



City of Tallahassee

300 South Adams Street B-26
Tallahassee, FL 32301

Excerpt from:

2035 Master Sewer Plan Update

February 19, 2016
Final Report

Report Prepared By:



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HMM Project No. 342595

Executive Summary

Introduction

This report presents the City of Tallahassee *2035 Master Sewer Plan Update*. The report contains an update to the City's existing Sewer Trunk System Model to include conceptual future piping, infrastructure, and projected wastewater flows through the year 2035. This report also provides hydraulic and capacity analysis observations, and recommends improvements for a 20-year Capital Improvements Program (CIP).

The CIP serves as a planning tool and is not intended to be used as a mandate to construct the projects. The City will need to monitor growth and may need to adjust the CIP schedule and timing of projects as growth occurs, and as dictated by economic feasibility and available funding. For example, growth in one development may occur more quickly than projected, and as such, certain improvements may need to happen sooner than indicated. On the other hand, growth may not return as quickly as projected, meaning certain projects will be delayed.

This report meets the requirements of the May 2005 Water and Sewer Agreement between the City of Tallahassee and Leon County, which stipulates that the City maintain a long-range master plan for the provision of sewer service.

Hatch Mott MacDonald (HMM) was selected by the City to perform the 2035 Master Sewer Plan Update and also completed the 2030 Master Sewer Plan in 2010. An overview of the key components of the project is highlighted below.

2014 Trunk System Model Summary

The existing 2014 Trunk System Model consists of all City-owned pump stations and force mains, along with gravity sewers 10 inches and larger in diameter. Some gravity sewers less than 10 inches are included only to ensure connectivity between the existing gravity and force main systems.

Urban Service Area Population Projections

The Master Sewer Plan Update service area is the area within the existing USA and Woodville. HMM received GIS information from the City containing 2007 and 2035 population projection information. This population data is categorized according to TAZ boundaries, and includes all of Leon County.

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The consultant used linear interpolation and GIS to estimate TAZ populations for years 2015, 2020, 2025, 2030, and 2035. Population projections were multiplied by 100 gallons per capita-day (gpcd) to estimate the total wastewater flow for each planning year.

Unsewered Area Evaluation Summary

A detailed analysis, including updated opinion of probable construction cost, of 13 unsewered target areas was performed to determine the present day cost required to provide central sewer to these areas. HMM personnel studied each area to verify the general topography, the extent of existing development, and the proximity to existing sanitary sewer system infrastructure, from which new infrastructure would be extended to serve each respective area.

Other Franchise and Unsewered Areas Evaluation Summary

Talquin Electric Cooperative (Talquin) has four water and sewer franchise areas within the existing USA. Talquin owns and operates a wastewater treatment plant in each of its four USA franchise areas.

Wastewater flows from each of the four Talquin franchise areas for this 2035 Master Sewer Plan Update were estimated as described previously. All 2035 projected wastewater flow from the four TEC franchise areas has been incorporated into the 2035 Trunk System Model.

In order to ensure flow from other unsewered areas was included in the overall 2035 Master Sewer Plan Update, HMM and the City worked jointly to adjust and expand the sewershed basin boundaries to include the entire USA. These new basin demarcations subdivide the entire USA into discrete sewersheds, most of which will be served by an existing master pump station.

2035 Trunk System Model Summary

The 2035 Trunk System Model was adapted by the City from the 2030 model created for the 2030 Master Sewer Plan, completed in 2010.

This model contains all force mains and pump stations, and all gravity sewers 10-inches diameter and larger. Reaches of gravity sewer less than 10-inches diameter were included where required for connectivity.

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Once the 2035 dry- and wet-weather Trunk System Models were fully established and running, HMM performed a capacity and operational assessment of the gravity sewer system, pump stations, and sewer force main system, in order to establish an updated 2035 infrastructure solution set.

Sewer System Capacity Analysis Summary

The model's gravity sewer system capacity was analyzed on a depth-of-flow basis. Gravity sewers flowing full were considered to be at 100 percent capacity to identify potential problem areas. There are no overflowing, or "flooding," manholes in the final wet-weather 2035 Trunk System Model. There were several reaches of gravity sewers flowing full under the 2035 wet-weather scenario. Profiles of several longer stretches of gravity sewers flowing full were extracted from the model output. The majority of the surcharging conditions do not warrant additional analysis or concern.

