Memorandum

Date: September 13, 2024

To: Honorable Chairman Oliver G. Gilbert, III
and Members, Board of County Commissioners

From: Daniella Levine Cava
Mayor

Subject: Site Selection for a Sustainable Solid Waste Campus and Update on Miami-Dade County's Solid Waste Disposal Strategy

---

Executive Summary

Following the fire at the waste-to-energy (WTE) facility in 2023, Miami-Dade County has been faced with an unprecedented challenge and a unique opportunity to invest in the future of our solid waste system. A historical lack of investment in key infrastructure, including the 40-year-old WTE facility, has led to many of the challenges our community faces today. The need to replace the WTE plant presents an opportunity to invest in a facility with adequate space to meet the needs of our growing population, with state-of-the-art technologies that protect human and environmental health and support our long-term sustainability.

The administration has given enormous care and consideration to this decision. Over the past year, County officials and staff visited cutting-edge WTE facilities in our backyard in Palm Beach as well as in Japan and Europe. We have seen first-hand how these facilities are integrated seamlessly into urban communities and built to protect the wellbeing of nearby residents while minimizing nuisances. We have also consulted at length with environmental experts because protecting our environment remains a top priority for my administration. Modern WTE plants are closely monitored by the state Department of Environmental Protection (DEP) and the U.S. Environmental Protection Agency (EPA) and designed with modern odor and pollution controls to protect human health, and emissions for a new facility will meet or exceed strict EPA air quality standards. Like Europe and Japan, Miami-Dade does not have available land to build more landfills even if we wanted to do so. Shipping waste out of the county or state is both more costly in the long term and increases our carbon footprint.

We believe the recommendation detailed in this memorandum – building a new Sustainable Solid Waste Campus at the Airport West location – offers our best option to move forward in the right direction, meeting our current and future disposal needs in the most cost-effective way while accommodating innovative zero-waste technologies. The recommendation on location was made to provide the best possible balance between multiple factors including cost, project timelines, and impact to residents and natural resources. Should the Board approve this recommendation, this site will undergo extensive permitting and regulatory approvals to further ensure the location is compatible with the need to safeguard our community and environment. To the extent that development of the WTE facility impacts wetlands, we recommend that the County perform a mitigation project within our watershed in Miami-Dade as part of our commitment to protecting the environment.

Background

On September 6, 2023, the Mayor presented to the Board of County Commissioners (Board) the Report Related to the Development of an Integrated Solid Waste Management Plan in Miami-Dade County, a Combined Response to Directives 222097, 230509 and 230998 (Strategy Memo). The Board accepted the Strategy Memo and indicated that it would have further discussions at the September 19, 2023, Board meeting. On September 19 the Mayor presented to the Board a Supplemental Memorandum to the Strategy Memo, and Transmittal of the Preliminary Solid Waste System Siting Alternatives Report. In preparing the Integrated Solid Waste Management Plan, the Administration worked closely with Arcadis, the professional bond engineer for the Department of Solid Waste Management (DSWM). The full Preliminary Solid Waste System Siting Alternatives Report (Arcadis Report) is attached hereto as Exhibit A.[1]

On September 19, 2023, the Board adopted a Resolution directing the Mayor to present three alternate Waste-to-Energy (WTE) sites to DEP for preliminary permit and regulatory review; directing the Mayor to negotiate an interlocal agreement with the City of Doral (Doral) for annual contributions to partially defray costs and fund the relocation, construction and operation of a new WTE facility outside the Doral, subject to Board approval; and to provide a report detailing the (a) air quality modeling results, and (b) environmental impacts and mitigation identified by the Department of Regulatory and Economic Resources – Division of Environmental Resources Management (RER-DERM), within four to six months of the effective date, and place the completed report on an agenda of the full Board without committee review On April 19, 2024, the County Mayor presented to the Board a report regarding the Three Alternate Waste-to-Energy Facility Sites Preliminary Permit and Regulatory Review, a copy of which is attached as Exhibit B. The Report indicated that the administration would bring a recommendation on site selection to the Board in September 2024.

On August 27, 2024, the Mayor received a Memorandum from Commissioner Juan Carlos Bermudez forwarding an unsolicited proposal from TAF Okeechobee Solutions, LLC and West Dade Nurseries, LLC (collectively, the Developer) concerning an exchange of land with the County for a site off Okeechobee Road in the northwest corner of the County (the "Okeechobee site") to accommodate a WTE Facility (the "Proposal Memorandum") A copy of the Proposal Memorandum is attached as Exhibit C.

Recommendation

When making the site recommendation, we carefully weighed multiple considerations including fiscal and economic impact and environmental impacts, while prioritizing the safety and wellbeing of the surrounding community regardless of county boundaries. My administration urges the Board to consider and approve the following action items, so we can move swiftly to implement the elements of the Integrated Solid Waste Management Plan.

[1] The Arcadis recommendations are also consistent with the recommendations set forth in the 2020 Update to the Solid Waste Master Plan. A link to that plan was provided in the Strategy Memo and is provided here as well. [LINK]

1) Authorize the Administration to take all necessary steps to implement the Administration's recommendation for the approval of the Airport West site for a Sustainable Solid Waste Campus.
2) Authorize and delegate authority to my Administration to take all necessary steps to proceed with the demolition of the County's former Resources Recovery Facility (RRF) located at 6990 NW 97th Avenue, Doral, and to repurpose this site for a transfer station.

The factors underlying this recommendation are further detailed below. Some of the highlights include:

- Preliminary air quality monitoring was most promising for Airport West compared to the other evaluated sites
- This location offers the largest footprint of the potential sites, meaning it can accommodate a comprehensive solid waste campus including multiple alternative zero-waste solutions
- Fewer residents reside in the nearby vicinity
- Since this site is already owned by the County and no land acquisition costs or relocations of facilities are required, this site has the second lowest cost and second quickest timeframe for development of the four sites

Sustainable Solid Waste Campus

The administration's recommended approach is to build out a sustainable campus that would consist of multiple phases or components inclusive of (1) a 4,000 ton/day state-of-the-art mass burn WTE facility and (2) other solid waste operations that will move the County toward a zero-waste future, including organics processing, sorting and separation systems, wood recycling and mulching, and other facilities to support diversion, repurposing, biogas harvesting and recycling. Mass-burn WTE is considered the most common commercially viable state-of-the-art technology for conversion of solid waste to energy. As mentioned above, modern WTE plants are closely monitored by the DEP and the US Environmental Protection Agency (EPA) and are designed with modern odor and pollution controls to operate in a manner that does not negatively impact human health. **The proposed Mass-Burn WTE emissions will meet or exceed strict EPA air quality standards.** The power generated by the WTE facility could also be used to reduce the County's current energy consumption by powering County facilities and/or charging electric vehicles.

Inspired by the WTE facility in neighboring Palm Beach, we are also planning to include an educational facility to help promote zero waste initiatives and educate best practices in sustainable solid waste management – beginning our path towards zero waste by educating future generations. We will ensure transparency by providing access to emissions readings similar to WTE plants overseas.

Analysis of Potential Sites

The administration, with the support of Arcadis, has conducted an in-depth analysis of the four potential sites for the future location of the Sustainable Solid Waste Campus; these factors include evaluating construction and operational costs, land acquisition costs (if applicable), proximity to residential neighborhoods, location with respect to the Urban Development Boundary (UDB), impacts to the Comprehensive Everglades Restoration Plan (CERP), general environmental impacts, access to utilities,

permitting timelines, and the financially sustainability of the solid waste system, among others.[2] All four sites are located in County Commission District 12. Attached as composite Exhibit D are score sheets prepared by Arcadis and County staff, enumerating the pros and cons for each of the four sites. The sections below summarize these findings.

Figure 1- Location of all considered sites

Airport West Site

This approximately 416-acre site consists of two County-owned parcels suitable for a WTE facility; with 180 acres available for a Sustainable Solid Waste Campus, it offers the largest footprint of the potential sites and has demonstrated the most promising preliminary air modeling results compared to the other evaluated sites. Fewer residents reside in the nearby vicinity of this site, compared to the Doral site. The location also offers favorable road access to US-27 and the Turnpike. Since this site is already owned by

[2] In the event the Board selects the Okeechobee site, there will be some additional due diligence required, including appraisals of the land being offered to the County and the land requested from the County in connection with the land swap.

the County, no complicated real estate or other financial transactions with private entities or other local jurisdictions would be required. Moreover, its ample footprint facilitates the adoption of a comprehensive suite of additional waste disposal technologies, enabling innovative, effective waste management practices that support sustainability and move us closer to zero-waste.

The site does present challenges. It is located outside the UDB, where water and sewer infrastructure are limited to public health and safety uses. The site is designated as "Open Land" under the CDMP, allowing a WTE facility only if deemed compatible and subject to prohibitions on certain groundwater contaminating uses. This site is situated approximately 0.5 miles from residential areas and less than 0.5 miles from Miami-Dade County Agricultural zoning, which currently allows for single family housing on minimum five-acre lots. The City of Miramar (Miramar) has formally objected to the use of this site for a WTE facility.

The site predominantly features muck soils which are not well-suited for WTE facilities and will require substantial site preparation. There are also potential traffic impacts and environmental concerns with respect to wetlands and endangered species habitats. This site is adjacent to the C-9 canal there may be implications to the CERP; compatibility with CERP and rock mining would need to be demonstrated.[3] There is also a risk of archaeological resources on site requiring a Cultural Resource Assessment Survey (CRAS). To ensure the environmental concerns are fully addressed, the location will undergo comprehensive permitting and regulatory approvals; and should the site be selected, the County will undertake mitigation to minimize any environmental impacts.

The estimated construction cost is approximately $1.6 billion, including the extension of utilities and the construction of a new transfer station, which would add approximately $50 million in capital costs and $11.8 million annually in operational expenses. Since this site is already owned by the County and there are no land acquisition costs or relocations of existing County facilities, this site has the second lowest total cost of development for the WTE facility. The site also offers a development timeline of about nine years and three months, the second shortest of the four sites.

An analysis by the Miami-Dade Aviation Department (MDAD) shows the development of a WTE facility on this site will impact potential future use of Airport West for aviation activities. The height of the required stack will render the north-south runway unusable under Federal Aviation Administration regulations, but the east-west runway – where 70% of the airport traffic historically occurred – could remain usable, meaning there is still potential for significant aviation activity on the site.

Despite the challenges of this site, the Airport West site offers an important balance between overall project cost, timelines, and impacts to residents and natural resources. Critically important, the location offers the largest footprint of the potential sites, meaning it can accommodate a comprehensive sustainable solid waste campus including multiple alternative zero-waste solutions to ensure we are planning for the future and making key investments in our infrastructure.

[3] The Airport West site, as well as the Okeechobee site, are approximately eight miles northwest of the current RRF site in Doral, near the intersection of Krome Avenue and US-27.

Resource Recovery Facility Site (Doral)
The 157.16-acre County-owned site presents some advantages for a new WTE facility. It has a history of previous WTE operations, allowing for advantages in the development of a facility that incorporates current state-of-the-art standards and aesthetics. The property is located within the UDB where it is designated as "Institutions, Utilities and Communication" under the Comprehensive Development Master Plan (CDMP). The 55-acre developable area is adequate for the WTE facility as well as additional facilities, with the option to expand this area to 60-70 acres through modifications to the existing stormwater system. There is no need to build an additional transfer station if the WTE facility is rebuilt on this site.

The site's proximity to the 58th Street property, which already hosts DSWM operations, could further facilitate the creation of an integrated solid waste campus. The location provides access to major roads and highways with minimal traffic issues, and all necessary utilities are already in place, including an adjacent electrical substation. Additionally, the site is free from wetlands, endangered species concerns and CERP impacts, and is the most resilient site from the perspective of sea level rise. The existing 80-acre ash monofill offers remaining airspace capacity, and previous air permits may offer potential emissions credits for the new facility. This construction cost is approximately $1.49 billion with a development timeline of about 7 years and 9 months (including 18 months for demolition of the old plant).

This site does present challenges, particularly that it is located the closest to residential neighborhoods and businesses, with adjacent communities to the north and west. Of all the proposed locations, the RRF location has the highest number of residences in the immediate area around the site. Although those residential communities were developed long after the former RRF was built and while it was operating, we still need to carefully consider concerns of proximity to operations, particularly as our community continues to grow. Doral has formally expressed its objections to the use of this site for a WTE facility. This site is also the closest to the actual boundaries of Everglades National Park, which is an important consideration in the air permitting process.

Medley Site
The approximately 100-acre site consists of two parcels under single private ownership and is located inside the UDB, where it is designated as "Industrial and Office" under the CDMP, allowing the construction of a WTE facility. The site has ample space for the proposed WTE facility and additional solid waste campus facilities, with favorable road access to US-27 and the Turnpike. According to the property owner, the site could also have access along the FEC rail corridor. Utilities such as electrical, potable water, and sanitary sewers are readily available, with the City of Medley's 12-inch water main and an 8-inch gravity sewer line located along the property's perimeter. The site has no CERP impacts and would not require new transfer station costs.

Several challenges do exist. The property is privately owned and the purchase of 100 acres would cost approximately $260 million for the sale alone. In addition to the purchase price, both the property owner and the City of Medley require payment of annual assessments based on the quantity of solid waste brought to the facility. This would result in an additional impact between $5 to 10 million annually for the life of the facility. The site is close to residential communities in Medley, Doral, and Hialeah Gardens, which may require addressing any impacts on those local communities. While the City of Medley has

indicated its willingness to host this facility within its municipal boundaries, the City of Doral has raised objections to this site.

The site was previously excavated as a quarry and subsequently backfilled, presenting significant geotechnical challenges and additional site preparation costs. Natural gas utilities are not available. An on-site lake would potentially need to be filled for usable space, presenting additional site development costs and requirements. Preliminary air modeling is complex due to proximity of large emitters such as the Medley Landfill and the Titan Pennsuco Facility. Significant traffic impacts are anticipated, with potential roadway improvements and additional signaling needed. An archaeological target on the site may require a CRAS, similar to the Airport West Site. Although there are no existing contamination records, Phase 1 and Phase 2 Environmental Site Assessments are still required. The estimated construction cost is approximately $1.6 billion (not including land acquisition costs), with a lengthy development schedule of about nine years and nine months.

Okeechobee Site

This site was submitted as an unsolicited proposal for a land swap with the County for two parcels located on NW 58th Street between NW 87th Avenue and 97th Avenue in unincorporated Miami-Dade County. These parcels currently house DSWM, Department of Transportation and Public Works (DTPW) and Internal Services Department (ISD) operations and facilities, including the Stericycle facility that handles all medical waste for the County. Maps of the two parcels are attached hereto as Exhibit E. In exchange for these approximately 74 acres of County land, the developer would provide the County with 65 acres of land on the Okeechobee site, as well as the design and construction costs of replacement facilities and a public infrastructure pad with access to all the required utilities on the Okeechobee site. As noted earlier, if the Board were to decide to move forward with this proposal, formal appraisals would be required. The site is approximately 1.6 miles from the nearest residential area, with sufficient space for a WTE facility (including a stormwater retention area and the roadwork for truck ingress and egress to the site)[4]. The site has good access to US-27 and the Turnpike. Although air emissions and human health impacts have not been evaluated for this site, we do not anticipate significant variations from the results for the Airport West site which is very close to this site.

This site, however, faces several significant drawbacks. First, there is no additional land for the other elements of a Sustainable Solid Waste campus or the relocation of any of the County operations currently located on NW 58th Street. The Developer has offered to provide additional land as needed; however, the value of any additional land would be deducted from the estimated $45 million cost of the pad-ready site and replacement structures for the relocated operations. Assuming the need for 50 to 80 additional acres, the value of those additional acres would likely exhaust the $45 million allowance for the construction. Moreover, breaking up the Sustainable Solid Waste campus among different locations in the County will likely result in the loss of operational efficiencies gained by co-locating the WTE facility with other County facilities.

The site is located outside the UDB, where water and sewer infrastructure are restricted, and is adjacent to Miami-Dade County Agricultural zoning, which currently allows for single family housing on

[4] It should be noted that Miramar has also objected to the use of this site for a WTE facility.

minimum five-acre lots. Compatibility with CERP and rock mining would need to be demonstrated. The site contains wetlands and potential endangered species habitats. Concerns also exist about significant traffic impacts and greater greenhouse gas impacts due to longer waste transportation distances. Furthermore, no on-site disposal of ash is permitted on this site; all WTE ash would need to be disposed offsite. The relocation of the existing DTPW Road, Bridges & Canal Maintenance Division operations at NW 58th Street to the Okeechobee site eight miles away would pose significant operational and logistical challenges, including impacts to DTPW's emergency response during hurricanes or extreme weather conditions, likely resulting in increased costs and reduced service levels. Finally, the development of a WTE facility on this site would have the same impacts to aviation activities at the Airport West location as the location of the WTE facility on that site.

The estimated time for development is 10 years, the longest for the four sites. The estimated construction cost is approximately $1.59 billion plus the need for a new transfer station at the current RRF site with the corresponding $50 million in construction costs and $11.8 million annually in operational costs. Please note that this estimate does not include the value of the land being swapped, the cost incurred by the County to build new facilities for existing operations, or any cost incurred by the County to acquire other properties on which to build such replacement facilities. It is estimated that the cost of constructing the replacement facilities for dislocated County departments alone is approximately $180 million.

Additional Considerations

Reliance on Landfilling as the Primary Mechanism for Disposal of Solid Waste is Not Sustainable

Until the new WTE facility comes online, the County will use private third-party landfill operations as the primary approach for waste disposal operations, including the transportation of solid waste by truck and train to landfills outside of Miami-Dade. The argument has been made that the County should not build a new WTE facility and simply rely on landfilling as the primary source for waste disposal. The Administration has explored this option and believes that such an approach poses substantial financial and environmental risks that make this option unsustainable and untenable.

Outsourcing the management of all County waste to private entities and out-of-County facilities weakens our position in contract negotiations, leading to higher costs and limited control over pricing for transfer and disposal fees. This has been the experience across the country for jurisdictions that have used this approach. This method would also place an unnecessary strain on the County's Disposal Fund, as revenues would be limited primarily to transfer and facility fees and said fees would have to be set higher to generate sufficient revenue to offset expenses, including all contract transfer and disposal costs. This could de-incentivize municipalities to renew long-term disposal agreements, which would lead to even more significant financial impacts on the Disposal Fund. By contrast, the construction of a state-of-the-art WTE Facility stabilizes the cost of disposal over the 40-year life of the facility and protects the system from major fluctuations in the market. The chart below shows the comparative fiscal impact on our solid waste system in the long term with or without the construction of the WTE facility.

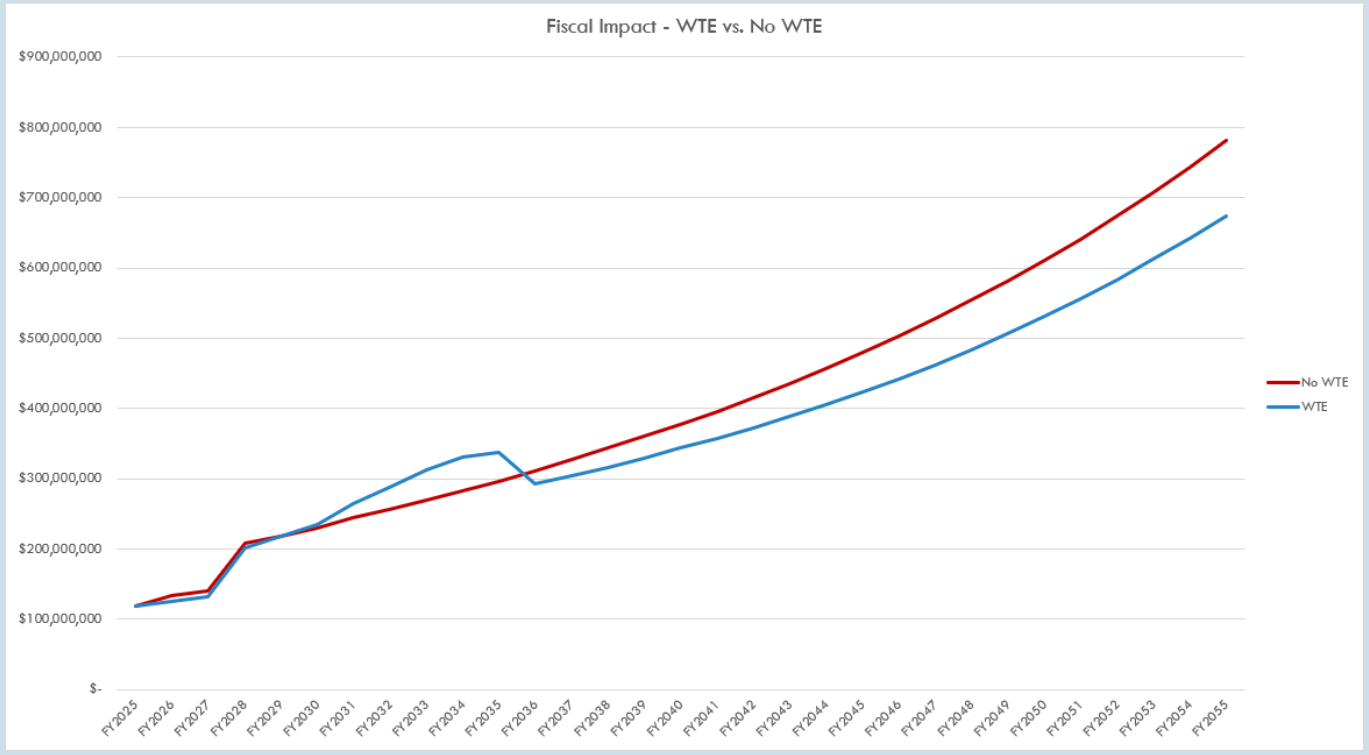


Figure 2 – Fiscal Impact of WTE vs. No WTE

Palm Beach County, for example, which operates two WTE facilities and has very limited landfilling of unprocessed solid waste, is able to maintain fairly stable rates for its customers.

Environmentally, landfill operations are less sustainable than alternatives like WTE facilities. Landfills emit methane, which the EPA calls a "climate super-pollutant," that is far more potent than carbon dioxide and is believed to be responsible for one-third of the warming from greenhouse gases. The heavy reliance on trucking and rail also contributes to a bigger carbon footprint through the long-haul transport of waste. These emissions, along with the high costs associated with landfill disposal, make this approach incompatible with the County's sustainability goals.

Addressing Health and Environmental Concerns

Residents are understandably concerned about the safety of any WTE facility in the County. We want to assure the public that we will build a WTE that is safe for humans and the environment. Modern WTE facilities produce extremely low levels of emissions which are strictly regulated by the EPA and DEP, and the county plans to meet or exceed strict EPA air quality standards. Additionally, the County retained Arcadis to conduct preliminary qualitative human health and ecological screening level risk assessments on three of the sites. There were two key findings:

1) With respect to human health, all three sites have low risk with results within or below the regulatory established risk levels. To paraphrase the cover letter summary from Arcadis on the

report, the worst-case health risk level at all three sites is below the risk posed by simply walking down the street and breathing air that includes car exhaust.

2) From an ecological perspective, the report found that "the potential ecological risks associated with air emissions at the three proposed locations are minimal and should not have an impact on the surrounding ecological communities."

These findings did not take into account the stricter standards that the EPA has proposed for new WTE facilities, which should produce even better results. As mentioned on page eight, although air emissions and human health impacts have not been evaluated for the Okeechobee Site, we do not anticipate significant variations from the results for the Airport West site which is approximately .25 miles south of the Airport West Site.

RER-DERM was also asked to perform an analysis of environmental impacts and required mitigation for the Airport West Site. To the extent that development of any WTE facility or Sustainable Solid Waste campus impacts wetlands, we recommend that the County commit to performing a mitigation project within Miami-Dade through the acquisition and/or restoration of wetlands rather than take the option to pay into a mitigation bank (which may not actually serve to restore wetlands within our watershed).

Transfer Station

Given the distance between residential neighborhoods and the proposed sites, both the Airport West and Okeechobee locations would add at least eight miles to each of our solid waste collection routes, making a transfer station essential. Additionally, third-party haulers serving commercial and residential customers would find it impractical to drive directly to these sites. To ensure efficient waste collection, reduce traffic congestion, and minimize emissions, constructing a new transfer station will be necessary if either of these sites is selected. A new transfer station in the vicinity of the RRF Site will enhance logistics, lower costs, improve safety, and support future zero waste diversion efforts.[5]

Unlike our existing transfer stations, some of which are now over 40 years old, new transfer stations incorporate important features to mitigate concerns of nearby communities, including:

Line of Sight – Visually pleasing perimeter wall design along with vegetation will provide a buffer. Building design can incorporate architectural features which integrate with the surrounding community.

Odors – The enclosed transfer building operation activities with staging, receiving area, and loading areas will include a negative pressure system with activated carbon filtration to control potential odors. An odor control misting system at the building perimeter with a neutralizing agent will help mitigate fugitive odors.

[5] This new Transfer Station represents an additional $50 million in upfront construction costs and nearly $12 million annually in additional operational and waste transfer costs. Those costs would increase if the Transfer Station were not located on the RRF site, and would instead be built on property to be acquired by the County.

Noise – The perimeter walls surrounding the transfer station building along with fast door systems at ingress and egress to the building will mitigate noise concerns. All loading and offloading activities will be performed within the enclosed building.

Traffic Control – Features such as sufficient queueing lanes for inbound vehicles, auto-attendant scale systems to minimize wait times, and multiple lanes inside the building for offloading will help efficient traffic flow.

When we consider where a transfer station could be located (e.g., the existing RRF site), it is important to keep in mind the lessened impacts of modern transfer stations.

Maintaining Concurrency During Construction of the WTE Facility

To maintain adequate system capacity as the various components of the Sustainable Solid Waste Campus come online, DSWM will rely on its agreements with Waste Management (WM) and Waste Connections (WC) for private landfill disposal. These contracts help the County extend the life of its own landfills, meet concurrency requirements, and ensure the financial health of the system. DSWM has been working over the last several months with WM and WC to negotiate additional private landfill capacity. To date, DSWM has secured a letter agreement with WC for an additional 300,000 tons subject to their contract being re-negotiated by March 2025. Additionally, the Board on September 4, 2024, approved a revised agreement with WM that increases the County's disposal capacity to 2.7 million tons per year through September 30, 2035, with two 10-year options to renew. This will ensure our compliance with concurrency pending the construction and placement into operation of the WTE facility.

Development of a Zero Waste Plan

The administration is committed to building a more environmentally sustainable and resilient waste system, which is a key reason we are seeking a WTE site with adequate space to incorporate zero-waste technologies. The Office of Resilience (OOR) is currently procuring a consultant to develop a Zero Waste Master Plan, which will outline best practices being employed in other communities to reduce waste, increase recycling rates, and divert organics, including yard waste and food waste away from landfills while considering our unique capacity requirements and local and state laws and regulations. The recommendations around zero waste technologies and practices in this Master Plan will be incorporated into the Sustainable Solid Waste Campus.

There are some who advocate that the County should not build a WTE facility and instead simply focus on zero-waste initiatives. The reality is that there are few, if any, examples of large communities that have successfully diverted all their waste from both landfills and waste-to-energy facilities. Further, Miami-Dade generates waste at a per capita rate that is nearly twice the national average, a problem exacerbated by millions of visitors who do not typically practice sustainable behaviors when they are here Other options such as composting become difficult due to our high-water table and our reliance on our water aquifers, particularly with the presence of forever chemicals, including per- and polyfluoroalkyl substances (PFAS) and many of the same siting concerns as with a WTE facility. Even in California, which is seen as a leader in zero waste, the state places more waste in landfills annually than any other state and its per capita landfill waste totals place it in the top ten in the country.

Finally, the administration believes that a WTE facility is part of a successful zero waste strategy. Currently, the County disposes of slightly more than 2 million tons of waste annually, representing less than 50% of all the waste generated in the County. While we have a legal right under state law to enact a flow control policy that would require that all waste come to us for disposal, we have never exercised that right due to a lack of capacity to process all waste. By building a WTE facility capable of processing 4,000 tons daily, our goal is to divert waste from landfills. If successful, we could potentially in the future require that more waste generated in the County come through our system. Eventually we may reach a point when we no longer need to landfill and could potentially provide diversion of waste opportunities to our neighboring counties in a true spirit of a regional system. In the meantime, we will rely on tested, proven technology that will ensure we can meet our concurrency requirements while disposing of waste in the most sustainable way currently possible.

Conclusion

The decision about where to place a new waste-to-energy facility is an extremely complex and challenging one that the administration has carefully weighed from all possible angles to arrive at this recommendation. Considering cost, timelines, impacts to the surrounding communities and environment, and our long-term sustainability, we believe that developing a new Sustainable Solid Waste Campus at the Airport West location presents our best available option to invest in the future of Miami-Dade's solid waste system.

Attachments

Exhibit A: Preliminary Solid Waste System Siting Alternatives Report (Arcadis Report)
Exhibit B: Report re: the Three Alternate Waste-to-Energy Facility Sites Preliminary Permit and Regulatory Review
Exhibit C: Unsolicited Proposal
Exhibit D: Pros/Cons List for Potential Sites
Exhibit E: Map of DSWM and DTPW Facilities (58th Street)

c: Geri Bonzon-Keenan, County Attorney
Gerald Sanchez, First Assistant County Attorney
Jess McCarty, Executive Assistant County Attorney
Office of the Mayor Senior Staff
Aneisha Daniel, Director, DSWM
Theresa Therilus, Interim Chief, Office of Policy and Budgetary Affairs
Yinka Majekodunmi, Commission Auditor
Basia Pruna, Director, Clerk of the Board

EXHIBIT A

EXHIBIT A

ARCADIS

Miami-Dade County

Department of Solid Waste Management

Preliminary Solid Waste System Siting Alternatives Report

August 2023

Contents

Tables

Figures

Appendices

Executive Summary

Purpose and Scope

The Miami-Dade County (County) Department of Solid Waste Management (DSWM or Department), per the Board of County Commissioners' (Commission or BCC) motion dated March 7, 2023, was tasked to analyze and recommend siting alternatives for a new WTE facility to replace the existing RRF, explore alternative technologies to a WTE facility; and prepare a report regarding said analysis and recommendations, including costs and potential funding sources. On May 16, 2023 the Commission amended the motion and changed the deadline for the County Mayor or the Mayor's Designee to provide the report by September 13, 2023.

The intent of the BCC direction to the DSWM was to revisit the evaluations of the four potential sites that were identified in the Preliminary Future Waste-to-Energy Facility Siting Alternatives Analysis Report ("Siting Report", copy included as Appendix A) completed in June 2022 as suitable for the development of a future Waste-to-Energy (WTE) facility and to prepare a report of findings within 90 calendar days. The report was to include additional analysis and information on the four potential sites including environmental, traffic, and public health effects, considering alternative technologies and facilities that may be needed to implement a Zero Waste management strategy within the County, and high-level cost implications, a discussion of potential funding sources, and potential Solid Waste System effects. Three additional sites (Sites A1 – Dolphin Expressway, A2 – Opa-Locka West Airport and A3 – Okeechobee Road) were added to the original four potential sites at the request of the County over the course of the evaluation process and are included in this report for consideration.

This analysis expands on the original Siting Report to provide the BCC and County staff with more detailed analysis on the four original potential sites and the three additional sites, including a practical discussion regarding the technologies and infrastructure, policy changes, and relative costs required to shift the County's current system of solid waste management toward a Zero Waste strategy.

Due to the expedited nature of this assignment, it should be noted that Arcadis' services are preliminary in nature. After a site is selected for development of a future solid waste facility, additional more detailed studies and site investigations will be needed. In addition, the information related to a future Zero Waste management strategy is intended to provide an introductory overview of the state of the industry and the factors to be taken into consideration for the current System and County policies. We recommend the development of a comprehensive Zero Waste Master Plan be considered to give the Board the detailed information needed to make informed policy decisions.

Updates to the 2022 Siting Report

It is important to note that the results of the 2022 Siting Report were dependent on the site screening criteria used. Those site screening criteria were generated through a collaborative effort between Arcadis and Department staff. No changes were made to those criteria in this update, but a more detailed explanation of why they are important and how they affect the suitability of a site is provided in this report. The screening criteria used in the Siting Report are briefly described below and include both the initial and detailed screening criteria. For more detailed siting criteria information, see Table 2.1.

Applied Site Screening Criteria:

- WTE Facility Capacity – Minimum 40-acre site area sufficient for a mass-burn WTE facility with a throughput capacity of 4,000 tons per day (tpd). Includes buildings, areas for roads, stormwater facilities, parking, setback requirements, etc.
- Site Area and Ownership – Minimum 40-acre site area comprised of no more than two contiguous parcels and two owners to minimize property acquisition schedule, costs, and possibility of Eminent Domain process.

- Site Geometry – Sites with parcel boundaries with shapes or dimensions incompatible with a 4,000 ton per day WTE facility (approximate rectangular parcel size 1,200 feet x 1,500 feet) were eliminated.
- Zoning Considerations – Only sites zoned Vacant, Industrial, Commercial, or Agricultural were considered. Properties with existing abandoned building structures and Conservation, Environmentally Endangered Lands (EEL) Program properties, or Other Protected Lands not screened by the GIS tool were excluded.
- Residential Zoning Offset – Sites that were within half a mile of residential zoning were eliminated.
- Proximity to Airport – Due to airport zoning codes and FAA regulations, sites less than four (4) miles from an airport were excluded from consideration.
- Transportation / Travel Time – Sites with a travel time of more than 10 minutes to major (arterial) or collector roads as calculated using posted speed limits and online mapping tools were eliminated.
- Canal or Major Roadways on Site – Sites with a canal or major roadway located on the site parcel were precluded from further evaluation because they could not be abandoned and developed.
- Lake / Borrow Pit – Sites that included a lake or borrow pit in a portion of the parcel were included as they could be filled. However, sites that were mostly or entirely excavated as a lake or borrow pit were eliminated due to the significant additional time and expense associated with backfilling to create the developable area of the site.
- County Parks and other County properties – County parks and other County properties (i.e., wellfields, etc.) that were not screened by the GIS tool were manually identified and eliminated.
- Other Siting Considerations – Any properties recommended directly by the County to be evaluated as well as sites within and outside of the Urban Development Boundary were considered.
- Location – Consideration of the physical location of the site relative to existing Solid Waste System facilities, large air emissions sources, transportation routes, and expected impacts to the System if a proposed WTE facility were sited there.
- Utilities – WTE facilities have high demand requirements on several utilities. This screening criteria evaluated the availability of potable water, sanitary sewer, natural gas, electric utility substations, stormwater, and groundwater at each site.
- Soils – United States Department of Agriculture (USDA) soil survey information was reviewed to confirm the type and potential suitability of soils located at each site. The soils data provides a wealth of information on the physical conditions at a site that can affect development.
- Environment – Extensive environmental permitting is required to construct a WTE facility, in any location. This criterion evaluated the relative difficulty for a site to meet Federal, State, and local environmental permitting requirements, policies and jurisdictional interfaces to site, construct and operate a new WTE facility.
- Transportation – This criterion considers local traffic impacts from approximately 300-400 inbound vehicles per day, site queueing lengths during peak delivery periods, road infrastructure needs, travel times, and other factors.
- Community – Considers environmental justice concerns and the reaction of the public to siting a WTE facility at a given location.
- Schedule Considerations – The development of a WTE facility typically takes seven (7) to ten (10) years to complete. This criterion considers the factors affecting the development schedule at a specific site, which includes the preliminary planning stage, siting, permitting, financing, procurement, design, and construction, and varies depending upon the complexity of the project and extent of the regulatory and public concerns.
- Cost – Arcadis developed a cost considerations table to approximate the difference in cost of the various components required to site, construct and operate a new WTE facility at the seven sites. This cost comparison includes preliminary planning-level estimates for additional costs associated with the facility construction, annual Operations and Maintenance (O&M), as well as the potential system impacts specific to each site option.

To aid with illustrating the extent of the siting limitations and options for a WTE facility within the County as represented by the applied screening criteria, a map of Miami-Dade County showing the areas eliminated from consideration due to the screening criteria was developed and is included as Appendix C. It should be noted that some siting criteria were suspended for the RRF site, Site 1 - Medley, and Sites A1, A2, and A3 as they were directly requested by the County for detailed review.

The June 2022 Siting Report was prepared to support the County in determining availability of sites within the County for development of a new WTE facility to replace the existing RRF, and the findings of that report remain the same, except for the addition of Sites A1, A2 and A3. Based upon the results of the preliminary analysis, development of a new WTE facility within the County is feasible for all the sites, pending resolution of specific constraints identified in the report.

Full site packages for each of the seven sites included in this evaluation were prepared and updated with additional screening details and considerations for several alternative processing technologies and are included in Appendix B. The locations of the seven sites within the County are shown in Figure ES.1.

A comparison of the seven sites relative to each of the applied screening criteria is included in Table ES.1.

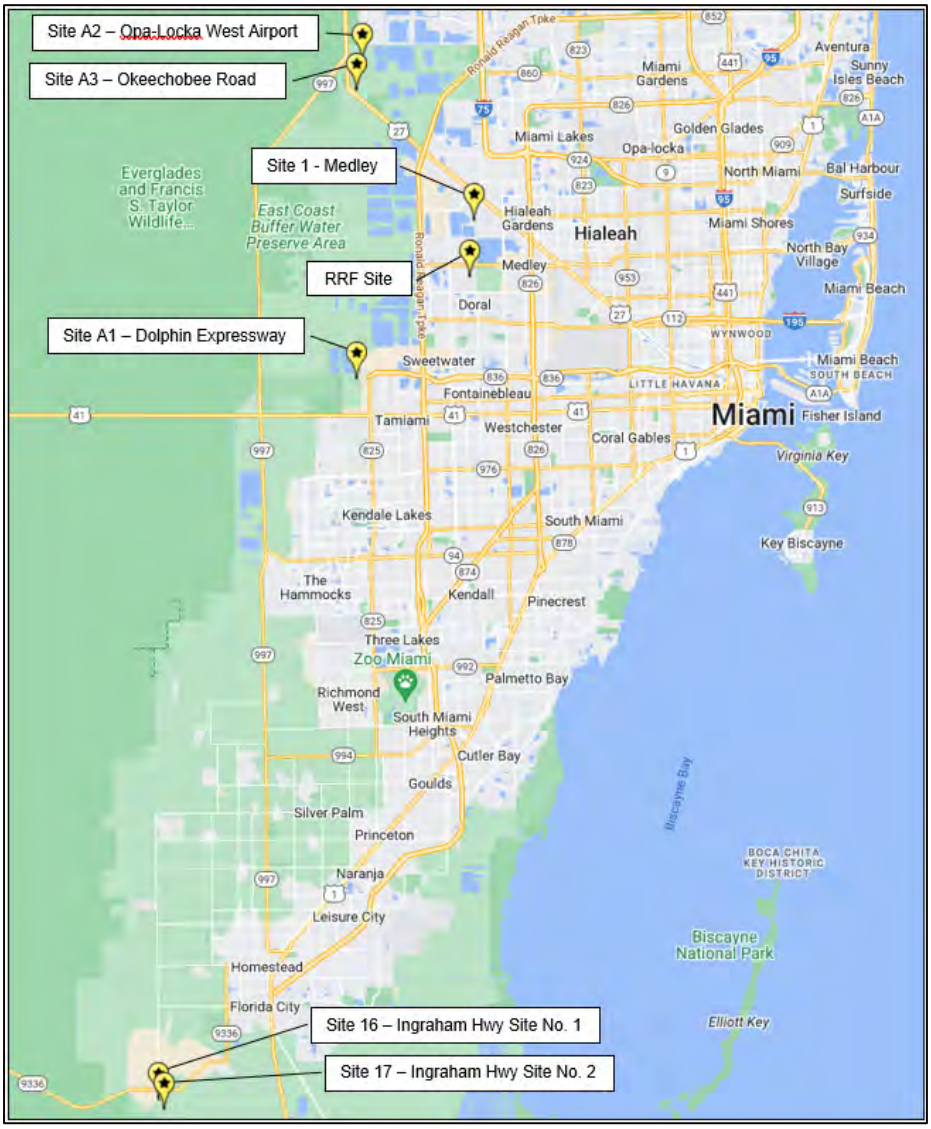


Figure ES.1 Evaluated Sites Location Map

It is important to note that the screening criteria used in the Siting Report were intended solely for the development of a future WTE facility on one of the seven sites. Other facility types would not have the identical siting requirements and could possibly result in more options for siting locations within the County, and a separate siting analysis should be considered for each type of facility. In this report, alternative technologies and facilities that may be needed to implement a Zero Waste strategy were evaluated for the seven sites using the same screening criteria, but while general siting parameters (i.e., property acreage, required utilities, etc.) are provided for Zero Waste facilities and discussed relative to each site, the selection and evaluation of specific potential properties in the County for Zero Waste facilities were not included as part of this analysis.

Table ES.1 Site Comparison Summary

New WTE Facility Siting Summary							
Siting Criteria	Existing RRF	Site 1 - Medley	Site 16 Ingraham Hwy. Site #1	Site 17 Ingraham Hwy. Site #2	Site A1 – Dolphin Expressway	Site A2 – Opa-Locka West Airport	Site A3 – Okeechobee Road
WTE Facility Capacity	Parcel size suitable for development of a 4,000 or 5,000 tpd WTE facility footprint as well as additional acreage to accommodate co-location of additional ash monofill capacity or other County facilities in consideration of future sustainable campus concept (after demolition of Existing RRF).	Parcel size suitable for development of a 4,000 or 5,000 tpd WTE facility footprint as well as additional acreage to accommodate co-location of ash monofill or other County facilities in consideration of future sustainable campus concept.	Parcel size suitable for development of a 4,000 or 5,000 tpd WTE facility footprint as well as additional acreage to accommodate co-location of ash monofill or other County facilities in consideration of future sustainable campus concept.	Parcel size suitable for development of a 4,000 or 5,000 tpd WTE facility footprint as well as additional acreage to accommodate co-location of ash monofill or other County facilities in consideration of future sustainable campus concept.	There are many possible parcel combinations that would result in an area suitable for development of a 4,000 or 5,000 tpd WTE facility as well as additional acreage to accommodate co-location of other County facilities.	Assuming the full parcel area can be developed, the parcel size is suitable for development of a 4,000 or 5,000 tpd WTE facility footprint as well as additional acreage to accommodate co-location of ash monofill or other County facilities in consideration of future sustainable campus concept.	Assuming the full parcel area can be developed, the parcel size is suitable for development of a 4,000 or 5,000 tpd WTE facility footprint as well as additional acreage to accommodate other County facilities in consideration of future sustainable campus concept.
Site Area and Ownership	157.16-acre site, single parcel, inside the UDB. County owned.	320.31-acre site, multiple parcels, inside the UDB. Single private owner.	159.71-acre site consisting of two parcels outside the UDB. Both parcels privately owned.	81.11-acre site, single parcel, located outside the UDB. Privately owned.	Site area considered includes 147 parcels covering a total area of 864 acres. The County owns a few parcels, but most are privately owned. Portions of the site area are within the UDB and the 2030 Urban Expansion Area Boundary (UEA), as follows: • Outside UDB (±772 acres) • Inside UDB (±89 acres) • Inside UEA (±284 acres)	416-acre site consisting of two parcels outside the UDB. Both parcels owned by the County.	68-acre site consisting of ten parcels outside the UDB. Single owner.
Site Geometry	Rectangular, 5,280 ft x 5,280 ft	Irregular	Rectangular, 1,320 ft x 2,640 ft	Rectangular, 2,640 ft x 2,640 ft	Variable, many possible parcel combinations	L-shaped, each leg approximately one mile long, ½ mile wide.	Irregular shape.
Zoning Considerations	Zoning District: GU (Interim District)	Zoning District: M-1 (Light Industrial)	Zoning District: AU (Agriculture)	Zoning District: AU (Agriculture)	Zoning District: GU (Interim District)	Zoning District: GU (Interim District)	Zoning District: AU (Agricultural/Residential)
Residential Zoning Offset	Less than 0.1 mile	None – adjacent to residential zoning	Greater than 0.5 mile	Greater than 0.5 mile	Varies, Minimum is 0.1 mile	Greater than 0.5 mile	Less than 0.5 mile
Proximity to Airport	4.0 miles from MIA	Greater than four miles	Greater than four miles	Greater than four miles	Greater than four miles	Greater than four miles	Greater than four miles

<table>
<tr><th colspan="8">New WTE Facility Siting Summary</th></tr>
<tr>
<td>Transportation / Travel Time</td>
<td>Travel time to major roads (i.e., 58th Street, 74th Street) is less than 10 minutes.

Estimated travel distances and times from the site to the County's transfer stations and landfills are as follows:

<table><tr><th>Facility</th><th>Est. Travel Dist/Time to RRF</th></tr><tr><td>West TS</td><td>9 mi/16 min</td></tr><tr><td>Central TS</td><td>14 mi/21 min</td></tr><tr><td>Northeast TS</td><td>18 mi/25 min</td></tr><tr><td>S. Dade LF</td><td>25 mi/31 min</td></tr><tr><td>N. Dade LF</td><td>21 mi/23 min</td></tr></table></td>
<td>Travel time to major roads (i.e., Florida Turnpike, US27) is less than 10 minutes.

Estimated travel distances and times from the site to the County's transfer stations and landfills are as follows:

<table><tr><th>Facility</th><th>Est. Travel Dist/Time to Site 1</th></tr><tr><td>West TS</td><td>11 mi/18 min</td></tr><tr><td>Central TS</td><td>11 mi/23 min</td></tr><tr><td>Northeast TS</td><td>15 mi/25 min</td></tr><tr><td>S. Dade LF</td><td>26 mi/32 min</td></tr><tr><td>N. Dade LF</td><td>18 mi/19 min</td></tr></table></td>
<td>Travel time north to W Palm Drive is less than 10 minutes.

Estimated travel distances and times from the site to the County's transfer stations and landfills are as follows:

<table><tr><th>Facility</th><th>Est. Travel Dist/Time to Site 16</th></tr><tr><td>West TS</td><td>35 mi/41 min</td></tr><tr><td>Central TS</td><td>45 mi/53 min</td></tr><tr><td>Northeast TS</td><td>58 mi/63 min</td></tr><tr><td>S. Dade LF</td><td>20 mi/31 min</td></tr><tr><td>N. Dade LF</td><td>58 mi/59 min</td></tr></table></td>
<td>Travel time north to W Palm Drive is less than 10 minutes.

Estimated travel distances and times from the site to the County's transfer stations and landfills are as follows:

<table><tr><th>Facility</th><th>Est. Travel Dist/Time to Site 17</th></tr><tr><td>West TS</td><td>35 mi/41 min</td></tr><tr><td>Central TS</td><td>45 mi/53 min</td></tr><tr><td>Northeast TS</td><td>58 mi/63 min</td></tr><tr><td>S. Dade LF</td><td>20 mi/31 min</td></tr><tr><td>N. Dade LF</td><td>58 mi/59 min</td></tr></table></td>
<td>Travel time to SR 836 and Florida Turnpike less than 10 minutes.

Estimated travel distances and times from the site to the County's transfer stations and landfills are as follows:

<table><tr><th>Facility</th><th>Est. Travel Dist/Time to Site A1</th></tr><tr><td>West TS</td><td>10 mi/13 min</td></tr><tr><td>Central TS</td><td>15 mi/19 min</td></tr><tr><td>Northeast TS</td><td>26 mi/30 min</td></tr><tr><td>S. Dade LF</td><td>20 mi/27 min</td></tr><tr><td>N. Dade LF</td><td>25 mi/25 min</td></tr></table></td>
<td>Travel time to US27 and Florida Turnpike less than 10 minutes.

Estimated travel distances and times from the site to the County's transfer stations and landfills are as follows:

<table><tr><th>Facility</th><th>Est. Travel Dist/Time to Site A2</th></tr><tr><td>West TS</td><td>22 mi/25 min</td></tr><tr><td>Central TS</td><td>26 mi/31 min</td></tr><tr><td>Northeast TS</td><td>23 mi/27 min</td></tr><tr><td>S. Dade LF</td><td>32 mi/37 min</td></tr><tr><td>N. Dade LF</td><td>19 mi/19 min</td></tr></table></td>
<td>Travel time to US27 and Florida Turnpike less than 10 minutes.

Estimated travel distances and times from the site to the County's transfer stations and landfills are as follows:

<table><tr><th>Facility</th><th>Est. Travel Dist/Time to Site A3</th></tr><tr><td>West TS</td><td>20 mi/23 min</td></tr><tr><td>Central TS</td><td>24 mi/29 min</td></tr><tr><td>Northeast TS</td><td>21 mi/25 min</td></tr><tr><td>S. Dade LF</td><td>30 mi/35 min</td></tr><tr><td>N. Dade LF</td><td>17 mi/17 min</td></tr></table></td>
</tr>
<tr><td>Canal or Major Roadways on Site</td><td>None</td><td>None</td><td>None</td><td>None</td><td>None</td><td>None</td><td>None</td></tr>
<tr><td>Lake / Borrow Pit</td><td>Existing stormwater pond on site</td><td>Existing borrow pit over much of the parcel area.</td><td>None</td><td>None</td><td>None</td><td>Existing stormwater ditches along both runways.</td><td>None</td></tr>
<tr><td>County Parks and other County properties</td><td>Site not selected by GIS screening criteria. County property used for solid waste management.</td><td>Site not selected by GIS screening criteria. Property is not a County Park or other County property.</td><td>Site selected by clearing GIS screening criteria. Property is not a County Park or other County property.</td><td>Site selected by clearing GIS screening criteria. Property is not a County Park or other County property.</td><td>Site not selected by GIS screening criteria. WASD owns several properties within the site area.</td><td>Site not selected by GIS screening criteria. County property, former small airport site.</td><td>Site not selected by GIS screening criteria.</td></tr>
<tr><td>Other Siting Considerations</td><td>Site requested by County for evaluation, inside the UDB</td><td>Site requested by County for evaluation, inside the UDB</td><td>Outside the UDB</td><td>Outside the UDB. Entire site is within a proposed Mitigation Bank area currently under consideration by the BCC.</td><td>Site requested by County for evaluation, parcels inside and outside the UDB.</td><td>Site requested by County for evaluation, outside the UDB, inside CERP Project Area.</td><td>Site requested by County for evaluation, outside the UDB. Wetlands Mitigation Area on site. Adjacent to CERP Project Area.</td></tr>
</table>

New WTE Facility Siting Summary							
Location	157.16-acre site, single parcel inside the UDB. Minimal impact to System if selected, however, construction phasing will need to be considered in order to limit impact to RRF operations. Parcel size suitable for development of WTE facility footprint as well as additional acreage to accommodate co-location of additional ash monofill capacity or other County facilities in consideration of future sustainable campus concept (after demolition of Existing RRF).	320.31-acre site, directly adjacent to residential zoning, inside the UDB, approximately two miles north of the existing RRF facility, and adjacent to the Medley Landfill. If this site were selected, the overall effects on the County's Solid Waste System would be relatively minimal.Also, the Medley Landfill has a history of odor complaints, and the WTE, if sited here, could be the subject of future odor complaints. Parcel size suitable for development of WTE facility footprint as well as additional acreage to accommodate co-location of ash monofill or other County facilities in consideration of future sustainable campus concept.	159.71-acre site consisting of two parcels outside the UDB. Considerable System effects if this site were selected. To maintain current collection patterns and travel times, a new transfer station would need to be constructed at the RRF site if this site were selected for development. Parcel size suitable for development of WTE facility footprint as well as additional acreage to accommodate co-location of ash monofill or other County facilities in consideration of future sustainable campus concept.	81.11-acre site is located outside the UDB. Considerable System effects if this site were selected. To maintain current collection patterns and travel times, a new transfer station would need to be constructed at the RRF site if this site were selected for development. Parcel size suitable for development of WTE facility footprint as well as additional acreage to accommodate co-location of ash monofill or other County facilities in consideration of future sustainable campus concept.	864-acre site is centrally located in the County and consists of 148 parcels with 70 different owners. Some parcels in the eastern portion of the site are inside the UDB and the 2030 Urban Expansion Area Boundary (UEA). There are many possible parcel combinations that could be large enough to support any of the alternative facilities and co-locate multiple facilities into a solid waste campus, depending on the constraints of the specific parcel(s) selected for development. To maintain current collection patterns and travel times, a new transfer station would need to be constructed at the RRF site if this site were selected for development.	416-acre site is located outside the UDB, at the northern edge of Miami Dade County. If this site were selected for the development of one or more of the alternative facilities there would be impacts to the local traffic levels, but the effects on the County's Solid Waste System would be minimal. To maintain current collection patterns and travel times, a new transfer station would need to be constructed at the RRF site if this site were selected for development. The changes in travel times and distances from the RRF site, especially for the West TS, may affect some Collection and Transfer operations. Collection and Transfer fleet labor, fuel consumption and maintenance costs may increase if this site were selected for development.	68-acre site is located outside the UDB, at the northern edge of Miami Dade County. If this site were selected for the development of one or more of the alternative facilities there would be impacts to the local traffic levels, but the effects on the County's Solid Waste System would be minimal. To maintain current collection patterns and travel times, a new transfer station would need to be constructed at the RRF site if this site were selected for development. The changes in travel times and distances from the RRF site, especially for the West TS, may affect some Collection and Transfer operations. Collection and Transfer fleet labor, fuel consumption and maintenance costs may increase if this site were selected for development.
Utilities	All required utilities infrastructure available	Potable water and sanitary sewer utilities appear to be available at the site, electric and natural gas utilities would have to be extended to the site.	All required utilities would have to be extended to the site.	All required utilities would have to be extended to the site.	All required utilities available on 137th Avenue. In general, the parcels bordering NW 137th Ave have good access to existing utilities, but access may become more complicated for parcels within the site. Depending on what parcel(s) are selected for development, many additional parcels or utility easements may be needed to allow for the extension of utilities	All required utilities would have to be extended to the site.	All required utilities would have to be extended to the site.

New WTE Facility Siting Summary							
Soils	Site has been used for WTE facility operations previously, no known site soils issues exist.	The USDA Soil Survey data for the site and historical aerial photos (c. 1985) indicate the site area was previously excavated and subsequently backfilled. In order for a WTE facility to be located at this site, the facility buildings and ancillary components would have to be constructed on backfill material, which could present significant geotechnical engineering challenges for foundation designs and additional site preparation costs.	Site soils are not ideally suited for building foundations because of water content and shallow depth to bedrock.	Site soils are not ideally suited for building foundations because of water content and shallow depth to bedrock.	Site soils are not ideally suited for building foundations because of water content and shallow depth to bedrock.	Site soils are primarily muck and silty soil types and are not ideally suited for building foundations because of water content and shallow depth to bedrock.	Site soils are primarily muck soil type and are not ideally suited for building foundations because of water content and shallow depth to bedrock.
Environment	Air Permitting - May be challenging, other large emitters (Medley Class I Landfill and Titan Pennsuco Complex) exist nearby that were not present when RRF was initially modeled and permitted. Possible habitat issues (Bonneted Bat)	Air Permitting – May be challenging, as site is located between two other large existing emitters, the Medley Class I Landfill and Titan Pennsuco Complex. In addition, the adjacent elevated (200 ft +) Medley Landfill may result in exhaust plume impaction during air emissions dispersion modeling. ERP required. Possible habitat issues (Bonneted Bat)	Floodplain – FEMA Zone A Air permitting expected to be extremely difficult due to proximity to Everglades National Park. ERP required, possible habitat issues (Bonneted Bat). The site is located within the Florida Bonneted Bat and Everglades Snail Kite consultation area, has core foraging habitat for the federally endangered Wood Stork and Florida Bonneted Bat, and may contain habitat for species listed in Appendix B of the CDMP. ERP permitting at this site may be very challenging due to required LEDPA (Least Environmentally Damaging Practicable Alternative) analysis.	Floodplain – FEMA Zone A Air permitting expected to be extremely difficult due to proximity to Everglades National Park. ERP required, possible habitat issues (Bonneted Bat). The site is located within the Florida Bonneted Bat and Everglades Snail Kite consultation area, has core foraging habitat for the federally endangered Wood Stork and Florida Bonneted Bat, and may contain habitat for species listed in Appendix B of the CDMP. ERP permitting at this site may be very challenging due to required LEDPA (Least Environmentally Damaging Practicable Alternative) analysis. Entire site is within a proposed Mitigation Bank area currently under consideration by the BCC.	Floodplain – FEMA Flood Zones AE (El. 7) and AH (El. 7) Air permitting expected to be extremely difficult due to close proximity to Everglades Class I Area (approximately 4.1 miles) and an existing nearby large emitter (CEMEX Miami facility). National Wetlands Inventory mapping indicates most of the site is a Freshwater Emergent Wetland habitat, possible habitat issues (Wood Stork, Bonneted Bat). ERP required. The site is located within the Florida Bonneted Bat and Everglades Snail Kite consultation area, has core foraging habitat for the federally endangered Wood Stork and Florida Bonneted Bat, and may contain habitat for species listed in Appendix B of the CDMP. ERP permitting at this site may be very challenging due to required LEDPA (Least Environmentally Damaging Practicable Alternative) analysis.	Air Permitting – May be challenging, as site is located near another large existing emitter, the Titan Pennsuco Complex. Floodplain – FEMA Flood Zones AE (El. 7) and AH (El. 7) National Wetlands Inventory mapping indicates most of the site is a Freshwater Emergent Wetland habitat, possible habitat issues (Wood Stork, Bonneted Bat). ERP required. The site is located within the Florida Bonneted Bat and Everglades Snail Kite consultation area, has core foraging habitat for the federally endangered Wood Stork and Florida Bonneted Bat, and may contain habitat for species listed in Appendix B of the CDMP. ERP permitting at this site may be very challenging due to required LEDPA (Least Environmentally Damaging Practicable Alternative) analysis.	Air Permitting – May be challenging, as site is located near another large existing emitter, the Titan Pennsuco Complex. Floodplain – FEMA Flood Zone A ERP required. The site has potential habitat for the Florida Panther, Swallow-Tailed Kite, and Southern Bald Eagle. Additionally, the site is also strategic habitat conservation area for the Florida Panther. The site is within 2.5 and 2.7 miles of active wood stork colonies and within five miles of three currently known Southern Bald Eagle nests. The site has jurisdictional wetland habitat and portions of the site are serving as wetland mitigation for on-site impacts. The northern parcels (30-001-2910-0070, etc) may contain jurisdictional wetlands and/or habitat for species listed in Appendix B of the CDMP. ERP permitting at this site may be very challenging due to required LEDPA (Least Environmentally Damaging Practicable Alternative) analysis.

New WTE Facility Siting Summary							
Transportation	Existing access to site is via NW 97th Ave., which was recently four- laned and has sufficient capacity for the expected traffic loadings of the proposed WTE facility. Traffic impacts on local roads would be unchanged from existing conditions. The site has sufficient area to accommodate truck queueing.	The site has good access to Florida Turnpike and US-27 via Beacon Station Blvd., but some road areas need to be improved and the Town of Medley may want the County to assume maintenance of some or all of the access roads, which would increase the County's costs. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts to local area will likely be significant. Truck queuing will have to be accomplished on site to prevent further congestion.	Existing access to the site is via Ingraham Hwy. and no additional offsite road improvements are needed. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts on Ingraham Hwy., W Palm Drive, and other local roads may be significant. Truck queuing will have to be accomplished on site to prevent further congestion.	Existing access to site is via Ingraham Hwy. and SW 222nd Ave. (see map below), but approximately 0.75 miles of two-lane road with paved shoulders will need to be constructed for proper site access. Additional ROW may have to be acquired. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts on Ingraham Hwy., W Palm Drive, and other local roads may be significant. Truck queuing will have to be accomplished on site to prevent further congestion	The parcels bordering NW 137th Ave have good access to the Dolphin Expressway and the Florida Turnpike, but access may become more complicated for parcels within the site. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will increase traffic loads on the Florida Turnpike and the Dolphin Expressway, which are already high traffic count roadways. Traffic increases would also be expected on 8th Street, 12th Street, 137th Ave and other local roads. Truck queuing will have to be accomplished on site to prevent congestion of local roads. Depending on what parcel(s) are selected for development, many additional parcels or access easements may be needed to establish road access sufficient for heavy truck traffic. Also, rail access may be available along north side of site.	The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will increase traffic loads on the Florida Turnpike and US27, which are already high traffic count roadways. Truck queuing will have to be accomplished on site to prevent congestion of local roads. Selection of this site will prohibit future use of the Opa-Locka West Airport site for aviation.	The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will increase traffic loads on the Florida Turnpike and US27, which are already high traffic count roadways. Traffic increases would also be expected on the frontage road at the site. Truck queuing will have to be accomplished on site to prevent congestion of local roads. Selection of this site will prohibit future use of the Opa-Locka West Airport site for aviation.
Community	Residential developments have encroached around the site in the years since the Existing RRF went into operation. The site is now less than a tenth of a mile from the nearest residential zoning and the local population. Community political leaders and environmental groups have indicated opposition to continued use of the site for WTE facility operations.	The site is adjacent to residential zoning. The west edge of the site borders one trailer park owned by the Town of Medley, and another that is leased by the town. Siting of a WTE facility may face community opposition at this location.	The site is approximately half a mile from the nearest residential zoning and is approximately one mile from the boundary of Everglades National Park, which suggests that the siting of a WTE facility may be strongly opposed by the community, environmental groups, and regulators.	The site is approximately half a mile from the nearest residential zoning and is 1.28 miles from the boundary of Everglades National Park, which suggests that the siting of a WTE facility may be strongly opposed by the community, environmental groups, and regulators.	Some parcels in the eastern and southern portions of the site are within 0.1 miles of residential zoning, and the site contains wetlands and possible habitat for multiple species. The siting of a WTE facility may face opposition by the community, environmental groups, and regulators at this location.	The site is more than a mile from residential zoning. Site contains extensive wetland areas and is located within a CERP project area, so the siting of a WTE facility may face opposition by environmental groups and regulators.	The site is less than a mile from residential zoning. Site is adjacent to a CERP project area, so the siting of a WTE facility may face opposition by environmental groups and regulators.

New WTE Facility Siting Summary							
Schedule Considerations	Shortest schedule duration because of existing PPSA, potentially reducing PPSA permitting effort and minimal site preparation work required. Coordination of construction during RRF operation required. Estimated Project Duration: 7-years 9-months	Short estimated schedule duration. Land acquisition, PPSA permitting, and some minor site work increase schedule duration. Estimated Project Duration: 9-years 9-months	Long estimated schedule duration. Land acquisition, PPSA permitting, wetland, floodplain, and wildlife mitigation, and significant site work increase schedule duration. Estimated Project Duration: 11-years 3-months	Long estimated schedule duration. Land acquisition, PPSA permitting, wetland, floodplain, and wildlife mitigation, and significant site work increase schedule duration. Estimated Project Duration: 11-years 3-months	Longest estimated schedule duration. Land and ROW/easement acquisition with multiple owners, PPSA permitting, wetland, floodplain, and wildlife mitigation, and significant site work increase schedule duration. Estimated Project Duration: 12-years 3-months	Second shortest estimated schedule duration. PPSA permitting, wetland, floodplain, and wildlife mitigation, and significant site and utility work increase schedule duration. Estimated Project Duration: 9-years 3-months	Short estimated schedule duration. Land acquisition, PPSA permitting, wetland, floodplain, and wildlife mitigation, and significant site and utility work increase schedule duration. Estimated Project Duration: 10-years 0-months
Cost	For comparative purposes, the existing RRF site is considered the base cost condition and the base capital cost includes estimated stormwater detention pond fill costs, environmental considerations and ash hauling costs. Total Estimated Capital Cost (not including land): $1,488,886,000[1]. Estimated Land Cost*: $0 Total Estimated Capital Cost (including land): $1,488,886,000	Additional costs anticipated for land acquisition*, on-site utility facilities, stormwater considerations and addition of fill for soil fortification, zoning and potential additional permitting efforts for new PPSA. A new transfer station facility at the RRF site is not anticipated because of the minimal change in hauling distance to this site. Purchase of potable water may increase anticipated operational costs. It is also assumed that there may be impact fees or improvements required to local roads that have not yet been factored into the capital cost for this site because the extent of roadway modifications is currently not known. It is anticipated that these would be negotiated and further evaluated during the land acquisition process. Total Estimated Capital Cost (not including land): $1,498,497,272[1] (0.6% increase). Estimated Land Cost*: $112,848,865. Total Estimated Capital Cost (including land): $1,611,346,137 (8.2% increase) (Additional 15% annual operational cost for potable water purchase and ash hauling.)	Significant additional costs anticipated for land acquisition*, on and off-site utility facilities, floodplain, wetland, and wildlife mitigation, additional permitting efforts, and a new ($45M) transfer station facility at the RRF site. Significant impact on hauling system due to distance from other System facilities would increase capital and operational cost. Purchase of potable water and significant distance to haul ash for disposal will increase anticipated operational costs. Total Estimated Capital Cost (not including land): $1,574,370,330[1] (5.7% increase). Estimated Land Cost*: $8,976,790. Total Estimated Capital Cost of $1,583,347,120 (6.3% increase) (Additional 103% annual operational cost for potable water purchase, significant ash hauling, and additional System hauling costs.)	Significant additional costs anticipated for land acquisition*, on and off-site utility facilities, flood plain, wetland, and wildlife mitigation, additional permitting efforts, and a new ($45M) transfer station facility at the RRF site. Significant impact on hauling system due to distance from other System facilities would increase capital and operational cost. Purchase of potable water and significant distance to haul ash for disposal will increase anticipated operational costs. Total Estimated Capital Cost (not including land): $1,576,952,227[1] (5.9% increase). Estimated Land Cost*: $4,118,620. Total Estimated Capital Cost of $1,581,070,847 (6.2% increase) (Additional 103% annual operational cost for potable water purchase, significant ash hauling, and additional System hauling costs.)	Significant additional costs anticipated for land acquisition* due to number of parcels needed and owners potentially involved, and a new ($45M) transfer station facility at the RRF site. Minor impacts on Collection and Transfer costs due to changes in hauling distances and travel times. Floodplain and wetland mitigation may increase capital costs. Purchase of potable water and significant distance to haul ash for disposal will increase anticipated operational costs. Rail haul of ash may be possible, further studies needed to determine if that would be cost-effective alternative to truck hauling. Total Estimated Capital Cost (not including land): $1,564,527,924[1] (5.1% increase). Estimated Land Cost*: $12,877,260. Total Estimated Capital Cost of $1,577,405,184 (5.9% increase) (Additional 98% annual operational cost for potable water purchase, and significant ash hauling costs.)	Significant additional costs anticipated for land acquisition*, on and off-site utility facilities, floodplain, wetland, and wildlife mitigation, additional permitting efforts, and a new ($45M) transfer station facility at the RRF site. Purchase of potable water and significant distance to haul ash for disposal will increase anticipated operational costs. Total Estimated Capital Cost (not including land): $1,582,443,592[1] (6.3% increase). Estimated Land Cost*: $0. Total Estimated Capital Cost of $1,582,443,592 (6.3% increase) (Additional 97% annual operational cost for potable water purchase, significant ash hauling, and additional System hauling costs.)	Significant additional costs anticipated for land acquisition*, on and off-site utility facilities, floodplain, wetland, and wildlife mitigation, additional permitting efforts, and a new ($45M) transfer station facility at the RRF site. Purchase of potable water and significant distance to haul ash for disposal will increase anticipated operational costs. Total Estimated Capital Cost (not including land): $1,593,591,461[1] (7.0% increase). Estimated Land Cost*: $29,370,858. Total Estimated Capital Cost of $1,622,962,319 (9.0% increase) (Additional 97% annual operational cost for potable water purchase, significant ash hauling, and additional System hauling costs.)

* Land acquisition cost estimated based upon 2023 Miami-Dade Property Appraiser Market Value plus 10%. For Site A1, the value of the largest parcel only was used.

[1] Cost values shown escalated 3% from values in June 2022 Siting Report per BLS CPI index data.

Considerations for a Zero Waste Management Strategy

Zero Waste Overview

The concept of "Zero Waste" is a version of comprehensive waste minimization, which has been a fundamental principle of waste management for a long time. Historically, waste management efforts have been focused on the end of the waste cycle, where waste collection, processing and disposal activities occur. The "Zero Waste" approach is much broader, looks at the whole waste cycle, and envisions altering entire economies by changing product manufacturing and producer responsibilities, consumption practices, regulations, recycling markets, and using other mechanisms to make a society less wasteful. Basically, the goal of Zero Waste is to eliminate waste at every level and push economies towards the target of sending no waste to landfills, combustion facilities, or the ocean.

However, many issues can arise when the realities of modern solid waste management and the difficulties in changing human behaviors are considered. Local municipalities have limited to no control over the factors affecting waste generation outside their jurisdictions (i.e., entire societies or economies), such as Federal or state regulations, general consumption practices, or many others, and this is where the "Zero Waste" concept has historically encountered significant difficulties. The guiding principles of the "Zero Waste" movement tend to rely on consistent and coordinated education, legislation, planning, and execution at all levels of government and in significantly changing behaviors in all individuals for successful implementation. This can be a challenging solution for many reasons, but primarily because the priorities, funding decisions, and approaches to solid waste management at the various levels of government are dynamic over the long term, and human behaviors are very difficult to change. As a result, virtually all decisions and activities related to solid waste (including waste minimization efforts) default to the local level, because that is the end of the line, where the generated waste arrives and must be promptly and effectively managed.

The definition of Zero Waste has varied over time and jurisdictions. For many municipalities that have adopted Zero Waste as a management strategy, the generally accepted benchmark to achieve "Zero Waste" is the diversion of 90% of a given solid waste stream from landfilling.

The State of Florida and Miami-Dade County have been working towards some of the same principles as Zero Waste for many years, although those efforts were not termed "Zero Waste" specifically. In 2008, the Florida Legislature set a recycling goal of 75% by 2020 for Florida counties. While this goal has been challenging to meet, five counties within the state, as of 2021 reporting, have met this 75% goal (inclusive of renewable energy and beneficial use of landfill gas credits), but the average remains under 50%.

The generally accepted benchmark to achieve "Zero Waste" is the diversion of 90% of a given solid waste stream from landfilling.

Miami-Dade County, the most populous county in the state, generated approximately 4.6 million tons of solid waste in 2021, with a reported recycling rate of 30% (including renewable energy recycling credits), which is higher than some municipalities that have officially adopted a "Zero Waste" strategy for managing their solid waste. Further, there are many opportunities to improve the County's diversion and recycling rates, but careful planning through the entire process, including detailed studies, funding for infrastructure and operational costs, significant public education, and the development of secondary markets is needed for successful and sustainable implementation. As we will discuss in the following sections, moving towards Zero Waste is a long-term, incremental process that takes consistent policies, funding, and many years to develop.

Many cities and counties comparable in size to Miami-Dade County are in different stages of implementing Zero Waste strategies. We reviewed several during this analysis (including Los Angeles, San Diego, King County (WA) and others) and found that most had adopted a Zero Waste management strategy more than five years ago (San

Francisco more than 30 years ago), none had achieved their target milestone goals, and all were still reliant on landfills and/or WTE facilities for waste disposal.

Understanding Miami-Dade County's Solid Waste Stream

As reported to the FDEP, the total waste stream of Miami-Dade County was approximately 4.6 million tons in Fiscal Year 2021. In order to consider how to control, reduce and manage a solid waste stream, it is important to understand the contributing factors to both the quantity and composition of the generated waste materials.

Waste Quantity

There are several factors that affect the quantity of solid waste generated in a municipality, but generally it is closely correlated with two primary factors, population and economic activity. As of December 2022, the population of the County was estimated by the University of Florida Bureau of Economic and Business Research (BEBR) at 2,757,792 and is projected to increase at a rate of approximately 0.5% per year through 2050.

The County also has the largest economy of any county in Florida, with a gross domestic product of approximately $151.9 billion that is expected to steadily increase. The combination of a large population and strong economic activity usually results in a high waste generation rate. However, the County generation rate of approximately 9.2 pounds per person per day in FY 2021 is almost twice the national average as reported by EPA, probably due in large part to the high tourist population and associated high consumption of convenience and single-use items. In consideration of implementing a Zero Waste strategy, additional studies would be recommended to better understand the waste generation factors specific to the County and determine the most effective rate minimization strategies.

Waste Composition

In general, two distinct types of solid waste comprise the bulk of the waste generated in most municipalities, Municipal Solid Waste (MSW) and Construction and Demolition Waste (C&D Waste). Understanding what everyday waste materials are represented in these two main types of waste are important in determining how to reduce their generation rate and how to effectively manage them and maximize diversion from disposal.

MSW is a very general type of material, and typically accounts for approximately 70-80% of the total quantity of waste generated by a municipality. MSW is usually highly mixed, contains putrescible and non-putrescible materials, and is primarily collected from residential and commercial properties.

C&D Waste is generally any non-putrescible waste associated with construction or demolition activity on a given property. The quantity of this type of waste is significant and usually accounts for approximately 20-30% of the total quantity of waste generated by a municipality. Also, C&D Waste components are generally easier to separate and recycle than those in MSW.

For composition analysis, 2021 data was used, as it was the most recent year available in FDEP reports. Based on FDEP estimates, the County's waste was composed of approximately 81% MSW and 19% C&D Waste. A more detailed breakdown of the overall waste composition by subcategory is shown in Figure ES.3 below.

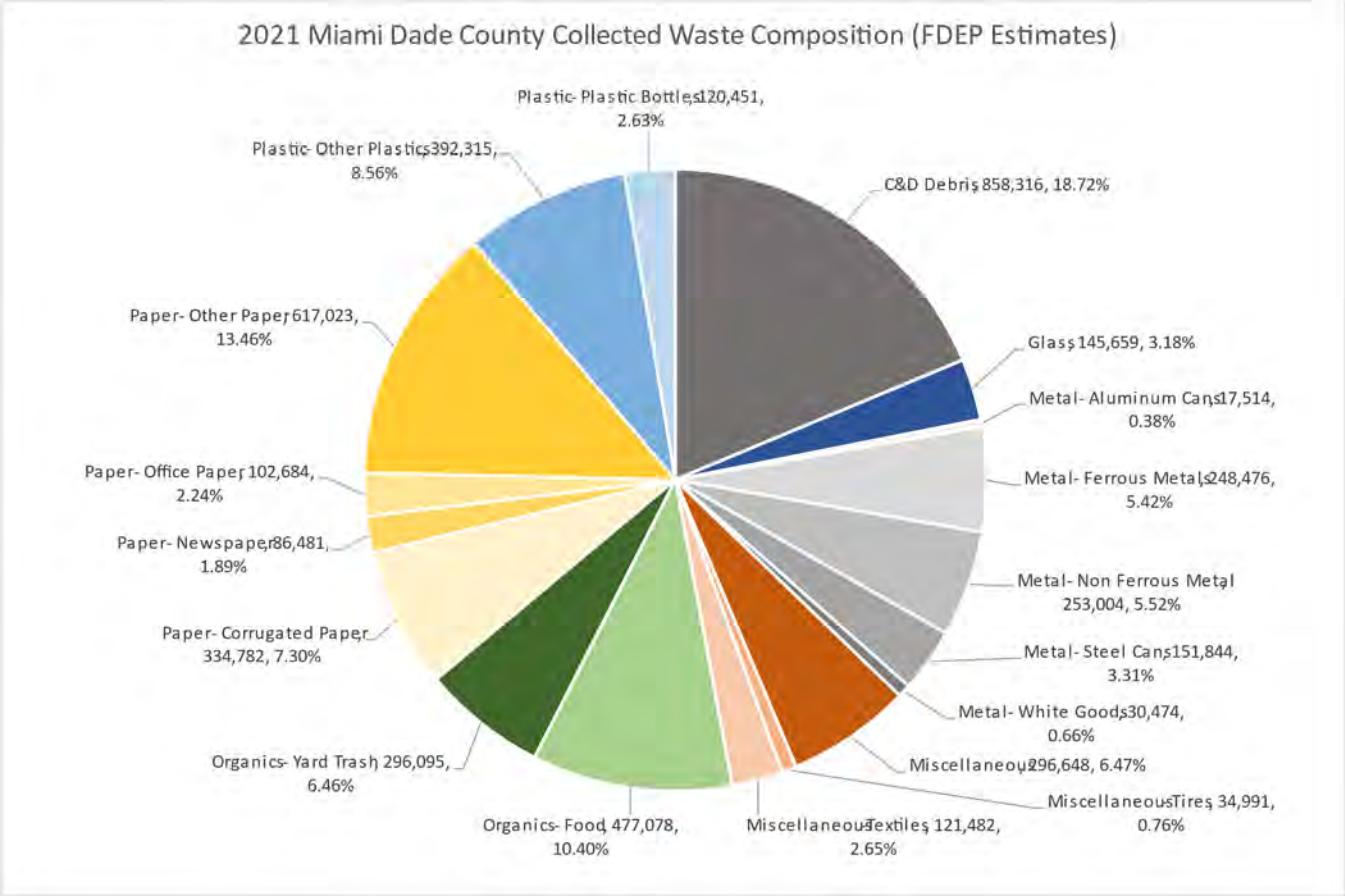


Figure ES.2 Miami-Dade County Solid Waste Composition (FDEP)

Existing County Solid Waste System Facilities and Operations

The County is comprised of 34 incorporated municipalities and the unincorporated County area. Each municipality manages the collection, recycling, and disposal of solid waste within its boundaries. MSW and curbside recyclables are typically collected either directly by a municipality, by contracts with private firms, or by interlocal agreement with the County and transported to private recycling, transfer, or disposal facilities, or to County disposal facilities. C&D waste is collected exclusively by private firms and transported to either private facilities for recycling or disposal, or to County facilities for disposal.

The County's Solid Waste System includes the following operations and facilities owned by the Department and operated either directly by the Department or by others under contract. For more detailed information, see Section 3.2.2.

- Trash and Recycling Centers (13)
- Residential Garbage and Trash Collection
- Residential Curbside Recycling
- Transfer Stations (3)
- Home Chemical Collection Facilities (2)
- Landfills (3)
- Resources Recovery Facility (RRF)
- Transfer and Disposal Fleet
- Private Disposal Contracts

Regulatory Considerations

As mentioned previously, the Zero Waste approach envisions altering entire economies by changing product manufacturing and producer responsibilities, consumption practices, regulations, recycling markets, and using other mechanisms to make a society less wasteful. This approach relies on consistent and coordinated legislation, planning, and execution at all levels of government for successful implementation. The sections below discuss Federal, State and local legislation that should be considered relative to Zero Waste planning and implementation.

Federal

The Federal Government regulates solid waste primarily through RCRA Subtitles C and D and delegates regulatory authority to the states. No new regulations regarding Zero Waste strategies on a national level have been created. The federal government encourages waste minimization and recycling efforts through EPA grants and other mechanisms, which provides financial assistance to states and municipalities to encourage development of alternative solid waste programs and facilities.

State of Florida

Chapters 62-701 through 62-722, F.A.C. establish standards for the construction, operation, and closure of solid waste management facilities to minimize their threat to public health and the environment. These regulations also prohibit the landfilling of certain waste materials (i.e., lead-acid batteries, used oil, white goods, whole tires, etc.).

In 2020, the FDEP reported that Florida's overall recycling rate was 50%, well short of the 75% goal set by the Legislature. The FDEP has suggested ways to potentially increase recycling in Florida, including options for focusing on markets, construction and demolition debris recycling, organics recycling, commercial recycling, and education and outreach. Even though these actions have had some success and at least five counties have met the 2020 75% goal (including renewable energy recycling credits), impactful changes to the statewide recycling rate will likely not occur without programmatic and legislative changes.

The current practices in Florida are not expected to significantly increase the statewide recycling rate. However, through partnership with Florida recycling stakeholders, there is an opportunity to transform Florida recycling from an aspirational goal into a program that incorporates source reduction, diversion of waste, recycling, and consideration of the full environmental impact of materials used from cradle to grave. Interestingly, many of these same concepts are also Zero Waste concepts, but one primary difference is the State of Florida is a strong advocate of the use of Waste-to-Energy facilities to convert solid waste to electricity.

In the Florida 2020 75% Recycling Goal Final Report (FDEP, 2021), the FDEP advocated for the development of a Comprehensive Waste Reduction and Recycling Plan that will:

- Identify a set of recycling goals using both sustainable materials management (SMM) and waste diversion concepts:
  - Sustainable Materials Management - Alternative approaches that recognize the differences among waste components with respect to environmental and resource outcomes are referred to as sustainable materials management (SMM).
  - Waste Diversion - Waste diversion (or waste reduction) is already an integral part of Florida's MSW management system. It can be defined as the amount of material that is reduced, reused, prevented and/or recycled, per capita and can be measured based on the amount of waste not being disposed of in a landfill.
- Develop objectives and propose a three-year plan to implement the following strategies:

  - Recycling Materials Market Development - There must be markets for finished goods that are manufactured from recycled materials in order for the recycling industry to operate efficiently and to provide for reasonable returns on investments.
- Propose statutory language to implement the revised recycling goals and the strategies.

Chapter 163.3180, Florida Statutes requires that all local government comprehensive plans require that public facilities and services needed to support development be available concurrent with the impacts of such development. Sanitary sewer, solid waste, drainage, and potable water are the only public facilities and services subject to the concurrency requirement on a statewide basis.

The local government comprehensive plan must demonstrate, for required or optional concurrency requirements, that the levels of service adopted can be reasonably met. Infrastructure needed to ensure that adopted level-of-service standards are achieved and maintained for the 5-year period of the capital improvement schedule must be identified pursuant to the requirements of s. 163.3177(3). The comprehensive plan must include principles, guidelines, standards, and strategies for the establishment of a concurrency management system.

Miami-Dade County has established its Comprehensive Development Master Plan (CDMP) which provides for the required guidelines and standards to meet this concurrency statute. The sections below provide a brief overview of relevant CDMP requirements.

Miami-Dade County

Comprehensive Development Master Plan (CDMP)

Chapter 163.3177(1), FS states "*The comprehensive plan shall provide the principles, guidelines, standards, and strategies for the orderly and balanced future economic, social, physical, environmental, and fiscal development of the area that reflects community commitments to implement the plan and its elements. These principles and strategies shall guide future decisions in a consistent manner and shall contain programs and activities to ensure comprehensive plans are implemented...*" The following CDMP objectives and policies are relevant to the discussion of the siting and operation of solid waste facilities. For more detailed descriptions, see Section 3.2.3.3.

- **Objective SW-1**: County shall plan and provide for solid waste disposal services on a countywide basis.
  - Policy SW-1A. Provision of County solid waste facilities outside of the UDB or UEA shall be avoided.
  - Policy SW-1C. County to assure that land in the vicinity of solid waste disposal facilities is developed for a use that is compatible with the operation of said facilities.
- **Objective SW-2**: The County will ensure that adequate system capacity is available to meet future needs.
  - Policy SW-2A. The County Solid Waste Management System shall maintain a solid waste disposal capacity sufficient to accommodate waste flows for a minimum of five (5) years.
  - Policy SW-2B. No development order shall be issued for any area of the County which is served by a solid waste facility which does not meet the standard in Policy SW-2A or will not meet these standards concurrent with the completion of the development.
- **Objective SW-3**: The County will provide an adequate level of service for solid waste facilities to meet both existing and projected needs through implementation of those projects listed in the Capital Improvements Element.
  - Policy SW-3A. Solid Waste improvements funding evaluation criteria.
- **Objective SW-4**: Miami-Dade County shall provide for the management of solid waste in a manner which places a high priority on the maintenance of environmental quality and community quality of life, with emphasis on recycling and waste reduction.
  - SW-4A. Miami-Dade County solid waste disposal facility operating requirements

- SW-4B. Unless economically prohibitive, Miami-Dade County shall reduce the amount of waste disposal through recycling programs or other alternative solid waste management strategies.
- SW-4C. Miami-Dade County shall promote the establishment and expansion of secondary markets.
- SW-4D. Miami-Dade County shall strive to reduce the per capita generation of solid waste.
- SW-4E. Miami-Dade County shall minimize the amount of yard trash disposed of in landfills.

- **Objective SW-5**: Miami-Dade County shall provide for the safe and efficient disposal of wastes through the development and maintenance of an integrated solid waste disposal system utilizing proven technologies, appropriate regulation, and equitable and responsible financing practices.

Regarding the concurrency requirement in Policy SW-2A, DSWM currently projects that the System will receive 2,000,534 tons of solid waste for disposal during FY 2023. At the end of FY 2023, the System is projected to have approximately 6.9 million tons of remaining physical and contract disposal capacity. Assuming an annual growth rate of 1.0%, the System appears to only have sufficient disposal capacity in place, under construction, or under contract to satisfy the 5-year concurrency requirement through FY 2024. If the County proceeds with its current plans for vertical expansion of the NDL, this will increase disposal capacity.

Reducing the waste stream through material diversion to C&D recycling facilities, composting facilities, and other alternative facilities also improves concurrency, but considering the long lead time associated with the planning, design and construction of capital projects, it is recommended that the County secure additional disposal capacity as soon as possible to ensure continued concurrency compliance.

Considerations for a Miami-Dade Zero Waste Strategy

Development and implementation of a comprehensive Zero Waste strategy in the County will require careful planning through the entire process including goals and objective setting, policy reviews, stakeholder engagement, infrastructure and operational investments, significant public education, and development of secondary markets for successful and sustainable implementation. As discussed in the following sections, Zero Waste planning and strategy development is something that takes consistent policies, funding, and sufficient time to develop, and there is not one “correct” approach - many different technologies and programs can be employed to meet the desired goals. The development of a Zero Waste strategy is a detailed, iterative process that should include the steps below, which are described in more detail in the sections that follow.

Analyze Waste Streams

The first step needed to move towards a Zero Waste type management strategy would be to conduct extensive waste characterization studies of both the MSW and C&D Waste streams to determine the quantity and composition of each. Such studies should be conducted over a full year to capture seasonal fluctuations and material issues (i.e., wet loads during the rainy season) that could have significant effects on processing facility equipment or operations and to achieve results with sufficient accuracy for facility design.

What Do We Have and How Much Do We Have?

Please note that the waste quantity and composition analyses presented in this report were taken from FDEP calculated estimates and from abbreviated waste characterization studies conducted on a small sampling of waste arriving at County

facilities during a short time span. While the results of such estimates and studies are useful for the purpose of visualizing the basic quantities and composition of the MSW and C&D waste streams, these studies are for conceptual planning level purposes only and should not be used for facility design purposes.

Identify and Prioritize Materials for Recovery

After the detailed waste characterization studies are completed, identify and prioritize those waste stream components that 1) have potential for a significant quantity of recovery, 2) can be readily separated and routed to processing facilities (i.e., C&D waste, food waste, glass, etc.) through County actions, and 3) have an existing secondary market or use for the end products of processing.

What Should We Recover, and What Will We Do With It?

Waste streams that do not meet the above criteria should be placed on a secondary priority list to be addressed in future actions as the Zero Waste strategy progresses and more improvements are made.

Develop Materials Control Strategy

One of the most common and difficult issues in the recovery of materials from a solid waste stream is how to efficiently, effectively and economically separate the various materials from MSW or C&D waste and direct them to appropriate facilities for processing. The processibility and value of the separated materials depend greatly on the extent of contamination with other wastes. Materials that are heavily contaminated will be rejected by processing facilities and will probably be sent to a landfill or other disposal facility. Therefore, maintaining the quality of the separated material is critical for moving towards a circular economy.

How Do We Separate Out What We Want To Recover?

Separation of materials by waste generators may be either voluntary or mandatory, but in general if separation is not mandated then the participation rate is lower, which can significantly affect per-ton costs. Local legislative action is therefore a very important factor.

Determine Collection Equipment and Processing Facilities

For each waste material targeted for recovery, the method and equipment needed to collect and transport the material to an appropriate processing facility must be determined. For some materials, such as C&D waste, private haulers already perform this function. For others, such as source-separated food waste, new collection systems including containers, vehicles, and drivers will be needed. A detailed estimate of the capital, O&M and labor costs for each new system must be calculated.

How Will We Turn Recovered Materials Into Something Usable?

Similarly, the size and type of processing facility that will receive the collected materials must be determined and a detailed estimate of the capital, O&M and labor costs must be calculated. Table ES-4 on page ES-19 includes brief descriptions of potential collection and processing technologies that are commercially available for waste materials that comprise the larger fractions of the County's waste stream (Organics, MSW, and C&D Waste).

Analyze Secondary Markets

The feasibility of achieving Zero Waste is highly dependent on identifying secondary markets that already exist or that can realistically be developed for the diverted material and end products of processing facilities. The market for recycled materials depends on the value of the virgin material, supply, the ability to meet market specifications, costs to manage contamination and process materials, and local, state, national and international economies. Specific drivers of market demand include policy incentives, research and development of new product or packaging applications,

Who Is Going To Buy or Use What We Recover?

specific incentives, and technical assistance for recycled material purchasers such as Environmentally Preferable Purchasing programs.

There are many potentially recoverable materials in the County's waste stream that are disposed because no secondary markets exist or they are not cost-effective to recover. The lack of secondary markets and the difficult economy of recoverable materials have been some of the biggest challenges for the recycling industry and for communities attempting Zero Waste management strategies around the country. Ever since China's National ban of 24 types of solid waste and recyclable materials was implemented in 2018, market prices for recyclables exponentially decreased as the Average Market Value (AMV) of commodities has declined by $100 per ton since a high point in 2011 (Source: Kessler report 2022).

The recycling commodity markets are still recovering from the effects of China's policy change in 2018, and the situation with secondary markets and the economics of recycled materials remains challenging. Over the last few years increased recycling costs have forced many communities to reduce their recycling programs, and some were forced to eliminate them entirely. However, waste generation rates continue to increase, and there may be significant opportunities for development of recycling industries and markets in the near future. Further studies and thorough analysis and validation of the economic viability of specific waste commodities will be needed before any selection of alternative processing technologies.

Prepare Zero Waste Master Plan and Detailed Financial Analysis

For each waste material that could potentially be recovered from a waste stream and routed to a secondary market or end use, a detailed analysis should be conducted to determine if the recovery is financially feasible. Such an analysis would involve determining the type, number and capacity of processing facilities needed to recover the material and a long-term (10 years or more) analysis of all expenses (educational, capital, facility operations and maintenance, materials transfer and transport, etc.) and revenues (i.e., solid waste collection rates, tipping fees, material sales, etc.) to clearly understand the financial impacts resulting from the recovery of that material.

How Much Is This Going To Cost?

The results of each material analysis could be used to develop a Zero Waste Master Plan which will be an iterative process incorporating all resources needed to recover the materials deemed financially feasible to recover. A Zero Waste Master Plan should also include a comprehensive long-term financial analysis for all Collection and Disposal Fund expense and revenues to determine if the overall financial effects on the County's System, including debt service coverage requirements, Collection Fees, and Disposal rates are within acceptable limits. The Zero Waste Master Plan would represent the maximum potential recovery of materials (and diversion rate) that meets all the various financial requirements and political demands of the County and its residents.

In addition to the solid waste collection and processing systems, the County will need many new programs to adopt a zero-waste approach to managing its solid waste. Such programs may include, but are not limited to, significant public education programs in schools, community centers, and other government properties and systems, regular advertising and resident outreach campaigns, increased compliance efforts to reduce contamination, and increased legislative efforts at the local and state level. The scope and cost of these additional programs may be substantial and must be factored into the total cost of a Zero Waste Master Plan.

Public Communication and Stakeholder Buy-In

How Do We Get Everybody To Support This and Participate?

In conjunction with the development of a Zero Waste Master Plan, significant planning, coordinating, and executing effective public communications and meetings with all stakeholders will be necessary. Those tasked with this critically important work must be able to explain current solid waste issues and proposed System changes, address questions and concerns, and negotiate changes to the Zero Waste Master Plan, as necessary. As the solid waste strategy for the

County will be heavily dependent on the participation of 34 municipalities, more than 2.7 million residents and thousands of private companies for its success, it is of paramount importance that the stakeholders understand and support the changes. Otherwise, as other municipalities have discovered, the resulting system will likely experience significant political and operational difficulties and public resentment no matter how much planning effort and funding is applied.

Zero Waste Master Plan Implementation Considerations

Local Legislation

Laws and programs surrounding waste management are typically handled at the state and local level. The federal government regulates waste management primarily through the Resource Conservation and Recovery Act (RCRA) but does not yet mandate Zero Waste activities at a national level. Legislation and programs surrounding specifically zero-waste are typically pursued at a local level (county, city, or municipality), with many states such as California mandating diversion requirements at a state level but leaving much of the action towards those goals to local regulators.

Funding Options

There are many sources of infrastructure funding that may be available for solid waste facilities and programs. The following potential likely sources of funds for future solid waste facilities have been identified, but there may be others that are applicable. Potential funding sources include:

1. Federal Grants and Tax Incentives
2. State Grants
3. Municipal Bonds
4. Private Activity Bonds

For additional information on each funding source is included section 3.3.12.

Federal Grants and Programs

The Bipartisan Infrastructure Law provides $275,000,000 total from Fiscal Year 2022 to Fiscal Year 2026 for grants authorized under the Save Our Seas 2.0 Act. Funding is intended for projects that implement the building a circular economy for all strategy series, improve local post-consumer materials management programs, including municipal recycling, or make improvements to local waste management systems.

Other potential Federal funding or revenue sources may be available for certain technologies through programs such as the Inflation Reduction Act (IRA), which provides for Production Tax Credits (up to 2.6 cents/KwH, escalating with inflation) and Investment Tax Credits (up to 30% on eligible property) for WTE facilities. The IRA specifically makes local governments eligible to receive the tax credits as a direct payment.

State Grants

Chapter 377.814, FS - Municipal Solid Waste-to-Energy Program - The Municipal Solid Waste-to-Energy Program was created to provide financial assistance grants and incentive grants to municipal solid waste-to-energy facilities to assist with the planning and designing for constructing, upgrading, or expanding a municipal solid waste-to-energy facility, including necessary legal or administrative expenses. To qualify for an incentive grant, the owner of a municipal solid waste-to-energy facility must apply to the department for funding; provide matching funds on a dollar-for-dollar basis; and demonstrate that the project is cost-effective, permittable, and implementable and complies with s. 403.7061.

Municipal Revenue Bonds

Miami-Dade County can issue revenue bonds backed by Solid Waste System revenues to fund development of future solid waste facilities. However, depending on the level of funding, the debt service on issued bonds may

result in increased user rates. Detailed long-term financial analyses of the County's Collection and Disposal Funds would be required to determine the financial effects of additional issued debt.

Private Activity Bonds

A private activity bond (PAB) is a municipal bond issued by or on behalf of local or state governments for the purpose of providing special financing benefits for qualified private projects that serve a public purpose. Solid waste PABs are also termed industrial revenue bonds (IRBs) and may be used to finance the qualifying solid waste capital expenditures for a variety of projects. Federal tax law imposes a number of restrictions and requirements on PAB issuance, including the requirement that the project be allocated "volume cap" at the state level for certain qualifying activities (including private solid waste IRBs). Each year, the states receive a volume cap allocation from the federal government based on the state's population. As of 2022, the state volume capacity limit is the greater of $335 million or $110 per capita.

Summary of Siting Findings and Financial Considerations

As discussed in the preceding sections, shifting the current solid waste management system in the County towards a Zero Waste approach would involve significant financial investment, both from a capital/infrastructure standpoint, as well as longer term operational and policy modifications. These investments would primarily consist of the addition of specialized collection systems and facilities, but also costs related to education programs, legislative efforts, increased enforcement efforts, and others. In order to illustrate the high-level cost implications, Tables ES.2 and ES.3 are presented to show the costs of the current County system and the additional cost effects of alternative facilities that could be part of a future "Zero Waste" strategy using the tonnage managed by the County in FY2021 as the frame of reference. It is important to note that the estimates below are only for that portion of the waste stream managed by DSWM, about 45% of the approximately 4.6 million tons of solid waste generated in Miami-Dade County in 2021.

Table ES.2 FY2021 Material Tonnages and Costs for Selected Miami-Dade County Solid Waste Management System Facilities and Operations

Material	No. Facilities	Per Ton Cost	Total Tons Received	Total FY2021 Cost
MSW and C&D Waste			**2,075,960**	
Collections	N/A	$72	756,502	$68.1M
Transfer Stations	3	$51	627,095	$32.4M
RRF (RDF)	1	$61	1,009,062	$62.2M
Landfills	3	$30	784,034	$23.4M
Trash and Recycling Centers (TRCs)	13	$27	188,914	$5.1M
Contract Disposal	N/A	$31	354,316	$10.9M
Curbside and Commercial Recyclables				
Private Contract Collections and Processing	N/A	$157	61,708	$9.7M
TOTAL				**$211.8M**

Source: Annual Comprehensive Financial Report 2021 and DSWM records

Table ES.3 Estimated Additional Costs of Zero Waste Alternative Facilities Using FY2021 Tonnage Data

Material	No. Facilities for Full Capacity	Estimated Per Ton Cost	Est. Total Potential Annual Tons [1]	Estimated Additional Annual Cost
FY2021 DSWM Disposal Fund Total Tons = 2,075,960				
Organics (Food and Yard Waste – 16.86% of Total Tons)			**159,397**	
Organics Collection	N/A	$72 - $600	159,397	$11.5M - $95.6M
Composting (Windrow)	3	$72-80	159,397	$11.5-12.8M
Composting (ASP)	3	$74-80	159,397	$11.8-12.8M
Composting (In-Vessel)	3	$9 - $50	159,397	$1.4M - $8.0M
Anaerobic Digestion	2	$57-90	159,397	$9.1M-$14.3M
MSW (31.89% of Total Tons)			**662,024**	
Mechanical/Biological Treatment	2	$123-184	412,024[2]	$50.7-75.8M
Waste-to Energy (Mass Burn)	1	$57-60	412,024[2]	$23.5-24.7M
Gasification	3-4	$154	412,024[2]	$63.5M
Mixed Waste Processing	1	$85-150	412,024[2]	$61.8M
Curbside and Commercial Recyclables (32.53% of Total Tons)			**675,310**	
Material Recovery Facility	1	$87 - $154	675,310	$58.8M - $104M
Glass Processing	70-100	$23 - $28	145,659	$3.4M - $4.1M
Construction and Demolition (C&D) Waste (18.72% of Total Tons)			**388,620**	
C&D Recycling Facility	2	$76 - $137	388,620	$29.5M - $58.3M
TOTAL				**$125M – $352M**

[1] Potential recovered tonnage value for each material is the FY2021 DSWM Disposal Total Tons of 2,075,960 multiplied by the material's estimated percentage of the total waste stream from the composition data.

[2] Tonnage reduced by 250,000 to account for contract disposal put-or-pay requirement.

Table ES.4 summarizes the findings associated with the siting of all alternative technologies, including WTE (Mass Burn), at all six sites included for consideration in this report. The information presented is based on research and documentation from existing facilities operating within the U.S. and emerging technologies from around the world that were included in a State of the Industry report prepared for the DSWM in conjunction with the original June 2022 Siting Report. A copy of the State of the Industry report is included as Appendix D.

Costs presented in Table ES.4 are planning-level costs based on industry studies, actual facility data, internal database, or other publicly available sourced data. Potential revenues are not included in the costs presented in Table ES.4.

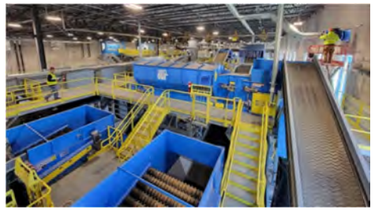
Table ES.4 – Preliminary Siting Alternatives Analysis Findings

Alternative	Example Photo	Area Required / Processing Capacity	Estimated Cost Per Ton / Development Time	Materials Processed / Technology Considerations	Site-Specific Considerations: RRF Site (157 Ac. ±, ~60 Ac Developable)	Site 1 – Medley (320 Ac. ± , ~100 Ac. Currently Developable)	Site 16 - Ingraham Highway Site 1 (159 Ac. ±)	Site 17 - Ingraham Highway Site 2 (81 Ac. ±)	Site A1 - Dolphin Expressway Site (416 Ac. ±)	Site A2 - Opa-Locka West Airport Site (460 Ac. ±)	Site A3 – Okeechobee Road Site (68 Ac.±)
Organics Composting (Windrow)		10-450+ Ac	$72-$80+ [1]	Process is suited for large volumes such as that generated by entire communities and collected by local governments, and high volume food-processing businesses.	Likely public concerns with noise, odor and vector issues. Estimated maximum processing capacity at this site approximately 125,000 tons per year.	Potential public concerns with noise, odor and vector issues. Estimated maximum processing capacity at this site approximately 200,000 tons per year without filling lake areas.	Reduced potential public concerns with noise, odor and vector issues. High groundwater may cause operational difficulties, especially during wet season. Estimated maximum processing capacity at this site approximately 300,000 tons per year. Utilities and travel times are concerns.	Reduced potential public concerns with noise, odor and vector issues. High groundwater may cause operational difficulties, especially during wet season. Estimated Maximum processing capacity at this site approximately 150,000 tons per year. Utilities and travel times are concerns.	Proximity to residential zoning increases potential public concerns with noise, odor and vector issues. High groundwater may cause operational difficulties, especially during wet season. Maximum processing capacity depends on parcel area acquired and developed, could be 1M tpy or more.	Potential permitting and public concerns. High groundwater may cause operational difficulties, especially during wet season. Estimated maximum processing capacity at this site, if fully developed, may be up to 1M tpy. Utilities and travel times are concerns.	High groundwater may cause operational difficulties, especially during wet season. Estimated maximum processing capacity at this site, may be approximately 125,000 tpy. Utilities and travel times are concerns.
		5-8 tons per acre per day. Typically, 80-500 TPD	3-5 years	Requires separate organics collection. Low complexity, low skill level needed for most operations. Minimum 30-day processing time. Processing capacity depends on available land area. Not well suited for urban areas, potential public concerns with noise, odor and vector issues. Challenging wet season operations. Good quality compost produced. End uses/markets and capacities may need development. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals.							
	This method involves forming organic waste into rows of long piles called “windrows” and aerating them periodically by either manually or mechanically turning the piles.										
Organics Composting (Aerated Static Pile (ASP))		5-450+ Ac	$74-$80+ [1]	Process is suitable for a relatively homogenous mix of organic waste and works well for larger quantity generators of yard trimmings and compostable municipal solid waste (e.g., food scraps, paper products), such as local governments, landscapers, or farms. Does not work well for composting animal byproducts or grease from food processing industries	Likely public concerns with noise, odor and vector issues. Estimated maximum processing capacity at this site approximately 180,000 tons per year.	Potential public concerns with noise, odor and vector issues. Estimated maximum processing capacity at this site approximately 250,000 tons per year without filling lake areas.	Reduced potential public concerns with noise, odor and vector issues. High groundwater may cause operational difficulties, especially during wet season. Estimated maximum processing capacity at this site approximately 400,000 tons per year. Utilities and travel times are concerns.	Reduced potential public concerns with noise, odor and vector issues. High groundwater may cause operational difficulties, especially during wet season. Estimated Maximum processing capacity at this site approximately 200,000 tons per year. Utilities and travel times are concerns.	Proximity to residential zoning increases potential public concerns with noise, odor and vector issues. High groundwater may cause operational difficulties, especially during wet season. Maximum processing capacity depends on parcel area acquired and developed, could be 1M tpy or more.	Potential permitting and public concerns. High groundwater may cause operational difficulties, especially during wet season. Estimated maximum processing capacity at this site, if fully developed, may be up to 1M tpy. Utilities and travel times are concerns.	High groundwater may cause operational difficulties, especially during wet season. Estimated maximum processing capacity at this site, may be approximately 125,000 tpy. Utilities and travel times are concerns.
		1-10 tons per acre per day. Typically, 80-700 TPD	3-5 years	Requires separate organics collection. Moderate complexity, moderate skill level needed for operation. More compact process than conventional windrow, different turning equipment. Minimum 30-day processing time. Processing capacity depends on available land area. Potential public concerns with noise, odor and vector issues. Challenging wet season operations. End uses/markets and capacities may need development. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals.							
	ASP involves mixing and placing organic waste in a large pile. To aerate the pile, layers of loosely piled bulking agents (e.g., wood chips, shredded newspaper) are added so that air can pass from the bottom to the top of the pile. The piles also can be placed over a network of pipes that deliver air into or draw air out of the pile. Air blowers may be activated by a timer or temperature sensors.										

Alternative	Example Photo / Process Description	Area Required: Processing Capacity	Estimated Cost Per Ton: Development Time	Materials Processed: Technology Considerations	RRF Site (157 Ac. ±, ~60 Ac Developable)	Site 1 – Medley (320 Ac. ± , ~100 Ac. Currently Developable)	Site 16 - Ingraham Highway Site 1 (159 Ac. ±)	Site 17 - Ingraham Highway Site 2 (81 Ac. ±)	Site A1 - Dolphin Expressway Site (416 Ac. ±)	Site A2 - Opa-Locka West Airport Site (460 Ac. ±)	Site A3 – Okeechobee Road Site (68 Ac.±)
Organics Composting (In-Vessel)		<1-20+ Ac	$9-$50+ [1],[2]	This process can accommodate virtually any type of organic waste (e.g., meat, animal manure, biosolids, food scraps) and is unaffected by weather conditions. Materials that do not compost completely (i.e. bones) can be easily reprocessed and completely broken down.	Compact footprint is a good option for this location. Reduced potential public concerns with noise, odor and vector issues. Depending on footprint area, could be co-located with other alternative facility(ies) on this site.	Reduced potential public concerns with noise, odor and vector issues. Could be co-located with other alternative facility(ies) on this site.	Reduced potential public concerns with noise, odor and vector issues. High groundwater may cause some operational difficulties, especially during wet season. Utilities and travel times are concerns. Could be co-located with other alternative facility(ies) on this site.	Reduced potential public concerns with noise, odor and vector issues. High groundwater may cause some operational difficulties, especially during wet season. Utilities and travel times are concerns. Could be co-located with other alternative facility(ies) on this site.	Potential permitting and public concerns. High groundwater may cause some operational difficulties, especially during wet season. Floodplain and wetland mitigation may increase development costs. All utilities available near site. Could be co-located with other alternative facility(ies) on this site.	Potential permitting and public concerns. High groundwater may cause some operational difficulties, especially during wet season. Floodplain and wetland mitigation may increase development costs. Utilities will need to be extended to site. Could be co-located with other alternative facility(ies) on this site.	High groundwater may cause some operational difficulties, especially during wet season. Floodplain and wetland mitigation may increase development costs. Utilities will need to be extended to site. Could be co-located with other alternative facility(ies) on this site.
	This method involves feeding organic materials into a drum, silo, concrete-lined trench, or similar equipment. This allows good control of the environmental conditions such as temperature, moisture, and airflow. The material is mechanically turned or mixed to make sure the material is aerated. The size of the vessel can vary in size and capacity.	5-100 tpd per vessel, 15 to 1200 TPD	3-5 years	Requires separate organics collection. Variable complexity, low skill level needed for operation. Short 5-7 day processing time. Compact process, smaller facility footprint, expandable capacity. Better suited for urban areas, vessels can be enclosed in metal building to mitigate potential public concerns with odor and vector issues from receiving areas. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals.							
Anaerobic Digestion		3-40+ acres depending on capacity	$57-$90+[1],[2]	The most common feedstocks for this process are fats, oils and greases (FOG), food waste, and manure.	Possible capacity limitations due to limited site area. Likely permitting issues and public concerns with noise, odor and vector issues.	Potential permitting issues and public concerns with noise, odor and vector issues. Some utilities may need to be extended to site. Could be co-located with other alternative facility(ies) on this site.	Reduced potential public concerns with noise, odor and vector issues. Presence of floodplain will increase development costs. Utilities will need to be extended to site and travel times are concerns.	Reduced potential public concerns with noise, odor and vector issues. Presence of floodplain will increase development costs. Utilities will need to be extended to site and travel times are concerns.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. All utilities available near site. Could be co-located with other alternative facility(ies) on this site.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Utilities will need to be extended to site. Could be co-located with other alternative facility(ies) on this site.	Floodplain and wetland mitigation may increase development costs. Utilities will need to be extended to site. Could be co-located with other alternative facility(ies) on this site.
	This method typically involves feeding pre-sorted organic waste into water tanks and forming a wet slurry via conveyors, pumps, and mechanized agitation. The slurry is processed by microorganisms in a series of sealed chambers that are maintained at the optimum conditions for anaerobic digestion. The process is optimized for the production of biogas, which is then captured and can be used for electricity generation, sold to a local gas utility, or used as fuel. The remaining organic solids from the digestion can be used as compost and liquids may be used as fertilizer.	270-600 TPD	5-7 years	Requires separate organics collection. High complexity, high skill level needed for operation. Processing capacity depends on available land area. Potential permitting issues and public concerns with noise, odor and vector issues. Fire risk from methane production. Additional composting or disposal of resulting digestate solids would be required. Resulting digestate liquids can be used for fertilizer in cover maintenance for landfills or on agricultural land. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals. End uses/markets and capacities may need development.							

Alternative	Example Photo	Area Required	Estimated Cost Per Ton	Materials Processed	Site-Specific Considerations						
		Processing Capacity	**Development Time**	**Technology Considerations**	**RRF Site (157 Ac. ±, ~60 Ac Developable)**	**Site 1 – Medley (320 Ac. ± , ~100 Ac. Currently Developable)**	**Site 16 - Ingraham Highway Site 1 (159 Ac. ±)**	**Site 17 - Ingraham Highway Site 2 (81 Ac. ±)**	**Site A1 - Dolphin Expressway Site (416 Ac. ±)**	**Site A2 - Opa-Locka West Airport Site (460 Ac. ±)**	**Site A3 – Okeechobee Road Site (68 Ac.±)**
	Process Description										
Gasification		5-60 Ac	$154 [3]	Raw MSW is not appropriate for the gasification process. Process performance depends greatly on the unique characteristics of the MSW feedstock. Delivered MSW requires extensive preparation (including shredding and separation of glass, metals, and inert materials) or gasifier feed system customization. MSW also may have characteristics like higher moisture content which may necessitate pre-gasification drying. In addition, the non-uniformity of MSW feedstocks and the variability of the specific composition over time require flexible and robust gasifiers.	Good transportation access, all utilities available. Permitting and public opposition challenges. Permitting schedule may be faster as site has existing Power Plant Site Certification. RRF Landfill on site for slag disposal.	Difficult permitting, close to Everglades Class I area and existing large emitters. Significant impacts to local traffic. Development at this site may require additional time and costs for backfilling and structure foundations. Could be co-located with other alternative facility(ies) on this site. WM Medley landfill adjacent to site for slag disposal.	Potential permitting issues and community opposition at this location. Expected very challenging permitting due to proximity to Everglades Class I Area. Utilities will need to be extended to site. Significantly increased local traffic and hauling costs. Could be co-located with other alternative facility(ies) on this site.	Potential permitting issues and community opposition at this location. Expected very challenging permitting due to proximity to Everglades Class I Area. Utilities will need to be extended to site. Significantly increased local traffic and hauling costs. Could be co-located with other alternative facility(ies) on this site.	Good transportation access, all utilities available near site. Difficult permitting due to close proximity to Everglades Class I area. Floodplain and wetland mitigation may increase development costs. Could be co-located with other alternative facility(ies) on this site. Rail access on the northern boundary could be used for slag hauling to out-of-county landfill.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Difficult permitting due to nearby large emitter (Titan Pennsuco Complex) and Everglades Class I area. Utilities will need to be extended to site Could be co-located with other alternative facility(ies) on this site.	Floodplain and wetland mitigation may increase development costs. Difficult permitting due to nearby large emitter (Titan Pennsuco Complex) and Everglades Class I area. Utilities will need to be extended to site Could be co-located with other alternative facility(ies) on this site.
		100 – 300+ TPD	10+ years								
	Gasification is a starved-oxygen, limited combustion thermochemical process that converts organic fuel or waste materials into the gaseous products of primarily carbon monoxide, hydrogen, as well as carbon dioxide and methane, collectively often referred to as a 'Synthesis gas' or 'Syn Gas'. The resulting gas is considered a fuel due to the flammability and energy content and can be converted into many different liquid or gaseous fuel products, or directly combusted in a gas turbine. Any non-organics in the chamber are melted and form a glass-like slag typically referred to as obsidian.			Unproven technology, significant pre-processing of MSW required. High complexity, high skill level needed for operation. Possible capacity limitations. Increased fire risk from syngas production; however, syngas could be used for electrical generation. High capital and operating cost. Active ash monofill required, preferably, on site for slag disposal.							
Waste-to-Energy (Mass Burn)		40-60 Ac	$57-60	Raw MSW and other wastes.	Good transportation access, all utilities available. Permitting and public opposition challenges. Permitting schedule may be faster as site has existing Power Plant Site Certification. RRF Landfill on site for ash disposal.	Difficult permitting, close to Everglades Class I area and existing large emitters. Significant impacts to local traffic. Development at this site may require additional time and costs for backfilling and structure foundations. Could be co-located with other alternative facility(ies) on this site. WM Medley landfill adjacent to site for ash disposal.	Potential permitting issues and community opposition at this location. Expected very challenging permitting due to proximity to Everglades Class I Area. Utilities will need to be extended to site. Significantly increased local traffic and hauling costs. Could be co-located with other alternative facility(ies) on this site.	Potential permitting issues and community opposition at this location. Expected very challenging permitting due to proximity to Everglades Class I Area. Utilities will need to be extended to site. Significantly increased local traffic and hauling costs. Could be co-located with other alternative facility(ies) on this site.	Good transportation access, all utilities available near site. Floodplain and wetland mitigation may increase development costs. Difficult permitting due to close proximity to Everglades Class I area. Could be co-located with other alternative facility(ies) on this site. Rail access on the northern boundary.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Difficult permitting due to nearby Everglades Class I area. Utilities will need to be extended to site Could be co-located with other alternative facility(ies) on this site.	Floodplain and wetland mitigation may increase development costs. Difficult permitting due to nearby large emitter (Titan Pennsuco Complex) and Everglades Class I area. Utilities will need to be extended to site.
		4,000-5,000 TPD	8-10+ years								
	This method involves receiving collected MSW and feeding it to boilers, where it is converted at high temperature to gas and ash residue. The MSW combustion heats boiler water to steam, which is routed to turbine generators to generate electricity to power the facility and export for electrical revenue. Flue gas is routed through an air pollution control system that uses lime slurry, activated carbon, baghouse filters, and other technologies to remove pollutants from the flue gas prior to exhaust. Ash residue is routed through magnetic and eddy current separators to recover up to 80% of metals from the ash.			No changes to existing collection system needed. Highest capacity alternative. High complexity, high skill level needed for operation. Permitting and public opposition challenges. High capital and operating cost. Electrical generation for revenue or powering other facilities. Good metal recovery possible from ash. Landfill needed for ash disposal.							

Alternative	Example Photo / Process Description	Area Required / Processing Capacity	Estimated Cost Per Ton / Development Time	Materials Processed / Technology Considerations	RRF Site (157 Ac. ±, ~60 Ac Developable)	Site 1 – Medley (320 Ac. ± , ~100 Ac. Currently Developable)	Site 16 - Ingraham Highway Site 1 (159 Ac. ±)	Site 17 - Ingraham Highway Site 2 (81 Ac. ±)	Site A1 - Dolphin Expressway Site (416 Ac. ±)	Site A2 - Opa-Locka West Airport Site (460 Ac. ±)	Site A3 – Okeechobee Road Site (68 Ac.±)
Mechanical Biological Treatment		5-15 Ac.	$103-$133	Process is suited for low to moderate MSW volumes.	Potential public concerns with noise, odor and vector issues. Could be co-located with other alternative facility(ies) on this site. Local concrete facilities may be able to use SRF.	Potential public concerns with noise, odor and vector issues. Could be co-located with other alternative facility(ies) on this site. Local concrete facilities may be able to use SRF.	Potential public concerns with noise, odor and vector issues. Significantly increased local traffic and hauling costs. Utilities will need to be extended to site. Could be co-located with other alternative facility(ies) on this site. Local concrete facilities may be able to use SRF.	Potential public concerns with noise, odor and vector issues. Significantly increased local traffic and hauling costs. Utilities will need to be extended to site. Could be co-located with other alternative facility(ies) on this site. Local concrete facilities may be able to use SRF.	Potential public concerns with noise, odor and vector issues. Floodplain and wetland mitigation may increase development costs. Could be co-located with other alternative facility(ies) on this site. Local concrete facilities may be able to use SRF. Rail access on the northern boundary could be used for SRF transport.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Could be co-located with other alternative facility(ies) on this site. Local concrete facilities may be able to use SRF. Utilities would have to be extended to site.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Could be co-located with other alternative facility(ies) on this site. Local concrete facilities may be able to use SRF. Utilities would have to be extended to site.
		200-560 TPD	3-4 years	Changes to existing collection system may be needed if required by MBT project developer. High complexity, high skill level needed for most operations. Pelletized SRF would need to be loaded and transported to another facility for firing. End uses/markets and capacities may need development. High capital and operating costs, few facilities in operation. Additional fleet equipment and operators would be needed for site operation and transport of SRF.							
	Mechanical Biological Treatment (MBT) is a combined approach to solid waste management that has both mechanical and biological treatment phases separately processed to ultimately produce a pelletized solid fuel. The mechanical stage comprises of automated mechanical sorting equipment such as via conveyors, magnets, trommels, shredders and eddy current separators to process combustible materials, while the biological treatment stage of MBT could involve anaerobic digestion, composting or bio drying. As a result of the mechanical and biological separation and processing, waste is typically shredded, and converted into pelletized solid recovered fuel (SRF).										
Mixed Waste Processing Facility	 	20-60 Ac	$85-$150	An MWP facility can accept a wide variety of waste materials. Modern MWP facilities typically recover plastics, cardboard, paper, metals, and in some cases the organic fraction of the waste stream.	Likely public concerns with noise, odor and vector issues. Depending on footprint area could be co-located with another alternative facility on this site.	Potential public concerns with noise, odor and vector issues. Significant impacts to local traffic. Could be co-located with other alternative facility(ies) on this site.	Potential public concerns with noise, odor and vector issues, but may be minimal at this location. Utilities will need to be extended to site. Significantly increased hauling costs. Could be co-located with other alternative facility(ies) on this site.	Potential public concerns with noise, odor and vector issues, but may be minimal at this location. Utilities will need to be extended to site. Significantly increased hauling costs. Could be co-located with other alternative facility(ies) on this site.	Potential public concerns with noise, odor and vector issues. Floodplain and wetland mitigation may increase development costs. Could be co-located with other alternative facility(ies) on this site. Rail access on the northern boundary could be used for sorted MSW hauling for disposal.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Utilities would have to be extended to site. Could be co-located with other alternative facility(ies) on this site.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Utilities would have to be extended to site. Could be co-located with other alternative facility(ies) on this site.
		200-1500 TPD	5-7 years	No changes to existing collection system needed. High complexity, but low skill level needed for most operations. Potential permitting issues and public concerns with noise, odor and vector issues. Additional processing/disposal of post-processed MSW would be required. Contamination of recovered materials is significant issue, recovery rates for marketable materials typically 30% or less. End uses/markets and capacities may need development. Moderate capital and operating costs, and additional fleet equipment and operators would be needed for site operations and transport of residuals.							
	This method involves using a combination of mechanical and manual systems to receive, separate, and process unsegregated municipal solid waste to separate recyclables. An MWP facility requires no consumer participation, education, or sorting behavior. Odors, vectors, and contamination are significant issues, and these facilities typically have low recovery rates.										

Alternative	Example Photo	Area Required	Estimated Cost Per Ton	Materials Processed	Site-Specific Considerations						
		Processing Capacity	**Development Time**	**Technology Considerations**	**RRF Site (157 Ac. ±, ~60 Ac Developable)**	**Site 1 – Medley (320 Ac. ± , ~100 Ac. Currently Developable)**	**Site 16 - Ingraham Highway Site 1 (159 Ac. ±)**	**Site 17 - Ingraham Highway Site 2 (81 Ac. ±)**	**Site A1 - Dolphin Expressway Site (416 Ac. ±)**	**Site A2 - Opa-Locka West Airport Site (460 Ac. ±)**	**Site A3 – Okeechobee Road Site (68 Ac.±)**
	Process Description										
Material Recovery Facility		20-60 Ac	$87-154	Materials recovery facilities sort a wide array of recyclable materials, including, but not limited to plastics, cardboard (OCC), paper (including newspapers, magazines, office paper, mixed paper, etc.), glass bottles and jars, and metal containers, including aluminum and steel cans.	Minimal expected permitting and public concerns. Could be co-located with another alternative facility on this site.	Minimal expected permitting and public concerns. Moderate impacts to local traffic. Could be co-located with another alternative facility on this site.	Minimal expected public concerns. Utilities will need to be extended to site. Significantly increased hauling costs. Could be co-located with another alternative facility on this site	Minimal expected public concerns. Utilities will need to be extended to site. Significantly increased hauling costs. Could be co-located with another alternative facility on this site	Minimal expected public concerns. Floodplain and wetland mitigation may increase development costs. Could be co-located with other alternative facility(ies) on this site.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Utilities would have to be extended to site. Could be co-located with another alternative facility on this site.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Utilities would have to be extended to site. Could be co-located with another alternative facility on this site.
		300-825 TPD	5-7 years	Modification of existing curbside collection system needed. High complexity, but low skill level needed for most operations. Capacity limited by site area. Typical maximum processing capacity for these facilities is approximately 350-400 tons per day. Minimal public concerns other than noise and odor. Additional processing/disposal of some post-processed materials (i.e., glass) would be required. Contamination of recovered materials is significant issue. End uses/markets and capacities may need development. Moderate capital and operating costs, and additional fleet equipment and operators would be needed for site operations.							
	A materials recovery facility (MRF) uses a combination of mechanical and manual systems to receive, separate, and process collected recycling materials to be sold to end buyers.										
C&D Recycling Facility		5-20 Ac	$76-150	C&D waste is defined in Chapter 62-701, FAC and generally includes a broad range of waste materials generated from the construction, destruction, or renovation of a structure, including land development operations. This type of waste typically includes materials such as steel, glass, brick, concrete, asphalt material, pipe, gypsum wallboard, and lumber, but also includes rocks, soils, tree remains, trees, and other vegetative matter, clean cardboard, paper, plastic, wood, and metal scraps, yard trash and other materials.	Likely public concerns with noise, odor and dust issues. Depending on footprint area could be co-located with another alternative facility on this site.	Likely public concerns with noise, odor and dust issues. Depending on footprint area could be co-located with another alternative facility on this site.	Potential public concerns with noise, odor and dust issues. Utilities will need to be extended to site. Significantly increased hauling costs. Could be co-located with another alternative facility on this site.	Potential public concerns with noise, odor and dust issues. Utilities will need to be extended to site. Significantly increased hauling costs. Could be co-located with another alternative facility on this site.	Potential public concerns with noise, odor and dust issues. Could be co-located with other alternative facility(ies) on this site.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Utilities would have to be extended to site. Could be co-located with another alternative facility on this site.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Utilities would have to be extended to site. Could be co-located with another alternative facility on this site.
		300 – 825 TPD	3-7 years								
	Processing of C&D waste is typically performed either indoors or outdoors at a dedicated C&D recycling facility using mechanical and manual sorting systems similar to those found in a Material Recovery Facility. The size, equipment, labor needs and layout of a C&D recycling facility depends on its complexity and capacity										

(1) Sources: DC Study (2017 costs escalated) and NREL Study (2020 costs escalated). Cost does not include additional organics collection system costs.

(2) Costs estimated from vendor quote, does not include building or land acquisition costs.

(3) Costs based on 2017 article in Waste Management journal using developed country costs.

1 Introduction

The Miami-Dade County (County) Department of Solid Waste Management (Department or DSWM) provides waste collection and recycling services for residents in the unincorporated areas of the County as well as several cities that have signed Interlocal Agreements (ILAs) with the Department. The Department owns and operates 13 Neighborhood Trash and Recycling Centers, three Regional Transfer Stations, two Home Chemical Collection Centers, three landfills and one Resource Recovery Facility (RRF). Chapter 15 of the County Code of Ordinances (Code) defines the sum of these facilities as the Solid Waste System (System).

A major component of the System is the existing RRF, which can accept up to 3,000 tons per day (tpd) of solid waste, processes approximately 1,000,000 tons of solid waste annually and produces approximately 77 megawatts of electricity annually. The existing RRF was constructed in the early 1980's, became operational in 1982 and due to its age and declining physical and operational condition the Department, the Miami-Dade County Board of County Commissioners (Commission) and the Miami-Dade County Mayor (Mayor) have been considering the development of a new waste-to-energy (WTE) facility to replace the existing RRF.

In April 2022, the Department was tasked with identifying and analyzing potential sites within the County that would be suitable for the development of a future WTE Facility, and to report findings within 60 days. Arcadis U.S., Inc., (Arcadis), as the Bond Engineer for DSWM, assisted the County with this preliminary analysis and prepared the Future Waste-to-Energy Facility Siting Alternatives Analysis Report ("Siting Report") that was completed in June 2022. The Siting Report identified four potential sites, and the Commission selected the existing RRF site for the development of a future WTE facility.

On February 12, 2023, a serious fire occurred at the RRF that heavily damaged the facility and, more importantly, destroyed both the processing equipment that converts incoming garbage to Refuse-Derived Fuel (RDF) and the conveyors that feed the RDF to the boilers. With no capacity to make RDF or feed it to the boilers, the fire rendered the RRF inoperable and the facility has been offline since then. The RRF fire, and its effect on the Doral community, prompted the Commission to reconsider the siting of a future WTE facility. The selection of the existing RRF site was rescinded and the Department, per the Commission's motion dated March 7, 2023, was tasked to:

- Analyze and recommend siting alternatives for a new WTE facility to replace the existing RRF
- Explore alternative technologies to a WTE facility; and
- Prepare a report regarding said analysis and recommendations, including costs and potential funding sources.

Based on discussions during the Commission meeting on March 7, 2023, our understanding is that the BCC directed the DSWM to reconsider the four potential sites that were identified in the Siting Report as suitable for the development of a future Waste-to-Energy facility and prepare a report of findings within 90 calendar days. The report will include additional analysis and information on the four potential sites including environmental, traffic, and public health effects, considering alternative technologies and facilities that may be needed to implement a Zero Waste management strategy within the County, and high-level cost implications, a discussion of potential funding sources, and potential Solid Waste System effects. Three additional sites (Sites A1 – Dolphin Expressway, A2 – Opa-Locka West Airport, and A3 – Okeechobee Road) were added to the original four potential sites at the request of the County over the course of the evaluation process and are included in this report for consideration.

In the June 2022 Siting Report, Arcadis performed a two-stage screening process to locate and evaluate potential sites within the County that would be suitable for the development of a future Waste-to-Energy (WTE) facility. The first screening stage identified parcels located in Miami-Dade County that met initial siting criteria and compared them to agreed-upon Pass/Fail criteria. Parcels that passed the initial screening stage were further analyzed in the second screening stage, which included the evaluation of additional, more extensive siting parameters.

This analysis expands on the original Siting Report to provide the BCC and County staff with more detailed analysis on the four final potential sites and the three additional sites, including a practical discussion regarding the technologies and infrastructure, policy changes, and relative costs required to shift the County's current system of solid waste management toward a Zero Waste strategy.

Due to the expedited nature of this assignment, it should be noted that Arcadis' services are preliminary in nature and a more detailed review and investigation of the factors which may affect the potential development of any solid waste processing facility at any proposed location is required and is assumed would be conducted in a future phase of the County's planning and implementation process. In addition, the information related to a future Zero Waste management strategy is preliminary and intended to provide an introductory overview of the state of the industry and the factors to be taken into consideration for the current System and County policies. It is recommended that a much more detailed analysis be conducted and a comprehensive Zero Waste Master Plan be considered to give the Board the accurate information needed to make informed policy decisions.

2 Preliminary Future WTE Facility Siting Evaluation Update

As mentioned previously, in the June 2022 Siting Report, Arcadis performed a two-stage screening process to locate and evaluate potential sites within the County that would be suitable for the development of a future WTE facility. For a detailed discussion of the screening methodology, please see the June 2022 Siting Report. This section expands on the discussion of the screening criteria used in the original Siting Report to provide the Commission and County staff with more information on the screening criteria rationale that resulted in the selection of the four final identified sites. The three additional sites were added at the request of the County and evaluated against the screening criteria for comparison.

2.1 Applied Screening Criteria

The screening criteria used in the Siting Report are detailed in Table 2.1 and include both the initial and detailed screening criteria. These criteria were generated out of a collaborative effort between Arcadis and Department staff and were applied during the screening analysis, and where possible, a more thorough explanation of the rationale used in their development is provided. To aid with illustrating the extent of the siting limitations for a WTE facility represented by the screening criteria, a map of Miami-Dade County showing the areas eliminated from consideration due to the screening criteria was developed and is included as Appendix C. It should be noted that some siting criteria were suspended for the RRF site, Site 1 - Medley, and Sites A1 – Dolphin Expressway, A2 – Opa-Locka West Airport and A3 – Okeechobee Road, as they were directly requested by the County for detailed review.

It is important to note that the screening criteria used in the Siting Report were intended solely for the development of a future WTE facility on one of the seven identified sites. Other facility types would not have the identical siting requirements and could possibly result in more options for siting locations in the County, and a separate siting analysis should be considered for each type of facility. In this report, alternative technologies and facilities that may be needed to implement a Zero Waste strategy were evaluated for the seven potential sites using the same screening criteria, but no new alternative sites were identified or evaluated.

Table 2.1 Applied Site Screening Criteria

New WTE Facility Site Screening Criteria	
Siting Criteria	Criteria Description
WTE Facility Capacity	Minimum site area sufficient for a mass-burn WTE facility with a throughput capacity of 4,000 tons per day (tpd), expandable to 5,000 tpd, if possible. The facility capacity is a major determining factor in the parcel area needed, and dictates the size of the buildings, areas for roads, stormwater facilities, parking, etc. In addition, setback requirements required by local building codes consume additional acreage. For a 4,000 ton per day WTE facility the minimum site area was determined to be approximately 40 acres.
Site Area and Ownership	Minimum 40-acre site (as explained above) comprised of no more than two contiguous parcels and two owners, no limit on the maximum acreage of any site. In discussions with County staff it was determined that a screening criteria requiring a contiguous 40-acre parcel would be overly restrictive and rule out many possible siting options, but having more than two owners would likely result in a protracted property acquisition schedule, increase acquisition costs, and increase the likelihood that Eminent Domain proceedings would have to be used to acquire one or more of the properties. Sites that were less than 40 acres were analyzed to confirm if any two adjacent parcels, with no more than two owners, could be combined into one site meeting the minimum 40-acre size criteria.
Site Geometry	Sites with parcel boundaries with shapes or dimensions incompatible with a 4,000 ton per day WTE facility were eliminated. In general, WTE facilities for this targeted throughput capacity plus expansion capabilities, if possible, require a parcel area that is at least 1,200 feet wide and approximately 1,500 feet long.
Zoning Considerations	Site(s) must have the following zoning designations: Vacant, Industrial, Commercial, or Agricultural. Properties with existing abandoned building structures and Conservation, Environmentally Endangered Lands (EEL) Program properties, or Other Protected Lands not screened by the GIS tool were excluded. The exclusion of properties with existing abandoned building structures was due to concerns about potential contamination issues that the County would be required to remediate prior to construction, which could greatly affect both the schedule and cost of the facility.
Residential Zoning Offset	Distance to residential zoning was determined using Geographic Information System (GIS) tools and those sites that were within 1,500 feet of residential zoning were eliminated. This requirement was not applied to Site 1, which was submitted by the County for detailed screening consideration. The 1,500-foot offset distance proved to be overly restrictive in the initial screening, and after discussion with County staff, the decision was made to increase the minimum offset from residential zoning to one-half mile (2,640 ft).
Proximity to Airport	Arcadis reviewed County Code Chapter 33 Zoning, Article XXXVII – Airport Zoning, adopted November 19, 2019 (Airport Zoning Article) and Federal Aviation Administration (FAA) regulations pertinent to land use and height restrictions in the proximity of airports and heliports. Sites less than four (4) miles from an airport were excluded from consideration.
Transportation / Travel Time	Maximum travel time of 10 minutes to major (arterial) or collector roads as shown on the 2010 Florida Department of Transportation (FDOT) Federal Functional Classification map was calculated using posted speed limits and online mapping tools.
Canal or Major Roadways on Site	Sites with a canal or major roadway located on the site parcel were precluded from further evaluation because they could not be abandoned and developed.
Lake / Borrow Pit	Sites that included a lake or borrow pit in a portion of the parcel were included as they could be filled. However, sites that were mostly or entirely excavated as a lake or borrow pit were eliminated due to the significant additional time and expense associated with backfilling to create the developable area of the site.
County Parks and other County properties	County parks and other County properties (i.e., wellfields, etc.) that were not screened by the GIS tool were manually identified and eliminated
Other Siting Considerations	Any properties recommended directly by the County to be evaluated as well as sites within and outside of the Urban Development Boundary were considered.
Location	The Location criteria includes the physical location of the site relative to existing Solid Waste System facilities, large air emissions sources, transportation routes, and expected impacts to the System if a proposed WTE facility were sited there. Distance to known large emitters, such as the Titan Pennsuco Complex, WM Medley Landfill, CEMEX Miami Concrete Plant, FPL Turkey Point Power Plant, etc., were calculated for purposes of determining the potential effects on air permitting. Transportation routes were further evaluated for potential traffic conditions, physical and operational condition of roadways, truck queueing areas, and other features that may affect the routing or traffic patterns of vehicles entering and leaving the proposed site. Finally, an evaluation of the effects on the County's Solid Waste System was conducted to determine potential changes to System operations and costs resulting from the assumption of WTE operations at the site.

New WTE Facility Site Screening Criteria	
Utilities	WTE facilities have high demand requirements on several utilities. This screening criteria evaluated the availability of potable water, sanitary sewer, natural gas, electric utility substations, stormwater, and groundwater at each site. If a utility was not available, the closest available service location was determined by a combination of on-line tools and information, service area maps, inspection of aerial and street-level photography, and discussions with County staff and utility services providers. The additional work needed to extend utilities to the site was then included in the site evaluation. Brief discussions of the evaluation of needs and demands for the various utility types are as follows: • Potable water is needed not only for normal human consumption and fire protection but may also be needed (if other sources are not available) for supply water for the boiler feedwater systems, lime slurry production in the Air Pollution Control (APC) system, and many other uses at the facility. For a 4,000 ton per day WTE facility, a site would need a minimum 12" water main with sufficient service pressure to provide an 8" fire line and a 4" potable supply line to the proposed facility. If service pressure is inadequate, a booster station must be added. If potable water utilities are unavailable, the construction of a typical 12" water main from the nearest service location (including valves and appurtenances) is needed, and depending on the site, additional easement or right-of-way area may be needed. • Wastewater (Sanitary Sewer) is needed for toilet facilities, boiler blowdown water, and several other facility processes. The proposed WTE facility would need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation and comparative purposes all wastewater was assumed to be discharged to sanitary sewer. If gravity sewer is not available, a lift station and 6" force main would have to be constructed to connect to the nearest sanitary sewer manhole or lift station wetwell, and depending on the site, additional easement or right-of-way area may be needed. • Natural Gas is the most economical fuel for the boiler auxiliary burners, which ignite the solid waste fuel fed to the boiler grates and allow for controlled startup and shutdown of the proposed facility. The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility. Online maps and other resources were used to determine the approximate location of gas service pipelines within the County. If gas service is unavailable, the construction of a typical 6" gas main from the nearest pipeline location (including valves and appurtenances) is needed, and depending on the site, additional easement or right-of-way area may be needed. • Electricity is used at WTE facilities to operate the various mechanical components. Once a WTE facility becomes operational, the steam generated from the boilers is typically used to drive a steam turbine connected to a generator to provide both the internal electricity required to operate the facility as well as produce excess electricity that is sold to the local electric utility. For this evaluation, the nearest electrical substation was located and the shortest route for the transmission line along existing or proposed access road right-of-way or FPL easements was determined. Additional analysis would need to be performed to verify substation/switchyard spare capacity, voltage, and available terminations. • Stormwater management and controls in accordance with Florida Department of Environmental Protection (FDEP) rules are required for the proposed WTE site. For this evaluation, the site soils, groundwater elevations, presence of floodplains and other information were analyzed to determine what effects the site conditions may have on the proposed WTE facility layout, construction issues, and if any connections to existing stormwater collection systems was available. If the site is located in a floodplain, typically the stormwater system must include additional floodplain compensating storage, which increase both the cost and the site area used for the stormwater system. • Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average 552,000 gallons per day. Other innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.
Soils	United States Department of Agriculture (USDA) soil survey information was reviewed to confirm the type and potential suitability of soils located at each site. Soils information for all sites was obtained from the USDA's Web Soil Survey (WSS), which provides soil data and information produced by the National Cooperative Soil Survey. The soils data provides a wealth of information on the physical conditions at a site that can affect development, including previous site disturbance, groundwater levels, soil bearing capacities and foundation design requirements, depth to bedrock, presence of muck, and many others. If muck and other unsuitable soils were found on a site, they would need to be removed and structural fill imported and placed under affected building foundations. Additional site preparation, such as additional fill for elevation of structures, vibro-compaction, or other work may also be needed. Additional geotechnical investigations and structural design work may also be needed to address poor soil conditions.

New WTE Facility Site Screening Criteria	
Environment	Extensive environmental permitting is required to construct a WTE Facility, in any location. A brief listing of the Federal, State, and local environmental permitting requirements, policies and jurisdictional interfaces required to site, construct and operate a new WTE facility in Miami-Dade County are provided below and were used to provide an estimated degree of permitting difficulty summary for each site. These parameters have not changed in this report. For more detailed explanations, please refer to the June 2022 Siting Report. • FDEP's Environmental Resource Permit (ERP) Program regulates activities involving the alteration of surface water flows. This includes new activities in uplands that generate stormwater runoff from upland construction, as well as dredging and filling in wetlands and other surface waters. • Threatened & Endangered Species - determine if any known Threatened and Endangered (T&E) species or critical habitat for endangered species were present on the sites being evaluated, such as the Florida bonneted bat, the Florida Panther, and the Florida wood stork. • Floodplains - Flood maps serve as critical decision-making tools in flood mitigation, land use planning, emergency management and general public awareness. • Comprehensive Everglades Restoration Plan (CERP) Considerations - CERP is a framework for restoring, protecting and preserving the greater Everglades ecosystem. The plan is a 50-50 partnership between the State of Florida and the federal government. The State of Florida and the South Florida Water Management District have so far invested approximately $2.3 billion in CERP-related land acquisition, project design and construction. The CERP project boundaries layer was used to identify conservation lands, including the Everglades National Park, to determine if any parcel was adjacent to any known or existing CERP project. • Code and Policy Considerations o Miami-Dade County Wellfield Protection Areas - New activities that use or store hazardous materials or generate hazardous waste are prohibited within certain parts of the wellfield protection areas per Sec. 24-43 of the County Code. o Comprehensive Development Master Plan (CDMP) Conservation Aquifer Recharge and Drainage Element (Element) - The intent of this Element is to identify, conserve, appropriately use, protect and restore as necessary the biological, geological and hydrological resources of Miami-Dade County. The following policies were considered when conducting the screening analysis. ▪ Policy CON-7J - In evaluating applications that will result in alterations or adverse impacts to wetlands, those found to be inconsistent with CERP objectives, projects or features shall be denied. ▪ Policy CON-9A - All activities that adversely affect habitat that is critical to federal or State designated, endangered or threatened species shall be prohibited unless such activity(ies) are a public necessity and there are no possible alternative sites where the activity(ies) can occur. ▪ Policy CON-9B - All nesting, roosting, and feeding habitats used by Federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized. o Miami-Dade County Airport Zoning Code - The Airport Zoning Code describes the regulations to provide both airspace protection and land uses compatible with airport operations. o Federal Aviation Administration (FAA) Requirements - the FAA governing regulation is 14 CFR Part 77. In accordance with this regulation and the Miami-Dade County Airport Zoning System Checklist, revised August 5, 2015, the distance for the FAA approach surface height restriction was determined to be approximately 3.4 miles. The existing RRF eastern-most stack is approximately four miles away from MIA along the centerline of the Runways 12-30. Therefore, for the purposes of the preliminary siting analysis, parcels located within four miles of any of the airports governed by the Airport Zoning Code, including the Homestead Air Reserve Base, were not considered. o Florida Electrical Power Plant Siting Act Certification - The Florida Electrical Power Plant Siting Act (PPSA), Sections 403.501-.518, Florida Statute (F.S.), is the State of Florida centralized process for licensing large electrical power plants and is administered by the FDEP Siting Coordination Office. The environmental permitting associated with siting, constructing, and operating a WTE facility falls under the PPSA. The PSD, NPDES, and other permits that the FDEP issues pursuant to federal programs are issued separately from, and in addition to, the issuance of the PPSA certification. Permits issued by the USACE also are issued separately from the PPSA certification. o Florida Transmission Line Act Certification - The Florida Transmission Line Siting Act (TLSA), Sections 403.52-.5365, Florida Statutes (F.S.), is the State of Florida centralized process for licensing electrical transmission lines that are 230 kilovolts (kV) or larger; cross a county line; and are 15 miles or longer. • Air Permitting Air Quality Permitting Requirements The Clean Air Act Amendments (CAAA) required the United States Environmental Protection Agency (USEPA) to set National Ambient Air Quality Standards (NAAQS) for common pollutants emitted from numerous and diverse sources considered harmful to public health and the environment. Based on preliminary estimates of potential emission levels, a new 4,000 tpd WTE Facility would constitute a new major emission source. As a proposed new major source, a 4,000 tpd WTE Facility would be subject to federal New Source Review (NSR) requirements. NSR refers to the pre-construction review process that applies to new and modified major sources for the purpose of protecting air quality through a permitting framework that supports compliance with the NAAQS. NSR includes two permitting programs: Prevention of Significant Deterioration (PSD) permitting and Nonattainment NSR (NNSR) permitting. Under NSR, a new 4,000 tpd WTE facility proposed for a location in Miami-Dade County would be subject to PSD permitting requirements in recognition that PSD review applies to new major sources in NAAQS attainment areas. PSD Permitting Program PSD permitting provides for carefully managed economic growth in a manner consistent with preserving clean air resources. The primary objectives of the PSD permitting program are to protect public health and welfare and to limit degradation of air quality in surrounding areas and within designated areas of special recreational, scenic, or historic value. Siting a new 4,000 tpd WTE facility in Miami-Dade County presents unique challenges considering the complex pre-construction permitting requirements that apply under the PSD permitting regulation. In particular, the proximity of nearby sensitive areas (Everglades National Park, which is a federally protected Class I area, and the Biscayne Bay sensitive Class II area) and the presence of existing facilities with high emission levels in the county, impart uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE Facility and make securing an air construction permit very challenging at the prospective sites. Extensive air dispersion modeling, additional analyses and correspondence with regulatory agencies is required in order to definitively evaluate the feasibility and degree of difficulty of air permitting at any proposed site.

New WTE Facility Site Screening Criteria	
Transportation	A proposed 4,000 ton per day WTE facility would be expected to receive approximately 300-400 inbound vehicles per day and provide for a typical queueing length suitable for between 50 and 100 vehicles during peak delivery periods. This transportation demand requires, at a minimum, an FDOT standard two-lane road with paved shoulders and stormwater controls and sufficient area on site for vehicle queueing. Also, per the Initial Siting requirements, the travel time to an Arterial or Collector Road must be less than 10 minutes. This report proposes no changes to the previous transportation evaluation results for the four potential sites.
Community	According to the USEPA, the term environmental justice is defined as: “the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.” The USEPA EJScreen Tool was used in the June 2022 Siting Report to provide an initial estimate of environmental justice concerns at each site. This report makes no changes to the initial estimates for the four potential sites.
Schedule Considerations	The development of a WTE facility typically takes seven (7) to ten (10) years to complete. This time frame, which includes the preliminary planning stage, siting, permitting, financing, procurement, design, and construction, varies depending upon the complexity of the project and extent of the regulatory and public concerns. For a detailed discussion of the methodology Arcadis used to develop preliminary high-level implementation schedules for the four final identified sites, please refer to the June 2022 Siting Report. While the starting date for the development implementation schedules will need to be adjusted depending on when final decisions are made by the County, the project durations included in the Siting Report have not been changed. The duration for new WTE facility implementation activities is estimated to be between 7 years, 9 months to 11 years, 6 months depending upon the ultimate site selected. See Table 2-2.
Cost	Arcadis developed a cost considerations table to approximate the difference in cost of the various components required to site, construct and operate a new WTE facility at the seven sites. This cost comparison includes planning level estimates for additional costs associated with the facility construction, annual Operations and Maintenance (O&M), as well as the potential system impacts specific to each site option. The additional costs are compared to the costs of developing a new WTE facility on the existing site, which is considered the base case and reflects estimated stormwater lake fill costs and environmental considerations. The capital costs and first year O&M cost associated with a new WTE facility located on the Existing RRF site were developed previously by Arcadis as part of a separate effort and represents the base case for comparative purposes. For a detailed discussion of the cost estimation methodology for the seven identified sites, please refer to the June 2022 Siting Report.

2.2 Evaluated Sites

The June 2022 Siting Report identified four potentially viable sites for consideration, which are listed below and shown in Figure 2.1:

- Site 1 – Medley
- Site 16 – Ingraham Hwy. Site #1
- Site 17 – Ingraham Hwy. Site #2
- Existing RRF Site – Doral

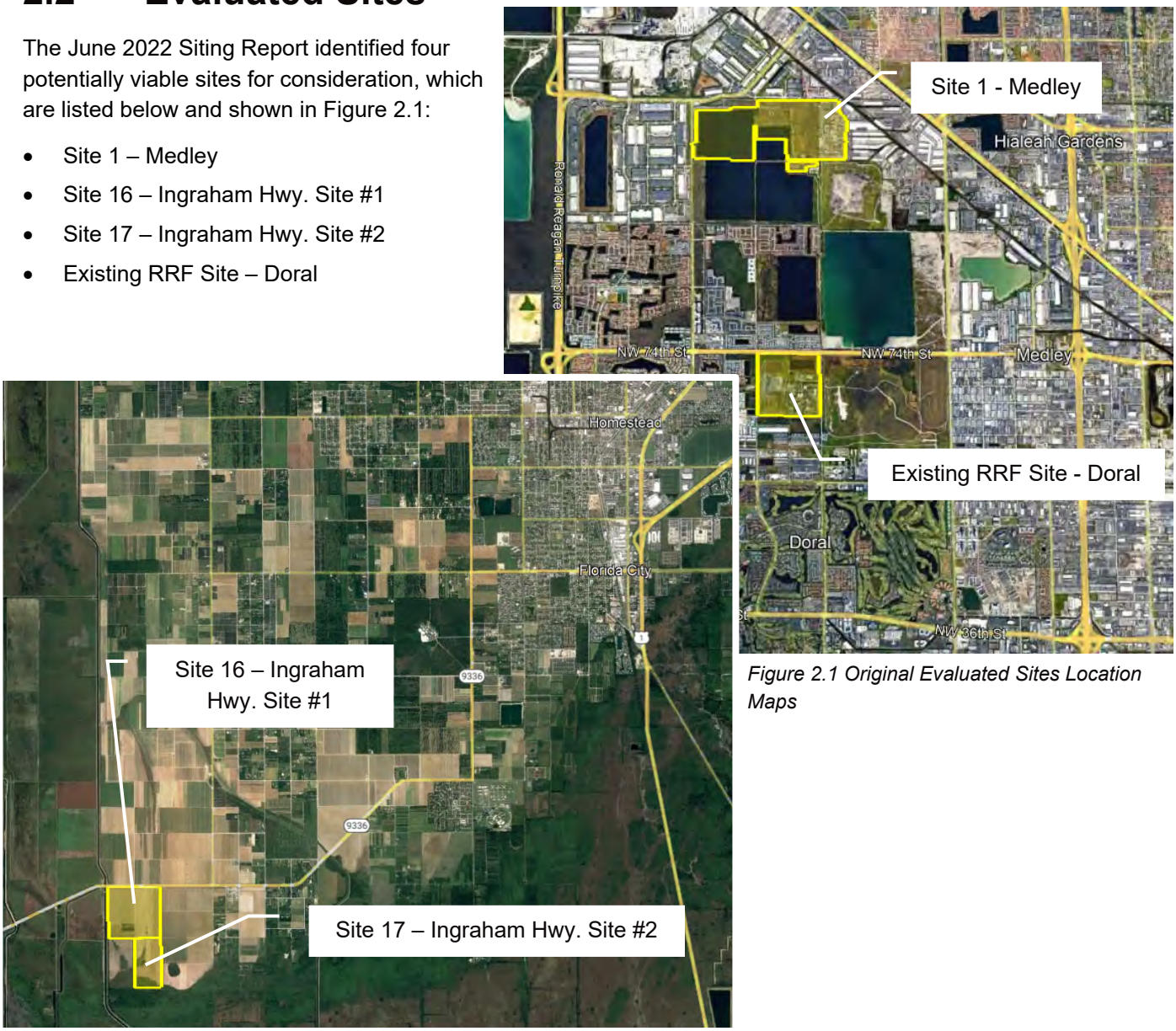


Figure 2.1 Original Evaluated Sites Location Maps

As mentioned previously, three additional sites (Sites A1 – Dolphin Expressway, A2 – Opa-Locka West Airport and A3 – Okeechobee Road) were added to the original four final sites at the request of the County over the course of this evaluation process and are included in this report for consideration. The locations of these sites are shown in Figure 2.2 below.

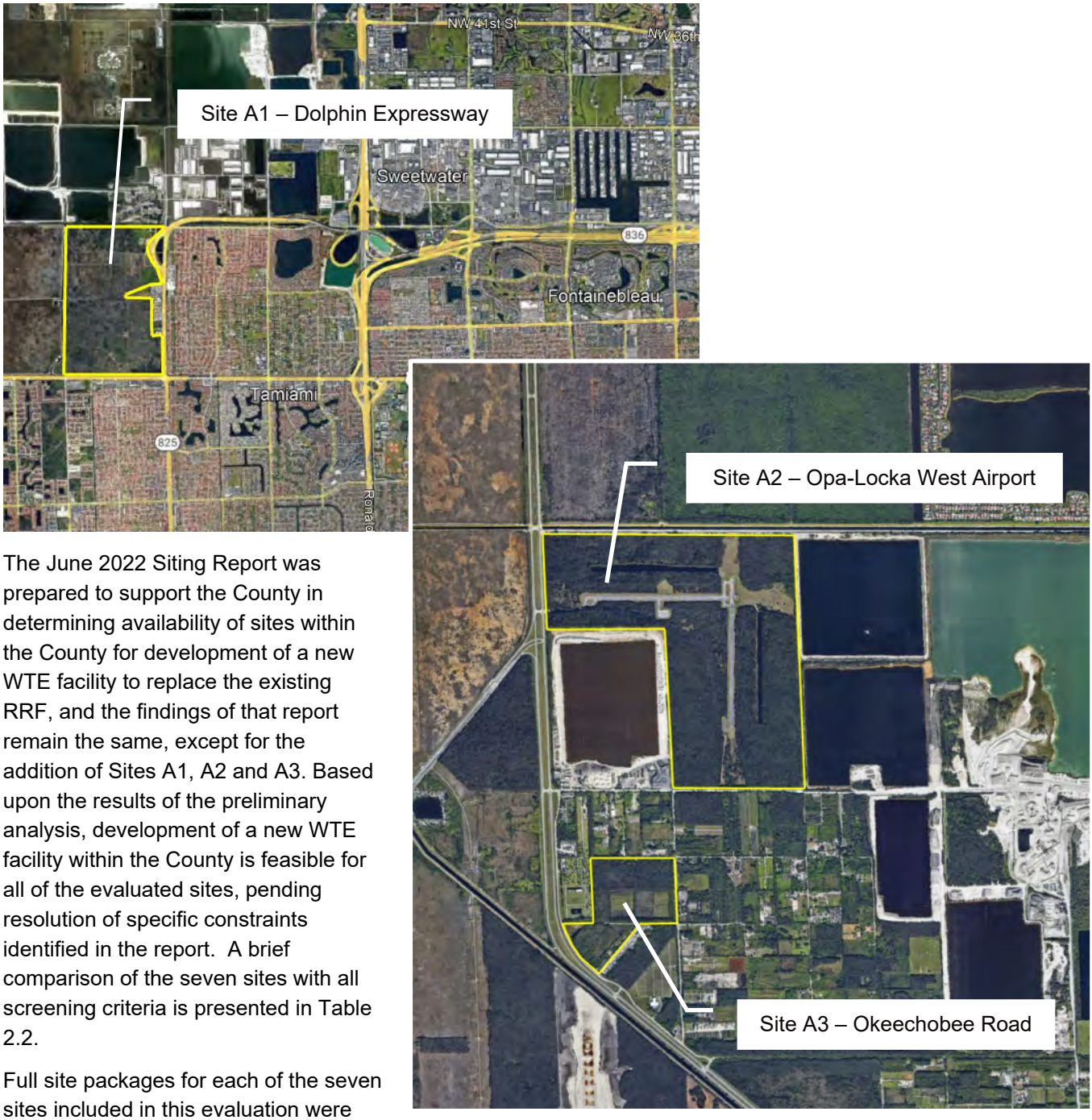


Figure 2.2 Additional Sites A1, A2 and A3 Location Maps

The June 2022 Siting Report was prepared to support the County in determining availability of sites within the County for development of a new WTE facility to replace the existing RRF, and the findings of that report remain the same, except for the addition of Sites A1, A2 and A3. Based upon the results of the preliminary analysis, development of a new WTE facility within the County is feasible for all of the evaluated sites, pending resolution of specific constraints identified in the report. A brief comparison of the seven sites with all screening criteria is presented in Table 2.2.

Full site packages for each of the seven sites included in this evaluation were prepared and updated with additional screening details and considerations for several alternative processing technologies and are included in Appendix C. The locations of the seven sites within Miami-Dade County are shown in Figure 2.3 below.

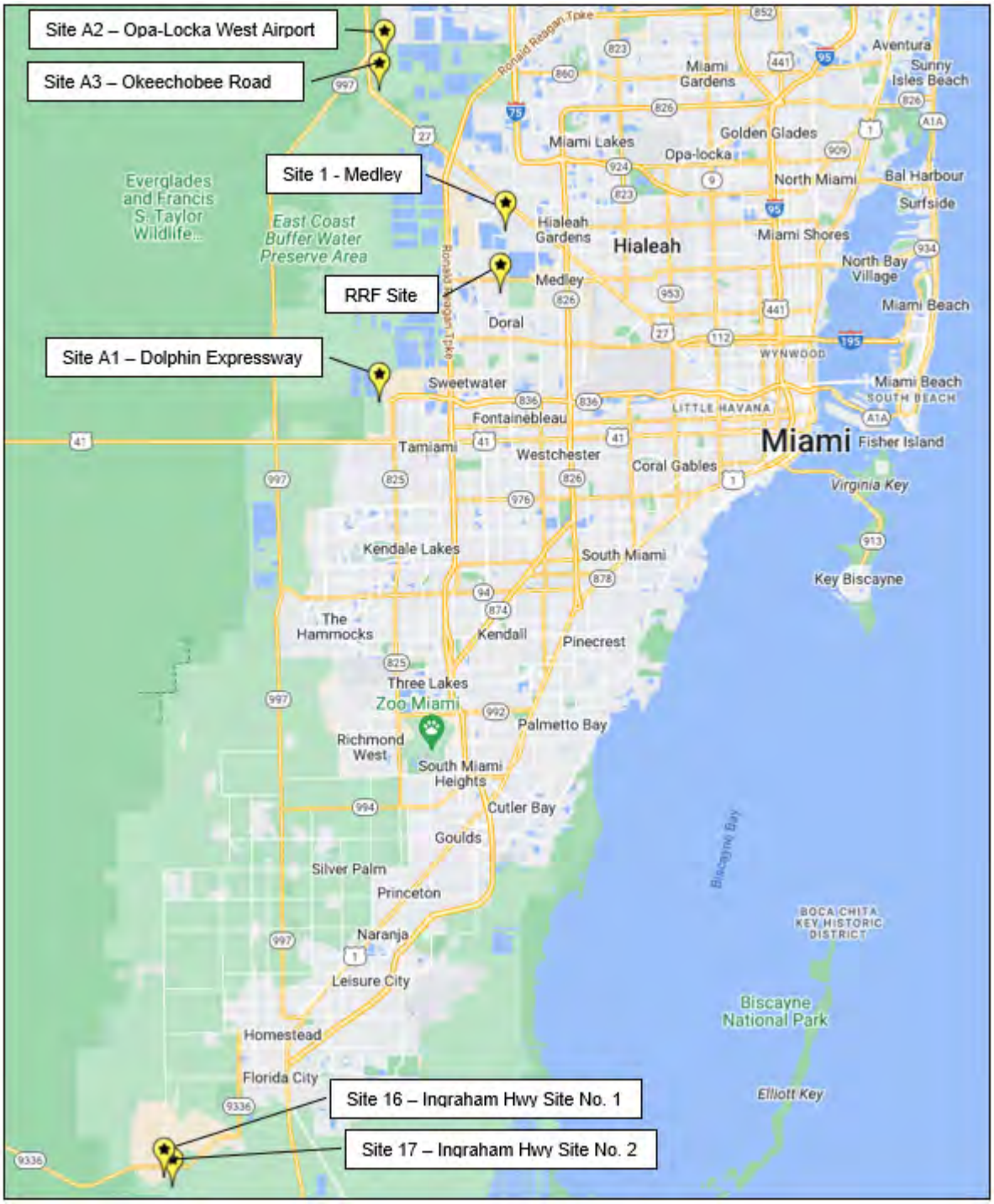


Figure 2.3 Evaluated Sites Location Map

Table 2.2 Site Comparison Summary

New WTE Facility Siting Summary							
Siting Criteria	Existing RRF	Site 1 - Medley	Site 16 Ingraham Hwy. Site #1	Site 17 Ingraham Hwy. Site #2	Site A1 – Dolphin Expressway	Site A2 – Opa-Locka West Airport	Site A3 – Okeechobee Road
WTE Facility Capacity	Parcel size suitable for development of a 4,000 or 5,000 tpd WTE facility footprint as well as additional acreage to accommodate co-location of additional ash monofill capacity or other County facilities in consideration of future sustainable campus concept (after demolition of Existing RRF).	Parcel size suitable for development of a 4,000 or 5,000 tpd WTE facility footprint as well as additional acreage to accommodate co-location of ash monofill or other County facilities in consideration of future sustainable campus concept.	Parcel size suitable for development of a 4,000 or 5,000 tpd WTE facility footprint as well as additional acreage to accommodate co-location of ash monofill or other County facilities in consideration of future sustainable campus concept.	Parcel size suitable for development of a 4,000 or 5,000 tpd WTE facility footprint as well as additional acreage to accommodate co-location of ash monofill or other County facilities in consideration of future sustainable campus concept.	There are many possible parcel combinations that would result in an area suitable for development of a 4,000 or 5,000 tpd WTE facility as well as additional acreage to accommodate co-location of other County facilities.	Assuming the full parcel area can be developed, the parcel size is suitable for development of a 4,000 or 5,000 tpd WTE facility footprint as well as additional acreage to accommodate co-location of ash monofill or other County facilities in consideration of future sustainable campus concept.	Assuming the full parcel area can be developed, the parcel size is suitable for development of a 4,000 or 5,000 tpd WTE facility footprint as well as additional acreage to accommodate other County facilities in consideration of future sustainable campus concept.
Site Area and Ownership	157.16-acre site, single parcel, inside the UDB. County owned.	320.31-acre site, multiple parcels, inside the UDB. Single private owner.	159.71-acre site consisting of two parcels outside the UDB. Both parcels privately owned.	81.11-acre site, single parcel, located outside the UDB. Privately owned.	Site area considered includes 147 parcels covering a total area of 864 acres. The County owns a few parcels, but most are privately owned. Portions of the site area are within the UDB and the 2030 Urban Expansion Area Boundary (UEA), as follows: • Outside UDB (±772 acres) • Inside UDB (±89 acres) • Inside UEA (±284 acres)	416-acre site consisting of two parcels outside the UDB. Both parcels owned by the County.	68-acre site consisting of ten parcels outside the UDB. Single owner.
Site Geometry	Rectangular, 5,280 ft x 5,280 ft	Irregular	Rectangular, 1,320 ft x 2,640 ft	Rectangular, 2,640 ft x 2,640 ft	Variable, many possible parcel combinations	L-shaped, each leg approximately one mile long, ½ mile wide.	Irregular shape.
Zoning Considerations	Zoning District: GU (Interim District)	Zoning District: M-1 (Light Industrial)	Zoning District: AU (Agriculture)	Zoning District: AU (Agriculture)	Zoning District: GU (Interim District)	Zoning District: GU (Interim District)	Zoning District: AU (Agricultural/Residential)
Residential Zoning Offset	Less than 0.1 mile	None – adjacent to residential zoning	Greater than 0.5 mile	Greater than 0.5 mile	Varies, Minimum is 0.1 mile	Greater than 0.5 mile	Less than 0.5 mile
Proximity to Airport	4.0 miles from MIA	Greater than four miles	Greater than four miles	Greater than four miles	Greater than four miles	Greater than four miles	Greater than four miles

<table>
<tr><th colspan="8">New WTE Facility Siting Summary</th></tr>
<tr>
<td>Transportation / Travel Time</td>
<td>Travel time to major roads (i.e., 58th Street, 74th Street) is less than 10 minutes.

