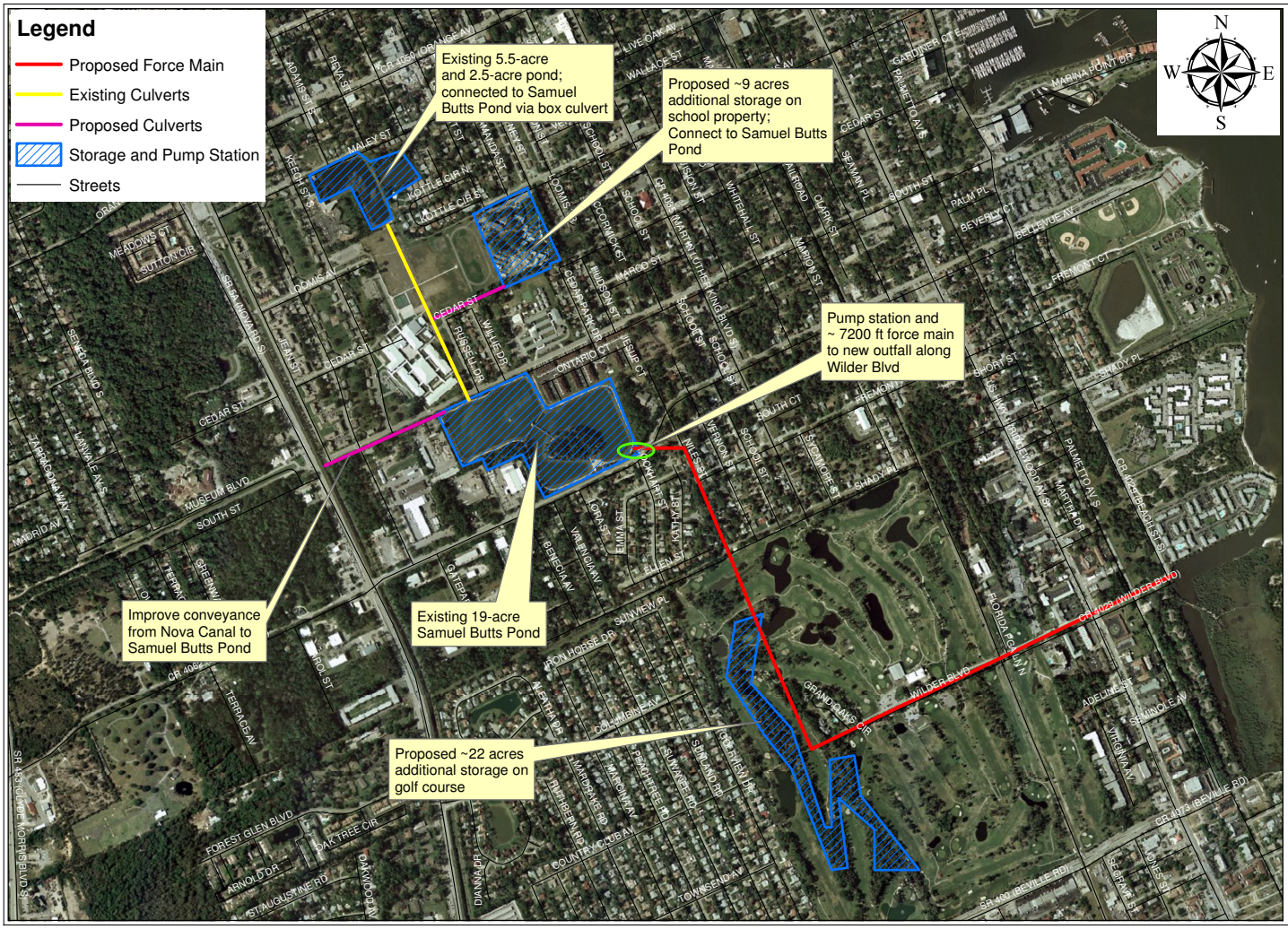

Figure 3-7
Nova Canal Flood Control and Integrated Water Resources Program
Samuel Butts Pond Project Component

East Volusia Regional Water Authority (EVRWA)

CDM

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3.2.7 Navy Canal Diversion Project Component

The Navy Canal Diversion project component includes various channel and culvert improvements, a diversion weir just west of Clyde Morris Boulevard, and more than 100-acres of additional surface water storage south of the Daytona Beach International Airport (DBIA). The concept is to store water within this topographic high-spot for the area and reduce the flow volume and rate that is discharged into the Nova Canal system. Previous evaluations in the mid-1990s indicated that the re-direction of this canal could have a 0.5 foot decrease in flood stages for the 25 year event at the confluence of the Navy and Nova Canal systems.

The diversion weir is intended to divert a portion of the flow away from the study area to the proposed storage areas. Existing flows and stages west to the Tomoka River and south to the B-19 Canal will be maintained (no increases). The proposed locations for the storage areas include approximately 100 acres of uplands and 20 acres of widened channel area. These elements are intended to complement upcoming proposed improvements by the City of Daytona in and adjacent to the DBIA. The parameters for this component are summarized in Table 3-1. The layout for this component is shown in **Figure 3-8**.

3.2.8 Bottleneck Removal in the Primary System

The Bottleneck removal project component included identification and evaluation of the potential flood reduction benefits from the removal of various culverts, bridge, and channel bottlenecks in the three canal systems (LPGA, Reed, and Halifax) as well as the primary tributary canals such as Nova Canal. Initially, the existing system model was evaluated to identify potential bottlenecks within the system. These conduits included canal segments, culverts, and bridges as determined by the JPA Partners in consultation with CDM/QLH. Typical parameters used to identify bottlenecks included 0.5 feet of head loss across culverts and 0.5 feet of head loss per 100 linear feet across channels. Analysis of canal sections revealed no opportunities to efficiently improve conveyance, as locations where expansion would be beneficial were space-limited with respect to available right-of-way.

Once identified, field confirmation of the bottleneck element was performed to verify the actual configuration (e.g., pipe diameter) of the bottleneck. Of the 10 structural bottlenecks initially identified, 8 were eliminated based on field verification of actual specification and the model was updated accordingly. For the remaining 2 bottlenecks that were confirmed, their removal was analyzed using larger conduits to determine the potential flood control benefits and impacts. However in both cases reviewed, removal of bottlenecks resulted in increased flooding conditions (impacts) downstream. Since reducing localized flooding in some areas at the expense of other areas is not acceptable nor permittable, no bottlenecks were ultimately identified that could be recommended for removal. Greater study may be warranted regarding the feasibility of bottleneck removal in project-specific locations. Additional supporting information for the bottleneck evaluation is provided in **Appendix E**.

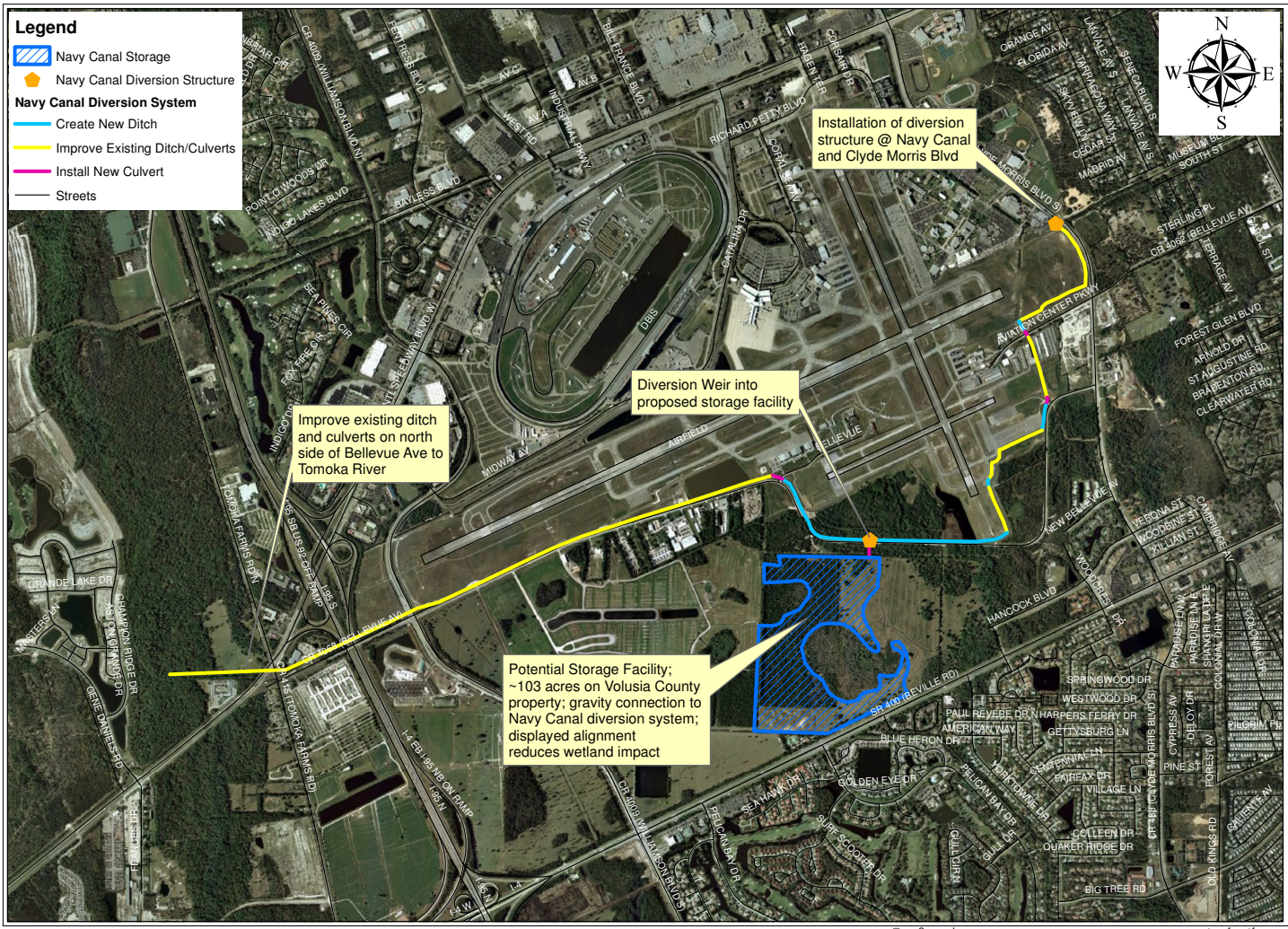

Figure 3-8
Nova Canal Flood Control and
Integrated Water Resources Program
Navy Canal Diversion Project Component

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(EVRWA)

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3.2.9 Buschman Pond Project Component

The Buschman Pond site was chosen for the alternative Halifax Canal Pump Station. This project component includes a 300-cfs pump station, a 4,800-foot force main (8-foot diameter) along Commonwealth Boulevard to the Halifax River, the existing 3.2-acre Buschman Pond and additional storage in the basin. The parameters for this component are summarized in Table 3-1. The layout for this component is shown in **Figure 3-9**.

3.3 Alternatives Descriptions and Development

In order to determine the incremental and comprehensive benefits of the potential project components discussed above, seven alternatives were developed that consider the project components in various combinations. The alternatives are described below.

3.3.1 Alternative 1

Alternative 1 includes the base improvements that were originally evaluated in the Phase 1 Study (see Section 2). This alternative includes pump stations (pump only configuration), ponds, and tide gates at each of the three existing outfall canals (LPGA Canal at Centennial Park, Reed Canal, and Halifax Canal) in their original configurations.

3.3.2 Alternative 2

Alternative 2 considers the existing system with removal of the culvert, bridge, and canal bottlenecks from the three canal systems (LPGA, Reed, and Halifax) as well as the Nova Canal. Since bottleneck removal was not found to be feasible, this alternative is not further considered.

3.3.3 Alternative 3

Alternative 3 considers the existing system with the Navy Canal Diversion.

3.3.4 Alternative 4

Alternative 4 includes four new pump station outfalls to the Halifax River to be located in the Laurel Creek area, the North Street Pond, the Samuel Butts Pond, and the Buschman Pond (serving the Halifax Canal).

3.3.5 Alternative 5

Alternative 5 combines Alternatives 3 and 4. This alternative includes the Navy Canal Diversion as well as four new pump stations outfalls to the Halifax River (at Laurel Creek, North Street Pond, Samuel Butts Pond and Buschman Pond).

Figure 3-9
Nova Canal Flood Control and
Integrated Water Resources Program
Buschman Pond Project Component

East Volusia
Regional Water Authority
(EVRWA)

CDM

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3.3.6 Alternative 6

Alternative 6 combines Alternatives 1, 2, 3, and 4 and includes all project components. The pump stations at the LPGA Canal (Centennial Park), Reed Canal, and Halifax Canal are considered in their original configurations as "pump only" systems.

3.3.7 Alternative 7

Alternative 7 combines the modified configuration of Alternative 1 with Alternatives 2, 3, and 4 and includes all project components (except the original pump station at the Halifax Canal). The modified Alternative 1 configurations includes pump stations with force mains located on the LPGA (Sica Hall site) and Reed Canals.

3.4 Alternatives Evaluation

3.4.1 Model Extension

In order to provide an expanded stormwater analysis of the study area for existing and alternative conditions, the Phase 1 SWMM5 was extended to the Laurel, Thompson, and Strickland Creek systems to the north (as previously modeled for the City of Ormond Beach). The updated model was also extended south to include the primary system from the Halifax Canal outlet to the railroad crossing downstream of Nova Road. Runoff from the tributary area that contributes to this area south of the Halifax Canal outfall (generally areas south of Nova Road and Dunlawton Avenue) is accounted for in the updated SWMM5 by using time-flow hydrographs as previously modeled in ICPR by QLH.

Model parameters used in the analysis of existing and alternative conditions related to design rainfall depths, duration and distribution, and downstream tidal boundary conditions are identical to those developed in Phase 1 and are further described in Section 2.

3.4.2 Model Results

Model results under existing and alternatives conditions for the 25- and 100-year, 24-hour design storms and the May 2009 storm event are presented in **Appendix F**. Using modeled flood stages and LiDAR topographic information, colorized flood inundation maps were developed for the May 2009 storm, 100-year 24-hour storm, and 25-year 24-hour storm for the existing stormwater infrastructure and with the proposed infrastructure improvements for each alternative. These maps are presented in **Appendix G**.

3.4.3 Alternatives Cost Estimates

Conceptual designs and cost estimates were developed for all of the alternatives except Alternative 2 (removal of bottlenecks in the LPGA, Reed, Halifax, and Nova Canals) since no bottleneck removals were identified to be beneficial. A summary of preliminary opinions of conceptual project costs (construction and enginering) for the alternatives are presented in **Table 3-2**. Detailed conceptual project costs for each of the project components are included in **Appendix H**.

Table 3-2: Preliminary Opinion of Conceptual Cost of Project Alternatives

Facility	Conceptual Cost
Alternative 1	
LPGA Canal at Centennial Park (Pump Only)	$10,649,000
Reed Canal (Pump Only)	$12,966,000
Halifax Canal-Summitt	$5,694,000
Total Alternative 1	**$29,309,000**
Alternative 2	
Bottleneck Removal Only	N/A
Alternative 3	
Navy Canal Diversion	**$10,112,000**
Alternative 4	
Ormond Beach Laurel Creek	$14,980,000
Daytona Beach North Street Park	$31,951,000
Daytona Beach Samuel Butts Park	$30,008,000
Port Orange Buschman Park	$21,383,000
Total Alternative 4	**$98,322,000**
Alternative 5	
Bottleneck Removal	N/A
Ormond Beach Laurel Creek	$14,980,000
Daytona Beach North Street Park	$31,951,000
Daytona Beach Samuel Butts Park	$30,008,000
Port Orange Buschman Park	$21,383,000
Navy Canal Diversion	$10,112,000
Total Alternative 5	**$108,434,000**
Alternative 6	
Alternative 1	$29,309,000
Bottleneck Removal	N/A
Ormond Beach Laurel Creek	$14,980,000
Daytona Beach North Street Park	$31,951,000
Daytona Beach Samuel Butts Park	$30,008,000
Port Orange Buschman Park	$21,383,000
Navy Canal Diversion	$10,112,000
Total Alternative 6	**$137, 743,000**
Alternative 7	
LPGA Canal Pump Station with Force Main (at Sica Hall)	$11,193,000
Reed Canal Pump Station with Force Main	$11,448,000
Bottleneck Removal	N/A
Ormond Beach Laurel Creek	$14,980,000
Daytona Beach North Street Park	$31,951,000
Daytona Beach Samuel Butts Park	$30,008,000
Port Orange Buschman Park	$21,383,000
Navy Canal Diversion	$10,112,000
Total Alternative 7	**$131,075,000**

3.4.4 Flood Damages and Flood Control Benefits

Assessment of costs and benefits is necessary to determine which alternative provides the best flood mitigation investment for the JPA Partners and to demonstrate benefit versus cost for potential Federal and/or State funding support. For purposes of assessing flood control benefits of the alternatives, the project team and JPA Technical Advisory Group agreed that empirical evidence and damage assessments from the May 2009 event suggests that flood inundation in excess of one foot above ground surface on improved parcels is a good indicator of when significant structural damage begins to accrue.