A force main capacity analysis was also performed, using a limiting condition of 6.5 feet per second (fps) maximum instantaneous velocity. The majority of these force mains have average velocities much less than 6.5 fps. Four reaches of the Capital Circle Force Main have average velocities above 10 fps.

20-Year Capital Improvements Program Summary

A sanitary sewer system 20-Year Capital Improvements Program through the year 2035 was developed. At the City's request, the 20-Year CIP lists improvements in one-year increments through 2020, then in five-year increments thereafter. This phasing plan is for general guidance only, and individual projects will be driven by both policy decisions and available funds as the City's sewer system expands.

Summary & Recommendations

- The City of Tallahassee's *InfoSWMM* Trunk System Model represents a valid working model of the existing system as of 2014. All model entities are matched one-to-one with the City's GIS.
- A detailed analysis of 13 unsewered target areas was performed to determine the present day cost required to provide central sewer to these areas.
- Population projections for the existing USA were established via TAZ data provided by the Tallahassee – Leon County Planning Department (2014).

Executive Summary

- The 2035 Trunk System Model was established to provide sewer service to the entire existing USA, and the Woodville Rural Community.
- Capacity analysis of the gravity system showed minor manhole surcharging in the system during wet-weather. Most of the observed gravity system surcharging is of little concern, due to minimal surcharging of manholes and significant system storage capacity prior to surface discharge (manhole “flooding”). Minor surcharging of the system and manholes without detriment to connected customers or risk of overflow is acceptable, practical and economical. These reaches should be periodically reviewed for rehabilitation, repair, or replacement in order to reduce RDII entering the system upstream of the applicable area.
- The Shannon Lakes area tributary to PS84 should be monitored as the flows in this area of the system increase over the Master Planning period. This trunk system was identified in the 2030 Master Sewer Plan, prepared in 2010, as an area of interest, due to irregular pipe slopes, negative pipe slopes, and larger pipes upstream of smaller diameter pipes.
- All pump stations were reviewed for both dry- and wet-weather operation, and some inefficiencies in pump cycle times were observed, many of which may be rectified by adjusting pump operating levels. Several pump stations run minimally throughout the day and have significant capacity available for future flows.
- The wet-weather force main capacity analysis revealed several instances where force mains are either nearing or are exceeding capacity, based on a limiting condition of 6.5 fps. Velocities in four reaches of the large diameter CCFM average 10 fps and above.

The following recommendations are offered to the City as a result of this project:

- Continue updating the model’s physical data, calibration (via flow monitoring), and operating scenario(s) to reflect evolving system conditions, operating protocol(s), and bypassing capabilities.
- Develop a Trunk System Model maintenance guidelines and specifications protocol, to ensure modifications are uniformly made to the Trunk System Model by all entities who use of the model. A semiannual update period is recommended.
- Consider adjustments to several pump station operating levels, to better equalize the stations’ performance.

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- Consider modifications to several pump impellers and/ or motors, to better equalize the stations' performance, enabling pumps to operate more efficiently.
- Now that RDII into Pump Station 36 trunk system has been studied via a flow monitoring program, remedial actions should be undertaken where practicable to reduce flows into and out of this pump station.
- Continue coordinating development of the Capital Circle West/ Southwest Force Main with the proposed widening of Capital Circle.