Estimated travel distances and times from the site to the County's transfer stations and landfills are as follows:

<table><tr><th>Facility</th><th>Est. Travel Dist/Time to RRF</th></tr><tr><td>West TS</td><td>9 mi/16 min</td></tr><tr><td>Central TS</td><td>14 mi/21 min</td></tr><tr><td>Northeast TS</td><td>18 mi/25 min</td></tr><tr><td>S. Dade LF</td><td>25 mi/31 min</td></tr><tr><td>N. Dade LF</td><td>21 mi/23 min</td></tr></table></td>
<td>Travel time to major roads (i.e., Florida Turnpike, US27) is less than 10 minutes.

Estimated travel distances and times from the site to the County's transfer stations and landfills are as follows:

<table><tr><th>Facility</th><th>Est. Travel Dist/Time to Site 1</th></tr><tr><td>West TS</td><td>11 mi/18 min</td></tr><tr><td>Central TS</td><td>11 mi/23 min</td></tr><tr><td>Northeast TS</td><td>15 mi/25 min</td></tr><tr><td>S. Dade LF</td><td>26 mi/32 min</td></tr><tr><td>N. Dade LF</td><td>18 mi/19 min</td></tr></table></td>
<td>Travel time north to W Palm Drive is less than 10 minutes.

Estimated travel distances and times from the site to the County's transfer stations and landfills are as follows:

<table><tr><th>Facility</th><th>Est. Travel Dist/Time to Site 16</th></tr><tr><td>West TS</td><td>35 mi/41 min</td></tr><tr><td>Central TS</td><td>45 mi/53 min</td></tr><tr><td>Northeast TS</td><td>58 mi/63 min</td></tr><tr><td>S. Dade LF</td><td>20 mi/31 min</td></tr><tr><td>N. Dade LF</td><td>58 mi/59 min</td></tr></table></td>
<td>Travel time north to W Palm Drive is less than 10 minutes.

Estimated travel distances and times from the site to the County's transfer stations and landfills are as follows:

<table><tr><th>Facility</th><th>Est. Travel Dist/Time to Site 17</th></tr><tr><td>West TS</td><td>35 mi/41 min</td></tr><tr><td>Central TS</td><td>45 mi/53 min</td></tr><tr><td>Northeast TS</td><td>58 mi/63 min</td></tr><tr><td>S. Dade LF</td><td>20 mi/31 min</td></tr><tr><td>N. Dade LF</td><td>58 mi/59 min</td></tr></table></td>
<td>Travel time to SR 836 and Florida Turnpike less than 10 minutes.

Estimated travel distances and times from the site to the County's transfer stations and landfills are as follows:

<table><tr><th>Facility</th><th>Est. Travel Dist/Time to Site A1</th></tr><tr><td>West TS</td><td>10 mi/13 min</td></tr><tr><td>Central TS</td><td>15 mi/19 min</td></tr><tr><td>Northeast TS</td><td>26 mi/30 min</td></tr><tr><td>S. Dade LF</td><td>20 mi/27 min</td></tr><tr><td>N. Dade LF</td><td>25 mi/25 min</td></tr></table></td>
<td>Travel time to US27 and Florida Turnpike less than 10 minutes.

Estimated travel distances and times from the site to the County's transfer stations and landfills are as follows:

<table><tr><th>Facility</th><th>Est. Travel Dist/Time to Site A2</th></tr><tr><td>West TS</td><td>22 mi/25 min</td></tr><tr><td>Central TS</td><td>26 mi/31 min</td></tr><tr><td>Northeast TS</td><td>23 mi/27 min</td></tr><tr><td>S. Dade LF</td><td>32 mi/37 min</td></tr><tr><td>N. Dade LF</td><td>19 mi/19 min</td></tr></table></td>
<td>Travel time to US27 and Florida Turnpike less than 10 minutes.

Estimated travel distances and times from the site to the County's transfer stations and landfills are as follows:

<table><tr><th>Facility</th><th>Est. Travel Dist/Time to Site A3</th></tr><tr><td>West TS</td><td>20 mi/23 min</td></tr><tr><td>Central TS</td><td>24 mi/29 min</td></tr><tr><td>Northeast TS</td><td>21 mi/25 min</td></tr><tr><td>S. Dade LF</td><td>30 mi/35 min</td></tr><tr><td>N. Dade LF</td><td>17 mi/17 min</td></tr></table></td>
</tr>
<tr><td>Canal or Major Roadways on Site</td><td>None</td><td>None</td><td>None</td><td>None</td><td>None</td><td>None</td><td>None</td></tr>
<tr><td>Lake / Borrow Pit</td><td>Existing stormwater pond on site</td><td>Existing borrow pit over much of the parcel area.</td><td>None</td><td>None</td><td>None</td><td>Existing stormwater ditches along both runways.</td><td>None</td></tr>
<tr><td>County Parks and other County properties</td><td>Site not selected by GIS screening criteria. County property used for solid waste management.</td><td>Site not selected by GIS screening criteria. Property is not a County Park or other County property.</td><td>Site selected by clearing GIS screening criteria. Property is not a County Park or other County property.</td><td>Site selected by clearing GIS screening criteria. Property is not a County Park or other County property.</td><td>Site not selected by GIS screening criteria. WASD owns several properties within the site area.</td><td>Site not selected by GIS screening criteria. County property, former small airport site.</td><td>Site not selected by GIS screening criteria.</td></tr>
<tr><td>Other Siting Considerations</td><td>Site requested by County for evaluation, inside the UDB</td><td>Site requested by County for evaluation, inside the UDB</td><td>Outside the UDB</td><td>Outside the UDB. Entire site is within a proposed Mitigation Bank area currently under consideration by the BCC.</td><td>Site requested by County for evaluation, parcels inside and outside the UDB.</td><td>Site requested by County for evaluation, outside the UDB, inside CERP Project Area.</td><td>Site requested by County for evaluation, outside the UDB. Wetlands Mitigation Area on site. Adjacent to CERP Project Area.</td></tr>
</table>

New WTE Facility Siting Summary							
Location	157.16-acre site, single parcel inside the UDB. Minimal impact to System if selected, however, construction phasing will need to be considered in order to limit impact to RRF operations. Parcel size suitable for development of WTE facility footprint as well as additional acreage to accommodate co-location of additional ash monofill capacity or other County facilities in consideration of future sustainable campus concept (after demolition of Existing RRF).	320.31-acre site, directly adjacent to residential zoning, inside the UDB, approximately two miles north of the existing RRF facility, and adjacent to the Medley Landfill. If this site were selected, the overall effects on the County's Solid Waste System would be relatively minimal.Also, the Medley Landfill has a history of odor complaints, and the WTE, if sited here, could be the subject of future odor complaints. Parcel size suitable for development of WTE facility footprint as well as additional acreage to accommodate co-location of ash monofill or other County facilities in consideration of future sustainable campus concept.	159.71-acre site consisting of two parcels outside the UDB. Considerable System effects if this site were selected. To maintain current collection patterns and travel times, a new transfer station would need to be constructed at the RRF site if this site were selected for development. Parcel size suitable for development of WTE facility footprint as well as additional acreage to accommodate co-location of ash monofill or other County facilities in consideration of future sustainable campus concept.	81.11-acre site is located outside the UDB. Considerable System effects if this site were selected. To maintain current collection patterns and travel times, a new transfer station would need to be constructed at the RRF site if this site were selected for development. Parcel size suitable for development of WTE facility footprint as well as additional acreage to accommodate co-location of ash monofill or other County facilities in consideration of future sustainable campus concept.	864-acre site is centrally located in the County and consists of 148 parcels with 70 different owners. Some parcels in the eastern portion of the site are inside the UDB and the 2030 Urban Expansion Area Boundary (UEA). There are many possible parcel combinations that could be large enough to support any of the alternative facilities and co-locate multiple facilities into a solid waste campus, depending on the constraints of the specific parcel(s) selected for development. To maintain current collection patterns and travel times, a new transfer station would need to be constructed at the RRF site if this site were selected for development.	416-acre site is located outside the UDB, at the northern edge of Miami Dade County. If this site were selected for the development of one or more of the alternative facilities there would be impacts to the local traffic levels, but the effects on the County's Solid Waste System would be minimal. To maintain current collection patterns and travel times, a new transfer station would need to be constructed at the RRF site if this site were selected for development. The changes in travel times and distances from the RRF site, especially for the West TS, may affect some Collection and Transfer operations. Collection and Transfer fleet labor, fuel consumption and maintenance costs may increase if this site were selected for development.	68-acre site is located outside the UDB, at the northern edge of Miami Dade County. If this site were selected for the development of one or more of the alternative facilities there would be impacts to the local traffic levels, but the effects on the County's Solid Waste System would be minimal. To maintain current collection patterns and travel times, a new transfer station would need to be constructed at the RRF site if this site were selected for development. The changes in travel times and distances from the RRF site, especially for the West TS, may affect some Collection and Transfer operations. Collection and Transfer fleet labor, fuel consumption and maintenance costs may increase if this site were selected for development.
Utilities	All required utilities infrastructure available	Potable water and sanitary sewer utilities appear to be available at the site, electric and natural gas utilities would have to be extended to the site.	All required utilities would have to be extended to the site.	All required utilities would have to be extended to the site.	All required utilities available on 137th Avenue. In general, the parcels bordering NW 137th Ave have good access to existing utilities, but access may become more complicated for parcels within the site. Depending on what parcel(s) are selected for development, many additional parcels or utility easements may be needed to allow for the extension of utilities	All required utilities would have to be extended to the site.	All required utilities would have to be extended to the site.

New WTE Facility Siting Summary							
Soils	Site has been used for WTE facility operations previously, no known site soils issues exist.	The USDA Soil Survey data for the site and historical aerial photos (c. 1985) indicate the site area was previously excavated and subsequently backfilled. In order for a WTE facility to be located at this site, the facility buildings and ancillary components would have to be constructed on backfill material, which could present significant geotechnical engineering challenges for foundation designs and additional site preparation costs.	Site soils are not ideally suited for building foundations because of water content and shallow depth to bedrock.	Site soils are not ideally suited for building foundations because of water content and shallow depth to bedrock.	Site soils are not ideally suited for building foundations because of water content and shallow depth to bedrock.	Site soils are primarily muck and silty soil types and are not ideally suited for building foundations because of water content and shallow depth to bedrock.	Site soils are primarily muck soil type and are not ideally suited for building foundations because of water content and shallow depth to bedrock.
Environment	Air Permitting - May be challenging, other large emitters (Medley Class I Landfill and Titan Pennsuco Complex) exist nearby that were not present when RRF was initially modeled and permitted. Possible habitat issues (Bonneted Bat)	Air Permitting – May be challenging, as site is located between two other large existing emitters, the Medley Class I Landfill and Titan Pennsuco Complex. In addition, the adjacent elevated (200 ft +) Medley Landfill may result in exhaust plume impaction during air emissions dispersion modeling. ERP required. Possible habitat issues (Bonneted Bat)	Floodplain – FEMA Zone A Air permitting expected to be extremely difficult due to proximity to Everglades National Park. ERP required, possible habitat issues (Bonneted Bat). The site is located within the Florida Bonneted Bat and Everglades Snail Kite consultation area, has core foraging habitat for the federally endangered Wood Stork and Florida Bonneted Bat, and may contain habitat for species listed in Appendix B of the CDMP. ERP permitting at this site may be very challenging due to required LEDPA (Least Environmentally Damaging Practicable Alternative) analysis.	Floodplain – FEMA Zone A Air permitting expected to be extremely difficult due to proximity to Everglades National Park. ERP required, possible habitat issues (Bonneted Bat). The site is located within the Florida Bonneted Bat and Everglades Snail Kite consultation area, has core foraging habitat for the federally endangered Wood Stork and Florida Bonneted Bat, and may contain habitat for species listed in Appendix B of the CDMP. ERP permitting at this site may be very challenging due to required LEDPA (Least Environmentally Damaging Practicable Alternative) analysis. Entire site is within a proposed Mitigation Bank area currently under consideration by the BCC.	Floodplain – FEMA Flood Zones AE (El. 7) and AH (El. 7) Air permitting expected to be extremely difficult due to close proximity to Everglades Class I Area (approximately 4.1 miles) and an existing nearby large emitter (CEMEX Miami facility). National Wetlands Inventory mapping indicates most of the site is a Freshwater Emergent Wetland habitat, possible habitat issues (Wood Stork, Bonneted Bat). ERP required. The site is located within the Florida Bonneted Bat and Everglades Snail Kite consultation area, has core foraging habitat for the federally endangered Wood Stork and Florida Bonneted Bat, and may contain habitat for species listed in Appendix B of the CDMP. ERP permitting at this site may be very challenging due to required LEDPA (Least Environmentally Damaging Practicable Alternative) analysis.	Air Permitting – May be challenging, as site is located near another large existing emitter, the Titan Pennsuco Complex. Floodplain – FEMA Flood Zones AE (El. 7) and AH (El. 7) National Wetlands Inventory mapping indicates most of the site is a Freshwater Emergent Wetland habitat, possible habitat issues (Wood Stork, Bonneted Bat). ERP required. The site is located within the Florida Bonneted Bat and Everglades Snail Kite consultation area, has core foraging habitat for the federally endangered Wood Stork and Florida Bonneted Bat, and may contain habitat for species listed in Appendix B of the CDMP. ERP permitting at this site may be very challenging due to required LEDPA (Least Environmentally Damaging Practicable Alternative) analysis.	Air Permitting – May be challenging, as site is located near another large existing emitter, the Titan Pennsuco Complex. Floodplain – FEMA Flood Zone A ERP required. The site has potential habitat for the Florida Panther, Swallow-Tailed Kite, and Southern Bald Eagle. Additionally, the site is also strategic habitat conservation area for the Florida Panther. The site is within 2.5 and 2.7 miles of active wood stork colonies and within five miles of three currently known Southern Bald Eagle nests. The site has jurisdictional wetland habitat and portions of the site are serving as wetland mitigation for on-site impacts. The northern parcels (30-001-2910-0070, etc) may contain jurisdictional wetlands and/or habitat for species listed in Appendix B of the CDMP. ERP permitting at this site may be very challenging due to required LEDPA (Least Environmentally Damaging Practicable Alternative) analysis.

New WTE Facility Siting Summary							
Transportation	Existing access to site is via NW 97th Ave., which was recently four- laned and has sufficient capacity for the expected traffic loadings of the proposed WTE facility. Traffic impacts on local roads would be unchanged from existing conditions. The site has sufficient area to accommodate truck queueing.	The site has good access to Florida Turnpike and US-27 via Beacon Station Blvd., but some road areas need to be improved and the Town of Medley may want the County to assume maintenance of some or all of the access roads, which would increase the County's costs. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts to local area will likely be significant. Truck queuing will have to be accomplished on site to prevent further congestion.	Existing access to the site is via Ingraham Hwy. and no additional offsite road improvements are needed. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts on Ingraham Hwy., W Palm Drive, and other local roads may be significant. Truck queuing will have to be accomplished on site to prevent further congestion.	Existing access to site is via Ingraham Hwy. and SW 222nd Ave. (see map below), but approximately 0.75 miles of two-lane road with paved shoulders will need to be constructed for proper site access. Additional ROW may have to be acquired. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts on Ingraham Hwy., W Palm Drive, and other local roads may be significant. Truck queuing will have to be accomplished on site to prevent further congestion	The parcels bordering NW 137th Ave have good access to the Dolphin Expressway and the Florida Turnpike, but access may become more complicated for parcels within the site. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will increase traffic loads on the Florida Turnpike and the Dolphin Expressway, which are already high traffic count roadways. Traffic increases would also be expected on 8th Street, 12th Street, 137th Ave and other local roads. Truck queuing will have to be accomplished on site to prevent congestion of local roads. Depending on what parcel(s) are selected for development, many additional parcels or access easements may be needed to establish road access sufficient for heavy truck traffic. Also, rail access may be available along north side of site.	The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will increase traffic loads on the Florida Turnpike and US27, which are already high traffic count roadways. Truck queuing will have to be accomplished on site to prevent congestion of local roads. Selection of this site will prohibit future use of the Opa-Locka West Airport site for aviation.	The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will increase traffic loads on the Florida Turnpike and US27, which are already high traffic count roadways. Traffic increases would also be expected on the frontage road at the site. Truck queuing will have to be accomplished on site to prevent congestion of local roads. Selection of this site will prohibit future use of the Opa-Locka West Airport site for aviation.
Community	Residential developments have encroached around the site in the years since the Existing RRF went into operation. The site is now less than a tenth of a mile from the nearest residential zoning and the local population. Community political leaders and environmental groups have indicated opposition to continued use of the site for WTE facility operations.	The site is adjacent to residential zoning. The west edge of the site borders one trailer park owned by the Town of Medley, and another that is leased by the town. Siting of a WTE facility may face community opposition at this location.	The site is approximately half a mile from the nearest residential zoning and is approximately one mile from the boundary of Everglades National Park, which suggests that the siting of a WTE facility may be strongly opposed by the community, environmental groups, and regulators.	The site is approximately half a mile from the nearest residential zoning and is 1.28 miles from the boundary of Everglades National Park, which suggests that the siting of a WTE facility may be strongly opposed by the community, environmental groups, and regulators.	Some parcels in the eastern and southern portions of the site are within 0.1 miles of residential zoning, and the site contains wetlands and possible habitat for multiple species. The siting of a WTE facility may face opposition by the community, environmental groups, and regulators at this location.	The site is more than a mile from residential zoning. Site contains extensive wetland areas and is located within a CERP project area, so the siting of a WTE facility may face opposition by environmental groups and regulators.	The site is less than a mile from residential zoning. Site is adjacent to a CERP project area, so the siting of a WTE facility may face opposition by environmental groups and regulators.
Schedule Considerations	Shortest schedule duration because of existing PPSA, potentially reducing PPSA permitting effort and minimal site preparation work required. Coordination of construction during RRF operation required. Estimated Project Duration: 7-years 9-months	Short estimated schedule duration. Land acquisition, PPSA permitting, and some minor site work increase schedule duration. Estimated Project Duration: 9-years 9-months	Long estimated schedule duration. Land acquisition, PPSA permitting, wetland, floodplain, and wildlife mitigation, and significant site work increase schedule duration. Estimated Project Duration: 11-years 3-months	Long estimated schedule duration. Land acquisition, PPSA permitting, wetland, floodplain, and wildlife mitigation, and significant site work increase schedule duration. Estimated Project Duration: 11-years 3-months	Longest estimated schedule duration. Land and ROW/easement acquisition with multiple owners, PPSA permitting, wetland, floodplain, and wildlife mitigation, and significant site work increase schedule duration. Estimated Project Duration: 12-years 3-months	Second shortest estimated schedule duration. PPSA permitting, wetland, floodplain, and wildlife mitigation, and significant site and utility work increase schedule duration. Estimated Project Duration: 9-years 3-months	Short estimated schedule duration. Land acquisition, PPSA permitting, wetland, floodplain, and wildlife mitigation, and significant site and utility work increase schedule duration. Estimated Project Duration: 10-years 0-months

New WTE Facility Siting Summary								
Cost	For comparative purposes, the existing RRF site is considered the base cost condition and the base capital cost includes estimated stormwater detention pond fill costs, environmental considerations and ash hauling costs. Total Estimated Capital Cost (not including land): $1,488,886,000[1]. Estimated Land Cost*: $0 Total Estimated Capital Cost (including land): $1,488,886,000	Additional costs anticipated for land acquisition*, on-site utility facilities, stormwater considerations and addition of fill for soil fortification, zoning and potential additional permitting efforts for new PPSA. A new transfer station facility at the RRF site is not anticipated because of the minimal change in hauling distance to this site. Purchase of potable water may increase anticipated operational costs. It is also assumed that there may be impact fees or improvements required to local roads that have not yet been factored into the capital cost for this site because the extent of roadway modifications is currently not known. It is anticipated that these would be negotiated and further evaluated during the land acquisition process. Total Estimated Capital Cost (not including land): $1,498,497,272[1] (0.6% increase). Estimated Land Cost*: $112,848,865. Total Estimated Capital Cost (including land): $1,611,346,137 (8.2% increase) (Additional 15% annual operational cost for potable water purchase and ash hauling.)	Significant additional costs anticipated for land acquisition*, on and off-site utility facilities, floodplain, wetland, and wildlife mitigation, additional permitting efforts, and a new ($45M) transfer station facility at the RRF site. Significant impact on hauling system due to distance from other System facilities would increase capital and operational cost. Purchase of potable water and significant distance to haul ash for disposal will increase anticipated operational costs. Total Estimated Capital Cost (not including land): $1,574,370,330[1] (5.7% increase). Estimated Land Cost*: $8,976,790. Total Estimated Capital Cost of $1,583,347,120 (6.3% increase) (Additional 103% annual operational cost for potable water purchase, significant ash hauling, and additional System hauling costs.)	Significant additional costs anticipated for land acquisition*, on and off-site utility facilities, flood plain, wetland, and wildlife mitigation, additional permitting efforts, and a new ($45M) transfer station facility at the RRF site. Significant impact on hauling system due to distance from other System facilities would increase capital and operational cost. Purchase of potable water and significant distance to haul ash for disposal will increase anticipated operational costs. Total Estimated Capital Cost (not including land): $1,576,952,227[1] (5.9% increase). Estimated Land Cost*: $4,118,620. Total Estimated Capital Cost of $1,581,070,847 (6.2% increase) (Additional 103% annual operational cost for potable water purchase, significant ash hauling, and additional System hauling costs.)	Significant additional costs anticipated for land acquisition* due to number of parcels needed and owners potentially involved, and a new ($45M) transfer station facility at the RRF site. Minor impacts on Collection and Transfer costs due to changes in hauling distances and travel times. Floodplain and wetland mitigation may increase capital costs. Purchase of potable water and significant distance to haul ash for disposal will increase anticipated operational costs. Rail haul of ash may be possible, further studies needed to determine if that would be cost-effective alternative to truck hauling. Total Estimated Capital Cost (not including land): $1,564,527,924[1] (5.1% increase). Estimated Land Cost*: $12,877,260. Total Estimated Capital Cost of $1,577,405,184 (5.9% increase) (Additional 98% annual operational cost for potable water purchase, and significant ash hauling costs.)	Significant additional costs anticipated for land acquisition*, on and off-site utility facilities, floodplain, wetland, and wildlife mitigation, additional permitting efforts, and a new ($45M) transfer station facility at the RRF site. Purchase of potable water and significant distance to haul ash for disposal will increase anticipated operational costs. Total Estimated Capital Cost (not including land): $1,582,443,592[1] (6.3% increase). Estimated Land Cost*: $0. Total Estimated Capital Cost of $1,582,443,592 (6.3% increase) (Additional 97% annual operational cost for potable water purchase, significant ash hauling, and additional System hauling costs.)	Significant additional costs anticipated for land acquisition*, on and off-site utility facilities, floodplain, wetland, and wildlife mitigation, additional permitting efforts, and a new ($45M) transfer station facility at the RRF site. Purchase of potable water and significant distance to haul ash for disposal will increase anticipated operational costs. Total Estimated Capital Cost (not including land): $1,593,591,461[1] (7.0% increase). Estimated Land Cost*: $29,370,858. Total Estimated Capital Cost of $1,622,962,319 (9.0% increase) (Additional 97% annual operational cost for potable water purchase, significant ash hauling, and additional System hauling costs.)

* Land acquisition cost estimated based upon 2023 Miami-Dade Property Appraiser Market Value plus 10%. For Site A1, the value of the largest parcel only was used.

[1] Cost values shown escalated 3% from values in June 2022 Siting Report per BLS CPI index data.

3 Considerations For A Zero Waste Management Strategy

3.1 Zero Waste Overview

3.1.1 Concept and Goals

The concept of "Zero Waste" is not new - it is a version of comprehensive waste minimization, which has been a fundamental principle of waste management for a long time. Historically, waste management efforts have been focused on the end of the waste cycle, where waste collection, processing and disposal activities occur. "Zero Waste" is a very broad set of guiding principles that envisions altering entire economies by changing product manufacturing and producer responsibilities, consumption practices, regulations, recycling markets, and using other mechanisms to make a society less wasteful. Basically, the goal of zero waste is to eliminate waste at every level and push economies towards the target of sending no waste to landfills, combustion facilities, or the ocean.

Figure 3.1 Zero Waste Hierarchy (from ZWIA)

Waste management efforts have historically focused on the end of the waste cycle because that is where local municipalities, who are responsible for the collection, processing and disposal of solid waste, exert control over the system. Local governments have significant control over solid waste within their boundaries and have been pursuing waste minimization efforts for many years, including enacting material bans, encouraging and supporting reuse and recycling businesses and markets, providing for source separation of waste streams, and developing and operating many types of processing facilities to improve the diversion of waste from disposal.

However, local municipalities have limited to no control over the factors affecting waste generation outside their jurisdictions (i.e., entire societies or economies), such as Federal or state regulations, general consumption practices, or many others, and this is where the "Zero Waste" concept has historically encountered significant difficulties. The guiding principles of the "Zero Waste" movement tend to rely on consistent and coordinated education, legislation, planning, and execution at all levels of government and in all individuals for successful implementation and this can be a challenging solution for many reasons, but primarily because the priorities, funding decisions, and approaches to solid waste management at the various levels of government are dynamic

over the long term. As a result, virtually all decisions and activities related to solid waste (including waste minimization efforts) default to the local level, because that is the end of the line, where the generated waste arrives and must be promptly and effectively managed.

These realities of the solid waste industry are reflected in the fact that the definition of Zero Waste has varied over time and jurisdictions. For many municipalities that have adopted Zero Waste as a management strategy, the generally-accepted benchmark to achieve "Zero Waste" is the diversion of 90% of a given solid waste stream from landfilling. The Zero Waste International Alliance (ZWIA) currently defines Zero Waste as *"the conservation of all resources by means of responsible production, consumption, reuse, and recovery of products, packaging, and materials without burning and with no discharges to land, water, or air that threaten the environment or human health"*, however, does not include a diversion benchmark to quantify the measure of success.

The State of Florida and Miami-Dade County have been working towards some of the same principles as Zero Waste for many years, although those efforts were not termed "Zero Waste" specifically. In 2008, the Florida Legislature set a recycling goal of 75% by 2020 for Florida counties. While this goal has been challenging to meet, five counties within the state, as of 2021 reporting, have met this 75% goal, but the average remains under 50% (inclusive of renewable energy and beneficial use of landfill gas credits). Miami-Dade County, the most populous county in the state, generated approximately 4.6 million tons of solid waste in 2021, with a reported recycling rate of 30% (including renewable energy recycling credits), which is higher than several municipalities that have officially adopted a "Zero Waste" strategy for managing their solid waste. Further, there are many opportunities to improve the County's diversion and recycling rates, but careful planning through the entire process, including funding for infrastructure and operational costs, significant public education, and the development of secondary markets is needed for successful and sustainable implementation. As discussed in the following sections, Zero Waste is something that takes consistent policies, funding, and significant time to develop.

3.1.2 Zero Waste Strategy in U.S. Municipalities

Many cities and counties comparable in size to Miami-Dade County are in different stages of implementing Zero Waste strategies. In Florida, the cities of Orlando, Gainesville, and Key West have adopted Zero Waste as their solid waste management strategy and have begun implementation. Arcadis reviewed the solid waste programs for several cities and counties in the U.S. with similar or larger populations and waste generation than Miami-Dade County. A comparison study was then conducted to understand what solid waste programs were in place before and after a Zero Waste strategy was implemented. Table 3.1 provides a snapshot of the current policies, programs, facilities implemented to reach a goal of zero waste by these representative communities. This comparison table provides a reference for the County to assess what facilities and collection infrastructure are in place in other municipalities. New York City (NY) and King County (WA) have the most ambitious targets to reach "zero waste" or 90%+ diversion by 2030.

Table 3.1 Comparison of Miami-Dade Solid Waste Management to Zero Waste Strategies in Municipalities of Comparable Size

Municipality	Miami-Dade	New York	King County	Seattle	City of LA	San Diego
Starting Year - Zero Waste Strategy	N/A	Plan Released in 2015; from 2005 Baseline Levels	2022	2007 (Zero waste resolution 30990) [6]	2006	2007 (City Recycling Ordinance went into effect) 2015 established Zero Waste Plan
Starting Year - Population	2,663,000	7,940,000	1.9 Million [4]	592,856	3,768,645 [11]	1.4 million
Starting Year - Tons Per Year MSW Managed	4,585,317 [15]	3.6 million tons public residential, ~4 million tons private commercial	922,000 tons (2016) [4]	850,000 tons [8]	10 million (2010) [11]	4,150,000 tons [12]
Starting Year - Per Capita Waste Generation Rate	1.68 tons/yr [16]	Information not available	Information not available	Information not available	4.1 lbs/day [10]	Information not available
Starting Year - Waste composition	25% Paper, 15% Metal, 11% Plastic, 17% Organics, 19% C&D, 10 % Misc	30% Paper, 14% Plastic, 39% Organics, 2% Appliance/Electronic, 4% Glass, 5% Metal, 5% C&D, 1% Misc Inorganics, >1% HHW (2005) [1]	13.7% Paper, 11.8% Plastics, 6.2% Metals, 17.8% Yard, 14.8% Food, 17% Other organics, 2% Glass, 14.9% Other wastes, 0.8% Electronics, 0.9% HHW (2019) [5]	MSW: 20% Paper, 17% Plastic. 21% Compostable organics, 23% Other organics Recycling: 52% Paper, 26% Glass [9]	29% paper, 11% Plastics, 40% Organics,8% C&D, 4% Special, 3% glass, 4% Metals, 1% electronics [11]	17% Paper, 9% Plastics, 39% Organics, 4% Metals, 2% Glass, 25% C&D, 4% Other [12]
Goal 1. Diversion Rate	N/A	90% by 2030	Zero waste/2030	70% recycling/2022 [7]	75% by 2013 [10]	Divert 75% by 2020
Goal 2. Diversion Rate	N/A	N/A	N/A	Next goal will be based on experience of last 5 years [6]	90%+ by 2025 [10]	90%/2035
Goal 3. Diversion Rate	N/A	N/A	N/A	N/A	Zero waste by 2050	Zero waste/2040
Current Diversion Rate	N/A	19.6% in 2022 [2] (WTE not counted)	52%/2019	66.3% recycling/2020 73.5% Diversion/2020 [9]	76.4% in 2012 [10]	67% in 2019 [14]
Current Facilities						
Collections	Residential: DSWM collects residential waste from five collection Districts. Commercial: Private haulers provide collection for commercial and multi-family complexes	Residential: 4-Stream System. Refuse, MGP, Paper/Cardboard, and for some areas of NYC curbside Organics. Single vs. dual bin collection trucks are based on efficiency by Sanitation District. Commercial: 3-4-Stream System. MGP and Paper/CB are allowed to be collected Single Stream by permitted haulers. Organics separate is required for specified business types. Mostly single-bin trucks.	Collection provided by private haulers Waste Management and Allied Waste	Collection provided by City and private waste haulers Waste Management and Recology. Garbage collection 1x week.	Residential: LA Sanitation collects residential waste from five collection Districts. Commercial: Private haulers provide collection for commercial and multi-family complexes	Provided by city. Garbage and organics collection 1x week. Comingled collection every other week [13]
Transfer	Northeast, West, Central Transfer Stations	17 Transfer Stations for Putrescible Waste	9 facilities 2 dropbox	North and South Transfer Stations	17 transfer stations	Several
Landfill	North Dade, Resource Recovery Ashfill, South Dade Landfill	Various Landfills in NY, PA, OH, VA, etc.	Cedar Hills regional facility (closes 2040)	Columbia Ridge Landfill	21 landfills received waste from the City including Sunshine Canyon, Chiquita Canyon, Simi Valley [10]	Miramar, Sycamore, and Otay Landfills

Municipality	Miami-Dade	New York	King County	Seattle	City of LA	San Diego
WTE (i.e., mass burn, plasma arc, gasification, etc.)	Resources Recovery Facility	NJ and Long Island	N/A	N/A	Existing facilities: Commerce Refuse to Energy Facility and Southeast resource recovery facility [10] Future Facilities evaluated: Gasification Pyrolysis (100-500 tpd) Advanced thermal recycling (500-2000 tpd)	N/A
Composting		Residential: Staten Island Compost Facility + regional farms + private micro-hauler composters	1 facility at cedar grove	Cedar Grove	Existing Facilities: Griffith composting facility, Harbor mulching facility and Lopez canyon composting Future facilities evaluated: Mulching facility Aerobic compositing facility (100-1000tpd) Biomass to energy facility	Miramar Greenery and others
Anaerobic Digestion		Newtown Creek Wastewater Treatment Plant	N/A	N/A	Currently planning a 200-500 tpd capacity facility for organics and black bin materials	Information not available
Materials recovery facility (MRF)	Privately operated single stream MRFs owned by Waste Management and Waste Connections.	Residential Recycling: SIMS and VISY [3]	3 MRFS (owned and operated by private collectors: Republic, WM, Recology)	Rabanco Recycling center	Existing MRFs: Angelus Western Paper fibers, Bestway recycling, city fibers, CR&R, Potential industries, RockTenn, Sun Valley paper stock etc. Existing Processors: 11 major processors Future Facility evaluated: Clean MRF (50-600tpd) for recyclables only.	Several
Mixed Waste Processing Facility (MWPF)	N/A	Not sure, maybe commercially run	Currently looking at proposals for a new MWPF	N/A	Future facility being evaluated (200-400 tpd)	N/A
Construction & Demolition Debris (C&D) Recycling	N/A	Cooper Recycling, may be others	Recyclable C&D: DTG Renton, United recycling Non-recyclable C&D: Recycling Northwest, Eastmost Recycling station, Cascade Recycling center	Information not available	Existing Facilities: 9 transfer facilities receive C&D 8 Landfills process C&D for beneficial use 7 Inert Landfills dispose C&D Future Facility evaluated: C&D mixed processing facility (50-500 tpd)	Three mixed C&D facilities and several source separated facilities
Household Hazardous Waste (HHW)	2 home chemical collection centers	Information not available	Information not available	Two facilities (North and South)	Existing Facilities: 7 SAFE centers (solvents, automotive, flammables, electronics)	One HHW Transfer Facility at Miramar landfill

Municipality	Miami-Dade	New York	King County	Seattle	City of LA	San Diego
Residential Dropoff Facilities	13 Trash and Recycling Centers	Information not available	Information not available	Information not available	Future Facility evaluated: Resource Recovery Park (10-200 tpd)	Information not available

[1] https://dsny.cityofnewyork.us/wp-content/uploads/2017/12/about_2004-2005-waste-characterization_0815.pdf
[2] https://www.nyc.gov/assets/dsny/site/resources/annual-dsny-non-dsny-collection
[3] Screenshots from OpenData NYC Session on DSNY Data
[4] WTE options and considerations
[5] Waste composition study 2019
[6] ZW Resolution 30990
[7] 2011 Solid Waste Plan revision
[8] 2020 Waste Prevention and Recycling Report
[9] Chapter 3 2022 Solid Waste Plan Update
[10] UCLA Zero Waste Progress Report (March 2013)
[11] SWIRP October 2013 compact
[12] City of San Diego Zero Waste Plan (2015)
[13] https://www.sandiego.gov/environmental-services/recycling/residential/curbside
[14] https://voiceofsandiego.org/2021/09/17/the-status-of-san-diegos-zero-waste-plan/
[15] Tons Municipal Solid Waste Collected in Florida Counties (2021) posted by FDEP
[16] 2021 County Municipal Solid Waste Collected per Capita (2021) posted by FDEP

Table 3.2 summarizes the common policies and associated programs that have been implemented by large cities and municipalities that have a Zero Waste strategy and plan. Common policies that have been implemented in multiple large municipalities include: an organics ordinance to separate organics from MSW, C&D ordinance to set a diversion goal for projects, and Extended Producer responsibility (EPR) policies for electronic waste, carpet, and paint. The table is not a comprehensive list of policies but rather shows a snapshot of policies and programs that could be considered at a minimum/starting point to build out Miami-Dade's Zero Waste strategy. Most policies or programs do not explicitly state a diversion goal. Hence, the targeted diversion range is based on the waste composition percentage of the respective material across the municipalities. The success rate of the policies and programs have not been published and would require further analysis.

Table 3.2 Zero Waste Policies and Programs Implemented in Different Municipalities

	Policies	Example Cities	Programs	Targeted Diversion
Recycling	Mandatory Recycling Ordinances - Commercial	-State of California -Washington, DC -Seattle -Orlando -Miami-Dade -New York	-New York: mandatory recycling of paper, mixed grade plastics, textiles. -Washington, DC : retailers to use recyclable or compostable containers -Seattle: zero waste at city special events	26% (San Diego) - 40% (LA)
	Mandatory Recycling Ordinances - Residential	-State of California -Seattle -Orlando -Miami-Dade	Mandatory multifamily recycling California, Orlando, Miami-Dade Single family recycling required in Seattle and State of California.	
C&D	C&D Recycling Ordinance	-State of California -Washington, DC	Source separation of C&D required in Washington, DC	Projects expected to divert 65% (State of CA)-75% (LA)
Material Bans	Single Use Plastic Bags	-Seattle -Los Angeles -San Diego -San Francisco -New York	Fee on single-use plastics shopping bags	Data not available
	Styrofoam	-New York -Washington, DC -Los Angeles -San Francisco	Typically implemented by ordinance to ban Styrofoam use	Data not available
	Organics/ Food Waste Ordinance (mandatory separation)	-Seattle -State of California -Washington, DC (2023)	-City drop-off programs -School food share -City provided rebate $35/ton food scraps diverted -Restaurant food scraps pilot	21% (Seattle) - 40% (LA)

	Policies	Example Cities	Programs	Targeted Diversion
EPR	Computers, Laptops, TVs, residential electronics	-Washington, DC -Seattle	-Green Energy Producer Bonus -Green Purchasing Policy -Green Business certification Program -Business Waste Assessment -E-Cycle voluntary program (DC) -Battery Recycling Program	0.3 - 2%
	Carpet	-State of California -New York		Data not available
	Paint	-State of California -Washington, DC -Seattle		Data not available
	Pharmaceuticals	-State of California -Seattle		Data not available
Education	Recycling ordinances/ solid waste management plans	-Included in all major city solid waste plans	-Residential placards -School composting programs -Digital community programs -Recycling contamination abatement program (tagging carts, warnings)	N/A

3.2 Overview of the Current Miami-Dade Solid Waste System

3.2.1 The County's Waste Stream

As reported to the FDEP, the total waste stream of Miami-Dade County was approximately 4.6 million tons in Fiscal Year 2021. In order to consider how to control, reduce and manage a solid waste stream, it is important to understand the contributing factors to both the quantity and composition of the generated waste materials.

First, a discussion on what drives the quantity of solid waste. There are several factors that affect the quantity of solid waste generated in a municipality, but generally it is closely correlated with two primary factors, population and economic activity. The section below details these factors for Miami-Dade County.

3.2.1.1 Waste Quantity Factors - Population and Economic Activity

As of December 2022, the population of the County was estimated by the University of Florida Bureau of Economic and Business Research (BEBR) at 2,757,792 and is projected to increase at a rate of approximately 0.5% per year through 2050, as shown in Figure 3.2 at right.

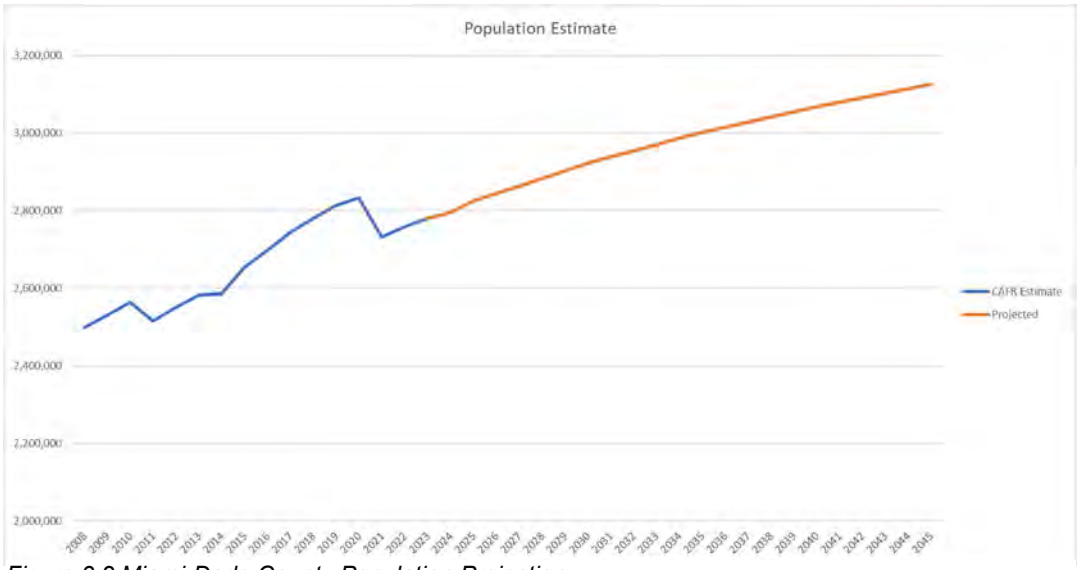


Figure 3.2 Miami-Dade County Population Projection

The County also has the largest economy of any county in Florida, with a gross domestic product of approximately $151.9 billion that is expected to steadily increase. The combination of a large population and strong economic activity usually results in a high waste generation rate. Not surprisingly, the FDEP reported that the per capita waste generation rate for the County has fluctuated over the last several years but was approximately 9.2 pounds per person per day in FY 2021. The County's generation rate is significantly higher than reported national averages, probably due in large part to the high tourist population and associated high consumption of convenience and single-use items.

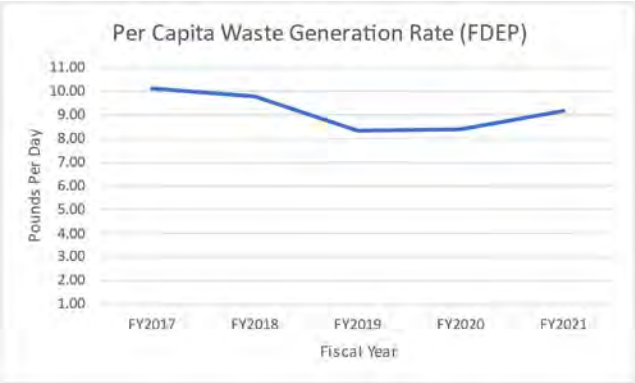


Figure 3.3 Miami-Dade County Per Capita Waste Generation Rate (FDEP)

For comparison, the EPA reported that the average US generation rate in 1960 was just 2.68 pounds per person per day, which increased to 3.66 in 1980, reached 4.74 in 2000 and then 4.90 in 2018 and has leveled off since then. In consideration of implementing a Zero Waste strategy, additional studies would be recommended to better understand the waste generation factors specific to the County and determine the most effective rate minimization strategies.

3.2.1.2 Waste Composition

In general, two distinct types of solid waste comprise the bulk of the waste generated in most municipalities, Municipal Solid Waste (MSW) and Construction and Demolition Waste (C&D Waste). Understanding what everyday waste materials are represented in these two main types of waste are important in determining how to reduce their generation rate and how to effectively manage them and maximize diversion from disposal.

3.2.1.2.1 Municipal Solid Waste (MSW)

MSW is a very general type of material, and typically accounts for approximately 70-80% of the total quantity of waste generated by a municipality. MSW is usually highly mixed and primarily collected from residential and commercial properties. The US EPA definition of municipal solid waste (MSW) is as follows:

"…MSW consists of everyday items such as product packaging, yard trimmings, furniture, clothing, bottles and cans, food, newspapers, appliances, electronics and batteries. Sources of MSW include residential waste, as well as waste from commercial and institutional locations, such as restaurants, grocery stores, other businesses, schools, hospitals and industrial facilities. Industrial facility waste includes waste from sources such as offices, cafeterias and packaging, but not process waste. The EPA definition of MSW does not include industrial process waste, hazardous waste, or construction and demolition (C&D) waste."

3.2.1.2.2 Construction and Demolition (C&D) Waste

C&D waste is somewhat easier to define, as it is generally any non-putrescible waste associated with construction or demolition activity on a given property. The quantity of this type of waste is significant and usually accounts for approximately 20-30% of the total quantity of waste generated by a municipality. Also, C&D waste components are generally easier to separate and recycle than those in MSW. Chapter 62-701.200, FAC defines C&D waste as follows:

"Construction and demolition debris" means discarded materials generally considered to be not water soluble and non-hazardous in nature, including but not limited to steel, glass, brick, concrete, asphalt material, pipe, gypsum wallboard, and lumber, from the construction or destruction of a structure as part of a construction or demolition project or from the renovation of a structure, including such debris from construction of structures at a site remote from the construction or demolition project site. The term includes rocks, soils, tree remains, trees, and other vegetative matter that normally results from land clearing or land development operations for a construction project; clean cardboard, paper, plastic, wood, and metal scraps from a construction project; except as provided in Section 403.707(9)(j), F.S., yard trash and unpainted, non-treated wood scraps from sources other than construction or demolition projects; scrap from manufacturing facilities that is the type of material generally used in construction projects and that would meet the definition of construction and demolition debris if it were generated as part of a construction or demolition project, including debris from the construction of manufactured homes and scrap shingles, wallboard, siding concrete, and similar materials from industrial or commercial facilities and de minimis amounts of other non-hazardous wastes that are generated at construction or demolition projects, provided such amounts are consistent with best management practices of the construction

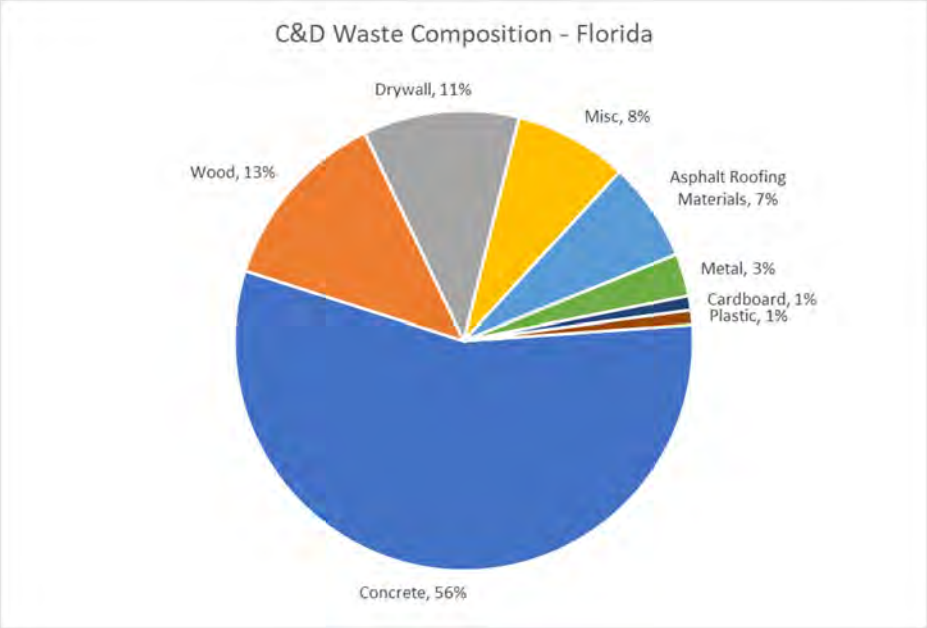


Figure 3.4 Approximate C&D Composition (From Cochran, et al (2007)).

and demolition industries. Mixing of construction and demolition debris with other types of solid waste will cause it to be classified as other than construction and demolition debris.

Previous studies on C&D material in Florida have indicated the approximate composition shown in Figure 3.4.

3.2.1.2.3 Miami-Dade County Waste Composition

For composition analysis, 2021 data was used, as it was the most recent year available in FDEP reports. Based on FDEP estimates, the County generated approximately 4.6 million tons of solid waste in 2021, composed of approximately 81% MSW and 19% C&D Waste, divided into seven major categories: Paper (24.88%), Plastic (11.18%), Glass (3.18%), Metals (15.29%), Organics (16.86%), C&D Waste (18.72%), and Miscellaneous (9.88%). A more detailed breakdown of the overall waste composition by subcategory is shown in Figure 3.5 below.

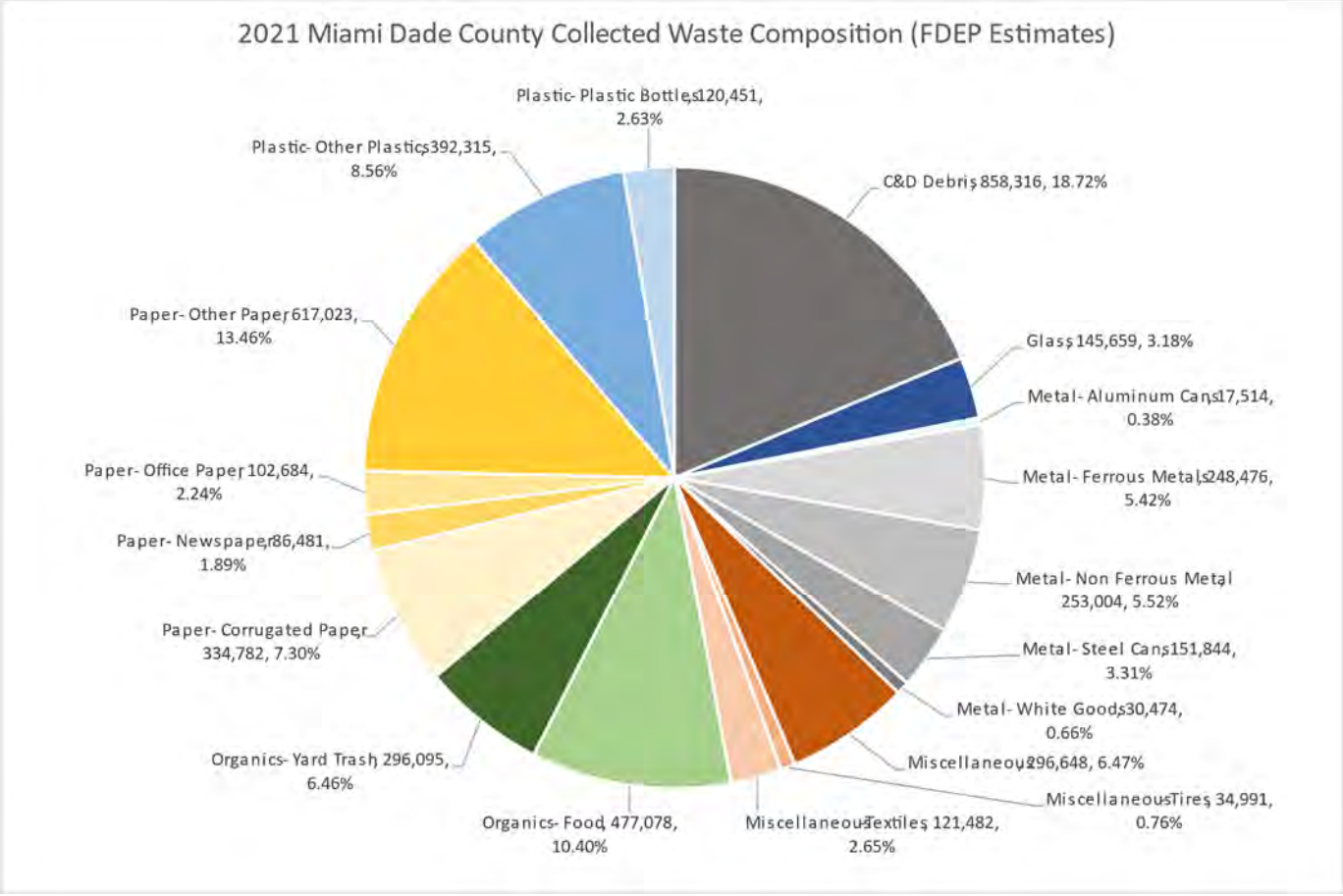


Figure 3.5 Miami-Dade County Solid Waste Composition (FDEP)

In 2021, the University of Florida conducted a composition study on the MSW fraction of the waste stream arriving at the County's disposal facilities. Their composition results are shown in Figure 3.6 below and demonstrate how complex the MSW waste stream is and show some of the challenges involved in cleanly separating the various waste materials so that those that can be reused or recycled are diverted from disposal. There may be several possible diversion strategies for each material type, and matching the most appropriate available technologies with the various waste streams to maximize diversion is one of the main objectives of a Zero Waste Master Plan.

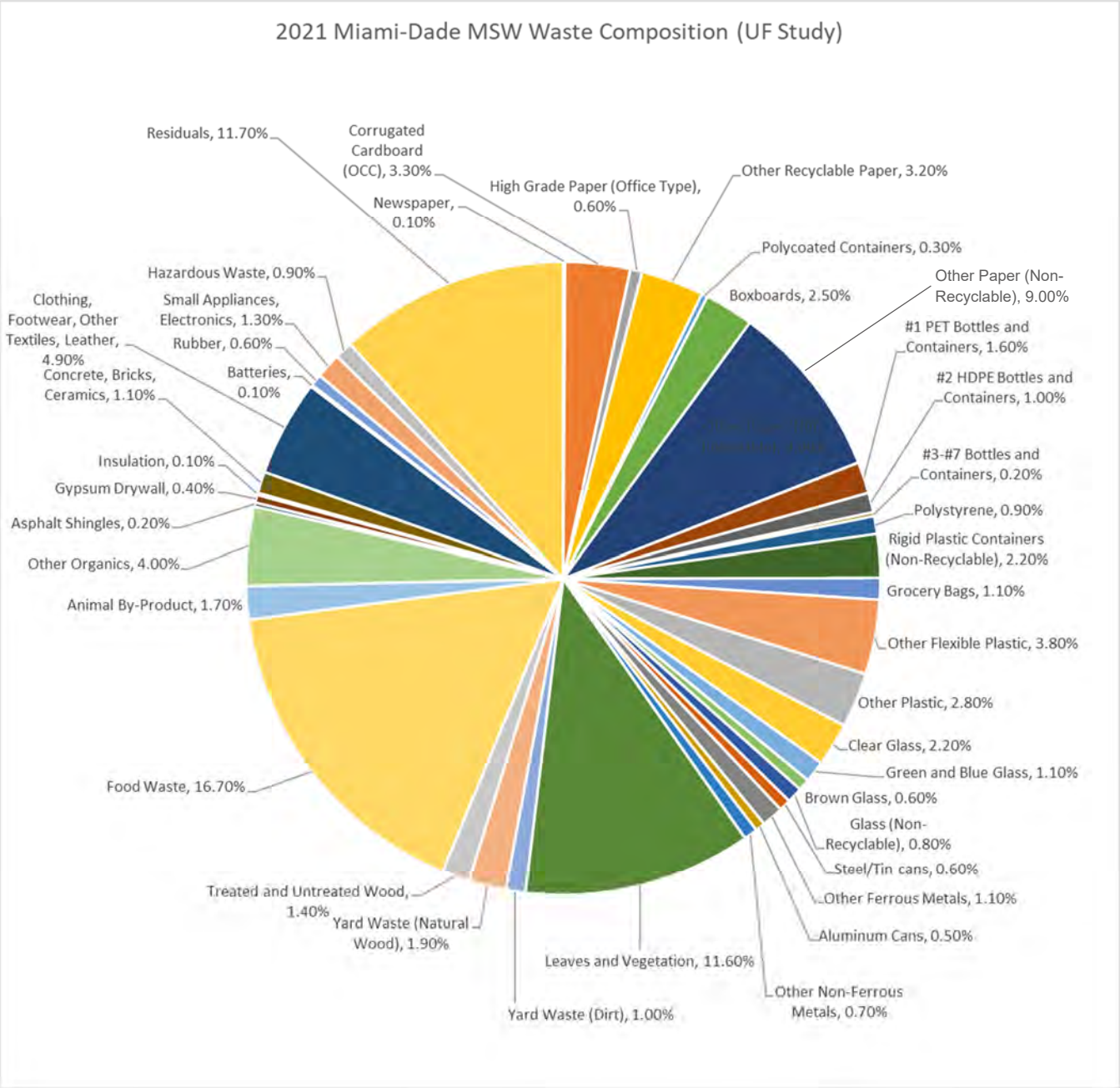


Figure 3.6 Miami-Dade County MSW Composition (University of Florida)

3.2.2 Existing Solid Waste Operations and Facilities

The County is comprised of 34 incorporated municipalities and the unincorporated County area. Each municipality manages the collection, recycling, and disposal of solid waste within its boundaries. MSW and curbside recyclables are typically collected either directly by a municipality, by contracts with private firms, or by interlocal agreement with the County and transported to private recycling, transfer, or disposal facilities, or to County disposal facilities. C&D waste is collected exclusively by private firms and transported to either private facilities for recycling or disposal, or to County facilities for disposal.

The County's Solid Waste System is defined as "*The aggregate of those solid waste management facilities owned by or operated under contract with Miami-Dade County*."

The County's Collections System includes the following operations and facilities owned by the Department and operated either directly by the Department or by others under contract:

- **Trash and Recycling Centers** - Thirteen Trash and Recycling Centers (TRCs) located throughout the County's service area.
- **Residential Garbage and Trash Collection** – County collection fleet including garbage and trash collection vehicles, which includes both hybrid and conventionally powered vehicles.
- **Residential Curbside Recycling** – Recyclables are collected curbside from the Department's residential customers under contract with a private firm. Miami-Dade County currently provides biweekly, single stream recycling collection service through contractual agreements to approximately 350,000 households in the unincorporated county, nine municipalities included in the solid waste service area, and an additional nine municipalities through Interlocal Agreements (ILAs). Currently, the County contracts with Waste Management Incorporated (WMI) at their Reuter Recycling Facility in Pembroke Pines, FL for the processing of recyclable materials.

The County's Disposal System includes the following operations and facilities owned by the Department and operated either directly by the Department or by others under contract:

- **Transfer Stations** – Three regional transfer stations (Central (CTS), Northeast (NETS), and West (WTS)) that transfer garbage and trash to the County's disposal facilities.
- **Home Chemical Collection** – Two Home Chemical Collection (HC2) sites.
- **Landfills** – Three active landfills and two closed landfills:
  - The North Dade Landfill (NDL), which is a Class III landfill that receives only trash, construction and demolition debris, and related materials. The NDL is nearing the end of its operational life and is projected to run out of available disposal capacity by 2027. In accordance with its Master Plan, the County is currently in the planning process for a vertical expansion of the NDL that will provide approximately eight million tons of additional capacity, sufficient for more than 25 years of expected Class III disposal needs.
  - The South Dade Landfill (SDL), which is a Class I landfill and receives MSW and special wastes for disposal but can also accept C&D waste. The SDL is currently projected to run out of available disposal capacity by 2032.
  - The Resources Recovery Facility Ashfill (RRFAF) is a Class I landfill adjacent to the Resources Recovery Facility that receives the ash residue from the combustion process.
  - The 58th Street Main Landfill, which is closed.
  - The Old South Dade Landfill (OSDL), which is closed.
- **Resources Recovery Facility (RRF)** – The RRF, which receives garbage and trash and combusts the waste to generate electricity and recovers recyclable materials, is operated under contract by a private company (Covanta Dade Renewable Energy, LLC). As mentioned previously, the RRF suffered a serious fire on February 12, 2023 which destroyed the RDF processing equipment and rendered the facility inoperable. The facility is currently offline and is expected to remain so for the near future. As a result, the County has adjusted its operations and rerouted the waste that had been arriving at the RRF to the County's three transfer stations, the North and South Dade landfills, and private facilities.
- **Transfer and Disposal Fleet** – The waste transfer and disposal fleet, including transfer vehicles used to transfer waste from the TRCs and Transfer Stations to the disposal facilities and heavy equipment used to maintain landfills.

- **Private Disposal Contracts**
  - Contract with Waste Management, Inc. of Florida, Inc. (Waste Management), that allows for the County to dispose of up to 1.75 million tons of garbage and trash per year at the Medley Landfill in Medley, Florida, the Monarch Hill Facility (often referred to as Sample Road landfill) in Broward County, Florida, and the Okeechobee Landfill in Okeechobee, Florida. This contract is effective until September 30, 2035, with provision for two additional five-year mutual options for renewal.
  - During FY 2021, the Department and Waste Management mutually consented to disposal of MSW at the Waste Management Miami Transfer Station in accordance with the terms of the Second Amended and Restated Non-Exclusive Agreement Between Miami-Dade County, Florida and Waste Management Inc. of Florida for Provision of Municipal Solid Waste Disposal Services to conserve airspace volume at the County's landfills. Beginning September 1, 2021, a minimum of 600 tons per day and a maximum of 700 tons per day of MSW could be delivered to the Miami Transfer Station located at 2120 NW 11th Avenue, Miami, FL 33125 from Monday through Saturday. The MSW is then loaded and transferred for disposal to the Okeechobee Landfill by Waste Management.
  - Contract with Progressive Waste Solutions of Florida, Inc. (Progressive Waste Solutions) DBA Waste Connections, Inc. for use of the JED Landfill in St. Cloud, Florida for disposal of up to 500,000 tons per year of County waste. The contract is effective until 2025, with provision for two additional five-year mutual options for renewal.

3.2.3 Regulatory Considerations

3.2.3.1 Federal

The Federal Government regulates solid waste primarily through RCRA Subtitles C and D and delegates regulatory authority to the states. No new regulations regarding Zero Waste strategies on a national level have been created. The federal government encourages waste minimization and recycling efforts through EPA grants and other mechanisms, which provides financial assistance to states and municipalities to encourage development of alternative solid waste programs and facilities.

3.2.3.2 State of Florida

In 2020, the FDEP reported that Florida's overall recycling rate was 50%, well short of the 75% goal set by the Legislature. The FDEP has suggested ways to potentially increase recycling in Florida, including options for focusing on markets, construction and demolition debris recycling, organics recycling, commercial recycling, and education and outreach. Even though these actions have had some success and at least five counties have met the 2020 75% goal (including renewable energy recycling credits), impactful changes to the statewide recycling rate will likely not occur without programmatic and legislative changes.

The current practices in Florida are not expected to significantly increase the statewide recycling rate. However, through partnership with Florida recycling stakeholders, there is an opportunity to transform Florida recycling from an aspirational goal into a program that incorporates source reduction, diversion of waste, recycling, and consideration of the full environmental impact of materials used from cradle to grave. Interestingly, many of these same concepts are also Zero Waste concepts, but one primary difference is the State of Florida is a strong advocate of the use of Waste-to-Energy facilities to convert solid waste to electricity.
In the Florida and the 2020 75% Recycling Goal Final Report (FDEP, 2021), the FDEP advocated for the development of a Comprehensive Waste Reduction and Recycling Plan. If directed by the Legislature, the FDEP will convene a technical assistance group (TAG) that will include stakeholder groups and any other interested

parties. The TAG's objective will be to develop a comprehensive waste reduction and recycling plan for Florida. The plan will:

- Identify a set of recycling goals using both sustainable materials management (SMM) and waste diversion concepts:
    - Sustainable Materials Management - Alternative approaches that recognize the differences among waste components with respect to environmental and resource outcomes are referred to as sustainable materials management (SMM).
    - Waste Diversion - Waste diversion (or waste reduction) is already an integral part of Florida's MSW management system. It can be defined as the amount of material that is reduced, reused, prevented and/or recycled, per capita and can be measured based on the amount of waste not being disposed of in a landfill.
- Develop objectives and propose a three-year plan to implement the following strategies:
    - Recycling Materials Market Development - There must be markets for finished goods that are manufactured from recycled materials in order for the recycling industry to operate efficiently and to provide for reasonable returns on investments.
- Propose statutory language to implement the revised recycling goals and the strategies.

Concurrency (Chapter 163, FS)

163.3180 Concurrency.

(1) Sanitary sewer, solid waste, drainage, and potable water are the only public facilities and services subject to the concurrency requirement on a statewide basis. Additional public facilities and services may not be made subject to concurrency on a statewide basis without approval by the Legislature; however, any local government may extend the concurrency requirement so that it applies to additional public facilities within its jurisdiction.

(b) The local government comprehensive plan must demonstrate, for required or optional concurrency requirements, that the levels of service adopted can be reasonably met. Infrastructure needed to ensure that adopted level-of-service standards are achieved and maintained for the 5-year period of the capital improvement schedule must be identified pursuant to the requirements of s. 163.3177(3). The comprehensive plan must include principles, guidelines, standards, and strategies for the establishment of a concurrency management system.

As discussed further in Section 3.2.3.3 below, the County has established its Comprehensive Development Master Plan (CDMP) which provides for the required guidelines and standards to meet this concurrency statute.

3.2.3.3 Miami-Dade County

3.2.3.3.1 Comprehensive Development Master Plan (CDMP)

Chapter 163.3177(1), FS states "*The comprehensive plan shall provide the principles, guidelines, standards, and strategies for the orderly and balanced future economic, social, physical, environmental, and fiscal development of the area that reflects community commitments to implement the plan and its elements. These principles and strategies shall guide future decisions in a consistent manner and shall contain programs and activities to ensure comprehensive plans are implemented...*" The following sections describe those Objectives and policies relevant to the discussion of the siting and operation of solid waste facilities.

- **Objective SW-1**: In order to serve those areas where growth is encouraged and to discourage urban sprawl, the County shall plan and provide for solid waste disposal services on a countywide basis as provided for in this subelement in conformance with the future land use element of the Comprehensive Development Master Plan (CDMP).
    - Policy SW-1A. The area within the Urban Development Boundary of the adopted Land Use Plan Map shall have the first priority in the provision of County solid waste management, and for committing financial resources to these services. Future development in the designated Urban Expansion Area shall have second priority in planning or investments for these services. Provision of County solid waste facilities outside of these areas shall be avoided, except where essential to eliminate or prevent a threat to public health, safety, or welfare.
    - Policy SW-1C. Miami-Dade County shall use all practical means to assure that land in the vicinity of solid waste disposal facilities is developed for a use that is compatible with the operation of said facilities. The County shall discourage changes to the Land Use Plan Map or land development regulations which would permit land uses that are incompatible with the continued operation or planned expansion of these facilities. Residential uses shall be considered incompatible with these public facilities where spillovers, particularly noise and odor, can reasonably be expected.
- **Objective SW-2**: The County will implement procedures to ensure that any existing solid waste system deficiencies that may exist are corrected and that adequate system capacity is available to meet future needs.
    - Policy SW-2A. The County Solid Waste Management System, which includes County-owned solid waste disposal facilities and those operated under contract with the County for disposal, shall collectively maintain a solid waste disposal capacity sufficient to accommodate waste flows committed to the System through long-term interlocal agreements or contracts with municipalities and private waste haulers, and anticipated non-committed waste flows, for a minimum of five (5) years.
    - Policy SW-2B. Except as provided by Objective SW-1 and the supporting policies, no development order authorizing new development or a significant expansion of an existing use shall be issued for any area of the County which is served by a solid waste facility which does not meet the standard in Policy SW-2A or will not meet these standards concurrent with the completion of the development. In any case where the federal, state, or County standards referenced in Policy SW-2A are revised, a reasonable time for compliance with the new standards shall be allowed.
- **Objective SW-3**: The County will provide an adequate level of service for solid waste facilities to meet both existing and projected needs as identified in this plan through implementation of those projects listed in the Capital Improvements Element. All improvements for replacement, expansion or increase in capacity of facilities shall conform with the adopted policies of this Plan including level of service standards for the facilities.
        - Policy SW-3A. Solid Waste improvements will be evaluated for funding in accordance with the following general criteria:
            1) Improvements which are necessary to protect the health, safety and environmental integrity of the community, consistent with the policies of this Plan and applicable federal, state and County regulatory requirements.
            2) Improvements which are necessary to meet existing deficiencies in capacity or in performance. These include the retrofit of deteriorating facilities which fail or threaten to fail to meet health, safety or environmental standards.
            3) Improvements which promote the recycling or reuse of materials prior to disposal.

4) Improvements which extend service to previously unserved developed areas within the Urban Development Boundary (UDB).
5) Improvements which have been identified in adopted functional plans and address system details which are beyond the scope of the comprehensive plan for solid waste and are consistent with the goals, objectives and policies of the comprehensive plan.
6) Cost-effective improvements to expand capacity, maximize operational efficiency, and increase productivity.

- **Objective SW-4**: Miami-Dade County shall provide for the management of solid waste in a manner which places a high priority on the maintenance of environmental quality and community quality of life, with emphasis on recycling and waste reduction.
    - SW-4A. All Miami-Dade County solid waste disposal facilities shall be developed and operated to:
        - Meet all applicable federal, state, and County environmental health and safety rules and regulations;
        - Minimize adverse human and natural environmental impacts;
        - Optimize capital and operating efficiencies;
        - Minimize environmental and economic risk.
    - SW-4B. Unless economically prohibitive, Miami-Dade County shall reduce the amount of waste disposal through recycling programs or other alternative solid waste management strategies. The County Waste Management System shall reduce the amount of municipal solid waste that would be disposed of within the County and maintain a recycling rate consistent with the requirements of the Florida State Solid Waste Management Act.
    - SW-4C. Miami-Dade County shall promote the establishment and expansion of markets for products and materials created from recycled wastes through cooperative state and federal efforts, County purchasing policies, and by encouraging the purchase of such products by County vendors, clients and citizens.
    - SW-4D. Miami-Dade County shall strive to reduce the per capita generation of solid waste by encouraging the use of waste reduction technologies and recyclable packaging materials, to the extent possible.
    - SW-4E. Miami-Dade County shall minimize the amount of yard trash disposed of in landfills through the development of alternative means that include encouraging, among other innovative programs, mulching or composting of yard waste or its diversion to a biomass fuel, and diversion or composting of biodegradable materials other than yard waste.
- **Objective SW-5**: Miami-Dade County shall provide for the safe and efficient disposal of wastes through the development and maintenance of an integrated solid waste disposal system utilizing proven technologies, appropriate regulation, and equitable and responsible financing practices.
- **Objective SW-6**: Substantially reduce or minimize the amount of household chemical wastes and used motor oil that are disposed of in an unsafe or improper manner.
    - SW-6A. Develop and implement a household chemical waste management program to achieve compliance with the provisions of Section 403.7265, F.S.
    - SW-6B. Miami-Dade County shall promote the installation of sufficient facilities into the County's Neighborhood Trash and Recycling Centers to accommodate the safe deposit of used motor oil by households in moderate quantities.

- SW-6C. Miami-Dade County shall seek funding and cooperation from the Florida Department of Environmental Protection to provide a means of disposal for special wastes.
- SW-6D. Miami-Dade County shall seek to develop funding to establish a comprehensive public education program to highlight the problems of household chemical waste and improper special waste disposal.
- SW-6E. Miami-Dade County shall encourage public and private organizations which currently collect and recycle used motor oil and lead acid batteries to accept moderate quantities of used motor oil and lead acid batteries from households for recycling.

Regarding the concurrency requirement in Policy SW-2A, DSWM currently projects that the System will receive 2,000,534 tons of solid waste for disposal during FY 2023. At the end of FY 2023, the System is projected to have approximately 6.9 million tons of remaining physical and contract disposal capacity. Assuming an annual growth rate of 1.0%, the System appears to only have sufficient disposal capacity in place, under construction, or under contract to satisfy the 5-year concurrency requirement through FY 2024. If the County proceeds with its current plans for vertical expansion of the NDL, this will increase disposal capacity.

Reducing the waste stream through material diversion to C&D recycling facilities, composting facilities, and other alternative facilities also improves concurrency, but considering the long lead time associated with the planning, design and construction of capital projects, it is recommended that the County secure additional disposal capacity as soon as possible to ensure continued concurrency compliance.

3.3 Considerations for a Miami-Dade Zero Waste Strategy

Development and implementation of a comprehensive Zero Waste strategy in the County will require careful planning through the entire process including goals and objective setting, policy reviews, stakeholder engagement, infrastructure and operational investments, significant public education, and development of secondary markets for successful and sustainable implementation. As discussed in the following sections, Zero Waste planning and strategy development is something that takes consistent policies, funding, and sufficient time to develop, and there is not one “correct” approach - many different technologies and programs can be employed to meet the desired goals. The following sections discuss some of the key aspects for development of a Zero Waste strategy.

3.3.1 Analyze Waste Streams

The first step needed to move towards a Zero Waste type management strategy would be to conduct extensive waste characterization studies of both the MSW and C&D Waste streams to determine the quantity and composition of each. Such studies should be conducted over a full year to capture seasonal fluctuations and material issues (i.e., wet loads during the rainy season) that could have significant effects on processing facility equipment or operations and to achieve results with sufficient accuracy for facility design.

Please note that the waste quantity and composition analyses presented in this report were taken from FDEP calculated estimates and from abbreviated waste characterization studies conducted on a small sampling of waste arriving at County facilities during a short time span. While the results of such estimates and studies are useful for the purpose of visualizing the basic quantities and composition of the MSW and C&D waste streams, these studies are for conceptual planning level purposes only and should not be used for facility design purposes.

3.3.2 Identify and Prioritize Materials for Recovery

After the detailed studies are completed, identify and prioritize those waste stream components that 1) have potential for a significant quantity of recovery, 2) can be readily separated and routed to processing facilities (i.e., C&D waste, food waste, glass, etc.) through County actions, and 3) have an existing secondary market or use for the end products of processing.

Waste streams that do not meet the above criteria should be placed on a secondary priority list to be addressed in future actions as the Zero Waste strategy progresses and more improvements are made.

3.3.3 Develop Materials Control Strategy

One of the most common and difficult issues in the recovery of materials from a solid waste stream is how to efficiently, effectively and economically separate the various materials from MSW or C&D waste and direct them to appropriate facilities for processing. The processibility and value of the separated materials depend greatly on the extent of contamination with other wastes. Materials that are heavily contaminated will be rejected by processing facilities and will probably be sent to a landfill or other disposal facility. Therefore, maintaining the quality of the separated material is critical for moving towards a circular economy.

Separation of materials by waste generators may be either voluntary or mandatory, but in general if separation is not mandated then the participation rate is lower, which can significantly affect per-ton costs. Local legislative action is therefore a very important factor.

3.3.4 Determine Collection Equipment and Processing Facilities

For each waste material targeted for recovery, the method and equipment needed to collect and transport the material to an appropriate processing facility must be determined. For some materials, such as C&D waste, private haulers already perform this function. For others, such as source-separated food waste, new collection systems including containers, vehicles, and drivers will be needed. A detailed estimate of the capital, O&M and labor costs for each new system must be calculated.

Similarly, the size and type of processing facility that will receive the collected materials must be determined and a detailed estimate of the capital, O&M and labor costs must be calculated.

The sections below include brief discussions of potential collection and processing technologies that are commercially available for waste materials that comprise the larger fractions of the County's waste stream, along with their approximate costs. For more detailed descriptions of the processing technologies, please see Appendix D.

3.3.4.1 Organic Wastes (Yard and Food Waste)

"Organic waste" generally includes food, green material, landscape and pruning waste, organic textiles and carpets, lumber, wood, paper products, printing and writing paper, manure, biosolids, digestate, and sludges. Organic wastes were estimated at more than 1.9 million tons in FY 2021 and accounted for approximately 42% of the total waste stream in the County (FDEP). Of that tonnage, yard and food wastes accounted for more than 773,000 tons,

or about 17% of the total waste stream. The generated waste amount alone suggests that organics may be a suitable material for recovery, but the separation, collection, processing, and end use of yard and food waste organic materials present many challenges and must be carefully analyzed before any recovery activities can be implemented.

3.3.4.1.1 Separation and Collection

First and foremost, organic wastes must be separated from the MSW and C&D waste streams to minimize contamination. Some organic waste, such as paper and lumber, is already being removed through curbside and commercial recycling. The remaining organic waste may be more difficult to separate. Organic waste processing facilities (i.e., composting, AD, etc.) are biologically driven processes and inherently sensitive to certain chemicals and other contaminants that may be present in a waste stream feedstock. Nationwide, the best practice for collecting organic wastes appears to be source separation - having generators place organics in a separate bin away from typical municipal solid waste and recyclables. By separating organics from the start and during its collection, chances of contamination are reduced. This approach would ensure higher quality organic products after processing which could be sold as desirable products to agriculture, industry, and to the public for use.

To date, numerous cities have adopted separate organics collection, and the methods of collection vary from self-hauling and drop-off facilities to curbside bin collection similar to recycling programs. Probably the most famous example would be the three-cart system developed in San Francisco (see Figure 3.7 at right), which has a cart for recyclables, compost, and landfill waste. The carts have lids to control vermin, flies, and odors, and the sizes of the various carts can be different to encourage generators towards recycling and composting. The organics are collected and sent to a composting facility where compost and soil amendments are made and are marketed to the public and local agriculture. The system has worked well for the City of San Francisco. New York and Baltimore have similarly adopted separate organics collection and processing but have not yet met with the same level of success as San Francisco.

Figure 3.7 Three-Cart System (SF Public Works)

Collection vehicles for organic waste must also be considered. As segregated organic wastes are of a different physical composition than municipal solid waste, different collection vehicles are required. Organic wastes generally have a high liquid content, and as wastes are collected, the food waste and organic materials tend to take on a slurry-like consistency that conventional collection vehicles simply are not designed to handle. Modern manufacturers of organic waste collection trucks consider and optimize their designs for these specific waste stream differences, including improvements such as watertight truck bodies, auger packing systems, sealed charge hoppers, and others.

As an example, the ROTO PAC collection truck (see Figure 3.8) is specially designed for organics collection and is able to exceed conventional packing capacity of typical trash vehicles — about 700 to 800 lbs/cubic yard (cy) — and instead will pack 1,000 to 1,400 lbs/cy. According to the manufacturer, due to its unique design with no packing blade, the vehicle is about 3,000 pounds less in overall weight, compared to other side loaders.

Organic waste is typically wet, heavy, and difficult and expensive to collect and transport. Not surprisingly, collection is one of the most commonly reported difficulties in initiating organic waste diversion programs. Collection costs for separated organic waste vary greatly, with some municipalities subsidizing collection so residents do not pay fees and others relying on private collection services that typically charge residents $16-$32

per month for weekly pickups. On a per collected ton basis, costs vary due to capital and labor costs, participation rates and other factors. New York City, which has struggled with low participation rates, routing issues and other difficulties reported organics collection costs as high as $602 per ton in 2019 (New York City Independent Budget Office Fiscal Brief, October 2021).

Once collected, the organic waste is routed to a processing facility, which could use composting, anaerobic digestion, or another technology to transform the waste material into compost, fertilizer, methane gas, or other usable products.

Figure 3.8 ROTO PAC Organic Waste Collection Truck with Auger Packing System

3.3.4.1.2 Organics Processing

The most common methods for processing organics are by composting and anaerobic digestion. Composting is an aerobic biological process (where microorganisms break down biodegradable materials in the presence of oxygen) and are generally one of the following three types: Windrow, Aerated Static Pile (ASP), and In-Vessel. Windrow and ASP composting require large land areas for proper operations. Insufficient space and equipment, combined with excessive quantities of incoming materials can cause significant odor and material management problems.

Most composting sites cannot efficiently manage more than 5,000 cubic yards per acre per year (cy/acre/yr) and 8,000 cy/acre/year is generally the upper limit for an intensely managed site. Too much material makes it difficult for operators to mix and turn material in proper ratios and frequencies. The average density of collected organics (food and yard waste) is approximately 750 pounds per cubic yard[2], indicating the effective capacity limit for windrow and ASR composting facilities is approximately 5-8 tons per acre per day depending on the intensity of operations.

In-vessel composting contains the composting process within a structure, usually a tank or rotary drum. For this report, information for a rotary drum operation is presented. The processing capacity of the operation depends on the number and size of the drum. Commercial drums can be up to 14 feet in diameter and up to 150 feet long, with processing capacity ranging from 5 to 100 tons per day per unit.

Anaerobic Digestion is a common process typically used in the processing of sewage sludge at wastewater treatment facilities but can also process organic solid wastes. Table 3.3 below gives a brief comparison of these four processes and is based on information from the EPA and the National Renewable Energy Laboratory (NREL).

As mentioned previously, the County generates a total of more than 1.9 million tons of organic waste per year and may need more than one type of organic processing technology. More detailed studies will be needed to determine the number and type of processing and end use facilities that will best serve the County's needs.

[1] *Michigan Compost Operator Guidebook, Chapter 4*

[2] *Minnesota Volume to Weight Report Sept 2021*

Table 3.3 Organic Waste Processing Types

Processing Type	Windrow	Aerated Static Pile (ASP)	In-Vessel (Rotary Drum)	Anaerobic Digestion (AD)
				
Process Description	This method involves forming organic waste into rows of long piles called “windrows” and aerating them periodically by either manually or mechanically turning the piles.	ASP involves mixing and placing organic waste in a large pile. To aerate the pile, layers of loosely piled bulking agents (e.g., wood chips, shredded newspaper) are added so that air can pass from the bottom to the top of the pile. The piles also can be placed over a network of pipes that deliver air into or draw air out of the pile. Air blowers may be activated by a timer or temperature sensors.	This method involves feeding organic materials into a drum, silo, concrete-lined trench, or similar equipment. This allows good control of the environmental conditions such as temperature, moisture, and airflow. The material is mechanically turned or mixed to make sure the material is aerated. The size of the vessel can vary in size and capacity.	This method typically involves feeding pre-sorted organic waste into water tanks and forming a wet slurry via conveyors, pumps, and mechanized agitation. The slurry is processed by microorganisms in a series of sealed chambers that are maintained at the optimum conditions for anaerobic digestion. The slurry remains in the chambers for a determined residence time to optimize the production of biogas that is rich in methane and other organic gases. The biogas is captured and can be used for electricity generation, sold to a local gas utility, or used as fuel. The remaining organic solids from the digestion can be used as compost and liquids may be used as fertilizer.

Processing Type	Windrow	Aerated Static Pile (ASP)	In-Vessel (Rotary Drum)	Anaerobic Digestion (AD)
Materials Processed	Process is suited for large volumes such as that generated by entire communities and collected by local governments, and high volume food-processing businesses.	Process is suitable for a relatively homogenous mix of organic waste and works well for larger quantity generators of yard trimmings and compostable municipal solid waste (e.g., food scraps, paper products), such as local governments, landscapers, or farms. Does not work well for composting animal byproducts or grease from food processing industries	This process can accommodate virtually any type of organic waste (e.g., meat, animal manure, biosolids, food scraps) and is unaffected by weather conditions. Materials that do not compost completely (i.e. bones) can be easily reprocessed and completely broken down.	The most common feedstocks for this process are fats, oils and greases (FOG), food waste, and manure.
Capacity	5-8 tons per acre per day	Up to 10 tons per acre per day	Up to 100 tons per day per vessel	270-300 TPD
Process Time	35-112 days	90-180 days	14 days	14-40 days depending on process
Curing Time	30-365 days	30-365 days	30-365 days	30-365 days
Land Area [1]	350-425+ acres	5-425+ acres	3-40+ acres	3-40+ acres depending on capacity
Capital Cost	$5-$11+ per ton	$6-$11+ per ton	$4-$21+ per ton	$18-50+ per ton
O&M Cost	$67 per ton	$68 per ton	$5-$26 per ton	$39 per ton
Staffing	Up to 26 depending on capacity	Up to 26 depending on capacity	1-5	1 per 1,000 tons capacity
Equipment	Dump trucks, Front Loaders, Trommels, Compost Turner	Dump trucks, Front Loaders, Trommels, Compressors	Composting Vessel, Bobcat/Front Loader, Dump Truck	Bobcat/Front Loader, Dump Truck
Complexity	Low	Moderate	Moderate-High	High
Training Level	Low	Low	Low	High
Odors	Heavy. Odors also need to be controlled.	Heavy-Moderate	Low	Designed to contain odors, but odors are possible (digester spills)
Vectors	Yes, animals and flies are common issues	Yes, rodents and flies are common issues	No	Yes, animals and flies are common issues

Processing Type	Windrow	Aerated Static Pile (ASP)	In-Vessel (Rotary Drum)	Anaerobic Digestion (AD)
Biogas and hazards	No	No	No	Yes

[1] *Land area needed to process total FY2021 organics waste stream of 773,000 tons per year for Miami-Dade County (FDEP)*

3.3.4.2 Municipal Solid Waste

As mentioned previously, MSW is a very general type of material, and typically accounts for approximately 70-80% of the total quantity of waste generated by a municipality. MSW is usually highly mixed and primarily collected from residential and commercial properties. In the County and its 24 municipalities, the collection of MSW is already well established, so this section will focus on those facilities that are used to separate and process materials from the MSW stream. Disposal of unprocessible or unrecyclable materials by landfilling or combustion is assumed and will not be included in this analysis.

It should be noted that the Bond Engineer previously completed a State of the Industry report evaluating the status of current solid waste technologies for the DSWM that are currently capable of processing MSW at commercial sizes suitable for DSWM's consideration. That report includes detailed descriptions and information for each of the MSW processing technologies presented. A copy of the report is included as Appendix D.

MSW Processing

Current commercially available methods for processing MSW include WTE (Mass Burn), gasification, mechanical biological treatment (MBT), and mixed waste processing (MWP) facilities. WTE (Mass Burn) is a combustion process that converts raw MSW into ash, recovers ferrous and nonferrous metals, and generates electricity. It should be noted that the WTE (Mass Burn) process is very different from the current RRF, which must shred and process MSW into Refuse-Derived Fuel (RDF) prior to thermal conversion. Gasification is a limited combustion process that converts waste materials into gaseous products and a glass-like slag, and producing synthetic gas which can be used as a fuel. MBT is a combined approach to solid waste management that has both mechanical and biological treatment phases separately processed to ultimately produce a pelletized solid fuel. MWP facilities use a combination of mechanical and manual systems to receive, separate, and process unsegregated municipal solid waste to separate recyclables. Table 3.4 below gives a brief comparison of these four methods. For more information on these processing technologies, please refer to Appendix D.

(This section intentionally left blank)

Table 3.4 MSW Waste Processing Types

Processing Type	Waste-to-Energy (Mass Burn)	Mechanical Biological Treatment	Gasification/Plasma Arc	Mixed Waste Processing
				 
Process Description	This method involves receiving collected MSW and feeding it to boilers, where it is converted at high temperature to gas and ash residue. The MSW combustion heats boiler water to steam, which is routed to turbine generators to generate electricity to power the facility and export for electrical revenue. Flue gas is routed through an air pollution control system that uses lime slurry, activated carbon, baghouse filters, and other technologies to remove pollutants from the flue gas prior to exhaust. Ash residue is routed through magnetic and eddy current separators to recover up to 80% of metals from the ash.	Mechanical Biological Treatment (MBT) is a combined approach to solid waste management that has both mechanical and biological treatment phases separately processed to ultimately produce a pelletized solid fuel. The mechanical stage comprises of automated mechanical sorting equipment such as via conveyors, magnets, trommels, shredders and eddy current separators to process combustible materials, while the biological treatment stage of MBT could involve anaerobic digestion, composting or bio drying. As a result of the mechanical and biological separation and processing, waste is typically shredded, and converted into pelletized solid recovered fuel (SRF)..	Gasification is a starved-oxygen, limited combustion thermochemical process that converts organic fuel or waste materials into the gaseous products of primarily carbon monoxide, hydrogen, as well as carbon dioxide and methane, collectively often referred to as a 'Synthesis gas' or 'Syn Gas'. The resulting gas is considered a fuel due to the flammability and energy content and can be converted into many different liquid or gaseous fuel products, or directly combusted in a gas turbine. Any non-organics in the chamber are melted and form a glass-like slag typically referred to as obsidian.	This method involves using a combination of mechanical and manual systems to receive, separate, and process unsegregated municipal solid waste to separate recyclables. An MWP facility requires no consumer participation, education, or sorting behavior. Odors, vectors, and contamination are significant issues, and these facilities typically have low recovery rates.

Processing Type	Waste-to-Energy (Mass Burn)	Mechanical Biological Treatment	Gasification/Plasma Arc	Mixed Waste Processing
Materials Processed	Raw MSW and other wastes. No change to current collection system needed.	Process is suited for low to moderate MSW volumes.	Raw MSW is not appropriate for the gasification process. Process performance depends greatly on the unique characteristics of the MSW feedstock. Delivered MSW requires extensive preparation (including shredding and separation of glass, metals, and inert materials) or gasifier feed system customization. MSW also may have characteristics like higher moisture content which may necessitate pre-gasification drying. In addition, the non-uniformity of MSW feedstocks and the variability of the specific composition over time require flexible and robust gasifiers.	An MWP facility can accept a wide variety of waste materials. Modern MWP facilities typically recover plastics, cardboard, paper, metals, and in some cases the organic fraction of the waste stream.
Capacity	High (up to 5,000 tpd)	200-560 TPD	100-300 TPD	200-1550 TPD
Land Area	40-60 acres	acres	5-60 acres	20-60 acres
Capital Cost	$35+ per ton	$53 per ton	$40+ per ton	$15-$20 per ton
O&M Cost	$22-26 per ton	$70-$130 per ton	$116 per ton	$70-$131 per ton (assumed similar to Materials Recovery Facility)
Staffing	50-70	16 for a 110,000 tpy plant	50-70 (assumed similar to Waste to Energy)	1 per 1,000 tons capacity
Equipment (Rolling Stock)	Dump trucks, Front Loaders, Others	Dump trucks, Front Loaders, Others	Dump trucks, Front Loaders, Others	Front Loaders, Bobcats, Others
Complexity	High	High	High	Moderate-High
Training Level	High	Medium to High	High	Low
Odors	Yes, in MSW storage areas	Heavy. Odors will need to be controlled.	Yes, in MSW storage and preparation areas	Heavy. Odors will need to be controlled.
Vectors	Yes, in MSW storage areas	Yes	Yes, in MSW storage and preparation areas	Yes, animals and flies are common issues
Notes	Revenue from electricity generation counts toward recycling goals in Florida	Costs based on European facilities and one recently closed facility in the U.S.	Unproven technology. Can be equipped for electrical generation, counts as recycling in Florida, fire hazards from syngas production	Past studies have indicated only about 10-30% of waste entering a MWP facility is recovered as commodity-grade recyclables due to contamination.

3.3.4.3 Residential and Commercial Recyclables

3.3.4.3.1 Collection

In the County and its 24 municipalities, the collection of source-separated residential and commercial recyclable materials is performed directly by the municipalities or by private haulers with automated recycling trucks and conventional collection trucks. The County currently provides biweekly, single stream recycling collection service through contractual agreements to approximately 350,000 households in the unincorporated County, nine municipalities included in the solid waste service area, and an additional nine municipalities through Interlocal Agreements (ILAs). Currently, the County contracts with Waste Management Incorporated (WMI) at their Reuter Recycling Facility in Pembroke Pines, FL for the processing of recyclable materials.

3.3.4.3.2 Material Recovery Facility

A materials recovery facility (MRF) uses a combination of mechanical and manual systems to receive, separate, and process collected recycling materials to be sold to end buyers (see Figure 3.9). A MRF is critical to any municipal recycling program.

Materials recovery facilities sort a wide array of recyclable materials, including, but not limited to:

- Plastics
- Cardboard (OCC)
- Paper including newspapers, magazines, office paper, mixed paper, etc.
- Glass bottles and jars
- Metal containers, including aluminum and steel cans

Figure 3.9 Typical MRF Facility (Courtesy CP)

Nonrecyclable or contaminated items are separated out and disposed, and typically are less than 10% of the total processing stream. The separated recyclable materials are then baled and loaded on trucks for transport to end users to be used as raw materials for new products. The market availability and material prices are crucial to MRF economics and operations. If the value of the materials is less than the processing cost, then MRFs will delay transporting them until market prices improve or dispose of them to reduce costs.

Siting Considerations

As a result of ongoing efforts to increase capacity and efficiency while reducing labor costs, MRFs are becoming larger facilities to accommodate larger and more complicated automated sorting equipment. Many newer facilities are more than 100,000 square feet and need 10-20 acres of land. Older MRFs were typically located close to collection routes to reduce travel times of collection vehicles, but new facilities are being planned as more “regional” facilities that accept materials from many communities and can be located further away. This also helps to reduce local traffic and noise, which are also associated with MRFs. Local collection vehicles would then take recyclables to transfer stations, where they are transferred to long haul trucks for transport to the MRF. However, a MRF should still be located within 10-15 minutes of a major road to reduce travel times as much as possible.

Costs

MRFs are capital and labor intensive, incurring capital costs of approximately $17-$23 per ton and O&M costs of $70-$131 per ton. Revenue from the sale of recovered materials helps to offset some of the costs, but tipping fees typically cover the bulk of the capital and operating costs.

3.3.4.3.3 Special Consideration – Glass

Glass is a particularly difficult material for the recycling industry, as its bulk weight makes it expensive to transport, glass remelt facilities are usually not locally available, and broken glass contaminates cardboard and other recyclables, presents hazards to workers, and causes significant wear and tear on sorting and processing equipment. For these reasons, many communities simply crush collected glass and use it as landfill road or cover material.

One consideration to help shift glass into a more circular economy may be to add a glass crusher (see Figure 3.10 and 3.11) at a MRF (or by itself) to pulverize the recycled glass and create both glass sand and glass gravel, which can then be used as fill material, beach renourishment, cement additives, or other potential uses. Many municipalities in Florida have begun glass pulverizing operations, mostly as a measure to reduce hauling and disposal costs. Most notably, as of March 1, 2023, Walt Disney World was conducting a pilot program to pulverize collected glass and use it to fill holes on roads and trails.

Commercial glass pulverizers can process up to 1,500 pounds of glass per hour, or more than 1,700 tons per year. Capital costs average approximately $13 per ton, and O&M costs are estimated at $10-15 per processed ton.

Figure 3.10 Glass Crushing Equipment (Courtesy City of Flagler Beach)

Figure 3.11 Glass Crushed to Sand (Courtesy Aqua Tools)

3.3.4.4 C&D Wastes

C&D waste is defined in Chapter 62-701, FAC and generally includes a broad range of waste materials generated from the construction, destruction, or renovation of a structure, including land development operations. This type of waste typically includes materials such as steel, glass, brick, concrete, asphalt material, pipe, gypsum wallboard, and lumber, but also includes rocks, soils, tree remains, trees, and other vegetative matter, clean cardboard, paper, plastic, wood, and metal scraps, yard trash and other materials. C&D wastes were estimated at more than 858,000 tons in FY 2021 and accounted for approximately 19% of the total waste stream generated in the County (FDEP).

C&D waste may be a suitable material for recovery, as it is usually separated from other waste streams and the collection is already performed by private haulers. Legislative controls on C&D waste through the building permit process have proven effective in other municipalities and could be implemented in the County.

Figure 3.12 C&D Recycling Facility (Courtesy Lee County)

The difficulty with C&D waste recycling stems from the lack of processing capacity and secondary markets for recovered materials. These aspects must be carefully analyzed before any recovery activities can be implemented. C&D recovery facilities are usually designed to process up to 400 tons per day, or about 145,000 tons per year, but can be larger – the WM Nashville C&D Facility reportedly can process up to 1,200 tpd. In 2021, FDEP estimated more than 700,000 tons of C&D waste was not being recycled in the County. Therefore, the County could develop, either directly or by encouraging private facilities through grants and other incentives, multiple C&D facilities to address the capacity shortfall.

Siting Considerations

Processing of C&D waste is typically performed either indoors or outdoors at a dedicated C&D recycling facility using mechanical and manual sorting systems similar to those found in a MRF. The size, equipment, labor needs and layout of a C&D recycling facility depends on its complexity and capacity and is explained in detail in Appendix D. Most facilities only require an area of approximately 5-10 acres, but they generate high levels of noise, dust, and traffic and should be located in industrial areas and other suitable sites well away from residential areas. Road access is important, and major roads should be within a 10-minute drive.

Costs

Depending on the layout and complexity, capital costs for C&D recycling facilities range from $6 to $19 per ton, and annual O&M costs are generally in the range of $70 to $131 per ton.

3.3.5 Analyze Secondary Markets

The feasibility of achieving Zero Waste is highly dependent on identifying secondary markets that already exist or that can realistically be developed for the diverted material and end products of processing facilities. The market for recycled materials depends on the value of the virgin material, supply, the ability to meet market specifications, costs to manage contamination and process materials, and local, state, national and international economies. Specific drivers of market demand include policy incentives, research and development of new product or packaging applications, specific incentives, and technical assistance for recycled material purchasers such as Environmentally Preferable Purchasing programs.

There are many potentially recoverable materials in the County's waste stream that are disposed because no secondary markets exist or they are not cost-effective to recover. The lack of secondary markets and the difficult economy of recoverable materials have been some of the biggest challenges for the recycling industry and for communities attempting Zero Waste management strategies around the country. Ever since China's National ban of 24 types of solid waste and recyclable materials was implemented in 2018, market prices for recyclables exponentially decreased as the Average Market Value (AMV) of commodities has declined by $100 per ton since a high point in 2011 (Source: Kessler report 2022).

The recycling commodity markets are still recovering from the effects of China's policy change in 2018, and the situation with secondary markets and the economics of recycled materials remains challenging. Over the last few years increased recycling costs have forced many communities to reduce their recycling programs, and some were forced to eliminate them entirely. However, waste generation rates continue to increase, and there may be significant opportunities for development of recycling industries and markets in the near future. Further studies and thorough analysis and validation of the economic viability of specific waste commodities will be needed before any selection of alternative processing technologies.

3.3.6 Zero Waste Plan and Detailed Financial Analysis

For each waste material that could potentially be recovered from a waste stream and routed to a secondary market or end use, a detailed analysis should be conducted to determine if the recovery is financially feasible. Such an analysis would involve determining the type, number and capacity of processing facilities needed to recover the material and a long-term (10 years or more) analysis of all expenses (educational, capital, facility operations and maintenance, materials transfer and transport, etc.) and revenues (i.e., solid waste collection rates, tipping fees, material sales, etc.) to clearly understand the financial impacts resulting from the recovery of that material.

The results of each material analysis could be used to develop a Zero Waste Master Plan which will be an iterative process incorporating all resources needed to recover the materials deemed financially feasible to recover. A Zero Waste Master Plan should also include a comprehensive long-term financial analysis for all Collection and Disposal Fund expense and revenues to determine if the overall financial effects on the County's System, including debt service coverage requirements, Collection Fees, and Disposal rates are within acceptable limits. The Zero Waste Master Plan would represent the maximum potential recovery of materials (and diversion rate) that meets all the various financial requirements and political demands of the County and its residents.

3.3.7 Additional Programs

In addition to the solid waste collection and processing systems, the County will need many new programs to adopt a zero-waste approach to managing its solid waste. Such programs may include, but are not limited to, significant public education programs in schools, community centers, and other government properties and systems, regular advertising and resident outreach campaigns, increased compliance efforts to reduce contamination, and increased legislative efforts at the local and state level. The scope and cost of these additional programs may be substantial and must be factored into the total cost of a Zero Waste Master Plan.

3.3.8 Public Communication and Stakeholder Buy-In

In conjunction with the development of a Zero Waste Master Plan, significant planning, coordinating, and executing effective public communications and meetings with all stakeholders will be necessary. Those tasked with this critically important work must be able to explain current solid waste issues and proposed System changes, address questions and concerns, and negotiate changes to the Zero Waste Master Plan, as necessary. As the solid waste strategy for the County will be heavily dependent on the participation of 24 municipalities, more than 2.7 million residents and thousands of private companies for its success, it is of paramount importance that the stakeholders

understand and support the changes. Otherwise, as other municipalities have discovered, the resulting system will likely experience significant political and operational difficulties and public resentment no matter how much planning effort and funding is applied.

3.3.9 Legislation

Laws and programs surrounding waste management are typically handled at the state and local level. The federal government regulates waste management primarily through the Resource Conservation and Recovery Act (RCRA), but does not yet mandate Zero Waste activities at a national level. Legislation and programs surrounding specifically zero-waste are typically pursued at a local level (county, city, or municipality), with many states such as California mandating diversion requirements at a state level but leaving much of the action towards those goals to local regulators.

Examples of types of legislation or programs used to further Zero Waste include but are not limited to:

- **Material Bans –** One more public-facing type of legislation is material bans. Typical items targeted by material bans include single-use plastics, plastic straws, polystyrene foam, and plastic bags. Bans such as these typically do not reduce waste-to-landfill by a substantial tonnage but are none-the-less impactful in reducing non-recyclable or non-compostable material from the waste stream. Florida state law currently prohibits local municipalities from banning plastic bags, but in time that law may be changed.
- **Diversion or Zero-Waste Mandates –** State or local governments can set diversion or zero-waste mandates that require diversion at a set goal. This is most easily applied to lower tier government bodies that the higher level governmental entity has jurisdiction over, such as a state mandate applied to counties, or a local government mandate applied to local governmental buildings. Those lower tier government bodies can then be held accountable for reaching the proposed goal(s) and can justify spending on studies, programs for residents and businesses, and facilities to reach those goal(s).
- **Extended Producer Responsibility (EPR) –** EPR policies put the financial responsibility for a product's end-of-life on the producers of the product, rather than directly to ratepayers or taxpayers. EPR policies can be difficult to pass due to the complexities of designing the regulations and setting the rates on materials, as well as pushback from manufacturers. However, these policies can have a substantial impact by incentivizing manufacturers to minimize waste or design for recycling, as well as incentivize the recycling of waste materials by product users. An extremely successful example of EPR is deposit return schemes for beverage containers, which allow for a higher return rate for plastic bottles and aluminum cans than other recyclable materials.
- **Public-Private Partnerships (PPP) –** PPPs can be an impactful way to develop the infrastructure necessary to improve diversion, such as development of more up-to-date MRFs, anaerobic digestors, WTE facilities, transfer stations, or other facilities. Even if a mandate increases the diversion at the point of generation, the materials diverted will still need to have a facility where it will be processed and a market for the sale of the product.
- **Contractor Performance Incentives –** Contracts with operators can be designed so that financial incentives exist for better performance. For example, a high diverter, San Jose's contracts with waste haulers allow for tiered higher rates to be paid to the hauler by the local government for higher diversion rates, as well as incentives to minimize contamination as higher contamination requires the hauler to pay a higher rate to the recycling or organics processor. Another example of a performance incentive is payment-sharing for recyclables or compostable products sent to market, where operators are paid a portion of the sale value of the materials to incentivize higher quality and quantity of outputs.
- **Pay-as-You-Throw (PAYT) –** PAYT is a type of incentive structure that encourages waste generators such as residents or businesses to limit the amount of waste that they set out. PAYT programs often either charge households by the size of bin that is used, or by the sale of certified bags for pickup.

- **Product Certification –** A concept being explored by some municipalities is adhering to a certification standard for products created by recycling or organics processors. For example, PAS 100 is a standard used the UK for compost. Another example is standards for biogas to be used as Renewable Natural Gas (RNG) in pipelines. These types of standards allow purchasers of these products produced from waste to know the quality of material that they are purchasing, thus encouraging a market for those products.

3.3.10 Options for the Evaluated Sites

This report serves to provide information regarding the types of commercially available processing technologies and high-level estimates of capital and operational costs and is focused only on the four identified sites from the previous Siting Report, plus the three additional sites identified subsequently (Sites A1 – Dolphin Expressway, A2 – Opa-Locka West Airport, and A3 – Okeechobee Road). Many of the alternate technologies discussed in this report use facilities of different sizes than a WTE facility, and the same siting parameters do not necessarily apply. In coordination with any Zero Waste Master Plan, it is recommended that a full county-wide siting analysis be considered for each alternative technology which would most likely reveal many additional properties within the County that could be considered.

While the details regarding the exact type, number, location, and capacity of facilities that may be used to achieve a Zero Waste strategy in the County are anticipated to be the subject of a future Zero Waste Master Plan, for the purposes of this report, the options below are offered as illustrations of what may be feasible for the seven sites, based on the estimated quantity and composition of the waste generated in the County. These options were selected using the assumption that the County, in the near term, will continue to rely on transfer hauling and landfills to dispose of the majority of its waste, but will gradually implement new operations and facilities with sufficient capacity to manage the entire county waste stream and move towards the goal of Zero Waste. Success will be defined by a gradually increasing landfill diversion rate, with the ultimate goal of 90% or higher.

Table 3.5 Potential Development Options for the Seven Evaluated Sites

Site		Waste Type	Processing Capacity (tpy)	Site Area
Existing RRF Site				**60 Ac±**
Option 1	WTE (Mass Burn)	MSW	1.4M± – 1.8M±	40-60 Ac
Option 2	Mixed Waste Processing Facility	MSW	140,000-180,000±	40-60 Ac.
Option 3	Organics Composting (In-Vessel)[1]	Food and Yard Waste	5,000-400,000±	1-60 Ac±
	Material Recovery Facility (MRF)	Curbside Recyclables	120,000-140,000±	40 Ac±
Option 4	C&D Recycling Facility	C&D Waste	140,000-150,000±	40-60 Ac
Medley Site				**320 Ac±**
Option 1	WTE (Mass Burn)	MSW	1.4M± – 1.8M±	40-60 Ac
	Ash Monofill	WTE Ash	Variable	200 Ac.±
Option 2	Organics Composting (In-Vessel)[1]	Food and Yard Waste	5,000-400,000±	1-60 Ac±
	Material Recovery Facility (MRF)	Curbside Recyclables	120,000-140,000±	40 Ac±
	C&D Recycling Facility	C&D Waste	140,000-150,000±	40-60 Ac

Site		Waste Type	Processing Capacity (tpy)	Site Area
Site 16 - Ingraham Highway Site 1				**159 Ac±**
Option 1	WTE (Mass Burn)	MSW	1.4M± – 1.8M±	40-60 Ac
Option 2	Mixed Waste Processing Facility	MSW	140,000-180,000±	40-60 Ac.
Option 3	Organics Composting (In-Vessel)[1]	Food and Yard Waste	5,000-400,000±	1-60 Ac±
Option 4	C&D Recycling Facility	C&D Waste	140,000-250,000±	40-60 Ac
Site 17 - Ingraham Highway Site 2				**81 Ac±**
Option 1	WTE (Mass Burn)	MSW	1.4M± – 1.8M±	40-60 Ac
Option 2	Mixed Waste Processing Facility	MSW	140,000-180,000±	40-60 Ac.
Option 3	Organics Composting (In-Vessel)[1]	Food and Yard Waste	5,000-400,000±	1-60 Ac±
Option 4	C&D Recycling Facility	C&D Waste	140,000-250,000±	40-60 Ac
Site A1 – Dolphin Expressway				**250+ Ac±**
Option 1	WTE (Mass Burn)	MSW	1.4M± – 1.8M±	40-60 Ac
Option 2	Mixed Waste Processing Facility	MSW	140,000-180,000±	40-60 Ac.
Option 3	Organics Composting (In-Vessel)[1]	Food and Yard Waste	5,000-400,000±	1-60 Ac±
Option 4	C&D Recycling Facility	C&D Waste	140,000-250,000±	40-60 Ac
Site A2 – Opa-Locka West Airport				**416 Ac±**
Option 1	WTE (Mass Burn)	MSW	1.4M± – 1.8M±	40-60 Ac
	Ash Monofill	WTE Ash	Variable	200 Ac.±
Option 2	Mixed Waste Processing Facility	MSW	140,000-180,000±	40-60 Ac.
Option 3	Organics Composting (In-Vessel)[1]	Food and Yard Waste	5,000-400,000±	1-60 Ac±
Option 4	C&D Recycling Facility	C&D Waste	140,000-250,000±	40-60 Ac
Site A3 – Okeechobee Road				**68 Ac±**
Option 1	WTE (Mass Burn)	MSW	1.4M± – 1.8M±	40-60 Ac
Option 2	Mixed Waste Processing Facility	MSW	140,000-180,000±	40-60 Ac.
Option 3	Organics Composting (In-Vessel)[1]	Food and Yard Waste	5,000-400,000±	1-60 Ac±
Option 4	C&D Recycling Facility	C&D Waste	140,000-250,000±	40-60 Ac

[1] *Requires separate organics collection system.*

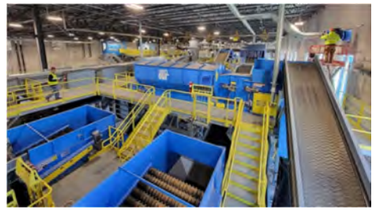
Table 3.6 Alternative Siting Considerations for the Seven Evaluated Sites

Alternative	Example Photo	Area Required	Estimated Cost Per Ton	Materials Processed	Site-Specific Considerations						
		Processing Capacity	**Development Time**	**Technology Considerations**	**RRF Site (157 Ac. ±, ~60 Ac Developable)**	**Site 1 – Medley (320 Ac. ± , ~100 Ac. Currently Developable)**	**Site 16 - Ingraham Highway Site 1 (159 Ac. ±)**	**Site 17 - Ingraham Highway Site 2 (81 Ac. ±)**	**Site A1 - Dolphin Expressway Site (416 Ac. ±)**	**Site A2 - Opa-Locka West Airport Site (460 Ac. ±)**	**Site A3 – Okeechobee Road Site (68 Ac.±)**
	Process Description										
Organics Composting (Windrow)		10-450+ Ac	$72-$80+ [1]	Process is suited for large volumes such as that generated by entire communities and collected by local governments, and high volume food-processing businesses.	Likely public concerns with noise, odor and vector issues. Estimated maximum processing capacity at this site approximately 125,000 tons per year.	Potential public concerns with noise, odor and vector issues. Estimated maximum processing capacity at this site approximately 200,000 tons per year without filling lake areas.	Reduced potential public concerns with noise, odor and vector issues. High groundwater may cause operational difficulties, especially during wet season. Estimated maximum processing capacity at this site approximately 300,000 tons per year. Utilities and travel times are concerns.	Reduced potential public concerns with noise, odor and vector issues. High groundwater may cause operational difficulties, especially during wet season. Estimated Maximum processing capacity at this site approximately 150,000 tons per year. Utilities and travel times are concerns.	Proximity to residential zoning increases potential public concerns with noise, odor and vector issues. High groundwater may cause operational difficulties, especially during wet season. Maximum processing capacity depends on parcel area acquired and developed, could be 1M tpy or more.	Potential permitting and public concerns. High groundwater may cause operational difficulties, especially during wet season. Estimated maximum processing capacity at this site, if fully developed, may be up to 1M tpy. Utilities and travel times are concerns.	High groundwater may cause operational difficulties, especially during wet season. Estimated maximum processing capacity at this site, may be approximately 125,000 tpy. Utilities and travel times are concerns.
		5-8 tons per acre per day. Typically, 80-500 TPD	3-5 years	Requires separate organics collection. Low complexity, low skill level needed for most operations. Minimum 30-day processing time. Processing capacity depends on available land area. Not well suited for urban areas, potential public concerns with noise, odor and vector issues. Challenging wet season operations. Good quality compost produced. End uses/markets and capacities may need development. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals.							
	This method involves forming organic waste into rows of long piles called “windrows” and aerating them periodically by either manually or mechanically turning the piles.										
Organics Composting (Aerated Static Pile (ASP))		5-450+ Ac	$74-$80+ [1]	Process is suitable for a relatively homogenous mix of organic waste and works well for larger quantity generators of yard trimmings and compostable municipal solid waste (e.g., food scraps, paper products), such as local governments, landscapers, or farms. Does not work well for composting animal byproducts or grease from food processing industries	Likely public concerns with noise, odor and vector issues. Estimated maximum processing capacity at this site approximately 180,000 tons per year.	Potential public concerns with noise, odor and vector issues. Estimated maximum processing capacity at this site approximately 250,000 tons per year without filling lake areas.	Reduced potential public concerns with noise, odor and vector issues. High groundwater may cause operational difficulties, especially during wet season. Estimated maximum processing capacity at this site approximately 400,000 tons per year. Utilities and travel times are concerns.	Reduced potential public concerns with noise, odor and vector issues. High groundwater may cause operational difficulties, especially during wet season. Estimated Maximum processing capacity at this site approximately 200,000 tons per year. Utilities and travel times are concerns.	Proximity to residential zoning increases potential public concerns with noise, odor and vector issues. High groundwater may cause operational difficulties, especially during wet season. Maximum processing capacity depends on parcel area acquired and developed, could be 1M tpy or more.	Potential permitting and public concerns. High groundwater may cause operational difficulties, especially during wet season. Estimated maximum processing capacity at this site, if fully developed, may be up to 1M tpy. Utilities and travel times are concerns.	High groundwater may cause operational difficulties, especially during wet season. Estimated maximum processing capacity at this site, may be approximately 125,000 tpy. Utilities and travel times are concerns.
		1-10 tons per acre per day. Typically, 80-700 TPD	3-5 years								
	ASP involves mixing and placing organic waste in a large pile. To aerate the pile, layers of loosely piled bulking agents (e.g., wood chips, shredded newspaper) are added so that air can pass from the bottom to the top of the pile. The piles also can be placed over a network of pipes that deliver air into or draw air out of the pile. Air blowers may be activated by a timer or temperature sensors.			Requires separate organics collection. Moderate complexity, moderate skill level needed for operation. More compact process than conventional windrow, different turning equipment. Minimum 30-day processing time. Processing capacity depends on available land area. Potential public concerns with noise, odor and vector issues. Challenging wet season operations. End uses/markets and capacities may need development. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals.							

Alternative	Example Photo / Process Description	Area Required: Processing Capacity	Estimated Cost Per Ton: Development Time	Materials Processed: Technology Considerations	RRF Site (157 Ac. ±, ~60 Ac Developable)	Site 1 – Medley (320 Ac. ± , ~100 Ac. Currently Developable)	Site 16 - Ingraham Highway Site 1 (159 Ac. ±)	Site 17 - Ingraham Highway Site 2 (81 Ac. ±)	Site A1 - Dolphin Expressway Site (416 Ac. ±)	Site A2 - Opa-Locka West Airport Site (460 Ac. ±)	Site A3 – Okeechobee Road Site (68 Ac.±)
Organics Composting (In-Vessel)		<1-20+ Ac	$9-$50+ (1),(2)	This process can accommodate virtually any type of organic waste (e.g., meat, animal manure, biosolids, food scraps) and is unaffected by weather conditions. Materials that do not compost completely (i.e. bones) can be easily reprocessed and completely broken down.	Compact footprint is a good option for this location. Reduced potential public concerns with noise, odor and vector issues. Depending on footprint area, could be co-located with other alternative facility(ies) on this site.	Reduced potential public concerns with noise, odor and vector issues. Could be co-located with other alternative facility(ies) on this site.	Reduced potential public concerns with noise, odor and vector issues. High groundwater may cause some operational difficulties, especially during wet season. Utilities and travel times are concerns. Could be co-located with other alternative facility(ies) on this site.	Reduced potential public concerns with noise, odor and vector issues. High groundwater may cause some operational difficulties, especially during wet season. Utilities and travel times are concerns. Could be co-located with other alternative facility(ies) on this site.	Potential permitting and public concerns. High groundwater may cause some operational difficulties, especially during wet season. Floodplain and wetland mitigation may increase development costs. All utilities available near site. Could be co-located with other alternative facility(ies) on this site.	Potential permitting and public concerns. High groundwater may cause some operational difficulties, especially during wet season. Floodplain and wetland mitigation may increase development costs. Utilities will need to be extended to site. Could be co-located with other alternative facility(ies) on this site.	High groundwater may cause some operational difficulties, especially during wet season. Floodplain and wetland mitigation may increase development costs. Utilities will need to be extended to site. Could be co-located with other alternative facility(ies) on this site.
	This method involves feeding organic materials into a drum, silo, concrete-lined trench, or similar equipment. This allows good control of the environmental conditions such as temperature, moisture, and airflow. The material is mechanically turned or mixed to make sure the material is aerated. The size of the vessel can vary in size and capacity.	5-100 tpd per vessel, 15 to 1200 TPD	3-5 years	Requires separate organics collection. Variable complexity, low skill level needed for operation. Short 5-7 day processing time. Compact process, smaller facility footprint, expandable capacity. Better suited for urban areas, vessels can be enclosed in metal building to mitigate potential public concerns with odor and vector issues from receiving areas. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals.							
Anaerobic Digestion		3-40+ acres depending on capacity	$57-$90+(1),(2)	The most common feedstocks for this process are fats, oils and greases (FOG), food waste, and manure.	Possible capacity limitations due to limited site area. Likely permitting issues and public concerns with noise, odor and vector issues.	Potential permitting issues and public concerns with noise, odor and vector issues. Some utilities may need to be extended to site. Could be co-located with other alternative facility(ies) on this site.	Reduced potential public concerns with noise, odor and vector issues. Presence of floodplain will increase development costs. Utilities will need to be extended to site and travel times are concerns.	Reduced potential public concerns with noise, odor and vector issues. Presence of floodplain will increase development costs. Utilities will need to be extended to site and travel times are concerns.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. All utilities available near site. Could be co-located with other alternative facility(ies) on this site.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Utilities will need to be extended to site. Could be co-located with other alternative facility(ies) on this site.	Floodplain and wetland mitigation may increase development costs. Utilities will need to be extended to site. Could be co-located with other alternative facility(ies) on this site.
	This method typically involves feeding pre-sorted organic waste into water tanks and forming a wet slurry via conveyors, pumps, and mechanized agitation. The slurry is processed by microorganisms in a series of sealed chambers that are maintained at the optimum conditions for anaerobic digestion. The process is optimized for the production of biogas, which is then captured and can be used for electricity generation, sold to a local gas utility, or used as fuel. The remaining organic solids from the digestion can be used as compost and liquids may be used as fertilizer.	270-600 TPD	5-7 years	Requires separate organics collection. High complexity, high skill level needed for operation. Processing capacity depends on available land area. Potential permitting issues and public concerns with noise, odor and vector issues. Fire risk from methane production. Additional composting or disposal of resulting digestate solids would be required. Resulting digestate liquids can be used for fertilizer in cover maintenance for landfills or on agricultural land. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals. End uses/markets and capacities may need development.							

Alternative	Example Photo	Area Required	Estimated Cost Per Ton	Materials Processed	Site-Specific Considerations						
		Processing Capacity	**Development Time**	**Technology Considerations**	**RRF Site (157 Ac. ±, ~60 Ac Developable)**	**Site 1 – Medley (320 Ac. ± , ~100 Ac. Currently Developable)**	**Site 16 - Ingraham Highway Site 1 (159 Ac. ±)**	**Site 17 - Ingraham Highway Site 2 (81 Ac. ±)**	**Site A1 - Dolphin Expressway Site (416 Ac. ±)**	**Site A2 - Opa-Locka West Airport Site (460 Ac. ±)**	**Site A3 – Okeechobee Road Site (68 Ac.±)**
	Process Description										
Gasification		5-60 Ac	$154 [3]	Raw MSW is not appropriate for the gasification process. Process performance depends greatly on the unique characteristics of the MSW feedstock. Delivered MSW requires extensive preparation (including shredding and separation of glass, metals, and inert materials) or gasifier feed system customization. MSW also may have characteristics like higher moisture content which may necessitate pre-gasification drying. In addition, the non-uniformity of MSW feedstocks and the variability of the specific composition over time require flexible and robust gasifiers.	Good transportation access, all utilities available. Permitting and public opposition challenges. Permitting schedule may be faster as site has existing Power Plant Site Certification. RRF Landfill on site for slag disposal.	Difficult permitting, close to Everglades Class I area and existing large emitters. Significant impacts to local traffic. Development at this site may require additional time and costs for backfilling and structure foundations. Could be co-located with other alternative facility(ies) on this site. WM Medley landfill adjacent to site for slag disposal.	Potential permitting issues and community opposition at this location. Expected very challenging permitting due to proximity to Everglades Class I Area. Utilities will need to be extended to site. Significantly increased local traffic and hauling costs. Could be co-located with other alternative facility(ies) on this site.	Potential permitting issues and community opposition at this location. Expected very challenging permitting due to proximity to Everglades Class I Area. Utilities will need to be extended to site. Significantly increased local traffic and hauling costs. Could be co-located with other alternative facility(ies) on this site.	Good transportation access, all utilities available near site. Difficult permitting due to close proximity to Everglades Class I area. Floodplain and wetland mitigation may increase development costs. Could be co-located with other alternative facility(ies) on this site. Rail access on the northern boundary could be used for slag hauling to out-of-county landfill.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Difficult permitting due to nearby large emitter (Titan Pennsuco Complex) and Everglades Class I area. Utilities will need to be extended to site Could be co-located with other alternative facility(ies) on this site.	Floodplain and wetland mitigation may increase development costs. Difficult permitting due to nearby large emitter (Titan Pennsuco Complex) and Everglades Class I area. Utilities will need to be extended to site Could be co-located with other alternative facility(ies) on this site.
	Gasification is a starved-oxygen, limited combustion thermochemical process that converts organic fuel or waste materials into the gaseous products of primarily carbon monoxide, hydrogen, as well as carbon dioxide and methane, collectively often referred to as a 'Synthesis gas' or 'Syn Gas'. The resulting gas is considered a fuel due to the flammability and energy content and can be converted into many different liquid or gaseous fuel products, or directly combusted in a gas turbine. Any non-organics in the chamber are melted and form a glass-like slag typically referred to as obsidian.	100 – 300+ TPD	10+ years	Unproven technology, significant pre-processing of MSW required. High complexity, high skill level needed for operation. Possible capacity limitations. Increased fire risk from syngas production; however, syngas could be used for electrical generation. High capital and operating cost. Active ash monofill required, preferably, on site for slag disposal.							
Waste-to-Energy (Mass Burn)		40-60 Ac	$57-60	Raw MSW and other wastes.	Good transportation access, all utilities available. Permitting and public opposition challenges. Permitting schedule may be faster as site has existing Power Plant Site Certification. RRF Landfill on site for ash disposal.	Difficult permitting, close to Everglades Class I area and existing large emitters. Significant impacts to local traffic. Development at this site may require additional time and costs for backfilling and structure foundations. Could be co-located with other alternative facility(ies) on this site. WM Medley landfill adjacent to site for ash disposal.	Potential permitting issues and community opposition at this location. Expected very challenging permitting due to proximity to Everglades Class I Area. Utilities will need to be extended to site. Significantly increased local traffic and hauling costs. Could be co-located with other alternative facility(ies) on this site.	Potential permitting issues and community opposition at this location. Expected very challenging permitting due to proximity to Everglades Class I Area. Utilities will need to be extended to site. Significantly increased local traffic and hauling costs. Could be co-located with other alternative facility(ies) on this site.	Good transportation access, all utilities available near site. Floodplain and wetland mitigation may increase development costs. Difficult permitting due to close proximity to Everglades Class I area. Could be co-located with other alternative facility(ies) on this site. Rail access on the northern boundary.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Difficult permitting due to nearby Everglades Class I area. Utilities will need to be extended to site Could be co-located with other alternative facility(ies) on this site.	Floodplain and wetland mitigation may increase development costs. Difficult permitting due to nearby large emitter (Titan Pennsuco Complex) and Everglades Class I area. Utilities will need to be extended to site.
	This method involves receiving collected MSW and feeding it to boilers, where it is converted at high temperature to gas and ash residue. The MSW combustion heats boiler water to steam, which is routed to turbine generators to generate electricity to power the facility and export for electrical revenue. Flue gas is routed through an air pollution control system that uses lime slurry, activated carbon, baghouse filters, and other technologies to remove pollutants from the flue gas prior to exhaust. Ash residue is routed through magnetic and eddy current separators to recover up to 80% of metals from the ash.	4,000-5,000 TPD	8-10+ years	No changes to existing collection system needed. Highest capacity alternative. High complexity, high skill level needed for operation. Permitting and public opposition challenges. High capital and operating cost. Electrical generation for revenue or powering other facilities. Good metal recovery possible from ash. Landfill needed for ash disposal.							

Alternative	Example Photo / Process Description	Area Required / Processing Capacity	Estimated Cost Per Ton / Development Time	Materials Processed / Technology Considerations	Site-Specific Considerations: RRF Site (157 Ac. ±, ~60 Ac Developable)	Site 1 – Medley (320 Ac. ± , ~100 Ac. Currently Developable)	Site 16 - Ingraham Highway Site 1 (159 Ac. ±)	Site 17 - Ingraham Highway Site 2 (81 Ac. ±)	Site A1 - Dolphin Expressway Site (416 Ac. ±)	Site A2 - Opa-Locka West Airport Site (460 Ac. ±)	Site A3 – Okeechobee Road Site (68 Ac.±)
Mechanical Biological Treatment		5-15 Ac.	$103-$133	Process is suited for low to moderate MSW volumes.	Potential public concerns with noise, odor and vector issues. Could be co-located with other alternative facility(ies) on this site. Local concrete facilities may be able to use SRF.	Potential public concerns with noise, odor and vector issues. Could be co-located with other alternative facility(ies) on this site. Local concrete facilities may be able to use SRF.	Potential public concerns with noise, odor and vector issues. Significantly increased local traffic and hauling costs. Utilities will need to be extended to site. Could be co-located with other alternative facility(ies) on this site. Local concrete facilities may be able to use SRF.	Potential public concerns with noise, odor and vector issues. Significantly increased local traffic and hauling costs. Utilities will need to be extended to site. Could be co-located with other alternative facility(ies) on this site. Local concrete facilities may be able to use SRF.	Potential public concerns with noise, odor and vector issues. Floodplain and wetland mitigation may increase development costs. Could be co-located with other alternative facility(ies) on this site. Local concrete facilities may be able to use SRF. Rail access on the northern boundary could be used for SRF transport.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Could be co-located with other alternative facility(ies) on this site. Local concrete facilities may be able to use SRF. Utilities would have to be extended to site.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Could be co-located with other alternative facility(ies) on this site. Local concrete facilities may be able to use SRF. Utilities would have to be extended to site.
		200-560 TPD	3-4 years	Changes to existing collection system may be needed if required by MBT project developer. High complexity, high skill level needed for most operations. Pelletized SRF would need to be loaded and transported to another facility for firing. End uses/markets and capacities may need development. High capital and operating costs, few facilities in operation. Additional fleet equipment and operators would be needed for site operation and transport of SRF.							
	Mechanical Biological Treatment (MBT) is a combined approach to solid waste management that has both mechanical and biological treatment phases separately processed to ultimately produce a pelletized solid fuel. The mechanical stage comprises of automated mechanical sorting equipment such as via conveyors, magnets, trommels, shredders and eddy current separators to process combustible materials, while the biological treatment stage of MBT could involve anaerobic digestion, composting or bio drying. As a result of the mechanical and biological separation and processing, waste is typically shredded, and converted into pelletized solid recovered fuel (SRF).										
Mixed Waste Processing Facility	 	20-60 Ac	$85-$150	An MWP facility can accept a wide variety of waste materials. Modern MWP facilities typically recover plastics, cardboard, paper, metals, and in some cases the organic fraction of the waste stream.	Likely public concerns with noise, odor and vector issues. Depending on footprint area could be co-located with another alternative facility on this site.	Potential public concerns with noise, odor and vector issues. Significant impacts to local traffic. Could be co-located with other alternative facility(ies) on this site.	Potential public concerns with noise, odor and vector issues, but may be minimal at this location. Utilities will need to be extended to site. Significantly increased hauling costs. Could be co-located with other alternative facility(ies) on this site.	Potential public concerns with noise, odor and vector issues, but may be minimal at this location. Utilities will need to be extended to site. Significantly increased hauling costs. Could be co-located with other alternative facility(ies) on this site.	Potential public concerns with noise, odor and vector issues. Floodplain and wetland mitigation may increase development costs. Could be co-located with other alternative facility(ies) on this site. Rail access on the northern boundary could be used for sorted MSW hauling for disposal.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Utilities would have to be extended to site. Could be co-located with other alternative facility(ies) on this site.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Utilities would have to be extended to site. Could be co-located with other alternative facility(ies) on this site.
		200-1500 TPD	5-7 years	No changes to existing collection system needed. High complexity, but low skill level needed for most operations. Potential permitting issues and public concerns with noise, odor and vector issues. Additional processing/disposal of post-processed MSW would be required. Contamination of recovered materials is significant issue, recovery rates for marketable materials typically 30% or less. End uses/markets and capacities may need development. Moderate capital and operating costs, and additional fleet equipment and operators would be needed for site operations and transport of residuals.							
	This method involves using a combination of mechanical and manual systems to receive, separate, and process unsegregated municipal solid waste to separate recyclables. An MWP facility requires no consumer participation, education, or sorting behavior. Odors, vectors, and contamination are significant issues, and these facilities typically have low recovery rates.										

Alternative	Example Photo	Area Required	Estimated Cost Per Ton	Materials Processed	Site-Specific Considerations						
		Processing Capacity	**Development Time**	**Technology Considerations**	**RRF Site (157 Ac. ±, ~60 Ac Developable)**	**Site 1 – Medley (320 Ac. ± , ~100 Ac. Currently Developable)**	**Site 16 - Ingraham Highway Site 1 (159 Ac. ±)**	**Site 17 - Ingraham Highway Site 2 (81 Ac. ±)**	**Site A1 - Dolphin Expressway Site (416 Ac. ±)**	**Site A2 - Opa-Locka West Airport Site (460 Ac. ±)**	**Site A3 – Okeechobee Road Site (68 Ac.±)**
	Process Description										
Material Recovery Facility		20-60 Ac	$87-154	Materials recovery facilities sort a wide array of recyclable materials, including, but not limited to plastics, cardboard (OCC), paper (including newspapers, magazines, office paper, mixed paper, etc.), glass bottles and jars, and metal containers, including aluminum and steel cans.	Minimal expected permitting and public concerns. Could be co-located with another alternative facility on this site.	Minimal expected permitting and public concerns. Moderate impacts to local traffic. Could be co-located with another alternative facility on this site.	Minimal expected public concerns. Utilities will need to be extended to site. Significantly increased hauling costs. Could be co-located with another alternative facility on this site	Minimal expected public concerns. Utilities will need to be extended to site. Significantly increased hauling costs. Could be co-located with another alternative facility on this site	Minimal expected public concerns. Floodplain and wetland mitigation may increase development costs. Could be co-located with other alternative facility(ies) on this site.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Utilities would have to be extended to site. Could be co-located with another alternative facility on this site.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Utilities would have to be extended to site. Could be co-located with another alternative facility on this site.
		300-825 TPD	5-7 years	Modification of existing curbside collection system needed. High complexity, but low skill level needed for most operations. Capacity limited by site area. Typical maximum processing capacity for these facilities is approximately 350-400 tons per day. Minimal public concerns other than noise and odor. Additional processing/disposal of some post-processed materials (i.e., glass) would be required. Contamination of recovered materials is significant issue. End uses/markets and capacities may need development. Moderate capital and operating costs, and additional fleet equipment and operators would be needed for site operations.							
	A materials recovery facility (MRF) uses a combination of mechanical and manual systems to receive, separate, and process collected recycling materials to be sold to end buyers.										
C&D Recycling Facility		5-20 Ac	$76-150	C&D waste is defined in Chapter 62-701, FAC and generally includes a broad range of waste materials generated from the construction, destruction, or renovation of a structure, including land development operations. This type of waste typically includes materials such as steel, glass, brick, concrete, asphalt material, pipe, gypsum wallboard, and lumber, but also includes rocks, soils, tree remains, trees, and other vegetative matter, clean cardboard, paper, plastic, wood, and metal scraps, yard trash and other materials.	Likely public concerns with noise, odor and dust issues. Depending on footprint area could be co-located with another alternative facility on this site.	Likely public concerns with noise, odor and dust issues. Depending on footprint area could be co-located with another alternative facility on this site.	Potential public concerns with noise, odor and dust issues. Utilities will need to be extended to site. Significantly increased hauling costs. Could be co-located with another alternative facility on this site.	Potential public concerns with noise, odor and dust issues. Utilities will need to be extended to site. Significantly increased hauling costs. Could be co-located with another alternative facility on this site.	Potential public concerns with noise, odor and dust issues. Could be co-located with other alternative facility(ies) on this site.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Utilities would have to be extended to site. Could be co-located with another alternative facility on this site.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Utilities would have to be extended to site. Could be co-located with another alternative facility on this site.
		300 – 825 TPD	3-7 years								
	Processing of C&D waste is typically performed either indoors or outdoors at a dedicated C&D recycling facility using mechanical and manual sorting systems similar to those found in a Material Recovery Facility. The size, equipment, labor needs and layout of a C&D recycling facility depends on its complexity and capacity										

(1) Sources: DC Study (2017 costs escalated) and NREL Study (2020 costs escalated). Cost does not include additional organics collection system costs.

(2) Costs estimated from vendor quote, does not include building or land acquisition costs.

(3) Costs based on 2017 article in Waste Management journal using developed country costs.

3.3.11 Financial Impacts

As discussed in the preceding sections, shifting the current solid waste management system in the County towards a Zero Waste approach would involve significant financial investment, both from a capital/infrastructure standpoint, as well as longer term operational and policy modifications. These investments would primarily consist of the addition of specialized collection systems and facilities, but also costs related to education programs, legislative efforts, increased enforcement efforts, and others. In order to illustrate the high-level cost implications, Tables 3.3 and 3.4 are presented to show the costs of the current County system and the additional cost effects of alternative facilities that could be part of a future Zero Waste strategy using the tonnage managed by the County in FY2021 as the frame of reference.

Table 3.7 FY 2021 Material Tonnages and Costs for Selected Miami-Dade County Solid Waste Management System Facilities and Operations

Material	No. Facilities	Per Ton Cost	Total Tons Received	Total FY 2021 Cost
MSW and C&D Waste			**2,075,960**	
Collections	N/A	$72	756,502	$68.1M
Transfer Stations	3	$51	627,095	$32.4M
RRF (RDF)	1	$61	1,009,062	$62.2M
Landfills	3	$30	784,034	$23.4M
Trash and Recycling Centers (TRCs)	13	$27	188,914	$5.1M
Contract Disposal	N/A	$31	354,316	$10.9M
Curbside and Commercial Recyclables				
Private Contract Collections and Processing	N/A	$157	61,708	$9.7M
TOTAL				**$211.8M**

Source: Annual Comprehensive Financial Report 2021

Table 3.8 Estimated Additional Costs of Zero Waste Alternative Facilities Using FY2021 Tonnage Data

Material	No. Facilities for Full Capacity	Estimated Per Ton Cost	Est. Total Potential Annual Tons[1]	Estimated Additional Annual Cost
FY2021 DSWM Disposal Fund Total Tons = 2,075,960				
Organics (Food and Yard Waste – 16.86% of Total Tons)			**159,397**	
Organics Collection	N/A	$72 - $600	159,397	$11.5M - $95.6M
Composting (Windrow)	3	$72-80	159,397	$11.5 -12.8M
Composting (ASP)	3	$74-80	159,397	$11.8 -12.8M
Composting (In-Vessel)	3	$9 - $50	159,397	$1.4M - $8.0M
Anaerobic Digestion	2	$57-90	159,397	$9.1M - $14.3M
MSW (31.89% of Total Tons)			**662,024**	
Mechanical/Biological Treatment	2	$123-184	412,024[2]	$50.7-75.8M
Waste-to Energy (Mass Burn)	1	$57-60	412,024[2]	$23.5 - 24.7M
Gasification	3-4	$154	412,024[2]	$63.5M
Mixed Waste Processing	1	$85-150	412,024[2]	$61.8M
Curbside and Commercial Recyclables (32.53% of Total Tons)			**675,310**	
Material Recovery Facility	1	$87 - $154	675,310	$58.8M - $104M
Glass Processing	70-100	$23 - $28	145,659	$3.4M - $4.1M
Construction and Demolition (C&D) Waste (18.72% of Total Tons)			**388,620**	
C&D Recycling Facility	2	$76 - $137	388,620	$29.5M - $58.3M
TOTAL				**$125M – $352M**

[1] Potential recovered tonnage value for each material is the FY2021 DSWM Disposal Total Tons of 2,075,960 multiplied by the material's estimated percentage of the total waste stream from the composition data.

[2] Tonnage reduced by 250,000 to account for contract disposal put-or-pay requirement.

3.3.12 Potential Funding Sources

There are many sources of infrastructure funding that may be available for solid waste facilities and programs. The following potential likely sources of funds for future solid waste facilities have been identified, but there may be others that are applicable. Potential funding sources include:

1. Federal Grants and Tax Credits
2. State Grants
3. Municipal Bonds
4. Private Activity Bonds

The sections below provide additional information on each funding source.

Federal Grants and Tax Credits

The Bipartisan Infrastructure Law provides $275,000,000 total from Fiscal Year 2022 to Fiscal Year 2026 for grants authorized under the Save Our Seas 2.0 Act. Funding is intended for projects that implement the building a circular economy for all strategy series, improve local post-consumer materials management programs, including municipal recycling, or make improvements to local waste management systems.

All applications must achieve one or more of the following objectives:

- Establish, increase, expand, or optimize collection and improve materials management infrastructure.
- Fund the creation and construction of tangible infrastructure, technology, or other improvements to reduce contamination in the recycled materials stream.
- Establish, increase, expand, or optimize capacity for materials management.
- Establish, improve, expand, or optimize end-markets for the use of recycled commodities.
- Demonstrate a significant and measurable increase in the diversion, recycling rate, and quality of materials collected for municipal solid waste.

Applications may include (but are not limited to) projects that fund:

- Innovative solutions and/or programs that provide or increase access to prevention, reuse, and recycling in areas that currently do not have access; including development of and/or upgrades to drop-off and transfer stations (including but not limited to a hub-and-spoke model in rural communities), etc.
- The purchase of recycling equipment, including but not limited to sorting equipment, waste metering, trucks, processing facilities, etc.
- Upgrades to material recovery facilities (MRFs) such as optical sorters, artificial intelligence, etc.
- Development of and/or upgrades to composting facilities or anaerobic digesters to increase capacity for organics recycling.
- Development of and/or upgrades to curbside collection programs or drop-off stations for organics.
- Development of and/or upgrades to reuse infrastructure such as online reuse platforms, community repair spaces, technology and equipment to improve materials management reuse options, food donation, and upcycling, staging areas for material reuse/donation, reuse warehouses, and reuse centers, and electronic waste and computer recycling and refurbishing.

The Inflation Reduction Act of 2022 (IRA), signed into law on August 16, 2022, contains $500 billion in new spending and tax breaks and is intended to encourage investments in domestic manufacturing capacity, procurement of critical supplies domestically or from free-trade partners, and jump-start R&D and commercialization of leading-edge technologies such as carbon capture and storage and clean hydrogen. The IRA provides for Production Tax Credits (up to 2.6 cents/KwH, escalating with inflation) and Investment Tax Credits (up to 30% on

eligible property) for WTE facilities and specifically makes local governments eligible to receive the tax credits as a direct payment.

Additional funding programs may become available through the Department of Energy, EPA, or other federal agencies and we will continue to monitor and evaluate potential funding sources for the County's future solid waste facilities and operations.

State Grants

Chapter 377.814, FS - Municipal Solid Waste-to-Energy Program

The Municipal Solid Waste-to-Energy Program was created to provide financial assistance grants and incentive grants to municipal solid waste-to-energy facilities to incentivize the production and sale of energy from municipal solid waste-to-energy facilities while also reducing the amount of waste that would otherwise be disposed of in a landfill.

The department, subject to appropriation, shall provide incentive grants to municipal solid waste-to-energy facilities to assist with the planning and designing for constructing, upgrading, or expanding a municipal solid waste-to-energy facility, including necessary legal or administrative expenses.

To qualify for an incentive grant, the owner of a municipal solid waste-to-energy facility must apply to the department for funding; provide matching funds on a dollar-for-dollar basis; and demonstrate that the project is cost-effective, permittable, and implementable and complies with s. 403.7061.

This program has not yet been funded and the implementation details have yet to be released.

Municipal Revenue Bonds

Miami-Dade County can issue revenue bonds backed by Solid Waste System revenues to fund development of future solid waste facilities. However, depending on the level of funding, the debt service on issued bonds may result in increased user rates. Detailed long-term financial analyses of the County's Collection and Disposal Funds would be required to determine the financial effects of additional issued debt.

Private Activity Bonds

A private activity bond (PAB) is a municipal bond issued by or on behalf of local or state governments for the purpose of providing special financing benefits for qualified private projects that serve a public purpose. Companies with qualifying activities, which include solid waste disposal facilities, are eligible to issue tax-exempt PABs through a third-party organization.

Solid waste PABs are also referred to as industrial revenue bonds (IRBs). For IRBs, solid waste disposal facilities are defined as "any property or a portion thereof used for the collection, storage, treatment, utilization, processing or final disposal of solid waste." Recycling facilities also qualify under this definition.

Further, the Internal Revenue Code defines solid waste as "property which is useless, unused, unwanted or discarded solid material, which has no market or other value at the place where it is located." This definition may include a broad array of solid waste capital expenditures, including carts, trucks, transfer stations, material recovery facilities (MRFs) and landfills.

Solid waste IRBs are flexible and may be used to finance the qualifying solid waste capital expenditures for projects at a single location (e.g., a new MRF), multiple locations, and/or the qualifying portions of much larger projects. In addition, a variety of assets may be bundled within a single IRB.

Federal tax law imposes a number of restrictions and requirements on PAB issuance, including the requirement that the project be allocated "volume cap" at the state level for certain qualifying activities (including private solid waste

IRBs). Each year, the states receive a volume cap allocation from the federal government based on the state's population. As of 2022, the state volume capacity limit is the greater of $335 million or $110 per capita.

4 Conclusions

The main purposes of this report were to analyze and recommend siting alternatives for a new WTE facility to replace the existing RRF and explore alternative technologies to a WTE facility. To that end, Arcadis revisited the evaluations of the four potential sites that were identified as feasible options for further consideration in the Preliminary Future Waste-to-Energy Facility Siting Alternatives Analysis Report completed in June 2022 and have, at the request of the County, added three additional sites (Sites A1 – Dolphin Expressway, A2 – Opa-Locka West Airport and A3 – Okeechobee Road) for consideration.

Each of the seven sites were analyzed, applying the WTE screening criteria developed with Department staff, and additional analysis and information on the sites including environmental considerations, expected traffic impacts, Solid Waste System effects, and others were included. For each site, Arcadis also considered the suitability of WTE and several alternative technologies and facilities that could be developed and may be needed to implement a Zero Waste management strategy within the County and included high-level cost implications of adding each alternative technology to the County's existing Solid Waste System. An overview of the planning and implementation steps recommended for consideration of a Zero Waste management strategy was also included.

Arcadis' goal was to provide the BCC and County staff with as much information as possible on the seven sites evaluated and present a realistic discussion regarding the technologies and infrastructure, policy changes, and relative costs required to shift the County's current system of solid waste management towards Zero Waste. In closing, any of the seven sites could be selected for development of one or more of the alternative technologies to support the County's Solid Waste System, depending on resolution of any specific limitations of each site. If focusing solely on the WTE (Mass Burn) option, the existing RRF site appears to still be the site with the shortest development schedule and lowest cost, recognizing there are many other factors to be considered when evaluating the long-term future of the County's Solid Waste System.

Appendix A

Preliminary Future Waste-to-Energy Facility Siting Alternatives Analysis Report

Miami-Dade County

Department of Solid Waste Management

Preliminary Siting Alternatives Report

June 2022

Contents

Tables

Figures

Appendices

Executive Summary

Purpose and Scope

The Miami-Dade County (County) Department of Solid Waste Management (DSWM or Department), in accordance with the Mayor's letter dated April 13, 2022, has been tasked with identifying and analyzing potential sites within the County that would be suitable for the development of a future Waste-to-Energy (WTE) facility, and to report findings within 60 days. Arcadis U.S., Inc., (Arcadis), as the Bond Engineer for DSWM, assisted the County with this preliminary analysis. Arcadis is a global engineering consulting firm with extensive experience assisting clients in the development and oversight of modern WTE facilities for over 40 years. Most recently, Arcadis served as the owner's representative and design criteria professional for the development of the Solid Waste Authority of Palm Beach County's new WTE facility, the only new facility to be built in the United States in the last 20 years, in operation since 2015.

Arcadis commenced the preliminary siting evaluations on May 9, 2022, which were performed in two stages, an initial screening stage and a detailed screening stage, as summarized below.

1. Initial Screening Stage: The initial screening stage identified parcels located in Miami-Dade County that met initial siting criteria and compared them to agreed-upon Pass/Fail criteria.
2. Detailed Screening Stage: Parcels that passed the initial screening stage were further analyzed in the detailed screening stage, which included the evaluation of additional, more extensive siting parameters.

Due to the expedited nature of the assignment, it should be noted that Arcadis' services were preliminary in nature and were conducted consistent with prudent industry practice under similar circumstances and timelines to provide a screening-level analysis of the availability of potential sites within the County. A more detailed review and investigation (including onsite visits, surveys, geotechnical testing, etc.) of the factors which may affect the potential development of a WTE facility at any proposed location is required and is assumed would be conducted in a future phase of the County's planning and implementation process.

Initial Screening Evaluation

Arcadis conducted a kick-off meeting with DSWM staff on May 13, 2022, in order to present and confirm the minimum screening criteria to be used in the Initial Screening evaluation process. The site criteria below were generated out of a collaborative effort between Arcadis and Department staff.

Initial Screening Criteria

- WTE Facility Capacity – Minimum site area sufficient for a mass-burn WTE facility with capacity of 4,000 tons per day (tpd), expandable to 5,000 tpd, if possible.
- Site Area and Ownership – Minimum 40-acre site comprised of no more than two contiguous parcels and two site owners.
- Zoning Considerations – Have the following zoning designations: Vacant, Industrial, Commercial, or Agricultural.
- Residential Zoning – Distance to residential zoning was determined using Geographic Information System (GIS) tools and those sites that were within 1,500-feet of residential zoning were eliminated. This criterion was not applied to Site 1, which was submitted by the County for detailed screening consideration.
- Transportation/Travel Time – Maximum travel time of 10 minutes to major (arterial) or collector roads.

- Canal or Major Roadways – Sites with a canal or major roadway located on the site parcel were precluded from further evaluation because they could not be abandoned and developed.
- Lake/Borrow Pit – Sites that included a lake or borrow pit were included as they could be filled.
- Other Site Considerations – Any properties recommended directly by the County to be evaluated as well as sites within and outside of the Urban Development Boundary were considered.

A GIS database was developed using layers provided by the County and acquired from external sources. The Initial Screening criteria were entered into a GIS-based screening tool, which resulted in approximately 235 parcels being identified from the GIS database. Additional analyses were conducted including the following:

- Site Area and Ownership – Sites that were less than 40 acres were analyzed to confirm if any two adjacent parcels, with no more than two owners, could be combined into one site, meeting the minimum 40-acre size criteria.
- Site Geometry – Sites with parcel boundaries with shapes or dimensions incompatible with a 4,000 tpd WTE facility were eliminated.
- Zoning Considerations – Properties with existing abandoned building structures and Conservation, Environmentally Endangered Lands (EEL) Program, or Other Protected Lands not screened by the GIS tool were excluded.
- Proximity to Airport – Sites within 4.0 miles of an existing airport were eliminated.
- Lake/Borrow Pit – Sites that were mostly or entirely excavated as a lake or borrow pit were eliminated due to the significant additional time and expense associated with backfilling to create the developable area of the site.
- County parks and other County properties (i.e., wellfields, etc.) that were not screened by the GIS tool were manually identified and eliminated.

At the end of the Initial Screening process, 24 sites remained and were presented to DSWM staff for discussion at a meeting on May 20, 2022. After discussion, the decision was made to increase the minimum offset from residential zoning to one-half mile (2,640 ft), which eliminated an additional two sites. The remaining 22 sites were approved to proceed to the Detailed Screening process.

Detailed Screening Evaluation

The approved 22 sites were then evaluated against Detailed Screening criteria, which are briefly summarized below.

Detailed Screening Criteria

- Location – physical location of the site relative to existing Solid Waste System (System) facilities, transportation routes, and expected impacts to the System if a proposed WTE facility were sited there.
- Wetlands and Surface Waters – Arcadis utilized GIS in order to identify sites with existing wetlands and surface waters.
- Threatened and Endangered (T&E) Species – Arcadis utilized existing T&E data from federal, regional, and local agencies to identify critical habitat for protected species, where development may be difficult.

- Air Emissions – The United States (US) Environmental Protection Agency (USEPA) Prevention of Significant Deterioration (PSD) permitting program determines the amount of air quality deterioration allowed for a proposed project. Current National Ambient Air Quality Standards (NAAQS) and PSD increments were reviewed and other nearby large emitters of air pollution and proximity to nearby Class I area (Everglades National Park) and sensitive Class II area (Biscayne Bay National Park) were also identified.
- Comprehensive Everglades Restoration Plan (CERP) Projects – CERP is a framework for restoring, protecting and preserving the greater Everglades ecosystem. The plan is a 50-50 partnership between the State of Florida and the federal government. The CERP project boundaries layer was used to identify conservation lands, including Everglades National Park, to determine if any parcel was adjacent to any known or existing CERP project.
- Miami-Dade County (MDC) Wellfield Protection Areas (WPA) – WPA boundaries were reviewed in order to identify whether any parcel was within or contained protected areas.
- Comprehensive Development Master Plan (CDMP) Conservation Aquifer Recharge and Drainage Element – The intent of this Element is to identify, conserve, appropriately use, protect and restore as necessary the biological, geological and hydrological resources of Miami-Dade County. CDMP Element policies were reviewed in order to identify whether the parcels were consistent and/or compliant.
- Utility Availability – Proximity and availability of water, wastewater, natural gas and electric utilities were reviewed and identified.
- Soils/Geology – United States Department of Agriculture (USDA) soil survey was reviewed to confirm the type and potential suitability of soils.
- Floodplain – The Federal Emergency Management Agency (FEMA) Flood Zone map was reviewed to determine flood zone designation and flood hazard probability.

For each site, a site package was developed to document the analysis of the site relative to the Initial and Detailed Screening criteria. The criteria were then separated into six general categories, as follows:

- Location – Site location within the County relative to the existing Miami Dade Resources Recovery Facility (RRF), proximity to residential zoning, and expected effects on the County's Solid Waste System if selected for a future WTE facility.
- Utilities – Availability of potable water, sanitary sewer, natural gas and electric utilities, as well as any stormwater and groundwater issues at the site.
- Soils – Identification of soil types at the site and potential effects on site development.
- Environment – Consideration of a range of environmental factors.
- Transportation – Proximity to major roads, available road access to the site and improvements needed, if any.
- Community – Estimate of public response to potential construction of a WTE facility.

Two additional criteria were applied only to the sites that were remaining after the Detailed Screening criteria were applied:

- Cost – Arcadis developed the capital cost and first year operations and maintenance (O&M) cost associated with developing a new WTE facility at the existing RRF site as part of a previous effort. Utilizing this cost as the base case, evaluated the three sites remaining after the detailed analysis criteria were applied.

- Schedule – Arcadis developed a preliminary high-level implementation schedule in evaluating the three sites remaining after the detailed analysis criteria were applied.

A simple stoplight rating was employed to illustrate the relative difficulty for each category (i.e., green/slight difficulty, yellow/moderate difficulty, red/significant difficulty) at each site.

Summary Findings

A meeting was held on June 7, 2022, to review the Detailed Screening process findings. Ultimately, 19 sites were eliminated due to several factors, such as roadway access and utility availability, site development and availability, permitting considerations, and conflicts with existing County policies.

DSWM staff then requested that a comparison be conducted of the existing RRF facility site to the three remaining potential sites found as part of this preliminary analysis. For comparison purposes, Arcadis conducted an analysis of the existing WTE Facility site, the RRF, using the same methodology for the other sites.

The four remaining sites are: the Existing RRF Facility Site – Doral; Site 1 – Medley; Site 16 – Ingraham Highway Site 1; and Site 17 - Ingraham Highway Site 2 as illustrated in the map provided below.

Figure ES-1 Potential Sites Location Map

The matrix below summarizes the findings associated with the Preliminary Siting Alternatives Analysis.

Table ES-1 – Preliminary Siting Alternatives Analysis Findings

Siting Parameter	Existing RRF Site	Site 1 Medley	Site 16 Ingraham Hwy. Site #1	Site 17 Ingraham Hwy. Site #2
Location	157.16-acre site, single parcel inside the UDB. Minimal impact to System if selected, however, construction phasing will need to be considered in order to limit impact to existing RRF operations. Parcel size suitable for development of WTE facility footprint as well as additional acreage to accommodate co-location of additional ash monofill capacity or other County facilities in consideration of future sustainable campus concept (after demolition of Existing RRF).	320.31-acre site, directly adjacent to residential zoning, inside the UDB, two-miles north of the existing RRF facility, and adjacent to the Medley Landfill. Overall effects on the System would be relatively minimal if selected. Parcel size suitable for development of WTE facility footprint as well as additional acreage to accommodate co-location of ash monofill or other County facilities in consideration of future sustainable campus concept.	159.71-acre site consisting of two parcels outside the UDB. Considerable System effects if selected. Parcel size suitable for development of WTE facility footprint as well as additional acreage to accommodate co-location of ash monofill or other County facilities in consideration of future sustainable campus concept.	81.11-acre site located outside the UDB. Considerable System effects if selected. Parcel size suitable for development of WTE facility footprint as well as additional acreage to accommodate co-location of ash monofill or other County facilities in consideration of future sustainable campus concept.
Utilities	All required utilities infrastructure available.	Potable water and sanitary sewer utilities appear to be available, electric and natural gas utilities would have to be extended to the site.	All required utilities would have to be extended to the site.	All required utilities would have to be extended to the site.

Siting Parameter	Existing RRF Site	Site 1 Medley	Site 16 Ingraham Hwy. Site #1	Site 17 Ingraham Hwy. Site #2
Soils	Site has been used for WTE facility operations previously, no known site soils issues exist.	The USDA Soil Survey data for the site and historical aerial photos (c. 1985) indicate the site area was previously excavated and subsequently backfilled which could present geotechnical engineering challenges for foundation designs and result in additional site preparation costs.	Site soils are not ideally suited for building foundations because of water content and shallow depth to bedrock.	Site soils are not ideally suited for building foundations because of water content and shallow depth to bedrock.
Environment	Air Permitting – May be challenging, due to other nearby large emitters that were not present when the RRF was originally permitted. Possible habitat issues for Bonneted Bat.	Air Permitting – May be challenging, due to nearby large emitters. Possible habitat issues for Bonneted Bat.	Floodplain – FEMA Zone A Air permitting expected to be extremely difficult due to proximity to Everglades National Park Additional permitting required because of wetlands on site, possible Bonneted Bat habitat issues.	Floodplain – FEMA Zone A Air permitting expected to be extremely difficult due to proximity to Everglades National Park Additional permitting required because of wetlands on site, possible Bonneted Bat habitat issues.
Transportation	Existing access to arterial and collector roads	Good access to Florida Turnpike and US27 via Beacon Station Blvd., local traffic impacts will need to be considered due to road orientations and close proximity of intersections.	Good access to arterial and collector roads.	Existing access to site is via Ingraham Hwy. and SW 222nd Ave., however proper site access will need to be constructed. Additional ROW may be needed.