Volusia County Property Appraiser data on improved property within the watershed were used to eliminate undeveloped properties from the inundated acreage for purposes of estimating flood damage reduction benefits for each alternative and for allocation of flood control benefits among the JPA Partners. Alternative cost estimates, flood inundation mapping, and predicted flood damage reduction benefits for each alternative were presented to the JPA Technical Advisory Group on May 10, 2010 and May 21, 2010. Estimated flood inundation and damages under existing and alternatives conditions for the design storms as well as the May 2009 event are presented in **Appendix I.**

3.4.5 Increased System Storage

Recognizing that the May 2009 storm was greater than a 300-year event and using this storm as a basis for design establishes the need for a very large and costly infrastructure upgrade, the JPA Technical Advisory Group suggested that a combination of property purchases for construction of increased system storage, in combination with smaller pump stations and conveyance facilities might yield greater overall benefits for less costs. While not incorporated into any alternative, additional work was performed by CDM/QLH to identify logically contiguous flooded areas within each JPA Partner's jurisdiction and the peak storage that would be necessary to fully capture the flood volumes from the 100-year 24-hour storm. These volumes should be viewed as guidance for the upper limit of beneficial storage needed to prevent ponding of water within the delineated areas during the 100-year 24-hour storm. The actual storage volumes needed to prevent structural damage within the delineated areas would be expected to be less than those reported, given the empirical evidence suggesting that widespread damage does not begin to accrue until flood stages exceed one foot above ground surface.

Figures provided in **Appendix J** show the estimated 100-year 24-hour flood volumes based upon the modeling performed for each of JPA Partner jurisdictions. If politically and financially feasible, purchase of low-lying properties within these areas for construction of additional storage facilities could significantly improve the benefit-cost relationship by removing the structure from the floodplain and reducing the size and cost of the pumping and conveyance facilities to discharge flows into the Halifax River.

3.5 Conclusions

Flooding within the watershed from the May 2009 storm (310 year event) is not fully eliminated by any of the seven alternatives evaluated. As discussed earlier and in the JPA presentations, the Nova Canal watershed contains significant portions of historic wetland floodplain that have been developed since the original US Department of the Interior reclamation project in the 1920s. Many buildings were constructed on very low ground and the pump stations required would not be constructable within the limits of available rights-of-way for the major canals without significant property acquisition and associated storage. However, significant flood control benefits can be provided by several of the proposed alternatives as indicated by the model results.

The pump stations, ponds, and weir-gates also offer opportunities for water quality benefits and alternative water supply use. To various degrees, the five proposed pump, pond, and weir-gate alternatives offer the following benefits:

1. Reduced peak stages;

2. Reduced inundated areas

3. Shortened flood durations;

4. Capability to pump down the system in advance of an approaching storm;

5. Prevention of tidal back surge for more extreme tidal conditions (e.g., Hurricane Dora or King); and

6. Capture of stormwater before release to tide to allow future design modifications to pump flow west for water supply and/or additional water quality benefits.

Based on review of model results, estimated flood damage reduction benefits and construction cost estimates, Alternative 4 was selected by the project team and the JPA Technical Advisory Group as the alternative with the best benefit-cost ratio for presentation to the JPA Board. Alternative 4 components are presented on **Figure 3-10** and the estimated construction costs are provided in Table 3-2. Flood inundation maps associated with the May 2009 storm for the existing stormwater management infrastructure and after implementation of Alternative 4 are presented in Appendix G.

Table 3-3 shows the computation of the Alternative 4 flood damage reduction benefits for the May 2009 storm. In summary, Alternative 4 is estimated to cost $98 million (plus land) and reduce flood damages from $52 million to $26 million for the May 2009 storm alone. Overall project life flood damage reduction includes other potential events (e.g., mean annual 5, 10, 25, and 100-year) and is estimated to be approximately $111 million as shown in **Table 3-4**, which considers the probability of storm event damages over the 50 year design life for the proposed facilities (flood damage reduction for multiple storms in 50 years).

0 4,500 9,000 18,000 Feet

Figure 3-10
Nova Canal Flood Control and
Integrated Water Resources Program
Alternative 4 Components

East Volusia
Regional Water Authority
(EVRWA)

CDM

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Table 3-3: May 2009 Flooding Extents by Component Area for Alternative 4

Location	Area Flooded >1 ft (ac)			Potential Flood Damage (>1ft Flooding) ($)		Potential Flood Damage Reduction ($)	
	Existing	Alternative 4	Reduction (%)	Existing	Alternative 4	Existing	Alternative 4
Laurel Creek Pump	51.7	29.7	43%	$2,200,000	$1,200,000	--	$1,000,000
North Street Pump	102.5	40.7	60%	$4,300,000	$1,700,000	--	$2,600,000
Samuel Butts Pump	245.6	66.0	73%	$10,300,000	$2,800,000	--	$7,500,000
Buschman Pump	80.2	50.8	37%	$3,400,000	$2,100,000	--	$1,300,000
Component Total	480.0	187.2	61%	$20,200,000	$7,800,000	$ --	$12,400,000
Overall Study Area Total	**1,231.0**	**623.4**	**49%**	**$51,700,000**	**$26,200,000**	**$ --**	**$25,500,000**

Basis for Estimate:

1. Homes per acre	2
2. Flood Damage per home	$21,000
3. Flood Damage per acre	$42,000
4. Developed area (structures)	100%

Table 3-4: Alternative 4 – Laurel Creek, North Street, Samuel Butts, & Buschman Pumps

Event (Yr)	Rainfall (inches)	Event (Probability)	Potential Flood Damage Reduction ($)	Annualized Flood Damage Reduction ($)	Design Life	Project Life Flood Damage Reduction ($)	Rectangle Representing Approximation
310	20-27	0.003	$25,500,000	$136,000	50	$6,800,000	1
100	13.0	0.010	$14,700,000	$347,000	50	$17,350,000	2
25	9.5	0.040	$8,400,000	$438,000	50	$21,900,000	3
10	8.0	0.100	$6,200,000	$525,000	50	$26,250,000	4
5	6.5	0.200	$4,300,000	$768,000	50	$38,400,000	5
2.33	5.2	0.429	$2,400,000	**	50	**	**
					Total	**$110,700,000**	

**Area accounted for in midpoint approximation of rectangle 5

Use of the May 2009 storm as a level of service objective establishes a need for very large and costly pumping and conveyance systems. These facilities will also provide flood control benefits for all smaller flood-producing storms. These additional benefits could be further estimated and refined to strengthen eligibility for federal funding. Typically, the cumulative benefit-cost ratio must exceed 1.0 to qualify for federal funding. Alternative 4 satisfies this requirement, and Table 3-4 and **Figure 3-11** show the estimated flood control benefits that should accrue from implementation of Alternative 4. It is important to note that these estimates of cumulative project benefits do not yet include potential alternative water supply benefits, water quality benefits, or ecosystem restoration benefits that may result from these improvements. Therefore the benefit-cost ratio would likely be higher with water supply and water quality benefits considered.

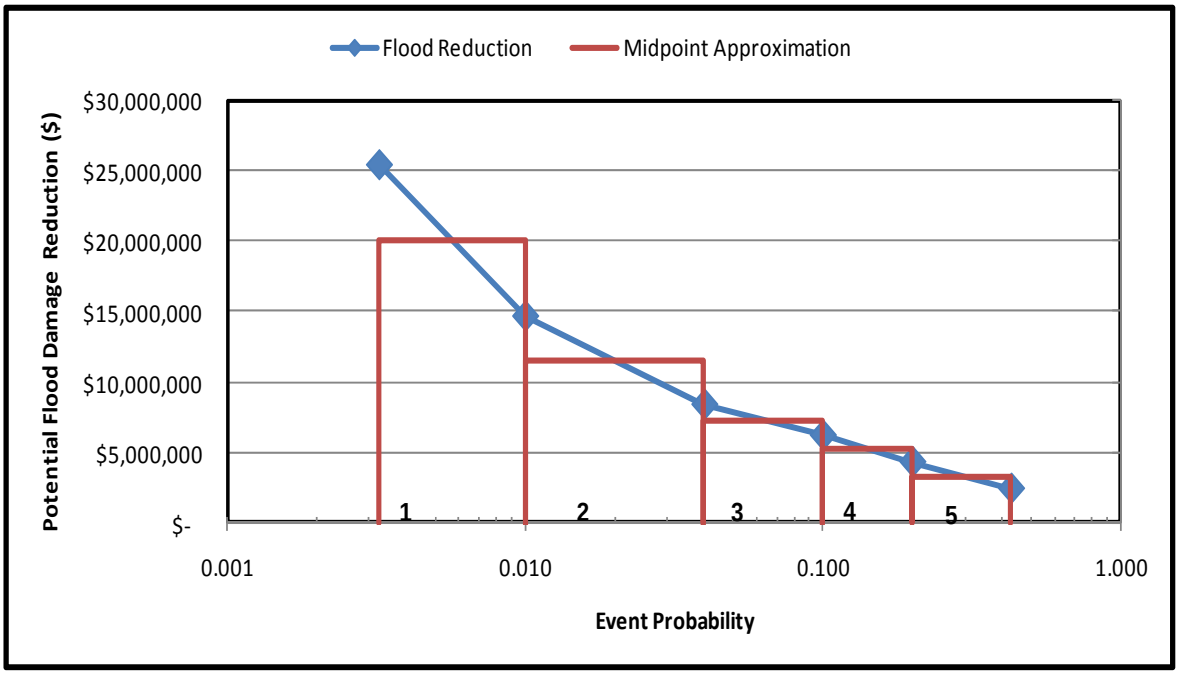


Figure 3-11 – Alternative 4 – Potential Flood Damage Reduction

Constructing additional storage within low-lying properties in the study area is also an effective means of reducing flood stages as well as removing flood-prone properties from the floodplain. When used in combination, creating additional storage also provides an opportunity to downsize the pumping and conveyance facilities required to provide substantial flood control.

Section 4
Recommendations

Based on the results indicated within this report, CDM/QLH recommend that the JPA Partners move forward with Alternative 4 under a prioritized implementation schedule as funding becomes available as follows:

1. Obtain finished floor elevations and map locations for all structures that incurred damage within the study area. This is important for verification of the actual and projected flood damages and flood damage reduction for the project components;

2. Continue to coordinate with FEMA as a group on the Flood Insurance Study (FIS) and Digital Flood Insurance Rate Map (DFIRM) updates;

3. Continue to pursue grant and loan funding individually and as a group to facilitate project implementation;

4. Confirm and update stormwater design standards consistently across the watershed as noted below;

5. Purchase land for Alternative 4 components and supplemental storage and treatment, where feasible, to optimize the storage and pumping relationships such that the maximum benefit-cost ratio can be achieved for cost-effective implementation and to position for federal and other funding;

6. Construct supplemental storage on acquired properties;

7. Implement pump stations at:

    i. Ormond Beach Laurel Creek
    ii. Daytona Beach North Street
    iii. Daytona Beach Samuel Butts Park
    iv. Port Orange Buschman Park

8. Consider implementing the Navy Canal Diversion Project (Alternative 5) in a subsequent phase for alternative water supply as well as flood control for smaller storm events (e.g., significant benefits for the 25-year storm); and

9. Consider implementing the tide weir-gates at the LPGA, Reed, and Halifax Canal outfalls as funding becomes available. These provide benefits beyond this flood reduction project for potential extreme high-tide backflow control, alternative water supply coordination with the cities, and potential treatment credits with SJRWMD. Also, consider the potential need for implementation of other backflow prevention devices for connected systems that may be pumped

down (in advance of storms and/or for alternative water supply-reuse harvesting).

Other upstream improvements of new and existing stormwater infrastructure would improve overall system capacity and connectivity. Improvements such as localized storage facilities and flood control structures would capture and attenuate peak flows and provide water quality and groundwater recharge benefits. In general, the localized project objectives should be to increase storage and treatment, decrease flood stages and flows for flood-prone areas, increase conveyance to storage and reuse areas where possible (without offsite stage increases), and increase recharge. Ultimately the overall system should be linked to the water supply and stormwater harvesting-reuse options being considered by the JPA Partners.

Specific near-term recommendations for each JPA Partner are provided below. The sequence of implementation listed in this report is the recommended necessary sequence for improvements (pre-requisite to others).

All Stakeholders

- Consider the implementation of additional storage for low lying parcels as shown in Appendix J as funding becomes available; and
- Confirm existing or implement updated stormwater management standards that regulate:
    - Floodplain storage – no net loss for 100-year storage (based on FEMA and/or current Nova-Halifax Canal Watershed model results, whichever is greater);
    - Volume controls – development or redevelopment should maintain the rate and volume of discharge equal to pre-development conditions for the 25- and 100-year, 24-hour storms for discharges to the Nova-Halifax Canal watershed system; and
    - Recharge – development or re-development on NRCS Hydrologic Soil Group (HSG) A soils should retain and infiltrate the first 1 inch of rainfall, and the first 0.5 inches of rainfall for HSG B soils.

Volusia County

- Proceed with Rio Way Subdivision acquisition and pond construction;
- Complete the Daytona Beach International Airport Stormwater Master Plan to evaluate options for Navy Canal and B-19 flow diversion and storage;

- Continue to coordinate with FDOT, Daytona Beach, South Daytona, and Port Orange on the Navy Canal Diversion project;
- Consider implementing the tide weir-gates at the LPGA, Reed, and Halifax Canal outfalls as funding becomes available. These provide benefits beyond this flood reduction project for potential extreme high-tide backflow control, alternative water supply coordination with the cities, and potential treatment credits with SJRWMD; and
- Seek additional public assistance funding through FEMA and other agencies (e.g., HUD, USACE) for the County and on behalf of the JPA Stakeholders.

Ormond Beach

- Explore treatment credits with the SJRWMD for existing borrow pit ponds in the Laurel Creek area (may need to purchase land for treatment depending on this credit);
- Continue to seek funding for the Central Park Flood Mitigation Project, Laurel Creek pump station, and force main outfall for the City and in coordination with the JPA Stakeholders;
- Implement the Central Park Flood Mitigation Project; and
- Acquire or regulate additional undeveloped properties around Central Park to prevent future development impacts (no increase in runoff volume or loss of existing floodplain storage).

Holly Hill

- Construct additional storage (approximately 11 acres) at the Holly Hill Middle School property (when it is phased out) and connect the storage with the Railroad and LPGA Canals as practicable;
- Consider implementing the tide weir-gate at the LPGA Canal outfall in coordination with Volusia County as funding becomes available. This weir-gate would provide benefits beyond this flood reduction project for potential extreme high-tide backflow control, alternative water supply coordination, and potential treatment credits with SJRWMD; and
- Continue to seek funding in coordination with the JPA Stakeholders.

Daytona Beach

- Continue to seek funding for the Samuel Butts Park and North Street Pond Projects for the City and in coordination with the JPA Stakeholders;

- Continue with development of Samuel Butts Park and North Street Pond projects as described in this report;
- Continue to work with FDOT to incorporate the two Nova Road connections and outfalls through these facilities (after all storage is implemented); and
- Continue to coordinate with Volusia County, FDOT, South Daytona, and Port Orange on the Navy Canal Diversion project.

South Daytona

- Continue to seek funding for project in coordination with the JPA Stakeholders;
- Purchase CEMEX property in South Daytona and construct an offline storage and treatment pond in this location;
- Coordinate with Volusia County, Daytona Beach, Port Orange, and FDOT on the Navy Canal Diversion Project; and
- Consider implementing the tide weir-gate at the Reed Canal outfall (US-1) in coordination with Volusia County and FDOT as funding becomes available. This weir-gate would provide benefits beyond this flood reduction project for potential extreme high-tide backflow control, alternative water supply coordination, and potential treatment credits with SJRWMD (in conjunction with the storage at the CEMEX site). If this is implemented, consider piping the Stevens Canal force main outfall to east of US-1.

Port Orange

- Continue to seek funding for project in coordination with the JPA Stakeholders;
- Proceed with Buschman Pond, pump station, and force main outfall project;
- Proceed with expansion of in-system storage projects through acquisition of low-lying properties that are amenable to construction of new storage ponds;
- Consider implementing the tide weir-gate and culvert flex valves at the Halifax Canal outfall (Nova Road crossing) in coordination with Volusia County and FDOT as funding becomes available. This weir-gate and flex valves would provide benefits beyond this flood reduction project for potential extreme high-tide backflow control, alternative water supply, and potential treatment credits with SJRWMD; and
- Continue to coordinate with Volusia County, FDOT, South Daytona, and Daytona Beach on the Navy Canal Diversion project.