FIGURE 2-1: 2014 OVERALL TRUNK SYSTEM MODEL

MAY 2015

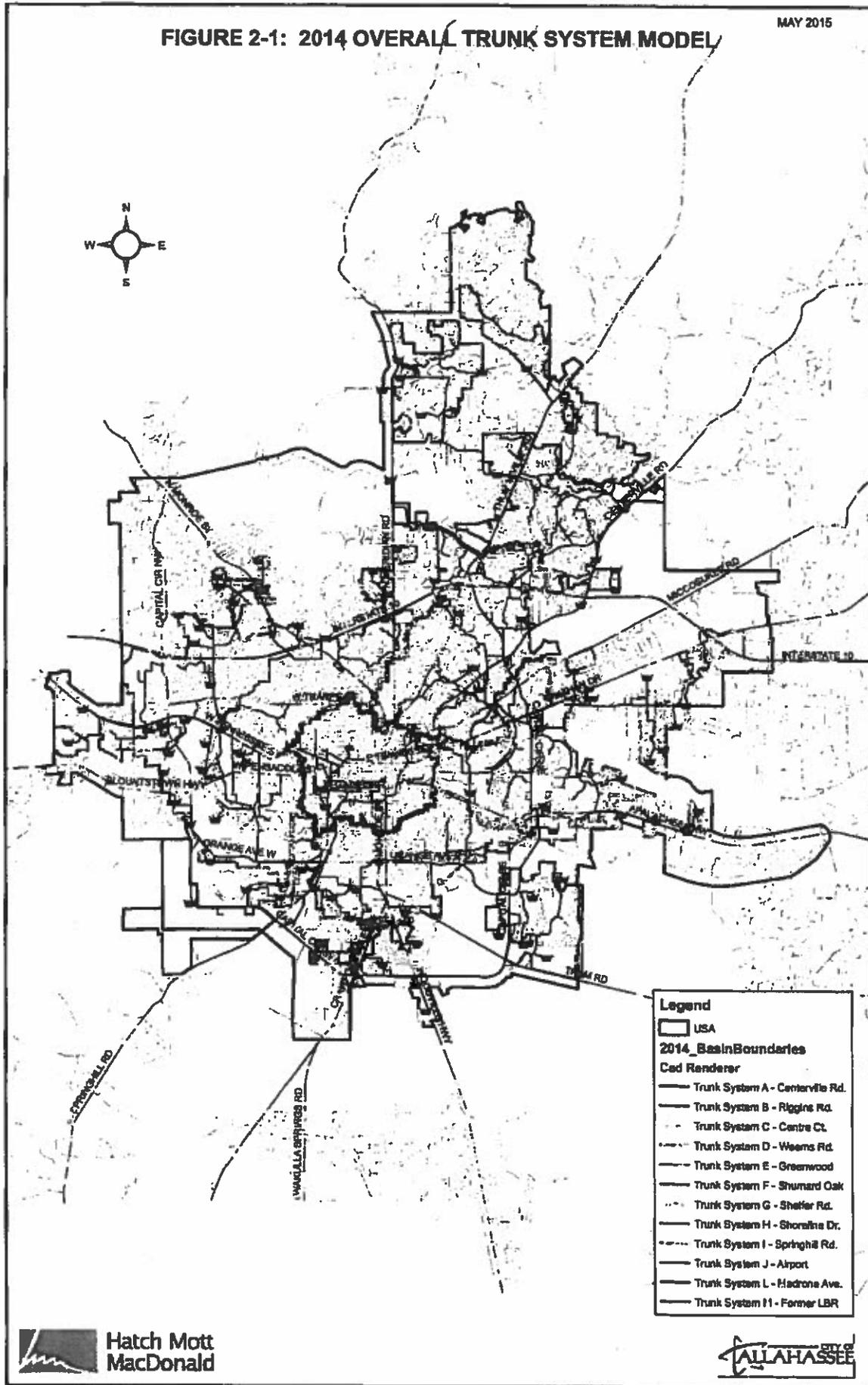
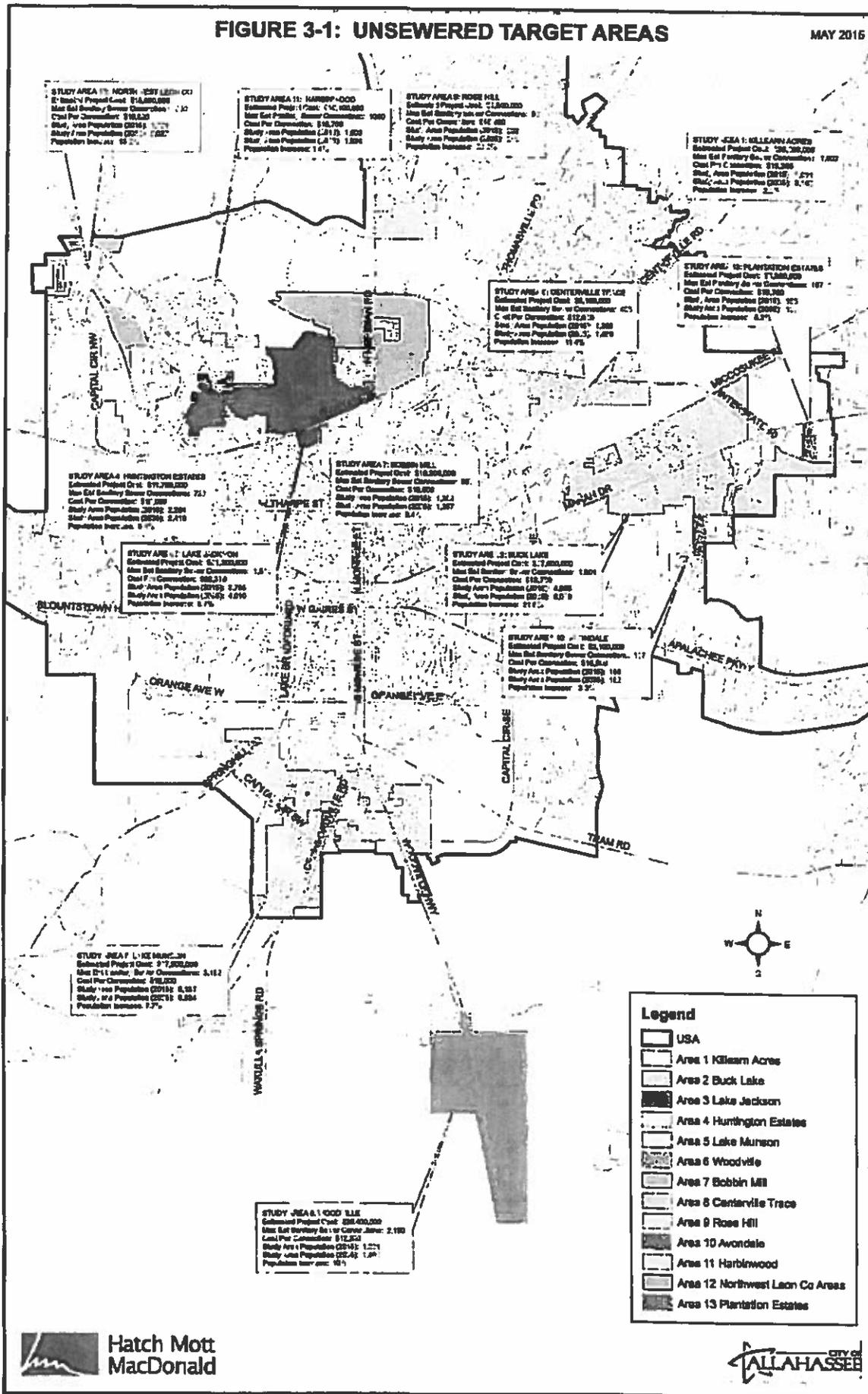


