

Chapter 5 - Implementation and Phasing Plan

This chapter provides an overview of the phasing and implementation of the various utilities evaluated as part of this report.

Domestic Water

The following table provides phasing and completion dates for modifications to the existing domestic water mains.

Phase #	Completion Date	Building/ Location	Area (SF)	Description of Impact to Campuswide Utilities
1	2009	Peterson Hall 3 Replacement Building	160,000	The work limit of the proposed replacement building for Peterson Hall 3, Microbiology and Science Lecture Hall should shrink along the northern edge so that it no longer conflicts with the existing 8-inch line that connects two existing 6-inch lines running north/south on the east and west sides of the Peterson Halls. There is also a fire hydrant to the north of the project site that should be avoided. By reducing the project limits slightly, the only modifications necessary to the water system will be removal of local service lines to existing buildings that will be demolished as part of the project. Potholing should be performed to verify the location of the 8-inch line. Service to the project can be provided from either of the 6-inch lines to the east and west of the project or the 8-inch to the north. Some improvements to the Campus mains should also be constructed as part of this project, including replacement of the 6-inch line in East Campus Drive with a 10-inch line from the water meter near the Central Plant to Microbiology.
2	2011	Liberal Arts Building (Phases 1 and 2)	155,000	The work limit of the proposed replacement building for Peterson Halls 1 & 2 and Faculty Office 5 should shrink in the southwest corner to avoid conflicting with the existing 6-inch main on the west side of the Peterson Halls. Potholing should be performed to verify the location of the 6-inch line. Service to the project can be provided from either of the 6-inch lines to the east and west of the project. Some improvements to the campus mains should also be constructed as part of this project, including replacement of the 6-inch line in the East Campus Drive with a 10-inch line, from Microbiology to Studio Theatre.
2	2011-2014	Parking Structure 3	416,000	No modifications to the existing water network are necessary to accommodate the proposed Parking Structure 3. Service to the project can be provided from the 8-inch line to the south.
2	2011-2014	Student Recreation Center	120,000	No modifications to the existing water network are necessary to accommodate the proposed Recreation Building. Service to the project can be provided from the 8-inch lines to the north, west and south.
2	2011-2014	Nursing Building Addition	5,000	It is recommended to replace the 6-inch ACP line that conflicts with the site of the proposed Nursing School Expansion with a DI pipe, but moved slightly to the north. The ACP line is old and should be replaced soon. The replacement could be confined to the portion conflicting with the proposed building or could expand to include the entire Residence Commons 6-inch ACP loop. Potholing should be performed to verify the location of the 6-inch line.
2	2011-2016	Outpost Replacement Building	8,000	No modifications to the existing water network are necessary to accommodate the proposed building.
3	2014-2016	Liberal Arts Complex	155,000	No modifications to the existing water network are necessary to accommodate the proposed replacement building for Liberal Arts 2, 3 & 4, Instructional Resources, Lecture Hall and Faculty Office 2. Service to the project can be provided from the 6-inch transite line to the west. The service connections to the existing buildings can be removed with the construction of the proposed building. There is also a drinking fountain located to the east of Instructional Resources that will need to be removed or reconnected to the 6-inch line to the south during the construction of the proposed building. Some improvements to the Campus mains should also be constructed as part of this project, including replacement of the 6-inch line in West Campus Drive with a 10-inch line running from the 8-inch water meter on Seventh Street to Parking Lot 3.
3	2014-2016	Student Services Complex	70,000	No modifications to the existing water network are recommended to accommodate the proposed Student Services Complex. Service to the project can be provided from the 6-inch line to the south. Some improvements to the campus mains should also be constructed as part of this project, consisting of replacement of the 6-inch line to the south with a 10-inch line being constructed in West Campus Drive to the existing 8-inch water meter by the Central Plant.
3	2014-2016	Engineering 3 & 4	80,000	The work limit of the proposed replacement building for Engineering 3 & 4 should shrink along the northern and western edges so that it doesn't conflict with the 6-inch mains in those areas. It should also shrink in the southeastern corner to avoid conflicting with the existing 4-inch line between Engineering 2 and ECS. Potholing should be performed to verify the location of the 4-inch and the 6-inch lines. Service to the project can be provided from either of the 6-inch lines to the north and west of the project.
4	after 2016	Corporate Yard Expansion	71,000	No modifications to the existing water network are necessary to accommodate the proposed expansion.
		Parking Structure 5 (Lot 7)	-	The western edge of the work limit of the proposed Parking Structure conflicts with an existing 6-inch water line. However, the 6-inch water line is undersized and should be replaced with a 10-inch line. The replacement water line can be constructed further to the west of the Parking Structure. There is also an existing fire hydrant in the current Parking Lot that will need to be removed and relocated along East Campus Drive. The extent of the new 10-inch line should cover from the 10-inch line being constructed in East Campus Drive as part of Peterson 1 and 2 and extend to the existing 8-inch water meter on Seventh Street.
		Parking Structure 4 (Lot 14)	-	The proposed structure does not interfere with any of the existing water lines.
		Satellite Dining Facility (Lot 15)	-	The proposed building is in conflict with a 8-inch line to the south. The 8-inch lines will need to be relocated to accommodate the proposed building. The relocated 6-inch lines could potentially serve the proposed building.
	2008-2012	Miscellaneous	-	Replace existing transite water pipes on the south side of the campus.



