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to Coastal Carolina University Master Plan Committee and Steering Committee

from Sasaki Associates, Inc.  
Castles Engineering, Inc.  
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project name Coastal Carolina University Master Plan

project # 94657.00

subject Campus Infrastructure

### **Utilities: Existing Conditions Summary – Campus Infrastructure**

#### ***Overview***

The purpose of this memorandum is to summarize existing campus infrastructure systems including stormwater, potable water, sanitary sewer, electric power, and wetlands. In general, the systems perform adequately for the existing development on campus. As discussed below, each system requires further study and coordination with relevant authorities as the master plan options and preferred direction are developed. Stormwater and wetlands pose the greatest challenge.

#### **Campus Stormwater System**

##### **1. Background Research**

- Meeting with CCU facilities maintenance staff Tuesday, June 15th, 2010.
- Telephone conversation and email correspondence with Joe Dignam, Stormwater Manager City of Conway.

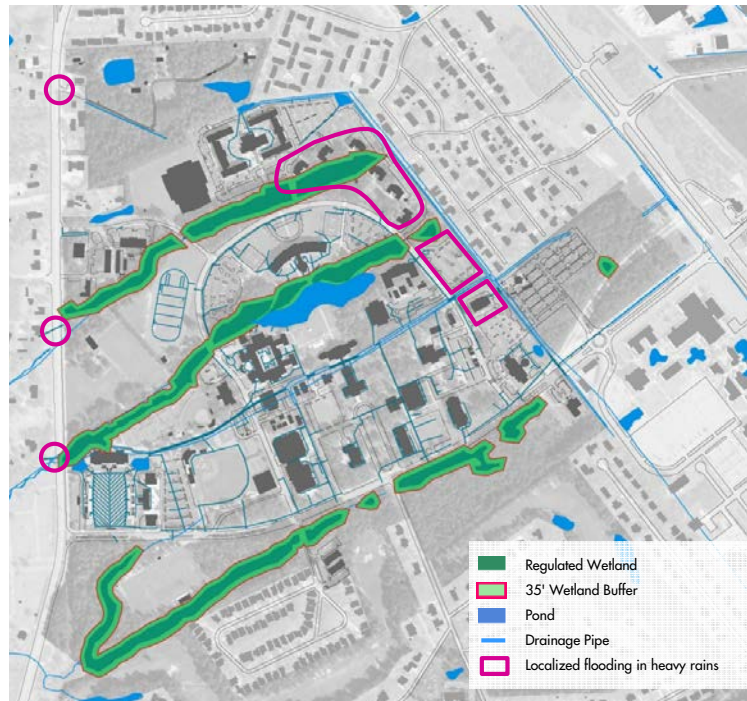
##### **2. Narrative Description**

The Campus Stormwater system is a private system owned and maintained by Coastal Carolina University. The system is comprised of catch basins, piping, ditches, ponds and wetlands for collection, conveyance and detention of stormwater runoff from the campus. The overall campus stormwater system was last studied by Cox & Dinkins, Inc. in 1993.

In general, stormwater runoff collected from the campus is routed through the on-site wetland areas and/or through the on-site lake that is located adjacent to the prince lawn in the center of campus. Discharge from the university drainage system flows through campus and discharges across SC Highway 544 into unnamed tributaries flowing to the Waccamaw River. This discharge across SC Highway 544 occurs at three main locations along SC 544 that can be described as the Brooks Stadium/Hillcrest Cemetery culvert, the Practice Fields/Carter Lane Culvert and a culvert near the Elvington property. Discharge from the campus drainage system is limited by the capacity of these culverts under SC-544.

Based upon interviews with CCU staff and the City of Conway Stormwater manager referenced above, the following items were noted relative to the performance of the existing stormwater system:

- The existing campus stormwater system performs well for average rain events. Heavy burst events can cause some localized flooding on campus, but this flooding is short-term until the water can be released through the 544 culverts. Long duration events without burst peaks are managed by the existing system and available storage. The most recent event noted for campus flooding occurred on June 2, 2010.
- Localized flooding in heavy burst duration events is experienced mainly in the areas near the Woods Residence Halls and the Kingston Hall and Smith Science Center parking areas.
- The lake near the Prince Lawn does not routinely experience flooding during rain events. This lake is also used as a reservoir for a majority of the irrigation systems on campus.



