STORMWATER MANAGEMENT

GOAL 1: To provide an on-site storm water management system which, to the extent possible, provides for adequate system capacity to protect campus populations and facilities, while remaining sensitive to the natural functions and environmental attributes of the campus' native plant and animal communities.

OBJECTIVE 1.1: To correct existing storm water permitting deficiencies, if any, by modifying the existing SJRWMD stormwater master permit.

POLICY 1.1.1: The University shall continue to implement the St. Johns River Water Management District (SJRWMD) approved UCF Stormwater Master Plan. The University's Facilities & Safety shall be responsible for the continued permitting of the stormwater management system. The plan shall continue to recognize a variety of implementation priorities to (1) eliminate existing system deficiencies, if any, (2) maintain the existing system, and (3) expand the system to accommodate new drainage needs. A stormwater permit data bank shall be maintained to monitor modifications and additions to the permit from ongoing design and construction projects. Such monitoring data shall be electronically maintained and provided to all staff, consultants and reviewing agencies as requested.

POLICY 1.1.2: UCF shall design and construct stormwater management ponds, as necessary, during the planning period. The proposed location of these ponds is identified in the master stormwater permit. The timing and phasing requirements and priorities for these stormwater management improvements are driven by the Capital Improvements Element.

OBJECTIVE 1.2: To coordinate future campus development with the provision of adequate storm water management system capacity.

POLICY 1.2.1: Any future development on the UCF campus which increases the amount of impervious surface area shall be approved per the provision of an on-site drainage system which serves the proposed development area under one or more of the following St. Johns River Water Management District (SJRWMD) permitted level of service standards:

1. Building finished floor elevations shall be a minimum 1' above the measured/calculated 100- year floodwater elevation,

2. Stormwater quality treatment shall be on a basin by basin basis. Basin storm water ponds will be provided treatment per the following: greater of (a) 2.5" times the area of impervious surface or (b) the calculated first 1" of runoff for the basin.

3. Post development stormwater discharge from the campus shall be less than the predevelopment discharge rate for the 25 year/24 hour storm event as determined per the approved SJRWMD Master Stormwater Plan.

4. UCF shall strive to exceed this standard by implementing changes so that post development discharge volumes will not exceed the predevelopment discharge volumes for the 25 year/24 hour storm event.

POLICY 1.2.2: Any proposed increase in campus impervious surfaces shall be implemented only upon verifying that existing facility capacity is already on-line to accommodate the increased need, or that additional capacity will be funded and on-line at the time of need. In this respect, the University shall maintain a record of existing and committed impervious surface areas relative to the agency approved permit maximums, as amended.

POLICY 1.2.3: Pursuant to the St. Johns River Water Management District (SJRWMD) regulatory permit requirements, the University's Storm water Management Sub-Element shall continue to take into account those off-site stormwater flows which travel through the campus' wetlands and drainage basins.

POLICY 1.2.4: The University shall rely upon the stormwater system permitting criteria and processes of the SJRWMD to coordinate drainage issues with off-campus entities.

OBJECTIVE 1.3: Through the year 2025, UCF shall protect natural drainage system functions by (1) generally prohibiting development within the campus' existing jurisdictional wetland areas, (2) by maintaining a common pre-post development rate and volume of stormwater discharge for newly developed areas and, (3) by maintaining or reestablishing normal wetland hydro-period elevations.

POLICY 1.3.1: The UCF Facilities Planning and Construction Department shall be charged with reviewing all proposed development projects to ensure that increases in impervious surface can be accommodated in the capacity of the existing and/or committed drainage system.

POLICY 1.3.2: No storm water discharges shall cause or contribute to a violation of water quality standards in waters of the State.

POLICY 1.3.3: UCF shall continue to mitigate University-generated storm water and to minimize stormwater borne pollutants through the implementation of a

system of Best Management Practices (BMPs), which includes, but is not limited to:

- Incorporating stormwater management retention and detention features into the design of parks, trails, commons and open spaces, and building roof tops where such features do not detract from the recreational or aesthetic value of a site.

- Using slow release fertilizers and/or carefully managed fertilizer applications timed to ensure maximum root uptake and minimal surface water runoff or leaching to groundwater.

- Educating maintenance personnel about the need to maintain motor vehicles to prevent the accumulation of oil, grease and other fluids on impervious surfaces, where they might be conveyed to surface and ground waters by runoff, and the need to regularly collect and properly dispose of yard debris.

- Avoiding the widespread application of broad spectrum pesticides by involving only purposeful and minimal application of pesticides, aimed at identified targeted species.

- Coordinating pesticide application with irrigation practices to reduce runoff and leaching to groundwater.

- Incorporating features into the design of fertilizer and pesticide storage, mixing and loading areas that are designed to prevent/minimize spillage.

POLICY 1.3.4: The University shall design all storm water management facilities to retain on-site all volume of runoff generated by the University and shall not adversely impact adjacent property. At a minimum, the University will design the systems consistent with the SJRWMD criteria. Post development stormwater discharge volumes from the campus shall be less than the predevelopment discharge volume for the 25 year/24 hour storm event.

POLICY 1.3.5: The University shall prioritize the use of stormwater and reuse water for irrigation as follows:

1. Reclaimed water from the Iron Bridge for all landscape irrigation if possible.

2. Irrigation from existing stormwater ponds when possible and practical.

3. Reduce, minimize, and eliminate, where possible, the use of groundwater for irrigation.

OBJECTIVE 1.4: To improve the existing SJRWMD permitted stormwater management system when possible and funding is available.

POLICY 1.4.1: The University shall identify storm water basins that do not meet current SJRMWD standards, develop an improvement plan that will meet current standards, and implement the plan when funding is available.

POTABLE WATER SUB-ELEMENT

GOAL 2: To continue to produce and provide quality potable water to the campus with reliable backup sources.

OBJECTIVE 2.1: To ensure that adequate potable water supply and distribution piping is available for both new and re-developed facilities.

POLICY 2.1.1: The University shall periodically design and construct potable water system improvements to (1) eliminate existing system deficiencies, (2) maintain/improve the existing system characteristics, and (3) expand the system to accommodate increased demand from proposed growth. The University will continue to correct deficiencies in the piping system and maintain that piping system and its associated valves.

POLICY 2.1.2: The campus water system shall have redundancy built into the supply and distribution network. Supply redundancy can be achieved by multiple water plant sources (i.e. Orange County and the Central Florida Research Park) and by multiple raw water wells. Interconnects with various utilities are desired for their capability to be used as backups in emergencies. Distribution network redundancy can be achieved by creating looped piping systems and eliminating dead-end pipe systems.

POLICY 2.1.3: Future increases in campus consumptive uses, whether residential or non-residential related, shall be approved only upon a finding that existing potable water treatment and distribution facility capacity is already on-line and available to accommodate the increased need. If capacity is not available, funding will be provided so capacity can be brought on-line at the forecasted future time of need

OBJECTIVE 2.2: **To meet adopted levels of service for potable water system fire flow and consumptive capacity to accommodate the proposed demand.**

POLICY 2.2.1: Future development on the UCF campus which increases the demand for potable water shall be approved on the provision of a potable water distribution system which serves the proposed development under one or more of the following level of service standards:

1. Fire flow pressures of 20 psi residual for 2 hour sprinkler system flow

2. Fire flow volumes of approx. 1,000 gpm (ordinary to light hazard buildings) to 2,500 gpm (assembly occupancies and higher hazard buildings) Note: This is occupancy specific and must be accounted for in design phase of all new projects.

3. Category demands according to the following:

Offices	0.03 gpd/sf
Classrooms	0.06 gpd/sf
Common areas	0.11 gpd/sf
Residence Halls	50 gpd/bed
Frat./Sororities	50 gpd/bed

OBJECTIVE 2.3: To maintain the current quality and quantity of raw water available in the campus' potable water well field.

POLICY 2.3.1: The UCF potable water treatment and distribution system shall be primarily oriented to the needs of the campus and secondarily oriented to the needs of off-campus consumers. The University shall make every effort to cooperate with the St. Johns River Water Management District (SJRWMD) with respect to the consideration and implementation of existing and future regional ground water management strategies.

POLICY 2.3.2: The UCF potable water treatment and distribution system shall continue to meet or exceed FDEP requirements for a public water supply system and stay current with FDEP regulations and policies.