FIGURE 3-1: UNSEWERED TARGET AREAS

MAY 2015



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**TABLE 7-1: USA Master Plan Projects
(Continued)**

Large Unsewered Area Improvements (Not Included in Target Unsewered Areas)

Project ID	Project Description	Construction Cost	Engineering/ Inspection Cost	Estimated Capital Cost
A-09	Maclean Hills	\$3,455,000	\$588,000	\$4,043,000
A-10	Ox Bottom	\$5,423,000	\$922,000	\$6,345,000
A-11	Spencer	\$2,832,000	\$482,000	\$3,314,000
A-12	High Grove	\$3,896,000	\$663,000	\$4,559,000
A-13	Velde Dairy	\$2,602,000	\$443,000	\$3,045,000
A-14	Rabbit Pond	\$2,553,000	\$435,000	\$2,988,000
B-01	Middlebrook	\$728,000	\$124,000	\$852,000
D-03	Apalachee Parkway East	\$416,000	\$71,000	\$487,000
D-06	Davis Subdivision	\$1,974,000	\$336,000	\$2,310,000
D-07	Tongue Hill	\$1,974,000	\$336,000	\$2,310,000
D-08	Windwood Hills	\$1,322,000	\$225,000	\$1,547,000
D-09a	Apalachee Pkwy / Williams Road	\$2,004,500	\$341,000	\$2,345,500
D-09b	Apalachee Pkwy / Williams Road	\$2,108,000	\$359,000	\$2,467,000
D-10a	Twin Lakes Subdivision	\$543,000	\$92,000	\$635,000
D-10b	Twin Lakes Subdivision	\$1,368,000	\$232,000	\$1,600,000
E-01	CCSE (Sembler) Pump Station & Force Main	\$522,000	\$89,000	\$611,000
H-08	West Tennessee Street Pump Station	\$360,000	\$62,000	\$422,000
H-09	West Jackson Bluff	\$5,183,000	\$882,000	\$6,065,000
H-16	W. B. Rodgers Gravity Main	\$389,000	\$67,000	\$456,000
H-20	Highway 20 West	\$1,979,000	\$337,000	\$2,316,000
H-21	Highway 90 West	\$6,178,000	\$1,051,000	\$7,229,000
I-02	Lake Bradford Road	\$3,333,000	\$567,000	\$3,900,000

Total Large Unsewered Area Improvements \$59,846,500

Total Estimated Capital Cost \$328,025,500

Notes:

- 1) Blue text = capacity related improvements.
- 2) Red text = target unsewered area related improvements.
- 3) Green text = operational strategy related improvements.
- 4) Purple text = large unsewered area related improvements.

Estimated Total of City of Tallahassee CIP \$38,134,500

Total of Currently Unfunded Projects \$289,891,000



Sort by Project Type



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**TABLE 7-1: USA Master Plan Projects
(Continued)**

Target Unsewered Area Related Improvements

Project ID	Project Description	Construction Cost	Engineering/ Inspection Cost	Estimated Capital Cost
A-07	Rose Hill	\$3,839,000	\$653,000	\$4,492,000
A-08	Killearn Acres	\$22,315,000	\$3,794,000	\$26,109,000
C-01	Centerville Trace	\$5,188,000	\$882,000	\$6,070,000
D-05	Buck Lake	\$32,103,000	\$5,458,000	\$37,561,000
D-11	Avondale	\$2,586,000	\$440,000	\$3,026,000
D-12	Plantation Estates	\$2,780,000	\$473,000	\$3,253,000
H-17	Lake Jackson	\$26,612,000	\$4,525,000	\$31,137,000
H-18	Bobbin Mill	\$13,919,000	\$2,367,000	\$16,286,000
H-19	Huntington Estates	\$9,930,000	\$1,689,000	\$11,619,000
H-22	Harbinwood Estates	\$15,426,000	\$2,623,000	\$18,049,000
H-23	Northwest Leon County	\$13,477,000	\$2,292,000	\$15,769,000
L-01	Lake Munson	\$32,361,000	\$5,502,000	\$37,863,000
N-01	Woodville	\$22,490,000	\$3,824,000	\$26,314,000
Total Target Unsewered Area Related Improvements				\$237,548,000

Notes:

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**Hatch Mott
MacDonald**

Sort by Project Type



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TABLE 7-1: USA Master Plan Projects

Capacity Related Improvements

Project ID	Project Description	Construction Cost	Engineering/ Inspection Cost	Estimated Capital Cost
B-04	Killearn Trunk Outfall Upgrade During Eastgate Drainage Improvements	\$888,000	\$151,000	\$1,039,000
D-04	Pump Station 33 Upgrade	\$420,000	\$72,000	\$492,000
G-01	Pump Station 137 (Tied to CCFM)	\$1,056,000	\$180,000	\$1,236,000
H-01	Capital Circle West Force Main - Phase 1 (PS 73 to Hwy 90)	\$300,000	\$0	\$300,000
H-02	Capital Circle West Force Main - Phase 2 (TPS to PS 73)	\$3,238,000	\$551,000	\$3,789,000
H-11	Pump Station 157 Force Main Extension	\$141,000	\$24,000	\$165,000
H-13	Mission Road Gravity Sewer Upgrade	\$611,000	\$104,000	\$715,000
I-03	Pump Station 127 Pump Upgrade	\$64,000	\$11,000	\$75,000
I-04	Jake Galther Inverted Siphon Modifications	\$330,000	\$57,000	\$387,000
M-02	Varsity Drive Upgrade	\$208,000	\$36,000	\$244,000
M-03	Pump Station 123 Force Main Extension to Airport Drive	\$81,000	\$14,000	\$95,000