Siting Parameter	Existing RRF Site	Site 1 Medley	Site 16 Ingraham Hwy. Site #1	Site 17 Ingraham Hwy. Site #2
Community	Residential developments have encroached around the site in the years since the existing RRF went into operation. The site is now less than a tenth of a mile from the nearest residential zoning and the local population. Community political leaders and environmental groups have indicated opposition to continued use of the site for WTE facility operations.	The site is directly adjacent to residential zoning. The west edge of the site borders one trailer park owned by the Town of Medley, and another that is leased by the town. Siting of a WTE facility may face community opposition at this location.	The site is approximately half a mile from the nearest residential zoning and is approximately one mile from the boundary of Everglades National Park, which suggests that the siting of a WTE facility may face community opposition at this location.	The site is approximately half a mile from the nearest residential zoning and is 1.28 miles from the boundary of Everglades National Park, which suggests that the siting of a WTE facility may face community opposition at this location.
Schedule (Preliminary Planning to Construction Completion)	Shortest schedule duration because of existing environmental permits and minimal site work. Coordination of construction to maintain continued existing RRF operation required. Estimated Project Duration: 7-years 9-months Possible Commercial Operations (CO) by April 2030	Second shortest schedule duration. Land acquisition, environmental permitting required, and site work increase schedule duration. Estimated Project Duration: 9-years 9-months Possible CO by April 2032	Longest estimated schedule duration. Land acquisition, significant environmental permitting required, and significant site work increase schedule duration. Estimated Project Duration: 11-years 3-months Possible CO by October 2033	Longest estimated schedule duration. Land acquisition, PPSA permitting, wetland, floodplain, and wildlife mitigation, and significant site work increase schedule duration. Estimated Project Duration: 11 years 3 months Possible CO by October 2033

Siting Parameter	Existing RRF Site	Site 1 Medley	Site 16 Ingraham Hwy. Site #1	Site 17 Ingraham Hwy. Site #2
Cost	For comparative purposes, the existing RRF site is considered the base condition and the base capital cost includes estimated stormwater detention pond fill costs and environmental considerations and the ash hauling costs as noted in Appendix C. Total Estimated Capital Cost of $1,450,000,000 Total annual net operational cost is $11.22 per ton of waste processed (estimated for Year 1). This does not include debt service payment for capital costs.	Additional costs anticipated for land acquisition*, on-site utility facilities, stormwater considerations and addition of fill for soil fortification, zoning and potential additional permitting efforts for new PPSA. Purchase of potable water may increase anticipated operational costs. It is also assumed that there may be impact fees or improvements required to local roads that have not yet been factored into the capital cost for this site because the extent of roadway modifications is currently not known. It is anticipated that these would be negotiated and further evaluated during the land acquisition process. Additional Capital Cost of $48.3M (4.2% increase) Additional 19% annual operational cost for potable water purchase and ash hauling.	Significant additional costs anticipated for land acquisition*, on and off-site utility facilities, flood plain, wetland, and wildlife mitigation, and additional permitting efforts. Significant impact on hauling system due to distance from other System facilities would increase capital and operational cost. Purchase of potable water and significant distance to haul ash for disposal will increase anticipated operational costs. Additional Capital Cost of $80.4M (6.4% increase) Additional 119% annual operational cost for potable water purchase, significant ash hauling, and additional System hauling costs.	Significant additional costs anticipated for land acquisition*, on and off-site utility facilities, flood plain, wetland, and wildlife mitigation, and additional permitting efforts. Significant impact on hauling system due to distance from other System facilities would increase capital and operational cost. Purchase of potable water and significant distance to haul ash for disposal will increase anticipated operational costs. Additional Capital Cost of $84.7M (6.7% increase) Additional 119% annual operational cost for potable water purchase, significant ash hauling, and additional System hauling costs.

** Land acquisition cost estimated based upon current Miami-Dade Property Appraiser Market Value plus 10%.*

1 Introduction

The Miami-Dade County (County) Department of Solid Waste Management (Department or DSWM) provides waste collection and recycling services for residents in the unincorporated areas of the County as well as several cities that have signed Interlocal Agreements (ILAs) with the Department. The Department owns and operates 13 Neighborhood Trash and Recycling Centers, three Regional Transfer Stations, two Home Chemical Collection Centers, three landfills and one Resource Recovery Facility (RRF). Chapter 15 of the County Code of Ordinances (Code) defines the sum of these facilities as the Solid Waste System (System).

A major component of the System is the existing RRF, which can accept up to 3,000 tons per day (tpd) of solid waste, processes approximately 1,000,000 tons of solid waste annually and produces approximately 77 megawatts of electricity annually. The existing RRF was constructed in the early 1980's, became operational in 1982 and is reaching the end of its useful life without significant additional investment in retrofits and improvements, which is driving the Department, Miami-Dade County Board of County Commissioners (Commission) and the Miami-Dade County Mayor (Mayor) to consider the development of a new waste-to-energy (WTE) facility to replace the existing RRF.

In accordance with the County Mayor's letter, dated April 13, 2022, the Department was tasked with identifying and analyzing potential sites within the County that would be suitable for the development of a future WTE Facility, and to report findings within 60 days. Arcadis U.S., Inc., (Arcadis), as the Bond Engineer for DSWM, assisted the County with this preliminary analysis. Arcadis is a global engineering consulting firm with extensive experience assisting clients in the development and oversight of modern WTE facilities for over 40 years. Most recently, Arcadis served as the owner's representative and design criteria professional for the development of the Solid Waste Authority of Palm Beach County's new WTE facility, the only new facility to be built in the United States in the last 20 years, in operation since 2015.

Due to the expedited nature of the assignment, it should be noted that Arcadis' services were preliminary in nature and were conducted consistent with prudent industry practice under similar circumstances and timelines to provide a screening-level analysis of the availability of potential sites within the County. A more detailed review and investigation (including onsite visits, surveys, geotechnical testing, etc.) of the factors which may affect the potential development of a new WTE facility at any proposed location is required and is assumed would be conducted in a future phase of the County's planning and implementation process. Additionally, Arcadis relied on readily available data and/or reports that were provided by DSWM. The preliminary analysis was desktop in nature and did not include site visits or on-site surveys.

2 Preliminary Siting Evaluation Process

Arcadis commenced the preliminary siting evaluation on May 9, 2022, which was performed in two stages, an initial screening stage and a detailed screening stage, as summarized below.

1. Initial Screening Stage – The initial screening stage identified parcels located in the County that met initial siting criteria and compared them to agreed-upon Pass/Fail criteria.
2. Detailed Screening Stage – Parcels that passed the initial screening stage were further analyzed in the detailed screening stage, which included the evaluation of additional, more extensive siting parameters.

2.1 Initial Screening Stage Methodology

Arcadis conducted a kick-off meeting with DSWM staff on May 13, 2022 to present and confirm the minimum screening criteria to be used in the Initial Screening evaluation process. The site criteria below were generated out of a collaborative effort between Arcadis and Department staff and were applied during the Initial Screening analysis.

Initial Screening Criteria

- WTE Facility Capacity – Minimum site area sufficient for a mass-burn WTE facility with a throughput capacity of 4,000 tons per day (tpd), expandable to 5,000 tpd, if possible.
- Site Area and Ownership – Minimum 40-acre site comprised of no more than two contiguous parcels and two owners, no limit on the maximum acreage of any site.
- Zoning Considerations – Site(s) must have the following zoning designations: Vacant, Industrial, Commercial, or Agricultural.
- Residential Zoning – Distance to residential zoning was determined using Geographic Information System (GIS) tools and those sites that were within 1,500 feet of residential zoning were eliminated. This requirement was not applied to Site 1, which was submitted by the County for detailed screening consideration.
- Transportation/Travel Time – Maximum travel time of 10 minutes to major (arterial) or collector roads as shown on the 2010 Florida Department of Transportation (FDOT) Federal Functional Classification map was calculated using posted speed limits and online mapping tools.
- Canal or Major Roadways – Sites with a canal or major roadway located on the site parcel were precluded from further evaluation because they could not be abandoned and developed.
- Lake/Borrow Pit – Sites that included a lake or borrow pit were included as they could be filled.
- Other Site Considerations – Any properties recommended directly by the County to be evaluated as well as sites within and outside of the Urban Development Boundary were considered.

2.1.1 Initial Screening Analysis

A GIS database was developed using layers provided by the County and acquired from external sources (i.e., National Wetlands Inventory; South Florida Water Management District; etc.). The Initial Screening criteria were entered into a GIS-based screening tool, which resulted in approximately 235 parcels being identified from the GIS database. Additional analyses were then conducted to address additional site considerations, including the following:

- Site Area and Ownership – Sites that were less than 40-acres were analyzed to confirm if any two adjacent parcels, with no more than two owners, could be combined into one site meeting the minimum 40-acre size criteria.
- Site Geometry – Sites with parcel boundaries with shapes or dimensions incompatible with a 4,000 ton per day WTE facility were eliminated. In general, WTE facilities for this targeted throughput capacity plus expansion capabilities, if possible, due to the size of the buildings and components, truck queueing lengths, and the minimum radii for the access roads, require a parcel area that is at least 1,200 feet wide and approximately 1,500 feet long.

- Zoning Considerations – Properties with existing abandoned building structures and Conservation, Environmentally Endangered Lands (EEL) Program properties, or Other Protected Lands not screened by the GIS tool were excluded.
- Proximity to Airport – Arcadis reviewed County Code Chapter 33 Zoning, Article XXXVII – Airport Zoning, adopted November 19, 2019 (Airport Zoning Article) and Federal Aviation Administration (FAA) regulations pertinent to land use and height restrictions in the proximity of airports and heliports. Sites less than four (4) miles from an airport were excluded from consideration.
- Lake/Borrow Pit – Sites that were mostly or entirely excavated as a lake or borrow pit were eliminated due to the significant additional time and expense associated with backfilling to create the developable area of the site.
- County Parks and other County properties – (i.e., wellfields, etc.) that were not screened by the GIS tool were manually identified and eliminated.

At the end of the Initial Screening process, 24 sites remained and were presented to DSWM staff for discussion at a meeting on May 20, 2022. After discussion, the decision was made to increase the minimum offset from residential zoning to one-half mile (2,640 ft), which eliminated two sites. The remaining 22 sites were approved to proceed to the Detailed Screening process.

2.2 Detailed Screening Stage Methodology

2.2.1 Detailed Screening Analysis

The approved 22 sites were then evaluated against Detailed Screening criteria, which considered many additional Federal, State, and County programs, policies, and legislation that can affect the siting of a future WTE facility. For each site, a site package was developed to document the analysis of the site relative to the Initial and Detailed Screening criteria. The criteria were then separated into six general categories, as follows:

- **Location** – Site location within the County relative to the existing RRF, proximity to residential zoning, and expected effects on the County's Solid Waste System if selected for a future WTE facility.
- **Utilities** – Availability of potable water, sanitary sewer, natural gas and electric utilities, and any stormwater and groundwater considerations at the site.
- **Soils** – Identification of soil types at the site and potential effects on site development.
- **Environment** – Consideration of a range of environmental factors, including floodplains, wetlands, threatened and endangered species, and permitting issues.
- **Transportation** – Proximity to major roads, available road access to the site and improvements needed, if any.
- **Community** – Estimate of public response to potential construction of a WTE Facility at the site considering proximity to residential zoning, environmentally sensitive areas, and environmental justice concerns.

Two additional criteria were applied only to the sites that were remaining after the Detailed Screening criteria were applied:

- **Cost** – Arcadis developed the capital cost and first year O&M cost associated with developing a new WTE facility at the existing RRF site as part of a previous effort. Utilizing this cost as the base case, evaluated differential cost associated with development of a new WTE facility on each of the three sites remaining after the detailed analysis criteria were applied.

- **Schedule** – Arcadis developed a preliminary high-level implementation schedule in order to compare the implementation timeline associated with development of a new WTE facility on each of the three sites remaining after the detailed analysis criteria were applied.

To assist decision makers, such as the County Commission, Mayor and Department leaders in determining the results of the screening analysis, the Site Packages employed a simple stoplight rating to identify the relative difficulty for each category (i.e., green/slight difficulty, yellow/moderate difficulty, red/significant difficulty) at each site. The Site Packages are provided in Appendix A.

The Detailed Screening criteria and the background information related to their application in this process are presented in the sections below.

2.2.2 Detailed Screening Criteria

2.2.2.1 Location

The Location criteria includes the physical location of the site relative to existing Solid Waste System facilities, large air emissions sources, transportation routes, and expected impacts to the System if a proposed WTE facility were sited there. Distance to known large emitters, such as the Titan Pennsuco Complex, WM Medley Landfill, CEMEX Miami Concrete Plant, FPL Turkey Point Power Plant, etc., were calculated for purposes of determining the potential effects on air permitting. Transportation routes were further evaluated for potential traffic conditions, physical and operational condition of roadways, truck queueing areas, and other features that may affect the routing or traffic patterns of vehicles entering and leaving the proposed site. Finally, an evaluation of the effects on the County's Solid Waste System was conducted to determine potential changes to System operations and costs resulting from the assumption of WTE operations at the site.

2.2.2.2 Utilities

WTE facilities have high demand requirements on several utilities. This screening criteria evaluated the availability of potable water, sanitary sewer, natural gas, electric utility substations, stormwater, and groundwater at each site. If a utility was not available, the closest available service location was determined by a combination of on-line tools and information, service area maps, inspection of aerial and street-level photography, and discussions with County staff and utility services providers. The additional work needed to extend utilities to the site was then included in the site evaluation. Brief discussions of the evaluation of needs and demands for the various utility types are as follows:

- Potable water is needed not only for normal human consumption and fire protection but may also be needed (if other sources are not available) for supply water for the boiler feedwater systems, lime slurry production in the Air Pollution Control (APC) system, and many other uses at the facility. For a 4,000 ton per day WTE facility, a site would need a minimum 12" water main with sufficient service pressure to provide an 8" fire line and a 4" potable supply line to the proposed facility. If service pressure is inadequate, a booster station must be added. If potable water utilities are unavailable, the construction of a typical 12" water main from the nearest service location (including valves and appurtenances) is needed, and depending on the site, additional easement or right-of-way area may be needed.
- Wastewater (Sanitary Sewer) is needed for toilet facilities, boiler blowdown water, and several other facility processes. The proposed WTE facility would need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered

depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation and comparative purposes all wastewater was assumed to be discharged to sanitary sewer. If gravity sewer is not available, a lift station and 6" force main would have to be constructed to connect to the nearest sanitary sewer manhole or lift station wetwell, and depending on the site, additional easement or right-of-way area may be needed.

- Natural Gas is the most economical fuel for the boiler auxiliary burners, which ignite the solid waste fuel fed to the boiler grates and allow for controlled startup and shutdown of the proposed facility. The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility. Online maps and other resources were used to determine the approximate location of gas service pipelines within the County. If gas service is unavailable, the construction of a typical 6" gas main from the nearest pipeline location (including valves and appurtenances) is needed, and depending on the site, additional easement or right-of-way area may be needed.
- Electricity is used at WTE facilities to operate the various mechanical components. Once a WTE facility becomes operational, the steam generated from the boilers is typically used to drive a steam turbine connected to a generator to provide both the internal electricity required to operate the facility as well as produce excess electricity that is sold to the local electric utility. For this evaluation, the nearest electrical substation was located and the shortest route for the transmission line along existing or proposed access road right-of-way or FPL easements was determined. Additional analysis would need to be performed to verify substation/switchyard spare capacity, voltage, and available terminations.
- Stormwater management and controls in accordance with Florida Department of Environmental Protection (FDEP) rules are required for the proposed WTE site. For this evaluation, the site soils, groundwater elevations, presence of floodplains and other information were analyzed to determine what effects the site conditions may have on the proposed WTE facility layout, construction issues, and if any connections to existing stormwater collection systems was available. If the site is located in a floodplain, typically the stormwater system must include additional floodplain compensating storage, which increase both the cost and the site area used for the stormwater system.
- Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average 552,000 gallons per day. Other innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

2.2.2.3 Soils

United States Department of Agriculture (USDA) soil survey information was reviewed to confirm the type and potential suitability of soils located at each site. Soils information for all sites was obtained from the USDA's Web Soil Survey (WSS), which provides soil data and information produced by the National Cooperative Soil Survey. The soils data provides a wealth of information on the physical conditions at a site that can affect development, including previous site disturbance, groundwater levels, soil bearing capacities and foundation design requirements, depth to bedrock, presence of muck, and many others. If muck and other unsuitable soils were found on a site, they would need to be removed and structural fill imported and placed under affected building foundations. Additional site preparation, such as additional fill for elevation of structures, vibro-compaction, or other work may also be

needed. Additional geotechnical investigations and structural design work may also be needed to address poor soil conditions.

2.2.2.4 Environment

Extensive environmental permitting is required to construct a WTE Facility, in any location. A summary of the Federal, State and regional environmental permitting requirements, policies and jurisdictional interfaces required to site, construct and operate a new WTE facility in Miami-Dade County are provided in the below subsections and were used to provide an estimated degree of permitting difficulty summary for each site.

2.2.2.4.1 Environmental Resource Permit (ERP)

The FDEP's Environmental Resource Permit (ERP) Program regulates activities involving the alteration of surface water flows. This includes new activities in uplands that generate stormwater runoff from upland construction, as well as dredging and filling in wetlands and other surface waters. Wetlands and Surface Waters were analyzed using the National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 GIS layers in order to identify existing wetlands and surface waters including streams, canals, ponds, lakes, impoundments, rivers, sloughs, and other watercourses that are present on the sites being evaluated.

2.2.2.4.2 Threatened & Endangered Species

In order to determine if any known Threatened and Endangered (T&E) species or critical habitat for endangered species were present on the sites being evaluated, Arcadis utilized the following resources:

- United States Fish and Wildlife Information for Planning and Consultation tool and designated and proposed critical habitat
- Florida bonneted bat consultation area for the South Florida Urban Bat Area in Miami-Dade County
- Florida Panther consultation areas, Florida wood stork colonies, and Florida Natural Areas Inventory datasets

2.2.2.4.3 Floodplain

Flood maps serve as critical decision-making tools in flood mitigation, land use planning, emergency management and general public awareness. Arcadis conducted a review of the FEMA Flood Zone map to determine flood zone designation and flood hazard probability for each site being evaluated.

2.2.2.4.4 Comprehensive Everglades Restoration Plan (CERP) Considerations

CERP is a framework for restoring, protecting and preserving the greater Everglades ecosystem. The plan is a 50-50 partnership between the State of Florida and the federal government. The State of Florida and the South Florida Water Management District have so far invested approximately $2.3 billion in CERP-related land acquisition, project design and construction. The CERP project boundaries layer was used to identify conservation lands, including the Everglades National Park, to determine if any parcel was adjacent to any known or existing CERP project.

2.2.2.4.5 Code and Policy Considerations

Miami-Dade County Wellfield Protection Areas

In Miami-Dade County, drinking water is drawn from the Biscayne Aquifer, which is a porous limestone rock formation that gives the aquifer excellent capacity. However, the rapid movement of water in the aquifer and the high-water table within many areas of the County make it vulnerable to pollution. Pollutants that are discharged onto the ground or in surface waters can contaminate the groundwater and be drawn into wells that supply drinking water.

For these reasons, Miami-Dade County has policies and programs in place to protect the Biscayne Aquifer from potential sources of contamination, especially in specific areas around the network of drinking water wellfields designated as wellfield protection areas (WPA). The WPAs were designated based on geological characteristics of the aquifer and the flow of water through it. New activities that use or store hazardous materials or generate hazardous waste are prohibited within certain parts of the wellfield protection areas. WPA requirements are included in Sec. 24-43 of the County Code. Arcadis reviewed the WPA boundaries in order to identify whether any parcel was within or contained protected areas.

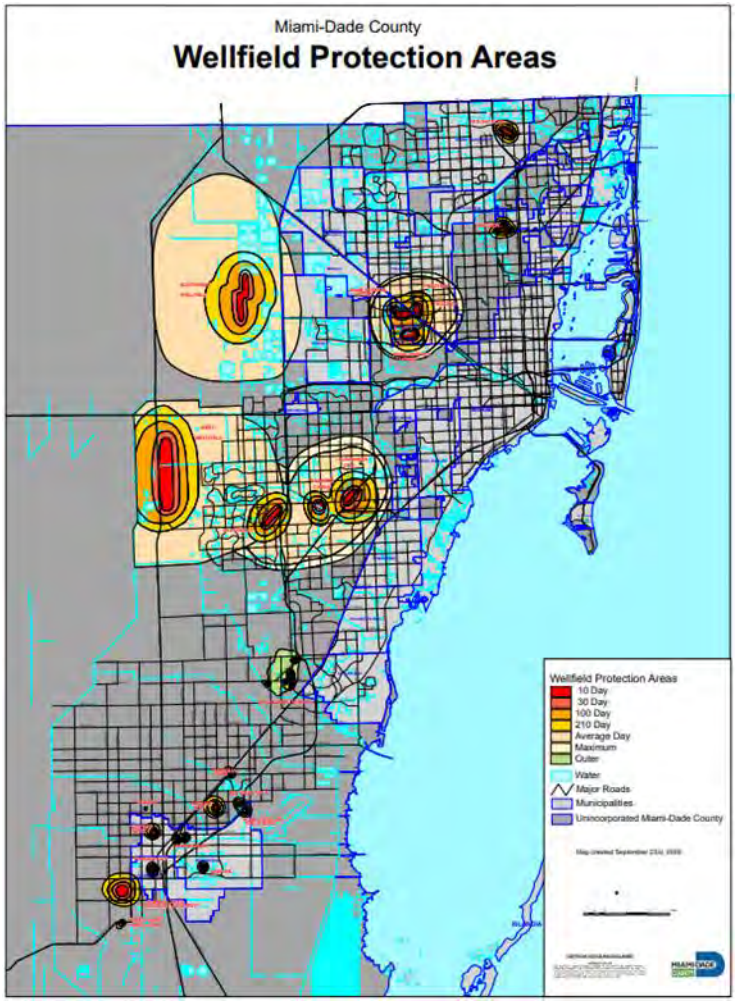


Figure 2.1 Wellfield Protection Areas

Comprehensive Development Master Plan (CDMP) Conservation Aquifer Recharge and Drainage Element (Element)

The intent of this Element is to identify, conserve, appropriately use, protect and restore as necessary the biological, geological and hydrological resources of Miami-Dade County. The following policies were considered when conducting the Detailed Screening analysis.

- Policy CON-7J of this Element States - In evaluating applications that will result in alterations or adverse impacts to wetlands, Miami-Dade County shall consider the applications' consistency with CERP objectives. Applications that are found to be inconsistent with CERP objectives, projects or features shall be denied.
- Policy CON-9A of this Element States - All activities that adversely affect habitat that is critical to federal or State designated, endangered or threatened species shall be prohibited unless such activity(ies) are a public necessity and there are no possible alternative sites where the activity(ies) can occur.

- Policy CON-9B of this Element States - All nesting, roosting, and feeding habitats used by Federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.

Miami-Dade County Airport Zoning Code

The Airport Zoning Code describes the regulations to provide both airspace protection and land uses compatible with airport operations. The Airport Zoning Code requirements provide the regulations that describe such items as Critical Approach Zones and height restrictions that could impact the ability to develop a WTE facility. The areas governed by this Code include airports owned by the County and managed by the Miami-Dade Aviation Department (MDAD) or its successor agency, and the incorporated and unincorporated areas that surround the following airports:

- Miami International Airport (MIA);
- Miami Executive Airport (TMB);
- Miami-Opa Locka Executive Airport (OPF);
- Miami Homestead General Aviation Airport (X51); and
- Any other County-owned or operated airports that may be hereafter established.

Note that the regulations in the Airport Zoning Code do not apply to, or govern, Dade-Collier Training and Transition Airport (TNT).

The Critical Approach Zone (CAZ) is a trapezoidal area extending outward from the Runway Protection Zone to a point that is 10,200 feet from the runway end. One of the uses prohibited within this zone is “establishments or uses that emit smoke, gases, or dust in quantities or densities sufficient to jeopardize the safe use of the airport. In no event shall these prohibitions be varied”. The Airport Zoning Article may be open to some interpretation about whether the stack emissions from a new WTE facility located within the CAZ are in sufficient quantities or densities to jeopardize the safe use of the airport. However, additional analysis and discussions with MDAD and the FAA would be required to determine if parcels within the CAZ may require more detailed analysis such as a thermal exhaust plume analysis. Therefore, for the purpose of this preliminary siting analysis, parcels located within the CAZ of any of the airports governed by the Airport Zoning Code were not considered.

The Airport Zoning Code also describes Airport Height Variance Eligible Areas (HVEAs) that are areas surrounding airports where variances of the applicable height restrictions may be applied for in accordance with the Airport Zoning Article. For the purposes of this siting analysis, parcels located within the HVEAs of any of the airports governed by the Airport Zoning Code were not considered.

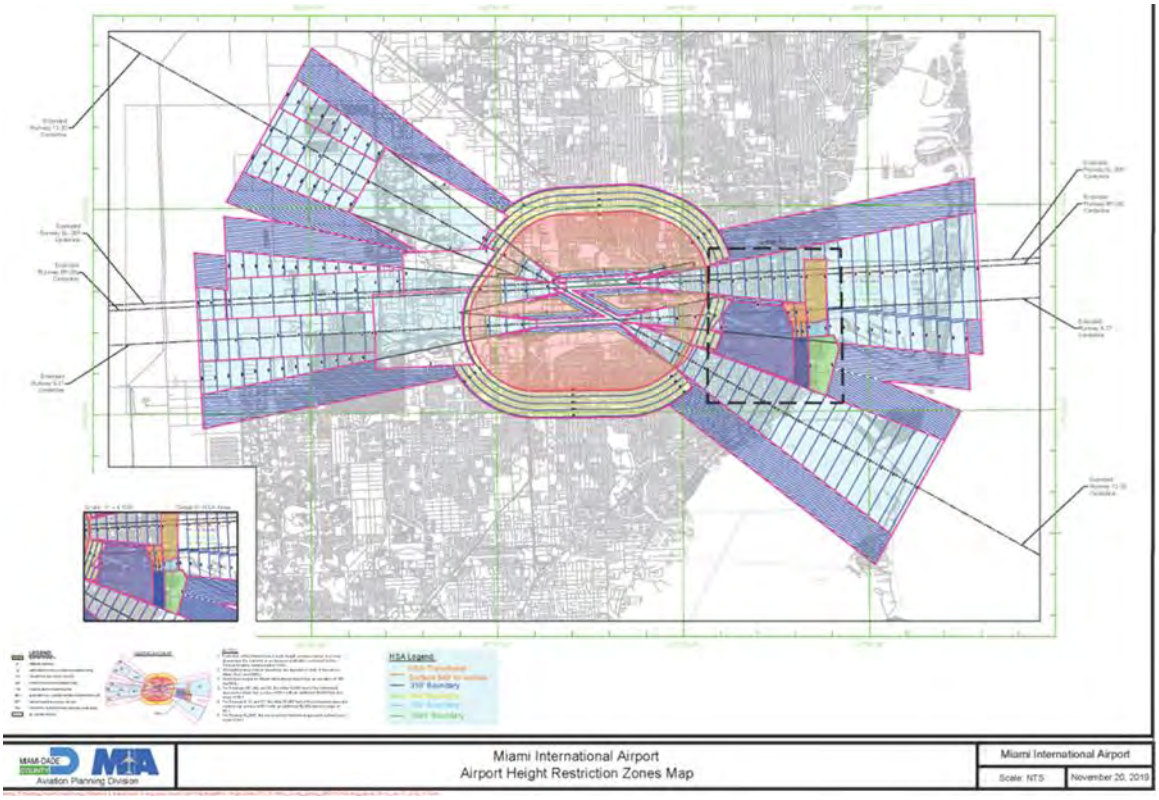


Figure 2.2 Miami International Airport - Airport Height Restriction Zone Map

Federal Aviation Administration (FAA) Requirements

The FAA governing regulation is 14 CFR Part 77. In accordance with this regulation and the Miami-Dade County Airport Zoning System Checklist, revised August 5, 2015 (Microsoft PowerPoint - Airport System Zoning Checklist 8-5-15 (white background) [Compatibility Mode] (miami-airport.com)) (County Airport Zoning Checklist) and the Airport Zoning Code (ARTICLE XXXVII. - AIRPORT ZONING | Code of Ordinances | Miami - Dade County, FL | Municode Library), the following approach areas to governed airports are used to determine height restrictions:

- 10,000 feet at a slope of 34 to 1 for all non-precision instrument runways other than utility; and
- 10,000 feet at a slope of 50 to 1 with an additional 40,000 feet at a slope of 40 to 1 for all precision instrument runways
- For MIA Runways 8R, 26L and 30 only, the initial 10,000 feet at a slope of 65 to 1 with an additional 40,000 feet at a slope of 40 to 1

The stack heights for modern U.S.-based WTE facilities ranges from 200-350 feet above grade. Using a conservatively tall 400 ft height stack, the distance for the FAA approach surface height restriction is approximately 18,000 feet from the RPZ or 3.4 miles. Note that the existing RRF eastern-most stack is approximately four miles away from MIA along the centerline of the Runways 12-30. Therefore, for the purposes of this siting analysis, parcels located within four miles of any of the airports governed by the Airport Zoning Code, including the Homestead Air Reserve Base, were not considered.

2.2.2.4.6 Florida Electrical Power Plant Siting Act Certification

The Florida Electrical Power Plant Siting Act (PPSA), Sections 403.501-.518, Florida Statute (F.S.), is the State of Florida centralized process for licensing large electrical power plants and is administered by the FDEP Siting Coordination Office. Section 403.503 (14) F.S., defines an electrical power plant, for the purpose of PPSA certification, as any steam or solar electrical generating facility using any process or fuel, that produces 75 megawatts or more of electrical capacity. PPSA certification may also be used to obtain approval for smaller capacity electrical power plants, if the applicant elects to use the PPSA process. A WTE facility utilizes solid waste as the process fuel to generate steam and produce electricity, therefore the environmental permitting associated with siting, constructing, and operating a WTE facility falls under the PPSA.

One license — a certification — replaces all local and state permits and is issued by the Siting Board (Florida Governor and their Cabinet Members). Since certification is a life-of-the facility authorization, the considerations involved in the PPSA application review are extensive. Local governments and state agencies within whose jurisdiction the WTE facility is to be constructed participate in the process. Certification addresses permitting, land use and zoning, and property interests. A certification grants approval for the location of the WTE facility and its associated facilities such as roadways and electrical transmission lines carrying power to the electrical grid, among others which are collectively referred to as a PPSA Certified Site.

PPSA certification covers almost every aspect of the facility as an all-in-one license for construction and operation. The PPSA creates a procedure that allows the local, regional, and state agencies to review a proposed electrical power plant within a single, coordinated process. State and local government permit requirements are typically included within the Conditions of Certification (COC) issued under the PPSA. As such, the state pre-empts the issuance of any other type of permit for the facility, except for local zoning and building.

Power Plant Site Certification - Existing and New Site

A PPSA Application was submitted for the existing RRF, and the COC PA 77-08, approving siting, construction and operation was issued by the FDEP on January 9, 1978. PPSA COCs can be modified during the life cycle of the facility through either an Amendment or Modification, which are defined below.

1. PPSA Amendment - a material change to the application for site certification that does not require a change in the final order or Conditions of Certification. Amendments can be authorized by the FDEP Siting Coordination Office.
2. PPSA Modification - a substantive change in the certification order including any substantive change in the Conditions of Certification. Proposed modifications are reviewed by all affected agencies and are issued by DEP or the Siting Board after public notice.

Construction of a new WTE facility at the existing RRF site would likely be considered a Modification to the COC. However, a pre-application meeting with the FDEP would be required in order to confirm this assumption. Construction of a new WTE Facility at a new site, would require the development of a new PPSA Application for approval.

Other Permits Included in PPSA Application

A Modification to an existing PPSA COC or development of a new PPSA Application also requires the development of applicable Federal, State and regional permit applications, that are ultimately provided in the appendices of the Modification or new Application submittal. Filing federal permit applications concurrently with the PPSA Application is advantageous because it helps ensure that the Federal permits and the PPSA certification are issued at or about

the same time. A summary of the other permit applications to be submitted as part of the PPSA Modification or Application are noted below.

- National Pollution Discharge Elimination System (NPDES) Application/Permit
- Hazardous Waste Disposal Application/Permit
- 404 Application/Permit
- Prevention of Significant Deterioration (PSD) Application/Permit
- Air Operation Application/Permit
- Coastal Zone Management Certification (as applicable)
- Zoning Descriptions and Concurrence
- Environmental Resource Permit Application
- Monitoring Programs

The PSD, NPDES, and other permits that the FDEP issues pursuant to federal programs are issued separately from, and in addition to, the issuance of the PPSA certification. Permits issued by the USACE also are issued separately from the PPSA certification.

2.2.2.4.7 Florida Transmission Line Act Certification

The Florida Transmission Line Siting Act (TLSA), Sections 403.52-.5365, Florida Statutes (F.S.), is the State of Florida centralized process for licensing electrical transmission lines that are 230 kilovolts (kV) or larger; Cross a county line; and are 15 miles or longer. The TLSA can also be used for transmission lines that are less than 15 miles long or if within one county. The TLSA is also administered by the FDEP and one license — a certification — replaces all local and state permits, and provides for construction, operation, and maintenance of electric transmission lines for the life of the transmission line. State and local government permit requirements are typically included within the COC issued under the TLSA.

The TLSA is similar to the PPSA in that both require Siting Board certification and the FDEP acts as lead agency as well as addresses its own jurisdictional interests. In both laws, certification covers all state and local permits and is for the life-of-the-facility. Public involvement opportunities are also provided in both laws. The two main differences between the TLSA and PPSA are that there is no Land Use and Zoning hearing for transmission line siting certification and alternative transmission line corridor locations can be proposed.

Florida Transmission Line Act Certification - Existing and New Site

The transmission line infrastructure was developed as part of the initial permitting and construction of the existing RRF, however, if reconfiguration is required, an amendment or modification to the COC would be required. Site specific transmission line infrastructure associated with the other parcels being considered would need to be evaluated as part of a future effort to determine if the County or the utility would be responsible for the permitting of the needed transmission lines.

2.2.2.4.8 Air Permitting

Air Quality Permitting Requirements

The Clean Air Act Amendments (CAAA) required the United States Environmental Protection Agency (USEPA) to set National Ambient Air Quality Standards (NAAQS) for common pollutants emitted from numerous and diverse sources considered harmful to public health and the environment. There are currently NAAQS designated for six

pollutants: sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), lead (Pb), ozone (O_3), and particulate matter (PM_{10} and $PM_{2.5}$). The CAAA also established two types of national air quality standards. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, young children, and the elderly. Secondary standards set limits to protect public welfare, including protection against visibility impairment, damage to animals, crops, vegetation, and buildings. Florida has incorporated the NAAQS by reference into the state's air quality regulations.

The USEPA tracks compliance with the NAAQS (not to exceed ambient air concentration) for each criteria pollutant by designating each area of the country as either "attainment" if the area meets the NAAQS or "nonattainment" if the area does not meet the NAAQS. A separate determination of attainment status is made for each criteria pollutant. Miami-Dade County is currently classified as an attainment area for all criteria pollutants.

Based on preliminary estimates of potential emission levels, a new 4,000 tpd WTE Facility would constitute a new major emission source. As a proposed new major source, a 4,000 tpd WTE Facility would be subject to federal New Source Review (NSR) requirements. NSR refers to the pre-construction review process that applies to new and modified major sources for the purpose of protecting air quality through a permitting framework that supports compliance with the NAAQS. NSR includes two permitting programs: Prevention of Significant Deterioration (PSD) permitting and Nonattainment NSR (NNSR) permitting. Under NSR, a new 4,000 tpd WTE facility proposed for a location in Miami-Dade County would be subject to PSD permitting requirements in recognition that PSD review applies to new major sources in NAAQS attainment areas.

PSD Permitting Program

PSD permitting provides for carefully managed economic growth in a manner consistent with preserving clean air resources. The primary objectives of the PSD permitting program are to protect public health and welfare and to limit degradation of air quality in surrounding areas and within designated areas of special recreational, scenic, or historic value. The PSD permitting regulation specifies that the following analyses be completed to address air pollution control technology requirements and to demonstrate that proposed projects will not adversely impact air quality:

- Air pollution control technology analyses are required on a pollutant-specific basis to define Best Available Control Technology (BACT) for project related emission units. BACT is an emission limitation or standard established on a case-by-case basis and reflects the maximum degree of emissions control that can be achieved considering energy, environmental, and economic impacts. If establishing an emissions limitation or standard is not feasible, BACT may be a design, equipment, work practice, or operational standard.
- An evaluation of ambient air impacts resulting from project related emissions is required with respect to PSD increments and the NAAQS. PSD increments represent increases in pollution allowed in an area and they prevent air quality in clean areas (i.e., attainment areas) from deteriorating to the level set by the NAAQS for a pollutant. The NAAQS is a maximum allowable concentration "ceiling." In contrast, a PSD increment is the maximum increase in concentration that is allowed to occur above a baseline concentration for a pollutant. PSD increments are established for three land use classifications: Class I, Class II, and Class III.
    - Class I areas are areas of special national or regional value, such as national parks, and are afforded the greatest degree of air quality protection.
    - Class II areas are areas where normal, well-managed growth is allowed. The Miami-Dade County area is designated as a Class II area.

- Class III areas industrialized attainment areas with limited restrictions on emissions. No area of the country has been designated as a Class III area.

To evaluate ambient air quality impacts for proposed projects subject to PSD permitting, dispersion modeling analyses must be completed. For each pollutant subject to PSD review, an initial dispersion modeling analysis referred to as a "significance analysis" is completed considering emissions from only the proposed project. If results from the "significance analysis" demonstrates that a proposed facility's impacts are below established PSD significant impact levels (SILs), then "full impact" (multi-source) dispersion modeling analyses including emissions from other offsite sources in the vicinity of the project site are not required. Results from dispersion modeling analyses for emissions associated with a new 4,000 tpd WTE facility are expected to exceed PSD significant impact levels (for one or more pollutants). Therefore, extensive, multi-source modeling analyses would likely be required as part of the PSD permitting process for a proposed 4,000 tpd WTE facility.

- An evaluation of project related impacts with respect to PSD increments and Air Quality Related Values (AQRVs) at any Class I area within close proximity to the site is required. Class I areas, such as Everglades National Park, are federally designated areas of special national or regional value which receive distinct protections under the PSD regulations. For each Class I area, the Federal Land Manager (FLM) is responsible for defining and protecting specific AQRVs and for establishing criteria to determine an adverse impact on the AQRVs. The AQRVs are resources that have the potential to be affected by air pollution and may include visibility, scenic, cultural, physical, or ecological resources for sensitive areas.
- The specific analyses and recommended air dispersion model(s) that may be required are dependent on the distance a proposed project is from protected Class I and/or sensitive Class II areas. For proposed facilities located within 10 kilometers (6.2 miles) of a Class I area and based on an assessment of 24-hour ambient impacts, PSD review may even be required for certain pollutants with emissions at minor levels (i.e., levels below PSD emission thresholds). In order to obtain a construction permit for these proposed sources, a vigorous evaluation would need to be completed to show its proposed operation would not degrade air quality and AQRVs. Given the proximity of the Everglades National Park (Class I area) and Biscayne Bay National Park (sensitive Class II area) to prospective sites in Miami-Dade County, demonstrating no adverse impacts to these protected areas from the operation of a new WTE facility presents uniquely difficult challenges.
- An assessment of project impacts on soils, vegetation, and visibility and an evaluation of air quality impacts relative to general growth (industrial, commercial, and residential) associated with the proposed project are also required.

In Florida, the permitting authority for issuance of air construction permits is the Florida Department of Environmental Protection (FDEP). Construction permits for projects subject to PSD permitting requirements are processed by FDEP's Division of Air Resource Management office in Tallahassee. The PSD permitting regulation provides for public participation and input from the USEPA and designated FLMs for Class I areas and sensitive Class II areas in the vicinity of the project site. Input from these entities is given special consideration and concerns are typically required to be addressed by an applicant during the permit review process. As the permitting authority, FDEP makes the final decision on whether to issue or deny issuance of an air construction permit.

Air Permitting Summary

Siting a new 4,000 tpd WTE facility in Miami-Dade County presents unique challenges considering the complex pre-construction permitting requirements that apply under the PSD permitting regulation. In particular, the proximity of nearby sensitive areas (Everglades National Park, which is a federally protected Class I area, and the Biscayne Bay sensitive Class II area) and the presence of existing facilities with high emission levels in the county, impart

uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE Facility and make securing an air construction permit very challenging at the prospective sites. Extensive air dispersion modeling, additional analyses and correspondence with regulatory agencies is required in order to definitively evaluate the feasibility and degree of difficulty of air permitting at any proposed site.

2.2.2.5 Transportation

A proposed 4,000 ton per day WTE facility would be expected to receive approximately 300-400 inbound vehicles per day and provide for a typical queueing length suitable for between 50 and 100 vehicles during peak delivery periods. This transportation demand requires, at a minimum, an FDOT standard two-lane road with paved shoulders and stormwater controls and sufficient area on site for vehicle queueing. Also, per the Initial Siting requirements, the travel time to an Arterial or Collector Road must be less than 10 minutes.

For this analysis, the Arterial and Collector Roads were identified from the *2010 Federal Functional Classification Map* published by the FDOT District Six Intermodal Systems Office. Travel time from each site to an identified Arterial or Collector Road was then determined using online mapping tools and calculated travel times based on data in the *2020 Miami-Dade County Mobility Profile* published by the FDOT Forecasting and Trends Office. For each site, the existing access road size, capacity, and physical condition were evaluated to determine its suitability for the demands of a proposed WTE facility, along with expected traffic impacts on area roads and intersections. If an access road is either inadequate or unavailable at a site, then a new two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access. Additional easement/ROW may have to be acquired. Local area traffic impacts were evaluated based on published FDOT Level of Service data and known traffic conditions.

2.2.2.6 Community

According to the USEPA, the term environmental justice is defined as: “the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.” The USEPA EJScreen Tool was used to provide an initial estimate of environmental justice concerns at each site. According to the USEPA website, EJScreen is an environmental justice mapping and screening tool that provides the EPA with a nationally consistent dataset and approach for combining environmental and demographic indicators. EJScreen users choose a geographic area; the tool then provides demographic and environmental information for that area. All of the EJScreen indicators are publicly available data. EJScreen simply provides a way to display this information and includes a method for combining environmental and demographic indicators into EJ indexes.

It is important to note that EJScreen is not a detailed risk analysis. It is a screening tool that examines some of the relevant issues related to environmental justice, and there is uncertainty in the data included. EJScreen cannot provide data on every environmental impact and demographic factor that may be important to any location. Therefore, its initial results should be supplemented with additional information and local knowledge whenever appropriate, for a more complete picture of a location.

Based on the information provided by the EJScreen Standard Report, proximity of the site to residential zoning and populations, and proximity to sensitive environmental areas (i.e., Everglades National Park, wetland and wildlife areas, etc.) a relative rating of expected community opposition to the siting of a new WTE facility was applied. Results of the EJScreen Standard Report, developed for each site, are included in the Site Packages found in Appendix A.

2.2.3 Detailed Screening Findings

A meeting was held on June 7, 2022, to review the findings of the Detailed Screening process. After discussion and agreement by DSWM and Arcadis, 19 sites were eliminated from consideration due to several factors, such as roadway access and utility availability, parcel development and availability, permitting considerations, and conflicts with existing County policies (i.e., located in WPA or CERP site, wetland/wildlife habitat issues, etc.).

DSWM staff then requested that a comparison be conducted of the existing RRF site to the three remaining potential sites found as part of this preliminary analysis, using the same methodology as the other sites.

The four remaining sites are listed below and are illustrated in the map at right.

- Site 1 – Medley
- Site 16 – Ingraham Hwy. Site #1
- Site 17 – Ingraham Hwy. Site #2
- Existing RRF Site – Doral

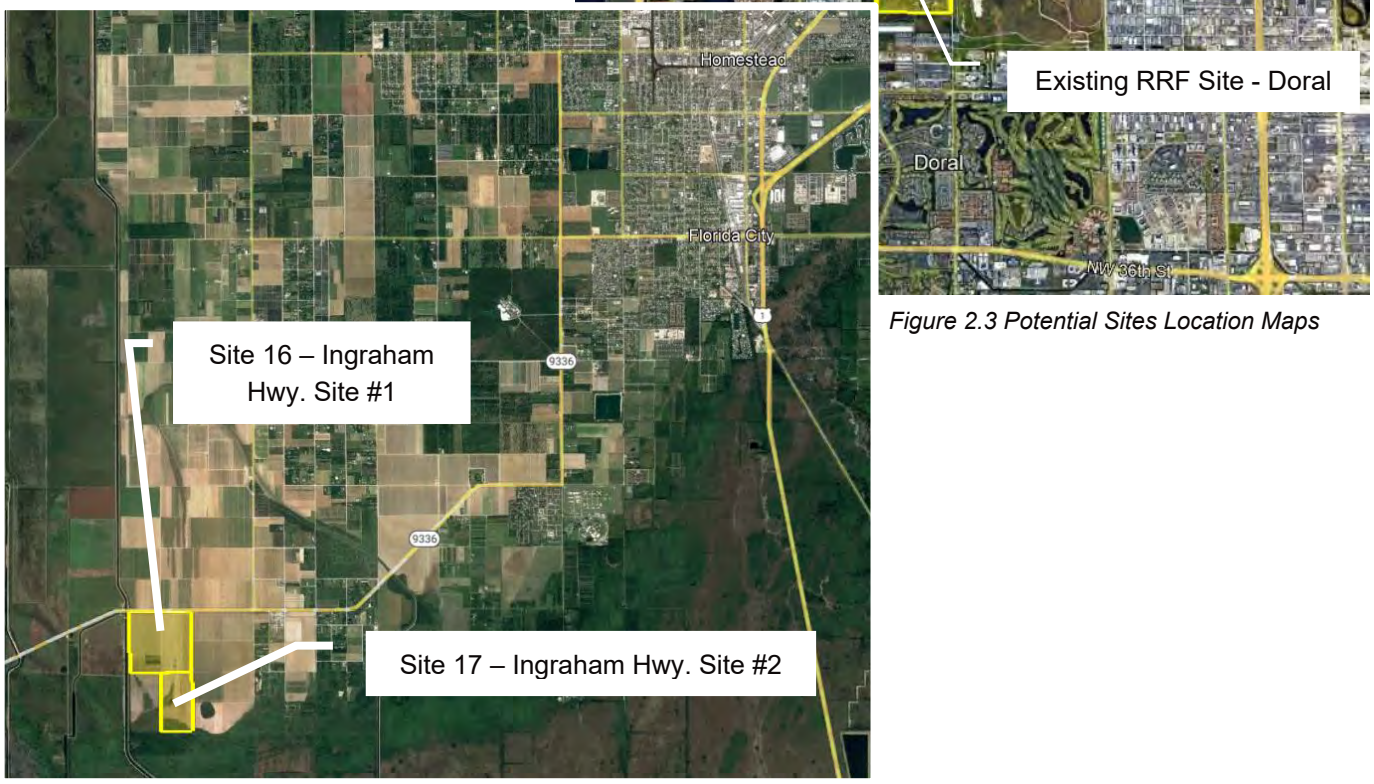


Figure 2.3 Potential Sites Location Maps

The full site packages for each of the 22 sites that were evaluated in the Detailed Screening process are included in Attachment B. A brief comparison of the four remaining sites is presented below and on the following pages for quick reference. For these four final sites, an estimate of the schedule and cost differentiators was also developed to provide the County with additional comparative analysis for consideration.

2.2.3.1 Schedule Considerations

The development of a WTE facility typically takes seven (7) to ten (10) years to complete. This time frame, which includes the preliminary planning stage, siting, permitting, financing, procurement, design, and construction, varies depending upon the complexity of the project and extent of the regulatory and public concerns. Arcadis has developed a preliminary high-level implementation schedule, included as Appendix B, for the four selected sites for use in evaluating different project development schedule impacts related to each site: the Existing RRF site, the Medley site, Ingraham Highway Site 1 and Ingraham Highway Site 2. Each potential site has unique schedule impact considerations, which are discussed in the subsections below. Task durations are estimates and may change once activities begin, which could extend or compress the schedule duration. Future phases of the County's planning and implementation process will include more detailed review of the factors which may affect the potential development of a new WTE facility at any proposed location and as such, the anticipated timelines and schedule impacts will be further refined as the process proceeds.

2.2.3.1.1 Assumptions

Several common assumptions were used in developing the new WTE facility preliminary implementation schedule. There are also many assumptions specific to an individual site option that differentiate their respective implementation timeframe from one another. The assumptions used for the purposes of this Report are identified in the following table:

Table 2.1 Schedule Assumptions

Assumptions	Applicable Site Option
The durations used for design and construction are generally based on the schedule for construction of the most-recently developed facility in the United States, referred to as reference facility (Palm Beach County's Renewable Energy Facility No. 2, completed in 2015).	All Site Options
To avoid waste diversion, the existing RRF would continue operations during construction of the new WTE facility, with shutdown and decommissioning occurring after construction completion.	Existing RRF Site
Development of the existing RRF site includes time for permitting and filling the onsite stormwater lake, planning and construction of temporary stormwater retainage during construction, and logistical planning for construction during operation of the existing RRF.	Existing RRF Site
The Medley site includes time for land acquisition, zoning and permitting of a greenfield site as well as additional site preparation work.	Medley Site
Ingraham Highway Site 1 and Ingraham Highway Site 2 include additional time for land acquisition, zoning permitting of a greenfield site, and extended environmental permitting due to proximity of Class I area. There will also be additional site preparation work required including wetland mitigation, flood plain mitigation (elevating finished floor elevation of structures one foot above grade and additional stormwater requirements), and wildlife mitigation.	Ingraham Highway Site 1 Ingraham Highway Site 2

2.2.3.1.2 Siting/Planning

Several activities are identified for the siting of a new WTE facility that are required to support the regulatory, permitting, design, and construction phases. Siting/Planning includes the following activities:

- Siting selection and land acquisition, if applicable
- Power purchase and interconnect agreement negotiations
- Public outreach activities

The Medley site, Ingraham Highway Site 1, and Ingraham Highway Site 2 require land acquisition to commence prior to the other activities listed above. It has been assumed that land acquisition may take approximately 18 months to 2 years.

2.2.3.1.3 Financing

Construction of a large capital project, such as a WTE facility, is most often financed, as most entities do not have the available funds to pay for the capital costs when constructed. A number of financing options exist for funding large capital projects, with the most common being municipal bond financing. It is anticipated that the County would most likely use a form of long-term revenue bond financing. Bond financing terms can vary and are determined during agreement development. For the purposes of this Report, it is assumed that a 30-year revenue bond would be used.

First, a financial plan for bond issue would be developed to determine the bond issue method and schedule. This would include bond issue support and a cash flow analysis at the commencement of the project and possibly a phased financing strategy, with interim and final financing. The interim financing could correspond with initial planning, permitting and procurement activities required prior to contractor notice to proceed. The final financing would likely correspond with the contractor notice to proceed and/or receipt of all regulatory approvals for construction.

Note that the financing tasks are not consecutive, and do not occur directly one after the other. There is time allotted in the schedule between these tasks when no financing activities occur. Therefore, the total duration for the financing tasks, commencing with the bond issue support and cash flow analysis and ending with the final financing, is estimated to be between four and six years. The financing tasks typically take place concurrently with the permitting and procurement tasks.

2.2.3.1.4 Regulatory/Permitting

The preliminary schedule reflects the permitting process including application preparation, submission, clarification, and issuance of permits and approvals required for the construction and start-up of a new WTE facility. These activities are discussed in more detail in Section 2.2.4 Environment. The critical path includes preparation of the dredge and fill permit, PSD, and PPSA permitting processes. It is also assumed that the PPSA and other permitting efforts would be accelerated, through the concurrent development of permit application packages. It is anticipated that the overall permitting duration will range from approximately three and a half years to four and a half years from preliminary application development through issuance of all required permits. It is assumed that permitting activities would occur concurrently with financing and procurement efforts, in order to accelerate the schedule.

There are many variables associated with the permitting process that could affect the duration of the permitting effort. The schedule presents what would be considered a typical scenario and assumes that significant regulatory

delays such as multiple requests for information (RFIs), significant public opposition and protest, or change in law would not occur.

2.2.3.1.5 Procurement

The procurement process outlined in the preliminary schedule consists of the following main tasks:

- Design criteria development
- Procurement strategy development
- RFI development, response, and response evaluation (it should be noted that DSWM has already initiated development of a RFI to be issued to the vendor community in the near future)
- Request for Qualifications (RFQ) development, response, and response evaluation
- Request for Proposals (RFP) development, response, and response evaluation
- Legal activities associated with development of the draft and final Construction and Operating Agreements.

The design criteria development is required prior to RFQ/RFP procurement process and is estimated to take approximately 6 months to one year. The RFQ/RFP procurement process is estimated to take approximately two to three years and would occur concurrently with the permitting and financing activities.

2.2.3.1.6 Design and Construction

The construction period outlined in the preliminary schedule is a general overview of the construction process. As the project moves forward, detailed construction schedules will be developed as part of the planning and procurement process by DSWM's consultants and/or the successful contractor. Typical construction-related activities would include:

- Preliminary construction activities, such as initial site work and preparation
- Detailed design
- Preliminary site and utilities work
- Procurement of major equipment
- Procurement of long lead time items
- Construction
- Start-up and commissioning
- Acceptance testing
- Final inspection and contract close-out

Preliminary Construction Activities

Considerations are made in the preliminary schedule based on specific activities associated with each site. For the Existing RRF site, it is assumed that shutdown of the existing RRF will not occur until after construction of a new WTE facility to avoid waste diversion. Planning activities will be required in consideration of specific site constraints associated with construction equipment laydown area, temporary stormwater storage, and stormwater pond fill activities.

The Medley site is assumed to require additional time prior to construction for placement of fill and site preparation work to fortify the site soils for construction. The Ingraham sites may require additional time prior to construction for wetland mitigation, removal of muck soils, replacement with fill, and fill placement for elevation to meet floodplain requirements. The duration of these additional efforts is estimated to be approximately 9 months to one and a half years, to be completed before other site and utility work can commence for a new WTE facility.

New WTE Facility Design and Construction Activities

It is currently anticipated that the design and construction duration for a new WTE facility is approximately four to five years from the contractor NTP through acceptance testing and Commercial Operations.

2.2.3.1.7 Summary

In summary, the duration for new WTE facility implementation activities is estimated to be between 7 years 9 months to 11 and a half years depending upon the ultimate site selected. For the purposes of this Report, it is assumed that work would commence in January 2023 for any of the site options. For the Existing RRF site, design and construction is estimated to start in October 2026 with Commercial Operations beginning in April 2030. For the Medley site, design and construction is estimated to start in January 2028 with Commercial Operations approximately in April 2032. For the Ingraham Highway Sites, design and construction is estimated to start in April 2029 with Commercial Operations in approximately October 2033.

The estimated project durations for the Medley site and Ingraham Highway sites are longer than the Existing RRF site because they include additional time for land acquisition as well as additional permitting time required as non-PPSA certified sites, additional air permitting considerations, and preliminary site work needed including soils stabilization or removal and wetland and wildlife mitigation. In contrast, the Existing RRF site does not require time to acquire new land, is currently a site certified under the PPSA, and would only require minimal preparatory site work.

Table 2-2 provides a summary of major tasks and the estimated durations for each of the selected site options. A graphical summary schedule showing the concurrent activities is provided in Appendix B.

Table 2.2 Summary of Schedule Tasks with Estimated Durations

Task	Estimated Duration of Activity		
	Existing RRF Site	Medley Site	Ingraham Hwy Sites
Total Project Duration	**7 years 9 months**	**9 years 9 months**	**11 years 3 months**
Estimated Commercial Operation	April 2030	April 2032	October 2033
Siting/Planning *	**1.5 years**	**2.5 years**	**2.5 years**
Siting Analysis and Land Acquisition	N/A	1.5 years	2 years
Financing *	**1.5 years**		
Permitting *	**3.5 years**	**3 years 9 months**	**4.5 years**

Task	Estimated Duration of Activity		
	Existing RRF Site	Medley Site	Ingraham Hwy Sites
Army Corps of Engineers Dredge and Fill Permit	1 year	N/A	1 year
Environmental Resource Permit	1 year	1 year 3 months	2 years
PSD Air Construction Permit	2 years	2 years 3 months	3 years
PPSA Process Activities	2.5 years	2 years 9 months	4 years
Procurement *	**2 - 3 years**		
Design Criteria Development	6 months – 1 year		
RFQ / RFP Process	1.5 - 2 years		
Design and Construction	**4 years**	**4 years 9 months**	**5 years**
Design	3 years		
Procurement of Major Equipment	3 years		
Preliminary Site and Utilities Work	9 months	1 year 3 months	1.5 years
Construction	2.5 years		
Start-up and Commissioning	6 months		
Acceptance Testing to Commercial Operations	2 months		
Final Inspection and Contract Closeout	6 months		
Shutdown and Demolition of RRF	**1 – 1.5 years**		

* These tasks occur concurrently.

2.2.3.2 Cost Considerations

Arcadis developed a cost considerations table to approximate the difference in cost of the various components required to site, construct and operate a new WTE facility at the four remaining sites. This cost comparison includes planning level estimates for additional costs associated with the facility construction, annual Operations and Maintenance (O&M), as well as the potential system impacts specific to each site option. The additional costs are compared to the costs of developing a new WTE facility on the existing site, which is considered the base case and reflects estimated stormwater lake fill costs and environmental considerations noted in Appendix C. The capital costs and first year O&M cost associated with a new WTE facility located on the Existing RRF site were developed previously by Arcadis as part of a separate effort and represents the base case for comparative purposes.

The cost considerations table provided in Appendix C identifies the item, unit cost, units for the unit cost, if the additional site condition applies to each site, the unit quantity needed for each site option, the cost, and the cost percentage increase compared to the base capital or annual O&M costs.

2.2.3.2.1 Identification of Costs

Many of the siting evaluation criteria and associated site conditions will require additional costs to address or mitigate the unique site conditions of each site. Arcadis conducted a preliminary analysis to identify the potential additional costs associated with the various site conditions that would likely apply to the selected sites, subsequently developed unit costs for those site conditions, and quantified the amount of work or units required for the individual sites reviewed. These conditions and costs were identified only for the four sites remaining after the Detailed Screening criteria were applied:

- Existing RRF Site
- Site 1 Medley Site
- Site 16 Ingraham Highway Site 1
- Site 17 Ingraham Highway Site 2

These different site conditions may impact both facility capital cost and ongoing annual O&M cost. Appendix C provides the cost differential comparison table and the Basis of Cost summary, which identifies information used to determine unit costs and calculate required quantities associated with each site.

2.2.3.2.2 Capital Costs

The following additional capital costs and associated assumptions were considered for the selected sites, when applicable:

- Land acquisition utilizing the current Miami Dade Property Appraiser value plus 10%
- Off-site road development when an access road to the site is not yet available
- Off-site utilities construction for interconnection to the nearest pipeline including:
  - 12-inch ductile iron pipeline for potable water
  - Potable water booster pump station
  - 6-inch PVC force main for wastewater
  - Natural gas pipeline
  - Electrical transmission mains
  - An industrial water supply well, where permittable, or rehabilitation of existing wells
  - Additional right of ways or easements required for off-site utilities or access, assumed to be 60-feet wide
- Additional stormwater requirements for high groundwater levels or floodplain mitigation, assumed a four-foot-tall site perimeter berm
- Additional stormwater requirements for temporary retainage during construction
- Geotechnical site preparation work including:
  - Lake fill costs
  - Removal of muck soils

  - Replacement with select fill
  - Additional geotechnical requirements, such as vibrocompaction of fill or other structural requirements
- Floodplain mitigation by elevating structures, assuming one foot above grade for Zone A.
- Wildlife mitigation including wood stork, bonneted bat, and Florida panther
- Permanent wetland mitigation
- Additional zoning and permitting cost possibly required for greenfield sites
- Additional permitting cost associated with difficulty due to site location or constraints
- Waste hauling and transfer system impacts including construction of a transfer station and additional transfer trailers if collection and hauling system significantly changes compared to current System

Existing RRF Site

The identified site conditions requiring capital cost for the existing RRF include industrial supply well rehabilitation, temporary stormwater retainage during construction, potential filling of the site stormwater detention pond and some additional geotechnical work, such as vibrocompaction of the detention pond fill area, as well as potential bonneted bat mitigation.

Medley Site

For the Medley site, the identified site conditions requiring potential capital costs include land acquisition, water booster pump station, wastewater lift station, natural gas pipeline, electrical transmission mains, right-of-way and/or easements for those utilities, additional stormwater management due to high groundwater levels, placing select fill and additional geotechnical requirements required to help stabilize existing soils, such as vibrocompaction or other method as selected by contractor, additional zoning and permitting for a greenfield site, and moderate environmental permitting difficulties due to location and proximity to existing industrial facilities. It is assumed that there may be impact fees or improvements required to local roads that have not yet been factored into the capital cost for this site because the extent of roadway modifications is currently not known. It is anticipated that these would be negotiated and further evaluated during the land acquisition process.

Ingraham Highway Sites 1 and 2

For the Ingraham Highway sites, the identified site conditions requiring potential capital costs include the land acquisition, potable water pipeline, water booster pump station, wastewater force main, wastewater lift station, natural gas pipeline, electrical transmission mains, right-of-way and/or easements for utilities or access, additional stormwater management due to floodplain mitigation, removal of muck soils, placing select fill and additional geotechnical requirements required to help stabilize existing soils, such as vibrocompaction, embankment fill required for floodplain mitigation elevation, bonneted bat mitigation, wetland mitigation, additional zoning and permitting for a greenfield site, extremely challenging environmental permitting due to location and proximity to Class I areas, and System impact due to increased hauling distance, which will likely include construction of a new transfer station and purchase of additional tractor trailers. Ingraham Highway Site 2 will also require development of an offsite access road and Florida panther mitigation in addition to the items listed above.

2.2.3.2.3 Operations and Maintenance Costs

The following additional annual O&M costs and associated assumptions were considered for the selected sites, when applicable:

Medley Site

- Purchase of potable water as industrial supply well development is likely not permittable, will result in additional costs.
- Cost for ash hauling to a landfill assumed to be near the existing RRF.

Ingraham Highway Sites

- Purchase of potable water would be an additional operations cost
- Cost for ash hauling to a landfill assumed to be near the existing RRF would be significant as the distance is much longer than the other sites.
- Transfer system O&M cost required for the additional hauling of waste to these locations.

2.2.3.2.4 Cost Considerations Summary

The following table summarizes the estimated additional capital cost associated with each site option and the additional annual operations and maintenance cost impact.

Table 2.3 Estimated Additional Costs for Each Site Option

	Estimated Total Additional Cost	Percentage of Base Cost
Existing RRF Site (Base Cost for Comparison)		
Capital	$1,450,000,000	N/A
Annual Net O&M (cost per ton *)	$11.22	N/A
Medley Site		
Additional Capital	$48,300,000	4.2%
Additional Annual Net O&M (cost per ton*)	$2.10	19%
Ingraham Highway Site 1		
Additional Capital	$80,400,000	6.4%
Additional Annual Net O&M (cost per ton*)	$13.40	119%
Ingraham Highway Site 2		
Additional Capital	$84,700,000	6.7%
Additional Annual Net O&M (cost per ton*)	$13.40	119%

* Does not include debt service payment for capital costs

The site option with the lowest anticipated impact on capital cost and annual operations and maintenance cost is the Existing RRF site (base case). This is much less than the highest anticipated impact, Ingraham Highway Site 2,

which is anticipated to have a 6.7% increase in capital costs and 119% increase in annual operational costs due to the significant waste hauling distance required.

3 Preliminary WTE Facility Site Analysis Summary

This preliminary siting analysis was prepared to support the County in determining availability of sites within the County for development of a new WTE facility to replace the existing RRF. Based upon the results of this preliminary analysis, development of a new WTE facility within the County is feasible, based on the criteria investigated for each site. Following completion of this preliminary siting analysis, it is recommended that the County consider pursuing a comprehensive siting evaluation, inclusive of site-visits, geotechnical investigations, preliminary air modeling, informal discussions with FDEP staff, as well as other efforts necessary to move forward with the selection of a site and implementation of a new WTE Facility.

Table 3-1 below provides an overall comparative summary of the four sites evaluated in the detailed screening analyses.

(Remainder of Page Left Blank)

Table 3.1 Site Comparison Summary

Siting Parameter	Existing RRF	Site 1 Medley	Site 16 Ingraham Hwy. Site #1	Site 17 Ingraham Hwy. Site #2
Location	157.16-acre site, single parcel inside the UDB. Minimal impact to System if selected, however, construction phasing will need to be considered in order to limit impact to existing RRF operations. Parcel size suitable for development of WTE facility footprint as well as additional acreage to accommodate co-location of additional ash monofill capacity or other County facilities in consideration of future sustainable campus concept (after demolition of Existing RRF).	320.31-acre site, directly adjacent to residential zoning, inside the UDB, approximately two miles north of the existing RRF facility, and adjacent to the Medley Landfill. If this site were selected, the overall effects on the County's Solid Waste System would be relatively minimal. However, the Medley Landfill has a history of odor complaints, and the WTE, if sited here, could be the subject of future odor complaints. Parcel size suitable for development of WTE facility footprint as well as additional acreage to accommodate co-location of ash monofill or other County facilities in consideration of future sustainable campus concept.	159.71-acre site consisting of two parcels outside the UDB. Considerable System effects if this site were selected. Parcel size suitable for development of WTE facility footprint as well as additional acreage to accommodate co-location of ash monofill or other County facilities in consideration of future sustainable campus concept.	81.11-acre site is located outside the UDB. Considerable System effects if this site were selected. Parcel size suitable for development of WTE facility footprint as well as additional acreage to accommodate co-location of ash monofill or other County facilities in consideration of future sustainable campus concept.
Utilities	All required utilities infrastructure available	Potable water and sanitary sewer utilities appear to be available at the site, electric and natural gas utilities would have to be extended to the site.	All required utilities would have to be extended to the site.	All required utilities would have to be extended to the site.

Siting Parameter	Existing RRF	Site 1 Medley	Site 16 Ingraham Hwy. Site #1	Site 17 Ingraham Hwy. Site #2
Soils	Site has been used for WTE facility operations previously, no known site soils issues exist.	The USDA Soil Survey data for the site and historical aerial photos (c. 1985) indicate the site area was previously excavated and subsequently backfilled. In order for a WTE facility to be located at this site, the facility buildings and ancillary components would have to be constructed on backfill material, which could present significant geotechnical engineering challenges for foundation designs and additional site preparation costs.	Site soils are not ideally suited for building foundations because of water content and shallow depth to bedrock.	Site soils are not ideally suited for building foundations because of water content and shallow depth to bedrock.
Environment	Air Permitting - May be challenging, other large emitters (Medley Class I Landfill and Titan Pennsuco Complex) exist nearby that were not present when RRF was initially modeled and permitted. Possible habitat issues (Bonneted Bat)	Air Permitting – May be challenging, as site is located between two other large existing emitters, the Medley Class I Landfill and Titan Pennsuco Complex. In addition, the adjacent elevated (200 ft +) Medley Landfill may result in exhaust plume impaction during air emissions dispersion modeling. Possible habitat issues (Bonneted Bat)	Floodplain – FEMA Zone A Air permitting expected to be extremely difficult due to proximity to Everglades National Park. ERP required because of minor wetlands on site, possible habitat issues (Bonneted Bat)	Floodplain – FEMA Zone A Air permitting expected to be extremely difficult due to proximity to Everglades National Park. ERP required because of minor wetlands on site, possible habitat issues (Bonneted Bat)

Siting Parameter	Existing RRF	Site 1 Medley	Site 16 Ingraham Hwy. Site #1	Site 17 Ingraham Hwy. Site #2
Transportation	Existing access to arterial and collector roads	Good access to Florida Turnpike and US27 via Beacon Station Blvd., however traffic impacts to local area may be significant due to road orientations and close proximity of intersections.	Good access to arterial and collector roads	Existing access to site is via Ingraham Hwy. and SW 222nd Ave., however approximately 0.75 miles of two-lane road with paved shoulders will need to be constructed for proper site access. Additional ROW may have to be acquired.
Community	Residential developments have encroached around the site in the years since the Existing RRF went into operation. The site is now less than a tenth of a mile from the nearest residential zoning and the local population. Community political leaders and environmental groups have indicated opposition to continued use of the site for WTE facility operations.	The site is adjacent to residential zoning. The west edge of the site borders one trailer park owned by the Town of Medley, and another that is leased by the town. Siting of a WTE facility may face community opposition at this location.	The site is approximately half a mile from the nearest residential zoning and is approximately one mile from the boundary of Everglades National Park, which suggests that the siting of a WTE facility may be strongly opposed by the community at this location.	The site is approximately half a mile from the nearest residential zoning and is 1.28 miles from the boundary of Everglades National Park, which suggests that the siting of a WTE facility may be strongly opposed by the community at this location.

Siting Parameter	Existing RRF	Site 1 Medley	Site 16 Ingraham Hwy. Site #1	Site 17 Ingraham Hwy. Site #2
Schedule (Preliminary Planning to Construction Completion)	Shortest schedule duration because of existing PPSA, potentially reducing PPSA permitting effort and minimal site preparation work required. Coordination of construction during MDRRF operation required. Estimated Project Duration: 7-years 9-months Possible Commercial Operations by April 2030	Second shortest schedule duration. Land acquisition, PPSA permitting, and some minor site work increase schedule duration. Estimated Project Duration: 9-years 9-months Possible Commercial Operations by April 2032	Longest estimated schedule duration. Land acquisition, PPSA permitting, wetland, floodplain, and wildlife mitigation, and significant site work increase schedule duration. Estimated Project Duration: 11-years 3-months Possible Commercial Operations by October 2033	Longest estimated schedule duration. Land acquisition, PPSA permitting, wetland, floodplain, and wildlife mitigation, and significant site work increase schedule duration. Estimated Project Duration: 11-years 3-months Possible Commercial Operations by October 2033

Siting Parameter	Existing RRF	Site 1 Medley	Site 16 Ingraham Hwy. Site #1	Site 17 Ingraham Hwy. Site #2
Cost	For comparative purposes, the existing RRF site is considered the base cost condition and the base capital cost includes estimated stormwater detention pond fill costs and environmental considerations and the ash hauling costs as noted in Appendix C. Total Estimated Capital Cost of $1,450,000,000. Total annual net operational cost is $11.22 per ton of waste processed (estimated for Year 1). Does not include debt service payment for capital costs.	Additional costs anticipated for land acquisition*, on-site utility facilities, stormwater considerations and addition of fill for soil fortification, zoning and potential additional permitting efforts for new PPSA. Purchase of potable water may increase anticipated operational costs. It is also assumed that there may be impact fees or improvements required to local roads that have not yet been factored into the capital cost for this site because the extent of roadway modifications is currently not known. It is anticipated that these would be negotiated and further evaluated during the land acquisition process. Additional Capital $48.3M (4.2% increase) Additional 19% annual operational cost for potable water purchase and ash hauling.	Significant additional costs anticipated for land acquisition*, on and off-site utility facilities, flood plain, wetland, and wildlife mitigation, and additional permitting efforts. Significant impact on hauling system due to distance from other System facilities would increase capital and operational cost. Purchase of potable water and significant distance to haul ash for disposal will increase anticipated operational costs. Additional Capital $80.4M (6.4% increase) Additional 119% annual operational cost for potable water purchase, significant ash hauling, and additional System hauling costs.	Significant additional costs anticipated for land acquisition*, on and off-site utility facilities, flood plain, wetland, and wildlife mitigation, and additional permitting efforts. Significant impact on hauling system due to distance from other System facilities would increase capital and operational cost. Purchase of potable water and significant distance to haul ash for disposal will increase anticipated operational costs. Additional Capital $84.7M (6.7% increase) Additional 119% annual operational cost for potable water purchase, significant ash hauling, and additional System hauling costs.

* Land acquisition cost estimated based upon current Miami-Dade Property Appraiser Market Value plus 10%.

Appendix A

Site Packages

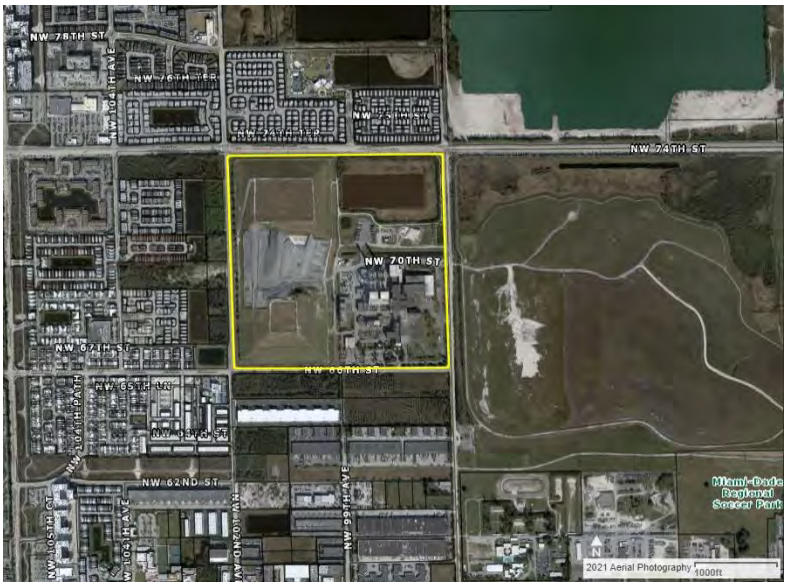
Future Waste-To-Energy Facility Siting Alternatives Analysis

Analysis Summary – Existing RRF Site - Doral

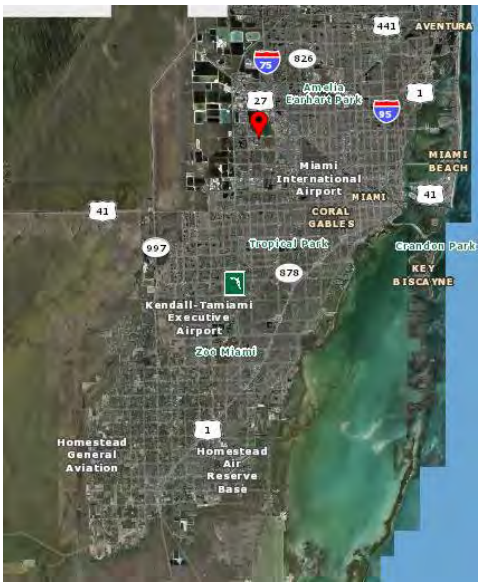
Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
–	✓	✓	–	✓	✗	✓	✓

MDPA Parcel Map



Location Map



Site Information

This 157.16-acre site is a single parcel inside the UDB, located in the City of Doral. The site area is sufficient to support the proposed 4,000 tpd WTE facility and is co-located with an active 80-acre Ash Monofil. The property is less than a 10-minute travel time to major roads, is less than 0.1 miles from the nearest residential zoning, and 9.87 miles (15.88 km) from the Class I boundary of Everglades National Park.

MDPA Parcel Data

Folio No: 35-3017-001-0120

Owner: Miami Dade County DSWM

2021 MDPA Market Value: $176,631,573

Zoning District: GU

Analysis Summary – Existing RRF Site - Doral

Operational, Engineering, and Regulatory Considerations

Location

The site is located at 6990 NW 97th Avenue, Miami, FL 33178, less than 0.1 miles from the nearest residential zoning, and 9.87 miles from the boundary of Everglades National Park. If this site were selected, the short-term effects on the County's Solid Waste System would be minimal. Over the short term, redeveloping this site with a new WTE facility while maintaining the existing RRF operations could be challenging and would require close coordination between the contractor and operator. Construction phasing will need to be considered and planned in order to limit impact to the existing RRF operations, which if impacted, could result in additional costs and extend the duration of the project schedule.

In the long term, the number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility, but their travel patterns and travel times would be unaltered. Although additional transfer fleet vehicles and drivers would be routed to the site in order to maximize WTE processing capacity, they may be rerouted from deliveries to non-DSWM disposal sites and the acquisition of additional fleet vehicles and driver staffing may not be needed. Transfer fleet fuel consumption and maintenance costs would increase due to the additional deliveries, while similar collection fleet costs would be virtually unchanged. Additionally, the existing RRF site is in close proximity to route power to the 58th Street Fleet Facility and could provide for charging stations for electric fleet vehicles, which are currently being procured.

Ash from the new WTE facility may be disposed of at the existing Ash Monofill, if capacity is available, or may be disposed either at the adjacent WM Medley landfill or hauled out of County. Either off-site option will significantly increase ash disposal costs from current levels.

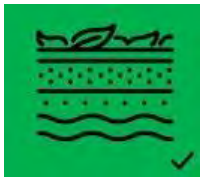
Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. According to WASD data, there is a 4" potable supply line at the property, and a 16" water main available on NW 97th Ave.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. Available at the site on NW 97th Ave., on-site lift station and leachate storage tank. WASD data indicates there is a 16" gravity sewer available on NW 97th Ave.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. An 8" gas service line is available at the site, and the transmission main is available on 97th Ave.
- **Electric** – Substation available approximately 0.15 miles SE of the site on NW 97th Ave. Need to verify substation/ switchyard spare capacity, voltage, and available terminations.

Analysis Summary – Existing RRF Site - Doral

- **Stormwater** – An existing stormwater system is on site serving both the existing RRF and the Ash Monofill. If a new WTE facility is constructed over the stormwater detention pond on the northeast quadrant of the site, allowing the existing RRF to maintain operations during construction, providing required stormwater quantity and quality controls for the site may be challenging.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. Three industrial supply wells are currently used at the RRF for source water for boiler feedwater, cooling tower/condenser feedwater, truck wheel wash, and irrigation water. If reused for a new WTE facility on site, the wells would need to be redeveloped.

Soil



The USDA Soil Survey data for the site classifies the predominant site soils as Udorthents-Water-Urban land complex, 0 to 60 percent slopes and Cooper Town muck, ponded-Urban land complex, 0 to 1 percent slopes. Udorthents soils consist of unconsolidated or heterogeneous geologic material removed during the excavation of ditches, canals, lakes, ponds, and quarries. This is consistent with the development of the RRF and Ash Monofill at the site.

The presence of muck soils in the northeast quadrant of the site indicates the seasonal high groundwater elevation is typically 0-6 inches below existing grade but would have to be confirmed by geotechnical investigations. The high groundwater makes stormwater control more challenging and will result in the need for elevating the tipping floor pit, similar to the existing tipping floor.

Environment

- **Floodplains** – Most of the site is in FEMA Flood Zone X (Minimal Flood Hazard), portions of the NE area (stormwater ponds) are in FEMA Flood Zone AE (El. 5).
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** The existing RRF is currently permitted under the Power Plant Siting Act (PPSA) Conditions of Certification PA 77-08. In order to construct a new WTE facility on the site, a complete PPSA Modification Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.). The PSC “need determination” filing process is also required.
- **New Source Review (NSR) - Prevention of Significant Deterioration (PSD) Permitting** – The site is located 9.87 miles (15.88 km) NE of the Everglades Class I Area, 14.77 miles (23.8 km) NW of the Biscayne Class II Area, one mile south of the Medley Landfill, 4.7 miles NE of the CEMEX Miami Cement Plant and about 2.2 miles SE of the Titan Pennsuco Complex, which are all large sources of emissions.

  As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the

Analysis Summary – Existing RRF Site - Doral

PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

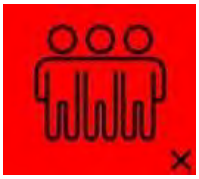
The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay National Park (sensitive Class II area) located on the eastern side border having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility, and thus will make air permitting challenging. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive areas.

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory indicates the site contains minor wetlands surrounding a large treatment pond and four surface waters. The National Hydrography Dataset shows three surface waters. The South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site contains one stormwater treatment pond. The site appears completely disturbed. The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required. The site is not within 18.6 miles of an active wood stork colony and does not appear to contain suitable foraging habitat; therefore, wood stork mitigation is not anticipated. Impacts to wetlands and surface waters designed and permitted as stormwater treatment areas are generally not regulated by the State of Florida, however, additional studies and analysis are required to determine if wetland permitting such as a State 404 Permit would be required.

Transportation

Travel time north to major roads (i.e., 58th Street, 74th Street) is less than 10 minutes. Existing access to site is via NW 97th Ave., which appears to be in relatively good physical condition and has sufficient capacity for the expected traffic loadings of the proposed WTE facility. Traffic impacts on local roads would be unchanged from existing conditions. The site has sufficient area to accommodate truck queueing.

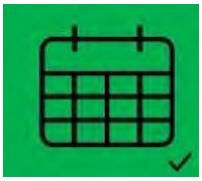
Community



The USEPA EJScreen Standard Report indicated elevated values for Particulate Matter 2.5 ($\mu g/m^3$) and several other pollutants. The site is less than a tenth of a mile from the nearest residential zoning, and the local population, community political leaders and environmental groups have indicated opposition to continued use of the site for WTE facility operations.

Analysis Summary – Existing RRF Site - Doral

Schedule



The existing RRF site is currently permitted under the PPSA Certification as well as PSD and Title V Air Operating Permits, which reduce the duration of the environmental permitting effort. Additionally, the site work required as compared to other sites is minimal because of existing RRF facility operations and infrastructure. However, there are existing conditions that affect the duration of the new WTE facility implementation including the following:

- **PSD Permitting** – The nearby Everglades National Park's (sensitive Class I area) location along the western border of the County and the Biscayne Bay National Park (sensitive Class II area) located on the eastern border of the County, both having more stringent AQRVs provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and will make air permitting challenging at this site.
- **PPSA Permitting** – This site was previously permitted and under the PPSA Certification and potentially reduces the duration needed for environmental permitting as a PPSA Certification modification and not a new application will be developed.
- **Community** –Opposition from the community is expected which could increase the duration of the new WTE facility implementation schedule.
- **Construction** – Additional planning and coordination is required in order to construct the new WTE facility at the existing RRF site, while the existing RRF continues to operate.

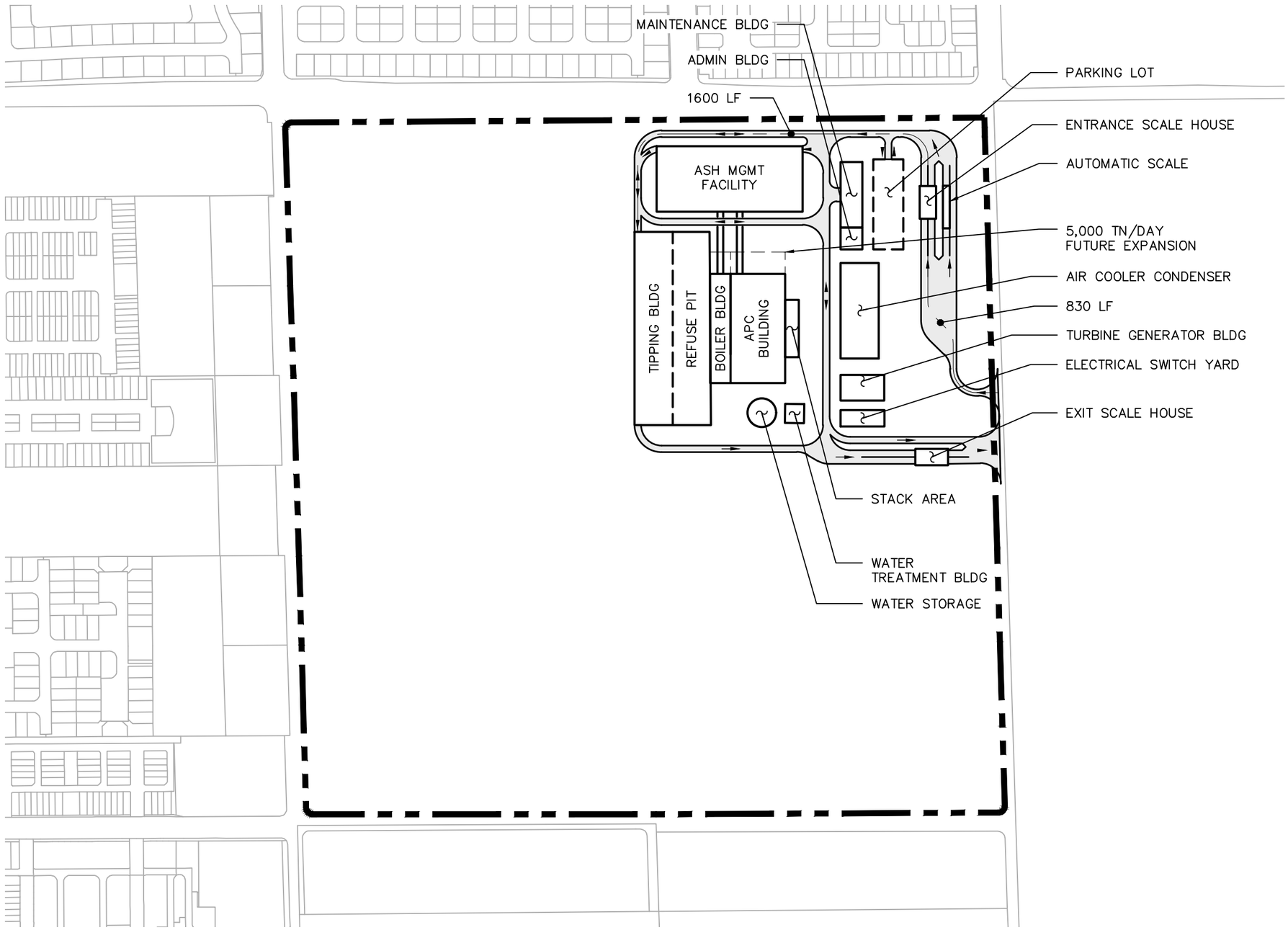
Cost

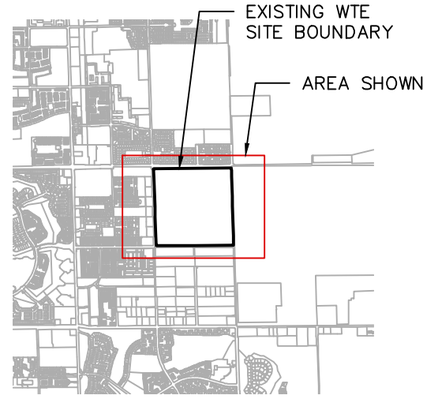
For comparative purposes, the existing RRF site was considered the base case, which includes the following costs:

- **Site Preparation** – Stormwater detention pond fill costs, environmental permitting costs and ash hauling.
- **System Effects** – If this site were selected, the effects on the County's Solid Waste System would be minimal, however, construction phasing will need to be considered in order to limit impact to existing RRF operations.

Site Differentiators Overview

- The existing RRF facility and site is currently permitted under the PPSA and is operating under an existing Conditions of Certification PA 77-08, which can be modified to provide for the construction and operation of a new WTE facility. A Modification to an existing Conditions of Certification is typically faster than developing an entirely new PPSA Application for an unpermitted site.
- Existing utilities suitable for a WTE facility are readily available and the site could route power to nearby System facilities.
- Construction phasing will need to be considered in order to limit impact to existing RRF operations, which could result in additional costs and extend project schedule.
- Expected significant opposition from the community could affect the project schedule.





KEY PLAN
N.T.S.

0 400' 800'

ARCADIS

MIAMI-DADE COUNTY

MIAMI-DADE DEPT OF SOLID WASTE MANAGEMENT

FUTURE WTE FACILITY SITING ALTERNATIVES ANALYSIS

WASTE-TO-ENERGY FACILTY

CONCEPTUAL 4,000 TPD SITE LAYOUT
FOLIO No. 35-3017-001-0120

JUNE 2022

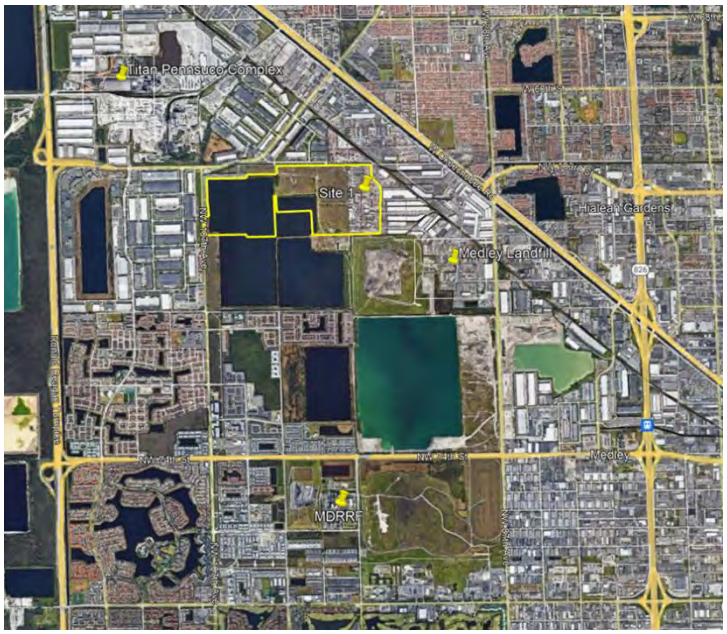
Future Waste-To-Energy Facility Siting Alternatives Analysis

Analysis Summary – Alternative Site No. 1 - Medley

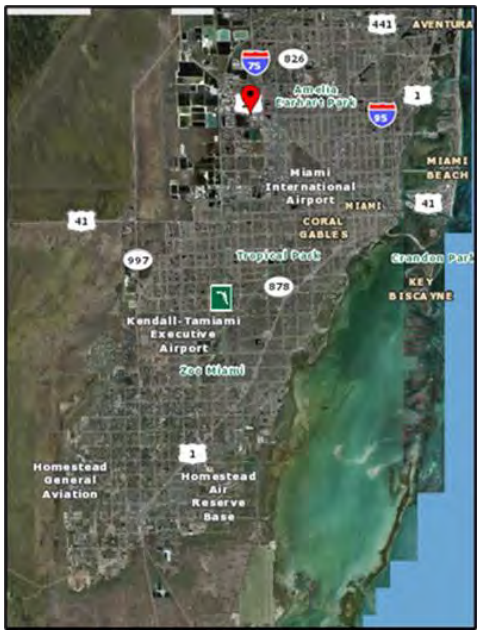
Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
–	–	✗	–	✓	✗	–	–

MDPA Parcel Map



Location Map



Site Information

This 320.31-acre site is inside the UDB, located in the Town of Medley. The site is composed of several parcel areas and is large enough to support the proposed 4,000 ton per day (tpd) Waste-to-Energy (WTE) facility, expansion to 5,000 tpd capacity, and other co-located solid waste facilities such as an ash monofill, recycling center or an education center. The property is less than a 10-minute travel time to US-27 or the Turnpike, is located adjacent to residential zoning and 11.38 (18.31 km) miles from the boundary of the Everglades Class I area.

MDPA Parcel Data

Owner: F77 1 F77 2 & F77 3 LLC, F00 1 LLC

2021 MDPA Market Value: $38,621,504

Zoning District: M-1

PA Zone: Industrial – Light

Folio No: 22-3004-001-0470, others.

Analysis Summary – Alternative Site No. 1 - Medley

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 2.0 miles north of the existing RRF, more than four miles from any active airport, adjacent to residential zoning, and more than 11 miles from the boundary of Everglades National Park. If this site were selected, the effects on the County's Solid Waste System would be minimal. Direct hauls from some of the collection routes in the vicinity of the existing RRF would divert to the West transfer station for disposal due to shorter travel times. Incoming waste at that station would increase and may result in capacity issues, as it is currently operating at approximately 80% of design capacity.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would increase due to longer travel distances and expected traffic congestion. Additional transfer fleet vehicles and drivers may be needed. Transfer fleet fuel consumption and maintenance costs would increase due to the additional deliveries, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be higher than at the existing RRF, and options for limiting ash hauling distances could be considered. If disposed at a non-County facility, costs for ash disposal would significantly increase from current levels.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. Potable water mains appear to be available at the site on NW 95th Ave. and NW 106th Street, but additional analysis will be needed to determine pipe size, service pressure, and available system capacity. A booster station may be needed to increase system pressure. Soils data indicates shallow depth to bedrock in some locations, rock removal may be required for pipe trench excavation for new lines in those areas.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer.

  Sanitary sewer appears to be available at the site on NW 95th Ave. and NW 106th Street, but additional analysis will be needed to determine pipe size and available system capacity. A lift station and force main to gravity sewer may be required. Soils data indicates shallow depth to bedrock in some locations, rock removal may be required for pipe trench excavation for new lines in those areas.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. There is a gas transmission main on Krome Ave/US-

1. Additional ROW/easement may be needed. Soils data indicates shallow depth to bedrock, rock removal may be required for pipe trench excavation.

- **Electric** – Nearest substation/ switchyard is FPL Substation located 1.9 miles away at 10800 NW 107th Avenue. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements.
- **Stormwater** – High groundwater elevations may result in slightly larger stormwater ponds on site, but there appears to be sufficient area for a stormwater system that meets regulatory requirements.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soils

The USDA Soil Survey data for the site and historical aerial photos (c. 1985) indicate the site area was previously excavated as a quarry and subsequently backfilled. This is consistent with the USDA Soil Survey data for the site, which classifies the site soils as 9—Udorthents-Water-Urban land complex, 0 to 60 percent slopes. Udorthents soils consist of unconsolidated or heterogeneous geologic material removed during the excavation of ditches, canals, lakes, ponds, and quarries.

In order for the facility to be located at this site, the facility buildings and ancillary components would have to be constructed on fill material, which could present geotechnical engineering challenges for foundation designs and additional site preparation costs.

Environment

- **Floodplains** – The site is not in a floodplain, it is within FEMA Flood Zone X (Minimal Flood Hazard).
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC “need determination” filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 11.38 mi (18.31 km) NE of the Everglades Class I Area, 16.19 mi (26.05 km) NW of the Biscayne Class II Area, and between two large existing emitters, the Medley Class I Landfill and Titan Pennsuco Complex. The adjacent Medley Landfill may result in elevated receptors (200ft+) and exhaust plume impaction during air emissions modeling.

Analysis Summary – Alternative Site No. 1 - Medley

As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

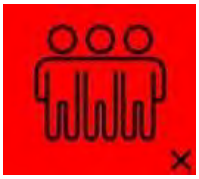
The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates no wetlands are present. The site appears disturbed. The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required but is assumed to be minimal as there is no roosting or foraging habitat remaining. The site is also within 18.6 miles of an active wood stork colony; however, the lack of apparent suitable foraging habitat precludes wood stork mitigation. No permit triggers exist for wetlands.

Transportation

The site has good access to Florida Turnpike and US-27 via Beacon Station Blvd., but some road areas need to be improved and the Town of Medley may want the County to assume maintenance of some or all of the access roads, which would increase the County's costs. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts to local area will likely be significant. Truck queuing will have to be accomplished on site to prevent further congestion.

Community



The USEPA EJScreen Standard Report indicated elevated values for Particulate Matter 2.5 (µg/m3 and several other pollutants. The site is adjacent to residential zoning, which suggests that the siting of a WTE facility may be opposed by the community at this location.

Analysis Summary – Alternative Site No. 1 - Medley

Schedule

There are a few site issues that could affect the schedule of the project, including:

- **Land Acquisition –** siting analysis and land acquisition will increase schedule duration.
- **Utilities** – Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- **Soils** – Additional geotechnical testing will be needed to determine the full extent of soil preparation needed (i.e., vibro-compaction, consolidation, etc.) and additional requirements for building foundations at the site, which may increase design and construction time.
- **Permitting** – Prevention of Significant Deterioration (PSD) Permitting – The site is located 11.38 mi (18.31 km) NE of the Everglades Class I Area, 16.19 mi (26.05 km) NW of the Biscayne Class II Area, and between two large existing emitters, the Medley Class I Landfill and Titan Pennsuco Complex. The adjacent Medley Landfill may result in elevated receptors (200ft+) and exhaust plume impaction during air emissions modeling. The nearby Everglades National Park's location along the western border of the County and the Biscayne Bay NP (sensitive Class II area) located on the eastern border of the County both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting challenging at this prospective site.
- **Community** – The site is adjacent to residential zoning. Therefore, siting of a new WTE facility may face community opposition at this location, which could affect the project schedule.

Cost

Overall, the cost of developing a WTE Facility on this site is expected to be higher than at the base alternative site, the Existing RRF. There are several site issues and additional Solid Waste System changes that could affect the total cost to the Department, including:

- **Land Acquisition –** siting analysis and land acquisition will increase project costs.
- **Utilities**
  - Construction of a potable water booster station may be required.
  - Construction of an on-site wastewater lift station will likely be required.
  - Construction of approximately 2.2 miles of 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
  - Soils data indicates shallow depth to bedrock, rock removal may be required in some areas for utility pipe trench excavation.
  - Construction of approximately 1.9 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
  - Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.

  - On-site water wells are likely not permittable, therefore potable water will need to be purchased, increasing anticipated operations and maintenance costs.

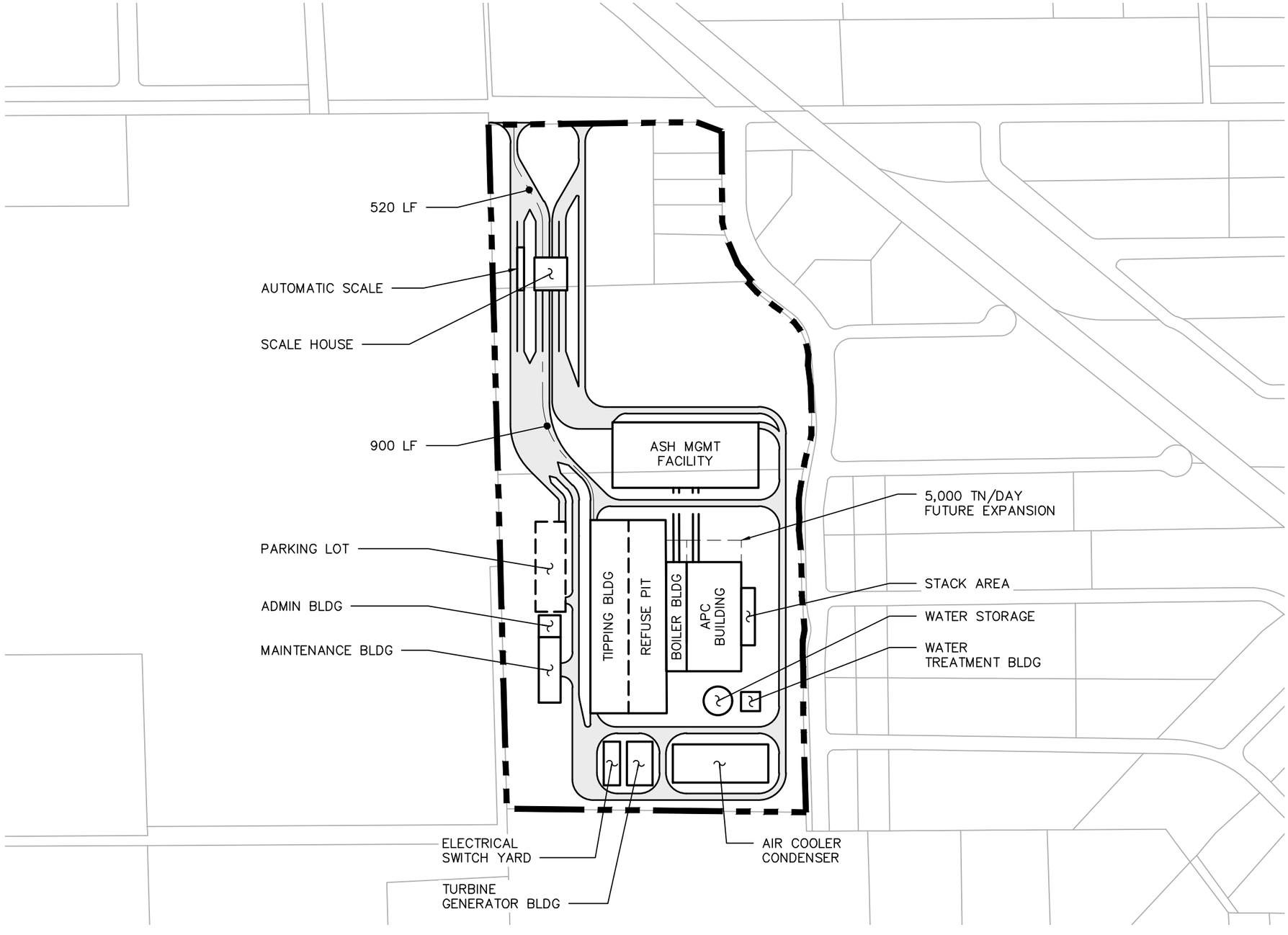
- **Soils** – Additional geotechnical testing will be needed to determine the full extent of soil preparation needed (i.e., vibro-compaction, consolidation, etc.) and additional requirements for building foundations at the site, which may increase design and construction costs.
- **Stormwater** – due to high groundwater levels, additional stormwater considerations or facilities may be required.
- **Zoning and Permitting** – because this is a greenfield site, additional zoning and permitting efforts may be required which could impact cost and schedule.
- **Solid Waste System**
  - Some collection routes that currently direct haul to the existing RRF would likely reroute to dispose at the West or Northeast Transfer Station to minimize travel times, which may increase traffic at those stations.
  - Collection and Transfer vehicles routed to this site would have slightly increased costs for fuel consumption, driver time, and vehicle wear related to the additional travel distance from the existing RRF.
  - Ash hauling costs for a new WTE facility located at this site are expected to be higher than at the existing RRF, however, options for limiting ash hauling distances could be considered. If disposed at a non-County facility, costs for ash disposal would significantly increase from current levels.
  - It is also assumed that there may be impact fees or improvements required to local roads that have not yet been factored into the capital cost for this site because the extent of roadway modifications is currently not known. It is anticipated that these would be negotiated and further evaluated during the land acquisition process.

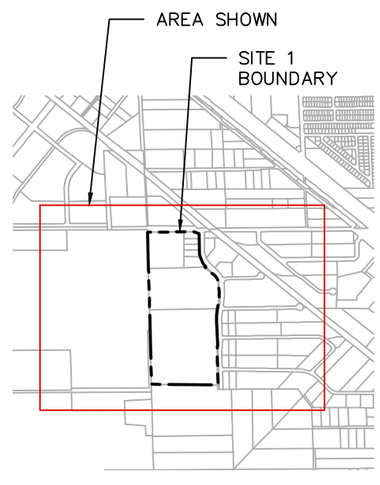
Site Differentiators Overview

- Construction of a potable water booster station may be required.
- Construction of an on-site wastewater lift station and 6” force main may be required.
- Construction of approximately 2.2 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Soils data indicates shallow depth to bedrock, rock removal may be required for utility pipe trench excavation.
- Additional geotechnical testing will be needed to determine the full extent of soil preparation needed (i.e., vibro-compaction, consolidation, etc.) and additional requirements for building foundations at the site, which may increase design and construction costs and extend the project schedule.
- Construction of approximately 1.9 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.

Analysis Summary – Alternative Site No. 1 - Medley

- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- Due to potential adverse effects to wetlands on site, groundwater may not be available for use as source water for boiler feedwater, cooling tower/condenser feedwater, truck wheel wash, and irrigation water.





KEY PLAN
N.T.S.

0 400' 800'

ARCADIS

MIAMI-DADE COUNTY

MIAMI–DADE DEPT OF SOLID WASTE MANAGEMENT

FUTURE WTE FACILITY SITING ALTERNATIVES ANALYSIS

WASTE–TO–ENERGY FACILTY

CONCEPTUAL 4,000 TPD SITE LAYOUT FOLIO MEDLEY

JUNE 2022

SITE 1

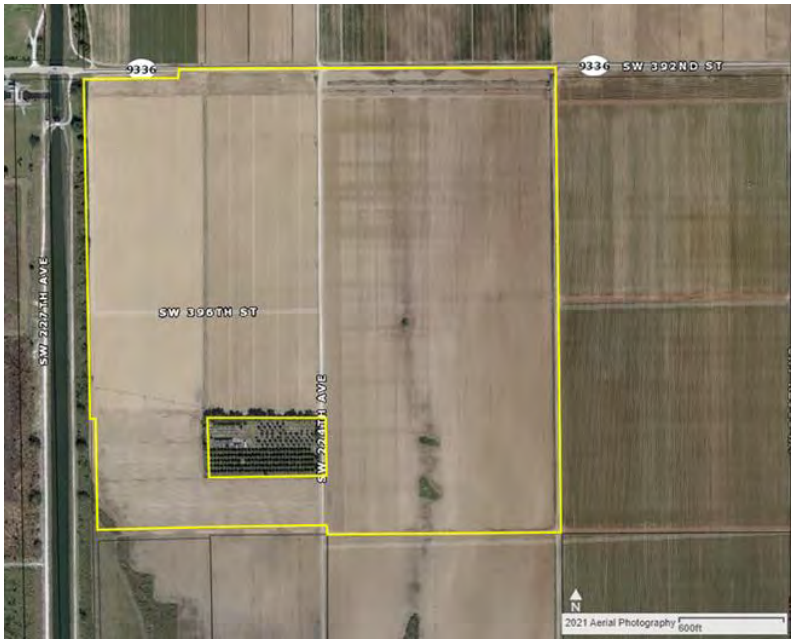
Future Waste-To-Energy Facility Siting Alternatives Analysis

Analysis Summary – Alternative Site No. 16 – Ingraham Hwy. Site #1

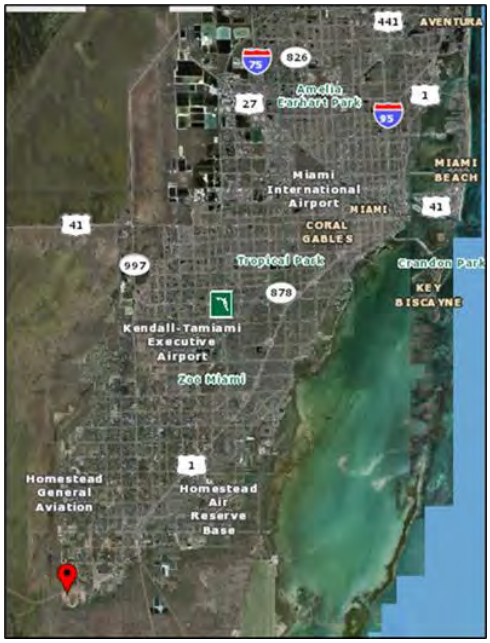
Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
✗	✗	✗	✗	✓	✗	✗	✗

MDPA Parcel Map



Location Map



Site Information

This 159.71-acre site consists of two parcels outside the UDB, located in unincorporated Miami-Dade County. The combined site area is sufficient to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility and expansion to 5,000 TPD capacity or the addition of other facilities such as an ash monofill, recycling center or an education center. The property is less than a 10-minute travel time to W Palm Drive, is 0.51 miles from the nearest residential zoning, and 1.02 miles from the boundary of Everglades National Park.

MDPA Parcel Data

Folio No: 30-8808-000-0030
Owner: P Acursio Partnership LTD
2021 MDPA Market Value: $2,160,760
Zoning District: AU
PA Zone: Interim - Agricultural

Folio No: 30-8808-000-0020
Owner: Everglades Fruit, Inc.
2021 MDPA Market Value: $133,720
Zoning District: AU
PA Zone: Interim - Agricultural

Analysis Summary – Alternative Site No. 16 – Ingraham Hwy. Site #1

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 32.5 miles SW of the existing RRF, slightly more than half a mile from the nearest residential zoning, and approximately one mile from the boundary of Everglades National Park. If this site were selected, the effects on the County's Solid Waste System would be considerable. Direct hauls from the collection routes in the vicinity of the existing RRF would divert to the three transfer stations for disposal. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station would need to be constructed at or near the site of the existing RRF to maintain the current collection patterns and transfer station loadings.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would significantly increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and would likely result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would significantly increase due to the additional deliveries and travel times and distances, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be significantly higher than at the existing RRF. If disposed at a non-County facility, expected costs for ash disposal would increase even further.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. Potable water mains appear to be available approximately 3.3 miles NE of the site on Ingraham Hwy., but further analysis is needed to verify service pressure and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. Appears to be available approximately 3.3 miles NE of the site on Ingraham Hwy., on-site lift station and about 3.3 miles of force main will likely be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest transmission main is approximately 5.5 miles NE of the site on Krome Ave/US-1. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

Analysis Summary – Alternative Site No. 16 – Ingraham Hwy. Site #1

- **Electric** – Nearest substation/switchyard is Florida City Substation located 6.5 miles away at 33800 SW 202nd Avenue. Need to verify substation/switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/FPL Easements is assumed. New legal easements may need to be established to complete this routing.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the predominant site soils as Krome very gravelly marly loam, 1 to 2 percent slopes, Biscayne marly silt loam, drained, 0 to 1 percent slopes, and Chekika very gravelly marly loam, 1 to 2 percent slopes. Generally, these soils are not well suited for building foundations because of water content and shallow depth to bedrock (typically 5-7 inches).

The presence of Biscayne marl soils indicates the seasonal high groundwater elevation is typically within 10 inches of the ground surface, but would have to be confirmed by geotechnical investigations. These soils are severely limited for building foundations because of water content and shallow depth to bedrock, and areas under building foundations would need to be removed and replaced with structural fill. The high groundwater may result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone A.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.). The PSC “need determination” filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 1.02 mi (1.7 km) E of the Everglades Class I Area, 13.00 mi (21.0 km) W of the Biscayne Class II Area, and about 13.0 miles WSW of the FPL Turkey Point Power Plant, a large source of emissions.

  As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the

PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

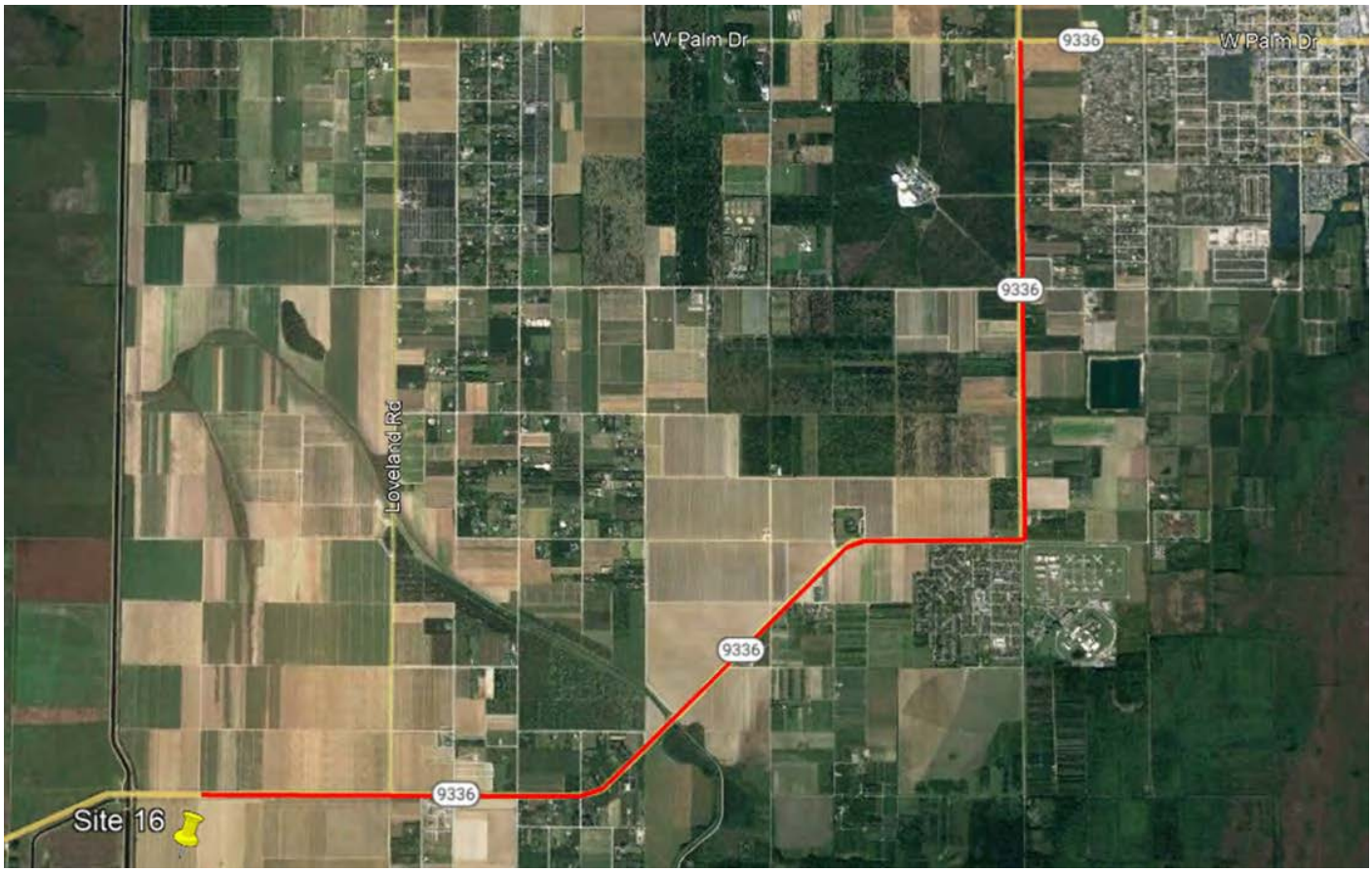
The nearby Everglades National Park's location along the western border of the County and the Biscayne Bay National Park (sensitive Class II area) located on the eastern border of the County both having more stringent Air Quality Related Values (AQRVs) and provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s). Based on projected emissions for a 4,000 tpd facility, preliminary evaluation indicates that this parcel may be too close to sensitive receptors in the nearby Class I area thus making it extremely difficult to demonstrate acceptable impacts for PSD permit issuance.

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site contains minor wetlands. The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required.

Transportation

Travel time north to W Palm Drive is less than 10 minutes. Existing access to the site is via Ingraham Hwy. (see map below), and no additional offsite road improvements are needed. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts on Ingraham Hwy., W Palm Drive, and other local roads may be significant. Truck queuing will have to be accomplished on site to prevent further congestion.

Analysis Summary – Alternative Site No. 16 – Ingraham Hwy. Site #1



Community

The USEPA EJScreen Standard Report indicated no existing environmental justice issues for this site. However, the site is about half a mile from the nearest residential zoning and is approximately a mile from the boundary of Everglades National Park, which suggests that siting of a WTE facility may be strongly opposed by environmental groups and community organizations.

Schedule

Development of this site has the longest duration and is the same as Site 17. The main issues affecting the duration of the new WTE facility implementation schedule include:

- **Land Acquisition –** siting analysis and land acquisition will increase schedule duration.
- **Soils** – The removal and replacement of site muck soils with structural fill and/or rock removal in development areas. Additional structural fill will be needed to elevate the tipping floor and pit due to the high groundwater table and floodplain mitigation.

Analysis Summary – Alternative Site No. 16 – Ingraham Hwy. Site #1

- **Permitting** – Based on projected emissions for a 4,000 tpd facility, preliminary evaluation indicates that this parcel may be too close to sensitive receptors in the nearby Class I area thus making it extremely difficult to demonstrate acceptable impacts for PSD permit issuance.
- **Mitigation** – Wetland, floodplain, and wildlife mitigation will likely increase the duration of the implementation schedule.
- **Community** – The close proximity of the site to Everglades National Park may result in significant opposition from environmental groups and community organization, which could impact the duration of the implementation schedule.

Cost

Overall, the cost of developing a WTE facility on this site is expected to be higher than at the existing RRF site, which was used as the base case in comparing the cost of developing a new WTE facility. Issues that could affect the cost include:

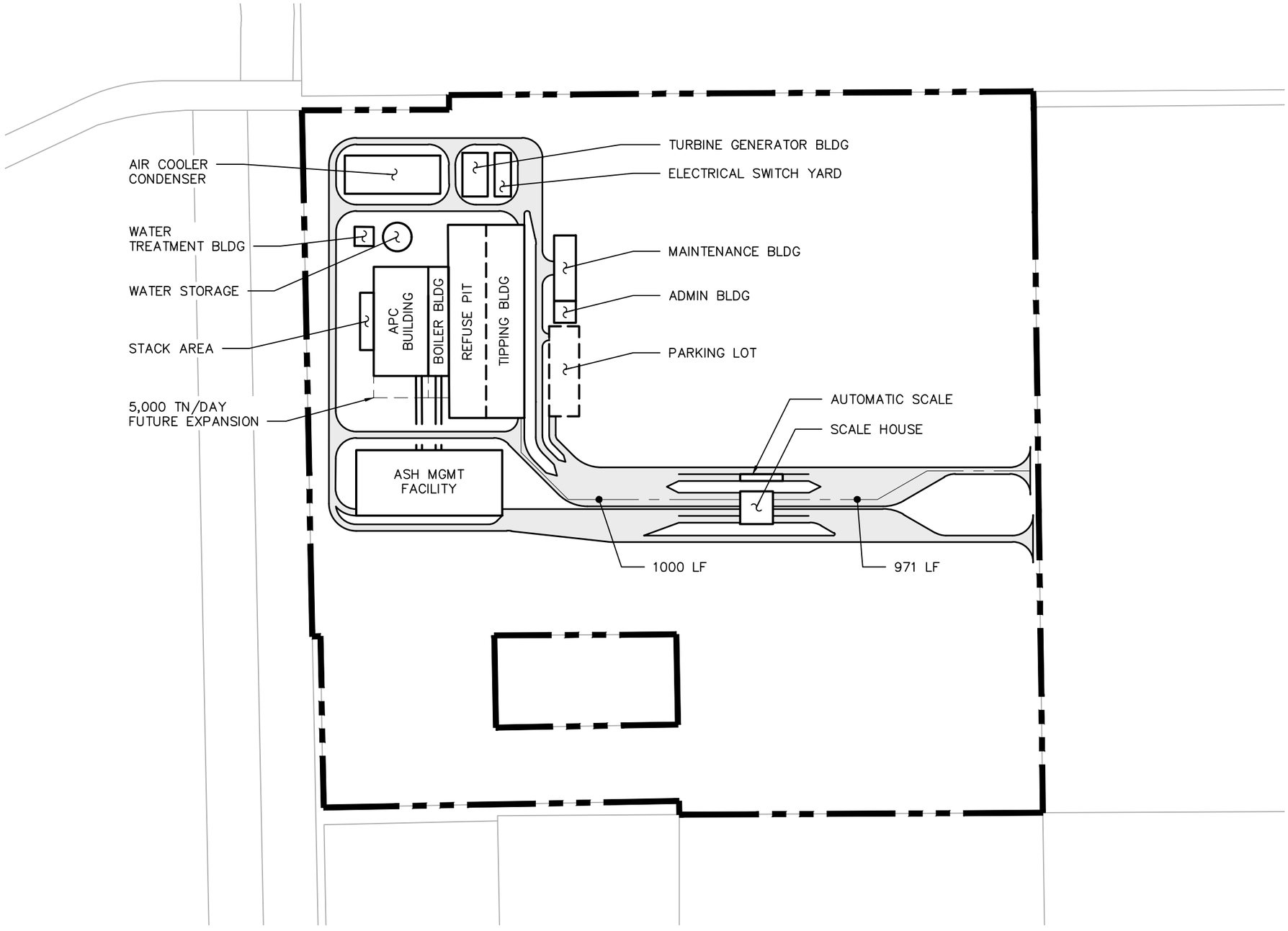
- **Land Acquisition –** siting analysis and land acquisition will increase costs.
- **Soils** – The removal and replacement of site soils with structural fill and/or rock removal in development areas. Additional structural fill will be needed to elevate the tipping floor and pit due to high groundwater.
- **Utilities**
  - Construction of a potable water booster station and 3.3 miles of water main will likely be required.
  - Construction of an on-site wastewater lift station and 3.3 miles of force main will likely be required.
  - Construction of approximately 5.5 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
  - Soils data indicates shallow depth to bedrock, rock removal may be required in some areas for utility pipe trench excavation.
  - Construction of approximately 6.5 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
  - Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
  - On-site water wells are likely not permittable, therefore potable water will need to be purchased, increasing anticipated operations and maintenance costs.
- **Permitting –** Based on projected emissions for a 4,000 tpd facility, preliminary evaluation indicates that this parcel may be too close to sensitive receptors in the nearby Class I area thus making it extremely difficult to demonstrate acceptable impacts for PSD permit issuance.
- **Stormwater** – High groundwater table and required floodplain compensating storage will significantly increase both the cost and site area required for stormwater retention.

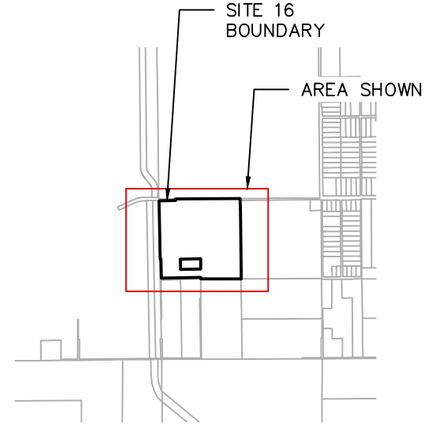
Analysis Summary – Alternative Site No. 16 – Ingraham Hwy. Site #1

- **Solid Waste System**
  - Collection and Transfer vehicles routed to this site would have significantly increased costs for fuel consumption, driver time, and vehicle wear related to the additional travel distance from the existing RRF.
  - Ash hauling costs for a new WTE facility located at this site are expected to be much higher than the existing RRF. An option to keep ash hauling distances short - there appears to be sufficient area on site to co-locate a new ash monofil, if permittable. If disposed at a non-County facility, costs for ash disposal would significantly increase from current levels.

Site Differentiators Overview

- Removal of soils and replacement with structural fill
- Additional structural fill for tipping floor pit due to high groundwater
- Floodplain compensating storage
- Extremely difficult PSD permitting
- Long extensions of utilities
- Close proximity to Everglades National Park – anticipated environmental group and community organization opposition





KEY PLAN
N.T.S.

0 400' 800'

ARCADIS

MIAMI-DADE COUNTY

MIAMI-DADE DEPT OF SOLID WASTE MANAGEMENT

FUTURE WTE FACILITY SITING ALTERNATIVES ANALYSIS

WASTE-TO-ENERGY FACILTY

CONCEPTUAL 4,000 TPD SITE LAYOUT
FOLIO No. 30-8808-000-0020/0030

JUNE 2022

SITE 16

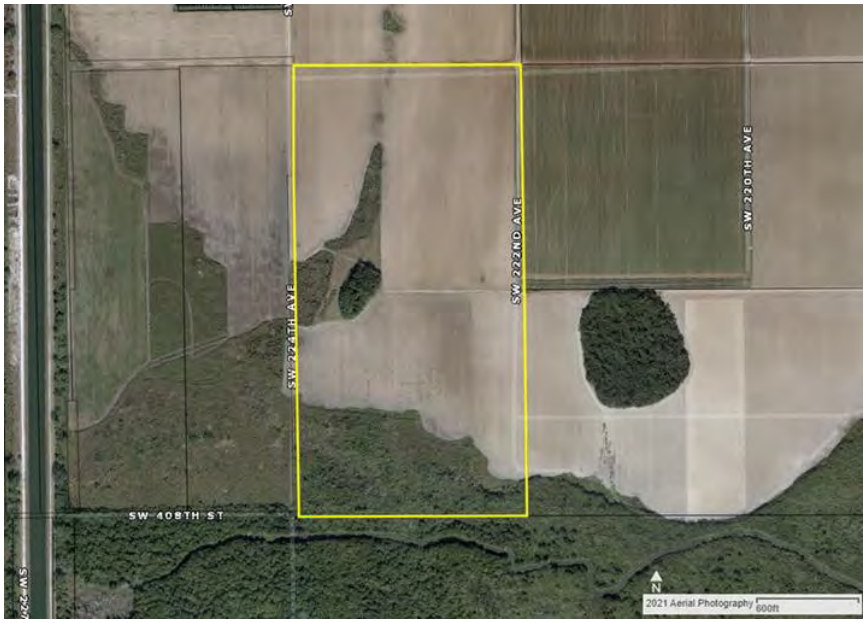
Future Waste-To-Energy Facility Siting Alternatives Analysis

Analysis Summary – Alternative Site No. 17

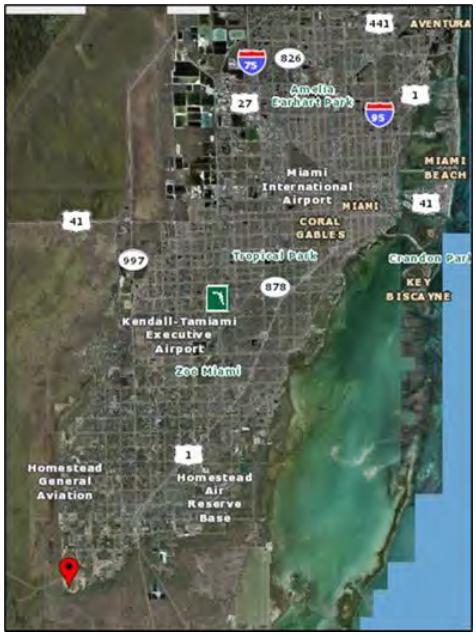
Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
✗	✗	✗	✗	–	✗	✗	✗

MDPA Parcel Map



Location Map



Site Information

This 81.11-acre site is a single parcel outside the UDB, located in unincorporated Miami-Dade County. The combined site area is sufficient to support the proposed 4,000 ton per day (tpd) Waste-to-Energy (WTE) facility and expansion to 5,000 tpd capacity or the addition of other facilities such as an ash monofil, recycling center or an education center. The property is less than a 10-minute travel time to W Palm Drive, is 0.53 miles from the nearest residential zoning, and is 1.28 miles from the boundary of Everglades National Park.

MDPA Parcel Data

Folio No: 30-8808-000-0040

Owner: EIP IV FL Round Hammock Land Co., LLC

2021 MDPA Market Value: $924,826

Zoning District: AU

PA Zone: Interim - Agricultural

Analysis Summary – Alternative Site No. 17

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 33.0 miles SW of the existing RRF site, slightly more than half a mile from the nearest residential zoning, and approximately one mile from the boundary of Everglades National Park. If this site were selected, the effects on the County's Solid Waste System would be considerable. Direct hauls from the collection routes in the vicinity of the existing RRF would divert to the three transfer stations for disposal. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station would need to be constructed at or near the site of the existing RRF to maintain the current collection patterns and transfer station loadings.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would significantly increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and would likely result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would significantly increase due to the additional deliveries and travel times and distances, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be significantly higher than at the existing RRF. If disposed at a non-County facility, expected costs for ash disposal would increase even further.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. Potable water mains appear to be available approximately 4.0 miles NE of the site on Ingraham Hwy., but further analysis is needed to verify service pressure and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. Appears to be available approximately 4.0 miles NE of the site on Ingraham Hwy., on-site lift station and about 4.0 miles of force main will likely be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest transmission main is approximately 6.0 miles NE of the site on Krome Ave/US-1. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

Analysis Summary – Alternative Site No. 17

- **Electric** – Nearest substation/ switchyard is Florida City Substation located 6.5 miles away at 33800 SW 202nd Avenue. Need to verify substation/switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/FPL Easements. New legal easements may need to be established to complete this routing.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the predominant site soils as Krome very gravelly marly loam, 1 to 2 percent slopes, Biscayne marly silt loam, drained, 0 to 1 percent slopes, and Chekika very gravelly marly loam, 1 to 2 percent slopes. Generally, these soils are not well suited for building foundations because of water content and shallow depth to bedrock (typically 5-7 inches).

The presence of Biscayne marl soils indicates the seasonal high groundwater elevation is typically within 10 inches of the ground surface, but would need to be confirmed by geotechnical investigations. These soils are severely limited for building foundations because of water content and shallow depth to bedrock, and areas under building foundations would need to be removed and replaced with structural fill. The high groundwater may result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone A.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification** – A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.). The PSC “need determination” filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 1.28 mi (2.1 km) E of the Everglades Class I Area, 13.12 mi (21.2 km) W of the Biscayne Class II Area, and about 12.8 miles WSW of the FPL Turkey Point Power Plant, a large source of emissions.

  As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the

PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

The nearby Everglades National Park's location along the western border of the County and the Biscayne Bay National Park (sensitive Class II area) located on the eastern border of the County both have more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s). Based on projected emissions for a 4,000 tpd facility, preliminary evaluation indicates that this parcel may be too close to sensitive receptors in the nearby Class I area thus making it extremely difficult to demonstrate acceptable impacts for PSD permit issuance.

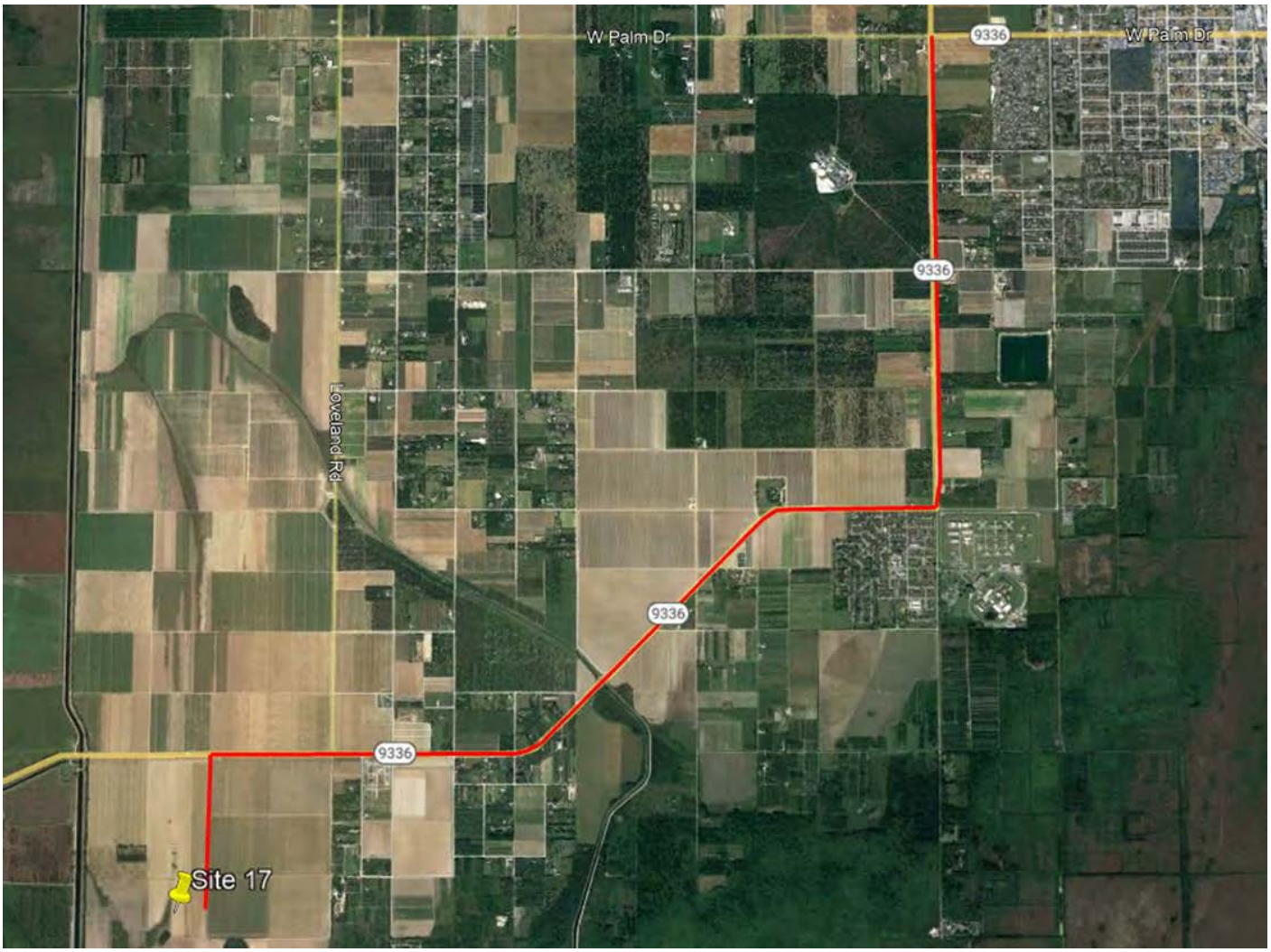
- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site contains wetlands. The site is within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required.

Transportation

Travel time north to W Palm Drive is less than 10 minutes. Existing access to site is via Ingraham Hwy. and SW 222nd Ave. (see map below), but approximately 0.75 miles of two-lane road with paved shoulders will need to be constructed for proper site access. Additional ROW may have to be acquired.

The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts on Ingraham Hwy., W Palm Drive, and other local roads may be significant. Truck queuing will have to be accomplished on site to prevent further congestion.

Analysis Summary – Alternative Site No. 17



Community

The USEPA EJScreen Standard Report indicated no existing environmental justice issues for this site. However, the site is about half a mile from the nearest residential zoning and is approximately 1.28 miles from the boundary of Everglades National Park, which suggests that the siting of a WTE facility may be strongly opposed by environmental groups and community organizations at this location.

Schedule

There are a few site issues that could affect the schedule of the project, including:

- **Soils** – The removal and replacement of site soils with structural fill and/or rock removal in development areas. Additional structural fill will be needed to elevate the tipping floor and pit due to high groundwater.

Analysis Summary – Alternative Site No. 17

- **Permitting** – Based on projected emissions for a 4,000 tpd facility, preliminary evaluation indicates that this parcel may be too close to sensitive receptors in the nearby Class I area thus making it extremely difficult to demonstrate acceptable impacts for PSD permit issuance.
- **Community** – The close proximity of the site to Everglades National Park may result in significant opposition from the community and could significantly affect the project schedule.
- **Mitigation** – Wetland, floodplain, and wildlife mitigation will likely increase project schedule.

Cost

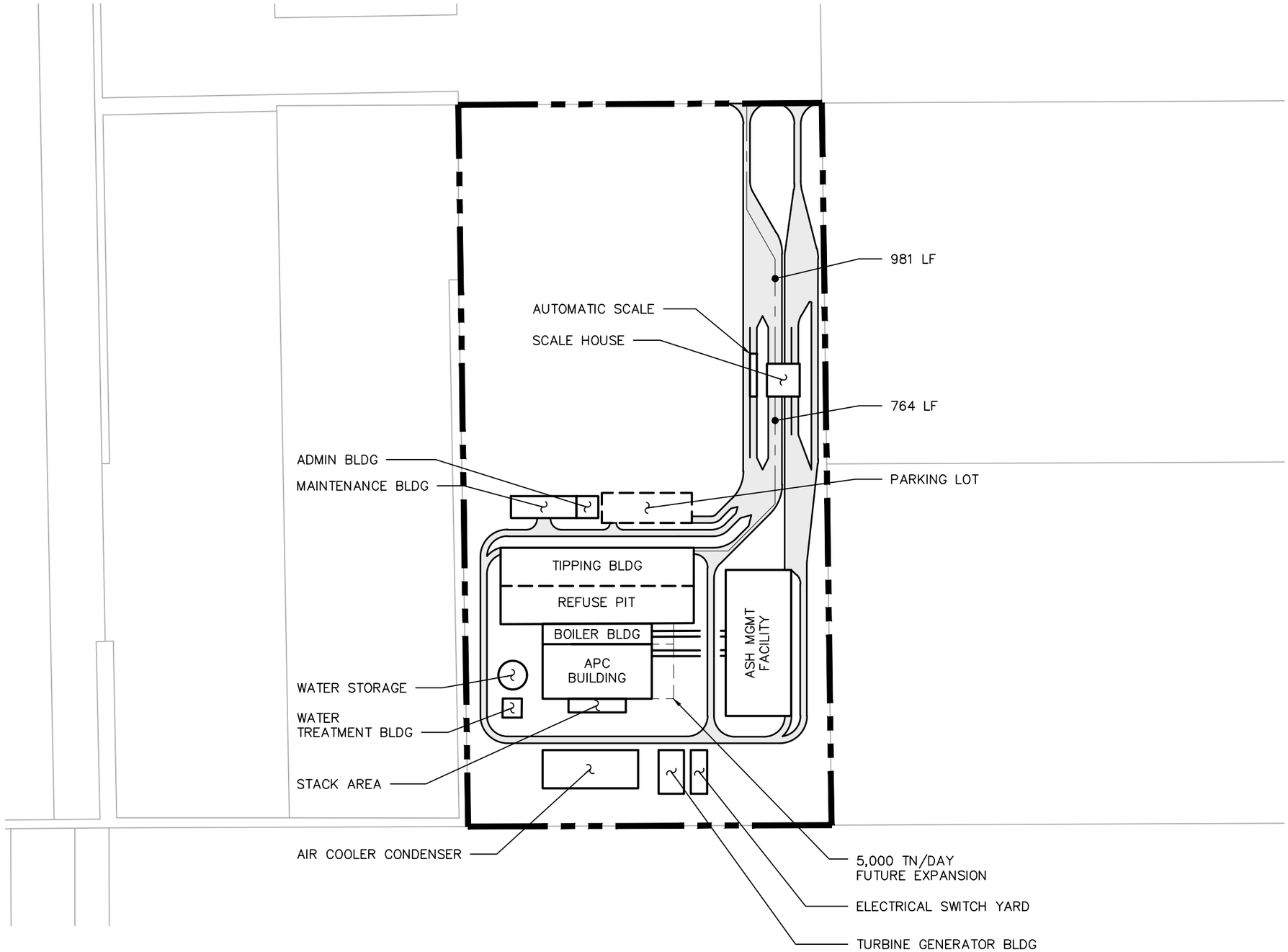
Overall, the cost of developing a WTE facility on this site is expected to be higher than at the existing RRF site, which was used as the base case in comparing the cost of developing a new WTE facility. Issues that could affect the cost include:

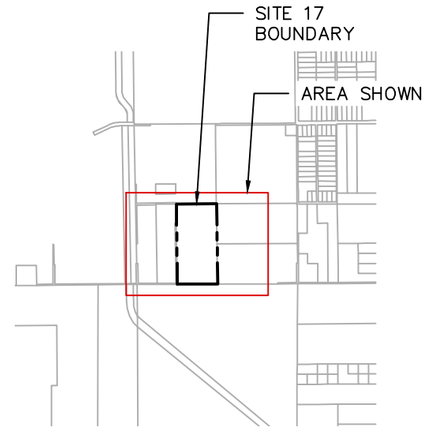
- **Land Acquisition –** siting analysis and land acquisition will increase costs.
- **Soils** – The removal and replacement of site soils with structural fill and/or rock removal in development areas. Additional structural fill will be needed to elevate the tipping floor and pit due to high groundwater.
- **Utilities**
  - Construction of a potable water booster station and 4.0 miles of water main will likely be required.
  - Construction of an on-site wastewater lift station and 4.0 miles of force main will likely be required.
  - Construction of approximately 6.0 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
  - Soils data indicates shallow depth to bedrock, rock removal may be required in some areas for utility pipe trench excavation.
  - Construction of approximately 6.0 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
  - Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
  - On-site water wells are likely not permittable, therefore potable water will need to be purchased, increasing anticipated operations and maintenance costs.
- **Permitting –** Based on projected emissions for a 4,000 tpd facility, preliminary evaluation indicates that this parcel may be too close to sensitive receptors in the nearby Class I area thus making it extremely difficult to demonstrate acceptable impacts for PSD permit issuance.
- **Stormwater** – High groundwater table and required floodplain compensating storage will significantly increase both the cost and site area required for stormwater retention.
- **Solid Waste System**

- Collection and Transfer vehicles routed to this site would have significantly increased costs for fuel consumption, driver time, and vehicle wear related to the additional travel distance from the existing RRF.
- Ash hauling costs for a new WTE facility located at this site are expected to be much higher than the existing RRF. An option to keep ash hauling distances short - there appears to be sufficient area on site to co-locate a new ash monofil, if permittable. If disposed at a non-County facility, costs for ash disposal would significantly increase from current levels

Site Differentiators Overview

- Removal of muck soils and replacement with structural fill
- Additional structural fill for tipping floor pit due to high groundwater
- Floodplain compensating storage
- Construction of 0.75 mile of access road
- Extremely difficult PSD permitting
- Long extensions of utilities
- Close proximity to Everglades National Park – anticipated environmental group and community organization opposition





KEY PLAN
N.T.S.

0 400' 800'

ARCADIS

MIAMI-DADE COUNTY

MIAMI-DADE DEPT OF SOLID WASTE MANAGEMENT

FUTURE WTE FACILITY SITING ALTERNATIVES ANALYSIS

WASTE-TO-ENERGY FACILTY

CONCEPTUAL 4,000 TPD SITE LAYOUT
FOLIO No. 30-8808-000-0040

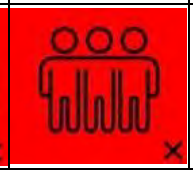
JUNE 2022

SITE 17

Future Waste-To-Energy Facility Siting Alternatives Analysis

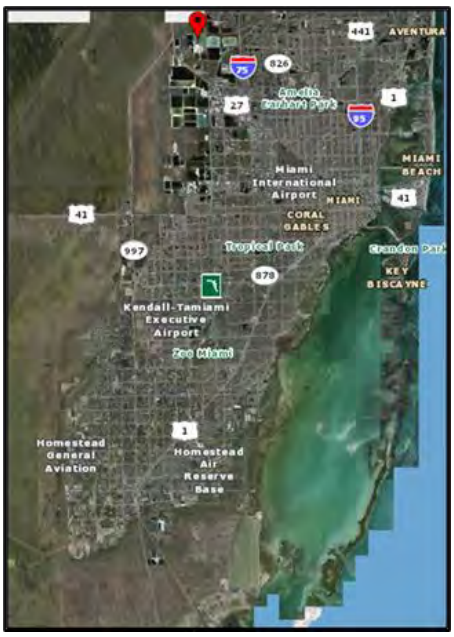
Analysis Summary – Alternative Site No. 2

Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
						N/A	N/A

MDPA Parcel Map

Location Map



Site Information

This 302.52-acre site is a single parcel outside the UDB, located in unincorporated Miami-Dade County. The combined site area is sufficient to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility and expansion to 5,000 TPD capacity or the addition of other facilities such as an ash monofil, recycling center or an education center. The property is less than a 10-minute travel time to US-27, is 0.57 miles from the nearest residential zoning, and 13.78 mi (22.2 km) from the boundary of Everglades National Park.

MDPA Parcel Data

Folio No: 30-2901-001-0040

Owner: Vecellio and Grogan, Inc.

2021 MDPA Market Value: $1,383,917

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 2

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 8.0 miles NW of the existing RRF, more than four miles from any active airport, 0.57 miles from the nearest residential zoning, and 13.8 miles from the boundary of Everglades National Park. If this site were selected, the expected effects on the County's Solid Waste System may be significant. Direct hauls from the collection routes in the vicinity of the existing RRF would likely decline, as some collection trucks would reroute to the Northeast and West Transfer Stations for disposal to reduce travel times. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. Transfer deliveries from those facilities would increase. A new transfer station may need to be constructed at or near the site of the existing RRF to maintain the current collection patterns and transfer station loadings.

The deliveries by transfer trucks from the landfills, transfer stations, and TRCs that are currently routed to the RRF would adjust to rebalance loadings at the transfer stations. The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would likely increase, their travel patterns would be altered, and travel times would significantly increase due to longer travel distances and expected traffic congestion. As a result, additional transfer fleet vehicles and drivers may be needed to maintain waste delivery volumes. Also, collection and transfer fleet fuel consumption and costs would increase.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. Potable water mains appear to be available approximately 4.0 miles east of the site on NW 186th St., but further analysis is needed to verify pipe size, service pressure, and system capacity. A booster station may be needed to provide adequate service pressure at the site. Soils data indicates shallow depth to bedrock, rock removal may be required for pipe trench excavation.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. The closest sanitary sewer collection system appears to be approximately 4.0 miles east of the site on NW 186th St., but further analysis is needed to verify capacity and system impacts. An on-site lift station and about 4.0 miles of 6" force main will likely be required. Soils data indicates shallow depth to bedrock, rock removal may be required for pipe trench excavation.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest gas transmission main is approximately 6.0 miles southeast of the site on SR 826. Additional ROW/easement may be needed. Soils data indicates shallow depth to bedrock, rock removal may be required for pipe trench excavation.

Analysis Summary – Alternative Site No. 2

- **Electric** – Nearest substation/ switchyard is FPL Substation located 6.7 miles away at 10800 NW 107th Avenue. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements. New legal easements may need to be established to complete this routing.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soils

The USDA Soil Survey data for the site and historical aerial photos indicate all but approximately 24 acres of the site area was previously excavated as a quarry and subsequently backfilled. This is consistent with the USDA Soil Survey data for the site, which classifies the predominant site soils as 9—Udorthents-Water-Urban land complex, 0 to 60 percent slopes. Udorthents soils consist of unconsolidated or heterogeneous geologic material removed during the excavation of ditches, canals, lakes, ponds, and quarries.

In order for the facility to be located at this site, the facility buildings and ancillary components would have to be constructed on fill material, which would present significant geotechnical engineering challenges for foundation designs and additional site preparation costs.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone A.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC “need determination” filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 7.13 mi (11.5 km) E of the Everglades Class I Area, 6.68 mi (10.8 km) W of the Biscayne Class II Area, and about 6.5 miles WSW of the FPL Turkey Point Power Plant, a large source of emissions.

  As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control

Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory and National Hydrography Dataset indicate surface waters are present and no wetlands are present. The South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site is comprised of rock quarry and upland shrub and brushland. The site appears disturbed with minimal vegetation cover. The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required but is assumed to be minimal as there is minimal to no roosting or foraging habitat remaining. The site is also within 18.6 miles of an active wood stork colony; however, the lack of apparent suitable foraging habitat precludes wood stork mitigation. An Environmental Resource Permit and State 404 Permit is likely required.
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

Transportation

Travel time to US-27 from the site is less than 10 minutes. Existing access to site is via unpaved single-lane road, as shown at right. Approximately 1.5 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access. Additional easement/ROW will have to be acquired. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts to US-27 and the local area will likely be significant. Truck queuing will have to be accomplished on site to prevent further congestion.

Analysis Summary – Alternative Site No. 2

Community

The USEPA EJScreen Standard Report indicated no existing issues for this site. However, the site is 0.58 miles from the nearest residential zoning and is a SFWMD CERP site, which suggests that the siting of a WTE facility may be strongly opposed by the community at this location.

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

Analysis Summary – Alternative Site No. 2

Site Differentiators Overview

- New transfer station in the vicinity of the existing RRF to maintain current collection patterns and loadings on the existing transfer stations, with associated O&M and staffing costs
- Additional transfer fleet and staff, additional fuel and fleet maintenance costs
- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Construction of approximately 1.5 miles of two-lane road with paved shoulder and stormwater controls for proper site access.
- Construction of approximately 4.0 miles of 12” water main and possibly a booster station will be required.
- Construction of an on-site wastewater lift station and about 4.0 miles of 6” force main will likely be required.
- Construction of approximately 6.0 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Soils data indicates shallow depth to bedrock, rock removal may be required for utility pipe trench excavation.
- Construction of approximately 6.7 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

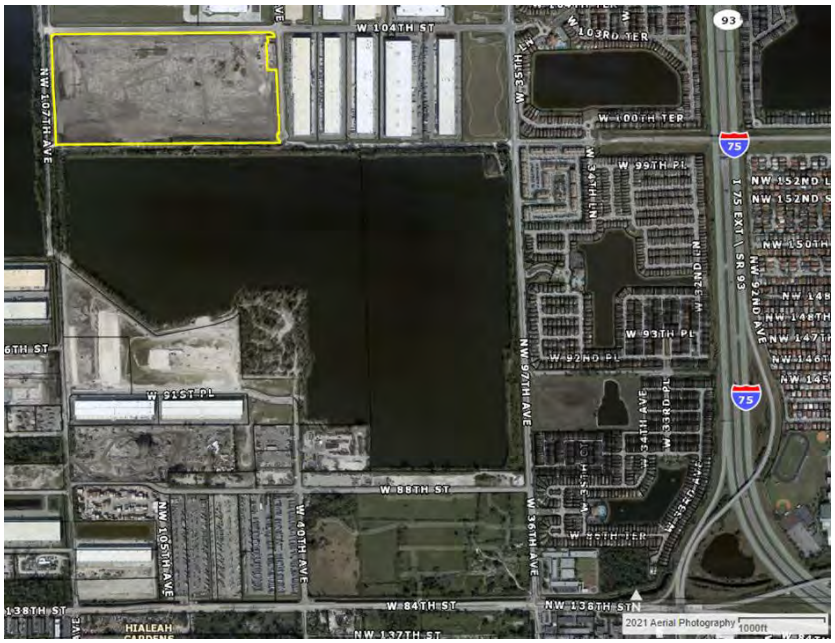
Future Waste-To-Energy Facility Siting Alternatives Analysis

Analysis Summary – Alternative Site No. 3

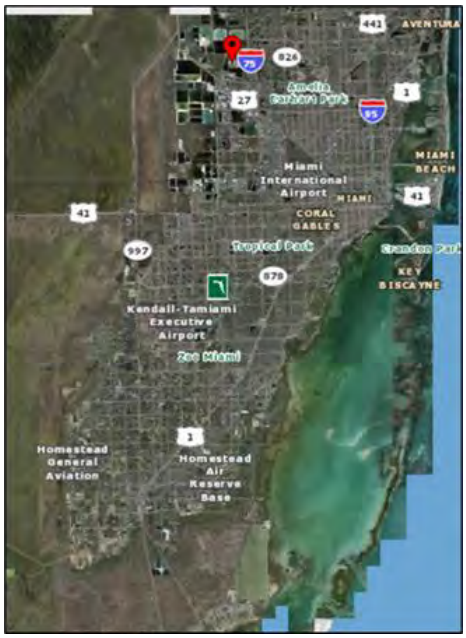
Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
✓	–	✗	–	✓	✗	N/A	N/A

MDPA Parcel Map



Location Map



Site Information

This 73.31-acre site is located inside the UDB, in the City of Hialeah, 0.52 miles from residential zoning and 13.11 miles from the Everglades Class I Area. The site measures approximately 1,300 feet x 2,650 feet, large enough to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility, and expansion to 5,000 TPD capacity or the addition of smaller facilities such as a recycling center or an education center. The property is less than a 10-minute travel time to I-75 or the Turnpike and is located 0.52 miles from the nearest residential zoning.

MDPA Parcel Data

Folio No: 04-2017-003-0010

Owner: Countyline 2, LLC

2021 MDPA Market Value: $76,651,656

Zoning District: A

PA Zone: Agriculture

Analysis Summary – Alternative Site No. 3

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 5.2 miles north of the existing RRF, more than four miles from any active airport, and 0.52 miles from the nearest residential zoning. If this site were selected, the expected effects on the County's Solid Waste System may be less than other sites. Direct hauls from the collection routes in the vicinity of the existing RRF would likely decline, as some collection trucks would reroute to the Northeast and West Transfer Stations for disposal to reduce travel times. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would increase due to longer travel distances and expected traffic congestion. Although additional transfer fleet vehicles and drivers would be routed to the site to maximize WTE processing capacity, they would be rerouting from deliveries to non-DSWM disposal sites and the acquisition of additional fleet vehicles and driver staffing may not be needed. Transfer fleet fuel consumption and maintenance costs would increase due to the additional deliveries, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be higher than at the existing RRF. There are multiple options to keep ash hauling distances short - the existing RRF site could be converted to an ash monofill, or ash generated at this location may be landfilled at the adjacent Medley Landfill, or there appears to be sufficient area on site to co-locate a new ash monofill. If disposed at a non-County facility, costs for ash disposal would significantly increase from current levels.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. Potable water mains appear to be available at the site, but further analysis is needed to verify pipe size, service pressure, and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. Sanitary sewer appears to be available at the site, but further analysis is needed to verify capacity and system impacts. An on-site lift station 6" force main may be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest gas transmission main is approximately 3.5 miles east of the site. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.
- **Electric** – Nearest substation/ switchyard is FPL Substation located 4.9 miles away at 10800 NW 107th Avenue. Need to verify substation/ switchyard spare capacity, voltage, and available

terminations. Proposed transmission line routing through existing ROW/ FPL Easements. New easements may need to be established to complete this routing.

- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the predominant site soils as Cooper Town muck and Shark Valley muck. They are not suitable for foundations and would need to be removed and replaced with structural fill for foundation areas, which will increase project costs.

In these soils the seasonal high groundwater elevation is typically 0-6 inches below existing grade but would have to be confirmed by geotechnical investigations. The high groundwater will result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone AE (El. 6 ft). High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC “need determination” filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 13.11 miles (21.1 km) NE of the Everglades Class I Area, 19.56 miles (31.5 km) NW of the Biscayne Class II Area, and about 2.5 miles NNE of the Titan Pennsuco Complex, a large source of emissions.

  As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate

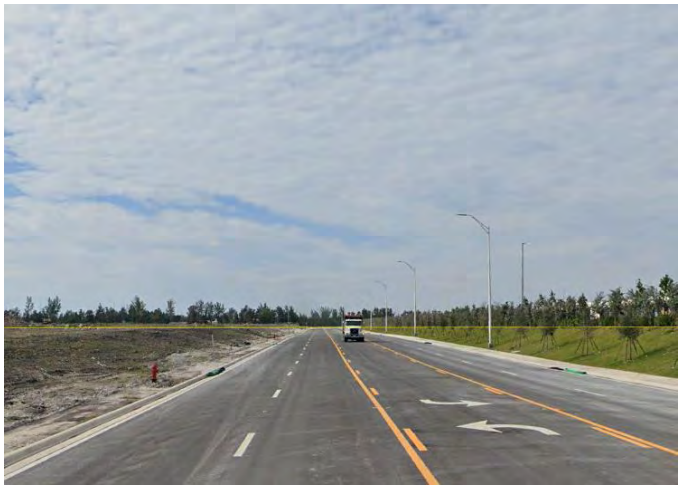
vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site contains no wetlands. Apparent previous clearing and grubbing was done, could still be considered wetland if no previous permit to impact. Cooper town muck is hydric soil. The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is not within the urban development boundary in Miami-Dade County for the Florida bonneted bat. **Site development underway - site was recently cleared, permit review indicated Class I well under construction.**

Transportation

Travel time to the Florida Turnpike and I-75 is less than 10 minutes. Existing access to site is via NW 136th St./97th Ave., roads are well developed, as shown at right. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts to local area will likely be significant. Truck queuing will have to be accomplished on site to prevent further congestion. Traffic impacts to local area may be significant due to single point of access on 97th Ave. Truck queuing will have to be accomplished on site to prevent further congestion of local roads.



Analysis Summary – Alternative Site No. 3

Community

The USEPA EJScreen Standard Report indicated no community impacts for this site. However, the site is just over half a mile from the nearest residential zoning, which suggests that the siting of a WTE facility may face community opposition at this location.

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Existing access to site is via NW 136th St./97th Ave., roads are well developed.

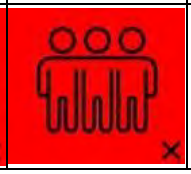
Analysis Summary – Alternative Site No. 3

- Potable water and sanitary sewer appear to available at the site.
- Construction of approximately 3.5 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 4.9 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Additional ROW/easements may be needed to complete routing of natural gas and electric utility infrastructure.
- **Site development underway - site was recently cleared, permit review indicated Class I well under construction.**

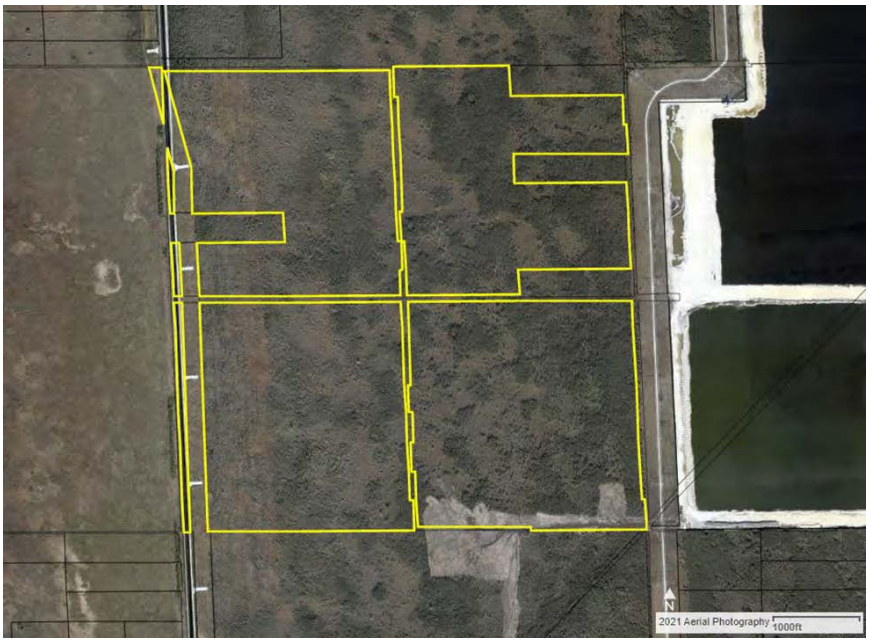
Future Waste-To-Energy Facility Siting Alternatives Analysis

Analysis Summary – Alternative Site No. 4

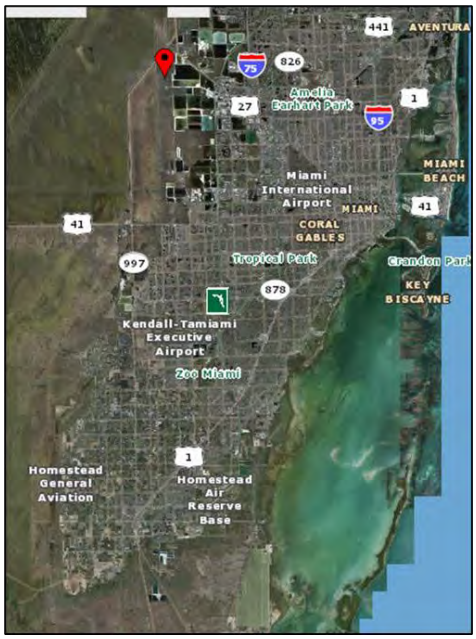
Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
						N/A	N/A

MDPA Parcel Map



Location Map



Site Information

This 559.05-acre property is a single parcel outside the UDB, located in unincorporated Miami-Dade County. The site is composed of several parcel areas and measures approximately one mile square, large enough to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility, and expansion to 5,000 TPD capacity or the addition of other facilities such as an ash monofil, recycling center or an education center. The property is less than a 10-minute travel time to US-27 or the Florida Turnpike and is located 1.93 miles from the nearest residential zoning. The north boundary of the site borders ME Thompson Park.