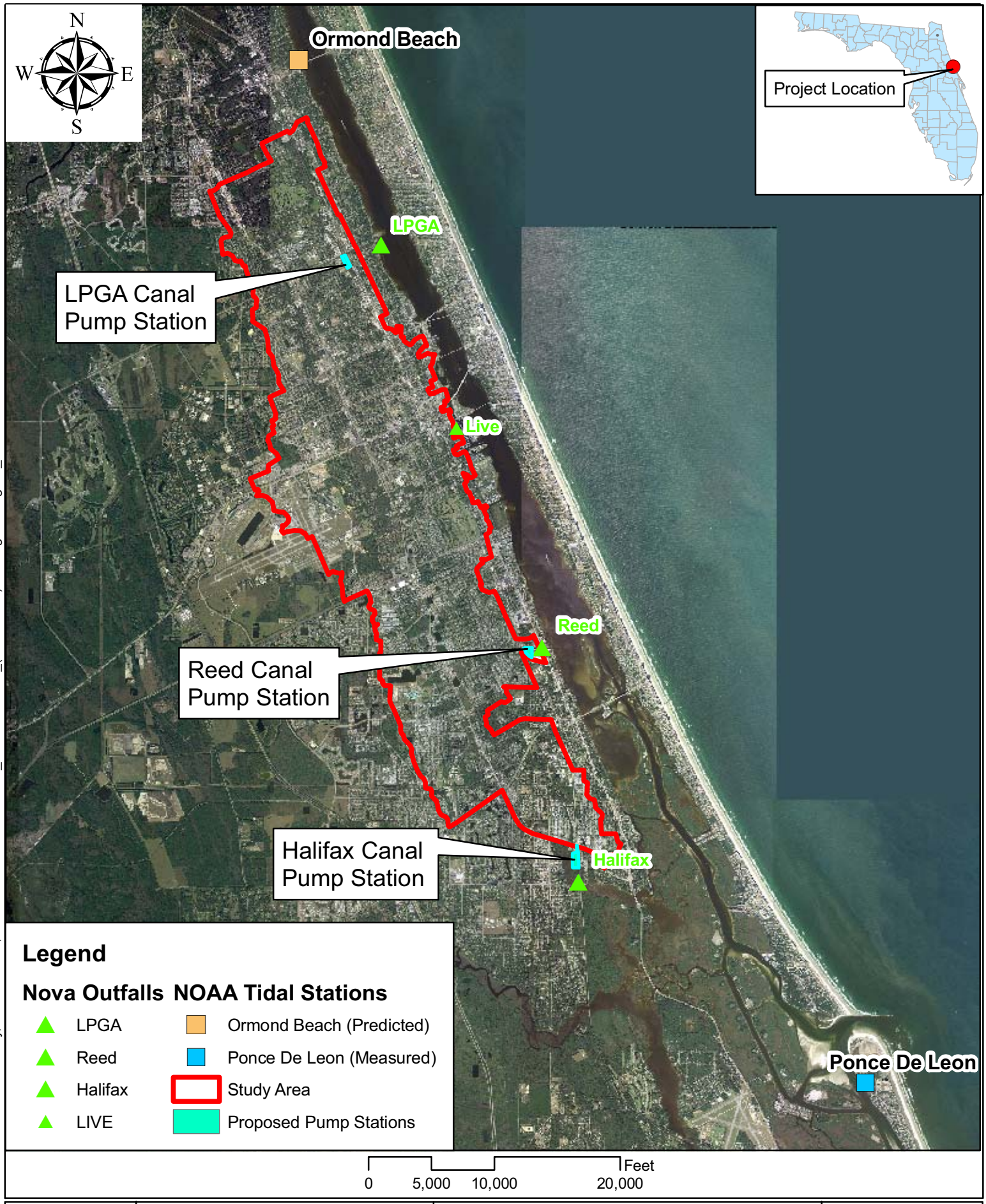
FDOT

- Consider addition of storage and treatment for all FDOT projects in the watershed including landscape and intersection improvements;
- Coordinate with and assist Daytona Beach on the Samuel Butts and North Street facility connections;
- Coordinate with and assist Volusia County, South Daytona, and Port Orange on the potential implementation of the Reed Canal (US-1) and Halifax Canal (Nova Road) tide weir-gates and flex valves as funding becomes available. These weir-gates and flex valves would provide benefits beyond this flood reduction project for potential extreme high-tide backflow control, alternative water supply, and potential treatment credits with SJRWMD;
- Coordinate with and assist Volusia County, Daytona Beach, Port Orange, and South Daytona on the potential Navy Canal Diversion project; and
- Continue to pursue and support grant funding opportunities with the JPA Stakeholders.

As soon as decisions are made regarding property acquisition and supplemental storage, model refinements should be made and designs should proceed to at least a 30 percent stage to further refine cost estimates and identify utility coordination needs and permitting requirements. More advanced designs should be completed, where practical, so that projects are as close to "shovel-ready" as possible when funding opportunities arise.

Appendix A

Tidal Measurements, Predictions, and Interpolations



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CDM

East Volusia
Regional Water Authority
(EVRWA)

Figure A-1
Nova Canal Flood Control and
Integrated Water Resources Program
Tidal Stations

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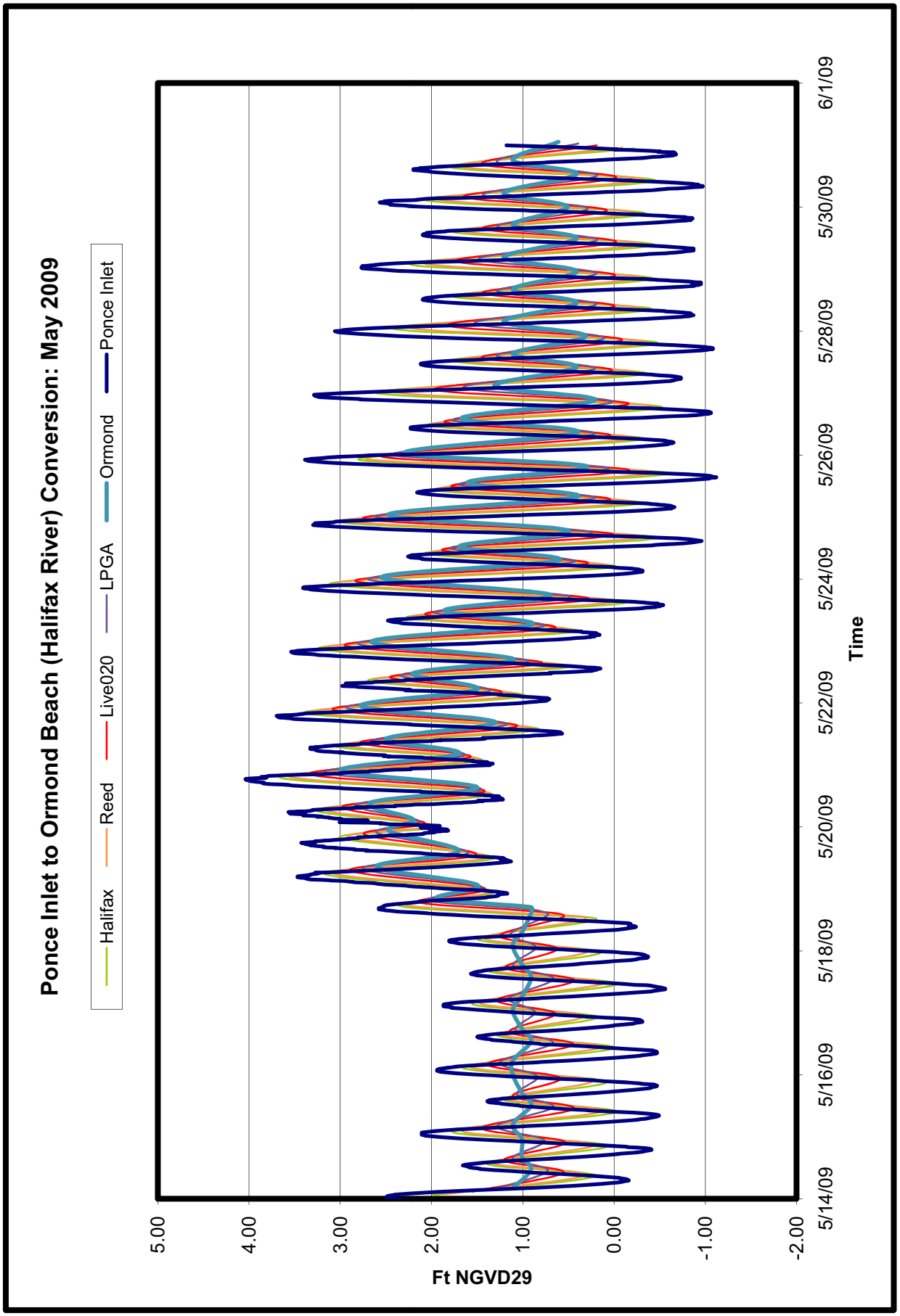
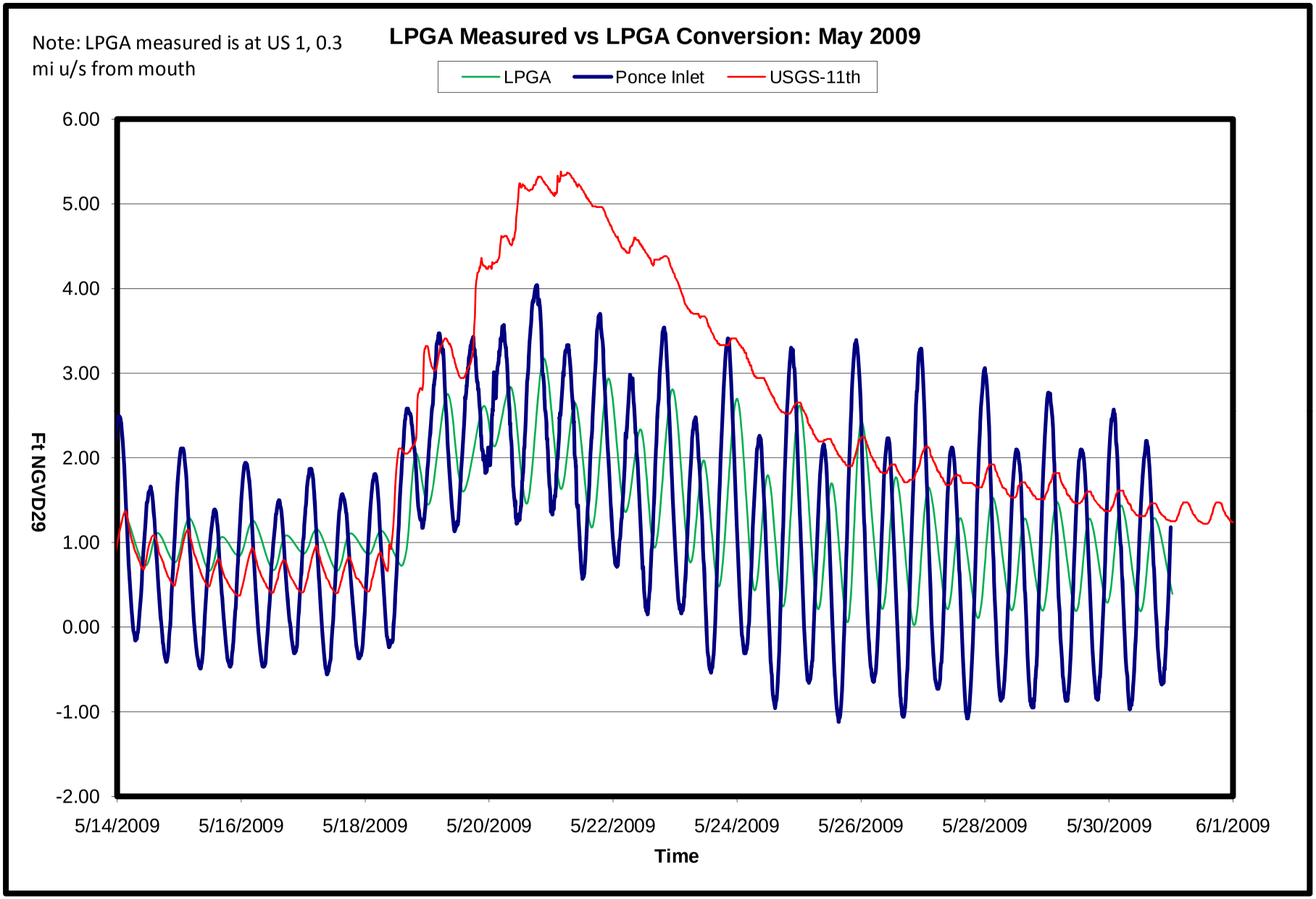


Figure A-2 Measured, Predicted, and Interpolated Tidal Values


Note: LPGA measured is at US 1, 0.3 mi u/s from mouth
LPGA Measured vs LPGA Conversion: May 2009
LPGA
Ponce Inlet
USGS-11th
6.00
5.00
4.00
3.00
2.00
1.00
0.00
-1.00
-2.00
Ft NGVD29
5/14/2009
5/16/2009
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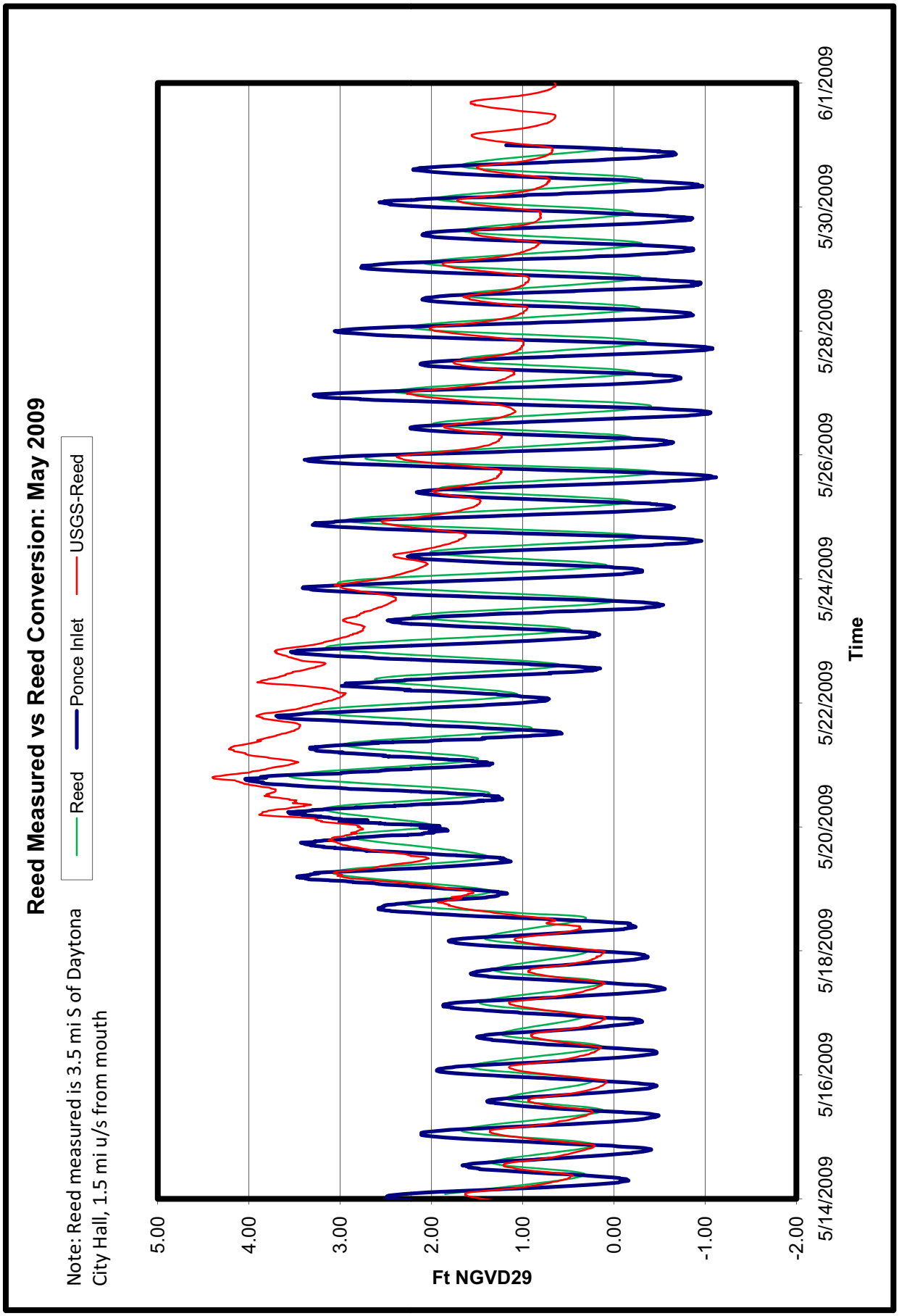