Total Capacity Related Improvements **\$8,537,000**
(2.6% of CIP total)

Notes:

- 1) Blue text = capacity related improvements.
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- 3) Green text = operational strategy related improvements.
- 4) Purple text = large unsewered area related improvements.



Sort by Project Type



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**TABLE 7-1: USA Master Plan Projects
(Continued)**

Operational Strategy Related Improvements

Project ID	Project Description	Construction Cost	Engineering/ Inspection Cost	Estimated Capital Cost
A-02	Pump Station 112 Gravity Outfall	\$318,000	\$55,000	\$373,000
A-03	Pump Station 129 Gravity Outfall	\$470,000	\$80,000	\$550,000
A-04a	Pump Station 128 Gravity Outfall	\$384,000	\$66,000	\$450,000
A-04b	Pump Station 128 Gravity Outfall	\$128,000	\$22,000	\$150,000
A-05	Pump Station 85 Gravity Outfall	\$460,000	\$79,000	\$539,000
A-15	Velda Dairy 15" Gravity Sewer Upgrade	\$252,000	\$43,000	\$295,000
A-16	Replace Drop Manhole SH28379	\$12,000	\$3,000	\$15,000
A-17	Pump Station 155 Force Main Discharge into Velda Dairy Gravity Sewer	\$8,000	\$2,000	\$10,000
B-03	Raymond Diehl Road 10" Force Main Extension	\$30,000	\$5,000	\$35,000
D-01	Pump Station 13 Gravity Outfall	\$287,000	\$49,000	\$336,000
D-13	PS 74 Parallel Force Main	\$425,000	\$73,000	\$498,000
F-01	Flow Control Valve on CCSE Force Main	\$300,000	\$51,000	\$351,000
G-02	Capital Circle 42" Force Main Valves and Bleed-Offs	\$496,000	\$85,000	\$581,000
H-03	Pump Station 160 Gravity Outfall	\$811,000	\$138,000	\$949,000
H-04	CCNW Pump Station and Force Main	\$1,689,000	\$288,000	\$1,977,000
H-05	Pump Station 37 Gravity Outfall & Pump Station 78 Upgrade	\$531,000	\$91,000	\$622,000
H-06	Pump Station 95 Gravity Outfall	\$345,000	\$30,000	\$375,000
H-10	Capital Circle West Force Main - Phase 3 (PS Talquin2 to Hwy 90)	\$2,514,000	\$428,000	\$2,942,000
H-12	Pump Station 66 Relocation	\$362,000	\$62,000	\$424,000
H-24a	PS 12 Parallel Force Main	\$3,470,000	\$590,000	\$4,060,000
H-24b	PS 12 Parallel Force Main	\$876,000	\$149,000	\$1,025,000
H-25a	PS 12 Replacement	\$171,000	\$29,000	\$200,000
H-25b	PS 12 Replacement	\$256,000	\$44,000	\$300,000
H-25c	PS 12 Replacement	\$775,000	\$125,000	\$900,000
H-25d	PS 12 Replacement	\$1,260,000	\$215,000	\$1,475,000
I-05	TPSWRF Force Main/ Valve Manifold	\$1,110,000	\$190,000	\$1,300,000
J-01	Pump Station 117 (Tied to CCSWFM)	\$10,000	\$2,000	\$12,000
M-01a	Gravity Sewer Line from Lake Bradford Road to Gamble St.	\$600,000	\$150,000	\$750,000
M-01b	Gravity Sewer Line from Lake Bradford Road to Gamble St.	\$600,000	\$0	\$600,000

Total Operational Strategy Related Improvements

**\$22,094,000
(6.7% of CIP total)**

Notes:

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Sort by Project Type



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TABLE 7-2: 20-Year Master Plan Improvements *
2015 - 2035 Phasing

Phase I (2015 - 2020)

Year	Project ID	Project Description	Construction Cost	Engineering/ Inspection Cost	Estimated Capital Cost
2015	H-01	Capital Circle West Force Main - Phase 1 (PS 73 to Hwy 90)	\$300,000	\$0	\$300,000
2015	H-06	Pump Station 95 Gravity Outfall	\$345,000	\$30,000	\$375,000
2015	H-11	Pump Station 157 Force Main Extension	\$141,000	\$21,000	\$165,000
2015	D-01	Pump Station 12 Gravity Outfall	\$287,000	\$49,000	\$336,000
2015	M-01a	Gravity Sewer Line from Lake Bradford Road to Gamble St.	\$600,000	\$150,000	\$750,000
2016	M-01b	Gravity Sewer Line from Lake Bradford Road to Gamble St.	\$600,000	\$0	\$600,000
2016	I-05	TFSWRP Force Main/ Valve Manifold	\$1,110,000	\$190,000	\$1,300,000
2016	H-24a	PS 12 Parallel Force Main	\$3,470,000	\$590,000	\$4,060,000
2016	H-25a	PS 12 Replacement	\$171,000	\$29,000	\$200,000
2017	A-02	Pump Station 112 Gravity Outfall	\$318,000	\$52,000	\$373,000
2017	D-10a	Twin Lakes Subdivision	\$343,000	\$92,000	\$635,000
2017	H-16	W. B. Rodgers Gravity Main	\$789,000	\$67,000	\$456,000
2017	A-04a	Pump Station 128 Gravity Outfall	\$384,000	\$66,000	\$450,000
2017	A-16	Replace Drop Manhole SH23379	\$12,000	\$3,000	\$15,000
2017	B-03	Raymond Dishl Road 18" Force Main Extension	\$30,000	\$3,000	\$33,000
2017	H-24b	PS 12 Parallel Force Main	\$876,000	\$149,000	\$1,025,000
2017	H-25b	PS 12 Replacement	\$256,000	\$44,000	\$300,000
2017	I-04	John Gailther Inverted Siphon Modifications	\$330,000	\$37,000	\$187,000
2017	M-02	Varsity Drive Upgrade	\$308,000	\$36,000	\$244,000
2018	A-04b	Pump Station 128 Gravity Outfall	\$128,000	\$21,000	\$150,000
2018	D-10b	Twin Lakes Subdivision	\$1,368,000	\$232,000	\$1,600,000
2018	H-25c	PS 12 Replacement	\$775,000	\$125,000	\$900,000
2018	A-17	Pump Station 155 Force Main Discharge into Velda Dairy Gravity Sewer	\$8,000	\$2,000	\$10,000
2018	A-19	Velda Dairy 15" Gravity Sewer Upgrade	\$252,000	\$43,000	\$295,000
2018	M-03	Pump Station 123 Force Main Extension to Airport Drive	\$81,000	\$14,000	\$95,000
2018	D-13	PS 74 Parallel Force Main	\$425,000	\$73,000	\$497,000
2019	D-09a	Apalachee Pinery / Williams Road	\$2,004,500	\$341,000	\$2,345,500
2019	H-25d	PS 12 Replacement	\$1,160,000	\$215,000	\$1,475,000
2020	D-09b	Apalachee Pinery / Williams Road	\$2,104,000	\$359,000	\$2,467,000

Notes:

- 1) Blue text = capacity related improvements.
- 2) Green text = operational strategy related improvements.
- 3) Purple text = large unsewered area related improvements.
- 4) Note that \$2,150,000 has been allocated for MP projects. Any costs above that allocation will be funded via other sources.
- 5) Note that \$2,260,000 has been allocated for MP projects. Any costs above that allocation will be funded via other sources.
- 6) Note that \$2,305,200 has been allocated for MP projects. Any costs above that allocation will be funded via other sources.
- 7) Note that \$2,420,500 has been allocated for MP projects. Any costs above that allocation will be funded via other sources.