POLICY 2.3.3: The University shall perform annual reviews of major system components of the water supply and distribution system. Review shall include wells, well pumps, water treatment plant components, storage tanks, distribution pumps, backup generators, distribution piping and valves, etc. Based on review, the University shall prepare a capital improvements needs list with schedule for improvements.

POLICY 2.3.4: UCF shall continue to require low-flow and low-flush plumbing appurtenances in all new building construction and building renovations.

POLICY 2.3.5: The use of "xeric" landscaping techniques, including the maintenance or installation of selected vegetation species, low volume irrigation and compact hydra-zone concepts, shall be a required element of all new building and ancillary facility construction through the year 2025.

POLICY 2.3.6: The University shall utilize reuse water for all landscaping; thus, providing more available potable water capacity for future campus development.

SOLID WASTE

GOAL 4: To base future campus development on the provision of a solid waste on-campus collection and off-campus disposal system which adequately serves the future campus population needs, and to the maximum extent feasible, protects the function and quality of the surrounding natural environment.

OBJECTIVE 4.1: To insure that future development on the UCF campus shall occur based on a finding of adequate solid waste collection and disposal capacity to accommodate the future demand, which may call for new systems to be evaluated and installed if necessary such as to accommodate a composting system.

POLICY 4.1.1: Future development on the UCF campus which increases the demand for waste collection and disposal shall be approved under the provision of a solid waste collection and disposal system which serves the future development under one or more of the following level of service standards:

1. Multiple weekly collections
2. Approximately 1 pound per day per FTE student

POLICY 4.1.2: As necessary and appropriate, UCF shall continue to participate in the regional solid waste management, waste reduction, and facility planning strategies undertaken by Orange County. Such activities will include continued recycling efforts for paper, glass, metal, and plastics as currently collected on-campus.

POLICY 4.1.3: The University shall continue to rely upon private vendors to collect and convey the campus' solid waste to area disposal sites. As part of the campus development process, the University's department of Facilities Planning and Construction shall be responsible for coordination with the waste vendor to establish the appropriate dumpster sizing and pick-up scheduling for new campus development areas. This coordination activity shall also include the appropriate planning actions for the siting and scheduling of recyclable materials dumpsters.

POLICY 4.1.4: UCF shall continue to rely upon Orange County's solid waste facility planning efforts for plant expansion.

POLICY 4.1.5: Future increases in campus generating uses, whether residential or non-residential related, shall be approved only upon a finding by the University that existing solid waste disposal capacity is already on-line to accommodate the increased need, or that additional capacity will be funded and on-line at the forecasted future time of need. The University's Facilities Planning and Construction department shall be responsible for the review of all development proposals and perform the appropriate periodic coordination efforts with Orange County to determine that solid waste capacity is available.

SANITARY SEWER SUB-ELEMENT

GOAL 5: To insure that the future development of UCF shall be based on the current configuration of a combination of gravity and forced main sewer system that adequately serves the current and future campus population.

OBJECTIVE 5.1: To maintain the University's current sewer system and upgrade the mechanical and electrical components as needed and as funds are available.

POLICY 5.1.1: The University shall periodically design and construct sanitary sewer system improvements to (1) eliminate existing system deficiencies, (2) maintain/improve the existing system characteristics, (3) expand the system to accommodate increased demand from proposed growth, and (4)continue to correct deficiencies in the piping system and maintain that piping system and its associated infrastructure.

POLICY 5.1.2: The campus's main wastewater pumping stations shall have backup systems in place to handle emergency power and pump failures.

POLICY 5.1.3: Future increases in campus wastewater flows, whether residential or non-residential related, shall be approved only upon a finding that existing purchased wasterwater capacity is available. If capacity is not available, funding will be provided so capacity can be purchased from Seminole County prior to the forecasted future time of need.

STORMWATER ANALYSIS

a) A facility capacity analysis, by geographic service area, indicating capacity surpluses and deficiencies for:

1. Existing conditions, based on the facility design capacity and the current demand on the facility capacity:

The University is divided into four major drainage basins (Basins 1 through 4). Each of these basins is further divided into sub-basins as shown on the included table. The master plan and subsequent stormwater permit were generated in the early 1990's based on projected development within the campus. Modifications have been made to the master permit as a result of changes in the projected growth and development of the campus.

The University currently maintains a master stormwater permit from the St. Johns River Water Management District (SJRWMD). This master permit allows for development within designated stormwater basins as it relates to an approved additional impervious area within each basin. Currently, the permitted impervious impacts are monitored by university staff and an independent consultant to insure that the capacities listed in the permit are not exceeded. The University will maintain a current record in plan and table format of existing stormwater facilities and the current permitted impacts. These documents are made available to any staff, consultant or regulatory agency as requested to review existing conditions and plan for future development. Attached is a current table (February 2014) showing the drainage sub-basins and the available impervious area in each sub-basin that is still available for development. This information, along with plan data, is maintained by the University's civil engineer and is updated as new developments impact the current data.

2. The end of the planning time frame, based on the projected demand at current level of service standards for the facility, projected student populations and land use distributions, and any available existing surplus facility capacity.

b) The general performance of existing stormwater management facilities, evaluating the adequacy of the current level of service provided by the facility, the general condition and expected life of the facility, and the impact of the facility upon adjacent natural resources:

The current stormwater system is functioning in accordance with the existing master permit. No adverse impacts have occurred as a result of discharges leaving the University property through the stormwater management system.

The existing stormwater system is in good condition. The life expectancy of the structural elements of the stormwater system are expected to exceed 25 years. Routine maintenance of stormwater facilities is required to meet this life span however.

The discharge points for this master system were selected based on pre-developed conditions in an effort to minimize impacts to adjacent natural resources. The University has made extensive efforts to reduce impacts to adjacent resources which includes construction or stormwater ponds, maintaining and enhancing existing wetlands systems by incorporating them into the master drainage system and restricting post development discharge rates to less than pre-1985 rates and providing required water quality treatment.

c) An analysis of the problems and opportunities for stormwater management facility expansion or replacement to meet projected needs of the University.

The University may need to modify the existing master permit to accommodate for future expansion in several sub-basins. The modifications may include the transfer of available impervious areas from one sub-basin to another. The water management district has been receptive to this transfer provided the final outfall conditions remain the same and additional treatment is provided in higher pollutant loading areas.

d) Existing regulations and programs which govern land use and development of natural stormwater management features shall be analyzed, including the strengths and deficiencies of those programs and regulations in maintaining the functions of natural stormwater management features.

The last major modification to the existing SJRWMD master stormwater permit No. 20026 (ERP) was for the proposed widening of Libra Drive permit No. 20026-121. The modification was for the proposed improvement of Libra Drive from 2 lanes to 4 and entailed the creation of a new basin and pond 4-P and the reconfiguring the limits Basins 4-L and 4-M.SJRWMD regulations require stormwater runoff to be “treated” prior to discharging into any natural wetland or water body and maintain a discharge rate less than pre-development condition. The university has maintained a stormwater management facility which accommodates these requirements and exceeds SJRWMD criteria for preservation except for Basin 4-F which is allowed to discharge directly into Wetland W-9. This condition was grandfathered by SJRWMD when the master stormwater system was developed and permitted in 1994. The stormwater system was also designed and is now functioning to enhance these existing wetlands by providing the natural hydration of each system to maintain the biological function. Because the biological function of the existing wetlands was considered in the original permitting design, the University should also consider habitat enhancements for these wetlands and

other transitional (buffers) areas. These enhancements may potentially be done as a part of an academic study program.