Figure A-4 Measured vs Predicted Tidal Values - Reed Canal

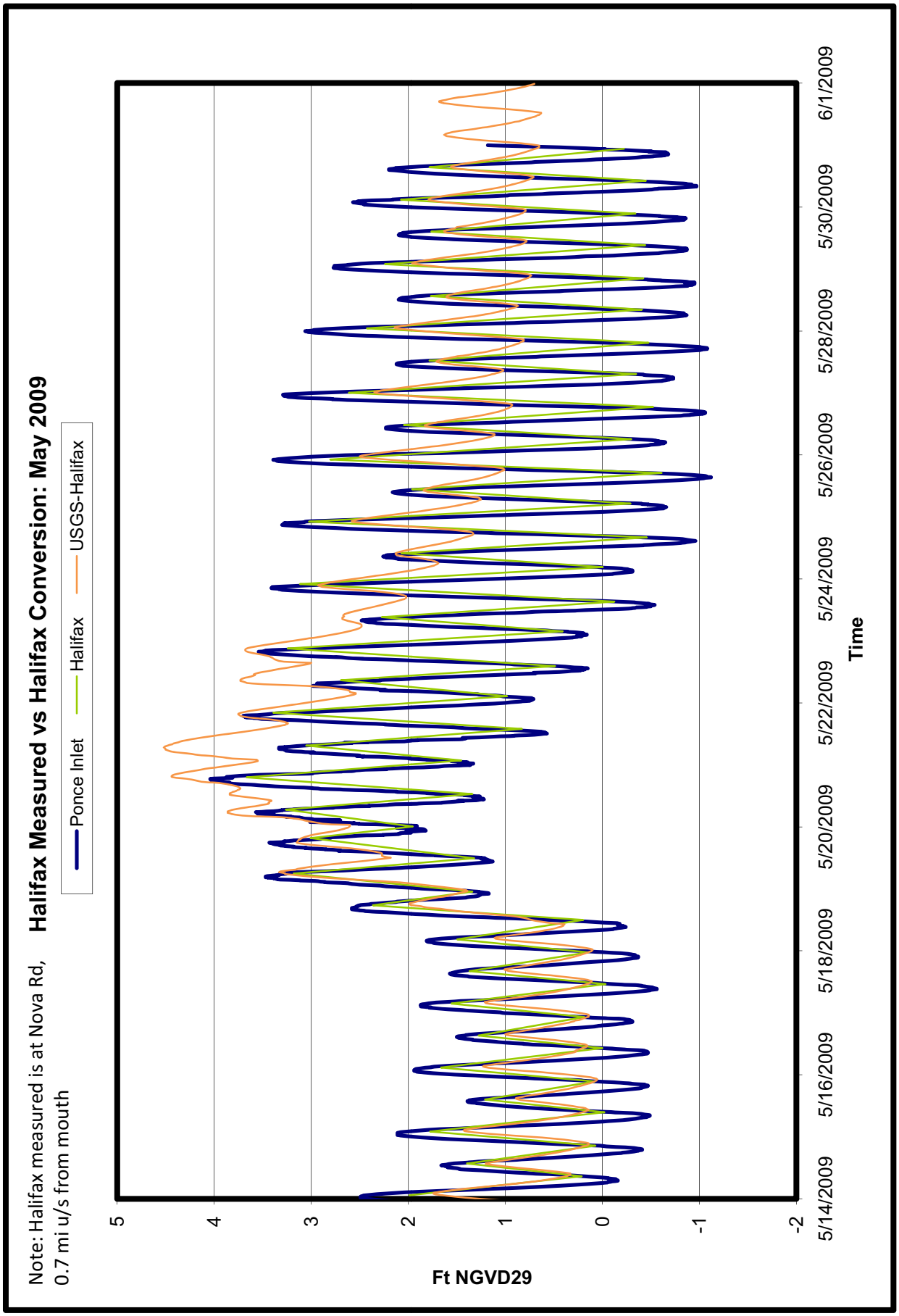


Figure A-5 Measured vs Predicted Tidal Values - Halifax Canal

Appendix B

Phase 1
Peak Stage Summary

Nova Canal Flood Control and Integrated Water Resources Project
Project Alternative 1 - Peak Stages for 24-hour Design Storms
LPGA Canal System

SJRWMD 24-hr Design Storm with 1-Year Stillwater															
				Peak Stages (ft NGVD)											
Location	Jurisdiction	Model Node	Indicator Elevation (ft NGVD)	Existing Mean Annual	Alt. 1 Mean Annual	Change (ft)	Existing 10-Year	Alt. 1 10-Year	Change (ft)	Existing 25-Year	Alt. 1 25-Year	Change (ft)	Existing 100-Year	Alt. 1 100-Year	Change (ft)
11th St Canal Outfall	HH	808	-	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Upstream of Riverside Dr	HH	806	4.6	2.4	2.5	0.1	2.6	2.6	0.0	2.7	2.7	0.0	2.9	2.9	0.0
Upstream of Daytona Road	HH	804	12.3	3.3	3.6	0.3	3.8	3.8	0.0	3.9	3.9	0.0	4.2	4.2	0.0
Upstream of US 1 (Ridegwood)	HH	802	11.7	3.8	4.2	0.4	4.4	4.4	0.0	4.6	4.6	0.0	5.1	5.0	0.0
11th St Canal at Railroad Ditch and Southeast Canal	HH	8	6.7	5.3	4.5	-0.8	5.9	5.7	-0.2	6.2	6.0	-0.1	6.6	6.6	0.0
Upstream of Alta Drive	HH	1101	8.7	5.9	5.2	-0.6	6.7	6.6	-0.1	7.1	7.0	-0.1	7.8	7.8	0.0
Upstream of Center Avenue	HH	1402	8.6	6.3	5.9	-0.4	7.1	7.0	-0.1	7.5	7.4	-0.1	8.2	8.2	0.0
11th St Canal at Nova Road	HH	1401	10.9	7.2	7.1	-0.1	7.9	7.8	0.0	8.2	8.1	0.0	8.8	8.8	0.0

SJRWMD 24-hr Design Storm with 100-Year Stillwater															
				Peak Stages (ft NGVD)											
Location	Jurisdiction	Model Node	Indicator Elevation (ft NGVD)	Existing Mean Annual	Alt. 1 Mean Annual	Change (ft)	Existing 10-Year	Alt. 1 10-Year	Change (ft)	Existing 25-Year	Alt. 1 25-Year	Change (ft)	Existing 100-Year	Alt. 1 100-Year	Change (ft)
11th St Canal Outfall	HH	808	-	5.0	5.0	0.0	5.0	5.0	0.0	5.0	5.0	0.0	5.0	5.0	0.0
Upstream of Riverside Dr	HH	806	4.6	5.1	5.4	0.3	5.2	5.4	0.2	5.2	5.4	0.2	5.3	5.4	0.1
Upstream of Daytona Road	HH	804	12.3	5.3	5.5	0.2	5.4	5.5	0.1	5.5	5.5	0.0	5.6	5.5	0.0
Upstream of US 1 (Ridegwood)	HH	802	11.7	5.5	5.7	0.2	5.7	5.7	0.0	5.9	5.8	0.0	6.1	6.0	0.0
11th St Canal at Railroad Ditch and Southeast Canal	HH	8	6.7	6.1	5.6	-0.5	6.5	6.3	-0.2	6.7	6.5	-0.2	7.0	6.9	-0.1
Upstream of Alta Drive	HH	1101	8.7	6.6	6.1	-0.4	7.2	7.0	-0.2	7.5	7.3	-0.2	8.1	8.0	-0.1
Upstream of Center Avenue	HH	1402	8.6	6.8	6.5	-0.3	7.5	7.3	-0.2	7.8	7.7	-0.1	8.4	8.3	-0.1
11th St Canal at Nova Road	HH	1401	10.9	7.4	7.2	-0.2	8.0	7.9	-0.1	8.3	8.2	-0.1	8.9	8.9	-0.1

HH = Holly Hill

Nova Canal Flood Control and Integrated Water Resources Project
Project Alternative 1 - Peak Stages for 24-hour Design Storms
LPGA Canal Branch Systems

SJRWMD 24-hr Design Storm with 1-Year Stillwater															
				Peak Stages (ft NGVD)											
Location	Jurisdiction	Model Node	Indicator Elevation (ft NGVD)	Existing Mean Annual	Alt. 1 Mean Annual	Change (ft)	Existing 10-Year	Alt. 1 10-Year	Change (ft)	Existing 25-Year	Alt. 1 25-Year	Change (ft)	Existing 100-Year	Alt. 1 100-Year	Change (ft)
Railroad Ditch at Walker	HH	604	5.2	5.3	4.6	-0.7	5.9	5.7	-0.2	6.2	6.1	-0.1	6.7	6.6	-0.1
Railroad Ditch at Flomich	HH	6	5.9	5.3	4.9	-0.5	5.9	5.7	-0.2	6.2	6.1	-0.1	6.7	6.6	-0.1
Railroad Ditch headwater (Hand Ave)	OB	1	5.4	5.3	4.7	-0.6	5.9	5.7	-0.2	6.2	6.1	-0.1	6.7	6.6	-0.1
Southeast Canal at 10th St	HH	1301	5.5	5.5	4.7	-0.8	6.2	6.0	-0.3	6.5	6.3	-0.2	7.0	6.9	-0.1
Southeast Canal at 8th St	HH	1603	6.5	5.9	5.5	-0.4	6.7	6.5	-0.2	7.0	6.8	-0.2	7.5	7.4	-0.1
Southeast Canal at 6th St	HH	1601	6.4	6.1	5.9	-0.1	6.7	6.6	-0.2	7.0	6.9	-0.1	7.5	7.4	-0.1
Southeast Canal at 3rd St	HH	2003	6.7	6.2	6.1	-0.1	6.8	6.7	-0.1	7.1	7.0	-0.1	7.6	7.5	-0.1
Southeast Canal at Mason	DB	26	7.5	6.4	6.4	0.0	7.0	6.9	0.0	7.2	7.2	0.0	7.6	7.6	0.0
Northwest Canal at 13th St	HH	9	8.4	7.2	7.1	-0.1	7.9	7.9	0.0	8.3	8.2	0.0	8.9	8.9	0.0
Northwest Canal at 15th St	HH	402	7.6	7.2	7.2	0.0	7.9	7.9	0.0	8.2	8.2	0.0	8.7	8.7	0.0
Northwest Canal at Flomich	HH	4	7.9	7.3	7.2	0.0	7.9	7.9	0.0	8.2	8.2	0.0	8.7	8.7	0.0
Northwest Canal upstream of Alabama; Calle Grande Ditch headwater (Arroyo Blvd)	HH	3	7.5	7.4	7.3	0.0	8.0	7.9	0.0	8.2	8.2	0.0	8.7	8.6	0.0

SJRWMD 24-hr Design Storm with 100-Year Stillwater															
				Peak Stages (ft NGVD)											
Location	Jurisdiction	Model Node	Indicator Elevation (ft NGVD)	Existing Mean Annual	Alt. 1 Mean Annual	Change (ft)	Existing 10-Year	Alt. 1 10-Year	Change (ft)	Existing 25-Year	Alt. 1 25-Year	Change (ft)	Existing 100-Year	Alt. 1 100-Year	Change (ft)
Railroad Ditch at Walker	HH	604	5.2	6.1	5.6	-0.5	6.6	6.3	-0.3	6.7	6.5	-0.2	7.0	6.9	-0.1
Railroad Ditch at Flomich	HH	6	5.9	6.1	5.6	-0.5	6.6	6.3	-0.3	6.8	6.5	-0.2	7.0	6.9	-0.1
Railroad Ditch headwater (Hand Ave)	OB	1	5.4	6.1	5.6	-0.5	6.6	6.3	-0.3	6.8	6.5	-0.2	7.0	6.9	-0.1
Southeast Canal at 10th St	HH	1301	5.5	6.3	5.8	-0.5	6.8	6.5	-0.3	7.0	6.8	-0.2	7.4	7.2	-0.1
Southeast Canal at 8th St	HH	1603	6.5	6.6	6.1	-0.4	7.1	6.8	-0.3	7.3	7.1	-0.2	7.8	7.6	-0.1
Southeast Canal at 6th St	HH	1601	6.4	6.6	6.3	-0.3	7.1	6.9	-0.2	7.3	7.1	-0.2	7.8	7.6	-0.2
Southeast Canal at 3rd St	HH	2003	6.7	6.6	6.4	-0.3	7.1	6.9	-0.2	7.3	7.2	-0.2	7.8	7.7	-0.1
Southeast Canal at Mason	DB	26	7.5	6.7	6.6	-0.1	7.2	7.1	-0.1	7.4	7.3	-0.1	7.8	7.7	-0.1
Northwest Canal at 13th St	HH	9	8.4	7.4	7.2	-0.2	8.1	8.0	-0.1	8.4	8.3	-0.1	9.0	8.9	-0.1
Northwest Canal at 15th St	HH	402	7.6	7.4	7.3	-0.1	8.0	7.9	-0.1	8.3	8.2	-0.1	8.8	8.7	0.0
Northwest Canal at Flomich	HH	4	7.9	7.4	7.3	-0.1	8.0	7.9	-0.1	8.3	8.2	-0.1	8.7	8.7	0.0
Northwest Canal upstream of Alabama; Calle Grande Ditch headwater (Arroyo Blvd)	HH	3	7.5	7.5	7.4	-0.1	8.0	8.0	0.0	8.3	8.2	-0.1	8.7	8.7	0.0

DB = Daytona Beach
HH = Holly Hill
OB = Ormond Beach

Nova Canal Flood Control and Integrated Water Resources Project
Project Alternative 1 - Peak Stages for 24-hour Design Storms
Reed Canal System

SJRWMD 24-hr Design Storm with 1-Year Stillwater															
				Peak Stages (ft NGVD)											
Location	**Jurisdiction**	**Model Node**	**Indicator Elevation (ft NGVD)**	**Existing Mean Annual**	**Alt. 1 Mean Annual**	**Change (ft)**	**Existing 10-Year**	**Alt. 1 10-Year**	**Change (ft)**	**Existing 25-Year**	**Alt. 1 25-Year**	**Change (ft)**	**Existing 100-Year**	**Alt. 1 100-Year**	**Change (ft)**
Reed Canal Outfall	SD	12102	-	2.2	2.2	0.0	2.2	2.2	0.0	2.2	2.2	0.0	2.2	2.2	0.0
Upstream of US 1	SD	12101	7.5	2.5	2.9	0.4	2.7	2.9	0.2	2.8	2.9	0.1	3.2	3.1	-0.1
Downstream of RR / Upstream of Proposed Gate	SD	12804	11.5	4.0	3.0	-1.1	4.7	4.6	-0.1	4.9	5.3	0.4	5.4	6.1	0.7
Reed Canal at Stevens Canal	SD	128	8.8	5.2	4.6	-0.6	6.0	5.8	-0.2	6.3	6.4	0.0	7.0	7.2	0.2
Saul Drive	SD	122	9.6	5.9	5.6	-0.4	6.7	6.6	-0.2	7.1	7.1	0.0	7.8	7.9	0.1
Reed Canal at Nova Road	SD	13104	9.2	6.9	6.7	-0.2	7.7	7.6	-0.1	8.1	8.0	-0.1	8.9	8.9	0.0
Downstream end of Stevens Canal	SD	11901	5.4	5.2	4.6	-0.6	6.2	6.0	-0.2	6.5	6.6	0.0	7.3	7.4	0.2
Stevens Canal at Ridge Drive	SD	11001	6.9	5.5	5.1	-0.4	6.6	6.4	-0.1	7.0	6.9	-0.1	7.7	7.8	0.1
Stevens Canal at Big Tree Road	SD	10101	8.6	5.9	5.6	-0.2	7.1	7.0	-0.1	7.5	7.5	0.0	8.3	8.3	0.0
Upstream end of Stevens Canal	SD	101	6.6	6.0	5.9	-0.1	7.3	7.3	0.0	7.7	7.7	0.0	8.5	8.5	0.0

SJRWMD 24-hr Design Storm with 100-Year Stillwater															
				Peak Stages (ft NGVD)											
Location	**Jurisdiction**	**Model Node**	**Indicator Elevation (ft NGVD)**	**Existing Mean Annual**	**Alt. 1 Mean Annual**	**Change (ft)**	**Existing 10-Year**	**Alt. 1 10-Year**	**Change (ft)**	**Existing 25-Year**	**Alt. 1 25-Year**	**Change (ft)**	**Existing 100-Year**	**Alt. 1 100-Year**	**Change (ft)**
Reed Canal Outfall	SD	12102	-	6.0	6.0	0.0	6.0	6.0	0.0	6.0	6.0	0.0	6.0	6.0	0.0
Upstream of US 1	SD	12101	7.5	6.2	6.5	0.3	6.4	6.4	0.1	6.4	6.4	0.0	6.6	6.6	-0.1
Downstream of RR / Upstream of Proposed Gate	SD	12804	11.5	6.4	6.4	0.1	6.6	6.4	-0.2	6.7	6.5	-0.2	7.0	6.8	-0.1
Reed Canal at Stevens Canal	SD	128	8.8	6.7	6.2	-0.5	7.2	6.8	-0.4	7.4	7.1	-0.2	7.7	7.6	-0.1
Saul Drive	SD	122	9.6	7.0	6.1	-0.8	7.5	7.2	-0.4	7.8	7.6	-0.2	8.3	8.1	-0.1
Reed Canal at Nova Road	SD	13104	9.2	7.5	6.9	-0.6	8.2	7.9	-0.3	8.5	8.3	-0.2	9.2	9.1	-0.1
Downstream end of Stevens Canal	SD	11901	5.4	6.7	5.4	-1.3	7.2	6.8	-0.4	7.5	7.2	-0.2	7.8	7.8	-0.1
Stevens Canal at Ridge Drive	SD	11001	6.9	6.7	5.6	-1.1	7.3	7.0	-0.4	7.6	7.4	-0.2	8.3	8.0	-0.3
Stevens Canal at Big Tree Road	SD	10101	8.6	6.8	5.9	-0.9	7.6	7.3	-0.3	7.9	7.7	-0.2	8.6	8.4	-0.2
Upstream end of Stevens Canal	SD	101	6.6	6.9	6.0	-0.9	7.7	7.4	-0.3	8.0	7.8	-0.2	8.7	8.5	-0.2