Top: Schematic diagram of the existing stormwater system.

### 3. Recommendations

In order to facilitate future growth plans of the University and ensure that stormwater quality and quantity needs can be addressed with the campus drainage system, it may be in the interest of the University to commission a full stormwater study once the master plan concept is fully developed. This study should consider the changes in stormwater regulations at the state and local level that have occurred since the previous stormwater study and take into consideration the downstream and upstream changes to the watershed. Without this study, it will be difficult to assess the sufficiency of the current stormwater system relative to future growth and development of the University Campus.

### 4. Supporting Documents

- Cox and Dinkins Master Drainage Plan dated November 5, 1993
- Exhibit showing CCU GIS data for campus drainage

## Campus Potable Water System

### 1. Background Research

- Meeting with CCU facilities maintenance staff Tuesday, June 15th, 2010.
- Telephone Conversations with Freddie DuBose, Utilities Director City of Conway.

### 2. Narrative Description

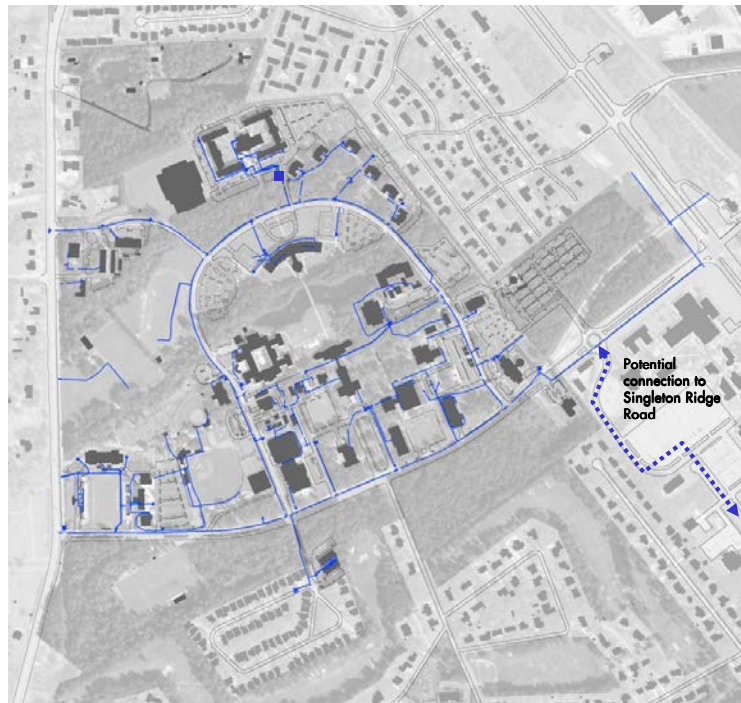
The Potable Water system serving the Coastal Carolina University Campus is a public system owned and maintained by the City of Conway, SC. Building

services and fire pumps for individual buildings are owned and maintained by the University from the meter or backflow device to the building being served. Buildings are individually and separately metered from the City of Conway water system, and fire systems for buildings are typically services on individual fire service lines. The University maintains one large booster pump station near the Residence Hall area to provide additional pressure to the buildings in this area. Additionally, there are smaller individual fire pump systems in many of the buildings around campus.

The portion of the City of Conway Water System serving the CCU campus is a looped distribution system with feeds from a 12" distribution main in University Boulevard and a 12" distribution main in SC-544. The main distribution feeder within the University campus is an 8" main that runs the entire length of Chanticleer Drive with ties to the 12" mains in SC-544 and University Drive. This portion of the City of Conway water system is supplied by two nearby elevated storage tanks located near Garner Lacy Road and the Atlantic Center.

Based upon interviews with CCU staff and the City of Conway Stormwater Utilities Director referenced above, the following items were noted relative to the performance of the existing potable water system and perceived improvement needs for the future:

- The existing potable water system serving the University Campus currently performs well for current loads and demands. The system is well looped and reliable.
- It is anticipated that as demand increases on the University campus and/or building height increases the addition of an elevated storage tank nearer to the University Campus may be required to meet pressure and flow demands of the University.
- The City of Conway also expressed a desire to improve the reliability of distribution feeds to the University by extending a 12" main through the Horry-Georgetown Technical College (HGTC) campus to tie the University Drive Main to a main in Singleton Ridge Road.