MDPA Parcel Data

Folio No: 30-2921-001-0020

Owner: CEMEX Construction Materials Florida, LLC

2021 MDPA Market Value: $10,664,225

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 4

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 7.0 miles northeast of the existing RRF, almost two miles from the nearest residential zoning, and 9.94 miles northeast of the boundary of Everglades National Park. If this site were selected, the expected effects on the County's Solid Waste System may be significant. Direct hauls from the collection routes in the vicinity of the existing RRF would likely decline, as many collection trucks would reroute to the Northeast and West Transfer Stations for disposal to reduce travel times. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station in the vicinity of the existing RRF facility would likely be needed to maintain current collection and transfer flow patterns.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and may result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would increase due to the additional deliveries, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be higher than at the existing RRF. There are options to keep ash hauling distances relatively short - the existing RRF site could be converted to an ash monofill, or ash generated at this location may be landfilled at the Medley Landfill. If disposed at a non-County facility, costs for ash disposal would significantly increase from current levels.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. Potable water mains appear to be available approximately 3.0 miles east of the site, but further analysis is needed to verify pipe size, service pressure, and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. The closest sanitary sewer collection system appears to be approximately 3.0 miles east of the site, but further analysis is needed to verify capacity and system impacts. An on-site lift station and about 3.0 miles of force main will likely be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest gas transmission main is approximately 7.0

Analysis Summary – Alternative Site No. 4

miles east of the site. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

- **Electric** – Nearest substation/ switchyard is FPL Substation located 7.4 miles away at 10800 NW 107th Avenue. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements. New legal easements may need to be established to complete this routing.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the site soils as Shark Valley muck, 0 to 1 percent slopes. These soils are high in organics content and may extend 20-40 inches below grade, even to the bedrock layer. They are not suitable for foundations and would need to be removed and replaced with structural fill for foundation areas, which will increase project costs. **USDA aerial photo (right) indicated that an active quarry operation is present at the site.**

In these soils the seasonal high groundwater elevation is typically 0-6 inches below existing grade but would have to be confirmed by geotechnical investigations. The high groundwater will result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone AE (El. 8 ft). High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Modification Application would need to be developed, inclusive of the associated individual permitting processes (Air

Analysis Summary – Alternative Site No. 4

Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process is also required.

- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 9.94 miles (15 km) NE of the Everglades Class I Area, 21.56 miles (35 km) NW of the Biscayne Class II Area, and about 4.1 miles NW of the Titan Pennsuco Complex, a large source of emissions.

  As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

  The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site is entirely wetlands. The site appears predominantly undisturbed. The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required. The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation. Permanent impacts to wetlands would potentially require an Individual Environmental Permit, a State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

- **Species Habitat – Conflict with Policy CON-9A.** MDC Policy CON-9A states that all activities that adversely affect habitat that is critical to Federal, or State designated, endangered or threatened species shall be prohibited unless such activity(ies) are a public necessity and there are no possible alternative sites where the activity(ies) can occur.

- **Species Habitat – Conflict with MDC Policy CON-9B.** MDC Policy CON-9B states that all nesting, roosting and feeding habitats used by federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.

Analysis Summary – Alternative Site No. 4

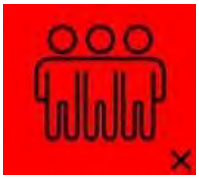
- **Within the Northwest Wellfield Protection Area – Conflict with MDC Policy LU-8G.** MDC Policy LU-8G states that when considering land areas to add to the UDB, after demonstrating that a need exists, the following areas shall not be considered:
  - The Northwest Wellfield Protection Area and the West Wellfield Protection Area west of SW 157 Avenue between SW 8 Street and SW 42 Street
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

Transportation

Travel time to the Florida Turnpike and US-27 is less than 10 minutes. Existing access to site is via unpaved single-lane road (see picture at right), approximately 3.3 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access (see the access route below). Additional easement/ROW will have to be aquired for almost 1.5 miles of the access road from FPL and other property owners. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day) will greatly increase the loads on local roads so the traffic impacts to local area will likely be significant. Additional traffic impacts on US-27 and to local area may result due to single point of access at NW 112th Ct/NW 136th St. Truck queuing will have to be accomplished on site to prevent further congestion of local roads.

Analysis Summary – Alternative Site No. 4

Community



The USEPA EJScreen Standard Report indicated no community impacts for this site. The site is almost two miles from the nearest residential zoning and adjacent to industrial mining operations, but the presence of wetlands, wildlife habitat and other environmental issues suggests that the siting of a WTE facility may be met with opposition by the community at this location.

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Construction of approximately 3.3 miles of two-lane road with paved shoulder and stormwater controls for proper site access
- Construction of approximately three miles of 12” water main and possibly a booster station will be required.
- Construction of an on-site wastewater lift station and about three miles of 4” force main will likely be required.
- Construction of approximately 7 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 7.4 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.
- Permanent impacts to wetlands would potentially require an Individual Environmental Permit, a State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

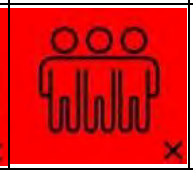
Analysis Summary – Alternative Site No. 4

- **Species Habitat – Conflict with MDC Policy CON-9A and CON-9B.**
- **Within the Northwest Wellfield Protection Area – Conflict with MDC Policy LU-8G.**
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

Future Waste-To-Energy Facility Siting Alternatives Analysis

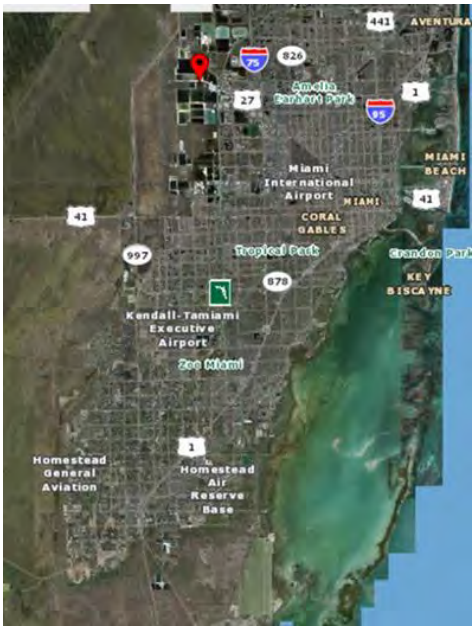
Analysis Summary – Alternative Site No. 5

Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
						N/A	N/A

MDPA Parcel Map

Location Map



Site Information

This 156.97-acre property is a single parcel outside the UDB, located in unincorporated Miami-Dade County. The site measures approximately one mile square, large enough to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility, and expansion to 5,000 TPD capacity or the addition of other facilities such as an ash monofil, recycling center or an education center. The property is less than a 10-minute travel time to US-27 or the Turnpike and is located 1.07 miles from the nearest residential zoning.

MDPA Parcel Data

Folio No: 30-2926-000-0010

Owner: CEMEX Construction Materials Florida, LLC

2021 MDPA Market Value: $2,843,062

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 5

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 5.2 miles northwest of the existing RRF, more than a mile from the nearest residential zoning. If this site were selected, the expected effects on the County's Solid Waste System may be significant. Direct hauls from the collection routes in the vicinity of the existing RRF would likely decline, as many collection trucks would reroute to the Northeast and West Transfer Stations for disposal to reduce travel times. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station in the vicinity of the existing RRF facility would likely be needed to maintain current collection and transfer flow patterns.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and may result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would increase due to the additional deliveries, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be higher than at the existing RRF. There are options to keep ash hauling distances relatively short - the existing RRF site could be converted to an ash monofill, or ash generated at this location may be landfilled at the Medley Landfill. If disposed at a non-County facility, costs for ash disposal would significantly increase from current levels.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. Potable water mains appear to be available approximately one mile east of the site, but further analysis is needed to verify pipe size, service pressure, and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. The closest sanitary sewer collection system appears to be approximately one mile east of the site, but further analysis is needed to verify capacity and system impacts. An on-site lift station and about one mile of 6" force main will likely be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest gas transmission main is approximately 5.0 miles east of the site. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

Analysis Summary – Alternative Site No. 5

- **Electric** – Nearest substation/ switchyard is FPL Substation located 4.5 miles away at 10800 NW 107th Avenue. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements. New easements may need to be established to complete this routing.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention. An existing inactive quarry borders the site to the west, could be purchased and used as stormwater retention for the site.
- **Groundwater** – Groundwater may not be usable as source water for boiler feedwater, cooling tower/condenser feedwater, truck wheel wash, and irrigation water.

Soil

The USDA Soil Survey data for the site classifies the site soils as Shark Valley muck, 0 to 1 percent slopes. These soils are high in organics content and may extend 20-40 inches below grade, even to the bedrock layer. They are not suitable for foundations and would need to be removed and replaced with structural fill for foundation areas, which will increase project costs.

In these soils the seasonal high groundwater elevation is typically 0-6 inches below existing grade, but would have to be confirmed by geotechnical investigations. The high groundwater will result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone AE (El. 8 ft). High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Modification Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC “need determination” filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 10.48 miles (17 km) NE of the Everglades Class I Area, 19.93 miles (32 km) NW of the Biscayne Class II Area, and about 1.7 miles NW of the Titan Pennsuco Complex, a large source of emissions.

  As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

Analysis Summary – Alternative Site No. 5

The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory and National Hydrography Dataset indicate no wetlands or surface waters are present; however, the South Florida Water Management District Land Cover and Land Use 2017-2019 shows wetlands hardwood forest are present. The site appears undisturbed. The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required. The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.

  Permanent impacts to wetlands would potentially require an Individual Environmental Resource Permit, State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

- **Species Habitat – Conflict with Policy CON-9A.** MDC Policy CON-9A states that all activities that adversely affect habitat that is critical to Federal, or State designated, endangered or threatened species shall be prohibited unless such activity(ies) are a public necessity and there are no possible alternative sites where the activity(ies) can occur.

- **Species Habitat – Conflict with MDC Policy CON-9B.** MDC Policy CON-9B states that all nesting, roosting and feeding habitats used by federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.

- **Within the Northwest Wellfield Protection Area – Conflict with MDC Policy LU-8G.** MDC Policy LU-8G states that when considering land areas to add to the UDB, after demonstrating that a need exists, the following areas shall not be considered:

  - The Northwest Wellfield Protection Area and the West Wellfield Protection Area west of SW 157 Avenue between SW 8 Street and SW 42 Street

- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

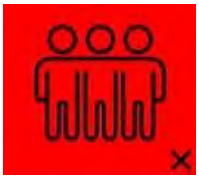
Analysis Summary – Alternative Site No. 5

Transportation

Travel time to Turnpike and US 27 is less than 10 minutes. Existing access to site is via unpaved single-lane road (see picture at right), approximately 1.8 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access (see the access route below). The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day) will greatly increase the loads on local roads and the single point of access at NW 112th Ct/NW 136th St. will likely result in significant traffic impacts to the local area. Truck queuing will have to be accomplished on site to prevent further congestion of local roads. .

Analysis Summary – Alternative Site No. 5

Community



The USEPA EJScreen Standard Report indicated no community impacts for this site. The site is 1.07 miles from the nearest residential zoning and adjacent to industrial mining operations, but the presence of wetlands, wildlife habitat and other environmental issues suggests that the siting of a WTE facility may be met with opposition by the community at this location.

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Construction of approximately 1.8 miles of two-lane road with paved shoulder and stormwater controls for proper site access
- Construction of approximately one mile of 12” water main and possibly a booster station will be required.
- Construction of an on-site wastewater lift station and about one mile of 6” force main will likely be required.
- Construction of approximately 5.0 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 4.5 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.
- Permanent impacts to wetlands would potentially require an Individual Environmental Permit, a State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

Analysis Summary – Alternative Site No. 5

- **Species Habitat – Conflict with MDC Policy CON-9A and CON-9B.**
- **Within the Northwest Wellfield Protection Area – Conflict with MDC Policy LU-8G.**
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

Future Waste-To-Energy Facility Siting Alternatives Analysis

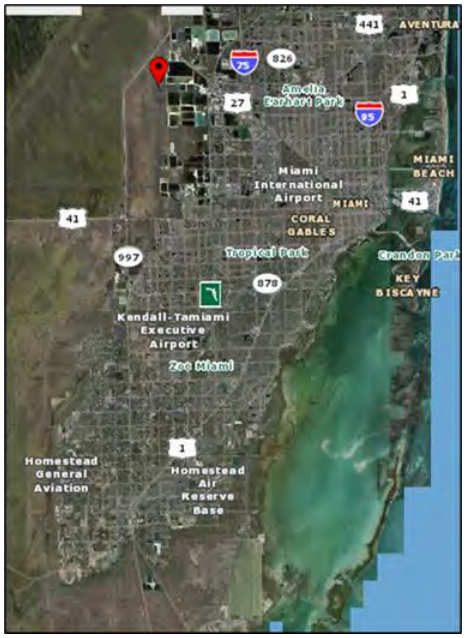
Analysis Summary – Alternative Site No. 6

Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
✕	✕	✕	✕	✕	✕	N/A	N/A

MDPA Parcel Map

Location Map



Site Information

This 628.69-acre property is a single parcel outside the UDB, located in unincorporated Miami-Dade County. The site is large enough to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility, and expansion to 5,000 TPD capacity or the addition of other facilities such as an ash monofil, recycling center or an education center. The property is less than a 10-minute travel time to US-27 and is located 2.32 miles from the nearest residential zoning.

MDPA Parcel Data

Folio No: 30-2928-000-0010

Owner: Southeastern Materials, Inc.

2021 MDPA Market Value: $5,805,800

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 6

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 6.5 miles northeast of the existing RRF, and more than two miles from the nearest residential zoning. If this site were selected, the expected effects on the County's Solid Waste System may be significant. Direct hauls from the collection routes in the vicinity of the existing RRF would likely decline, as many collection trucks would reroute to the Northeast and West Transfer Stations for disposal to reduce travel times. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station in the vicinity of the existing RRF facility would likely be needed to maintain current collection and transfer flow patterns.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and may result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would increase due to the additional deliveries, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be higher than at the existing RRF. There are options to keep ash hauling distances relatively short - the existing RRF site could be converted to an ash monofill, or ash generated at this location may be landfilled at the Medley Landfill. If disposed at a non-County facility, costs for ash disposal would significantly increase from current levels.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. Potable water mains appear to be available approximately 3.0 miles east of the site, but further analysis is needed to verify pipe size, service pressure, and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. The closest sanitary sewer collection system appears to be approximately 3.0 miles east of the site, but further analysis is needed to verify capacity and system impacts. An on-site lift station and about 3.0 miles of force main will likely be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest gas transmission main is approximately 7.0

Analysis Summary – Alternative Site No. 6

miles east of the site. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

- **Electric** – Nearest substation/ switchyard is FPL Substation located 6.7 miles away at 10800 NW 107th Avenue. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements. New legal easements may need to be established to complete this routing.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the site soils as Shark Valley muck, 0 to 1 percent slopes. These soils are high in organics content and may extend 20-40 inches below grade, even to the bedrock layer. They are not suitable for foundations and would need to be removed and replaced with structural fill for foundation areas, which will increase project costs.

In these soils the seasonal high groundwater elevation is typically 0-6 inches below existing grade but would have to be confirmed by geotechnical investigations. The high groundwater will result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone AE (El. 8 ft). High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 9.48 miles (15.26 km) NE of the Everglades Class I Area, 21.08 miles (33.92 km) NW of the Biscayne Class II Area, and about 4.0 miles W of the Titan Pennsuco Complex, a large source of emissions.

As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site is entirely wetlands. The site appears predominantly undisturbed. The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required. The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.
- **Species Habitat – Conflict with Policy CON-9A.** MDC Policy CON-9A states that all activities that adversely affect habitat that is critical to Federal, or State designated, endangered or threatened species shall be prohibited unless such activity(ies) are a public necessity and there are no possible alternative sites where the activity(ies) can occur.
- **Species Habitat – Conflict with MDC Policy CON-9B.** MDC Policy CON-9B states that all nesting, roosting and feeding habitats used by federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.
- **Within the Northwest Wellfield Protection Area – Conflict with MDC Policy LU-8G.** MDC Policy LU-8G states that when considering land areas to add to the UDB, after demonstrating that a need exists, the following areas shall not be considered:
  - The Northwest Wellfield Protection Area and the West Wellfield Protection Area west of SW 157 Avenue between SW 8 Street and SW 42 Street
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include

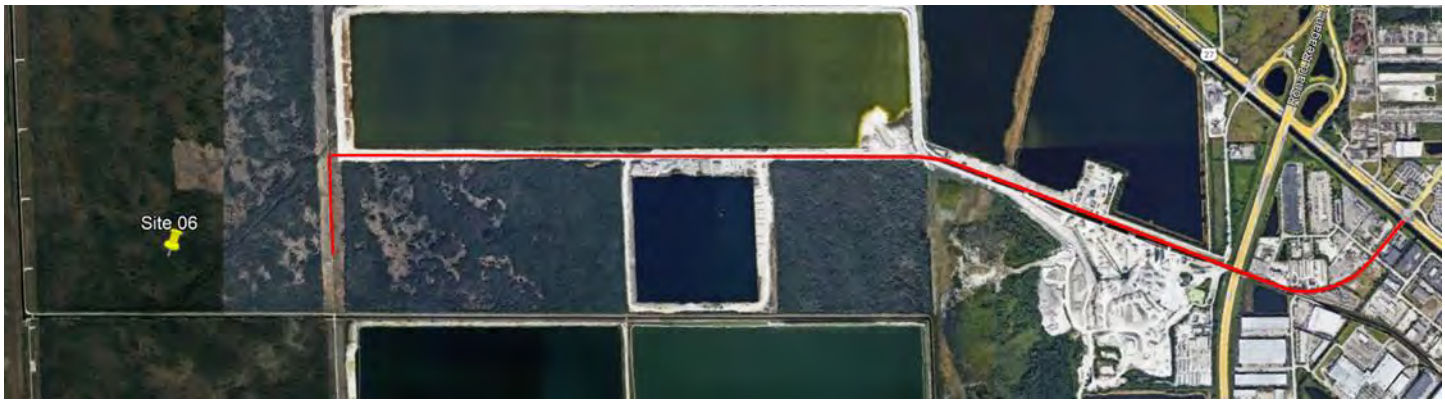
Analysis Summary – Alternative Site No. 6

wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

Transportation

Travel time to US-27 is less than 10 minutes. Existing access to site is via unpaved single-lane road (see picture at right). Approximately 3.6 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access (see the access route below). An additional 1.8 miles of easement/ROW will have to be acquired.

The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts to local area will likely be significant. Additional traffic impacts on US-27 and to local area may result due to single point of access at NW 112th Ct/NW 136th St. Truck queuing will have to be accomplished on site to prevent further congestion of local roads.



Community

The USEPA EJScreen Standard Report indicated no community impacts for this site. The site is more than two miles from the nearest residential zoning and adjacent to industrial mining operations, but the presence of wetlands, wildlife habitat and other environmental issues suggests that the siting of a WTE facility may be met with opposition by the community at this location.

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Analysis Summary – Alternative Site No. 6

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

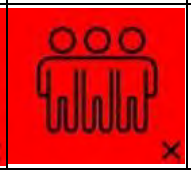
Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Approximately 3.6 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access (see the access route below). An additional 1.8 miles of easement/ROW will have to be acquired.
- Construction of approximately 3.0 miles of 12” water main and possibly a booster station will be required.
- Construction of an on-site wastewater lift station and about 3.0 miles of 6” force main will likely be required.
- Construction of approximately 7.0 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 6.7 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.
- Permanent impacts to wetlands would potentially require an Individual Environmental Permit, a State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.
- **Species Habitat – Conflict with MDC Policy CON-9A and CON-9B.**
- **Within the Northwest Wellfield Protection Area – Conflict with MDC Policy LU-8G.**
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

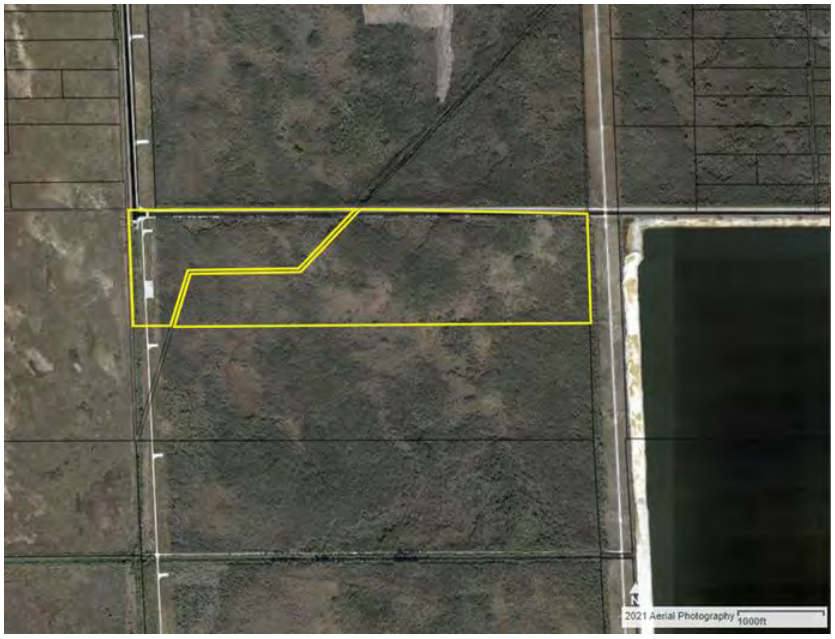
Future Waste-To-Energy Facility Siting Alternatives Analysis

Analysis Summary – Alternative Site No. 7

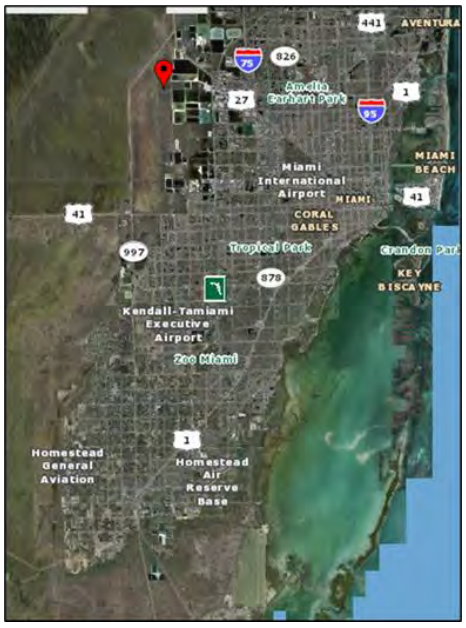
Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
						N/A	N/A

MDPA Parcel Map



Location Map



Site Information

This 144.24-acre property is a single parcel outside the UDB, located in unincorporated Miami-Dade County. The site is large enough to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility, and expansion to 5,000 TPD capacity or the addition of other facilities such as an ash monofil, recycling center or an education center. The property is less than a 10-minute travel time to US-27 and is located 2.59 miles from the nearest residential zoning.

MDPA Parcel Data

Folio No: 30-2928-000-0020

Owner: TARMAC Florida, Inc.

2021 MDPA Market Value: $2,534,330

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 7

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 6.6 miles northwest of the existing RRF, and more than 2.5 miles from the nearest residential zoning. If this site were selected, the expected effects on the County's Solid Waste System may be significant. Direct hauls from the collection routes in the vicinity of the existing RRF would likely decline, as many collection trucks would reroute to the Northeast and West Transfer Stations for disposal to reduce travel times. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station in the vicinity of the existing RRF facility would likely be needed to maintain current collection and transfer flow patterns.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and may result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would increase due to the additional deliveries, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be higher than at the existing RRF. There are options to keep ash hauling distances relatively short - the existing RRF site could be converted to an ash monofill, or ash generated at this location may be landfilled at the Medley Landfill. If disposed at a non-County facility, costs for ash disposal would significantly increase from current levels.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. Potable water mains appear to be available approximately 3.6 miles east of the site, but further analysis is needed to verify pipe size, service pressure, and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. The closest sanitary sewer collection system appears to be approximately 3.6 miles east of the site, but further analysis is needed to verify capacity and system impacts. An on-site lift station and about 3.6 miles of 6" force main may be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest gas transmission main is approximately 7.7

miles east of the site. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

- **Electric** – Nearest substation/ switchyard is FPL Substation located 7.1 miles away at 10800 NW 107th Avenue. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements. New legal easements may need to be established to complete this routing.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the site soils as Shark Valley muck, 0 to 1 percent slopes. These soils are high in organics content and may extend 20-40 inches below grade, even to the bedrock layer. They are not suitable for foundations and would need to be removed and replaced with structural fill for foundation areas, which will increase project costs.

In these soils the seasonal high groundwater elevation is typically 0-6 inches below existing grade, but would have to be confirmed by geotechnical investigations. The high groundwater will result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone AE (El. 8 ft). High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 9.22 miles (14.9 km) NE of the Everglades Class I Area, 20.86 miles (33.7 km) NW of the Biscayne Class II Area, and about 3.5 miles NNW of the Titan Pennsuco Complex, a large source of emissions.

Analysis Summary – Alternative Site No. 7

As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site is entirely wetlands. The site appears predominantly undisturbed. The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required. The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.

  Permanent impacts to wetlands would potentially require an Individual Environmental Resource Permit, State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

- **Species Habitat – Conflict with Policy CON-9A.** MDC Policy CON-9A states that all activities that adversely affect habitat that is critical to Federal, or State designated, endangered or threatened species shall be prohibited unless such activity(ies) are a public necessity and there are no possible alternative sites where the activity(ies) can occur.

- **Species Habitat – Conflict with MDC Policy CON-9B.** MDC Policy CON-9B states that all nesting, roosting and feeding habitats used by federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.

- **Within the Northwest Wellfield Protection Area – Conflict with MDC Policy LU-8G.** MDC Policy LU-8G states that when considering land areas to add to the UDB, after demonstrating that a need exists, the following areas shall not be considered:

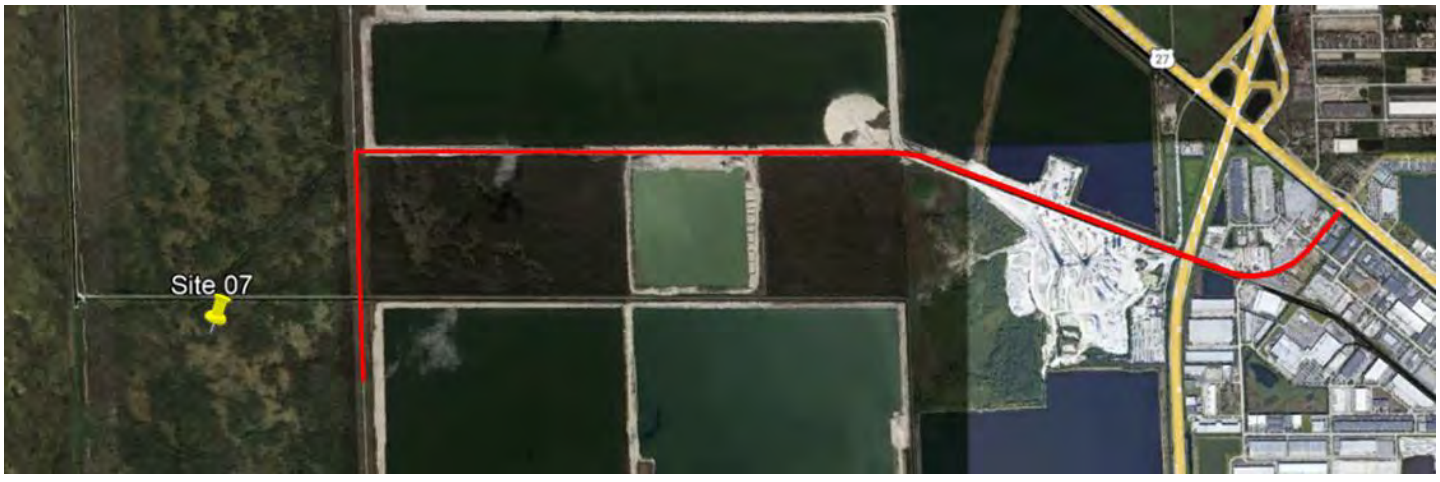
  - The Northwest Wellfield Protection Area and the West Wellfield Protection Area west of SW 157 Avenue between SW 8 Street and SW 42 Street

Analysis Summary – Alternative Site No. 7

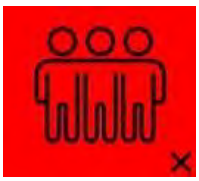
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

Transportation

Travel time to US-27 is less than 10 minutes. Existing access to site is via unpaved single-lane road (see picture at right), approximately 4.1 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access (see the access route below). Additional easement/ROW will have to be aquired for almost 2.3 miles of the access road from FPL and other property owners. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts to local area will likely be significant. Additional traffic impacts on US-27 and to local area may result due to single point of access at NW 112th Ct/NW 136th St. Truck queuing will have to be accomplished on site to prevent further congestion of local roads.



Community



The USEPA EJScreen Standard Report indicated no community impacts for this site. The site is more than two miles from the nearest residential zoning and adjacent to industrial mining operations, but the presence of wetlands, wildlife habitat and other environmental issues suggests that the siting of a WTE facility may be met with opposition by the community at this location.

Analysis Summary – Alternative Site No. 7

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

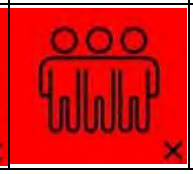
Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Approximately 4.1 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access (see the access route below). An additional 2.3 miles of easement/ROW will have to be acquired.
- Construction of approximately 3.6 miles of 12” water main and possibly a booster station will be required.
- Construction of an on-site wastewater lift station and about 3.6 miles of 6” force main will likely be required.
- Construction of approximately 7.7 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 7.1 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.
- Permanent impacts to wetlands would potentially require an Individual Environmental Permit, a State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.
- **Species Habitat – Conflict with MDC Policy CON-9A and CON-9B.**
- **Within the Northwest Wellfield Protection Area – Conflict with MDC Policy LU-8G.**
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

Future Waste-To-Energy Facility Siting Alternatives Analysis

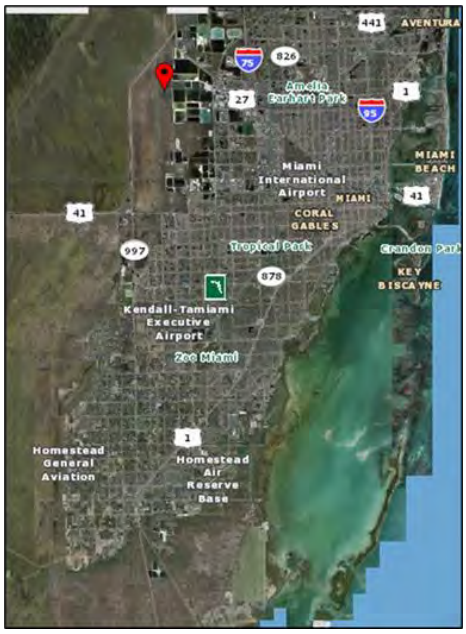
Analysis Summary – Alternative Site No. 8

Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
						N/A	N/A

MDPA Parcel Map

Location Map



Site Information

This 150.75-acre property is a single parcel outside the UDB, located in unincorporated Miami-Dade County. The site is large enough to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility, and expansion to 5,000 TPD capacity or the addition of other facilities such as an ash monofil, recycling center or an education center. The property is less than a 10-minute travel time to US-27 and is located 2.74 miles from the nearest residential zoning.

MDPA Parcel Data

Folio No: 30-2928-000-0030

Owner: TARMAC Florida, Inc.

2021 MDPA Market Value: $2,908,000

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 8

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 6.0 miles northwest of the existing RRF, and more than 2.7 miles from the nearest residential zoning. If this site were selected, the expected effects on the County's Solid Waste System may be significant. Direct hauls from the collection routes in the vicinity of the existing RRF would likely decline, as many collection trucks would reroute to the Northeast and West Transfer Stations for disposal to reduce travel times. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station in the vicinity of the existing RRF facility would likely be needed to maintain current collection and transfer flow patterns.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and may result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would increase due to the additional deliveries, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be higher than at the existing RRF. There are options to keep ash hauling distances relatively short - the existing RRF site could be converted to an ash monofill, or ash generated at this location may be landfilled at the Medley Landfill. If disposed at a non-County facility, costs for ash disposal would significantly increase from current levels.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. Potable water mains appear to be available approximately 4.0 miles east of the site, but further analysis is needed to verify pipe size, service pressure, and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. The closest sanitary sewer collection system appears to be approximately 4.0 miles east of the site, but further analysis is needed to verify capacity and system impacts. An on-site lift station and about 4.0 miles of 6" force main may be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest gas transmission main is approximately 8.0

miles east of the site. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

- **Electric** – Nearest substation/ switchyard is FPL Substation located 7.4 miles away at 10800 NW 107th Avenue. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements. New legal easements may need to be established to complete this routing.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the site soils as Shark Valley muck, 0 to 1 percent slopes. These soils are high in organics content and may extend 20-40 inches below grade, even to the bedrock layer. They are not suitable for foundations and would need to be removed and replaced with structural fill for foundation areas, which will increase project costs.

In these soils the seasonal high groundwater elevation is typically 0-6 inches below existing grade, but would have to be confirmed by geotechnical investigations. The high groundwater will result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone AE (El. 8 ft). High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 8.99 miles (14.5 km) NE of the Everglades Class I Area, 20.62 miles (33.2 km) NW of the Biscayne Class II Area, and about 3.5 miles NNW of the Titan Pennsuco Complex, a large source of emissions.

Analysis Summary – Alternative Site No. 8

As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site is entirely wetlands. The site appears predominantly undisturbed. The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required. The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.

  Permanent impacts to wetlands would potentially require an Individual Environmental Resource Permit, State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

- **Species Habitat – Conflict with Policy CON-9A.** MDC Policy CON-9A states that all activities that adversely affect habitat that is critical to Federal, or State designated, endangered or threatened species shall be prohibited unless such activity(ies) are a public necessity and there are no possible alternative sites where the activity(ies) can occur.

- **Species Habitat – Conflict with MDC Policy CON-9B.** MDC Policy CON-9B states that all nesting, roosting and feeding habitats used by federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.

- **Within the Northwest Wellfield Protection Area – Conflict with MDC Policy LU-8G.** MDC Policy LU-8G states that when considering land areas to add to the UDB, after demonstrating that a need exists, the following areas shall not be considered:

  - The Northwest Wellfield Protection Area and the West Wellfield Protection Area west of SW 157 Avenue between SW 8 Street and SW 42 Street

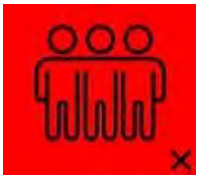
Analysis Summary – Alternative Site No. 8

- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

Transportation

Travel time to US-27 is less than 10 minutes. Existing access to site is via unpaved single-lane road (see picture at right). Approximately 4.25 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access (see the access route below). An additional 2.5 miles of easement/ROW will have to be acquired. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts to local area will likely be significant. Additional traffic impacts on US-27 and to local area may result due to single point of access at NW 112th Ct/NW 136th St. Truck queuing will have to be accomplished on site to prevent further congestion of local roads.

Community



The USEPA EJScreen Standard Report indicated no community impacts for this site. The site is more than 2.7 miles from the nearest residential zoning and adjacent to industrial mining operations, but the presence of wetlands, wildlife habitat and other environmental issues suggests that the siting of a WTE facility may be met with opposition by the community at this location.

Analysis Summary – Alternative Site No. 8

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

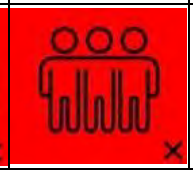
Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Approximately 4.25 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access (see the access route below). An additional 2.5 miles of easement/ROW will have to be acquired.
- Construction of approximately 4.0 miles of 12” water main and possibly a booster station will be required.
- Construction of an on-site wastewater lift station and about 4.0 miles of 6” force main will likely be required.
- Construction of approximately 8.0 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 7.4 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.
- Permanent impacts to wetlands would potentially require an Individual Environmental Permit, a State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.
- **Species Habitat – Conflict with MDC Policy CON-9A and CON-9B.**
- **Within the Northwest Wellfield Protection Area – Conflict with MDC Policy LU-8G.**
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

Future Waste-To-Energy Facility Siting Alternatives Analysis

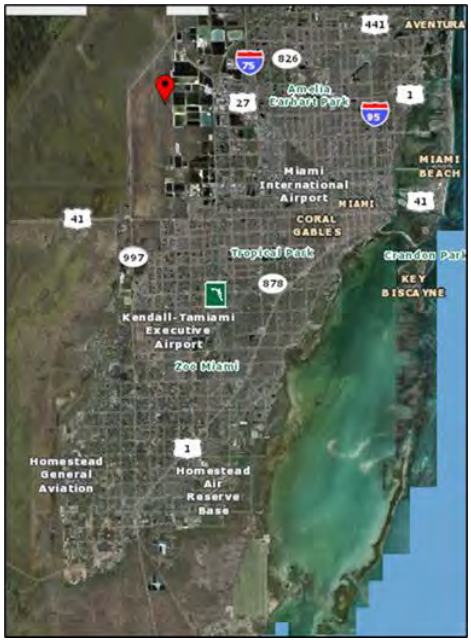
Analysis Summary – Alternative Site No. 9

Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
						N/A	N/A

MDPA Parcel Map

Location Map



Site Information

This 628.69-acre property is a single parcel outside the UDB, located in unincorporated Miami-Dade County. The site is large enough to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility, and expansion to 5,000 TPD capacity or the addition of other facilities such as an ash monofil, recycling center or an education center. The property is less than a 10-minute travel time to US-27 and is located 2.93 miles from the nearest residential zoning.

MDPA Parcel Data

Folio No: 30-2933-000-0010

Owner: TARMAC Florida, Inc.

2021 MDPA Market Value: $11,579,000

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 9

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 5.5 miles northwest of the existing RRF, and more than 2.9 miles from the nearest residential zoning. If this site were selected, the expected effects on the County's Solid Waste System may be significant. Direct hauls from the collection routes in the vicinity of the existing RRF would likely decline, as many collection trucks would reroute to the Northeast and West Transfer Stations for disposal to reduce travel times. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station in the vicinity of the existing RRF facility would likely be needed to maintain current collection and transfer flow patterns.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and may result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would increase due to the additional deliveries, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be higher than at the existing RRF. There are options to keep ash hauling distances relatively short - the existing RRF site could be converted to an ash monofill, or ash generated at this location may be landfilled at the Medley Landfill. If disposed at a non-County facility, costs for ash disposal would significantly increase from current levels.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. Potable water mains appear to be available approximately 5.0 miles east of the site, but further analysis is needed to verify pipe size, service pressure, and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. The closest sanitary sewer collection system appears to be approximately 5.0 miles east of the site, but further analysis is needed to verify capacity and system impacts. An on-site lift station and about 5.0 miles of 6" force main may be required.

- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest gas transmission main is approximately 9.0 miles east of the site. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.
- **Electric** – Nearest substation/ switchyard is FPL Substation located 8.3 miles away at 10800 NW 107th Avenue. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements. New legal easements may need to be established to complete this routing.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the site soils as Shark Valley muck, 0 to 1 percent slopes. These soils are high in organics content and may extend 20-40 inches below grade, even to the bedrock layer. They are not suitable for foundations and would need to be removed and replaced with structural fill for foundation areas, which will increase project costs.

In these soils the seasonal high groundwater elevation is typically 0-6 inches below existing grade, but would have to be confirmed by geotechnical investigations. The high groundwater will result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone AH (El. 7 ft). High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP,

Analysis Summary – Alternative Site No. 9

Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process is also required.

- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 8.08 miles (13 km) NE of the Everglades Class I Area, 19.69 miles (31.7 km) NW of the Biscayne Class II Area, and about 3.4 miles W of the Titan Pennsuco Complex, a large source of emissions.

  As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

  The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site is entirely wetlands. The site appears predominantly undisturbed. The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required. The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.

  Permanent impacts to wetlands would potentially require an Individual Environmental Resource Permit, State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

- **Species Habitat – Conflict with Policy CON-9A.** MDC Policy CON-9a states that all activities that adversely affect habitat that is critical to Federal, or State designated, endangered or threatened species shall be prohibited unless such activity(ies) are a public necessity and there are no possible alternative sites where the activity(ies) can occur.

Analysis Summary – Alternative Site No. 9

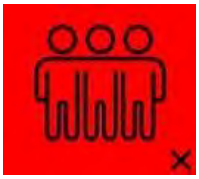
- **Species Habitat – Conflict with MDC Policy CON-9B.** MDC Policy CON-9B states that all nesting, roosting and feeding habitats used by federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.
- **Within the Northwest Wellfield Protection Area – Conflict with MDC Policy LU-8G.** MDC Policy LU-8G states that when considering land areas to add to the UDB, after demonstrating that a need exists, the following areas shall not be considered:
  - The Northwest Wellfield Protection Area and the West Wellfield Protection Area west of SW 157 Avenue between SW 8 Street and SW 42 Street
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

Transportation

Travel time to US-27 is less than 10 minutes. Existing access to site is via unpaved single-lane road (see picture at right). Approximately 5.25 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access (see the access route below). An additional 3.5 miles of easement/ROW will have to be acquired. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts to local area will likely be significant. Additional traffic impacts on US-27 and to local area may result due to single point of access at NW 112th Ct/NW 136th St. Truck queuing will have to be accomplished on site to prevent further congestion of local roads.

Analysis Summary – Alternative Site No. 9

Community



The USEPA EJScreen Standard Report indicated no community impacts for this site. The site is more than 2.9 miles from the nearest residential zoning and adjacent to industrial mining operations, but the presence of wetlands, wildlife habitat and other environmental issues suggests that the siting of a WTE facility may be met with opposition by the community at this location.

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Approximately 5.25 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access (see the access route below). An additional 3.5 miles of easement/ROW will have to be acquired.
- Construction of approximately 5.0 miles of 12” water main and possibly a booster station will be required.
- Construction of an on-site wastewater lift station and about 5.0 miles of 6” force main will likely be required.
- Construction of approximately 9.0 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 8.3 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.

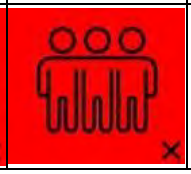
Analysis Summary – Alternative Site No. 9

- Permanent impacts to wetlands would potentially require an Individual Environmental Permit, a State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.
- **Species Habitat – Conflict with MDC Policies CON-9A and CON-9B.**
- **Within the Northwest Wellfield Protection Area – Conflict with MDC Policy LU-8G.**
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

Future Waste-To-Energy Facility Siting Alternatives Analysis

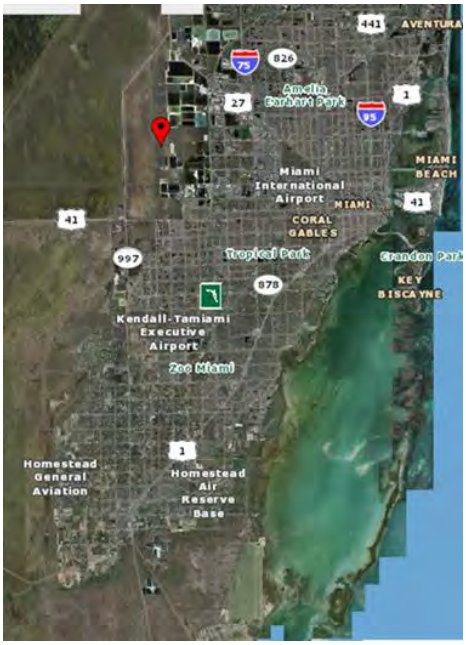
Analysis Summary – Alternative Site No. 10

Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
						N/A	N/A

MDPA Parcel Map

Location Map



Site Information

This 590.71-acre property is a single parcel outside the UDB, located in unincorporated Miami-Dade County. The site is large enough to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility, and expansion to 5,000 TPD capacity or the addition of other facilities such as an ash monofil, recycling center or an education center. The property is less than a 10-minute travel time to the Turnpike via 41st Street and is located 2.84 miles from the nearest residential zoning.

MDPA Parcel Data

Folio No: 30-3916-000-0010

Owner: APAC Southeast, Inc.

2021 MDPA Market Value: $10,560,268

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 10

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 5.4 miles W of the existing RRF, and more than 2.8 miles from the nearest residential zoning. If this site were selected, the expected effects on the County's Solid Waste System may be significant. Direct hauls from the collection routes in the vicinity of the existing RRF would likely decline, as many collection trucks would reroute to the Northeast and West Transfer Stations for disposal to reduce travel times. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station in the vicinity of the existing RRF facility would likely be needed to maintain current collection and transfer flow patterns.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and may result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would increase due to the additional deliveries, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be higher than at the existing RRF. There are options to keep ash hauling distances relatively short - the existing RRF site could be converted to an ash monofill, or ash generated at this location may be landfilled at the Medley Landfill. If disposed at a non-County facility, costs for ash disposal would significantly increase from current levels.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. Potable water mains appear to be available approximately 2.0 miles southeast of the site, but further analysis is needed to verify pipe size, service pressure, and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. The closest sanitary sewer collection system appears to be approximately 2.0 miles southeast of the site, but further analysis is needed to verify capacity and system impacts. An on-site lift station and about 2.0 miles of 6" force main may be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest gas transmission main is approximately 4.0

miles southeast of the site. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

- **Electric** – Nearest substation/ switchyard is FPL Substation located 2.1 miles away at 52444-139954 NW 41st Street. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements. New legal easements may need to be established to complete this routing.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the site soils as Shark Valley muck, 0 to 1 percent slopes. These soils are high in organics content and may extend 20-40 inches below grade, even to the bedrock layer. They are not suitable for foundations and would need to be removed and replaced with structural fill for foundation areas, which will increase project costs.

In these soils the seasonal high groundwater elevation is typically 0-6 inches below existing grade, but would have to be confirmed by geotechnical investigations. The high groundwater will result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone AH (El. 7 ft). High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 5.44 miles (8.75 km) NE of the Everglades Class I Area, 16.95 miles (27.28 km) NW of the Biscayne Class II Area, and about 3 mi NNW of the CEMEX Miami facility, a large source of emissions.

Analysis Summary – Alternative Site No. 10

As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site is entirely wetlands. Minor disturbances include prior excavation and ditching, but most of the site appears undisturbed. The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required. The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.

  Permanent impacts to wetlands would potentially require an Individual Environmental Resource Permit, State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

- **Species Habitat – Conflict with Policy CON-9A.** MDC Policy CON-9B states that **a**ll activities that adversely affect habitat that is critical to Federal, or State designated, endangered or threatened species shall be prohibited unless such activity(ies) are a public necessity and there are no possible alternative sites where the activity(ies) can occur.

- **Species Habitat – Conflict with MDC Policy CON-9B.** MDC Policy CON-9B states that all nesting, roosting and feeding habitats used by federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.

- **Within the Northwest Wellfield Protection Area – Conflict with MDC Policy LU-8G.** MDC Policy LU-8G states that when considering land areas to add to the UDB, after demonstrating that a need exists, the following areas shall not be considered:

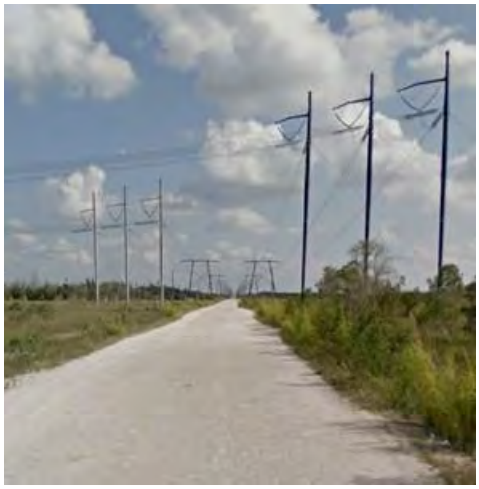
  - The Northwest Wellfield Protection Area and the West Wellfield Protection Area west of SW 157 Avenue between SW 8 Street and SW 42 Street

Analysis Summary – Alternative Site No. 10

- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

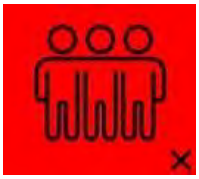
Transportation

Travel time to the Turnpike is less than 10 minutes. Existing access to site is via 41st Street, then 1.5 miles of unpaved single-lane road. Approximately 1.5 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access. Additional easement/ROW will have to be aquired for almost 1.5 miles of the access road from FPL and/or other property owners. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts to local area will likely be significant. Additional traffic impacts due to single point of access at Turnpike/41st St. Truck queuing will have to be accomplished on site to prevent further congestion of local roads.



Analysis Summary – Alternative Site No. 10

Community



The USEPA EJScreen Standard Report indicated no community impacts for this site. The site is more than 2.8 miles from the nearest residential zoning and adjacent to industrial mining operations, but the presence of wetlands, wildlife habitat and other environmental issues suggests that the siting of a WTE facility may be met with opposition by the community at this location.

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Approximately 1.5 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access (see the access route below). An additional 1.5 miles of easement/ROW will have to be acquired.
- Construction of approximately 2.0 miles of 12” water main and possibly a booster station will be required.
- Construction of an on-site wastewater lift station and about 2.0 miles of 6” force main will likely be required.
- Construction of approximately 4.0 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 2.1 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.
- Permanent impacts to wetlands would potentially require an Individual Environmental Permit, a State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

Analysis Summary – Alternative Site No. 10

- **Species Habitat – Conflict with MDC Policy CON-9A and CON-9B.**
- **Within the Northwest Wellfield Protection Area – Conflict with MDC Policy LU-8G.**
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

Future Waste-To-Energy Facility Siting Alternatives Analysis

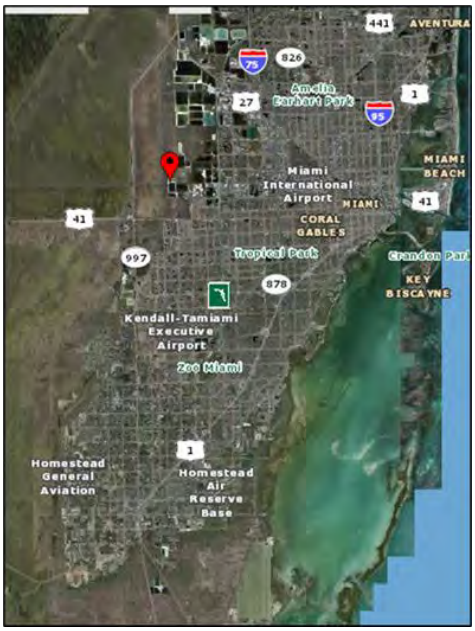
Analysis Summary – Alternative Site No. 11

Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
✕	–	✕	–	–	✕	N/A	N/A

MDPA Parcel Map

Location Map



Site Information

This 1,425.59-acre property is a single parcel outside the UDB, located in unincorporated Miami-Dade County. The site is large enough to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility, and expansion to 5,000 TPD capacity or the addition of other facilities such as an ash monofil, recycling center or an education center. The property is less than a 10-minute travel time to the Turnpike via 41st Street and is located 0.52 miles from the nearest residential zoning.

MDPA Parcel Data

Folio No: 30-3920-000-0020

Owner: CEMEX Construction Materials

2021 MDPA Market Value: $18,710,559

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 11

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 4.8 miles SW of the existing RRF but is 0.52 miles from the nearest residential zoning. If this site were selected, the expected effects on the County's Solid Waste System may be significant. Direct hauls from the collection routes in the vicinity of the existing RRF would likely decline, as many collection trucks would reroute to the Northeast and West Transfer Stations for disposal to reduce travel times. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station in the vicinity of the existing RRF facility would likely be needed to maintain current collection and transfer flow patterns.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and may result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would increase due to the additional deliveries, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be higher than at the existing RRF. There are options to keep ash hauling distances relatively short - the existing RRF site could be converted to an ash monofill, or ash generated at this location may be landfilled at the Medley Landfill. If disposed at a non-County facility, costs for ash disposal would significantly increase from current levels.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. Potable water mains appear to be available approximately 0.75 miles east of the site on 41st Street, but further analysis is needed to verify pipe size, service pressure, and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. The closest sanitary sewer collection system appears to be approximately 0.75 miles east of the site on 41st Street, but further analysis is needed to verify capacity and system impacts. An on-site lift station and about 0.75 miles of 6" force main may be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest gas transmission main is approximately 2.9

miles east of the site. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

- **Electric** – Nearest substation/ switchyard is the Levee Substation located 1.1 miles away at 52444-139954 NW 41st Street. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements. New legal easements may need to be established to complete this routing.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the site soils as Shark Valley muck, 0 to 1 percent slopes. These soils are high in organics content and may extend 20-40 inches below grade, even to the bedrock layer. They are not suitable for foundations and would need to be removed and replaced with structural fill for foundation areas, which will increase project costs.

In these soils the seasonal high groundwater elevation is typically 0-6 inches below existing grade, but would have to be confirmed by geotechnical investigations. The high groundwater will result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone AH (El. 7 ft). High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 3.45 miles (5.55 km) NE of the Everglades Class I Area, 14.24 miles (22.92 km) NW of the Biscayne Class II Area, and about 1.5 miles NNW of the CEMEX Miami facility, a large source of emissions.

Analysis Summary – Alternative Site No. 11

As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site is comprised of wetlands and excavated ponds. Minor disturbances include prior excavation and ditching, but portions of the site appear undisturbed. The site is not within a Florida panther focus area for consultation. The site is within the proposed critical habitat and within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required. The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.

Permanent impacts to wetlands would potentially require an Individual Environmental Resource Permit, State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

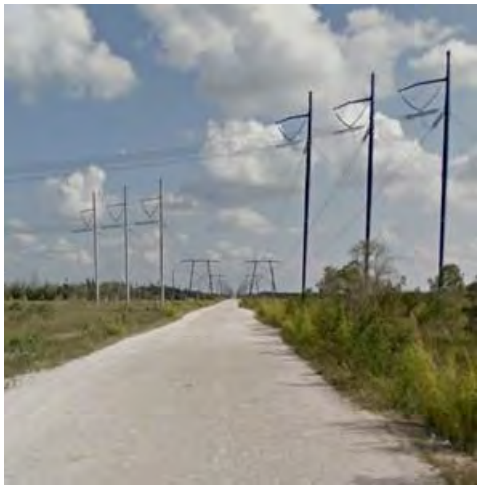
- **Species Habitat – Conflict with Policy CON-9A.** All activities that adversely affect habitat that is critical to Federal, or State designated, endangered or threatened species shall be prohibited unless such activity(ies) are a public necessity and there are no possible alternative sites where the activity(ies) can occur.
- **Species Habitat – Conflict with MDC Policy CON-9B.** MDC Policy CON-9B states that all nesting, roosting and feeding habitats used by federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.
- **Within the Northwest Wellfield Protection Area – Conflict with MDC Policy LU-8G.** MDC Policy LU-8G states that when considering land areas to add to the UDB, after demonstrating that a need exists, the following areas shall not be considered:
  - The Northwest Wellfield Protection Area and the West Wellfield Protection Area west of SW 157 Avenue between SW 8 Street and SW 42 Street

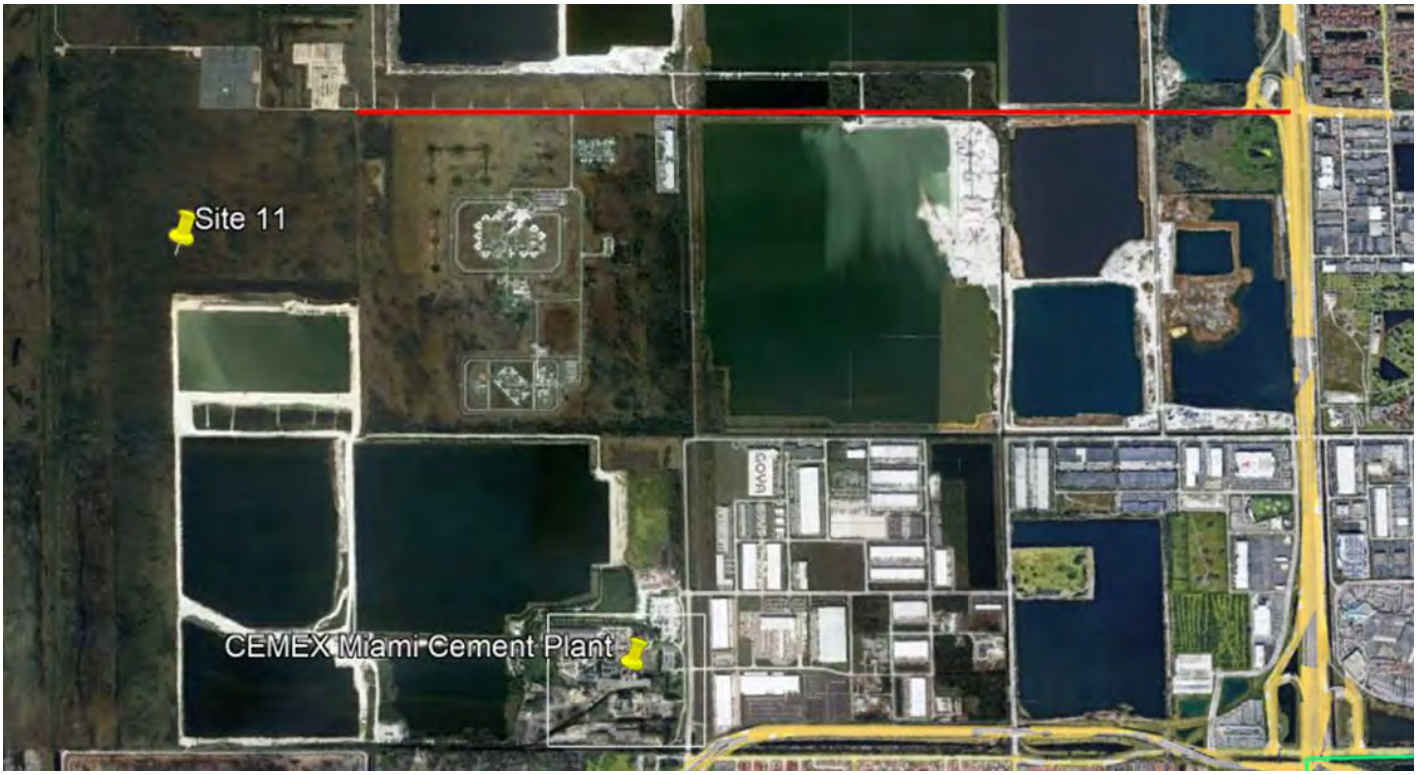
Analysis Summary – Alternative Site No. 11

- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

Transportation

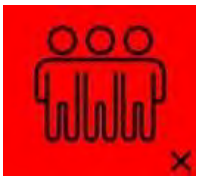
Travel time to the Turnpike is less than 10 minutes. Existing access to site is via 41st Street, then 1.5 miles of unpaved single-lane road (see picture at right) . Approximately 1.5 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access. Additional easement/ROW will have to be aquired for almost 1.5 miles of the access road from FPL and/or other property owners. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day) will greatly increase the loads on local roads so the traffic impacts to local area will likely be significant. Additional traffic impacts on 41st Street and to the local area may be significant due to single point of access at Turnpike/41st St. Truck queuing will have to be accomplished on site to prevent further congestion of local roads.





Analysis Summary – Alternative Site No. 11

Community



The USEPA EJScreen Standard Report indicated no community impacts for this site. However, the site is 0.52 miles from the nearest residential zoning. Even though it is adjacent to an industrial cement manufacturing operation, the close proximity of the site to a residential area and the presence of wetlands, wildlife habitat and other environmental issues suggests that the siting of a WTE facility may be met with opposition by the community at this location.

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Approximately 1.5 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access (see the access route below). An additional 1.5 miles of easement/ROW will have to be acquired.
- Construction of approximately 0.75 miles of 12” water main and possibly a booster station will be required.
- Construction of an on-site wastewater lift station and about 0.75 miles of 6” force main will likely be required.
- Construction of approximately 2.9 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 1.1 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.
- Permanent impacts to wetlands would potentially require an Individual Environmental Permit, a State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.
- **Species Habitat – Conflict with MDC Policy CON-9A.**

Analysis Summary – Alternative Site No. 11

- **Species Habitat – Conflict with MDC Policy CON-9B.**
- **Within the Northwest Wellfield Protection Area – Conflict with MDC Policy LU-8G.**
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

Future Waste-To-Energy Facility Siting Alternatives Analysis

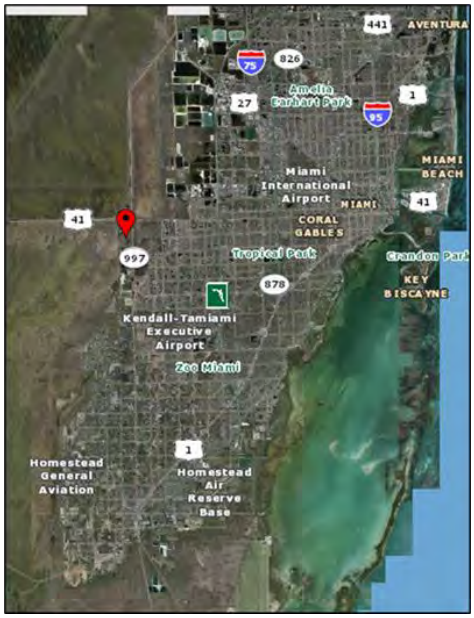
Analysis Summary – Alternative Site No. 12

Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
✗	✗	✗	✗	✓	✗	N/A	N/A

MDPA Parcel Map

Location Map



Site Information

This 561.18-acre property is a single parcel outside the UDB, located in unincorporated Miami-Dade County. The site is large enough to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility, and expansion to 5,000 TPD capacity or the addition of other facilities such as an ash monofil, recycling center or an education center. The property is less than a 10-minute travel time to Krome Ave. and US 41 and is located 1.03 miles from the nearest residential zoning and approximately 0.1 mile from the boundary of the Everglades National Park.

MDPA Parcel Data

Folio No: 30-4813-000-0010

Owner: ALA NV
% LA PRIMERA INTN'L CORP

2021 MDPA Market Value: $1,251,057

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 12

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 10.5 miles SW of the existing RRF and is more than a mile from the nearest residential zoning, but is approximately 0.1 mile from the boundary of the Everglades National Park. If this site were selected, the expected effects on the County's Solid Waste System may be significant. Direct hauls from the collection routes in the vicinity of the existing RRF would likely decline, as many collection trucks would reroute to the three transfer stations for disposal to reduce travel times. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station in the vicinity of the existing RRF facility would likely be needed to maintain current collection and transfer flow patterns.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and may result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would increase due to the additional deliveries, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be higher than at the existing RRF. There are options to keep ash hauling distances relatively short - the existing RRF site could be converted to an ash monofill, or ash generated at this location may be landfilled at the Medley Landfill. If disposed at a non-County facility, costs for ash disposal would significantly increase from current levels.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. Potable water mains appear to be available approximately 0.4 miles north of the site, but further analysis is needed to verify pipe size, service pressure, and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. There is a 30" sanitary sewer along Krome Ave., but further analysis is needed to verify capacity and system impacts. An on-site lift station and force main may be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest gas transmission main is approximately 4.0

miles northeast of the site on US41. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

- **Electric** – Nearest substation/switchyard is FPL Substation located 4.7 miles away at 8905 Krome Avenue. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements. New legal easements may need to be established to complete this routing.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the predominant site soils as Perrine marly silt loam, 0 to 1 percent slopes and Tamiami muck, 0 to 1 percent slopes. These hydric soils are high in organics content and may extend 31-41 inches below grade, even to the bedrock layer. They are not suitable for foundations and would need to be removed and replaced with structural fill for foundation areas, which will increase project costs.

In these soils the seasonal high groundwater elevation is typically 0-6 inches below existing grade, but would have to be confirmed by geotechnical investigations. The high groundwater will result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone AH (El. 8 ft). High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 0.1 miles (0.16 km) E of the Everglades Class I Area, 13.72 miles (22.08 km) W of

the Biscayne Class II Area, and about 5.0 miles SW of the CEMEX Miami Cement Plant, a large source of emissions.

As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s). **Based on projected emissions for a 4000 tpd facility, preliminary evaluation indicates that this parcel is too close to sensitive receptors in the nearby Class I area thus making it extremely difficult to demonstrate acceptable impacts for PSD permit issuance.**

Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site is comprised of wetlands. The site appears predominantly undisturbed`. The site is not within a Florida panther focus area for consultation. The site is within the proposed critical habitat and within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required. The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.

Permanent impacts to wetlands would potentially require an Individual Environmental Resource Permit, State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

- **Species Habitat – Conflict with Policy CON-9A.** All activities that adversely affect habitat that is critical to Federal, or State designated, endangered or threatened species shall be prohibited unless such activity(ies) are a public necessity and there are no possible alternative sites where the activity(ies) can occur.
- **Species Habitat – Conflict with MDC Policy CON-9B.** MDC Policy CON-9B states that all nesting, roosting and feeding habitats used by federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.
- **Within the West Wellfield Protection Area – Conflict with MDC Policy LU-8G.** MDC Policy LU-8G states that when considering land areas to add to the UDB, after demonstrating that a need exists, the following areas shall not be considered:

Analysis Summary – Alternative Site No. 12

- The Northwest Wellfield Protection Area and the West Wellfield Protection Area west of SW 157 Avenue between SW 8 Street and SW 42 Street

- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

Transportation

Travel time to US 41 (SW 8th Street) is less than 10 minutes. Existing access to site is via Krome Ave. (see map below), and no additional offsite access roadway is required. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts on Krome Ave., US 41 (SW 8th Street), and to local area may be significant. Truck queuing will have to be accomplished on site to prevent further congestion on Krome Ave.

Community

The USEPA EJScreen Standard Report indicated elevated values for Particulate Matter 2.5 (µg/m3), 2017 Air Toxics Cancer Risk, and 2017 Air Toxics Respiratory HI for this site. Although the site is more than a mile from the nearest residential zoning, it is approximately 0.1 mile from the boundary of the Everglades National Park, which suggests that the siting of a WTE facility may be strongly opposed by the community at this location.

Analysis Summary – Alternative Site No. 12

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

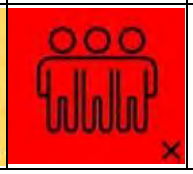
Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Construction of approximately 0.4 miles of 12” water main and possibly a booster station will be required.
- Construction of an on-site wastewater lift station and 6” force main may be required.
- Construction of approximately 4.0 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 4.7 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Additional ROW/easements may be needed to complete routing of potable water, natural gas, and electric utility infrastructure.
- The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.
- Permanent impacts to wetlands would potentially require an Individual Environmental Permit, a State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.
- **Based on projected emissions for a 4000 tpd facility, preliminary evaluation indicates that this parcel is too close to sensitive receptors in the nearby Class I area thus making it extremely difficult to demonstrate acceptable impacts for PSD permit issuance.**
- **Species Habitat – Conflict with MDC Policy CON-9A.**
- **Species Habitat – Conflict with MDC Policy CON-9B.**
- **Within the West Wellfield Protection Area – Conflict with MDC Policy LU-8G.**
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

Future Waste-To-Energy Facility Siting Alternatives Analysis

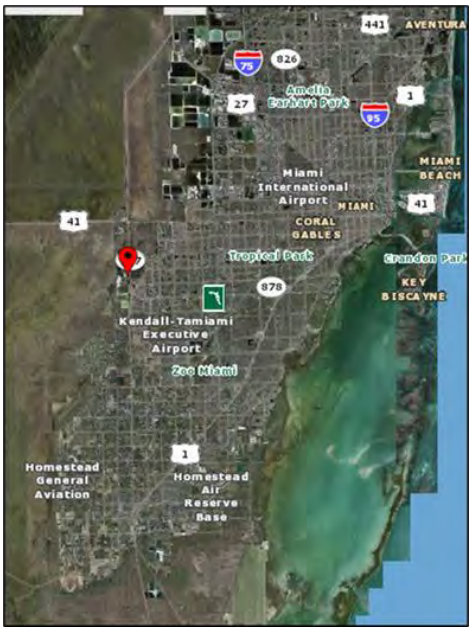
Analysis Summary – Alternative Site No. 13

Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
						N/A	N/A

MDPA Parcel Map

Location Map



Site Information

This 63.07-acre property is a single parcel outside the UDB, located in unincorporated Miami-Dade County. The site is large enough to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility, and expansion to 5,000 TPD capacity or the addition of other facilities such as an ash monofil, recycling center or an education center. The property is less than a 10-minute travel time to US-41 and is located 1.08 miles from the nearest residential zoning and approximately 0.7 miles from the boundary of the Everglades National Park.

MDPA Parcel Data

Folio No: 30-4835-000-0010

Owner: Kendall Properties and Investments

2021 MDPA Market Value: $1,576,700

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 13

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 11.8 miles SW of the existing RRF and is more than a mile from the nearest residential zoning, but is less than a mile from the boundary of the Everglades National Park. If this site were selected, the expected effects on the County's Solid Waste System may be significant. Direct hauls from the collection routes in the vicinity of the existing RRF would likely decline, as many collection trucks would reroute to the Northeast and West Transfer Stations for disposal to reduce travel times. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station in the vicinity of the existing RRF facility would likely be needed to maintain current collection and transfer flow patterns.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would increase due to longer travel distances and expected traffic congestion on US-41 and SW 88th Street. Transfer fleet round trip times would increase and may result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would increase due to the additional deliveries, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be higher than at the existing RRF. There are options to keep ash hauling distances relatively short - the existing RRF site could be converted to an ash monofill, or ash generated at this location may be landfilled at the Medley Landfill. If disposed at a non-County facility, costs for ash disposal would significantly increase from current levels.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. A 12" potable water main appears to be available at the site on Krome Ave., but further analysis is needed to verify service pressure and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. There is a 30" sanitary sewer on Krome Ave., but further analysis is needed to verify capacity and system impacts. An on-site lift station and force main may be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest gas transmission main is approximately 7.0

miles northeast of the site on US-41. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

- **Electric** – Nearest substation/switchyard is FPL Substation located 1.8 miles away at 8905 Krome Avenue. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements. New legal easements may need to be established to complete this routing.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the predominant site soils as Udorthents-Water-Urban land complex, 0 to 60 percent slopes and Cooper Town muck. Udorthents soils consist of unconsolidated or heterogeneous geologic material removed during the excavation of ditches, canals, lakes, ponds, and quarries. This suggests that the site was previously excavated as a borrow pit and backfilled to its present land area. If this is confirmed, the site soils may present significant geotechnical engineering challenges for foundation designs.

The presence of muck soils indicates the seasonal high groundwater elevation is typically 0-6 inches below existing grade, but would have to be confirmed by geotechnical investigations. The high groundwater will result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone AH (El. 8 ft). The remainder of the site is in FEMA Flood Zone X (Minimal Flood Hazard).
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process is also required.

Analysis Summary – Alternative Site No. 13

- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 0.68 miles (1.09 km) E of the Everglades Class I Area, 12.52 miles (20.15 km) W of the Biscayne Class II Area, and about 6.3 miles SW of the CEMEX Miami Cement Plant, a large source of emissions.

  As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

  The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s). **Based on projected emissions for a 4000 tpd facility, preliminary evaluation indicates that this parcel is too close to sensitive receptors in the nearby Class I area thus making it extremely difficult to demonstrate acceptable impacts for PSD permit issuance.**

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory and National Hydrography Dataset indicate a surface water is present and no wetlands are present. The South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site is comprised of upland mixed forests, improved pasture, and holding ponds. The site appears developed with minimal trees and maintained lawn. The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required but is assumed to be minimal as there is minimal to no roosting or foraging habitat remaining. The site is also within 18.6 miles of an active wood stork colony and minor wood stork mitigation may be required.

- **Species Habitat – Conflict with MDC Policy CON-9B.** MDC Policy CON-9B states that all nesting, roosting and feeding habitats used by federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.

- **Within the West Wellfield Protection Area – Conflict with MDC Policy LU-8G.** MDC Policy LU-8G states that when considering land areas to add to the UDB, after demonstrating that a need exists, the following areas shall not be considered:

  - The Northwest Wellfield Protection Area and the West Wellfield Protection Area west of SW 157 Avenue between SW 8 Street and SW 42 Street

Analysis Summary – Alternative Site No. 13

- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

Transportation

Travel time north to US 41 (SW 8th Street) and south to SW 88th Street is less than 10 minutes. Existing access to site is via Krome Ave. (see map below), and no additional offsite access roadway is required. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads. Traffic impacts on Krome Ave., US 41 (SW 8th Street), SW 88th Street, and to local area may be significant due to only two points of access on Krome Ave. Truck queuing will have to be accomplished on site to prevent further congestion on Krome Ave.

Community

The USEPA EJScreen Standard Report indicated elevated values for Particulate Matter 2.5 (µg/m3), 2017 Air Toxics Cancer Risk, and 2017 Air Toxics Respiratory HI for this site. Although the site is more than a mile from the nearest residential zoning, it is less than a mile from the boundary of the Everglades National Park, which suggests that the siting of a WTE facility may be strongly opposed by the community at this location.

Analysis Summary – Alternative Site No. 13

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

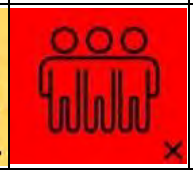
Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Construction of a water booster station may be required.
- Construction of an on-site wastewater lift station and 6” force main may be required.
- Construction of approximately 7.0 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 1.8 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Additional ROW/easements may be needed to complete routing of natural gas and electric utility infrastructure.
- The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.
- **Based on projected emissions for a 4000 tpd facility, preliminary evaluation indicates that this parcel is too close to sensitive receptors in the nearby Class I area thus making it extremely difficult to demonstrate acceptable impacts for PSD permit issuance.**
- **Species Habitat – Conflict with MDC Policy CON-9B.**
- **Within the West Wellfield Protection Area – Conflict with MDC Policy LU-8G.**
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

Future Waste-To-Energy Facility Siting Alternatives Analysis

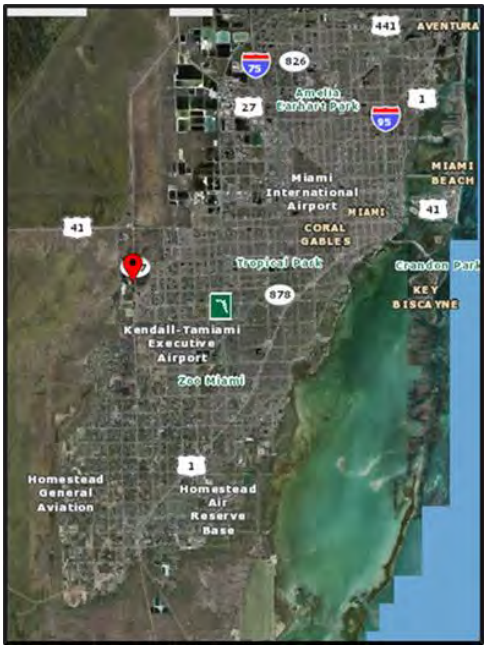
Analysis Summary – Alternative Site No. 14

Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
						N/A	N/A

MDPA Parcel Map

Location Map



Site Information

This 42.68-acre property is a single parcel outside the UDB, located in unincorporated Miami-Dade County. The site area is minimal but appears sufficient to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility, but no additional expansion capacity or other facilities. The property is less than a 10-minute travel time north to US-41 and south to SW 88th Street, is 1.05 miles from the nearest residential zoning, and approximately 0.75 miles from the boundary of the Everglades National Park.

MDPA Parcel Data

Folio No: 30-4835-000-0013

Owner: Kendall Properties and Investments

2021 MDPA Market Value: $1,072,500

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 14

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 11.8 miles SW of the existing RRF and is more than a mile from the nearest residential zoning but is less than a mile from the boundary of the Everglades National Park. If this site were selected, the expected effects on the County's Solid Waste System may be significant. Direct hauls from the collection routes in the vicinity of the existing RRF would likely decline, as many collection trucks would reroute to the Northeast and West Transfer Stations for disposal to reduce travel times. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station in the vicinity of the existing RRF facility would likely be needed to maintain current collection and transfer flow patterns.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would increase due to longer travel distances and expected traffic congestion on US-41 and SW 88th Street. Transfer fleet round trip times would increase and may result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would increase due to the additional deliveries, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be higher than at the existing RRF. There are options to keep ash hauling distances relatively short - the existing RRF site could be converted to an ash monofill, or ash generated at this location may be landfilled at the Medley Landfill. If disposed at a non-County facility, costs for ash disposal would significantly increase from current levels.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. A 12" potable water main appears to be available at the site on Krome Ave., but further analysis is needed to verify service pressure and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. There is a 30" sanitary sewer on Krome Ave., but further analysis is needed to verify capacity and system impacts. An on-site lift station and force main may be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest gas transmission main is approximately 7.0

miles northeast of the site on US-41. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

- **Electric** – Nearest substation/switchyard is FPL Substation located 2.1 miles away at 8905 Krome Avenue. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements. New legal easements may need to be established to complete this routing.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the predominant site soils as Udorthents-Water-Urban land complex, 0 to 60 percent slopes and Biscayne marly silt loam, ponded-Urban land complex, 0 to 1 percent slopes. Udorthents soils consist of unconsolidated or heterogeneous geologic material removed during the excavation of ditches, canals, lakes, ponds, and quarries. This suggests that the site was previously excavated as a borrow pit and backfilled to its present land area. If this is confirmed, the site soils may present significant geotechnical engineering challenges for foundation designs. Removal and replacement of these soils with structural fill and/or additional compactive effort on existing soils in development areas may be required.

The presence of Biscayne marl soils indicates the seasonal high groundwater elevation is typically within 10 inches of the ground surface, but would have to be confirmed by geotechnical investigations. These soils are severely limited for building foundations because of water content and shallow depth to bedrock, and areas under building foundations would need to be removed and replaced with structural fill. The high groundwater will result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone AH (El. 8 ft). The remainder of the site is in FEMA Flood Zone X (Minimal Flood Hazard).
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP,

Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process is also required.

- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 0.75 miles (1.2 km) E of the Everglades Class I Area, 12.74 miles (20.5 km) W of the Biscayne Class II Area, and about 6.0 miles SW of the CEMEX Miami Cement Plant, a large source of emissions.

  As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

  The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s). **Based on projected emissions for a 4000 tpd facility, preliminary evaluation indicates that this parcel is too close to sensitive receptors in the nearby Class I area thus making it extremely difficult to demonstrate acceptable impacts for PSD permit issuance.**

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory and National Hydrography Dataset indicate a surface water is present and no wetlands are present. The South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site is comprised of a holding pond, spoil area, and improved pasture. The site appears to be disturbed. The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required but is assumed to be minimal as there is minimal to no roosting or foraging habitat remaining. The site is also within 18.6 miles of an active wood stork colony and minor wood stork mitigation may be required.

- **Species Habitat – Conflict with MDC Policy CON-9B.** MDC Policy CON-9B states that all nesting, roosting and feeding habitats used by federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.

- **Within the West Wellfield Protection Area – Conflict with MDC Policy LU-8G.** MDC Policy LU-8G states that when considering land areas to add to the UDB, after demonstrating that a need exists, the following areas shall not be considered:

Analysis Summary – Alternative Site No. 14

- The Northwest Wellfield Protection Area and the West Wellfield Protection Area west of SW 157 Avenue between SW 8 Street and SW 42 Street

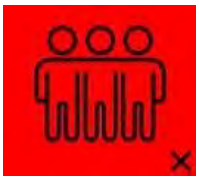
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

Transportation

Travel time north to US 41 (SW 8th Street) and south to SW 88th Street is less than 10 minutes. Existing access to site is via Krome Ave. (see map below), and no additional offsite access roadway is required. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads. Traffic impacts on Krome Ave., US 41 (SW 8th Street), SW 88th Street, and to local area may be significant due to only two points of access on Krome Ave. Truck queuing will have to be accomplished on site to prevent further congestion on Krome Ave.

Analysis Summary – Alternative Site No. 14

Community



The USEPA EJScreen Standard Report indicated elevated values for Particulate Matter 2.5 (µg/m3), 2017 Air Toxics Cancer Risk, and 2017 Air Toxics Respiratory HI for this site. Although the site is more than a mile from the nearest residential zoning, it is less than a mile from the boundary of the Everglades National Park, which suggests that the siting of a WTE facility may be strongly opposed by the community at this location.

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Construction of a water booster station may be required.
- Construction of an on-site wastewater lift station and 6” force main may be required.
- Construction of approximately 7.0 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 2.1 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Additional ROW/easements may be needed to complete routing of natural gas and electric utility infrastructure.
- The site is within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.
- **Based on projected emissions for a 4000 tpd facility, preliminary evaluation indicates that this parcel is too close to sensitive receptors in the nearby Class I area thus making it extremely difficult to demonstrate acceptable impacts for PSD permit issuance.**
- **Species Habitat – Conflict with MDC Policy CON-9B.**
- **Within the West Wellfield Protection Area – Conflict with MDC Policy LU-8G.**

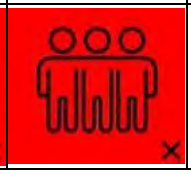
Analysis Summary – Alternative Site No. 14

- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

Future Waste-To-Energy Facility Siting Alternatives Analysis

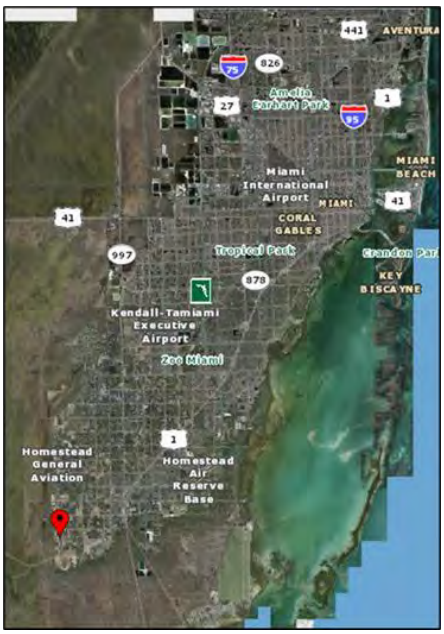
Analysis Summary – Alternative Site No. 15

Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
						N/A	N/A

MDPA Parcel Map

Location Map



Site Information

This 164.83-acre property is a single parcel outside the UDB, located in unincorporated Miami-Dade County. The site area is sufficient to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility and expansion to 5,000 TPD capacity or the addition of other facilities such as an ash monofil, recycling center or an education center. The property is less than a 10-minute travel time north to W Palm Drive, is 0.58 miles from the nearest residential zoning, and 1.02 miles from the boundary of Everglades National Park. **This parcel is under contract with several adjacent parcels in a pending development.**

MDPA Parcel Data

Folio No: 30-7832-000-0030

Owner: Krupalu, Inc.

2021 MDPA Market Value: $2,097,000

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 15

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 31.0 miles SW of the existing RRF, slightly more than half a mile from the nearest residential zoning, and approximately one mile from the boundary of Everglades National Park. If this site were selected, the effects on the County's Solid Waste System would be considerable. Direct hauls from the collection routes in the vicinity of the existing RRF would divert to the three transfer stations for disposal. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station would need to be constructed at or near the site of the existing RRF to maintain the current collection patterns and transfer station loadings.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would significantly increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and would likely result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would significantly increase due to the additional deliveries and travel times and distances, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be significantly higher than at the existing RRF even if the existing RRF site could be converted to an ash monofill, or ash generated at this location was landfilled at the Medley Landfill. If disposed at a non-County facility, expected costs for ash disposal would increase even further.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. Potable water mains appear to be available approximately 5.0 miles east of the site on SW 360th Street., but further analysis is needed to verify pipe size, service pressure, and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. The closest sanitary sewer collection system appears to be approximately 5.0 miles east of the site on SW 360th Street., but further analysis is needed to verify capacity and system impacts. An on-site lift station and about 5.0 miles of 6" force main will likely be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest gas transmission main is approximately

5.0 miles NE of the site on Krome Ave/US-1. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

- **Electric** – Nearest substation/ switchyard is Florida City Substation located 5 miles away at 33800 SW 202nd Avenue. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements. New legal easements may need to be established to complete this routing.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.
- Due to expected shallow depth to bedrock, rock excavation may be required to install utility pipelines, which will significantly increase utility construction costs.

Soil

The USDA Soil Survey data for the site classifies the predominant site soils as Krome very gravelly marly loam, 1 to 2 percent slopes, Biscayne marly silt loam, drained, 0 to 1 percent slopes, and Chekika very gravelly marly loam, 1 to 2 percent slopes. Generally, these soils are not well suited for building foundations because of water content and shallow depth to bedrock (typically 5-7 inches).

The presence of Biscayne marl soils indicates the seasonal high groundwater elevation is typically within 10 inches of the ground surface, but would have to be confirmed by geotechnical investigations. These soils are severely limited for building foundations because of water content and shallow depth to bedrock, and areas under building foundations would need to be removed and replaced with structural fill. The high groundwater may result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone A. High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process is also required.

Analysis Summary – Alternative Site No. 15

- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 1.02 miles (1.64 km) E of the Everglades Class I Area, 12.75 miles (20.51 km) W of the Biscayne Class II Area, and about 12.7 miles WSW of the FPL Turkey Point Power Plant, a large Title V emitter.

  As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

  The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s). **Based on projected emissions for a 4000 tpd facility, preliminary evaluation indicates that this parcel is too close to sensitive receptors in the nearby Class I area thus making it extremely difficult to demonstrate acceptable impacts for PSD permit issuance.**

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site contains wetlands and stream with riparian habitat. The site appears predominantly undisturbed. The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required. The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.

  Permanent impacts to wetlands and streams would potentially require an Individual Environmental Resource Permit, State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

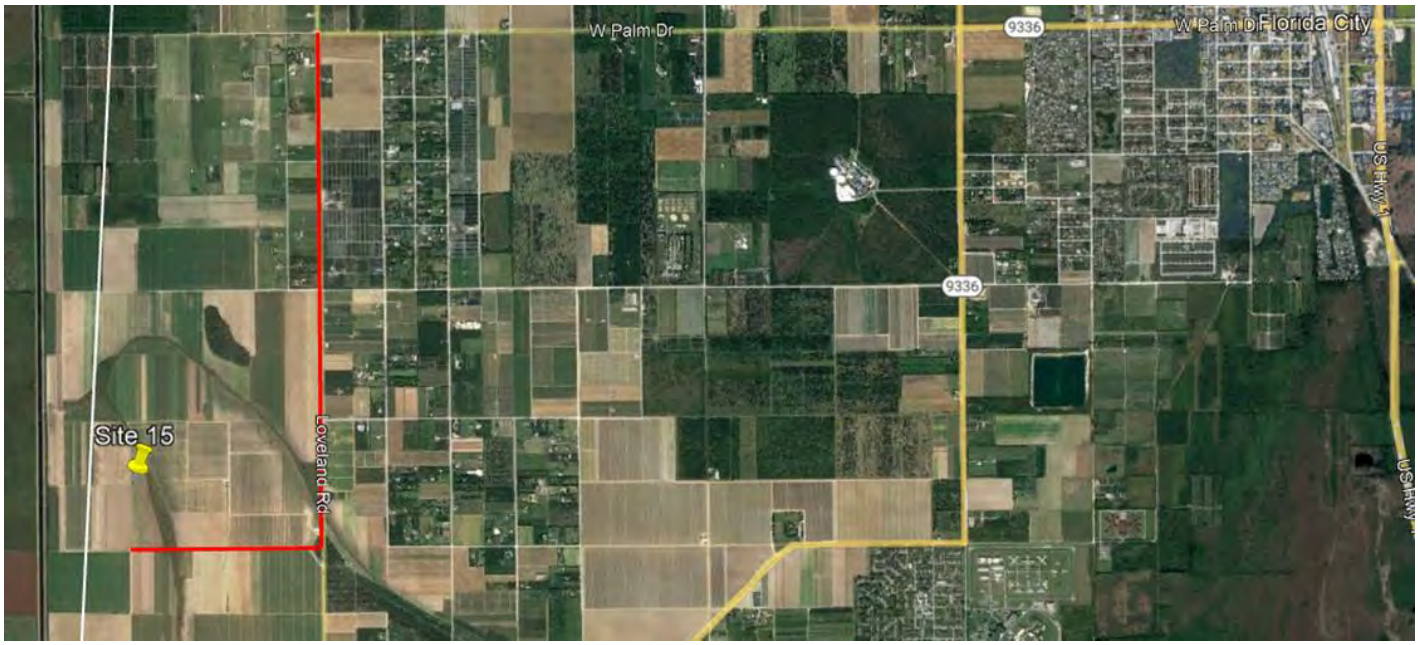
- **Species Habitat – Conflict with MDC Policy CON-9B.** MDC Policy CON-9B states that all nesting, roosting and feeding habitats used by federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.

Analysis Summary – Alternative Site No. 15

Transportation

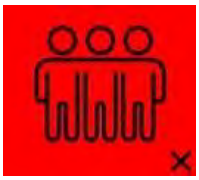
Travel time north to W Palm Drive is less than 10 minutes. Existing access to site is via SW 367th Street and Loveland Road (see map below), but as shown in the picture of Loveland Road at right, construction of approximately 2.75 miles of two-lane roadway with paved shoulders will be required for proper site access. Additional ROW may have to be acquired for access roads.

The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts to local area will likely be significant. Additional traffic impacts on Loveland Road, W Palm Drive, and other local roads may be significant due to only two points of access and limited road capacity. Truck queuing will have to be accomplished on site to prevent further congestion.



Analysis Summary – Alternative Site No. 15

Community



The USEPA EJScreen Standard Report indicated no existing issues for this site. However, the site is about half a mile from the nearest residential zoning and is approximately a mile from the boundary of Everglades National Park, which suggests that the siting of a WTE facility may be strongly opposed by the community at this location.

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

Site Differentiators Overview

- **This parcel is under contract with several adjacent parcels in a pending development.**
- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Approximately 2.75 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access. Additional easement/ROW may have to be acquired.
- Construction of approximately 5.0 miles of 12” water main and possibly a booster station will be required.
- Construction of an on-site wastewater lift station and about 5.0 miles of 6” force main will likely be required.
- Construction of approximately 5.0 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 5.0 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- Due to expected shallow depth to bedrock, rock excavation may be required to install utility pipelines, which will significantly increase utility construction costs.

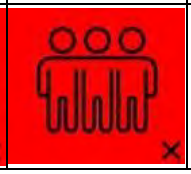
Analysis Summary – Alternative Site No. 15

- The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.
- Permanent impacts to wetlands would potentially require an Individual Environmental Permit, a State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.
- **Based on projected emissions for a 4000 tpd facility, preliminary evaluation indicates that this parcel is too close to sensitive receptors in the nearby Class I area thus making it extremely difficult to demonstrate acceptable impacts for PSD permit issuance.**
- **Species Habitat – Conflict with MDC Policy CON-9B.**

Future Waste-To-Energy Facility Siting Alternatives Analysis

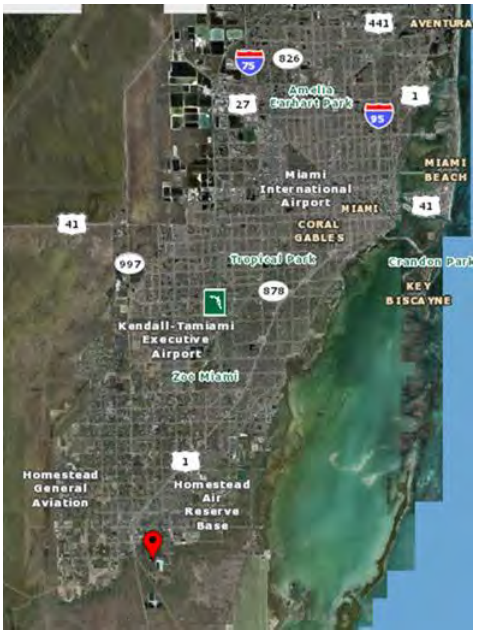
Analysis Summary – Alternative Site No. 18

Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
						N/A	N/A

MDPA Parcel Map

Location Map



Site Information

This 81.44-acre site is a single parcel outside the UDB, located in unincorporated Miami-Dade County. The combined site area is sufficient to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility and expansion to 5,000 TPD capacity or the addition of other facilities such as an ash monofil, recycling center or an education center. The property is less than a 10-minute travel time to Card Sound Road, is 0.77 miles from the nearest residential zoning, and 7.13 miles from the boundary of Everglades National Park.

MDPA Parcel Data

Folio No: 16-7932-001-0025

Owner: CEMEX Construction Materials Florida, LLC

2021 MDPA Market Value: $1,581,860

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 18

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 33.0 miles SW of the existing RRF, 0.77 miles from the nearest residential zoning, and more than seven miles from the boundary of Everglades National Park. If this site were selected, the effects on the County's Solid Waste System would be considerable. Direct hauls from the collection routes in the vicinity of the existing RRF would divert to the three transfer stations for disposal. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station would need to be constructed at or near the site of the existing RRF to maintain the current collection patterns and transfer station loadings.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would significantly increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and would likely result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would significantly increase due to the additional deliveries and travel times and distances, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be significantly higher than at the existing RRF even if the existing RRF site could be converted to an ash monofill, or ash generated at this location was landfilled at the Medley Landfill. If disposed at a non-County facility, expected costs for ash disposal would increase even further. .

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. A 12" potable water main is available approximately 0.25 miles N of the site on SW 167th Ave., but further analysis is needed to verify pipe size, service pressure, and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. The closest sanitary sewer collection system appears to be available approximately 0.75 miles N of the site on SW 167th Ave., but further analysis is needed to verify capacity and system impacts. An on-site lift station and about 0.75 miles of 6" force main will likely be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest transmission main is approximately 2.0

miles NW of the site on Krome Ave/US-1. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

- **Electric** – Nearest substation/ switchyard is FPL Farmlife Substation located 0.93 miles away at 35600 SW 162nd Street. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater may not be used as source water for boiler feedwater, cooling tower/condenser feedwater, truck wheel wash, and irrigation water.

Soil

The USDA Soil Survey data for the site classifies the predominant site soils as Biscayne marly silt loam, drained, 0 to 1 percent slopes. The presence of Biscayne marl soils indicates the seasonal high groundwater elevation is typically within 10 inches of the ground surface but would have to be confirmed by geotechnical investigations.

These soils are severely limited for building foundations because of water content and shallow depth to bedrock, and areas under building foundations would need to be removed and replaced with structural fill. The high groundwater may result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone AE (El. 8 ft). High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 7.13 mi (11.5 km) E of the Everglades Class I Area, 6.68 mi (10.8 km) W of the Biscayne Class II Area, and about 6.5 miles WSW of the FPL Turkey Point Power Plant, a large Title V emitter.

  As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

Analysis Summary – Alternative Site No. 18

The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site contains minor wetlands. The site appears predominantly undisturbed. The site is within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required.

  Permanent impacts to wetlands would potentially require an Individual Environmental Resource Permit, State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

- **Species Habitat – Conflict with MDC Policy CON-9B.** MDC Policy CON-9B states that all nesting, roosting and feeding habitats used by federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.

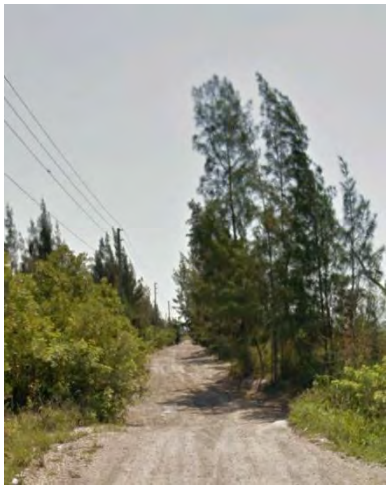
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

Analysis Summary – Alternative Site No. 18

Transportation

Travel time north to Card Sound Road and US-1 is less than 10 minutes. Existing access to site is via SW 360th Street and SW 167th Ave. (see map below), but approximately 1.2 miles of two-lane road with paved shoulders will need to be constructed for proper site access (see existing SW 360th Street picture at right). Additional ROW may have to be acquired.

The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts on Card Sound Road, SW 360th Street and SW 167th Ave., and other local roads will likely be significant. Truck queuing will have to be accomplished on site to prevent further congestion.



Community

The USEPA EJScreen Standard Report indicated no existing issues for this site. However, the site is less than a mile from the nearest residential zoning and the presence of wetlands, wildlife habitat and other environmental issues suggests that the siting of a WTE facility may be met with opposition by the community at this location.

Analysis Summary – Alternative Site No. 18

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

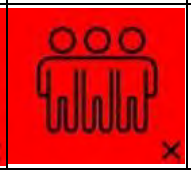
Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Approximately 1.2 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access. Additional ROW may have to be acquired.
- Construction of approximately 0.25 miles of 12” water main and possibly a booster station will be required.
- Construction of an on-site wastewater lift station and about 0.75 miles of 6” force main will likely be required.
- Construction of approximately 2.0 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 0.93 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Due to shallow depth to bedrock, rock excavation may be required to install utility pipelines, which could significantly increase utility construction costs.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- Permanent impacts to wetlands would potentially require an Individual Environmental Permit, a State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.
- **Species Habitat – Conflict with MDC Policy CON-9B.**
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

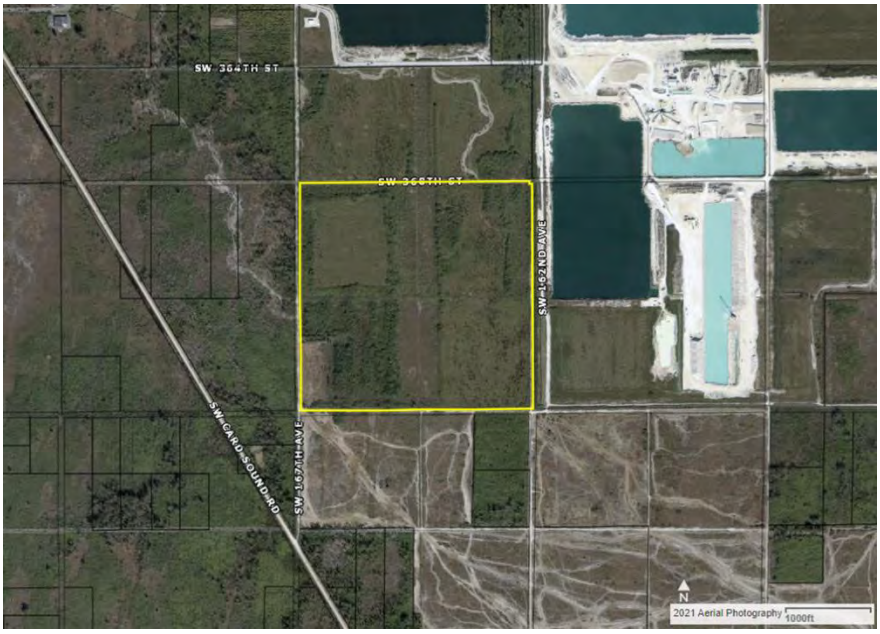
Future Waste-To-Energy Facility Siting Alternatives Analysis

Analysis Summary – Alternative Site No. 19

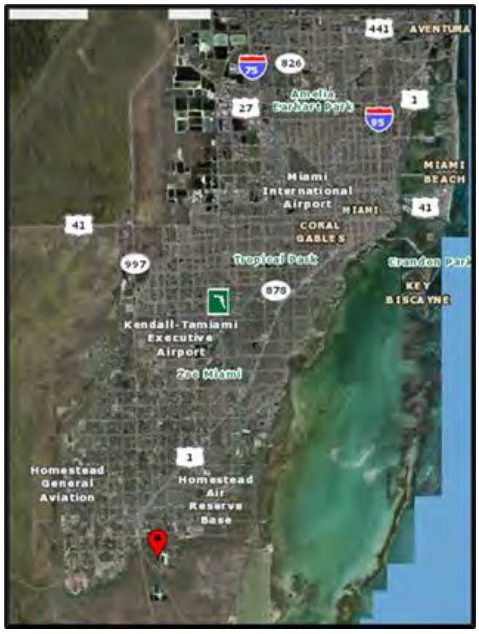
Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
						N/A	N/A

MDPA Parcel Map



Location Map



Site Information

This 161.81-acre site is located outside the UDB, in unincorporated Miami-Dade County. The combined site area is sufficient to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility and expansion to 5,000 TPD capacity or the addition of other facilities such as an ash monofil, recycling center or an education center. The property is less than a 10-minute travel time to Card Sound Road, 1.02 miles from residential zoning and 7.11 miles from the boundary of Everglades National Park.

MDPA Parcel Data

Folio No: 16-7932-001-0030

Owner: CEMEX Construction Materials Florida, LLC

2021 MDPA Market Value: $3,127,500

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 19

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 29.0 miles southwest of the existing RRF, 1.02 miles from residential zoning and 7.11 miles from the boundary of Everglades National Park. If this site were selected, the effects on the County's Solid Waste System would be considerable. Direct hauls from the collection routes in the vicinity of the existing RRF would divert to the three transfer stations for disposal. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station would need to be constructed at or near the site of the existing RRF to maintain the current collection patterns and transfer station loadings.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would significantly increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and would likely result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would significantly increase due to the additional deliveries and travel times and distances, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be significantly higher than at the existing RRF even if the existing RRF site could be converted to an ash monofill, or ash generated at this location was landfilled at the Medley Landfill. If disposed at a non-County facility, expected costs for ash disposal would increase even further.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. A 12" potable water main is available approximately 0.5 miles N of the site on SW 167th Ave., but further analysis is needed to verify pipe size, service pressure, and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. The closest sanitary sewer collection system appears to be available approximately 1.1 miles N of the site on SW 167th Ave., but further analysis is needed to verify capacity and system impacts. An on-site lift station and about 1.1 miles of 6" force main will likely be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest transmission main is approximately 2.3

miles NW of the site on Krome Ave/US-1. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

- **Electric** – Nearest substation/ switchyard is FPL Farmlife Substation located 1.4 miles away at 35600 SW 162nd Street. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the predominant site soils as Biscayne marly silt loam, drained, 0 to 1 percent slopes. The presence of Biscayne marl soils indicates the seasonal high groundwater elevation is typically within 10 inches of the ground surface but would have to be confirmed by geotechnical investigations.

These soils are severely limited for building foundations because of water content and shallow depth to bedrock, and areas under building foundations would need to be removed and replaced with structural fill. The high groundwater may result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone A. High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 7.11 mi (11.5 km) E of the Everglades Class I Area, 6.68 mi (10.8 km) W of the Biscayne Class II Area, and about 6.8 miles WSW of the FPL Turkey Point Power Plant, a large Title V emitter.

Analysis Summary – Alternative Site No. 19

As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site contains minor wetlands. The site appears predominantly undisturbed. The site is within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required.

  Permanent impacts to wetlands would potentially require an Individual Environmental Resource Permit, State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

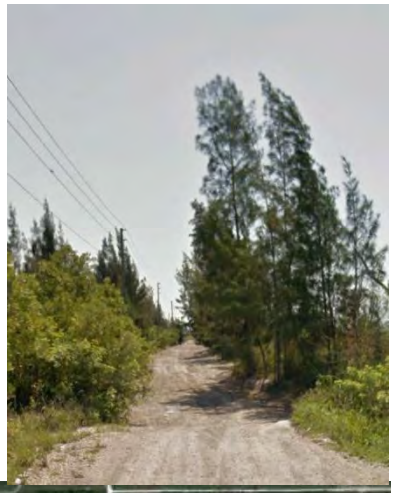
- **Species Habitat – Conflict with MDC Policy CON-9B.** MDC Policy CON-9B states that all nesting, roosting and feeding habitats used by federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.

- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

Analysis Summary – Alternative Site No. 19

Transportation

Travel time north to Card Sound Road and US-1 is less than 10 minutes. Existing access to site is via SW 360th Street and SW 167th Ave. (see map below), but approximately 1.4 miles of two-lane road with paved shoulders will need to be constructed for proper site access (see existing SW 360th Street picture at right). Additional ROW may have to be acquired.



The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts on Card Sound Road, SW 360th Street and SW 167th Ave., and other local roads will likely be significant. Truck queuing will have to be accomplished on site to prevent further congestion.

Community

The USEPA EJScreen Standard Report indicated no existing issues for this site. However, the site is less than a mile from the nearest residential zoning and the presence of wetlands, wildlife habitat and other environmental issues suggests that the siting of a WTE facility may be met with opposition by the community at this location.

Analysis Summary – Alternative Site No. 19

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

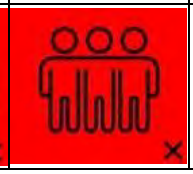
Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Approximately 1.2 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access. Additional ROW may have to be acquired.
- Construction of approximately 0.5 miles of 12” water main and possibly a booster station will be required.
- Construction of an on-site wastewater lift station and about 1.1 miles of 6” force main will likely be required.
- Construction of approximately 2.3 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 1.4 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Due to shallow depth to bedrock, rock excavation may be required to install utility pipelines, which could significantly increase utility construction costs.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- Permanent impacts to wetlands would potentially require an Individual Environmental Permit, a State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.
- **Species Habitat – Conflict with MDC Policy CON-9B.**
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

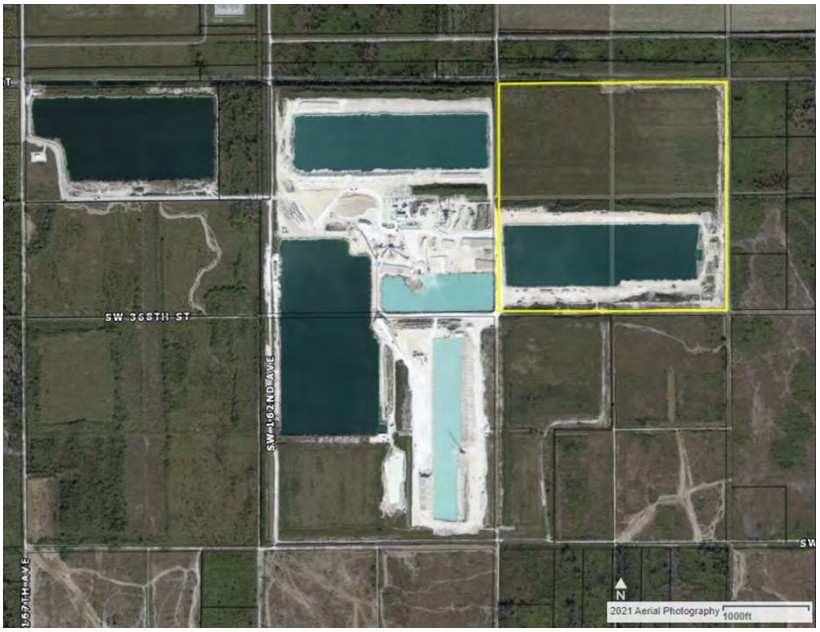
Future Waste-To-Energy Facility Siting Alternatives Analysis

Analysis Summary – Alternative Site No. 20

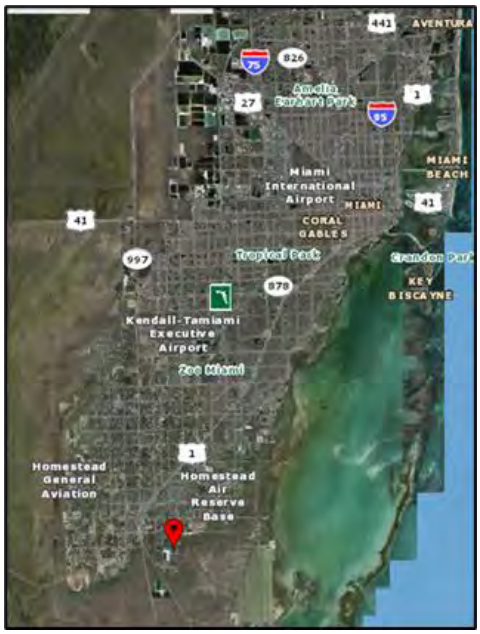
Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
						N/A	N/A

MDPA Parcel Map



Location Map



Site Information

This 156.56-acre site is located outside the UDB, in unincorporated Miami-Dade County. The combined site area is sufficient to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility and expansion to 5,000 TPD capacity or the addition of other facilities such as an ash monofil, recycling center or an education center. The property is less than a 10-minute travel time to Card Sound Road, 0.61 miles from residential zoning and 8.16 miles from the boundary of Everglades National Park.

MDPA Parcel Data

Folio No: 16-7933-001-0020

Owner: SDI Aggregates, LLC

2021 MDPA Market Value: $3,375,575

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 20

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 28.2 miles southwest of the existing RRF, 0.61 miles from residential zoning and 8.16 miles from the boundary of Everglades National Park. If this site were selected, the effects on the County's Solid Waste System would be considerable. Direct hauls from the collection routes in the vicinity of the existing RRF would divert to the three transfer stations for disposal. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station would need to be constructed at or near the site of the existing RRF to maintain the current collection patterns and transfer station loadings.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would significantly increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and would likely result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would significantly increase due to the additional deliveries and travel times and distances, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be significantly higher than at the existing RRF even if the existing RRF site could be converted to an ash monofill, or ash generated at this location was landfilled at the Medley Landfill. If disposed at a non-County facility, expected costs for ash disposal would increase even further.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. A 12" potable water main is available approximately 1.25 miles NW of the site on SW 167th Ave., but further analysis is needed to verify service pressure and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. The closest sanitary sewer collection system appears to be available approximately 1.5 miles NW of the site on SW 167th Ave., but further analysis is needed to verify capacity and system impacts. An on-site lift station and about 1.5 miles of 6" force main may be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest transmission main is approximately 3.2

miles NW of the site on Krome Ave/US-1. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

- **Electric** – Nearest substation/ switchyard is FPL Farmlife Substation located 1.6 miles away at 35600 SW 162nd Street. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the predominant site soils as Biscayne marly silt loam, drained, 0 to 1 percent slopes. The presence of Biscayne marl soils indicates the seasonal high groundwater elevation is typically within 10 inches of the ground surface but would have to be confirmed by geotechnical investigations.

These soils are severely limited for building foundations because of water content and shallow depth to bedrock, and areas under building foundations would need to be removed and replaced with structural fill. The high groundwater may result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone A. High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 8.16 miles (13.1 km) E of the Everglades Class I Area, 5.63 mi (9.1 km) W of the Biscayne Class II Area, and about 5.5 miles WSW of the FPL Turkey Point Power Plant, a large Title V emitter.

Analysis Summary – Alternative Site No. 20

As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site contains no wetlands. The site appears predominantly undisturbed. The site is within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required.

  Permanent impacts to wetlands would potentially require an Individual Environmental Resource Permit, State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

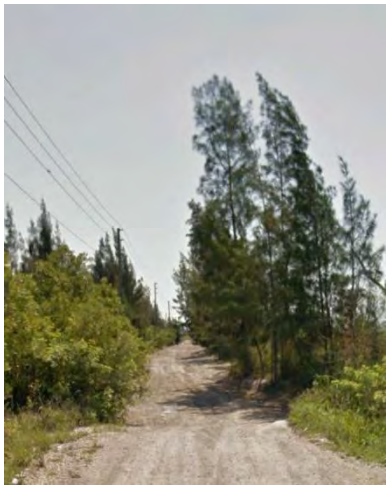
- **Species Habitat – Conflict with MDC Policy CON-9B.** MDC Policy CON-9B states that all nesting, roosting and feeding habitats used by federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.

- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

Analysis Summary – Alternative Site No. 20

Transportation

Travel time north to Card Sound Road and US-1 is less than 10 minutes. Existing access to site is via SW 360th Street, SW 167th Ave., and SW 356th St. (see map below), but approximately 2.4 miles of two-lane road with paved shoulders will need to be constructed for proper site access (see existing SW 360th Street picture at right). Additional ROW may have to be acquired.



The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts on Card Sound Road, SW 360th Street and SW 167th Ave., and other local roads will likely be significant. Truck queuing will have to be accomplished on site to prevent further congestion.

Community

The USEPA EJScreen Standard Report indicated no existing issues for this site. However, the site is less than a mile from the nearest residential zoning and the presence of wetlands, wildlife habitat and other environmental issues suggests that the siting of a WTE facility may be met with opposition by the community at this location.

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Analysis Summary – Alternative Site No. 20

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

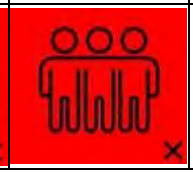
Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Approximately 2.4 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access. Additional ROW may have to be acquired.
- Construction of approximately 1.25 miles of 12” water main and possibly a booster station will be required.
- Construction of an on-site wastewater lift station and about 1.5 miles of 6” force main may be required.
- Construction of approximately 3.2 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 1.6 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Due to shallow depth to bedrock, rock excavation may be required to install utility pipelines, which could significantly increase utility construction costs.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- Permanent impacts to wetlands would potentially require an Individual Environmental Permit, a State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.
- **Species Habitat – Conflict with MDC Policy CON-9B.**
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

Future Waste-To-Energy Facility Siting Alternatives Analysis

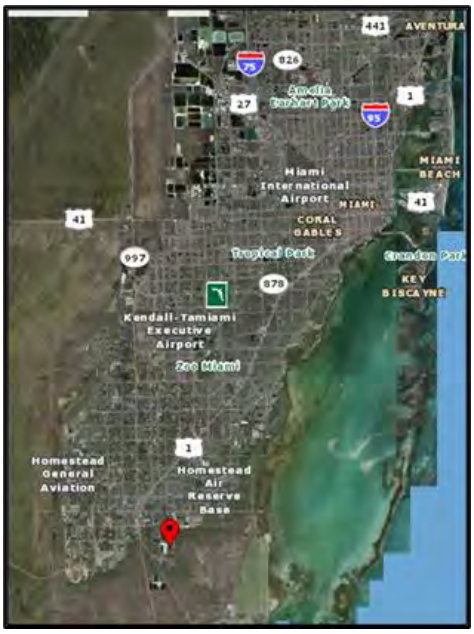
Analysis Summary – Alternative Site No. 21

Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
						N/A	N/A

MDPA Parcel Map

Location Map



Site Information

This 57.85-acre site is located outside the UDB, in unincorporated Miami-Dade County. The combined site area is sufficient to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility and expansion to 5,000 TPD capacity or the addition of other facilities such as a recycling center or an education center. The property is less than a 10-minute travel time to Card Sound Road, 1.09 miles from residential zoning and 8.14 miles from the boundary of Everglades National Park.

MDPA Parcel Data

Folio No: 16-7933-001-0031

Owner: SDI Aggregates, LLC

2021 MDPA Market Value: $1,421,500

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 21

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 28.6 miles southwest of the existing RRF, 1.09 miles from residential zoning and 8.14 miles from the boundary of Everglades National Park. If this site were selected, the effects on the County's Solid Waste System would be considerable. Direct hauls from the collection routes in the vicinity of the existing RRF would divert to the three transfer stations for disposal. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station would need to be constructed at or near the site of the existing RRF to maintain the current collection patterns and transfer station loadings.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would significantly increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and would likely result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would significantly increase due to the additional deliveries and travel times and distances, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be significantly higher than at the existing RRF even if the existing RRF site could be converted to an ash monofill, or ash generated at this location was landfilled at the Medley Landfill. If disposed at a non-County facility, expected costs for ash disposal would increase even further.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. A 12" potable water main is available approximately 2.0 miles NW of the site on SW 167th Ave., but further analysis is needed to verify service pressure and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. The closest sanitary sewer collection system appears to be available approximately 2.7 miles NW of the site on SW 167th Ave., but further analysis is needed to verify capacity and system impacts. An on-site lift station and about 2.7 miles of 6" force main may be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest transmission main is approximately 5.1

miles NW of the site on Krome Ave/US-1. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

- **Electric** – Nearest substation/ switchyard is FPL Farmlife Substation located 2.3 miles away at 35600 SW 162nd Street. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the predominant site soils as Biscayne marly silt loam, drained, 0 to 1 percent slopes. The presence of Biscayne marl soils indicates the seasonal high groundwater elevation is typically within 10 inches of the ground surface but would have to be confirmed by geotechnical investigations.

These soils are severely limited for building foundations because of water content and shallow depth to bedrock, and areas under building foundations would need to be removed and replaced with structural fill. The high groundwater may result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone A. High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 8.14 miles (13.1 km) E of the Everglades Class I Area, 5.98 mi (9.6 km) W of the Biscayne Class II Area, and about 5.8 miles WSW of the FPL Turkey Point Power Plant, a large Title V emitter.

Analysis Summary – Alternative Site No. 21

As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site contains minor wetlands. The site appears predominantly undisturbed. The site is within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required.

  Permanent impacts to wetlands would potentially require an Individual Environmental Resource Permit, State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

- **Species Habitat – Conflict with MDC Policy CON-9B.** MDC Policy CON-9B states that all nesting, roosting and feeding habitats used by federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.

- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

Analysis Summary – Alternative Site No. 21

Transportation

Travel time north to Card Sound Road and US-1 is less than 10 minutes. Existing access to site is via SW 167th Ave. and SW 376th Street (see map below), but approximately 1.4 miles of two-lane road with paved shoulders will need to be constructed for proper site access. Additional ROW may have to be acquired.

The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts on Card Sound Road, SW 376th Street and SW 167th Ave. will likely be significant. Truck queuing will have to be accomplished on site to prevent further congestion.

Community

The USEPA EJScreen Standard Report indicated no existing issues for this site. However, the site is less than a mile from the nearest residential zoning and the presence of wetlands, wildlife habitat and other environmental issues suggests that the siting of a WTE facility may be met with opposition by the community at this location.

Analysis Summary – Alternative Site No. 21

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

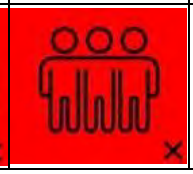
Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Approximately 1.4 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access. Additional ROW may have to be acquired.
- Construction of approximately 2.0 miles of 12” water main and possibly a booster station will be required.
- Construction of an on-site wastewater lift station and about 2.7 miles of 6” force main may be required.
- Construction of approximately 5.1 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 2.3 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Due to shallow depth to bedrock, rock excavation may be required to install utility pipelines, which could significantly increase utility construction costs.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- Permanent impacts to wetlands would potentially require an Individual Environmental Permit, a State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.
- **Species Habitat – Conflict with MDC Policy CON-9B.**
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

Future Waste-To-Energy Facility Siting Alternatives Analysis

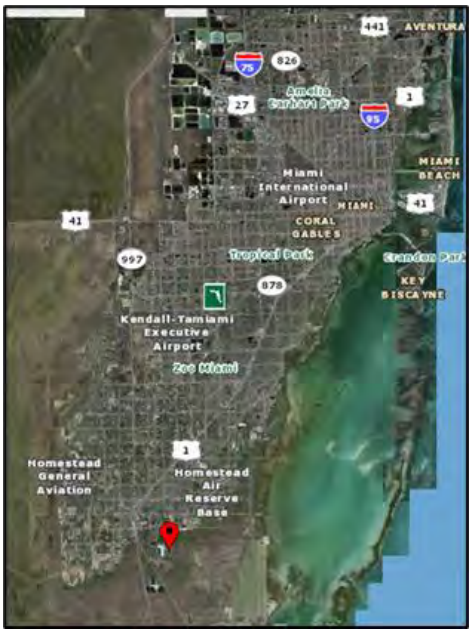
Analysis Summary – Alternative Site No. 22

Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
						N/A	N/A

MDPA Parcel Map

Location Map



Site Information

This 98.43-acre site is located outside the UDB, in unincorporated Miami-Dade County. The combined site area is sufficient to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility and expansion to 5,000 TPD capacity or the addition of other facilities such as a recycling center or an education center. The property is less than a 10-minute travel time to Card Sound Road, 1.17 miles from residential zoning and 8.26 miles from the boundary of Everglades National Park.

MDPA Parcel Data

Folio No: 16-7933-001-0031

Owner: SDI Aggregates, LLC

2021 MDPA Market Value: $335,825

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 22

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 29.0 miles southwest of the existing RRF, 1.17 miles from residential zoning and 8.26 miles from the boundary of Everglades National Park. If this site were selected, the effects on the County's Solid Waste System would be considerable. Direct hauls from the collection routes in the vicinity of the existing RRF would divert to the three transfer stations for disposal. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station would need to be constructed at or near the site of the existing RRF to maintain the current collection patterns and transfer station loadings.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would significantly increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and would likely result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would significantly increase due to the additional deliveries and travel times and distances, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be significantly higher than at the existing RRF even if the existing RRF site could be converted to an ash monofill, or ash generated at this location was landfilled at the Medley Landfill. If disposed at a non-County facility, expected costs for ash disposal would increase even further.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. A 12" potable water main is available approximately 2.2 miles NW of the site on SW 167th Ave., but further analysis is needed to verify service pressure and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. The closest sanitary sewer collection system appears to be available approximately 2.7 miles NW of the site on SW 167th Ave., but further analysis is needed to verify capacity and system impacts. An on-site lift station and about 2.7 miles of 6" force main may be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest transmission main is approximately 5.7

miles NW of the site. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

- **Electric** – Nearest substation/ switchyard is FPL Farmlife Substation located 2.3 miles away at 35600 SW 162nd Street. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the predominant site soils as Biscayne marly silt loam, drained, 0 to 1 percent slopes. The presence of Biscayne marl soils indicates the seasonal high groundwater elevation is typically within 10 inches of the ground surface but would have to be confirmed by geotechnical investigations.

These soils are severely limited for building foundations because of water content and shallow depth to bedrock, and areas under building foundations would need to be removed and replaced with structural fill. The high groundwater may result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone A. High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 8.26 miles (13.3 km) E of the Everglades Class I Area, 5.74 mi (9.2 km) W of the Biscayne Class II Area, and about 5.7 miles WSW of the FPL Turkey Point Power Plant, a large Title V emitter.

Analysis Summary – Alternative Site No. 22

As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory and National Hydrography Dataset indicates wetlands are present. The South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site is comprised wet prairie wetlands. The site appears to be partially disturbed. The site is within the Florida panther primary focus area for consultation and will potentially require panther mitigation. The site is within the proposed critical habitat and within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required. The site is not within the 18.6 miles buffer of an active wood stork colony and does not appear to require wood stork mitigation.

  Permanent impacts to wetlands would potentially require an Individual Environmental Resource Permit, State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

- **Species Habitat – Conflict with Policy CON-9A.** MDC Policy CON-9A states that all activities that adversely affect habitat that is critical to Federal, or State designated, endangered or threatened species shall be prohibited unless such activity(ies) are a public necessity and there are no possible alternative sites where the activity(ies) can occur.

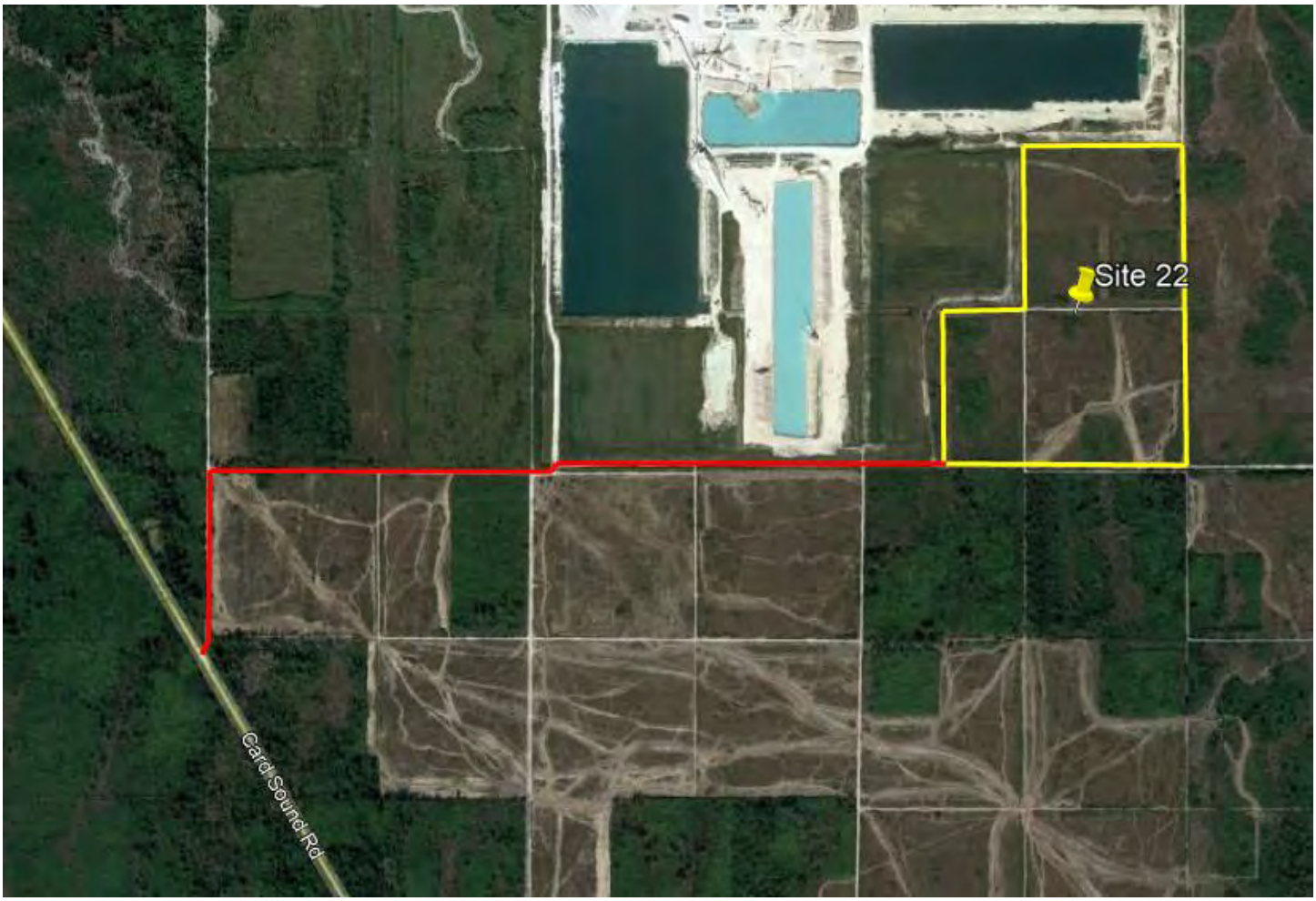
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

Analysis Summary – Alternative Site No. 22

Transportation

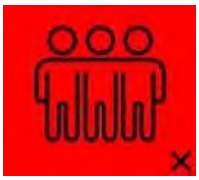
Travel time north to Card Sound Road and US-1 is less than 10 minutes. Existing access to site is via SW 167th Ave. and SW 376th Street (see map below), but approximately 1.4 miles of two-lane road with paved shoulders will need to be constructed for proper site access. Additional ROW may have to be acquired.

The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts on Card Sound Road, SW 376th Street and SW 167th Ave. will likely be significant. Truck queuing will have to be accomplished on site to prevent further congestion.



Analysis Summary – Alternative Site No. 22

Community



The USEPA EJScreen Standard Report indicated no existing issues for this site. However, the site is less than a mile from the nearest residential zoning and the presence of wetlands, wildlife habitat and other environmental issues suggests that the siting of a WTE facility may be met with opposition by the community at this location.

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Approximately 1.4 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access. Additional ROW may have to be acquired.
- Construction of approximately 2.2 miles of 12” water main and possibly a booster station will be required.
- Construction of an on-site wastewater lift station and about 2.7 miles of 6” force main may be required.
- Construction of approximately 5.2 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 2.3 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Due to shallow depth to bedrock, rock excavation may be required to install utility pipelines, which could significantly increase utility construction costs.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- Permanent impacts to wetlands would potentially require an Individual Environmental Permit, a State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

Analysis Summary – Alternative Site No. 22

- **Species Habitat – Conflict with MDC Policy CON-9A.**
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

Appendix B

Preliminary Implementation Schedule

Task	Activity	Duration of Activity	Total Task Duration (Start Date to Finish Date)	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
				Q Q Q Q	Q Q Q Q	Q Q Q Q	Q Q Q Q	Q Q Q Q	Q Q Q Q	Q Q Q Q	Q Q Q Q	Q Q Q Q	Q Q Q Q	Q Q Q Q	Q Q Q Q	Q Q Q Q
	Summary	7 years 9 months - 11 years 3 months *demo not included in duration	7 years 9 months - 11 years 3 months *demo not included in duration													
1	**Siting / Planning**	1.5 - 2.5 years	1.5 - 2.5 years													
2	**Financing**	1.5 years	3 years 9 months - 6 years 3 months													
3	**Regulatory / Permitting**	3.5 - 4.5 years	3.5 - 4.5 years													
4	**Procurement**	2 - 3 years	3 years - 4 years 9 months													
5	**Notice to Proceed / Design and Construction**	4 - 5 years	4 - 5 years													
6	**System Operational Impacts and Demolition**	1 - 1.5 years for Shutdown and Demo	1.5 years - 7 years 9 months													

Legend

- Existing Site
- Site 1: Medley
- Site 16: Ingraham Hwy Site 1
- Site 17: Ingraham Hwy Site 2

Note:

-Tasks identified in this high-level implementation schedule represent the Early Start Date, the earliest date a scheduled activity can be started. Certain tasks may be started earlier or later or extend or compressed to shorten or extend the schedule.

-Duration of Activity indicates the time that activity is occurring for the task and is included in report Table 2-2 Summary of Schedule Tasks with Estimated Durations

-Total Task Duration (Start Date to Finish Date) indicates the total time from the beginning of the first task or subtask to the end of the last task or subtask.

-Task durations provided are preliminary best estimates based on our professional judgement and experience with other facilities and processes.

-Demolition of the existing RRF included as lighter-colored durations.

Appendix C

Cost Considerations Table

Site	Costs (Unit Costs, when available)	Units for Unit Cost	Existing MDRRF Site (Doral)				Site 1 - Medley				Site 16 - Ingraham Hwy. Site #1				Site 17 - Ingraham Hwy. Site #2			
			Checklist	Unit Quantity	Cost	% of BASE	Checklist	Unit Quantity	Cost	% of BASE	Checklist	Unit Quantity	Cost	% of BASE	Checklist	Unit Quantity	Cost	% of BASE
Additional Site Estimates																		
Parcel Area		acres	157.16				320.31				159.71				81.11			
WTE Site Area		acres	50				50				50				50			
Building areas for vibrocompaction		square feet	871,200				871,200				871,200				871,200			
Soils Removal/Replace with Select Fill		depth (feet)					0.25				0.58				0.58			
		volume (CY)					8,067				18,822				18,822			
Embankment Fill (for elevation)		volume (CY) for one foot elevation required					32,267				32,267				32,267			
Estimated Cost Differentials																		
Location																		
Land Acquisition - MDPA Market Value Plus[1]	10%	percentage above market value	N		$0	0.0%	Y		$42,483,287	2.9%	Y	1	$2,523,928	0.2%	Y		$1,017,309	0.1%
Offsite Access Road development	$2,546,993	per mile	N			0.0%	N			0.0%	N				Y	0.75	$1,910,245	0.1%
Utilities																		
Off-Site Utilities Construction																		
Water																		
12-inch DIP pipeline	$475,200	per mile	N			0.0%	N			0.0%	Y	3.3	$1,568,160	0.1%	Y	4.0	$1,900,800	0.1%
Booster Pump Station, MGD (if no ISW)	$200,644	per booster static	N			0.0%	Y	1	$200,644	0.0%	Y	1	$200,644	0.0%	Y	1	$200,644	0.0%
Wastewater																		
6-inch PVC force main	$386,338	per mile	N			0.0%	N			0.0%	Y	3.3	$1,274,914	0.1%	Y	4.0	$1,545,350	0.1%
Lift station	$45,936	per station	N				Y	1	$45,936	0.0%	Y	1	$45,936	0.0%	Y	1	$45,936	0.0%
Natural Gas																		
Distance	$500,000	per mile	N			0.0%	Y	2.2	$1,100,000	0.1%	Y	5.5	$2,750,000	0.2%	Y	6.0	$3,000,000	0.2%
Electric																		
Distance	$1,000,000	per mile	N			0.0%	Y	1.9	$1,900,000	0.1%	Y	6.5	$6,500,000	0.4%	Y	6.5	$6,500,000	0.4%
Industrial Supply Well Development	$1,200,000	per well	N			0.0%	N			0.0%	N			0.0%	N			0.0%
Industrial Supply Well Rehabilitation - 25% of well d	$300,000	per well	Y	3	$900,000	0.1%	N				N				N			
Additional ROW/Easement for Utilities - 60 foot wid	Market Value		N			0.0%	Y	2.2	$2,122,109	0.1%	Y	6.5	$747,060	0.1%	Y	6.5	$592,910	0.0%
Stormwater[2]																		
Additional for site, above typical, 4 foot perimet	$30.13	per CY	N			0.0%	Y	16,800	$506,184	0.0%	Y	16,800	$506,184	0.0%	Y	16,800	$506,184	0.0%
Additional for temporary stormwater retainage c	$500,000	per site	Y	1	$500,000	0.0%	N			0.0%	N			0.0%	N			0.0%
Special Construction (i.e., Elevate Pit)																		
Additional Elevation of Pit due to high ground water elevation (5 foot included in re			N			0.0%	N			0.0%	N			0.0%	N			0.0%
Lake fill costs	$56.43	per CY	Y	114,060	$6,436,201	0.4%	N			0.0%	N			0.0%	N			0.0%
Soil																		
Removal of Muck Soils	$14.43	CY	N	0		0.0%	N			0.0%	Y	18,822	$271,605	0.0%	Y	18,822	$271,605	0.0%
Replace with Select Fill	$25.00	CY	N	0		0.0%	Y	8,067	$201,667	0.0%	Y	18,822	$470,556	0.0%	Y	18,822	$470,556	0.0%
Geotechnical Issues (Vibrocompaction)	$7.83	per square foot	Y	500,000	$3,915,000	0.3%	Y	871,200	$6,821,496	0.5%	Y	871,200	$6,821,496	0.5%	Y	871,200	$6,821,496	0.5%
Environment																		
Flood plain mitigation	if required	feet of elevation	N				N				Y	1			Y	1		
Embankment Fill	$30.13	per CY	N			0.0%	N			0.0%	Y	32,267	$972,195	0.1%	Y	32,267	$972,195	0.1%
Wildlife Mitigation / Relocation																		
Wood Stork	$65,000	per acre	N			0.0%	N			0.0%	N			0.0%	N			0.0%
Bonneted Bat - developed	$5,000	per acre	Y	50	$250,000	0.0%	N			0.0%	N			0.0%	N			0.0%
Bonneted Bat - undeveloped	$200,000	per acre	N			0.0%	N			0.0%	Y	50	$10,000,000	0.7%	Y	50	$10,000,000	0.7%
Florida Panthers	$65,000	per acre	N			0.0%	N			0.0%	N			0.0%	Y	50	$3,250,000	0.2%
Environmental Mitigation						0.0%												
Permanent Wetlands Mitigation - low	$65,000	per acre	N			0.0%	N			0.0%	Y	50	$3,250,000	0.2%	Y	50	$3,250,000	0.2%
Permanent Wetlands Mitigation - high	$120,000	per acre	N			0.0%	N			0.0%	N			0.0%	N			0.0%
Zoning and Permitting Cost Differential	$3,074,668	per site	N			0.0%	Y	1	$3,074,668	0.2%	Y	1	$3,074,668	0.2%	Y	1	$3,074,668	0.2%
Permitting Difficulty (percentage of)[3]	$3,074,668	per site	N		$0	0.0%	Moderate		$1,844,801	0.1%	Severe	1	$3,382,135	0.2%	Severe		$3,382,135	0.2%
State 404			N								Y				Y			
Environmental Resources Permit											Y				Y			
Air PSD/NSR Permitting			Y				Y				Y				Y			
PPSA							Y											
Consumptive Use Permit																		
System																		
Ash Disposal																		
Monofill Development (if feasible and space av	$1,000,000	per acre	N			0.0%	N			0.0%	N			0.0%	N			0.0%
System Effects - Capital[4]																		
Transfer Station Construction	$45,000,000	per station	N			0.0%	N			0.0%	Y	1	$45,000,000	3.1%	Y	1	$45,000,000	3.1%
Fleet vehicles - Transfer Trailers	$300,000	per trailer	N			0.0%	N			0.0%	Y	10	$3,000,000	0.2%	Y	10	$3,000,000	0.2%
Waste Diversion for Construction[5]	see Basis of Cos	total cost	N			0.0%	N			0.0%	N			0.0%	N			0.0%
TOTAL SITE COST DIFFERENTIATORS - Capital					$12,001,201	0.8%			$60,300,792	4.2%			$92,359,480	6.4%			$96,712,032	6.7%
ESTIMATED TOTAL CAPITAL COST					$1,445,520,543				$1,493,820,134				$1,525,878,822				$1,530,231,374	
ESTIMATED TOTAL CAPITAL COST DIFFERENTIAL WITH BASE COST				Base - Least Cost Alt					$48,300,000				$80,400,000				$84,700,000	

Site	Costs (Unit Costs, when available)	Units for Unit Cost	Existing MDRRF Site (Doral)				Site 1 - Medley				Site 16 - Ingraham Hwy. Site #1				Site 17 - Ingraham Hwy. Site #2			
			Checklist	Unit Quantity	Cost	% of BASE	Checklist	Unit Quantity	Cost	% of BASE	Checklist	Unit Quantity	Cost	% of BASE	Checklist	Unit Quantity	Cost	% of BASE
Operational Impacts[6]	$10.83	per ton, Year 1																
Utilities - Water																		
Purchase of Potable	$1.72	cost per ton wast	N				Y	1	$1.72	15%	Y	1	$1.72	15%	Y	1	$1.72	15%
System Effects - Operational																		
Ash Disposal[7,8]																		
Ash Hauling - landfill near RRF site	see Basis of Cos	cost per ton wast	Y	1	$0.39		Y	1	$0.39	3%	Y	1	$3.08	27%	Y	1	$3.08	27%
O&M Cost Impacts[9]																		
Transfer O&M (staffing, utilities, maintenance f	$8.61	cost per ton wast	N				N				Y	1	$8.61	77%	Y	1	$8.61	77%
TOTAL SITE COST DIFFERENTIATORS - Operational, cost per ton waste processed Year 1					$0.39				$2.10	19%			$13.40	119%			$13.40	119%
ESTIMATED TOTAL ANNUAL O&M COST per ton waste processed - Year 1					$11.22				$12.93				$24.23				$24.23	

Notes:

1 *Property acquisition based on 2021 MDPA Market Value plus markup identified on same row*
2 *Stormwater above typical assumes construction of berm around perimeter of WTE site for stormwater containment.*
3 *Permitting Difficulty - Rated as minor (25%), moderate (60%), and severe difficulty (110%) with percentage of Zoning and permitting cost differential to account for additional consultant cost.*
4 *System Effects - Capital Cost Impacts estimated to be transfer station development and additional transfer trailers*
5 *Waste Diversion for Construction on existing site - estimated cost differential between hauling and disposal at Okeechobee and disposal at MDRRF.*
6 *Operational Impacts are estimated on a per ton of waste processed basis and compared to base operational costs per ton waste processed, per the estimates developed for the WTE Facility Cost Estimate Project*
7 *Ash Hauling - assuming ash would be hauled off-site for disposal at a Landfill near RRF site. Cost differential is in hauling distance/cost.*
8 *Regular MSW that may be sent to nearby landfill would have to be diverted to allow ash to be disposed at nearby landfill.*
9 *System Effect - O&M Cost Impacts estimated to be additional drivers, equipment replacement, additional consumables for waste hauling*

Basis of Costs

CAPITAL

Water and Wastewater Utility Costs				
12" DIP	$83.99	per lineal foot	2022	*FDOT summary cost data*
12" DIP rounded up to include fittings, valves, etc. (water supply)	$90.00	per lineal foot	2022	*FDOT summary cost data*
6" PVC pipe (wastewater force main)	$73.17	per lineal foot	2022	*FDOT summary cost data*
wastewater lift station	$500,000	per MGD flow	2022	*recent project cost estimate*
assumed wastewater flow	0.09	MGD		*see Water, WW, and NG Needs sheet*
wastewater lift station cost per lift station	$45,936	per lift station		
water booster pump station	$500,000	per MGD flow	2022	*recent project cost estimate*
water booster pump station cost per pump station	$200,644	per pump station		*without ISW*
Industrial Supply Well development, 6-inch	$1,200,000	per well	2022	*recent project cost estimate, to be verified*
Industrial Supply Well rehabilitation (25% of development)	$300,000	per well		*existing site has 3 wells on-site. Would need review and repair*

Road Development Costs				
Undivided 2-lane rural road, 5' shoulders, new construction	$2,546,993	per mile	2022	*FDOT summary cost data, includes required stormwater for road*

Site Development Costs				
Regular excavation (removal of soils)	$14.43	per cubic yard	2022	*FDOT summary cost data*
Embankment fill (for elevating site)	$30.13	per cubic yard	2022	*FDOT summary cost data*
Regular fill	$25.00	per cubic yard	2022	*recent project cost estimate*
Vibrocompaction, 450 probes per acre at 40ft depth	$5.52	per square foot	2010	*PBREF 2 change order 5 (see separate sheet for breakdown)*
Vibrocompaction, 450 probes per acre at 40ft depth	$7.83	per square foot	2022	*PBREF 2 change order 5, escalated per ENR cost index*

Stormwater

Assumes construction of 4 foot berm around site perimeter, 3:1 side slope, 2 feet top width

Perimeter (linear feet)	8100	on average, can update based on si	Perimeter		
Foot print (square feet)	26	per linear foot	Existing Site	5713	linear feet
Total foot print, on average	4.83	acres	Site 16	8218.54	linear feet
Volume of soils for berm (cubic feet)	56	per linear foot	Site 17	8055.11	linear feet
Volume of soils for berm (cubic yards)	6.22	per linear yard	Average	8136.825	
Volume of soils for berm (cubic yards)	16800	CY per site			
Cost for berm construction	$30.13	per cubic yard	similar to embankment fill cost		
Cost per site	$506,184	per site			

Lake Fill

Reference Facility Lake Fill Cost Estimate (2020)	$13,000,000		2020
Lake Fill Cost Estimate (CY) - South Lake	338,323		
Estimated Cost Per CY	$38.42		2020
Estimated Cost Per CY	$56.43		2033

Ash Monofill	Unit Cost	unit	Date of Cost Estimate	*Source:*
Ash Monofill Expansion cost per acre	$800,000	per acre	Sep-18	*recent project cost estimate*
Ash Monofill Expansion cost per acre	$1,000,000	per acre	May-22	*recent project cost estimate*
Ash disposal per acre		ton per acre		*data from existing ash monofill?*
				existing ash monofill disposal capacity until 2028. Expansion may be possible

System Effects - Capital					
Capital Cost					
Transfer Station Construction	$45,000,000	Tampa ($34M, 2021, 50K sq ft), SWA (2013), DSWM CIP $45M			
Fleet vehicles - Transfer Trailers	$300,000	per trailer	10	units needed	based on recent 2021/2022 quote
Fleet vehicles - Collection Vehicles	$350,000	per vehicle	0	units needed	

OPERATIONAL

Waste Processed per year	1,333,333	tons per year		
Ash disposal per year	120,051	tons per year		
Year 1 Net O&M Cost	$14,439,872			
Year 1 Net O&M Cost per Ton (Base)	$10.83	per ton	2033	
Potable Water Purchased				
Potable water cost	$8.20	per ccf	2021	*MD DSWM WTE cost estimate*
Potable water cost	$11.69	per ccf	2033	
Potable water cost	$10,962.57	per million gallons	2021	
Potable water cost	$15,630.00	per million gallons	2033	
assumed potable water usage without ISW	0.40	MGD		*see Water, WW, and NG Needs sheet*
assumed potable water usage without ISW	146.47	MG per year		*see Water, WW, and NG Needs sheet*
Total assumed potable water cost without ISW - Year 1	$2,289,332	per year	2033	
Total potable water cost without ISW per ton waste processed	$1.72	per ton of waste processed		

Assumptions

Site Information		
Overall WTE site area - 4,000 TPD	50	acres
	2,178,000	square feet
Percent of site for buildings (area of	40%	
CPI	3%	

Unit Conversion		
1	cubic yards	
27	cubic feet	
1	mile	
5280	feet	
1	acre	0
43560	square feet	
1	square miles	
640	acre	
1	ccf	
748	gallons	

Ash hauling and disposal costs:

Medley Landfill (Waste Management)	**9350 NW 89th Ave, Medley, FL**			will need to verify capacity for past 2033
Tipping Fee ($/ton)	$34.17	per ton	2021	*MD DSWM WTE cost estimate, Medley Landfill*
	$48.72	per ton	2033	
Distance from existing site	3	miles		
Haul Cost ($/ton) - near existing site	$3.00	per ton ash	2021	
Haul Cost ($/ton) - near existing site - Year 1	$4.28	per ton ash	2033	
Total ash haul cost -near existing site - Year 1	$513,491	per year		
Ash Haul Cost per ton processed waste - Year 1 (near existing)	$0.39	cost per ton waste processed		
Distance to Site 16 and 17	43	miles		
Haul Cost ($/ton) - Sites 16 and 17	$9.36	per ton ash	2021	
Haul Cost ($/ton) - Sites 16 and 17 - Year 1	$13.35	per ton ash	2033	
Total ash haul cost - Year 1	$4,102,133	per year		
Ash Haul Cost per ton processed waste - Year 1 (Site 16 and 17)	$3.08	cost per ton waste processed		

Okeechobee Landfill (Waste Management)	**10800 NE 128th Ave, Okeechobee, FL**			
Tipping Fee ($/ton)	$30.00	per ton	2021	*MD DSWM WTE cost estimate, Okeechobee Landfill*
	$42.77	per ton	2033	
Estimated tipping fee percent increase due to demand	17.00%			*assume renegotiate with Okeechobee at a higher rate because of need and higher waste disposal tonnage contract*
Renegotiated Tipping Fee ($/ton)	$50.04	per ton	2033	not used
Distance from existing site	135	miles		
Haul Cost ($/ton) - near existing site	$17.80	per ton	2021	
Haul Cost ($/ton) - near existing site - Year 1	$25.38	per ton	2033	
Total ash haul cost -near existing site - Year 1	$3,046,712	per year		
Ash Haul Cost per ton processed waste - Year 1 (near existing)	$2.29	cost per ton waste processed		
Distance to Site 16 and 17	160	miles		
Haul Cost ($/ton) - Sites 16 and 17	$21.18	per ton	2021	estimated 19% more because distance is 19% greater than from existing
Haul Cost ($/ton) - Sites 16 and 17 - Year 1	$30.20	per ton	2033	
Total ash haul cost - Year 1	$3,601,522	per year		
Ash Haul Cost per ton processed waste - Year 1 (Site 16 and 17)	$2.70	cost per ton waste processed		

SWA Diverted Waste Basis of Cost for reference

Diverted Waste Disposal Location	Okeechobee Landfi	N/A	N/A		Current Agreements
Waste Disposal Location Distance fr	56	N/A	N/A		miles
Hauling Cost per mile	$ 4.15	N/A	$	4.15	$/mile
Haul Cost per ton	$ 7.27	N/A	$	7.27	$/ton
Year of Hauling Cost Estimate	2018	N/A		2018	year
Tipping Fee - Solid Waste (per ton)	$ 39.75	N/A	N/A		$/ton
Tipping Fee - C&D (per ton)	$ 31.25	N/A	N/A		$/ton
Tipping Fee - Vegetation (per ton)	$ 31.25	N/A	N/A		$/ton
Year of Tipping Fee Used	2019	N/A	N/A		year
Tons per Load - Garbage	$ 21.70	N/A	$	21.70	tons/load
Tons per Load - Ash	N/A	N/A	$	21.70	tons/load
PBREF 3 Distance from PBREP (mi	N/A	N/A		30	miles

System Effects - Operational — Operational costs are compared to projected O&M base cost

O&M Costs

Transfer Station O&M (staffing, utilities, maintenance)	$7,000,000	per year	2021	based on SWAPBC and Hillsborough data
Drivers	$75,000	per driver per year	2021	estimates
Transfer trailer units needed	10	units needed		
Cost per year	$8,050,000	per year	2021	similar to SWAPBC and Hillsborough data
	$11,477,375.14	per year	2033	
Cost per year per ton waste processed	$8.61	cost per ton waste processed		
Transfer Trailer O&M - Fuel, Maintenance, Equipment Replaceme	$30,000	per unit per year	2021	estimates

SWAPBC Component Cost Summ

	Avg TS Cost Per T	Transportation Cost per ton		Annual Tonnage	Total Expenses	
Belle Glade TS	$67.29	$23.40	2012	31,285	$2,097,110	
Lantana TS	$26.44	$11.35	2012	176,938	$8,883,190	
Jupiter TS	$20.87	$8.68	2012	376,658	$9,910,933	
Royal Palm Beach TS	$22.36	$6.70	2012	211,726	$4,382,320	
Southwest TS	$51.24	$7.61	2012	273,305	$6,098,259	
Overall	$29.38	$8.77	2012	1,264,125	$6,130,836	average
	$39.48	$11.79	2022		**$8,239,330**	
	$54.66	**$16.31**	**2033**		**$11,405,160**	

ATRI Study (2019) - Hauling costs	https://truckingresearch.org/wp-content/uploads/2019/11/ATRI-Operational-Costs-of-Trucking-2019-1.pdf			
Average Marginal Cost per Mile	$1.82	2018	includes fuel, R&M, insurance, driver wages and benefits, permits and tolls	
Average Marginal Cost per Hour	$71.78	2018	includes fuel, R&M, insurance, driver wages and benefits, permits and tolls	

Miami-Dade System Costs

Transfer Station Operations Expenses	$28,801,000		FY 2020 Actua	
Transfer Fee Tonnage	647,655	tons per year	FY 2022 Proje	
Transfer Station Operations Cost per Ton (Estimate)	$44.47	per ton	2020	
Transfer Station Operations Cost per Ton (Estimate)	$47.18		2022	
Transfer Station Operations Cost per Ton (Estimate)	$65.31		2033	

Hillsborough County - Transfer Station Costs

NWTS and CCC FY23 Total Budget	$6,622,909		
NWTS and CCC FY21 Tonnage	246,807.54		
Estimated cost per ton	$26.83		
SCTS and 3CCC FY23 Total Budget	$5,546,013		
SCTS and 3CCC FY21 Tonnage	173,314.75		
Estimated cost per ton (2023)	$32.00		
Estimated cost per ton (2033)	**$43.00**		

Waste Diversion for Construction (additional cost compared to MDRRF disposal) — not used

Months of waste diversion	0	months		
Years of waste diversion	0	years	2028-2032	assumes MDRRF will continue operations during construction of new WTE Facility
Waste processed per year	1,000,000	tons	MDRRF capacity	
Total waste diverted	-	tons		

Medley cannot take all of diverted waste

Medley Landfill (Waste Management)			
Existing Site			
Diverted waste hauling	$4,277,283	per year	2033
Diverted waste hauling	$0	total for construction period	
Diverted waste disposal	$34,170,000	per year	2033
Diverted waste disposal	$0	total for construction period	
Total waste hauling and disposal	$0		

Okeechobee Landfill (Waste Management)			
Existing Site			
Diverted waste hauling	$25,378,544	per year	2033
Diverted waste hauling	$0	total for construction period	
Diverted waste disposal	$50,044,207	per year	2033
Diverted waste disposal	$0	total for construction period	
Total waste hauling and disposal	$0		2033
Total waste hauling and disposal	#DIV/0!	per ton	2033

	miles from RRF	Year capacity reached (Current Capacity, No Expansion, With RRF)	Year capacity reached (Current Capacity, With Expansion, With RRF)	Draft Arcadis Estimates as of Sept 2021
North Dade LF	15.00	2024	2048	2030
South Dade LF	25.00	2033	2042	2030
RRF LF	0.00	2031	N/A	2030

County Landfill

Existing Site			
Diverted waste hauling		per year	2033
Diverted waste hauling		total for construction period	
Diverted waste disposal		per year	2033
Diverted waste disposal		total for construction period	
Total waste hauling and disposal			

RRF 2021 Operating Cost per Ton Processed (Gross)	$61.34	per ton	2021	does not include electrical revenues. Rates and Charges Report
RRF Operating Cost per Ton Processed (Gross)	$87.46	per ton	2033	
RRF 2021 Operating Cost	$62,203,174		2021	Rates and Charges Report
Electrical Revenues 2021	$8,640,000		2021	Rates and Charges Report
RRF Tonnage FY 2021	1,014,050	tons	2021	Rates and Charges Report
RRF 2021 Operating Cost per Ton Processed (Net)	$52.82	per ton	2021	including electrical revenues
RRF Operating Cost per Ton Processed (Net)	$75.31	per ton	2033	

likely $79M once 5th amendment approved

Waste Diversion for Construction - Cost Difference to send to Okeechobee vs MDRRF	#DIV/0!	per ton
Total Waste Diversion Cost Difference	#DIV/0!	

Easement/ROW Access

use market value per acre		
60 foot wide easement	0.011363636	miles

Demolition Cost applies to all not used

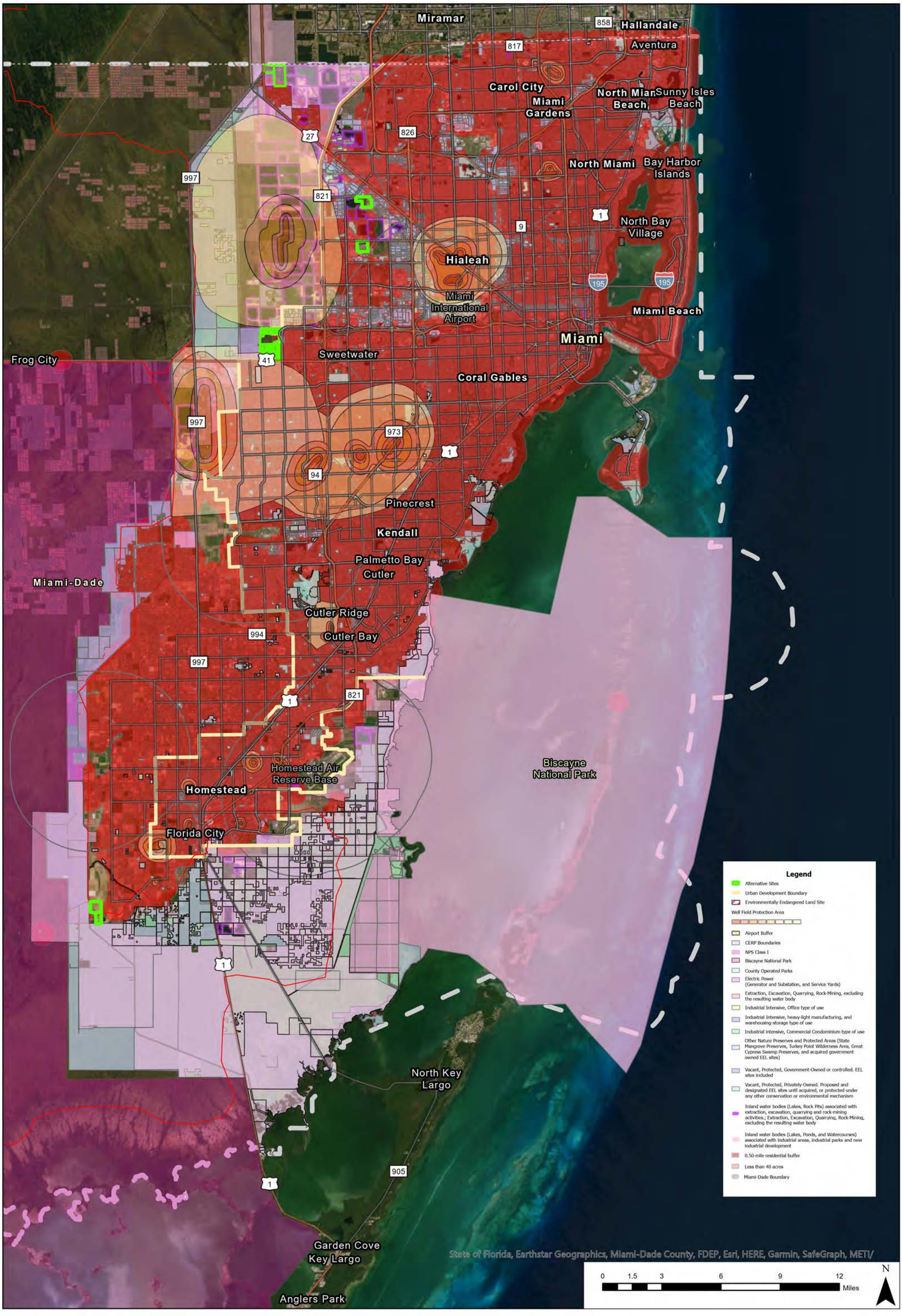
Arcadis U.S., Inc.
701 Waterford Way
Suite 420
Miami
Florida 33126
Phone: 305 913 1316
Fax: 305 913 1301
www.arcadis.com

Appendix B

Screening Criteria Map

Preliminary Solid Waste System Siting Alternatives Evaluation Map

Miami - Dade County, Florida



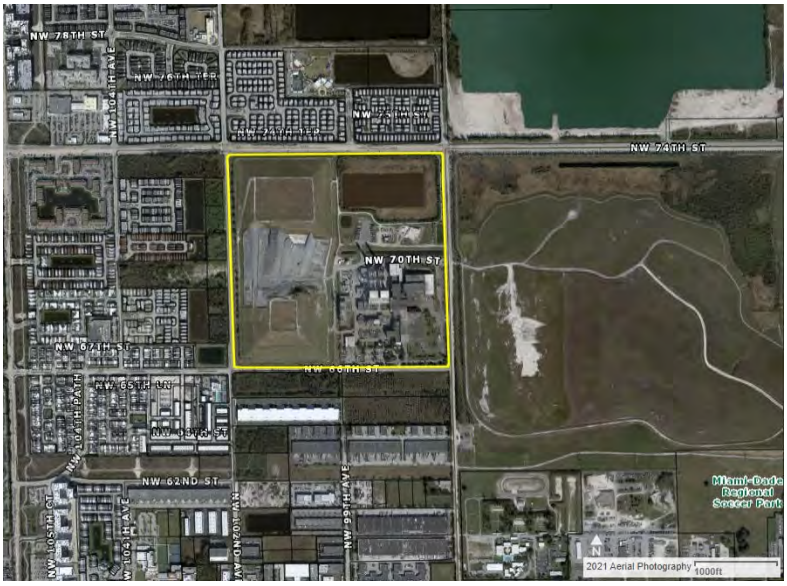
Appendix C

Site Packages

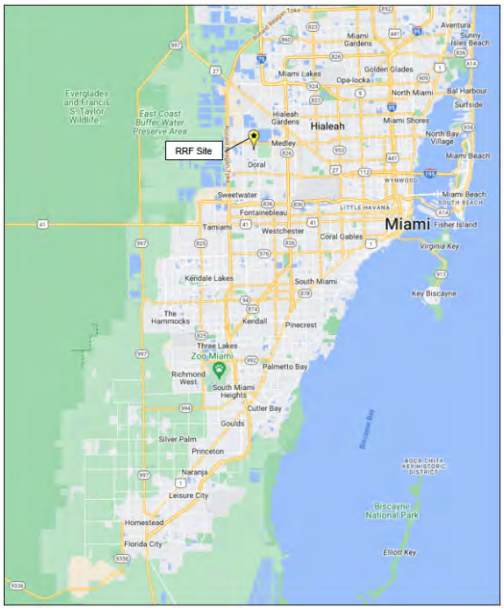
Future Waste-To-Energy Facility Siting Alternatives Analysis

Analysis Summary – Existing RRF Site - Doral

MDPA Parcel Map



Location Map



Site Information

MDPA Parcel Data

Folio No: 35-3017-001-0120
Owner: Miami Dade County DSWM
2023 MDPA Market Value: $176,644,467
Zoning District: GU

This 157.16-acre site is a single parcel inside the UDB, located in the City of Doral. The developable site area is sufficient to support any of the alternative facilities and is co-located with an active 80-acre Ash Landfill. The property is less than a 10-minute travel time to major roads, is less than 0.1 miles from the nearest residential zoning, and 9.87 miles (15.88 km) from the Class I boundary of Everglades National Park.

