Beaches and Waterways Advisory Commission

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Executive Summary

The Beaches and Waterways Advisory Commission was tasked by the City Council to study the issues of dredge spoils removal and transfer stations related to the Neighborhood Dredging Program. Specifically, the study was to include, at a minimum:

- The feasibility of alternative dredging methods, such as hydraulic rather than mechanical dredging;
- The potential for beneficial re-use of spoils;
- Opportunity for public input from all concerned citizens with at least one facilitated structured meeting for public input;
- An analysis of the impact on affected communities with a focus on identifying sites that are sufficient to support the needs of the project but that have the least potential impact; and
- A proposed framework with parameters for operation of the spoils sites, including the potential use of the sites by the public for dredging by entities or individuals other than the City.

The Commission conducted a series of meetings, which included briefings by members of City staff and a panel of experts in the field of dredging, as well as significant input from interested members of the public. The following executive summary is extracted from the full text of the Commission’s report to address the five specific tasks in Council’s referral on this topic.

Alternative Dredging Methods

This topic was discussed at length by the Commission, and input from City staff, a panel of experts and the public was duly considered. A white paper from a dredging consultant on the topic is included as Appendix B to the Commission’s report.

The Commission recommends that both hydraulic and mechanical methods be employed in the Neighborhood Dredging Program, but that the selected method be chosen based on engineering and economics for each specific project, rather than mandated through policy.

Mechanical dredging is thought to be the best method, in general, for neighborhood work in the Lynnhaven basin due to limited channel size and the flexibility afforded by this method. It is noted that the use of mechanical dredging requires the use of dredged material transfer stations. The Commission recommends that every effort be made to select a transfer station within the neighborhood being dredged. However, acknowledging that such selection will not always be possible, the Commission recommends that five City-owned dredged material transfer station be created throughout the Lynnhaven basin, each specifically serving an identified service area.

The five service areas and the potential City-owned transfer stations are depicted on separate maps in Appendix A of this report.
The Commission further recommends that each such City-owned transfer station be approved by the City Council and that the transfer stations also be made available to dredging projects within the service areas that are not participating in the Neighborhood Dredging Program.

**Beneficial Re-Use of Dredged Material**

This topic was also discussed at length by the Commission, and input from City staff, the panel of experts and the public was duly considered. A separate white paper on this topic was also prepared by dredging and environmental experts for the Commission’s consideration and is included as Appendix C to their report.

Although opportunities for beneficial re-use of dredged material may materialize in the future and should be pursued and studied, at present no significant opportunity has been identified. Creation of wetlands and habitat enhancement appear to hold future promise, but the present state of environmental regulation severely limits these opportunities. Given the potential to reduce impacts associated with the transport of dredged material, it is strongly recommended that the City stay engaged in the topic and pursue opportunities as they evolve.

**Public Input**

The Commission provided numerous opportunities for public input at their regularly scheduled meetings, and a formal, facilitated and structured, public hearing was conducted on October 13, 2011, at the Great Neck Recreation Center. Much of the input received was related to potential dredged material transfer stations in the Long Creek (Maple Street) and Upper Western Branch (Crab Creek) service areas. The Commission also received numerous written comments from the public and had several individual conversations and meetings with interested parties and groups. In addition, the Commission’s draft report was published on the City’s website with an invitation for public comment.

In general, the input received focused on impacts related to the dredged material transfer stations, as opposed to the efficacy of the Neighborhood Dredging Program. A few comments were received regarding the fiscal integrity of the program and barge and truck safety. The Commission agrees that the fiscal integrity of the program should be reviewed, but also opines that truck safety is not of significant concern. With regard to barge safety, the Commission does recognize that provisions to minimize risk of damages to Lesner Bridge are necessary.

The collective input was meaningfully incorporated into the Commission’s report, leading to specific recommendations for an alternate site in the Long Creek service area as well as recommendations for very restrictive operational parameters for both the Long Creek and Upper Western Branch service area dredged material transfer stations.
Impact Analysis and Site Selection

Through site visits and public input, the Commission carefully considered impacts to communities near the potential dredged material transfer stations. A total of nine transfer sites were considered by the Commission. Of the five service areas, the Commission believes that impacts to nearby communities, residences and commercial alike, would rise to significant levels at only the Long Creek and Upper Western Branch dredged material transfer stations.

The potential impacts in the Long Creek service area led the Commission to recommend an alternative site. The Commission recommends that the Maple Street site no longer be considered, and that an alternative site, on City-owned property between the Lynnhaven Boatel and the Marina Shores Shoppes, be selected. Special operational constraints are recommended to minimize impacts at this alternate location.

Potential impacts at the Upper Western Branch (Crab Creek) site are recognized by the Commission. However, the importance of this location to the overall program is noted and no feasible alternative was identified. Special operating constraints are also recommended for this site to minimize impacts.

Operational Parameters

Based on public input and the careful review of each site, the Commission recommends both general operational conditions for all transfer stations and site specific constraints to minimize impacts. In addition, the Commission recommends that the dredged material transfer stations within each service district be limited for use by projects solely within the district. It is, however, recognized that special circumstances may arise and some flexibility may be necessary.

General Operational Conditions

The general operational conditions involve job site safety, cleanliness, permitting, performance, noise, roadway traffic, pollution and notices to the surrounding communities. These are in general conformance to City standards and policies and are enumerated in the body of the report.

Site Specific Constraints by Service Area

Long Creek Service Area

- Determine if traffic signal at Lynnhaven Drive and Great Neck Road is warranted
• If Maple Street site is utilized, provide planted screening along access road
• If Lynnhaven Drive site is utilized: no work between November 15 to January 2 to minimize holiday shopping impacts; and screen outdoor dining deck with planting
• No queuing or idling of trucks on Lynnhaven Drive or Maple Street access road
• No trucks permitted within the Cape Story by the Sea subdivision
• Pre-construction survey and video inspection of adjacent structures
• Any required temporary office trailers or storage be as close to transfer operation and as far away from neighboring residences or commercial properties as possible
• Employ dust abatement as necessary
• Use of site only permitted for 60 consecutive workable days during a 3-year period
• Work hours limited from 7:00 a.m. to 4:00 p.m.
• Work limited to 40 hours per week; no weekend or holiday work
• Limit truck traffic to 30 loads a day
• Use site only during the period beginning the Friday before Memorial Day to Labor Day
• Conduct vibration impact study prior to use; employ vibration monitoring during use
• Coordinate with all other possible dredging work within the service area to assure opportunity to participate in the 60-day window is maximized

Upper Western Service Area (Crab Creek)
• Use of site only permitted for 60 consecutive workable days during a 3-year period
• Work hours limited from 7:00 a.m. to 4:00 p.m.
• Work limited to 40 hours per week; no weekend or holiday work
• Limit truck traffic to 30 loads per day
• Use site only during the period beginning the Friday before Memorial Day to Labor Day
• Work days and periods to be adjusted to minimize impacts to boat ramp usage
• Include dredged turning basin and breasting dolphins to control barges at the transfer site
• Coordinate with all other possible dredging work within the service area to assure opportunity to participate in the 60-day window is maximized

Lower Western Branch Transfer Station (Thalia)
• Work hours limited from 7:00 a.m. to 4:00 p.m.
• Work limited to 40 hours per week; no weekend or holiday work
• Limit truck traffic to 30 loads per day
- Work to be coordinated with crew club and kayak/canoe interests
- Work to be coordinated with Thalia Elementary School
- All worker parking to be accommodated on-site

**Linkhorn Service Area**

- Work hours limited from 7:00 a.m. to 4:00 p.m.
- Work limited to 40 hours per week; no weekend or holiday work
- Limit truck traffic to 30 loads per day
- Use site only during the period beginning the Friday before Memorial Day to Labor Day
- Employ flagmen as necessary to assure traffic safety
- Employ broom tractor as necessary to maintain roadway

**Eastern Branch Service Area**

- Work hours limited from 7:00 a.m. to 4:00 p.m.
- Work limited to 40 hours per week; no weekend or holiday work
- Limit truck traffic to 30 loads per day
Introduction

The Beaches and Waterways Advisory Commission, as tasked by a resolution of the City Council, has met and comprehensively studied the issues of dredge materials removal and transfer stations necessary to ensure that the Lynnhaven River, Rudee Inlet, the Elizabeth River, Broad Bay and Linkhorn Bay navigation channels are adequately dredged. This report is ready for presentation to City Council detailing our findings and recommendations.