Top: Schematic diagram of the existing potable water system.

### 3. *Recommendations*

In order to facilitate future growth plans of the University and ensure that potable water service and fire service is sufficient in quantity and pressure, it may be in the interest of the University in conjunction with the City of Conway to commission a modeling effort and study for the potable water system serving the campus. This model and study should incorporate the elements of the master plan concept and could provide a reliable predictor of future potable water infrastructure needs of the University.

### 4. *Supporting Documents*

- Exhibit showing CCU GIS data for campus potable water system

## Campus Sanitary Sewer System

### 1. *Background Research*

- Meeting with CCU facilities maintenance staff Tuesday, June 15th, 2010.
- Telephone Conversation and email exchange with Matthew Minor, GSW&SA Engineer

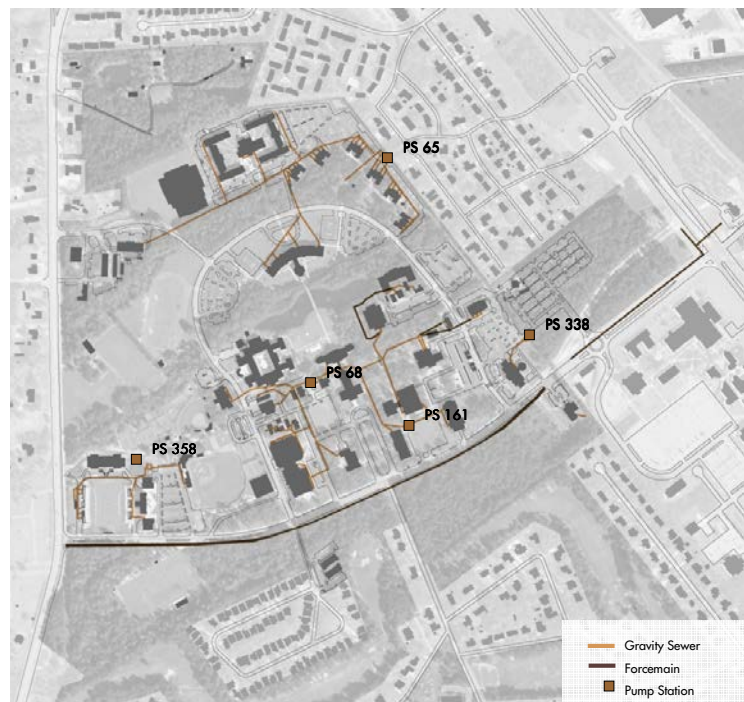
### 2. *Narrative Description*

The campus sanitary sewer system is a combination of private and public systems owned and maintained jointly by Coastal Carolina

University and Grand Strand Water and Sewer Authority (GSW&SA). The gravity collection systems on campus including manholes, gravity sewer pipe and services are currently maintained by the CCU facilities management department. The pump stations and sewer force mains are owned and maintained by GSW&SA. All of the wastewater collected from campus is pumped and conveyed to Grand Strand Water and Sewer Authority for wastewater treatment.

The campus sewer system is served by five sewer pump stations location on the University campus. A listing of these pump stations is provided below:

- Pump Station #65 (Residence Halls Pump Station)
- Pump Station #68 (Singleton Building Pump Station)
- Pump Station #161(Kerns Hall Grinder Station)
- Pump Station #338 (Welcome Center Pump Station)



Top: Schematic diagram of the existing sanitary sewer system.



e. Pump Station #358 (Brooks Stadium Pump Station)

Details regarding the current service areas of these pump stations, capacities of the stations and historical run data for these stations are still being obtained at the time of this report. In general, sewer collection and pump station service for the University has been designed and constructed on an as-needed, project-by-project basis. In the absence of a comprehensive master sewer study and report, it is difficult to evaluate the available capacity of the existing infrastructure. Based upon conversations with Grand Strand Water and Sewer and CCU personnel, it appears that the existing sewer facilities are functioning sufficiently under the current loads.

**3. Recommendations**

In order to facilitate future growth plans of the University and ensure that sewer collection and pumping facilities are available to serve the needs of the master plan, it may be in the interest of the University to commission a full sewer study for the university campus once the master plan concept is fully developed. This study should consider the service areas of each of the existing stations, evaluate the performance of these stations under current and planned growth conditions, and project the future infrastructure needed to service the improvements proposed by the master plan.