Site Alternatives Summary

Considerations for the selection of each alternative technology at this site are shown on the pages that follow.

Analysis Summary – Existing RRF Site - Doral

Site Alternatives Summary						
Alternative	**Potential Site Area**	**Capacity**	**Annual Cost Per Ton**	**Development Time**	**Technology Considerations**	**Site-Specific Considerations**
Organics Composting (Windrow)	10-60 Ac	5-8 tons per acre per day, typically 80-500 TPD.	$72-$80+ (1)	3-5 years	Requires separate organics collection. Low complexity, low skill level needed for most operations. Minimum 30-day processing time. Processing capacity depends on available land area. Not well suited for urban areas, potential public concerns with noise, odor and vector issues. Challenging wet season operations. Good quality compost produced. End uses/markets and capacities may need development. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals.	Likely public concerns with noise, odor and vector issues. Estimated maximum processing capacity at this site approximately 125,000 tons per year. Could be co-located with other alternative facility(ies) on this site.
Organics Composting (ASP)	5-60 Ac	1-10 tons per acre per day. Typically, 80-700 TPD	$74-$80+ (1)	3-5 years	Requires separate organics collection. Moderate complexity, moderate skill level needed for operation. Minimum 30-day processing time. Processing capacity depends on available land area. Potential public concerns with noise, odor and vector issues. Challenging wet season operations. End uses/markets and capacities may need development. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals.	Likely public concerns with noise, odor and vector issues. Estimated maximum processing capacity at this site approximately 180,000 tons per year. Could be co-located with other alternative facility(ies) on this site.
Organics Composting (In-Vessel)	1-60 Ac	5-100 tpd per vessel, 15 to 1200 TPD	$9-$50+ (1), (2)	3-5 years	Requires separate organics collection. Variable complexity, low skill level needed for operation. Short 5-7 day processing time. Compact process, smaller facility footprint, expandable capacity. Better suited for urban areas, vessels can be enclosed in metal building to mitigate potential public concerns with odor and vector issues from receiving areas. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals.	Compact footprint is a good option for this location. Reduced potential public concerns with noise, odor and vector issues. Depending on footprint area, could be co-located with other alternative facility(ies) on this site.
Anaerobic Digestion	3-40+ acres depending on capacity	270-600 TPD	$57-$90+ (1), (2)	5-7 years	Requires separate organics collection. High complexity, high skill level needed for operation. Processing capacity depends on available land area. Potential permitting issues and public concerns with noise, odor and vector issues. Fire risk from methane production. Additional composting or disposal of resulting digestate solids would be required. Resulting digestate liquids can be used for fertilizer in cover maintenance for landfills or on agricultural land. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals. End uses/markets and capacities may need development.	Possible capacity limitations due to limited site area. Likely permitting issues and public concerns with noise, odor and vector issues. Could be co-located with other alternative facility(ies) on this site.
Gasification	5-60+ Ac	100-300+ TPD	$154+(3)	10+ years	Unproven technology, significant pre-processing of MSW required. High complexity, high skill level needed for operation. Possible capacity limitations. Increased fire risk from syngas production but can fuel turbines for electrical generation. High capital and operating cost. Active ash monofil on site for slag disposal.	Good transportation access, all utilities available. Permitting and public opposition challenges. Permitting schedule may be faster as site has existing Power Plant Site Certification. RRF Landfill on site for slag disposal.

Analysis Summary – Existing RRF Site - Doral

Site Alternatives Summary						
Alternative	**Potential Site Area**	**Capacity**	**Annual Cost Per Ton**	**Development Time**	**Technology Considerations**	**Site-Specific Considerations**
Waste-to-Energy (Mass Burn)	40-60 Ac	4,000-5,000 TPD	$57-60+	8-10+ years	No changes to existing collection system needed. Highest capacity alternative. High complexity, high skill level needed for operation. Permitting and public opposition challenges. High capital and operating cost. Electrical generation for revenue or powering other facilities. Good metal recovery possible from ash. Landfill needed for ash disposal.	Good transportation access, all utilities available. Permitting and public opposition challenges. Permitting schedule may be faster as site has existing Power Plant Site Certification. RRF Landfill on site for ash disposal.
Mechanical Biological Treatment	5-15 Ac	200-560 TPD	$123-183	3-4 years	No changes to existing collection system needed. High complexity, high skill level needed for operation. High capital and operating cost. High-capacity alternative, but waste is typically shredded and converted into pelletized solid recovered fuel (SRF) that must be transported and fired at another facility capable of using the SRF. Additional fleet equipment and operators would be needed for site operation and transport of SRF.	Potential public concerns with noise, odor and vector issues. Could be co-located with other alternative facility(ies) on this site. Local concrete facilities may be able to use SRF.
Mixed Waste Processing Facility	20-60 Ac	200-1500 TPD	$85-$150	5-7 years	No changes to existing collection system needed. High complexity, but low skill level needed for most operations. Capacity limited to approximately 3,000 tpd. Potential permitting issues and public concerns with noise, odor and vector issues. Additional processing/disposal of post-processed MSW would be required. Contamination of recovered materials is significant issue, recovery rates for marketable materials typically 30% or less. End uses/markets and capacities may need development. Moderate capital and operating costs, and additional fleet equipment and operators would be needed for site operations and transport of residuals.	Likely public concerns with noise, odor and vector issues. Depending on footprint area could be co-located with another alternative facility on this site.
Material Recovery Facility	20-60 Ac	300-400 TPD	$87-154	5-7 years	Modification of existing curbside collection system needed. High complexity, but low skill level needed for most operations. Capacity limited by site area. Typical maximum processing capacity for these facilities is approximately 350-400 tons per day. Minimal public concerns. Additional processing/disposal of some post-processed materials (i.e., glass) would be required. Contamination of recovered materials is significant issue. End uses/markets and capacities may need development. Moderate capital and operating costs, and additional fleet equipment and operators would be needed.	Minimal expected permitting and public concerns. Could be co-located with another alternative facility on this site.
C&D Recycling Facility	5-20 Ac	300–825 TPD	$76-150	3-7 years	No change to existing collection system needed. Can be low or high complexity, but low skill level needed for most operations. Capacity limited by site area. Potential public concerns with noise, odor, and dust. Additional processing/disposal of some post-processed materials (i.e., mixed fines) would be required. End uses/markets and capacities may need development. Moderate capital and operating costs, and additional fleet equipment and operators would be needed.	Likely public concerns with noise, odor and dust issues. Depending on footprint area could be co-located with another alternative facility on this site.

(1) Sources: DC Study (2017 costs escalated) and NREL Study (2020 costs escalated). Cost does not include additional organics collection system costs.
(2) Costs estimated from vendor quote, does not include building or land acquisition costs.
(3) Costs based on 2017 article in Waste Management journal using developed country costs.

Analysis Summary – Existing RRF Site - Doral

Operational, Engineering, and Regulatory Considerations

Location

The site is located at 6990 NW 97th Avenue, Miami, FL 33178, less than 0.1 miles from the nearest residential zoning, and 9.87 miles from the boundary of Everglades National Park. If this site were selected, the short-term effects on the County's Solid Waste System would be minimal. Over the short term, redeveloping this site with a new WTE facility while maintaining the existing RRF operations could be challenging and would require close coordination between the contractor and operator. Construction phasing will need to be considered and planned in order to limit impact to the existing RRF operations, which if impacted, could result in additional costs and extend the duration of the project schedule.

In the long term, the number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility, but their travel patterns and travel times would be unaltered. Estimated travel distances and times from the site to the County's transfer stations and landfills are as follows:

Facility	Est. Travel Distance/Time to RRF
West TS	9 mi/16 min
Central TS	14 mi/21 min
Northeast TS	18 mi/25 min
South Dade LF	25 mi/31 min
North Dade LF	21 mi/23 min

Although additional transfer fleet vehicles and drivers would be routed to the site in order to maximize WTE processing capacity, they may be rerouted from deliveries to non-DSWM disposal sites and the acquisition of additional fleet vehicles and driver staffing may not be needed. Transfer fleet fuel consumption and maintenance costs would increase due to the additional deliveries, while similar Collection fleet costs would be virtually unchanged. Additionally, the existing RRF site is in close proximity to route power to the 58th Street Fleet Facility and could provide for charging stations for electric fleet vehicles, which are currently being procured.

Ash from the new WTE facility may be disposed of at the existing Ash Monofill, if capacity is available, or may be disposed either at the adjacent WM Medley landfill or hauled out of County. Either off-site option will significantly increase ash disposal costs from current levels.

Analysis Summary – Existing RRF Site - Doral

Utilities

- **Potable water** – The potable water capacity required for fire lines and supply lines will depend on the type of alternative facility(ies) selected. According to WASD data, there is a 4" potable supply line at the property and a 16" water main available on NW 97th Ave.
- **Wastewater** – The minimum sanitary sewer capacity requirements will depend on the type of alternative facility(ies) selected. Sanitary sewer is available at the site on NW 97th Ave., on-site lift station and leachate storage tank. WASD data indicates there is a 16" gravity sewer available on NW 97th Ave.
- **Natural gas** – The minimum natural gas capacity requirements will depend on the type of alternative facility(ies) selected. If needed for facility operations, there is an 8" gas service line available at the site, and the transmission main is available on 97th Ave.
- **Electric** – The electrical service capacity required will depend on the type of alternative facility(ies) selected. Standard 120V/230A electrical service is available at the site. The nearest substation available approximately 0.15 miles SE of the site on NW 97th Ave. Need to verify substation/ switchyard spare capacity, voltage, and available terminations.
- **Stormwater** – An existing stormwater system is on site serving both the existing RRF and the Ash Monofill.
- **Groundwater** – If necessary for facility operations, a consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer. If a consumptive use permit cannot be obtained, then potable water service will have to provide for all facility water consumption needs, which will increase operating costs. Three industrial supply wells are currently used at the RRF for source water for boiler feedwater, cooling tower/condenser feedwater, truck wheel wash, and irrigation water. If reused for a new alternative facility on site, the wells may need to be redeveloped.

Soil

The USDA Soil Survey data for the site classifies the predominant site soils as Udorthents-Water-Urban land complex, 0 to 60 percent slopes and Cooper Town muck, ponded-Urban land complex, 0 to 1 percent slopes. Udorthents soils consist of unconsolidated or heterogeneous geologic material removed during the excavation of ditches, canals, lakes, ponds, and quarries. This is consistent with the development of the RRF and Ash Monofill at the site.

The presence of muck soils in the northeast quadrant of the site indicates the seasonal high groundwater elevation is typically 0-6 inches below existing grade but would have to be confirmed by geotechnical investigations. Depending on the type of alternative facility(ies) selected for this site, the facility buildings and ancillary components would have to be constructed on fill material, which could present geotechnical engineering challenges for foundation designs and additional site preparation costs.

Analysis Summary – Existing RRF Site - Doral

Environment

- **Floodplains** – Most of the site is in FEMA Flood Zone X (Minimal Flood Hazard), portions of the NE area (stormwater ponds) are in FEMA Flood Zone AE (El. 5).
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification** – The existing RRF is currently permitted under the Power Plant Siting Act (PPSA) Conditions of Certification PA 77-08. In order to construct a new WTE or gasification facility on the site, a complete PPSA Modification Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.). The PSC "need determination" filing process is also required.
- **New Source Review (NSR) - Prevention of Significant Deterioration (PSD) Permitting** – The site is located 9.87 miles (15.88 km) NE of the Everglades Class I Area, 14.77 miles (23.8 km) NW of the Biscayne Class II Area, one mile south of the Medley Landfill, 4.7 miles NE of the CEMEX Miami Cement Plant and about 2.2 miles SE of the Titan Pennsuco Complex, which are all large sources of emissions.

  As a proposed major source of air pollutant emissions, a new WTE or gasification facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

  The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay National Park (sensitive Class II area) located on the eastern side border having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE or gasification facility, and thus will make air permitting challenging. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive areas.

Analysis Summary – Existing RRF Site - Doral

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory indicates the site contains minor wetlands surrounding a large treatment pond and four surface waters. National Wetlands Inventory mapping indicates most of the site is a Freshwater Emergent Wetland habitat classified as a PEM1C, as shown in Figure 1. The National Hydrography Dataset shows three surface waters. The South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site contains one stormwater treatment pond. The site appears completely disturbed.

Fig. 1 - Wetlands area on RRF Site (from NWI data)

The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required. The site is not within 18.6 miles of an active wood stork colony and does not appear to contain suitable foraging habitat; therefore, wood stork mitigation is not anticipated. Impacts to wetlands and surface waters designed and permitted as stormwater treatment areas are generally not regulated by the State of Florida, however, additional studies and analysis are required to determine if wetland permitting such as a State 404 Permit would be required.

Transportation

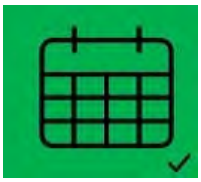
Travel time north to major roads (i.e., 58th Street, 74th Street) is less than 10 minutes. Existing access to site is via NW 97th Ave., which was recently four-laned and has sufficient capacity for the expected traffic loadings of any of the proposed alternative facilities. Traffic impacts on local roads would be unchanged from existing conditions. The site has sufficient area to accommodate truck queueing.

Analysis Summary – Existing RRF Site - Doral

Community

The USEPA EJScreen Standard Report indicated elevated values for Particulate Matter 2.5 ($\mu g/m^3$) and several other pollutants. The site is less than a tenth of a mile from the nearest residential zoning, and the local population, community political leaders and environmental groups have indicated opposition to continued use of the site for WTE facility operations.

Schedule



The existing RRF site is currently permitted under the PPSA Certification as well as PSD and Title V Air Operating Permits, which reduce the duration of the environmental permitting effort. Additionally, the site work required as compared to other sites is minimal because of existing RRF facility operations and infrastructure. However, there are existing conditions that affect the duration of a new WTE or gasification facility implementation including the following:

- **PSD Permitting** – The nearby Everglades National Park's (sensitive Class I area) location along the western border of the County and the Biscayne Bay National Park (sensitive Class II area) located on the eastern border of the County, both having more stringent AQRVs provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE or gasification facility and will make air permitting challenging at this site.
- **PPSA Permitting** – This site was previously permitted and under the PPSA Certification and potentially reduces the duration needed for environmental permitting as a PPSA Certification modification and not a new application will be developed.
- **Community** –Opposition from the community is expected which could increase the duration of the new WTE facility implementation schedule.
- **Construction** – Additional planning and coordination is required in order to construct the new WTE facility at the existing RRF site, assuming the existing RRF continues to operate.

Cost

For comparative purposes, the existing RRF site was considered the base case, which includes the following costs:

- **Site Preparation** – Stormwater detention pond fill costs, environmental permitting costs and ash hauling.
- **System Effects** – If this site were selected, the effects on the County's Solid Waste System would be minimal, however, construction phasing will need to be considered in order to limit impact to assumed ongoing RRF operations.

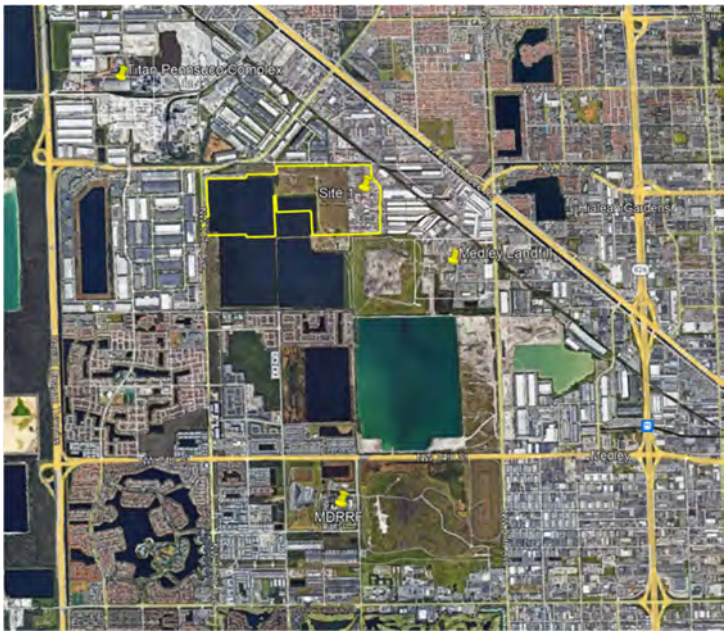
Analysis Summary – Existing RRF Site - Doral

Site Differentiators Overview

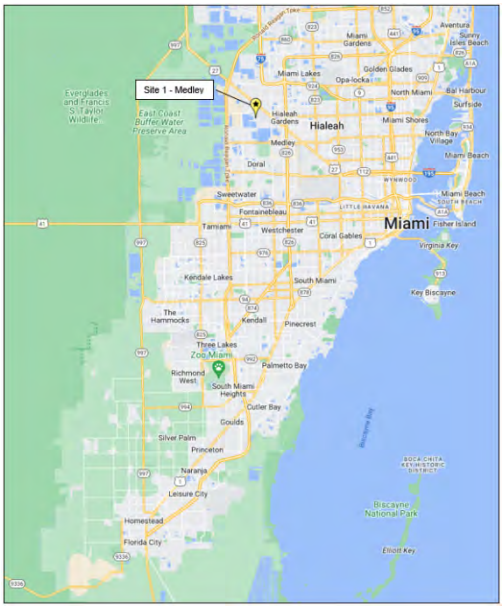
- The existing RRF facility and site is currently permitted under the PPSA and is operating under an existing Conditions of Certification PA 77-08, which can be modified to provide for the construction and operation of a new WTE or gasification facility. A Modification to an existing Conditions of Certification is typically faster than developing an entirely new PPSA Application for an unpermitted site.
- Existing utilities suitable for any of the alternative facilities are readily available and the site could potentially route power to nearby System facilities.
- Depending on the alternative facility(ies) selected for this site, construction phasing may need to be considered in order to limit impact to assumed ongoing RRF operations, which could result in additional costs and extend project schedule.
- Expected significant opposition from the community could affect the project schedule.

Analysis Summary – Alternative Site No. 1 - Medley

MDPA Parcel Map



Location Map



Site Information

This 320.31-acre site is inside the UDB, located in the Town of Medley. The site is composed of several parcel areas and is large enough to support any of the alternative facilities and co-locate multiple facilities into a solid waste campus, depending on the constraints of the specific parcel(s) selected for development. The property is less than a 10-minute travel time to US-27 or the Turnpike, is located adjacent to residential zoning and 11.38 (18.31 km) miles from the boundary of the Everglades Class I area.

MDPA Parcel Data

Owner: F77 1 F77 2 & F77 3 LLC, F00 1 LLC
2023 MDPA Market Value: $102,589,877
Zoning District: M-1
PA Zone: Industrial – Light
Folio No: 22-3004-001-0470, others.

Site Alternatives Summary

Considerations for the selection of each alternative technology at this site are shown on the pages that follow.

Analysis Summary – Alternative Site No. 1 - Medley

Site Alternatives Summary						
Alternative	**Potential Site Area**	**Capacity**	**Cost Per Ton**	**Development Time**	**Technology Considerations**	**Site-Specific Considerations**
Organics Composting (Windrow)	10-300 Ac	5-8 tons per acre per day, typically 80-500 TPD.	$72-$80+ (1)	3-5 years	Requires separate organics collection. Low complexity, low skill level needed for most operations. Minimum 30-day processing time. Processing capacity depends on available land area. Not well suited for urban areas, potential public concerns with noise, odor and vector issues. Challenging wet season operations. Good quality compost produced. End uses/markets and capacities may need development. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals.	Potential public concerns with noise, odor and vector issues. Estimated maximum processing capacity at this site approximately 200,000 tons per year without filling lake areas. Could be co-located with other alternative facility(ies) on this site.
Organics Composting (ASP)	5-300 Ac	1-10 tons per acre per day. Typically, 80-700 TPD	$74-$80+ (1)	3-5 years	Requires separate organics collection. Moderate complexity, moderate skill level needed for operation. Minimum 30-day processing time. Processing capacity depends on available land area. Potential public concerns with noise, odor and vector issues. Challenging wet season operations. End uses/markets and capacities may need development. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals.	Potential public concerns with noise, odor and vector issues. Estimated maximum processing capacity at this site approximately 250,000 tons per year without filling lake areas. Could be co-located with other alternative facility(ies) on this site.
Organics Composting (In-Vessel)	1-60 Ac	5-100 tpd per vessel, 15 to 1200 TPD	$9-$50+ (1), (2)	3-5 years	Requires separate organics collection. Variable complexity, low skill level needed for operation. Short 5-7 day processing time. Compact process, smaller facility footprint, expandable capacity. Better suited for urban areas, vessels can be enclosed in metal building to mitigate potential public concerns with odor and vector issues from receiving areas. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals.	Reduced potential public concerns with noise, odor and vector issues. Could be co-located with other alternative facility(ies) on this site.
Anaerobic Digestion	3-40+ acres depending on capacity	270-600 TPD	$57-$90+ (1), (2)	5-7 years	Requires separate organics collection. High complexity, high skill level needed for operation. Processing capacity depends on available land area. Potential permitting issues and public concerns with noise, odor and vector issues. Fire risk from methane production. Additional composting or disposal of resulting digestate solids would be required. Resulting digestate liquids can be used for fertilizer in cover maintenance for landfills or on agricultural land. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals. End uses/markets and capacities may need development.	Potential permitting issues and public concerns with noise, odor and vector issues. Some utilities may need to be extended to site. Could be co-located with other alternative facility(ies) on this site.
Gasification	5-60+ Ac	100-300+ TPD	$154+(3)	10+ years	Unproven technology, significant pre-processing of MSW required. High complexity, high skill level needed for operation. Possible capacity limitations. Increased fire risk from syngas production but can fuel turbines for electrical generation. High capital and operating cost. Active ash monofil on site for slag disposal.	Difficult permitting, close to Everglades Class I area and existing large emitters. Significant impacts to local traffic. Development at this site may require additional time and costs for backfilling and structure foundations. Could be co-located with other alternative facility(ies) on this site. WM Medley landfill adjacent to site for slag disposal.

Analysis Summary – Alternative Site No. 1 - Medley

Site Alternatives Summary						
Alternative	**Potential Site Area**	**Capacity**	**Cost Per Ton**	**Development Time**	**Technology Considerations**	**Site-Specific Considerations**
Waste-to-Energy (Mass Burn)	40-60 Ac	4,000-5,000 TPD	$57-60+	8-10+ years	No changes to existing collection system needed. Highest capacity alternative. High complexity, high skill level needed for operation. Permitting and public opposition challenges. High capital and operating cost. Electrical generation for revenue or powering other facilities. Good metal recovery possible from ash. Landfill needed for ash disposal.	Difficult permitting, close to Everglades Class I area and existing large emitters. Significant impacts to local traffic. Site development may require additional time and costs for backfilling and structure foundations. Could be co-located with other alternative facility(ies) on this site. WM Medley landfill adjacent to site for ash disposal.
Mechanical Biological Treatment	5-15 Ac	200-560 TPD	$123-183	3-4 years	No changes to existing collection system needed. High complexity, high skill level needed for operation. High capital and operating cost. High-capacity alternative, but waste is typically shredded and converted into pelletized solid recovered fuel (SRF) that must be transported and fired at another facility capable of using the SRF. Additional fleet equipment and operators would be needed for site operation and transport of SRF.	Potential public concerns with noise, odor and vector issues. Could be co-located with other alternative facility(ies) on this site. Local concrete facilities may be able to use SRF.
Mixed Waste Processing Facility	20-60 Ac	200-1500 TPD	$85-$150	5-7 years	No changes to existing collection system needed. High complexity, but low skill level needed for most operations. Capacity limited to approximately 3,000 tpd. Potential permitting issues and public concerns with noise, odor and vector issues. Additional processing/disposal of post-processed MSW would be required. Contamination of recovered materials is significant issue, recovery rates for marketable materials typically 30% or less. End uses/markets and capacities may need development. Moderate capital and operating costs, and additional fleet equipment and operators would be needed for site operations and transport of residuals.	Potential public concerns with noise, odor and vector issues. Significant impacts to local traffic. Could be co-located with other alternative facility(ies) on this site.
Material Recovery Facility	20-60 Ac	300-400 TPD	$87-154	5-7 years	Modification of existing curbside collection system needed. High complexity, but low skill level needed for most operations. Capacity limited by site area. Typical maximum processing capacity for these facilities is approximately 350-400 tons per day. Minimal public concerns. Additional processing/disposal of some post-processed materials (i.e., glass) would be required. Contamination of recovered materials is significant issue. End uses/markets and capacities may need development. Moderate capital and operating costs, and additional fleet equipment and operators would be needed.	Minimal expected public concerns. Moderate impacts to local traffic. Could be co-located with another alternative facility on this site.
C&D Recycling Facility	5-20 Ac	300–825 TPD	$76-150	3-7 years	No change to existing collection system needed. Can be low or high complexity, but low skill level needed for most operations. Capacity limited by site area. Potential public concerns with noise, odor, and dust. Additional processing/disposal of some post-processed materials (i.e., mixed fines) would be required. End uses/markets and capacities may need development. Moderate capital and operating costs, and additional fleet equipment and operators would be needed.	Likely public concerns with noise, odor and dust issues. Depending on footprint area could be co-located with another alternative facility on this site.

(1) Sources: DC Study (2017 costs escalated) and NREL Study (2020 costs escalated). Cost does not include additional organics collection system costs.
(2) Costs estimated from vendor quote, does not include building or land acquisition costs.
(3) Costs based on 2017 article in Waste Management journal using developed country costs.

Analysis Summary – Alternative Site No. 1 - Medley

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 2.0 miles north of the existing RRF, more than four miles from any active airport, adjacent to residential zoning, and more than 11 miles from the boundary of Everglades National Park. If this site were selected, the effects on the County's Solid Waste System would be minimal. Direct hauls from some of the collection routes in the vicinity of the existing RRF would divert to the West transfer station for disposal due to shorter travel times. Incoming waste at that station would increase and may result in capacity issues, as it is currently operating at approximately 80% of design capacity.

The number of deliveries by collection vehicles and transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the capacity and material types processed by the alternative facility(ies) developed at the site. Their travel patterns would be slightly altered, and travel times would change slightly due to changes in travel distances and expected traffic congestion. Estimated travel distances and times from the site to the County's transfer stations and landfills as compared to the RRF site are as follows:

Facility	Est. Travel Distance/Time to Site 1 - Medley	Est. Travel Distance/Time to RRF
West TS	11 mi/18 min	9 mi/16 min
Central TS	11 mi/23 min	14 mi/21 min
Northeast TS	15 mi/25 min	18 mi/25 min
South Dade LF	26 mi/32 min	25 mi/31 min
North Dade LF	18 mi/19 min	21 mi/23 min

The changes in travel times and distances from the RRF site do not appear to be sufficient to significantly affect Collection and Transfer operations. Provided no other operational changes are made, Collection and Transfer fleet labor, fuel consumption and maintenance costs are expected to have only minor changes if this site were selected for development.

Ash/slag hauling costs for a new WTE or gasification facility located at this site are expected to be higher than at the existing RRF, and options for limiting hauling distances could be considered. If disposed at a non-County facility, costs for disposal would significantly increase from current levels.

Analysis Summary – Alternative Site No. 1 - Medley

Utilities

- **Potable water** – The potable water capacity required for fire lines and supply lines will depend on the type of alternative facility(ies) selected. Potable water mains appear to be available at the site on NW 95th Ave. and NW 106th Street, but additional analysis will be needed to determine pipe size, service pressure, and available system capacity. A booster station may be needed to increase system pressure. Soils data indicates shallow depth to bedrock in some locations, rock removal may be required for pipe trench excavation for new lines in those areas.
- **Wastewater** – The minimum sanitary sewer capacity requirements will depend on the type of alternative facility(ies) selected. Sanitary sewer appears to be available at the site on NW 95th Ave. and NW 106th Street, but additional analysis will be needed to determine pipe size and available system capacity. A lift station and force main to gravity sewer may be required. Soils data indicates shallow depth to bedrock in some locations, rock removal may be required for pipe trench excavation for new lines in those areas.
- **Natural gas** – The minimum natural gas capacity requirements will depend on the type of alternative facility(ies) selected. If needed for facility operations, service lines will need to be extended to the site. According to the National Pipeline Mapping System (NPMS) there is a gas transmission main approximately 2.0 miles away near the intersection of NW 90th Street and NW 79th Avenue. Additional ROW/easement may be needed. Soils data indicates shallow depth to bedrock, rock removal may be required for pipe trench excavation.
- **Electric** – The electrical service capacity required will depend on the type of alternative facility(ies) selected. Standard 120V/230A electrical service appears to be available at the site. The nearest substation/ switchyard is an FPL Substation located 1.9 miles away at 10800 NW 107th Street. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements.
- **Stormwater** – High groundwater elevations may result in slightly larger stormwater ponds on site, but there appears to be sufficient area for a stormwater system that meets regulatory requirements.
- **Groundwater** – If necessary for facility operations, a consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer. If a consumptive use permit cannot be obtained, then potable water service will have to provide for all facility water consumption needs, which will increase operating costs.

Soils

The USDA Soil Survey data for the site and historical aerial photos (c. 1985) indicate the site area was previously excavated as a quarry and subsequently backfilled. This is consistent with the USDA Soil Survey data for the site, which classifies the site soils as 9—Udorthents-Water-Urban land complex, 0 to 60 percent slopes. Udorthents soils consist of unconsolidated or heterogeneous geologic material removed during the excavation of ditches, canals, lakes, ponds, and quarries.

Analysis Summary – Alternative Site No. 1 - Medley

Depending on the type of alternative facility(ies) selected.for this site, the facility buildings and ancillary components would have to be constructed on fill material, which could present geotechnical engineering challenges for foundation designs and additional site preparation costs.

Environment

- **Floodplains** – The site is not in a floodplain, it is within FEMA Flood Zone X (Minimal Flood Hazard).
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 11.38 mi (18.31 km) NE of the Everglades Class I Area, 16.19 mi (26.05 km) NW of the Biscayne Class II Area, and between two large existing emitters, the Medley Class I Landfill and Titan Pennsuco Complex. The adjacent Medley Landfill may result in elevated receptors (200ft+) and exhaust plume impaction during air emissions modeling.

  As a proposed major source of air pollutant emissions, a new WTE or gasification facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

  The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE or gasification facility and thus will make air permitting challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).
- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates no wetlands are present. The site appears disturbed. The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required but is assumed to be minimal as there is no roosting or foraging habitat remaining. The site is also

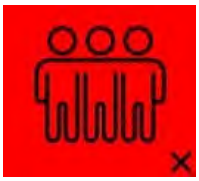
Analysis Summary – Alternative Site No. 1 - Medley

within 18.6 miles of an active wood stork colony; however, the lack of apparent suitable foraging habitat precludes wood stork mitigation. No permit triggers exist for wetlands.

Transportation

The site has good access to Florida Turnpike and US-27 via Beacon Station Blvd., but some road areas need to be improved and the Town of Medley may want the County to assume maintenance of some or all of the access roads, which would increase the County's costs. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads (i.e., NW 106th Terrace and NW 106th Street) so the traffic impacts to local area will likely be significant. Truck queuing will have to be accomplished on site to prevent further congestion.

Community



The USEPA EJScreen Standard Report indicated elevated values for Particulate Matter 2.5 ($\mu g/m^3$) and several other pollutants. The site is adjacent to residential zoning, which suggests that the siting of a WTE facility may be opposed by the community at this location.

Schedule

There are a few site issues that could affect the schedule of any alternative facility project, including:

- **Land Acquisition –** siting analysis and land acquisition will increase schedule duration.
- **Utilities** – Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- **Soils** – Depending on the type of alternative facility(ies) selected for this site, additional geotechnical testing will be needed to determine the full extent of soil preparation needed (i.e., vibro-compaction, consolidation, etc.) and additional requirements for building foundations at the site, which may increase design and construction time.
- **Permitting** – If a WTE or gasification facility is selected for this site, the Prevention of Significant Deterioration (PSD) Permitting will be difficult. The site is located 11.38 mi (18.31 km) NE of the Everglades Class I Area, 16.19 mi (26.05 km) NW of the Biscayne Class II Area, and between two large existing emitters, the Medley Class I Landfill and Titan Pennsuco Complex. The adjacent Medley Landfill may result in elevated receptors (200ft+) and exhaust plume impaction during air emissions modeling. The nearby Everglades National Park's location along the western border of the County and the Biscayne Bay NP (sensitive Class II area) located on the eastern border of the County both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE or gasification facility and thus will make air permitting challenging at this prospective site.
- **Community** – The site is adjacent to residential zoning. Therefore, siting of new alternative facility(ies) may face community opposition at this location, which could affect the project schedule.

Analysis Summary – Alternative Site No. 1 - Medley

Cost

Overall, the site area is sufficient for any of the alternative facilities, and more than one depending on the property area acquired. There are many different possible combinations of facilities and processing capacities that could be developed at this location, and the total redevelopment costs could range from $20 million for a low-tech outdoor C&D recycling facility to more than $1.5 billion for a state-of the art mass burn WTE facility and ash landfill. The optimal selection, sizing and arrangement of alternative facilities will require additional studies to more accurately determine the total development costs. If a WTE or gasification facility is selected for this site, development costs are expected to be higher than at the existing RRF site, primarily due to geotechnical and operational issues. Depending on the alternative facility(ies) selected, there are several site issues and additional Solid Waste System changes that could affect the total cost to the Department, including:

- **Land Acquisition –** siting analysis and land acquisition will increase project costs.
- **Utilities**
  - Construction of a potable water booster station may be required.
  - Construction of an on-site wastewater lift station will likely be required.
  - Construction of approximately 2.2 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
  - Soils data indicates shallow depth to bedrock, rock removal may be required in some areas for utility pipe trench excavation.
  - Construction of approximately 1.9 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
  - Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
  - On-site water wells are likely not permittable, therefore potable water will need to be purchased, increasing anticipated operations and maintenance costs.
- **Soils** – Additional geotechnical testing will be needed to determine the full extent of soil preparation needed (i.e., vibro-compaction, consolidation, etc.) and additional requirements for building foundations at the site, which may increase design and construction costs.
- **Stormwater** – due to high groundwater levels, additional stormwater considerations or facilities may be required.
- **Zoning and Permitting** – because this is a greenfield site, additional zoning and permitting efforts may be required which could impact cost and schedule.
- **Solid Waste System**
  - Some collection routes that currently direct haul to the existing RRF would likely reroute to dispose at the West or Northeast Transfer Station to minimize travel times, which may increase traffic at those stations.

- Ash hauling costs for a new WTE facility located at this site are expected to be higher than at the existing RRF, however, options for limiting ash hauling distances could be considered. If disposed at a non-County facility, costs for ash disposal would significantly increase from current levels.
- It is also assumed that there may be impact fees or improvements required to local roads that have not yet been factored into the capital cost for this site because the extent of roadway modifications is currently not known. It is anticipated that these would be negotiated and further evaluated during the land acquisition process.

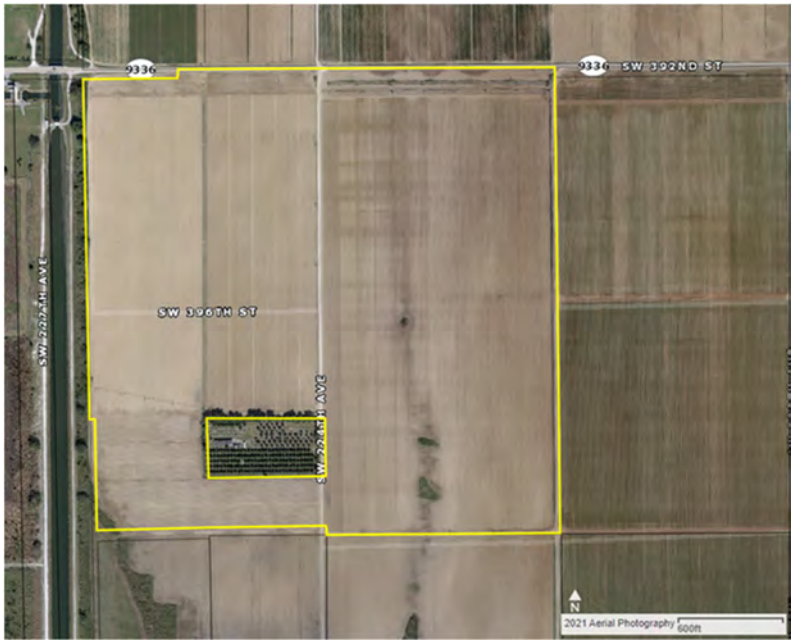
Site Differentiators Overview

Depending on the alternative facility(ies) selected, the following differentiators from the RRF site may affect the cost and schedule of development at this site:

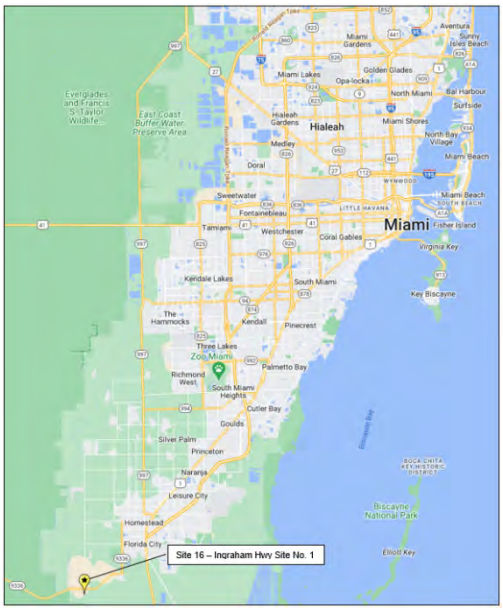
- Construction of a potable water booster station may be required.
- Construction of an on-site wastewater lift station and 6” force main may be required.
- Construction of approximately 2.2 miles of 6” gas service piping to provide natural gas.
- Soils data indicates shallow depth to bedrock, rock removal may be required for utility pipe trench excavation.
- Additional geotechnical testing will be needed to determine the full extent of soil preparation needed (i.e., vibro-compaction, consolidation, etc.) and additional requirements for building foundations at the site, which may increase design and construction costs and extend the project schedule.
- Construction of approximately 1.9 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing FPL substation may be needed.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- There may be impact fees or improvements required to local roads that have not yet been factored into the capital cost for this site because the extent of roadway modifications is currently not known.

Analysis Summary – Alternative Site No. 16 – Ingraham Hwy. Site #1

MDPA Parcel Map



Location Map



Site Information

This 159.71-acre site consists of two parcels outside the UDB, located in unincorporated Miami-Dade County. The combined site area is sufficient to support is large enough to support any of the alternative facilities and potentially co-locate multiple facilities. The property is less than a 10-minute travel time to W Palm Drive, is 0.51 miles from the nearest residential zoning, and 1.02 miles from the boundary of Everglades National Park.

Site Alternatives Summary

Considerations for the selection of each alternative technology at this site are shown on the pages that follow.

MDPA Parcel Data

Folio No: 30-8808-000-0030
Owner: P Acursio Partnership LTD
2023 MDPA Market Value: $8,160,718
Zoning District: AU
PA Zone: Interim - Agricultural

Folio No: 30-8808-000-0020
Owner: Everglades Fruit, Inc.
2022 MDPA Market Value: $139,014
Zoning District: AU
PA Zone: Interim - Agricultural

Analysis Summary – Alternative Site No. 16 – Ingraham Hwy. Site #1

Site Alternatives Summary						
Alternative	**Potential Site Area**	**Capacity**	**Annual Cost Per Ton**	**Development Time**	**Technology Considerations**	**Site-Specific Considerations**
Organics Composting (Windrow)	10-150 Ac	5-8 tons per acre per day, typically 80-500 TPD.	$72-$80+ (1)	3-5 years	Requires separate organics collection. Low complexity, low skill level needed for most operations. Minimum 30-day processing time. Processing capacity depends on available land area. Not well suited for urban areas, potential public concerns with noise, odor and vector issues. Challenging wet season operations. Good quality compost produced. End uses/markets and capacities may need development. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals.	Reduced potential public concerns with noise, odor and vector issues. High groundwater may cause operational difficulties, especially during wet season. Estimated maximum processing capacity at this site approximately 300,000 tons per year. Significantly increased hauling costs. Could be co-located with other alternative facility(ies) on this site.
Organics Composting (ASP)	5-150 Ac	1-10 tons per acre per day. Typically, 80-700 TPD	$74-$80+ (1)	3-5 years	Requires separate organics collection. Moderate complexity, moderate skill level needed for operation. Minimum 30-day processing time. Processing capacity depends on available land area. Potential public concerns with noise, odor and vector issues. Challenging wet season operations. End uses/markets and capacities may need development. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals.	Reduced potential public concerns with noise, odor and vector issues. High groundwater may cause operational difficulties, especially during wet season. Estimated maximum processing capacity at this site approximately 400,000 tons per year. Significantly increased hauling costs. Could be co-located with other alternative facility(ies) on this site.
Organics Composting (In-Vessel)	1-60 Ac	5-100 tpd per vessel, 15 to 1200 TPD	$9-$50+ (1), (2)	3-5 years	Requires separate organics collection. Variable complexity, low skill level needed for operation. Short 5-7 day processing time. Compact process, smaller facility footprint, expandable capacity. Better suited for urban areas, vessels can be enclosed in metal building to mitigate potential public concerns with odor and vector issues from receiving areas. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals.	Reduced potential public concerns with noise, odor and vector issues. High groundwater may cause some operational difficulties, especially during wet season. Utilities and travel times are concerns. Could be co-located with other alternative facility(ies) on this site.
Anaerobic Digestion	3-40+ acres depending on capacity	270-600 TPD	$57-$90+ (1), (2)	5-7 years	Requires separate organics collection. High complexity, high skill level needed for operation. Processing capacity depends on available land area. Potential permitting issues and public concerns with noise, odor and vector issues. Fire risk from methane production. Additional composting or disposal of resulting digestate solids would be required. Resulting digestate liquids can be used for fertilizer in cover maintenance for landfills or on agricultural land. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals. End uses/markets and capacities may need development.	Reduced potential public concerns with noise, odor and vector issues. Presence of floodplain will increase development costs. Utilities will need to be extended to site and travel times are concerns.

Analysis Summary – Alternative Site No. 16 – Ingraham Hwy. Site #1

Site Alternatives Summary						
Alternative	**Potential Site Area**	**Capacity**	**Annual Cost Per Ton**	**Development Time**	**Technology Considerations**	**Site-Specific Considerations**
Gasification	5-60+ Ac	100-300+ TPD	$154+[(3)]	10+ years	Unproven technology, significant pre-processing of MSW required. High complexity, high skill level needed for operation. Possible capacity limitations. Increased fire risk from syngas production but can fuel turbines for electrical generation. High capital and operating cost. Active ash monofil on site for slag disposal.	Potential permitting issues and community opposition at this location. Expected very challenging permitting due to proximity to Everglades Class I Area. Utilities will need to be extended to site. Significantly increased local traffic and hauling costs. Could be co-located with other alternative facility(ies) on this site.
Waste-to-Energy (Mass Burn)	40-60 Ac	4,000-5,000 TPD	$57-60+	8-10+ years	No changes to existing collection system needed. Highest capacity alternative. High complexity, high skill level needed for operation. Permitting and public opposition challenges. High capital and operating cost. Electrical generation for revenue or powering other facilities. Good metal recovery possible from ash. Landfill needed for ash disposal.	Potential permitting issues and community opposition at this location. Expected very challenging permitting due to proximity to Everglades Class I Area. Utilities will need to be extended to site. Significantly increased local traffic and hauling costs. Could be co-located with other alternative facility(ies) on this site.
Mechanical Biological Treatment	5-15 Ac	200-560 TPD	$123-183	3-4 years	No changes to existing collection system needed. High complexity, high skill level needed for operation. High capital and operating cost. High-capacity alternative, but waste is typically shredded and converted into pelletized solid recovered fuel (SRF) that must be transported and fired at another facility capable of using the SRF. Additional fleet equipment and operators would be needed for site operation and transport of SRF.	Potential public concerns with noise, odor and vector issues. Significantly increased local traffic and hauling costs. Utilities will need to be extended to site. Could be co-located with other alternative facility(ies) on this site. Local concrete facilities may be able to use SRF.
Mixed Waste Processing Facility	20-60 Ac	200-1500 TPD	$85-$150	5-7 years	No changes to existing collection system needed. High complexity, but low skill level needed for most operations. Capacity limited to approximately 3,000 tpd. Potential permitting issues and public concerns with noise, odor and vector issues. Additional processing/disposal of post-processed MSW would be required. Contamination of recovered materials is significant issue, recovery rates for marketable materials typically 30% or less. End uses/markets and capacities may need development. Moderate capital and operating costs, and additional fleet equipment and operators would be needed for site operations and transport of residuals.	Potential public concerns with noise, odor and vector issues, but may be minimal at this location. Utilities will need to be extended to site. Significantly increased hauling costs. Could be co-located with other alternative facility(ies) on this site.

Analysis Summary – Alternative Site No. 16 – Ingraham Hwy. Site #1

Site Alternatives Summary						
Alternative	**Potential Site Area**	**Capacity**	**Annual Cost Per Ton**	**Development Time**	**Technology Considerations**	**Site-Specific Considerations**
Material Recovery Facility	20-60 Ac	300-400 TPD	$87-154	5-7 years	Modification of existing curbside collection system needed. High complexity, but low skill level needed for most operations. Capacity limited by site area. Typical maximum processing capacity for these facilities is approximately 350-400 tons per day. Minimal public concerns. Additional processing/disposal of some post-processed materials (i.e., glass) would be required. Contamination of recovered materials is significant issue. End uses/markets and capacities may need development. Moderate capital and operating costs, and additional fleet equipment and operators would be needed.	Minimal expected public concerns. Utilities will need to be extended to site. Significantly increased hauling costs. Could be co-located with another alternative facility on this site.
C&D Recycling Facility	5-20 Ac	300–825 TPD	$76-150	3-7 years	No change to existing collection system needed. Can be low or high complexity, but low skill level needed for most operations. Capacity limited by site area. Potential public concerns with noise, odor, and dust. Additional processing/disposal of some post-processed materials (i.e., mixed fines) would be required. End uses/markets and capacities may need development. Moderate capital and operating costs, and additional fleet equipment and operators would be needed.	Potential public concerns with noise, odor and dust issues. Utilities will need to be extended to site. Significantly increased hauling costs. Could be co-located with another alternative facility on this site.

(1) Sources: DC Study (2017 costs escalated) and NREL Study (2020 costs escalated). Cost does not include additional organics collection system costs.
(2) Costs estimated from vendor quote, does not include building or land acquisition costs.
(3) Costs based on 2017 article in Waste Management journal using developed country costs.

Analysis Summary – Alternative Site No. 16 – Ingraham Hwy. Site #1

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 32.5 miles SW of the existing RRF, slightly more than half a mile from the nearest residential zoning, and approximately one mile from the boundary of Everglades National Park. If this site were selected for siting alternative facility(ies), the effects on the County's Solid Waste System would be considerable.

To maintain the current collection patterns and travel times, a new transfer station would need to be constructed at the RRF site if this site was selected for development. The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the capacity of the alternative facility(ies) developed on the site. Their travel patterns would be altered, and travel times would significantly increase due to longer travel distances and expected traffic congestion. Estimated travel distances and times from the site to the County's transfer stations and landfills as compared to the RRF site are as follows:

Facility	Est. Travel Distance/Time to Site 16	Est. Travel Distance/Time to RRF
West TS	35 mi/41 min	9 mi/16 min
Central TS	45 mi/53 min	14 mi/21 min
Northeast TS	58 mi/63 min	18 mi/25 min
South Dade LF	20 mi/31 min	25 mi/31 min
North Dade LF	58 mi/59 min	21 mi/23 min

Transfer fleet round trip times would increase and would likely result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would significantly increase due to the additional deliveries and travel times and distances, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash/slag hauling costs for a new WTE or gasification facility located at this site are expected to be significantly higher than at the existing RRF. If disposed at a non-County facility, expected costs for disposal would increase even further.

Utilities

- **Potable water** – The potable water capacity required for fire lines and supply lines will depend on the type of alternative facility(ies) selected. Potable water mains appear to be available approximately 3.3 miles NE of the site on Ingraham Hwy., but further analysis is needed to verify service pressure and system capacity. A booster station may be needed to provide adequate service pressure at the site.

Analysis Summary – Alternative Site No. 16 – Ingraham Hwy. Site #1

- **Wastewater** – The minimum sanitary sewer capacity requirements will depend on the type of alternative facility(ies) selected. Sanitary sewer appears to be available approximately 3.3 miles NE of the site on Ingraham Hwy., an on-site lift station and about 3.3 miles of force main will likely be required.
- **Natural gas** – The minimum natural gas capacity requirements will depend on the type of alternative facility(ies) selected. If needed for facility operations, service lines will need to be extended to the site. According to the National Pipeline Mapping System (NPMS) the closest transmission main is approximately 5.5 miles NE of the site on Old Dixie Hwy. Construction of the service line to the site is assumed to be within existing ROW and easements.
- **Electric** – The electrical service capacity required will depend on the type of alternative facility(ies) selected. Standard 120V/230A electrical service appears to be available at the site. Nearest substation/switchyard is Florida City Substation located approximately 6.5 miles away at 33800 SW 202nd Avenue. For WTE and gasification facilities, would need to verify substation/switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/FPL easements is assumed. New legal easements may need to be established to complete this routing.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and area used for stormwater retention.
- **Groundwater** – If necessary for facility operations, a consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer. If a consumptive use permit cannot be obtained, then potable water service will have to provide for all facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the predominant site soils as Krome very gravelly marly loam, 1 to 2 percent slopes, Biscayne marly silt loam, drained, 0 to 1 percent slopes, and Chekika very gravelly marly loam, 1 to 2 percent slopes. Generally, these soils are not well suited for building foundations because of water content and shallow depth to bedrock (typically 5-7 inches).

The presence of Biscayne marl soils indicates the seasonal high groundwater elevation is typically within 10 inches of the ground surface, but would have to be confirmed by geotechnical investigations. These soils are severely limited for building foundations because of water content and shallow depth to bedrock, and areas under building foundations would need to be removed and replaced with structural fill. Depending on the type of alternative facility(ies) selected for the site, the high groundwater and the presence of a 100-year floodplain on the site will result in the need for elevating building foundations, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The entire site is in a 100-year floodplain, within FEMA Flood Zone A.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.

Analysis Summary – Alternative Site No. 16 – Ingraham Hwy. Site #1

- **Power Plant Siting Act (PPSA) Certification –** If a WTE or gasification facility were selected for this site, a complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.). The PSC "need determination" filing process would also be also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 1.02 mi (1.7 km) E of the Everglades Class I Area, 13.00 mi (21.0 km) W of the Biscayne Class II Area, and about 13.0 miles WSW of the FPL Turkey Point Power Plant, a large source of emissions.

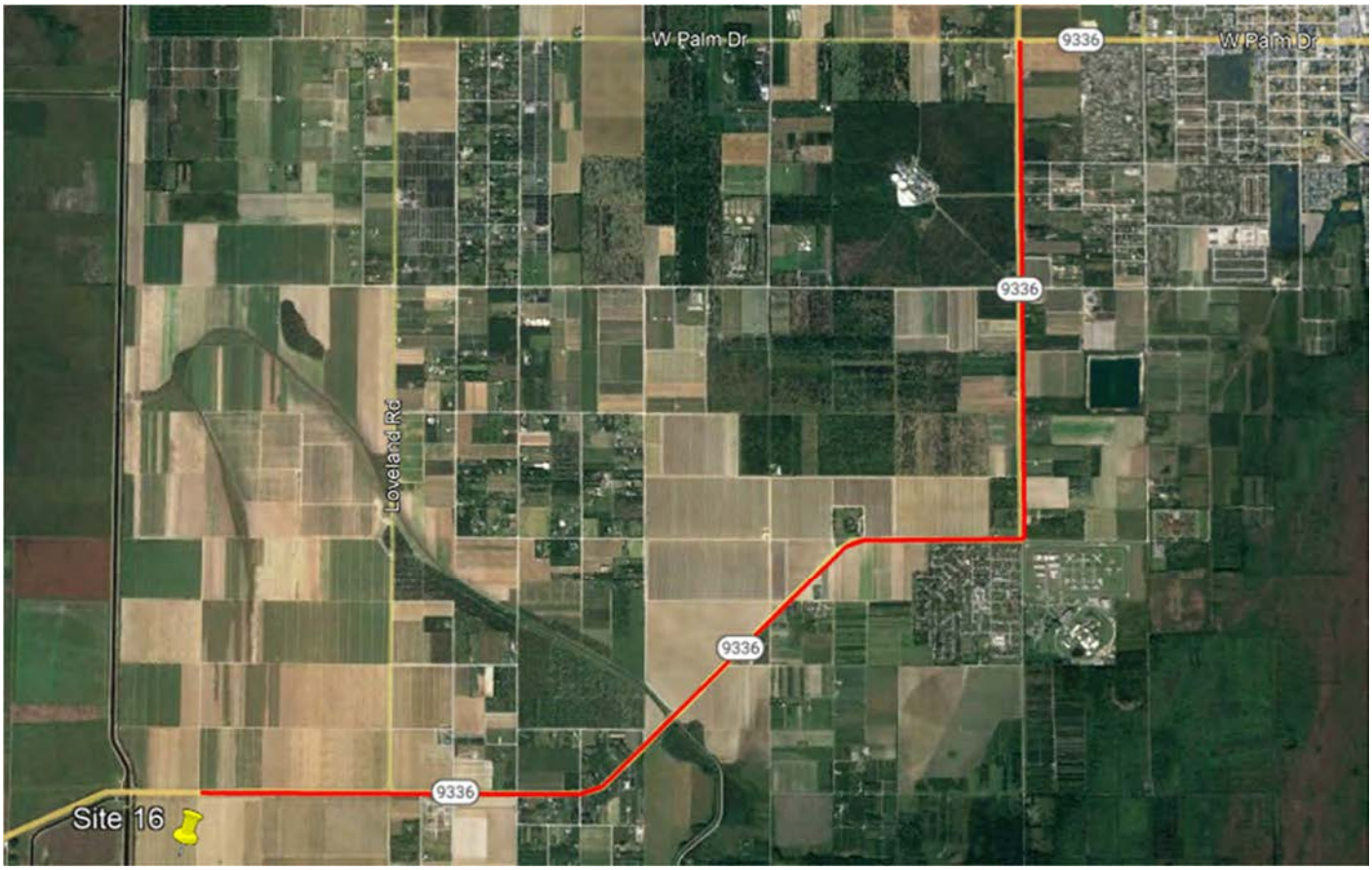
  If a WTE or gasification facility were selected for this site, it would be a proposed major source of air pollutant emissions and subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

  The nearby Everglades National Park's location along the western border of the County and the Biscayne Bay National Park (sensitive Class II area) located on the eastern border of the County both having more stringent Air Quality Related Values (AQRVs) and provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE or gasification facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s). Based on projected emissions for a 4,000 tpd WTE facility, preliminary evaluation indicates that this parcel may be too close to sensitive receptors in the nearby Class I area thus making it extremely difficult to demonstrate acceptable impacts for PSD permit issuance.
- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site contains minor wetlands. The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required.

Transportation

Travel time north to W Palm Drive is less than 10 minutes. Existing access to the site is via Ingraham Hwy. (see map below), and no additional offsite road improvements are needed. Depending on the type of alternative facility(ies) selected for the site, the volume of traffic could increase to 400-500 trucks per day, which will greatly increase the loads on local roads. The traffic impacts on Ingraham Hwy., W Palm Drive, and other local roads may be significant. Truck queuing will have to be accomplished on site to prevent further congestion.

Analysis Summary – Alternative Site No. 16 – Ingraham Hwy. Site #1



Community

The USEPA EJScreen Standard Report indicated no existing environmental justice issues for this site. However, the site is about half a mile from the nearest residential zoning and is approximately a mile from the boundary of Everglades National Park, which suggests that siting that the siting of any alternative facility(ies) that may have potential noise, odor, or other objectionable characteristics may be opposed by the community at this location.

Schedule

There are a few site issues that could affect the schedule of any alternative facility project, including:

- **Land Acquisition –** The land acquisition process will increase schedule duration.
- **Soils** – Depending on the type of alternative facility(ies) selected for the site, the removal and replacement of site muck soils with structural fill and/or rock removal in development areas may be needed. Additional structural fill will be needed to elevate buildings due to the high groundwater table and floodplain mitigation.

Analysis Summary – Alternative Site No. 16 – Ingraham Hwy. Site #1

- **Permitting** – Due to the presence of floodplains, minor wetlands, and the close proximity of the site to the Everglades Class I Area, permitting at this site may be very challenging, especially if a WTE or gasification facility is selected. Based on projected emissions for a 4,000 tpd WTE facility, preliminary evaluation indicates that this parcel may be too close to sensitive receptors in the nearby Class I area, thus making it extremely difficult to demonstrate acceptable impacts for PSD permit issuance.
- **Mitigation** – Wetland, floodplain, and wildlife mitigation will likely increase the duration of the implementation schedule.
- **Community** – The close proximity of the site to Everglades National Park may result in significant opposition from environmental groups and community organizations, which could impact the duration of the implementation schedule.

Cost

Overall, the site area is sufficient for any of the alternative facilities, and more than one depending on the property area acquired. There are many different possible combinations of facilities and processing capacities that could be developed at this location, and the total redevelopment costs could range from $20 million for a low-tech outdoor C&D recycling facility to more than $1.5 billion for a state-of the art mass burn WTE facility and ash landfill. The optimal selection, sizing and arrangement of alternative facilities will require additional studies to more accurately determine the total development costs. If a WTE or gasification facility is selected for this site, development costs are expected to be significantly higher than at the existing RRF site, primarily due to floodplain and wetland mitigation issues. Depending on the alternative facility(ies) selected, there are several site issues and additional Solid Waste System changes that could affect the total cost to the Department, including:

- **Land Acquisition –** siting analysis and land acquisition will increase costs.
- **Soils** – Depending on the type of alternative facility(ies) selected for the site, the removal and replacement of site muck soils with structural fill and/or rock removal in development areas may be needed. Additional structural fill will be needed to elevate buildings due to the high groundwater table and floodplain mitigation.
- **Utilities**
  - Construction of a potable water booster station and 3.3 miles of water main may be required.
  - Construction of an on-site wastewater lift station and 3.3 miles of force main may be required.
  - Construction of approximately 5.5 miles of 6” gas service piping to provide natural gas to the site may be required.
  - Soils data indicates shallow depth to bedrock, rock removal may be required in some areas for utility pipe trench excavation.
  - If a WTE or gasification facility is selected for this site, construction of approximately 6.5 miles of electrical transmission line routing through existing ROW/ FPL easements will be needed. Also, upgrades to the existing substation may be needed.
  - Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.

  - On-site water wells are likely not permittable; therefore potable water will need to be purchased, increasing anticipated operations and maintenance costs.

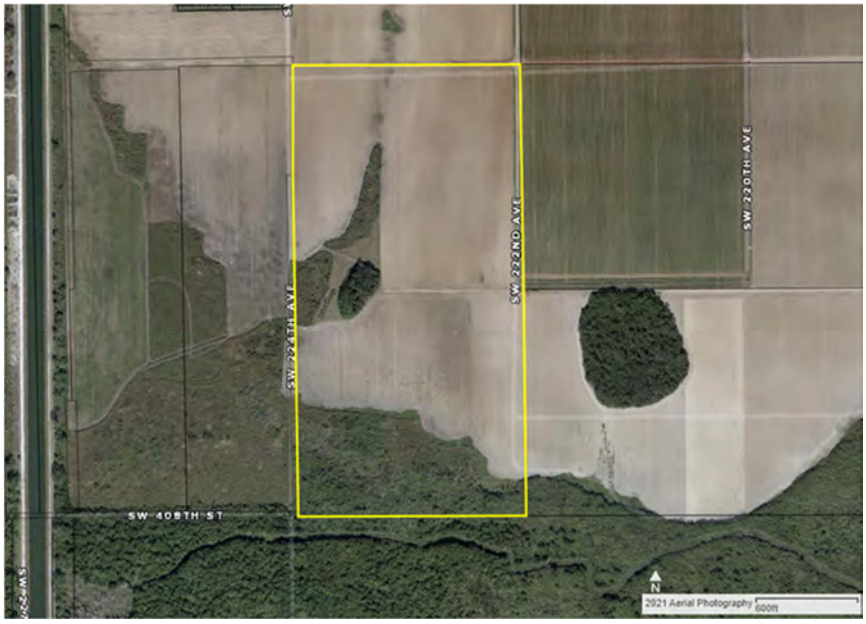
- **Permitting –** Due to the presence of floodplains, minor wetlands, and the close proximity of the site to the Everglades Class I Area, permitting at this site may be very challenging, especially if a WTE or gasification facility is selected. Permitting difficulties are expected to increase costs at this site.
- **Stormwater** – High groundwater table and required floodplain compensating storage will significantly increase both the cost and site area required for stormwater retention.
- **Solid Waste System**
  - Collection and Transfer vehicles routed to this site would have significantly increased costs for fuel consumption, driver time, and vehicle wear related to the additional travel distance from the existing RRF.
  - Ash/slag hauling costs for a new WTE or gasification facility located at this site are expected to be much higher than the existing RRF. An option to keep hauling distances short - there appears to be sufficient area on site to co-locate a new ash monofil, if permittable. If disposed at a non-County facility, costs for disposal would significantly increase from current levels.

Site Differentiators Overview

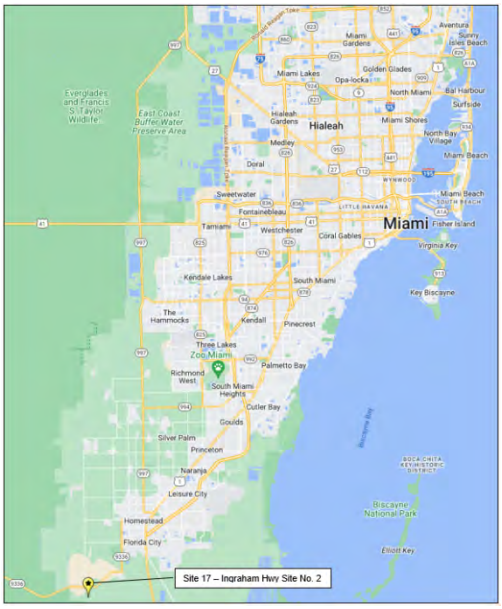
- Removal of soils and replacement with structural fill
- Additional structural fill for elevation of buildings due to high groundwater
- Floodplain compensating storage
- Extremely difficult PSD permitting
- Long extensions of utilities
- Close proximity to Everglades National Park – anticipated environmental group and community organization opposition
- Collection and Transfer vehicles routed to this site would have significantly increased costs for fuel consumption, driver time, and vehicle wear related to the additional travel distance from existing System facilities.

Analysis Summary – Alternative Site No. 17 – Ingraham Hwy. Site #2

MDPA Parcel Map



Location Map



Site Information

This 81.11-acre site is a single parcel outside the UDB, located in unincorporated Miami-Dade County. The site area is sufficient to support is large enough to support any of the alternative facilities and potentially co-locate multiple facilities. The property is less than a 10-minute travel time to W Palm Drive, is 0.53 miles from the nearest residential zoning, and is 1.28 miles from the boundary of Everglades National Park. The entire site is within a proposed Mitigation Bank area currently under consideration by the BCC.

MDPA Parcel Data

Folio No: 30-8808-000-0040
Owner: EIP IV FL Round Hammock Land Co., LLC
2023 MDPA Market Value: $3,744,200
Zoning District: AU
PA Zone: 9000 - Agricultural

Site Alternatives Summary

Considerations for the selection of each alternative technology at this site are shown on the pages that follow.

Analysis Summary – Alternative Site No. 17 – Ingraham Hwy. Site #2

Site Alternatives Summary						
Alternative	**Potential Site Area**	**Capacity**	**Annual Cost Per Ton**	**Development Time**	**Technology Considerations**	**Site-Specific Considerations**
Organics Composting (Windrow)	10-70 Ac	5-8 tons per acre per day, typically 80-500 TPD.	$72-$80+ (1)	3-5 years	Requires separate organics collection. Low complexity, low skill level needed for most operations. Minimum 30-day processing time. Processing capacity depends on available land area. Not well suited for urban areas, potential public concerns with noise, odor and vector issues. Challenging wet season operations. Good quality compost produced. End uses/markets and capacities may need development. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals.	Reduced potential public concerns with noise, odor and vector issues. High groundwater may cause operational difficulties, especially during wet season. Estimated maximum processing capacity at this site approximately 150,000 tons per year. Significantly increased hauling costs. Could be co-located with other alternative facility(ies) on this site.
Organics Composting (ASP)	5-70 Ac	1-10 tons per acre per day. Typically, 80-700 TPD	$74-$80+ (1)	3-5 years	Requires separate organics collection. Moderate complexity, moderate skill level needed for operation. Minimum 30-day processing time. Processing capacity depends on available land area. Potential public concerns with noise, odor and vector issues. Challenging wet season operations. End uses/markets and capacities may need development. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals.	Reduced potential public concerns with noise, odor and vector issues. High groundwater may cause operational difficulties, especially during wet season. Estimated Maximum processing capacity at this site approximately 200,000 tons per year. Significantly increased hauling costs. Could be co-located with other alternative facility(ies) on this site.
Organics Composting (In-Vessel)	1-70 Ac	5-100 tpd per vessel, 15 to 1200 TPD	$9-$50+ (1),(2)	3-5 years	Requires separate organics collection. Variable complexity, low skill level needed for operation. Short 5-7 day processing time. Compact process, smaller facility footprint, expandable capacity. Better suited for urban areas, vessels can be enclosed in metal building to mitigate potential public concerns with odor and vector issues from receiving areas. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals.	Reduced potential public concerns with noise, odor and vector issues. High groundwater may cause some operational difficulties, especially during wet season. Utilities and travel times are concerns. Could be co-located with other alternative facility(ies) on this site.
Anaerobic Digestion	3-40+ acres depending on capacity	270-600 TPD	$57-$90+ (1),(2)	5-7 years	Requires separate organics collection. High complexity, high skill level needed for operation. Processing capacity depends on available land area. Potential permitting issues and public concerns with noise, odor and vector issues. Fire risk from methane production. Additional composting or disposal of resulting digestate solids would be required. Resulting digestate liquids can be used for fertilizer in cover maintenance for landfills or on agricultural land. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals. End uses/markets and capacities may need development.	Reduced potential public concerns with noise, odor and vector issues. Presence of floodplain will increase development costs. Utilities will need to be extended to site and travel times are concerns.

Analysis Summary – Alternative Site No. 17 – Ingraham Hwy. Site #2

Site Alternatives Summary						
Alternative	**Potential Site Area**	**Capacity**	**Annual Cost Per Ton**	**Development Time**	**Technology Considerations**	**Site-Specific Considerations**
Gasification	5-60+ Ac	100-300+ TPD	$154+[(3)]	10+ years	Unproven technology, significant pre-processing of MSW required. High complexity, high skill level needed for operation. Possible capacity limitations. Increased fire risk from syngas production but can fuel turbines for electrical generation. High capital and operating cost. Active ash monofil on site for slag disposal.	Potential permitting issues and community opposition at this location. Expected very challenging permitting due to proximity to Everglades Class I Area. Utilities will need to be extended to site. Significantly increased local traffic and hauling costs. Could be co-located with other alternative facility(ies) on this site.
Waste-to-Energy (Mass Burn)	40-60 Ac	4,000-5,000 TPD	$57-60+	8-10+ years	No changes to existing collection system needed. Highest capacity alternative. High complexity, high skill level needed for operation. Permitting and public opposition challenges. High capital and operating cost. Electrical generation for revenue or powering other facilities. Good metal recovery possible from ash. Landfill needed for ash disposal.	Potential permitting issues and community opposition at this location. Expected very challenging permitting due to proximity to Everglades Class I Area. Utilities will need to be extended to site. Significantly increased local traffic and hauling costs. Could be co-located with other alternative facility(ies) on this site.
Mechanical Biological Treatment	5-15 Ac	200-560 TPD	$123-183	3-4 years	No changes to existing collection system needed. High complexity, high skill level needed for operation. High capital and operating cost. High-capacity alternative, but waste is typically shredded and converted into pelletized solid recovered fuel (SRF) that must be transported and fired at another facility capable of using the SRF. Additional fleet equipment and operators would be needed for site operation and transport of SRF.	Potential public concerns with noise, odor and vector issues. Significantly increased local traffic and hauling costs. Utilities will need to be extended to site. Could be co-located with other alternative facility(ies) on this site. Local concrete facilities may be able to use SRF.
Mixed Waste Processing Facility	20-60 Ac	200-1500 TPD	$85-$150	5-7 years	No changes to existing collection system needed. High complexity, but low skill level needed for most operations. Capacity limited to approximately 3,000 tpd. Potential permitting issues and public concerns with noise, odor and vector issues. Additional processing/disposal of post-processed MSW would be required. Contamination of recovered materials is significant issue, recovery rates for marketable materials typically 30% or less. End uses/markets and capacities may need development. Moderate capital and operating costs, and additional fleet equipment and operators would be needed for site operations and transport of residuals.	Potential public concerns with noise, odor and vector issues, but may be minimal at this location. Utilities will need to be extended to site. Significantly increased hauling costs. Could be co-located with other alternative facility(ies) on this site.

Analysis Summary – Alternative Site No. 17 – Ingraham Hwy. Site #2

Site Alternatives Summary						
Alternative	**Potential Site Area**	**Capacity**	**Annual Cost Per Ton**	**Development Time**	**Technology Considerations**	**Site-Specific Considerations**
Material Recovery Facility	20-60 Ac	300-400 TPD	$87-154	5-7 years	Modification of existing curbside collection system needed. High complexity, but low skill level needed for most operations. Capacity limited by site area. Typical maximum processing capacity for these facilities is approximately 350-400 tons per day. Minimal public concerns. Additional processing/disposal of some post-processed materials (i.e., glass) would be required. Contamination of recovered materials is significant issue. End uses/markets and capacities may need development. Moderate capital and operating costs, and additional fleet equipment and operators would be needed.	Minimal expected public concerns. Utilities will need to be extended to site. Significantly increased hauling costs. Could be co-located with another alternative facility on this site.
C&D Recycling Facility	5-20 Ac	300–825 TPD	$76-150	3-7 years	No change to existing collection system needed. Can be low or high complexity, but low skill level needed for most operations. Capacity limited by site area. Potential public concerns with noise, odor, and dust. Additional processing/disposal of some post-processed materials (i.e., mixed fines) would be required. End uses/markets and capacities may need development. Moderate capital and operating costs, and additional fleet equipment and operators would be needed.	Potential public concerns with noise, odor and dust issues. Utilities will need to be extended to site. Significantly increased hauling costs. Could be co-located with another alternative facility on this site.

(1) Sources: DC Study (2017 costs escalated) and NREL Study (2020 costs escalated). Cost does not include additional organics collection system costs.
(2) Costs estimated from vendor quote, does not include building or land acquisition costs.
(3) Costs based on 2017 article in Waste Management journal using developed country costs.

Analysis Summary – Alternative Site No. 17 – Ingraham Hwy. Site #2

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 33.0 miles SW of the existing RRF site, slightly more than half a mile from the nearest residential zoning, and approximately one mile from the boundary of Everglades National Park. If this site were selected for siting alternative facility(ies), the effects on the County's Solid Waste System would be considerable.

To maintain the current collection patterns and travel times, a new transfer station would need to be constructed at the RRF site if this site was selected for development. The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would significantly increase due to longer travel distances and expected traffic congestion. Estimated travel distances and times from the site to the County's transfer stations and landfills as compared to the RRF site are as follows:

Facility	Est. Travel Distance/Time to Site 17	Est. Travel Distance/Time to RRF
West TS	35 mi/41 min	9 mi/16 min
Central TS	45 mi/53 min	14 mi/21 min
Northeast TS	58 mi/63 min	18 mi/25 min
South Dade LF	20 mi/31 min	25 mi/31 min
North Dade LF	58 mi/59 min	21 mi/23 min

Transfer fleet round trip times would increase and would likely result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would significantly increase due to the additional deliveries and travel times and distances, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash/slag hauling costs for a new WTE or gasification facility located at this site are expected to be significantly higher than at the existing RRF. If disposed at a non-County facility, expected costs for disposal would increase even further.

Utilities

- **Potable water** – The potable water capacity required for fire lines and supply lines will depend on the type of alternative facility(ies) selected. Potable water mains appear to be available approximately 3.3 miles NE of the site on Ingraham Hwy., but further analysis is needed to verify service pressure and system capacity. A booster station may be needed to provide adequate service pressure at the site.

Analysis Summary – Alternative Site No. 17 – Ingraham Hwy. Site #2

- **Wastewater** – The minimum sanitary sewer capacity requirements will depend on the type of alternative facility(ies) selected. Sanitary sewer appears to be available approximately 3.3 miles NE of the site on Ingraham Hwy., an on-site lift station and about 3.3 miles of force main will likely be required.
- **Natural gas** – The minimum natural gas capacity requirements will depend on the type of alternative facility(ies) selected. If needed for facility operations, service lines will need to be extended to the site. According to the National Pipeline Mapping System (NPMS) the closest transmission main is approximately 5.5 miles NE of the site on Old Dixie Hwy. Construction of the service line to the site is assumed to be within existing ROW and easements.
- **Electric** – The electrical service capacity required will depend on the type of alternative facility(ies) selected. Standard 120V/230A electrical service appears to be available at the site. Nearest substation/switchyard is Florida City Substation located approximately 6.5 miles away at 33800 SW 202nd Avenue. For WTE and gasification facilities, would need to verify substation/switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/FPL easements is assumed. New legal easements may need to be established to complete this routing.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and area used for stormwater retention.
- **Groundwater** – If necessary for facility operations, a consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer. If a consumptive use permit cannot be obtained, then potable water service will have to provide for all facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the predominant site soils as Krome very gravelly marly loam, 1 to 2 percent slopes, Biscayne marly silt loam, drained, 0 to 1 percent slopes, and Chekika very gravelly marly loam, 1 to 2 percent slopes. Generally, these soils are not well suited for building foundations because of water content and shallow depth to bedrock (typically 5-7 inches).

The presence of Biscayne marl soils indicates the seasonal high groundwater elevation is typically within 10 inches of the ground surface, but would have to be confirmed by geotechnical investigations. These soils are severely limited for building foundations because of water content and shallow depth to bedrock, and areas under building foundations would need to be removed and replaced with structural fill. Depending on the type of alternative facility(ies) selected for the site, the high groundwater and the presence of a 100-year floodplain on the site will result in the need for elevating building foundations, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone A.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.

Analysis Summary – Alternative Site No. 17 – Ingraham Hwy. Site #2

- **Power Plant Siting Act (PPSA) Certification** – A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.). The PSC "need determination" filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 1.28 mi (2.1 km) E of the Everglades Class I Area, 13.12 mi (21.2 km) W of the Biscayne Class II Area, and about 12.8 miles WSW of the FPL Turkey Point Power Plant, a large source of emissions.

  As a proposed major source of air pollutant emissions, a new WTE or gasification facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

Fig. 1 - Wetland areas on Site 17 (from NWI data)

The nearby Everglades National Park's location along the western border of the County and the Biscayne Bay National Park (sensitive Class II area) located on the eastern border of the County both have more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s). Based on projected emissions for a 4,000 tpd facility, preliminary evaluation indicates that this parcel may be too close to sensitive receptors in the nearby Class I area thus making it extremely difficult to demonstrate acceptable impacts for PSD permit issuance.

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site contains wetlands. National Wetlands Inventory mapping indicates the presence of a 0.96 acre Freshwater Forested/Shrub Wetland habitat classified as a PFO1Ad, a 4.19 acre Freshwater Emergent Wetland habitat classified as a PEM1A, and a 10.41 acre Freshwater Forested/Shrub Wetland habitat classified as a PSS1/3A, as shown in Figure 1. Additionally, there is an active application to amend the Land Use Element's Land Use Plan (LUP) Map of the Miami-Dade County Comprehensive Development Master Plan (CDMP) Code for a portion of Site 17 from Agricultural to Environmental Protection to restore the land and establish a private Wetland Mitigation Bank. Should the LUP Amendment be successful, a portion of Site 17 will be turned into a Wetland

Analysis Summary – Alternative Site No. 17 – Ingraham Hwy. Site #2

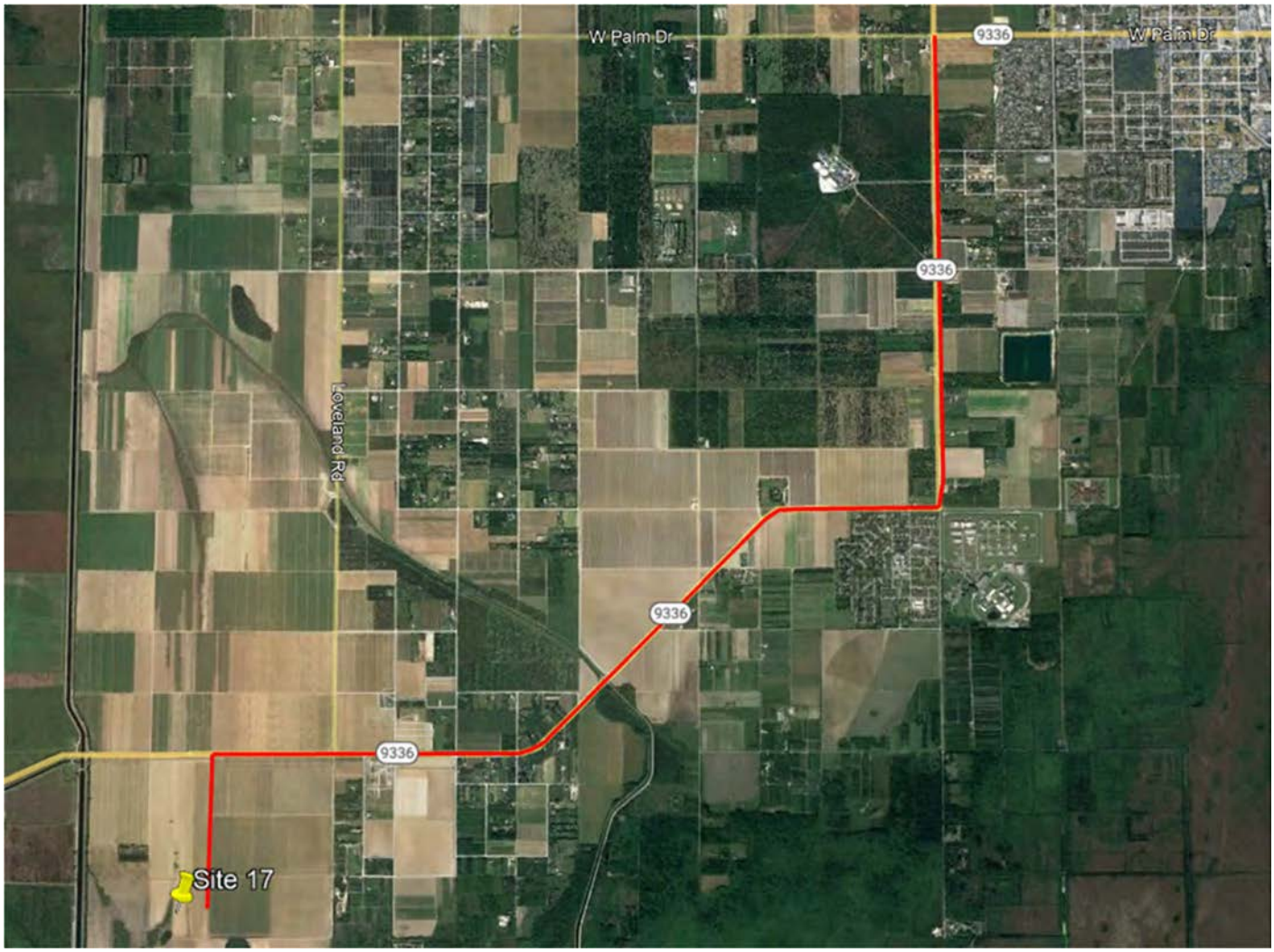
Mitigation Bank. Wetland Mitigation banking is a practice in which an environmental enhancement and preservation project is conducted by a public agency or private entity to provide mitigation for unavoidable wetland impacts within a defined region. The entire site is within a proposed Mitigation Bank area currently under consideration by the BCC. The site is within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required.

Transportation

Travel time north to W Palm Drive is less than 10 minutes. Existing access to site is via Ingraham Hwy. and SW 222nd Ave. (see map below), but approximately 0.75 miles of two-lane road with paved shoulders will need to be constructed for proper site access. Additional ROW may have to be acquired.

Depending on the type of alternative facility(ies) selected for the site, the volume of traffic could increase to 400-500 trucks per day, which will greatly increase the loads on local roads. Traffic impacts on Ingraham Hwy., W Palm Drive, and other local roads may be significant. Truck queuing will have to be accomplished on site to prevent further congestion.

Analysis Summary – Alternative Site No. 17 – Ingraham Hwy. Site #2



Community

The USEPA EJScreen Standard Report indicated no existing environmental justice issues for this site. However, the site is about half a mile from the nearest residential zoning and is approximately 1.28 miles from the boundary of Everglades National Park, which suggests that the siting of any alternative facility(ies) that may have potential noise, odor, or other objectionable characteristics may be opposed by the community at this location.

Future Waste-To-Energy Facility Siting Alternatives Analysis

Analysis Summary – Alternative Site No. 17 – Ingraham Hwy. Site #2

Schedule

There are a few site issues that could affect the schedule of any alternative facility project, including:

- **Land Acquisition –** The land acquisition process will increase schedule duration.
- **Soils** – Depending on the type of alternative facility(ies) selected for the site, the removal and replacement of site muck soils with structural fill and/or rock removal in development areas may be needed. Additional structural fill will be needed to elevate buildings due to the high groundwater table and floodplain mitigation.
- **Permitting** – Due to the presence of floodplains, minor wetlands, wildlife habitat, and the close proximity of the site to the Everglades Class I Area, permitting at this site may be very challenging, especially if a WTE or gasification facility is selected. Based on projected emissions for a 4,000 tpd WTE facility, preliminary evaluation indicates that this parcel may be too close to sensitive receptors in the nearby Class I area, thus making it extremely difficult to demonstrate acceptable impacts for PSD permit issuance.
- **Mitigation** – Wetland, floodplain, and wildlife mitigation will likely increase the duration of the implementation schedule.
- **Community** – The close proximity of the site to Everglades National Park may result in significant opposition from environmental groups and community organizations, which could impact the duration of the implementation schedule.

Cost

Overall, the site area is sufficient for any of the alternative facilities, and more than one depending on which facilities are selected. There are a few different possible combinations of facilities and processing capacities that could be developed at this location, and the total redevelopment costs could range from $20 million for a low-tech outdoor C&D recycling facility to more than $1.5 billion for a state-of the art mass burn WTE facility. The optimal selection, sizing and arrangement of alternative facilities will require additional studies to more accurately determine the total development costs. If a WTE or gasification facility is selected for this site, development costs are expected to be significantly higher than at the existing RRF site, primarily due to floodplain and wetland mitigation issues. Depending on the alternative facility(ies) selected, there are several site issues and additional Solid Waste System changes that could affect the total cost to the Department, including:

- **Land Acquisition –** siting analysis and land acquisition will increase costs.
- **Soils** – Depending on the type of alternative facility(ies) selected for the site, the removal and replacement of site muck soils with structural fill and/or rock removal in development areas may be needed. Additional structural fill will be needed to elevate buildings due to the high groundwater table and floodplain mitigation.
- **Utilities**
  - Construction of a potable water booster station and 3.3 miles of water main may be required.
  - Construction of an on-site wastewater lift station and 3.3 miles of force main may be required.

- Construction of approximately 5.5 miles of 6” gas service piping to provide natural gas to the site may be required.
- Soils data indicates shallow depth to bedrock, rock removal may be required in some areas for utility pipe trench excavation.
- If a WTE or gasification facility is selected for this site, construction of approximately 6.5 miles of electrical transmission line routing through existing ROW/ FPL easements will be needed. Also, upgrades to the existing substation may be needed.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- On-site water wells are likely not permittable; therefore potable water will need to be purchased, increasing anticipated operations and maintenance costs.

- **Permitting –** Due to the presence of floodplains, wetlands, wildlife habitat, and the close proximity of the site to the Everglades Class I Area, permitting at this site may be very challenging, especially if a WTE or gasification facility is selected. Permitting difficulties are expected to increase costs at this site.
- **Stormwater** – High groundwater table and required floodplain compensating storage will significantly increase both the cost and site area required for stormwater retention.
- **Solid Waste System**
  - Collection and Transfer vehicles routed to this site would have significantly increased costs for fuel consumption, driver time, and vehicle wear related to the additional travel distance from the existing RRF.
  - Ash/slag hauling costs for a new WTE or gasification facility located at this site are expected to be much higher than the existing RRF. An option to keep hauling distances short - there appears to be sufficient area on site to co-locate a new ash monofil, if permittable. If disposed at a non-County facility, costs for disposal would significantly increase from current levels.

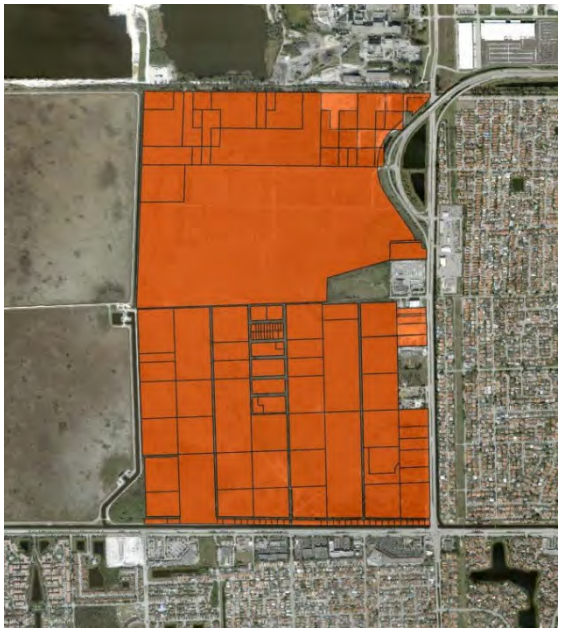
Analysis Summary – Alternative Site No. 17 – Ingraham Hwy. Site #2

Site Differentiators Overview

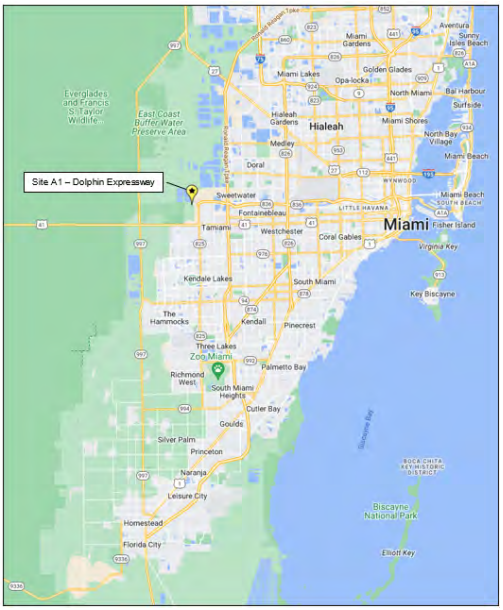
- Removal of muck soils and replacement with structural fill
- Additional structural fill for tipping floor pit due to high groundwater
- Floodplain compensating storage
- Construction of 0.75 mile of access road
- Extremely difficult PSD permitting
- Long extensions of utilities
- Close proximity to Everglades National Park – anticipated environmental group and community organization opposition
- Collection and Transfer vehicles routed to this site would have significantly increased costs for fuel consumption, driver time, and vehicle wear related to the additional travel distance from existing System facilities.

Analysis Summary – Alternative Site A1 – Dolphin Expressway

MDPA Parcel Map



Location Map



MDPA Parcel Data

See Table 1 starting on page 11.

Site Information

This 864-acre site is centrally located in the County, with NW 137th Ave on the east side, SW 8th Street on the south side and is approximately 6.5 miles west of Miami International Airport. The site consists of 148 parcels, with 70 different owners. Some parcels (±89 acres) in the eastern portion of the site are inside the UDB, but most parcels (±772 acres) are outside it. Approximately 284 acres of the site are outside the UDB but within the 2030 Urban Expansion Area Boundary (UEA).

There are many possible parcel combinations that could be large enough to support any of the alternative facilities and co-locate multiple facilities into a solid waste campus, depending on the constraints of the specific parcel(s) selected for development. Multiple owners, some being other County departments, will likely be involved in any site development effort and may result in increased costs, protracted schedules, interdepartmental negotiations, and other issues that will have to be resolved. The site is less than a 10-minute travel time to SR-836 or the Florida Turnpike, and some parcels are located less than 0.5 mi from residential zoning. The site is approximately 4.1 miles (6.6 km) ENE of the boundary of the Everglades Class I area.

Site Alternatives Summary

Considerations for the selection of each alternative technology at this site are shown on the pages that follow.

Analysis Summary – Alternative Site A1 – Dolphin Expressway

Site Alternatives Summary						
Alternative	**Area**	**Capacity**	**Cost Per Ton**	**Development Time**	**Technology Considerations**	**Site-Specific Considerations**
Organics Composting (Windrow)	10-450+ Ac	5-8 tons per acre per day, typically 80-500 TPD.	$72-$80+ (1)	3-5 years	Requires separate organics collection. Low complexity, low skill level needed for most operations. Minimum 30-day processing time. Processing capacity depends on available land area. Not well suited for urban areas, potential public concerns with noise, odor and vector issues. Challenging wet season operations. Good quality compost produced. End uses/markets and capacities may need development. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals.	Proximity to residential zoning increases potential public concerns with noise, odor and vector issues. High groundwater may cause operational difficulties, especially during wet season. Maximum processing capacity depends on parcel area acquired and developed, could be 1M tpy or more.
Organics Composting (Aerated Static Pile (ASP))	5-450+ Ac	1-10 tons per acre per day. Typically, 80-700 TPD	$74-$80+ (1)	3-5 years	Requires separate organics collection. Moderate complexity, moderate skill level needed for operation. Minimum 30-day processing time. Processing capacity depends on available land area. Potential public concerns with noise, odor and vector issues. Challenging wet season operations. End uses/markets and capacities may need development. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals.	Proximity to residential zoning increases potential public concerns with noise, odor and vector issues. High groundwater may cause operational difficulties, especially during wet season. Maximum processing capacity depends on parcel area acquired and developed, could be 1M tpy or more.
Organics Composting (In-Vessel)	<1-20+ Ac	5-100 tpd per vessel, 15 to 1200 TPD	$9-$50+ (1), (2)	3-5 years	Requires separate organics collection. Variable complexity, low skill level needed for operation. Short 5-7 day processing time. Compact process, smaller facility footprint, expandable capacity. Better suited for urban areas, vessels can be enclosed in metal building to mitigate potential public concerns with odor and vector issues from receiving areas. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals.	Potential permitting and public concerns. High groundwater may cause some operational difficulties, especially during wet season. Floodplain and wetland mitigation may increase development costs. All utilities available near site. Could be co-located with other alternative facility(ies) on this site.
Anaerobic Digestion	3-40+ acres depending on capacity	270-600 TPD	$57-$90+ (1), (2)	5-7 years	Requires separate organics collection. High complexity, high skill level needed for operation. Processing capacity depends on available land area. Potential permitting issues and public concerns with noise, odor and vector issues. Fire risk from methane production. Additional composting or disposal of resulting digestate solids would be required. Resulting digestate liquids can be used for fertilizer in cover maintenance for landfills or on agricultural land. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals. End uses/markets and capacities may need development.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. All utilities available near site. Could be co-located with other alternative facility(ies) on this site.

Analysis Summary – Alternative Site A1 – Dolphin Expressway

Site Alternatives Summary						
Alternative	**Area**	**Capacity**	**Cost Per Ton**	**Development Time**	**Technology Considerations**	**Site-Specific Considerations**
Gasification	5-60+ Ac	100-300+ TPD	$154+[(3)]	10+ years	Unproven technology, significant pre-processing of MSW required. High complexity, high skill level needed for operation. Possible capacity limitations. Increased fire risk from syngas production but can fuel turbines for electrical generation. High capital and operating cost. Active ash monofil on site for slag disposal.	Good transportation access, all utilities available near site. Difficult permitting due to close proximity to Everglades Class I area. Floodplain and wetland mitigation may increase development costs. Could be co-located with other alternative facility(ies) on this site. Rail access on the northern boundary could be used for slag hauling to out-of-county landfill.
Waste-to-Energy (Mass Burn)	40-60 Ac	4,000-5,000 TPD	$57-60+	8-10+ years	No changes to existing collection system needed. Highest capacity alternative. High complexity, high skill level needed for operation. Permitting and public opposition challenges. High capital and operating cost. Electrical generation for revenue or powering other facilities. Good metal recovery possible from ash. Landfill needed for ash disposal.	Good transportation access, all utilities available near site. Difficult permitting due to close proximity to Everglades Class I area. Floodplain and wetland mitigation may increase development costs. Could be co-located with other alternative facility(ies) on this site. Rail access on the northern boundary could be used for ash hauling to out-of-county landfill.
Mechanical Biological Treatment	5-15 Ac	200-560 TPD	$123-183	3-5 years	No changes to existing collection system needed. High complexity, high skill level needed for operation. High capital and operating cost. High-capacity alternative, but waste is typically shredded and converted into pelletized solid recovered fuel (SRF) that must be transported and fired at another facility capable of using the SRF. Additional fleet equipment and operators would be needed for site operation and transport of SRF.	Potential public concerns with noise, odor and vector issues. Floodplain and wetland mitigation may increase development costs. Could be co-located with other alternative facility(ies) on this site. Local concrete facilities may be able to use SRF. Rail access on the northern boundary could be used for SRF transport.
Mixed Waste Processing Facility	20-60 Ac	200-1500 TPD	$85-$150	5-7 years	No changes to existing collection system needed. High complexity, but low skill level needed for most operations. Capacity limited to approximately 3,000 tpd. Potential permitting issues and public concerns with noise, odor and vector issues. Additional processing/disposal of post-processed MSW would be required. Contamination of recovered materials is significant issue, recovery rates for marketable materials typically 30% or less. End uses/markets and capacities may need development. Moderate capital and operating costs, and additional fleet equipment and operators would be needed for site operations and transport of residuals.	Potential public concerns with noise, odor and vector issues. Floodplain and wetland mitigation may increase development costs. Could be co-located with other alternative facility(ies) on this site. Rail access on the northern boundary could be used for sorted MSW hauling for disposal.

Analysis Summary – Alternative Site A1 – Dolphin Expressway

Site Alternatives Summary						
Alternative	**Area**	**Capacity**	**Cost Per Ton**	**Development Time**	**Technology Considerations**	**Site-Specific Considerations**
Material Recovery Facility	20-60 Ac	300-825 TPD	$87-154	5-7 years	Modification of existing curbside collection system needed. High complexity, but low skill level needed for most operations. Capacity limited by site area. Typical maximum processing capacity for these facilities is approximately 350-400 tons per day. Minimal public concerns. Additional processing/disposal of some post-processed materials (i.e., glass) would be required. Contamination of recovered materials is significant issue. End uses/markets and capacities may need development. Moderate capital and operating costs, and additional fleet equipment and operators would be needed.	Minimal expected public concerns. Floodplain and wetland mitigation may increase development costs. Could be co-located with other alternative facility(ies) on this site.
C&D Recycling Facility	5-20 Ac	300–825 TPD	$76-150	3-7 years	No change to existing collection system needed. Can be low or high complexity, but low skill level needed for most operations. Capacity limited by site area. Potential public concerns with noise, odor, and dust. Additional processing/disposal of some post-processed materials (i.e., mixed fines) would be required. End uses/markets and capacities may need development. Moderate capital and operating costs, and additional fleet equipment and operators would be needed.	Potential public concerns with noise, odor and dust issues. Could be co-located with other alternative facility(ies) on this site.

(1) Sources: DC Study (2017 costs escalated) and NREL Study (2020 costs escalated). Cost does not include additional organics collection system costs.
(2) Costs estimated from vendor quote, does not include building or land acquisition costs.
(3) Costs based on 2017 article in Waste Management journal using developed country costs.

Analysis Summary – Alternative Site A1 – Dolphin Expressway

Operational, Engineering, and Regulatory Considerations

Location

The site is centrally located in the County, approximately 5.0 miles southwest of the existing RRF site, more than four miles from any active airport, approximately 0.1 miles (at closest) to residential zoning, and approximately 4.1 miles from the boundary of Everglades National Park. If this site were selected for the development of one or more of the alternative facilities there would be impacts to the local traffic levels, but the effects on the County's Solid Waste System would be minimal.

To maintain the current collection patterns and travel times, a new transfer station would need to be constructed at the RRF site if this site was selected for development. The number of deliveries by collection vehicles and transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the capacity and material types processed by the alternative facility(ies) developed at the site. Their travel patterns would be slightly altered, and travel times would change slightly due to changes in travel distances and expected traffic congestion. Estimated travel distances and times from the site to the County's transfer stations and landfills as compared to the RRF site are as follows:

Facility	Est. Travel Distance/Time to Site A1	Est. Travel Distance/Time to RRF
West TS	10 mi/13 min	9 mi/16 min
Central TS	15 mi/19 min	14 mi/21 min
Northeast TS	26 mi/30 min	18 mi/25 min
South Dade LF	20 mi/27 min	25 mi/31 min
North Dade LF	25 mi/25 min	21 mi/23 min

The changes in travel times and distances from the RRF site do not appear to be sufficient to significantly affect Collection and Transfer operations. Provided no other operational changes are made, Collection and Transfer fleet labor, fuel consumption and maintenance costs are expected to have only minor changes if this site were selected for development.

Utilities

In general, the parcels bordering NW 137th Avenue have good access to the existing utilities along NW 137th Avenue, but access may become more complicated for parcels within the site. Depending on what parcel(s) are selected for development, many additional parcels or utility easements may be needed to allow for the extension of utilities.

- **Potable water** – The potable water capacity required for fire lines and supply lines will depend on the type of alternative facility(ies) selected. A 16" potable water main appears to be available on

NW 137th Avenue, but additional analysis will be needed to verify the pipe size, service pressure, and available system capacity. A booster station may be needed to increase system pressure. Soils data indicates shallow depth to bedrock in some locations, rock removal may be required for pipe trench excavation for new lines in those areas.

Wastewater – The minimum sanitary sewer capacity requirements will depend on the type of alternative facility(ies) selected. Sanitary sewer appears to be available on NW 137th Avenue, but additional analysis will be needed to determine pipe size and available system capacity. A lift station and force main to gravity sewer may be required. Soils data indicates shallow depth to bedrock in some locations, rock removal may be required for pipe trench excavation for new lines in those areas.

- **Natural gas** – The minimum natural gas capacity requirements will depend on the type of alternative facility(ies) selected. If needed for facility operations, service lines will need to be extended to the site. According to the National Pipeline Mapping System (NPMS) there is a gas transmission main on NW 137th Avenue, but additional analysis will be needed to determine pipe size and available system capacity. Additional ROW/easement may be needed. Soils data indicates shallow depth to bedrock, rock removal may be required for pipe trench excavation.
- **Electric** – The electrical service capacity required will depend on the type of alternative facility(ies) selected. Standard 120V/230A electrical service appears to be available at the site. The nearest substation/switchyard is the FPL South Transmission facility located less than 0.25 miles away at 13655 NW 6th Street. Substation/switchyard spare capacity, voltage, and available terminations will need to be evaluated.
- **Stormwater** – High groundwater elevations and floodplain mitigation measures may result in significantly larger stormwater pond areas on the site.
- **Groundwater** – If necessary for facility operations, a consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer. If a consumptive use permit cannot be obtained, then potable water service will have to provide for all facility water consumption needs, which will increase operating costs.

Soils

The USDA Soil Survey data for the site classifies the site soils as primarily Shark Valley Muck, Coopertown Muck, Perrine Marly Silt Loam, Biscayne Marly Silt Loam, and Udorthents. The presence of muck soils indicates high groundwater conditions. Udorthents soils consist of unconsolidated or heterogeneous geologic material removed during the excavation of ditches, canals, lakes, ponds, and quarries.

While this may not present an issue for some alternative facilities, any facility(ies) having buildings and ancillary components with slab-on-grade foundations located at this site would have to be constructed on fill material, which could present geotechnical engineering challenges for the foundation designs and additional site preparation costs.

Analysis Summary – Alternative Site A1 – Dolphin Expressway

Environment

- **Floodplains** – Almost the entire site area is located within FEMA Flood Zones AE (El. 7) and AH (El. 7). Floodplain compensating storage and other mitigation and site development measures will likely have to be addressed.
- **Environmental Assessments** – Based on a review of the Miami-Dade County Environmental Resources Access Portal, several biological and wetland assessments have been conducted for several of the parcels located within Site A1. The findings of these biological and wetlands assessments noted the presence of jurisdictional wetlands and the potential presence of endangered species; however, due to the age of the existing assessments, these studies would need to repeated for the portions of the Site A1 that the County is interested in exploring for development
- **Power Plant Siting Act (PPSA) Certification** – If a large WTE or gasification facility were selected for this site, a complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process would also be required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The SW corner of the site is located approximately 4.1 mi (6.6 km) NE of the Everglades Class I Area and the northern edge of the site is adjacent to the CEMEX Miami Facility, a large existing emitter. The adjacent CEMEX facility may result in elevated receptors (200ft+) and exhaust plume impaction during air emissions modeling.

  As a proposed major source of air pollutant emissions, a new WTE or gasification facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

  The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).
- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – As mentioned previously, almost the entire site area is located within a 100-year floodplain (FEMA Flood Zones AE (El. 7) and AH (El. 7)). In addition, the National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates wetlands are present. National Wetlands Inventory

Analysis Summary – Alternative Site A1 – Dolphin Expressway

mapping indicates most of the site is a Freshwater Emergent Wetland habitat classified as a PEM1/SS3Cd, as shown in Figure 1. Development at this site may conflict with County Policies CON-7A and/or CON-7B.

The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. Eastern portions of the site are within the urban development boundary, while western portions are outside of the urban development boundary. The Florida Fish and Wildlife Commission Terrestrial Resources Geographic Information System database notes that within this site, there are strategic habitat conservation areas for the Florida Panther, Snail Kite, and Swallow-Tailed Kite. Additionally, the site is located within the Florida bonneted bat consultation area and individual consultation with the U.S. Fish and Wildlife Service is required. The site is also within 5.3 miles of an active wood stork colony.

Figure 1 - Wetlands area on Site A1 (from NWI data)

Transportation

The parcels bordering NW 137th Ave have good access to the Dolphin Expressway and the Florida Turnpike, but access may become more complicated for parcels within the site. Depending on what parcel(s) are selected for development, many additional parcels or access easements may be needed to establish road access sufficient for heavy truck traffic. There are three existing road access points to NW 137th Ave in the northern (at 12th Street) and central (at Dolphin Expressway and NW 6th St.) areas of the site, but parcels south of NW 6th Street would need to construct road access to either NW 137th Ave or NW 8th Street. Additionally, if County right of way or access easements are not present, they will have to be acquired or additional parcels purchased to establish access corridors in the site.

The volume of traffic that is expected at the site will depend on the type of facility(ies) selected but will increase the loads on local roads. Significant traffic increases would be expected on the Florida Turnpike and the Dolphin Expressway, which are already high traffic count roadways according to the Florida Department of Transportation's Florida Traffic Online Web Application. Traffic increases would also be expected on 8th Street, 12th Street, 137th Avenue and other local roads. Truck queuing will have to be accomplished on site to prevent congestion of local roads, which has important effects on the number and arrangement of parcels needed. A typical WTE facility layout was overlaid on the northern, central and southern parcel areas on the site and, depending on the parcel(s) selected for development between one and 22 parcels were needed, along with additional ROW and/or access easements.

Analysis Summary – Alternative Site A1 – Dolphin Expressway

Also, CSX rail lines run along the northern edge of the site and may be available for connection with the selected site. Additional evaluation and investigation is needed.

Community

The USEPA EJScreen Standard Report indicated elevated values for Particulate Matter 2.5 (µg/m^3) and Diesel Particulate Matter (µg/m^3) and several other pollutants. However, these pollutants may be more closely associated with the adjacent CEMEX facility and the Dolphin Expressway rather than the Site A1 area. Some parcels in the eastern and southern portions of the site are within 0.1 miles of residential zoning, which suggests that the siting of any alternative facility(ies) that may have potential noise, odor, or other objectionable characteristics may be opposed by the community at this location.

Schedule

There are a few site constraints that could affect the schedule of any alternative facility project, including:

- **Land Acquisition** – Depending on what facility(ies) and parcel(s) are selected for development, many additional parcels and/or ROW or access/utility easements may be needed, increasing the number and schedule associated with parcel and/or easement acquisition.
- **Utilities** – Additional ROW/easements will be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- **Soils** – Additional geotechnical testing will be needed to determine the full extent of soil preparation needed (i.e., vibro-compaction, consolidation, etc.) and additional requirements for building foundations at the site (f needed), which may increase design and construction time. Also, soils data indicates shallow depth to bedrock in some locations, so rock removal may be required for pipe trench excavation for new utility lines in those areas and may affect construction schedules.
- **Permitting** – Due to the presence of floodplains, wetlands, and the close proximity of the site to the Everglades Class I Area, permitting at this site will be very challenging. In addition, development at this site may conflict with Miami-Dade County policies CON-9A, CON-9B, and others. If a WTE or gasification facility is selected for this site, the Prevention of Significant Deterioration (PSD) Permitting will be difficult. The site is located approximately 4.1 mi (18.31 km) ENE of the Everglades Class I Area and about 0.25 miles south of a large existing emitter, the CEMEX Miami Facility, which may result in elevated receptors and exhaust plume impaction during air emissions modeling. The nearby Everglades National Park's location along the western border of the County and the Biscayne Bay NP (sensitive Class II area) located on the eastern border of the County both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of any new large emitter and thus will make air permitting challenging at this prospective site. For these reasons, this site has the longest estimated development time for a WTE or gasification facility for the six evaluated sites.
- **Community** – Portions of the site are within 0.1 miles of residential zoning. Therefore, siting of new alternative facility(ies) may face community opposition at this location, which could affect the project schedule.

Analysis Summary – Alternative Site A1 – Dolphin Expressway

Cost

Overall, the site area is sufficient for any of the alternative facilities, and more than one depending on the property area acquired. There are many different possible combinations of facilities and processing capacities that could be developed at this location, and the total redevelopment costs could range from $20 million for a low-tech outdoor C&D recycling facility to more than $1.5 billion for a state-of the art mass burn WTE facility and ash landfill. The optimal selection, sizing and arrangement of alternative facilities will require additional studies to more accurately determine the total development costs. If a WTE or gasification facility is selected for this site, development costs are expected to be higher than at the existing RRF site, primarily due to floodplain and wetland mitigation costs. Depending on the alternative facility(ies) selected, there are several site constraints and additional Solid Waste System changes that could affect the total cost to the Department, including:

- **Land Acquisition** – Depending on what facility(ies) and parcel(s) are selected for development, many additional parcels and/or ROW or access/utility easements may be needed, increasing the number and costs associated with parcel and/or easement acquisition.
- **Utilities**
  - Depending on what parcel(s) are selected for development, many additional parcels or utility easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
  - Construction of approximately 0.5-1.25 miles of potable water piping will be needed. A booster station may be required to provide adequate water service pressure.
  - Construction of an on-site wastewater lift station and approximately 0.5-1.25 miles of force main will likely be required.
  - Construction of approximately 0.5-1.25 miles of gas service piping to provide natural gas service to the site.
  - Soils data indicates shallow depth to bedrock, rock removal may be required in some areas for utility pipe trench excavation, which may increase construction costs.
  - For WTE and gasification alternatives, construction of approximately 0.5-1.25 miles of electrical transmission line routing through ROW or utility easements.
  - On-site water wells are likely not permittable. All potable water will probably need to be purchased, increasing anticipated operational costs.
- **Soils** – If buildings are needed, additional geotechnical testing will be needed to determine the full extent of soil preparation needed (i.e., vibro-compaction, consolidation, etc.) and additional requirements for building foundations at the site, which may increase design and construction costs.
- **Stormwater** – High groundwater elevations and floodplain mitigation measures may result in significantly larger stormwater pond areas on the site.
- **Permitting** – Due to the presence of floodplains, wetlands, and the close proximity of the site to the Everglades Class I Area, permitting at this site will be very challenging and will significantly increase the associated permitting costs.

Analysis Summary – Alternative Site A1 – Dolphin Expressway

Site Differentiators Overview

From a solid waste standpoint, Site A1 has many very positive attributes, but from a permitting perspective development on this site would be more challenging. Specific differentiators of this site include the following:

- Large 864-acre site area, centrally located in the County, consisting of 148 parcels, with 70 different owners. Some parcels in the eastern portion of the site are inside the UDB and the 2030 UEA. There are many possible parcel combinations that could be large enough to support any of the alternative facilities and co-locate multiple facilities into a solid waste campus, depending on the constraints of the specific parcel(s) selected for development. Multiple owners, including some major corporations and other County departments, will likely be involved in any site development effort and may result in increased costs, protracted schedules, interdepartmental negotiations, and other issues that will have to be resolved.
- Good access to high-capacity road and rail transportation infrastructure, available potable water, sanitary sewer, electrical and natural gas utilities. The FPL South Substation is almost adjacent to the site, located on the east side of SW 137th Avenue.
- Parcels bordering NW 137th Ave have good access to the Dolphin Expressway and the Florida Turnpike, but access may become more complicated for parcels within the site. Depending on what parcel(s) are selected for development, many additional parcels or access easements may be needed to establish road access sufficient for heavy truck traffic and for the extension of utility infrastructure.
- Soils on the site are primarily muck soils and generally unsuitable for construction. Additional geotechnical testing will be needed to determine the full extent of soil preparation needed (i.e., vibro-compaction, consolidation, etc.) and additional requirements for building foundations at the site, which may increase design and construction costs and extend the project schedule. Also, soils data indicates shallow depth to bedrock, so rock removal may be required for utility pipe trench excavation.
- The site is almost entirely within the 100-year floodplain (FEMA Flood Zones AE (El. 7) and AH (El. 7) and within a Special Flood Hazard Area. High groundwater elevations and floodplain mitigation measures may result in significantly larger stormwater pond areas on the site and increased costs for elevating buildings.
- National Wetlands Inventory mapping indicates most of the site is a Freshwater Emergent Wetland habitat. Also, due to potential adverse effects to wetlands on site, groundwater may not be available for use as source water for non-potable uses such as boiler feedwater, cooling tower/condenser feedwater, truck wheel wash, and irrigation water.
- The site contains habitat area for the Wood Stork, Florida Panther, and other protected species.
- Due to the presence of floodplains, wetlands, and the close proximity of the site to the Everglades Class I Area (approximately 4.1 miles) and an existing large emitter (CEMEX Miami facility), permitting at this site will be very challenging. If a WTE or gasification facility is selected for this site, the Prevention of Significant Deterioration (PSD) Permitting will be difficult. In addition, development at this site may conflict with Miami-Dade County policies CON-9A, CON-9B, and others.

Analysis Summary – Alternative Site A1 – Dolphin Expressway

Table 1 - Parcel Ownership Information (from MDPA)

Folio No.	Owner	Area (Ac)	2023 MDPA Market Value
3039530000130	MDXQ LLC	234.13	$11,706,600
3039530000134	PROLOGIS EXCHANGE BEACON LAKES	2.50	
3039530000135	MIAMI DADE	4.40	
3039530000136	PROLOGIS EXCHANGE FL2003 LLC	20.00	
3039530000137	PROLOGIS EXCHANGE FL2003 LLC	33.75	
3039530000138	MDXQ LLC	11.36	
3039530000139	DOBA INVESTMENT CORP	11.99	
3039530000142	ROLANDO BARRERO TRS	1.25	
3039530000145	BEACON VILLAGE LLC	2.50	
3039530000146	BEACON VILLAGE LLC	1.25	
3039530000147	PROLOGIS EXCHANGE	1.25	
3039530000148	PROLOGIS EXCHANGE	2.50	
3039530000149	JBR LLC	2.50	
3039530000150	PROXIMITY WAREHOUSES INC	1.85	
3039530000151	JBR LLC	1.25	
3039530000152	CARADEL VENTURES INC &	4.20	
3039530000154	PROLOGIS EXCHANGE BEACON LAKES	2.17	
3039530000156	PROLOGIS EXCHANGE FL 2002 LLC	2.50	
3039530000157	PROLOGIS EXCHANGE BEACON LAKES	1.25	
3039530000158	SRM INVESTMENTS LLC	1.40	
3039530000159	BEACON VILLAGE LLC	2.50	
3039530000161	MIAMI DADE EXPRESSWAY AUTHORITY	0.72	
3039530000162	PROLOGIS EXCHANGE BEACON LAKES	2.50	
3039530000163	PROLOGIS EXCHANGE BEACON LAKES	6.25	
3039530000164	PROLOGIS EXCHANGE	3.75	
3039530000165	YARITZA GARCIA	0.45	
3039530000166	BEACON VILLAGE LLC	0.53	
3039530000167	MIAMI DADE EXPRESSWAY AUTHORITY	0.11	
3039530000170	MIAMI DADE	0.33	
3039530000180	DOBA INVESTMENT CORP	2.50	
3039530000190	JAMES JOHN STENGER	1.25	
3039530000200	DOBA INVESTMENT CORP	4.04	
3039530000201	MIAMI-DADE EXPRESSWAY AUTHORITY	5.00	
3039530000210	DOBA INVESTMENT CORP	7.93	
3039530000210	DOBA INVESTMENT CORP	7.93	
3039530000220	DOBA INVESTMENT CORP	1.25	
3039530000230	BARCORP OF MIAMI INC	3.75	
3039530000250	PROLOGIS EXCHANGE BEACON LAKES	6.25	
3049030030012	EW SB FL MIAMI 400 LLC	1.78	

Analysis Summary – Alternative Site A1 – Dolphin Expressway

Folio No.	Owner	Area (Ac)	2023 MDPA Market Value
3049030030015	EW SB FL MIAMI 400 LLC	1.29	
3049030030017	GERMICO 137 LLC	2.47	
3049030030019	EW SB FL MIAMI 400 LLC	0.50	
3049030030020	BLUE HERON 6137 LLC	9.62	
3049030030030	836 HEC LLC	25.00	
3049030030040	CHRISTINE PARKES	10.00	
3049030030050	MIAMI-DADE COUNTY	10.00	
3049030030060	MIAMI PROPERTY LLC	20.00	
3049030030070	MIAMI DADE COUNTY	12.27	
3049030030080	MIAMI DADE COUNTY	2.32	
3049030030081	MIAMI DADE COUNTY	5.00	
3049030030100	MIAMI DADE COUNTY	4.93	
3049030030101	THE SUN LAND COMPANY	4.93	
3049030030110	JONATHAN HALE KROSLEY	5.00	
3049030030111	MIAMI-DADE EXPRESSWAY AUTHORITY	5.00	
3049030030120	GONZALO ESTEVEZ	4.63	
3049030030130	BLUE HERON 6137 LLC	10.00	
3049030030160	BLUE HERON 6137 LLC	10.00	
3049030030180	8TH STREET LAND HOLDINGS LLC	10.00	
3049030030190	MIAMI-DADE COUNTY	20.00	
3049030030191	MIAMI DADE COUNTY	19.02	
3049030030200	ALFREDO LAMADRIZ TRS	10.00	
3049030030210	MIAMI DADE COUNTY	10.00	
3049030030220	MIAMI DADE COUNTY	10.00	
3049030030230	E R TRUCK & EQUIP CORP	10.00	
3049030030250	KIN YEN CHU &	10.00	
3049030030260	THREE I CORP	10.00	
3049030030270	137 AVE 8TH ST HOLDINGS LLC	28.75	
3049030030280	BLUE HERON 6137 LLC	10.00	
3049030030290	ATLAS HIALEAH 1031 LLC	3.91	
3049030030291	ATLAS HIALEAH 1031 LLC	2.60	
3049030030292	ATLAS HIALEAH 1031 LLC	2.60	
3049030030300	ATLAS HIALEAH 1031 LLC	3.91	
3049030030301	TARGET CORPORATION	3.10	
3049030030310	TARGET CORPORATION	4.32	
3049030030320	ATLAS HIALEAH 1031 LLC	5.68	
3049030030330	NC CAPITAL GROUP L L C	10.00	
3049030030340	ATP XXXII LLC	10.00	
3049030030350	JOSE TEJEDO JR &W GLADYS	10.00	
3049030030370	MIAMI DADE ESPRESSWAY AUTHORITY	10.00	

Analysis Summary – Alternative Site A1 – Dolphin Expressway

Folio No.	Owner	Area (Ac)	2023 MDPA Market Value
3049030030380	MIAMI-DADE EXPRESSWAY AUTHORITY	7.13	
3049030030400	ATP XXXII LLC	7.50	
3049030030410	MIAMI-DADE EXPRESSWAY AUTHORITY	8.20	
3049030030420	NC CAPITAL GROUP L L C	8.50	
3049030030440	TARGET CORPORATION	9.25	
3049030030450	TARGET CORPORATION	7.87	
3049030030470	TARGET CORPORATION	0.16	
3049030030480	TARGET CORPORATION	0.25	
3049030030490	TARGET CORPORATION	0.25	
3049030030500	TARGET CORPORATION	0.25	
3049030030510	TARGET CORPORATION	0.25	
3049030030520	TARGET CORPORATION	0.25	
3049030030530	TARGET CORPORATION	0.25	
3049030030540	TARGET CORPORATION	0.25	
3049030030550	TARGET CORPORATION	0.25	
3049030030560	TARGET CORPORATION	0.25	
3049030030570	TARGET CORPORATION	0.25	
3049030030580	137 AVE 8TH ST HOLDINGS LLC	0.25	
3049030030590	137 AVE 8TH ST HOLDINGS LLC	0.25	
3049030030600	137 AVE 8TH ST HOLDINGS LLC	0.25	
3049030030610	137 AVE 8TH ST HOLDINGS LLC	0.25	
3049030030620	137 AVE 8TH ST HOLDINGS LLC	0.25	
3049030030630	137 AVE 8TH ST HOLDINGS LLC	0.25	
3049030030640	JATHAN SUED	0.25	
3049030030650	MARIA I BOXER	1.23	
3049030030660	EDWILLA JENKS	0.25	
3049030030670	DEBRAH DEMIRZA	0.25	
3049030030680	KIN YEN CHU &	0.25	
3049030030690	ULISES ARIAS	0.25	
3049030030700	ULISES ARIAS	0.25	
3049030030710	ULISES ARIAS	0.25	
3049030030720	JUDITH STONE	0.25	
3049030030730	JUDITH STONE	0.25	
3049030030740	JUDITH STONE	0.25	
3049030030750	ROBERTO HERNANDEZ	0.50	
3049030030770	RAYMOND E PARKER	0.25	
3049030030790	JOSE M JORGE &W	0.50	
3049030030800	LILLIAN GONZALEZ	0.98	
3049030040010	CHRISTINE PARKES	1.81	
3049030040016	MIAMI DADE EXPRESSWAY AUTHORITY	1.81	

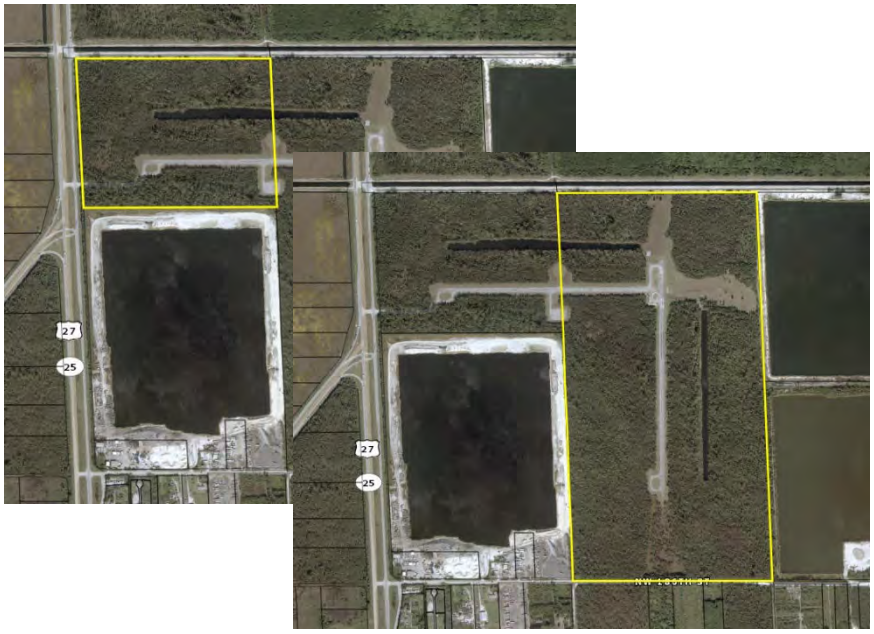
Analysis Summary – Alternative Site A1 – Dolphin Expressway

Folio No.	Owner	Area (Ac)	2023 MDPA Market Value
3049030040020	ALICE C AVARD	0.19	
3049030040030	ARLENE COHEN TRS	0.16	
3049030040040	MELISSA ORTS	0.16	
3049030040050	MELISSA ORTS	0.16	
3049030040060	ANGEL RAFAEL RIVERA SANCHEZ	0.16	
3049030040070	LIGHT RAY INVESTMENTS LLC	0.16	
3049030040080	LIGHT RAY INVESTMENTS LLC	0.16	
3049030040090	ENGEL RIVERA	0.16	
3049030040100	PEDRO FORTE	0.16	
3049030040110	PEDRO FORTE	0.16	
3049030040120	EST OF HILDA STIEREN	0.35	
3049030040130	PROXIMITY WAREHOUSE INC	0.19	
3049030040140	PROXIMITY WAREHOUSE INC	0.16	
3049030040150	PROXIMITY WAREHOUSE INC	0.16	
3049030040160	PROXIMITY WAREHOUSE INC	0.16	
3049030040170	PROXIMITY WAREHOUSE INC	0.16	
3049030040180	ALEAGA S EMPIRE LLC	0.16	
3049030040181	JULIO O MECHOSO	0.16	
3049030040182	DIMAS RODRIGUEZ	0.16	
3049030040183	JOHN H FERREIRA &	0.32	
3049030040185	LEON SIEV	0.32	
3049030040190	JOSE M JORGE &W LOLA C	0.51	
3049030040200	MIAMI DADE EXPRESSWAY AUTHORITY	3.45	
3049030040270	MIAMI- DADE EXPRESSWAY AUTHORITHY	3.96	
3049030040340	MIAMI- DADE EXPRESSWAY AUTHORITY	3.95	
3049030040440	MIAMI - DADE EXPRESSWAY AUTHORITY	2.94	
3049030040540	MIAMI DADE EXPRESSWAY AUTHORITY	1.01	
3049030280010	STOR ALL NW 137TH AVE LLC	2.47	

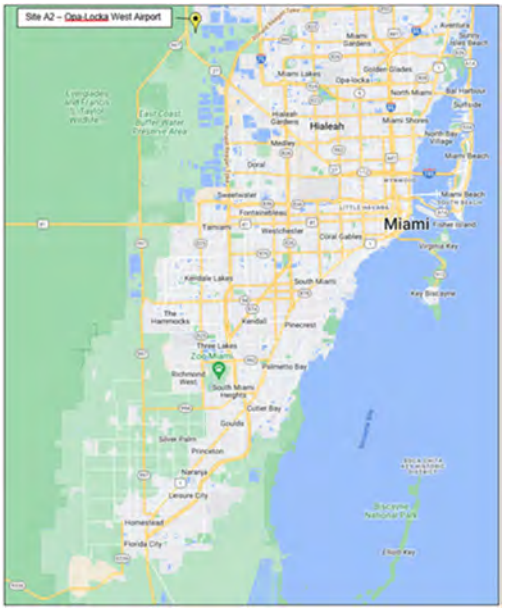
Future Solid Waste Facility Siting Alternatives Analysis

Analysis Summary – Alternative Site A2 – Opa-Locka West Airport

MDPA Parcel Map



Location Map



Site Information

This site consists of two parcels totaling approximately 416 acres in the northwest portion of Miami-Dade County, outside the UDB, with US27 on the western border and approximately 7.8 miles northwest of the RRF. The site is owned by the County, but approximately 377 acres consists of wetland preserve areas. The site is less than a 10-minute travel time to US27 or the Florida Turnpike, is located more than 0.5 miles from residential zoning and approximately 13.4 miles (21.6 km) northeast of the boundary of the Everglades Class I area. This site is located in a Comprehensive Everglades Restoration Program (CERP) project area.

MDPA Parcel Data

Owner: Miami-Dade County Aviation Department - Finance
2023 MDPA Market Value: $10,794,603
Zoning District: GU
PA Zone: GU - INTERIM DISTRICT - USES DEPEND ON CHARACTER OF NEIGHBORHOOD, OTHERWISE EU-2 STANDARDS APPLY
Folio Nos: 30-2903-000-0010, 30-2902-000-0010

Site Alternatives Summary

Considerations for the selection of each alternative technology at this site are shown on the pages that follow.

Analysis Summary – Alternative Site A2 – Opa-Locka West Airport

Site Alternatives Summary						
Alternative	**Potential Site Area**	**Capacity**	**Cost Per Ton**	**Development Time**	**Technology Considerations**	**Site-Specific Considerations**
Organics Composting (Windrow)	10-60 Ac	5-8 tons per acre per day, typically 80-500 TPD.	$72-$80+ (1)	3-5 years	Requires separate organics collection. Low complexity, low skill level needed for most operations. Minimum 30-day processing time. Processing capacity depends on available land area. Not well suited for urban areas, potential public concerns with noise, odor and vector issues. Challenging wet season operations. Good quality compost produced. End uses/markets and capacities may need development. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals.	Potential permitting and public concerns. High groundwater may cause operational difficulties, especially during wet season. Estimated maximum processing capacity at this site, if fully developed, may be up to 1M tpy. Utilities and travel times are concerns.
Organics Composting (ASP)	5-60 Ac	1-10 tons per acre per day. Typically, 80-700 TPD	$74-$80+ (1)	3-5 years	Requires separate organics collection. Moderate complexity, moderate skill level needed for operation. Minimum 30-day processing time. Processing capacity depends on available land area. Potential public concerns with noise, odor and vector issues. Challenging wet season operations. End uses/markets and capacities may need development. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals.	Potential permitting and public concerns. High groundwater may cause operational difficulties, especially during wet season. Estimated maximum processing capacity at this site, if fully developed, may be up to 1M tpy. Utilities and travel times are concerns.
Organics Composting (In-Vessel)	1-60 Ac	5-100 tpd per vessel, 15 to 1200 TPD	$9-$50+ (1),(2)	3-5 years	Requires separate organics collection. Variable complexity, low skill level needed for operation. Short 5-7 day processing time. Compact process, smaller facility footprint, expandable capacity. Better suited for urban areas, vessels can be enclosed in metal building to mitigate potential public concerns with odor and vector issues from receiving areas. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals.	Potential permitting and public concerns. High groundwater may cause some operational difficulties, especially during wet season. Floodplain and wetland mitigation may increase development costs. Utilities will need to be extended to site. Could be co-located with other alternative facility(ies) on this site.
Anaerobic Digestion	3-40+ acres depending on capacity	270-600 TPD	$57-$90+ (1),(2)	5-7 years	Requires separate organics collection. High complexity, high skill level needed for operation. Processing capacity depends on available land area. Potential permitting issues and public concerns with noise, odor and vector issues. Fire risk from methane production. Additional composting or disposal of resulting digestate solids would be required. Resulting digestate liquids can be used for fertilizer in cover maintenance for landfills or on agricultural land. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals. End uses/markets and capacities may need development.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Utilities will need to be extended to site. Could be co-located with other alternative facility(ies) on this site.
Gasification	5-60+ Ac	100-300+ TPD	$154+(3)	10+ years	Unproven technology, significant pre-processing of MSW required. High complexity, high skill level needed for operation. Possible capacity limitations. Increased fire risk from syngas production but can fuel turbines for electrical generation. High capital and operating cost. Active ash monofil on site for slag disposal.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Difficult permitting due to nearby Everglades Class I area. Utilities will need to be extended to site. Could be co-located with other alternative facility(ies) on this site.

Analysis Summary – Alternative Site A2 – Opa-Locka West Airport

Site Alternatives Summary						
Alternative	**Potential Site Area**	**Capacity**	**Cost Per Ton**	**Development Time**	**Technology Considerations**	**Site-Specific Considerations**
Waste-to-Energy (Mass Burn)	40-60 Ac	4,000-5,000 TPD	$57-60+	8-10+ years	No changes to existing collection system needed. Highest capacity alternative. High complexity, high skill level needed for operation. Permitting and public opposition challenges. High capital and operating cost. Electrical generation for revenue or powering other facilities. Good metal recovery possible from ash. Landfill needed for ash disposal.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Difficult permitting due to nearby Everglades Class I area. Utilities will need to be extended to site Could be co-located with other alternative facility(ies) on this site.
Mechanical Biological Treatment	5-15 Ac	200-560 TPD	$123-183	3-5 years	No changes to existing collection system needed. High complexity, high skill level needed for operation. High capital and operating cost. High-capacity alternative, but waste is typically shredded and converted into pelletized solid recovered fuel (SRF) that must be transported and fired at another facility capable of using the SRF. Additional fleet equipment and operators would be needed for site operation and transport of SRF.	Potential public concerns with noise, odor and vector issues. Could be co-located with other alternative facility(ies) on this site. Local concrete facilities may be able to use SRF.
Mixed Waste Processing Facility	20-60 Ac	200-1500 TPD	$85-$150	5-7 years	No changes to existing collection system needed. High complexity, but low skill level needed for most operations. Capacity limited to approximately 3,000 tpd. Potential permitting issues and public concerns with noise, odor and vector issues. Additional processing/disposal of post-processed MSW would be required. Contamination of recovered materials is significant issue, recovery rates for marketable materials typically 30% or less. End uses/markets and capacities may need development. Moderate capital and operating costs, and additional fleet equipment and operators would be needed for site operations and transport of residuals.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Utilities would have to be extended to site. Could be co-located with other alternative facility(ies) on this site.
Material Recovery Facility	20-60 Ac	300-400 TPD	$87-154	5-7 years	Modification of existing curbside collection system needed. High complexity, but low skill level needed for most operations. Capacity limited by site area. Typical maximum processing capacity for these facilities is approximately 350-400 tons per day. Minimal public concerns. Additional processing/disposal of some post-processed materials (i.e., glass) would be required. Contamination of recovered materials is significant issue. End uses/markets and capacities may need development. Moderate capital and operating costs, and additional fleet equipment and operators would be needed.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Utilities would have to be extended to site. Could be co-located with another alternative facility on this site.
C&D Recycling Facility	5-20 Ac	300–825 TPD	$76-150	3-7 years	No change to existing collection system needed. Can be low or high complexity, but low skill level needed for most operations. Capacity limited by site area. Potential public concerns with noise, odor, and dust. Additional processing/disposal of some post-processed materials (i.e., mixed fines) would be required. End uses/markets and capacities may need development. Moderate capital and operating costs, and additional fleet equipment and operators would be needed.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Utilities would have to be extended to site. Could be co-located with another alternative facility on this site.

(1) Sources: DC Study (2017 costs escalated) and NREL Study (2020 costs escalated). Cost does not include additional organics collection system costs.
(2) Costs estimated from vendor quote, does not include building or land acquisition costs.
(3) Costs based on 2017 article in Waste Management journal using developed country costs.

Analysis Summary – Alternative Site A2 – Opa-Locka West Airport

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 7.8 miles northwest of the existing RRF site, more than four miles from any active airport, more than 0.5 miles from residential zoning, and approximately 13.4 miles northeast of the boundary of Everglades National Park. If this site were selected for the development of one or more of the alternative facilities there would be impacts to the local traffic levels, but the effects on the County's Solid Waste System would be minimal. Significant traffic increases would be expected on the Florida Turnpike and US27, which are already high traffic count roadways according to the Florida Department of Transportation's Florida Traffic Online Web Application.

To maintain the current collection patterns and travel times, a new transfer station would need to be constructed at the RRF site if this site was selected for development. The number of deliveries by collection vehicles and transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the capacity and material types processed by the alternative facility(ies) developed at the site. Their travel patterns would be altered, and travel times would generally increase due to changes in travel distances and expected traffic congestion. Estimated travel distances and times from Site A2 to the County's transfer so and landfills as compared to the RRF site are as follows:

Facility	Est. Travel Distance/Time to Site A2	Est. Travel Distance/Time to RRF
West TS	22 mi/25 min	9 mi/16 min
Central TS	26 mi/31 min	14 mi/21 min
Northeast TS	23 mi/27 min	18 mi/25 min
South Dade LF	32 mi/37 min	25 mi/31 min
North Dade LF	19 mi/19 min	21 mi/23 min

The changes in travel times and distances from the RRF site, especially for the West TS, may affect some Collection and Transfer operations. Collection and Transfer fleet labor, fuel consumption and maintenance costs may increase if this site were selected for development.

Utilities

- **Potable water** – The potable water capacity required for fire lines and supply lines will depend on the type of alternative facility(ies) selected. No potable water service appears to be available at the site, and the closest connection point appears to be approximately 5.0 miles to the south in the City of Hialeah Gardens. Additional analysis will be needed to determine pipe size and available system capacity, and a booster station may be needed to increase system pressure. Soils data

indicates shallow depth to bedrock in some locations, rock removal may be required for pipe trench excavation for new lines in those areas.

Wastewater – The minimum sanitary sewer capacity requirements will depend on the type of alternative facility(ies) selected. No sanitary sewer service appears to be available at the site, and the closest connection point appears to be approximately 5.0 miles south in the City of Hialeah Gardens. Additional analysis will be needed to determine pipe size and available system capacity, and a lift station and force main to gravity sewer may be required. Soils data indicates shallow depth to bedrock in some locations, rock removal may be required for pipe trench excavation for new lines in those areas.

- **Natural gas** – The minimum natural gas capacity requirements will depend on the type of alternative facility(ies) selected. No natural gas service is available at the site. According to the National Pipeline Mapping System (NPMS) the closest gas transmission main is located approximately 9.7 miles south on the north side of US27, but additional analysis will be needed to determine pipe size and available system capacity. Additional ROW/easement may be needed. Soils data indicates shallow depth to bedrock, rock removal may be required for pipe trench excavation.
- **Electric** – The electrical service capacity required will depend on the type of alternative facility(ies) selected. Standard 120V/230A electrical service appears to be available at the site. The nearest substation/switchyard is the FPL substation approximately 5.6 miles southeast of the site, near the Titan Pennsuco complex. Substation/switchyard spare capacity, voltage, and available terminations will need to be evaluated.
- **Stormwater** – The presence of floodplains and high groundwater elevations may result in slightly larger stormwater ponds on site, but there may be sufficient area for a stormwater system that meets regulatory requirements.
- **Groundwater** – If necessary for facility operations, a consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or surface water bodies. If a consumptive use permit cannot be obtained, then potable water service will have to provide for all facility water consumption needs, which will increase operating costs.

Soils

The USDA Soil Survey data for the site classifies the site soils as primarily Shark Valley Muck, Coopertown Muck, Perrine Marly Silt Loam, Biscayne Marly Silt Loam, and Udorthents. The presence of muck soils indicates high groundwater conditions. Udorthents soils consist of unconsolidated or heterogeneous geologic material removed during the excavation of ditches, canals, lakes, ponds, and quarries.

While this may not present an issue for some alternative facilities, any facility(ies) having buildings and ancillary components with slab-on-grade foundations located at this site would have to be constructed on fill material, which could present geotechnical engineering challenges for the foundation designs and additional site preparation costs.

Future Solid Waste Facility Siting Alternatives Analysis

Analysis Summary – Alternative Site A2 – Opa-Locka West Airport

Environment

- **Floodplains** – Almost the entire site area is located within FEMA Flood Zones A.
- **Environmental Assessments** – Based on a review of the Miami-Dade County Environmental Resources Access Portal, several biological and wetland assessments have been conducted for Site A2. The findings of these biological and wetlands assessments noted the presence of jurisdictional wetlands and the potential presence of endangered species, however, due to the age of the existing assessments, these studies would need to repeated.
- **Comprehensive Everglades Restoration Plan (CERP) Considerations** – This site is included in a CERP project area. CERP is a framework for restoring, protecting and preserving the greater Everglades ecosystem. The plan is a 50-50 partnership between the State of Florida and the federal government. The State of Florida and the South Florida Water Management District have so far invested approximately $2.3 billion in CERP-related land acquisition, project design and construction. During the screening process the CERP project boundaries GIS layer was used to identify conservation lands, including the Everglades National Park, to determine if any parcel was adjacent to any known or existing CERP project. Any development at this site will take additional regulatory coordination and discussion and may conflict with County policy CON-7J and others.
- **Power Plant Siting Act (PPSA) Certification** – If a WTE or gasification facility were selected for this site, a complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC “need determination” filing process would also be required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located approximately 13.4 mi (21.6 km) NE of the Everglades Class I Area.

  As a proposed major source of air pollutant emissions, a new WTE or gasification facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

  The nearby Everglades National Park’s location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE or gasification facility and thus will make air permitting challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

Future Solid Waste Facility Siting Alternatives Analysis

Analysis Summary – Alternative Site A2 – Opa-Locka West Airport

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates wetlands are present. National Wetlands Inventory mapping indicates most of the site is a Palustrine Emergent wetland habitat classified as a PEM1, as shown in Figure 1. Development at this site may conflict with County Policies CON-7A and/or CON-7B.

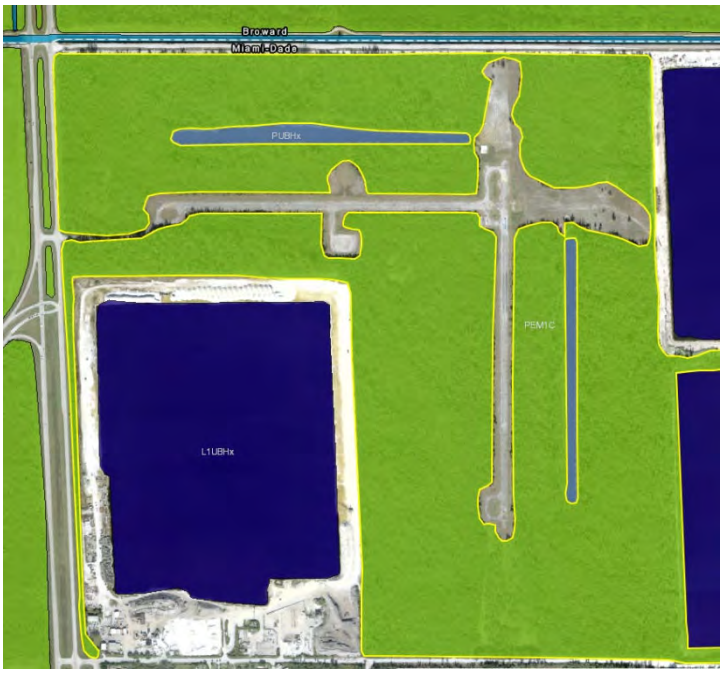


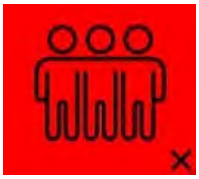
Figure. 1 - Wetlands area on Site A2 (from NWI data)

The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The Florida Fish and Wildlife Commission Terrestrial Resources Geographic Information System database notes that within this site, there are strategic habitat conservation areas for the Florida Panther and Swallow-Tailed Kite. Additionally, the site is located within the Florida Bonneted Bat and Everglades Snail Kite consultation area and individual consultation with the U.S. Fish and Wildlife Service is required. The site is within 8.3 and 8.5 miles of active wood stork colonies; and based on previous environmental assessments found on the Miami-Dade County Environmental Resources Access Portal, this site has core foraging habitat for the federally endangered Wood Stork and Florida Bonneted Bat.

Transportation

The site has good access to US27 and the Florida Turnpike. The volume of traffic that is expected at the site will depend on the type of facility(ies) selected but will increase the loads on the Florida Turnpike and US27, which are already high traffic count roadways. Traffic impacts to the local area could be significant. Truck queuing will have to be accomplished on site to prevent congestion of US27 and local roads. It should be noted that if a WTE or gasification facility is developed on the site it may preclude the use of the site for aviation purposes.

Community



The USEPA EJScreen Standard Report indicated slightly elevated values for Diesel Particulate Matter. The site is more than 0.5 miles from residential zoning, but has extensive wetland preserve areas on site, which suggests that the siting of any alternative facility(ies) may be opposed by the community or environmental groups at this location.

Future Solid Waste Facility Siting Alternatives Analysis

Analysis Summary – Alternative Site A2 – Opa-Locka West Airport

Schedule

There are a several site constraints that could affect the schedule of any alternative facility project, including:

- **Utilities** – Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- **Soils** – Additional geotechnical testing will be needed to determine the full extent of soil preparation needed (i.e., vibro-compaction, consolidation, etc.) and additional requirements for building foundations at the site (f needed), which may increase design and construction time.
- **Permitting** – The presence of floodplains, wetlands, and threatened and endangered species habitat are expected to extend the project schedule. In addition, if a WTE or gasification facility is selected for this site, the Prevention of Significant Deterioration (PSD) Permitting will be difficult. The site is located approximately 13.4 mi (21.6 km) NE of the Everglades Class I Area. The nearby Everglades National Park's location along the western border of the County and the Biscayne Bay NP (sensitive Class II area) located on the eastern border of the County both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE or gasification facility and thus will make air permitting challenging at this prospective site.
- **Community** – The site is more than 0.5 miles from residential zoning, but has extensive wetland preserve areas on site, which suggests that the siting of any alternative facility(ies) may be opposed by the community or environmental groups at this location, which could affect the project schedule.

Cost

Overall, the site area is sufficient for any of the alternative facilities, and more than one if smaller facilities are co-located. There are many different possible combinations of facilities and processing capacities, and the total redevelopment costs could range from $20 million for a low-tech outdoor C&D recycling facility to more than $1.5 billion for a state-of the art mass burn WTE facility and ash landfill. The optimal selection, sizing and arrangement of alternative facilities will require additional studies to more accurately determine the total development costs. If a WTE or gasification facility is selected for this site, development costs are expected to be higher than at the existing RRF site. Depending on the alternative facility(ies) selected, there are several site constraints and additional Solid Waste System changes that could affect the total cost to the Department, including:

- **Utilities**
  - Construction of approximately 5.0 miles of potable water piping and a potable water booster station may be required.
  - Construction of an on-site wastewater lift station and approximately 5.0 miles of sanitary sewer forcemain may be required.
  - Construction of approximately 9.7 miles of gas service piping to provide natural gas to the site.

  - Soils data indicates shallow depth to bedrock, rock removal may be required in some areas for utility pipe trench excavation.
  - For WTE and gasification alternatives, construction of approximately 5.6 miles of electrical transmission line routing through existing ROW/FPL easements. Also, upgrades to the existing substation may be needed.
  - Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
  - On-site water wells are likely not permittable. All potable water will probably need to be purchased, increasing anticipated operations and maintenance costs.

- **Soils** – If buildings are needed, additional geotechnical testing will be needed to determine the full extent of soil preparation needed (i.e., vibro-compaction, consolidation, etc.) and additional requirements for building foundations at the site, which may increase design and construction costs.
- **Stormwater** – due to the presence of floodplains and high groundwater levels, additional stormwater considerations or facilities may be required.
- **Permitting** – Due to the presence of floodplains, wetlands, threatened and endangered species habitat and the location of the site in a CERP project area, additional permitting efforts will be required which could impact cost and schedule.

Site Differentiators Overview

- Construction of approximately 5.0 miles of potable water service piping and a booster station may be required.
- Construction of an on-site wastewater lift station and approximately 5.0 miles of force main piping may be required.
- If natural gas service is required, construction of approximately 9.7 miles of gas service piping will be necessary.
- Soils data indicates shallow depth to bedrock, rock removal may be required for utility pipe trench excavation.
- Additional geotechnical testing will be needed to determine the full extent of soil preparation needed (i.e., vibro-compaction, consolidation, etc.) and additional requirements for building foundations at the site, which may increase design and construction costs and extend the project schedule.
- If a WTE or gasification facility is selected, construction of approximately 5.6 miles of electrical transmission line routing through existing ROW/FPL easements would be necessary. Also, upgrades to the existing substation may be needed.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- Due to potential adverse effects to wetlands on site, groundwater may not be available for use as source water.
- The Florida Fish and Wildlife Commission Terrestrial Resources Geographic Information System database notes that within this site, there are strategic habitat conservation areas for the Florida Panther and Swallow-Tailed Kite. Additionally, The site is within 8.3 and 8.5 miles of active wood stork colonies; and based on previous environmental assessments found on the Miami-Dade County Environmental Resources Access Portal, this site has core foraging habitat for the federally endangered Wood Stork and Florida Bonneted Bat. Development at this site may conflict with County Policies CON-7A and/or CON-7B.

Analysis Summary – Alternative Site A2 – Opa-Locka West Airport

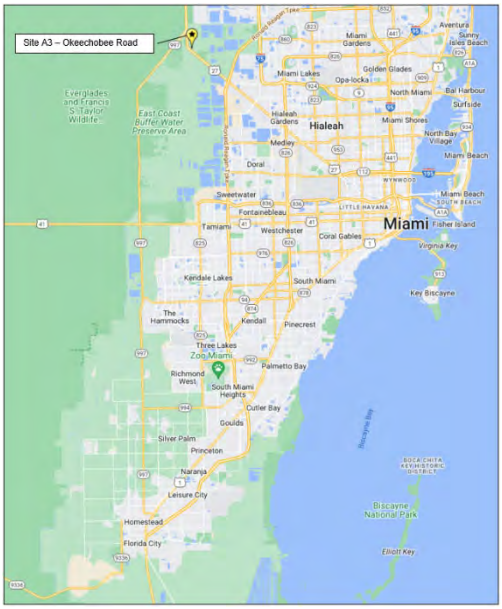
- The site is in a CERP project area. Any development at this site will take additional regulatory coordination and discussion and may conflict with County policy CON-7J and others.

Future Solid Waste Facility Siting Alternatives Analysis

Analysis Summary – Alternative Site A3 – Okeechobee Road

MDPA Parcel Map

Location Map



Site Information

This site consists of ten parcels totaling approximately 68 acres in the northwest portion of Miami-Dade County, outside the UDB, with US27 on the western border and approximately 7.5 miles northwest of the RRF. The site is less than a 10-minute travel time to US27 or the Florida Turnpike, is located more than a mile from residential zoning and approximately 12.6 miles (20.3 km) northeast of the boundary of the Everglades Class I area. This site borders a Comprehensive Everglades Restoration Program (CERP) project area (North Lake Belt Storage Area).

MDPA Parcel Data

Owner: West Dade Nurseries, LLC
2023 MDPA Market Value: $26,700,780
Zoning District: AU
PA Zone: 9000 - AGRICULTURE
Folio Nos: 30-2910-002-0020, 30-2910-002-0030, 30-2910-001-0130, 30-2910-001-0131, 30-2910-001-0140, 30-2910-001-0141, 30-2910-001-0150, 30-2910-001-0151, 30-2910-001-0160, 30-2910-001-0170.

Site Alternatives Summary

Considerations for the selection of each alternative technology at this site are shown on the pages that follow.

Analysis Summary – Alternative Site A3 – Okeechobee Road

Site Alternatives Summary						
Alternative	**Potential Site Area**	**Capacity**	**Cost Per Ton**	**Development Time**	**Technology Considerations**	**Site-Specific Considerations**
Organics Composting (Windrow)	10-60 Ac	5-8 tons per acre per day, typically 80-500 TPD.	$72-$80+ (1)	3-5 years	Requires separate organics collection. Low complexity, low skill level needed for most operations. Minimum 30-day processing time. Processing capacity depends on available land area. Not well suited for urban areas, potential public concerns with noise, odor and vector issues. Challenging wet season operations. Good quality compost produced. End uses/markets and capacities may need development. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals.	Potential permitting and public concerns. High groundwater may cause operational difficulties, especially during wet season. Estimated maximum processing capacity at this site, if fully developed, may be up to 125,000 tpy. Utilities and travel times are concerns.
Organics Composting (ASP)	5-60 Ac	1-10 tons per acre per day. Typically, 80-700 TPD	$74-$80+ (1)	3-5 years	Requires separate organics collection. Moderate complexity, moderate skill level needed for operation. Minimum 30-day processing time. Processing capacity depends on available land area. Potential public concerns with noise, odor and vector issues. Challenging wet season operations. End uses/markets and capacities may need development. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals.	Potential permitting and public concerns. High groundwater may cause operational difficulties, especially during wet season. Estimated maximum processing capacity at this site, if fully developed, may be up to 125,000 tpy. Utilities and travel times are concerns.
Organics Composting (In-Vessel)	1-60 Ac	5-100 tpd per vessel, 15 to 1200 TPD	$9-$50+ (1),(2)	3-5 years	Requires separate organics collection. Variable complexity, low skill level needed for operation. Short 5-7 day processing time. Compact process, smaller facility footprint, expandable capacity. Better suited for urban areas, vessels can be enclosed in metal building to mitigate potential public concerns with odor and vector issues from receiving areas. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals.	Potential permitting and public concerns. High groundwater may cause some operational difficulties, especially during wet season. Floodplain and wetland mitigation may increase development costs. Utilities will need to be extended to site. Could be co-located with other alternative facility(ies) on this site.
Anaerobic Digestion	3-40+ acres depending on capacity	270-600 TPD	$57-$90+ (1),(2)	5-7 years	Requires separate organics collection. High complexity, high skill level needed for operation. Processing capacity depends on available land area. Potential permitting issues and public concerns with noise, odor and vector issues. Fire risk from methane production. Additional composting or disposal of resulting digestate solids would be required. Resulting digestate liquids can be used for fertilizer in cover maintenance for landfills or on agricultural land. Additional fleet equipment and operators would be needed for organics collection, site operation and disposal of residuals. End uses/markets and capacities may need development.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Utilities will need to be extended to site. Could be co-located with other alternative facility(ies) on this site.
Gasification	5-60+ Ac	100-300+ TPD	$154+(3)	10+ years	Unproven technology, significant pre-processing of MSW required. High complexity, high skill level needed for operation. Possible capacity limitations. Increased fire risk from syngas production but can fuel turbines for electrical generation. High capital and operating cost. Active ash monofil on site for slag disposal.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Difficult permitting due to nearby Everglades Class I area. Utilities will need to be extended to site. Could be co-located with other alternative facility(ies) on this site.

Analysis Summary – Alternative Site A3 – Okeechobee Road

Site Alternatives Summary						
Alternative	**Potential Site Area**	**Capacity**	**Cost Per Ton**	**Development Time**	**Technology Considerations**	**Site-Specific Considerations**
Waste-to-Energy (Mass Burn)	40-60 Ac	4,000-5,000 TPD	$57-60+	8-10+ years	No changes to existing collection system needed. Highest capacity alternative. High complexity, high skill level needed for operation. Permitting and public opposition challenges. High capital and operating cost. Electrical generation for revenue or powering other facilities. Good metal recovery possible from ash. Landfill needed for ash disposal.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Difficult permitting due to nearby Everglades Class I area. Utilities will need to be extended to site Could be co-located with other alternative facility(ies) on this site.
Mechanical Biological Treatment	5-15 Ac	200-560 TPD	$123-183	3-5 years	No changes to existing collection system needed. High complexity, high skill level needed for operation. High capital and operating cost. High-capacity alternative, but waste is typically shredded and converted into pelletized solid recovered fuel (SRF) that must be transported and fired at another facility capable of using the SRF. Additional fleet equipment and operators would be needed for site operation and transport of SRF.	Potential public concerns with noise, odor and vector issues. Could be co-located with other alternative facility(ies) on this site. Local concrete facilities may be able to use SRF.
Mixed Waste Processing Facility	20-60 Ac	200-1500 TPD	$85-$150	5-7 years	No changes to existing collection system needed. High complexity, but low skill level needed for most operations. Capacity limited to approximately 3,000 tpd. Potential permitting issues and public concerns with noise, odor and vector issues. Additional processing/disposal of post-processed MSW would be required. Contamination of recovered materials is significant issue, recovery rates for marketable materials typically 30% or less. End uses/markets and capacities may need development. Moderate capital and operating costs, and additional fleet equipment and operators would be needed for site operations and transport of residuals.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Utilities would have to be extended to site. Could be co-located with other alternative facility(ies) on this site.
Material Recovery Facility	20-60 Ac	300-400 TPD	$87-154	5-7 years	Modification of existing curbside collection system needed. High complexity, but low skill level needed for most operations. Capacity limited by site area. Typical maximum processing capacity for these facilities is approximately 350-400 tons per day. Minimal public concerns. Additional processing/disposal of some post-processed materials (i.e., glass) would be required. Contamination of recovered materials is significant issue. End uses/markets and capacities may need development. Moderate capital and operating costs, and additional fleet equipment and operators would be needed.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Utilities would have to be extended to site. Could be co-located with another alternative facility on this site.
C&D Recycling Facility	5-20 Ac	300–825 TPD	$76-150	3-7 years	No change to existing collection system needed. Can be low or high complexity, but low skill level needed for most operations. Capacity limited by site area. Potential public concerns with noise, odor, and dust. Additional processing/disposal of some post-processed materials (i.e., mixed fines) would be required. End uses/markets and capacities may need development. Moderate capital and operating costs, and additional fleet equipment and operators would be needed.	Potential permitting and public concerns. Floodplain and wetland mitigation may increase development costs. Utilities would have to be extended to site. Could be co-located with another alternative facility on this site.

(1) Sources: DC Study (2017 costs escalated) and NREL Study (2020 costs escalated). Cost does not include additional organics collection system costs.
(2) Costs estimated from vendor quote, does not include building or land acquisition costs.
(3) Costs based on 2017 article in Waste Management journal using developed country costs.

Analysis Summary – Alternative Site A3 – Okeechobee Road

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 7.5 miles northwest of the existing RRF site, more than four miles from any active airport, more than a mile from residential zoning, and approximately 12.6 miles northeast of the boundary of Everglades National Park. If this site were selected for the development of one or more of the alternative facilities there would be impacts to the local traffic levels, but the effects on the County's Solid Waste System would be minimal. Significant traffic increases would be expected on the Florida Turnpike and US27, which are already high traffic count roadways according to the Florida Department of Transportation's Florida Traffic Online Web Application.

To maintain the current collection patterns and travel times, a new transfer station would need to be constructed at the RRF site if this site was selected for development. The number of deliveries by collection vehicles and transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the capacity and material types processed by the alternative facility(ies) developed at the site. Their travel patterns would be altered, and travel times would generally increase due to changes in travel distances and expected traffic congestion. Estimated travel distances and times from Site A3 to the County's transfer stations and landfills as compared to the RRF site are as follows:

Facility	Est. Travel Distance/Time to Site A3	Est. Travel Distance/Time to RRF
West TS	20 mi/23 min	9 mi/16 min
Central TS	24 mi/29 min	14 mi/21 min
Northeast TS	21 mi/25 min	18 mi/25 min
South Dade LF	30 mi/35 min	25 mi/31 min
North Dade LF	17 mi/17 min	21 mi/23 min

The changes in travel times and distances from the RRF site, especially for the West TS, may affect some Collection and Transfer operations. Collection and Transfer fleet labor, fuel consumption and maintenance costs may increase if this site were selected for development.

Utilities

- **Potable water** – The potable water capacity required for fire lines and supply lines will depend on the type of alternative facility(ies) selected. No potable water service appears to be available at the site, and the closest connection point appears to be approximately 3.9 miles to the south in the City of Hialeah Gardens. Additional analysis will be needed to determine pipe size and available system capacity, and a booster station may be needed to increase system pressure. Soils data

indicates shallow depth to bedrock in some locations, rock removal may be required for pipe trench excavation for new lines in those areas.

Wastewater – The minimum sanitary sewer capacity requirements will depend on the type of alternative facility(ies) selected. No sanitary sewer service appears to be available at the site, and the closest connection point appears to be approximately 3.9 miles south in the City of Hialeah Gardens. Additional analysis will be needed to determine pipe size and available system capacity, and a lift station and force main to gravity sewer may be required. Soils data indicates shallow depth to bedrock in some locations, rock removal may be required for pipe trench excavation for new lines in those areas.

- **Natural gas** – The minimum natural gas capacity requirements will depend on the type of alternative facility(ies) selected. No natural gas service is available at the site. According to the National Pipeline Mapping System (NPMS) the closest gas transmission main is located approximately 8.2 miles south on the north side of US27, but additional analysis will be needed to determine pipe size and available system capacity. Additional ROW/easement may be needed. Soils data indicates shallow depth to bedrock, rock removal may be required for pipe trench excavation.
- **Electric** – The electrical service capacity required will depend on the type of alternative facility(ies) selected. Standard 120V/230A electrical service appears to be available at the site. The nearest substation/switchyard is the FPL substation approximately 5.4 miles southeast of the site, near the Titan Pennsuco complex. Substation/switchyard spare capacity, voltage, and available terminations will need to be evaluated.
- **Stormwater** – The presence of floodplains and high groundwater elevations may result in slightly larger stormwater ponds on site, but there may be sufficient area for a stormwater system that meets regulatory requirements.
- **Groundwater** – If necessary for facility operations, a consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or surface water bodies. If a consumptive use permit cannot be obtained, then potable water service will have to provide for all facility water consumption needs, which will increase operating costs.