The Commission considers the Neighborhood Dredging SSD Program (NDSSDP) to be based on well conceived funding sources and solid engineering principals. The NDSSDP should lead to a beneficial conclusion for the neighborhoods afforded the opportunity to dredge their navigable channels to access deep water. The program should result in enhanced property value for the participating homeowners and increased recreational opportunities, while providing increased real estate tax revenue for the City. Indeed Council recognized this reasoning by adopting the Old Donation Special Service District (SSD) Ordinance on September 13, 2011. The Old Donation neighborhood overwhelmingly requested such approval, and voted a tax rate surcharge, due to a prior dredging experience which improved water quality, increased property values and provided enhanced recreational opportunities via adequate water depths for the largest of their boats. It is believed, as has been demonstrated in the conceptual design for the Thalia Dredged Material Transfer Station (DMTS), that enhanced recreational opportunities by the public can be made available at other DMTS sites. A copy of the conceptual Thalia design is depicted on the cover of this report.

As an introductory to the Commission findings and recommendations, it could be helpful to introduce some similarities with other tasks previously referred to our Commission. This is done in order to establish some perspective pertaining to the Neighborhood Dredging SSD Program.

Just as experienced with the Comprehensive Beach Management Plan, and with the findings in the more recent Lake Trant dredging project, the value or efficacy of the Neighborhood Dredging SSD Program has not received significant challenge. The opposition centers on neighborhood and resident impacts associated with this public improvement and enhancement program. The opposition groups voice concerns that the DMTS and the associated haul vehicles will have adverse impacts on their neighborhoods and residents. They also share a belief that verbally stated promises between them and the City have been broken. The same was true at Lake Trant.

It has been our experience that any physical change or introduction of a permanent public facility into an established neighborhood that could impact a settled life style will be resisted regardless of the positive benefit to the general public.

The response is exacerbated by a breakdown in civil discourse and questioning of the veracity of the communications on both sides of the issue.
There is a great deal of support for the status quo. The Commission believes that if the Neighborhood Dredging SSD Program is made available to the waterfront communities on the Long Creek and Broad Bay waterway, the status quo cannot remain and adverse impacts will be a part of the process to implementation of this program.

When developing the Comprehensive Beach Management Plan, any reference to increased public parking or increased public infrastructure (Bathrooms and Bath houses) in the beach neighborhoods resulted in serious concerns for negative impacts on the resident’s quality of life. The locals had their parking places and facilities and they didn’t need improvements to maintain their established way of life or their access to the beach. Any added improvement, regardless of the positive benefit to the general public, would result in an adverse impact on their neighborhood and their established quality of life.

We believe that the NDSSDP is producing the same effect, if not greater, for impact concerns by the communities close to potential DMTS on Long Creek. Just as with the breakdown in constructive dialogue between a segment of the residents of Lake Trant and the City representatives, there exists a similar breakdown between a segment of residents in the Long Creek, Broad Bay, and Bay Island, Cape Story by the Sea, and Shore Drive communities and City representatives.

The Commission has received comments about a lack of confidence that negative impacts on these neighborhoods will be adequately addressed by the City and a concern that there are very few in the City that are truly attentive to their concerns. They are skeptical that any conditions agreed to for the mitigation of the impacts or operational controls in the present will be ignored in the future. They are concerned that future Councils or Administrations will change or adjust conditions set out in these recommendations.
Impact Analysis and Site Selection

The Commission was tasked to analyze the impact that operational Dredged Material Transfer Stations would have on affected communities with a focus on identifying sites that are sufficient to support the needs of the project, but have the least potential for adverse impacts on the community. The Commission interprets this to instruct us to identify, if possible, additional sites adequate to support the Neighborhood Dredging SSD Program and not to eliminate those previously selected when this program was first briefed to Council.

The sites that have been identified for the DMTS in the Lynnhaven basin that are located at the southern end of Linkhorn Bay, the Eastern Branch and Lower Western Branch areas should have minimal impact on neighborhoods and residents. The Crab Creek DMTS, serving the Upper Western Branch, will have some level of adverse impacts on the bordering neighborhoods, recreational fishing, and the boating communities.

In an effort to mitigate these impacts, the Commission recommends that the Crab Creek DMTS have greater restrictions on its operating activities.

The Long Creek DMTS will also cause adverse impacts and will need greater restriction on the operating parameters.

The NDSSDP currently conceives of five mechanical Dredged Material Transfer Stations, one located in each service area. The Commission believes that a suitable site for locating a DMTS to serve the Lower Western Branch, the Eastern Branch and the Linkhorn Bay service areas can be selected by Public Works from a group of six sites that have been identified or reviewed by the Commission. We have not prioritized these sites. The six sites, in our opinion, are adequate to support the needs of these three service areas. We believe that a DMTS can be located and constructed in these areas so as to have minimal impact on the surrounding neighborhoods.

It is recommended that the Upper Western Branch be served by a DMTS located at the City owned beach quality sand storage site known to us as Crab Creek. The Long Creek DMTS site is recommended to be located at the City owned property between the Lynnhaven Boatel and the rear of the Marina Shores Shoppes. This site is known to us as Long Creek / Lynnhaven Drive. There is a second location that would support the NDSSDP located in the near proximity to Maple Street and know to us as Long Creek / Maple Street. We strongly recommend the elimination of Long Creek / Maple Street from further consideration because of the significant impacts on surrounding neighborhoods. The Long Creek / Lynnhaven Drive and the Crab Creek DMTS sites will have adverse impacts; but, in our opinion, not to the extent of the severe impacts that would be created by use of Long Creek / Maple Street.
The Crab Creek site has been previously opposed for impacts on the fishing and recreational communities. That opposition continues to be voiced at this time.

Additionally, there are concerns for safety issues with runaway barges hitting the Lesner Bridge; safety concerns along the perceived haul routes, impacts on the neighborhood that would cause loss of property value and concern for environmental impacts have been stated in numerous emails from residents and civic organizations. Several speakers at the public forum spoke against locating any DMTS at Crab Creek and that continues to be amplified in correspondence forwarded to the Commission. The Commission has not been able to locate a suitable alternative site to Crab Creek which was previously selected for a DMTS to facilitate the mechanical transfer of dredged materials in the Upper Western Branch controlled service area. No alternative site has been proposed or suggested for Commission review. The exception to this statement is the occasional discussion or suggestion that a full service, state of the art dredge material transfer and handling operation could be established on or in the Pleasure House Point property that is under discussion for purchase by the City and participating environmental groups.

If a DMTS is constructed and made operational at Crab Creek, it is believed that dredging will be necessary to create a turn basin for tendered barges. In the opinion of the Commission, dolphins or some other form of moorings would be required to control the barges in the currents at this site. The proximity to the Lesner Bridge is a serious consideration and potential negative impacts created by the construction project for the new Lesner Bridge is an unknown at this time. There appears to be several options for haul routes from the DMTS to Shore Drive. Even though we know this site to be controversial, it is important to the efficient implementation of the Neighborhood Dredging SSD Program in the Upper Western Branch of the Lynnhaven River. Please see the recommended control parameters for this DMTS site that are itemized later in this report.

We have forwarded to Public Works for further consideration, as a reference tool, relative to the topic of the Lesner Bridge safety, a 2003 United States Coast Guard Bridge Allison Working Group Report that was provided to the Commission as a notice of potential risk created by conducting any work with loaded barges in the close proximity to the Lesner Bridge. This was forwarded without study or opinion.

There are two sites on Long Creek capable of fully meeting the requirements to support a mechanical dredge operation in this service area (Long Creek / Maple Street and Long Creek / Lynnhaven Drive). The Commission believes that the use of Long Creek / Maple Street as a DMTS will cause severe impacts that will be experienced along the haul road when dump trucks will pass very close to the Long Creek Cove condominium complex while exiting the City owned site. If this Long Creek DMTS were to be used, we know of no alternative routing to avoid this severe impact.
We believe that there will be dust and dirt impacts, visual impacts, vibration impacts, noise impacts and smell impacts when a NDSSDP project is active and haul trucks are moving in and out of this site.