UCF STORMWATER MASTER PLAN
IMPERVIOUS AREA STATUS REPORT

Date: 11/13/2013
Revised 12/3/2013
Revision No.: 2013-02
SJRWMD Permit No.: 40-095-20026-123

Proposed development this submission:

Project name: UCF Building 154 MMAE Laboratory Expansion
Project area: 0.32 Acres
Drainage basin: 4-Z
Imp. area increase: 0.153 acres 0.103 acres impervious area for expansion previously permitted under Permit 40-095-20026-109

Information: Application is for a 5,560 +/- s.f. addition to Building 154 with associated hardscape.
0.103 ac. previously permitted so overall increase of 0.050 acres

Overall Plan Status:

Basin (1) I.D.	Drainage Area (2) (AC)	Existing Imperv. Area (3) (AC)	Impervious Area This Submittal (4) (AC)	Total Imperv. Area Allowed (5) (AC)	Remaining Imperv. Area Allowed (6) (AC)
1-BC	5.79	1.59		2.94	1.35
1-B (7)	-	-	-	-	-
1-C (7)	-	-	-	-	-
1-D	64.74	25.70		30.56	4.34
1-D Dry Pond	1.21	0.74		0.74	0.00
1-D Pond	63.53	25.48		29.82	4.34
1-F	16.91	11.01		11.11	0.10
1-F Vault	2.52	2.52		2.52	0.00
1-F Pond	14.29	8.49		8.59	0.10
1-G	57.82	0.00		0.00	0.00
2-B	1.81	0.87		1.80	0.93
2-C	0.57	0.00		0.00	0.00
2-D	23.24	0.00		0.00	0.00
2-E	23.57	0.00		0.00	0.00
2-H	164.52	71.34		74.00	2.66
2-H3	32.53	0.00		16.50	16.50
2-Z	50.62	0.00		0.00	0.00
3-A & 3-Aa	130.04	44.35		51.00	6.65
3-Z	13.95	0.00		0.00	0.00
4-B(Pond)				34.13	
4-B(provided in 4-R)				3.02	
4-B Totals	65.34	37.15		37.15	0.00
4-F	35.24	21.12		26.61	5.49
4-L	116.14	50.83		53.09	2.26
4-M	13.80	7.99		8.17	0.18
4-P	10.37	4.59		8.10	3.51
4-R	115.84	31.10		56.00	24.90
4-S	3.75	2.69		3.10	0.41
4-Z	215.33	5.66		7.01	1.35
4-Z Bldg 154	2.08	0.98	0.05	1.03	0.00
4Z-a	6.85	3.07		3.50	0.43
FDOT	2.50	1.20		1.20	0.00
TOTALS	**1173.25**	**321.24**	**0.05**	**392.87**	**71.06**

Completed ponds permitted and or proposed to be entirely constructed:

Ponds 1-F, 2-H, 4-B, 4-M, 4-S & 3-A have been completely constructed. Impervious areas may be constructed up to the amount noted, without additional permitting.
Pond 1-BC is proposed under this application.

Portions of Ponds Permitted and Completed or Under Construction:

Ponds 1-D & 4-R have been partially constructed. The area of each pond and impervious area allowed prior to additional expansion or permitting is as follows:

Pond 2-H3 has not been constructed and no improvements can be made in that basin until the pond is built.

Pond ID	Existing Pond Permitted Maximum Imp. Area (ac)	Existing Imp. Area Constructed (ac)	Imp. Area This Submittal (ac)	Revised Imp. Area (ac)	Future Imp. Area Allowed prior to Lake expansion (ac)
1-D (pond)	26.25	25.70	0.00	25.70	0.55
2-H3	0.00	0.00		0.00	0.00
4-R	43.83	31.10	0.00	31.10	
4-B(provided in 4-R)	3.02	3.02	0.00	3.02	
4-R Totals	46.85	34.12		34.12	12.73

Note: Existing impervious under basin 4R includes excess impervious area built in basin 4-B

Basin 4-L Underdrained Fields

Allowable (ac)	Existing (ac)	This Submittal (ac)	Remaining (ac)
5.96	0.00	0.00	5.96

Note: Basin 4-L underdrained fields will provide treatment volume on-site via soil storage between finished grade and underdrain elevations

NOTES:
(1) Basin I.D. as indicated in the Approved stormwater master plan permit dated 3/9/04 and as Amended on 4/2/09
(2) Proposed drainage area as indicated in Approved stormwater master plan permit dated 3/9/04 and ammended on 4/2/09
(3) Indicates the permitted impervious area which exist within each basin.
(4) Impervious area proposed (not to exceed values in Approved stormwater master plan permit and lattest ammendment(s)
(5) Total impervious area allowed for basin based on the stormwater master plan pond design.
(6) Remaining impervious area allowed within basin based on the 2010 stormwater pond design.
(7) Basins 1-B and 1-C will combined to form Basin 1-BC under permit 40-095-20026-105
(8) Dry Pond 1-D at Greek Park Expansion added under permit 40-095-20026-112
(9) Bain & Pond 4-P added under Permit 40-095-20026-121

PREPARED BY HARRIS CIVIL ENGINEERS

1 of 1

POTABLE WATER ANALYSIS

a) A facility capacity analysis, by geographic service area, indicating surpluses and deficiencies for:

1. Existing conditions, based on the facility design capacity and the current demand on facility capacity.

UCF operates and maintains its own potable water treatment plant and distribution system that serves a majority of the main campus. The existing systems consists of four

wells that pump water from the Floridian aquifer to a storage tank at the water treatment plant where additional treatment is provided. Each well has a capacity of approximately 500 gallons a minute. The design capacity of this system is approximately 1,500 gpm based on using three of the four wells during normal operating conditions. The system uses a series of high service water pumps and an above ground storage tank to maintain consistent pressure and provide fire flows when necessary.

UCF upgraded its potable water distribution system by installing 16 inch looped water mains in 2000-2002. This upgrade improved the capacity of the water system to meet fire and potable demands. The upgrade also included connecting to the Orange County Utilities (OCU) system for a backup water supply.

The connection to the Orange County system is adjacent to the CMMS Building (Building #81). UCF draws water from the OCU 24" water main and increases pressure as needed via water booster pumps located at the Booster Pump Station (Building #307). Currently only the Academic Villages housing complex and Recreation and Wellness Buildings are supplied water from the Orange County system. An automated interconnection is provided between the Orange County system and the UCF water system via a 16" water main. The purpose of the interconnection is to provide emergency backup water in case the UCF Water Treatment Plant becomes non-operational or to provide additional water volume during a fire event on campus.

2. The end of the planning time frame, based on the projected demand at the current level of service standards for the facility, projected student populations and land use distributions, and any available existing surplus facility capacity.

The amount of water UCF is allowed to withdraw from the Floridian Aquifer to supply water to the campus is regulated by the St. Johns River Water Management District (SJRWMD) through the Consumptive Use Permit (CUP) process UCF has made application with SJRWMD for renewal of the CUP and expects to have the permitting process completed by summer of 2014.

Over the past several years, UCF has been is in the process of converting the campus irrigation systems from potable water and well systems to a reuse water system. The reuse water is supplied from the Seminole County, Iron Bridge Waste Water Treatment Plant located approximately 1 mile to the northwest of campus. Over 95% of the campus irrigation system has been converted to reuse water. The removal of the irrigation demand from the potable system along water conservation measures UCF has implemented for new construction and renovations has created excess capacity within the system to provide domestic and fire flow demands for expansions shown in this planning period. The existing and projected water demands, based on student populations, are as

follows along with estimated demands for future projects are shown in the following tables:

Projected Water Demands Based on Student Population

Year	Population(2)	Existing & Estimated Demands			GPD/Student	
		Gallons/Year(3)	Avg. Gal/Day	Avg. Gal/Min		
2011	49,186	237,037,886	649,419	451	13	
2012	49,641	189,018,116	517,858	360	10	
2013	49,902	202,766,828	555,526	386	11	
2014	49,902	218,570,760	598,824	416	12	(1)
2015	50,714	222,128,947	608,572	423	12	(1)
2016	52,026	227,874,015	624,312	434	12	(1)
2017	53,295	233,432,751	639,542	444	12	(1)
2018	54,288	237,783,560	651,462	452	12	(1)
2019	54,155	237,200,491	649,864	451	12	(1)
2020	54,163	237,234,130	649,957	451	12	(1)
2021	54,577	239,047,428	654,924	455	12	(1)
2022	54,917	240,537,990	659,008	458	12	(1)
2023	55,241	241,955,760	662,892	460	12	(1)
2024	56,051	245,502,047	672,608	467	12	(1)
2025	56,858	249,039,706	682,301	474	12	(1)

Table Notes:

(1) Estimated per day student demand based on average of 2011 to 2013 demands

(2) Population for main campus

(3) Demand for water produced by UCF water treatment plant only

Estimated Water Demands - Future Projects

Future Projects:	Estimated Size (GSF)	Estimated Water Demand			
		Gallons/Year	Avg. Gal/Day	Avg. Gal/Min	
Interdisciplinary Research I	118,000	3,445,600	9,440	7	(1)
Interdisciplinary Research II	61,000	1,781,200	4,880	3	(1)
Simulation and Training	60,000	1,752,000	4,800	3	(1)
Civil & Environmental Eng.	75,000	2,190,000	6,000	4	(1)
Global UCF	54,000	1,576,800	4,320	3	(1)
Academic Research Park	368,000	10,745,600	29,440	20	(1)
Chiller Plant No. 3 (2,000 Tons)		23,400,000	64,110	45	(2)
Totals		44,891,200	122,990	85	