SD = South Daytona

Nova Canal Flood Control and Integrated Water Resources Project
Project Alternative 1 - Peak Stages for 24-hour Design Storms
Halifax Canal System

SJRWMD 24-hr Design Storm with 1-Year Stillwater															
				Peak Stages (ft NGVD)											
Location	**Jurisdiction**	**Model Node**	**Indicator Elevation (ft NGVD)**	**Existing Mean Annual**	**Alt. 1 Mean Annual**	**Change (ft)**	**Existing 10-Year**	**Alt. 1 10-Year**	**Change (ft)**	**Existing 25-Year**	**Alt. 1 25-Year**	**Change (ft)**	**Existing 100-Year**	**Alt. 1 100-Year**	**Change (ft)**
Outfall	PO	1010	-	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Nova Road d/s	PO	1591	11	3.9	3.5	-0.5	4.4	4.2	-0.2	4.7	4.5	-0.2	5.2	5.1	-0.2
Nova Road u/s	PO	159	11	4.0	3.5	-0.5	4.5	4.3	-0.2	4.7	4.6	-0.2	5.3	5.2	-0.1
Near Jackson Street	PO	150	5.3	4.2	3.8	-0.3	4.8	4.6	-0.2	5.1	5.0	-0.2	5.8	5.7	-0.1
Oak Street	PO	141	6	4.9	4.7	-0.3	5.7	5.6	-0.2	6.0	5.9	-0.1	6.5	6.5	0.0
Powers Avenue	PO	2301HAL	6.6	5.8	5.6	-0.2	6.5	6.5	-0.1	6.7	6.6	0.0	7.0	6.9	0.0
Ryanwood Ave	PO	1381	8.5	6.6	6.4	-0.2	7.8	7.7	-0.1	8.2	8.1	0.0	8.6	8.6	0.0
Nova Road	PO	132	9.1	6.9	6.8	-0.1	7.9	7.9	-0.1	8.3	8.3	0.0	8.8	8.8	0.0

SJRWMD 24-hr Design Storm with 100-Year Stillwater															
				Peak Stages (ft NGVD)											
Location	**Jurisdiction**	**Model Node**	**Indicator Elevation (ft NGVD)**	**Existing Mean Annual**	**Alt. 1 Mean Annual**	**Change (ft)**	**Existing 10-Year**	**Alt. 1 10-Year**	**Change (ft)**	**Existing 25-Year**	**Alt. 1 25-Year**	**Change (ft)**	**Existing 100-Year**	**Alt. 1 100-Year**	**Change (ft)**
Outfall	PO	1010	-	7.0	7.0	0.0	7.0	7.0	0.0	7.0	7.0	0.0	7.0	7.0	0.0
Nova Road d/s	PO	1591	11	7.1	7.0	-0.1	7.2	7.0	-0.2	7.3	7.1	-0.2	7.5	7.3	-0.2
Nova Road u/s	PO	159	11	7.1	7.0	-0.1	7.2	7.0	-0.3	7.3	7.1	-0.2	7.6	7.4	-0.2
Near Jackson Street	PO	150	5.3	7.2	6.9	-0.3	7.4	7.2	-0.2	7.5	7.3	-0.2	7.8	7.6	-0.2
Oak Street	PO	141	6	7.3	7.0	-0.3	7.5	7.3	-0.2	7.6	7.4	-0.2	8.0	7.8	-0.2
Powers Avenue	PO	2301HAL	6.6	7.3	7.0	-0.3	7.6	7.3	-0.2	7.7	7.5	-0.2	8.1	7.9	-0.2
Ryanwood Ave	PO	1381	8.5	7.8	7.5	-0.3	8.4	8.2	-0.1	8.6	8.5	-0.1	8.9	8.8	-0.1
Nova Road	PO	132	9.1	7.9	7.6	-0.3	8.4	8.3	-0.1	8.7	8.6	-0.1	9.1	9.0	-0.1

PO = Port Orange

Nova Canal Flood Control and Integrated Water Resources Project
Project Alternative 1 - Peak Stages for 24-hour Design Storms
Nova Canal System

SJRWMD 24-hr Design Storm with 1-Year Stillwater															
				Peak Stages (ft NGVD)											
Location	Jurisdiction	Model Node	Indicator Elevation (ft NGVD)	Existing Mean Annual	Alt. 1 Mean Annual	Change (ft)	Existing 10-Year	Alt. 1 10-Year	Change (ft)	Existing 25-Year	Alt. 1 25-Year	Change (ft)	Existing 100-Year	Alt. 1 100-Year	Change (ft)
10th Street	HH	14	8.3	7.3	7.3	-0.1	8.0	8.0	0.0	8.3	8.2	0.0	8.9	8.9	0.0
3rd Street	VC	1901	10.8	7.9	7.9	0.0	8.6	8.6	0.0	8.9	8.9	0.0	9.4	9.4	0.0
Mason Avenue	DB	3203	10.9	8.1	8.1	0.0	8.8	8.8	0.0	9.1	9.1	0.0	9.6	9.6	0.0
Madison Avenue		3201	8.7	8.2	8.1	0.0	8.8	8.8	0.0	9.1	9.1	0.0	9.6	9.6	0.0
George W. Engram Boulevard	DB	3501	9.5	8.2	8.2	0.0	8.9	8.9	0.0	9.1	9.1	0.0	9.6	9.6	0.0
West International Speedway Boulevard	DB	4601	8.9	8.1	8.1	0.0	8.9	8.9	0.0	9.2	9.2	0.0	9.6	9.6	0.0
Sutton Place Apartment Complex	DB	5501	*	8.1	8.1	0.0	8.9	8.9	0.0	9.2	9.2	0.0	9.6	9.6	0.0
Museum Boulevard / Navy Canal	DB	6102	8.4	8.1	8.1	0.0	8.9	8.9	0.0	9.2	9.2	0.0	9.6	9.6	0.0
Bellevue Avenue	DB	7201	8.4	8.1	8.1	0.0	8.9	8.9	0.0	9.1	9.1	0.0	9.6	9.6	0.0
Woodcliff Drive	DB	8701	8.4	8.0	8.0	0.0	8.8	8.8	0.0	9.1	9.1	0.0	9.6	9.7	0.0
Beville Road	VC	10401	9.4	8.0	8.0	0.0	8.7	8.7	0.0	9.0	9.0	0.0	9.8	9.8	0.0
Big Tree Road	VC	11601	9.4	7.8	7.8	0.0	8.6	8.6	0.0	9.0	9.0	0.0	10.0	10.0	0.0
Reed Canal Road	SD	12401	9.4	6.9	6.8	-0.2	7.7	7.7	-0.1	8.1	8.1	0.0	9.0	9.0	0.0
Moonstone Court	PO	13901	6.5	6.9	6.8	-0.1	8.0	7.9	0.0	8.3	8.3	0.0	8.8	8.8	0.0
Madeline Avenue	PO	12901	9.4	7.3	7.2	-0.1	8.2	8.2	0.0	8.6	8.6	0.0	9.4	9.4	0.0

SJRWMD 24-hr Design Storm with 100-Year Stillwater															
				Peak Stages (ft NGVD)											
Location	Jurisdiction	Model Node	Indicator Elevation (ft NGVD)	Existing Mean Annual	Alt. 1 Mean Annual	Change (ft)	Existing 10-Year	Alt. 1 10-Year	Change (ft)	Existing 25-Year	Alt. 1 25-Year	Change (ft)	Existing 100-Year	Alt. 1 100-Year	Change (ft)
10th Street	HH	14	8.3	7.5	7.3	-0.2	8.1	8.0	-0.1	8.4	8.3	-0.1	9.0	8.9	-0.1
3rd Street	VC	1901	10.8	8.1	8.0	-0.1	8.7	8.6	-0.1	8.9	8.9	0.0	9.5	9.4	0.0
Mason Avenue	DB	3203	10.9	8.2	8.1	-0.1	8.8	8.8	0.0	9.1	9.1	0.0	9.6	9.6	0.0
Madison Avenue		3201	8.7	8.3	8.2	-0.1	8.9	8.8	-0.1	9.2	9.1	0.0	9.7	9.6	0.0
George W. Engram Boulevard	DB	3501	9.5	8.3	8.2	-0.1	9.0	8.9	-0.1	9.2	9.2	-0.1	9.7	9.6	0.0
West International Speedway Boulevard	DB	4601	8.9	8.3	8.2	-0.2	9.0	9.0	-0.1	9.2	9.2	-0.1	9.7	9.6	0.0
Sutton Place Apartment Complex	DB	5501	*	8.3	8.2	-0.2	9.0	9.0	-0.1	9.2	9.2	-0.1	9.7	9.6	0.0
Museum Boulevard / Navy Canal	DB	6102	8.4	8.3	8.2	-0.1	9.0	9.0	-0.1	9.3	9.2	0.0	9.7	9.7	0.0
Bellevue Avenue	DB	7201	8.4	8.3	8.1	-0.1	9.0	8.9	-0.1	9.2	9.2	-0.1	9.7	9.7	0.0
Woodcliff Drive	DB	8701	8.4	8.2	8.1	-0.2	8.9	8.8	-0.1	9.2	9.1	-0.1	9.8	9.7	-0.1
Beville Road	VC	10401	9.4	8.2	8.0	-0.2	8.9	8.7	-0.1	9.2	9.1	-0.1	9.9	9.8	-0.1
Big Tree Road	VC	11601	9.4	8.1	7.9	-0.3	8.8	8.7	-0.2	9.2	9.1	-0.1	10.2	10.0	-0.1
Reed Canal Road	SD	12401	9.4	7.6	7.0	-0.6	8.2	7.9	-0.3	8.5	8.3	-0.2	9.3	9.1	-0.1
Moonstone Court	PO	13901	6.5	7.9	7.6	-0.3	8.4	8.3	-0.1	8.7	8.6	-0.1	9.1	9.0	-0.1
Madeline Avenue	PO	12901	9.4	8.0	7.6	-0.4	8.6	8.4	-0.2	8.9	8.8	-0.1	9.7	9.5	-0.1

DB = Daytona Beach
HH = Holly Hill
PO = Port Orange
SD = South Daytona
VC = Volusia County

Nova Canal Flood Control and Integrated Water Resources Project
Project Alternative 1 - Peak Stages for 96-hour Design Storms
LPGA Canal System

SJRWMD 96-hr Design Storm with 1-Year Stillwater															
				Peak Stages (ft NGVD)											
Location	Jurisdiction	Model Node	Indicator Elevation (ft NGVD)	Existing Mean Annual	Alt. 1 Mean	Change (ft)	Existing 10-Year	Alt. 1 10-Year	Change (ft)	Existing 25-Year	Alt. 1 25-Year	Change (ft)	Existing 100-Year	Alt. 1 100-Year	Change (ft)
11th St Canal Outfall	HH	808	-	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Upstream of Riverside Dr	HH	806	4.6	2.4	2.5	0.1	2.6	2.6	0.0	2.7	2.7	0.0	2.9	2.9	0.0
Upstream of Daytona Road	HH	804	12.3	3.4	3.6	0.2	3.8	3.8	0.0	4.0	4.0	0.0	4.3	4.2	0.0
Upstream of US 1 (Ridegwood)	HH	802	11.7	3.9	4.2	0.3	4.5	4.5	0.0	4.8	4.7	-0.1	5.1	5.0	-0.1
11th St Canal at Railroad Ditch and Southeast Canal	HH	8	6.7	5.4	4.8	-0.6	6.0	5.8	-0.2	6.3	6.2	-0.1	6.6	6.6	-0.1
Upstream of Alta Drive	HH	1101	8.7	6.0	5.5	-0.5	6.9	6.7	-0.2	7.3	7.2	-0.1	7.9	7.8	-0.1
Upstream of Center Avenue	HH	1402	8.6	6.4	6.1	-0.3	7.3	7.2	-0.1	7.7	7.6	-0.1	8.2	8.2	-0.1
11th St Canal at Nova Road	HH	1401	10.9	7.3	7.2	-0.1	8.0	7.9	-0.1	8.4	8.3	0.0	8.8	8.8	-0.1

SJRWMD 96-hr Design Storm with 100-Year Stillwater															
				Peak Stages (ft NGVD)											
Location	Jurisdiction	Model Node	Indicator Elevation (ft NGVD)	Existing Mean Annual	Alt. 1 Mean	Change (ft)	Existing 10-Year	Alt. 1 10-Year	Change (ft)	Existing 25-Year	Alt. 1 25-Year	Change (ft)	Existing 100-Year	Alt. 1 100-Year	Change (ft)
11th St Canal Outfall	HH	808	-	5.0	5.0	0.0	5.0	5.0	0.0	5.0	5.0	0.0	5.0	5.0	0.0
Upstream of Riverside Dr	HH	806	4.6	5.1	5.4	0.3	5.2	5.4	0.2	5.2	5.4	0.2	5.3	5.4	0.1
Upstream of Daytona Road	HH	804	12.3	5.3	5.5	0.2	5.4	5.5	0.1	5.5	5.5	0.0	5.6	5.5	-0.1
Upstream of US 1 (Ridegwood)	HH	802	11.7	5.5	5.7	0.2	5.8	5.7	-0.1	5.9	5.8	-0.1	6.1	6.0	-0.1
11th St Canal at Railroad Ditch and Southeast Canal	HH	8	6.7	6.1	5.4	-0.7	6.5	6.2	-0.4	6.7	6.5	-0.2	7.0	6.8	-0.2
Upstream of Alta Drive	HH	1101	8.7	6.6	6.0	-0.6	7.3	7.0	-0.4	7.6	7.4	-0.2	8.1	8.0	-0.2
Upstream of Center Avenue	HH	1402	8.6	6.9	6.4	-0.5	7.6	7.3	-0.3	8.0	7.8	-0.2	8.4	8.3	-0.1
11th St Canal at Nova Road	HH	1401	10.9	7.5	7.2	-0.2	8.1	8.0	-0.2	8.5	8.3	-0.1	9.0	8.9	-0.1

HH = Holly Hill

Nova Canal Flood Control and Integrated Water Resources Project
Project Alternative 1 - Peak Stages for 96-hour Design Storms
LPGA Canal Branch Systems

SJRWMD 96-hr Design Storm with 1-Year Stillwater															
				Peak Stages (ft NGVD)											
Location	Jurisdiction	Model Node	Indicator Elevation (ft NGVD)	Existing Mean Annual	Alt. 1 Mean Annual	Change (ft)	Existing 10-Year	Alt. 1 10-Year	Change (ft)	Existing 25-Year	Alt. 1 25-Year	Change (ft)	Existing 100-Year	Alt. 1 100-Year	Change (ft)
Railroad Ditch at Walker	HH	604	5.2	5.5	4.9	-0.6	6.1	5.9	-0.2	6.4	6.3	-0.2	6.8	6.7	-0.1
Railroad Ditch at Flomich	HH	6	5.9	5.5	5.0	-0.5	6.1	5.9	-0.2	6.5	6.3	-0.2	6.8	6.7	-0.1
Railroad Ditch headwater (Hand Ave)	OB	1	5.4	5.5	5.0	-0.5	6.1	5.9	-0.2	6.5	6.3	-0.2	6.8	6.7	-0.1
Southeast Canal at 10th St	HH	1301	5.5	5.7	5.0	-0.7	6.4	6.1	-0.3	6.7	6.5	-0.2	7.1	6.9	-0.1
Southeast Canal at 8th St	HH	1603	6.5	6.0	5.6	-0.4	6.7	6.5	-0.2	7.1	6.9	-0.2	7.5	7.3	-0.1
Southeast Canal at 6th St	HH	1601	6.4	6.1	6.0	-0.2	6.8	6.6	-0.2	7.1	6.9	-0.2	7.5	7.4	-0.1
Southeast Canal at 3rd St	HH	2003	6.7	6.3	6.2	-0.1	6.8	6.7	-0.1	7.1	7.0	-0.1	7.5	7.4	-0.1
Southeast Canal at Mason	DB	26	7.5	6.5	6.5	0.0	7.0	6.9	0.0	7.2	7.2	0.0	7.6	7.5	-0.1
Northwest Canal at 13th St	HH	9	8.4	7.3	7.2	-0.1	8.1	8.0	-0.1	8.5	8.4	0.0	8.9	8.9	0.0
Northwest Canal at 15th St	HH	402	7.6	7.3	7.3	0.0	8.0	8.0	0.0	8.4	8.3	0.0	8.8	8.8	0.0
Northwest Canal at Flomich	HH	4	7.9	7.4	7.3	0.0	8.0	8.0	0.0	8.4	8.3	0.0	8.8	8.8	0.0
Northwest Canal upstream of Alabama; Calle Grande Ditch headwater (Arroyo Blvd)	HH	3	7.5	7.5	7.4	0.0	8.1	8.1	0.0	8.4	8.4	0.0	8.8	8.8	0.0