There are opportunities for mitigation, but regardless of effort, we believe that impacts will be present. There exists a serious concern for loss of property value and the opportunity to sell homes abutting the haul route.

Residents of the neighborhoods near the Long Creek / Maple Street site have cited concern for potential adverse impacts in the form of noise, dirt, dust, odors, visuals, barge traffic complications, truck haul complications, wetland impacts, fishery impacts, the industrialization of a once serene environment, the loss of recreational opportunity, the devaluation of personal property and general concern for public safety and neighbor infrastructure. We believe that are methods of mitigation and opportunities for controls that could help to eliminate, or significantly reduce, some of the issues of concern.

The potential for a DMTS at Long Creek / Maple Street is the one site that has received the greatest opposition during the work of this Commission. It would be difficult to overstate the resistance to this location and the organized opposition to developing a DMTS at this site.

The anticipated adverse impacts could range from minor to severe. Yet, the Commission recommends that Council pursues its original intent to establish the NDSSDP in all service areas of the Lynnhaven and Rudee Inlet basins. In order to do that, the Commission strongly believes that there must be a DMTS located on Long Creek.

The Commission recommends that the Long Creek / Maple Street site not be used, now or in the future, as the site for the DMTS on Long Creek. The Commission believes that the Long Creek / Lynnhaven Drive site is significantly superior to Long Creek / Maple Street and recommends the Long Creek / Lynnhaven Drive site for the Long Creek service area.

We believe that either Long Creek DMTS would have adverse impacts on the community of Broad Bay Island. In our opinion, there will be visual impacts, noise impacts during operating hours and the potential for smell impacts. It is known, and concern acknowledged, that there will be an increase in barge and tender activity when a NDSSDP project is active. There is a serious concern voiced for the safe operation of the tendered barges when moving within the confines of Long Creek and as they pass existing docks and structures. In addition to the perceived safety issue, the shore residents are also concerned about the visual impact of the barges, dump trucks and industrialized activity that would be necessary to establish any DMTS on Long Creek.

Only the Long Creek / Maple Street site would have any adverse impact on the Cape Story by the Sea neighborhood.
The Civic League and residents of Cape Story by the Sea have expressed concerns about visual impacts of trucks, barges and the excavated transfer of materials for disposal. This impact should be limited to the relatively few houses bordering the marsh and the City owned beach quality sand storage area.

The Commission believes, as it has been told, that surface vibration does occur when digging sand from the holding area. The distance of vibration travel is not known.

The Commission does not believe that any significant vibration associated with the transfer of dredged material from water borne barges to tandem axle dump trucks will occur. It is not believed that the smell of diesel exhaust or an odor similar to a marsh at low tide would have serious impact. There is no travel route recommended in the Cape Story neighborhood. Only severe wind conditions could cause the community to experience any dirt or dust impact. It is believed that some noise impact would be present during normal work hours in the permitted months of operation. The severity is thought to be minor.

Public access to the City owned site used as a sand retention area by the City for the Army Corps of Engineers dredging of the main channel at Long Creek must be seriously evaluated to limit or prohibit public access. In the opinion of the Commission, the lack of prudent controls for safety and restricted public use in the past has added to the difficulty of working with residents and recommending increased activity at this site in the future.

The sand retention area, along with the potential haul road and the access to a small sandy beach, over a City controlled easement, are being used as a quasi-public park. The site is part of what the neighborhood defines as a serene environment and casual recreational area. In fact, the site is intended to serve as a Public Works sand holding facility for beach replenishment activity. It is the disposal site for the Army Corps of Engineers channel dredging project on Long Creek Canal. In our opinion, it is a welcoming nuisance of the highest order. We believe that the opportunities for injury are numerous and significant. We recommend that regardless of whether this site is used for the NDSSDP or not, that the City reviews this site to ensure that it is controlled and secured.

The Long Creek / Lynnhaven Drive site is located between the rear of the Marina Shores Shoppes and beside the Lynnhaven Boatel. The Commission strongly recommends the selection of the Long Creek / Lynnhaven Drive option as the appropriate site to support the Long Creek NDSSDP.

In the opinion of the Commission, the Long Creek / Lynnhaven site could have some minimal level of adverse impact on the commercial operations which are located on either side of the truck haul ingress and egress route that approaches the DMTS. The Commission believes that the impact is manageable. The neighborhood impacts are limited to the Arbors at Cape Henry. The entrance to the condominium community is located diagonally opposite of the proposed ingress and egress curb cut leading to the DMTS.
The separation is on an approximate 45 degree angle and there is approximately 250 feet of separation. The Commission has received correspondence from residents of the Arbors at Cape Henry expressing concerns about truck traffic on Lynnhaven Drive, concerns for the potential of impacts of smell, vibration, dirt and dust, noise and safety. The Commission does not believe that any of these impacts would be severe and believes that most would be minimal, if present at all. There are no apparent sight line impacts other than the visual of trucks leaving City property onto a City street.

A recent engineering study concluded that the construction of a Dredged Materials Transfer Station is feasible on this City owned property. The ingress and egress road contains sufficient upland space for trucks to enter and exit in forward gear and the road bed is capable of supporting the weight of dredge materials laden haul trucks. The report concludes that the width of upland property will allow for truck maneuvering for loading from barges. The retaining end cap, where the land meets the channel, is sufficient and will not need bulkhead reinforcement. The engineering study conceives of placing the barge to truck transfer excavator on a timber platform over the water thereby buffering the end cap from the dredged canal. The report opines that a 25’ wide channel at -6.0MLLW elevation and timber fender piles forming a 30’ wide canal will allow barge access from Long Creek while protecting adjacent property.

The estimated cost to construct an operationally ready DMTS at Long Creek / Maple Street or Long Creek / Lynnhaven Drive is very comparable in the opinion of Public Works.

The Commission has received a letter of concern from the owner of the Marina Shores Shoppes strongly opposing the selection of this site. The owner expresses concerns for noise, vibration, sight line issues and the staging of trucks used for the dredge material transfer. The site is commercial in nature and currently has large storage containers spotted on the site. The rear of the Marina Shores Shoppes contains significant amounts of utility piping and rear entry doors. There is no apparent intended curb appeal in this area. The Commission believes that the view from the outside deck at O’learys Bar and Grill can be screened with planting that could eliminate any patron view of the proposed DMTS. The recommended periods of operations should also reduce this concern. It is the recommendation of the Commission that this DMTS site not be used for more than 60 workable days in one consecutive use period during any three year cycle. The days of operation are to be selected by Public Works from the months between Labor Day and Memorial Day so as to reduce the impact on outside activity and the recreational boating public. The Commission further recommends that no activity take place from November 15th through January 2nd to avoid any conflict with haul truck traffic and the holiday shopping season.

The recommendation to use this site is made with the understanding that the ingress and egress road can be designed so that haul trucks can be staged on the site and not staged on Lynnhaven Drive.

To ensure limited and controlled use of the DMTS, the Commission strongly recommends that only dredge materials generated in the service area be transferred through that respective DMTS. The
Council will need to provide some flexibility for hardship and unforeseen circumstances. Also, there is the potential for off cycle dredging which is discussed later in this report. In the opinion of the Commission, the greatest opportunity to reduce adverse impacts in the surrounding neighborhoods is the establishment of guidelines to control the amount of activity at the unique DMTS supporting the service area.

By Council’s adoption of this simple concept of a single and unique Dredge Material Transfer Station per service area, Council will provide each service area with the opportunity to focus exclusively on their individual wants and needs. As an example, the residents of the Long Creek and Broad Bay service area could work exclusively to influence the activity in their surrounding neighborhoods. With the very high requirement of an 80% affirmative vote to start a SSD project, it is possible that activity could be seriously restricted at any Long Creek site because of the organizational structure of the civic leagues and activism in the Long Creek and Broad Bay Island communities.

The Linkhorn service area and the Eastern and Western Branches of the Lynnhaven River service areas will have their unique DMTS that will provide them with the necessary infrastructure to economically and effectively provide for a viable NDSSDP.

The Commission strongly recommends that no construction activity begin on any DMTS until a NDSSDP has been submitted to and approved by Council.