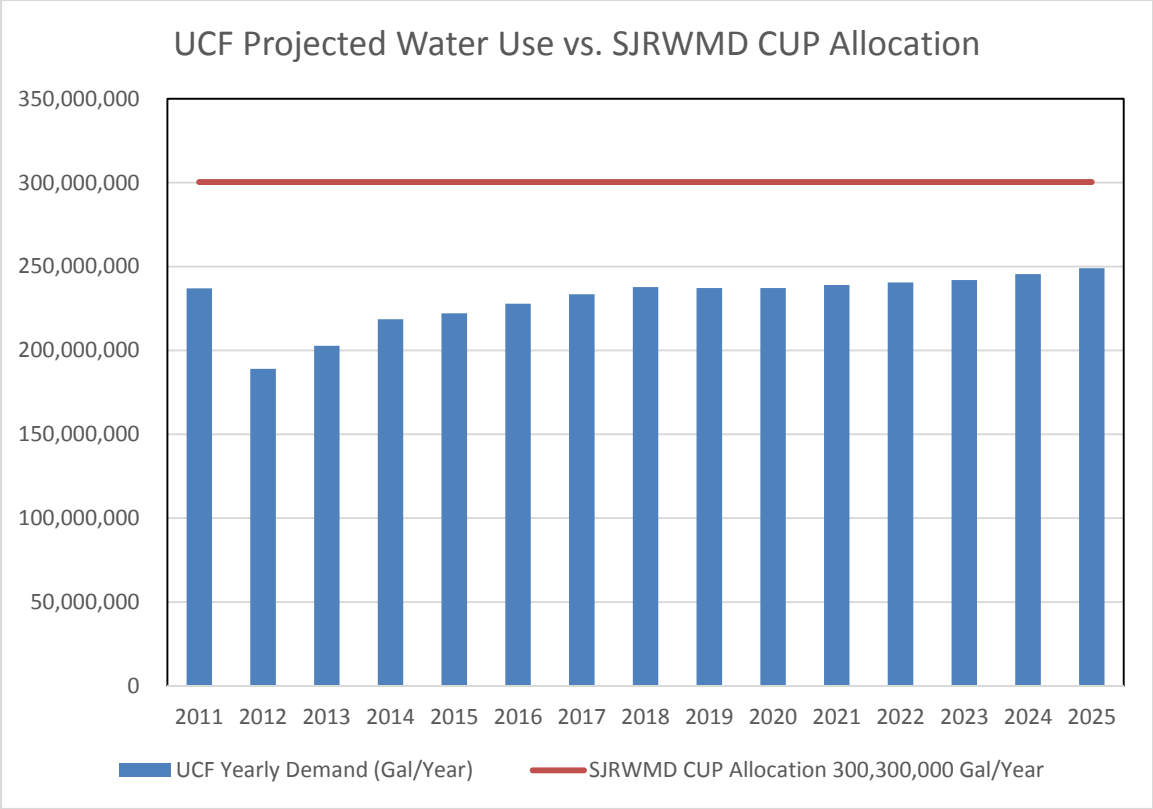
Table Notes:
(1) Demand based on 0.08 Gallons/S.F.
(2) Demand based on average demad of 2013 water used by all chillers on campus

The UCF water plant has a daily capacity of approximately 1,500 gpm x 1,440 min./day = 2,160,000 gpd. Because of the magnitude of this distribution system and the fact that minimal potable water is used for irrigation, a peaking factor of two (2) times the actual daily use is sufficient for the period being evaluated.

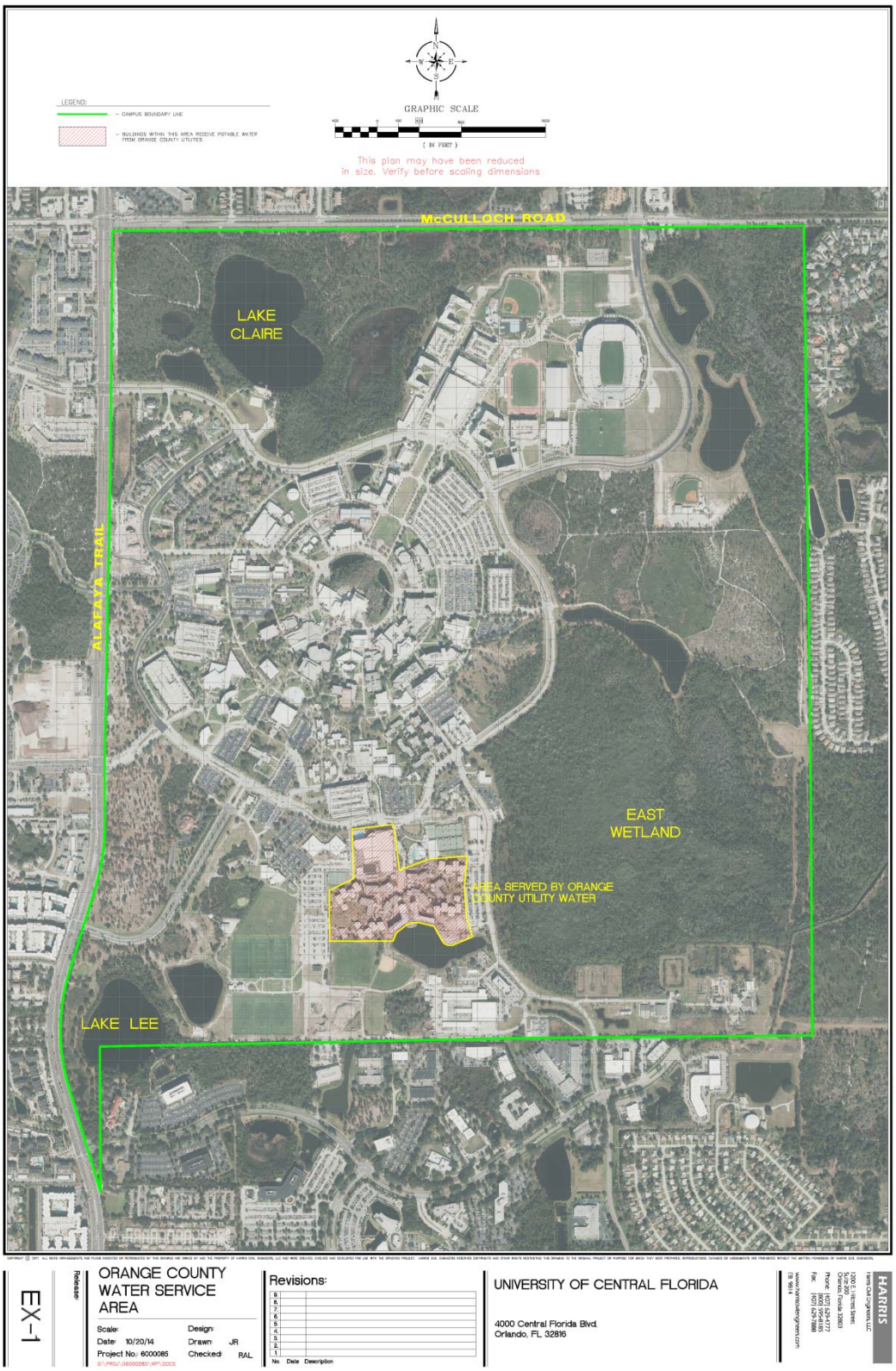
In 2013 the Average Day Demand was 555,526 GPD and the Maximum Day Demand was 993,524 GPD (from actual meter readings) which shows the existing potable water system is currently running at 26% on an average day and 46% capacity on max day. For year 2025 the projected Average Day Demand is 682,301 + 122,990 = 805,291 GPD and the Maximum Day Demand is 1,610,582 GPD (Peaking Factor 2). At these rates the system will be running at 37% on an average day and 75% capacity on max day.

Based on the above projections, the existing water treatment plant has available capacity for the proposed future development on campus.

On May 15, 2014 the St. Johns River Water Management District issued a new Consumptive Use Permit for the campus. The total withdrawal allotment for the campus was set at 300.3 Million Gallons per year. The following graph illustrates the campus water use until the year 2025 versus the allowed allotment.