Sanitary Sewer

The following table provides phasing and completion dates for modifications to the existing sanitary sewer.

Phase #	Completion Date	Building/ Location	Area (SF)	Description of Impact to Campuswide Utilities
1	2009	Peterson Hall 3 Replacement Building	160,000	The work limit of the proposed replacement building for Peterson Hall 3 and Science Lecture Hall should shrink along the western edge so that it no longer conflicts with the existing 10-inch main to the west of the project. The proposed building can be served from either the existing 10-inch line to the west or the existing 8-inch line to the east. As shown in the sewer video, there are some instances of severe root intrusion and pipe cracking in the downstream 10-inch line (see Appendix: Inspection Report from MH 28 to MH 41). Based on the added usage caused by the proposed projects and the existing condition of the 10-inch line, it is recommended that the 10-inch line be replaced with a 12-inch line from the connection point with the 12-inch line in West Campus Center Drive to the project site.
2	2011	Liberal Arts Building (Phases 1 and 2)	155,000	The work limit of the proposed replacement building for Peterson Halls 1 & 2 and Faculty Office 5 should shrink along the western edge so that it no longer conflicts with the 10-inch main to the west of project. The proposed building can be served from either the existing 6-inch line to the south or the existing 10-inch line to the west. The remainder of the 10-inch line not replaced by the Peterson Hall 3 project should be replaced with a 12-inch line. The 6-inch line was found to have several locations with minor to major root intrusion (see Appendix: Inspection Report from MH 48 to MH 47) and should be replaced with a new 8-inch line.
2	2011-2014	Parking Structure 3	416,000	The location of the proposed Parking Structure 3 does not conflict with any existing sanitary sewer mains. There is a 24-inch LACSD main to the west that could provide a sewer service* to the proposed Structure, or 6-inch and 8-inch Campus lines further to the west that could provide service.
2	2011-2014	Student Recreation Center	120,000	The work limit of the proposed Recreation Building should shrink along the western edge so that it no longer conflicts with the existing 24-inch LACSD main to the west of the project. The proposed building can be served from either the existing 24-inch main* to the west or the 8-inch Campus line to the south.
2	2011-2014	Nursing Building Addition	5,000	The work limit of the proposed Nursing School Expansion should shrink along the northeast edge so that it no longer conflicts with the 12-inch LACSD sewer main to the northeast of the project. The Structure could potentially be served by the 12-inch main* or by the existing 6-inch Campus line to the west of the building.
2	2011-2016	Outpost Replacement Building	8,000	No modifications to the existing sanitary sewer network are necessary to accommodate the proposed building.
3	2014-2016	Liberal Arts Complex	155,000	The proposed replacement building for Liberal Arts 2, 3 & 4, Instructional Resources, Lecture Hall and Faculty Office 2 conflicts with the existing 3-inch main that can be removed at the same time as the Liberal Arts buildings in the construction of the proposed building. The proposed building could potentially be served by the 6-inch Campus line to the west of the Liberal Arts buildings.
3	2014-2016	Student Services Complex	70,000	The proposed Student Services Complex is not in conflict with of any existing sewer lines. The Structure could potentially be served by the 12-inch Campus line to the southwest of the building.
3	2014-2016	Engineering 3 & 4	80,000	The proposed replacement building for Engineering 3 & 4 is not in conflict with any existing sewer lines. The Structure could potentially be served by the 6-inch Campus line to the west of the building. Due to the moderate to severe cracks found in several locations along the 6-inch line (see Appendix: Inspection Report from MH 71 to MH 70), it should be replaced with an 8-inch line from the new building to the connection with the 8-inch Campus sewer to the south.
4	after 2016	Corporate Yard Expansion	71,000	No modifications to the existing sanitary sewer network are necessary to accommodate the proposed expansion.
		Parking Structure 5 (Lot 7)	-	The proposed structure does not interfere with any of the existing sewer lines.
		Parking Structure 4 (Lot 14)	-	The proposed structure does not interfere with any of the existing sewer lines.
		Satellite Dining Facility (Lot 15)	-	The proposed building does not interfere with any of the existing sewer lines. The proposed building could potentially be served by a 4" line located on the south side of the proposed facility.
	2008-2012	Miscellaneous	-	Replace existing deteriorating sewer pipes per sewer video report.