In conclusion, when the Commission considers all of the adverse impacts on the surrounding neighborhoods associated with Long Creek / Maple Street, the very severe financial burden and loss of quality of life for residents of the Long Creek Cove condominiums and the temporary industrialization of a serene vista, compared to the impacts anticipated with the Long Creek / Lynnhaven Drive site, we strongly recommend the Long Creek / Lynnhaven Drive site as the DMTS location for the Long Creek / Broad Bay NDSSDP service area.

The Commission believes that the Long Creek / Lynnhaven Drive site provides superior advantages for barge handling, road access, mechanical transfer ease and the ability to control sight impacts. For these reasons, the Commissions recommends that Council supports the Long Creek / Lynnhaven Drive site to support the Long Creek service area and directing the removal of Long Creek / Maple Street from further consideration as a Dredge Material Transfer Station to support the Neighborhood Dredging SSD Program now or in the future.

Additional topics associated with the NDSSDP have been presented to us in public forum and in stakeholder comments. The recommendations that we forward for your further study and review are concerns about the fiscal integrity of the SSD program in general, concerns for citizen safety resulting from barge and truck activity, concerns for barge impacts with existing piers and docks on Long Creek and concerns for the potential of damage to existing road and utility infrastructure.

There is significant concern for the safe execution of barge and tender operations in Long Creek.
The Commission has received a number of questions about the fiscal integrity of the Special Service District program, in particular. We have received one inquiry questioning the legality of the SSD as it relates to conditions contained in State Law governing SSDs and the application of those laws to this program. The economics and legal issues of the Neighborhood Dredging SSD Program are beyond the scope of our assignment and beyond our area of expertise.

Our study and recommendations for operational safety are restricted to the Dredge Material Transfer Station sites. However, the Commission believes that the past history of truck hauls provides adequate evidence that material transfers from the DMTS to the disposal site can be accomplished in a safe and efficient manner. The Commission is not aware of any damage to road or utility infrastructure caused by previous truck hauls. With the exception of tendered barge traffic, the movement of dredged materials from the DMTS to the spoil site is not significantly different than the movement of beach quality sand from the City owned storage sites to the public beaches. Our believed and consistent response to travel safety concerns has been that the City has conducted many similar projects that required large dump trucks with full loads moving on City streets.

The historical record is that this can and has been done in a safe and efficient manner. The point of reference is the 100,000 to 150,000 cubic yard truck sand haul for the oceanfront beaches prior to the utilization of deep water hopper dredges. The Commission understands from inquiry that all haul route roads are designed for heavy load truck travel. We also understand from inquiry that prior to any haul contract being awarded, the City, through the Public Works Department, will require the contractor to identify the travel routes to be used. We understand that the City will conduct engineering reviews to ensure the adequacy of the roads to be used for both load bearing capacity and will provide for safe conditions for neighborhood infrastructure prior to approving the contractors preferred haul route.

Alternative Dredging Methods
The subject of mechanical versus hydraulic dredging was discussed and debated at length. Several opportunities for professional and public input were provided. It is important to acknowledge that certain members of the Commission have significant expertise in the field of dredging and water borne slurries. It has been concluded that the NDSSDP cannot be reasonably initiated or completed without the use of both mechanical and hydraulic dredging. This may not be the case for future maintenance cycles. Currently, the funding, engineering and infrastructure does not exist to support a potential third option, a hybrid system. Further investigation may conclude that opportunities exist for consideration and use of a hybrid system in the future. Any decision will require a commitment for inclusion in the Capital Improvement Program and a detailed investigation of engineering and aesthetic challenges. Included with this report as Appendix B is a white paper on this topic from an independent consultant on alternative dredging methods.

The Commission understands that the preferred method of dredging is directly dependant on the dredge site conditions, environmental considerations and the cost associated with the individual projects within the NDSSDP. This should not be a political decision. The dredging methodology for individual projects should be left to engineering and bid proposal processes.

The Commission understands that Hydraulic Dredging is more capital intensive, has high mobilization cost, requires 24/7 operation to be economically efficient, produces more noise impact than mechanical dredging and has greater adverse impacts on surrounding neighborhoods in general. Hydraulic is said to be an excellent option for large volume, localized projects. For many of the positive factors, hydraulic dredging is the preferred primary method in the Rudee basin due to the physical conditions of some of the areas to be dredged and the availability of a permitted disposal site. There will be a need for some mechanical dredging in the Harbour Point and Shadow Lawn neighborhoods.

The disposal of dredged materials in the anoxic holes that form portions of the bottom of Lake Rudee and Lake Wesley is actually a beneficial re-use of the dredged materials and gives greater weight to the use of hydraulic dredging. The disposal of dredged materials in the anoxic holes is a condition of the Corps of Engineers permit. The only permitted dredge disposal option for inner harbor dredged materials is placement in the deep, anoxic holes in Lake Rudee and Lake Wesley. Under City Council policy, only the Lake Rudee disposal area is to be used.

Mechanical Dredging is recognized as the best method for areas within the neighborhoods of the Lynnhaven basin due to channel sizes, turn basin restrictions and ancillary channel confines.

Mechanical dredging methods also provide the flexibility to adapt to the various conditions that will be encountered.

Additional positive consideration for mechanical dredging results from the awareness of the existence of tree trunks and similar debris on the bottom of many of the ancillary channels to be
dredged. There exist in the mechanical industry, environmentally friendly, level cut excavator buckets which will result in less spillage and less damage to the physical environment. One of the few negatives is that mechanical dredging creates greater turbidity which causes some temporary environmental impacts. Because mechanical dredging is a strong recommendation for any near term dredging in the Lynnhaven basin, an accompanying DMTS, as well as, barge and truck haul routes become necessities. The barge sizes will be determined by the water depth of the channel to be dredged. We do not consider barge traffic to be an unmanageable hazard to navigation or bridges. Dredge project oriented dump trucks present no more of a traffic hazard than any normal tandem dump truck.

There has been considerable public input opining that DMTS sites for neighborhoods opting into the NDSSDP are best when located inside the project area and on private property. The Commission concurs and supports this position as it would reduce adverse impacts on communities that would receive no benefit. Localized DMTS would reduce project cost and benefit the SSD participants. However, it is firmly believed that this private property option should not preclude the construction of one unique, publically owned transfer station associated with each identified service area. Conditions change constantly with private property and private property ownership. Any unknowns that could complicate future dredging maintenance needs should be avoided. All DMTS must be constructed to meet safety and environmental standards. No work should begin on any DMTS prior to a project being submitted to Council for approval and approval being received. Equally important, and strongly recommended, is the availability of a transfer station in each program service area for use by the public for dredging by entities or individuals other than the City, should the need arise.
Beneficial Re-Use of Dredge Spoil

On review and consideration, no known beneficial re-use options have been identified for the initial stage of the dredging in the NDSSDP. However, we believe that there is good reason to investigate future beneficial re-uses and the needs for alternative placement of dredged materials. We understand that the availability of permitted disposal sites in the City is currently very limited and their capacity is clearly finite. The study of the creation of salt water wetlands and salt water marsh islands are presently underway in the environmental engineering community. The same is true with fresh water studies. At this time, fresh water studies are more advanced than salt water studies. Currently, there is adequate disposal capacity available for the initial dredging, and some amount of future maintenance dredging, to accomplish the goals of the NDSSDP. The Commission believes that Council would be wise to authorize and fund a study of alternative re-use options for dredged materials for the future phases of this program. The Commission believes that there are several reasons to investigate these options. When permitted by controlling agencies, the beneficial re-use of dredge materials, for other than fill for anoxic deep water holes, will play heavily into the future of watered communities such as Virginia Beach. The reduction of future negative impacts on established neighborhoods alone would justify the cost and effort of investigation. A white paper is included with this report as Appendix C on this topic. The authors, Ronald Vann and Harold Jones, both former leaders at the Norfolk District Army Corps of Engineers, are respected members of this engineering and environmental regulatory community and were members of the panel to discuss the beneficial re-use potential.
**Operational Parameters**

The following is a list of nine (9) sites that the Commission feels are sufficient to support the needs of the project:

1) The Long Creek / Maple Street site, east of the North Great Neck Road Bridge
2) The Long Creek / Lynnhaven Drive site, east of Lynnhaven Boatel and west of Marina Shores Shoppes
3) The Crab Creek site which lays south and west of the Lesner Bridge
4) The Thalia site at 4300 Virginia Beach Blvd, east of Thalia Lynn Baptist Church
5) The “Pep Boys” site at 321 Hutton Lane, approximately 2500 Virginia Beach Blvd
6) The Reagan Avenue site just west of Riverwood Court
7) The Virginia Beach Shopping Center site at approximately 2868 Virginia Beach Blvd
8) Laskin Road sites in the 800 block and 900 block of Laskin Road
9) Robin Hood Forest at 2713 Robin Drive

The Commission believes that all of the DMTS have similarities and differences to consider when establishing their service parameters to ensure the least possible adverse impact on their served and surrounding communities.