Year	Estimated Capital Cost
2015	\$1,926,000
2016	\$4,160,000
2017	\$3,928,000
2018	\$3,548,000
2019	\$5,830,500
2020	\$2,467,000
Total	\$21,861,500

Phasing plan is for general guidance only. Policy decisions, based upon available revenue and expenditure; for system growth versus system operational strategy; improvements, may result in significantly different capital budgets and phasing.



Sort by Project Phasing



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TABLE 7-2: 20-Year Master Plan Improvements *
2015 - 2035 Phasing
(Continued)

Phase II (2021 - 2025)

Year	Project ID	Project Description	Construction Cost	Engineering/ Inspection Cost	Estimated Capital Cost
2021-2025	B-04	Killbuck Trunk Outfall Upgrade During Eastgate Drainage Improvements	\$888,000	\$151,000	\$1,039,000
2021-2025	C-01	Pump Station 157 (Tied to CCFM)	\$1,036,000	\$180,000	\$1,236,000
2021-2025	F-02	Capital Circle West Force Main - Phase 2 (TP6 to FS 75)	\$3,238,000	\$551,000	\$3,789,000
2021-2025	H-13	Minton Road Gravity Sewer Upgrade	\$611,000	\$104,000	\$715,000
2021-2025	H-04	CCNW Pump Station and Force Main	\$1,689,000	\$288,000	\$1,977,000
2021-2025	H-05	Pump Station 37 Gravity Outfall & Pump Station 78 Upgrade	\$531,000	\$91,000	\$622,000
2021-2025	J-01	Pump Station 117 (Tied to CCSWTM)	\$10,000	\$7,000	\$17,000
Phase II (2021 - 2025)			\$10,503,000	\$1,772,000	\$12,275,000

Notes:

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- 2) Green text = operational strategy related improvements.

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**TABLE 7-2: 20-Year Master Plan Improvements *
2015 - 2035 Phasing
(Continued)**

Phase IV (2031-2035)

Year	Project ID	Project Description	Construction Cost	Engineering/ Inspection Cost	Estimated Capital Cost
2031-2035	G-01	Capital Circle 42" Force Main Valves and Bleed-Offs	\$496,000	\$85,000	\$581,000
2031-2035	H-03	Pump Station 160 Gravity Outfall	\$811,000	\$138,000	\$949,000
2031-2035	H-10	Capital Circle West Force Main - Phase 3 (PS Talquin? to Hwy 99)	\$2,514,000	\$418,000	\$2,942,000
Phase IV (2031-2035)			\$3,821,000	\$641,000	\$4,462,000

Total Estimated Capital Cost (2015 - 2035) \$38,134,500

Notes:

- 1) Blue text = capacity related improvements
- 2) Green text = operational strategy related improvements.

Phasing plan is for general guidance only. Policy decisions, based upon available revenues and expenditures for system growth versus system operational strategy, improvements, may result in significantly different capital budgets and phasing.

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**TABLE 7-2: 20-Year Master Plan Improvements *
2015 - 2035 Phasing
(Continued)**

Phase III (2026-2030)

Year	Project ID	Project Description	Construction Cost	Engineering/ Inspection Cost	Estimated Capital Cost
2026-2030	D-84	Pump Station 33 Upgrade	\$420,000	\$72,000	\$492,000
2026-2030	I-83	Pump Station 127 Pump Upgrade	\$64,000	\$11,000	\$75,000
2026-2030	A-03	Pump Station 129 Gravity Outfall	\$470,000	\$80,000	\$550,000
2026-2030	A-05	Pump Station 85 Gravity Outfall	\$460,000	\$79,000	\$539,000
2026-2030	F-01	Flow Control Valve on CCSE Force Main	\$300,000	\$51,000	\$351,000
2026-2030	H-12	Pump Station 66 Relocation	\$342,000	\$62,000	\$404,000
Phase III (2026-2030)			\$2,496,000	\$455,000	\$2,951,000

Notes:

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- 2) Green text = operational strategy related improvements.

Phasing plan is for general guidance only. Policy decisions, based upon available revenue and expenditures for system growth versus system operational strategy improvements, may result in significantly different capital budgets and phasing.