Soils

The USDA Soil Survey data for the site classifies the site soils as primarily Coopertown Muck. The presence of muck soils indicates high groundwater conditions.

While this may not present an issue for some alternative facilities, any facility(ies) having buildings and ancillary components with slab-on-grade foundations located at this site would have to be constructed on fill material, which could present geotechnical engineering challenges for the foundation designs and additional site preparation costs.

Future Solid Waste Facility Siting Alternatives Analysis

Analysis Summary – Alternative Site A3 – Okeechobee Road

Environment

- **Floodplains** – The entire site area is located within FEMA Flood Zone A.
- **Environmental Assessments** – Based on a review of the Miami-Dade County Environmental Resources Access Portal, several wetland assessments have been conducted for portions of Site A3. The findings of the wetlands assessments noted the presence of jurisdictional wetlands. A covenant between Miami-Dade County and the landowner of approximately 25-acres of the 68-acre site was executed in 2000. The convent requires that the landowner maintain an on-site wetland mitigation area and preserve natural areas of portions of the site. The covenant is perpetual in that it has a 30-year initial duration and is automatically renewed every 10-years, however, it could be amended by the County Commission.
- **Comprehensive Everglades Restoration Plan (CERP) Considerations** – This site is adjacent to a CERP project area, the North Lake Belt Storage Area. CERP is a framework for restoring, protecting and preserving the greater Everglades ecosystem. The plan is a 50-50 partnership between the State of Florida and the federal government. The State of Florida and the South Florida Water Management District have so far invested approximately $2.3 billion in CERP-related land acquisition, project design and construction. During the screening process the CERP project boundaries GIS layer was used to identify conservation lands, including the Everglades National Park, to determine if any parcel was adjacent to any known or existing CERP project. Any development at this site will take additional regulatory coordination and discussion and may conflict with County policy CON-7J and others.
- **Power Plant Siting Act (PPSA) Certification** – If a WTE or gasification facility were selected for this site, a complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC “need determination” filing process would also be required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located approximately 12.6 mi (20.3 km) northeast of the Everglades Class I Area.

  As a proposed major source of air pollutant emissions, a new WTE or gasification facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

  The nearby Everglades National Park’s location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE or gasification facility and thus will make air permitting challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air

pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting – The South Florida Water Management District Land Cover and Land Use 2017-2019 indicates that wetlands are present on portions of the site.

The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The Florida Fish and Wildlife Commission Terrestrial Resources Geographic Information System database notes that within this site, there is potential habitat for the Florida Panther, Swallow-Tailed Kite, and Southern Bald Eagle. Additionally, the site is also strategic habitat conservation area for the Florida Panther. The site is within 2.5 and 2.7 miles of active wood stork colonies and within five miles of three currently known Southern Bald Eagle nests.

Based on previous environmental assessments found on the Miami-Dade County Environmental Resources Access Portal, the site has jurisdictional wetland habitat and portions of the site are serving as wetland mitigation for on-site impacts. It should be noted that we were unable to locate any formal assessments for the northern parcels (30-001-2910-0070, etc) but they may contain jurisdictional wetlands and/or habitat for species listed in Appendix B of the CDMP. ERP permitting at this site may be very challenging due to required LEDPA (Least Environmentally Damaging Practicable Alternative) analysis.

Transportation

The site has good access to US27 and the Florida Turnpike. The volume of traffic that is expected at the site will depend on the type of facility(ies) selected but will increase the loads on the Florida Turnpike and US27, which are already high traffic count roadways. Traffic impacts to the local area could be significant. Truck queuing will have to be accomplished on site to prevent congestion of US27 and local roads. Also, it should be noted that development of a WTE or gasification facility at this site may preclude the use of Site A2 – Opa Locka West Airport for future aviation purposes.

Community

The USEPA EJScreen Standard Report indicated slightly elevated values for Particulate Matter, Diesel Particulate Matter, and elevated values for traffic proximity and air toxics. The site has an active wetland mitigation area on site and may contain jurisdictional wetlands and/or threatened and endangered species habitat, which suggests that the siting of any alternative facility(ies) may be opposed by the community or environmental groups at this location.

Schedule

There are a several site constraints that could affect the schedule of any alternative facility project, including:

- **Utilities** – Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.

Analysis Summary – Alternative Site A3 – Okeechobee Road

- **Soils** – Additional geotechnical testing will be needed to determine the full extent of soil preparation needed (i.e., vibro-compaction, consolidation, etc.) and additional requirements for building foundations at the site (f needed), which may increase design and construction time.
- **Permitting** – If a WTE or gasification facility is selected for this site, the Prevention of Significant Deterioration (PSD) Permitting will be difficult. The site is located approximately 13.4 mi (6.6 km) NE of the Everglades Class I Area. The nearby Everglades National Park's location along the western border of the County and the Biscayne Bay NP (sensitive Class II area) located on the eastern border of the County both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE or gasification facility and thus will make air permitting challenging at this prospective site.
- **Community** – The site is more than a mile from residential zoning, but has extensive wetland preserve areas on site, which suggests that the siting of any alternative facility(ies) may be opposed by the community or environmental groups at this location, which could affect the project schedule.

Cost

Overall, the site area is sufficient for any of the alternative facilities, and more than one if smaller facilities are co-located. There are many different possible combinations of facilities and processing capacities, and the total redevelopment costs could range from $20 million for a low-tech outdoor C&D recycling facility to more than $1.5 billion for a state-of the art mass burn WTE facility and ash landfill. The optimal selection, sizing and arrangement of alternative facilities will require additional studies to more accurately determine the total development costs. If a WTE or gasification facility is selected for this site, development costs are expected to be higher than at the existing RRF site. Depending on the alternative facility(ies) selected, there are several site constraints and additional Solid Waste System changes that could affect the total cost to the Department, including:

- **Utilities**
  - Construction of approximately 3.9 miles of potable water piping and a potable water booster station may be required.
  - Construction of an on-site wastewater lift station and approximately 3.9 miles of sanitary sewer forcemain may be required.
  - Construction of approximately 8.3 miles of gas service piping to provide natural gas to the site.
  - Soils data indicates shallow depth to bedrock, rock removal may be required in some areas for utility pipe trench excavation.
  - For WTE and gasification alternatives, construction of approximately 5.4 miles of electrical transmission line routing through existing ROW/FPL easements. Also, upgrades to the existing substation may be needed.
  - Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
  - On-site water wells may not be permittable. All potable water may need to be purchased, increasing anticipated operations and maintenance costs.

Analysis Summary – Alternative Site A3 – Okeechobee Road

- **Soils** – If buildings are needed, additional geotechnical testing will be needed to determine the full extent of soil preparation needed (i.e., vibro-compaction, consolidation, etc.) and additional requirements for building foundations at the site, which may increase design and construction costs.
- **Stormwater** – due to the presence of floodplains and high groundwater levels, additional stormwater considerations or facilities may be required.
- **Permitting** – because the site is adjacent to a CERP project area, additional coordination efforts will be required which could impact cost and schedule.

Site Differentiators Overview

- Construction of approximately 3.9 miles of potable water service piping and a booster station may be required.
- Construction of an on-site wastewater lift station and approximately 3.9 miles of force main piping may be required.
- If natural gas service is required, construction of approximately 8.2 miles of gas service piping will be necessary.
- Soils data indicates shallow depth to bedrock, rock removal may be required for utility pipe trench excavation.
- Additional geotechnical testing will be needed to determine the full extent of soil preparation needed (i.e., vibro-compaction, consolidation, etc.) and additional requirements for building foundations at the site, which may increase design and construction costs and extend the project schedule.
- If a WTE or gasification facility is selected, construction of approximately 5.4 miles of electrical transmission line routing through existing ROW/FPL easements would be necessary. Also, upgrades to the existing substation may be needed.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- Due to potential adverse effects to wetlands north of the site, groundwater may not be available for use as source water.
- The Florida Fish and Wildlife Commission Terrestrial Resources Geographic Information System database notes that within this site, there is potential habitat for the Florida Panther, Southern Bald Eagle and Swallow-Tailed Kite as well as strategic habitat for the Florida Panther. Additionally, The site is within 2.5 miles of active wood stork colonies and within 5.0 miles of three known Southern Bald Eagle nests; and based on previous environmental assessments found on the Miami-Dade County Environmental Resources Access Portal, this site has jurisdictional wetlands. Development at this site may conflict with County Policies CON-7A and/or CON-7B.
- The site is adjacent to a CERP project area. Any development at this site will take additional regulatory coordination and discussion and may conflict with County policy CON-7J and others.

Appendix D

State of the Industry Report

ARCADIS

Miami-Dade County Department of Solid Waste Management

State of the Waste Processing Technology Industry

Final Report

June 2022

Contents

Tables

Figures

Acronyms and Abbreviations

APC	Air pollution control
B&W	Babcock and Wilcox
CCS	Carbon capture and sequestration
Cd	Cadmium
CO	Carbon Monoxide
County	Miami-Dade County
Covanta	Covanta Energy Corporation
CSWSP	CT Solid Waste System Project
CT	Connecticut
CSWS RRF	Connecticut Solid Waste System Resource Recovery Facility
CTDEEP	Connecticut Department of Energy and Environmental Protection
DSWM	Department of Solid Waste Management or Department
FDEP	Florida Department of Environmental Protection
FOG	Fats, Oils and Greases
G3P	Green3Power St. Lucie, LLC
GHG	greenhouse gas
GWP	global warming potential
HAPs	hazardous air pollutants
HCl	Hydrogen Chloride
Hg	Mercury
JSE	Jacoby Synergy Renewables
LAER	lowest achievable emissions rate
MACT	maximum achievable control technology
MBT	Mechanical Biological Treatment
MIRA	Materials Innovation Recycling Authority
MSW	Municipal Solid Waste
MTCE	metric tons of carbon equivalent
MTCO2E	metric tons of carbon dioxide equivalent
MWCs	Municipal Waste Combustors

NESHAPs	National Emission Standards for Hazardous Air Pollutants
NH3	Ammonia
NOx	Nitrogen Oxides
NSPS	New Source Performance Standards
Pb	Lead
PBF	Power Block Facility
PEF	processed engineered fuel
PM	Particulate Matter
RDF	Refuse-derived fuel
RFQ	Request for Qualifications
RFI	Request for Information
RFP	Request for Proposals
RNG	renewable natural gas
RRA	Resource Recovery Act
SCR	Selective Catalytic Reduction
SIP	state implementation plan
SNCR	Selective Non-Catalytic Reduction
SO2	Sulfur Dioxide
SOI	State of the Industry
SWA	Solid Waste Authority of Palm Beach County, Fl
TCLP	Toxicity Characteristic Leaching Procedure
TPD or tpd	Tons per day
US or USA	United States of America
USEPA	United States Environmental Protection Agency
USPHS	US Public Health Service
WARM	Waste Reduction Model
WPF	Waste Processing Facility
WTE	Waste-to-Energy

1 Introduction and Background

The purpose of this state of the industry (SOI) report is to provide Miami-Dade County (County) Department of Solid Waste Management (DSWM or Department) a summary of the latest commercially-available processing technologies used in the solid waste industry that may be suitable for handling the County's municipal solid waste stream. This report will review the history of waste to energy (WTE) facilities in the solid waste industry, environmental characteristics of WTE and waste processing facilities, proven waste processing technologies at a commercial scale, emerging waste processing technologies, recent procurements of WTE facilities and recommendations of waste technologies to be used by the County. The information presented in this report is based on data and information that is available from published sources and vendor information and is augmented by general industry experience. Specific vendors for each general technology type are not reviewed in detail in this report.

The County requires a new waste processing or disposal facility to replace an existing WTE facility that, without significant refurbishment, is approaching the end of its useful life. The County's landfills are nearing capacity in the next few decades and transporting the County's waste to central Florida landfills has been determined by the County to be inefficient, unsustainable, and not resilient. The County plans to issue a Request for Information (RFI) to obtain information to determine the current best practices, industry standards, available technologies, supplier availability, vendor capabilities and interest, supplier recommendations for a successful project and location, and input on the procurement process for a new WTE facility. The new WTE facility is anticipated to have a throughput capacity of 4,000 tons per day (tpd) of municipal solid waste (MSW) with a possible future expansion capability of up to 5,000 tpd of MSW.

This SOI report will provide the County additional background information regarding the solid waste processing industry to assist the County when reviewing responses to the RFI as well as when considering technology options for the potential new WTE facility. It is important to note that this report only provides information that is publicly and readily available at the time of issuance of this report, and the County should be aware that responses to the RFI may include additional waste technologies and specific technology suppliers that were not discussed in this SOI report. Additionally, overviews of technologies reviewed are limited to (a) technologies that are capable of processing municipal solid waste (MSW) or portions of the MSW stream on a commercial basis (demonstrated technologies) or (b) technologies that are reported to be developing the capability to become commercially viable for processing MSW (emerging technologies). Both demonstrated and emerging technologies are included to provide an appropriate perspective of the range of potential alternatives that may be available.

As the County has already evaluated recycling and waste diversion technologies[1], the focus of this SOI report is on processing and disposal technologies that process municipal solid waste, after residential and commercial recycling and diversion efforts, commonly referred to as post-recycled MSW. The evaluated technologies must provide some type of volume or weight reduction to reduce impact to both the County's existing landfills and disposal options at other private landfills within the region or state. As an example, this report may include technologies that can only process certain subsections of MSW, such as: woody waste or yard waste, food waste and other organics, refined or processed MSW to remove non-combustibles also referred to as refuse-derived fuel (RDF), and technologies that focus on the entire remaining post-recycled MSW stream such as mass-burn.

1 Refer to Board Memo, dated February 11, 2022, summarizing efforts related to evaluating options for Countywide recycling (Directive 192055) and the "Recycling Analysis and Program Planning" report, dated July 2021.

2 WTE Historical Perspective

The first solid waste incinerator facility or waste to energy (WTE) facility in the United States that combusted municipal solid waste (MSW) was constructed in New York in 1885. The use of incineration grew during the early decades of the 20th century until the 1930s, when there were more than 700 units in operation.

In the early 1960s the US Public Health Service (USPHS) solid waste program began to study problems with incineration as a means of disposal. At that time, many major US cities depended on those antiquated, poorly designed, and operated WTE facilities to manage a major portion of their waste disposal. With the assistance of USPHS, the industry began to develop new concepts in design, materials, and operation. New designs included the installation of scales to help monitor and control the waste feed throughput of the facility, and larger tipping floors and pits designed to handle the volume of the facilities. Hoppers were designed to allow gravity flow of MSW into furnaces and to provide a seal at the charging end of the unit. Bridge cranes became the main means for charging furnace hoppers, while terminology became more standard with design terms. Several advancements in air pollution control technology and improved combustion practices continued.

In 1970, the Resource Recovery Act (RRA) amended the federal solid waste legislation and developed a broader solid waste role for the federal government. RRA defined resource recovery as the recovery of both materials and energy recovery from MSW. Many old incinerators were shut down due to pressures of the Clean Air Act as well as the emergence of sanitary landfills. The RRA gave federal solid waste program opportunities to address WTE with financial and staffing resources and to expand the efforts that began during the 1960's to enhance and increase the efficiencies of WTE facilities. Throughout the 1970's and 1980's federal solid waste programs studied many new MSW combustion concepts, specifically, ones that would allow for the recovery of both materials and energy.[2]

In accordance with the United States Environmental Protection Agency (USEPA) data from 2020 as updated for the Bay County, FL WTE Facility closure in 2021[3], there are 73 WTE facilities in operation in the United States, 57 of those facilities use mass burn technologies, 12 facilities use RDF technologies, and four facilities used modular technologies (a type of mass burn technology).[4] In July 2015, the Solid Waste Authority of Palm Beach County achieved commercial operations of the 3,000 tpd Palm Beach Renewable Energy Facility No. 2, which was the last new WTE facility constructed in the United States.

3 Environmental Characteristics of Waste Processing Technologies

3.1 Air Quality Regulations

The purpose of this section is to discuss the regulations related to solid waste combustion facilities that are expected to include WTE, RDF, pyrolysis and gasification facilities except for certain technologies related that

2 https://www.mswmanagement.com/collection/article/13001185/a-brief-history-of-solid-waste-management-during-the-last-50-years-part-9a

3 https://www.wastedive.com/news/florida-incinerator-bay-county-shutting-down-wte/584718/#:~:text=The%20Bay%20County%20Waste-to-Energy%20Facility%20operated%20by%20Engen,vote%20by%20county%20commissioners%20to%20wind%20down%20operations.

4 "Assessment of Municipal Solid Waste Energy Recovery Technologies – Final Report", dated December 2020, prepared for the USEPA.

may be dependent on how the fuel is used to generate the power such as anaerobic digestion. Solid waste combustion facilities, commonly referred to as incinerators, which the EPA refers to as Municipal Waste Combustors (MWCs), are regulated under the federal Clean Air Act, originally passed by Congress in 1963, and amended in 1990. The Clean Air Act directs EPA to establish pollution control requirements for criteria air pollutants, which are known as the New Source Performance Standards (NSPS). The NSPS includes limits on emissions from new, modified, and reconstructed MWCs. In 2015, the EPA issued final regulations to also limit greenhouse gas (GHG) emissions from new sources[5]. For facilities performing thermal destruction of solid waste, the NSPS include limits for sulfur dioxide (SO2), carbon monoxide (CO), nitrogen oxides (NOx), hydrogen chloride (HCl), dioxins/furans, particulate matter (PM), cadmium, lead, mercury, fugitive ash, and opacity. NSPS regulations are detailed in Chapter 40 of the Code of Federal Regulations, Part 60 (40 CFR 60), and are intended primarily to establish minimum nationwide requirements for new and existing MWCs (under 40 CFR 60 Subpart Eb for new MWCs and 40 CFR 60 Subpart Cb for existing MWCs).

The Clean Air Act also regulates hazardous air pollutants (HAPs). These pollutants include asbestos, benzene, beryllium, inorganic arsenic, mercury, radionuclides, and vinyl chloride. National emission standards for hazardous air pollutants (NESHAPs) are detailed in 40 CFR Part 61 and establish minimum nationwide requirements for existing and new facilities. NESHAPs require an evaluation of the maximum achievable control technology (MACT) for controlling HAPs and are often referred to as "MACT standards". NESHAP regulations can be found in 40 CFR Part 63 and establish nationwide requirements for existing and new facilities.

Under the Clean Air Act sections, the EPA may implement and enforce the requirements of these standards or may delegate such authority to state, local, or tribal regulatory agencies. For the purposes of a facility within Miami-Dade County, the EPA would delegate permitting actions and enforcement authority to the Florida Department of Environmental Protection (FDEP). This delegation is typically limited to allowing the FDEP to draft specific rules for managing permits and monitoring emissions, including potentially making more stringent regulatory requirements, but does not allow the FDEP any authority to lower requirements to below the minimum federal regulatory standards. The Clean Air Act emissions limits applicable to new MWCs are shown below:

Table 3-1. Clean Air Act Emission Limits

Air Pollutant	Emissions Limit[1,2]
Cadmium (Cd)	10 µg/dscm
Carbon Monoxide (CO)	100 ppmvd
Dioxin/furan (Total Mass Basis)	13 ng/dscm
Fugitive Ash	Visible emissions for no more than 5 percent of the hourly observation period
Opacity	10 %
Hydrogen Chloride (HCl)	25 ppmvd
Lead (Pb)	140 µg/dscm

5 https://www.epa.gov/stationary-sources-air-pollution/nsps-ghg-emissions-new-modified-and-reconstructed-electric-utility

Air Pollutant	Emissions Limit[1,2]
Mercury (Hg)	50 µg/dscm
Nitrogen Oxides (NOx)	150 ppmvd
Particulate Matter (PM)	20 mg/dscm
Sulfur Dioxide (SO_2)	30 ppmvd

Notes:
1. Emission limits reflect the NSPS for new MWCs (40 CFR 60 Subpart Eb).
2. All concentrations are corrected to 7% O_2.

Air permitting for a WTE facility can be a lengthy process and requires a multitude of analysis and correspondence with a variety of regulatory agencies. Any new WTE facility would be considered a new major source of air pollutant emissions and be required to obtain a Prevention of Significant Deterioration (PSD) permit under the New Source Review (NSR) permitting program. The PSD permitting process is complex, includes public participation, and requires completion of various air quality analyses. These analyses include BACT analyses for the air pollutants associated with the planned emission units, dispersion modeling analyses to determine air quality impacts at nearby receptors and at receptor locations within federally protected Class I areas, visibility analyses to determine impacts at the Class I areas, and a toxic air contaminant impact analysis. Prior to issuance of a final air construction permit, multiple iterations of these analyses will likely be required to address any adverse impacts and to satisfy concerns of the permitting authorities, Federal Land Managers responsible for the Class I areas, and the public. As the Everglades National Park is a designated Class I area and close to any location within Miami-Dade County, this process could be lengthy for any new facility within the County.

All sources at the facility must comply with applicable federal standards mentioned above. These regulations prescribe emission standards as shown in the table above, require monitoring and performance testing, and include siting requirements. The siting requirements specify that a detailed Materials Separation Plan be completed (preliminary and final draft versions) with a defined public review process.

As a major source, the Facility will also be required to obtain a Title V operating permit. A Title V permit application can be submitted after the PSD construction permit is issued or concurrently with the PSD construction permit application. Considering the complexities associated with the Facility and anticipated construction schedule, it is recommended to prepare and submit the Title V permit application after the PSD construction permit is issued. The southeast Florida airshed, Broward, Miami-Dade and Palm Beach Counties, were previously a non-attainment area for ozone, which would have imposed additional permitting requirements on the facility. However, at the time of this SOI report, that status is currently revoked. If this revocation reverses before the attempt to permit a new facility, any new facility (new source) will be required to adhere to the lowest achievable emissions rate (LAER). This will be the lowest emissions rate achieved by a similar source or the lowest rate for a similar source in a state implementation plan (SIP) anywhere in the country. The two pollutants impacted by this are oxides of nitrogen (NOx) and volatile organic compounds (VOC). These analyses would raise the development cost and increase the time required to go through the permit process for a waste conversion facility. The most common control technology for NOx, Selective Non-Catalytic Reduction (SNCR), can reduce emissions to 100 ppm, below required limits. Additional reduction in NOx is achieved by urea or ammonia injection into the furnace. The only recently permitted MWC for a new source in Florida in the last

twenty (20) years was the Palm Beach Renewable Energy Facility No. 2 (PBREF No. 2) in Palm Beach County, which became commercially operable in 2015. Permitting efforts for that facility were required by the FDEP to include Selective Catalytic Reduction (SCR) technology for NOx reduction, so it is likely that any facility in Miami-Dade would be required to be at least as stringent as that facility from a permitting perspective. The initial permit limits for the PBREF No. 2 facility are listed below for reference in Table 3-2. Table 3-3 shows the permit limit and recent stack testing results to demonstrate the ability to operate below such limits.

Table 3-2. Initial Permit Limits

Pollutant	Emission Standard/Limit[1]	lb/hour[3]	Basis
NOx	50 ppmvd – 24-hour block arithmetic mean	37.4	BACT
	45 ppmvd – 12-month rolling average		BACT
CO	100 ppmvd – 4-hr block arithmetic mean	45.5	Subpart Eb
	80 ppmvd – 30-day rolling average		BACT
SO2	24 ppmvd – 24-hour geometric mean	25.0	BACT
HCl[3]	20 ppmvd	11.9	BACT
VOC (as propane)	7 ppmvd	5.0	BACT
$PM/PM_{10}/PM_{2.5}$ (filterable)	12.0 mg/dscm	4.7	BACT
Lead (Pb)	125 µg/dscm	0.049	Avoid PSD
Hg[4]	N/A[5]	37.7 lb/yr[6]	Avoid PSD
	25 µg/dscm	0.0098	Applicant Request
Cadmium (Cd)	10 µg/dscm	3.91E-03	Subpart Eb
Dioxins/Furans[7]	13.0 ng/dscm		Subpart Eb
	10 ng/dscm during initial two years		Initial Test
	0.75 to 10 ng/dscm 3rd year and thereafter		BACT
Opacity	10% - 6-minute average	N/A[5]	BACT
Ammonia Slip	10 ppmvd	2.76	PM, Opacity

Notes:

1. All concentration values are corrected to 7% O2: µg/dscm = micrograms per dry standard cubic meter; mg/dscm = milligrams per dry standard cubic meter; ng/dscm = nanograms per dry standard cubic meter; and ppmvd = part per million dry volume.
2. Mass emission limits reflect maximum values calculated at 110% of 24 hours steam production limit of 291,000 lb steam/hr for each MWC. The 110% steam limit is 320,100 lb steam/hr for each MWC.
3. HCl is not a BACT pollutant. However, it must be limited together with SO2 because they both comprise MWC-Acid Gases which has its own PSD threshold.
4. Within 60 days after achieving the maximum production rate, but not later than 180 days after the initial startup, PBREF No. 2 shall commence quarterly performance Hg stack test events for each MWC exhaust flue to show compliance with the 25

Pollutant	Emission Standard/Limit[1]	lb/hour[3]	Basis

µg/dscm emission limit. The 25 µg/dscm quarterly stack-based standard is based on the applicant's request. By meeting the quarterly stack test standard, PBREF No. 2 will show compliance with Subpart Eb Hg emission standard of 50 µg/dscm.

5. N/A = not applicable
6. The 37.7 lb/yr emission limit is a 12-month rolled monthly average based on CEMS data. The Hg CEMS must become operational within 60 days after PBREF No. 2 achieves its maximum production rate, but not later than 180 days after the initial startup. During the first four quarters of Hg CEMS availability, the CEMS must achieve an 80% data availability rate. Subsequently, an 85% data availability rate is required.
7. Dioxins/furans: Total tetra through octa-chlorinated dibenzo-p-dioxins and dibenzofurans. During the first year of the PBREF No. 2 operation of the 10 ng/dscm limit applies. Subsequently, the To Be Determined (TBD) limit will govern based on initial performance and efficiency tests at the inlet and outlet of the SCR.

Table 3-3. Example Permit Limits and Emissions from PBREF No. 2

Sample Type	Limit	Units[1]	Test Result [6]		
			Unit #3	Unit #4	Unit #5
Ammonia Slip (NH3)	10	ppmvd[3]	2.59	5.01	2.40
	2.76	lb / hr	0.78	1.58	0.77
Particulate Matter (PM) (filterable)	12	mg / dscm[2]	1.93	3.04	2.59
	4.7	lb / hr	0.82	1.32	1.16
Hydrogen Chloride (HCl)	20	ppmvd[3]	6.18	6.78	4.19
	11.9	lb / hr	3.99	4.43	2.85
Volatile Organic Compounds (VOC) (as propane)	7	ppmvd[3]	0.96	0.26	0.18
	5.0	lb / hr	0.74	0.21	0.15
Lead (Pb)	125	µg / dscm[2]	1.20	8.32	1.29
	4.9 E-02	lb / hr	5.14E-04	3.55E-03	5.64E-04
Cadmium (Cd)	10	µg / dscm[2]	<0.50	1.86	0.43
	3.91 E-03	lb / hr	<2.10E-04	7.97E-04	1.88E-04
Mercury (Hg)	25	µg / dscm[2]	<0.67	0.72	1.10
	9.8 E-03	lb / hr	<2.89E-04	3.08E-04	4.81E-04
Outlet Dioxins / Furans[5]	4.2	ng / dscm[4]	0.67	0.21	0.44

Sample Type	Limit	Units[1]	Test Result [6]		
			Unit #3	Unit #4	Unit #5
Visible Emissions	10	%	0.0	0.0	0.00
Carbon Monoxide	100	ppmvd[3]	31.9	15.5	13.6
	45.5	lb / hr	8.74	6.51	5.64
Nitrogen Oxides	50	ppmvd[3]	36.7	39.9	37.6
	37.4	lb / hr	30.1	26.2	26.3
Sulfur Dioxide	24	ppmvd[3]	20.3	20.7	21.4
	25.0	lb / hr	19.4	20.3	19.9
Opacity	10	%	0.9	2.1	0.8

Notes:
1. All concentrations are corrected to 7% O_2.
2. Micrograms per cubic meter on a dry basis at standard conditions.
3. Parts per million on a dry volume basis.
4. Nanograms per cubic meter on a dry basis at standard conditions.
5. Based on stack testing performed over the first two full years of commercial operation, the dioxin/furan emission limit was set to 4.2 ng/dscm @ 7% O_2, which is equivalent to 1.7 x 10^{-6} lb/hr.
6. Testing results are from the March 2018 stack testing program.

3.2 Greenhouse Gases

Combustion of MSW in a WTE facility results in the emissions of carbon dioxide (CO_2) and nitrous oxide (N_2O). Carbon dioxide is the most significant GHG emitted by WTE. Nitrous oxide is produced at much lower concentrations in a WTE facility compared to CO_2, but is a more potent GHG with a global warming potential (GWP) 298 times that of CO_2. Carbon dioxide from WTE is primarily emitted as a product of combustion and from transporting the residual waste ash to a landfill. Furthermore, GHG emissions (primarily CO_2) would be generated from WTE facility construction activities (e.g., worker transportation, truck delivery of supplies, raw materials, etc.) and from operations of the WTE facility (e.g., truck deliveries of supplies, worker transportation, etc.).

Construction and miscellaneous operational-GHG emissions (e.g., raw materials, delivery of supplies, worker commute) from a WTE facility are currently difficult to estimate. However, GHG emissions associated with these activities should be a relatively small component of the overall lifetime GHG emissions considering the long-term duration of a WTE facility.

The U.S. EPA has developed a Waste Reduction Model (WARM) to help solid waste planners and organizations estimate greenhouse gas emission reductions from several different waste management practices. WARM calculates GHG emissions for baseline and alternative waste management practices, including source reduction, recycling, combustion, composting, and landfilling. The model calculates emissions in metric tons of carbon equivalent (MTCE) and metric tons of carbon dioxide equivalent (MTCO2E) across a wide range of material types

commonly found in municipal solid waste (MSW). In addition, the model calculates energy use for each of the options. This tool could be used by Miami-Dade to estimate the amount of greenhouse gas emissions from a new WTE facility and how it would compare to alternative MSW management approaches. WARM models require data inputs related to waste generation, waste characterization, and recycling rates in addition to waste management/disposal alternatives.

Arcadis performed a recent WARM analysis for King County, Washington as part of a comparison of a new WTE facility of similar size to the proposed facility for Miami-Dade County vs rail (and truck) hauling and ultimate landfilling of MSW as shown in Tables 3-4 and 3-5 below, respectively.

Table 3-4. GHG Results for WTE using Method 2 in King County, WA for a 4,000 TPD WTE facility

Description	MTCO2E/ton[1]
CO2 and N2O from MSW Combustion[2]	0.42
Truck transport of ash from WTE to IMF	0.008
Rail transport of ash from IMF to landfill	0.002
Avoided Utilities - Washington	-0.26
Avoided emissions – steel recovery	-0.04
Avoided emissions – AMP	-0.11
Avoided emissions – ash recycling	-0.07
Total	-0.05

Notes:

1. MTCO2E/ton = metric tons of carbon dioxide equivalent per short ton of MSW
2. The gross GHG emissions from MSW Combustion are based on national average values which include older WTE technologies. The GHG emissions from a new WTE facility would presumably be less due to advances in combustion technology. Additionally, the percentage of plastics in MSW is reportedly higher nationally than in King County (e.g., 18.3% versus 12.2%, suggesting that the WTE GHG emissions for the King County waste composition may be less than national averages).

Table 3-5. GHG Evaluation for Disposal of MSW at Out-Of-County Landfill in King County, WA

Description	MTCO2E/ton[1]
Methane not captured by LFG recovery[2]	0.32
Landfill equipment operation	0.02
Rail transport of ash from IMF to landfill	0.03
Avoided Utilities - Washington	-0.08
Avoided emissions – carbon sequestration	-0.21

Description	MTCO2E/ton[1]
Total	0.08 – 0.29

Notes:

1. Methane not captured by LFG recovery system assumes methane generation from anaerobic generation is 1.62MTCO2E per ton of MSW and 80% LFG recovery. The 80% is based on professional judgment and EPA efficiency testing performed in 2012 and assumes aggressive landfill gas capture.
2. MTCO2E/ton = metric tons of carbon dioxide equivalent per short ton of MSW

While these comparisons are not a perfect comparison for Miami-Dade County based on transportation and hauling differences and potential waste composition differences, the waste tonnages under consideration are similar and the analysis does illustrate an overall net reduction in GHG based on WTE compared to landfilling with aggressive landfill gas capture and re-use.

At the time of this report, there is no large-scale commercial success of carbon dioxide capture and sequestration out of WTE flue gas. However, carbon capture and sequestration (CCS) technologies are currently being explored and tested at multiple WTE facilities outside of the United States. While this technology may not be fully commercial at the inception of any new facility by Miami-Dade County, the technology is on the cusp of commercial viability and may become sufficiently commercial to include during the design and inception process.[6]

3.3 Water

Mass-burn and RDF combustion technologies utilize water in order to generate steam to rotate the turbine and produce electricity as well as for standard potable uses. Water is also a key necessary resource for facility process functions such as cooling functions on heat exchangers and desuperheaters, quenching bottom ash after combustion, and mixing with air pollution control chemicals for air pollution control usage. While detailed engineering can occur to clean and re-use existing internal water sources in an attempt to create a “zero-discharge” facility during normal operations, generally all types of WTE facilities have a wastewater discharge or the ability to discharge wastewater during atypical operating periods.

Non-potable water may also be used as cooling water for the steam condensers, but the large cooling water supplies necessary for condenser cooling are normally not available, and cooling towers or cooling water ponds are often provided as part of the facility. However, due to water availability and restrictions, it has become more common on construction of recent WTE facilities to utilize air-cooled condensers to lower overall water usage requirements. Air cooled condensers increase the internal electrical demand and reduce net exports to the grid, which can be balanced against water use restrictions or space availability for ponds or other source restrictions.

It is also common in Europe and in northern portions of the United States for some projects to cogenerate steam and electricity for sale, such as district heating/cooling projects or those with a significant steam user in proximity of the WTE facility site.

Other technologies such as gasification and anaerobic digestion will not necessarily use a boiler and do not typically require a large condenser for cooling. However, they would still typically require potable water use, as well as have internal process requirements for cooling water and air pollution control.

6 https://www.globalccsinstitute.com/wp-content/uploads/2019/10/Waste-to-energy-with-CCS_A-pathway-to-carbon-negative-power-generation_Oct2019-4.pdf

3.4 Residue Disposal

Ash will be generated by non-high temperature thermal waste options such as mass-burn combustion, RDF combustion, gasification and pyrolysis. In 2016, United States WTE facilities generated approximately seven million tons of ash, which can be categorized as either bottom ash or fly ash. Bottom ash is the material that is either falls through a furnace grate or remains on the grate after the waste is combusted. Bottom ash also includes heat recovery ash that is collected in the heat recovery system of the facility. Fly ash refers to ash that becomes entrained in flue gas that is collected by an air pollution system. The bottom ash/fly ash split is approximately 15% fly ash by weight compared to 85% bottom ash by weight, but can vary based on the combustion technology and waste composition. [7] Bottom ash typically represents a 75% reduction by weight of the MSW processed by WTE facilities and is typically a reduction in volume of 90%. Bottom ash is typically not classified as a hazardous material, subject to ash testing and analysis. Fly ash, however, when collected separately, will have a higher concentration of heavy metals. Fly ash is typically treated as a hazardous material unless it is combined with bottom ash, prior to testing, which is the current practice utilized at most United States WTE facilities. However, based on Arcadis' experience and observations, most recent testing of fly ash at WTE facilities in Florida has shown a downward trend in heavy metals concentrations (speculatively due to the changing waste composition and better recycling programs) and show that the ash is often not testing as hazardous. Laws and regulations, both by the EPA and the FDEP, require WTE operators to test this ash to ensure it is non-hazardous through a test called Toxicity Characteristic Leaching Procedure (TCLP). In Florida, this results in an initial characterization of the ash streams and requires further testing if any substantial changes occur in the average waste composition or processing or air pollution control equipment technology. If the fly ash is separated, often for purposes of increased metals recovery in the bottom ash and ash recycling efforts, it can be treated, if necessary, with a fixative to prevent leaching of hazardous constituents so it can be classified as non-hazardous.

WTE facilities are capable of recovering ferrous and non-ferrous metals in bottom ash from products and packaging discards that are not collected in source-separation recycling. There are two approaches that are being used on a commercial scale to recover these metals; wet ash dry processing systems and dry ash processing systems. Wet ash dry processing systems quench the bottom ash following combustion. Recovery is performed based on the particle size and density of the wet bottom ash. This is the system that is most common in United State WTE facilities. Dry ash processing systems do not quench bottom ash, but use air to cool the ash and use magnetic systems to recover metals.[8]

Florida regulations require applications for construction permits of WTE facilities to include an ash management plan. The plan must describe measures to control dispersion of ash residue and location of ash disposal. The plan must include ash quantity estimates and recycled material estimates.[9] WTE ash in Florida has typically been used as a cover for sanitary landfills. Other applications of ash have included landfill shaping and grading material, landfill gas venting layers, as well as construction and road fill applications. States may have different laws and regulations that limit how WTE ash can be applied.

In recent years, Florida has been on the forefront of additional post-recovery metals capture technologies to improve collection efforts and performing pilot testing of bottom and combined ash re-use projects. These efforts,

7 https://www.mswmanagement.com/home/article/13026561/innovations-in-wastetoenergy-ash-management

8 https://www.mswmanagement.com/home/article/13026561/innovations-in-wastetoenergy-ash-management

9 Florida Statutes, Chapter 62-702 Solid Waste Combustor Ash Management

in coordination and with the approval of the FDEP, have resulted in significant quantities of additional ferrous and non-ferrous metals removal, and successful ash re-use projects for roadway construction and testing for use as aggregate in concrete and asphalt mixes. Miami-Dade's current RDF processing facility currently performs post-recovery of metals on WTE ash from its facility as well as on ash from other facilities in the south Florida area and has been working with FDEP to test future ash re-use opportunities.

For gasification and plasma-arc technologies, inorganic materials such as metals and glass melt in the pyrolysis chamber and forms a gravel-like black substance called frit or obsidian that can be used as an aggregate for building roads or sold as a secondary product for other processes. Char is additionally produced and exits from the bottom chamber, where it can be processed for metals recovery. Typical residue percentage is greater than 10% by weight of incoming processed material.

For anaerobic digestion technologies, the organic substrate after the digestion process, digestate, may also be beneficially processed and recovered as a compost-like soil conditioner. The residue then remaining from anaerobic consists of stones, glass or similar items, which is normally directed to a solid waste landfill. If not beneficially processed, the residue quantity and characteristics are substantially similar to MSW with organic materials removed. Assuming all digestate is utilized as compost, the remaining residue is approximately 5% to 10% by weight of incoming processed material.

4 Proven Waste Processing Technologies

Municipal solid waste (MSW) consists of energy-rich material such as paper, plastics, yard wastes, and wood, and inorganics such as metals. Most large waste processing technologies in the United States primarily utilize post-recycled MSW, which is MSW that remains after typical residential and commercial recycling has occurred. For this reason, this report does not focus on certain specific technologies, such as chemical decomposition of paper and plastics or other gasification efforts for recyclable materials. Large-scale waste processing methods focused for inclusion in this report include the following:

1. Mass-Burn/Waterwall Combustion: This is the controlled combustion of post-recycled, unprocessed, mixed MSW. The furnace is constructed with water/steam tubes to efficiently capture energy. Waterwall systems are fabricated on-site and generally have larger unit sizes (200-1000 tpd) in the United States.[10]
2. Modular Technologies: Modular technologies typically burn unprocessed, mixed MSW and differ from mass burn facilities in that they are typically much smaller (5-140 tpd) and utilize standard sizes for construction. Modular technologies are often built off-site and hauled to site rather than built in place.[11]
3. Refuse-Derived Fuel (RDF)/Dedicated Boiler: This process uses mechanical methods to shred incoming MSW. The shredded MSW is then sorted and all non-combustible materials such as glass, metals, and stones under a certain size fraction are removed. A combustible mixture is produced that has a higher heating value than traditional mixed MSW and is utilized as fuel in a dedicated furnace or as a supplemental fuel in a conventional boiler system.[12]

It is important to note that there are other methods of MSW disposal practiced in the United States such as mixed-waste composting and landfills, however, neither of these technologies are focused on within this report due to

10 https://wasteadvantagemag.com/the-resurgence-of-waste-to-energy-and-conversion-technologies-wheres-the-risk/

11 https://www.epa.gov/smm/energy-recovery-combustion-municipal-solid-waste-msw

12 https://www.sciencedirect.com/topics/engineering/refuse-derived-fuel#:~:text=RDF%20is%20the%20product%20of%20the%20treatment%20of%20MSW%20to,as%20glass%2C%20metal%20and%20stone.

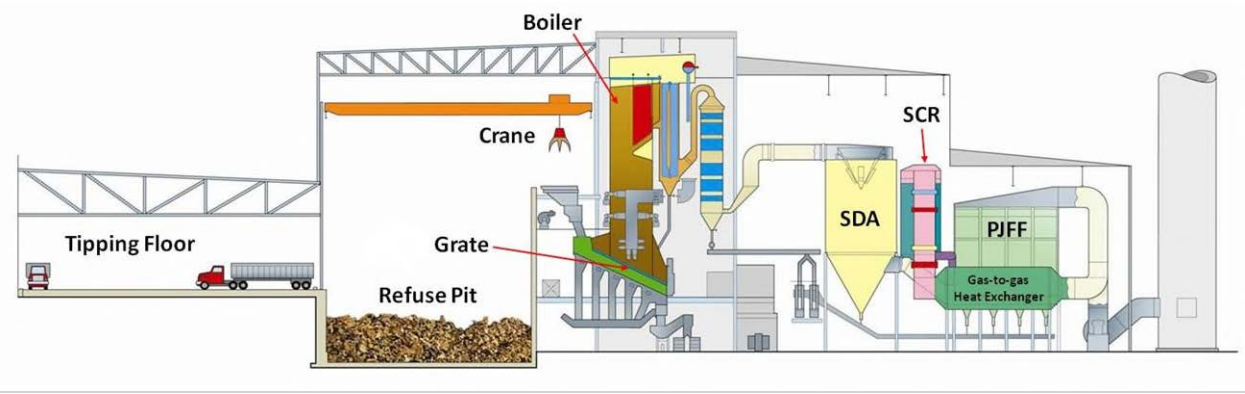
specific technical limitations in Miami-Dade County. Mixed-waste composting requires large land areas and/or high capital investment. It is typically difficult to site due to the strong odor and has limited applications for remaining compost. Landfilling also requires large land areas and are becoming more difficult to site within Florida due to potential groundwater impacts with the high groundwater table and sinkhole risks. Additionally, landfills produce methane, a greenhouse gas that is 25 times as potent as carbon dioxide, even with aggressive landfill gas capture systems in place.

Due to some of these limitations, the Florida legislature incentivized WTE facilities in the 1980s to encourage less reliance on landfill technologies. Due to those incentives, many facilities were built, and Florida currently has ten (10) operational WTE facilities that process MSW or RDF of which eight (8) facilities use mass-burn technologies and two (2) facilities use RDF technologies. These ten (10) facilities have the largest capacity to burn MSW of any state in the United States.

4.1 Mass-Burn/Waterwall Combustion

4.1.1 Process Description

Mass-burn/waterwall combustion is one of the most common commercially viable technologies for conversion of MSW to energy. Refuse typically does not require pre-processing before it can be combusted using this method. However, some pre-processing typically still occurs, including separation of oversized materials and removal of hazardous or potentially explosive materials. Refuse is stored in a loading bay and moved via an overhead crane or hydraulic ram onto a reciprocating or roller grate. The grate moves the refuse through a combustion furnace on the grate until combustion is complete. Combustion air in excess of stoichiometric amounts is supplied both below and above the grate. Water-filled tubes in the furnace walls are used to recover heat to produce steam and/or electricity. Generally, mass burn units range from 50 to 1,000 tons per day, and multiple units can be installed at a single facility. Bottom ash, usually about 10% of the initial volume (25% of the weight) of the incoming MSW, remains after the combustibles in the waste are burned. In addition, this process produces flue gas, which includes pollutants that must be strictly treated via air pollution control devices.[13] An example side profile of a mass-burn WTE facility is shown below.



13 https://www3.epa.gov/ttnchie1/ap42/ch02/final/c02s01.pdf

Figure 4-1. Profile Configuration of the most recently built mass-burn facility in the U.S., PBREF No. 2

Note: Image used with permission from the Solid Waste Authority of Palm Beach County

4.1.2 US and International Experience

In 2018 there were 75 operational WTE facilities within 21 states in the United States. Of these 75 facilities, 58 facilities used mass burn technologies.[14] As of 2019, there were approximately 2,179 WTE facilities in operation worldwide. Asian countries such as Japan, Taiwan, Singapore, and China have the largest number of WTE facilities in operation. Economic development and rapid urbanization in China over the past several decades have resulted in a rapid generation of over 200 million tons of MSW requiring disposal. In 2016, China had 259 WTE mass burn facilities in operation. Japan has put a heavy emphasis on WTE facilities as the country as a whole has a minimal amount of land available for landfills. Japan processes approximately 70% of its MSW in WTE facilities.[15]

Florida currently has eight (8) operating mass-burn/waterwall combustion facilities that process MSW, the most recent being the 3,000 ton-per-day Palm Beach Renewable Energy Facility No. 2 located in Palm Beach County, which entered commercial operations in 2015.

4.1.3 Suitability for Miami-Dade County

Mass-burn technologies typically have the least number of technical restrictions for waste processing. Site footprint is limited compared to other processing technologies and can be managed with additional costs. Total cost per ton of MSW processed is typically lower than most other types of processing facilities except for landfills. As the facilities typically process MSW with limited pre-processing, transfer hauling can be more efficiently routed and additional space for fuel processing is not required. Mass-burn facility sizes typically have not exceeded 3,000 tons per day of single-facility capacity in the United States due to fuel availability and flexibility for maintenance without large diversions; however, international vendors in areas like China have built single facilities as large as 5,000 tons per day. For the proposed 4,000 tons per day of MSW processing capacity as envisioned in Miami-Dade County, mass-burn technologies are both commercially available and suitable.

4.2 Modular Technologies

4.2.1 Process Description

Modular combustion units provide a smaller scale commercial option for MSW to energy conversion. They generally range from 5 to 140 tons per day, and similar to mass-burn, do not typically require refuse to be pre-processed before combustion with exceptions for oversized and hazardous or explosive materials. Two common types of modular combustors are 1) starved air or controlled air type and 2) excess air type. For starved air combustion, air is supplied to the first of two combustion chambers at sub-stoichiometric levels. This results in incomplete combustion, generating CO and organic compounds. This feeds into a secondary combustion changer

14 http://energyrecoverycouncil.org/wp-content/uploads/2019/10/ERC-2018-directory.pdf

15 https://www.mswmanagement.com/collection/article/13036128/the-current-worldwide-wte-trend

where additional air is added and combustion is completed. The process produces bottom ash and flue gas. A few newer models have acid gas/PM controls but many existing modular systems do not use air pollution controls. In the modular excess air combustor, two chambers are also used, but excess air is used in the primary chamber. Emissions from modular excess air combustors are similar to that of mass burn combustors but generally with lower NOx.[16]

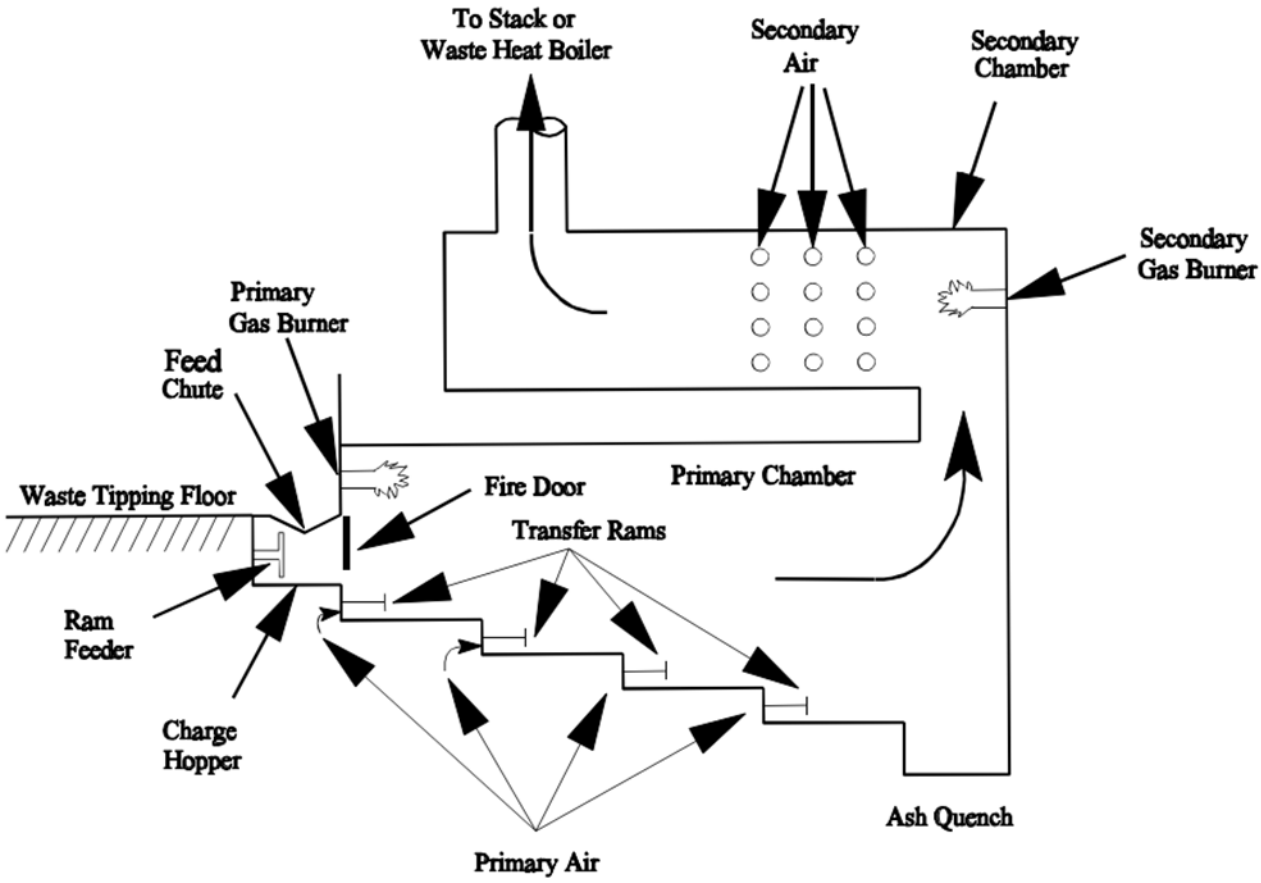


Figure 4-2. Typical Modular Starved-Air Combustor with Transfer Rams17

4.2.2 International and US Based Experience

As of 2020, there are four (4) operating modular facilities in the United States.[18] No modular facilities currently operate in Florida. As the facilities are typically small and not always captured on lists with traditional mass-burn

16 https://www3.epa.gov/ttnchie1/ap42/ch02/final/c02s01.pdf

17 https://www3.epa.gov/ttnchie1/ap42/ch02/final/c02s01.pdf

18 EPA December 2020 Assessment of Municipal Solid Waste Energy Recovery Technologies Report

and RDF technologies, it is difficult to quantify the number of facilities operating internationally. However, modular facilities are commercial and viable, within their typical size limitations.

4.2.3 Suitability for Miami-Dade County

Modular technologies typically have a very low number of technical restrictions for waste processing, but as they are sized to be mobile or constructed off-site, they are typically limited by maximum sizing. Site footprint is limited compared to other processing technologies. Total cost per ton of MSW processed is typically on par or less than traditional mass-burn WTE facilities for smaller-sized facilities, but more expensive when compared to larger facilities. As the facilities typically process MSW with limited pre-processing, transfer hauling can be more efficiently routed and additional space for fuel processing is not required. Modular WTE facility sizes typically have not exceeded 150 tons per day of single-facility capacity in the United States due restrictions on transportation for off-site construction. For the proposed 4,000 tons per day of MSW processing capacity as envisioned in Miami-Dade County, modular technologies would likely not be financially viable or easily scalable.

4.3 Refuse-derived Fuel

4.3.1 Process Description

Refuse-derived fuel combustion is another large-scale commercially viable MSW to energy technology. Refuse processed via this method usually requires pre-processing, including removal of non-combustibles and shredding of waste. This makes the feedstock more uniform for the combustion process and generally raises its heating value to improve combustion efficiency and electricity output; however, typically results in much less volume reduction than mass-burn and higher residuals remaining to be landfilled. Sometimes, RDF may be co-fired with pulverized coal. Due to these reasons, RDF facilities were typically built in the past to maximize energy output rather than maximize waste throughput. Generally, RDF combustor units can range from 320 to 1,400 tons per day.

The primary style of RDF boilers usually utilizes spreader stokers and combust RDF in a mixture of semi-suspension and traditional grate burnout. An air swept distributor blows the lighter portion of the RDF into the air which combusts in suspension while the heavier portions combust after falling on a horizontal traveling grate. Underfire air and overfire air are supplied to support mixing and completion of the combustion process. The process creates bottom ash as well as flue gas. PM levels from RDF combustion are typically double at the inlet to pollution control devices of mass-burn systems, but actual stack emissions tend to be comparable to mass-burn systems.[19]

RDF can also be combusted in a fluidized bed combustor. In this type of combustor, fluff or pelletized RDF is combusted on a turbulent bed of noncombustible materials such as limestone, sand, or silica. The combustor vessel has a gas distribution plate and underfire air windbox. The underfire air is introduced at a high flow rate, suspending/fluidizing the combustion bed. RDF, other wastes, and supplemental fuel can be injected via openings in the combustor wall. Overfire air completes the combustion process. Fluidized bed combustors utilize very

19 https://www3.epa.gov/ttnchie1/ap42/ch02/final/c02s01.pdf

uniform gas temperatures and mass compositions, which allows them to operate at lower excess air and temperature levels than mass burn systems.[20]

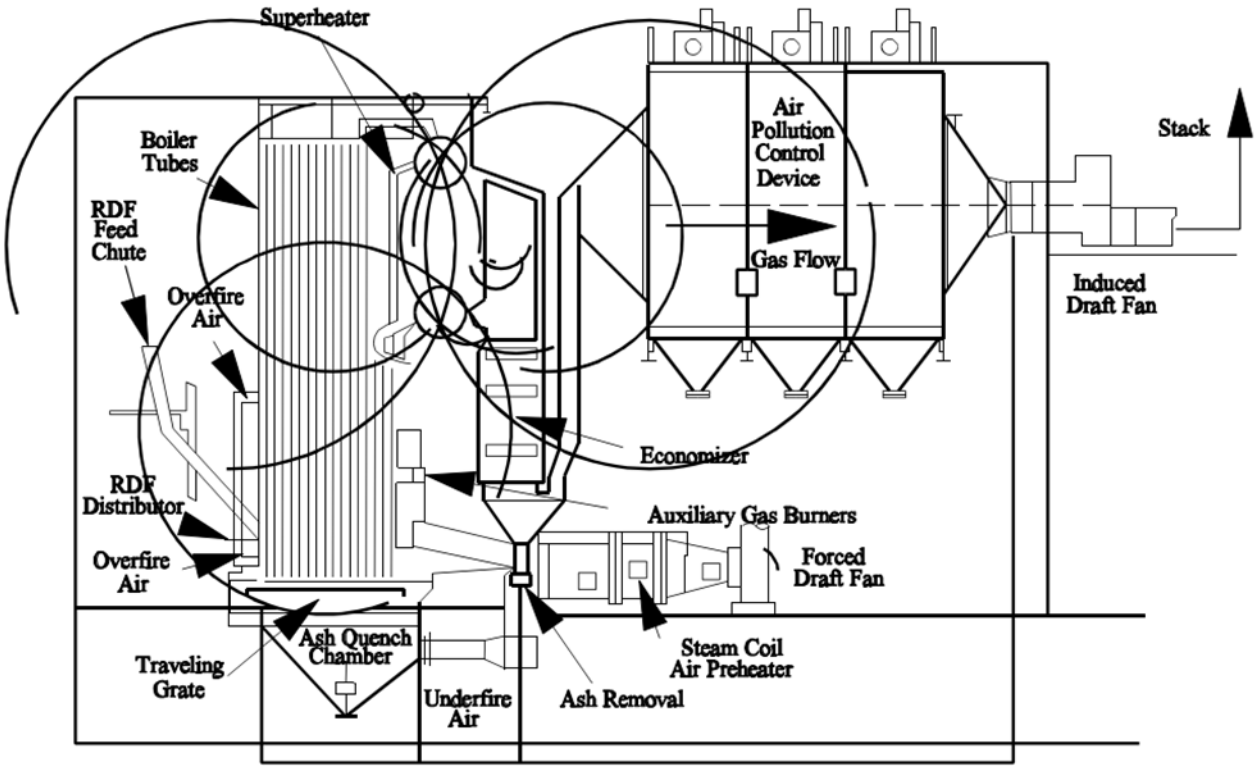


Figure 4-3. Typical RDF-Fired Spreader Stoker Boiler21

4.3.2 International and US Based Experience

As of 2020, there were currently thirteen (13) RDF WTE facilities operating in the United States.[22] There are currently two (2) of these facilities in operation in Florida, including Miami-Dade's existing RDF WTE facility. Internationally the number of RDF facilities is difficult to determine as they are often not differentiated from mass-burn style systems. However, a general estimate would be that roughly a fifth to a quarter of the almost 500 WTE facilities in Europe may be RDF facilities. These numbers are likely lower in new growth areas such as China as

20 https://www3.epa.gov/ttnchie1/ap42/ch02/final/c02s01.pdf

21 https://www3.epa.gov/ttnchie1/ap42/ch02/final/c02s01.pdf

22 EPA December 2020 Assessment of Municipal Solid Waste Energy Recovery Technologies Report

mass-burn has become the much more common choice for new facilities due to lowered MSW processing requirements and overall costs.

4.3.3 Suitability for Miami-Dade County

RDF technologies typically require a much larger site footprint in order to manage the additional processing lines to create RDF from MSW. Due to the additional processing requirements, RDF facilities typically cost more to both construct and operate than a mass-burn facility or modular facility. Due to their history of previous mixes of RDF with coal and the higher operating and construction costs, most existing RDF facilities are above 2,000 tons per day and were built to achieve maximum electrical output rather than maximum MSW volume reduction. For the proposed 4,000 tons per day of MSW processing capacity as envisioned in Miami-Dade County, RDF technologies are both commercially available and suitable, but would likely cost more to both construct and maintain than a mass-burn system and result in less volume reduction of MSW streams and more landfill requirements for residuals.

5 Emerging Waste Technologies

5.1 Gasification / Plasma Arc

Gasification is a thermochemical process that converts organic fuel or waste materials into the gaseous products of primarily carbon monoxide, hydrogen, as well as carbon dioxide and methane, collectively often referred to as a 'Synthesis gas' or 'Syn Gas'. The resulting gas is considered a fuel due to the flammability and energy content and can be converted into many different liquid or gaseous fuel products, or directly combusted in a gas turbine. Unlike typical combustion that relies on a continuous supply of oxygen, gasification occurs under a limited combustion where not enough oxygen is entering the system for a complete combustion reaction. In addition, most gasification occurs at higher temperatures and pressures than a standard combustion system. These higher temperatures and pressures, along with starved-air conditions allow fuel to break apart into their constituents instead of undergoing oxidation (combustion). Those constituent gases, mostly hydrogen, methane, carbon dioxide, carbon monoxide and water vapor, can then be separated and any non-organics in the chamber are melted and form a glass-like slag typically referred to as obsidian. Once the gas is produced, it needs to be cleaned to prevent contamination issues with the fuel being developed, any water vapor is extracted, and the syn gas is cooled down. Once the syn gas is produced, there are various options on how to utilize or process it further into more valuable products. It is most commonly burned directly in internal combustion engines or combustion turbines; however, it can also be used to produce hydrogen as a natural gas alternative, or it can be used to produce methanol and other various chemicals or synthetic fuels via commercially available and typical oil/gas reformation systems.

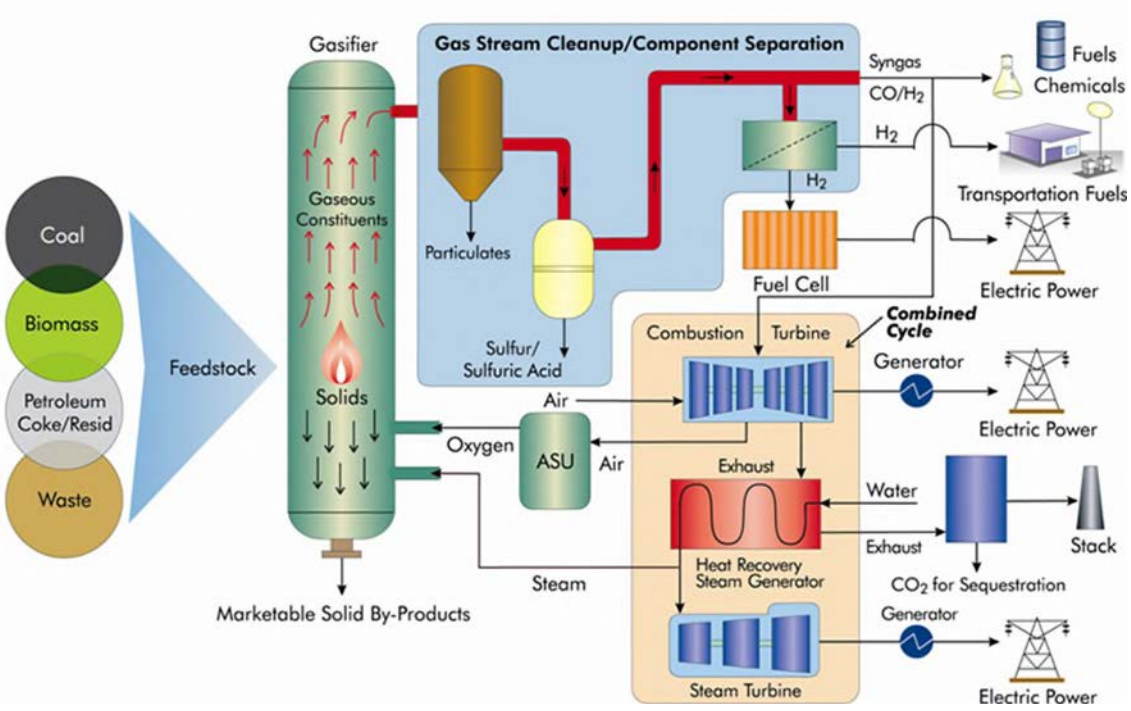


Figure 5-1. Department of Energy diagram of Gasification processes & products

There are variations in gasification system designs. Pyrolysis is considered the second stage of gasification, some facilities operate on pyrolysis to produce biochar and synthesis gas, which primarily gets condensed into a bio-oil that generally has 50-70% of the fuel value of petroleum-based oils. The bio-oil is however chemically unstable and requires refining into various fuels[23]. Another variation of gasification system design is plasma gasification. This variant relies on a plasma torch powered by an electric arc to catalyze organic matter and ionize gas into syn gas. The benefits of plasma gasification are the effective production of syn gas with minimal harmful emissions due to the extreme temperatures and a reduction in ash volume compared to traditional mass-burn technology. However, the operation of the plasma torch is energy intensive and reduces the net energy output. Several other variations of gasification technologies include moving bed, fluidized bed reactor, and entrained-flow gasifiers.

The gasifier process is chosen by the composition, quantity, and parameters of the feedstock or waste stream. Depending on the gasification process chosen, there are varying feedstock & processing restrictions. Regardless of the gasification process, a highly processed and homogeneous feedstock is required. Coal is a common feedstock for larger commercial gasifiers. There has been significant interest in co-gasifying biomass with coal to process waste. MSW can be gasified with all the main gasification processes[24], however the variations in MSW composition can influence the gasification efficiency and the caloric value of the syn gas. Higher moisture contents can also reduce the efficiency[25]. Excessive tar content from inorganic materials in MSW that creates slag can have adverse effects on the process efficiency and cause fouling of various system components such as the gas sulfur removal system. Reactor temperature can also become affected by the MSW composition. Separation of inert materials is important prior to the gasification of residual MSW, as they melt, can create excessive tar or slag which will foul the gasifier system[26]. Because of these concerns, for gasification of MSW to be successful it typically requires front-end processing, similar to RDF technologies to shred the waste, remove metals and other contaminants, and often to dry the waste to a lower moisture value. While there are plasma gasification vendors that claim they can utilize mass-burn style MSW, most technologies that Arcadis has reviewed in the past only had bench or demonstration-scale tests of waste, not full-scale tests with extremely varied waste streams.

5.1.1 International and US Based Experience

Internationally, numerous plasma gasification plants have been in operation in Japan, Korea, and Europe. The Hitachi plant in Utashinai, which was able to process 300 tons per day of MSW but had to shut down in 2013 due to increased recycling rates and limited availability of feedstock[27]. Other plasma gasification facilities in Japan, Korea, and Europe remain in operation at various smaller capacities.

US company Air Products had commissioned the world's largest capacity gasification facility, TV1 and nearly completed TV2, for the Tees Valley authority in England. The facility had sourced presorted MSW, or RDF that would fuel the facilities which were rated to have a combined capacity of 700,000 tons per year. Shortly after commissioning TV1, Air Products sold the two facilities due to design and operational challenges. The Tees

23 https://www.ars.usda.gov/northeast-area/wyndmoor-pa/eastern-regional-research-center/docs/biomass-pyrolysis-research-1/what-is-pyrolysis/

24 https://www.netl.doe.gov/research/coal/energy-systems/gasification/gasifipedia/waste

25 https://www.sciencedirect.com/science/article/pii/B9780444639929000197

26 https://www.intechopen.com/chapters/59269

27 https://www.netl.doe.gov/research/Coal/energy-systems/gasification/gasifipedia/westinghouse

Valley authority is currently in the procurement process for a new 450,000 tons per year WTE facility to process the waste of 1.5 million residents.[28]

In the United States, there have been several attempts to build large gasification technologies from a variety of vendors, but none have successfully reached commercialization at a large scale and continued operations at full load for more than a short period of time. Notable failures include the Ineos facility in Vero Beach, Florida which was intended to process both biomass and MSW, which reached preliminary commercial status but ultimately shut down and sold due to ongoing operations issues that could not be resolved. In Nevada, the Sierra biofuels facility is a 175,000-ton per year facility located in Storey County capable of creating 11 million gallons per year of renewable synthetic crude oil, or "Syncrude," that will be processed by Marathon Petroleum into transportation fuel. The facility is owned by Fulcrum BioEnergy, Inc. and works on modern gasification techniques with a proprietary Fischer-Tropsch (FT) fuel process[29]. At the time of this report, the Fulcrum BioEnergy facility has publicly announced successful production of syn gas during commissioning, but is not yet operating at a full commercial capacity to create transportation fuel.

In Canada, the Enerkem/ Suncor Alberta Biofuels facility is the first commercial scale biorefinery in North America. The 100,000 tons per year facility produces a syngas platform capable of converting MSW to methanol, ethanol, drop-in fuels and circular chemicals, such as acetic acid, acrylic acid, and olefins. The facility uses a low oxygen gasifier and other proprietary processes to produce its fuels and chemicals[30]. However, while it has been publicly announced to have achieved commercial operation and is producing fuel, the facility has had multiple reports of shutdowns and re-designs to address ongoing operations and capacity issues and its full commercial status when compared to design is not known at this time.

5.1.2 Suitability for Miami-Dade County

Gasification has some advantages over combustion for emissions control, as gasifiers produce synthesis gas at higher temperatures and pressures than in typical combustion. These higher temperatures and pressures allow for easier removal of SOx, NOx & CO2 from emissions. Once the synthesis gas is produced from the gasification chamber, it needs to be cooled and cleaned to prevent fouling. Particulates are filtered out using a baghouse or cyclone, and the gas may need to be scrubbed for acids due to potential sulfur content. Because the syn gas Is directly captured during the gasification process, there is reduced emissions when compared with traditional WTE technologies. However, if the syn gas is burned directly (unless it is converted or cleaned to pure hydrogen) to generate power such as via a combustion engine or gas turbine, there could be criteria pollutants emitted.

Aside from the potential various products and benefits of gasification, when considering gasification as a primary method of processing MSW in Miami-Dade, there are some problems that require consideration. The major limitation of the gasification technology to Miami Dade County, would be the limited daily processing tonnage capacity. Existing facilities for plasma gasification, which appear to be the ideal for MSW, all have very low capacities and have reported higher operating costs. Most facilities in operation internationally are under 100 tons per day, which would not be an appropriate scale-up to the 4,000 tons per day of processing capacity required by Miami-Dade County. For non-plasma systems a significant challenge remains for the design and process optimization, as the thermochemical reactions must be optimized under the varying feedstock compositions and feedstock processing requirements would increase the cost and reduce the throughput of a gasification facility.

28 https://www.letsrecycle.com/news/air-products-to-halt-tees-valley-gasification-project/

29 https://fulcrum-bioenergy.com/facilities/

30 https://www.oilandgasiq.com/decarbonization/interviews/from-our-archives-turning-garbage-to-ethanol-to-reduce-albertas-co2-footprint

There are no large-scale traditional gasification technologies utilizing MSW that have stayed in operation over 10 years or not reported significant processing and maintenance issues that caused cost increases.

5.2 Anaerobic Digestion

In anaerobic digestion for MSW, the feedstock input would be pre-sorted organic MSW such as food and yard waste which gets fed into water tanks and formed into a wet slurry via conveyors, pumps, and mechanized agitation. Insoluble inorganics such as glass, plastics, and metals are discharged for separate processing or disposal. The resulting slurry, or "black water", has a high organic content that is broken down and consumed by microorganisms such as methanogens, which generate methane in environments of no oxygen. The slurry stream is sent to be processed by these organisms in a series of sealed chambers/digesters that are designed to remain at the optimum conditions for anaerobic digestion. The slurry remains in the chambers for a determined residence time to optimize the production of gas. The resulting biogas that has been produced is rich in methane and other organic gases that are captured and can be used for electricity generation, sold to a local gas utility, or used as fuel. The remaining organic solids from the digestion can be used as compost and liquids may be used as fertilizer.

Anaerobic Digestion is a common type of organic waste facility used in the processing of sewage sludge at water resource recovery facilities which is considered liquid waste digestion. Also commonly used to process manure at large livestock facilities, and in the processing of food waste. A 2021 EPA report covering 209 facilities shows the top feedstock sources for anaerobic digestion to be Fats, Oils and Greases (FOG), and food waste[31]. Some digesters are designed to process one specific type of feedstock such as sludge in a water resource recovery facility, while others that can digest varying compositions of organic waste, such as is found in MSW, are called co-digestion. The biogas created can be further processed into renewable natural gas (RNG) with investment into a biofuel processing facility.

Anaerobic digesters have been increasingly used to combat the emissions issue of food waste by diverting it from landfills, where it decomposes and creates methane, a greenhouse gas with 25 times greater global warming potential than carbon dioxide[32]. Biogas production creates additional income and can reduce the overall costs of operating waste handling facilities if organics can be presorted from MSW. Figure 5-2 below shows an EPA process diagram of anaerobic digestion. The organic feedstock becomes processed and creates the two coproducts of solid compost and a liquid concentrate fertilizer which may be sold for agricultural purposes. It is critical that the presorting is efficient at removing nonorganic waste to prevent contamination and ensure quality coproducts that can be sold.

31 https://www.epa.gov/sites/default/files/2021-02/documents/2021_final_ad_report_feb_2_with_links.pdf

32 https://www.epa.gov/ghgemissions/overview-greenhouse-gases

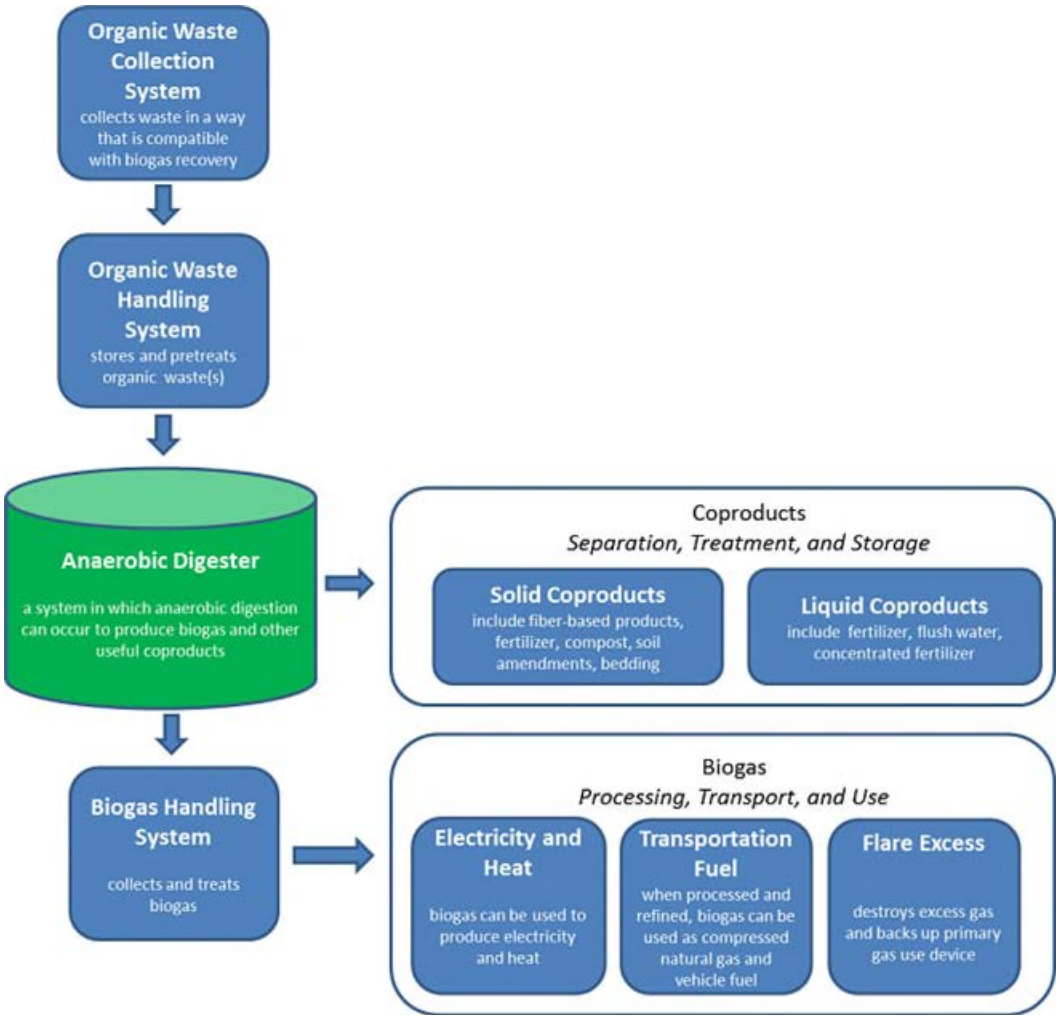


Figure 5-2. EPA Diagram of Anaerobic Digestion Process

Air pollution control (APC) is an important consideration to meet air quality permitting requirements for any waste processing facility, however, anaerobic digestion plants capture most gases produced when the facility collects biogas. Emission sources for this facility are primarily if combustion of the biogas is commenced such as with an internal combustion engine to generate electricity at the facility, thus requiring APC devices to ensure the emissions meet air quality permitting requirements. Potential APC devices required would include baghouses for particulates, scrubbers for SO_2, oxidation catalysts and/or selective catalytic reduction for various other air pollutants. A flare may also be an additional source of emissions when the facility has reached capacity of gas storage and is required to burn any excess that is produced.

As the process of anaerobic digestion is biologically driven, it requires time for the microorganisms to start up the digestion process and manage the organic waste. Due to the processing time requirement, anaerobic digesters require large chambers and processing vessels that requires a high level of investment & increased land use. Contamination from non-organics, and hazardous materials in MSW can have a detrimental inhibition on the digestion process or biogas production, therefore it is important to have an efficient sorting system.

5.2.1 International and US Based Experience

A recent EPA report showed 33 operating anaerobic digester facilities in the US as of 2020. Almost all of the facilities are processing waste streams where organics were separated from MSW through either source-side or mechanical processing means prior to supply to the facility (not directly coupled with the facility).

While the facilities can vary in size, they are easily scalable with sufficient available organic feedstock and land availability for the digesters. The city of Surrey, Canada recently built a biofuel facility that processes organic solid waste through anaerobic digestion. The facility handles approximately 115,000 tons of organic waste per year and converts its biogas into RNG that is used to power the city's fleet of natural gas-powered vehicles. The facility also markets the residual solids from digestion as compost for additional income[33].

5.2.2 Suitability for Miami-Dade County

When considering anaerobic digestion as a primary method of processing MSW in Miami-Dade, there are some problems that should be considered. Due to the processing time, biological sensitivity to contaminants and large land footprint, anaerobic digestion is best suited for areas with a smaller population, as the daily processing capacity in tons are significantly lower when compared to more commonly adopted technologies such as waste to energy facilities that can handle large daily tonnage capacities of incoming MSW. The Surrey biofuel facility is ideal choice for the city of Surrey, as there are lower amounts of solid waste generated due to a smaller population of 568,322 [34] compared to a large metropolitan area of Miami-Dade County with a population of 2,662,777 [35] and high tourism. Another concern is how the separation of organics from nonorganic materials can be successfully implemented at either collection or preprocessing with high efficiency. Contamination of non-organics and hazardous materials in MSW can have a detrimental inhibition on the digestion process or biogas production. Contamination would also lower the value of the compost and liquid concentrate fertilizer coproducts that may have given additional revenue. This required separation would still require a more traditional processing or disposal facility (i.e., WTE or landfilling) for the remaining inorganic materials. Ideally, if Miami-Dade built an organics separation facility coupled with anaerobic digestion, it would be a way to divert a portion of the MSW stream; however, it would likely be best used as a hedge against future MSW increases and removing necessity of building additional WTE or landfills, not as a primary disposal or processing technology.

5.3 Mechanical Biological Treatment / Solid Recovered Fuel Technologies

Mechanical Biological Treatment (MBT) is a combined approach to solid waste management that has both mechanical and biological treatment phases separately processed to ultimately produce a pelletized solid fuel. The mechanical stage comprises of automated mechanical sorting equipment such as via conveyors, magnets, trommels, shredders and eddy current separators to process combustible materials, while the biological treatment stage of MBT could involve anaerobic digestion, composting or bio drying. Use of anaerobic digestion would

33 https://www.surrey.ca/services-payments/waste-collection/surrey-biofuel-facility/about-surrey-biofuel

34 https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/details/page.cfm?Lang=E&SearchText=Surrey&DGUIDlist=2021A00055915004&GENDERlist=1&STATISTIClist=1&HEADERlist=0

35 https://www.census.gov/quickfacts/fact/table/miamidadecountyflorida/POP060210

reduce the organics content, stabilize the waste and produce biogas for collection, bio drying serves to stabilize the organics by reducing the moisture, where later they are combined with the other processed waste and formed into SRF pellets. This method involves the separation of waste without requiring the generator to separate the MSW at waste collection points. The biological stage is effective at processing the organics in MSW and producing products like biogas and compost. As a result of the mechanical and biological separation and processing, both fractions of waste are combined, shredded, and converted into pelletized solid recovered fuel (SRF). These separated components of MSW are dried, shredded and blended to meet fuel specifications and quality standards. An additional product of MBT is a compost-like output which usually is of low value due to concerns of contamination[36].

The benefits of MBT and processing MSW into SRF, is an improved quality pelletized feedstock fuel that can serve as a renewable substitute for coal or other solid fossil fuels. An additional benefit is the reduction in greenhouse gas emissions from the displacement of fossil fuels. Some European MBT facilities have agreements with cement manufacturers to provide SRF as a replacement for coal or petroleum coke to fire up cement kilns and coal power plants. Some concerns regarding the usage of SRF was the fuel specifications. Issues such as fouling, increased mercury emissions and ash production, and increased oxidation & corrosion of equipment.[37]

5.3.1 International and US Based Experience

MBT has higher adoption in Europe, where it is widely used for processing MSW. One study of six European facilities concluded that a MBT plant must have a very efficient sorting and recyclables recovery line with sufficient gate fees. It also found that including a stream to recover fuel materials for power plant or cement plant use can increase revenue, landfill diversion, and reduce greenhouse gas emissions. In this study, the six European facilities processed between 16,500 to 350,000 tons of MSW per year.[38]

MBT has not received wide adoption in the US, however there are numerous facilities in Europe to study. Facility capacities for MBT are typically in range from 25,000 – 200,000 tons per year.[39] In 2017, Entsorga West Virginia LLC began operation on the first MBT facility built in the U.S. The facility had a capacity of 110,000 tons per year, and produced SRF for the Essroc cement plant nearby to heat up the Portland cement kiln.[40] Just recently after 3 years of operation, the facility closed due to a reported intellectual property lawsuit. Entsorga states the shutdown is temporary.[41]

5.3.2 Suitability for Miami-Dade County

When considering MBT/SRF technologies as a primary method of processing MSW in Miami-Dade, there are some problems that should be considered. The biggest limitation to this technology regarding Miami-Dade's needs would be that the tonnage capacity for existing facilities is not nearly enough to handle the amount of MSW generated within the county. Approximately 200,000 tons per year is the higher end on the range of typical existing MBT facilities. Another consideration is analyzing the existing MSW composition and determining what

36 https://www.swim-h2020.eu/wp-content/uploads/2018/03/3a-Part2-Ben-Amor-Long-Term-Solutions-for-Solid-Waste-Management.pdf

37 https://www.researchgate.net/publication/281905251_MBT-derived_SRF_State-of-the-art_in_Europe_Will_Quality_Management_Deliver

38 https://www.sciencedirect.com/science/article/abs/pii/S0956053X22000253

39 https://www.ciwem.org/assets/pdf/Policy/Policy%20Position%20Statement/Mechanical-biological-treatment-of-waste.pdf

40 https://renovareenv.com/entsorgawv/

41 https://morgancountyusa.org/?p=5451

the SRF fuel specifications need to be to sell the product. Additionally, the facility would need efficient removal of contaminants and hazardous materials prior to mechanical and biological separation, especially if bio drying will be utilized. Additionally, as MBT/SRF technology is primarily a processing, it still needs a partner to use the product as fuel or a facility to burn the fuel created. If coupled with RDF or other combustion technologies, this process would be much more expensive than a technology such as mass-burn.

6 Recent Waste Processing Technology Procurements and Facility Expansions

As previously stated, the US currently uses 73 WTE facilities to combust MSW and recover energy. While several have expanded to manage additional waste, the last new facility opened was in West Palm Beach, Florida in 2015[42]. Since that time, no new greenfield commercial plant has been implemented in the US. The following sections describe select initiatives that occurred in the last ten (10) years related to evaluating and choosing waste processing technologies – WTE and others – to handle significant waste streams in the future for certain jurisdictions.

6.1 Procurements

6.1.1 St. Lucie County, FL

In May 2006, the Board of County Commissioners, St. Lucie County, Florida solicited offers to design, permit, finance, construct, and operate a Plasma Arc Gasification Facility to process MSW for St. Lucie County. There were two respondents to the RFQ: Alternative Resources, Inc. and Geoplasma, LLC that resulted in Geoplasma LLC as the highest ranking respondent.[43] The developer planned to process 3,000 TPD, generating 120 megawatts of electricity. The plant was to cost over $425 million.[44] The size of the facility was reduced to 600 TPD with an estimated export of 18 MW of electricity. FDEP issued a final air permit in July 2010.[45]

In 2012, St. Lucie County terminated the agreement with Geoplasma. The St. Lucie County solid waste division director stated that Geoplasma could not finance the project due to inability to obtain a technology guaranty from the technology owner, Westinghouse Plasma. The County also could not commit to deliver Fort Pierce, FL MSW to the proposed plant, leaving only the County and Port St. Lucie MSW for processing throughput[46].

In April 2012, St. Lucie County authorized issuance of a Request for Qualifications (RFQ) from firms to design, permit, finance and operate a thermal conversion facility for the processing MSW. Six firms responded with Covanta Energy Corporation (Covanta) ranked highest and Jacoby Synergy Renewables (JSE) ranked second highest. Negotiations with Covanta and the County could not be completed due to the processing fee within four years would be substantially higher than the St. Lucie County's processing fee. In 2013, the County entered into negotiations with JSE but the two parties were also unable to agree to a revised JSE proposal.

In 2014, St. Lucie County issued an RFQ to utilize a thermal conversion facility to process MSW. Of 331 companies notified, 27 copies of the RFQ were issued and six (6) proposals were received. In 2015, St. Lucie County approved entering into contract with Green3Power St. Lucie, LLC (G3P) to build and operate a gasification facility at the St. Lucie County site.[47] Available literature related to the proposed facility indicated that

42 https://www.epa.gov/smm/energy-recovery-combustion-municipal-solid-waste-msw

43 Approval of Short-Listed Firms for RFQ No. 14-057 - Utilization of a Conversion Facility to Process Municipal Solid Waste for St. Lucie County - St Lucie County, Florida (iqm2.com)

44 Company plans $425 million gasification plant to recycle trash (starnewsonline.com)

45 GeoPlasma-St. Lucie - Energy Resources Group, Inc. (energyresourcesgrp.com)

46 https://www.floridatrend.com/article/14356/trashed-plan-to-use-plasma-technology-for-garbage-disposal

47 Lease and Contract with Green3Power St. Lucie, LLC - Development of a Gasification Facility to Process Municipal Solid Waste for St. Lucie County - St Lucie County, Florida (iqm2.com)

in 2018 St. Lucie County is exploring alternative waste conversion technologies. No further documentation could be located regarding the implementation of this facility.

6.1.2 New York City, NY

In 2012, a request for proposals (RFP) for a pilot program to process 450 tons of waste per day (capable of doubling capacity if successful) was issued. The RFP called for constructing a WTE facility near or within New York City. The pilot program implementation process was eventually stopped. However, as of 2019, New York City sends approximately 25% of collected waste to existing WTE facilities outside of New York City.

6.1.3 Hartford, CT

In November 2015, the Connecticut (CT) Department of Energy and Environmental Protection (CTDEEP) issued the Phase 1 RFP for financing, design, construction, operation and maintenance of a Waste Recycling and Disposal Project to qualify firms and technologies to re-develop the CT Solid Waste System Project (CSWSP). The CSWSP includes recycling facility, four transfer stations, and the 2,850 tpd RDF facility known as the Connecticut Solid Waste System Resource Recovery Facility (CSWS RRF) in Hartford, CT. The CSWS RRF includes a Waste Processing Facility (WPF) and Power Block Facility (PBF). Technologies submitted included:

- Mixed waste processing facilities
- Anaerobic digestion
- Composting
- Gasification (pyrolysis, plasma arc, etc.)
- Other conversion technologies to create renewable fuels, chemicals, electricity or other usable products

CT DEEP selected three firms to receive the Phase 2 RFP:

- Covanta Energy, LLC – source separated organics processing through anaerobic digestion and haul to Covanta WTE facilities with potential expansion of existing Covanta Bristol, CT WTE facility.
- Mustang Renewables Power Ventures, LLC – organics processing through composting and anaerobic digestion; mixed waste processing to remove recyclables and deliver processed engineered fuel (PEF) to cement kilns.
- Sacyr Rooney Recovery Team, LLC. (Sacyr Rooney or SRRT) – refurbish existing PBF and construct new sorting lines at the WPF to extract recyclables and organics; organics processed through enclosed, aerobic composting and anaerobic digestion.

In December 2017, CT DEEP selected Sacyr Rooney to modernize the CSWS RRF and directed the Materials Innovation Recycling Authority (MIRA) to enter into agreement with Sacyr Rooney. MIRA and SRRT entered into a memorandum of understanding to further negotiations in July 2019. In July 2020, CT DEEP rejected the $330M refurbishment of the existing facility. At this time, the CSWS RRF is planning to be closed between mid-2022 to 2023 and waste will be transported for disposal in other resource recovery facilities or out-of-state landfills.

6.1.4 Solid Waste Authority of Palm Beach County, Florida

In December 2008, the Solid Waste Authority of Palm Beach County, Fl (SWA) issued an RFQ to identify qualified firms to design, build and operate a new waste-to- energy facility for the County. The SWA was seeking mass-

burn technology that demonstrated success in the efficient and feasible conversion of MSW into marketable steam, thermal energy, fuel and electricity. The SWA Governing Board selected three firms that responded to the RFQ to receive a Request for Proposals (RFP): (1) Babcock and Wilcox (B&W); (2) Covanta Energy; and (3) Wheelabrator Technologies to receive the Request for Proposals (RFP). The RFP first RFP was released in February 2010 after receipt of comments on the draft RFP from qualified firms. Because the new WTE facility is to model the best practices of the industry, SWA developed a Conceptual Planning Report and an Aesthetic Conceptual Design along with the draft RFP to establish SWA's objectives with respect to achieving the highest standards of sustainable "green" design. The first RFP was cancelled in August 2010 to address additional permitting requirements from the FDEP to incorporate selective catalytic reduction (SCR) technology for enhanced NOx emissions control. The second RFP was issued in September 2010. Proposals were received in December 2010. SWA entered into agreement with the joint venture of KBR and B&W in April 2011. The new 3,000 tpd Palm Beach Renewable Energy Facility No. 2 (PBREF No. 2) WTE facility is located on the SWA Energy Park Campus and achieved commercial operations in July 2015.

6.2 Florida Waste-to-Energy Facility Expansions

Since the 2015 start of operations for the SWA of Palm Beach County PBREF No. 2, there have not been any new waste-to-energy facilities built in the United States. We are aware of other communities that are further investigating innovative waste processing technologies or building new waste-to-energy capacity in areas outside of Florida. For example, the Port of Seattle, WA in conjunction with King County, WA commenced a study in 2022 to review the state of the industry in converting the MSW stream or portion of the MSW stream into sustainable aviation fuel.

However, the majority of the efforts related to waste processing facilities have been focused in several communities with existing waste-to-energy facilities that have or are planning to expand their existing WTE facilities. Other than the 2012 completion of the mass-burn expansion of Covanta's H-Power facility in Honolulu, HI and the 2010 completion of permitting for the planned expansion of the existing York County, PA mass-burn combustion facility, the completed WTE expansions have primarily focused on the Florida facilities.

The following represents a summary of the status of completed expansions to existing waste-to-energy facilities in Florida:

Hillsborough County, FL

In 2007, Hillsborough County sole-sourced to Covanta for a new 600-TPD line to add to the existing 1200-TPD facility which consists of three operating 400-TPD lines. There was no RFP issued for the expansion that was completed in 2009. The expansion increased the facility capacity from 1,200 to 1,800 TPD and also included an additional turbine generator. The electricity that is produced is used to power residential homes as well as the adjacent wastewater treatment plant. In 2022, Hillsborough County noted plans in a recent capital improvement project planning document to build a new facility with at least 1,950 tpd processing capacity.[48]

Lee County, FL

In 2006, Lee County contracted with Covanta to add a third line with a 636-TPD capacity to the existing 1200 TPD facility. The expansion continued to use the same Martin technology. The Lee County Solid Waste Division finished its expansion project in the late summer of 2007. The facility processes more than 622,000 tons of waste

48 FY22 - FY27 Adopted Capital Improvement Programs (CIP) (hillsboroughcounty.org)

per year and produces 57 MW of electricity. In February 2022, Lee County and Covanta reached an agreement to extend their public-private partnership of the facility through 2031. The agreement also included an optional four-year extension[49].

Pasco County, FL

In February 2022, Pasco County filed with the FDEP the Unit 4 supplemental application through the Florida Power Plant Siting Act to expand their existing WTE facility with the addition of a fourth unit of 475 tpd processing capacity.[50] Prior to the submission of the permit application, Covanta was selected to design and build the expansion and continued operation of the existing facility and the expanded facility after completion.[51]

49 https://www.covanta.com/news/press-releases/covanta-lee-county-fla.-extend-waste-to-energy-partnership-to-2031?hsLang=en

50 Pasco County Resource Recovery Facility Expansion - Unit 4 Supplemental Application | Florida Department of Environmental Protection

51 Pasco takes first step to expand its trash-to-energy incinerator (tampabay.com)

7 Summary and Conclusions

7.1 Summary and Comparison for Use at Miami-Dade

The table below provides a limited break-down of technology types, including some not specifically reviewed in this report to assist in a qualitative understanding of the variety of technology types that may be available. It is important to note that within each of these technologies are often specific proprietary equipment and operating practices that vary all of the overall specifics, so references provided are for generic averages based on Arcadis' experience in the industry and do not reflect a specific vendor or design for each technology.

Table 7-1. Technology Comparison Table

Technology	Waste Input	Facility Sizing[1]	Facility Cost vs Mass-Burn[2]	Miami-Dade Implementation Recommendations	Additional Notes
Landfill	Pre- or Post-Recycled MSW, Residue	Unlimited capacity, but limited by space to site	Lower than mass-burn cost/ton	For MSW and residue disposal after diversion and processing technologies.	Technology not analyzed in this report.
Composting	Organics	Unlimited capacity, but limited by space to site and source separation or mechanical separation volumes	Greater than mass-burn cost/ton	For organics diversion before processing and disposal technologies. Not a primary disposal center.	Technology not analyzed in this report.
Recycling	Source Separated Recyclables	Limited by source separation or mechanical separation volumes	Greater than mass-burn cost/ton	For waste diversion before processing and disposal technologies. Not a primary disposal center.	Technology not analyzed in this report.
Mass-Burn WTE	Post-Recycled MSW	Viable from 0 to 5,000 tons per day in a single facility	N/A	Viable as a primary processing and disposal technology for 4,000 tons per day capacity.	
Modular WTE	Post-Recycled MSW	Viable from 0 to 200 tons per day	Greater than mass-burn cost/ton	Not viable for primary processing and disposal at 4,000 tons per day capacity.	Scale-up not feasible due to cost.

Technology	Waste Input	Facility Sizing[1]	Facility Cost vs Mass-Burn[2]	Miami-Dade Implementation Recommendations	Additional Notes
RDF WTE	Post-Recycled, Processed MSW	Viable from 0 to 5,000+ tons per day in a single facility	Greater than mass-burn cost/ton	Viable as a primary processing and disposal technology for 4,000 tons per day capacity.	Requires larger site footprint and larger residuals stream than mass-burn.
Gasification	Post-Recycled, Processed MSW	Viable from 0 to 500 tons per day	Greater than mass-burn cost/ton	Not currently viable for primary processing and disposal at 4,000 tons per day capacity.	Larger size units not commercially proven. Further scale-up may not be feasible due to costs. Pre-processing for viable units could be extensive and costly.
Anaerobic Digestion	Contaminated Organics	Unlimited capacity, but limited by space to site and source separation or mechanical separation volumes	Less than mass-burn cost/ton	Not viable for primary processing and disposal at 4,000 tons per day capacity. Better use as waste diversion before processing and disposal technologies.	Site area required and separation may limit ability to use. Not commercially proven at higher scales, but most technology is modular.
MBT/SRF	Post-Recycled, Processed MSW	Unlimited capacity	Greater than mass-burn cost/ton	Not a true disposal site as its primary use is for pre-processing and fuel preparation. Not viable for primary processing and disposal at 4,000 tons per day capacity.	Requires extensive pre-processing and would still need a disposal site for fuel. Could be coupled with gasification to increase viability, but at high cost.

Notes:

1. Sizing roughly estimated based on existing large-scale commercial technology availability.
2. Costs roughly compared to mass-burn technology. Each technology price could vary considerably depending on specific technology and vendor, so specific quantifiable numbers or ranges are not provided.

7.2 Conclusions

Based on the review of the technologies noted in this report, the largest limiting factor for waste processing and disposal technology viability at a 4,000 ton-per-day size is the commercial availability of scaled up units. Mass-burn technology and RDF technology are the only large-scale volume reduction technologies that are technically feasible for the sizing required for the County. While both could be utilized to meet the throughput criteria, mass-burn would be considerably less expensive and take up a smaller site footprint than RDF. In addition to not being commercially viable at the required throughput capacity, the remaining available technologies (except landfilling) would all require more available land area and would be at a greater cost point than mass-burn or RDF technologies.

Arcadis U.S., Inc.
701 Waterford Way, Suite 420
Miami
Florida 33126
Phone: 305 913 1316
Fax: 305 913 1301
www.arcadis.com

Arcadis U.S., Inc.
701 Waterford Way
Suite 420
Miami
Florida 33126
Phone: 305 913 1316
Fax: 305 913 1301
www.arcadis.com

Memorandum

MIAMI-DADE COUNTY

Date: July 11, 2022

To: Honorable Chairman Jose "Pepe" Diaz
and Members, Board of County Commissioners

From: Daniella Levine Cava
Mayor

Subject: Future Waste-to-Energy Facility Siting Alternatives
Report to the Board – Directive #221140

Executive Summary

On April 13, 2022, in anticipation of Resolution No. R-432-22, sponsored by Chairman Jose "Pepe" Diaz, I provided the Chairman and the Board of County Commissioners (Board) with a report on the steps being taken by the administration regarding the plans for a new waste to energy plant (WTE).

The Department of Solid Waste Management (DSWM) subsequently engaged Arcadis, who then identified over 235 parcels as potential locations for the development of a future WTE. That list, through multiple rounds of screening and consideration of several factors detailed below and in the report attached, has been refined to four recommended locations – three alternative sites and the current County WTE facility property.

The summary below provides you with the steps taken to date by the Department and Arcadis on the screening process for potential sites for the replacement WTE, as well as the Request for Information process that will help further inform our evaluation efforts. My administration is also committed to engaging directly with residents on this critical topic, and we ask for the opportunity to conduct community outreach with respect to the potential sites as we move forward.

Background

On May 3, 2022, the Board approved Resolution No. R-432-22. The Resolution asked the Administration to provide the following within 60 days of the effective date of the resolution: (1) Develop and issue a solicitation for a design criteria professional to prepare a design criteria package for a new waste to energy plant to replace the County's RRF on the same site or a similar site, that meets all the land use, zoning and permitting requirements; (2) Upon the conclusion of any negotiations, place the recommendation on the solicitation for the design criteria professional on an agenda of the full Board without committee review for the Board's consideration and approval; and (3) To use all legally available and budgeted funding to accomplish the directive set forth herein. The Resolution also provided that if there is insufficient budgeted and legally available funding to accomplish the foregoing directive, the County Mayor or County Mayor's designee shall set forth in its recommendation what additional funding is required to obtain the services of the design criteria professional. As part of the motion approving the Resolution, the Board also granted my request that we be able to assess multiple sites and explore alternative methods for delivery of the WTE project.

Department of Solid Waste Management (DSWM or Department) staff and Internal Services Department (ISD) staff have worked closely to develop a Request for Information (RFI) which will help gather market information from businesses in the industry with respect to technology, alternative delivery models, financing options and other relevant information. The RFI was issued on July 1, 2022 and the responses are due no later than August 5, 2022. Additionally, DSWM has drafted the Request to Advertise (RTA) for Design Criteria Professional and Owner's Representative Services, which was reviewed by the County Attorney's Office for legal sufficiency and has been advertised for proposals.

Summary

In accordance with the Mayor's letter dated April 13, 2022, DSWM was tasked with identifying and analyzing potential sites within the County that would be suitable for the development of a future WTE facility. Arcadis was tasked with assisting the County with this preliminary analysis. Arcadis commenced the preliminary siting evaluations on May 9, 2022, which, in consideration of the expedited timeframe required, were performed in two stages, an Initial Screening stage and a Detailed Screening stage, utilizing a desktop evaluation approach. Arcadis conducted a kick-off meeting with DSWM staff on May 13, 2022, to discuss and confirm the minimum screening criteria to be used in the Initial Screening evaluation process. The site criteria were generated through a collaborative effort between Arcadis and DSWM staff and were applied in the Initial Screening process, and included minimum site area, zoning, transportation access, and other considerations.

The Initial Screening criteria search resulted in approximately 235 parcels being identified. Further desktop analyses were then conducted to address additional site considerations, including parcel combinations, site geometry, proximity to airports, current site usage/availability, site area used as borrow pits, and others. At the conclusion of the Initial Screening process, 24 sites remained and were presented to DSWM staff for review and consideration on May 20, 2022. After discussion, the decision was made to increase the minimum offset from residential zoning to half a mile, which eliminated an additional two sites. The remaining 22 sites were approved for the Detailed Screening process, where they were evaluated against more extensive site development criteria, including expected impacts to the County's Solid Waste System, presence of wetlands, floodplains, threatened and endangered species, soil characteristics, utilities availability, air permitting issues, conflicts with County policies, and many others. For each site, a site package was developed to document the analysis of the site relative to the Initial and Detailed Screening criteria. The criteria were then separated into six general categories (Location, Utilities, Soils, Environment, Transportation, Community) and a simple stoplight rating identified the relative difficulty for each category.

Arcadis reviewed the findings of the Detailed Screening process with DSWM on June 7, 2022, and after discussion and agreement by DSWM and Arcadis, 19 sites were eliminated from consideration due to several factors such as roadway access and utility availability, parcel development and availability, permitting considerations, and conflicts with existing County policies (e.g., located in Wellfield Protection Areas or Comprehensive Everglades Restoration Plan site, wetland/wildlife habitat issues, etc.). DSWM staff then requested that a comparison be conducted of the existing WTE Facility site to the three remaining potential sites found as part of this preliminary analysis. For comparison purposes, Arcadis conducted an analysis of the existing WTE Facility site, the Miami-Dade Resources Recovery Facility (RRF), using the same methodology as for the other sites.

The four remaining sites are listed below and presented in more detail on the attached Preliminary Siting Alternatives Report.

- Site 1 – Medley
- Site 16 – Ingraham Hwy. Site #1
- Site 17 – Ingraham Hwy. Site #2
- Existing RRF Site – Doral

The Report provides a summary of the entirety of the analysis, including evaluation methodology, preliminary site layouts, conceptual-level cost estimates to serve as a decision-making tool for the purpose of evaluating the relative financial impact of developing a WTE Facility at any of the sites identified, and a summary of comparative considerations for each potential site, such as schedule and regulatory approval process.

Based on the environmental sensitivity of Site 16 and Site 17 and their location outside the Urban Development Boundary, my recommendation is that the Board shortlist two sites: Site 1 Medley and the Existing RRF Site. Furthermore, we would ask for the opportunity to (i) conduct community outreach with

respect to the potential sites, and (ii) evaluate whether any information received in response to the RFI might inform the ultimate selection.

If you have any questions or concerns on this report, please contact DSWM Director Michael J. Fernandez, 305-514-6609.

Per Ordinance No. 14-65, this report shall be placed on the next available Board meeting agenda.

c: Geri Bonzon-Keenan, County Attorney
Gerald Sanchez, First Assistant County Attorney
Jess McCarty, Executive Assistant County Attorney
Office of the Mayor Senior Staff
Michael J. Fernandez, Director, Department of Solid Waste
Yinka Majekodunmi, Commission Auditor
Jennifer Moon, Chief, Office of Policy and Budgetary Affairs
Basia Pruna, Director, Clerk of the Board
Eugene Love, Agenda Coordinator

Miami-Dade County

Department of Solid Waste Management

Preliminary Siting Alternatives Report

June 2022

Contents

Tables

Figures

Appendices

Executive Summary

Purpose and Scope

The Miami-Dade County (County) Department of Solid Waste Management (DSWM or Department), in accordance with the Mayor's letter dated April 13, 2022, has been tasked with identifying and analyzing potential sites within the County that would be suitable for the development of a future Waste-to-Energy (WTE) facility, and to report findings within 60 days. Arcadis U.S., Inc., (Arcadis), as the Bond Engineer for DSWM, assisted the County with this preliminary analysis. Arcadis is a global engineering consulting firm with extensive experience assisting clients in the development and oversight of modern WTE facilities for over 40 years. Most recently, Arcadis served as the owner's representative and design criteria professional for the development of the Solid Waste Authority of Palm Beach County's new WTE facility, the only new facility to be built in the United States in the last 20 years, in operation since 2015.

Arcadis commenced the preliminary siting evaluations on May 9, 2022, which were performed in two stages, an initial screening stage and a detailed screening stage, as summarized below.

1. Initial Screening Stage: The initial screening stage identified parcels located in Miami-Dade County that met initial siting criteria and compared them to agreed-upon Pass/Fail criteria.
2. Detailed Screening Stage: Parcels that passed the initial screening stage were further analyzed in the detailed screening stage, which included the evaluation of additional, more extensive siting parameters.

Due to the expedited nature of the assignment, it should be noted that Arcadis' services were preliminary in nature and were conducted consistent with prudent industry practice under similar circumstances and timelines to provide a screening-level analysis of the availability of potential sites within the County. A more detailed review and investigation (including onsite visits, surveys, geotechnical testing, etc.) of the factors which may affect the potential development of a WTE facility at any proposed location is required and is assumed would be conducted in a future phase of the County's planning and implementation process.

Initial Screening Evaluation

Arcadis conducted a kick-off meeting with DSWM staff on May 13, 2022, in order to present and confirm the minimum screening criteria to be used in the Initial Screening evaluation process. The site criteria below were generated out of a collaborative effort between Arcadis and Department staff.

Initial Screening Criteria

- WTE Facility Capacity – Minimum site area sufficient for a mass-burn WTE facility with capacity of 4,000 tons per day (tpd), expandable to 5,000 tpd, if possible.
- Site Area and Ownership – Minimum 40-acre site comprised of no more than two contiguous parcels and two site owners.
- Zoning Considerations – Have the following zoning designations: Vacant, Industrial, Commercial, or Agricultural.
- Residential Zoning – Distance to residential zoning was determined using Geographic Information System (GIS) tools and those sites that were within 1,500-feet of residential zoning were eliminated. This criterion was not applied to Site 1, which was submitted by the County for detailed screening consideration.
- Transportation/Travel Time – Maximum travel time of 10 minutes to major (arterial) or collector roads.

- Canal or Major Roadways – Sites with a canal or major roadway located on the site parcel were precluded from further evaluation because they could not be abandoned and developed.
- Lake/Borrow Pit – Sites that included a lake or borrow pit were included as they could be filled.
- Other Site Considerations – Any properties recommended directly by the County to be evaluated as well as sites within and outside of the Urban Development Boundary were considered.

A GIS database was developed using layers provided by the County and acquired from external sources. The Initial Screening criteria were entered into a GIS-based screening tool, which resulted in approximately 235 parcels being identified from the GIS database. Additional analyses were conducted including the following:

- Site Area and Ownership – Sites that were less than 40 acres were analyzed to confirm if any two adjacent parcels, with no more than two owners, could be combined into one site, meeting the minimum 40-acre size criteria.
- Site Geometry – Sites with parcel boundaries with shapes or dimensions incompatible with a 4,000 tpd WTE facility were eliminated.
- Zoning Considerations – Properties with existing abandoned building structures and Conservation, Environmentally Endangered Lands (EEL) Program, or Other Protected Lands not screened by the GIS tool were excluded.
- Proximity to Airport – Sites within 4.0 miles of an existing airport were eliminated.
- Lake/Borrow Pit – Sites that were mostly or entirely excavated as a lake or borrow pit were eliminated due to the significant additional time and expense associated with backfilling to create the developable area of the site.
- County parks and other County properties (i.e., wellfields, etc.) that were not screened by the GIS tool were manually identified and eliminated.

At the end of the Initial Screening process, 24 sites remained and were presented to DSWM staff for discussion at a meeting on May 20, 2022. After discussion, the decision was made to increase the minimum offset from residential zoning to one-half mile (2,640 ft), which eliminated an additional two sites. The remaining 22 sites were approved to proceed to the Detailed Screening process.

Detailed Screening Evaluation

The approved 22 sites were then evaluated against Detailed Screening criteria, which are briefly summarized below.

Detailed Screening Criteria

- Location – physical location of the site relative to existing Solid Waste System (System) facilities, transportation routes, and expected impacts to the System if a proposed WTE facility were sited there.
- Wetlands and Surface Waters – Arcadis utilized GIS in order to identify sites with existing wetlands and surface waters.
- Threatened and Endangered (T&E) Species – Arcadis utilized existing T&E data from federal, regional, and local agencies to identify critical habitat for protected species, where development may be difficult.

- Air Emissions – The United States (US) Environmental Protection Agency (USEPA) Prevention of Significant Deterioration (PSD) permitting program determines the amount of air quality deterioration allowed for a proposed project. Current National Ambient Air Quality Standards (NAAQS) and PSD increments were reviewed and other nearby large emitters of air pollution and proximity to nearby Class I area (Everglades National Park) and sensitive Class II area (Biscayne Bay National Park) were also identified.
- Comprehensive Everglades Restoration Plan (CERP) Projects – CERP is a framework for restoring, protecting and preserving the greater Everglades ecosystem. The plan is a 50-50 partnership between the State of Florida and the federal government. The CERP project boundaries layer was used to identify conservation lands, including Everglades National Park, to determine if any parcel was adjacent to any known or existing CERP project.
- Miami-Dade County (MDC) Wellfield Protection Areas (WPA) – WPA boundaries were reviewed in order to identify whether any parcel was within or contained protected areas.
- Comprehensive Development Master Plan (CDMP) Conservation Aquifer Recharge and Drainage Element – The intent of this Element is to identify, conserve, appropriately use, protect and restore as necessary the biological, geological and hydrological resources of Miami-Dade County. CDMP Element policies were reviewed in order to identify whether the parcels were consistent and/or compliant.
- Utility Availability – Proximity and availability of water, wastewater, natural gas and electric utilities were reviewed and identified.
- Soils/Geology – United States Department of Agriculture (USDA) soil survey was reviewed to confirm the type and potential suitability of soils.
- Floodplain – The Federal Emergency Management Agency (FEMA) Flood Zone map was reviewed to determine flood zone designation and flood hazard probability.

For each site, a site package was developed to document the analysis of the site relative to the Initial and Detailed Screening criteria. The criteria were then separated into six general categories, as follows:

- Location – Site location within the County relative to the existing Miami Dade Resources Recovery Facility (RRF), proximity to residential zoning, and expected effects on the County's Solid Waste System if selected for a future WTE facility.
- Utilities – Availability of potable water, sanitary sewer, natural gas and electric utilities, as well as any stormwater and groundwater issues at the site.
- Soils – Identification of soil types at the site and potential effects on site development.
- Environment – Consideration of a range of environmental factors.
- Transportation – Proximity to major roads, available road access to the site and improvements needed, if any.
- Community – Estimate of public response to potential construction of a WTE facility.

Two additional criteria were applied only to the sites that were remaining after the Detailed Screening criteria were applied:

- Cost – Arcadis developed the capital cost and first year operations and maintenance (O&M) cost associated with developing a new WTE facility at the existing RRF site as part of a previous effort. Utilizing this cost as the base case, evaluated the three sites remaining after the detailed analysis criteria were applied.

- Schedule – Arcadis developed a preliminary high-level implementation schedule in evaluating the three sites remaining after the detailed analysis criteria were applied.

A simple stoplight rating was employed to illustrate the relative difficulty for each category (i.e., green/slight difficulty, yellow/moderate difficulty, red/significant difficulty) at each site.

Summary Findings

A meeting was held on June 7, 2022, to review the Detailed Screening process findings. Ultimately, 19 sites were eliminated due to several factors, such as roadway access and utility availability, site development and availability, permitting considerations, and conflicts with existing County policies.

DSWM staff then requested that a comparison be conducted of the existing RRF facility site to the three remaining potential sites found as part of this preliminary analysis. For comparison purposes, Arcadis conducted an analysis of the existing WTE Facility site, the RRF, using the same methodology for the other sites.

The four remaining sites are: the Existing RRF Facility Site – Doral; Site 1 – Medley; Site 16 – Ingraham Highway Site 1; and Site 17 - Ingraham Highway Site 2 as illustrated in the map provided below.

Figure ES-1 Potential Sites Location Map

The matrix below summarizes the findings associated with the Preliminary Siting Alternatives Analysis.

Table ES-1 – Preliminary Siting Alternatives Analysis Findings

Siting Parameter	Existing RRF Site	Site 1 Medley	Site 16 Ingraham Hwy. Site #1	Site 17 Ingraham Hwy. Site #2
Location	157.16-acre site, single parcel inside the UDB. Minimal impact to System if selected, however, construction phasing will need to be considered in order to limit impact to existing RRF operations. Parcel size suitable for development of WTE facility footprint as well as additional acreage to accommodate co-location of additional ash monofill capacity or other County facilities in consideration of future sustainable campus concept (after demolition of Existing RRF).	320.31-acre site, directly adjacent to residential zoning, inside the UDB, two-miles north of the existing RRF facility, and adjacent to the Medley Landfill. Overall effects on the System would be relatively minimal if selected. Parcel size suitable for development of WTE facility footprint as well as additional acreage to accommodate co-location of ash monofill or other County facilities in consideration of future sustainable campus concept.	159.71-acre site consisting of two parcels outside the UDB. Considerable System effects if selected. Parcel size suitable for development of WTE facility footprint as well as additional acreage to accommodate co-location of ash monofill or other County facilities in consideration of future sustainable campus concept.	81.11-acre site located outside the UDB. Considerable System effects if selected. Parcel size suitable for development of WTE facility footprint as well as additional acreage to accommodate co-location of ash monofill or other County facilities in consideration of future sustainable campus concept.
Utilities	All required utilities infrastructure available.	Potable water and sanitary sewer utilities appear to be available, electric and natural gas utilities would have to be extended to the site.	All required utilities would have to be extended to the site.	All required utilities would have to be extended to the site.

Siting Parameter	Existing RRF Site	Site 1 Medley	Site 16 Ingraham Hwy. Site #1	Site 17 Ingraham Hwy. Site #2
Soils	Site has been used for WTE facility operations previously, no known site soils issues exist.	The USDA Soil Survey data for the site and historical aerial photos (c. 1985) indicate the site area was previously excavated and subsequently backfilled which could present geotechnical engineering challenges for foundation designs and result in additional site preparation costs.	Site soils are not ideally suited for building foundations because of water content and shallow depth to bedrock.	Site soils are not ideally suited for building foundations because of water content and shallow depth to bedrock.
Environment	Air Permitting – May be challenging, due to other nearby large emitters that were not present when the RRF was originally permitted. Possible habitat issues for Bonneted Bat.	Air Permitting – May be challenging, due to nearby large emitters. Possible habitat issues for Bonneted Bat.	Floodplain – FEMA Zone A Air permitting expected to be extremely difficult due to proximity to Everglades National Park Additional permitting required because of wetlands on site, possible Bonneted Bat habitat issues.	Floodplain – FEMA Zone A Air permitting expected to be extremely difficult due to proximity to Everglades National Park Additional permitting required because of wetlands on site, possible Bonneted Bat habitat issues.
Transportation	Existing access to arterial and collector roads	Good access to Florida Turnpike and US27 via Beacon Station Blvd., local traffic impacts will need to be considered due to road orientations and close proximity of intersections.	Good access to arterial and collector roads.	Existing access to site is via Ingraham Hwy. and SW 222nd Ave., however proper site access will need to be constructed. Additional ROW may be needed.

Siting Parameter	Existing RRF Site	Site 1 Medley	Site 16 Ingraham Hwy. Site #1	Site 17 Ingraham Hwy. Site #2
Community	Residential developments have encroached around the site in the years since the existing RRF went into operation. The site is now less than a tenth of a mile from the nearest residential zoning and the local population. Community political leaders and environmental groups have indicated opposition to continued use of the site for WTE facility operations.	The site is directly adjacent to residential zoning. The west edge of the site borders one trailer park owned by the Town of Medley, and another that is leased by the town. Siting of a WTE facility may face community opposition at this location.	The site is approximately half a mile from the nearest residential zoning and is approximately one mile from the boundary of Everglades National Park, which suggests that the siting of a WTE facility may face community opposition at this location.	The site is approximately half a mile from the nearest residential zoning and is 1.28 miles from the boundary of Everglades National Park, which suggests that the siting of a WTE facility may face community opposition at this location.
Schedule (Preliminary Planning to Construction Completion)	Shortest schedule duration because of existing environmental permits and minimal site work. Coordination of construction to maintain continued existing RRF operation required. Estimated Project Duration: 7-years 9-months Possible Commercial Operations (CO) by April 2030	Second shortest schedule duration. Land acquisition, environmental permitting required, and site work increase schedule duration. Estimated Project Duration: 9-years 9-months Possible CO by April 2032	Longest estimated schedule duration. Land acquisition, significant environmental permitting required, and significant site work increase schedule duration. Estimated Project Duration: 11-years 3-months Possible CO by October 2033	Longest estimated schedule duration. Land acquisition, PPSA permitting, wetland, floodplain, and wildlife mitigation, and significant site work increase schedule duration. Estimated Project Duration: 11 years 3 months Possible CO by October 2033

Siting Parameter	Existing RRF Site	Site 1 Medley	Site 16 Ingraham Hwy. Site #1	Site 17 Ingraham Hwy. Site #2
Cost	For comparative purposes, the existing RRF site is considered the base condition and the base capital cost includes estimated stormwater detention pond fill costs and environmental considerations and the ash hauling costs as noted in Appendix C. Total Estimated Capital Cost of $1,450,000,000 Total annual net operational cost is $11.22 per ton of waste processed (estimated for Year 1). This does not include debt service payment for capital costs.	Additional costs anticipated for land acquisition*, on-site utility facilities, stormwater considerations and addition of fill for soil fortification, zoning and potential additional permitting efforts for new PPSA. Purchase of potable water may increase anticipated operational costs. It is also assumed that there may be impact fees or improvements required to local roads that have not yet been factored into the capital cost for this site because the extent of roadway modifications is currently not known. It is anticipated that these would be negotiated and further evaluated during the land acquisition process. Additional Capital Cost of $48.3M (4.2% increase) Additional 19% annual operational cost for potable water purchase and ash hauling.	Significant additional costs anticipated for land acquisition*, on and off-site utility facilities, flood plain, wetland, and wildlife mitigation, and additional permitting efforts. Significant impact on hauling system due to distance from other System facilities would increase capital and operational cost. Purchase of potable water and significant distance to haul ash for disposal will increase anticipated operational costs. Additional Capital Cost of $80.4M (6.4% increase) Additional 119% annual operational cost for potable water purchase, significant ash hauling, and additional System hauling costs.	Significant additional costs anticipated for land acquisition*, on and off-site utility facilities, flood plain, wetland, and wildlife mitigation, and additional permitting efforts. Significant impact on hauling system due to distance from other System facilities would increase capital and operational cost. Purchase of potable water and significant distance to haul ash for disposal will increase anticipated operational costs. Additional Capital Cost of $84.7M (6.7% increase) Additional 119% annual operational cost for potable water purchase, significant ash hauling, and additional System hauling costs.

** Land acquisition cost estimated based upon current Miami-Dade Property Appraiser Market Value plus 10%.*

1 Introduction

The Miami-Dade County (County) Department of Solid Waste Management (Department or DSWM) provides waste collection and recycling services for residents in the unincorporated areas of the County as well as several cities that have signed Interlocal Agreements (ILAs) with the Department. The Department owns and operates 13 Neighborhood Trash and Recycling Centers, three Regional Transfer Stations, two Home Chemical Collection Centers, three landfills and one Resource Recovery Facility (RRF). Chapter 15 of the County Code of Ordinances (Code) defines the sum of these facilities as the Solid Waste System (System).

A major component of the System is the existing RRF, which can accept up to 3,000 tons per day (tpd) of solid waste, processes approximately 1,000,000 tons of solid waste annually and produces approximately 77 megawatts of electricity annually. The existing RRF was constructed in the early 1980's, became operational in 1982 and is reaching the end of its useful life without significant additional investment in retrofits and improvements, which is driving the Department, Miami-Dade County Board of County Commissioners (Commission) and the Miami-Dade County Mayor (Mayor) to consider the development of a new waste-to-energy (WTE) facility to replace the existing RRF.

In accordance with the County Mayor's letter, dated April 13, 2022, the Department was tasked with identifying and analyzing potential sites within the County that would be suitable for the development of a future WTE Facility, and to report findings within 60 days. Arcadis U.S., Inc., (Arcadis), as the Bond Engineer for DSWM, assisted the County with this preliminary analysis. Arcadis is a global engineering consulting firm with extensive experience assisting clients in the development and oversight of modern WTE facilities for over 40 years. Most recently, Arcadis served as the owner's representative and design criteria professional for the development of the Solid Waste Authority of Palm Beach County's new WTE facility, the only new facility to be built in the United States in the last 20 years, in operation since 2015.

Due to the expedited nature of the assignment, it should be noted that Arcadis' services were preliminary in nature and were conducted consistent with prudent industry practice under similar circumstances and timelines to provide a screening-level analysis of the availability of potential sites within the County. A more detailed review and investigation (including onsite visits, surveys, geotechnical testing, etc.) of the factors which may affect the potential development of a new WTE facility at any proposed location is required and is assumed would be conducted in a future phase of the County's planning and implementation process. Additionally, Arcadis relied on readily available data and/or reports that were provided by DSWM. The preliminary analysis was desktop in nature and did not include site visits or on-site surveys.

2 Preliminary Siting Evaluation Process

Arcadis commenced the preliminary siting evaluation on May 9, 2022, which was performed in two stages, an initial screening stage and a detailed screening stage, as summarized below.

1. Initial Screening Stage – The initial screening stage identified parcels located in the County that met initial siting criteria and compared them to agreed-upon Pass/Fail criteria.
2. Detailed Screening Stage – Parcels that passed the initial screening stage were further analyzed in the detailed screening stage, which included the evaluation of additional, more extensive siting parameters.

2.1 Initial Screening Stage Methodology

Arcadis conducted a kick-off meeting with DSWM staff on May 13, 2022 to present and confirm the minimum screening criteria to be used in the Initial Screening evaluation process. The site criteria below were generated out of a collaborative effort between Arcadis and Department staff and were applied during the Initial Screening analysis.

Initial Screening Criteria

- WTE Facility Capacity – Minimum site area sufficient for a mass-burn WTE facility with a throughput capacity of 4,000 tons per day (tpd), expandable to 5,000 tpd, if possible.
- Site Area and Ownership – Minimum 40-acre site comprised of no more than two contiguous parcels and two owners, no limit on the maximum acreage of any site.
- Zoning Considerations – Site(s) must have the following zoning designations: Vacant, Industrial, Commercial, or Agricultural.
- Residential Zoning – Distance to residential zoning was determined using Geographic Information System (GIS) tools and those sites that were within 1,500 feet of residential zoning were eliminated. This requirement was not applied to Site 1, which was submitted by the County for detailed screening consideration.
- Transportation/Travel Time – Maximum travel time of 10 minutes to major (arterial) or collector roads as shown on the 2010 Florida Department of Transportation (FDOT) Federal Functional Classification map was calculated using posted speed limits and online mapping tools.
- Canal or Major Roadways – Sites with a canal or major roadway located on the site parcel were precluded from further evaluation because they could not be abandoned and developed.
- Lake/Borrow Pit – Sites that included a lake or borrow pit were included as they could be filled.
- Other Site Considerations – Any properties recommended directly by the County to be evaluated as well as sites within and outside of the Urban Development Boundary were considered.

2.1.1 Initial Screening Analysis

A GIS database was developed using layers provided by the County and acquired from external sources (i.e., National Wetlands Inventory; South Florida Water Management District; etc.). The Initial Screening criteria were entered into a GIS-based screening tool, which resulted in approximately 235 parcels being identified from the GIS database. Additional analyses were then conducted to address additional site considerations, including the following:

- Site Area and Ownership – Sites that were less than 40-acres were analyzed to confirm if any two adjacent parcels, with no more than two owners, could be combined into one site meeting the minimum 40-acre size criteria.
- Site Geometry – Sites with parcel boundaries with shapes or dimensions incompatible with a 4,000 ton per day WTE facility were eliminated. In general, WTE facilities for this targeted throughput capacity plus expansion capabilities, if possible, due to the size of the buildings and components, truck queueing lengths, and the minimum radii for the access roads, require a parcel area that is at least 1,200 feet wide and approximately 1,500 feet long.

- Zoning Considerations – Properties with existing abandoned building structures and Conservation, Environmentally Endangered Lands (EEL) Program properties, or Other Protected Lands not screened by the GIS tool were excluded.
- Proximity to Airport – Arcadis reviewed County Code Chapter 33 Zoning, Article XXXVII – Airport Zoning, adopted November 19, 2019 (Airport Zoning Article) and Federal Aviation Administration (FAA) regulations pertinent to land use and height restrictions in the proximity of airports and heliports. Sites less than four (4) miles from an airport were excluded from consideration.
- Lake/Borrow Pit – Sites that were mostly or entirely excavated as a lake or borrow pit were eliminated due to the significant additional time and expense associated with backfilling to create the developable area of the site.
- County Parks and other County properties – (i.e., wellfields, etc.) that were not screened by the GIS tool were manually identified and eliminated.

At the end of the Initial Screening process, 24 sites remained and were presented to DSWM staff for discussion at a meeting on May 20, 2022. After discussion, the decision was made to increase the minimum offset from residential zoning to one-half mile (2,640 ft), which eliminated two sites. The remaining 22 sites were approved to proceed to the Detailed Screening process.

2.2 Detailed Screening Stage Methodology

2.2.1 Detailed Screening Analysis

The approved 22 sites were then evaluated against Detailed Screening criteria, which considered many additional Federal, State, and County programs, policies, and legislation that can affect the siting of a future WTE facility. For each site, a site package was developed to document the analysis of the site relative to the Initial and Detailed Screening criteria. The criteria were then separated into six general categories, as follows:

- **Location** – Site location within the County relative to the existing RRF, proximity to residential zoning, and expected effects on the County's Solid Waste System if selected for a future WTE facility.
- **Utilities** – Availability of potable water, sanitary sewer, natural gas and electric utilities, and any stormwater and groundwater considerations at the site.
- **Soils** – Identification of soil types at the site and potential effects on site development.
- **Environment** – Consideration of a range of environmental factors, including floodplains, wetlands, threatened and endangered species, and permitting issues.
- **Transportation** – Proximity to major roads, available road access to the site and improvements needed, if any.
- **Community** – Estimate of public response to potential construction of a WTE Facility at the site considering proximity to residential zoning, environmentally sensitive areas, and environmental justice concerns.

Two additional criteria were applied only to the sites that were remaining after the Detailed Screening criteria were applied:

- **Cost** – Arcadis developed the capital cost and first year O&M cost associated with developing a new WTE facility at the existing RRF site as part of a previous effort. Utilizing this cost as the base case, evaluated differential cost associated with development of a new WTE facility on each of the three sites remaining after the detailed analysis criteria were applied.

- **Schedule** – Arcadis developed a preliminary high-level implementation schedule in order to compare the implementation timeline associated with development of a new WTE facility on each of the three sites remaining after the detailed analysis criteria were applied.

To assist decision makers, such as the County Commission, Mayor and Department leaders in determining the results of the screening analysis, the Site Packages employed a simple stoplight rating to identify the relative difficulty for each category (i.e., green/slight difficulty, yellow/moderate difficulty, red/significant difficulty) at each site. The Site Packages are provided in Appendix A.

The Detailed Screening criteria and the background information related to their application in this process are presented in the sections below.

2.2.2 Detailed Screening Criteria

2.2.2.1 Location

The Location criteria includes the physical location of the site relative to existing Solid Waste System facilities, large air emissions sources, transportation routes, and expected impacts to the System if a proposed WTE facility were sited there. Distance to known large emitters, such as the Titan Pennsuco Complex, WM Medley Landfill, CEMEX Miami Concrete Plant, FPL Turkey Point Power Plant, etc., were calculated for purposes of determining the potential effects on air permitting. Transportation routes were further evaluated for potential traffic conditions, physical and operational condition of roadways, truck queueing areas, and other features that may affect the routing or traffic patterns of vehicles entering and leaving the proposed site. Finally, an evaluation of the effects on the County's Solid Waste System was conducted to determine potential changes to System operations and costs resulting from the assumption of WTE operations at the site.

2.2.2.2 Utilities

WTE facilities have high demand requirements on several utilities. This screening criteria evaluated the availability of potable water, sanitary sewer, natural gas, electric utility substations, stormwater, and groundwater at each site. If a utility was not available, the closest available service location was determined by a combination of on-line tools and information, service area maps, inspection of aerial and street-level photography, and discussions with County staff and utility services providers. The additional work needed to extend utilities to the site was then included in the site evaluation. Brief discussions of the evaluation of needs and demands for the various utility types are as follows:

- Potable water is needed not only for normal human consumption and fire protection but may also be needed (if other sources are not available) for supply water for the boiler feedwater systems, lime slurry production in the Air Pollution Control (APC) system, and many other uses at the facility. For a 4,000 ton per day WTE facility, a site would need a minimum 12" water main with sufficient service pressure to provide an 8" fire line and a 4" potable supply line to the proposed facility. If service pressure is inadequate, a booster station must be added. If potable water utilities are unavailable, the construction of a typical 12" water main from the nearest service location (including valves and appurtenances) is needed, and depending on the site, additional easement or right-of-way area may be needed.
- Wastewater (Sanitary Sewer) is needed for toilet facilities, boiler blowdown water, and several other facility processes. The proposed WTE facility would need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered

depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation and comparative purposes all wastewater was assumed to be discharged to sanitary sewer. If gravity sewer is not available, a lift station and 6" force main would have to be constructed to connect to the nearest sanitary sewer manhole or lift station wetwell, and depending on the site, additional easement or right-of-way area may be needed.

- Natural Gas is the most economical fuel for the boiler auxiliary burners, which ignite the solid waste fuel fed to the boiler grates and allow for controlled startup and shutdown of the proposed facility. The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility. Online maps and other resources were used to determine the approximate location of gas service pipelines within the County. If gas service is unavailable, the construction of a typical 6" gas main from the nearest pipeline location (including valves and appurtenances) is needed, and depending on the site, additional easement or right-of-way area may be needed.
- Electricity is used at WTE facilities to operate the various mechanical components. Once a WTE facility becomes operational, the steam generated from the boilers is typically used to drive a steam turbine connected to a generator to provide both the internal electricity required to operate the facility as well as produce excess electricity that is sold to the local electric utility. For this evaluation, the nearest electrical substation was located and the shortest route for the transmission line along existing or proposed access road right-of-way or FPL easements was determined. Additional analysis would need to be performed to verify substation/switchyard spare capacity, voltage, and available terminations.
- Stormwater management and controls in accordance with Florida Department of Environmental Protection (FDEP) rules are required for the proposed WTE site. For this evaluation, the site soils, groundwater elevations, presence of floodplains and other information were analyzed to determine what effects the site conditions may have on the proposed WTE facility layout, construction issues, and if any connections to existing stormwater collection systems was available. If the site is located in a floodplain, typically the stormwater system must include additional floodplain compensating storage, which increase both the cost and the site area used for the stormwater system.
- Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average 552,000 gallons per day. Other innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

2.2.2.3 Soils

United States Department of Agriculture (USDA) soil survey information was reviewed to confirm the type and potential suitability of soils located at each site. Soils information for all sites was obtained from the USDA's Web Soil Survey (WSS), which provides soil data and information produced by the National Cooperative Soil Survey. The soils data provides a wealth of information on the physical conditions at a site that can affect development, including previous site disturbance, groundwater levels, soil bearing capacities and foundation design requirements, depth to bedrock, presence of muck, and many others. If muck and other unsuitable soils were found on a site, they would need to be removed and structural fill imported and placed under affected building foundations. Additional site preparation, such as additional fill for elevation of structures, vibro-compaction, or other work may also be

needed. Additional geotechnical investigations and structural design work may also be needed to address poor soil conditions.

2.2.2.4 Environment

Extensive environmental permitting is required to construct a WTE Facility, in any location. A summary of the Federal, State and regional environmental permitting requirements, policies and jurisdictional interfaces required to site, construct and operate a new WTE facility in Miami-Dade County are provided in the below subsections and were used to provide an estimated degree of permitting difficulty summary for each site.

2.2.2.4.1 Environmental Resource Permit (ERP)

The FDEP's Environmental Resource Permit (ERP) Program regulates activities involving the alteration of surface water flows. This includes new activities in uplands that generate stormwater runoff from upland construction, as well as dredging and filling in wetlands and other surface waters. Wetlands and Surface Waters were analyzed using the National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 GIS layers in order to identify existing wetlands and surface waters including streams, canals, ponds, lakes, impoundments, rivers, sloughs, and other watercourses that are present on the sites being evaluated.

2.2.2.4.2 Threatened & Endangered Species

In order to determine if any known Threatened and Endangered (T&E) species or critical habitat for endangered species were present on the sites being evaluated, Arcadis utilized the following resources:

- United States Fish and Wildlife Information for Planning and Consultation tool and designated and proposed critical habitat
- Florida bonneted bat consultation area for the South Florida Urban Bat Area in Miami-Dade County
- Florida Panther consultation areas, Florida wood stork colonies, and Florida Natural Areas Inventory datasets

2.2.2.4.3 Floodplain

Flood maps serve as critical decision-making tools in flood mitigation, land use planning, emergency management and general public awareness. Arcadis conducted a review of the FEMA Flood Zone map to determine flood zone designation and flood hazard probability for each site being evaluated.

2.2.2.4.4 Comprehensive Everglades Restoration Plan (CERP) Considerations

CERP is a framework for restoring, protecting and preserving the greater Everglades ecosystem. The plan is a 50-50 partnership between the State of Florida and the federal government. The State of Florida and the South Florida Water Management District have so far invested approximately $2.3 billion in CERP-related land acquisition, project design and construction. The CERP project boundaries layer was used to identify conservation lands, including the Everglades National Park, to determine if any parcel was adjacent to any known or existing CERP project.

2.2.2.4.5 Code and Policy Considerations

Miami-Dade County Wellfield Protection Areas

In Miami-Dade County, drinking water is drawn from the Biscayne Aquifer, which is a porous limestone rock formation that gives the aquifer excellent capacity. However, the rapid movement of water in the aquifer and the high-water table within many areas of the County make it vulnerable to pollution. Pollutants that are discharged onto the ground or in surface waters can contaminate the groundwater and be drawn into wells that supply drinking water.

For these reasons, Miami-Dade County has policies and programs in place to protect the Biscayne Aquifer from potential sources of contamination, especially in specific areas around the network of drinking water wellfields designated as wellfield protection areas (WPA). The WPAs were designated based on geological characteristics of the aquifer and the flow of water through it. New activities that use or store hazardous materials or generate hazardous waste are prohibited within certain parts of the wellfield protection areas. WPA requirements are included in Sec. 24-43 of the County Code. Arcadis reviewed the WPA boundaries in order to identify whether any parcel was within or contained protected areas.

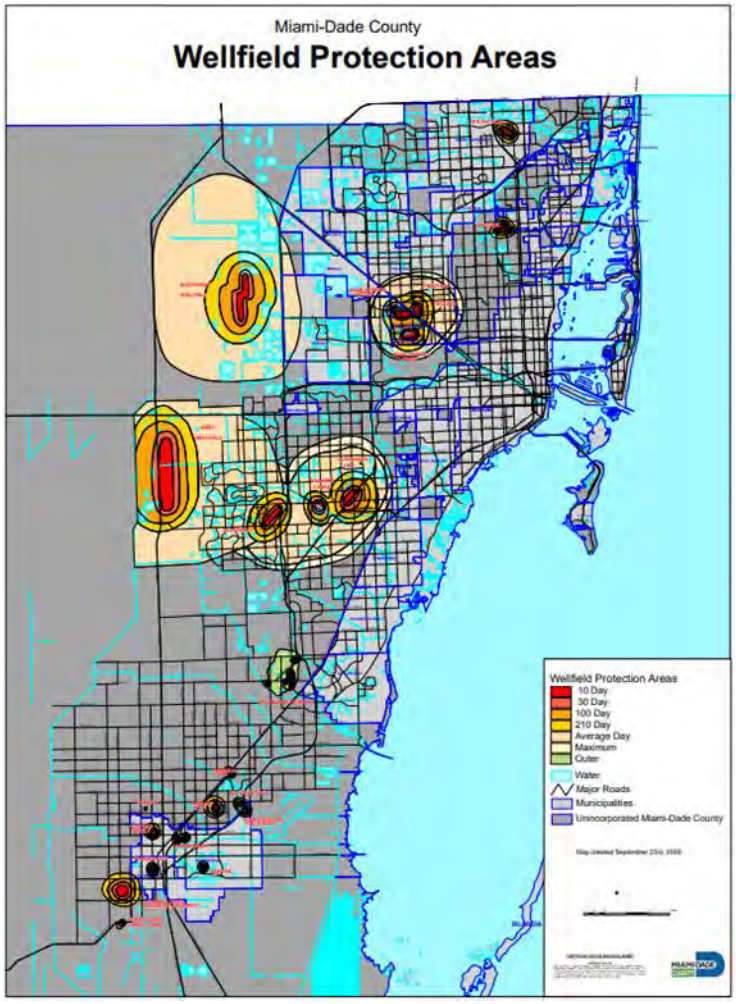


Figure 2.1 Wellfield Protection Areas

Comprehensive Development Master Plan (CDMP) Conservation Aquifer Recharge and Drainage Element (Element)

The intent of this Element is to identify, conserve, appropriately use, protect and restore as necessary the biological, geological and hydrological resources of Miami-Dade County. The following policies were considered when conducting the Detailed Screening analysis.

- Policy CON-7J of this Element States - In evaluating applications that will result in alterations or adverse impacts to wetlands, Miami-Dade County shall consider the applications' consistency with CERP objectives. Applications that are found to be inconsistent with CERP objectives, projects or features shall be denied.
- Policy CON-9A of this Element States - All activities that adversely affect habitat that is critical to federal or State designated, endangered or threatened species shall be prohibited unless such activity(ies) are a public necessity and there are no possible alternative sites where the activity(ies) can occur.

- Policy CON-9B of this Element States - All nesting, roosting, and feeding habitats used by Federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.

Miami-Dade County Airport Zoning Code

The Airport Zoning Code describes the regulations to provide both airspace protection and land uses compatible with airport operations. The Airport Zoning Code requirements provide the regulations that describe such items as Critical Approach Zones and height restrictions that could impact the ability to develop a WTE facility. The areas governed by this Code include airports owned by the County and managed by the Miami-Dade Aviation Department (MDAD) or its successor agency, and the incorporated and unincorporated areas that surround the following airports:

- Miami International Airport (MIA);
- Miami Executive Airport (TMB);
- Miami-Opa Locka Executive Airport (OPF);
- Miami Homestead General Aviation Airport (X51); and
- Any other County-owned or operated airports that may be hereafter established.

Note that the regulations in the Airport Zoning Code do not apply to, or govern, Dade-Collier Training and Transition Airport (TNT).

The Critical Approach Zone (CAZ) is a trapezoidal area extending outward from the Runway Protection Zone to a point that is 10,200 feet from the runway end. One of the uses prohibited within this zone is “establishments or uses that emit smoke, gases, or dust in quantities or densities sufficient to jeopardize the safe use of the airport. In no event shall these prohibitions be varied”. The Airport Zoning Article may be open to some interpretation about whether the stack emissions from a new WTE facility located within the CAZ are in sufficient quantities or densities to jeopardize the safe use of the airport. However, additional analysis and discussions with MDAD and the FAA would be required to determine if parcels within the CAZ may require more detailed analysis such as a thermal exhaust plume analysis. Therefore, for the purpose of this preliminary siting analysis, parcels located within the CAZ of any of the airports governed by the Airport Zoning Code were not considered.

The Airport Zoning Code also describes Airport Height Variance Eligible Areas (HVEAs) that are areas surrounding airports where variances of the applicable height restrictions may be applied for in accordance with the Airport Zoning Article. For the purposes of this siting analysis, parcels located within the HVEAs of any of the airports governed by the Airport Zoning Code were not considered.

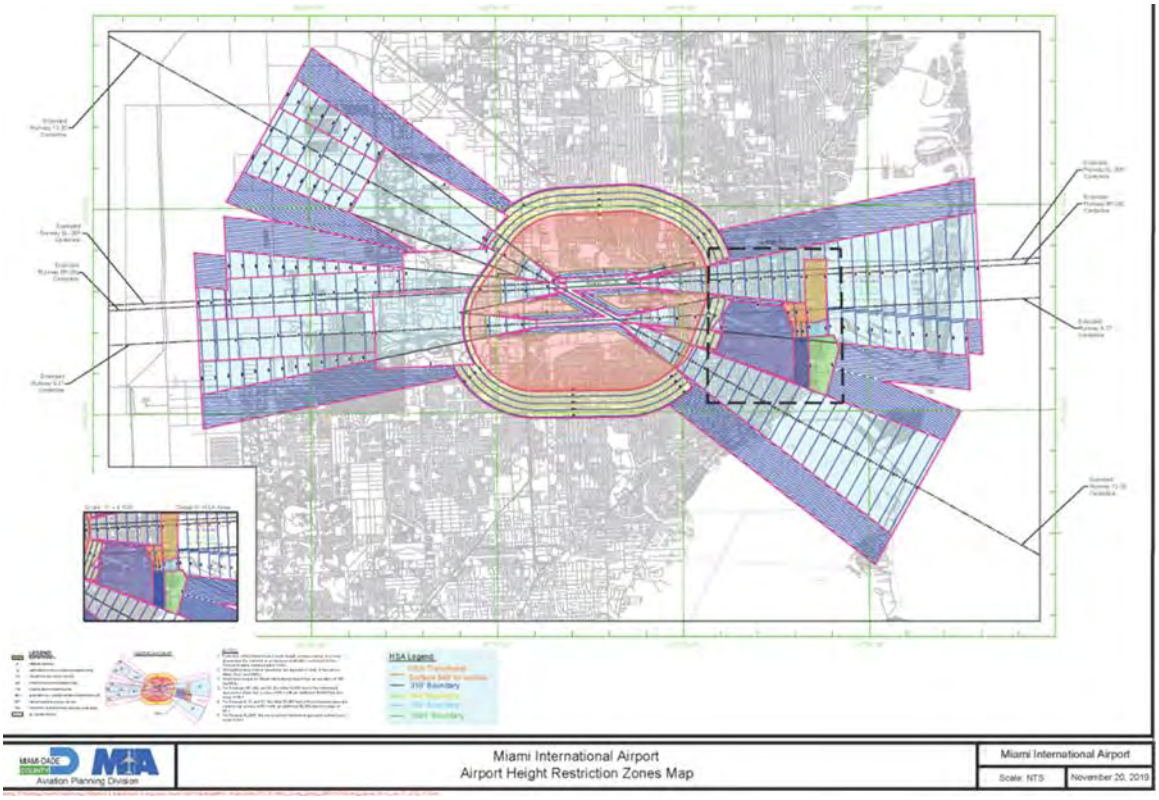


Figure 2.2 Miami International Airport - Airport Height Restriction Zone Map

Federal Aviation Administration (FAA) Requirements

The FAA governing regulation is 14 CFR Part 77. In accordance with this regulation and the Miami-Dade County Airport Zoning System Checklist, revised August 5, 2015 (Microsoft PowerPoint - Airport System Zoning Checklist 8-5-15 (white background) [Compatibility Mode] (miami-airport.com)) (County Airport Zoning Checklist) and the Airport Zoning Code (ARTICLE XXXVII. - AIRPORT ZONING | Code of Ordinances | Miami - Dade County, FL | Municode Library), the following approach areas to governed airports are used to determine height restrictions:

- 10,000 feet at a slope of 34 to 1 for all non-precision instrument runways other than utility; and
- 10,000 feet at a slope of 50 to 1 with an additional 40,000 feet at a slope of 40 to 1 for all precision instrument runways
- For MIA Runways 8R, 26L and 30 only, the initial 10,000 feet at a slope of 65 to 1 with an additional 40,000 feet at a slope of 40 to 1

The stack heights for modern U.S.-based WTE facilities ranges from 200-350 feet above grade. Using a conservatively tall 400 ft height stack, the distance for the FAA approach surface height restriction is approximately 18,000 feet from the RPZ or 3.4 miles. Note that the existing RRF eastern-most stack is approximately four miles away from MIA along the centerline of the Runways 12-30. Therefore, for the purposes of this siting analysis, parcels located within four miles of any of the airports governed by the Airport Zoning Code, including the Homestead Air Reserve Base, were not considered.

2.2.2.4.6 Florida Electrical Power Plant Siting Act Certification

The Florida Electrical Power Plant Siting Act (PPSA), Sections 403.501-.518, Florida Statute (F.S.), is the State of Florida centralized process for licensing large electrical power plants and is administered by the FDEP Siting Coordination Office. Section 403.503 (14) F.S., defines an electrical power plant, for the purpose of PPSA certification, as any steam or solar electrical generating facility using any process or fuel, that produces 75 megawatts or more of electrical capacity. PPSA certification may also be used to obtain approval for smaller capacity electrical power plants, if the applicant elects to use the PPSA process. A WTE facility utilizes solid waste as the process fuel to generate steam and produce electricity, therefore the environmental permitting associated with siting, constructing, and operating a WTE facility falls under the PPSA.

One license — a certification — replaces all local and state permits and is issued by the Siting Board (Florida Governor and their Cabinet Members). Since certification is a life-of-the facility authorization, the considerations involved in the PPSA application review are extensive. Local governments and state agencies within whose jurisdiction the WTE facility is to be constructed participate in the process. Certification addresses permitting, land use and zoning, and property interests. A certification grants approval for the location of the WTE facility and its associated facilities such as roadways and electrical transmission lines carrying power to the electrical grid, among others which are collectively referred to as a PPSA Certified Site.

PPSA certification covers almost every aspect of the facility as an all-in-one license for construction and operation. The PPSA creates a procedure that allows the local, regional, and state agencies to review a proposed electrical power plant within a single, coordinated process. State and local government permit requirements are typically included within the Conditions of Certification (COC) issued under the PPSA. As such, the state pre-empts the issuance of any other type of permit for the facility, except for local zoning and building.

Power Plant Site Certification - Existing and New Site

A PPSA Application was submitted for the existing RRF, and the COC PA 77-08, approving siting, construction and operation was issued by the FDEP on January 9, 1978. PPSA COCs can be modified during the life cycle of the facility through either an Amendment or Modification, which are defined below.

1. PPSA Amendment - a material change to the application for site certification that does not require a change in the final order or Conditions of Certification. Amendments can be authorized by the FDEP Siting Coordination Office.
2. PPSA Modification - a substantive change in the certification order including any substantive change in the Conditions of Certification. Proposed modifications are reviewed by all affected agencies and are issued by DEP or the Siting Board after public notice.

Construction of a new WTE facility at the existing RRF site would likely be considered a Modification to the COC. However, a pre-application meeting with the FDEP would be required in order to confirm this assumption. Construction of a new WTE Facility at a new site, would require the development of a new PPSA Application for approval.

Other Permits Included in PPSA Application

A Modification to an existing PPSA COC or development of a new PPSA Application also requires the development of applicable Federal, State and regional permit applications, that are ultimately provided in the appendices of the Modification or new Application submittal. Filing federal permit applications concurrently with the PPSA Application is advantageous because it helps ensure that the Federal permits and the PPSA certification are issued at or about

the same time. A summary of the other permit applications to be submitted as part of the PPSA Modification or Application are noted below.

- National Pollution Discharge Elimination System (NPDES) Application/Permit
- Hazardous Waste Disposal Application/Permit
- 404 Application/Permit
- Prevention of Significant Deterioration (PSD) Application/Permit
- Air Operation Application/Permit
- Coastal Zone Management Certification (as applicable)
- Zoning Descriptions and Concurrence
- Environmental Resource Permit Application
- Monitoring Programs

The PSD, NPDES, and other permits that the FDEP issues pursuant to federal programs are issued separately from, and in addition to, the issuance of the PPSA certification. Permits issued by the USACE also are issued separately from the PPSA certification.

2.2.2.4.7 Florida Transmission Line Act Certification

The Florida Transmission Line Siting Act (TLSA), Sections 403.52-.5365, Florida Statutes (F.S.), is the State of Florida centralized process for licensing electrical transmission lines that are 230 kilovolts (kV) or larger; Cross a county line; and are 15 miles or longer. The TLSA can also be used for transmission lines that are less than 15 miles long or if within one county. The TLSA is also administered by the FDEP and one license — a certification — replaces all local and state permits, and provides for construction, operation, and maintenance of electric transmission lines for the life of the transmission line. State and local government permit requirements are typically included within the COC issued under the TLSA.

The TLSA is similar to the PPSA in that both require Siting Board certification and the FDEP acts as lead agency as well as addresses its own jurisdictional interests. In both laws, certification covers all state and local permits and is for the life-of-the-facility. Public involvement opportunities are also provided in both laws. The two main differences between the TLSA and PPSA are that there is no Land Use and Zoning hearing for transmission line siting certification and alternative transmission line corridor locations can be proposed.

Florida Transmission Line Act Certification - Existing and New Site

The transmission line infrastructure was developed as part of the initial permitting and construction of the existing RRF, however, if reconfiguration is required, an amendment or modification to the COC would be required. Site specific transmission line infrastructure associated with the other parcels being considered would need to be evaluated as part of a future effort to determine if the County or the utility would be responsible for the permitting of the needed transmission lines.

2.2.2.4.8 Air Permitting

Air Quality Permitting Requirements

The Clean Air Act Amendments (CAAA) required the United States Environmental Protection Agency (USEPA) to set National Ambient Air Quality Standards (NAAQS) for common pollutants emitted from numerous and diverse sources considered harmful to public health and the environment. There are currently NAAQS designated for six

pollutants: sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), lead (Pb), ozone (O_3), and particulate matter (PM_{10} and $PM_{2.5}$). The CAAA also established two types of national air quality standards. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, young children, and the elderly. Secondary standards set limits to protect public welfare, including protection against visibility impairment, damage to animals, crops, vegetation, and buildings. Florida has incorporated the NAAQS by reference into the state's air quality regulations.

The USEPA tracks compliance with the NAAQS (not to exceed ambient air concentration) for each criteria pollutant by designating each area of the country as either "attainment" if the area meets the NAAQS or "nonattainment" if the area does not meet the NAAQS. A separate determination of attainment status is made for each criteria pollutant. Miami-Dade County is currently classified as an attainment area for all criteria pollutants.

Based on preliminary estimates of potential emission levels, a new 4,000 tpd WTE Facility would constitute a new major emission source. As a proposed new major source, a 4,000 tpd WTE Facility would be subject to federal New Source Review (NSR) requirements. NSR refers to the pre-construction review process that applies to new and modified major sources for the purpose of protecting air quality through a permitting framework that supports compliance with the NAAQS. NSR includes two permitting programs: Prevention of Significant Deterioration (PSD) permitting and Nonattainment NSR (NNSR) permitting. Under NSR, a new 4,000 tpd WTE facility proposed for a location in Miami-Dade County would be subject to PSD permitting requirements in recognition that PSD review applies to new major sources in NAAQS attainment areas.

PSD Permitting Program

PSD permitting provides for carefully managed economic growth in a manner consistent with preserving clean air resources. The primary objectives of the PSD permitting program are to protect public health and welfare and to limit degradation of air quality in surrounding areas and within designated areas of special recreational, scenic, or historic value. The PSD permitting regulation specifies that the following analyses be completed to address air pollution control technology requirements and to demonstrate that proposed projects will not adversely impact air quality:

- Air pollution control technology analyses are required on a pollutant-specific basis to define Best Available Control Technology (BACT) for project related emission units. BACT is an emission limitation or standard established on a case-by-case basis and reflects the maximum degree of emissions control that can be achieved considering energy, environmental, and economic impacts. If establishing an emissions limitation or standard is not feasible, BACT may be a design, equipment, work practice, or operational standard.
- An evaluation of ambient air impacts resulting from project related emissions is required with respect to PSD increments and the NAAQS. PSD increments represent increases in pollution allowed in an area and they prevent air quality in clean areas (i.e., attainment areas) from deteriorating to the level set by the NAAQS for a pollutant. The NAAQS is a maximum allowable concentration "ceiling." In contrast, a PSD increment is the maximum increase in concentration that is allowed to occur above a baseline concentration for a pollutant. PSD increments are established for three land use classifications: Class I, Class II, and Class III.
    - Class I areas are areas of special national or regional value, such as national parks, and are afforded the greatest degree of air quality protection.
    - Class II areas are areas where normal, well-managed growth is allowed. The Miami-Dade County area is designated as a Class II area.

- Class III areas industrialized attainment areas with limited restrictions on emissions. No area of the country has been designated as a Class III area.

To evaluate ambient air quality impacts for proposed projects subject to PSD permitting, dispersion modeling analyses must be completed. For each pollutant subject to PSD review, an initial dispersion modeling analysis referred to as a "significance analysis" is completed considering emissions from only the proposed project. If results from the "significance analysis" demonstrates that a proposed facility's impacts are below established PSD significant impact levels (SILs), then "full impact" (multi-source) dispersion modeling analyses including emissions from other offsite sources in the vicinity of the project site are not required. Results from dispersion modeling analyses for emissions associated with a new 4,000 tpd WTE facility are expected to exceed PSD significant impact levels (for one or more pollutants). Therefore, extensive, multi-source modeling analyses would likely be required as part of the PSD permitting process for a proposed 4,000 tpd WTE facility.

- An evaluation of project related impacts with respect to PSD increments and Air Quality Related Values (AQRVs) at any Class I area within close proximity to the site is required. Class I areas, such as Everglades National Park, are federally designated areas of special national or regional value which receive distinct protections under the PSD regulations. For each Class I area, the Federal Land Manager (FLM) is responsible for defining and protecting specific AQRVs and for establishing criteria to determine an adverse impact on the AQRVs. The AQRVs are resources that have the potential to be affected by air pollution and may include visibility, scenic, cultural, physical, or ecological resources for sensitive areas.
- The specific analyses and recommended air dispersion model(s) that may be required are dependent on the distance a proposed project is from protected Class I and/or sensitive Class II areas. For proposed facilities located within 10 kilometers (6.2 miles) of a Class I area and based on an assessment of 24-hour ambient impacts, PSD review may even be required for certain pollutants with emissions at minor levels (i.e., levels below PSD emission thresholds). In order to obtain a construction permit for these proposed sources, a vigorous evaluation would need to be completed to show its proposed operation would not degrade air quality and AQRVs. Given the proximity of the Everglades National Park (Class I area) and Biscayne Bay National Park (sensitive Class II area) to prospective sites in Miami-Dade County, demonstrating no adverse impacts to these protected areas from the operation of a new WTE facility presents uniquely difficult challenges.
- An assessment of project impacts on soils, vegetation, and visibility and an evaluation of air quality impacts relative to general growth (industrial, commercial, and residential) associated with the proposed project are also required.

In Florida, the permitting authority for issuance of air construction permits is the Florida Department of Environmental Protection (FDEP). Construction permits for projects subject to PSD permitting requirements are processed by FDEP's Division of Air Resource Management office in Tallahassee. The PSD permitting regulation provides for public participation and input from the USEPA and designated FLMs for Class I areas and sensitive Class II areas in the vicinity of the project site. Input from these entities is given special consideration and concerns are typically required to be addressed by an applicant during the permit review process. As the permitting authority, FDEP makes the final decision on whether to issue or deny issuance of an air construction permit.

Air Permitting Summary

Siting a new 4,000 tpd WTE facility in Miami-Dade County presents unique challenges considering the complex pre-construction permitting requirements that apply under the PSD permitting regulation. In particular, the proximity of nearby sensitive areas (Everglades National Park, which is a federally protected Class I area, and the Biscayne Bay sensitive Class II area) and the presence of existing facilities with high emission levels in the county, impart

uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE Facility and make securing an air construction permit very challenging at the prospective sites. Extensive air dispersion modeling, additional analyses and correspondence with regulatory agencies is required in order to definitively evaluate the feasibility and degree of difficulty of air permitting at any proposed site.

2.2.2.5 Transportation

A proposed 4,000 ton per day WTE facility would be expected to receive approximately 300-400 inbound vehicles per day and provide for a typical queueing length suitable for between 50 and 100 vehicles during peak delivery periods. This transportation demand requires, at a minimum, an FDOT standard two-lane road with paved shoulders and stormwater controls and sufficient area on site for vehicle queueing. Also, per the Initial Siting requirements, the travel time to an Arterial or Collector Road must be less than 10 minutes.

For this analysis, the Arterial and Collector Roads were identified from the *2010 Federal Functional Classification Map* published by the FDOT District Six Intermodal Systems Office. Travel time from each site to an identified Arterial or Collector Road was then determined using online mapping tools and calculated travel times based on data in the *2020 Miami-Dade County Mobility Profile* published by the FDOT Forecasting and Trends Office. For each site, the existing access road size, capacity, and physical condition were evaluated to determine its suitability for the demands of a proposed WTE facility, along with expected traffic impacts on area roads and intersections. If an access road is either inadequate or unavailable at a site, then a new two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access. Additional easement/ROW may have to be acquired. Local area traffic impacts were evaluated based on published FDOT Level of Service data and known traffic conditions.

2.2.2.6 Community

According to the USEPA, the term environmental justice is defined as: “the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.” The USEPA EJScreen Tool was used to provide an initial estimate of environmental justice concerns at each site. According to the USEPA website, EJScreen is an environmental justice mapping and screening tool that provides the EPA with a nationally consistent dataset and approach for combining environmental and demographic indicators. EJScreen users choose a geographic area; the tool then provides demographic and environmental information for that area. All of the EJScreen indicators are publicly available data. EJScreen simply provides a way to display this information and includes a method for combining environmental and demographic indicators into EJ indexes.

It is important to note that EJScreen is not a detailed risk analysis. It is a screening tool that examines some of the relevant issues related to environmental justice, and there is uncertainty in the data included. EJScreen cannot provide data on every environmental impact and demographic factor that may be important to any location. Therefore, its initial results should be supplemented with additional information and local knowledge whenever appropriate, for a more complete picture of a location.

Based on the information provided by the EJScreen Standard Report, proximity of the site to residential zoning and populations, and proximity to sensitive environmental areas (i.e., Everglades National Park, wetland and wildlife areas, etc.) a relative rating of expected community opposition to the siting of a new WTE facility was applied. Results of the EJScreen Standard Report, developed for each site, are included in the Site Packages found in Appendix A.

2.2.3 Detailed Screening Findings

A meeting was held on June 7, 2022, to review the findings of the Detailed Screening process. After discussion and agreement by DSWM and Arcadis, 19 sites were eliminated from consideration due to several factors, such as roadway access and utility availability, parcel development and availability, permitting considerations, and conflicts with existing County policies (i.e., located in WPA or CERP site, wetland/wildlife habitat issues, etc.).