Included at the end of this report are the sites with their overarching and unique considerations with recommendations. The overarching similarities are their proximity to wetlands, need for adequate road structure, need for operational safety, need for cleanliness of operation and need for minimal impact on the surrounding neighborhoods and travel routes. Differences to consider are time of year, hours and days of operation, length of operating segments and frequency of use. Wash down, dust and noise abatement, ingress and egress and environmental concerns should necessarily be considered on a per site basis.

The Commission strongly recommends that the City Council adopt a policy which provides for permitted use of the dredged material transfer station sites by the public for dredging by entities or individuals other than the City or the NDSSDP, if demand is justified.
General Operational Conditions

The following general conditions should be applicable to all sites:

SAFETY: The Commission recommends strict adherence to the Federal Occupational Safety and Health Administration (OSHA) regulations and related Commonwealth Of Virginia and City of Virginia Beach laws, ordinances regulations and policies.

It is recommended that any engaged contractor develop and submit a Site Safety Plan to the City Project Manager for review and approval at least 30 days in advance of the start of work.

City Inspectors should review safety procedures daily for compliance with the approved safety plan and appropriate OSHA standards. Any findings of non-compliance must be discussed with the Contractor and noted in the Inspector’s daily report. We recommend that the City Inspector be delegated the authority to immediately stop work until corrections are made and unsafe conditions are eliminated.

CLEANLINESS: It is recommended that the contractor clean the site as needed, but not less than twice per work day. Trash should be collected daily and removed from the site as needed, but not less than twice per work week. We consider it important to pay strict attention to the collection of any and all trash that is on residential property. Vehicles should contain a trash bag for use by the operator.

It is recommended that the contractor establish an equipment wash rack on site or a City approved alternative. Sediment pressure washed from vehicles will be collected to prevent drainage into the waterways. Where possible, at the Inspectors option, a 50’ long x 15’ to 19’ wide VDOT construction entrance featuring a geotextile fabric and VDOT #1 coarse aggregate, maybe substituted for the wash rack. Such construction entrance shall be installed prior to the ingress onto a hard surface public road.

Hauling vehicles beds should be watertight and sediment tight.

The contractor should place and maintain portable bathroom facilities at worksites. These facilities should be maintained in a clean condition and inspected daily. They should be serviced at least once per week.

PERMITTING: It is recommended that the City identify a communications contact for the purpose of explaining to interested parties, concisely, how the permitting process for the Special Service Districts (SSD), small independent groups and individual property owner’s permit applications will be handled. Strict adherence to all required permits for the work is critical. Copies of all permits should be provided to the City Inspectors, and their site visits should focus on assuring that the contractor is in compliance.
PERFORMANCE: It is recommended that the contractor be required to post a performance bond. The contractor should be required to conduct his work in the navigable waters so as to minimize obstructions and avoid impacting navigable depths; and comply with appropriate US Coast Guard Regulations.

NEIGHBORHOOD TRANSFER SITES: We strongly recommend the establishment of individual Dredge Materials Transfer Stations be located in the neighborhood receiving the benefit of the dredging project, wherever possible. We realize that cost, ingress and egress, site conditions and proximity to established transfer locations will factor into the decision process for site selection.

NOISE ABATEMENT: It is recognized and acknowledged that construction sites by their very nature produce noise. We recommend that all reasonable efforts, and known engineering options, be utilized to reduce noise that impacts travel routes in and adjacent to neighborhoods.

TRUCK TRAVEL: We recommend that adherence to neighborhood speed limits are strictly enforced. We recommend that the contractor submit a proposed haul route plan prior to initiating work. The planned haul route should be reviewed by the City Project Manager and the City Traffic Engineer to ensure appropriateness, sufficient road strength and capacity. The contractor’s contract should include stipulation that upon completion of the work, the transfer site and neighborhood streets be returned to their pre-construction condition.

WATER QUALITY: The Contractor must recognize that any adverse impact on water quality will have an equal impact on the quality of life of residents living in the waterfront neighborhoods. We recommend that every effort be made to ensure avoiding even minor pollution of waterways and the placement of deleterious materials into the waterways. Care should be exercised to avoid any impact on fish and wildlife.

NOTICE TO PROPERTY OWNERS: Prior to mobilization, we recommend that the City / Contractor conduct a neighborhood meeting to answer questions and provide information pertaining to the project, anticipated construction schedules and points of contact with telephone numbers.
The Commission believes that the Long Creek DMTS and Crab Creek DMTS are uniquely different from the DMTS sites located in the other three service areas. The DMTS in these three service areas can be situated so that they will not cause severe impacts on their neighborhoods.

We believe that Long Creek and Crab Creek have issues associated with barge travel and there are concerns for safety and the industrialization of a serene natural area. The Commission has spent significant time studying these impacts and how best to mitigate or eliminate them. The Commission believes that a DMTS must be located in the Long Creek / Broad Bay service area, as well as the Crab Creek service area, as included in the Council approved Neighborhood Dredging Program. To do otherwise would be to disadvantage a segment of the waterfront community from this worthwhile program.

It is recognized that the Neighborhood SSD Dredging Program was created and designed as a “user friendly” product. The “opt in or not” decision allows the benefited neighborhood to determine their involvement and what level of temporary inconvenience they are willing to accept. That is not true with the negatively affected communities that become the travel routes for barges and the haul route for loaded tandem trucks. This inequity needs to be addressed, and for that reason alone, the DMTS supporting Long Creek / Broad Bay and Crab Creek’s involvement in the NDSSDP needs to be strictly managed.

Each and every time that the Commission has proposed to negotiate conditions at the Long Creek / Maple Street site it has encountered positions of “not one day of activity”, “not one truck moving by our property” and “not one barge” moving along Long Creek. There are no operational parameters acceptable to the leadership for opposition to the NDSSDP in this community. The Commission believes that efforts to find common ground will not benefit from any additional amount of discussion, any added amount of willingness to compromise or any amount of additional public input. However, it is the Commission’s conclusion, and recommendation to Council, that a Dredge Material Transfer Station must be located in each service area to support the Neighborhood Dredging SSD Program regardless of the unwillingness on the part of the communities’ leadership to accept any level of truck, barge and transfer activity in the neighborhoods and waterways.

The Commission believes that the selection of the Long Creek / Lynnhaven Drive DMTS option will greatly reduce “neighborhood” impacts, but could present unstudied business or commercial impacts. The recommendation for management of the NDSSDP and the DMTS site on Long Creek, as outlined below, will be the same regardless of which location is selected.

As used above, strictly managed would mean that the programs “user friendly” options for neighborhoods in the Long Creek and Crab Creek control service areas would be reduced.

The neighborhoods would make application to Council, through Public Works, for inclusion in the NDSSDP not on an “as wanted time line” but would be managed on an “as available time line”. The
Commission recommends that use of the Long Creek DMTS and the Crab Creek DMTS be restricted from operation for anytime greater than one work segment not to exceed 60 consecutive workable days during any three year cycle. A workable day is as determined by the contractor in his sole discretion. The 60 day period would be selected from the time period starting after Labor Day and ending before Memorial Day, by Public Works in their sole discretion.

The application process would start with a neighborhood coming forward, proactively, and requesting a study be started to determine the amount of the Special Service District increase to their real estate taxes and the other necessary engineering to be done prior to submission to Council for approval. Once approved, the Commission recommends that Public Works advertises and aggressively informs the waterfront communities in the appropriate service area of the selected time for a dredging project. The opting in neighborhoods would be required to perform financially in the same manner as the NDSSDP currently requires. Those neighborhoods that do not opt in would be made aware that the next opportunity for inclusion in the NDSSDP would be at the next 3 year cycle. Any groups or individuals that desired dredging outside of the three year windows of opportunity would have to provide for their own private DMTS or pay a premium for the cost to barge the dredge materials to an available site for transfer. Public Works would manage and select the best DMTS for this off cycle activity. This would be an approved exception to the “one DMTS per service area which handles only material dredged in the service area” recommendation.