* Obtaining a new connection permit for one of the existing LACSD mains is not recommended, as it is up to the discretion of the County whether they will consider issuing such a permit. Wherever possible, it would be preferable to connect to existing Campus mains that already tie in to one of the County mains.



Storm Drain

The following table provides phasing and completion dates for modifications to the existing storm drain system.

Phase #	Completion Date	Building/ Location	Area (SF)	Description of Impact to Campuswide Utilities
1	2009	Peterson Hall 3 Replacement Building	160,000	The proposed replacement building for Peterson Hall 3 and Science Lecture Hall is located on top of existing 6-inch and 12-inch lines that collect local runoff and tie to the Campus network. The lines and area drains can be removed during the construction of the proposed building. The proposed building could potentially be served by the 12-inch line to the west or the 21-inch line to the east.
2	2011	Liberal Arts Building (Phases 1 and 2)	155,000	The proposed replacement building for Peterson Halls 1 & 2 and Faculty Office 5 only conflicts with existing local collection lines and area drains that can be removed during construction of the proposed building. The proposed building could potentially be served by the 10-inch line to the south.
2	2011-2014	Parking Structure 3	416,000	No modifications to the existing storm drain network are necessary to accommodate the proposed expansion.
2	2011-2014	Student Recreation Center	120,000	The location of the proposed Parking Structure 3 conflicts with the existing 15-inch line that collects local drainage in the northern third of Parking Lot 11. The 15-inch line will need to be removed and the 10-inch line that collects runoff from the eastern portion of the Lot which is to remain will need to be reconnected to the Campus system via the 12-inch line to the south of the proposed building.
2	2011-2014	Nursing Building Addition	5,000	The proposed Recreation Building conflicts with the existing 10-inch and 12-inch local collection lines and area drains in Parking Lot 11 that can be removed during construction of the proposed building. It also interferes with a 4-inch line that collects runoff from the south and ties into the lines in Lot 11. This 4-inch line will need to be relocated. The proposed building could potentially be served by the existing 15-inch line to the southwest.
2	2011-2016	Outpost Replacement Building	8,000	The proposed Nursing School Expansion is not in conflict with any existing storm drain lines. The Structure could potentially be served by the 8-inch line to the north or the 12-inch line to the west.
3	2014-2016	Liberal Arts Complex	155,000	No modifications to the existing storm drain network are necessary to accommodate the proposed building.
3	2014-2016	Student Services Complex	70,000	The proposed replacement building for Liberal Arts 2, 3 & 4, Instructional Resources, Lecture Hall and Faculty Office 2 only conflicts with existing local collection lines and area drains that can be removed during construction of the proposed building. The proposed building could potentially be served by the 10-inch line to the south or the 8-inch line to the west.
3	2014-2016	Engineering 3 & 4	80,000	The proposed Student Services Complex conflicts with a storm drain line that collects some local area drainage and outlets to the Channel. It also conflicts with a sump pump that connects to a 6-inch line that also outlets to the Channel. The area drains and storm drain outlet to the Channel will need to be relocated further to the west of the proposed building as will the sump pump.
4	after 2016	Corporate Yard Expansion	71,000	The proposed replacement building for Engineering 3 & 4 conflicts with 4-inch, 6-inch and 8-inch storm drain lines that take care of local drainage for the buildings that will be removed as part of the project. The proposed building also conflicts with a 4-inch local drainage line to the east of the building that must be reconnected to the Campus network, either to the 8-inch line to the south or the 6-inch line to the north. The proposed building could potentially be served by the 12-inch line to the west or the 8-inch line to the south.
		Parking Structure 5 (Lot 7)	-	The proposed structure conflicts with 18-inch and 12-inch storm drain lines. The same need to be relocated to accommodate the proposed facility.
		Parking Structure 4 (Lot 14)	-	The proposed structure does not interfere with any of the existing storm drain lines. However, drainage in parking lot 14 will have to be evaluated as part of the proposed structure project.
		Satellite Dining Facility (Lot 15)	-	The proposed building conflicts with 6-inch and 8-inch storm drain lines. The same need to be relocated to accommodate the proposed facility.
	2008-2012	Miscellaneous	-	Replace existing deteriorating storm drain pipes.