A portion of the campus is served by Orange County Utilities (OCU)Water System, See Exhibit EX-1 that shows the services area. The following table shows UCF's water use from the Orange County system for the last 3.5 years.


LEGEND:
- CAMPUS BOUNDARY LINE
- BUILDINGS WITHIN THIS AREA RECEIVE POTABLE WATER FROM ORANGE COUNTY UTILITIES
GRAPHIC SCALE
(IN FEET)
This plan may have been reduced in size. Verify before scaling dimensions.
McCULLOCH ROAD
LAKE CLAIRE
ALAFAYA TRAIL
EAST WETLAND
AREA SERVED BY ORANGE COUNTY UTILITY WATER
LAKE LEE
EX-1
Release:
ORANGE COUNTY WATER SERVICE AREA
Scale:
Date: 10/20/14
Project No.: 6000085
Design:
Drawn: JR
Checked: RAL
Revisions:
No. Date Description
UNIVERSITY OF CENTRAL FLORIDA
4000 Central Florida Blvd.
Orlando, FL 32816
HARRIS

UCF Water Usage from Orange County Water System

	Daily Use (Gal/Day)	Monthly Use (Gal/Month)	Yearly Gal/Year)
Orange County Allotment	**154,453**	**4,697,945**	**56,375,345**

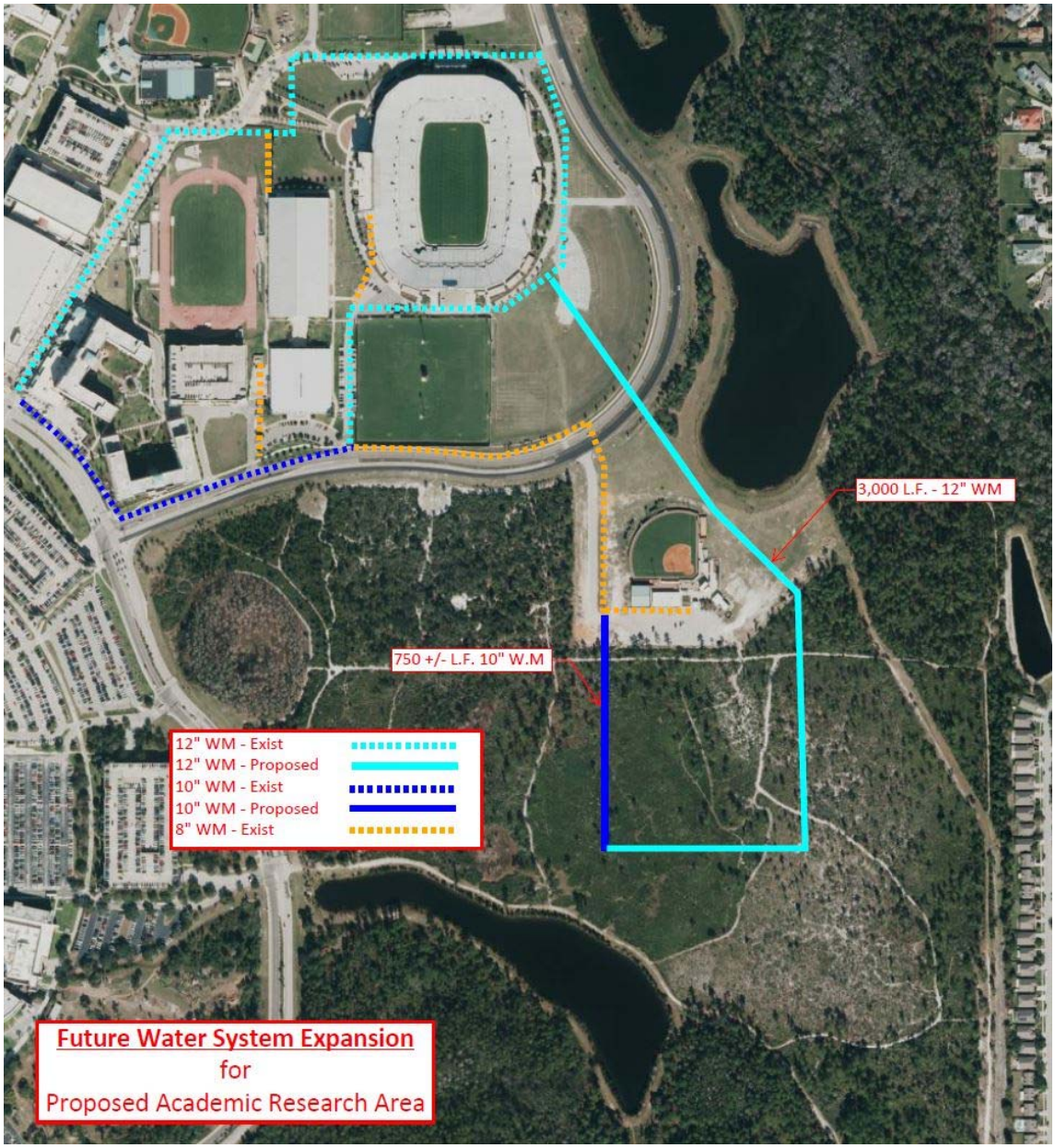
Period		Monthly Use	Avg Daily Use(1)	Avg Daily Use PerYear(2)	Avg Montly Use	Total Yearly Use
Month	Year	(Gal/Month)	(Gal/Day)	(Gal/Day)	(Gal/Month)	Total Yearly Use (Gal/Year)
Aug	2014	2,414,000	83,241	71,546	2,106,375	25,276,500
Jul	2014	2,610,000	81,563			(Projected Value)
Jun	2014	1,515,000	54,107			
May	2014	931,000	30,032			
Apr	2014	2,717,000	90,567			
Mar	2014	2,053,000	73,321			
Feb	2014	2,259,000	83,667			
Jan	2014	2,352,000	75,871			
Dec	2013	909,000	30,300	82,479	2,425,917	29,111,000
Nov	2013	2,197,000	78,464			
Oct	2013	3,131,000	101,000			
Sep	2013	2,729,000	97,464			
Aug	2013	2,583,000	80,719			
Jul	2013	3,558,000	118,600			
Jun	2013	1,381,000	51,148			
May	2013	1,207,000	37,719			
Apr	2013	3,778,000	130,276			
Mar	2013	1,831,000	65,393			
Feb	2013	2,373,000	87,889			
Jan	2013	3,434,000	110,774			
Dec	2012	4,097,000	141,276	100,064	2,933,333	35,200,000
Nov	2012	4,973,000	160,419			
Oct	2012	4,942,000	170,414			
Sep	2012	5,021,000	185,963			
Aug	2012	3,732,000	113,091			
Jul	2012	2,251,000	77,621			
Jun	2012	1,272,000	45,429			
May	2012	1,085,000	33,906			
Apr	2012	1,880,000	67,143			
Mar	2012	1,994,000	64,323			
Feb	2012	2,157,000	77,036			
Jan	2012	1,796,000	64,143			
Dec	2011	949,000	29,656	69,375	69,375	24,368,000
Nov	2011	1,979,000	68,241			
Oct	2011	2,287,000	81,679			
Sep	2011	2,709,000	84,656			
Aug	2011	1,936,000	66,759			
Jul	2011	2,008,000	77,231			
Jun	2011	1,612,000	50,375			
May	2011	1,199,000	39,967			
Apr	2011	3,580,000	115,484			
Mar	2011	2,110,000	72,759			
Feb	2011	2,170,000	80,370			
Jan	2011	1,829,000	65,321			

Notes: (1) Based on days in billing cycle
(2) Average of Average Daily Use column

No additional capacity is anticipated to be needed from OCU during the planning period. Per the above table the average daily demand for 2014 is 71,546 gallons per day with the max month being April with a demand of 90,567 gallons per day. Over the past couple of years the water demand has decreased due to the campus switching over to reclaim water for irrigation. Even though 700 new beds were added to the system in August 2013 under the Academic Villages Expansion, the water demand has decreased from previous years. Under the current planning period, no major improvements are proposed that would generate a new large water demand. It is predicted that water demands will stabilize at their current levels with no significant increase projected during the planning period, since the area served is mainly student housing and the population will remain constant for the planning period.

b) The general performance of existing potable water facilities, evaluating the adequacy of the current level of service provided by the facility, the general condition and expected life of the facility, and the impact of the facility upon adjacent natural resources will be more than sufficient until 2025 or until the University obtains its potable supply from OCU. The UCF water plant was constructed in 1968, but has received periodic upgrades since then. A project to upsize the water feed lines from the wells to the treatment plant along with refurbishment of the at grade water storage tank was completed in 2002. The water treatment plant's service pumps motor control unit and emergency generator are scheduled to be replaced in 2014. The booster station (bldg. 307) was constructed in 2001 and should not need significant repair or upgrades throughout the planning period. When practical, as new construction expands the existing distribution facility, water main dead ends should be extended to a second tie-in point to provide two directions of service for any given point in the system.