The three year cycles should be timed to eventually coincide with scheduled maintenance cycles and create some economies of scale and possibly provide an opportunity for higher volume hydraulic dredging.

During the 60 workable days of operation, all of the recommended site operational controls would be in effect.

**Long Creek Service Area**

Prior to the start of dredge materials transfer, we recommend the following site preparations.

We recommend a study to determine if the installation of a traffic signal at the Lynnhaven Drive and Great Neck Road intersection would improve traffic flow and safety.

If determined to be practical and necessary to protect the cleanliness of our streets, we recommend the construction of a wash rack located on or near the haul road prior to Lynnhaven Drive.

If Maple Street is used: Provide screening for the residences along the 470 ft. reach from the current sand holding area to Lynnhaven Drive. We recommend planting improvements.

We recommend a provision in any contract that prohibits trucks from queuing or idling on Lynnhaven Road or the sand pit haul road in the proximity of the Long Creek Condominiums.
No equipment shall be operated on Maple Street or elsewhere in the Cape Story by the Sea neighborhood.

We strongly recommend a structural survey, to include photography, be accomplished for residences or commercial properties prior to any project initiation.

The contractor’s office, maintenance facilities and storage needs should be located near the transfer station platform so as to be as far removed from residences or commercial properties as possible.

We recommend the contractor be required to provide dust abatement by using a water truck or trailer to spray on the haul road where instructed by the City Inspector.

We recommend the following constraints on operations at the Long Creek Transfer Station:

- No more than one 60 consecutive workable day segment in any three year period
- Work hours: 0700 to 1600
- 40 hour work weeks without Saturday, Sunday or Holidays
- No more than 30 truck loads per day. A truck load is defined as a round trip of an empty truck and the departure of the same loaded truck.
- No work may be conducted on the Friday before Memorial Day through Labor Day, without special relief
- We recommend a second engineering study focusing on potential vibration issues at the site
- We recommend a videographer record conditions at the adjoining properties prior to any start
- We recommend the use of a vibration recorder during the appropriate phases of any project

Upper Western Branch Service Area

We recommend the following constraints on operations at the Crab Creek transfer station:

- No more than one 60 consecutive workable day segment in any three year period
  Work hours: 0700 to 1600
- 40 hour work week without Saturday, Sunday or holidays
- No more than 30 truckloads per day. A truck load is defined as a round trip of an empty truck and the departure of the same loaded truck.
- Work days and periods to be adjusted to accommodate the appropriate fishing seasons
- Site preparation should include dredging of adequate turning basin and installation of dolphins or restraining structure for barge control.
- No work may be conducted on the Friday before Memorial Day through Labor Day, without special relief

Lower Western Branch Service Area

We recommend the following constraints on the operations at the Thalia Transfer Station:
- Work hours: 0700 to 1600
- 40 hour work week without Saturday, Sunday or Holidays
- No more than 30 truck loads per day. A truck load is defined as a round trip of an empty truck and the departure of the same loaded truck.
- Work to be coordinated with the crew, kayak and canoe enthusiasts
- Work to be coordinate with Thalia Elementary School
- Contractor will not utilize Thalia Lynn Baptist Church parking lots nor adjacent commercial business lots for employee privately owned vehicle parking

**Linkhorn Service Area**

We recommend the following constraints on the operations at the Linkhorn Transfer Station:

- Work hours: 0700 to 1600
- 40 hour work week without Saturday, Sunday and Holidays
- No more than 30 truck loads per work day. A truck load is defined as a round trip of an empty truck and the departure of the same loaded truck.
- During work hours, flagmen are required to control all vehicular entry from the work area onto Laskin Road
- Special care is required to prevent the buildup of soil on the heavily revealed Laskin Road to include rotary broom cleaning of the paved surfaces three times per day.
- No work maybe conducted from the Friday before Memorial Day through Labor Day

**Eastern Branch Service Area**

We recommend the following constraints on operations for the Eastern Branch Transfer Station:

- Work hours: 0700 to 1600
- 40 hour work week without Saturday, Sunday or Holidays
- No more than 30 truck loads per work day. A truck load is defined as a round trip of an empty truck and the departure of the same loaded truck.
Appendix A

Service Area Maps
Hydraulic Dredges

Hydraulic dredges work by sucking a mixture of dredged material and water from the channel bottom. The amount of water sucked up with the material is controlled to make the best mixture. Too little water and the dredge will bog down too much and the dredge won’t be efficient in its work. The type of hydraulic dredge that would have the greatest application to the Virginia Beach Neighborhood Dredging Program is the pipeline hydraulic dredge.

A cutterhead pipeline dredge sucks dredged material through one end, the intake pipe, and then pushes it out the discharge pipeline directly into the disposal site. Because pipeline dredges pump directly into the disposal site, they operate continuously and can be very cost efficient. Most pipeline dredges have a cutterhead on the suction end. A cutterhead is a mechanical device that has rotating blades or teeth to break up or loosen the bottom material so that it can be sucked through the dredge. Pipeline dredges are mounted to barges and are not usually self-powered but are towed to the dredging site and secured in place by special anchor piling, called spuds.

Cutterhead pipeline dredges work best in wide open areas in deeper water where the cutterhead is buried in the bottom. The disposal site must be located close enough for an economical cost. The distance varies depending on the size of the project and the power of the dredge. Each project must be evaluated through a thorough analysis (engineering cost, placement site location, depth of channel, real estate, dredging interval).

Pipeline dredges require a pipeline that must be floated on top of the water, laid on the bottom, or placed on land to transport the material to the ultimate placement site.

Advantages of pipeline cutterhead dredges:

1) Most economical method of transporting material under certain condition – large project with close placement sites
2) Can operate 24 hours a day
3) High production under ideal conditions
4) Dredged material not seen by often uninformed public

Disadvantages of pipeline cutterhead dredges:

1) Require wide area to efficiently operate
2) High mob cost with pipeline installation
3) Often need to operate 24 hours a day to be cost effective
4) Pump approximately 80% water – require large disposal area to accommodate water and dredged material
5) Loud noise – 24 hours a day
6) Pipeline can often interfere with navigation
7) Pipeline often require real estate easements, environmental effects – very long lead times
Mechanical Dredges

There are a number of types of dredges. The main types of dredges that have application to the Virginia Beach Neighborhood Dredging Program are small mechanical dredges and hydraulic dredges.

Mechanical dredges remove material by scooping it from the bottom and then placing it onto a waiting barge or into a disposal area. Dipper dredges, clamshell and back dredges are the three most common types of mechanical dredges.

Mechanical dredges are rugged and can work in tightly confined areas such as the many small tributaries to the Lynnhaven system. They are mounted on a barge and are towed to the dredging site and secured in place by anchors of anchor pilings called spuds. They are effective around docks and piers and in relative protected channels.

Two or more disposal barges called scows are used in conjunction with the mechanical dredge. While one barge is being filled, another is being towed to the transfer site or placement site. The project can proceed continuously, only interfered by changing scows or moving the dredge. This aspect makes mechanical dredges particularly well suited for dredging projects where the disposal site is many miles away. Special buckets have been designed for controlling the flow of water from buckets that minimize turbidity at the dredging site.

Advantages for mechanical dredged in area similar to projects being considered for the Virginia Beach Neighborhood Dredging Program.