Irrigation Water

The following table provides phasing and completion dates for modifications to the existing irrigation water mains.

Phase #	Completion Date	Building/ Location	Area (SF)	Description of Impact to Campuswide Utilities
1	2009	Peterson Hall 3 Replacement Building	160,000	The proposed replacement building for Peterson Hall 3, Microbiology and Science Lecture Hall is located on top of several small irrigation water lines that serve the planted areas surrounding the buildings that will be demolished. Future Irrigation water services can be provided from either of the two existing 6-inch water lines that run north/south on the east and west sides of the Peterson Halls.
2	2011	Liberal Arts Building (Phases 1 and 2)	155,000	The proposed replacement building for Peterson Halls 1 & 2 and Faculty Office 5 does not conflict with any existing irrigation lines, but is located on top of an existing 6-inch water main on the west side of the Peterson Halls. Section 4.1 discusses recommendations for water lines. Future Irrigation water services can be provided from either the relocated 6-inch water line on the west side or the 6-inch water line on the east side of the Peterson Halls.
2	2011-2014	Parking Structure 3	416,000	No modifications to the existing irrigation network are necessary to accommodate the proposed expansion.
2	2011-2014	Student Recreation Center	120,000	The proposed Parking Structure 3 does not conflict with any existing irrigation or domestic water lines. Future Irrigation water services can be provided from either the 6-inch reclaimed water line to the north or the 4-inch reclaimed water line to the west.
2	2011-2014	Nursing Building Addition	5,000	The proposed Recreation Building does not conflict with any existing irrigation or domestic water lines. Future Irrigation water services can be provided from the 6-inch reclaimed water line to the west.
2	2011-2016	Outpost Replacement Building	8,000	The proposed Nursing School Expansion does not conflict with any existing irrigation water lines, but it is located on top of an existing 6-inch water line that serves the Residence Commons. Section 4.1 discusses recommendations for water lines. There are several irrigation water valves located around the site of the proposed Structure that could be used to provide irrigation water, otherwise it could potentially come from the relocated 6-inch line.
3	2014-2016	Liberal Arts Complex	155,000	No modifications to the existing irrigation network are necessary to accommodate the proposed building.
3	2014-2016	Student Services Complex	70,000	The proposed replacement building for Liberal Arts 2, 3 & 4, Instructional Resources, Lecture Hall and Faculty Office 2 does not conflict with any existing irrigation water lines, but it is located on top of an existing 3-inch water main on running through Liberal Arts 4. Section 4.1 discusses recommendations for water lines. There are several irrigation water valves located around the site of the proposed building that could be used to provide irrigation water, otherwise it could potentially come from the 6-inch domestic water line to the west.
3	2014-2016	Engineering 3 & 4	80,000	The proposed Student Services Complex is not in conflict with any existing irrigation water lines. The Structure could potentially be served by a 6-inch domestic water line to the south of the building.
4	after 2016	Corporate Yard Expansion	71,000	The proposed replacement building for Engineering 3 & 4 does not conflict with any reclaimed water lines. There are several irrigation water valves surrounding the location of the proposed building that could potentially provide irrigation service, otherwise it could potentially come from the 6-inch domestic water line to the north and west.
		Parking Structure 5 (Lot 7)	-	Refer to the Recommendations Table in the domestic water section.
		Parking Structure 4 (Lot 14)	-	Refer to the Recommendations Table in the domestic water section.
		Satellite Dining Facility (Lot 15)	-	Refer to the Recommendations Table in the domestic water section.
	2008-2012	Miscellaneous	-	Provide new back flow preventers on the south side of the campus.