Under the current planning period, the Academic Research Project would require an expansion of the water distribution system. The expansion would require about 3,000 L.F. of 12-inch water main and 750 L.F. of 10-inch water main to create a looped system as shown in the following exhibit.



In addition, the existing system consists primarily of PVC piping which has a life span in excess of 50 years. Isolated, older sections of piping will require replacement within the study period, however, the location and extent of replacement will need to be studied in more detail based on maintenance records.

c) An analysis of the problems and opportunities for potable water facility expansion or replacement to meet projected needs of the University should be considered with each new building constructed. Potable water supplies are available on the main UCF campus through the 2015-2025 planning period. However, some areas of campus still do not have water piping in the immediate vicinity. Also, some future buildings will likely

require more water volumes at higher pressures than is currently available. Engineering studies on the campus as a whole, and on project-specific water requirements should continue. For building construction of 3 stories or more, the need for additional booster pumps may be required to meet the necessary potable water and fire flows.

d) A description of the campus underground hydrology, including its potential for use as a potable water source:

The drinking water for the UCF campus originates from the vast Floridian aquifer, which supplies about 60 percent of Florida's drinking water. This source of drinking water is common within the Central Florida area. This source will be able to provide the required water needs during this study period.

In addition, UCF has interconnections with Orange County Utilities and Research Park water supply systems. These interconnections provided alternative backups if the UCF water treatment plant becomes inoperable. In addition the OCU connection provides backup water flow/volume for fire protection should UCF's distribution pressure drops below 25 psi. This additional source of potable water will reduce the University's dependence on campus well water as the only source for drinking water.

e) An analysis of existing local, state and federal regulations governing potable water systems:

The current drinking water system is regulated by the Florida Department of Environmental Protection under Chapter 175 of the Florida Administrative Code and Section 403 of the Florida Statues. The state regulations are in addition to the federal "Safe Drinking Water Act" which establishes national standards for drinking water.

The water treatment plant operator at UCF is certified by the state. In addition, the Department of Environmental Protection oversees and regulates the water treatment facility. DEP requires that UCF send in a monthly report which details daily chlorine residuals at the plant and remote areas, number of gallons produced, and bacteriological results of well's and building's water samples.

As additions are made to the water distribution system, permits are required from the Florida Department of Environmental Protection. These permits insure that the new distribution piping meets current regulations regarding quality construction, water and long term maintenance. The University has been routinely acquiring these permits as needed.

SANITARY SEWER SYSTEM ANALYSIS

a) A facility capacity analysis, by geographic service area, indicating surpluses and deficiencies for:

1. Under a 1999 wastewater agreement with Seminole County, UCF purchased 1,000,000 gallons/day of wastewater capacity at the county's Iron Bridge Wastewater Treatment plant located in Oviedo, Florida just to the northeast of UCF's main campus. The Iron Bridge treatment plant is permitted to 40 million gallons/day and is currently running at half of its capacity. At current the treatment plant has 3.5 mgd of capacity available for purchase. To date UCF has used 627,877 gpd of its purchased capacity leaving a reaming balance of 372,123 gpd for future development. The following table is a projection of wasterwater flows based on population.

Projected Wastewater Demands Based on Student Population

		Existing & Estimated Wastewater Flows			
Year	Population(2)	Gallons/Year(3)	Avg. Gal/Day	Avg. Gal/Min	GPD/Student
2012	49,641	254,369,000	696,901	484	14
2013	49,902	238,021,000	652,112	453	13
2014	49,902	236,784,990	648,726	451	13
2015	50,714	240,639,693	659,287	458	13
2016	52,026	246,863,517	676,338	470	13
2017	53,295	252,885,481	692,837	481	13
2018	54,288	257,598,856	705,750	490	13
2019	54,155	256,967,198	704,020	489	13
2020	54,163	257,003,640	704,120	489	13
2021	54,577	258,968,047	709,501	493	13
2022	54,917	260,582,823	713,926	496	13
2023	55,241	262,118,740	718,134	499	13
2024	56,051	265,960,551	728,659	506	13
2025	56,858	269,793,015	739,159	513	13

Table Notes:

(1) Estimated per day student demand based on 2013 demands

(2) Population for main campus

(3) Wastewater flows for UCF Campus, Research Park and Seimens

(4) Actual Measured flows

Under this planning period several large scale projects are indicated. The following is a table showing the estimated sewer capacity that will be required per project.

Estimated Wastewater Demands - Future Projects

Future Projects:	Estimated Size (GSF)	Estimated Water Demand			
		Gallons/Year	Avg. Gal/Day	Avg. Gal/Min	
Interdisciplinary Research I	118,000	3,014,900	8,260	6	(1)
Interdisciplinary Research II	61,000	1,558,550	4,270	3	(1)
Simulation and Training	60,000	1,533,000	4,200	3	(1)
Civil & Environmental Eng.	75,000	1,916,250	5,250	4	(1)
Global UCF	54,000	1,379,700	3,780	3	(1)
Academic Research Park	368,000	9,402,400	25,760	18	(1)
Chiller Plant No. 3 (2,000 Tons)		23,400,000	64,109.59	45	(2)
Totals		42,204,800	115,630	80	

Table Notes:
(1) Demand based on 0.07 Gallons/S.F.
(2) Demand based on average demad of 2013 water used by all chillers on campus

To date UCF has used 627,877 gpd of its purchased capacity leaving a reaming balance of 372,123

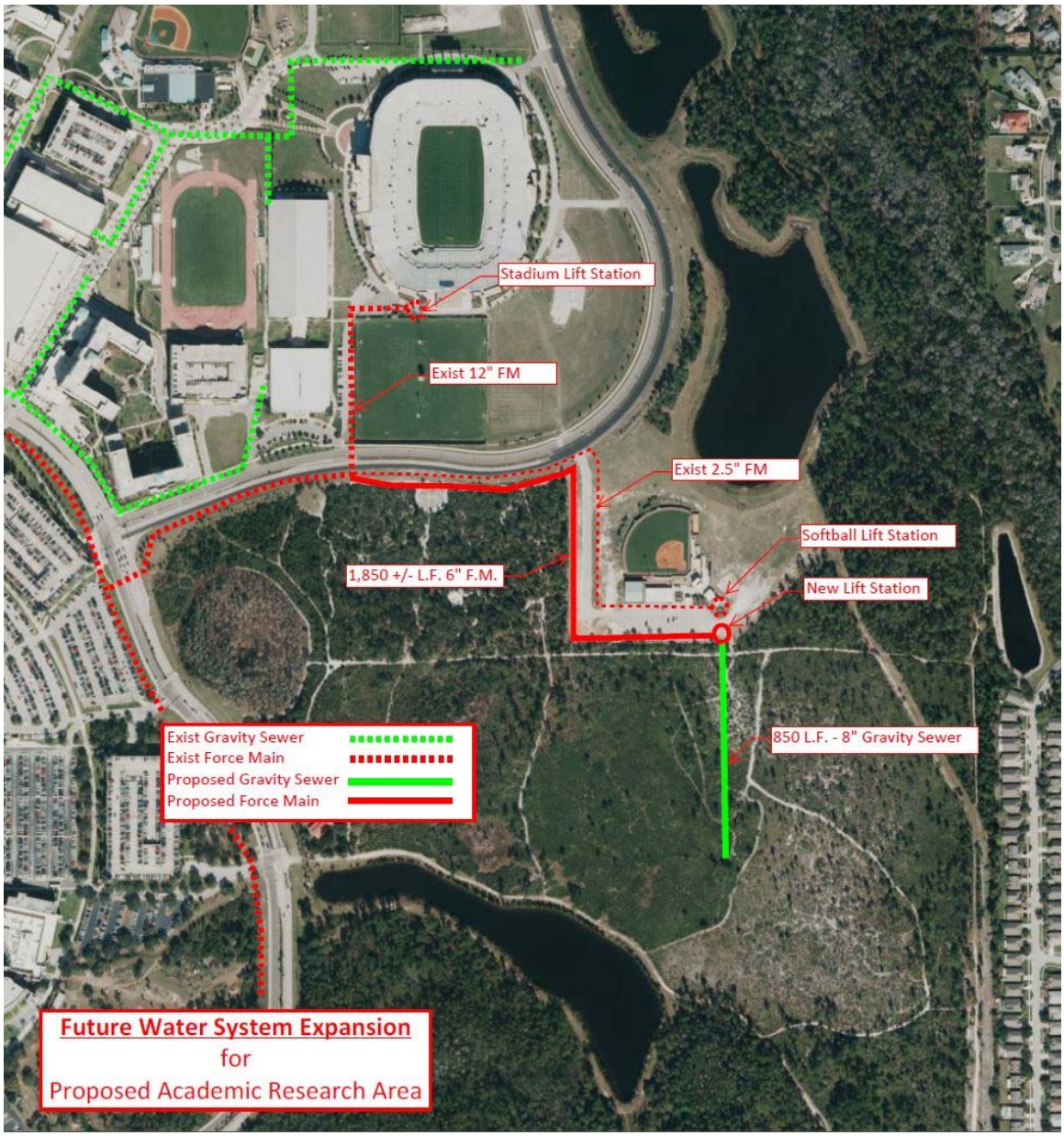
For year 2025 the projected Average Day Sewage Flow is 739,159 + 115,630 = 854,789 GPD which is below the allotted 1,000,000 GPD. Based on the above projections, there will be available waster capacity left for future development on campus and it is not anticipated that additional capacity will have to be purchased.