DSWM staff then requested that a comparison be conducted of the existing RRF site to the three remaining potential sites found as part of this preliminary analysis, using the same methodology as the other sites.

The four remaining sites are listed below and are illustrated in the map at right.

- Site 1 – Medley
- Site 16 – Ingraham Hwy. Site #1
- Site 17 – Ingraham Hwy. Site #2
- Existing RRF Site – Doral

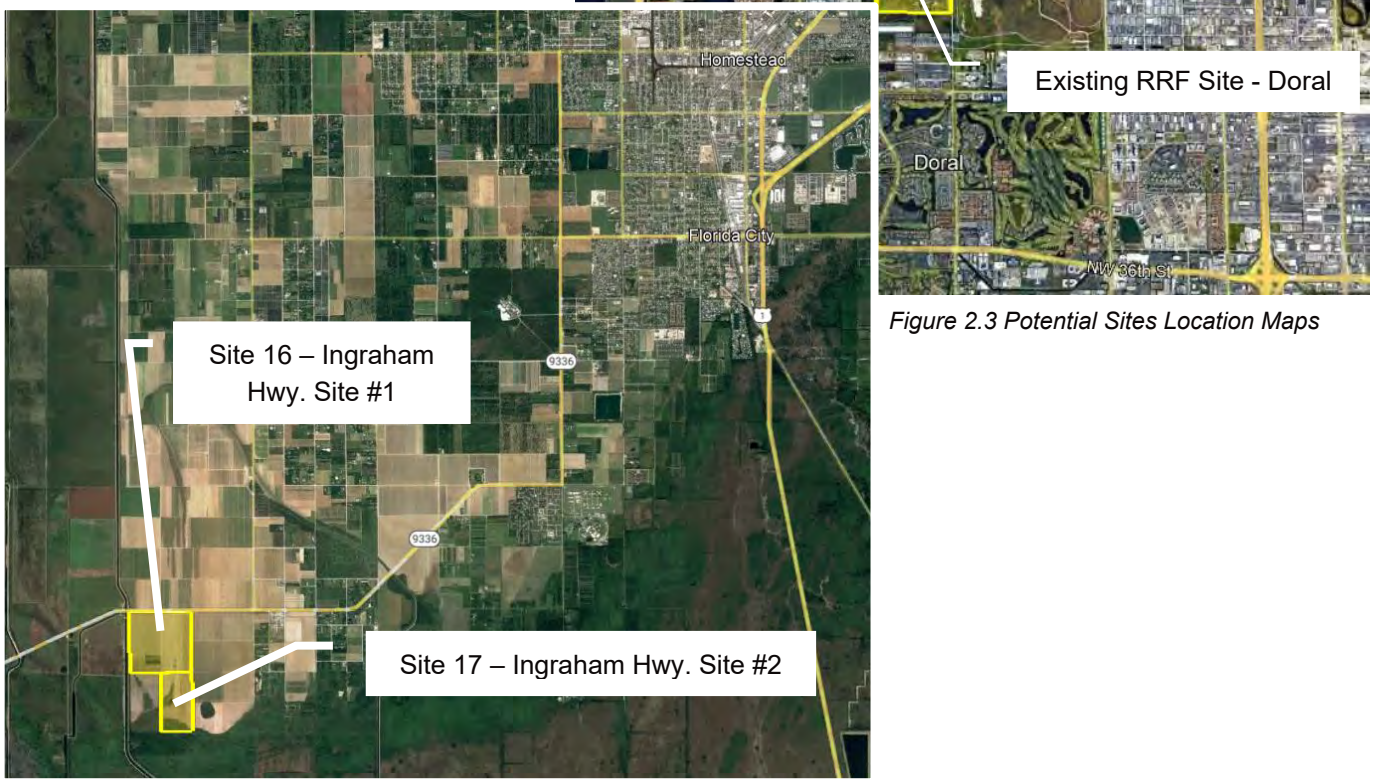


Figure 2.3 Potential Sites Location Maps

The full site packages for each of the 22 sites that were evaluated in the Detailed Screening process are included in Attachment B. A brief comparison of the four remaining sites is presented below and on the following pages for quick reference. For these four final sites, an estimate of the schedule and cost differentiators was also developed to provide the County with additional comparative analysis for consideration.

2.2.3.1 Schedule Considerations

The development of a WTE facility typically takes seven (7) to ten (10) years to complete. This time frame, which includes the preliminary planning stage, siting, permitting, financing, procurement, design, and construction, varies depending upon the complexity of the project and extent of the regulatory and public concerns. Arcadis has developed a preliminary high-level implementation schedule, included as Appendix B, for the four selected sites for use in evaluating different project development schedule impacts related to each site: the Existing RRF site, the Medley site, Ingraham Highway Site 1 and Ingraham Highway Site 2. Each potential site has unique schedule impact considerations, which are discussed in the subsections below. Task durations are estimates and may change once activities begin, which could extend or compress the schedule duration. Future phases of the County's planning and implementation process will include more detailed review of the factors which may affect the potential development of a new WTE facility at any proposed location and as such, the anticipated timelines and schedule impacts will be further refined as the process proceeds.

2.2.3.1.1 Assumptions

Several common assumptions were used in developing the new WTE facility preliminary implementation schedule. There are also many assumptions specific to an individual site option that differentiate their respective implementation timeframe from one another. The assumptions used for the purposes of this Report are identified in the following table:

Table 2.1 Schedule Assumptions

Assumptions	Applicable Site Option
The durations used for design and construction are generally based on the schedule for construction of the most-recently developed facility in the United States, referred to as reference facility (Palm Beach County's Renewable Energy Facility No. 2, completed in 2015).	All Site Options
To avoid waste diversion, the existing RRF would continue operations during construction of the new WTE facility, with shutdown and decommissioning occurring after construction completion.	Existing RRF Site
Development of the existing RRF site includes time for permitting and filling the onsite stormwater lake, planning and construction of temporary stormwater retainage during construction, and logistical planning for construction during operation of the existing RRF.	Existing RRF Site
The Medley site includes time for land acquisition, zoning and permitting of a greenfield site as well as additional site preparation work.	Medley Site
Ingraham Highway Site 1 and Ingraham Highway Site 2 include additional time for land acquisition, zoning permitting of a greenfield site, and extended environmental permitting due to proximity of Class I area. There will also be additional site preparation work required including wetland mitigation, flood plain mitigation (elevating finished floor elevation of structures one foot above grade and additional stormwater requirements), and wildlife mitigation.	Ingraham Highway Site 1 Ingraham Highway Site 2

2.2.3.1.2 Siting/Planning

Several activities are identified for the siting of a new WTE facility that are required to support the regulatory, permitting, design, and construction phases. Siting/Planning includes the following activities:

- Siting selection and land acquisition, if applicable
- Power purchase and interconnect agreement negotiations
- Public outreach activities

The Medley site, Ingraham Highway Site 1, and Ingraham Highway Site 2 require land acquisition to commence prior to the other activities listed above. It has been assumed that land acquisition may take approximately 18 months to 2 years.

2.2.3.1.3 Financing

Construction of a large capital project, such as a WTE facility, is most often financed, as most entities do not have the available funds to pay for the capital costs when constructed. A number of financing options exist for funding large capital projects, with the most common being municipal bond financing. It is anticipated that the County would most likely use a form of long-term revenue bond financing. Bond financing terms can vary and are determined during agreement development. For the purposes of this Report, it is assumed that a 30-year revenue bond would be used.

First, a financial plan for bond issue would be developed to determine the bond issue method and schedule. This would include bond issue support and a cash flow analysis at the commencement of the project and possibly a phased financing strategy, with interim and final financing. The interim financing could correspond with initial planning, permitting and procurement activities required prior to contractor notice to proceed. The final financing would likely correspond with the contractor notice to proceed and/or receipt of all regulatory approvals for construction.

Note that the financing tasks are not consecutive, and do not occur directly one after the other. There is time allotted in the schedule between these tasks when no financing activities occur. Therefore, the total duration for the financing tasks, commencing with the bond issue support and cash flow analysis and ending with the final financing, is estimated to be between four and six years. The financing tasks typically take place concurrently with the permitting and procurement tasks.

2.2.3.1.4 Regulatory/Permitting

The preliminary schedule reflects the permitting process including application preparation, submission, clarification, and issuance of permits and approvals required for the construction and start-up of a new WTE facility. These activities are discussed in more detail in Section 2.2.4 Environment. The critical path includes preparation of the dredge and fill permit, PSD, and PPSA permitting processes. It is also assumed that the PPSA and other permitting efforts would be accelerated, through the concurrent development of permit application packages. It is anticipated that the overall permitting duration will range from approximately three and a half years to four and a half years from preliminary application development through issuance of all required permits. It is assumed that permitting activities would occur concurrently with financing and procurement efforts, in order to accelerate the schedule.

There are many variables associated with the permitting process that could affect the duration of the permitting effort. The schedule presents what would be considered a typical scenario and assumes that significant regulatory

delays such as multiple requests for information (RFIs), significant public opposition and protest, or change in law would not occur.

2.2.3.1.5 Procurement

The procurement process outlined in the preliminary schedule consists of the following main tasks:

- Design criteria development
- Procurement strategy development
- RFI development, response, and response evaluation (it should be noted that DSWM has already initiated development of a RFI to be issued to the vendor community in the near future)
- Request for Qualifications (RFQ) development, response, and response evaluation
- Request for Proposals (RFP) development, response, and response evaluation
- Legal activities associated with development of the draft and final Construction and Operating Agreements.

The design criteria development is required prior to RFQ/RFP procurement process and is estimated to take approximately 6 months to one year. The RFQ/RFP procurement process is estimated to take approximately two to three years and would occur concurrently with the permitting and financing activities.

2.2.3.1.6 Design and Construction

The construction period outlined in the preliminary schedule is a general overview of the construction process. As the project moves forward, detailed construction schedules will be developed as part of the planning and procurement process by DSWM's consultants and/or the successful contractor. Typical construction-related activities would include:

- Preliminary construction activities, such as initial site work and preparation
- Detailed design
- Preliminary site and utilities work
- Procurement of major equipment
- Procurement of long lead time items
- Construction
- Start-up and commissioning
- Acceptance testing
- Final inspection and contract close-out

Preliminary Construction Activities

Considerations are made in the preliminary schedule based on specific activities associated with each site. For the Existing RRF site, it is assumed that shutdown of the existing RRF will not occur until after construction of a new WTE facility to avoid waste diversion. Planning activities will be required in consideration of specific site constraints associated with construction equipment laydown area, temporary stormwater storage, and stormwater pond fill activities.

The Medley site is assumed to require additional time prior to construction for placement of fill and site preparation work to fortify the site soils for construction. The Ingraham sites may require additional time prior to construction for wetland mitigation, removal of muck soils, replacement with fill, and fill placement for elevation to meet floodplain requirements. The duration of these additional efforts is estimated to be approximately 9 months to one and a half years, to be completed before other site and utility work can commence for a new WTE facility.

New WTE Facility Design and Construction Activities

It is currently anticipated that the design and construction duration for a new WTE facility is approximately four to five years from the contractor NTP through acceptance testing and Commercial Operations.

2.2.3.1.7 Summary

In summary, the duration for new WTE facility implementation activities is estimated to be between 7 years 9 months to 11 and a half years depending upon the ultimate site selected. For the purposes of this Report, it is assumed that work would commence in January 2023 for any of the site options. For the Existing RRF site, design and construction is estimated to start in October 2026 with Commercial Operations beginning in April 2030. For the Medley site, design and construction is estimated to start in January 2028 with Commercial Operations approximately in April 2032. For the Ingraham Highway Sites, design and construction is estimated to start in April 2029 with Commercial Operations in approximately October 2033.

The estimated project durations for the Medley site and Ingraham Highway sites are longer than the Existing RRF site because they include additional time for land acquisition as well as additional permitting time required as non-PPSA certified sites, additional air permitting considerations, and preliminary site work needed including soils stabilization or removal and wetland and wildlife mitigation. In contrast, the Existing RRF site does not require time to acquire new land, is currently a site certified under the PPSA, and would only require minimal preparatory site work.

Table 2-2 provides a summary of major tasks and the estimated durations for each of the selected site options. A graphical summary schedule showing the concurrent activities is provided in Appendix B.

Table 2.2 Summary of Schedule Tasks with Estimated Durations

Task	Estimated Duration of Activity		
	Existing RRF Site	Medley Site	Ingraham Hwy Sites
Total Project Duration	**7 years 9 months**	**9 years 9 months**	**11 years 3 months**
Estimated Commercial Operation	April 2030	April 2032	October 2033
Siting/Planning *	**1.5 years**	**2.5 years**	**2.5 years**
Siting Analysis and Land Acquisition	N/A	1.5 years	2 years
Financing *	**1.5 years**		
Permitting *	**3.5 years**	**3 years 9 months**	**4.5 years**

Task	Estimated Duration of Activity		
	Existing RRF Site	Medley Site	Ingraham Hwy Sites
Army Corps of Engineers Dredge and Fill Permit	1 year	N/A	1 year
Environmental Resource Permit	1 year	1 year 3 months	2 years
PSD Air Construction Permit	2 years	2 years 3 months	3 years
PPSA Process Activities	2.5 years	2 years 9 months	4 years
Procurement *	**2 - 3 years**		
Design Criteria Development	6 months – 1 year		
RFQ / RFP Process	1.5 - 2 years		
Design and Construction	**4 years**	**4 years 9 months**	**5 years**
Design	3 years		
Procurement of Major Equipment	3 years		
Preliminary Site and Utilities Work	9 months	1 year 3 months	1.5 years
Construction	2.5 years		
Start-up and Commissioning	6 months		
Acceptance Testing to Commercial Operations	2 months		
Final Inspection and Contract Closeout	6 months		
Shutdown and Demolition of RRF	**1 – 1.5 years**		

* These tasks occur concurrently.

2.2.3.2 Cost Considerations

Arcadis developed a cost considerations table to approximate the difference in cost of the various components required to site, construct and operate a new WTE facility at the four remaining sites. This cost comparison includes planning level estimates for additional costs associated with the facility construction, annual Operations and Maintenance (O&M), as well as the potential system impacts specific to each site option. The additional costs are compared to the costs of developing a new WTE facility on the existing site, which is considered the base case and reflects estimated stormwater lake fill costs and environmental considerations noted in Appendix C. The capital costs and first year O&M cost associated with a new WTE facility located on the Existing RRF site were developed previously by Arcadis as part of a separate effort and represents the base case for comparative purposes.

The cost considerations table provided in Appendix C identifies the item, unit cost, units for the unit cost, if the additional site condition applies to each site, the unit quantity needed for each site option, the cost, and the cost percentage increase compared to the base capital or annual O&M costs.

2.2.3.2.1 Identification of Costs

Many of the siting evaluation criteria and associated site conditions will require additional costs to address or mitigate the unique site conditions of each site. Arcadis conducted a preliminary analysis to identify the potential additional costs associated with the various site conditions that would likely apply to the selected sites, subsequently developed unit costs for those site conditions, and quantified the amount of work or units required for the individual sites reviewed. These conditions and costs were identified only for the four sites remaining after the Detailed Screening criteria were applied:

- Existing RRF Site
- Site 1 Medley Site
- Site 16 Ingraham Highway Site 1
- Site 17 Ingraham Highway Site 2

These different site conditions may impact both facility capital cost and ongoing annual O&M cost. Appendix C provides the cost differential comparison table and the Basis of Cost summary, which identifies information used to determine unit costs and calculate required quantities associated with each site.

2.2.3.2.2 Capital Costs

The following additional capital costs and associated assumptions were considered for the selected sites, when applicable:

- Land acquisition utilizing the current Miami Dade Property Appraiser value plus 10%
- Off-site road development when an access road to the site is not yet available
- Off-site utilities construction for interconnection to the nearest pipeline including:
  - 12-inch ductile iron pipeline for potable water
  - Potable water booster pump station
  - 6-inch PVC force main for wastewater
  - Natural gas pipeline
  - Electrical transmission mains
  - An industrial water supply well, where permittable, or rehabilitation of existing wells
  - Additional right of ways or easements required for off-site utilities or access, assumed to be 60-feet wide
- Additional stormwater requirements for high groundwater levels or floodplain mitigation, assumed a four-foot-tall site perimeter berm
- Additional stormwater requirements for temporary retainage during construction
- Geotechnical site preparation work including:
  - Lake fill costs
  - Removal of muck soils

  - Replacement with select fill
  - Additional geotechnical requirements, such as vibrocompaction of fill or other structural requirements
- Floodplain mitigation by elevating structures, assuming one foot above grade for Zone A.
- Wildlife mitigation including wood stork, bonneted bat, and Florida panther
- Permanent wetland mitigation
- Additional zoning and permitting cost possibly required for greenfield sites
- Additional permitting cost associated with difficulty due to site location or constraints
- Waste hauling and transfer system impacts including construction of a transfer station and additional transfer trailers if collection and hauling system significantly changes compared to current System

Existing RRF Site

The identified site conditions requiring capital cost for the existing RRF include industrial supply well rehabilitation, temporary stormwater retainage during construction, potential filling of the site stormwater detention pond and some additional geotechnical work, such as vibrocompaction of the detention pond fill area, as well as potential bonneted bat mitigation.

Medley Site

For the Medley site, the identified site conditions requiring potential capital costs include land acquisition, water booster pump station, wastewater lift station, natural gas pipeline, electrical transmission mains, right-of-way and/or easements for those utilities, additional stormwater management due to high groundwater levels, placing select fill and additional geotechnical requirements required to help stabilize existing soils, such as vibrocompaction or other method as selected by contractor, additional zoning and permitting for a greenfield site, and moderate environmental permitting difficulties due to location and proximity to existing industrial facilities. It is assumed that there may be impact fees or improvements required to local roads that have not yet been factored into the capital cost for this site because the extent of roadway modifications is currently not known. It is anticipated that these would be negotiated and further evaluated during the land acquisition process.

Ingraham Highway Sites 1 and 2

For the Ingraham Highway sites, the identified site conditions requiring potential capital costs include the land acquisition, potable water pipeline, water booster pump station, wastewater force main, wastewater lift station, natural gas pipeline, electrical transmission mains, right-of-way and/or easements for utilities or access, additional stormwater management due to floodplain mitigation, removal of muck soils, placing select fill and additional geotechnical requirements required to help stabilize existing soils, such as vibrocompaction, embankment fill required for floodplain mitigation elevation, bonneted bat mitigation, wetland mitigation, additional zoning and permitting for a greenfield site, extremely challenging environmental permitting due to location and proximity to Class I areas, and System impact due to increased hauling distance, which will likely include construction of a new transfer station and purchase of additional tractor trailers. Ingraham Highway Site 2 will also require development of an offsite access road and Florida panther mitigation in addition to the items listed above.

2.2.3.2.3 Operations and Maintenance Costs

The following additional annual O&M costs and associated assumptions were considered for the selected sites, when applicable:

Medley Site

- Purchase of potable water as industrial supply well development is likely not permittable, will result in additional costs.
- Cost for ash hauling to a landfill assumed to be near the existing RRF.

Ingraham Highway Sites

- Purchase of potable water would be an additional operations cost
- Cost for ash hauling to a landfill assumed to be near the existing RRF would be significant as the distance is much longer than the other sites.
- Transfer system O&M cost required for the additional hauling of waste to these locations.

2.2.3.2.4 Cost Considerations Summary

The following table summarizes the estimated additional capital cost associated with each site option and the additional annual operations and maintenance cost impact.

Table 2.3 Estimated Additional Costs for Each Site Option

	Estimated Total Additional Cost	Percentage of Base Cost
Existing RRF Site (Base Cost for Comparison)		
Capital	$1,450,000,000	N/A
Annual Net O&M (cost per ton *)	$11.22	N/A
Medley Site		
Additional Capital	$48,300,000	4.2%
Additional Annual Net O&M (cost per ton*)	$2.10	19%
Ingraham Highway Site 1		
Additional Capital	$80,400,000	6.4%
Additional Annual Net O&M (cost per ton*)	$13.40	119%
Ingraham Highway Site 2		
Additional Capital	$84,700,000	6.7%
Additional Annual Net O&M (cost per ton*)	$13.40	119%

* Does not include debt service payment for capital costs

The site option with the lowest anticipated impact on capital cost and annual operations and maintenance cost is the Existing RRF site (base case). This is much less than the highest anticipated impact, Ingraham Highway Site 2,

which is anticipated to have a 6.7% increase in capital costs and 119% increase in annual operational costs due to the significant waste hauling distance required.

3 Preliminary WTE Facility Site Analysis Summary

This preliminary siting analysis was prepared to support the County in determining availability of sites within the County for development of a new WTE facility to replace the existing RRF. Based upon the results of this preliminary analysis, development of a new WTE facility within the County is feasible, based on the criteria investigated for each site. Following completion of this preliminary siting analysis, it is recommended that the County consider pursuing a comprehensive siting evaluation, inclusive of site-visits, geotechnical investigations, preliminary air modeling, informal discussions with FDEP staff, as well as other efforts necessary to move forward with the selection of a site and implementation of a new WTE Facility.

Table 3-1 below provides an overall comparative summary of the four sites evaluated in the detailed screening analyses.

(Remainder of Page Left Blank)

Table 3.1 Site Comparison Summary

Siting Parameter	Existing RRF	Site 1 Medley	Site 16 Ingraham Hwy. Site #1	Site 17 Ingraham Hwy. Site #2
Location	157.16-acre site, single parcel inside the UDB. Minimal impact to System if selected, however, construction phasing will need to be considered in order to limit impact to existing RRF operations. Parcel size suitable for development of WTE facility footprint as well as additional acreage to accommodate co-location of additional ash monofill capacity or other County facilities in consideration of future sustainable campus concept (after demolition of Existing RRF).	320.31-acre site, directly adjacent to residential zoning, inside the UDB, approximately two miles north of the existing RRF facility, and adjacent to the Medley Landfill. If this site were selected, the overall effects on the County's Solid Waste System would be relatively minimal. However, the Medley Landfill has a history of odor complaints, and the WTE, if sited here, could be the subject of future odor complaints. Parcel size suitable for development of WTE facility footprint as well as additional acreage to accommodate co-location of ash monofill or other County facilities in consideration of future sustainable campus concept.	159.71-acre site consisting of two parcels outside the UDB. Considerable System effects if this site were selected. Parcel size suitable for development of WTE facility footprint as well as additional acreage to accommodate co-location of ash monofill or other County facilities in consideration of future sustainable campus concept.	81.11-acre site is located outside the UDB. Considerable System effects if this site were selected. Parcel size suitable for development of WTE facility footprint as well as additional acreage to accommodate co-location of ash monofill or other County facilities in consideration of future sustainable campus concept.
Utilities	All required utilities infrastructure available	Potable water and sanitary sewer utilities appear to be available at the site, electric and natural gas utilities would have to be extended to the site.	All required utilities would have to be extended to the site.	All required utilities would have to be extended to the site.

Siting Parameter	Existing RRF	Site 1 Medley	Site 16 Ingraham Hwy. Site #1	Site 17 Ingraham Hwy. Site #2
Soils	Site has been used for WTE facility operations previously, no known site soils issues exist.	The USDA Soil Survey data for the site and historical aerial photos (c. 1985) indicate the site area was previously excavated and subsequently backfilled. In order for a WTE facility to be located at this site, the facility buildings and ancillary components would have to be constructed on backfill material, which could present significant geotechnical engineering challenges for foundation designs and additional site preparation costs.	Site soils are not ideally suited for building foundations because of water content and shallow depth to bedrock.	Site soils are not ideally suited for building foundations because of water content and shallow depth to bedrock.
Environment	Air Permitting - May be challenging, other large emitters (Medley Class I Landfill and Titan Pennsuco Complex) exist nearby that were not present when RRF was initially modeled and permitted. Possible habitat issues (Bonneted Bat)	Air Permitting – May be challenging, as site is located between two other large existing emitters, the Medley Class I Landfill and Titan Pennsuco Complex. In addition, the adjacent elevated (200 ft +) Medley Landfill may result in exhaust plume impaction during air emissions dispersion modeling. Possible habitat issues (Bonneted Bat)	Floodplain – FEMA Zone A Air permitting expected to be extremely difficult due to proximity to Everglades National Park. ERP required because of minor wetlands on site, possible habitat issues (Bonneted Bat)	Floodplain – FEMA Zone A Air permitting expected to be extremely difficult due to proximity to Everglades National Park. ERP required because of minor wetlands on site, possible habitat issues (Bonneted Bat)

Siting Parameter	Existing RRF	Site 1 Medley	Site 16 Ingraham Hwy. Site #1	Site 17 Ingraham Hwy. Site #2
Transportation	Existing access to arterial and collector roads	Good access to Florida Turnpike and US27 via Beacon Station Blvd., however traffic impacts to local area may be significant due to road orientations and close proximity of intersections.	Good access to arterial and collector roads	Existing access to site is via Ingraham Hwy. and SW 222nd Ave., however approximately 0.75 miles of two-lane road with paved shoulders will need to be constructed for proper site access. Additional ROW may have to be acquired.
Community	Residential developments have encroached around the site in the years since the Existing RRF went into operation. The site is now less than a tenth of a mile from the nearest residential zoning and the local population. Community political leaders and environmental groups have indicated opposition to continued use of the site for WTE facility operations.	The site is adjacent to residential zoning. The west edge of the site borders one trailer park owned by the Town of Medley, and another that is leased by the town. Siting of a WTE facility may face community opposition at this location.	The site is approximately half a mile from the nearest residential zoning and is approximately one mile from the boundary of Everglades National Park, which suggests that the siting of a WTE facility may be strongly opposed by the community at this location.	The site is approximately half a mile from the nearest residential zoning and is 1.28 miles from the boundary of Everglades National Park, which suggests that the siting of a WTE facility may be strongly opposed by the community at this location.

Siting Parameter	Existing RRF	Site 1 Medley	Site 16 Ingraham Hwy. Site #1	Site 17 Ingraham Hwy. Site #2
Schedule (Preliminary Planning to Construction Completion)	Shortest schedule duration because of existing PPSA, potentially reducing PPSA permitting effort and minimal site preparation work required. Coordination of construction during MDRRF operation required. Estimated Project Duration: 7-years 9-months Possible Commercial Operations by April 2030	Second shortest schedule duration. Land acquisition, PPSA permitting, and some minor site work increase schedule duration. Estimated Project Duration: 9-years 9-months Possible Commercial Operations by April 2032	Longest estimated schedule duration. Land acquisition, PPSA permitting, wetland, floodplain, and wildlife mitigation, and significant site work increase schedule duration. Estimated Project Duration: 11-years 3-months Possible Commercial Operations by October 2033	Longest estimated schedule duration. Land acquisition, PPSA permitting, wetland, floodplain, and wildlife mitigation, and significant site work increase schedule duration. Estimated Project Duration: 11-years 3-months Possible Commercial Operations by October 2033

Siting Parameter	Existing RRF	Site 1 Medley	Site 16 Ingraham Hwy. Site #1	Site 17 Ingraham Hwy. Site #2
Cost	For comparative purposes, the existing RRF site is considered the base cost condition and the base capital cost includes estimated stormwater detention pond fill costs and environmental considerations and the ash hauling costs as noted in Appendix C. Total Estimated Capital Cost of $1,450,000,000. Total annual net operational cost is $11.22 per ton of waste processed (estimated for Year 1). Does not include debt service payment for capital costs.	Additional costs anticipated for land acquisition*, on-site utility facilities, stormwater considerations and addition of fill for soil fortification, zoning and potential additional permitting efforts for new PPSA. Purchase of potable water may increase anticipated operational costs. It is also assumed that there may be impact fees or improvements required to local roads that have not yet been factored into the capital cost for this site because the extent of roadway modifications is currently not known. It is anticipated that these would be negotiated and further evaluated during the land acquisition process. Additional Capital $48.3M (4.2% increase) Additional 19% annual operational cost for potable water purchase and ash hauling.	Significant additional costs anticipated for land acquisition*, on and off-site utility facilities, flood plain, wetland, and wildlife mitigation, and additional permitting efforts. Significant impact on hauling system due to distance from other System facilities would increase capital and operational cost. Purchase of potable water and significant distance to haul ash for disposal will increase anticipated operational costs. Additional Capital $80.4M (6.4% increase) Additional 119% annual operational cost for potable water purchase, significant ash hauling, and additional System hauling costs.	Significant additional costs anticipated for land acquisition*, on and off-site utility facilities, flood plain, wetland, and wildlife mitigation, and additional permitting efforts. Significant impact on hauling system due to distance from other System facilities would increase capital and operational cost. Purchase of potable water and significant distance to haul ash for disposal will increase anticipated operational costs. Additional Capital $84.7M (6.7% increase) Additional 119% annual operational cost for potable water purchase, significant ash hauling, and additional System hauling costs.

* Land acquisition cost estimated based upon current Miami-Dade Property Appraiser Market Value plus 10%.

Appendix A

Site Packages

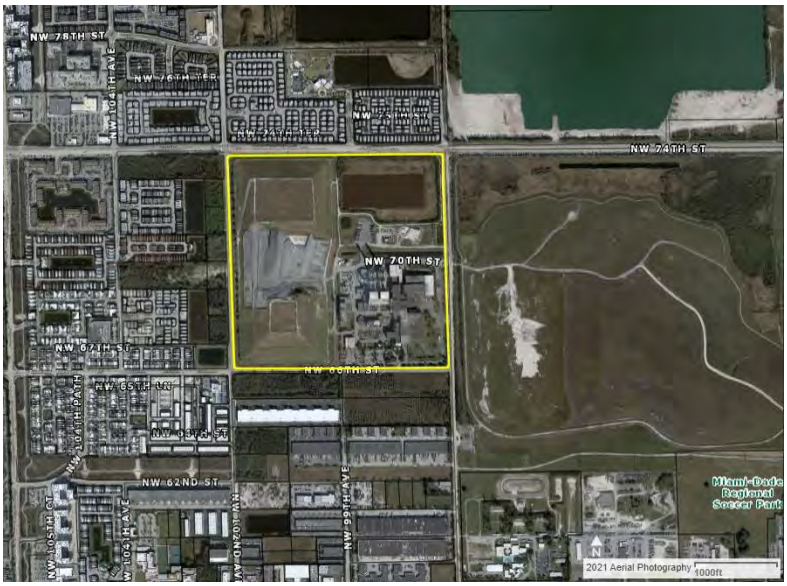
Future Waste-To-Energy Facility Siting Alternatives Analysis

Analysis Summary – Existing RRF Site - Doral

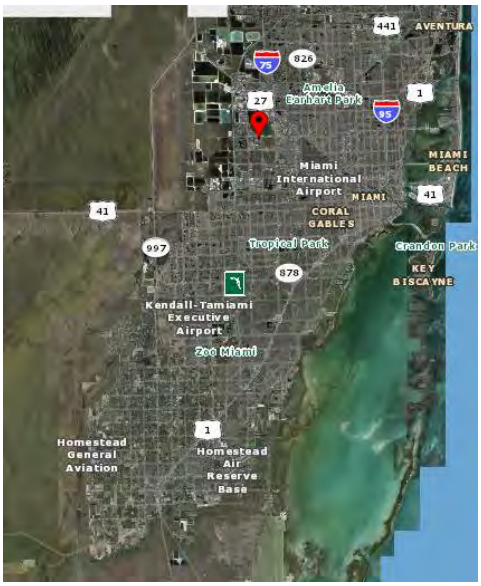
Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
–	✓	✓	–	✓	✗	✓	✓

MDPA Parcel Map



Location Map



Site Information

This 157.16-acre site is a single parcel inside the UDB, located in the City of Doral. The site area is sufficient to support the proposed 4,000 tpd WTE facility and is co-located with an active 80-acre Ash Monofil. The property is less than a 10-minute travel time to major roads, is less than 0.1 miles from the nearest residential zoning, and 9.87 miles (15.88 km) from the Class I boundary of Everglades National Park.

MDPA Parcel Data

Folio No: 35-3017-001-0120

Owner: Miami Dade County DSWM

2021 MDPA Market Value: $176,631,573

Zoning District: GU

Analysis Summary – Existing RRF Site - Doral

Operational, Engineering, and Regulatory Considerations

Location

The site is located at 6990 NW 97th Avenue, Miami, FL 33178, less than 0.1 miles from the nearest residential zoning, and 9.87 miles from the boundary of Everglades National Park. If this site were selected, the short-term effects on the County's Solid Waste System would be minimal. Over the short term, redeveloping this site with a new WTE facility while maintaining the existing RRF operations could be challenging and would require close coordination between the contractor and operator. Construction phasing will need to be considered and planned in order to limit impact to the existing RRF operations, which if impacted, could result in additional costs and extend the duration of the project schedule.

In the long term, the number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility, but their travel patterns and travel times would be unaltered. Although additional transfer fleet vehicles and drivers would be routed to the site in order to maximize WTE processing capacity, they may be rerouted from deliveries to non-DSWM disposal sites and the acquisition of additional fleet vehicles and driver staffing may not be needed. Transfer fleet fuel consumption and maintenance costs would increase due to the additional deliveries, while similar collection fleet costs would be virtually unchanged. Additionally, the existing RRF site is in close proximity to route power to the 58th Street Fleet Facility and could provide for charging stations for electric fleet vehicles, which are currently being procured.

Ash from the new WTE facility may be disposed of at the existing Ash Monofill, if capacity is available, or may be disposed either at the adjacent WM Medley landfill or hauled out of County. Either off-site option will significantly increase ash disposal costs from current levels.

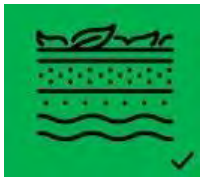
Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. According to WASD data, there is a 4" potable supply line at the property, and a 16" water main available on NW 97th Ave.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. Available at the site on NW 97th Ave., on-site lift station and leachate storage tank. WASD data indicates there is a 16" gravity sewer available on NW 97th Ave.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. An 8" gas service line is available at the site, and the transmission main is available on 97th Ave.
- **Electric** – Substation available approximately 0.15 miles SE of the site on NW 97th Ave. Need to verify substation/ switchyard spare capacity, voltage, and available terminations.

Analysis Summary – Existing RRF Site - Doral

- **Stormwater** – An existing stormwater system is on site serving both the existing RRF and the Ash Monofill. If a new WTE facility is constructed over the stormwater detention pond on the northeast quadrant of the site, allowing the existing RRF to maintain operations during construction, providing required stormwater quantity and quality controls for the site may be challenging.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. Three industrial supply wells are currently used at the RRF for source water for boiler feedwater, cooling tower/condenser feedwater, truck wheel wash, and irrigation water. If reused for a new WTE facility on site, the wells would need to be redeveloped.

Soil



The USDA Soil Survey data for the site classifies the predominant site soils as Udorthents-Water-Urban land complex, 0 to 60 percent slopes and Cooper Town muck, ponded-Urban land complex, 0 to 1 percent slopes. Udorthents soils consist of unconsolidated or heterogeneous geologic material removed during the excavation of ditches, canals, lakes, ponds, and quarries. This is consistent with the development of the RRF and Ash Monofill at the site.

The presence of muck soils in the northeast quadrant of the site indicates the seasonal high groundwater elevation is typically 0-6 inches below existing grade but would have to be confirmed by geotechnical investigations. The high groundwater makes stormwater control more challenging and will result in the need for elevating the tipping floor pit, similar to the existing tipping floor.

Environment

- **Floodplains** – Most of the site is in FEMA Flood Zone X (Minimal Flood Hazard), portions of the NE area (stormwater ponds) are in FEMA Flood Zone AE (El. 5).
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** The existing RRF is currently permitted under the Power Plant Siting Act (PPSA) Conditions of Certification PA 77-08. In order to construct a new WTE facility on the site, a complete PPSA Modification Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.). The PSC “need determination” filing process is also required.
- **New Source Review (NSR) - Prevention of Significant Deterioration (PSD) Permitting** – The site is located 9.87 miles (15.88 km) NE of the Everglades Class I Area, 14.77 miles (23.8 km) NW of the Biscayne Class II Area, one mile south of the Medley Landfill, 4.7 miles NE of the CEMEX Miami Cement Plant and about 2.2 miles SE of the Titan Pennsuco Complex, which are all large sources of emissions.

  As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the

Analysis Summary – Existing RRF Site - Doral

PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

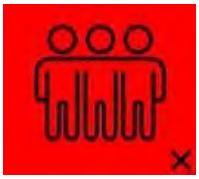
The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay National Park (sensitive Class II area) located on the eastern side border having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility, and thus will make air permitting challenging. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive areas.

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory indicates the site contains minor wetlands surrounding a large treatment pond and four surface waters. The National Hydrography Dataset shows three surface waters. The South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site contains one stormwater treatment pond. The site appears completely disturbed. The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required. The site is not within 18.6 miles of an active wood stork colony and does not appear to contain suitable foraging habitat; therefore, wood stork mitigation is not anticipated. Impacts to wetlands and surface waters designed and permitted as stormwater treatment areas are generally not regulated by the State of Florida, however, additional studies and analysis are required to determine if wetland permitting such as a State 404 Permit would be required.

Transportation

Travel time north to major roads (i.e., 58th Street, 74th Street) is less than 10 minutes. Existing access to site is via NW 97th Ave., which appears to be in relatively good physical condition and has sufficient capacity for the expected traffic loadings of the proposed WTE facility. Traffic impacts on local roads would be unchanged from existing conditions. The site has sufficient area to accommodate truck queueing.

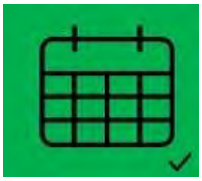
Community



The USEPA EJScreen Standard Report indicated elevated values for Particulate Matter 2.5 ($\mu g/m^3$) and several other pollutants. The site is less than a tenth of a mile from the nearest residential zoning, and the local population, community political leaders and environmental groups have indicated opposition to continued use of the site for WTE facility operations.

Analysis Summary – Existing RRF Site - Doral

Schedule



The existing RRF site is currently permitted under the PPSA Certification as well as PSD and Title V Air Operating Permits, which reduce the duration of the environmental permitting effort. Additionally, the site work required as compared to other sites is minimal because of existing RRF facility operations and infrastructure. However, there are existing conditions that affect the duration of the new WTE facility implementation including the following:

- **PSD Permitting** – The nearby Everglades National Park's (sensitive Class I area) location along the western border of the County and the Biscayne Bay National Park (sensitive Class II area) located on the eastern border of the County, both having more stringent AQRVs provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and will make air permitting challenging at this site.
- **PPSA Permitting** – This site was previously permitted and under the PPSA Certification and potentially reduces the duration needed for environmental permitting as a PPSA Certification modification and not a new application will be developed.
- **Community** –Opposition from the community is expected which could increase the duration of the new WTE facility implementation schedule.
- **Construction** – Additional planning and coordination is required in order to construct the new WTE facility at the existing RRF site, while the existing RRF continues to operate.

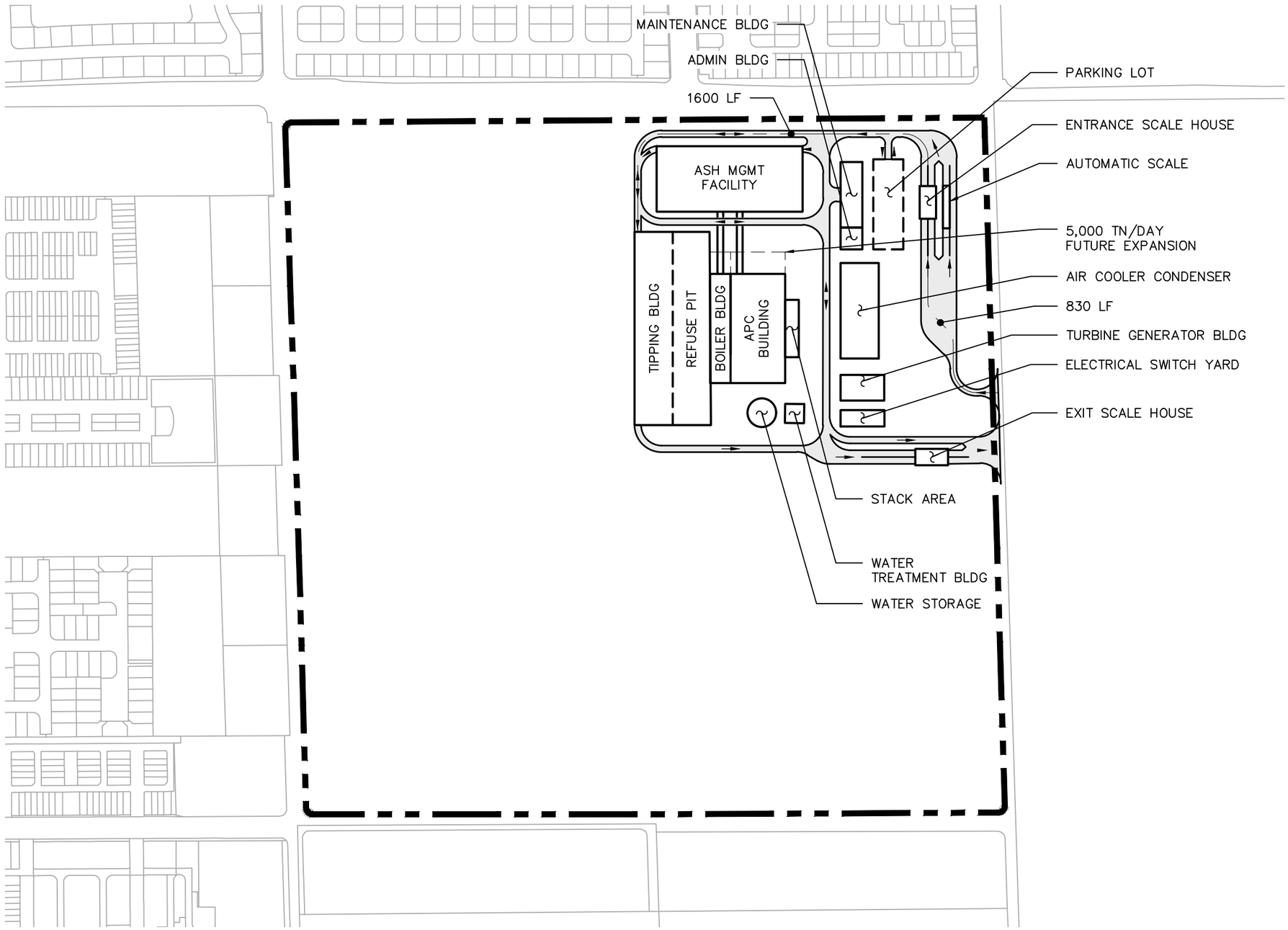
Cost

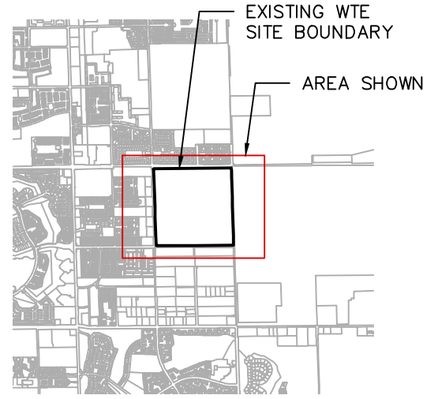
For comparative purposes, the existing RRF site was considered the base case, which includes the following costs:

- **Site Preparation** – Stormwater detention pond fill costs, environmental permitting costs and ash hauling.
- **System Effects** – If this site were selected, the effects on the County's Solid Waste System would be minimal, however, construction phasing will need to be considered in order to limit impact to existing RRF operations.

Site Differentiators Overview

- The existing RRF facility and site is currently permitted under the PPSA and is operating under an existing Conditions of Certification PA 77-08, which can be modified to provide for the construction and operation of a new WTE facility. A Modification to an existing Conditions of Certification is typically faster than developing an entirely new PPSA Application for an unpermitted site.
- Existing utilities suitable for a WTE facility are readily available and the site could route power to nearby System facilities.
- Construction phasing will need to be considered in order to limit impact to existing RRF operations, which could result in additional costs and extend project schedule.
- Expected significant opposition from the community could affect the project schedule.





KEY PLAN
N.T.S.

0 400' 800'

ARCADIS

MIAMI-DADE COUNTY

MIAMI-DADE DEPT OF SOLID WASTE MANAGEMENT

FUTURE WTE FACILITY SITING ALTERNATIVES ANALYSIS

WASTE-TO-ENERGY FACILTY

CONCEPTUAL 4,000 TPD SITE LAYOUT
FOLIO No. 35-3017-001-0120

JUNE 2022

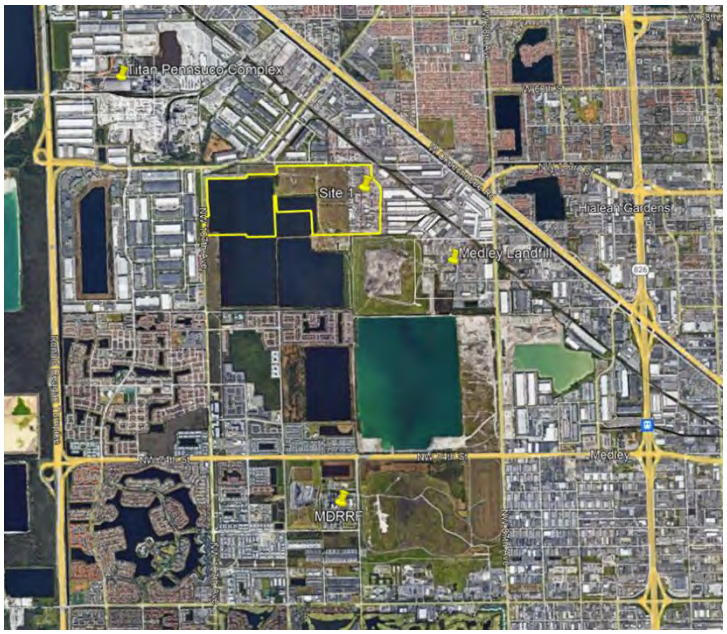
Future Waste-To-Energy Facility Siting Alternatives Analysis

Analysis Summary – Alternative Site No. 1 - Medley

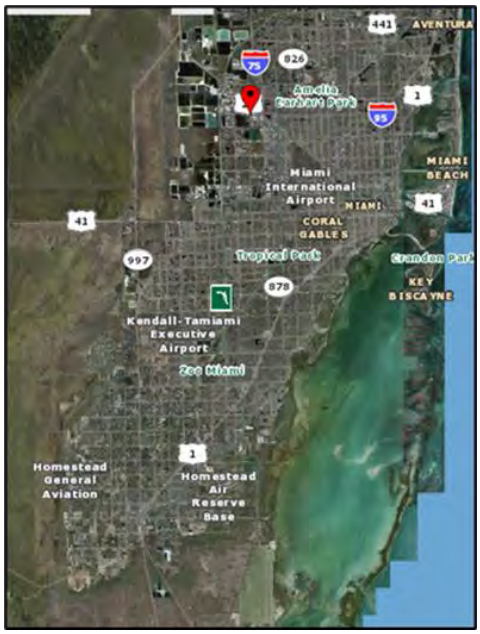
Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
–	–	✗	–	✓	✗	–	–

MDPA Parcel Map



Location Map



Site Information

This 320.31-acre site is inside the UDB, located in the Town of Medley. The site is composed of several parcel areas and is large enough to support the proposed 4,000 ton per day (tpd) Waste-to-Energy (WTE) facility, expansion to 5,000 tpd capacity, and other co-located solid waste facilities such as an ash monofill, recycling center or an education center. The property is less than a 10-minute travel time to US-27 or the Turnpike, is located adjacent to residential zoning and 11.38 (18.31 km) miles from the boundary of the Everglades Class I area.

MDPA Parcel Data

Owner: F77 1 F77 2 & F77 3 LLC, F00 1 LLC

2021 MDPA Market Value: $38,621,504

Zoning District: M-1

PA Zone: Industrial – Light

Folio No: 22-3004-001-0470, others.

Analysis Summary – Alternative Site No. 1 - Medley

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 2.0 miles north of the existing RRF, more than four miles from any active airport, adjacent to residential zoning, and more than 11 miles from the boundary of Everglades National Park. If this site were selected, the effects on the County's Solid Waste System would be minimal. Direct hauls from some of the collection routes in the vicinity of the existing RRF would divert to the West transfer station for disposal due to shorter travel times. Incoming waste at that station would increase and may result in capacity issues, as it is currently operating at approximately 80% of design capacity.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would increase due to longer travel distances and expected traffic congestion. Additional transfer fleet vehicles and drivers may be needed. Transfer fleet fuel consumption and maintenance costs would increase due to the additional deliveries, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be higher than at the existing RRF, and options for limiting ash hauling distances could be considered. If disposed at a non-County facility, costs for ash disposal would significantly increase from current levels.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. Potable water mains appear to be available at the site on NW 95th Ave. and NW 106th Street, but additional analysis will be needed to determine pipe size, service pressure, and available system capacity. A booster station may be needed to increase system pressure. Soils data indicates shallow depth to bedrock in some locations, rock removal may be required for pipe trench excavation for new lines in those areas.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer.

  Sanitary sewer appears to be available at the site on NW 95th Ave. and NW 106th Street, but additional analysis will be needed to determine pipe size and available system capacity. A lift station and force main to gravity sewer may be required. Soils data indicates shallow depth to bedrock in some locations, rock removal may be required for pipe trench excavation for new lines in those areas.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. There is a gas transmission main on Krome Ave/US-

1. Additional ROW/easement may be needed. Soils data indicates shallow depth to bedrock, rock removal may be required for pipe trench excavation.

- **Electric** – Nearest substation/ switchyard is FPL Substation located 1.9 miles away at 10800 NW 107th Avenue. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements.
- **Stormwater** – High groundwater elevations may result in slightly larger stormwater ponds on site, but there appears to be sufficient area for a stormwater system that meets regulatory requirements.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soils

The USDA Soil Survey data for the site and historical aerial photos (c. 1985) indicate the site area was previously excavated as a quarry and subsequently backfilled. This is consistent with the USDA Soil Survey data for the site, which classifies the site soils as 9—Udorthents-Water-Urban land complex, 0 to 60 percent slopes. Udorthents soils consist of unconsolidated or heterogeneous geologic material removed during the excavation of ditches, canals, lakes, ponds, and quarries.

In order for the facility to be located at this site, the facility buildings and ancillary components would have to be constructed on fill material, which could present geotechnical engineering challenges for foundation designs and additional site preparation costs.

Environment

- **Floodplains** – The site is not in a floodplain, it is within FEMA Flood Zone X (Minimal Flood Hazard).
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC “need determination” filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 11.38 mi (18.31 km) NE of the Everglades Class I Area, 16.19 mi (26.05 km) NW of the Biscayne Class II Area, and between two large existing emitters, the Medley Class I Landfill and Titan Pennsuco Complex. The adjacent Medley Landfill may result in elevated receptors (200ft+) and exhaust plume impaction during air emissions modeling.

Analysis Summary – Alternative Site No. 1 - Medley

As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

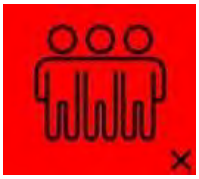
The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates no wetlands are present. The site appears disturbed. The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required but is assumed to be minimal as there is no roosting or foraging habitat remaining. The site is also within 18.6 miles of an active wood stork colony; however, the lack of apparent suitable foraging habitat precludes wood stork mitigation. No permit triggers exist for wetlands.

Transportation

The site has good access to Florida Turnpike and US-27 via Beacon Station Blvd., but some road areas need to be improved and the Town of Medley may want the County to assume maintenance of some or all of the access roads, which would increase the County's costs. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts to local area will likely be significant. Truck queuing will have to be accomplished on site to prevent further congestion.

Community



The USEPA EJScreen Standard Report indicated elevated values for Particulate Matter 2.5 (µg/m3 and several other pollutants. The site is adjacent to residential zoning, which suggests that the siting of a WTE facility may be opposed by the community at this location.

Analysis Summary – Alternative Site No. 1 - Medley

Schedule

There are a few site issues that could affect the schedule of the project, including:

- **Land Acquisition –** siting analysis and land acquisition will increase schedule duration.
- **Utilities** – Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- **Soils** – Additional geotechnical testing will be needed to determine the full extent of soil preparation needed (i.e., vibro-compaction, consolidation, etc.) and additional requirements for building foundations at the site, which may increase design and construction time.
- **Permitting** – Prevention of Significant Deterioration (PSD) Permitting – The site is located 11.38 mi (18.31 km) NE of the Everglades Class I Area, 16.19 mi (26.05 km) NW of the Biscayne Class II Area, and between two large existing emitters, the Medley Class I Landfill and Titan Pennsuco Complex. The adjacent Medley Landfill may result in elevated receptors (200ft+) and exhaust plume impaction during air emissions modeling. The nearby Everglades National Park's location along the western border of the County and the Biscayne Bay NP (sensitive Class II area) located on the eastern border of the County both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting challenging at this prospective site.
- **Community** – The site is adjacent to residential zoning. Therefore, siting of a new WTE facility may face community opposition at this location, which could affect the project schedule.

Cost

Overall, the cost of developing a WTE Facility on this site is expected to be higher than at the base alternative site, the Existing RRF. There are several site issues and additional Solid Waste System changes that could affect the total cost to the Department, including:

- **Land Acquisition –** siting analysis and land acquisition will increase project costs.
- **Utilities**
  - Construction of a potable water booster station may be required.
  - Construction of an on-site wastewater lift station will likely be required.
  - Construction of approximately 2.2 miles of 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
  - Soils data indicates shallow depth to bedrock, rock removal may be required in some areas for utility pipe trench excavation.
  - Construction of approximately 1.9 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
  - Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.

  - On-site water wells are likely not permittable, therefore potable water will need to be purchased, increasing anticipated operations and maintenance costs.

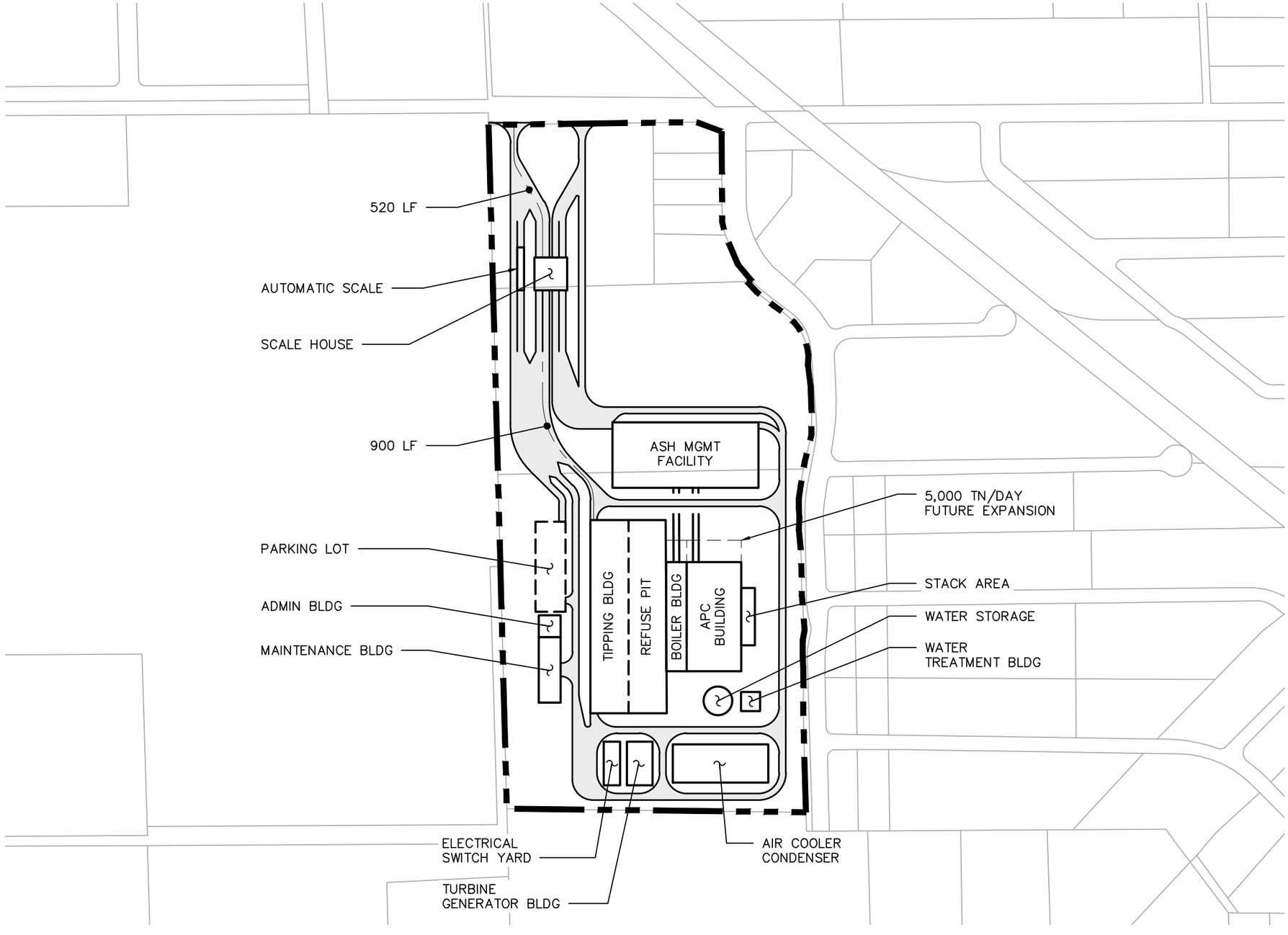
- **Soils** – Additional geotechnical testing will be needed to determine the full extent of soil preparation needed (i.e., vibro-compaction, consolidation, etc.) and additional requirements for building foundations at the site, which may increase design and construction costs.
- **Stormwater** – due to high groundwater levels, additional stormwater considerations or facilities may be required.
- **Zoning and Permitting** – because this is a greenfield site, additional zoning and permitting efforts may be required which could impact cost and schedule.
- **Solid Waste System**
  - Some collection routes that currently direct haul to the existing RRF would likely reroute to dispose at the West or Northeast Transfer Station to minimize travel times, which may increase traffic at those stations.
  - Collection and Transfer vehicles routed to this site would have slightly increased costs for fuel consumption, driver time, and vehicle wear related to the additional travel distance from the existing RRF.
  - Ash hauling costs for a new WTE facility located at this site are expected to be higher than at the existing RRF, however, options for limiting ash hauling distances could be considered. If disposed at a non-County facility, costs for ash disposal would significantly increase from current levels.
  - It is also assumed that there may be impact fees or improvements required to local roads that have not yet been factored into the capital cost for this site because the extent of roadway modifications is currently not known. It is anticipated that these would be negotiated and further evaluated during the land acquisition process.

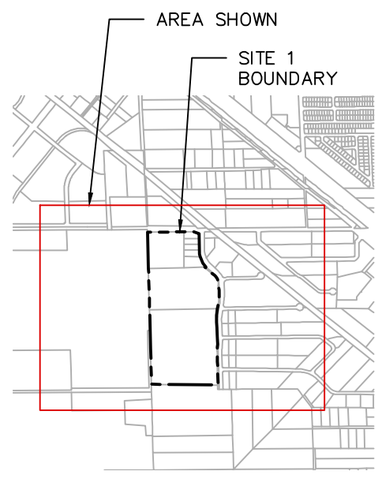
Site Differentiators Overview

- Construction of a potable water booster station may be required.
- Construction of an on-site wastewater lift station and 6” force main may be required.
- Construction of approximately 2.2 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Soils data indicates shallow depth to bedrock, rock removal may be required for utility pipe trench excavation.
- Additional geotechnical testing will be needed to determine the full extent of soil preparation needed (i.e., vibro-compaction, consolidation, etc.) and additional requirements for building foundations at the site, which may increase design and construction costs and extend the project schedule.
- Construction of approximately 1.9 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.

Analysis Summary – Alternative Site No. 1 - Medley

- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- Due to potential adverse effects to wetlands on site, groundwater may not be available for use as source water for boiler feedwater, cooling tower/condenser feedwater, truck wheel wash, and irrigation water.





KEY PLAN
N.T.S.

0 400' 800'

ARCADIS

MIAMI-DADE COUNTY

MIAMI–DADE DEPT OF SOLID WASTE MANAGEMENT

FUTURE WTE FACILITY SITING ALTERNATIVES ANALYSIS

WASTE–TO–ENERGY FACILTY

CONCEPTUAL 4,000 TPD SITE LAYOUT FOLIO MEDLEY

JUNE 2022

SITE 1

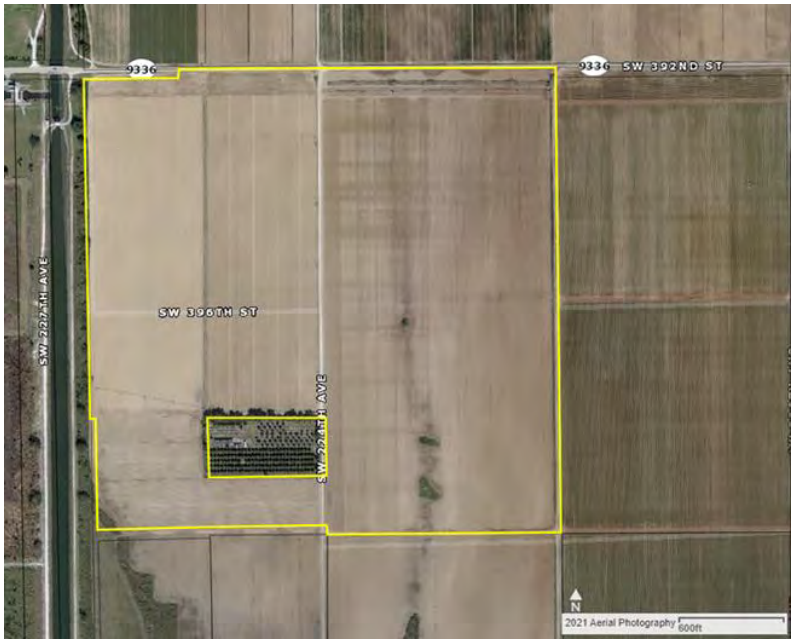
Future Waste-To-Energy Facility Siting Alternatives Analysis

Analysis Summary – Alternative Site No. 16 – Ingraham Hwy. Site #1

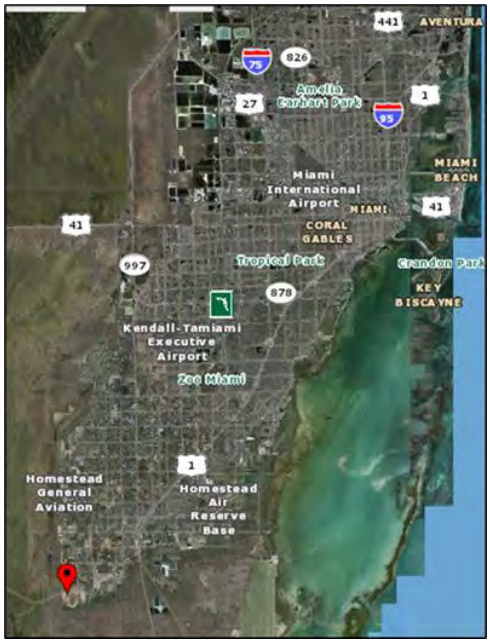
Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
✗	✗	✗	✗	✓	✗	✗	✗

MDPA Parcel Map



Location Map



Site Information

This 159.71-acre site consists of two parcels outside the UDB, located in unincorporated Miami-Dade County. The combined site area is sufficient to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility and expansion to 5,000 TPD capacity or the addition of other facilities such as an ash monofill, recycling center or an education center. The property is less than a 10-minute travel time to W Palm Drive, is 0.51 miles from the nearest residential zoning, and 1.02 miles from the boundary of Everglades National Park.

MDPA Parcel Data

Folio No: 30-8808-000-0030
Owner: P Acursio Partnership LTD
2021 MDPA Market Value: $2,160,760
Zoning District: AU
PA Zone: Interim - Agricultural

Folio No: 30-8808-000-0020
Owner: Everglades Fruit, Inc.
2021 MDPA Market Value: $133,720
Zoning District: AU
PA Zone: Interim - Agricultural

Analysis Summary – Alternative Site No. 16 – Ingraham Hwy. Site #1

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 32.5 miles SW of the existing RRF, slightly more than half a mile from the nearest residential zoning, and approximately one mile from the boundary of Everglades National Park. If this site were selected, the effects on the County's Solid Waste System would be considerable. Direct hauls from the collection routes in the vicinity of the existing RRF would divert to the three transfer stations for disposal. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station would need to be constructed at or near the site of the existing RRF to maintain the current collection patterns and transfer station loadings.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would significantly increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and would likely result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would significantly increase due to the additional deliveries and travel times and distances, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be significantly higher than at the existing RRF. If disposed at a non-County facility, expected costs for ash disposal would increase even further.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. Potable water mains appear to be available approximately 3.3 miles NE of the site on Ingraham Hwy., but further analysis is needed to verify service pressure and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. Appears to be available approximately 3.3 miles NE of the site on Ingraham Hwy., on-site lift station and about 3.3 miles of force main will likely be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest transmission main is approximately 5.5 miles NE of the site on Krome Ave/US-1. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

Analysis Summary – Alternative Site No. 16 – Ingraham Hwy. Site #1

- **Electric** – Nearest substation/switchyard is Florida City Substation located 6.5 miles away at 33800 SW 202nd Avenue. Need to verify substation/switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/FPL Easements is assumed. New legal easements may need to be established to complete this routing.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the predominant site soils as Krome very gravelly marly loam, 1 to 2 percent slopes, Biscayne marly silt loam, drained, 0 to 1 percent slopes, and Chekika very gravelly marly loam, 1 to 2 percent slopes. Generally, these soils are not well suited for building foundations because of water content and shallow depth to bedrock (typically 5-7 inches).

The presence of Biscayne marl soils indicates the seasonal high groundwater elevation is typically within 10 inches of the ground surface, but would have to be confirmed by geotechnical investigations. These soils are severely limited for building foundations because of water content and shallow depth to bedrock, and areas under building foundations would need to be removed and replaced with structural fill. The high groundwater may result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone A.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.). The PSC “need determination” filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 1.02 mi (1.7 km) E of the Everglades Class I Area, 13.00 mi (21.0 km) W of the Biscayne Class II Area, and about 13.0 miles WSW of the FPL Turkey Point Power Plant, a large source of emissions.

  As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the

PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

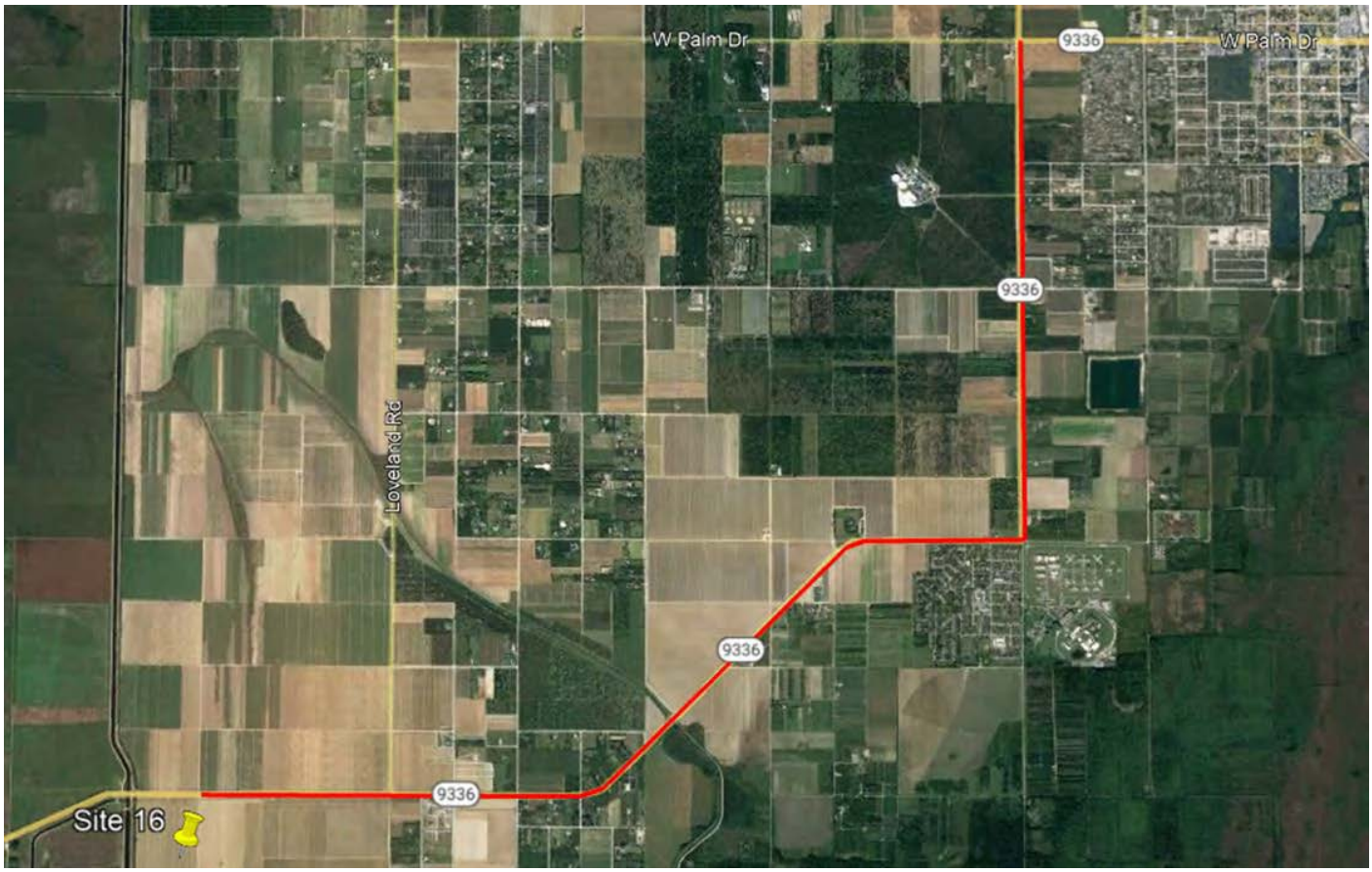
The nearby Everglades National Park's location along the western border of the County and the Biscayne Bay National Park (sensitive Class II area) located on the eastern border of the County both having more stringent Air Quality Related Values (AQRVs) and provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s). Based on projected emissions for a 4,000 tpd facility, preliminary evaluation indicates that this parcel may be too close to sensitive receptors in the nearby Class I area thus making it extremely difficult to demonstrate acceptable impacts for PSD permit issuance.

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site contains minor wetlands. The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required.

Transportation

Travel time north to W Palm Drive is less than 10 minutes. Existing access to the site is via Ingraham Hwy. (see map below), and no additional offsite road improvements are needed. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts on Ingraham Hwy., W Palm Drive, and other local roads may be significant. Truck queuing will have to be accomplished on site to prevent further congestion.

Analysis Summary – Alternative Site No. 16 – Ingraham Hwy. Site #1



Community

The USEPA EJScreen Standard Report indicated no existing environmental justice issues for this site. However, the site is about half a mile from the nearest residential zoning and is approximately a mile from the boundary of Everglades National Park, which suggests that siting of a WTE facility may be strongly opposed by environmental groups and community organizations.

Schedule

Development of this site has the longest duration and is the same as Site 17. The main issues affecting the duration of the new WTE facility implementation schedule include:

- **Land Acquisition –** siting analysis and land acquisition will increase schedule duration.
- **Soils** – The removal and replacement of site muck soils with structural fill and/or rock removal in development areas. Additional structural fill will be needed to elevate the tipping floor and pit due to the high groundwater table and floodplain mitigation.

Analysis Summary – Alternative Site No. 16 – Ingraham Hwy. Site #1

- **Permitting** – Based on projected emissions for a 4,000 tpd facility, preliminary evaluation indicates that this parcel may be too close to sensitive receptors in the nearby Class I area thus making it extremely difficult to demonstrate acceptable impacts for PSD permit issuance.
- **Mitigation** – Wetland, floodplain, and wildlife mitigation will likely increase the duration of the implementation schedule.
- **Community** – The close proximity of the site to Everglades National Park may result in significant opposition from environmental groups and community organization, which could impact the duration of the implementation schedule.

Cost

Overall, the cost of developing a WTE facility on this site is expected to be higher than at the existing RRF site, which was used as the base case in comparing the cost of developing a new WTE facility. Issues that could affect the cost include:

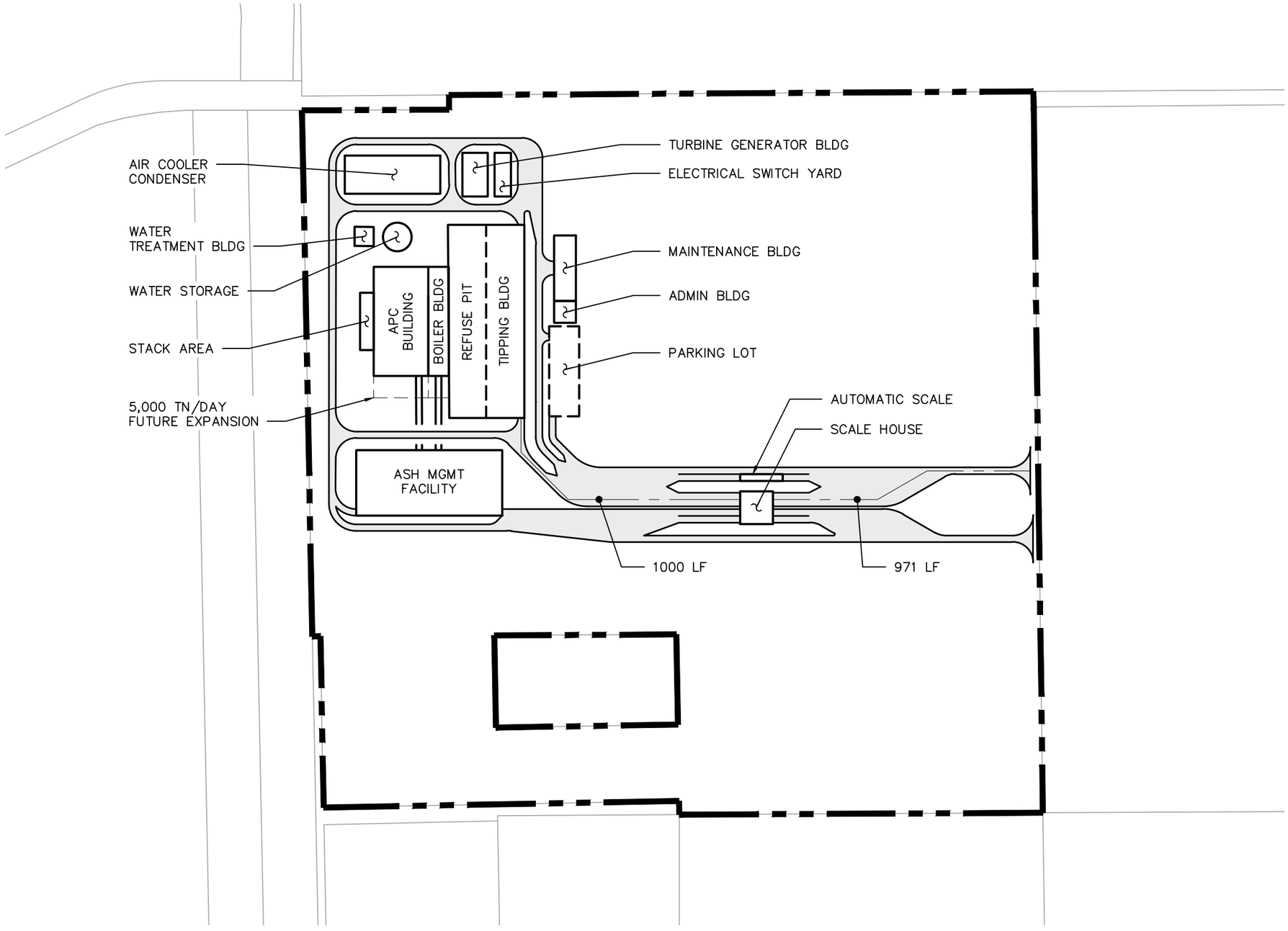
- **Land Acquisition –** siting analysis and land acquisition will increase costs.
- **Soils** – The removal and replacement of site soils with structural fill and/or rock removal in development areas. Additional structural fill will be needed to elevate the tipping floor and pit due to high groundwater.
- **Utilities**
  - Construction of a potable water booster station and 3.3 miles of water main will likely be required.
  - Construction of an on-site wastewater lift station and 3.3 miles of force main will likely be required.
  - Construction of approximately 5.5 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
  - Soils data indicates shallow depth to bedrock, rock removal may be required in some areas for utility pipe trench excavation.
  - Construction of approximately 6.5 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
  - Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
  - On-site water wells are likely not permittable, therefore potable water will need to be purchased, increasing anticipated operations and maintenance costs.
- **Permitting –** Based on projected emissions for a 4,000 tpd facility, preliminary evaluation indicates that this parcel may be too close to sensitive receptors in the nearby Class I area thus making it extremely difficult to demonstrate acceptable impacts for PSD permit issuance.
- **Stormwater** – High groundwater table and required floodplain compensating storage will significantly increase both the cost and site area required for stormwater retention.

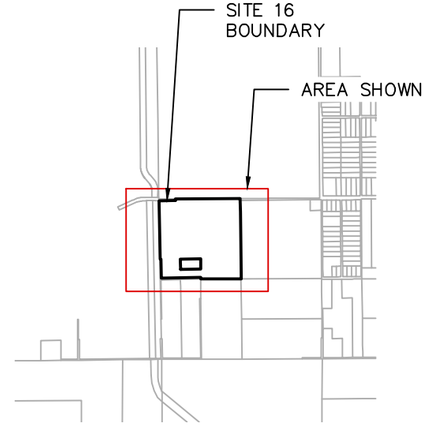
Analysis Summary – Alternative Site No. 16 – Ingraham Hwy. Site #1

- **Solid Waste System**
  - Collection and Transfer vehicles routed to this site would have significantly increased costs for fuel consumption, driver time, and vehicle wear related to the additional travel distance from the existing RRF.
  - Ash hauling costs for a new WTE facility located at this site are expected to be much higher than the existing RRF. An option to keep ash hauling distances short - there appears to be sufficient area on site to co-locate a new ash monofil, if permittable. If disposed at a non-County facility, costs for ash disposal would significantly increase from current levels.

Site Differentiators Overview

- Removal of soils and replacement with structural fill
- Additional structural fill for tipping floor pit due to high groundwater
- Floodplain compensating storage
- Extremely difficult PSD permitting
- Long extensions of utilities
- Close proximity to Everglades National Park – anticipated environmental group and community organization opposition





KEY PLAN
N.T.S.

0 400' 800'

ARCADIS

MIAMI-DADE COUNTY

MIAMI-DADE DEPT OF SOLID WASTE MANAGEMENT

FUTURE WTE FACILITY SITING ALTERNATIVES ANALYSIS

WASTE-TO-ENERGY FACILTY

CONCEPTUAL 4,000 TPD SITE LAYOUT
FOLIO No. 30-8808-000-0020/0030

JUNE 2022

SITE 16

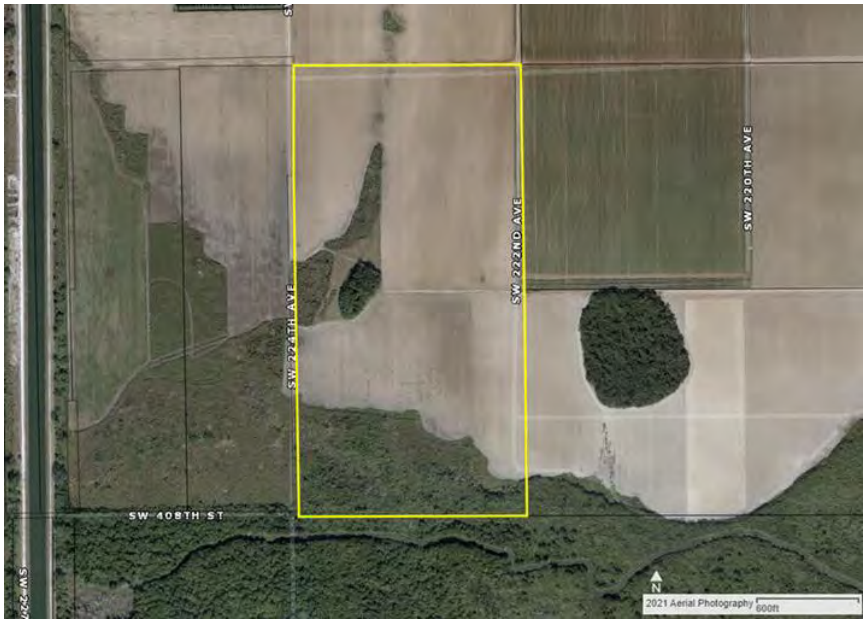
Future Waste-To-Energy Facility Siting Alternatives Analysis

Analysis Summary – Alternative Site No. 17

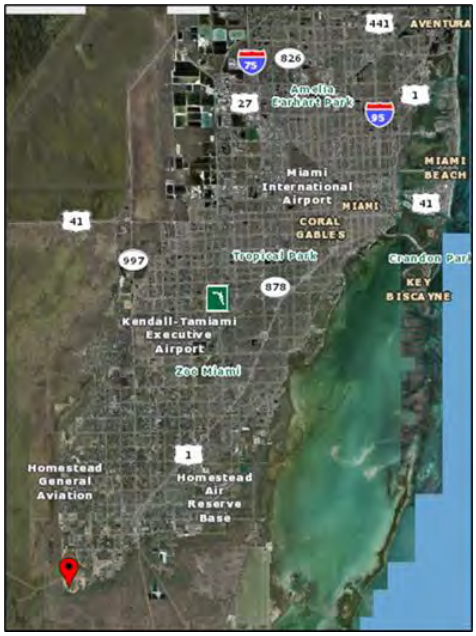
Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
✗	✗	✗	✗	–	✗	✗	✗

MDPA Parcel Map



Location Map



Site Information

This 81.11-acre site is a single parcel outside the UDB, located in unincorporated Miami-Dade County. The combined site area is sufficient to support the proposed 4,000 ton per day (tpd) Waste-to-Energy (WTE) facility and expansion to 5,000 tpd capacity or the addition of other facilities such as an ash monofil, recycling center or an education center. The property is less than a 10-minute travel time to W Palm Drive, is 0.53 miles from the nearest residential zoning, and is 1.28 miles from the boundary of Everglades National Park.

MDPA Parcel Data

Folio No: 30-8808-000-0040

Owner: EIP IV FL Round Hammock Land Co., LLC

2021 MDPA Market Value: $924,826

Zoning District: AU

PA Zone: Interim - Agricultural

Analysis Summary – Alternative Site No. 17

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 33.0 miles SW of the existing RRF site, slightly more than half a mile from the nearest residential zoning, and approximately one mile from the boundary of Everglades National Park. If this site were selected, the effects on the County's Solid Waste System would be considerable. Direct hauls from the collection routes in the vicinity of the existing RRF would divert to the three transfer stations for disposal. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station would need to be constructed at or near the site of the existing RRF to maintain the current collection patterns and transfer station loadings.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would significantly increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and would likely result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would significantly increase due to the additional deliveries and travel times and distances, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be significantly higher than at the existing RRF. If disposed at a non-County facility, expected costs for ash disposal would increase even further.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. Potable water mains appear to be available approximately 4.0 miles NE of the site on Ingraham Hwy., but further analysis is needed to verify service pressure and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. Appears to be available approximately 4.0 miles NE of the site on Ingraham Hwy., on-site lift station and about 4.0 miles of force main will likely be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest transmission main is approximately 6.0 miles NE of the site on Krome Ave/US-1. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

Analysis Summary – Alternative Site No. 17

- **Electric** – Nearest substation/ switchyard is Florida City Substation located 6.5 miles away at 33800 SW 202nd Avenue. Need to verify substation/switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/FPL Easements. New legal easements may need to be established to complete this routing.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the predominant site soils as Krome very gravelly marly loam, 1 to 2 percent slopes, Biscayne marly silt loam, drained, 0 to 1 percent slopes, and Chekika very gravelly marly loam, 1 to 2 percent slopes. Generally, these soils are not well suited for building foundations because of water content and shallow depth to bedrock (typically 5-7 inches).

The presence of Biscayne marl soils indicates the seasonal high groundwater elevation is typically within 10 inches of the ground surface, but would need to be confirmed by geotechnical investigations. These soils are severely limited for building foundations because of water content and shallow depth to bedrock, and areas under building foundations would need to be removed and replaced with structural fill. The high groundwater may result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone A.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification** – A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.). The PSC “need determination” filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 1.28 mi (2.1 km) E of the Everglades Class I Area, 13.12 mi (21.2 km) W of the Biscayne Class II Area, and about 12.8 miles WSW of the FPL Turkey Point Power Plant, a large source of emissions.

  As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the

PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

The nearby Everglades National Park's location along the western border of the County and the Biscayne Bay National Park (sensitive Class II area) located on the eastern border of the County both have more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s). Based on projected emissions for a 4,000 tpd facility, preliminary evaluation indicates that this parcel may be too close to sensitive receptors in the nearby Class I area thus making it extremely difficult to demonstrate acceptable impacts for PSD permit issuance.

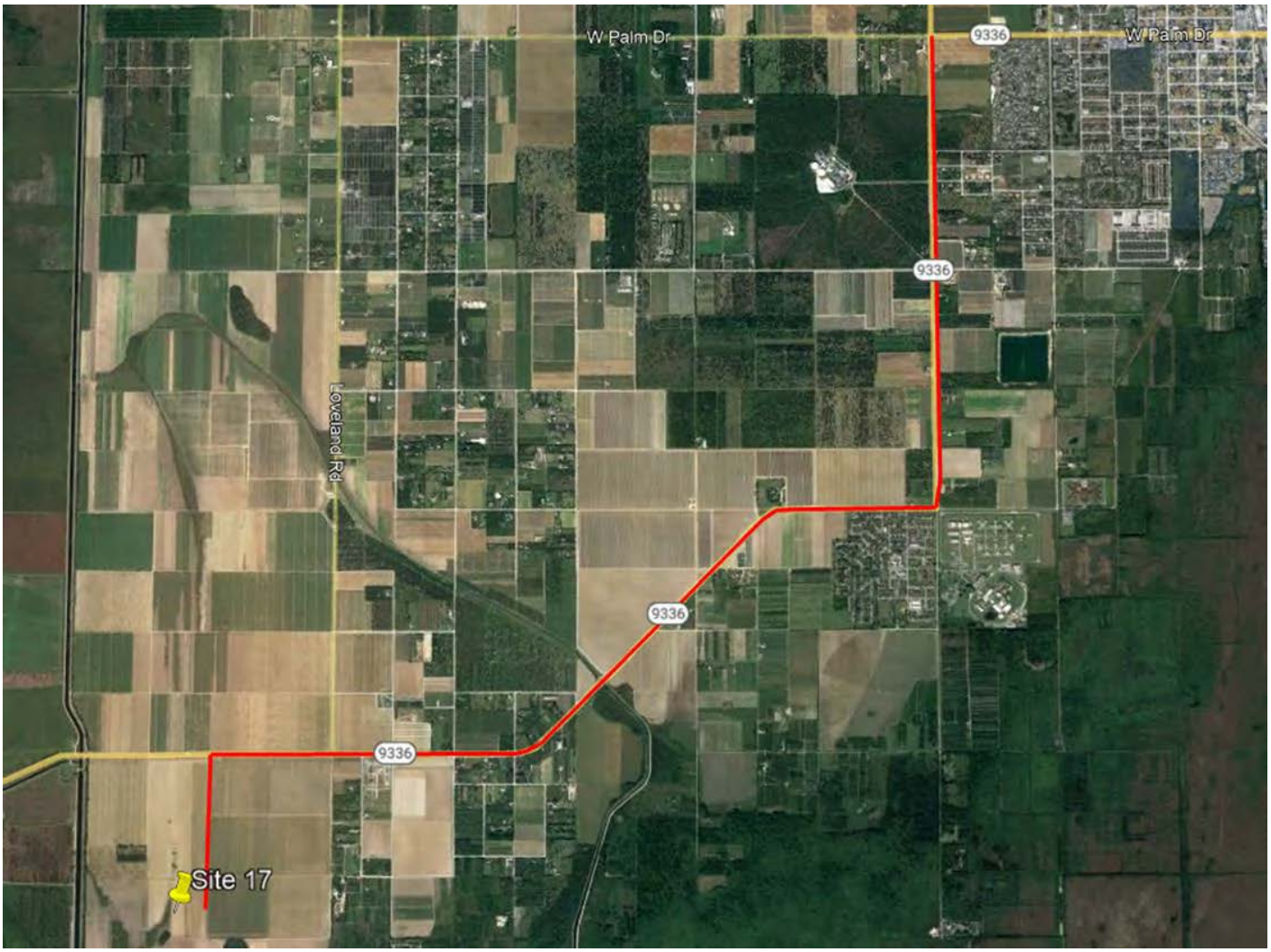
- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site contains wetlands. The site is within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required.

Transportation

Travel time north to W Palm Drive is less than 10 minutes. Existing access to site is via Ingraham Hwy. and SW 222nd Ave. (see map below), but approximately 0.75 miles of two-lane road with paved shoulders will need to be constructed for proper site access. Additional ROW may have to be acquired.

The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts on Ingraham Hwy., W Palm Drive, and other local roads may be significant. Truck queuing will have to be accomplished on site to prevent further congestion.

Analysis Summary – Alternative Site No. 17



Community

The USEPA EJScreen Standard Report indicated no existing environmental justice issues for this site. However, the site is about half a mile from the nearest residential zoning and is approximately 1.28 miles from the boundary of Everglades National Park, which suggests that the siting of a WTE facility may be strongly opposed by environmental groups and community organizations at this location.

Schedule

There are a few site issues that could affect the schedule of the project, including:

- **Soils** – The removal and replacement of site soils with structural fill and/or rock removal in development areas. Additional structural fill will be needed to elevate the tipping floor and pit due to high groundwater.

Analysis Summary – Alternative Site No. 17

- **Permitting** – Based on projected emissions for a 4,000 tpd facility, preliminary evaluation indicates that this parcel may be too close to sensitive receptors in the nearby Class I area thus making it extremely difficult to demonstrate acceptable impacts for PSD permit issuance.
- **Community** – The close proximity of the site to Everglades National Park may result in significant opposition from the community and could significantly affect the project schedule.
- **Mitigation** – Wetland, floodplain, and wildlife mitigation will likely increase project schedule.

Cost

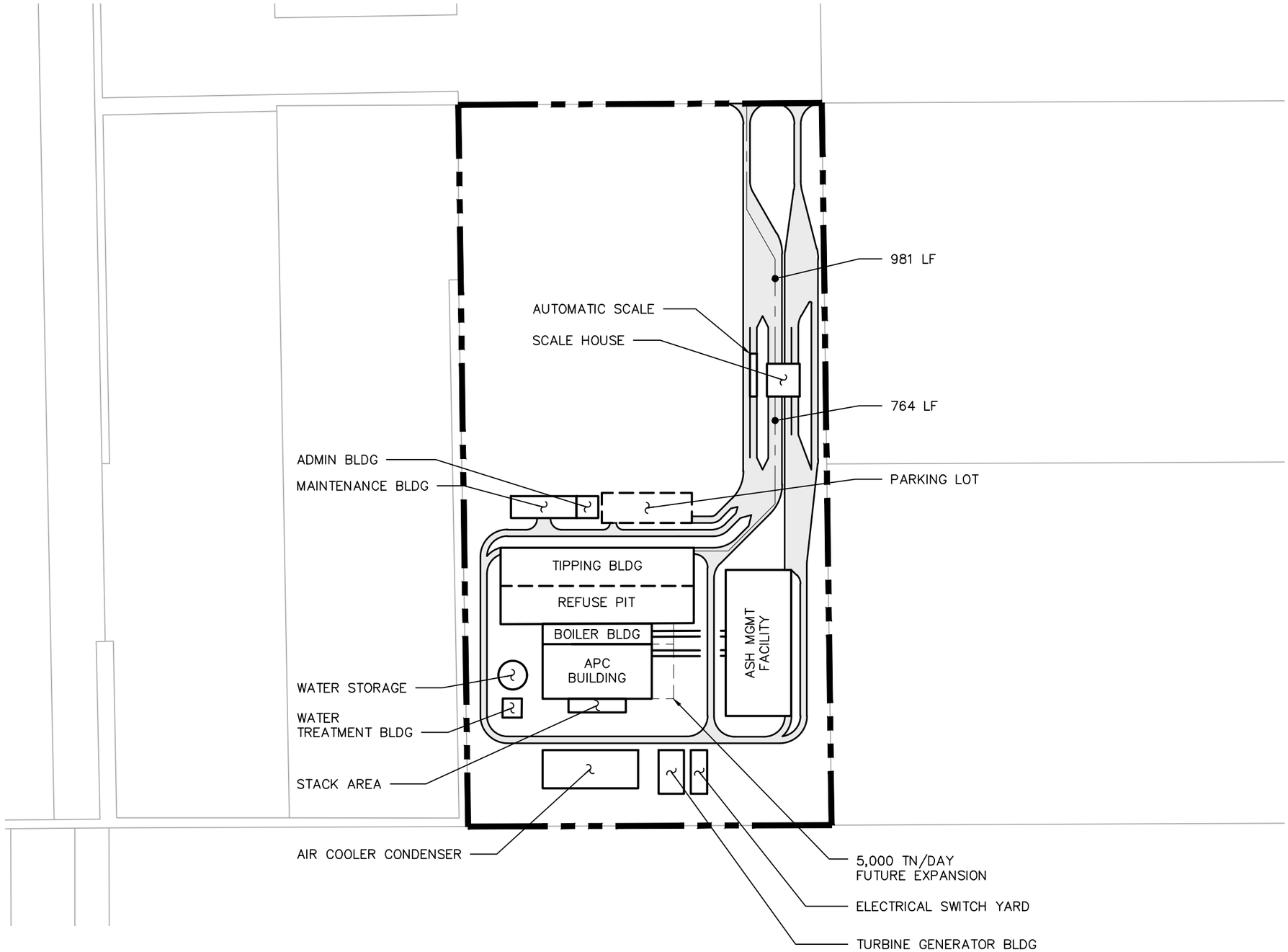
Overall, the cost of developing a WTE facility on this site is expected to be higher than at the existing RRF site, which was used as the base case in comparing the cost of developing a new WTE facility. Issues that could affect the cost include:

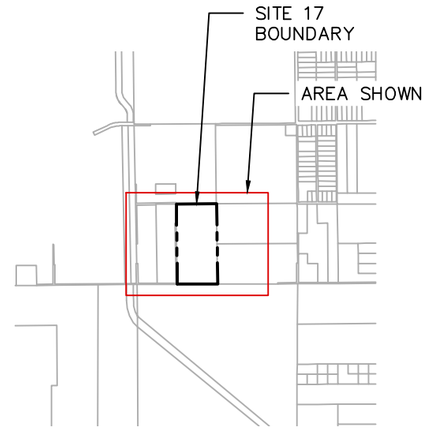
- **Land Acquisition –** siting analysis and land acquisition will increase costs.
- **Soils** – The removal and replacement of site soils with structural fill and/or rock removal in development areas. Additional structural fill will be needed to elevate the tipping floor and pit due to high groundwater.
- **Utilities**
  - Construction of a potable water booster station and 4.0 miles of water main will likely be required.
  - Construction of an on-site wastewater lift station and 4.0 miles of force main will likely be required.
  - Construction of approximately 6.0 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
  - Soils data indicates shallow depth to bedrock, rock removal may be required in some areas for utility pipe trench excavation.
  - Construction of approximately 6.0 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
  - Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
  - On-site water wells are likely not permittable, therefore potable water will need to be purchased, increasing anticipated operations and maintenance costs.
- **Permitting –** Based on projected emissions for a 4,000 tpd facility, preliminary evaluation indicates that this parcel may be too close to sensitive receptors in the nearby Class I area thus making it extremely difficult to demonstrate acceptable impacts for PSD permit issuance.
- **Stormwater** – High groundwater table and required floodplain compensating storage will significantly increase both the cost and site area required for stormwater retention.
- **Solid Waste System**

- Collection and Transfer vehicles routed to this site would have significantly increased costs for fuel consumption, driver time, and vehicle wear related to the additional travel distance from the existing RRF.
- Ash hauling costs for a new WTE facility located at this site are expected to be much higher than the existing RRF. An option to keep ash hauling distances short - there appears to be sufficient area on site to co-locate a new ash monofil, if permittable. If disposed at a non-County facility, costs for ash disposal would significantly increase from current levels

Site Differentiators Overview

- Removal of muck soils and replacement with structural fill
- Additional structural fill for tipping floor pit due to high groundwater
- Floodplain compensating storage
- Construction of 0.75 mile of access road
- Extremely difficult PSD permitting
- Long extensions of utilities
- Close proximity to Everglades National Park – anticipated environmental group and community organization opposition





KEY PLAN
N.T.S.

0 400' 800'

ARCADIS

MIAMI-DADE COUNTY

MIAMI-DADE DEPT OF SOLID WASTE MANAGEMENT

FUTURE WTE FACILITY SITING ALTERNATIVES ANALYSIS

WASTE-TO-ENERGY FACILTY

CONCEPTUAL 4,000 TPD SITE LAYOUT
FOLIO No. 30-8808-000-0040

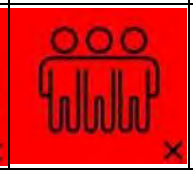
JUNE 2022

SITE 17

Future Waste-To-Energy Facility Siting Alternatives Analysis

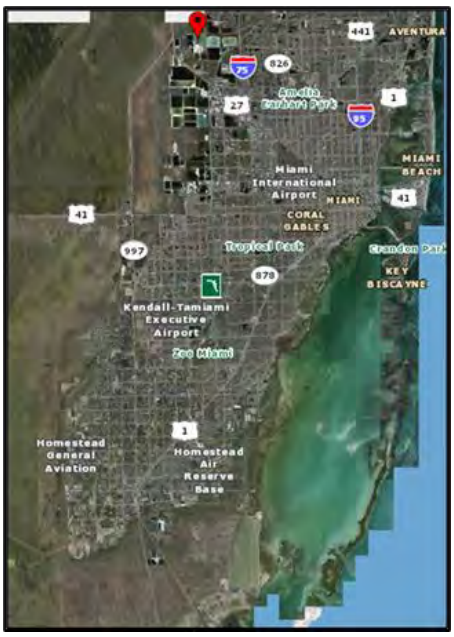
Analysis Summary – Alternative Site No. 2

Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
						N/A	N/A

MDPA Parcel Map

Location Map



Site Information

This 302.52-acre site is a single parcel outside the UDB, located in unincorporated Miami-Dade County. The combined site area is sufficient to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility and expansion to 5,000 TPD capacity or the addition of other facilities such as an ash monofil, recycling center or an education center. The property is less than a 10-minute travel time to US-27, is 0.57 miles from the nearest residential zoning, and 13.78 mi (22.2 km) from the boundary of Everglades National Park.

MDPA Parcel Data

Folio No: 30-2901-001-0040

Owner: Vecellio and Grogan, Inc.

2021 MDPA Market Value: $1,383,917

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 2

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 8.0 miles NW of the existing RRF, more than four miles from any active airport, 0.57 miles from the nearest residential zoning, and 13.8 miles from the boundary of Everglades National Park. If this site were selected, the expected effects on the County's Solid Waste System may be significant. Direct hauls from the collection routes in the vicinity of the existing RRF would likely decline, as some collection trucks would reroute to the Northeast and West Transfer Stations for disposal to reduce travel times. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. Transfer deliveries from those facilities would increase. A new transfer station may need to be constructed at or near the site of the existing RRF to maintain the current collection patterns and transfer station loadings.

The deliveries by transfer trucks from the landfills, transfer stations, and TRCs that are currently routed to the RRF would adjust to rebalance loadings at the transfer stations. The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would likely increase, their travel patterns would be altered, and travel times would significantly increase due to longer travel distances and expected traffic congestion. As a result, additional transfer fleet vehicles and drivers may be needed to maintain waste delivery volumes. Also, collection and transfer fleet fuel consumption and costs would increase.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. Potable water mains appear to be available approximately 4.0 miles east of the site on NW 186th St., but further analysis is needed to verify pipe size, service pressure, and system capacity. A booster station may be needed to provide adequate service pressure at the site. Soils data indicates shallow depth to bedrock, rock removal may be required for pipe trench excavation.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. The closest sanitary sewer collection system appears to be approximately 4.0 miles east of the site on NW 186th St., but further analysis is needed to verify capacity and system impacts. An on-site lift station and about 4.0 miles of 6" force main will likely be required. Soils data indicates shallow depth to bedrock, rock removal may be required for pipe trench excavation.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest gas transmission main is approximately 6.0 miles southeast of the site on SR 826. Additional ROW/easement may be needed. Soils data indicates shallow depth to bedrock, rock removal may be required for pipe trench excavation.

Analysis Summary – Alternative Site No. 2

- **Electric** – Nearest substation/ switchyard is FPL Substation located 6.7 miles away at 10800 NW 107th Avenue. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements. New legal easements may need to be established to complete this routing.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soils

The USDA Soil Survey data for the site and historical aerial photos indicate all but approximately 24 acres of the site area was previously excavated as a quarry and subsequently backfilled. This is consistent with the USDA Soil Survey data for the site, which classifies the predominant site soils as 9—Udorthents-Water-Urban land complex, 0 to 60 percent slopes. Udorthents soils consist of unconsolidated or heterogeneous geologic material removed during the excavation of ditches, canals, lakes, ponds, and quarries.

In order for the facility to be located at this site, the facility buildings and ancillary components would have to be constructed on fill material, which would present significant geotechnical engineering challenges for foundation designs and additional site preparation costs.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone A.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC “need determination” filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 7.13 mi (11.5 km) E of the Everglades Class I Area, 6.68 mi (10.8 km) W of the Biscayne Class II Area, and about 6.5 miles WSW of the FPL Turkey Point Power Plant, a large source of emissions.

  As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control

Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory and National Hydrography Dataset indicate surface waters are present and no wetlands are present. The South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site is comprised of rock quarry and upland shrub and brushland. The site appears disturbed with minimal vegetation cover. The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required but is assumed to be minimal as there is minimal to no roosting or foraging habitat remaining. The site is also within 18.6 miles of an active wood stork colony; however, the lack of apparent suitable foraging habitat precludes wood stork mitigation. An Environmental Resource Permit and State 404 Permit is likely required.
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

Transportation

Travel time to US-27 from the site is less than 10 minutes. Existing access to site is via unpaved single-lane road, as shown at right. Approximately 1.5 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access. Additional easement/ROW will have to be acquired. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts to US-27 and the local area will likely be significant. Truck queuing will have to be accomplished on site to prevent further congestion.

Analysis Summary – Alternative Site No. 2

Community

The USEPA EJScreen Standard Report indicated no existing issues for this site. However, the site is 0.58 miles from the nearest residential zoning and is a SFWMD CERP site, which suggests that the siting of a WTE facility may be strongly opposed by the community at this location.

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

Analysis Summary – Alternative Site No. 2

Site Differentiators Overview

- New transfer station in the vicinity of the existing RRF to maintain current collection patterns and loadings on the existing transfer stations, with associated O&M and staffing costs
- Additional transfer fleet and staff, additional fuel and fleet maintenance costs
- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Construction of approximately 1.5 miles of two-lane road with paved shoulder and stormwater controls for proper site access.
- Construction of approximately 4.0 miles of 12” water main and possibly a booster station will be required.
- Construction of an on-site wastewater lift station and about 4.0 miles of 6” force main will likely be required.
- Construction of approximately 6.0 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Soils data indicates shallow depth to bedrock, rock removal may be required for utility pipe trench excavation.
- Construction of approximately 6.7 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

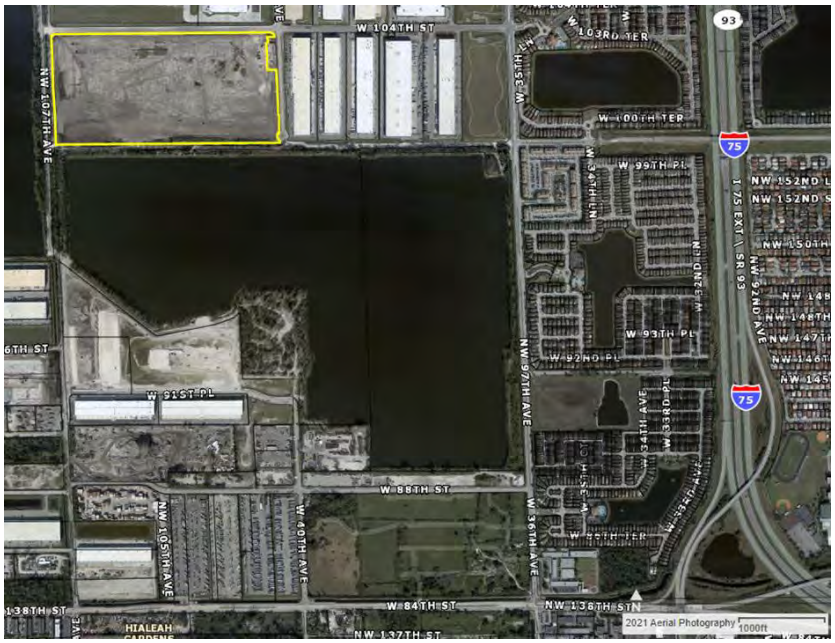
Future Waste-To-Energy Facility Siting Alternatives Analysis

Analysis Summary – Alternative Site No. 3

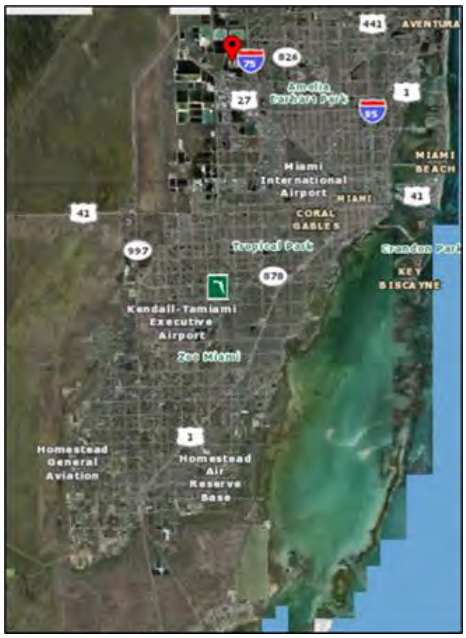
Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
✓	–	✗	–	✓	✗	N/A	N/A

MDPA Parcel Map



Location Map



Site Information

This 73.31-acre site is located inside the UDB, in the City of Hialeah, 0.52 miles from residential zoning and 13.11 miles from the Everglades Class I Area. The site measures approximately 1,300 feet x 2,650 feet, large enough to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility, and expansion to 5,000 TPD capacity or the addition of smaller facilities such as a recycling center or an education center. The property is less than a 10-minute travel time to I-75 or the Turnpike and is located 0.52 miles from the nearest residential zoning.

MDPA Parcel Data

Folio No: 04-2017-003-0010

Owner: Countyline 2, LLC

2021 MDPA Market Value: $76,651,656

Zoning District: A

PA Zone: Agriculture

Analysis Summary – Alternative Site No. 3

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 5.2 miles north of the existing RRF, more than four miles from any active airport, and 0.52 miles from the nearest residential zoning. If this site were selected, the expected effects on the County's Solid Waste System may be less than other sites. Direct hauls from the collection routes in the vicinity of the existing RRF would likely decline, as some collection trucks would reroute to the Northeast and West Transfer Stations for disposal to reduce travel times. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would increase due to longer travel distances and expected traffic congestion. Although additional transfer fleet vehicles and drivers would be routed to the site to maximize WTE processing capacity, they would be rerouting from deliveries to non-DSWM disposal sites and the acquisition of additional fleet vehicles and driver staffing may not be needed. Transfer fleet fuel consumption and maintenance costs would increase due to the additional deliveries, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be higher than at the existing RRF. There are multiple options to keep ash hauling distances short - the existing RRF site could be converted to an ash monofill, or ash generated at this location may be landfilled at the adjacent Medley Landfill, or there appears to be sufficient area on site to co-locate a new ash monofill. If disposed at a non-County facility, costs for ash disposal would significantly increase from current levels.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. Potable water mains appear to be available at the site, but further analysis is needed to verify pipe size, service pressure, and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. Sanitary sewer appears to be available at the site, but further analysis is needed to verify capacity and system impacts. An on-site lift station 6" force main may be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest gas transmission main is approximately 3.5 miles east of the site. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.
- **Electric** – Nearest substation/ switchyard is FPL Substation located 4.9 miles away at 10800 NW 107th Avenue. Need to verify substation/ switchyard spare capacity, voltage, and available

terminations. Proposed transmission line routing through existing ROW/ FPL Easements. New easements may need to be established to complete this routing.

- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the predominant site soils as Cooper Town muck and Shark Valley muck. They are not suitable for foundations and would need to be removed and replaced with structural fill for foundation areas, which will increase project costs.

In these soils the seasonal high groundwater elevation is typically 0-6 inches below existing grade but would have to be confirmed by geotechnical investigations. The high groundwater will result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone AE (El. 6 ft). High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC “need determination” filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 13.11 miles (21.1 km) NE of the Everglades Class I Area, 19.56 miles (31.5 km) NW of the Biscayne Class II Area, and about 2.5 miles NNE of the Titan Pennsuco Complex, a large source of emissions.

  As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate

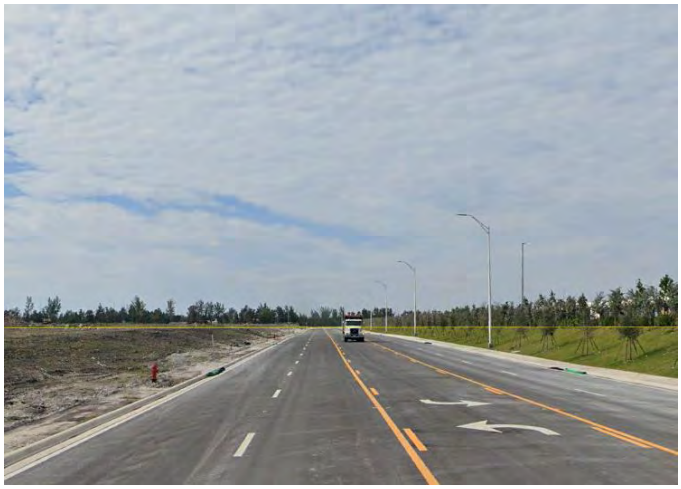
vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site contains no wetlands. Apparent previous clearing and grubbing was done, could still be considered wetland if no previous permit to impact. Cooper town muck is hydric soil. The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is not within the urban development boundary in Miami-Dade County for the Florida bonneted bat. **Site development underway - site was recently cleared, permit review indicated Class I well under construction.**

Transportation

Travel time to the Florida Turnpike and I-75 is less than 10 minutes. Existing access to site is via NW 136th St./97th Ave., roads are well developed, as shown at right. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts to local area will likely be significant. Truck queuing will have to be accomplished on site to prevent further congestion. Traffic impacts to local area may be significant due to single point of access on 97th Ave. Truck queuing will have to be accomplished on site to prevent further congestion of local roads.



Analysis Summary – Alternative Site No. 3

Community

The USEPA EJScreen Standard Report indicated no community impacts for this site. However, the site is just over half a mile from the nearest residential zoning, which suggests that the siting of a WTE facility may face community opposition at this location.

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Existing access to site is via NW 136th St./97th Ave., roads are well developed.

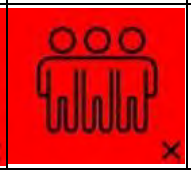
Analysis Summary – Alternative Site No. 3

- Potable water and sanitary sewer appear to available at the site.
- Construction of approximately 3.5 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 4.9 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Additional ROW/easements may be needed to complete routing of natural gas and electric utility infrastructure.
- **Site development underway - site was recently cleared, permit review indicated Class I well under construction.**

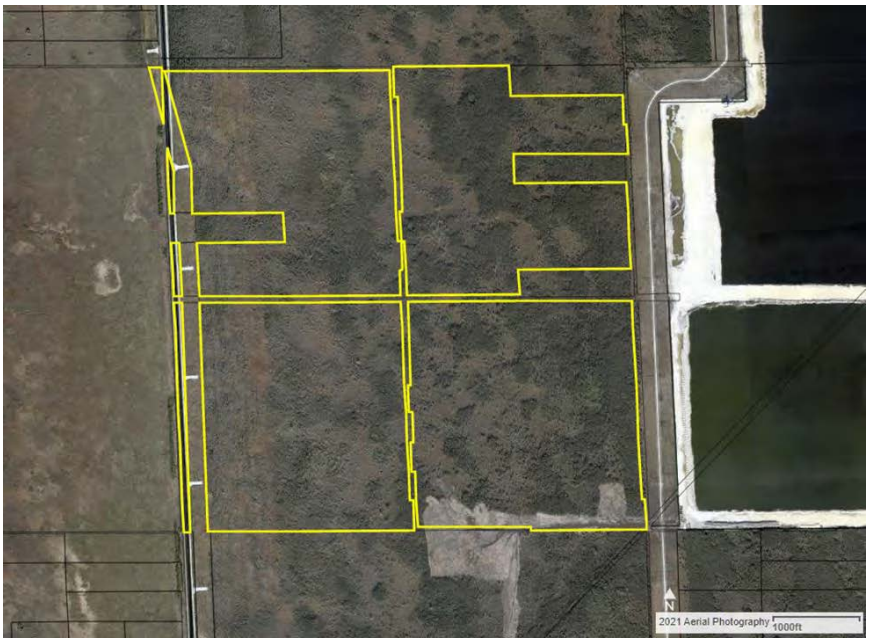
Future Waste-To-Energy Facility Siting Alternatives Analysis

Analysis Summary – Alternative Site No. 4

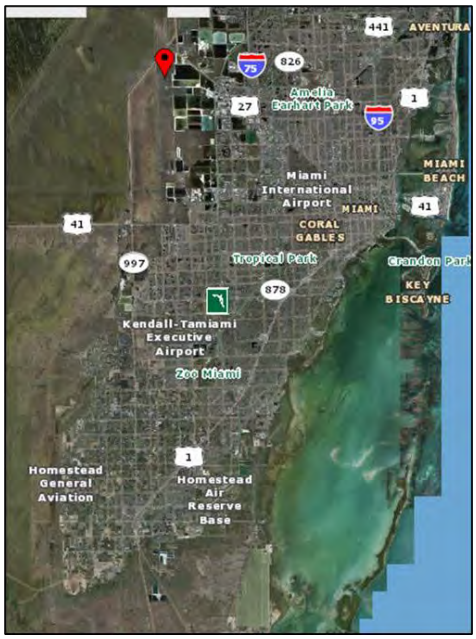
Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
						N/A	N/A

MDPA Parcel Map



Location Map



Site Information

This 559.05-acre property is a single parcel outside the UDB, located in unincorporated Miami-Dade County. The site is composed of several parcel areas and measures approximately one mile square, large enough to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility, and expansion to 5,000 TPD capacity or the addition of other facilities such as an ash monofil, recycling center or an education center. The property is less than a 10-minute travel time to US-27 or the Florida Turnpike and is located 1.93 miles from the nearest residential zoning. The north boundary of the site borders ME Thompson Park.

MDPA Parcel Data

Folio No: 30-2921-001-0020

Owner: CEMEX Construction Materials Florida, LLC

2021 MDPA Market Value: $10,664,225

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 4

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 7.0 miles northeast of the existing RRF, almost two miles from the nearest residential zoning, and 9.94 miles northeast of the boundary of Everglades National Park. If this site were selected, the expected effects on the County's Solid Waste System may be significant. Direct hauls from the collection routes in the vicinity of the existing RRF would likely decline, as many collection trucks would reroute to the Northeast and West Transfer Stations for disposal to reduce travel times. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station in the vicinity of the existing RRF facility would likely be needed to maintain current collection and transfer flow patterns.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and may result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would increase due to the additional deliveries, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be higher than at the existing RRF. There are options to keep ash hauling distances relatively short - the existing RRF site could be converted to an ash monofill, or ash generated at this location may be landfilled at the Medley Landfill. If disposed at a non-County facility, costs for ash disposal would significantly increase from current levels.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. Potable water mains appear to be available approximately 3.0 miles east of the site, but further analysis is needed to verify pipe size, service pressure, and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. The closest sanitary sewer collection system appears to be approximately 3.0 miles east of the site, but further analysis is needed to verify capacity and system impacts. An on-site lift station and about 3.0 miles of force main will likely be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest gas transmission main is approximately 7.0

Analysis Summary – Alternative Site No. 4

miles east of the site. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

- **Electric** – Nearest substation/ switchyard is FPL Substation located 7.4 miles away at 10800 NW 107th Avenue. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements. New legal easements may need to be established to complete this routing.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the site soils as Shark Valley muck, 0 to 1 percent slopes. These soils are high in organics content and may extend 20-40 inches below grade, even to the bedrock layer. They are not suitable for foundations and would need to be removed and replaced with structural fill for foundation areas, which will increase project costs. **USDA aerial photo (right) indicated that an active quarry operation is present at the site.**

In these soils the seasonal high groundwater elevation is typically 0-6 inches below existing grade but would have to be confirmed by geotechnical investigations. The high groundwater will result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone AE (El. 8 ft). High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Modification Application would need to be developed, inclusive of the associated individual permitting processes (Air

Analysis Summary – Alternative Site No. 4

Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process is also required.

- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 9.94 miles (15 km) NE of the Everglades Class I Area, 21.56 miles (35 km) NW of the Biscayne Class II Area, and about 4.1 miles NW of the Titan Pennsuco Complex, a large source of emissions.

  As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

  The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site is entirely wetlands. The site appears predominantly undisturbed. The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required. The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation. Permanent impacts to wetlands would potentially require an Individual Environmental Permit, a State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

- **Species Habitat – Conflict with Policy CON-9A.** MDC Policy CON-9A states that all activities that adversely affect habitat that is critical to Federal, or State designated, endangered or threatened species shall be prohibited unless such activity(ies) are a public necessity and there are no possible alternative sites where the activity(ies) can occur.

- **Species Habitat – Conflict with MDC Policy CON-9B.** MDC Policy CON-9B states that all nesting, roosting and feeding habitats used by federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.

Analysis Summary – Alternative Site No. 4

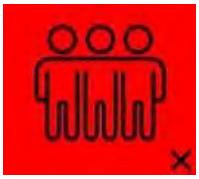
- **Within the Northwest Wellfield Protection Area – Conflict with MDC Policy LU-8G.** MDC Policy LU-8G states that when considering land areas to add to the UDB, after demonstrating that a need exists, the following areas shall not be considered:
  - The Northwest Wellfield Protection Area and the West Wellfield Protection Area west of SW 157 Avenue between SW 8 Street and SW 42 Street
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

Transportation

Travel time to the Florida Turnpike and US-27 is less than 10 minutes. Existing access to site is via unpaved single-lane road (see picture at right), approximately 3.3 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access (see the access route below). Additional easement/ROW will have to be aquired for almost 1.5 miles of the access road from FPL and other property owners. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day) will greatly increase the loads on local roads so the traffic impacts to local area will likely be significant. Additional traffic impacts on US-27 and to local area may result due to single point of access at NW 112th Ct/NW 136th St. Truck queuing will have to be accomplished on site to prevent further congestion of local roads.

Analysis Summary – Alternative Site No. 4

Community



The USEPA EJScreen Standard Report indicated no community impacts for this site. The site is almost two miles from the nearest residential zoning and adjacent to industrial mining operations, but the presence of wetlands, wildlife habitat and other environmental issues suggests that the siting of a WTE facility may be met with opposition by the community at this location.

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Construction of approximately 3.3 miles of two-lane road with paved shoulder and stormwater controls for proper site access
- Construction of approximately three miles of 12” water main and possibly a booster station will be required.
- Construction of an on-site wastewater lift station and about three miles of 4” force main will likely be required.
- Construction of approximately 7 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 7.4 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.
- Permanent impacts to wetlands would potentially require an Individual Environmental Permit, a State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

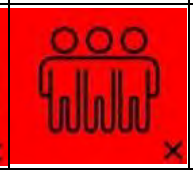
Analysis Summary – Alternative Site No. 4

- **Species Habitat – Conflict with MDC Policy CON-9A and CON-9B.**
- **Within the Northwest Wellfield Protection Area – Conflict with MDC Policy LU-8G.**
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

Future Waste-To-Energy Facility Siting Alternatives Analysis

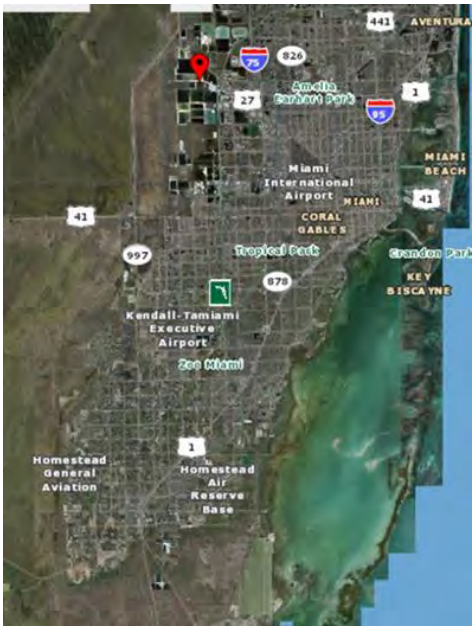
Analysis Summary – Alternative Site No. 5

Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
						N/A	N/A

MDPA Parcel Map

Location Map



Site Information

This 156.97-acre property is a single parcel outside the UDB, located in unincorporated Miami-Dade County. The site measures approximately one mile square, large enough to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility, and expansion to 5,000 TPD capacity or the addition of other facilities such as an ash monofil, recycling center or an education center. The property is less than a 10-minute travel time to US-27 or the Turnpike and is located 1.07 miles from the nearest residential zoning.

MDPA Parcel Data

Folio No: 30-2926-000-0010

Owner: CEMEX Construction Materials Florida, LLC

2021 MDPA Market Value: $2,843,062

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 5

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 5.2 miles northwest of the existing RRF, more than a mile from the nearest residential zoning. If this site were selected, the expected effects on the County's Solid Waste System may be significant. Direct hauls from the collection routes in the vicinity of the existing RRF would likely decline, as many collection trucks would reroute to the Northeast and West Transfer Stations for disposal to reduce travel times. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station in the vicinity of the existing RRF facility would likely be needed to maintain current collection and transfer flow patterns.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and may result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would increase due to the additional deliveries, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be higher than at the existing RRF. There are options to keep ash hauling distances relatively short - the existing RRF site could be converted to an ash monofill, or ash generated at this location may be landfilled at the Medley Landfill. If disposed at a non-County facility, costs for ash disposal would significantly increase from current levels.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. Potable water mains appear to be available approximately one mile east of the site, but further analysis is needed to verify pipe size, service pressure, and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. The closest sanitary sewer collection system appears to be approximately one mile east of the site, but further analysis is needed to verify capacity and system impacts. An on-site lift station and about one mile of 6" force main will likely be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest gas transmission main is approximately 5.0 miles east of the site. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

Analysis Summary – Alternative Site No. 5

- **Electric** – Nearest substation/ switchyard is FPL Substation located 4.5 miles away at 10800 NW 107th Avenue. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements. New easements may need to be established to complete this routing.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention. An existing inactive quarry borders the site to the west, could be purchased and used as stormwater retention for the site.
- **Groundwater** – Groundwater may not be usable as source water for boiler feedwater, cooling tower/condenser feedwater, truck wheel wash, and irrigation water.

Soil

The USDA Soil Survey data for the site classifies the site soils as Shark Valley muck, 0 to 1 percent slopes. These soils are high in organics content and may extend 20-40 inches below grade, even to the bedrock layer. They are not suitable for foundations and would need to be removed and replaced with structural fill for foundation areas, which will increase project costs.

In these soils the seasonal high groundwater elevation is typically 0-6 inches below existing grade, but would have to be confirmed by geotechnical investigations. The high groundwater will result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone AE (El. 8 ft). High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Modification Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC “need determination” filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 10.48 miles (17 km) NE of the Everglades Class I Area, 19.93 miles (32 km) NW of the Biscayne Class II Area, and about 1.7 miles NW of the Titan Pennsuco Complex, a large source of emissions.

  As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

Analysis Summary – Alternative Site No. 5

The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory and National Hydrography Dataset indicate no wetlands or surface waters are present; however, the South Florida Water Management District Land Cover and Land Use 2017-2019 shows wetlands hardwood forest are present. The site appears undisturbed. The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required. The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.

  Permanent impacts to wetlands would potentially require an Individual Environmental Resource Permit, State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

- **Species Habitat – Conflict with Policy CON-9A.** MDC Policy CON-9A states that all activities that adversely affect habitat that is critical to Federal, or State designated, endangered or threatened species shall be prohibited unless such activity(ies) are a public necessity and there are no possible alternative sites where the activity(ies) can occur.

- **Species Habitat – Conflict with MDC Policy CON-9B.** MDC Policy CON-9B states that all nesting, roosting and feeding habitats used by federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.

- **Within the Northwest Wellfield Protection Area – Conflict with MDC Policy LU-8G.** MDC Policy LU-8G states that when considering land areas to add to the UDB, after demonstrating that a need exists, the following areas shall not be considered:

  - The Northwest Wellfield Protection Area and the West Wellfield Protection Area west of SW 157 Avenue between SW 8 Street and SW 42 Street

- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

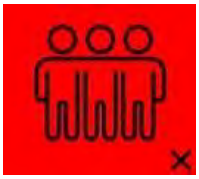
Analysis Summary – Alternative Site No. 5

Transportation

Travel time to Turnpike and US 27 is less than 10 minutes. Existing access to site is via unpaved single-lane road (see picture at right), approximately 1.8 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access (see the access route below). The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day) will greatly increase the loads on local roads and the single point of access at NW 112th Ct/NW 136th St. will likely result in significant traffic impacts to the local area. Truck queuing will have to be accomplished on site to prevent further congestion of local roads. .

Analysis Summary – Alternative Site No. 5

Community



The USEPA EJScreen Standard Report indicated no community impacts for this site. The site is 1.07 miles from the nearest residential zoning and adjacent to industrial mining operations, but the presence of wetlands, wildlife habitat and other environmental issues suggests that the siting of a WTE facility may be met with opposition by the community at this location.

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Construction of approximately 1.8 miles of two-lane road with paved shoulder and stormwater controls for proper site access
- Construction of approximately one mile of 12” water main and possibly a booster station will be required.
- Construction of an on-site wastewater lift station and about one mile of 6” force main will likely be required.
- Construction of approximately 5.0 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 4.5 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.
- Permanent impacts to wetlands would potentially require an Individual Environmental Permit, a State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

Analysis Summary – Alternative Site No. 5

- **Species Habitat – Conflict with MDC Policy CON-9A and CON-9B.**
- **Within the Northwest Wellfield Protection Area – Conflict with MDC Policy LU-8G.**
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

Future Waste-To-Energy Facility Siting Alternatives Analysis

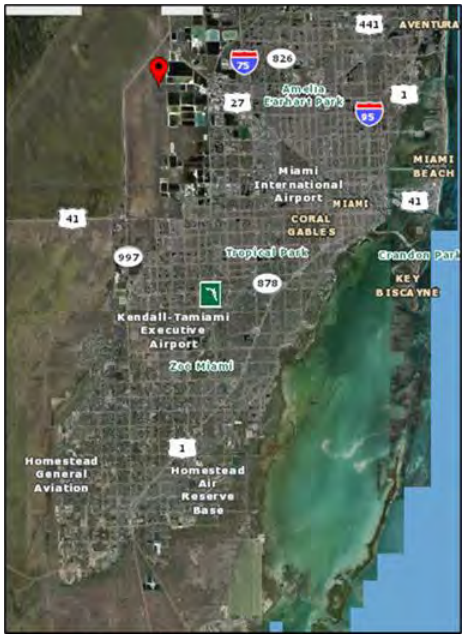
Analysis Summary – Alternative Site No. 6

Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
✕	✕	✕	✕	✕	✕	N/A	N/A

MDPA Parcel Map

Location Map



Site Information

This 628.69-acre property is a single parcel outside the UDB, located in unincorporated Miami-Dade County. The site is large enough to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility, and expansion to 5,000 TPD capacity or the addition of other facilities such as an ash monofil, recycling center or an education center. The property is less than a 10-minute travel time to US-27 and is located 2.32 miles from the nearest residential zoning.

MDPA Parcel Data

Folio No: 30-2928-000-0010

Owner: Southeastern Materials, Inc.

2021 MDPA Market Value: $5,805,800

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 6

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 6.5 miles northeast of the existing RRF, and more than two miles from the nearest residential zoning. If this site were selected, the expected effects on the County's Solid Waste System may be significant. Direct hauls from the collection routes in the vicinity of the existing RRF would likely decline, as many collection trucks would reroute to the Northeast and West Transfer Stations for disposal to reduce travel times. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station in the vicinity of the existing RRF facility would likely be needed to maintain current collection and transfer flow patterns.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and may result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would increase due to the additional deliveries, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be higher than at the existing RRF. There are options to keep ash hauling distances relatively short - the existing RRF site could be converted to an ash monofill, or ash generated at this location may be landfilled at the Medley Landfill. If disposed at a non-County facility, costs for ash disposal would significantly increase from current levels.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. Potable water mains appear to be available approximately 3.0 miles east of the site, but further analysis is needed to verify pipe size, service pressure, and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. The closest sanitary sewer collection system appears to be approximately 3.0 miles east of the site, but further analysis is needed to verify capacity and system impacts. An on-site lift station and about 3.0 miles of force main will likely be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest gas transmission main is approximately 7.0

Analysis Summary – Alternative Site No. 6

miles east of the site. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

- **Electric** – Nearest substation/ switchyard is FPL Substation located 6.7 miles away at 10800 NW 107th Avenue. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements. New legal easements may need to be established to complete this routing.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the site soils as Shark Valley muck, 0 to 1 percent slopes. These soils are high in organics content and may extend 20-40 inches below grade, even to the bedrock layer. They are not suitable for foundations and would need to be removed and replaced with structural fill for foundation areas, which will increase project costs.

In these soils the seasonal high groundwater elevation is typically 0-6 inches below existing grade but would have to be confirmed by geotechnical investigations. The high groundwater will result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone AE (El. 8 ft). High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 9.48 miles (15.26 km) NE of the Everglades Class I Area, 21.08 miles (33.92 km) NW of the Biscayne Class II Area, and about 4.0 miles W of the Titan Pennsuco Complex, a large source of emissions.

As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site is entirely wetlands. The site appears predominantly undisturbed. The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required. The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.
- **Species Habitat – Conflict with Policy CON-9A.** MDC Policy CON-9A states that all activities that adversely affect habitat that is critical to Federal, or State designated, endangered or threatened species shall be prohibited unless such activity(ies) are a public necessity and there are no possible alternative sites where the activity(ies) can occur.
- **Species Habitat – Conflict with MDC Policy CON-9B.** MDC Policy CON-9B states that all nesting, roosting and feeding habitats used by federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.
- **Within the Northwest Wellfield Protection Area – Conflict with MDC Policy LU-8G.** MDC Policy LU-8G states that when considering land areas to add to the UDB, after demonstrating that a need exists, the following areas shall not be considered:
  - The Northwest Wellfield Protection Area and the West Wellfield Protection Area west of SW 157 Avenue between SW 8 Street and SW 42 Street
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include

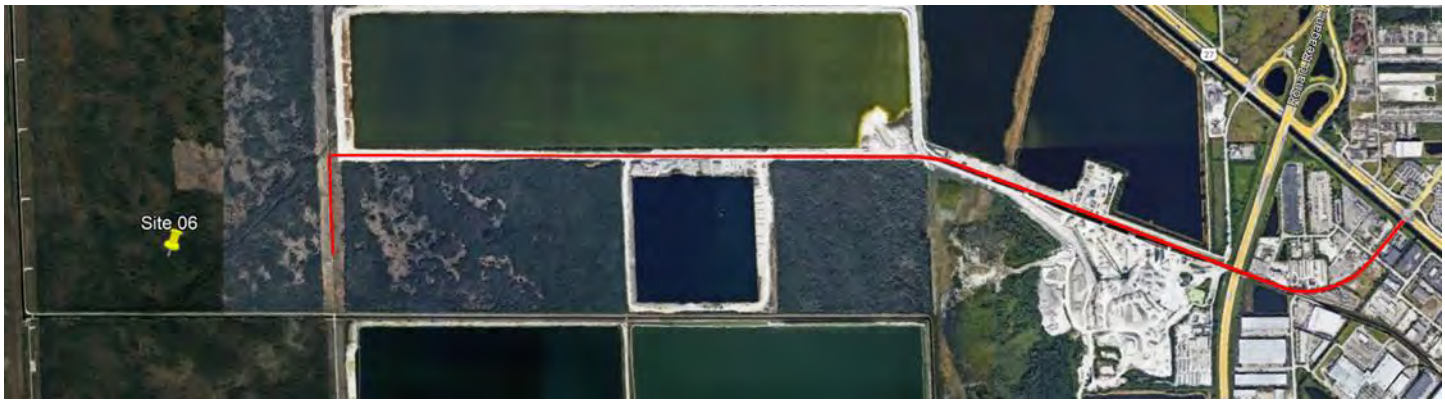
Analysis Summary – Alternative Site No. 6

wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

Transportation

Travel time to US-27 is less than 10 minutes. Existing access to site is via unpaved single-lane road (see picture at right). Approximately 3.6 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access (see the access route below). An additional 1.8 miles of easement/ROW will have to be acquired.

The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts to local area will likely be significant. Additional traffic impacts on US-27 and to local area may result due to single point of access at NW 112th Ct/NW 136th St. Truck queuing will have to be accomplished on site to prevent further congestion of local roads.



Community

The USEPA EJScreen Standard Report indicated no community impacts for this site. The site is more than two miles from the nearest residential zoning and adjacent to industrial mining operations, but the presence of wetlands, wildlife habitat and other environmental issues suggests that the siting of a WTE facility may be met with opposition by the community at this location.

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Analysis Summary – Alternative Site No. 6

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

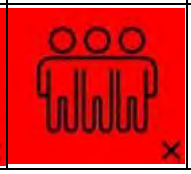
Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Approximately 3.6 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access (see the access route below). An additional 1.8 miles of easement/ROW will have to be acquired.
- Construction of approximately 3.0 miles of 12” water main and possibly a booster station will be required.
- Construction of an on-site wastewater lift station and about 3.0 miles of 6” force main will likely be required.
- Construction of approximately 7.0 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 6.7 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.
- Permanent impacts to wetlands would potentially require an Individual Environmental Permit, a State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.
- **Species Habitat – Conflict with MDC Policy CON-9A and CON-9B.**
- **Within the Northwest Wellfield Protection Area – Conflict with MDC Policy LU-8G.**
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

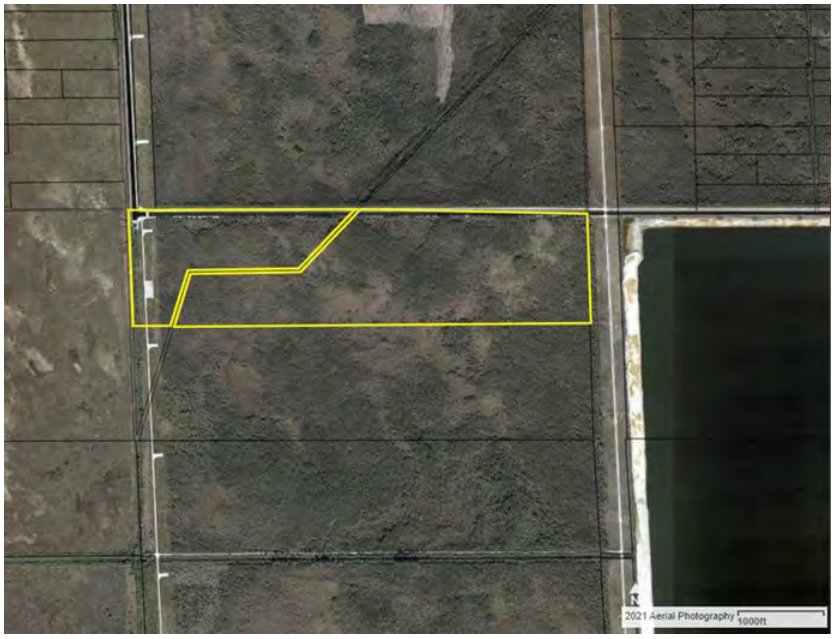
Future Waste-To-Energy Facility Siting Alternatives Analysis

Analysis Summary – Alternative Site No. 7

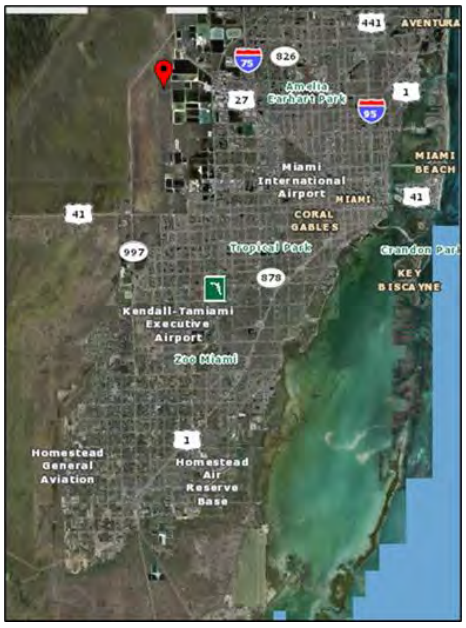
Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
						N/A	N/A

MDPA Parcel Map



Location Map



Site Information

This 144.24-acre property is a single parcel outside the UDB, located in unincorporated Miami-Dade County. The site is large enough to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility, and expansion to 5,000 TPD capacity or the addition of other facilities such as an ash monofil, recycling center or an education center. The property is less than a 10-minute travel time to US-27 and is located 2.59 miles from the nearest residential zoning.

MDPA Parcel Data

Folio No: 30-2928-000-0020

Owner: TARMAC Florida, Inc.

2021 MDPA Market Value: $2,534,330

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 7

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 6.6 miles northwest of the existing RRF, and more than 2.5 miles from the nearest residential zoning. If this site were selected, the expected effects on the County's Solid Waste System may be significant. Direct hauls from the collection routes in the vicinity of the existing RRF would likely decline, as many collection trucks would reroute to the Northeast and West Transfer Stations for disposal to reduce travel times. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station in the vicinity of the existing RRF facility would likely be needed to maintain current collection and transfer flow patterns.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and may result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would increase due to the additional deliveries, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be higher than at the existing RRF. There are options to keep ash hauling distances relatively short - the existing RRF site could be converted to an ash monofill, or ash generated at this location may be landfilled at the Medley Landfill. If disposed at a non-County facility, costs for ash disposal would significantly increase from current levels.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. Potable water mains appear to be available approximately 3.6 miles east of the site, but further analysis is needed to verify pipe size, service pressure, and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. The closest sanitary sewer collection system appears to be approximately 3.6 miles east of the site, but further analysis is needed to verify capacity and system impacts. An on-site lift station and about 3.6 miles of 6" force main may be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest gas transmission main is approximately 7.7

miles east of the site. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

- **Electric** – Nearest substation/ switchyard is FPL Substation located 7.1 miles away at 10800 NW 107th Avenue. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements. New legal easements may need to be established to complete this routing.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the site soils as Shark Valley muck, 0 to 1 percent slopes. These soils are high in organics content and may extend 20-40 inches below grade, even to the bedrock layer. They are not suitable for foundations and would need to be removed and replaced with structural fill for foundation areas, which will increase project costs.

In these soils the seasonal high groundwater elevation is typically 0-6 inches below existing grade, but would have to be confirmed by geotechnical investigations. The high groundwater will result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone AE (El. 8 ft). High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 9.22 miles (14.9 km) NE of the Everglades Class I Area, 20.86 miles (33.7 km) NW of the Biscayne Class II Area, and about 3.5 miles NNW of the Titan Pennsuco Complex, a large source of emissions.

Analysis Summary – Alternative Site No. 7

As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site is entirely wetlands. The site appears predominantly undisturbed. The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required. The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.

  Permanent impacts to wetlands would potentially require an Individual Environmental Resource Permit, State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

- **Species Habitat – Conflict with Policy CON-9A.** MDC Policy CON-9A states that all activities that adversely affect habitat that is critical to Federal, or State designated, endangered or threatened species shall be prohibited unless such activity(ies) are a public necessity and there are no possible alternative sites where the activity(ies) can occur.

- **Species Habitat – Conflict with MDC Policy CON-9B.** MDC Policy CON-9B states that all nesting, roosting and feeding habitats used by federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.

- **Within the Northwest Wellfield Protection Area – Conflict with MDC Policy LU-8G.** MDC Policy LU-8G states that when considering land areas to add to the UDB, after demonstrating that a need exists, the following areas shall not be considered:

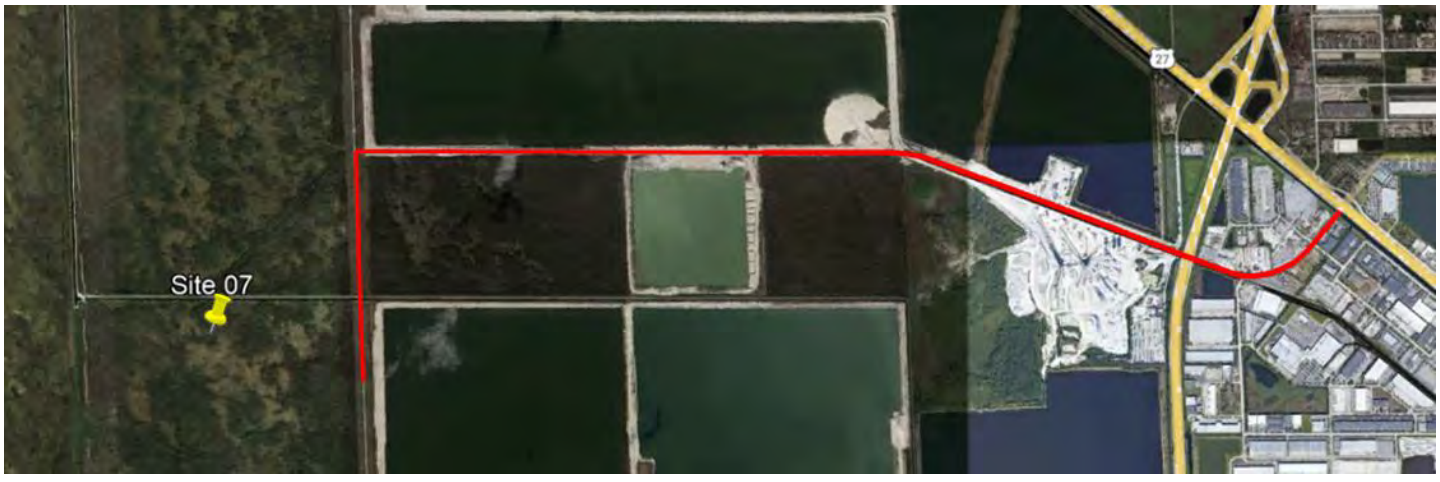
  - The Northwest Wellfield Protection Area and the West Wellfield Protection Area west of SW 157 Avenue between SW 8 Street and SW 42 Street

Analysis Summary – Alternative Site No. 7

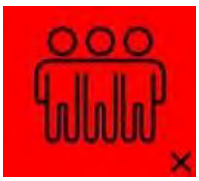
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

Transportation

Travel time to US-27 is less than 10 minutes. Existing access to site is via unpaved single-lane road (see picture at right), approximately 4.1 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access (see the access route below). Additional easement/ROW will have to be aquired for almost 2.3 miles of the access road from FPL and other property owners. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts to local area will likely be significant. Additional traffic impacts on US-27 and to local area may result due to single point of access at NW 112th Ct/NW 136th St. Truck queuing will have to be accomplished on site to prevent further congestion of local roads.



Community



The USEPA EJScreen Standard Report indicated no community impacts for this site. The site is more than two miles from the nearest residential zoning and adjacent to industrial mining operations, but the presence of wetlands, wildlife habitat and other environmental issues suggests that the siting of a WTE facility may be met with opposition by the community at this location.

Analysis Summary – Alternative Site No. 7

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

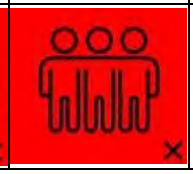
Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Approximately 4.1 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access (see the access route below). An additional 2.3 miles of easement/ROW will have to be acquired.
- Construction of approximately 3.6 miles of 12” water main and possibly a booster station will be required.
- Construction of an on-site wastewater lift station and about 3.6 miles of 6” force main will likely be required.
- Construction of approximately 7.7 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 7.1 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.
- Permanent impacts to wetlands would potentially require an Individual Environmental Permit, a State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.
- **Species Habitat – Conflict with MDC Policy CON-9A and CON-9B.**
- **Within the Northwest Wellfield Protection Area – Conflict with MDC Policy LU-8G.**
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

Future Waste-To-Energy Facility Siting Alternatives Analysis

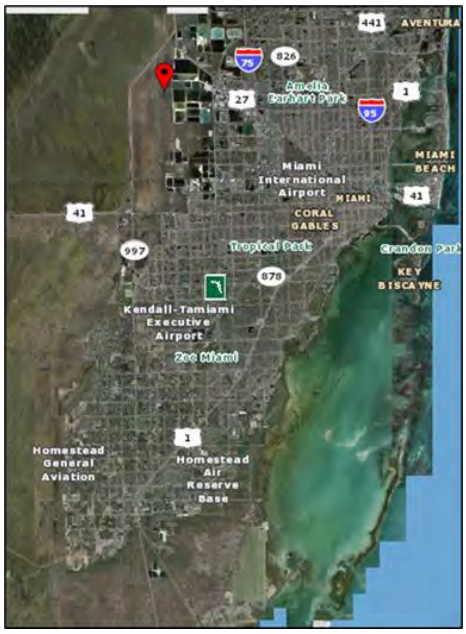
Analysis Summary – Alternative Site No. 8

Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
						N/A	N/A

MDPA Parcel Map

Location Map



Site Information

This 150.75-acre property is a single parcel outside the UDB, located in unincorporated Miami-Dade County. The site is large enough to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility, and expansion to 5,000 TPD capacity or the addition of other facilities such as an ash monofil, recycling center or an education center. The property is less than a 10-minute travel time to US-27 and is located 2.74 miles from the nearest residential zoning.

MDPA Parcel Data

Folio No: 30-2928-000-0030

Owner: TARMAC Florida, Inc.

2021 MDPA Market Value: $2,908,000

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 8

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 6.0 miles northwest of the existing RRF, and more than 2.7 miles from the nearest residential zoning. If this site were selected, the expected effects on the County's Solid Waste System may be significant. Direct hauls from the collection routes in the vicinity of the existing RRF would likely decline, as many collection trucks would reroute to the Northeast and West Transfer Stations for disposal to reduce travel times. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station in the vicinity of the existing RRF facility would likely be needed to maintain current collection and transfer flow patterns.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and may result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would increase due to the additional deliveries, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be higher than at the existing RRF. There are options to keep ash hauling distances relatively short - the existing RRF site could be converted to an ash monofill, or ash generated at this location may be landfilled at the Medley Landfill. If disposed at a non-County facility, costs for ash disposal would significantly increase from current levels.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. Potable water mains appear to be available approximately 4.0 miles east of the site, but further analysis is needed to verify pipe size, service pressure, and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. The closest sanitary sewer collection system appears to be approximately 4.0 miles east of the site, but further analysis is needed to verify capacity and system impacts. An on-site lift station and about 4.0 miles of 6" force main may be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest gas transmission main is approximately 8.0

miles east of the site. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

- **Electric** – Nearest substation/ switchyard is FPL Substation located 7.4 miles away at 10800 NW 107th Avenue. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements. New legal easements may need to be established to complete this routing.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the site soils as Shark Valley muck, 0 to 1 percent slopes. These soils are high in organics content and may extend 20-40 inches below grade, even to the bedrock layer. They are not suitable for foundations and would need to be removed and replaced with structural fill for foundation areas, which will increase project costs.

In these soils the seasonal high groundwater elevation is typically 0-6 inches below existing grade, but would have to be confirmed by geotechnical investigations. The high groundwater will result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone AE (El. 8 ft). High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 8.99 miles (14.5 km) NE of the Everglades Class I Area, 20.62 miles (33.2 km) NW of the Biscayne Class II Area, and about 3.5 miles NNW of the Titan Pennsuco Complex, a large source of emissions.

Analysis Summary – Alternative Site No. 8

As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site is entirely wetlands. The site appears predominantly undisturbed. The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required. The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.

  Permanent impacts to wetlands would potentially require an Individual Environmental Resource Permit, State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

- **Species Habitat – Conflict with Policy CON-9A.** MDC Policy CON-9A states that all activities that adversely affect habitat that is critical to Federal, or State designated, endangered or threatened species shall be prohibited unless such activity(ies) are a public necessity and there are no possible alternative sites where the activity(ies) can occur.

- **Species Habitat – Conflict with MDC Policy CON-9B.** MDC Policy CON-9B states that all nesting, roosting and feeding habitats used by federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.

- **Within the Northwest Wellfield Protection Area – Conflict with MDC Policy LU-8G.** MDC Policy LU-8G states that when considering land areas to add to the UDB, after demonstrating that a need exists, the following areas shall not be considered:

  - The Northwest Wellfield Protection Area and the West Wellfield Protection Area west of SW 157 Avenue between SW 8 Street and SW 42 Street

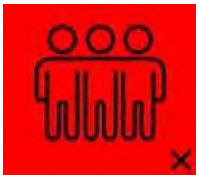
Analysis Summary – Alternative Site No. 8

- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

Transportation

Travel time to US-27 is less than 10 minutes. Existing access to site is via unpaved single-lane road (see picture at right). Approximately 4.25 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access (see the access route below). An additional 2.5 miles of easement/ROW will have to be acquired. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts to local area will likely be significant. Additional traffic impacts on US-27 and to local area may result due to single point of access at NW 112th Ct/NW 136th St. Truck queuing will have to be accomplished on site to prevent further congestion of local roads.

Community



The USEPA EJScreen Standard Report indicated no community impacts for this site. The site is more than 2.7 miles from the nearest residential zoning and adjacent to industrial mining operations, but the presence of wetlands, wildlife habitat and other environmental issues suggests that the siting of a WTE facility may be met with opposition by the community at this location.

Analysis Summary – Alternative Site No. 8

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

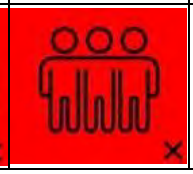
Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Approximately 4.25 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access (see the access route below). An additional 2.5 miles of easement/ROW will have to be acquired.
- Construction of approximately 4.0 miles of 12” water main and possibly a booster station will be required.
- Construction of an on-site wastewater lift station and about 4.0 miles of 6” force main will likely be required.
- Construction of approximately 8.0 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 7.4 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.
- Permanent impacts to wetlands would potentially require an Individual Environmental Permit, a State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.
- **Species Habitat – Conflict with MDC Policy CON-9A and CON-9B.**
- **Within the Northwest Wellfield Protection Area – Conflict with MDC Policy LU-8G.**
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

Future Waste-To-Energy Facility Siting Alternatives Analysis

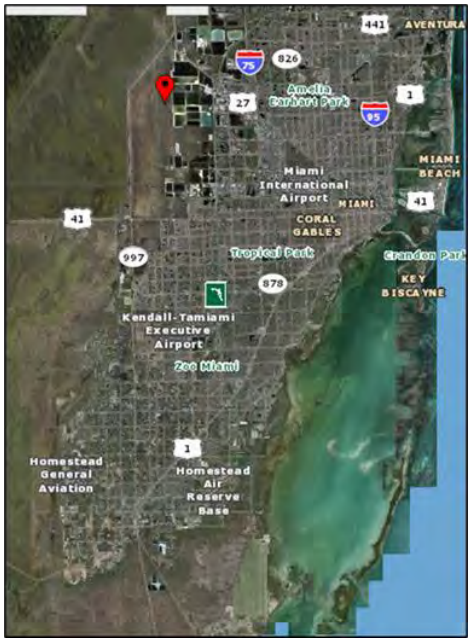
Analysis Summary – Alternative Site No. 9

Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
						N/A	N/A

MDPA Parcel Map

Location Map



Site Information

This 628.69-acre property is a single parcel outside the UDB, located in unincorporated Miami-Dade County. The site is large enough to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility, and expansion to 5,000 TPD capacity or the addition of other facilities such as an ash monofil, recycling center or an education center. The property is less than a 10-minute travel time to US-27 and is located 2.93 miles from the nearest residential zoning.

MDPA Parcel Data

Folio No: 30-2933-000-0010

Owner: TARMAC Florida, Inc.

2021 MDPA Market Value: $11,579,000

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 9

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 5.5 miles northwest of the existing RRF, and more than 2.9 miles from the nearest residential zoning. If this site were selected, the expected effects on the County's Solid Waste System may be significant. Direct hauls from the collection routes in the vicinity of the existing RRF would likely decline, as many collection trucks would reroute to the Northeast and West Transfer Stations for disposal to reduce travel times. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station in the vicinity of the existing RRF facility would likely be needed to maintain current collection and transfer flow patterns.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and may result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would increase due to the additional deliveries, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be higher than at the existing RRF. There are options to keep ash hauling distances relatively short - the existing RRF site could be converted to an ash monofill, or ash generated at this location may be landfilled at the Medley Landfill. If disposed at a non-County facility, costs for ash disposal would significantly increase from current levels.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. Potable water mains appear to be available approximately 5.0 miles east of the site, but further analysis is needed to verify pipe size, service pressure, and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. The closest sanitary sewer collection system appears to be approximately 5.0 miles east of the site, but further analysis is needed to verify capacity and system impacts. An on-site lift station and about 5.0 miles of 6" force main may be required.

- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest gas transmission main is approximately 9.0 miles east of the site. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.
- **Electric** – Nearest substation/ switchyard is FPL Substation located 8.3 miles away at 10800 NW 107th Avenue. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements. New legal easements may need to be established to complete this routing.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the site soils as Shark Valley muck, 0 to 1 percent slopes. These soils are high in organics content and may extend 20-40 inches below grade, even to the bedrock layer. They are not suitable for foundations and would need to be removed and replaced with structural fill for foundation areas, which will increase project costs.

In these soils the seasonal high groundwater elevation is typically 0-6 inches below existing grade, but would have to be confirmed by geotechnical investigations. The high groundwater will result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone AH (El. 7 ft). High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP,

Analysis Summary – Alternative Site No. 9

Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process is also required.

- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 8.08 miles (13 km) NE of the Everglades Class I Area, 19.69 miles (31.7 km) NW of the Biscayne Class II Area, and about 3.4 miles W of the Titan Pennsuco Complex, a large source of emissions.

  As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

  The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site is entirely wetlands. The site appears predominantly undisturbed. The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required. The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.

  Permanent impacts to wetlands would potentially require an Individual Environmental Resource Permit, State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

- **Species Habitat – Conflict with Policy CON-9A.** MDC Policy CON-9a states that all activities that adversely affect habitat that is critical to Federal, or State designated, endangered or threatened species shall be prohibited unless such activity(ies) are a public necessity and there are no possible alternative sites where the activity(ies) can occur.

Analysis Summary – Alternative Site No. 9

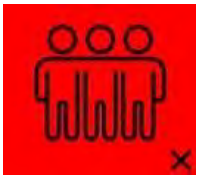
- **Species Habitat – Conflict with MDC Policy CON-9B.** MDC Policy CON-9B states that all nesting, roosting and feeding habitats used by federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.
- **Within the Northwest Wellfield Protection Area – Conflict with MDC Policy LU-8G.** MDC Policy LU-8G states that when considering land areas to add to the UDB, after demonstrating that a need exists, the following areas shall not be considered:
  - The Northwest Wellfield Protection Area and the West Wellfield Protection Area west of SW 157 Avenue between SW 8 Street and SW 42 Street
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

Transportation

Travel time to US-27 is less than 10 minutes. Existing access to site is via unpaved single-lane road (see picture at right). Approximately 5.25 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access (see the access route below). An additional 3.5 miles of easement/ROW will have to be acquired. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts to local area will likely be significant. Additional traffic impacts on US-27 and to local area may result due to single point of access at NW 112th Ct/NW 136th St. Truck queuing will have to be accomplished on site to prevent further congestion of local roads.

Analysis Summary – Alternative Site No. 9

Community



The USEPA EJScreen Standard Report indicated no community impacts for this site. The site is more than 2.9 miles from the nearest residential zoning and adjacent to industrial mining operations, but the presence of wetlands, wildlife habitat and other environmental issues suggests that the siting of a WTE facility may be met with opposition by the community at this location.

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Approximately 5.25 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access (see the access route below). An additional 3.5 miles of easement/ROW will have to be acquired.
- Construction of approximately 5.0 miles of 12” water main and possibly a booster station will be required.
- Construction of an on-site wastewater lift station and about 5.0 miles of 6” force main will likely be required.
- Construction of approximately 9.0 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 8.3 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.

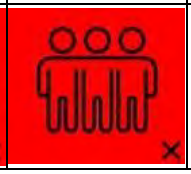
Analysis Summary – Alternative Site No. 9

- Permanent impacts to wetlands would potentially require an Individual Environmental Permit, a State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.
- **Species Habitat – Conflict with MDC Policies CON-9A and CON-9B.**
- **Within the Northwest Wellfield Protection Area – Conflict with MDC Policy LU-8G.**
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

Future Waste-To-Energy Facility Siting Alternatives Analysis

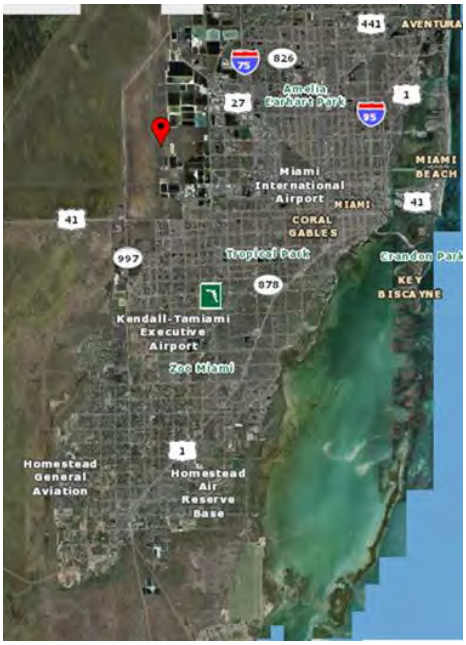
Analysis Summary – Alternative Site No. 10

Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
						N/A	N/A

MDPA Parcel Map

Location Map



Site Information

This 590.71-acre property is a single parcel outside the UDB, located in unincorporated Miami-Dade County. The site is large enough to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility, and expansion to 5,000 TPD capacity or the addition of other facilities such as an ash monofil, recycling center or an education center. The property is less than a 10-minute travel time to the Turnpike via 41st Street and is located 2.84 miles from the nearest residential zoning.