SJRWMD 96-hr Design Storm with 100-Year Stillwater															
				Peak Stages (ft NGVD)											
Location	Jurisdiction	Model Node	Indicator Elevation (ft NGVD)	Existing Mean Annual	Alt. 1 Mean Annual	Change (ft)	Existing 10-Year	Alt. 1 10-Year	Change (ft)	Existing 25-Year	Alt. 1 25-Year	Change (ft)	Existing 100-Year	Alt. 1 100-Year	Change (ft)
Railroad Ditch at Walker	HH	604	5.2	6.2	5.4	-0.7	6.6	6.2	-0.4	6.8	6.5	-0.3	7.1	6.8	-0.2
Railroad Ditch at Flomich	HH	6	5.9	6.2	5.5	-0.8	6.7	6.2	-0.5	6.9	6.6	-0.3	7.1	6.8	-0.3
Railroad Ditch headwater (Hand Ave)	OB	1	5.4	6.2	5.5	-0.8	6.7	6.2	-0.5	6.9	6.6	-0.3	7.1	6.8	-0.3
Southeast Canal at 10th St	HH	1301	5.5	6.4	5.6	-0.8	6.8	6.4	-0.4	7.1	6.7	-0.3	7.4	7.1	-0.2
Southeast Canal at 8th St	HH	1603	6.5	6.6	6.1	-0.6	7.1	6.7	-0.4	7.4	7.1	-0.3	7.7	7.5	-0.3
Southeast Canal at 6th St	HH	1601	6.4	6.6	6.2	-0.4	7.1	6.8	-0.3	7.4	7.1	-0.3	7.8	7.5	-0.3
Southeast Canal at 3rd St	HH	2003	6.7	6.7	6.4	-0.3	7.1	6.9	-0.3	7.4	7.2	-0.3	7.8	7.6	-0.2
Southeast Canal at Mason	DB	26	7.5	6.7	6.6	-0.1	7.2	7.0	-0.1	7.4	7.3	-0.1	7.8	7.6	-0.2
Northwest Canal at 13th St	HH	9	8.4	7.5	7.3	-0.2	8.2	8.1	-0.1	8.6	8.4	-0.1	9.0	8.9	-0.1
Northwest Canal at 15th St	HH	402	7.6	7.5	7.3	-0.1	8.1	8.0	-0.1	8.5	8.4	-0.1	8.9	8.8	-0.1
Northwest Canal at Flomich	HH	4	7.9	7.5	7.4	-0.1	8.1	8.0	-0.1	8.5	8.4	-0.1	8.9	8.8	-0.1
Northwest Canal upstream of Alabama; Calle Grande Ditch headwater (Arroyo Blvd)	HH	3	7.5	7.6	7.5	-0.1	8.2	8.1	-0.1	8.5	8.4	-0.1	8.9	8.8	-0.1

DB = Daytona Beach
HH = Holly Hill
OB = Ormond Beach

Nova Canal Flood Control and Integrated Water Resources Project
Project Alternative 1 - Peak Stages for 96-hour Design Storms
Reed Canal System

SJRWMD 96-hr Design Storm with 1-Year Stillwater															
				Peak Stages (ft NGVD)											
Location	Jurisdiction	Model Node	Indicator Elevation (ft NGVD)	Existing Mean Annual	Alt. 1 Mean Annual	Change (ft)	Existing 10-Year	Alt. 1 10-Year	Change (ft)	Existing 25-Year	Alt. 1 25-Year	Change (ft)	Existing 100-Year	Alt. 1 100-Year	Change (ft)
Reed Canal Outfall	SD	12102	-	2.2	2.2	0.0	2.2	2.2	0.0	2.2	2.2	0.0	2.2	2.2	0.0
Upstream of US 1	SD	12101	7.5	2.6	2.9	0.3	2.8	3.1	0.3	3.0	3.0	0.1	3.2	3.2	-0.1
Downstream of RR / Upstream of Proposed Gate	SD	12804	11.5	4.2	3.0	-1.2	4.8	5.1	0.3	5.1	5.6	0.5	5.4	6.1	0.7
Reed Canal at Stevens Canal	SD	128	8.8	5.4	4.7	-0.7	6.2	6.2	0.0	6.6	6.7	0.1	7.0	7.2	0.2
Saul Drive	SD	122	9.6	6.1	5.8	-0.4	6.9	6.9	0.0	7.3	7.3	0.0	7.8	7.9	0.1
Reed Canal at Nova Road	SD	13104	9.2	7.0	6.9	-0.2	7.9	7.8	0.0	8.3	8.3	0.0	8.9	8.9	0.0
Downstream end of Stevens Canal	SD	11901	5.4	5.5	4.8	-0.7	6.4	6.4	0.0	6.8	6.9	0.1	7.3	7.5	0.1
Stevens Canal at Ridge Drive	SD	11001	6.9	5.8	5.3	-0.4	6.8	6.8	-0.1	7.3	7.3	0.0	7.8	7.8	0.0
Stevens Canal at Big Tree Road	SD	10101	8.6	6.1	5.9	-0.2	7.4	7.3	0.0	7.9	7.9	0.0	8.4	8.4	0.0
Upstream end of Stevens Canal	SD	101	6.6	6.3	6.1	-0.1	7.6	7.5	0.0	8.0	8.0	0.0	8.5	8.5	0.0

SJRWMD 96-hr Design Storm with 100-Year Stillwater															
				Peak Stages (ft NGVD)											
Location	Jurisdiction	Model Node	Indicator Elevation (ft NGVD)	Existing Mean Annual	Alt. 1 Mean Annual	Change (ft)	Existing 10-Year	Alt. 1 10-Year	Change (ft)	Existing 25-Year	Alt. 1 25-Year	Change (ft)	Existing 100-Year	Alt. 1 100-Year	Change (ft)
Reed Canal Outfall	SD	12102	-	6.0	6.0	0.0	6.0	6.0	0.0	6.0	6.0	0.0	6.0	6.0	0.0
Upstream of US 1	SD	12101	7.5	6.2	6.5	0.3	6.4	6.4	0.0	6.5	6.5	0.0	6.7	6.6	-0.1
Downstream of RR / Upstream of Proposed Gate	SD	12804	11.5	6.4	6.4	0.0	6.7	6.4	-0.3	6.8	6.6	-0.2	7.0	6.9	-0.1
Reed Canal at Stevens Canal	SD	128	8.8	6.8	6.2	-0.6	7.3	6.9	-0.3	7.5	7.3	-0.2	7.7	7.7	-0.1
Saul Drive	SD	122	9.6	7.1	6.2	-0.9	7.7	7.3	-0.3	7.9	7.7	-0.3	8.3	8.2	-0.1
Reed Canal at Nova Road	SD	13104	9.2	7.7	7.1	-0.6	8.3	8.1	-0.3	8.7	8.5	-0.2	9.3	9.0	-0.2
Downstream end of Stevens Canal	SD	11901	5.4	6.8	5.7	-1.1	7.4	7.0	-0.4	7.7	7.4	-0.3	7.9	7.8	0.0
Stevens Canal at Ridge Drive	SD	11001	6.9	6.9	5.9	-1.0	7.5	7.2	-0.4	7.9	7.6	-0.3	8.4	8.1	-0.4
Stevens Canal at Big Tree Road	SD	10101	8.6	7.0	6.2	-0.8	7.9	7.5	-0.3	8.2	8.0	-0.3	8.7	8.5	-0.3
Upstream end of Stevens Canal	SD	101	6.6	7.1	6.3	-0.8	8.0	7.6	-0.3	8.3	8.1	-0.2	8.8	8.6	-0.2

SD = South Daytona

Nova Canal Flood Control and Integrated Water Resources Project
Project Alternative 1 - Peak Stages for 96-hour Design Storms
Halifax Canal System

SJRWMD 96-hr Design Storm with 1-Year Stillwater															
			Indicator Elevation (ft NGVD)	Peak Stages (ft NGVD)											
Location	Jurisdiction	Model Node		Existing Mean Annual	Alt. 1 Mean	Change (ft)	Existing 10-Year	Alt. 1 10-Year	Change (ft)	Existing 25-Year	Alt. 1 25-Year	Change (ft)	Existing 100-Year	Alt. 1 100-Year	Change (ft)
Outfall	PO	1010	-	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Nova Road d/s	PO	1591	11	3.9	3.5	-0.5	4.4	4.2	-0.2	4.7	4.5	-0.2	5.2	5.1	-0.2
Nova Road u/s	PO	159	11	4.0	3.5	-0.5	4.5	4.3	-0.2	4.7	4.6	-0.2	5.3	5.2	-0.1
Near Jackson Street	PO	150	5.3	4.2	3.8	-0.3	4.8	4.6	-0.2	5.1	5.0	-0.2	5.8	5.7	-0.1
Oak Street	PO	141	6	4.9	4.7	-0.3	5.7	5.6	-0.2	6.0	5.9	-0.1	6.5	6.5	0.0
Powers Avenue	PO	2301HAL	6.6	5.8	5.6	-0.2	6.5	6.5	-0.1	6.7	6.6	0.0	7.0	6.9	0.0
Ryanwood Ave	PO	1381	8.5	6.6	6.4	-0.2	7.8	7.7	-0.1	8.2	8.1	0.0	8.6	8.6	0.0
Nova Road	PO	132	9.1	6.9	6.8	-0.1	7.9	7.9	-0.1	8.3	8.3	0.0	8.8	8.8	0.0

SJRWMD 96-hr Design Storm with 100-Year Stillwater															
			Indicator Elevation (ft NGVD)	Peak Stages (ft NGVD)											
Location	Jurisdiction	Model Node		Existing Mean Annual	Alt. 1 Mean Annual	Change (ft)	Existing 10-Year	Alt. 1 10-Year	Change (ft)	Existing 25-Year	Alt. 1 25-Year	Change (ft)	Existing 100-Year	Alt. 1 100-Year	Change (ft)
Outfall	PO	1010	-	7.0	7.0	0.0	7.0	7.0	0.0	7.0	7.0	0.0	7.0	7.0	0.0
Nova Road d/s	PO	1591	11	7.1	7.0	-0.1	7.2	7.0	-0.2	7.3	7.1	-0.2	7.5	7.3	-0.2
Nova Road u/s	PO	159	11	7.1	7.0	-0.1	7.2	7.0	-0.3	7.3	7.1	-0.2	7.6	7.4	-0.2
Near Jackson Street	PO	150	5.3	7.2	6.9	-0.3	7.4	7.2	-0.2	7.5	7.3	-0.2	7.8	7.6	-0.2
Oak Street	PO	141	6	7.3	7.0	-0.3	7.5	7.3	-0.2	7.6	7.4	-0.2	8.0	7.8	-0.2
Powers Avenue	PO	2301HAL	6.6	7.3	7.0	-0.3	7.6	7.3	-0.2	7.7	7.5	-0.2	8.1	7.9	-0.2
Ryanwood Ave	PO	1381	8.5	7.8	7.5	-0.3	8.4	8.2	-0.1	8.6	8.5	-0.1	8.9	8.8	-0.1
Nova Road	PO	132	9.1	7.9	7.6	-0.3	8.4	8.3	-0.1	8.7	8.6	-0.1	9.1	9.0	-0.1

PO = Port Orange

Nova Canal Flood Control and Integrated Water Resources Project
Project Alternative 1 - Peak Stages for 96-hour Design Storms
Nova Canal System

SJRWMD 96-hr Design Storm with 1-Year Stillwater															
				Peak Stages (ft NGVD)											
Location	Jurisdiction	Model Node	Indicator Elevation (ft NGVD)	Existing Mean Annual	Alt. 1 Mean Annual	Change (ft)	Existing 10-Year	Alt. 1 10-Year	Change (ft)	Existing 25-Year	Alt. 1 25-Year	Change (ft)	Existing 100-Year	Alt. 1 100-Year	Change (ft)
10th Street	HH	14	8.3	7.4	7.4	0.0	8.1	8.0	-0.1	8.4	8.4	0.0	8.9	8.9	0.0
3rd Street	VC	1901	10.8	8.0	8.0	0.0	8.7	8.7	0.0	9.0	9.0	0.0	9.4	9.4	0.0
Mason Avenue	DB	3203	10.9	8.2	8.2	0.0	8.9	8.9	0.0	9.2	9.2	0.0	9.6	9.6	0.0
Madison Avenue		3201	8.7	8.3	8.2	0.0	8.9	8.9	0.0	9.2	9.2	0.0	9.6	9.6	0.0
George W. Engram Boulevard	DB	3501	9.5	8.3	8.3	0.0	9.0	9.0	0.0	9.3	9.3	0.0	9.6	9.6	0.0
West International Speedway Boulevard	DB	4601	8.9	8.2	8.2	0.0	9.0	9.0	0.0	9.3	9.3	0.0	9.6	9.6	0.0
Sutton Place Apartment Complex	DB	5501	*	8.2	8.2	0.0	9.0	9.0	0.0	9.3	9.3	0.0	9.6	9.6	0.0
Museum Boulevard / Navy Canal	DB	6102	8.4	8.2	8.2	0.0	9.0	9.0	0.0	9.3	9.3	0.0	9.6	9.6	0.0
Bellevue Avenue	DB	7201	8.4	8.2	8.2	0.0	9.0	9.0	0.0	9.3	9.3	0.0	9.6	9.6	0.0
Woodcliff Drive	DB	8701	8.4	8.1	8.1	0.0	8.9	8.9	0.0	9.2	9.2	0.0	9.6	9.6	0.0
Beville Road	VC	10401	9.4	8.1	8.1	0.0	8.8	8.8	0.0	9.3	9.3	0.0	9.9	9.8	0.0
Big Tree Road	VC	11601	9.4	8.0	8.0	0.0	8.8	8.8	0.0	9.4	9.3	0.0	10.1	10.1	0.0
Reed Canal Road	SD	12401	9.4	7.1	6.9	-0.1	7.9	7.9	0.0	8.4	8.4	0.0	9.0	9.0	0.0
Moonstone Court	PO	13901	6.5	7.1	7.0	-0.1	8.1	8.1	0.0	8.4	8.4	0.0	8.8	8.8	0.0
Madeline Avenue	PO	12901	9.4	7.5	7.4	-0.1	8.4	8.4	0.0	8.8	8.8	0.0	9.4	9.4	0.0

SJRWMD 96-hr Design Storm with 100-Year Stillwater															
				Peak Stages (ft NGVD)											
Location	Jurisdiction	Model Node	Indicator Elevation (ft NGVD)	Existing Mean Annual	Alt. 1 Mean Annual	Change (ft)	Existing 10-Year	Alt. 1 10-Year	Change (ft)	Existing 25-Year	Alt. 1 25-Year	Change (ft)	Existing 100-Year	Alt. 1 100-Year	Change (ft)
10th Street	HH	14	8.3	7.6	7.4	-0.2	8.2	8.1	-0.1	8.6	8.4	-0.1	9.0	8.9	-0.1
3rd Street	VC	1901	10.8	8.1	8.0	-0.1	8.7	8.7	-0.1	9.1	9.0	-0.1	9.5	9.4	-0.1
Mason Avenue	DB	3203	10.9	8.3	8.2	-0.1	8.9	8.9	0.0	9.3	9.2	-0.1	9.7	9.6	-0.1
Madison Avenue		3201	8.7	8.4	8.3	-0.1	9.0	8.9	-0.1	9.3	9.2	-0.1	9.7	9.6	-0.1
George W. Engram Boulevard	DB	3501	9.5	8.4	8.3	-0.1	9.1	9.0	-0.1	9.4	9.3	-0.1	9.7	9.6	-0.1
West International Speedway Boulevard	DB	4601	8.9	8.4	8.3	-0.2	9.1	9.0	-0.1	9.4	9.3	-0.1	9.7	9.6	-0.1
Sutton Place Apartment Complex	DB	5501	*	8.4	8.3	-0.2	9.1	9.0	-0.1	9.4	9.3	-0.1	9.7	9.6	-0.1
Museum Boulevard / Navy Canal	DB	6102	8.4	8.4	8.3	-0.2	9.1	9.0	-0.1	9.4	9.3	-0.1	9.7	9.7	-0.1
Bellevue Avenue	DB	7201	8.4	8.4	8.2	-0.2	9.1	9.0	-0.1	9.4	9.3	-0.1	9.7	9.7	-0.1
Woodcliff Drive	DB	8701	8.4	8.3	8.1	-0.2	9.0	8.9	-0.1	9.4	9.3	-0.1	9.8	9.7	-0.1
Beville Road	VC	10401	9.4	8.3	8.1	-0.2	9.0	8.9	-0.2	9.4	9.3	-0.1	10.0	9.9	-0.1
Big Tree Road	VC	11601	9.4	8.3	8.0	-0.3	9.0	8.8	-0.2	9.5	9.4	-0.2	10.2	10.1	-0.2
Reed Canal Road	SD	12401	9.4	7.7	7.1	-0.6	8.3	8.1	-0.2	8.8	8.5	-0.2	9.3	9.1	-0.2
Moonstone Court	PO	13901	6.5	7.9	7.4	-0.5	8.5	8.3	-0.2	8.8	8.6	-0.2	9.0	8.9	-0.2
Madeline Avenue	PO	12901	9.4	8.1	7.6	-0.5	8.7	8.5	-0.2	9.1	8.9	-0.2	9.6	9.5	-0.2