**4. Supporting Documents**

- Email Correspondence from GSW&SA
- As-Built Drawings for Pump Stations #68, #338 and #354.
- Exhibit showing CCU GIS data for campus sanitary sewer system.

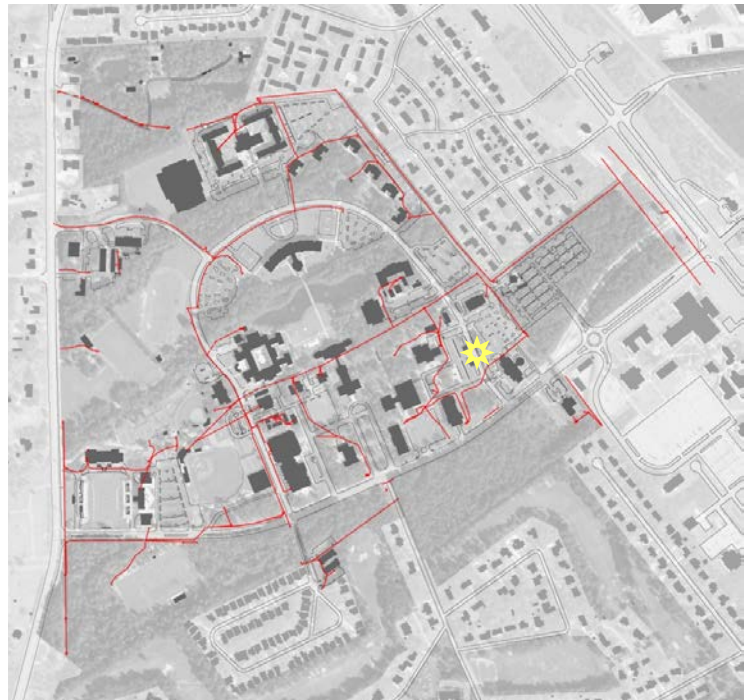
**Campus Primary Power System**

**1. Background Research**

- Meeting with CCU facilities maintenance staff Tuesday, June 15th, 2010.

**2. Narrative Description**

The Primary Power system serving the Coastal Carolina University Campus is a SC Cooperative utility owned and operated by Santee Cooper. Service to the University is provided via a main feed from US-501 with looped



Top: Schematic diagram of the existing primary power system.

connections to SC-544 and University Drive. Internal to the campus the electrical system is well looped throughout the campus with individual services to buildings. The majority of the electrical service on campus is underground with aerial feeds only from US-501 and SC-544. All planning, design, installation, maintenance and monitoring for this primary power system is done by Santee Cooper. There is sufficient electrical supply to serve the current needs of the University.

Buildings are individually metered. The Facilities department is actively monitoring building energy usage and making efforts to reduce energy consumption. In conjunction with Santee Cooper, the University installed demonstration solar panels on the bus shelter near the Union.

**3. Recommendations**

In order to facilitate future growth plans of the University and ensure that electrical service is sufficient for future growth, it may be in the interest of the University to provide a copy of the final Master Plan document to Santee Cooper for their use in planning and design of electrical service to serve the University. The University should continue its efforts to reduce energy consumption and work with Santee Cooper, the only green energy provider in the state.

**4. Supporting Documents**

Exhibit showing CCU GIS data for campus primary power system.

**Campus Exterior Lighting System**

**1. Background Research**

- Meeting with CCU facilities maintenance staff Tuesday, June 15th, 2010.

**2. Narrative Description**

The Exterior Lighting System serving the Coastal Carolina University Campus is a mixture of private, University Owned Lighting and some lease lighting from Santee Cooper. Operation and maintenance of the private lighting is done by the university, while the lease lighting is maintained by Santee Cooper. Campus lighting is deemed sufficient for the current campus by the facilities staff.

**3. Recommendations**

In order to facilitate future growth plans of the University, it may be in the interest of the University to establish a standard for exterior lighting that can be used as guidance in planning and design of future facilities.

**4. Supporting Documents**

Exhibit showing CCU GIS data for campus exterior lighting system

**Campus Natural Gas System**

**1. Background Research**

- Meeting with CCU facilities maintenance staff Tuesday, June 15th, 2010.