MDPA Parcel Data

Folio No: 30-3916-000-0010

Owner: APAC Southeast, Inc.

2021 MDPA Market Value: $10,560,268

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 10

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 5.4 miles W of the existing RRF, and more than 2.8 miles from the nearest residential zoning. If this site were selected, the expected effects on the County's Solid Waste System may be significant. Direct hauls from the collection routes in the vicinity of the existing RRF would likely decline, as many collection trucks would reroute to the Northeast and West Transfer Stations for disposal to reduce travel times. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station in the vicinity of the existing RRF facility would likely be needed to maintain current collection and transfer flow patterns.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and may result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would increase due to the additional deliveries, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be higher than at the existing RRF. There are options to keep ash hauling distances relatively short - the existing RRF site could be converted to an ash monofill, or ash generated at this location may be landfilled at the Medley Landfill. If disposed at a non-County facility, costs for ash disposal would significantly increase from current levels.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. Potable water mains appear to be available approximately 2.0 miles southeast of the site, but further analysis is needed to verify pipe size, service pressure, and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. The closest sanitary sewer collection system appears to be approximately 2.0 miles southeast of the site, but further analysis is needed to verify capacity and system impacts. An on-site lift station and about 2.0 miles of 6" force main may be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest gas transmission main is approximately 4.0

miles southeast of the site. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

- **Electric** – Nearest substation/ switchyard is FPL Substation located 2.1 miles away at 52444-139954 NW 41st Street. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements. New legal easements may need to be established to complete this routing.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the site soils as Shark Valley muck, 0 to 1 percent slopes. These soils are high in organics content and may extend 20-40 inches below grade, even to the bedrock layer. They are not suitable for foundations and would need to be removed and replaced with structural fill for foundation areas, which will increase project costs.

In these soils the seasonal high groundwater elevation is typically 0-6 inches below existing grade, but would have to be confirmed by geotechnical investigations. The high groundwater will result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone AH (El. 7 ft). High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 5.44 miles (8.75 km) NE of the Everglades Class I Area, 16.95 miles (27.28 km) NW of the Biscayne Class II Area, and about 3 mi NNW of the CEMEX Miami facility, a large source of emissions.

Analysis Summary – Alternative Site No. 10

As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site is entirely wetlands. Minor disturbances include prior excavation and ditching, but most of the site appears undisturbed. The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required. The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.

  Permanent impacts to wetlands would potentially require an Individual Environmental Resource Permit, State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

- **Species Habitat – Conflict with Policy CON-9A.** MDC Policy CON-9B states that **a**ll activities that adversely affect habitat that is critical to Federal, or State designated, endangered or threatened species shall be prohibited unless such activity(ies) are a public necessity and there are no possible alternative sites where the activity(ies) can occur.

- **Species Habitat – Conflict with MDC Policy CON-9B.** MDC Policy CON-9B states that all nesting, roosting and feeding habitats used by federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.

- **Within the Northwest Wellfield Protection Area – Conflict with MDC Policy LU-8G.** MDC Policy LU-8G states that when considering land areas to add to the UDB, after demonstrating that a need exists, the following areas shall not be considered:

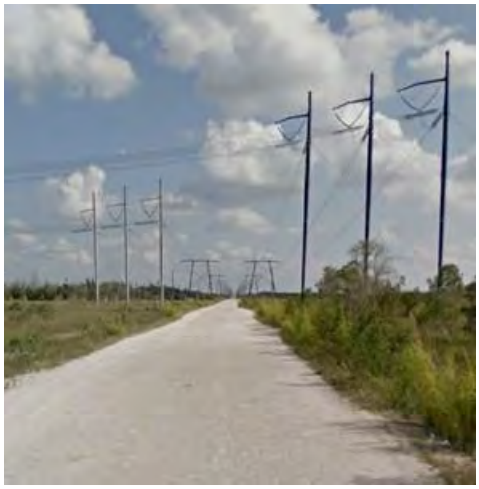
  - The Northwest Wellfield Protection Area and the West Wellfield Protection Area west of SW 157 Avenue between SW 8 Street and SW 42 Street

Analysis Summary – Alternative Site No. 10

- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

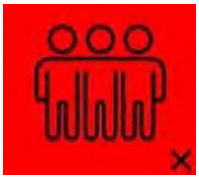
Transportation

Travel time to the Turnpike is less than 10 minutes. Existing access to site is via 41st Street, then 1.5 miles of unpaved single-lane road. Approximately 1.5 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access. Additional easement/ROW will have to be aquired for almost 1.5 miles of the access road from FPL and/or other property owners. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts to local area will likely be significant. Additional traffic impacts due to single point of access at Turnpike/41st St. Truck queuing will have to be accomplished on site to prevent further congestion of local roads.



Analysis Summary – Alternative Site No. 10

Community



The USEPA EJScreen Standard Report indicated no community impacts for this site. The site is more than 2.8 miles from the nearest residential zoning and adjacent to industrial mining operations, but the presence of wetlands, wildlife habitat and other environmental issues suggests that the siting of a WTE facility may be met with opposition by the community at this location.

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Approximately 1.5 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access (see the access route below). An additional 1.5 miles of easement/ROW will have to be acquired.
- Construction of approximately 2.0 miles of 12” water main and possibly a booster station will be required.
- Construction of an on-site wastewater lift station and about 2.0 miles of 6” force main will likely be required.
- Construction of approximately 4.0 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 2.1 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.
- Permanent impacts to wetlands would potentially require an Individual Environmental Permit, a State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

Analysis Summary – Alternative Site No. 10

- **Species Habitat – Conflict with MDC Policy CON-9A and CON-9B.**
- **Within the Northwest Wellfield Protection Area – Conflict with MDC Policy LU-8G.**
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

Future Waste-To-Energy Facility Siting Alternatives Analysis

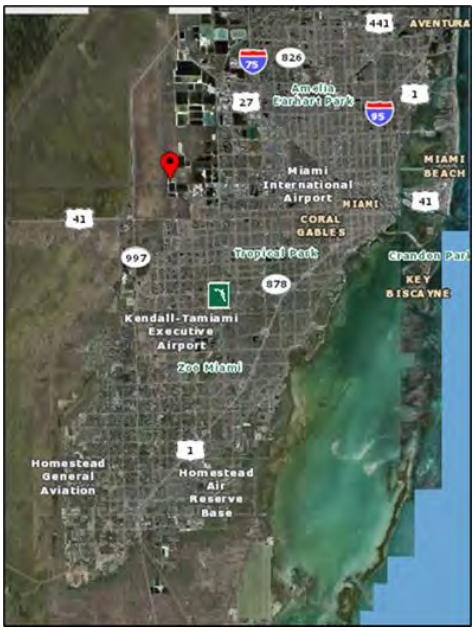
Analysis Summary – Alternative Site No. 11

Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
✕	–	✕	–	–	✕	N/A	N/A

MDPA Parcel Map

Location Map



Site Information

This 1,425.59-acre property is a single parcel outside the UDB, located in unincorporated Miami-Dade County. The site is large enough to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility, and expansion to 5,000 TPD capacity or the addition of other facilities such as an ash monofil, recycling center or an education center. The property is less than a 10-minute travel time to the Turnpike via 41st Street and is located 0.52 miles from the nearest residential zoning.

MDPA Parcel Data

Folio No: 30-3920-000-0020

Owner: CEMEX Construction Materials

2021 MDPA Market Value: $18,710,559

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 11

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 4.8 miles SW of the existing RRF but is 0.52 miles from the nearest residential zoning. If this site were selected, the expected effects on the County's Solid Waste System may be significant. Direct hauls from the collection routes in the vicinity of the existing RRF would likely decline, as many collection trucks would reroute to the Northeast and West Transfer Stations for disposal to reduce travel times. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station in the vicinity of the existing RRF facility would likely be needed to maintain current collection and transfer flow patterns.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and may result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would increase due to the additional deliveries, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be higher than at the existing RRF. There are options to keep ash hauling distances relatively short - the existing RRF site could be converted to an ash monofill, or ash generated at this location may be landfilled at the Medley Landfill. If disposed at a non-County facility, costs for ash disposal would significantly increase from current levels.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. Potable water mains appear to be available approximately 0.75 miles east of the site on 41st Street, but further analysis is needed to verify pipe size, service pressure, and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. The closest sanitary sewer collection system appears to be approximately 0.75 miles east of the site on 41st Street, but further analysis is needed to verify capacity and system impacts. An on-site lift station and about 0.75 miles of 6" force main may be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest gas transmission main is approximately 2.9

miles east of the site. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

- **Electric** – Nearest substation/ switchyard is the Levee Substation located 1.1 miles away at 52444-139954 NW 41st Street. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements. New legal easements may need to be established to complete this routing.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the site soils as Shark Valley muck, 0 to 1 percent slopes. These soils are high in organics content and may extend 20-40 inches below grade, even to the bedrock layer. They are not suitable for foundations and would need to be removed and replaced with structural fill for foundation areas, which will increase project costs.

In these soils the seasonal high groundwater elevation is typically 0-6 inches below existing grade, but would have to be confirmed by geotechnical investigations. The high groundwater will result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone AH (El. 7 ft). High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 3.45 miles (5.55 km) NE of the Everglades Class I Area, 14.24 miles (22.92 km) NW of the Biscayne Class II Area, and about 1.5 miles NNW of the CEMEX Miami facility, a large source of emissions.

Analysis Summary – Alternative Site No. 11

As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site is comprised of wetlands and excavated ponds. Minor disturbances include prior excavation and ditching, but portions of the site appear undisturbed. The site is not within a Florida panther focus area for consultation. The site is within the proposed critical habitat and within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required. The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.

Permanent impacts to wetlands would potentially require an Individual Environmental Resource Permit, State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

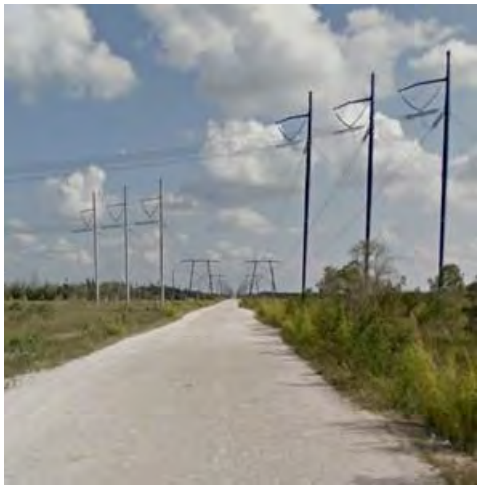
- **Species Habitat – Conflict with Policy CON-9A.** All activities that adversely affect habitat that is critical to Federal, or State designated, endangered or threatened species shall be prohibited unless such activity(ies) are a public necessity and there are no possible alternative sites where the activity(ies) can occur.
- **Species Habitat – Conflict with MDC Policy CON-9B.** MDC Policy CON-9B states that all nesting, roosting and feeding habitats used by federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.
- **Within the Northwest Wellfield Protection Area – Conflict with MDC Policy LU-8G.** MDC Policy LU-8G states that when considering land areas to add to the UDB, after demonstrating that a need exists, the following areas shall not be considered:
  - The Northwest Wellfield Protection Area and the West Wellfield Protection Area west of SW 157 Avenue between SW 8 Street and SW 42 Street

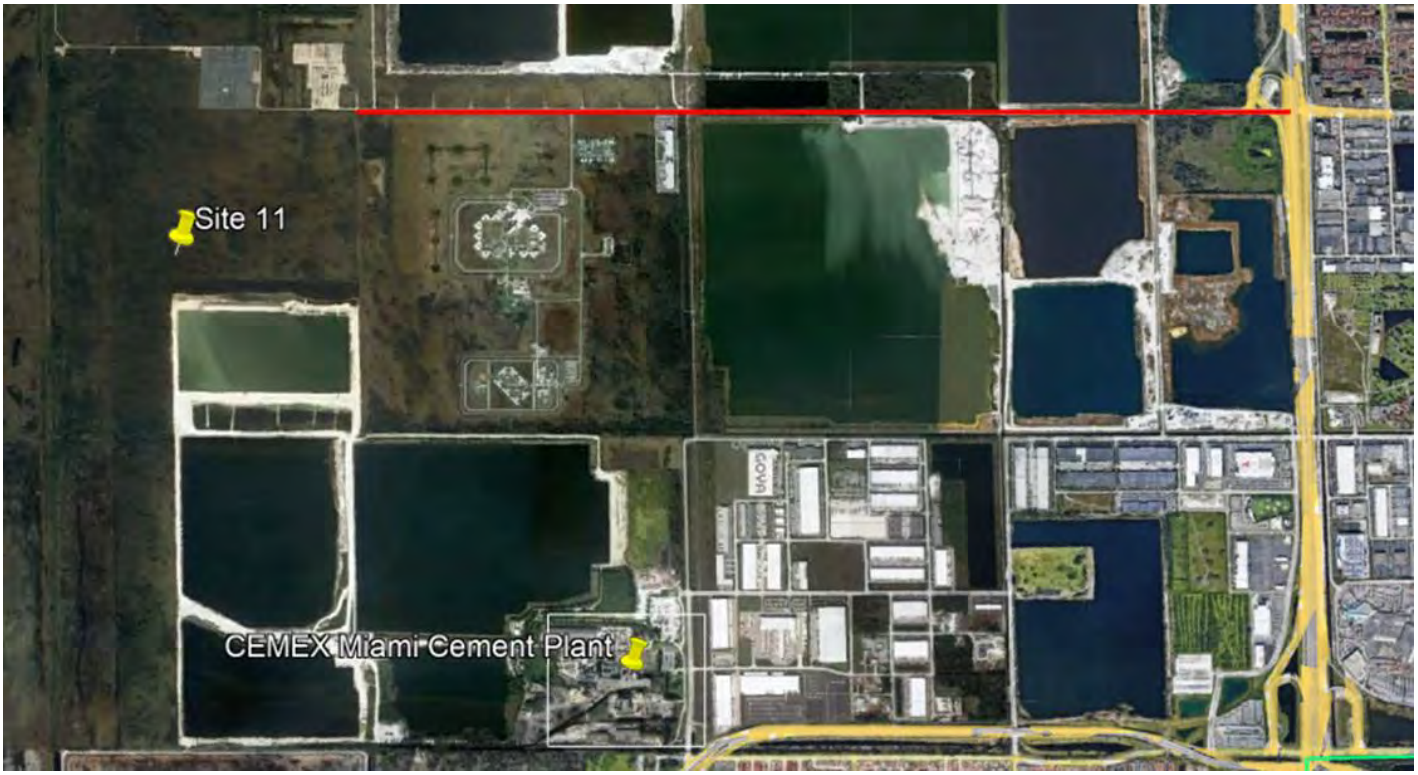
Analysis Summary – Alternative Site No. 11

- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

Transportation

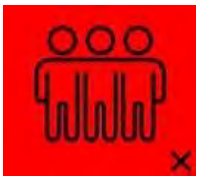
Travel time to the Turnpike is less than 10 minutes. Existing access to site is via 41st Street, then 1.5 miles of unpaved single-lane road (see picture at right) . Approximately 1.5 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access. Additional easement/ROW will have to be aquired for almost 1.5 miles of the access road from FPL and/or other property owners. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day) will greatly increase the loads on local roads so the traffic impacts to local area will likely be significant. Additional traffic impacts on 41st Street and to the local area may be significant due to single point of access at Turnpike/41st St. Truck queuing will have to be accomplished on site to prevent further congestion of local roads.





Analysis Summary – Alternative Site No. 11

Community



The USEPA EJScreen Standard Report indicated no community impacts for this site. However, the site is 0.52 miles from the nearest residential zoning. Even though it is adjacent to an industrial cement manufacturing operation, the close proximity of the site to a residential area and the presence of wetlands, wildlife habitat and other environmental issues suggests that the siting of a WTE facility may be met with opposition by the community at this location.

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Approximately 1.5 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access (see the access route below). An additional 1.5 miles of easement/ROW will have to be acquired.
- Construction of approximately 0.75 miles of 12” water main and possibly a booster station will be required.
- Construction of an on-site wastewater lift station and about 0.75 miles of 6” force main will likely be required.
- Construction of approximately 2.9 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 1.1 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.
- Permanent impacts to wetlands would potentially require an Individual Environmental Permit, a State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.
- **Species Habitat – Conflict with MDC Policy CON-9A.**

Analysis Summary – Alternative Site No. 11

- **Species Habitat – Conflict with MDC Policy CON-9B.**
- **Within the Northwest Wellfield Protection Area – Conflict with MDC Policy LU-8G.**
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

Future Waste-To-Energy Facility Siting Alternatives Analysis

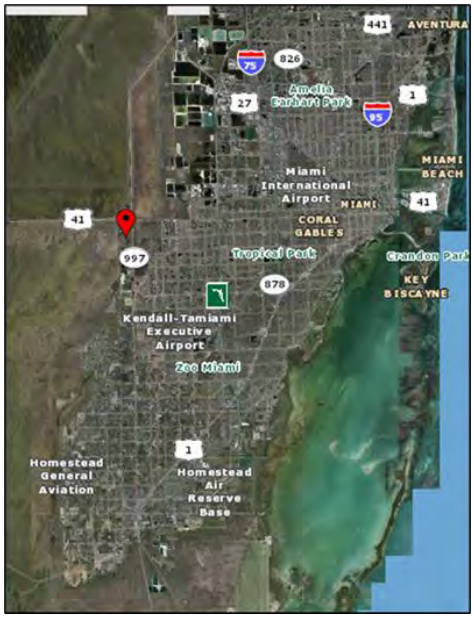
Analysis Summary – Alternative Site No. 12

Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
✗	✗	✗	✗	✓	✗	N/A	N/A

MDPA Parcel Map

Location Map



Site Information

This 561.18-acre property is a single parcel outside the UDB, located in unincorporated Miami-Dade County. The site is large enough to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility, and expansion to 5,000 TPD capacity or the addition of other facilities such as an ash monofil, recycling center or an education center. The property is less than a 10-minute travel time to Krome Ave. and US 41 and is located 1.03 miles from the nearest residential zoning and approximately 0.1 mile from the boundary of the Everglades National Park.

MDPA Parcel Data

Folio No: 30-4813-000-0010

Owner: ALA NV
% LA PRIMERA INTN'L CORP

2021 MDPA Market Value: $1,251,057

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 12

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 10.5 miles SW of the existing RRF and is more than a mile from the nearest residential zoning, but is approximately 0.1 mile from the boundary of the Everglades National Park. If this site were selected, the expected effects on the County's Solid Waste System may be significant. Direct hauls from the collection routes in the vicinity of the existing RRF would likely decline, as many collection trucks would reroute to the three transfer stations for disposal to reduce travel times. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station in the vicinity of the existing RRF facility would likely be needed to maintain current collection and transfer flow patterns.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and may result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would increase due to the additional deliveries, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be higher than at the existing RRF. There are options to keep ash hauling distances relatively short - the existing RRF site could be converted to an ash monofill, or ash generated at this location may be landfilled at the Medley Landfill. If disposed at a non-County facility, costs for ash disposal would significantly increase from current levels.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. Potable water mains appear to be available approximately 0.4 miles north of the site, but further analysis is needed to verify pipe size, service pressure, and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. There is a 30" sanitary sewer along Krome Ave., but further analysis is needed to verify capacity and system impacts. An on-site lift station and force main may be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest gas transmission main is approximately 4.0

miles northeast of the site on US41. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

- **Electric** – Nearest substation/switchyard is FPL Substation located 4.7 miles away at 8905 Krome Avenue. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements. New legal easements may need to be established to complete this routing.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the predominant site soils as Perrine marly silt loam, 0 to 1 percent slopes and Tamiami muck, 0 to 1 percent slopes. These hydric soils are high in organics content and may extend 31-41 inches below grade, even to the bedrock layer. They are not suitable for foundations and would need to be removed and replaced with structural fill for foundation areas, which will increase project costs.

In these soils the seasonal high groundwater elevation is typically 0-6 inches below existing grade, but would have to be confirmed by geotechnical investigations. The high groundwater will result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone AH (El. 8 ft). High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 0.1 miles (0.16 km) E of the Everglades Class I Area, 13.72 miles (22.08 km) W of

the Biscayne Class II Area, and about 5.0 miles SW of the CEMEX Miami Cement Plant, a large source of emissions.

As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s). **Based on projected emissions for a 4000 tpd facility, preliminary evaluation indicates that this parcel is too close to sensitive receptors in the nearby Class I area thus making it extremely difficult to demonstrate acceptable impacts for PSD permit issuance.**

Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site is comprised of wetlands. The site appears predominantly undisturbed`. The site is not within a Florida panther focus area for consultation. The site is within the proposed critical habitat and within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required. The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.

Permanent impacts to wetlands would potentially require an Individual Environmental Resource Permit, State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

- **Species Habitat – Conflict with Policy CON-9A.** All activities that adversely affect habitat that is critical to Federal, or State designated, endangered or threatened species shall be prohibited unless such activity(ies) are a public necessity and there are no possible alternative sites where the activity(ies) can occur.
- **Species Habitat – Conflict with MDC Policy CON-9B.** MDC Policy CON-9B states that all nesting, roosting and feeding habitats used by federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.
- **Within the West Wellfield Protection Area – Conflict with MDC Policy LU-8G.** MDC Policy LU-8G states that when considering land areas to add to the UDB, after demonstrating that a need exists, the following areas shall not be considered:

Analysis Summary – Alternative Site No. 12

- The Northwest Wellfield Protection Area and the West Wellfield Protection Area west of SW 157 Avenue between SW 8 Street and SW 42 Street

- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

Transportation

Travel time to US 41 (SW 8th Street) is less than 10 minutes. Existing access to site is via Krome Ave. (see map below), and no additional offsite access roadway is required. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts on Krome Ave., US 41 (SW 8th Street), and to local area may be significant. Truck queuing will have to be accomplished on site to prevent further congestion on Krome Ave.

Community

The USEPA EJScreen Standard Report indicated elevated values for Particulate Matter 2.5 (µg/m3), 2017 Air Toxics Cancer Risk, and 2017 Air Toxics Respiratory HI for this site. Although the site is more than a mile from the nearest residential zoning, it is approximately 0.1 mile from the boundary of the Everglades National Park, which suggests that the siting of a WTE facility may be strongly opposed by the community at this location.

Analysis Summary – Alternative Site No. 12

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

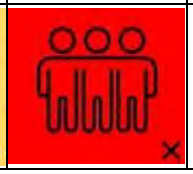
Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Construction of approximately 0.4 miles of 12” water main and possibly a booster station will be required.
- Construction of an on-site wastewater lift station and 6” force main may be required.
- Construction of approximately 4.0 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 4.7 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Additional ROW/easements may be needed to complete routing of potable water, natural gas, and electric utility infrastructure.
- The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.
- Permanent impacts to wetlands would potentially require an Individual Environmental Permit, a State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.
- **Based on projected emissions for a 4000 tpd facility, preliminary evaluation indicates that this parcel is too close to sensitive receptors in the nearby Class I area thus making it extremely difficult to demonstrate acceptable impacts for PSD permit issuance.**
- **Species Habitat – Conflict with MDC Policy CON-9A.**
- **Species Habitat – Conflict with MDC Policy CON-9B.**
- **Within the West Wellfield Protection Area – Conflict with MDC Policy LU-8G.**
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

Future Waste-To-Energy Facility Siting Alternatives Analysis

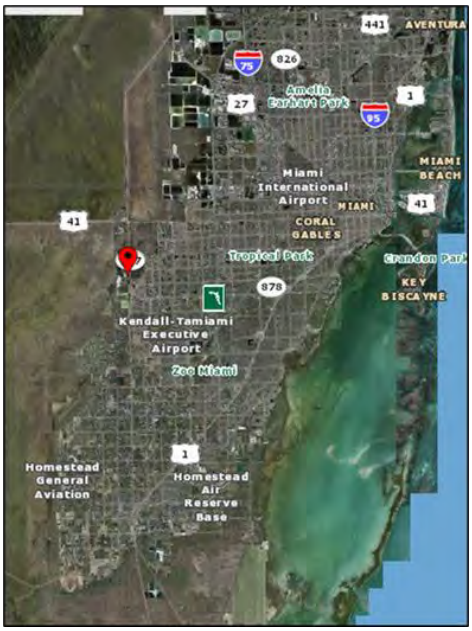
Analysis Summary – Alternative Site No. 13

Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
						N/A	N/A

MDPA Parcel Map

Location Map



Site Information

This 63.07-acre property is a single parcel outside the UDB, located in unincorporated Miami-Dade County. The site is large enough to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility, and expansion to 5,000 TPD capacity or the addition of other facilities such as an ash monofil, recycling center or an education center. The property is less than a 10-minute travel time to US-41 and is located 1.08 miles from the nearest residential zoning and approximately 0.7 miles from the boundary of the Everglades National Park.

MDPA Parcel Data

Folio No: 30-4835-000-0010

Owner: Kendall Properties and Investments

2021 MDPA Market Value: $1,576,700

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 13

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 11.8 miles SW of the existing RRF and is more than a mile from the nearest residential zoning, but is less than a mile from the boundary of the Everglades National Park. If this site were selected, the expected effects on the County's Solid Waste System may be significant. Direct hauls from the collection routes in the vicinity of the existing RRF would likely decline, as many collection trucks would reroute to the Northeast and West Transfer Stations for disposal to reduce travel times. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station in the vicinity of the existing RRF facility would likely be needed to maintain current collection and transfer flow patterns.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would increase due to longer travel distances and expected traffic congestion on US-41 and SW 88th Street. Transfer fleet round trip times would increase and may result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would increase due to the additional deliveries, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be higher than at the existing RRF. There are options to keep ash hauling distances relatively short - the existing RRF site could be converted to an ash monofill, or ash generated at this location may be landfilled at the Medley Landfill. If disposed at a non-County facility, costs for ash disposal would significantly increase from current levels.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. A 12" potable water main appears to be available at the site on Krome Ave., but further analysis is needed to verify service pressure and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. There is a 30" sanitary sewer on Krome Ave., but further analysis is needed to verify capacity and system impacts. An on-site lift station and force main may be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest gas transmission main is approximately 7.0

miles northeast of the site on US-41. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

- **Electric** – Nearest substation/switchyard is FPL Substation located 1.8 miles away at 8905 Krome Avenue. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements. New legal easements may need to be established to complete this routing.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the predominant site soils as Udorthents-Water-Urban land complex, 0 to 60 percent slopes and Cooper Town muck. Udorthents soils consist of unconsolidated or heterogeneous geologic material removed during the excavation of ditches, canals, lakes, ponds, and quarries. This suggests that the site was previously excavated as a borrow pit and backfilled to its present land area. If this is confirmed, the site soils may present significant geotechnical engineering challenges for foundation designs.

The presence of muck soils indicates the seasonal high groundwater elevation is typically 0-6 inches below existing grade, but would have to be confirmed by geotechnical investigations. The high groundwater will result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone AH (El. 8 ft). The remainder of the site is in FEMA Flood Zone X (Minimal Flood Hazard).
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process is also required.

Analysis Summary – Alternative Site No. 13

- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 0.68 miles (1.09 km) E of the Everglades Class I Area, 12.52 miles (20.15 km) W of the Biscayne Class II Area, and about 6.3 miles SW of the CEMEX Miami Cement Plant, a large source of emissions.

  As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

  The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s). **Based on projected emissions for a 4000 tpd facility, preliminary evaluation indicates that this parcel is too close to sensitive receptors in the nearby Class I area thus making it extremely difficult to demonstrate acceptable impacts for PSD permit issuance.**

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory and National Hydrography Dataset indicate a surface water is present and no wetlands are present. The South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site is comprised of upland mixed forests, improved pasture, and holding ponds. The site appears developed with minimal trees and maintained lawn. The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required but is assumed to be minimal as there is minimal to no roosting or foraging habitat remaining. The site is also within 18.6 miles of an active wood stork colony and minor wood stork mitigation may be required.

- **Species Habitat – Conflict with MDC Policy CON-9B.** MDC Policy CON-9B states that all nesting, roosting and feeding habitats used by federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.

- **Within the West Wellfield Protection Area – Conflict with MDC Policy LU-8G.** MDC Policy LU-8G states that when considering land areas to add to the UDB, after demonstrating that a need exists, the following areas shall not be considered:

  - The Northwest Wellfield Protection Area and the West Wellfield Protection Area west of SW 157 Avenue between SW 8 Street and SW 42 Street

Analysis Summary – Alternative Site No. 13

- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

Transportation

Travel time north to US 41 (SW 8th Street) and south to SW 88th Street is less than 10 minutes. Existing access to site is via Krome Ave. (see map below), and no additional offsite access roadway is required. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads. Traffic impacts on Krome Ave., US 41 (SW 8th Street), SW 88th Street, and to local area may be significant due to only two points of access on Krome Ave. Truck queuing will have to be accomplished on site to prevent further congestion on Krome Ave.

Community

The USEPA EJScreen Standard Report indicated elevated values for Particulate Matter 2.5 (µg/m3), 2017 Air Toxics Cancer Risk, and 2017 Air Toxics Respiratory HI for this site. Although the site is more than a mile from the nearest residential zoning, it is less than a mile from the boundary of the Everglades National Park, which suggests that the siting of a WTE facility may be strongly opposed by the community at this location.

Analysis Summary – Alternative Site No. 13

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

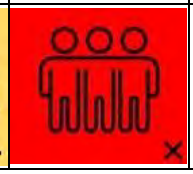
Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Construction of a water booster station may be required.
- Construction of an on-site wastewater lift station and 6” force main may be required.
- Construction of approximately 7.0 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 1.8 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Additional ROW/easements may be needed to complete routing of natural gas and electric utility infrastructure.
- The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.
- **Based on projected emissions for a 4000 tpd facility, preliminary evaluation indicates that this parcel is too close to sensitive receptors in the nearby Class I area thus making it extremely difficult to demonstrate acceptable impacts for PSD permit issuance.**
- **Species Habitat – Conflict with MDC Policy CON-9B.**
- **Within the West Wellfield Protection Area – Conflict with MDC Policy LU-8G.**
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

Future Waste-To-Energy Facility Siting Alternatives Analysis

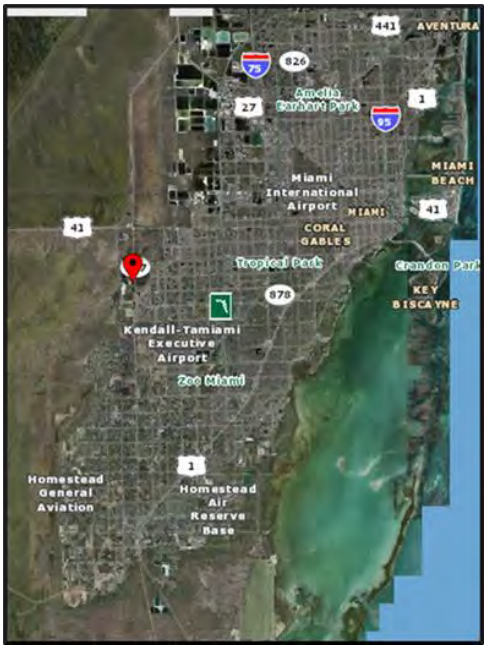
Analysis Summary – Alternative Site No. 14

Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
						N/A	N/A

MDPA Parcel Map

Location Map



Site Information

This 42.68-acre property is a single parcel outside the UDB, located in unincorporated Miami-Dade County. The site area is minimal but appears sufficient to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility, but no additional expansion capacity or other facilities. The property is less than a 10-minute travel time north to US-41 and south to SW 88th Street, is 1.05 miles from the nearest residential zoning, and approximately 0.75 miles from the boundary of the Everglades National Park.

MDPA Parcel Data

Folio No: 30-4835-000-0013

Owner: Kendall Properties and Investments

2021 MDPA Market Value: $1,072,500

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 14

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 11.8 miles SW of the existing RRF and is more than a mile from the nearest residential zoning but is less than a mile from the boundary of the Everglades National Park. If this site were selected, the expected effects on the County's Solid Waste System may be significant. Direct hauls from the collection routes in the vicinity of the existing RRF would likely decline, as many collection trucks would reroute to the Northeast and West Transfer Stations for disposal to reduce travel times. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station in the vicinity of the existing RRF facility would likely be needed to maintain current collection and transfer flow patterns.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would increase due to longer travel distances and expected traffic congestion on US-41 and SW 88th Street. Transfer fleet round trip times would increase and may result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would increase due to the additional deliveries, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be higher than at the existing RRF. There are options to keep ash hauling distances relatively short - the existing RRF site could be converted to an ash monofill, or ash generated at this location may be landfilled at the Medley Landfill. If disposed at a non-County facility, costs for ash disposal would significantly increase from current levels.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. A 12" potable water main appears to be available at the site on Krome Ave., but further analysis is needed to verify service pressure and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. There is a 30" sanitary sewer on Krome Ave., but further analysis is needed to verify capacity and system impacts. An on-site lift station and force main may be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest gas transmission main is approximately 7.0

miles northeast of the site on US-41. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

- **Electric** – Nearest substation/switchyard is FPL Substation located 2.1 miles away at 8905 Krome Avenue. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements. New legal easements may need to be established to complete this routing.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the predominant site soils as Udorthents-Water-Urban land complex, 0 to 60 percent slopes and Biscayne marly silt loam, ponded-Urban land complex, 0 to 1 percent slopes. Udorthents soils consist of unconsolidated or heterogeneous geologic material removed during the excavation of ditches, canals, lakes, ponds, and quarries. This suggests that the site was previously excavated as a borrow pit and backfilled to its present land area. If this is confirmed, the site soils may present significant geotechnical engineering challenges for foundation designs. Removal and replacement of these soils with structural fill and/or additional compactive effort on existing soils in development areas may be required.

The presence of Biscayne marl soils indicates the seasonal high groundwater elevation is typically within 10 inches of the ground surface, but would have to be confirmed by geotechnical investigations. These soils are severely limited for building foundations because of water content and shallow depth to bedrock, and areas under building foundations would need to be removed and replaced with structural fill. The high groundwater will result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone AH (El. 8 ft). The remainder of the site is in FEMA Flood Zone X (Minimal Flood Hazard).
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP,

Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process is also required.

- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 0.75 miles (1.2 km) E of the Everglades Class I Area, 12.74 miles (20.5 km) W of the Biscayne Class II Area, and about 6.0 miles SW of the CEMEX Miami Cement Plant, a large source of emissions.

  As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

  The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s). **Based on projected emissions for a 4000 tpd facility, preliminary evaluation indicates that this parcel is too close to sensitive receptors in the nearby Class I area thus making it extremely difficult to demonstrate acceptable impacts for PSD permit issuance.**

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory and National Hydrography Dataset indicate a surface water is present and no wetlands are present. The South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site is comprised of a holding pond, spoil area, and improved pasture. The site appears to be disturbed. The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required but is assumed to be minimal as there is minimal to no roosting or foraging habitat remaining. The site is also within 18.6 miles of an active wood stork colony and minor wood stork mitigation may be required.

- **Species Habitat – Conflict with MDC Policy CON-9B.** MDC Policy CON-9B states that all nesting, roosting and feeding habitats used by federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.

- **Within the West Wellfield Protection Area – Conflict with MDC Policy LU-8G.** MDC Policy LU-8G states that when considering land areas to add to the UDB, after demonstrating that a need exists, the following areas shall not be considered:

Analysis Summary – Alternative Site No. 14

- The Northwest Wellfield Protection Area and the West Wellfield Protection Area west of SW 157 Avenue between SW 8 Street and SW 42 Street

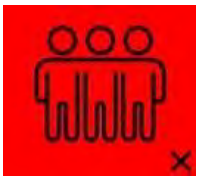
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

Transportation

Travel time north to US 41 (SW 8th Street) and south to SW 88th Street is less than 10 minutes. Existing access to site is via Krome Ave. (see map below), and no additional offsite access roadway is required. The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads. Traffic impacts on Krome Ave., US 41 (SW 8th Street), SW 88th Street, and to local area may be significant due to only two points of access on Krome Ave. Truck queuing will have to be accomplished on site to prevent further congestion on Krome Ave.

Analysis Summary – Alternative Site No. 14

Community



The USEPA EJScreen Standard Report indicated elevated values for Particulate Matter 2.5 (µg/m3), 2017 Air Toxics Cancer Risk, and 2017 Air Toxics Respiratory HI for this site. Although the site is more than a mile from the nearest residential zoning, it is less than a mile from the boundary of the Everglades National Park, which suggests that the siting of a WTE facility may be strongly opposed by the community at this location.

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Construction of a water booster station may be required.
- Construction of an on-site wastewater lift station and 6” force main may be required.
- Construction of approximately 7.0 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 2.1 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Additional ROW/easements may be needed to complete routing of natural gas and electric utility infrastructure.
- The site is within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.
- **Based on projected emissions for a 4000 tpd facility, preliminary evaluation indicates that this parcel is too close to sensitive receptors in the nearby Class I area thus making it extremely difficult to demonstrate acceptable impacts for PSD permit issuance.**
- **Species Habitat – Conflict with MDC Policy CON-9B.**
- **Within the West Wellfield Protection Area – Conflict with MDC Policy LU-8G.**

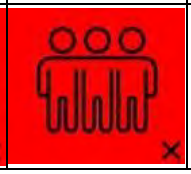
Analysis Summary – Alternative Site No. 14

- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

Future Waste-To-Energy Facility Siting Alternatives Analysis

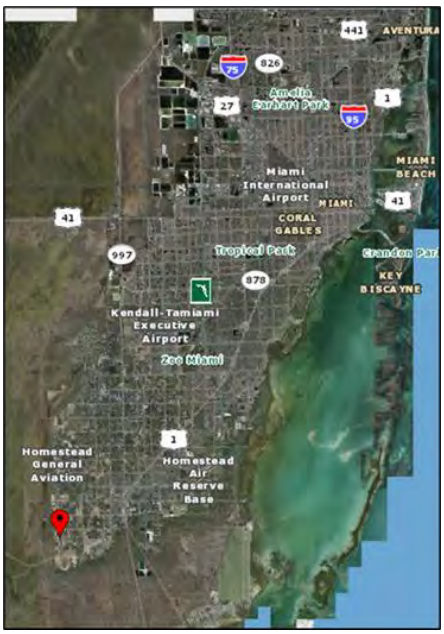
Analysis Summary – Alternative Site No. 15

Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
						N/A	N/A

MDPA Parcel Map

Location Map



Site Information

This 164.83-acre property is a single parcel outside the UDB, located in unincorporated Miami-Dade County. The site area is sufficient to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility and expansion to 5,000 TPD capacity or the addition of other facilities such as an ash monofil, recycling center or an education center. The property is less than a 10-minute travel time north to W Palm Drive, is 0.58 miles from the nearest residential zoning, and 1.02 miles from the boundary of Everglades National Park. **This parcel is under contract with several adjacent parcels in a pending development.**

MDPA Parcel Data

Folio No: 30-7832-000-0030

Owner: Krupalu, Inc.

2021 MDPA Market Value: $2,097,000

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 15

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 31.0 miles SW of the existing RRF, slightly more than half a mile from the nearest residential zoning, and approximately one mile from the boundary of Everglades National Park. If this site were selected, the effects on the County's Solid Waste System would be considerable. Direct hauls from the collection routes in the vicinity of the existing RRF would divert to the three transfer stations for disposal. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station would need to be constructed at or near the site of the existing RRF to maintain the current collection patterns and transfer station loadings.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would significantly increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and would likely result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would significantly increase due to the additional deliveries and travel times and distances, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be significantly higher than at the existing RRF even if the existing RRF site could be converted to an ash monofill, or ash generated at this location was landfilled at the Medley Landfill. If disposed at a non-County facility, expected costs for ash disposal would increase even further.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. Potable water mains appear to be available approximately 5.0 miles east of the site on SW 360th Street., but further analysis is needed to verify pipe size, service pressure, and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. The closest sanitary sewer collection system appears to be approximately 5.0 miles east of the site on SW 360th Street., but further analysis is needed to verify capacity and system impacts. An on-site lift station and about 5.0 miles of 6" force main will likely be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest gas transmission main is approximately

5.0 miles NE of the site on Krome Ave/US-1. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

- **Electric** – Nearest substation/ switchyard is Florida City Substation located 5 miles away at 33800 SW 202nd Avenue. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements. New legal easements may need to be established to complete this routing.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.
- Due to expected shallow depth to bedrock, rock excavation may be required to install utility pipelines, which will significantly increase utility construction costs.

Soil

The USDA Soil Survey data for the site classifies the predominant site soils as Krome very gravelly marly loam, 1 to 2 percent slopes, Biscayne marly silt loam, drained, 0 to 1 percent slopes, and Chekika very gravelly marly loam, 1 to 2 percent slopes. Generally, these soils are not well suited for building foundations because of water content and shallow depth to bedrock (typically 5-7 inches).

The presence of Biscayne marl soils indicates the seasonal high groundwater elevation is typically within 10 inches of the ground surface, but would have to be confirmed by geotechnical investigations. These soils are severely limited for building foundations because of water content and shallow depth to bedrock, and areas under building foundations would need to be removed and replaced with structural fill. The high groundwater may result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone A. High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process is also required.

Analysis Summary – Alternative Site No. 15

- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 1.02 miles (1.64 km) E of the Everglades Class I Area, 12.75 miles (20.51 km) W of the Biscayne Class II Area, and about 12.7 miles WSW of the FPL Turkey Point Power Plant, a large Title V emitter.

  As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

  The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s). **Based on projected emissions for a 4000 tpd facility, preliminary evaluation indicates that this parcel is too close to sensitive receptors in the nearby Class I area thus making it extremely difficult to demonstrate acceptable impacts for PSD permit issuance.**

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site contains wetlands and stream with riparian habitat. The site appears predominantly undisturbed. The site is not within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required. The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.

  Permanent impacts to wetlands and streams would potentially require an Individual Environmental Resource Permit, State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

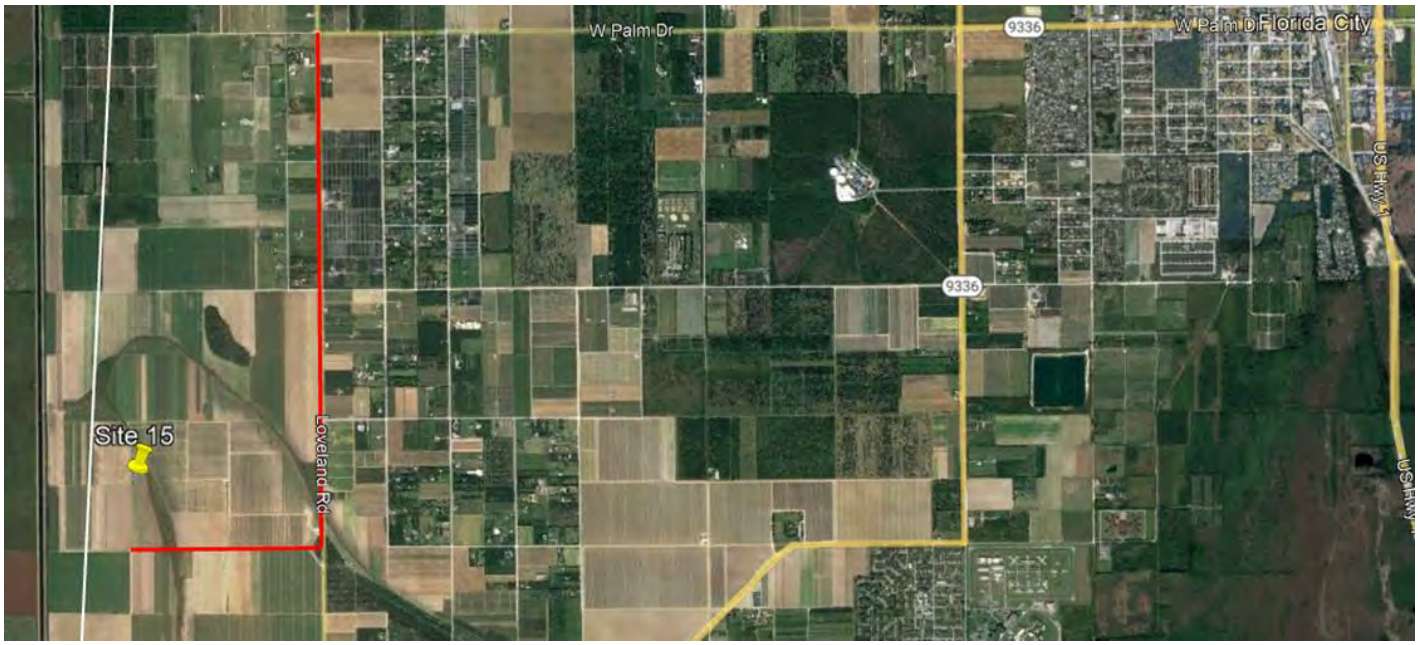
- **Species Habitat – Conflict with MDC Policy CON-9B.** MDC Policy CON-9B states that all nesting, roosting and feeding habitats used by federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.

Analysis Summary – Alternative Site No. 15

Transportation

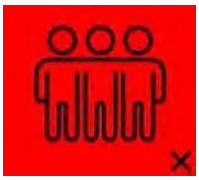
Travel time north to W Palm Drive is less than 10 minutes. Existing access to site is via SW 367th Street and Loveland Road (see map below), but as shown in the picture of Loveland Road at right, construction of approximately 2.75 miles of two-lane roadway with paved shoulders will be required for proper site access. Additional ROW may have to be acquired for access roads.

The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts to local area will likely be significant. Additional traffic impacts on Loveland Road, W Palm Drive, and other local roads may be significant due to only two points of access and limited road capacity. Truck queuing will have to be accomplished on site to prevent further congestion.



Analysis Summary – Alternative Site No. 15

Community



The USEPA EJScreen Standard Report indicated no existing issues for this site. However, the site is about half a mile from the nearest residential zoning and is approximately a mile from the boundary of Everglades National Park, which suggests that the siting of a WTE facility may be strongly opposed by the community at this location.

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

Site Differentiators Overview

- **This parcel is under contract with several adjacent parcels in a pending development.**
- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Approximately 2.75 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access. Additional easement/ROW may have to be acquired.
- Construction of approximately 5.0 miles of 12” water main and possibly a booster station will be required.
- Construction of an on-site wastewater lift station and about 5.0 miles of 6” force main will likely be required.
- Construction of approximately 5.0 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 5.0 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- Due to expected shallow depth to bedrock, rock excavation may be required to install utility pipelines, which will significantly increase utility construction costs.

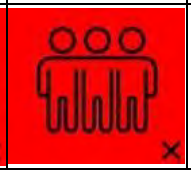
Analysis Summary – Alternative Site No. 15

- The site is also within 18.6 miles of an active wood stork colony and will potentially disturb greater than one-half acre of suitable foraging habitat; therefore, would potentially require wood stork mitigation.
- Permanent impacts to wetlands would potentially require an Individual Environmental Permit, a State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.
- **Based on projected emissions for a 4000 tpd facility, preliminary evaluation indicates that this parcel is too close to sensitive receptors in the nearby Class I area thus making it extremely difficult to demonstrate acceptable impacts for PSD permit issuance.**
- **Species Habitat – Conflict with MDC Policy CON-9B.**

Future Waste-To-Energy Facility Siting Alternatives Analysis

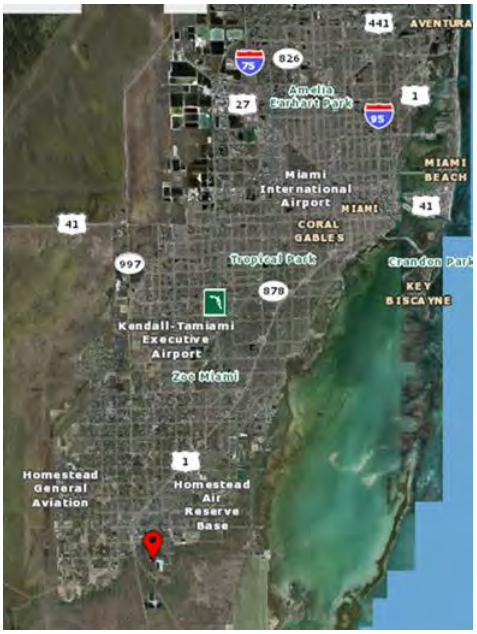
Analysis Summary – Alternative Site No. 18

Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
						N/A	N/A

MDPA Parcel Map

Location Map



Site Information

This 81.44-acre site is a single parcel outside the UDB, located in unincorporated Miami-Dade County. The combined site area is sufficient to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility and expansion to 5,000 TPD capacity or the addition of other facilities such as an ash monofil, recycling center or an education center. The property is less than a 10-minute travel time to Card Sound Road, is 0.77 miles from the nearest residential zoning, and 7.13 miles from the boundary of Everglades National Park.

MDPA Parcel Data

Folio No: 16-7932-001-0025

Owner: CEMEX Construction Materials Florida, LLC

2021 MDPA Market Value: $1,581,860

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 18

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 33.0 miles SW of the existing RRF, 0.77 miles from the nearest residential zoning, and more than seven miles from the boundary of Everglades National Park. If this site were selected, the effects on the County's Solid Waste System would be considerable. Direct hauls from the collection routes in the vicinity of the existing RRF would divert to the three transfer stations for disposal. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station would need to be constructed at or near the site of the existing RRF to maintain the current collection patterns and transfer station loadings.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would significantly increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and would likely result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would significantly increase due to the additional deliveries and travel times and distances, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be significantly higher than at the existing RRF even if the existing RRF site could be converted to an ash monofill, or ash generated at this location was landfilled at the Medley Landfill. If disposed at a non-County facility, expected costs for ash disposal would increase even further. .

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. A 12" potable water main is available approximately 0.25 miles N of the site on SW 167th Ave., but further analysis is needed to verify pipe size, service pressure, and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. The closest sanitary sewer collection system appears to be available approximately 0.75 miles N of the site on SW 167th Ave., but further analysis is needed to verify capacity and system impacts. An on-site lift station and about 0.75 miles of 6" force main will likely be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest transmission main is approximately 2.0

miles NW of the site on Krome Ave/US-1. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

- **Electric** – Nearest substation/ switchyard is FPL Farmlife Substation located 0.93 miles away at 35600 SW 162nd Street. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater may not be used as source water for boiler feedwater, cooling tower/condenser feedwater, truck wheel wash, and irrigation water.

Soil

The USDA Soil Survey data for the site classifies the predominant site soils as Biscayne marly silt loam, drained, 0 to 1 percent slopes. The presence of Biscayne marl soils indicates the seasonal high groundwater elevation is typically within 10 inches of the ground surface but would have to be confirmed by geotechnical investigations.

These soils are severely limited for building foundations because of water content and shallow depth to bedrock, and areas under building foundations would need to be removed and replaced with structural fill. The high groundwater may result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone AE (El. 8 ft). High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 7.13 mi (11.5 km) E of the Everglades Class I Area, 6.68 mi (10.8 km) W of the Biscayne Class II Area, and about 6.5 miles WSW of the FPL Turkey Point Power Plant, a large Title V emitter.

  As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

Analysis Summary – Alternative Site No. 18

The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site contains minor wetlands. The site appears predominantly undisturbed. The site is within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required.

  Permanent impacts to wetlands would potentially require an Individual Environmental Resource Permit, State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

- **Species Habitat – Conflict with MDC Policy CON-9B.** MDC Policy CON-9B states that all nesting, roosting and feeding habitats used by federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.

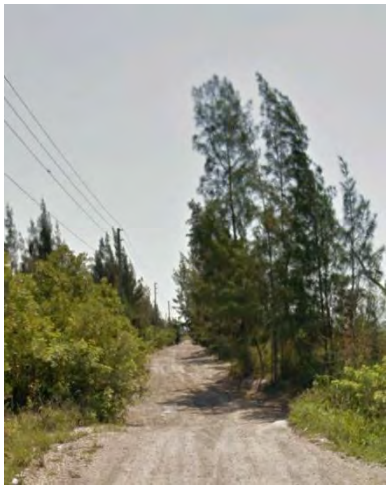
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

Analysis Summary – Alternative Site No. 18

Transportation

Travel time north to Card Sound Road and US-1 is less than 10 minutes. Existing access to site is via SW 360th Street and SW 167th Ave. (see map below), but approximately 1.2 miles of two-lane road with paved shoulders will need to be constructed for proper site access (see existing SW 360th Street picture at right). Additional ROW may have to be acquired.

The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts on Card Sound Road, SW 360th Street and SW 167th Ave., and other local roads will likely be significant. Truck queuing will have to be accomplished on site to prevent further congestion.



Community

The USEPA EJScreen Standard Report indicated no existing issues for this site. However, the site is less than a mile from the nearest residential zoning and the presence of wetlands, wildlife habitat and other environmental issues suggests that the siting of a WTE facility may be met with opposition by the community at this location.

Analysis Summary – Alternative Site No. 18

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

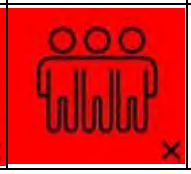
Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Approximately 1.2 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access. Additional ROW may have to be acquired.
- Construction of approximately 0.25 miles of 12” water main and possibly a booster station will be required.
- Construction of an on-site wastewater lift station and about 0.75 miles of 6” force main will likely be required.
- Construction of approximately 2.0 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 0.93 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Due to shallow depth to bedrock, rock excavation may be required to install utility pipelines, which could significantly increase utility construction costs.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- Permanent impacts to wetlands would potentially require an Individual Environmental Permit, a State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.
- **Species Habitat – Conflict with MDC Policy CON-9B.**
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

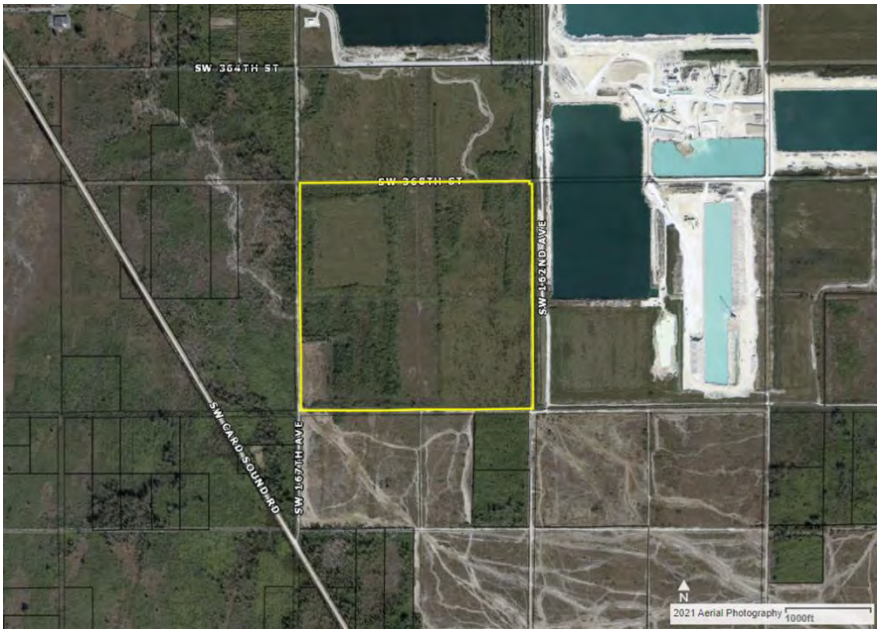
Future Waste-To-Energy Facility Siting Alternatives Analysis

Analysis Summary – Alternative Site No. 19

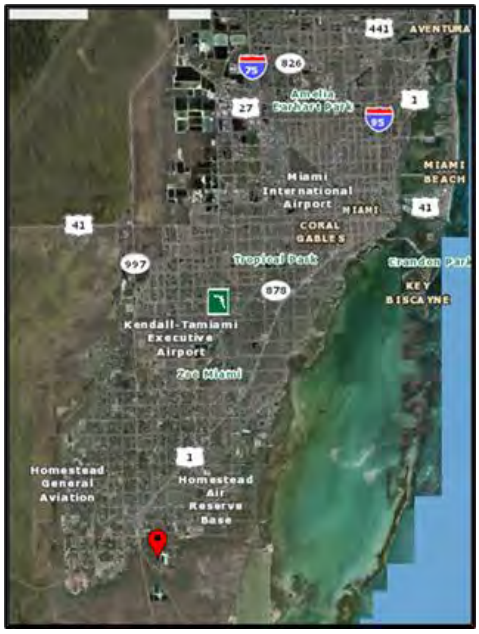
Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
						N/A	N/A

MDPA Parcel Map



Location Map



Site Information

This 161.81-acre site is located outside the UDB, in unincorporated Miami-Dade County. The combined site area is sufficient to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility and expansion to 5,000 TPD capacity or the addition of other facilities such as an ash monofil, recycling center or an education center. The property is less than a 10-minute travel time to Card Sound Road, 1.02 miles from residential zoning and 7.11 miles from the boundary of Everglades National Park.

MDPA Parcel Data

Folio No: 16-7932-001-0030

Owner: CEMEX Construction Materials Florida, LLC

2021 MDPA Market Value: $3,127,500

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 19

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 29.0 miles southwest of the existing RRF, 1.02 miles from residential zoning and 7.11 miles from the boundary of Everglades National Park. If this site were selected, the effects on the County's Solid Waste System would be considerable. Direct hauls from the collection routes in the vicinity of the existing RRF would divert to the three transfer stations for disposal. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station would need to be constructed at or near the site of the existing RRF to maintain the current collection patterns and transfer station loadings.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would significantly increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and would likely result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would significantly increase due to the additional deliveries and travel times and distances, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be significantly higher than at the existing RRF even if the existing RRF site could be converted to an ash monofill, or ash generated at this location was landfilled at the Medley Landfill. If disposed at a non-County facility, expected costs for ash disposal would increase even further.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. A 12" potable water main is available approximately 0.5 miles N of the site on SW 167th Ave., but further analysis is needed to verify pipe size, service pressure, and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. The closest sanitary sewer collection system appears to be available approximately 1.1 miles N of the site on SW 167th Ave., but further analysis is needed to verify capacity and system impacts. An on-site lift station and about 1.1 miles of 6" force main will likely be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest transmission main is approximately 2.3

miles NW of the site on Krome Ave/US-1. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

- **Electric** – Nearest substation/ switchyard is FPL Farmlife Substation located 1.4 miles away at 35600 SW 162nd Street. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the predominant site soils as Biscayne marly silt loam, drained, 0 to 1 percent slopes. The presence of Biscayne marl soils indicates the seasonal high groundwater elevation is typically within 10 inches of the ground surface but would have to be confirmed by geotechnical investigations.

These soils are severely limited for building foundations because of water content and shallow depth to bedrock, and areas under building foundations would need to be removed and replaced with structural fill. The high groundwater may result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone A. High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 7.11 mi (11.5 km) E of the Everglades Class I Area, 6.68 mi (10.8 km) W of the Biscayne Class II Area, and about 6.8 miles WSW of the FPL Turkey Point Power Plant, a large Title V emitter.

Analysis Summary – Alternative Site No. 19

As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site contains minor wetlands. The site appears predominantly undisturbed. The site is within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required.

  Permanent impacts to wetlands would potentially require an Individual Environmental Resource Permit, State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

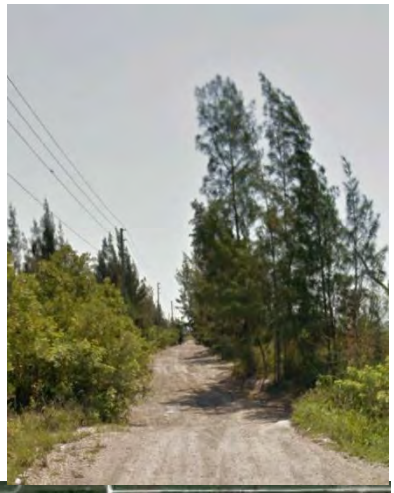
- **Species Habitat – Conflict with MDC Policy CON-9B.** MDC Policy CON-9B states that all nesting, roosting and feeding habitats used by federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.

- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

Analysis Summary – Alternative Site No. 19

Transportation

Travel time north to Card Sound Road and US-1 is less than 10 minutes. Existing access to site is via SW 360th Street and SW 167th Ave. (see map below), but approximately 1.4 miles of two-lane road with paved shoulders will need to be constructed for proper site access (see existing SW 360th Street picture at right). Additional ROW may have to be acquired.



The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts on Card Sound Road, SW 360th Street and SW 167th Ave., and other local roads will likely be significant. Truck queuing will have to be accomplished on site to prevent further congestion.

Community

The USEPA EJScreen Standard Report indicated no existing issues for this site. However, the site is less than a mile from the nearest residential zoning and the presence of wetlands, wildlife habitat and other environmental issues suggests that the siting of a WTE facility may be met with opposition by the community at this location.

Analysis Summary – Alternative Site No. 19

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

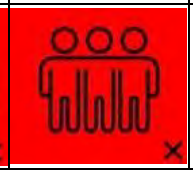
Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Approximately 1.2 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access. Additional ROW may have to be acquired.
- Construction of approximately 0.5 miles of 12” water main and possibly a booster station will be required.
- Construction of an on-site wastewater lift station and about 1.1 miles of 6” force main will likely be required.
- Construction of approximately 2.3 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 1.4 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Due to shallow depth to bedrock, rock excavation may be required to install utility pipelines, which could significantly increase utility construction costs.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- Permanent impacts to wetlands would potentially require an Individual Environmental Permit, a State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.
- **Species Habitat – Conflict with MDC Policy CON-9B.**
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

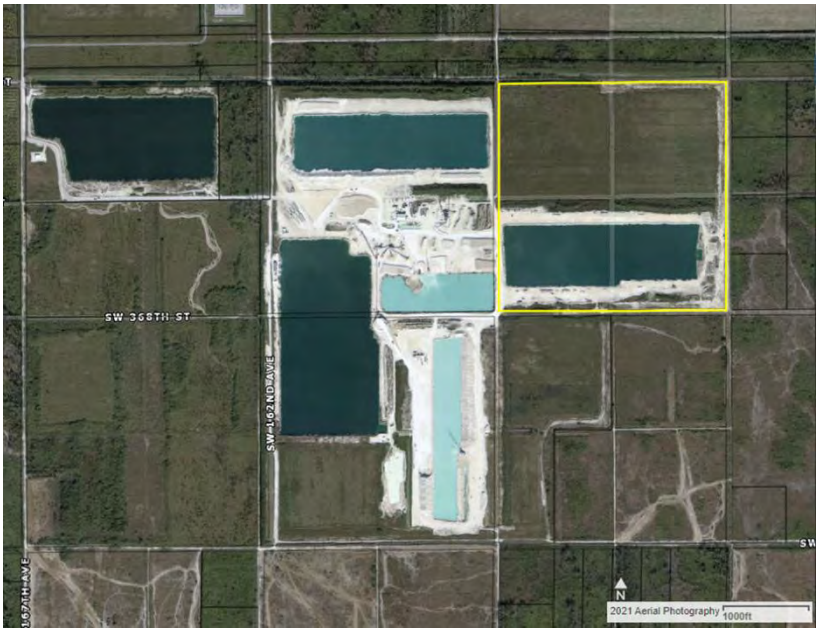
Future Waste-To-Energy Facility Siting Alternatives Analysis

Analysis Summary – Alternative Site No. 20

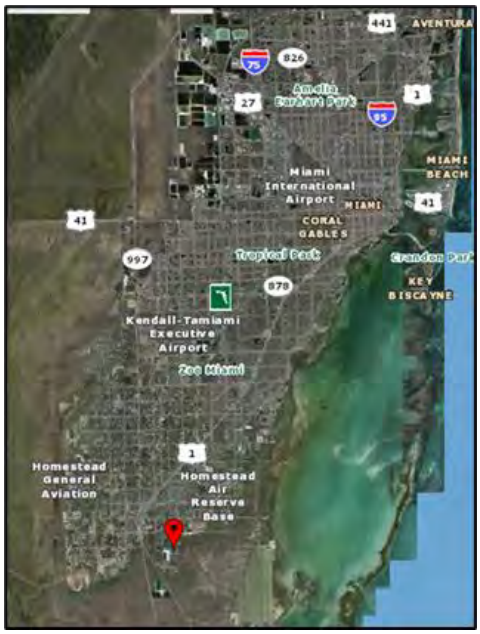
Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
						N/A	N/A

MDPA Parcel Map



Location Map



Site Information

This 156.56-acre site is located outside the UDB, in unincorporated Miami-Dade County. The combined site area is sufficient to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility and expansion to 5,000 TPD capacity or the addition of other facilities such as an ash monofil, recycling center or an education center. The property is less than a 10-minute travel time to Card Sound Road, 0.61 miles from residential zoning and 8.16 miles from the boundary of Everglades National Park.

MDPA Parcel Data

Folio No: 16-7933-001-0020

Owner: SDI Aggregates, LLC

2021 MDPA Market Value: $3,375,575

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 20

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 28.2 miles southwest of the existing RRF, 0.61 miles from residential zoning and 8.16 miles from the boundary of Everglades National Park. If this site were selected, the effects on the County's Solid Waste System would be considerable. Direct hauls from the collection routes in the vicinity of the existing RRF would divert to the three transfer stations for disposal. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station would need to be constructed at or near the site of the existing RRF to maintain the current collection patterns and transfer station loadings.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would significantly increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and would likely result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would significantly increase due to the additional deliveries and travel times and distances, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be significantly higher than at the existing RRF even if the existing RRF site could be converted to an ash monofill, or ash generated at this location was landfilled at the Medley Landfill. If disposed at a non-County facility, expected costs for ash disposal would increase even further.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. A 12" potable water main is available approximately 1.25 miles NW of the site on SW 167th Ave., but further analysis is needed to verify service pressure and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. The closest sanitary sewer collection system appears to be available approximately 1.5 miles NW of the site on SW 167th Ave., but further analysis is needed to verify capacity and system impacts. An on-site lift station and about 1.5 miles of 6" force main may be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest transmission main is approximately 3.2

miles NW of the site on Krome Ave/US-1. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

- **Electric** – Nearest substation/ switchyard is FPL Farmlife Substation located 1.6 miles away at 35600 SW 162nd Street. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the predominant site soils as Biscayne marly silt loam, drained, 0 to 1 percent slopes. The presence of Biscayne marl soils indicates the seasonal high groundwater elevation is typically within 10 inches of the ground surface but would have to be confirmed by geotechnical investigations.

These soils are severely limited for building foundations because of water content and shallow depth to bedrock, and areas under building foundations would need to be removed and replaced with structural fill. The high groundwater may result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone A. High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 8.16 miles (13.1 km) E of the Everglades Class I Area, 5.63 mi (9.1 km) W of the Biscayne Class II Area, and about 5.5 miles WSW of the FPL Turkey Point Power Plant, a large Title V emitter.

Analysis Summary – Alternative Site No. 20

As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site contains no wetlands. The site appears predominantly undisturbed. The site is within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required.

  Permanent impacts to wetlands would potentially require an Individual Environmental Resource Permit, State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

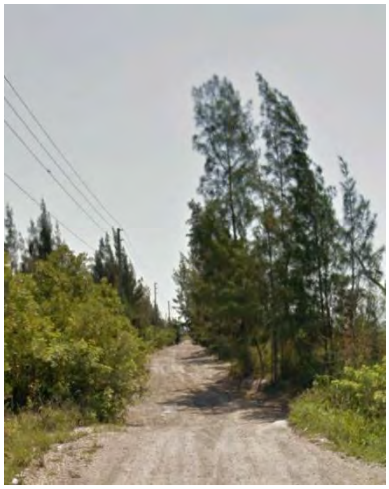
- **Species Habitat – Conflict with MDC Policy CON-9B.** MDC Policy CON-9B states that all nesting, roosting and feeding habitats used by federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.

- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

Analysis Summary – Alternative Site No. 20

Transportation

Travel time north to Card Sound Road and US-1 is less than 10 minutes. Existing access to site is via SW 360th Street, SW 167th Ave., and SW 356th St. (see map below), but approximately 2.4 miles of two-lane road with paved shoulders will need to be constructed for proper site access (see existing SW 360th Street picture at right). Additional ROW may have to be acquired.



The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts on Card Sound Road, SW 360th Street and SW 167th Ave., and other local roads will likely be significant. Truck queuing will have to be accomplished on site to prevent further congestion.

Community

The USEPA EJScreen Standard Report indicated no existing issues for this site. However, the site is less than a mile from the nearest residential zoning and the presence of wetlands, wildlife habitat and other environmental issues suggests that the siting of a WTE facility may be met with opposition by the community at this location.

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Analysis Summary – Alternative Site No. 20

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

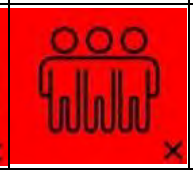
Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Approximately 2.4 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access. Additional ROW may have to be acquired.
- Construction of approximately 1.25 miles of 12” water main and possibly a booster station will be required.
- Construction of an on-site wastewater lift station and about 1.5 miles of 6” force main may be required.
- Construction of approximately 3.2 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 1.6 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Due to shallow depth to bedrock, rock excavation may be required to install utility pipelines, which could significantly increase utility construction costs.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- Permanent impacts to wetlands would potentially require an Individual Environmental Permit, a State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.
- **Species Habitat – Conflict with MDC Policy CON-9B.**
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

Future Waste-To-Energy Facility Siting Alternatives Analysis

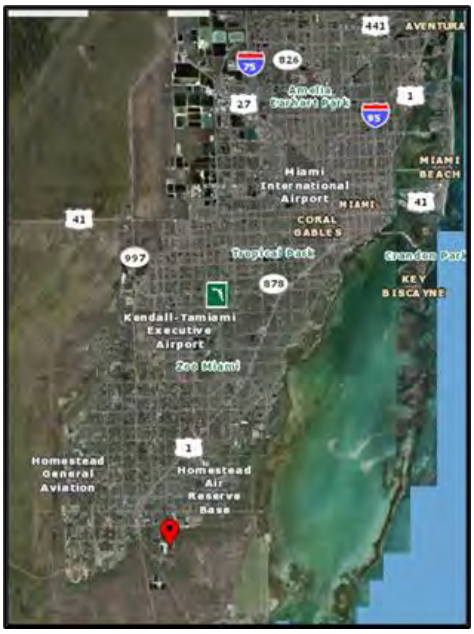
Analysis Summary – Alternative Site No. 21

Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
						N/A	N/A

MDPA Parcel Map

Location Map



Site Information

This 57.85-acre site is located outside the UDB, in unincorporated Miami-Dade County. The combined site area is sufficient to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility and expansion to 5,000 TPD capacity or the addition of other facilities such as a recycling center or an education center. The property is less than a 10-minute travel time to Card Sound Road, 1.09 miles from residential zoning and 8.14 miles from the boundary of Everglades National Park.

MDPA Parcel Data

Folio No: 16-7933-001-0031

Owner: SDI Aggregates, LLC

2021 MDPA Market Value: $1,421,500

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 21

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 28.6 miles southwest of the existing RRF, 1.09 miles from residential zoning and 8.14 miles from the boundary of Everglades National Park. If this site were selected, the effects on the County's Solid Waste System would be considerable. Direct hauls from the collection routes in the vicinity of the existing RRF would divert to the three transfer stations for disposal. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station would need to be constructed at or near the site of the existing RRF to maintain the current collection patterns and transfer station loadings.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would significantly increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and would likely result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would significantly increase due to the additional deliveries and travel times and distances, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be significantly higher than at the existing RRF even if the existing RRF site could be converted to an ash monofill, or ash generated at this location was landfilled at the Medley Landfill. If disposed at a non-County facility, expected costs for ash disposal would increase even further.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. A 12" potable water main is available approximately 2.0 miles NW of the site on SW 167th Ave., but further analysis is needed to verify service pressure and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. The closest sanitary sewer collection system appears to be available approximately 2.7 miles NW of the site on SW 167th Ave., but further analysis is needed to verify capacity and system impacts. An on-site lift station and about 2.7 miles of 6" force main may be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest transmission main is approximately 5.1

miles NW of the site on Krome Ave/US-1. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

- **Electric** – Nearest substation/ switchyard is FPL Farmlife Substation located 2.3 miles away at 35600 SW 162nd Street. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the predominant site soils as Biscayne marly silt loam, drained, 0 to 1 percent slopes. The presence of Biscayne marl soils indicates the seasonal high groundwater elevation is typically within 10 inches of the ground surface but would have to be confirmed by geotechnical investigations.

These soils are severely limited for building foundations because of water content and shallow depth to bedrock, and areas under building foundations would need to be removed and replaced with structural fill. The high groundwater may result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone A. High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 8.14 miles (13.1 km) E of the Everglades Class I Area, 5.98 mi (9.6 km) W of the Biscayne Class II Area, and about 5.8 miles WSW of the FPL Turkey Point Power Plant, a large Title V emitter.

Analysis Summary – Alternative Site No. 21

As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory, National Hydrography Dataset, and South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site contains minor wetlands. The site appears predominantly undisturbed. The site is within a Florida panther focus area for consultation or critical habitat for endangered or threatened species under the Endangered Species Act. The site is within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required.

  Permanent impacts to wetlands would potentially require an Individual Environmental Resource Permit, State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

- **Species Habitat – Conflict with MDC Policy CON-9B.** MDC Policy CON-9B states that all nesting, roosting and feeding habitats used by federal or State designated endangered or threatened species, shall be protected and buffered from surrounding development or activities and further degradation or destruction of such habitat shall not be authorized.

- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

Analysis Summary – Alternative Site No. 21

Transportation

Travel time north to Card Sound Road and US-1 is less than 10 minutes. Existing access to site is via SW 167th Ave. and SW 376th Street (see map below), but approximately 1.4 miles of two-lane road with paved shoulders will need to be constructed for proper site access. Additional ROW may have to be acquired.

The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts on Card Sound Road, SW 376th Street and SW 167th Ave. will likely be significant. Truck queuing will have to be accomplished on site to prevent further congestion.

Community

The USEPA EJScreen Standard Report indicated no existing issues for this site. However, the site is less than a mile from the nearest residential zoning and the presence of wetlands, wildlife habitat and other environmental issues suggests that the siting of a WTE facility may be met with opposition by the community at this location.

Analysis Summary – Alternative Site No. 21

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

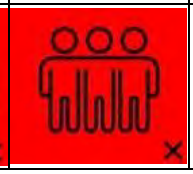
Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Approximately 1.4 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access. Additional ROW may have to be acquired.
- Construction of approximately 2.0 miles of 12” water main and possibly a booster station will be required.
- Construction of an on-site wastewater lift station and about 2.7 miles of 6” force main may be required.
- Construction of approximately 5.1 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 2.3 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Due to shallow depth to bedrock, rock excavation may be required to install utility pipelines, which could significantly increase utility construction costs.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- Permanent impacts to wetlands would potentially require an Individual Environmental Permit, a State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.
- **Species Habitat – Conflict with MDC Policy CON-9B.**
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

Future Waste-To-Energy Facility Siting Alternatives Analysis

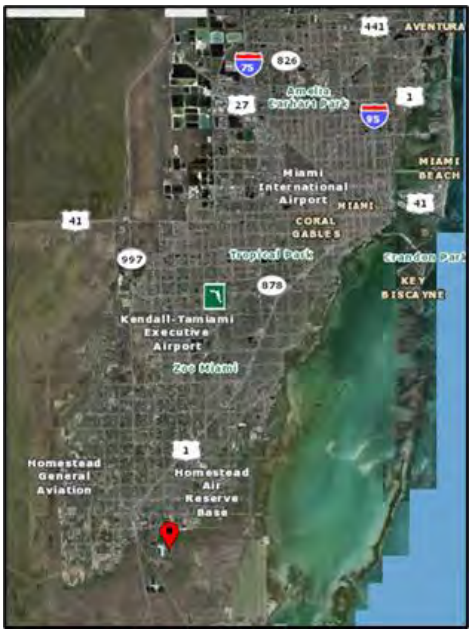
Analysis Summary – Alternative Site No. 22

Site Scorecard

Location	Utilities	Soils	Environment	Transportation	Community	Schedule	Cost
						N/A	N/A

MDPA Parcel Map

Location Map



Site Information

This 98.43-acre site is located outside the UDB, in unincorporated Miami-Dade County. The combined site area is sufficient to support the proposed 4,000 ton per day (TPD) Waste-to-Energy (WTE) facility and expansion to 5,000 TPD capacity or the addition of other facilities such as a recycling center or an education center. The property is less than a 10-minute travel time to Card Sound Road, 1.17 miles from residential zoning and 8.26 miles from the boundary of Everglades National Park.

MDPA Parcel Data

Folio No: 16-7933-001-0031

Owner: SDI Aggregates, LLC

2021 MDPA Market Value: $335,825

Zoning District: GU

PA Zone: Interim - Awaiting Specific Zoning

Analysis Summary – Alternative Site No. 22

Operational, Engineering, and Regulatory Considerations

Location

The site is located approximately 29.0 miles southwest of the existing RRF, 1.17 miles from residential zoning and 8.26 miles from the boundary of Everglades National Park. If this site were selected, the effects on the County's Solid Waste System would be considerable. Direct hauls from the collection routes in the vicinity of the existing RRF would divert to the three transfer stations for disposal. Incoming waste at those stations would increase and may result in capacity issues, especially at the West Transfer Station, which is currently operating at approximately 80% of design capacity. A new transfer station would need to be constructed at or near the site of the existing RRF to maintain the current collection patterns and transfer station loadings.

The number of deliveries by transfer trucks from the County's landfills, transfer stations, and Trash & Recycling Centers (TRCs) would increase to meet the increased capacity of the new WTE facility. Their travel patterns would be altered, and travel times would significantly increase due to longer travel distances and expected traffic congestion. Transfer fleet round trip times would increase and would likely result in the need for additional vehicles and drivers to manage transfer volumes. Transfer fleet fuel consumption and maintenance costs would significantly increase due to the additional deliveries and travel times and distances, while similar Collection fleet costs would also increase due to longer travel distances and traffic congestion.

Ash hauling costs for a new WTE facility located at this site are expected to be significantly higher than at the existing RRF even if the existing RRF site could be converted to an ash monofill, or ash generated at this location was landfilled at the Medley Landfill. If disposed at a non-County facility, expected costs for ash disposal would increase even further.

Utilities

- **Potable water** – The site would need a minimum 12" water main to provide an 8" fire line and a 4" potable supply line to the proposed facility. A 12" potable water main is available approximately 2.2 miles NW of the site on SW 167th Ave., but further analysis is needed to verify service pressure and system capacity. A booster station may be needed to provide adequate service pressure at the site.
- **Wastewater** – The proposed facility will need a minimum wastewater reuse or discharge capacity of approximately 96,000 gallons per day. Wastewater reuse or discharge options will need to be considered depending upon sewer system capacity and injection well permitting alternatives. Reuse of process wastewater is commonly used to minimize sanitary sewer usage at WTE facilities, but for site evaluation purposes all wastewater was assumed to be discharged to sanitary sewer. The closest sanitary sewer collection system appears to be available approximately 2.7 miles NW of the site on SW 167th Ave., but further analysis is needed to verify capacity and system impacts. An on-site lift station and about 2.7 miles of 6" force main may be required.
- **Natural gas** – The site would need a minimum 6" gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners. The closest transmission main is approximately 5.7

miles NW of the site. Construction of the 6" service line to the site is assumed to be within existing ROW and easements.

- **Electric** – Nearest substation/ switchyard is FPL Farmlife Substation located 2.3 miles away at 35600 SW 162nd Street. Need to verify substation/ switchyard spare capacity, voltage, and available terminations. Proposed transmission line routing through existing ROW/ FPL Easements.
- **Stormwater** – High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Groundwater** – Groundwater is typically used at WTE facilities to supplement the potable water service and provide industrial supply water for cooling towers, condensers, and other high-volume water uses. The proposed 4,000 tpd WTE facility is expected to consume an average of 552,000 gallons per day. Other more innovative and sustainable solutions, such as reuse and rainwater harvesting, are also available to reduce potable water consumption requirements. A consumptive use permit from the South Florida Water Management District (SFWMD) would be required to withdraw any groundwater from the aquifer or from a canal, lake or river. If groundwater is not available at a site, or a consumptive use permit cannot be obtained, then potable water service will have to provide for WTE facility water consumption needs, which will increase operating costs.

Soil

The USDA Soil Survey data for the site classifies the predominant site soils as Biscayne marly silt loam, drained, 0 to 1 percent slopes. The presence of Biscayne marl soils indicates the seasonal high groundwater elevation is typically within 10 inches of the ground surface but would have to be confirmed by geotechnical investigations.

These soils are severely limited for building foundations because of water content and shallow depth to bedrock, and areas under building foundations would need to be removed and replaced with structural fill. The high groundwater may result in the need for elevating the tipping floor pit, which will also increase project costs due to the need for additional structural fill.

Environment

- **Floodplains** – The site is in a 100-year floodplain, within FEMA Flood Zone A. High groundwater elevations and required floodplain compensating storage will significantly increase both the cost and site area used for stormwater retention.
- **Environmental Assessments** – No known existing Environmental Assessments for this site.
- **Power Plant Siting Act (PPSA) Certification –** A complete PPSA Application would need to be developed, inclusive of the associated individual permitting processes (Air Construction/PSD, ERP, Stormwater Permitting, UIC Permitting (if needed), etc.) The PSC "need determination" filing process is also required.
- **New Source Review (NSR) / Prevention of Significant Deterioration (PSD) Permitting** – The site is located 8.26 miles (13.3 km) E of the Everglades Class I Area, 5.74 mi (9.2 km) W of the Biscayne Class II Area, and about 5.7 miles WSW of the FPL Turkey Point Power Plant, a large Title V emitter.

Analysis Summary – Alternative Site No. 22

As a proposed major source of air pollutant emissions, a new WTE facility would be subject to PSD permitting requirements under the NSR permitting program. Pre-construction approval under the PSD permitting program is primarily contingent upon application of Best Available Control Technology (BACT) and completion of dispersion modeling analyses to demonstrate compliance with ambient air quality standards and PSD increments at both receptors located in the immediate vicinity of the site (Class II areas) and stricter air quality related criteria at sensitive receptors located within nearby federally protected Class I areas (or sensitive Class II areas).

The nearby Everglades National Park's location along the western border of the county and the Biscayne Bay NP (sensitive Class II area) located on the eastern side both having more stringent air quality related values (AQRVs) provide uncertainties associated with demonstrating acceptable impacts from the operation of a new WTE facility and thus will make air permitting very challenging at this prospective site. The AQRVs are resources, identified by the Class I area land manager agencies (i.e., National Parks Service), that have the potential to be affected by air pollution. These resources may include visibility, scenic, cultural, physical, or ecological resources for sensitive area(s).

- **Environmental Resources Permitting and United States Army Corps of Engineers (USACE) Dredge & Fill Permitting** – The National Wetlands Inventory and National Hydrography Dataset indicates wetlands are present. The South Florida Water Management District Land Cover and Land Use 2017-2019 indicates the site is comprised wet prairie wetlands. The site appears to be partially disturbed. The site is within the Florida panther primary focus area for consultation and will potentially require panther mitigation. The site is within the proposed critical habitat and within the urban development boundary in Miami-Dade County for the Florida bonneted bat and individual consultation with the U.S. Fish and Wildlife Service is required. The site is not within the 18.6 miles buffer of an active wood stork colony and does not appear to require wood stork mitigation.

  Permanent impacts to wetlands would potentially require an Individual Environmental Resource Permit, State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

- **Species Habitat – Conflict with Policy CON-9A.** MDC Policy CON-9A states that all activities that adversely affect habitat that is critical to Federal, or State designated, endangered or threatened species shall be prohibited unless such activity(ies) are a public necessity and there are no possible alternative sites where the activity(ies) can occur.

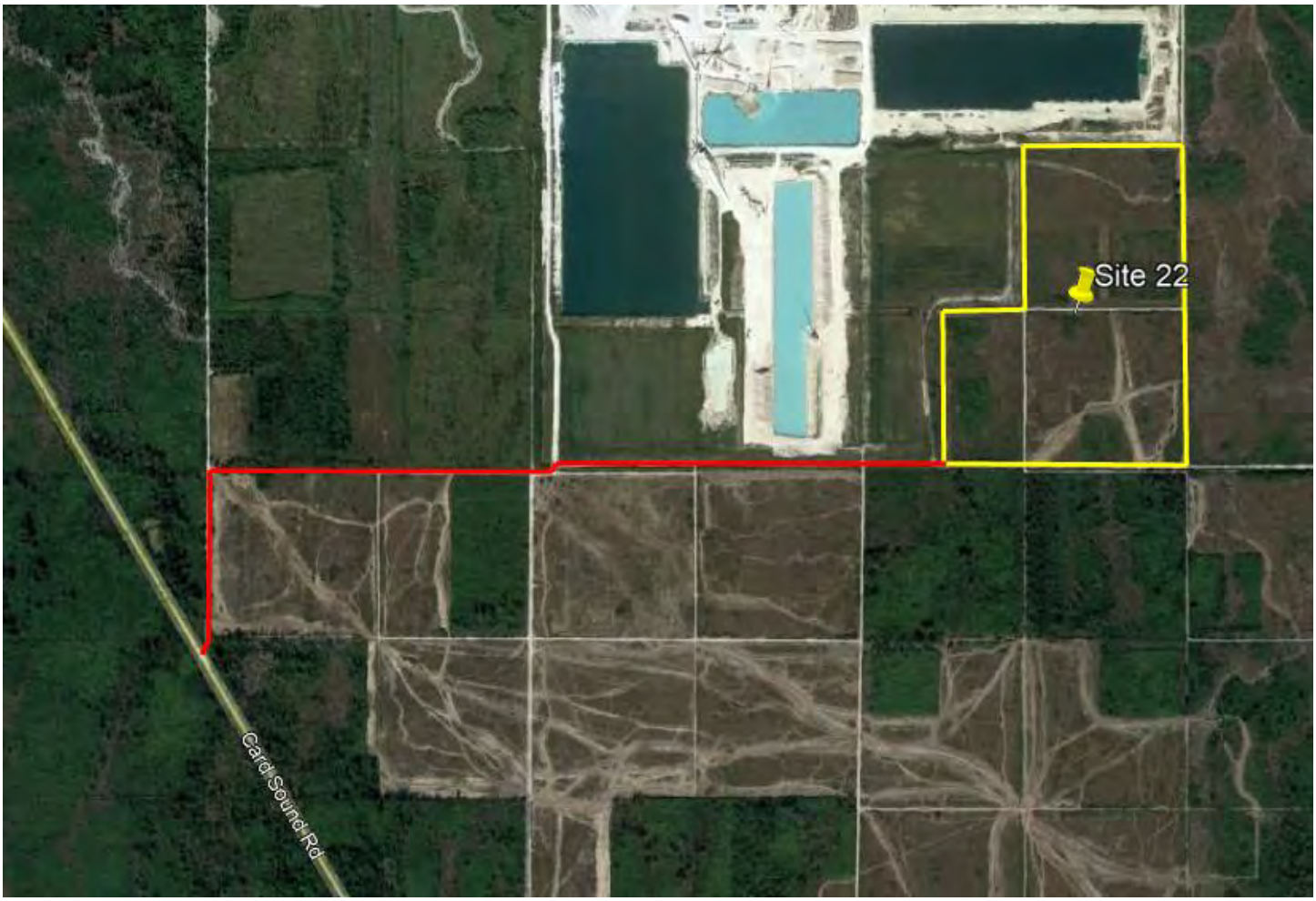
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.** The site is within the Comprehensive Everglades Restoration Plan (CERP) area and development at this location will have wetland impacts. MDC Policy CON-7J states the County is to review development applications that include wetland impacts for consistency with CERP objectives. Applications inconsistent with CERP objectives, projects or features shall be denied.

Analysis Summary – Alternative Site No. 22

Transportation

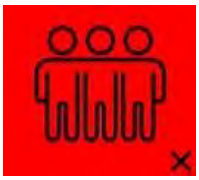
Travel time north to Card Sound Road and US-1 is less than 10 minutes. Existing access to site is via SW 167th Ave. and SW 376th Street (see map below), but approximately 1.4 miles of two-lane road with paved shoulders will need to be constructed for proper site access. Additional ROW may have to be acquired.

The volume of traffic that is expected at the proposed WTE facility (400-500 trucks per day), will greatly increase the loads on local roads so the traffic impacts on Card Sound Road, SW 376th Street and SW 167th Ave. will likely be significant. Truck queuing will have to be accomplished on site to prevent further congestion.



Analysis Summary – Alternative Site No. 22

Community



The USEPA EJScreen Standard Report indicated no existing issues for this site. However, the site is less than a mile from the nearest residential zoning and the presence of wetlands, wildlife habitat and other environmental issues suggests that the siting of a WTE facility may be met with opposition by the community at this location.

Schedule

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of schedule effects resulting from site conditions was performed.

Cost

This site was eliminated from consideration during the Detailed Screening stage. No evaluation of differential costs resulting from site conditions was performed.

Site Differentiators Overview

- Larger site area for stormwater control due to high groundwater
- Floodplain compensating storage required
- Removal of muck soils and replacement with structural fill required in development areas
- Additional structural fill for tipping floor pit due to high groundwater
- Approximately 1.4 miles of two-lane road with paved shoulder and stormwater controls will need to be constructed for proper site access. Additional ROW may have to be acquired.
- Construction of approximately 2.2 miles of 12” water main and possibly a booster station will be required.
- Construction of an on-site wastewater lift station and about 2.7 miles of 6” force main may be required.
- Construction of approximately 5.2 miles of 6” gas service piping to provide natural gas to the proposed facility for boiler auxiliary burners.
- Construction of approximately 2.3 miles of electrical transmission line routing through existing ROW/ FPL easements. Also, upgrades to the existing substation may be needed.
- Due to shallow depth to bedrock, rock excavation may be required to install utility pipelines, which could significantly increase utility construction costs.
- Additional ROW/easements may be needed to complete routing of potable water, sanitary sewer, natural gas, and electric utility infrastructure.
- Permanent impacts to wetlands would potentially require an Individual Environmental Permit, a State 404 Permit from the Florida Department of Environmental Protection, and wetland mitigation.

Analysis Summary – Alternative Site No. 22

- **Species Habitat – Conflict with MDC Policy CON-9A.**
- **SFWMD CERP Site – Conflict with MDC Policy CON-7J.**

Appendix B

Preliminary Implementation Schedule

Task	Activity	Duration of Activity	Total Task Duration (Start Date to Finish Date)	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
				Q Q Q Q	Q Q Q Q	Q Q Q Q	Q Q Q Q	Q Q Q Q	Q Q Q Q	Q Q Q Q	Q Q Q Q	Q Q Q Q	Q Q Q Q	Q Q Q Q	Q Q Q Q	Q Q Q Q
	Summary	7 years 9 months - 11 years 3 months *demo not included in duration	7 years 9 months - 11 years 3 months *demo not included in duration													
1	**Siting / Planning**	1.5 - 2.5 years	1.5 - 2.5 years													
2	**Financing**	1.5 years	3 years 9 months - 6 years 3 months													
3	**Regulatory / Permitting**	3.5 - 4.5 years	3.5 - 4.5 years													
4	**Procurement**	2 - 3 years	3 years - 4 years 9 months													
5	**Notice to Proceed / Design and Construction**	4 - 5 years	4 - 5 years													
6	**System Operational Impacts and Demolition**	1 - 1.5 years for Shutdown and Demo	1.5 years - 7 years 9 months													

Legend

- Existing Site
- Site 1: Medley
- Site 16: Ingraham Hwy Site 1
- Site 17: Ingraham Hwy Site 2

Note:

-Tasks identified in this high-level implementation schedule represent the Early Start Date, the earliest date a scheduled activity can be started. Certain tasks may be started earlier or later or extend or compressed to shorten or extend the schedule.

-Duration of Activity indicates the time that activity is occurring for the task and is included in report Table 2-2 Summary of Schedule Tasks with Estimated Durations

-Total Task Duration (Start Date to Finish Date) indicates the total time from the beginning of the first task or subtask to the end of the last task or subtask.

-Task durations provided are preliminary best estimates based on our professional judgement and experience with other facilities and processes.

-Demolition of the existing RRF included as lighter-colored durations.

Appendix C

Cost Considerations Table

Site	Costs (Unit Costs, when available)	Units for Unit Cost	Existing MDRRF Site (Doral)				Site 1 - Medley				Site 16 - Ingraham Hwy. Site #1				Site 17 - Ingraham Hwy. Site #2			
			Checklist	Unit Quantity	Cost	% of BASE	Checklist	Unit Quantity	Cost	% of BASE	Checklist	Unit Quantity	Cost	% of BASE	Checklist	Unit Quantity	Cost	% of BASE
Additional Site Estimates																		
Parcel Area		acres	157.16				320.31				159.71				81.11			
WTE Site Area		acres	50				50				50				50			
Building areas for vibrocompaction		square feet	871,200				871,200				871,200				871,200			
Soils Removal/Replace with Select Fill		depth (feet)					0.25				0.58				0.58			
		volume (CY)					8,067				18,822				18,822			
Embankment Fill (for elevation)		volume (CY) for one foot elevation required					32,267				32,267				32,267			
Estimated Cost Differentials																		
Location																		
Land Acquisition - MDPA Market Value Plus[1]	10%	percentage above market value	N		$0	0.0%	Y		$42,483,287	2.9%	Y	1	$2,523,928	0.2%	Y		$1,017,309	0.1%
Offsite Access Road development	$2,546,993	per mile	N			0.0%	N			0.0%	N				Y	0.75	$1,910,245	0.1%
Utilities																		
Off-Site Utilities Construction																		
Water																		
12-inch DIP pipeline	$475,200	per mile	N			0.0%	N			0.0%	Y	3.3	$1,568,160	0.1%	Y	4.0	$1,900,800	0.1%
Booster Pump Station, MGD (if no ISW)	$200,644	per booster static	N			0.0%	Y	1	$200,644	0.0%	Y	1	$200,644	0.0%	Y	1	$200,644	0.0%
Wastewater																		
6-inch PVC force main	$386,338	per mile	N			0.0%	N			0.0%	Y	3.3	$1,274,914	0.1%	Y	4.0	$1,545,350	0.1%
Lift station	$45,936	per station	N				Y	1	$45,936	0.0%	Y	1	$45,936	0.0%	Y	1	$45,936	0.0%
Natural Gas																		
Distance	$500,000	per mile	N			0.0%	Y	2.2	$1,100,000	0.1%	Y	5.5	$2,750,000	0.2%	Y	6.0	$3,000,000	0.2%
Electric																		
Distance	$1,000,000	per mile	N			0.0%	Y	1.9	$1,900,000	0.1%	Y	6.5	$6,500,000	0.4%	Y	6.5	$6,500,000	0.4%
Industrial Supply Well Development	$1,200,000	per well	N			0.0%	N			0.0%	N			0.0%	N			0.0%
Industrial Supply Well Rehabilitation - 25% of well d	$300,000	per well	Y	3	$900,000	0.1%	N				N				N			
Additional ROW/Easement for Utilities - 60 foot wid	Market Value		N			0.0%	Y	2.2	$2,122,109	0.1%	Y	6.5	$747,060	0.1%	Y	6.5	$592,910	0.0%
Stormwater[2]																		
Additional for site, above typical, 4 foot perimet	$30.13	per CY	N			0.0%	Y	16,800	$506,184	0.0%	Y	16,800	$506,184	0.0%	Y	16,800	$506,184	0.0%
Additional for temporary stormwater retainage c	$500,000	per site	Y	1	$500,000	0.0%	N			0.0%	N			0.0%	N			0.0%
Special Construction (i.e., Elevate Pit)																		
Additional Elevation of Pit due to high ground water elevation (5 foot included in re			N			0.0%	N			0.0%	N			0.0%	N			0.0%
Lake fill costs	$56.43	per CY	Y	114,060	$6,436,201	0.4%	N			0.0%	N			0.0%	N			0.0%
Soil																		
Removal of Muck Soils	$14.43	CY	N	0		0.0%	N			0.0%	Y	18,822	$271,605	0.0%	Y	18,822	$271,605	0.0%
Replace with Select Fill	$25.00	CY	N	0		0.0%	Y	8,067	$201,667	0.0%	Y	18,822	$470,556	0.0%	Y	18,822	$470,556	0.0%
Geotechnical Issues (Vibrocompaction)	$7.83	per square foot	Y	500,000	$3,915,000	0.3%	Y	871,200	$6,821,496	0.5%	Y	871,200	$6,821,496	0.5%	Y	871,200	$6,821,496	0.5%
Environment																		
Flood plain mitigation	if required	feet of elevation	N				N				Y	1			Y	1		
Embankment Fill	$30.13	per CY	N			0.0%	N			0.0%	Y	32,267	$972,195	0.1%	Y	32,267	$972,195	0.1%
Wildlife Mitigation / Relocation																		
Wood Stork	$65,000	per acre	N			0.0%	N			0.0%	N			0.0%	N			0.0%
Bonneted Bat - developed	$5,000	per acre	Y	50	$250,000	0.0%	N			0.0%	N			0.0%	N			0.0%
Bonneted Bat - undeveloped	$200,000	per acre	N			0.0%	N			0.0%	Y	50	$10,000,000	0.7%	Y	50	$10,000,000	0.7%
Florida Panthers	$65,000	per acre	N			0.0%	N			0.0%	N			0.0%	Y	50	$3,250,000	0.2%
Environmental Mitigation						0.0%												
Permanent Wetlands Mitigation - low	$65,000	per acre	N			0.0%	N			0.0%	Y	50	$3,250,000	0.2%	Y	50	$3,250,000	0.2%
Permanent Wetlands Mitigation - high	$120,000	per acre	N			0.0%	N			0.0%	N			0.0%	N			0.0%
Zoning and Permitting Cost Differential	$3,074,668	per site	N			0.0%	Y	1	$3,074,668	0.2%	Y	1	$3,074,668	0.2%	Y	1	$3,074,668	0.2%
Permitting Difficulty (percentage of)[3]	$3,074,668	per site	N		$0	0.0%	Moderate		$1,844,801	0.1%	Severe	1	$3,382,135	0.2%	Severe		$3,382,135	0.2%
State 404			N								Y				Y			
Environmental Resources Permit											Y				Y			
Air PSD/NSR Permitting			Y				Y				Y				Y			
PPSA							Y											
Consumptive Use Permit																		
System																		
Ash Disposal																		
Monofill Development (if feasible and space av	$1,000,000	per acre	N			0.0%	N			0.0%	N			0.0%	N			0.0%
System Effects - Capital[4]																		
Transfer Station Construction	$45,000,000	per station	N			0.0%	N			0.0%	Y	1	$45,000,000	3.1%	Y	1	$45,000,000	3.1%
Fleet vehicles - Transfer Trailers	$300,000	per trailer	N			0.0%	N			0.0%	Y	10	$3,000,000	0.2%	Y	10	$3,000,000	0.2%
Waste Diversion for Construction[5]	see Basis of Cos	total cost	N			0.0%	N			0.0%	N			0.0%	N			0.0%
TOTAL SITE COST DIFFERENTIATORS - Capital					$12,001,201	0.8%			$60,300,792	4.2%			$92,359,480	6.4%			$96,712,032	6.7%
ESTIMATED TOTAL CAPITAL COST					$1,445,520,543				$1,493,820,134				$1,525,878,822				$1,530,231,374	
ESTIMATED TOTAL CAPITAL COST DIFFERENTIAL WITH BASE COST				Base - Least Cost Alt					$48,300,000				$80,400,000				$84,700,000	

Site	Costs (Unit Costs, when available)	Units for Unit Cost	Existing MDRRF Site (Doral)				Site 1 - Medley				Site 16 - Ingraham Hwy. Site #1				Site 17 - Ingraham Hwy. Site #2			
			Checklist	Unit Quantity	Cost	% of BASE	Checklist	Unit Quantity	Cost	% of BASE	Checklist	Unit Quantity	Cost	% of BASE	Checklist	Unit Quantity	Cost	% of BASE
Operational Impacts[6]	$10.83	per ton, Year 1																
Utilities - Water																		
Purchase of Potable	$1.72	cost per ton wast	N				Y	1	$1.72	15%	Y	1	$1.72	15%	Y	1	$1.72	15%
System Effects - Operational																		
Ash Disposal[7,8]																		
Ash Hauling - landfill near RRF site	see Basis of Cos	cost per ton wast	Y	1	$0.39		Y	1	$0.39	3%	Y	1	$3.08	27%	Y	1	$3.08	27%
O&M Cost Impacts[9]																		
Transfer O&M (staffing, utilities, maintenance f	$8.61	cost per ton wast	N				N				Y	1	$8.61	77%	Y	1	$8.61	77%
TOTAL SITE COST DIFFERENTIATORS - Operational, cost per ton waste processed Year 1					$0.39				$2.10	19%			$13.40	119%			$13.40	119%
ESTIMATED TOTAL ANNUAL O&M COST per ton waste processed - Year 1					$11.22				$12.93				$24.23				$24.23	

Notes:

1 *Property acquisition based on 2021 MDPA Market Value plus markup identified on same row*
2 *Stormwater above typical assumes construction of berm around perimeter of WTE site for stormwater containment.*
3 *Permitting Difficulty - Rated as minor (25%), moderate (60%), and severe difficulty (110%) with percentage of Zoning and permitting cost differential to account for additional consultant cost.*
4 *System Effects - Capital Cost Impacts estimated to be transfer station development and additional transfer trailers*
5 *Waste Diversion for Construction on existing site - estimated cost differential between hauling and disposal at Okeechobee and disposal at MDRRF.*
6 *Operational Impacts are estimated on a per ton of waste processed basis and compared to base operational costs per ton waste processed, per the estimates developed for the WTE Facility Cost Estimate Project*
7 *Ash Hauling - assuming ash would be hauled off-site for disposal at a Landfill near RRF site. Cost differential is in hauling distance/cost.*
8 *Regular MSW that may be sent to nearby landfill would have to be diverted to allow ash to be disposed at nearby landfill.*
9 *System Effect - O&M Cost Impacts estimated to be additional drivers, equipment replacement, additional consumables for waste hauling*

Basis of Costs

CAPITAL

Water and Wastewater Utility Costs				
12" DIP	$83.99	per lineal foot	2022	*FDOT summary cost data*
12" DIP rounded up to include fittings, valves, etc. (water supply)	$90.00	per lineal foot	2022	*FDOT summary cost data*
6" PVC pipe (wastewater force main)	$73.17	per lineal foot	2022	*FDOT summary cost data*
wastewater lift station	$500,000	per MGD flow	2022	*recent project cost estimate*
assumed wastewater flow	0.09	MGD		*see Water, WW, and NG Needs sheet*
wastewater lift station cost per lift station	$45,936	per lift station		
water booster pump station	$500,000	per MGD flow	2022	*recent project cost estimate*
water booster pump station cost per pump station	$200,644	per pump station		*without ISW*
Industrial Supply Well development, 6-inch	$1,200,000	per well	2022	*recent project cost estimate, to be verified*
Industrial Supply Well rehabilitation (25% of development)	$300,000	per well		*existing site has 3 wells on-site. Would need review and repair*

Road Development Costs				
Undivided 2-lane rural road, 5' shoulders, new construction	$2,546,993	per mile	2022	*FDOT summary cost data, includes required stormwater for road*

Site Development Costs				
Regular excavation (removal of soils)	$14.43	per cubic yard	2022	*FDOT summary cost data*
Embankment fill (for elevating site)	$30.13	per cubic yard	2022	*FDOT summary cost data*
Regular fill	$25.00	per cubic yard	2022	*recent project cost estimate*
Vibrocompaction, 450 probes per acre at 40ft depth	$5.52	per square foot	2010	*PBREF 2 change order 5 (see separate sheet for breakdown)*
Vibrocompaction, 450 probes per acre at 40ft depth	$7.83	per square foot	2022	*PBREF 2 change order 5, escalated per ENR cost index*

Stormwater

Assumes construction of 4 foot berm around site perimeter, 3:1 side slope, 2 feet top width

Perimeter (linear feet)	8100	on average, can update based on si	Perimeter		
Foot print (square feet)	26	per linear foot	Existing Site	5713	linear feet
Total foot print, on average	4.83	acres	Site 16	8218.54	linear feet
Volume of soils for berm (cubic feet)	56	per linear foot	Site 17	8055.11	linear feet
Volume of soils for berm (cubic yards)	6.22	per linear yard	Average	8136.825	
Volume of soils for berm (cubic yards)	16800	CY per site			
Cost for berm construction	$30.13	per cubic yard	similar to embankment fill cost		
Cost per site	$506,184	per site			

Lake Fill

Reference Facility Lake Fill Cost Estimate (2020)	$13,000,000		2020
Lake Fill Cost Estimate (CY) - South Lake	338,323		
Estimated Cost Per CY	$38.42		2020
Estimated Cost Per CY	$56.43		2033

Ash Monofill	Unit Cost	unit	Date of Cost Estimate	*Source:*
Ash Monofill Expansion cost per acre	$800,000	per acre	Sep-18	*recent project cost estimate*
Ash Monofill Expansion cost per acre	$1,000,000	per acre	May-22	*recent project cost estimate*
Ash disposal per acre		ton per acre		*data from existing ash monofill?*
				existing ash monofill disposal capacity until 2028. Expansion may be possible

System Effects - Capital					
Capital Cost					
Transfer Station Construction	$45,000,000	Tampa ($34M, 2021, 50K sq ft), SWA (2013), DSWM CIP $45M			
Fleet vehicles - Transfer Trailers	$300,000	per trailer	10	units needed	based on recent 2021/2022 quote
Fleet vehicles - Collection Vehicles	$350,000	per vehicle	0	units needed	

OPERATIONAL

Waste Processed per year	1,333,333	tons per year		
Ash disposal per year	120,051	tons per year		
Year 1 Net O&M Cost	$14,439,872			
Year 1 Net O&M Cost per Ton (Base)	$10.83	per ton	2033	
Potable Water Purchased				
Potable water cost	$8.20	per ccf	2021	*MD DSWM WTE cost estimate*
Potable water cost	$11.69	per ccf	2033	
Potable water cost	$10,962.57	per million gallons	2021	
Potable water cost	$15,630.00	per million gallons	2033	
assumed potable water usage without ISW	0.40	MGD		*see Water, WW, and NG Needs sheet*
assumed potable water usage without ISW	146.47	MG per year		*see Water, WW, and NG Needs sheet*
Total assumed potable water cost without ISW - Year 1	$2,289,332	per year	2033	
Total potable water cost without ISW per ton waste processed	$1.72	per ton of waste processed		

Assumptions

Site Information		
Overall WTE site area - 4,000 TPD	50	acres
	2,178,000	square feet
Percent of site for buildings (area of	40%	
CPI	3%	

Unit Conversion		
1	cubic yards	
27	cubic feet	
1	mile	
5280	feet	
1	acre	0
43560	square feet	
1	square miles	
640	acre	
1	ccf	
748	gallons	

Ash hauling and disposal costs:

Medley Landfill (Waste Management)	**9350 NW 89th Ave, Medley, FL**			will need to verify capacity for past 2033
Tipping Fee ($/ton)	$34.17	per ton	2021	*MD DSWM WTE cost estimate, Medley Landfill*
	$48.72	per ton	2033	
Distance from existing site	3	miles		
Haul Cost ($/ton) - near existing site	$3.00	per ton ash	2021	
Haul Cost ($/ton) - near existing site - Year 1	$4.28	per ton ash	2033	
Total ash haul cost -near existing site - Year 1	$513,491	per year		
Ash Haul Cost per ton processed waste - Year 1 (near existing)	$0.39	cost per ton waste processed		
Distance to Site 16 and 17	43	miles		
Haul Cost ($/ton) - Sites 16 and 17	$9.36	per ton ash	2021	
Haul Cost ($/ton) - Sites 16 and 17 - Year 1	$13.35	per ton ash	2033	
Total ash haul cost - Year 1	$4,102,133	per year		
Ash Haul Cost per ton processed waste - Year 1 (Site 16 and 17)	$3.08	cost per ton waste processed		

Okeechobee Landfill (Waste Management)	**10800 NE 128th Ave, Okeechobee, FL**			
Tipping Fee ($/ton)	$30.00	per ton	2021	*MD DSWM WTE cost estimate, Okeechobee Landfill*
	$42.77	per ton	2033	
Estimated tipping fee percent increase due to demand	17.00%			*assume renegotiate with Okeechobee at a higher rate because of need and higher waste disposal tonnage contract*
Renegotiated Tipping Fee ($/ton)	$50.04	per ton	2033	not used
Distance from existing site	135	miles		
Haul Cost ($/ton) - near existing site	$17.80	per ton	2021	
Haul Cost ($/ton) - near existing site - Year 1	$25.38	per ton	2033	
Total ash haul cost -near existing site - Year 1	$3,046,712	per year		
Ash Haul Cost per ton processed waste - Year 1 (near existing)	$2.29	cost per ton waste processed		
Distance to Site 16 and 17	160	miles		
Haul Cost ($/ton) - Sites 16 and 17	$21.18	per ton	2021	estimated 19% more because distance is 19% greater than from existing
Haul Cost ($/ton) - Sites 16 and 17 - Year 1	$30.20	per ton	2033	
Total ash haul cost - Year 1	$3,601,522	per year		
Ash Haul Cost per ton processed waste - Year 1 (Site 16 and 17)	$2.70	cost per ton waste processed		

SWA Diverted Waste Basis of Cost for reference

Diverted Waste Disposal Location	Okeechobee Landfi	N/A	N/A		Current Agreements
Waste Disposal Location Distance fr	56	N/A	N/A		miles
Hauling Cost per mile	$ 4.15	N/A	$	4.15	$/mile
Haul Cost per ton	$ 7.27	N/A	$	7.27	$/ton
Year of Hauling Cost Estimate	2018	N/A		2018	year
Tipping Fee - Solid Waste (per ton)	$ 39.75	N/A	N/A		$/ton
Tipping Fee - C&D (per ton)	$ 31.25	N/A	N/A		$/ton
Tipping Fee - Vegetation (per ton)	$ 31.25	N/A	N/A		$/ton
Year of Tipping Fee Used	2019	N/A	N/A		year
Tons per Load - Garbage	$ 21.70	N/A	$	21.70	tons/load
Tons per Load - Ash	N/A	N/A	$	21.70	tons/load
PBREF 3 Distance from PBREP (mi	N/A	N/A		30	miles

System Effects - Operational — Operational costs are compared to projected O&M base cost

O&M Costs

Transfer Station O&M (staffing, utilities, maintenance)	$7,000,000	per year	2021	based on SWAPBC and Hillsborough data
Drivers	$75,000	per driver per year	2021	estimates
Transfer trailer units needed	10	units needed		
Cost per year	$8,050,000	per year	2021	similar to SWAPBC and Hillsborough data
	$11,477,375.14	per year	2033	
Cost per year per ton waste processed	$8.61	cost per ton waste processed		
Transfer Trailer O&M - Fuel, Maintenance, Equipment Replaceme	$30,000	per unit per year	2021	estimates

SWAPBC Component Cost Summ

	Avg TS Cost Per T	Transportation Cost per ton		Annual Tonnage	Total Expenses	
Belle Glade TS	$67.29	$23.40	2012	31,285	$2,097,110	
Lantana TS	$26.44	$11.35	2012	176,938	$8,883,190	
Jupiter TS	$20.87	$8.68	2012	376,658	$9,910,933	
Royal Palm Beach TS	$22.36	$6.70	2012	211,726	$4,382,320	
Southwest TS	$51.24	$7.61	2012	273,305	$6,098,259	
Overall	$29.38	$8.77	2012	1,264,125	$6,130,836	average
	$39.48	$11.79	2022		**$8,239,330**	
	$54.66	**$16.31**	**2033**		**$11,405,160**	

ATRI Study (2019) - Hauling costs	https://truckingresearch.org/wp-content/uploads/2019/11/ATRI-Operational-Costs-of-Trucking-2019-1.pdf			
Average Marginal Cost per Mile	$1.82	2018	includes fuel, R&M, insurance, driver wages and benefits, permits and tolls	
Average Marginal Cost per Hour	$71.78	2018	includes fuel, R&M, insurance, driver wages and benefits, permits and tolls	

Miami-Dade System Costs

Transfer Station Operations Expenses	$28,801,000		FY 2020 Actua	
Transfer Fee Tonnage	647,655	tons per year	FY 2022 Proje	
Transfer Station Operations Cost per Ton (Estimate)	$44.47	per ton	2020	
Transfer Station Operations Cost per Ton (Estimate)	$47.18		2022	
Transfer Station Operations Cost per Ton (Estimate)	$65.31		2033	

Hillsborough County - Transfer Station Costs

NWTS and CCC FY23 Total Budget	$6,622,909		
NWTS and CCC FY21 Tonnage	246,807.54		
Estimated cost per ton	$26.83		
SCTS and 3CCC FY23 Total Budget	$5,546,013		
SCTS and 3CCC FY21 Tonnage	173,314.75		
Estimated cost per ton (2023)	$32.00		
Estimated cost per ton (2033)	**$43.00**		

Waste Diversion for Construction (additional cost compared to MDRRF disposal) — not used

Months of waste diversion	0	months		
Years of waste diversion	0	years	2028-2032	assumes MDRRF will continue operations during construction of new WTE Facility
Waste processed per year	1,000,000	tons	MDRRF capacity	
Total waste diverted	-	tons		

Medley cannot take all of diverted waste

Medley Landfill (Waste Management)			
Existing Site			
Diverted waste hauling	$4,277,283	per year	2033
Diverted waste hauling	$0	total for construction period	
Diverted waste disposal	$34,170,000	per year	2033
Diverted waste disposal	$0	total for construction period	
Total waste hauling and disposal	$0		

Okeechobee Landfill (Waste Management)			
Existing Site			
Diverted waste hauling	$25,378,544	per year	2033
Diverted waste hauling	$0	total for construction period	
Diverted waste disposal	$50,044,207	per year	2033
Diverted waste disposal	$0	total for construction period	
Total waste hauling and disposal	$0		2033
Total waste hauling and disposal	#DIV/0!	per ton	2033

	miles from RRF	Year capacity reached (Current Capacity, No Expansion, With RRF)	Year capacity reached (Current Capacity, With Expansion, With RRF)	Draft Arcadis Estimates as of Sept 2021
North Dade LF	15.00	2024	2048	2030
South Dade LF	25.00	2033	2042	2030
RRF LF	0.00	2031	N/A	2030

County Landfill

Existing Site			
Diverted waste hauling		per year	2033
Diverted waste hauling		total for construction period	
Diverted waste disposal		per year	2033
Diverted waste disposal		total for construction period	
Total waste hauling and disposal			

RRF 2021 Operating Cost per Ton Processed (Gross)	$61.34	per ton	2021	does not include electrical revenues. Rates and Charges Report
RRF Operating Cost per Ton Processed (Gross)	$87.46	per ton	2033	
RRF 2021 Operating Cost	$62,203,174		2021	Rates and Charges Report
Electrical Revenues 2021	$8,640,000		2021	Rates and Charges Report
RRF Tonnage FY 2021	1,014,050	tons	2021	Rates and Charges Report
RRF 2021 Operating Cost per Ton Processed (Net)	$52.82	per ton	2021	including electrical revenues
RRF Operating Cost per Ton Processed (Net)	$75.31	per ton	2033	

likely $79M once 5th amendment approved

Waste Diversion for Construction - Cost Difference to send to Okeechobee vs MDRRF	#DIV/0!	per ton
Total Waste Diversion Cost Difference	#DIV/0!	

Easement/ROW Access

use market value per acre		
60 foot wide easement	0.011363636	miles

Demolition Cost applies to all not used

Arcadis U.S., Inc.
701 Waterford Way
Suite 420
Miami
Florida 33126
Phone: 305 913 1316
Fax: 305 913 1301
www.arcadis.com

EXHIBIT B

EXHIBIT B

Memorandum

MIAMI-DADE COUNTY

Date: August 29, 2024

To: Honorable Chairman Oliver G. Gilbert, III
and Members, Board of County Commissioners

From: Daniella Levine Cava
Mayor

Subject: Update on the Site Selection for the Replacement Waste-to-Energy Facility

---

The administration has been analyzing three potential replacement sites for a new waste-to-energy (WTE) facility including a location in Medley, the Airport West site, and the existing Doral site. This is an important decision for the future of our community and the administration is committed to collaborating with this Board, local leaders, community stakeholders and residents to chart the best course forward, to provide the County critically needed disposal capacity while minimizing impact to our residents.

On April 19, 2024, an Arcadis US, Inc. report was presented to the Board of County Commissioners on the results of a preliminary air quality and human health and ecological analysis for all three sites. This report detailed that the potential air emissions at all three sites are minimal and should have no effect on the health of the surrounding ecological communities.

The County received an unsolicited proposal (attached) from TAF Okeechobee Solutions, LLC, and West Dade Nurseries, LLC, outlining a land swap to redevelop and revitalize county-owned land along NW 58th Street between NW 87th and 97th Avenues in exchange for land held by the developer that may accommodate a new WTE. Based on preliminary review, the proposal offers an alternative site located further away from residential communities and in an already industrial area and this potential site warrants a thorough review. The Department of Solid Waste Management (DSWM) will work with Arcadis to perform similar preliminary air modeling and human health risk assessments at this location. We will continue working with stakeholders and residents to hear directly from the community about all the potential sites.

In parallel to our work to identify a location for a replacement WTE facility, the County continues to advance "Zero-Waste" policies to help reduce the amount of waste going to landfills while also reusing and repurposing as much waste as possible. To that end, the County will shortly begin reviewing proposals received for the services of a Zero-Waste consultant to develop a master plan.

It is important that site selection proceed as planned in September. To ensure the process can proceed while allowing for a thorough assessment of the unsolicited proposal, I request that a WTE facility site selection discussion item be added to the Board's September 17 agenda and a copy of this memorandum be placed at the next available Board Agenda.

Attachment

c: Geri Bonzon-Keenan, County Attorney
Gerald Sanchez, First Assistant County Attorney
Jess McCarty, Executive Assistant County Attorney
Office of the Mayor Senior Staff
Dr. Aneisha Daniel, Director, Department of Solid Waste Management
Yinka Majekodunmi, Commission Auditor
Theresa Therilus, Interim Chief, Office of Policy and Budgetary Affairs
Basia Pruna, Director, Clerk of the Board
Eugene Love, Agenda Coordinator

August 29, 2024

RE: Land Swap Proposal For New Public Facility Campus

The Hon. Daniella Levine Cava
Miami-Dade County Mayor
111 NW 1st Street, 29th Floor
Miami, FL 33128

Dear Mayor Levine Cava,

In accordance with Miami-Dade County Implementing Order 8-4 ("IO 8-4"), TAF Okeechobee Solutions, LLC (the "Developer"), together with West Dade Nurseries, LLC ("WDN"), recently initiated the unsolicited proposal application process, as provided by IO 8-4, via the District Commissioner, for your review and consideration.

We are honored to put forth the attached application to revitalize County-owned property currently utilized by the Departments of Solid Waste Management and Transit and Public Works, and provide the County with a new ~65-acre County Public Facility campus, at a location which we respectfully submit is worthy of your consideration as the preferred site for the County's planned new waste-to-energy facility.

We look forward to your review of the proposal and to engaging in more detailed discussions with your Administration to bring this proposal to life. Thank you for your leadership and your efforts to prioritize public infrastructure solutions for the benefit of the Miami-Dade County community.

Sincerely,

David Martin
TAF Okeechobee Solutions, LLC

c: Johanna Cervone, Chief of Staff, Office of the Mayor

EXHIBIT C

EXHIBIT C

Okeechobee Solutions

MIAMI-DADE COUNTY

August 2024

1.2 Cover Letter

August 19, 2024

RE: **Land Swap Proposal For New Public Facility Campus**

District 12 Office
8333 NW 53 Street, Suite 102
Miami, FL 33126
Attn: Commissioner Juan Carlos Bermudez

Dear Commissioner Bermudez,

TAF Okeechobee Solutions, LLC (the "Developer"), together with West Dade Nurseries, LLC ("WDN"), is honored to put forth this application, pursuant to Section 125.37 of the Florida Statutes and Implementing Order 8-4, for an equal-value exchange of property between the Developer and Miami-Dade County (the "County"). Developer and WDN propose to convey to the County a new ~65-acre County campus for public facilities on property currently owned by WDN (the "Public Facility Campus"), in exchange for the County's conveyance to the Developer of a portion of the property located at 8701-8795 N.W. 58th Street, currently owned by the County (the "County Property"). Both the County Property and the new Public Facility Campus are located in unincorporated Miami-Dade County. The attached presentation outlines the details of the proposal.

As part of this proposal, Developer will (1) complete the site work and permitting required to deliver to the County a development-ready pad on the Public Facility Campus that allows the County, at its option, to develop its planned new waste-to-energy facility (the "Public Infrastructure Pad"), and (2) construct new replacement facilities for the County operations currently located on the County Property, based on the County's determination of its priority needs, using a design-to-budget framework (the "Replacement Facilities").[1] Depending on the County's needs, the Developer is open to locating the Replacement Facilities on approximately 16 acres of the Public Facility Campus or any alternative sites controlled by the County, which would allow for the full ~65-acre Public Facility Campus to be utilized for new Solid Waste Management or other new County facilities. Please note the Developer has the ability to provide additional contiguous land as part of the Public Facility Campus in the event that the County's desired program for the Public Facility Campus requires more than 65 acres. To equalize the value of the exchange, Developer will provide the County with an allowance for the design and construction of the Replacement Facilities and Public Infrastructure Pad equal to the difference in the appraised values of the County Property and the Public Facility Campus, which developer estimates to be $45 Million.

The Developer is of course aware of the ongoing public discussions regarding potential locations for the County's planned new waste-to-energy facility. The Developer is not a provider of waste-to-energy facilities and has no interest in the planned new facility, nor does Developer's proposed exchange require the siting of the new waste-to-energy facility on the Public Facility Campus, as the new campus can be utilized for any purpose desired by the County. However, the Developer does believe that the Public Facility Campus is worthy of the County's consideration as a superior location for the waste-to-energy facility relative to the potential sites that have been discussed at public meetings or reported by the media. Notably, the Public Facility Campus provides the following advantages:

1. Proximity to planned US-27 rail corridor, which would allow for the efficient shipping of waste to the facility by rail;
2. Proximity and ease of access to and from the Ronald Reagan Florida Turnpike;
3. Location approximately two miles further from Miramar and other residential areas than NW Dade sites currently owned and being considered by the County; and
4. Expedited construction timeline as a result of Developer's delivery of a development-ready site, with prior completion of site work and environmental permitting tasks.

The Developer currently anticipates that following the delivery of the Public Facility Campus to the County, the Developer would leverage existing uses in the vicinity of the County Property to develop a Garden Style Multi-Family Housing and Industrial Park project on the County Property (the "58th Street Development Project"), with easy access to the 87th Avenue corridor and major transit ways such as the Palmetto Expressway.

The 58th Street Development Project will be designed and constructed in a manner that is integrated with the County's separately planned development of the regional soccer park adjacent to a portion of the County Property (the "Soccer Park"), with design elements that revitalize the area in and around the Soccer Park and enhance its future activation. The Soccer Park property is not a part of the proposed exchange, and would remain separately owned by Miami-Dade County at all times. However, to the extent the 58th Street Development Project creates any efficiencies or economies of scale that would benefit the Soccer Park, Developer is willing to discuss a potential collaboration with the County to expedite the County's delivery of this important amenity to the surrounding neighborhood and broader community.

The Developer is an affiliate of Terra, one of South Florida's most accomplished real estate developers with more than five million square feet of developed space. We believe that our resources and expertise in developing residential, office, commercial, and public space makes us uniquely qualified to successfully envision and complete this proposed project. With a strong connection to the South Florida community, we understand that the most successful projects are completed in collaboration with government entities and the community.

As we have demonstrated on other public-private projects Terra has completed or is in the process of developing in Miami-Dade County, we are committed to working closely with the County to build projects that advance the County's priorities and shape the future of our community. Should the County find this proposal merits further consideration, we look forward to engaging in more detailed discussions with relevant County Departments and the Administration in order to bring this proposal to life for the benefit of the greater Miami-Dade community.

Sincerely,

David Martin
TAF Okeechobee Solutions, LLC

West Dade Nurseries, LLC

[1] Developer is separately proposing a similar exchange agreement with the South Florida Water Management District ("SFWMD"), to provide for the relocation of the existing SFWMD facility located adjacent to the County Property at 9001 N.W. 58th Street, to a site abutting the new Solid Waste Campus. Although the participation of the SFWMD would enhance the 58th Street Development Project, this proposal could proceed as a stand-alone project if the SFWMD declines to proceed with an exchange agreement.

1.3 Executive Summary | Key Points

The Developer and its teams of architects, engineers and consultants desire to convey to the County a new 65 + acre Public Facility Campus located south of NW 182nd Street, directly north of Okeechobee Road, in exchange for a portion of County-owned land located west of N.W. 87th Avenue and north of N.W. 58 Street. This proposal aims to deliver a new Public Facility Campus, including Replacement Facilities and an Expansion Pad, located in an area further away from residential development that can potentially enhance the operational capacities of various Miami-Dade County departments, including, but not limited to, the Department of Solid Waste Management. Additionally, the project on the property currently owned by the County will provide new multi-family residential housing and industrial facilities, consistent with the existing mix of uses along the N.W. 58th Street Corridor.

EQUAL VALUE

Proposed Public Facility Campus

65 ACRES

The proposed 65 acres to be conveyed to the County consist of a 49 acre development-ready pad and 16 acres for the construct of new facilities, to be determined by the County. The County may choose to relocate the existing uses to any other County owned property at their discretion.

49 ACRES

The 49 acre pad will be delivered with all necessary site work and proper permits in place, allowing the County to proceed with planning and developing a waste-to-energy facility or any other project the County determines appropriate.

16 ACRES

Approximately 16 acres of the 65 acres will be allocated for the relocation of approximately 110,000 square feet of new flex-office space to accommodate the relocation of the existing uses at NW 57th avenue. The County may also choose to relocate this uses elsewhere and us the full 65 acres for the new Solid Waste Management or other new County facilities.

Proposed Development on NW 58 Street

73 ACRES

Approximately 73 acres of underutilized County owned land will be transformed into a Master Development featuring garden-style apartments and a new industrial park just north of the heart of Doral.

47 ACRES

Approximately 47 acres will be for industrial park consisting of over one-million square feet to be developed in two phases. This development will lead to job creation, economic growth and increased tax revenues for the County.

26 ACRES

The remaining 26 acres will be used to develop approximately 1,000 garden-style residential units, totaling around 955,000 square feet. The development is planned in two phases, with each phase consisting of about 500 units

LAND EXCHANGE

1.4 Ownership Disclosure Affidavit

OWNERSHIP DISCLOSURE AFFIDAVIT

Before me, the undersigned authority, personally appeared, **David P. Martin**, on this ____ day of August, 2024, who, first being duly sworn, as required by law, subject to the penalties prescribed for perjury, deposes and says:

1) Affiant has read the contents of this Affidavit, has actual knowledge of the facts contained herein, and states that the facts contained herein are true, correct, and complete.

2) TAF Okeechobee Solutions, LLC, a Delaware limited liability company whose address is 3310 Mary Street, Suite 302, Coconut Grove, FL 33133, will be the entity being contracted or transacting business with Miami-Dade County. The following is a list of every individual and entity holding an ownership interest in TAF Okeechobee Solutions, LLC:

Full Name (Including Middle)	Date of Birth	Address	Interest %
David P. Martin	7/27/1977	3310 Mary Street, Suite 302, Coconut Grove, FL 33133	100 %

FURTHER AFFIANT SAYETH NOT.

Witness

Print

Witness

Print

AFFIANT:

By: _____
David P. Martin

Date: 08/19/24

STATE OF FLORIDA

COUNTY OF MIAMI-DADE

The foregoing instrument was acknowledged before me, by means of ☒ physical presence or ☐ online notarization, this 19th day of August, 2024, by **DAVID P. MARTIN**, as Authorized Manager of **TAF OKEECHOBEE SOLUTIONS, LLC**, a Delaware limited liability company, who is personally known to me.

NOTARY'S SEAL:

CARLA D. ARRIETA
Notary Public-State of Florida
Commission # HH 64652
My Commission Expires
November 17, 2024

NOTARY PUBLIC, STATE OF FLORIDA

CARLA D. ARRIETA
(Name of Acknowledger Typed, Printed or Stamped)

HH64652
Commission Number

2.1 Land Exchange

Proposed Public Facility Campus

Proposed Development on NW 58 Street

2.1 Land Exchange

The Developer proposes an equal value exchange based on the value of the land as determined by appraised values as determined by independent third-party appraisals. To equalize the value of the exchange, an allowance will be provided to the County for the design and constructions of the replacement facilities.

Proposed Public Facility Campus

Potential Solid Waste Campus

The proposed 65 acres to be conveyed to the County will enable the County to move forward with selecting a site that can accommodate both existing and future needs. Having a selected site will also allow the County to proceed with the procurement process needed to find the appropriate candidate to develop the much-needed waste-to-energy facility. Additionally, the Developer has the ability to secure and provide additional land in the event that the County's desired program for the Public Facility Campus requires more than 65 acres.

Development Ready Pad

The 65 acres included in the land exchange can accommodate a waste-to-energy facility that aligns with the County's vision for its Solid Waste Program. Located over two miles from any residential development, less than 10 minutes from the Florida Turnpike, and with future rail development directly south of the site, this location is optimal for such a development.

Design-to-Budget

Using a design-to-budget approach based on the difference in appraised land values, the Developer will design and build replacement facilities for the County's current uses on N.W. 58th Street. These facilities may be accommodated on the 16 acres of the Public Facility Campus, leaving 49 acres for a waste-to-energy facility or other County projects. Alternatively, the replacement facilities could be built on any other County-owned site, freeing the entire Public Facility Campus for new County uses.

Proposed Development on NW 58 Street

Industrial + Multi Family Master Development

The 73 acres of land currently owned by Miami-Dade County, under this proposal, will be developed into an industrial park and multi-family garden-style residences. The development will be divided by 40 acres for an approved by Miami-Dade County Regional Soccer park, which is not part of the proposed exchange. The integration of these three uses will revitalize the area, providing significant benefits to both Miami-Dade County and the neighboring City of Doral.

Industrial Park

The planned industrial park within the Urban Development Boundary offers sustainable growth, protects natural resources, and enhances economic opportunities. Strategically located less than two miles from the 826 and Florida Turnpike, it e ciently utilizes existing infrastructure, making it an ideal site for development.

Multi-Family

The development of 1,000 residential units on underutilized Miami-Dade County land north of Doral o ers significant benefits, including meeting high housing demand, optimizing land use, and generating economic growth. This project would enhance community connectivity and take advantage of the strategic location near Doral's commercial hub, making it a valuable addition to the region's development

Proposed Public Facility Campus

2.2 Location | Location

10
MINUTES

To Turnpike

The site is less than 10 minutes away from the Florida Turnpike and is accessible through Okeechobee Road.

2
MILES

From Residential

The nearest residential development is 2 miles from the site. This distance is enough to prevent any human health or ecological risks associated with air emissions.

10
MILES

To US-27 Railway

The proposed rail will run directly in front of the propety. This access will significantly reduce any environment impact and assist with minimizing the carbon footprint.

2.2 Proposed Public Facility Campus | Site Development and Strategy

The entitlement strategy for the proposed Public Facility Campus in unincorporated Miami-Dade County focuses on key steps involving planning, regulatory compliance, and community engagement, along with potential path-ways for obtaining the necessary approvals to advance the development.

Site Entitlement Strategy:

The entitlement strategy for the proposed Solid Waste Campus involves several key steps:

Current Site and Zoning:
The site is in unincorporated Miami-Dade County, outside the Urban Development Boundary, and is designated as Open Land Subarea 1 under the Miami-Dade County Comprehensive Development Master Plan (CDMP). The site is currently zoned as an AU, Agricultural District.

Land Use Compatibility:
The Land Use Element of the CDMP allows for public facilities and utility facilities within the Open Land Subarea 1 area, which aligns with the proposed Solid Waste Campus.

Approval Process:
If the County approves the Exchange Agreement, there are two main options for processing a public hearing application.

Unusual Use Approval:
An application can be made for Unusual Use Approval for public utilities or similar uses under Section 33-13(e)(i) of the Miami-Dade County Code.

These steps provide a framework for securing the necessary entitlements for the Public Facility Campus within the existing land use and zoning regulations.

Alternatively, an application can be submitted for a district boundary change from AU District to a GP, Governmental Property overlay zoning district, under Section 33-284.22 of the Miami-Dade County Code.

$200 MILLION

Accelerated Time-Line
The speed-to-market of this land swap enables Miami-Dade County to meet its procurement and permitting deadlines, as well as manage capital and operational expenses e ectively. Accelerating the construction of the new waste-to-energy facility is crucial for leveraging up to $200 million in potential insurance proceeds.

4K-5K PER DAY

Infrastructure Pad
The development-ready pad is designed to accommodate a state-of-the-art waste-to-energy facility, along with other solid waste operations, meeting both current and future needs. It has the capacity to process 4,000 to 5,000 tons of waste daily, aligning operational requirements to manage increasing waste volumes efficiently and sustainably.

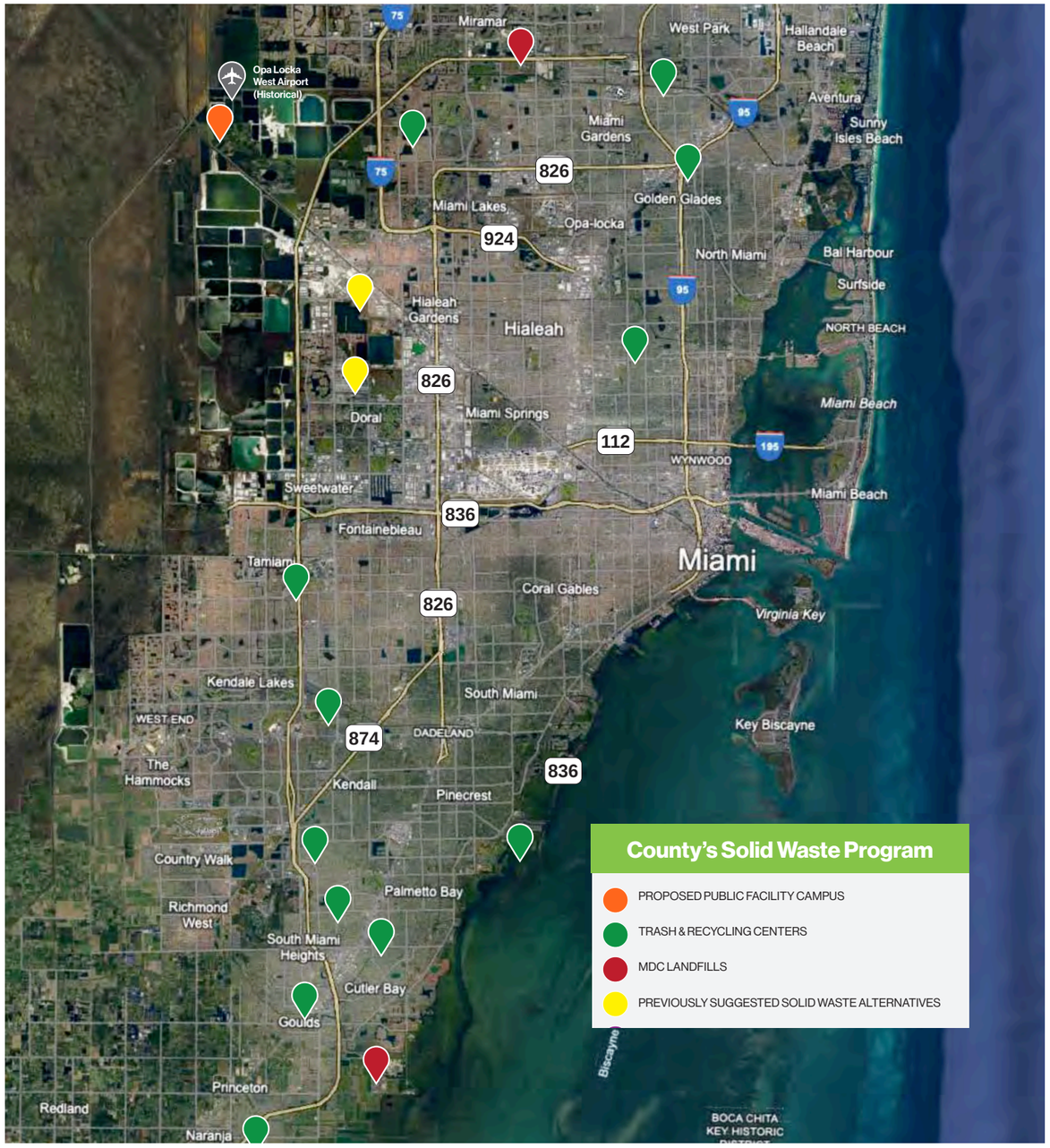
65K SF

Replacement Site
Up to 65,000 square feet has been allocated for replacement facilities to meet the County's needs, following a Design-to-Budget approach as determined by the County. Additionally, the 16-acre site may also be utilized by the County to expand the waste-to-energy plant capacity, aligning with the vision for the master Solid Waste Campus

2.4 Proposed Development | Milestones and Schedule

TASK NAME	FINISH
PUBLIC FACILITY CAMPUS	
ENVIROMENTAL SITE ASSESMENT & REMEDIATOIN	Q2 2025
ENVIROMENTAL PERMITS	Q2 2025
ZONING ENTITLEMENTS	Q2 2025
PERMITS	Q2 2026
CONSTRUCTION	Q2 2027

2.2 Proposed Public Facility Campus | Miamy Dade County Facilities



Zero Waste Vision

- 4.6 Million Tons of Solid Waste a year. The largest government owned and operated waste management program in the South East
- Aim to reduce waste at the source by promoting sustainable product design, responsible consumption, and comprehensive waste reduction practices.
- Enhance recycling programs, composting, and other waste diversion efforts to achieve a 90% diversion rate from landfills and incineration.

Integrated Approach

- Combine waste reduction, recycling, composting, and waste-to-energy strategies to create a comprehensive and efficient waste management system.
- Involve public agencies, private sector partners, and community stakeholders in coordinated efforts to optimize waste management practices and infrastructure.
- Invest in modern facilities and technologies that support waste diversion, resource recovery, and environmental protection, ensuring long-term sustainability and efficiency.

Sustainable

- Generate renewable energy from waste that can be used to power homes and businesses, thereby reducing reliance on fossil fuels.
- Implement state-of-the-art emission control technologies to minimize air pollutants, including particulates, nitrogen oxides, sulfur dioxide, and dioxins.
- Create a financially viable facility that supports local economies through job creation and revenue generation from energy sales and waste processing

Selecting the Okeechobee Solutions site positions Miami-Dade County to successfully achieve these sustainable goals

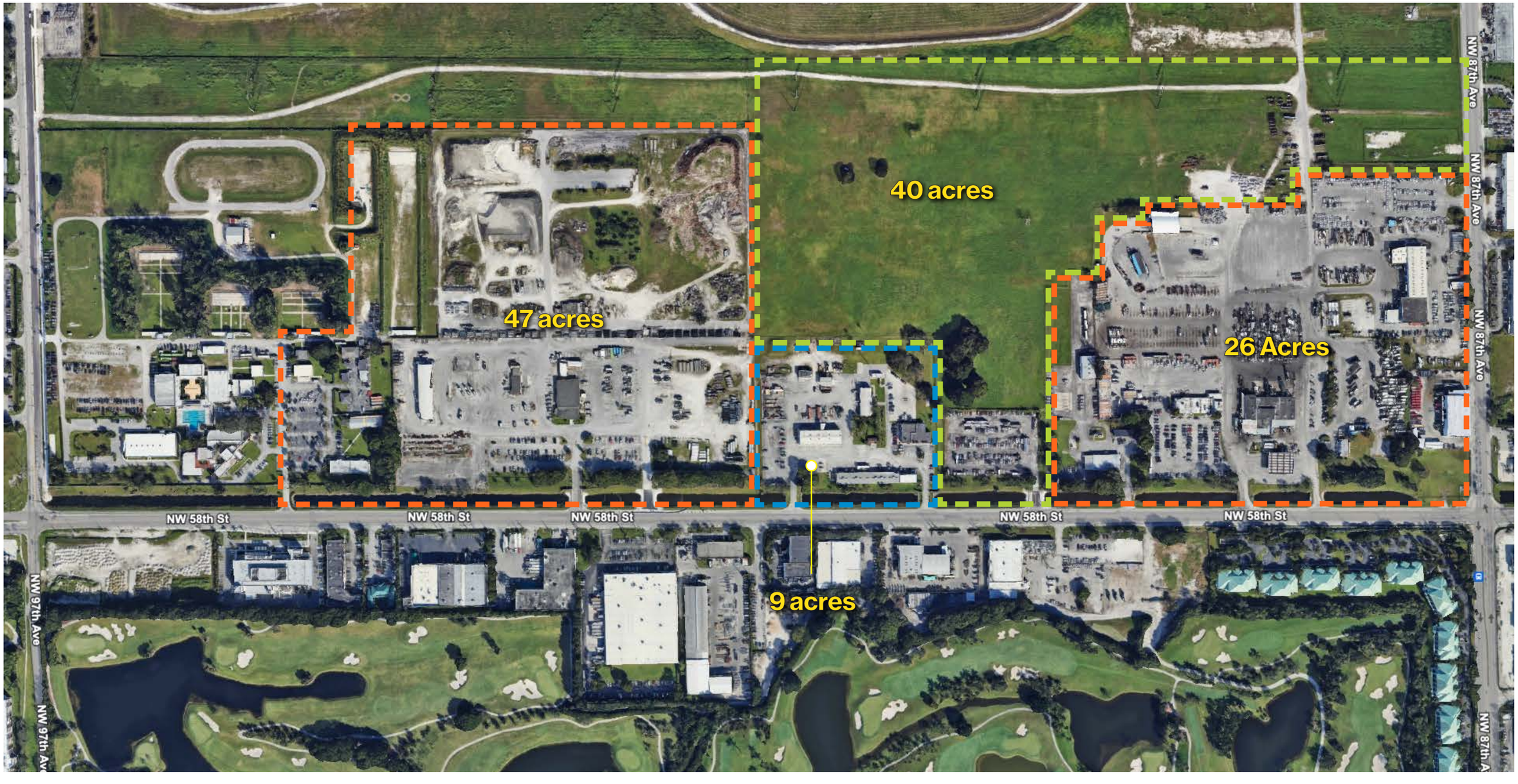
Proposed Development on NW 58 Street

2.3 Proposed Development | Existing County-Owned Site

73 ACRES

Existing 96,300 SF of Workshops & Office Space

- Proposed Development
- Future MDC Regional Soccer Park (Soccer Park is not part of the proposed exchange)
- South Florida Water Management District



2.3 Proposed Development | Master Development

Proposer's Vision

Okeechobee Solutions and the Developer's vision is to transform underutilized land north of Doral into a vibrant economic and residential hub, featuring over 1 million square feet of industrial space and 1,000 garden-style residential units. This development will stimulate the local economy, provide new job opportunities, and offer sustainable living options, setting a new standard for urban planning in Miami-Dade County

>

Industrial Development

The proposed industrial park addresses the needs for industrial space in within the Urban Development Boundary. The development includes four industrial buildings (building four is part of a separate application to the South Florida Water Management District) totaling over 1 million square feet of usable space. The project will be executed in two phases, focusing on efficient land use, modern infrastructure and sustainability. Strategically located, the park provides easy access to major transportation routes, enhancing logistics and minimizing environmental impact. By integrating industrial activities within the urban core, the park supports economic growth, job creation, and sustainable urban development.

+

Multi-Family Development

The 1,002 units (approximately 954,000 square feet) garden-style multi-family development is designed to o er a serene and community-focused living environment. It consists of several three-story buildings with walk-up units, arranged in clusters to create inviting courtyards and green spaces. Each unit features a private entrances and includes balconies or patios to extend living spaces outdoors. Extensive green spaces with native plants, central courtyards and central clubhouse with fitness facilities and pool enhances the living experience. The development emphasizes walkability and connectivity, with well-lit pathways, bike storage, and proximity to local shops, restaurants, public transportation, and the soccer park.

EXHIBIT D

EXHIBIT D

Okeechobee Site

Pros	Cons
• ±64.5-acre site, privately owned, consisting of 9 parcels: 30-2910-001-0130, 30-2910-001-0131, 30-2910-001-0140, 30-2910-001-0141, 30-2910-001-0150, 30-2910-001-0151, 30-2910-001-0160, 30-2910-001-0170, 30-2910-002-0030. • Approximately 1.6 miles from closest Broward County (Miramar) residential property. • Site appears large enough to site a WTE facility. Good road access to US-27 and Turnpike. • Site consists primarily of muck soils. Per swap proposal, Developer will make site "pad ready". • Air Emissions and Human Health Impacts not evaluated, but do not anticipate significant variation from Airport West results. Slightly closer to Everglades National Park. • Access to Utilities – Electrical service available, No potable water, sanitary sewer, or natural gas utilities available at the site, however, all utilities will be constructed by Developer per swap proposal. Total estimated utility infrastructure cost is approximately $8.1M. - *Potable Water, Sanitary Sewer and Natural Gas pipelines expected to be directionally drilled under Turnpike along US-27 ROW. Will need to ensure utilities to be installed are sufficient for WTE operations, including booster station and 12" potable water main (extended 3.9 miles), SS lift station and FM with 90,000 gpd capacity (extended 4.4 miles) and 6" natural gas service (extended 8.4 miles). New electrical substation expected to be constructed on site as part of WTE development, Developer would need to construct 138kV line from new substation to agreed-upon tie in point to FPL transmission line.* - *Utility construction would require FDOT approval to build along W Okeechobee Rd. Unknown amount of ROW available for construction of utility lines.* - *Sanitary sewer forcemain may require permission from Hialeah Gardens.*	• SFWMD owns part of requested swap parcel on 58th Street. • Site location creates operational and logistical challenges for relocated 58th Street facilities and is not of sufficient size for all operations (DPTW, DSWM, etc.). • Parcel geometry presents site configuration challenges related to access roads, turning radii, and other issues which may result in additional development costs • Property is located outside the UDB. - *Water & Sewer infrastructure allowed only to protect public health and safety* - *Active parks facilities not allowed outside UDB* • CDMP Designation - "Open Land" (Subarea 1) - *WTE facility allowed if compatible* - *Prohibition on potential groundwater contaminating uses* - *Land swap proposal implies uses (parks facility and offices) on the property that would require a CDMP amendment to be allowed and relocation of DTPW facility that may be restricted in its operations.* - *Commercial vehicle/truck parking uses allowed but prohibited from conducting maintenance and repair* - *Truck washing allowed at parking facilities only in fully enclosed buildings, with 100% recyclable water systems and with secondary containment surrounding all storage tanks.* • Site less than 0.5 miles from Miami-Dade County Agricultural zoning with Primary Land Use code 5001 (IMPR AGRI : RESIDENTIAL - SINGLE FAMILY) that allows for single family housing for farm labor personnel. • Site is located within FEMA Flood Zone A (Undefined) – need engineering study. County Flood criteria approximately elevation 6.0 feet N.A.V.D. Site will involve more technical challenges with stormwater retention and discharge. May not be sufficient room for relocated facilities. Consider option of relocating County facilities to RRF Site. • Traffic impacts on local roads will be significant, roadway improvements and additional intersection signaling may be required. • Potential impacts to CERP however given privately owned parcel, likely not considered in CERP planning/modeling. Compatibility with CERP and rock mining to be demonstrated • Site bifurcated by NW 178 Street right-of-way, which may need to be vacated to unify properties • Potential for tree island archaeological resources on site. CRAS required. • Wetlands - WTE would impact wetlands. Site is located within the C-9 Wetland Basin. Wetlands of Regional Significance are on site. • Sea Level Rise requirements in Western C-9 Canal Basin, Rule 40E-41.063 Endangered Species - USFWS consultation area for Florida Bonneted Bat and Everglades Snail Kite, as well as the core foraging area for federally threatened wood stork colonies and may contain habitat for species listed in Appendix B of the CDMP. Development at this site may conflict with County Policies CON-7A and/or CON-7B. • Contamination - No DERM records -- Phase 1 and Phase 2 Environmental Site Assessment would be required. • Estimated Construction Cost of $1,593,591,461 does not include value of land being swapped or additional development costs for demolition of existing RRF building foundations, pits, underground infrastructure, etc. to relocate County buildings to RRF site. • New Transfer Station required, estimated to add $50M in capital costs and approximately $11.8M annually in additional operational and waste transfer costs. • Greater GHG impacts to be considered given NW location and longer transportation distance for waste deliveries and relocated operations. • No on-site disposal possible – all WTE ash disposed offsite. • Site not sized for sustainable campus concept, nor relocation of facilities from swapped 58th Street parcel. Stericycle agreement requires reimbursement of 30% of relocation cost for their 58th Street facility. Total cost for relocation of existing County 58th Street facilities estimated at approximately $389M, including acquisition of 47 ac for DPW facilities and loss of 62 ac of land value at RRF site. • Longest estimated development schedule of approximately 10 years (pending land swap negotiations and confirmation of utilities and "pad ready" definition). Timing of swap dependent on permitting and could affect schedule – consideration of risk associated with proceeding with development prior to receipt of all regulatory approvals for WTE facility. • Very limited space to accommodate for carbon capture.

EXHIBIT D

Airport West Site

Pros	Cons
• ±416-acre site, two parcels, both parcels owned by the County. Folios 30-2902-000-0010, 30-2903-000-0010. 180 acres available to DSWM for campus. • Site appears large enough to site a WTE facility, with space for additional solid waste campus facilities. Good road access to US-27 and Turnpike. • On site ash disposal may be feasible. • Furthest from Everglades National Park boundary, produced most favorable preliminary air modeling results of the three sites evaluated (Existing RRF, Medley, and Airport West).	• Property is located outside the UDB. - *Water & Sewer infrastructure allowed only to protect public health and safety* • CDMP Designation - "Open Land" (Subarea 1) - *WTE facility allowed if compatible* - *Prohibition on potential groundwater contaminating uses* • Site is closest to Miramar residents, approximately 0.5 miles from the nearest residential property. Site is less than 0.5 miles from Miami-Dade County Agricultural zoning with Primary Land Use code 5001 (IMPR AGRI : RESIDENTIAL - SINGLE FAMILY) that allows for single family housing for farm labor personnel. • Site consists primarily of muck soils. Existing soils not well suited for WTE - additional site preparation required. • Access to Utilities – Electrical service available, No potable water, sanitary sewer, or natural gas utilities available at the site. • Site is located within FEMA Flood Zone A (Undefined) – need engineering study. County Flood criteria approximately elevation 7.0 feet N.A.V.D. Site will involve more technical challenges with stormwater retention and discharge. • Traffic impacts on local roads will be significant, roadway improvements and additional intersection signaling may be required. • Potential impacts to CERP. Compatibility with CERP and rock mining to be demonstrated. • Potential for tree island archaeological resources on site. CRAS required. • Wetlands - WTE would impact wetlands. Site is located within the C-9 Wetland Basin. Wetlands of Regional Significance are on site. • Sea Level Rise requirements in Western C-9 Canal Basin, Rule 40E-41.063 • Endangered Species - USFWS consultation area for Florida Bonneted Bat and Everglades Snail Kite, as well as the core foraging area for federally threatened wood stork colonies and may contain habitat for species listed in Appendix B of the CDMP. Development at this site may conflict with County Policies CON-7A and/or CON-7B. • Contamination - No DERM records -- Phase 1 and Phase 2 Environmental Site Assessment would be required • Estimated Construction Cost of $1,602,000,000, which includes the cost to extend the required utilities (water, sanitary sewer, natural gas). Potable Water, Sanitary Sewer and Natural Gas pipelines expected to be directionally drilled under Turnpike along US-27 ROW. • Additional annual operational cost for potable water purchase, ash hauling, and additional System hauling costs. • New Transfer Station required, estimated to add $50M in capital costs and approximately $11.8M annually in additional operational and waste transfer costs. • Greater GHG impacts to be considered given NW location and longer transportation distance for waste deliveries. • Environmental groups exercise concern that the facility is within the BBSEER and adjacent to the Broward County Water Preserve Area (BCWPA) Project. • Long estimated development schedule of 9 years, 3 months.

EXHIBIT D

Medley Site

Pros	Cons

• ±320.31-acre site, two parcels, single private owner. Folio 22-3005-001-0010
• Property is located inside the UDB.
• CDMP Designation - "Industrial and Office"
  - WTE facility allowed
  - Lake on site may be filled and developed
• Site appears large enough to site a WTE facility, with space for additional solid waste campus facilities. Road access to US-27 and Turnpike.
• Utilities – Electrical, potable water and sanitary sewer available at site.
  - City of Medley 12-inch water main abutting the property at NW 104 ST & NW 95 Ave.
  - City of Medley 8-inch gravity sewer line at NW 104 ST & NW 95 Ave.
• No wetlands or endangered species concerns.
• No CERP impacts.
• No new Transfer Station costs.
	• Private ownership, land acquisition required.
	• Residential communities to the southwest of the site.
	• Site consists primarily of muck soils. Existing soils not well suited for WTE - additional site preparation required.
	• No natural gas utilities available at the site.
	• Site is located within FEMA Flood Zone AE (5ft). County Flood criteria approximately elevation 6.0 feet N.A.V.D.
	• Most complicated site for preliminary air modeling due to adjacent large emitters (Medley Landfill and Titan Pennsuco Facility)
	• Traffic impacts on local roads will be significant, roadway improvements and additional intersection signaling may be required.
	• Potential archaeological target identified on site. HP staff could conduct initial visual field assessment to determine need for a Cultural Resource Assessment Survey.
	• Contamination - No DERM records -- Phase 1 and Phase 2 Environmental Site Assessment would be required
	• Highest Estimated Construction Cost of $1,610,850,000 plus Annualized Host Fees ($6M-$9M)
	• Long estimated development schedule of 9 years, 9 months.

EXHIBIT D

RRF Site	
Pros	**Cons**
• ±157.16-acre site, County owned. Folio 35-3017-001-0120 • Existing site with history of WTE operations prior to residential development. New WTE would be built to current state of the art standards and aesthetics. • Property is located inside the UDB. • CDMP Designation - "Institutions, Utilities and Communication" - WTE facility allowed • 55-acre developable area of site is large enough to site a WTE facility, may be large enough to accommodate additional facilities. Modification of existing stormwater system on site to reduce retention area footprint and increase developable area to approximately 60-70 acres may be possible. • Adjacent 58th Street Landfill property, with existing DSWM and DPW operations, may be an option for redevelopment with additional solid waste/zero waste facilities. Could be combined with RRF site facilities into an integrated solid waste campus. • Good access to major roads, no significant traffic impacts. • All utilities are available at the site. Electrical substation adjacent to site. • No floodplains • No wetlands or endangered species concerns. • No CERP impacts. • No new Transfer Station costs • Existing 80-acre ash monofill on site with remaining airspace capacity. • Previous Air permit and possible emissions credit. • Lowest Estimated Construction Cost of $1,489,000,000. However, this cost does not include additional development costs for demolition of existing RRF building foundations, pits, parking areas, underground infrastructure, etc. • Shortest estimated development schedule of 7 years, 9 months. Compatible with concurrency requirements. This schedule includes 1 year and 6 months for demolition work.	• Residential communities adjacent to the site on the north and west sides. • • Demolition of existing RRF building foundations, pits, parking areas, underground infrastructure, etc. required prior to redevelopment. • WASD pump station serving ash monofill must be retained on site. • Contamination – DERM records indicate documented contamination at the site. This will be addressed during closure of the RRF with the removal of the above-grade structures.

EXHIBIT D

Status Quo (Transfer and Landfill Operations)	
Pros	**Cons**
• Current operations, already underway – no major changes to existing operations needed. • Avoids public opposition and costs of potential legal challenges to WTE development. • Avoids expenses associated with development and operation of the proposed WTE facility. • Contract transfer and disposal costs for about 60-65% of the County's waste tonnage will be incurred whether or not a WTE facility is developed. The proposed 4,000 tpd WTE facility would only manage about half the waste arriving at the Department's facilities. Further, if the WTE facility is developed, any unprocessible waste and the WTE ash, which is typically about 25-30% of the weight of the processed waste, would be managed through contract transfer and disposal operations. • Satisfies Concurrency requirements.	• If no new WTE facility is constructed, once the County's landfills reach capacity the County will not have any active disposal facilities. Disposal Fund revenues will be limited primarily to transfer and facility fees, which will have to be set to generate revenue sufficient to offset the County's Disposal Fund expenses, including all contract transfer and disposal costs. Price pressures on transfer and facility fees may have significant effects on the County's ability to generate Disposal Fund revenues. Further analysis is needed to fully evaluate the potential financial effects. • Ultimately outsources the management of all County waste to private entities and out-of-County facilities. The County will be dependent on private entities for solid waste disposal and would have little or no leverage in future contract negotiations or transfer and disposal pricing. • The County would need to construct a new transfer station at the RRF site with additional fleet and ops personnel (approximately $50M CAPEX, $11M annual OPEX). • Potential odor issues along rail haul corridor. • May need to modify the Central TS to accommodate loading of intermodal containers, which cannot be loaded by compactors. • May disincentivize Contract Municipalities from renewing long-term disposal agreements with the County, which could lead to significant adverse financial effects on the Collection Fund and Disposal fund. • Overall GHG emissions from additional long-haul transport by truck and rail and landfilling of municipal solid waste may be higher than WTE. • Most costly option over the long-term planning horizon (total cost in 2024 dollars TBD).

EXHIBIT E

EXHIBIT E

Figure 1: Aerial View of DSWM Facilities

EXHIBIT E

Figure 2: Aerial View of DTPW Facilities