Wastewater on the UCF campus is collected via gravity sewer mains which discharge to various underground pump/lift stations located across campus. The pump/lift stations discharge directly into the main campus 16 inch wasterwater force main that goes to Iron Bridge or to other on campus gravity systems or lift stations. The main campus lift station which collects a majority of the campus's wasterwater and pumps it to Iron Bridge Plant has a capacity of 1.728 mgd.

2. As new projects are proposed, existing pump/lift stations will need to be analyzed to determine if they have the capacity to handle the proposed increased flows to the station.

If the station(s) cannot handle the increased flows, the proposed project will be required to upgrade the pump/lift station as needed. UCF continually provides routine maintenance of all pump/lift stations and upgrades or replaces equipment as needed to extend the service life of the station, increase efficiency, or expand available capacity within the existing system

Additional pump stations and gravity sewer systems will be required for future growth, particularly in areas where no existing wastewater infrastructure exists. Under the current planning period, the Academic Research Project would require a new lift station with force main and a gravity collection system as shown in the following exhibit.



a) GENERAL PERFORMANCE

The existing gravity and pumping systems are functioning as designed. Both systems appear to be in good condition and only periodic maintenance is anticipated based on current flows. The two main lift stations on campus are currently be retrofitted with emergency diesel powered backup pumps so service can be maintained during unsuspected power outages.

b) PROBLEMS AND OPPORTUNITIES

During the development of the Athletic Node, two new lift stations were constructed. One to service the Knights Housing and Arena Projects and the other to service the Brighthouse Football Stadium. Both lift station wetwells were oversized for potential future growth in the area. Individual projects will need to analyze their impact on these systems to determine the need for upgrades to either the gravity system or pump station if not both.

c) STATE AND FEDERAL REGULATIONS

The wastewater collection and transmission system is currently regulated by the Florida Department of Environmental Protection. No on-site septic systems are allowed since wastewater service is available to the campus. . Authority is granted these agencies by Chapter 17 of the Florida Administrative Code. The University is currently in compliance with all applicable codes under these agencies review.

As future developments are constructed and additional flows added to the sanitary sewer system, permits are obtained from the Florida Department of Environmental Protection (FDEP). Since Seminole County is the utility provider for wasterwater to the campus, they are required to review, approve and sign the wasterwater applications made to FDEP

These permits insure that capacity is available at the wasterwater treatment plant and that the new construction meets current regulations regarding proper design, quality construction, and long term maintenance. The University has been routinely acquiring these permits as needed

SOLID WASTE ANALYSIS

a) A facility capacity analysis, by geographic service area, indicating surpluses and deficiencies for:

1. Existing conditions, based on the facility design capacity and the current demand on facility capacity.

The University provides for the collection of solid waste through service areas and solid waste dumpsters. Servicing of the dumpster system is through a private vendor under a continuing contract renewable at the discretion of the University.

The University also maintains a series of dumpsters designated for recycled materials. These materials include paper, glass, metals and plastics. Typically these dumpsters are co-mingled with standard trash dumpsters.

Virtually all of the University's solid waste is disposed of at the Orange County Landfill. This is a class 1 landfill which uses the "high-rise" method of layering the refuse material above the groundwater table. This landfill services Orange County and some smaller municipalities outside the county.

2. The end of the planning time frame, based the projected demand at the current level of service standards for the facility, projected student populations and land use distributions, and any available existing surplus facility capacity.

The size and location of waste disposal facilities will be determined on individual project requirements. These requirements should be then incorporated into the master collection and disposal program under the existing contract. There is no limit on the amount of refuse going to the landfill since the producer pays as they generate the waste.

b) The general performance of existing solid waste collection and disposal facilities, evaluating the adequacy of the current level of service provided by the facility, the general condition and expected life of the facility, and the impact of the facility upon adjacent natural resources.

Current waste collection sites on campus are removed, to the extent possible, from pedestrian traffic and visual contact. Collection sites are typically screened or removed from view for aesthetic purposes. Vehicular access to the collection sites should be multipurpose in that additional parking, deliveries and emergency access and storage areas are incorporated along this route.

The system of using outside vendors has been satisfactory over the previous five years and is meeting current expansion needs. The continued out-servicing of this contract for waste collection appears to be in the University's best interest

c) An analysis of the problems and opportunities for solid waste collection and disposal facility expansion or replacement to meet projected needs of the University.

As the University grows the solid waste collection system needs to be studied further to identify areas of opportunity to combine facility locations and thus reduce the overall number of collection sites on campus. In addition, as a possible research program for

recycled waste, the University should encourage the available academic community to study possible recycle and resource recovery systems, such as composting and material sorting, to reduce offsite disposal volume and costs associated with this disposal method.

d) An analysis of existing local, state and federal regulations governing waste disposal systems.

UCF currently contracts with a third party to collect and dispose of waste generated by the university. This contract addresses the need for the vendor to dispose of these materials in accordance with current laws. Hazardous wastes generated by the University are collected and disposed of under separate contracts specifically for the removal of this material.

UCF also has in place a recycling program in accordance with state and federal laws mandating such programs. The recyclable materials include paper, plastic, glass and metals. Special dumpsters also recycle cardboard materials for off-site disposal.

e) An assessment of opportunities or available and practical technologies for the reduction, recycling and re-use of solid waste generated by the University. Investigation of emerging technologies to address this issue is encouraged.

With the rapid expansion of computer network systems, the use of electronic data transmission and storage should significantly reduce the amount of solid paper waste on campus. The University should study opportunities to reduce other forms of waste generation through the use of current technologies.

f) An analysis of the terms of any agreements for the collection and/or disposal of University-generated solid waste, including allocated capacity and duration of service. Identify any future limitations on University development resulting from these factors.

The existing contracts provide the University with collection, transmission and disposal of solid waste. The contract allows the University to renew or terminate based on satisfactory performance of the vendor. As recycling of new waste products becomes available to the public, the University will want to re-negotiate the existing contract or include these items in future contracts.