DB = Daytona Beach
HH = Holly Hill
PO = Port Orange
SD = South Daytona
VC = Volusia County

Appendix C

Phase 1
Peak Flow Summary

Nova Canal Flood Control and Integrated Water Resources Project
Project Alternative 1 - Peak Flows for 24-Hour Design Storms
LPGA Canal System

1-Year Stillwater														
			Peak flow (cfs)											
Location	Jurisdiction	SWMM5 Conduit	Existing Mean Annual	Alternative 1 Mean Annual	Change	Existing 10-Year	Alternative 1 10-Year	Change	Existing 25-Year	Alternative 1 25-Year	Change	Existing 100-Year	Alternative 1 100-Year	Change
Riverside Drive Culverts	HH	80087	121	142	21	153	156	3	167	166	-1	194	192	-2
		80087A	121	142	21	153	156	3	167	166	-1	194	192	-2
		80087B	121	142	21	153	156	3	167	166	-1	194	192	-2
Daytona Road Culvert	HH	80085	362	426	64	459	467	8	502	498	-4	582	575	-7
US 1 (Ridegwood) Culvert	HH	80083	362	426	64	459	467	8	502	498	-4	582	575	-7
Railroad Trestle	HH	80081	362	657	294	459	657	198	502	658	156	582	657	75
Alta Drive Culvert	HH	80112	339	368	29	393	421	28	417	448	30	468	511	43
Center Avenue Culvert	HH	80143	332	362	30	389	407	18	413	422	8	465	465	1
Start of LPGA Canal	HH	80142	333	362	29	389	409	20	414	426	12	465	466	1

100-Year Stillwater														
			Peak flow (cfs)											
Location	Jurisdiction	SWMM5 Conduit	Existing Mean Annual	Alternative 1 Mean Annual	Change	Existing 10-Year	Alternative 1 10-Year	Change	Existing 25-Year	Alternative 1 25-Year	Change	Existing 100-Year	Alternative 1 100-Year	Change
Riverside Drive Culverts	HH	80087	120	152	32	151	152	1	162	157	-5	184	180	-4
		80087A	120	152	32	151	152	1	162	157	-5	184	180	-4
		80087B	120	152	32	151	152	1	162	157	-5	184	180	-4
Daytona Road Culvert	HH	80085	361	391	29	452	439	-12	487	471	-16	552	540	-12
US 1 (Ridegwood) Culvert	HH	80083	361	383	22	452	439	-12	487	471	-16	552	540	-12
Railroad Trestle	HH	80081	361	653	291	452	654	202	487	652	164	552	652	100
Alta Drive Culvert	HH	80112	304	348	44	361	407	46	387	443	56	452	456	4
Center Avenue Culvert	HH	80143	299	335	36	357	371	14	384	393	9	449	446	-3
Start of LPGA Canal	HH	80142	299	339	39	357	376	19	384	401	17	449	446	-3

HH = Holly Hill

Nova Canal Flood Control and Integrated Water Resources Project
Project Alternative 1 - Peak Flows for 24-Hour Design Storms
LPGA Canal Branch Systems

1-Year Stillwater														
			Peak flow (cfs)											
Location	Jurisdiction	SWMM5 Conduit	Existing Mean Annual	Alternative 1 Mean Annual	Change	Existing 10-Year	Alternative 1 10-Year	Change	Existing 25-Year	Alternative 1 25-Year	Change	Existing 100-Year	Alternative 1 100-Year	Change
Walker Street Culvert	HH	80064	48	59	12	49	80	31	54	88	34	58	96	38
Flomich Avenue Culvert	HH	80061	47	62	15	59	91	31	70	102	32	80	118	38
From Railroad Ditch north to Tomoka Basin	OB	HAND_TO_STOR	0	0	0	126	78	-48	218	156	-62	551	462	-88
Southeast Canal at 10th St Culvert	HH	80133	61	76	15	76	79	2	78	78	-1	86	84	-2
Southeast Canal at 8th St Culvert	HH	80165	131	139	8	142	157	16	142	161	19	137	162	25
Southeast Canal at 6th St Culverts	HH	80162	50	52	2	64	69	4	67	74	7	68	81	13
		80163	35	37	2	45	48	3	47	52	5	47	56	9
Southeast Canal at 3rd St Culverts	HH	80204	22	22	0	20	20	0	20	20	0	20	20	0
		80204A	22	22	0	20	20	0	20	20	0	20	20	0
Start of Southeast Canal (at Mason)	DB	80264	29	27	-2	33	32	-1	33	33	0	18	34	16

100-Year Stillwater														
			Peak flow (cfs)											
Location	Jurisdiction	SWMM5 Conduit	Existing Mean Annual	Alternative 1 Mean Annual	Change	Existing 10-Year	Alternative 1 10-Year	Change	Existing 25-Year	Alternative 1 25-Year	Change	Existing 100-Year	Alternative 1 100-Year	Change
Walker Street Culvert	HH	80064	37	66	29	45	80	36	45	86	41	41	67	26
Flomich Avenue Culvert	HH	80061	37	72	35	44	93	49	44	105	60	45	94	49
From Railroad Ditch north to Tomoka Basin	OB	HAND_TO_STOR	211	38	-173	487	255	-232	642	403	-239	868	809	-59
Southeast Canal at 10th St Culvert	HH	80133	62	79	17	69	83	14	73	99	26	84	81	-3
Southeast Canal at 8th St Culvert	HH	80165	87	122	35	96	133	37	98	136	38	101	136	35
Southeast Canal at 6th St Culverts	HH	80162	32	47	15	39	58	19	42	61	20	46	66	20
		80163	22	33	11	28	40	13	29	43	14	32	46	14
Southeast Canal at 3rd St Culverts	HH	80204	14	20	6	13	20	6	14	20	5	16	19	4
		80204A	14	20	6	13	20	6	14	20	5	16	19	4
Start of Southeast Canal (at Mason)	DB	80264	29	34	5	29	33	3	29	24	-5	28	17	-11

DB = Daytona Beach
HH = Holly Hill
OB = Ormond Beach

Nova Canal Flood Control and Integrated Water Resources Project
Project Alternative 1 - Peak Flows for 24-Hour Design Storms
Reed Canal System

1-Year Stillwater														
			Peak flow (cfs)											
Location	Jurisdiction	SWMM5 Conduit	Existing Mean Annual	Alternative 1 Mean Annual	Change	Existing 10-Year	Alternative 1 10-Year	Change	Existing 25-Year	Alternative 1 25-Year	Change	Existing 100-Year	Alternative 1 100-Year	Change
Reed Canal at US 1 Culvert	SD	81211	954	1,369	415	1,230	1,419	189	1,336	1,418	82	1,630	1,585	-46
Reed Canal downstream of Railroad	SD	81285	941	1,308	368	1,203	1,312	109	1,302	1,316	14	1,497	1,341	-157
Reed Canal downstream of Stevens Canal	SD	81281	874	935	61	1,098	1,151	53	1,190	1,278	88	1,377	1,387	10
Reed Canal at Saul Drive culverts	SD	81221	214	226	12	243	251	8	265	274	9	323	321	-2
		81221A	214	226	12	243	251	8	265	274	9	323	321	-2
		81221B	214	226	12	243	251	8	265	274	9	323	321	-2
Start of Reed Canal	SD	81243	594	623	28	695	704	9	731	744	13	848	843	-4
Stevens Canal at Ridge Drive culvert	SD	81102	96	102	6	157	165	8	175	182	7	209	203	-6
Stevens Canal at Big Tree Road culvert	SD	81012	19	21	1	35	37	2	39	41	2	46	46	0

100-Year Stillwater														
			Peak flow (cfs)											
Location	Jurisdiction	SWMM5 Conduit	Existing Mean Annual	Alternative 1 Mean Annual	Change	Existing 10-Year	Alternative 1 10-Year	Change	Existing 25-Year	Alternative 1 25-Year	Change	Existing 100-Year	Alternative 1 100-Year	Change
Reed Canal at US 1 Culvert	SD	81211	718	1,160	442	972	1,087	115	1,066	1,090	24	1,292	1,235	-57
Reed Canal downstream of Railroad	SD	81285	709	1,131	422	955	1,131	176	1,046	1,131	84	1,205	1,200	-5
Reed Canal downstream of Stevens Canal	SD	81281	657	897	239	880	1,136	256	963	1,168	205	1,101	1,300	199
Reed Canal at Saul Drive culverts	SD	81221	191	224	33	224	252	29	247	260	13	306	310	4
		81221A	191	224	33	224	252	29	247	260	13	306	310	4
		81221B	191	224	33	224	252	29	247	260	13	306	310	4
Start of Reed Canal	SD	81243	536	624	88	614	688	74	665	694	29	799	821	22
Stevens Canal at Ridge Drive culvert	SD	81102	72	92	20	126	136	10	137	145	8	177	166	-11
Stevens Canal at Big Tree Road culvert	SD	81012	15	19	4	26	31	5	30	33	4	38	37	-1

SD = South Daytona

Nova Canal Flood Control and Integrated Water Resources Project
Project Alternative 1 - Peak Flows for 24-Hour Design Storms
Halifax Canal System

1-Year Stillwater														
			Peak flow (cfs)											
Location	Jurisdiction	SWMM5 Conduit	Existing Mean Annual	Alternative 1 Mean Annual	Change	Existing 10-Year	Alternative 1 10-Year	Change	Existing 25-Year	Alternative 1 25-Year	Change	Existing 100-Year	Alternative 1 100-Year	Change
To Outfall	PO	44	163	203	40	217	284	67	245	320	75	304	385	81
Nova Road culverts														
Box culvert	PO	43	164	201	38	218	284	66	245	320	75	305	385	80
Road overflow		159	0	0	0	0	0	0	0	0	0	0	0	0
36-inch culverts		HAL_36	44	13	-31	68	30	-38	80	36	-44	102	48	-54
Near Jackson Street														
Culvert	PO	37	58	60	1	74	77	3	72	78	6	54	61	8
Road overflow		1030	0	0	0	3	0	-3	20	13	-8	75	67	-8
Oak Street														
Culvert	PO	29	58	59	1	77	76	0	91	89	-2	125	123	-1
Road overflow		141	0	0	0	0	0	0	0	0	0	0	0	0
Powers Avenue														
Culvert	PO	23	40	41	1	43	44	1	41	43	1	38	39	1
Road overflow		2301	0	0	0	24	19	-5	41	38	-4	88	85	-2
Ryanwood Ave														
Culvert	PO	21	104	112	7	110	116	6	110	115	5	107	112	4
Road overflow		1381	0	0	0	0	0	0	1	1	-1	32	32	-1

100-Year Stillwater														
			Peak flow (cfs)											
Location	Jurisdiction	SWMM5 Conduit	Existing Mean Annual	Alternative 1 Mean Annual	Change	Existing 10-Year	Alternative 1 10-Year	Change	Existing 25-Year	Alternative 1 25-Year	Change	Existing 100-Year	Alternative 1 100-Year	Change
To Outfall	PO	44	144	227	83	218	227	9	258	227	-32	348	346	-2
Nova Road culverts														
Box culvert	PO	43	143	225	82	218	225	8	258	228	-30	348	346	-2
Road overflow		159	0	0	0	0	0	0	0	0	0	0	0	0
36-inch culverts		HAL_36	36	56	19	55	47	-8	64	41	-24	85	34	-51
Near Jackson Street														
Culvert	PO	37	6	9	3	8	9	1	8	9	1	9	9	0
Road overflow		1030	58	52	-6	85	80	-5	99	92	-7	134	125	-9
Oak Street														
Culvert	PO	29	48	50	2	62	66	4	68	70	3	76	78	1
Road overflow		141	16	9	-7	30	22	-8	40	31	-9	66	56	-10
Powers Avenue														
Culvert	PO	23	7	36	29	7	22	14	7	11	4	7	9	2
Road overflow		2301	42	37	-4	64	59	-5	78	72	-6	115	107	-8
Ryanwood Ave														
Culvert	PO	21	55	55	0	67	72	4	68	73	5	68	73	5
Road overflow		1381	0	0	0	11	4	-7	27	18	-9	72	62	-11

PO = Port Orange

Nova Canal Flood Control and Integrated Water Resources Project
Project Alternative 1 - Peak Flows for 24-Hour Design Storms
Nova Canal System

1-Year Stillwater														
			Peak flow (cfs)											
Location	Jurisdiction	SWMM5 Conduit	Existing Mean Annual	Alternative 1 Mean Annual	Change	Existing 10-Year	Alternative 1 10-Year	Change	Existing 25-Year	Alternative 1 25-Year	Change	Existing 100-Year	Alternative 1 100-Year	Change
Northwest Canal between 11th and 13th Streets	HH	80092	134	130	-5	130	125	-5	127	134	8	117	150	33
West of Nova Road to LPGA Canal														
Culvert	HH	80152	70	72	2	100	103	3	124	127	3	164	167	3
Road overflow weir		WEIR10@1501-1401	0	0	0	0	0	0	0	0	0	0	0	0
Nova Canal Between 10th and 11th Street														
Canal conduit	HH, VC	80141	411	415	4	433	441	8	425	434	9	373	395	22
Overland conduit		80178	0	0	0	0	0	0	4	3	-1	31	29	-1
Nova Canal north of Mason Avenue														
Closed conduit	DB	80324	73	73	1	60	61	1	51	54	3	58	58	0
Closed conduit		80325	73	73	1	60	61	1	51	54	3	58	58	0
Road overflow weir	DB	WEIR37@3203-2301	0	0	0	0	0	0	0	0	0	0	0	0
Nova Canal north of Reed Canal	SD	81241	483	501	18	552	567	15	591	607	17	743	754	11
Nova Canal south of Reed Canal	SD	81315	144	124	-21	149	148	0	159	156	-4	170	165	-4
Nova Canal to Halifax Canal	PO	Halifax	91	92	1	109	110	1	117	117	0	162	162	0

100-Year Stillwater														
			Peak flow (cfs)											
Location	Jurisdiction	SWMM5 Conduit	Existing Mean Annual	Alternative 1 Mean Annual	Change	Existing 10-Year	Alternative 1 10-Year	Change	Existing 25-Year	Alternative 1 25-Year	Change	Existing 100-Year	Alternative 1 100-Year	Change
Northwest Canal between 11th and 13th Streets	HH	80092	120	128	8	125	121	-4	123	129	6	127	138	11
West of Nova Road to LPGA Canal	HH													
Culvert	HH	80152	48	67	19	97	99	2	121	124	3	160	162	2
Road overflow weir	HH	WEIR10@1501-1401	0	0	0	0	0	0	0	0	0	0	0	0
Nova Canal Between 10th and 11th Street	HH, VC													
Canal conduit	HH, VC	80141	391	418	27	386	437	51	363	428	65	321	375	55
Overland conduit	HH, VC	80178	0	0	0	1	0	-1	7	5	-2	35	32	-3
Nova Canal north of Mason Avenue	DB													
Closed conduit	DB	80324	60	70	10	49	57	9	48	49	1	58	58	0
Closed conduit	DB	80325	60	70	10	49	57	9	48	49	1	58	58	0
Road overflow weir	DB	WEIR37@3203-2301	0	0	0	0	0	0	0	0	0	0	0	0
Nova Canal north of Reed Canal	SD	81241	416	482	66	500	553	54	545	578	33	704	748	44
Nova Canal south of Reed Canal	SD	81315	124	156	32	123	164	41	127	169	42	139	180	40
Nova Canal to Halifax Canal	PO	Halifax	57	90	33	81	88	7	106	99	-7	152	155	3

Jurisdiction
DB = Daytona Beach
HH = Holly Hill
PO = Port Orange
SD = South Daytona
VC = Volusia County

Nova Canal Flood Control and Integrated Water Resources Project
Project Alternative 1 - Peak Flows for 96-Hour Design Storms
LPGA Canal System

1-Year Stillwater														
			Peak flow (cfs)											
Location	Jurisdiction	SWMM5 Conduit	Existing Mean Annual	Alternative 1 Mean Annual	Change	Existing 10-Year	Alternative 1 10-Year	Change	Existing 25-Year	Alternative 1 25-Year	Change	Existing 100-Year	Alternative 1 100-Year	Change
Riverside Drive Culverts	HH	80087	127	143	16	160	159	-1	177	173	-4	197	193	-4
		80087A	127	143	16	160	159	-1	177	173	-4	197	193	-4
		80087B	127	143	16	160	159	-1	177	173	-4	197	193	-4
Daytona Road Culvert	HH	80085	382	430	48	480	477	-3	532	519	-13	590	579	-11
US 1 (Ridegwood) Culvert	HH	80083	382	430	48	480	477	-3	532	519	-13	590	579	-11
Railroad Trestle	HH	80081	382	657	275	480	657	177	532	656	125	590	657	67
Alta Drive Culvert	HH	80112	342	372	30	397	429	32	424	463	39	469	502	33
Center Avenue Culvert	HH	80143	336	366	30	393	413	19	421	426	5	466	467	1
Start of LPGA Canal	HH	80142	337	367	30	394	417	23	421	426	5	466	467	1