**2. Narrative Description**

The Natural Gas system serving the Coastal Carolina University Campus is a private utility owned and operated by

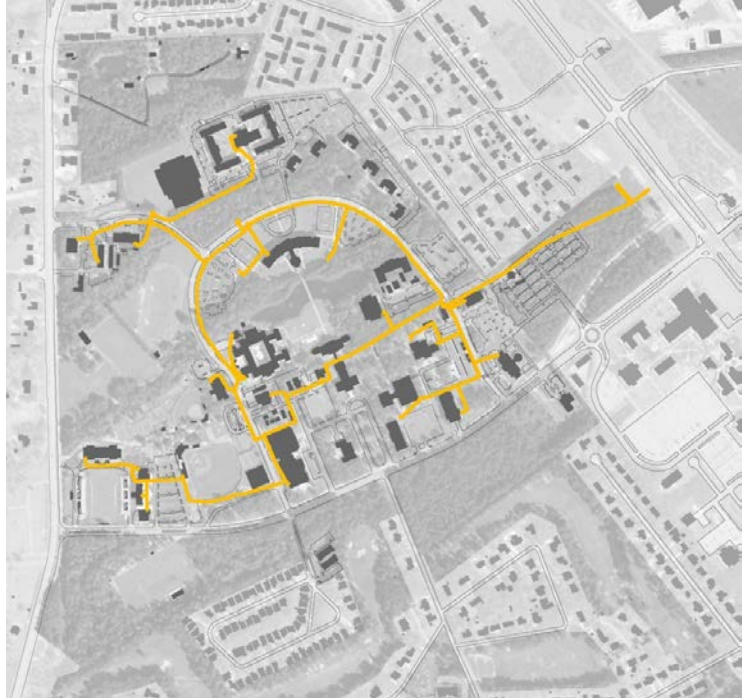
South Carolina Electric and Gas (SCE&G). Service to the University is provided via a main feed from US 501. Internal to the campus the gas main is looped with a feeder line along Chanticleer Drive and services from this loop to individual buildings. Metering is done at the individual buildings. All planning, design, installation, maintenance and monitoring for this Natural Gas System is done by SCE&G. There is sufficient gas supply to serve the current needs of the University.

**3. Recommendations**

In order to facilitate future growth plans of the University and ensure that natural gas service is sufficient for future growth, it may be in the interest of the University to provide a copy of the final Master Plan document to SCE&G for their use in planning and design of natural gas to serve the University.

**4. Supporting Documents**

Exhibit showing CCU GIS data for campus natural gas system



Top: Schematic diagram of the existing natural gas system.

## Campus Wetlands

### 1. **Background Research**

- Meeting with CCU facilities maintenance staff Tuesday, June 15th, 2010.
- Telephone conversation with Chuck Oates, S&ME Wetland Consultant.

### 2. **Narrative Description**

The USACOE Jurisdictional Wetlands on the Coastal Carolina Campus was approved by letter on April 2, 1992 from a wetland delineation done by the Brigman Company and

mapped by Coastal Land Surveyors. This delineation was done in support of a USACOE wetland permit that was approved February 17, 1993 for the excavation of the Prince Lawn Pond and fill placement required for the construction of the Wall Building and Rivers Residence Halls. This permit established buffers, restrictive covenants and management guidelines for all identified wetlands and mitigation areas. A small wetland fill area was permitted for campus under a nationwide permit on March 8, 1990, but this permit pre-dated the current covenant and restrictions set by the 1993 permit. Any/all land disturbance and development activity on the Coastal Carolina University Campus must honor the restrictions set forth by the 1993 documents regarding wetlands and buffers as long as the covenants and restrictions remain in place.

As part of the arena site project a more current delineation was done by Chuck Oates of S&ME, Inc. for the development partnership for this project. In conversation with Mr. Oates, it was discovered that there exists a current wetland delineation (expiring in October 2011) for this portion of the University Campus. This delineation certifies no jurisdictional wetlands on the arena site. We are in the process of obtaining a copy of the Jurisdictional Determination.