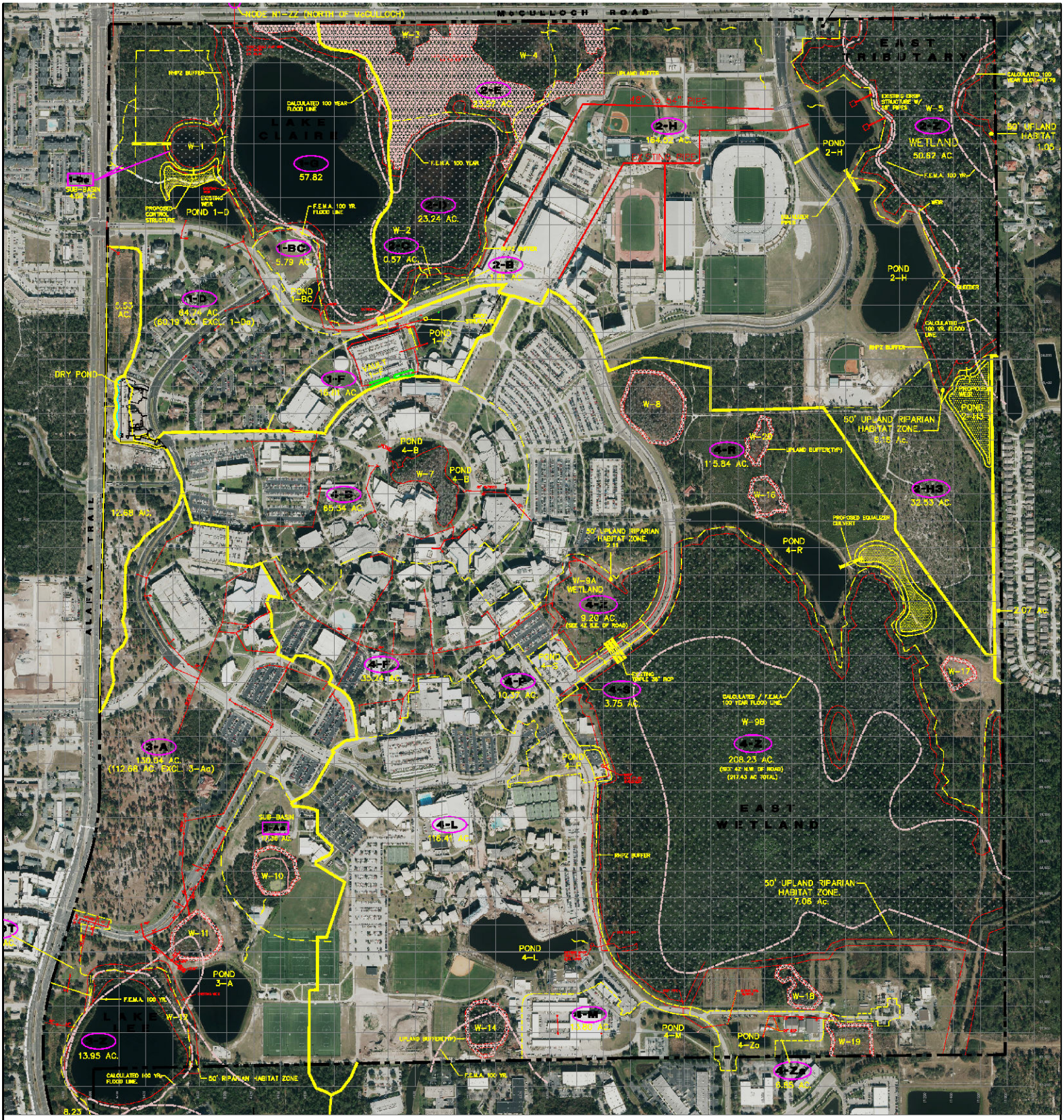


Figure 9-1

Stormwater Facilities

Comprehensive Master Plan Update

University of Central Florida

Orlando, Florida

2015-2025

LEGEND:

- = BOUNDARY LINE
- = DRAINAGE DIVIDES
- = DRAINAGE BASIN DIVIDES
- = DRAINAGE SUB-BASIN DIVIDES
- SUB-BASINS 3-Aa 15.61 AC. = SUB-BASIN IDENTIFICATION/AREA
- 4-R 115.84 AC. = BASIN IDENTIFICATION/AREA
- = DIRECTION OF SURFACE FLOW
- = PROPOSED POND LOCATIONS
- = EXIST. STORMWATER STRUCTURES/CULVERTS.
- = PROP. STORMWATER STRUCTURES/CULVERTS.
- = F.E.M.A. 100 YR. FLOOD LINE
- = CALCULATED 100 YR. FLOOD LINE

N

All maps are diagrammatic and conceptual. The various areas shown are approximate and not to survey accuracy. The intent of these maps is to illustrate general areas of existing or potential use.

Rev. 20120610

This map has been withheld for security reasons.

Figure 9-2

Potable Water Facilities

Comprehensive Master Plan Update

University of Central Florida

Orlando, Florida

2015-2025

All maps are diagrammatic and conceptual. The various areas shown are approximate and not to survey accuracy. The intent of these maps is to illustrate general areas of existing or potential use.

Rev. 20140701

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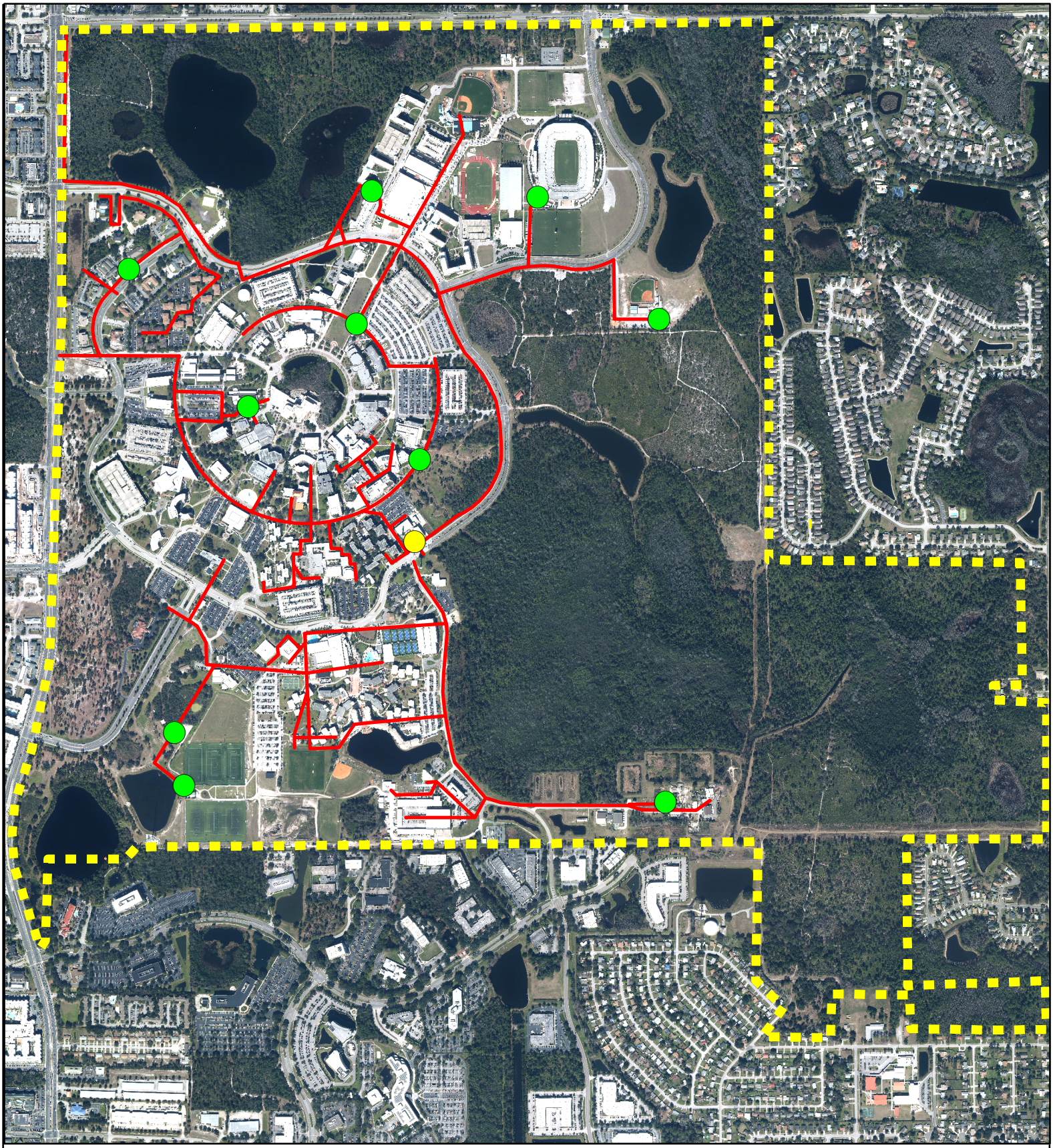

Figure 9-3

Sanitary Sewer Facilities

Comprehensive Master Plan Update

University of Central Florida

Orlando, Florida

2015-2025

Legend

- Existing Sanitary Sewer Line
- Lift Station
- Master Lift Station
- Boundary

0 1,000 2,000 4,000 Feet

N

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Rev. 20140622