100-Year Stillwater														
			Peak flow (cfs)											
Location	Jurisdiction	SWMM5 Conduit	Existing Mean Annual	Alternative 1 Mean Annual	Change	Existing 10-Year	Alternative 1 10-Year	Change	Existing 25-Year	Alternative 1 25-Year	Change	Existing 100-Year	Alternative 1 100-Year	Change
Riverside Drive Culverts	HH	80087	125	153	29	155	153	-1	169	158	-11	186	176	-10
		80087A	125	153	29	155	153	-1	169	158	-11	186	176	-10
		80087B	125	153	29	155	153	-1	169	158	-11	186	176	-10
Daytona Road Culvert	HH	80085	374	391	17	464	430	-34	507	474	-33	558	528	-30
US 1 (Ridegwood) Culvert	HH	80083	374	376	2	464	430	-34	507	474	-33	558	528	-30
Railroad Trestle	HH	80081	374	655	281	464	655	190	507	655	148	558	655	97
Alta Drive Culvert	HH	80112	310	358	48	368	415	47	404	456	52	457	460	3
Center Avenue Culvert	HH	80143	305	345	40	366	386	21	401	410	10	453	451	-2
Start of LPGA Canal	HH	80142	306	349	43	366	389	23	401	411	10	453	452	-1

HH = Holly Hill

Nova Canal Flood Control and Integrated Water Resources Project
Project Alternative 1 - Peak Flows for 96-Hour Design Storms
LPGA Canal Branch Systems

1-Year Stillwater														
			Peak flow (cfs)											
Location	Jurisdiction	SWMM5 Conduit	Existing Mean Annual	Alternative 1 Mean Annual	Change	Existing 10-Year	Alternative 1 10-Year	Change	Existing 25-Year	Alternative 1 25-Year	Change	Existing 100-Year	Alternative 1 100-Year	Change
Walker Street Culvert	HH	80064	50	63	13	60	81	21	63	85	22	56	90	34
Flomich Avenue Culvert	HH	80061	49	69	20	59	90	32	66	103	37	68	112	44
From Railroad Ditch north to Tomoka Basin	OB	HAND_TO_STOR	5	0	-5	186	101	-86	413	246	-167	783	571	-213
Southeast Canal at 10th St Culvert	HH	80133	61	67	6	73	72	0	77	76	-1	83	81	-2
Southeast Canal at 8th St Culvert	HH	80165	128	141	13	123	149	26	121	149	28	115	146	31
Southeast Canal at 6th St Culverts	HH	80162	50	54	4	56	66	10	56	70	14	55	72	17
		80163	35	38	3	39	46	7	39	49	10	38	50	12
Southeast Canal at 3rd St Culverts	HH	80204	21	21	0	18	19	1	17	19	3	15	18	4
		80204A	21	21	0	18	19	1	17	19	3	15	18	4
Start of Southeast Canal (at Mason)	DB	80264	28	26	-2	29	28	-1	33	32	-1	34	34	0

100-Year Stillwater														
			Peak flow (cfs)											
Location	Jurisdiction	SWMM5 Conduit	Existing Mean Annual	Alternative 1 Mean Annual	Change	Existing 10-Year	Alternative 1 10-Year	Change	Existing 25-Year	Alternative 1 25-Year	Change	Existing 100-Year	Alternative 1 100-Year	Change
Walker Street Culvert	HH	80064	40	65	26	47	81	34	46	87	41	45	88	43
Flomich Avenue Culvert	HH	80061	39	66	26	46	87	41	46	100	55	47	86	39
From Railroad Ditch north to Tomoka Basin	OB	HAND_TO_STOR	267	4	-263	505	161	-344	179	305	126	211	651	439
Southeast Canal at 10th St Culvert	HH	80133	60	79	19	68	82	15	73	91	17	82	79	-3
Southeast Canal at 8th St Culvert	HH	80165	87	130	43	91	135	44	93	137	44	92	134	42
Southeast Canal at 6th St Culverts	HH	80162	33	53	19	37	60	23	40	63	24	42	66	24
		80163	23	37	14	26	42	16	28	44	17	29	46	17
Southeast Canal at 3rd St Culverts	HH	80204	12	20	8	12	19	7	13	19	6	15	19	4
		80204A	12	20	8	12	19	7	13	19	6	15	19	4
Start of Southeast Canal (at Mason)	DB	80264	30	35	6	30	35	6	30	35	6	30	35	6

DB = Daytona Beach
HH = Holly Hill
OB = Ormond Beach

Nova Canal Flood Control and Integrated Water Resources Project
Project Alternative 1 - Peak Flows for 96-Hour Design Storms
Reed Canal System

1-Year Stillwater														
			Peak flow (cfs)											
Location	Jurisdiction	SWMM5 Conduit	Existing Mean Annual	Alternative 1 Mean Annual	Change	Existing 10-Year	Alternative 1 10-Year	Change	Existing 25-Year	Alternative 1 25-Year	Change	Existing 100-Year	Alternative 1 100-Year	Change
Reed Canal at US 1 Culvert	SD	81211	1,020	1,381	361	1,280	1,539	259	1,456	1,506	50	1,677	1,618	-59
Reed Canal downstream of Railroad	SD	81285	1,004	1,311	307	1,252	1,316	64	1,370	1,316	-55	1,499	1,339	-161
Reed Canal downstream of Stevens Canal	SD	81281	930	998	69	1,148	1,190	42	1,261	1,313	52	1,383	1,397	14
Reed Canal at Saul Drive culverts	SD	81221	218	232	13	251	256	6	285	289	3	326	326	0
		81221A	218	232	13	251	256	6	285	289	3	326	326	0
		81221B	218	232	13	251	256	6	285	289	3	326	326	0
Start of Reed Canal	SD	81243	611	642	31	710	708	-3	763	768	5	855	853	-2
Stevens Canal at Ridge Drive culvert	SD	81102	111	116	5	170	177	7	192	194	2	215	204	-11
Stevens Canal at Big Tree Road culvert	SD	81012	23	23	0	38	39	2	42	43	1	47	46	-1

100-Year Stillwater														
			Peak flow (cfs)											
Location	Jurisdiction	SWMM5 Conduit	Existing Mean Annual	Alternative 1 Mean Annual	Change	Existing 10-Year	Alternative 1 10-Year	Change	Existing 25-Year	Alternative 1 25-Year	Change	Existing 100-Year	Alternative 1 100-Year	Change
Reed Canal at US 1 Culvert	SD	81211	795	1,179	384	1,021	1,086	65	1,170	1,156	-13	1,346	1,250	-96
Reed Canal downstream of Railroad	SD	81285	783	1,131	348	1,005	1,131	126	1,106	1,131	25	1,214	1,219	4
Reed Canal downstream of Stevens Canal	SD	81281	723	925	202	928	1,138	210	1,020	1,213	193	1,114	1,242	127
Reed Canal at Saul Drive culverts	SD	81221	192	222	30	231	252	21	266	275	9	309	316	7
		81221A	192	222	30	231	252	21	266	275	9	309	316	7
		81221B	192	222	30	231	252	21	266	275	9	309	316	7
Start of Reed Canal	SD	81243	540	621	81	634	680	47	706	730	25	808	821	13
Stevens Canal at Ridge Drive culvert	SD	81102	85	108	23	134	142	8	154	154	0	189	168	-21
Stevens Canal at Big Tree Road culvert	SD	81012	19	23	4	29	32	3	34	34	0	39	37	-2

SD = South Daytona

Nova Canal Flood Control and Integrated Water Resources Project
Project Alternative 1 - Peak Flows for 96-Hour Design Storms
Halifax Canal System

1-Year Stillwater														
			Peak flow (cfs)											
Location	Jurisdiction	SWMM5 Conduit	Existing Mean Annual	Alternative 1 Mean Annual	Change	Existing 10-Year	Alternative 1 10-Year	Change	Existing 25-Year	Alternative 1 25-Year	Change	Existing 100-Year	Alternative 1 100-Year	Change
To Outfall	PO	44	170	210	39	225	294	69	260	321	61	305	371	66
Nova Road culverts														
Box culvert	PO	43	171	208	37	226	294	69	261	321	61	305	372	67
Road overflow		159	0	0	0	0	0	0	0	0	0	0	0	0
36-inch culverts		HAL_36	47	16	-31	71	32	-39	86	40	-46	103	48	-54
Near Jackson Street														
Culvert	PO	37	61	63	2	71	77	5	62	69	6	51	56	5
Road overflow		1030	0	0	0	15	8	-7	43	36	-8	87	81	-6
Oak Street														
Culvert	PO	29	61	63	2	86	84	-2	105	104	-2	162	131	-31
Road overflow		141	0	0	0	0	0	0	0	0	0	32	0	-32
Powers Avenue														
Culvert	PO	23	41	42	0	42	43	1	40	41	1	40	40	1
Road overflow		2301	0	0	0	34	30	-3	56	53	-3	92	90	-2
Ryanwood Ave														
Culvert	PO	21	98	101	3	98	102	4	93	97	4	91	92	1
Road overflow		1381	0	0	0	0	0	0	7	6	-1	31	31	-1

100-Year Stillwater														
			Peak flow (cfs)											
Location	Jurisdiction	SWMM5 Conduit	Existing Mean Annual	Alternative 1 Mean Annual	Change	Existing 10-Year	Alternative 1 10-Year	Change	Existing 25-Year	Alternative 1 25-Year	Change	Existing 100-Year	Alternative 1 100-Year	Change
To Outfall	PO	44	150	227	77	231	227	-4	282	227	-55	349	236	-112
Nova Road culverts														
Box culvert	PO	43	150	225	75	231	225	-5	282	225	-57	348	243	-105
Road overflow		159	0	0	0	0	0	0	0	0	0	0	0	0
36-inch culverts		HAL_36	38	77	39	58	71	13	70	67	-3	85	62	-23
Near Jackson Street														
Culvert	PO	37	6	28	22	8	27	19	8	22	14	9	16	8
Road overflow		1030	61	47	-15	89	73	-16	107	88	-19	133	110	-23
Oak Street														
Culvert	PO	29	50	55	5	63	71	8	69	74	5	76	78	3
Road overflow		141	18	8	-10	33	13	-21	46	24	-22	66	42	-24
Powers Avenue														
Culvert	PO	23	7	36	29	7	37	30	7	37	30	7	37	30
Road overflow		2301	44	32	-12	67	59	-9	86	74	-12	113	97	-16
Ryanwood Ave														
Culvert	PO	21	58	69	12	67	81	14	68	82	15	67	81	14
Road overflow		1381	0	0	0	15	2	-13	36	17	-19	69	46	-23

PO = Port Orange

Nova Canal Flood Control and Integrated Water Resources Project
Project Alternative 1 - Peak Flows for 96-Hour Design Storms
Nova Canal System

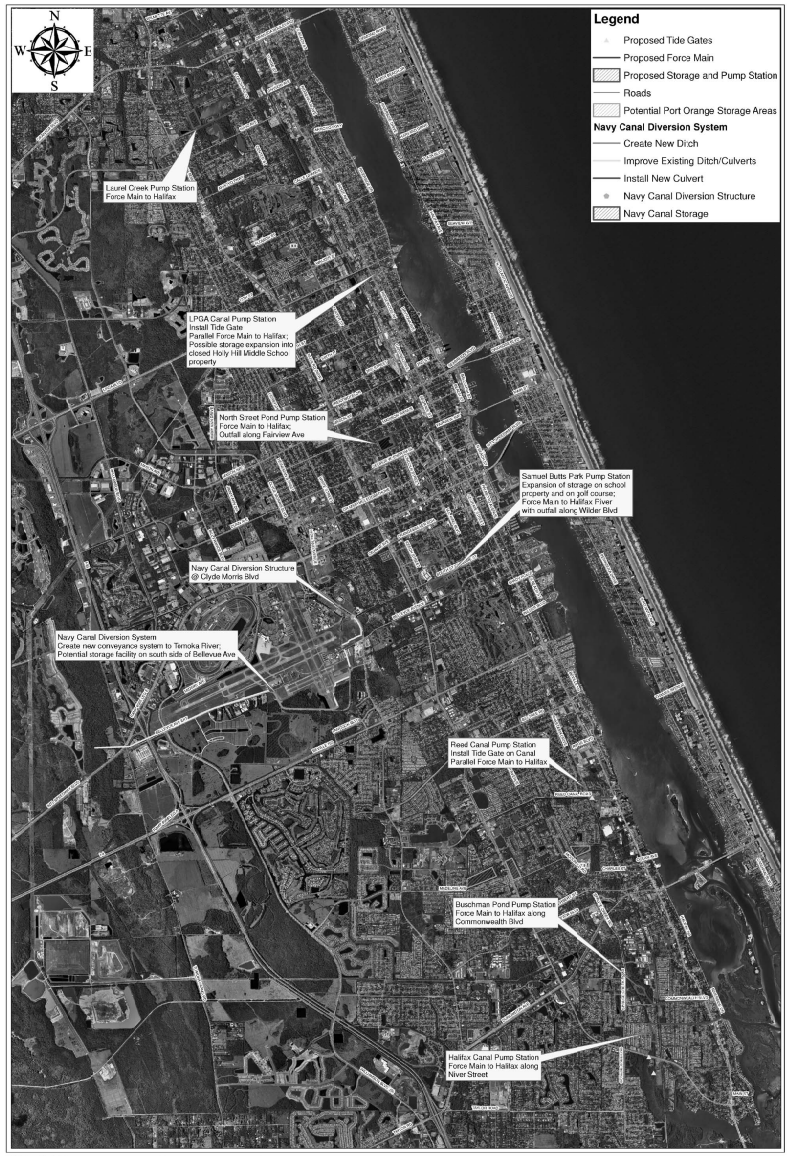
1-Year Stillwater														
			Peak flow (cfs)											
Location	Jurisdiction	SWMM5 Conduit	Existing Mean Annual	Alternative 1 Mean Annual	Change	Existing 10-Year	Alternative 1 10-Year	Change	Existing 25-Year	Alternative 1 25-Year	Change	Existing 100-Year	Alternative 1 100-Year	Change
Northwest Canal between 11th and 13th Streets	HH	80092	144	140	-4	134	131	-2	134	144	10	147	157	10
West of Nova Road to LPGA Canal														
Culvert	HH	80152	64	67	4	125	130	4	151	155	4	172	175	3
Road overflow weir		WEIR10@1501-1401	0	0	0	0	0	0	0	0	0	0	0	0
Nova Canal Between 10th and 11th Street														
Canal conduit	HH, VC	80141	430	436	6	417	431	14	376	403	27	316	360	45
Overland conduit		80178	0	0	0	1	1	0	9	7	-1	32	30	-2
Nova Canal north of Mason Avenue														
Closed conduit	DB	80324	75	76	1	57	59	2	48	49	0	59	59	0
Closed conduit		80325	75	76	1	57	59	2	48	49	0	59	59	0
Road overflow weir		WEIR37@3203-2301	0	0	0	0	0	0	0	0	0	0	0	0
Nova Canal north of Reed Canal	SD	81241	496	516	20	573	581	8	646	658	13	770	780	10
Nova Canal south of Reed Canal	SD	81315	144	131	-13	153	150	-3	163	158	-5	167	168	2
Nova Canal to Halifax Canal	PO	Halifax	100	99	-1	116	116	0	124	125	1	161	160	-1

100-Year Stillwater														
			Peak flow (cfs)											
Location	Jurisdiction	SWMM5 Conduit	Existing Mean Annual	Alternative 1 Mean Annual	Change	Existing 10-Year	Alternative 1 10-Year	Change	Existing 25-Year	Alternative 1 25-Year	Change	Existing 100-Year	Alternative 1 100-Year	Change
Northwest Canal between 11th and 13th Streets	HH	80092	126	139	14	126	127	1	121	136	16	133	147	14
West of Nova Road to LPGA Canal														
Culvert	HH	80152	59	66	7	123	127	4	149	153	4	170	172	3
Road overflow weir		WEIR10@1501-1401	0	0	0	0	0	0	0	0	0	0	0	0
Nova Canal Between 10th and 11th Street														
Canal conduit	HH, VC	80141	401	437	35	361	430	69	313	401	89	287	341	54
Overland conduit		80178	0	0	0	2	1	-2	12	8	-4	37	32	-6
Nova Canal north of Mason Avenue														
Closed conduit	DB	80324	60	75	15	48	59	11	48	49	1	59	59	0
Closed conduit		80325	60	75	15	48	59	11	48	49	1	59	59	0
Road overflow weir		WEIR37@3203-2301	0	0	0	0	0	0	0	0	0	0	0	0
Nova Canal north of Reed Canal	SD	81241	425	494	69	523	563	39	605	637	33	731	771	40
Nova Canal south of Reed Canal	SD	81315	124	145	21	123	156	33	128	164	36	137	182	45
Nova Canal to Halifax Canal	PO	Halifax	63	91	28	94	92	-2	126	117	-9	153	160	7

DB = Daytona Beach
HH = Holly Hill
PO = Port Orange
SD = South Daytona
VC = Volusia County

Appendix D

Concept Layouts



NOVA CANAL FLOOD CONTROL PROJECT COMPONENTS AND ALTERNATIVES

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EASTERN VOLUSIA REGIONAL WATER AUTHORITY
VOLUSIA COUNTY, FLORIDA

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PROJECT NO. 87458-73553
FILE NAME:
SHEET NO.
1

PRELIMINARY

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