Advantages of Mechanical Dredges

1) Operate effectively in narrow shallow water channels
2) Economical for dredging where the placement site is miles from the dredging site (more than 1-2 miles)
3) Accurate dredging near piers, bulkheads and wetlands
4) Relatively quiet
5) Low mobilization cost. Effective where channels do not require annual or regular maintenance 1-5 years (no long pipelines)
6) Do not need to operate 24 hours a day for economical performance
7) Equipment and personnel generally available to Provide an economical bidding climate
8) Not a complicated construct technique
9) Require easements efficient for projects that require dredging every 5-10 years

Disadvantages of Mechanical Dredges

1) Dredged material must be removed from barge or dumped
2) Dredging not as fast as hydraulic dredges in some situations where the disposal area is close (1-2 miles)
3) Dredged material visible to sometimes uninformed public (social disadvantage)
4) Usually must be combined with truck hauls or hydraulic pumps to transport to placement site. Dumping is the exception.
5) Often require rehandling sites.
Appendix C

Beneficial Uses of Dredged Material

Prepared by

Ron Vann, P.E. and Harold Jones
Virginia Beach, Virginia
INTRODUCTION

Materials generated from navigational dredging projects have been traditionally viewed as waste products that require disposal in the most economically feasible manner. Traditionally, dredged material was side-cast overboard, or placed in adjacent wetlands or in low laying areas. Prior to and during World War II large commercial and military interests located on waterways and ports found it increasingly difficult to locate new disposal sites as the existing sites reached and exceed capacity. To address this need, the US Congress authorized and appropriated funds in the early 1940s to analyze the feasibility of developing alternative disposal strategies. The study recommended that confined disposal facilities (CDF) for dredged material should developed as an alternative to overboard disposal. The study also suggested that a multi-parameter approach should be used to evaluate CDF feasibility based on such factors as capacity, impacts on navigation, costs, engineering, and site longevity. One of the first CDFs in the country to be developed was the 2,500-acre Craney Island Dredged Material Management Area (formerly the Craney Island Disposal Area) in Portsmouth, Virginia. The CIDMMA was congressionally authorized in the late 1940s and construction was completed in 1957. The CIDMMA is still in operation today.

Passage and implementation of the Clean Water Act in 1972 required federal regulatory agencies, primarily the US Army Corps of Engineers (USACE), the US Environmental Protection Agency (EPA), and state water quality certification agencies, to evaluate and certify that dredging and disposal components were in compliance with the EPA 404(b)(1) guidelines and water quality certification standards. In the case of the Commonwealth of Virginia, the Virginia Department of Water Quality has this responsibility.

Many, if not most, CDFs established in the last fifty years, are nearing or have already reached full capacity. Identifying new containment sites poses difficulties due to conflicting land use issues, potential environmental impacts, and the high value of near-water real estate. In an effort to address the capacity problem, public and private project sponsors, state, federal and local environmental and regulatory agencies, non-governmental organizations (NGOs), and citizen groups, have developed creative concepts and ideas for how dredged materials may be used beneficially. In last ten to fifteen years, design parameters have migrated from a single-use design, such as creation of a salt marsh or sand island, to multi-use design. Beneficial design components of multi-use facilities may now include shoreline stabilization, wetland creation/restoration, wildlife habitat development, and aquatic resource habitat enhancements, all rolled into one project.
Prior to identifying specific beneficial disposal options or sites for consideration, an interdisciplinary approach and team should be established that includes all potential stakeholders. Typically, this will include state, federal, and local environmental and regulatory agencies, local government commissions, local boards and political leaders, non-governmental organizations (NGOs), and locally affected citizens. Collective input and open dialogue regarding design concepts, location, engineering, environmental benefits and impacts, economics, and land use and zoning will play a pivotal role in developing sound concepts and plans that will ultimately be acceptable to the majority of the potentially affected neighborhood dredging program (NDP) community groups. Every effort should be made through collective input coupled with decisive leadership, that all pertinent regulatory and environmental evaluation factors are analyzed, documented and considered.

The outcome of such collective evaluation and decision-making is that a beneficial dredged material placement plan can be developed and move forward. All projects involving the beneficial uses of dredged material require consideration of several important and wide-ranging interdisciplinary factors. Typically these range from the physical and chemical makeup of the dredged material, to issues of technical feasibility and costs, to regulatory requirements and project partners.

**Composition of the Dredged Material**

The first steps in determining if material that will be generated by a dredging project is acceptable for beneficial use, involves examining the composition of the material. Before beginning any dredging project, the proposed dredge material must be tested for physical characteristics, such as grain size, particulate constituency (oyster and clam shell, other aggregates), and for water content to determine the basic engineering parameters for placement. The material must also be analyzed for potential chemical contaminants to determine if it meets water quality standards established by the US Environmental Protection Agency (EPA), as administered by the Virginia Department of Environmental Quality (DEQ). In general, highly contaminated sediments are not normally suitable for most beneficial use applications, and particularly those involving wildlife or aquatic resource habitat development. However, after further examination, and testing, and possibly pretreatment, the material may be classified as suitable, depending on the specific beneficial use goal. Dredged material from ongoing maintenance activities should be re-evaluated periodically to ensure that the sediment contaminations levels have not increased since the previous dredging cycle. Should potential dredge material fail EPA and DEQ water quality standards, its availability for beneficial use will be severely, if not totally limited, and no further planning or evaluations for beneficial uses for the material should be explored.

**Site-Engineering and Technical Feasibility**
The identification, investigation, and evaluation of project critical components are paramount to successful project design and functionality, and to overall project feasibility. Development of comprehensive and accurate information regarding specific engineering parameters is critical in determining whether a particular site is conducive to accomplishing the desired beneficial use of dredged material. All parameters that could affect the final outcome, in both the short- and long-term, should be analyzed. For in-situ placement projects, the parameters that should be examined may include: the geotechnical characteristics of the dredged material; the placement site bathymetry; the site waterway currents and circulation patterns; proximity to navigational concerns; salinity ranges; proximity to existing infrastructure components or other structures; wind fetch; and the engineering specifications of material to be used for the containment structures.

**ENVIRONMENTAL CONCERNS**

In most beneficial use projects, the regulatory and environmental agencies and the affected public may hold perceived or real environmental concerns regarding the proposed development site, and these can be a significant challenge to developing a successful project site. For an in-situ project to be successful, the overall benefits must clearly out-weight the adverse impacts to the environment. Current Commonwealth of Virginia laws and implementing regulations have significant standards (barriers) which must be met before a beneficial use site is approved. Preparing a detailed environmental assessment and associated engineering/technical feasibility study will greatly assist the regulatory community in making sound decisions regarding project permitting and will also provide the affected public with professionally developed information to assist them in formulating an informed opinion on the project.

**IDENTIFYING ENVIRONMENTAL PARTNERS**

It is important to identify those local, Commonwealth of Virginia and national environmental organizations which may have interest and expertise in developing a particular beneficial use project. The project sponsors should consider enlisting the support of such organizations in the project planning, construction and success monitoring phases. Examples of such organizations that may have an interest in the projects include the Chesapeake Bay Foundation, The Nature Conservancy, the National Audubon Society, and the Wildlife Society. These types of organizations may also help identify potential sources of project funding and, in some cases; they may be able to provide volunteers to perform tasks as planting grasses at marsh restoration sites, or conducting post-construction monitoring.

**REGULATORY REQUIREMENTS**
Dredging and subsequent placement of the dredge material requires prior authorization from several regulatory agencies pursuant to the authorities vested in them. The following table identifies the agency and the regulatory or advisory role in reviewing potential dredging and placement projects.

<table>
<thead>
<tr>
<th>AGENCY</th>
<th>AUTHORITY/ROLE</th>
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| US Army Corps of Engineers                        | -Section 404 of the Clean Water Act  
  -Section 10 of the Rivers and Harbors Act  
  -National Environmental Policy Act             |
| Virginia Department of Environmental Quality      | -Section 401 of the Clean Water Act-Water Quality Certification  
  -State Water Control Law, Virginia Water Protection Permit  
  -Virginia Pollution Discharge Elimination System |
| Virginia Marine Resources Commission              | Sub-Aqueous Bottom Regulations                                                |
| Virginia Beach Wetlands Board                     | Wetlands and Primary Dunes                                                    |
| Environmental Protection Agency                   | Clean Water Act                                                                |
| NOAA, National Marine Fisheries Service           | Essential Fish Habitat                                                         |
| US Fish and Wildlife Service                      | -Fish and Wildlife Coordination Act  
  -Endangered Species Act                         |
| Virginia Game and Inland Fisheries                | State Fish and Wildlife Resources                                             |
| Virginia Department of Natural Heritage           | State Threatened and Endangered Species                                        |
| Virginia Institute of Marine Science              | Scientific Advisory to VMRC and Local Wetlands Boards                          |
| Virginia Department of Historic Resources         | Federal and State Historic Properties                                          |
BENEFICIAL USE TYPE PROJECTS

Most dredged material can be a valuable resource and should be considered for beneficial uses. In the early planning stages primary consideration must be given to dredged material constituency, i.e. grain size (clay, silt, sand,) and the amount and type of aggregations such as oyster/clam shell or rock. These characteristics will determine the materials suitability for use in any particular project. For example, beach nourishment projects will require coarse to medium grain sand, whereas wetland creation or restoration projects can successfully use most size of material. Identification of a specific application will directly depend on multiple factors and sometimes mutually exclusive factors. The following section provides a short discussion of the major types of beneficial use projects that have been successfully developed to date.