The wetland system on the Coastal University Campus serves as an integral part of the current stormwater collection, conveyance and management on campus. This wetland system provides attenuation of runoff peaks and filtering of contaminants improving the quality of runoff leaving the university campus. Under the current restrictions imposed on these wetlands, the wetland system does not have avail much flexibility for modifications or improvements as it pertains to stormwater management.

### 3. **Recommendations**

As there have been major changes to the CCU campus and the hydrology of the area since 1993, it may be in the interest of the University to commission a re-delineation of all of the wetlands on



Top: Schematic diagram of the wetlands on the campus.



campus in hopes of developing a new wetland master plan for the campus. This exercise will require that the USACOE consider either lifting or modifying the current restrictive covenants in-place in exchange for an updated wetland master plan that better serves the needs of the University and more accurately protects the current environmentally sensitive areas. This effort, if undertaken by the University, should incorporate stormwater management into the wetland master plan in order that the current stormwater elements currently being served by these wetlands are both protected and enhanced. Additionally, incorporation of the master plan concept would allow for the consideration of future stormwater needs to be addressed in the wetland master plan.

#### 4. *Supporting Documents*

- a. Wetland permits and exhibits 1990-1993
- b. Wetland Restrictive Covenants
- c. Recorded Wetland Map (pending)
- d. Arena Site Jurisdictional Determination (pending)
- e. FEMA Flood Map

#### Climatology Information

##### 1. *Supporting Documents*

- a. Average Annual Temperatures
- b. Annual Rainfall Data Department of Natural Resources
- c. Periodic Rainfall – NOAA

#### Normal Temperatures

(CONWAY Weather station, 0.41 miles from Conway)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Max °F	57.1	60.6	67.9	75.4	82.3	87.6	90.8	89.4	84.9	76.5	69.0	60.0	75.1
Mean °F	45.8	48.7	55.7	62.9	70.7	77.1	80.9	79.6	74.7	64.5	56.4	48.4	63.8
Min °F	34.5	36.7	43.5	50.4	59.0	66.6	70.9	69.8	64.5	52.5	43.8	36.7	52.4

#### Normal Precipitation

(CONWAY Weather station, 0.41 miles from Conway)

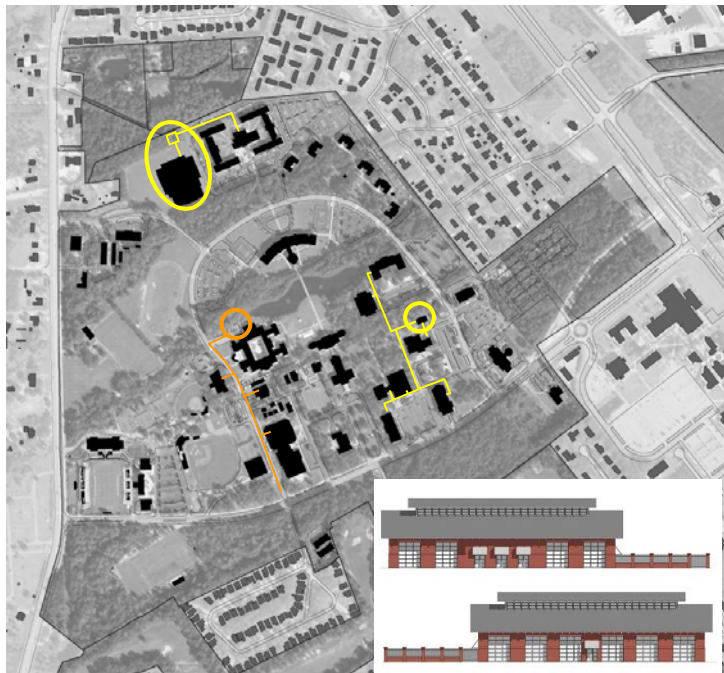
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Inch	4.72	3.45	4.07	3.10	4.26	4.74	6.70	6.76	5.86	3.25	2.74	3.62	53.27

Precipitation Frequency Estimates (inches)																		
ARI* (years)	<a href="#">5 min</a>	<a href="#">10 min</a>	<a href="#">15 min</a>	<a href="#">30 min</a>	<a href="#">60 min</a>	<a href="#">120 min</a>	<a href="#">3 hr</a>	<a href="#">6 hr</a>	<a href="#">12 hr</a>	<a href="#">24 hr</a>	<a href="#">48 hr</a>	<a href="#">4 day</a>	<a href="#">7 day</a>	<a href="#">10 day</a>	<a href="#">20 day</a>	<a href="#">30 day</a>	<a href="#">45 day</a>	<a href="#">60 day</a>
1	0.48	0.77	0.96	1.32	1.65	1.95	2.10	2.51	2.94	3.44	4.05	4.55	5.29	5.99	8.11	10.12	12.71	15.21
2	0.57	0.91	1.14	1.57	1.98	2.35	2.53	3.03	3.54	4.18	4.90	5.49	6.37	7.18	9.65	12.00	15.01	17.93
5	0.66	1.05	1.33	1.89	2.42	2.94	3.18	3.81	4.49	5.40	6.27	6.94	7.96	8.82	11.68	14.25	17.58	20.81
10	0.74	1.18	1.49	2.16	2.82	3.49	3.80	4.55	5.39	6.40	7.40	8.12	9.23	10.12	13.27	15.98	19.54	22.98
25	0.83	1.33	1.68	2.49	3.32	4.21	4.63	5.58	6.65	7.85	9.04	9.79	11.01	11.90	15.44	18.28	22.11	25.79
50	0.91	1.45	1.84	2.77	3.75	4.83	5.38	6.49	7.79	9.07	10.39	11.17	12.46	13.32	17.16	20.06	24.09	27.92
100	0.98	1.57	1.98	3.03	4.17	5.47	6.16	7.46	9.01	10.38	11.86	12.64	13.97	14.79	18.92	21.86	26.04	30.01
200	1.06	1.68	2.12	3.30	4.62	6.16	7.02	8.54	10.38	11.80	13.44	14.21	15.57	16.31	20.74	23.67	28.00	32.06
500	1.15	1.82	2.30	3.65	5.24	7.13	8.27	10.10	12.38	13.87	15.73	16.45	17.84	18.42	23.23	26.09	30.60	34.77
1000	1.24	1.94	2.44	3.95	5.77	7.97	9.37	11.49	14.20	15.59	17.63	18.30	19.69	20.13	25.20	27.98	32.60	36.81

\* These precipitation frequency estimates are based on a [partial duration series](#). ARI is the Average Recurrence Interval. Please refer to [NOAA Atlas 14 Document](#) for more information. NOTE: Formatting forces estimates near zero to appear as zero.

### Chilled Water

The University is constructing two new district chiller plants: one at the Student Recreation and Convocation Center and one at the new Central Plant near the Union. An existing plant at the Edwards College of Humanities and Fine Arts serves buildings along Chanticleer Boulevard on the west side of the main campus. The new Central Plant, on the east side of the main campus, will include 1,000 tons of capacity and will serve the new Swain Science building, existing Smith Science building, the Library and its planned addition, Wheelwright Auditorium, and Kearns Hall. The plant at the Student Recreation and Convocation Center will include 900 tons of capacity and serve the center, the Rivers Residence Halls, and the Commons, including planned expansion.



With the new additions, the main campus chilled water supply will be adequate for current development, including near term planned projects. Going forward, new development will trigger demand for additional chilled water capacity. Future plants should follow the current district service approach and should be visually masked with buildings and landscape. As the Central Plant, and future plants, are developed, service lines should be kept within streets and access drives to avoid conflicts with future development.

### East Campus

#### *Narrative*

The East Campus is well served for water, electricity, gas, and sewer. The area was master planned as an industrial park with infrastructure sized for intense industrial uses. The district has significant

stormwater issues. Downstream tributaries are severely compromised and back up, causing flooding during storm events.

***Recommendations***

A detailed stormwater study is recommended. In the past, a relief canal has been discussed . The problem extends beyond University property and involves multiple owners, significant cost, and permitting issues.

**Golf Course**

The Golf course is well served by water, power, and sewer. The district includes several ponds and wetland areas. Development is restricted by covenants. No new buildings or infrastructure are anticipated with the exception of a potential 12 inch water main through the HGTC campus on the eastern edge of the Golf Course District.

**University Place**

University Place is well served by water, power, and sewer. The district includes a large pond engineered to handle 25-year storms per regulations. No new development is anticipated since the site is fully developed. If the parcel bordering SC-544 were acquired, further study would be needed to assess additional infrastructure needs.