SHORELINE PLACEMENT

Dredged material may be placed along an existing shoreline to provide beach nourishment, shoreline stabilization, or to act as a sacrificial buffer to protect pre-existing resources such as salt marshes, non-tidal wetlands, or sand/cobble nesting habitats from erosional forces. Individual placement sites must be individually engineered to meet the specific ecological or design goals. Dredged material must be pre-tested to ensure compatibility with indigenous materials at the placement site. Potential adverse impacts to existing nearby resources, such as submerged aquatic vegetation (SAV), shellfish beds, and vegetated wetlands must also be evaluated. Real estate issues, such a determining land ownership, acquiring necessary easements or right-of-ways, and developing partnerships with the owners must be initiated early in the project feasibility stage.

In some cases engineered structures, such breakwaters, groins or jetties, may be incorporated to enhance the long-term viability of the placement effort. Beach nourishment can involve constructing of underwater berms to decrease erosion by wave action; and may be a means of supplying sand to eroding beaches for beach nourishment. Caution, however, should be used in determining placement depth for underwater berms. Wave energy may not be able to reshape the berm material if the material is too deep. Consultation with coastal engineers, wetland ecologists, specific resource experts, and resource and regulatory agencies, is essential in developing a successfully engineered project plan.

HABITAT DEVELOPMENT
Dredged material is used to build and maintain productive plant and animal habitats, especially wetlands. The use of dredged material as a substrate for habitat development is one of the most common and important beneficial uses of dredged material. In considering habitat development, it is necessary to determine the type of habitat that is needed (e.g., habitat to enhance fish communities, or bird communities); whether the constructed habitat will be stable at the proposed location; and whether the new habitat will displace existing unique or valuable habitats. Five general categories of habitat development used dredged material are discussed below — uplands, islands, vegetated wetlands, non-vegetated and aquatic habitats, and multi-dimensional habitats.

**Uplands**

Upland habitat includes a broad category of terrestrial communities characterized by vegetation not normally subject to inundation, and including grasses, shrubs, and trees. Upland habitat projects can be designed to support birds, waterfowl nesting areas, mammals, and rare, threatened or endangered species. In upland restoration projects dredged material is usually placed in previously excavated areas such as borrow pits, man-made industrial or agricultural lagoons or pits, with the purpose of restoring the site to the original grade and elevation. The final use of the disposal/restoration site will be directly dependent to the proponents’ development plans, current zoning, and any deed/easement restrictions.

**Islands**

Dredged material can be used, where appropriate, to create new islands. Colonial-nesting seabirds such as skimmers, oystercatchers, plovers and terns are the primary users of new island habitats since these new islands are generally free of upland predators. Furthermore, sandy upland islands are also important nesting areas for the diamond back terrapin turtle, sea turtles and rare insect species. Depending on their location in relation to other aquatic and upland habitats, newly created islands may provide important stop-over habitats for migrating neo-tropical bird species.

**Vegetated Wetlands**

Vegetated wetlands are a broad category of periodically inundated or saturated soils and plant communities, characterized by vegetation that survives in wet (flooded or saturated) soils. Vegetated wetlands in the Lynnhaven River Basin are most commonly saltwater marshes with some tidal freshwater occupying the extreme upper reaches of some tributaries.

Fresh water habitats exist in man-made retention ponds or lakes. In developing wetland habitats, dredged material may be used to fill sub-aqueous or intertidal areas to a precise elevation that will sustain certain
plant species over the long-term. Dredged material may be used to restore pre-existing wetlands, enhance or expand existing wetlands or create new wetlands.

Aquatic

Aquatic habitats are permanently submerged or intertidal habitats extending from near sea, river, or lake levels down several feet. Dredged material is used to affect either the bottom elevation or the condition of the submerged area. Potential aquatic habitats that could be developed using dredged material include seagrass meadows, base material for development of oyster beds, clam beds and fishing reefs.

Multi-dimensional Habitats

Multi-dimensional habitats are those habitats in which the design goals include more that one habitat component and/or include more than one beneficial use of the dredge material. For example, in the designed expansion of an existing, but somewhat eroding saltmarsh island, dredged material may be placed in geo-tubes along the perimeter of the expansion area. Geotubes or Geo-textile tubes are filled with dredged material slurry where the material is dewatered and used to build structures such as breakwaters, shoreline or island creation. Additional material would be placed behind the geo-tubes as backfill and raised to an intertidal elevation conducive to support additional saltmarsh plants, such saltmarsh cordgrass (*Spartina alterniflora*). The outboard side of the geo-tubes would be faced with stone or concrete rip-rap to create a revetment that would armor the geo-tubes. Oyster shell would be placed over the revetment and would provide substrate for oyster spat set and oyster reef development.

ECONOMICS

The alternative of selecting beneficial use placement must be considered to be economically affordable by the project sponsors. A thorough technical analysis of the placement site requires an interdisciplinary approach during the project feasibility stage and is fundamental in determining project costs. Costs will vary considerably depending on numerous parameters such as type of dredging and placement methodology (hydraulic, mechanical, combination), the distance between the dredging operation and the placement site, dredged material volume, material constituency, construction of any material containment structures, material contouring to achieve desired final grade, habitat enhancements and placement costs (plant sprigs, oyster shell, etc.), mobilization costs, permitting costs, fees and royalties, environmental assessments, and short- and long-term monitoring.

Although a detailed economic plan and budget may be prepared and approved, a contingency plan should also be prepared to deal with unforeseen impediments. These would included such items as an extended
period of inclement weather impacting dredging and placement site construction, natural disasters (locally hurricanes), and litigation.

OUTREACH AND PUBLIC INVOLVEMENT

In most beneficial use projects, the public will significantly influence decision making at various points in the often multiyear process of project planning, implementation, and regulatory compliance. Effective public involvement will improve the quality of the decisions made about the beneficial use of dredged material. Many people still regard dredged material as a waste product rather than a valuable resource. Such misconceptions underscore the need for informing the public about the proposed beneficial use projects and involving the affected communities in pertinent discussions. Different segments of the affected public will have different levels of interest and concern regarding beneficial use projects. Therefore it is important to involve the affected community in projects that may significantly affect them. Their motivation may be due to the proximity of the project; or due to economic, social or environmental concerns; or due to their personal values.

The best way to effectively involve the public is to develop a public involvement plan. The project proponent should identify key stakeholders, opinion leaders, representatives of important constituencies, elected officials, agency representatives and other non-governmental organizations who need to be involved in the decision making process. It is important for the project proponent to make it clear to the affected NDP community how public involvement can make a difference in project planning and design. Community participation can add value on several levels, but it can only be successful if the project proponents are willing to consider the resulting input in their decision making process. Convening all interested parties in a beneficial use planning group promotes early identification and evaluation of alternatives. The group can develop criteria for evaluating alternatives. These criteria/attributes of a successful partnership can be used to direct data gathering and allocation of limited financial resources. Key attributes of a public involvement plan, at a minimum include the following.

- Involve the NDP community from the onset. Go to the community; do not wait for the public to come to the project sponsor
- Identify and respond to issues raised by the community
- Convey the decision-making process and schedule
- Articulate how the community’s input will be used
- Use a variety of methods to inform and involve segments of the affected community with different levels of interest
• Involve representatives of the public in project decision making.

Dredged material disposal provides opportunities for a number of environmental, economic, and aesthetic beneficial uses. Identification and analysis of technical and engineering parameters, regulatory requirements, environmental impacts and benefits, and involvement by all stakeholders through the entire developmental process is essential in developing a sound beneficial use project plan that will be acceptable to the majority of the involved parties.