Chilled and Heating Hot Water Systems

The following tables summarize the changes to the heating and cooling loads in each phase of the Master Plan. Based on the projected loads a 10,000 to 12,000 ton-hr Thermal Energy Storage tank would enable the campus to continue to not run the chillers during the peak electricity rates.

As described earlier, the ten boilers at the Central Plant, together, have a total heating capacity of 54,000 kBTU/hr, which will be more than sufficient to accommodate the increased demand in Phase 1. However, during Phase 2, three buildings will be added to the central plant, and the new load will outstrip the current capacity. The addition of two new boilers will mitigate the possibility of shortage by increasing capacity to 65,250 kBTU/hr. In the 3rd Phase, additional building connections are estimated to bring the peak demand to 64,400 kBTU/hr. The two boilers added during phase 2 just meet this projected load. A condensing boiler in series would allow more efficient operation of the whole system.

Projects after 2016 are undefined at this point, but would make up a potential Phase 4.

Summary of Load Impact Assessment

Name of the Utility: Heating Hot Water												
Phase #	Completion Date	Project Name	Building #	Area	Buildings Being Replaced	Estimated Peak Demand (MBH)	Diversity Factor	Demand on Central Plant (MBH)	Estimated Total Diversified Peak Demand (MBH) ¹	Net Estimated Cumulative Peak Demand - Diversified (MBH)	Peak Capacity Reserve or deficit (MBH)	Comments
1	2009	Peterson Hall 3 and Replacement Building	F39	160,000	39, 40, 42, 43	8,042	80%	6,400	47,400	3,400	6,975	Replaced buildings demand 3,000 mbh
1	2009	University Music Center	F71	66,476	N/A	1,304	68%	893	48,300	4,300	6,075	Existing building to be added to Central Plant
2	2011-2014	Nursing Building Addition	F3.5	5,000	N/A	200		200	53,500	4,500	5,875	
2	2011	Liberal Arts Building (Phases 1 & 2)	F37.5	155,000	37,38,45	5,849		5,849		4,700	5,675	Replaced buildings demand 5,700 mbh
2	2011-2014	Outpost Replacement Building	F82	8,000	82	160		0		4,700	5,675	Not State Building. Not proposed to put on Central Plant
2	2011-2014	Student Services Complex	F93	120,000	N/A	4,800		4,800		9,500	875	
3	2014-2016	Engineering 3 & 4	F52	80,000	52, 53	2,400		2,400	62,200	10,900	-525	Replaced buildings demand 1,000 mbh
3	2014-2016	Liberal Arts Building	F12	155,000	11, 12, 13, 16, 17, 18	6,200		6,200		15,400	-5,025	Replaced buildings demand 1,700 mbh
3	2014-2016	Student Services Complex	F1.5	70,000	N/A	2,800		2,800		18,200	-7,825	

Notes:

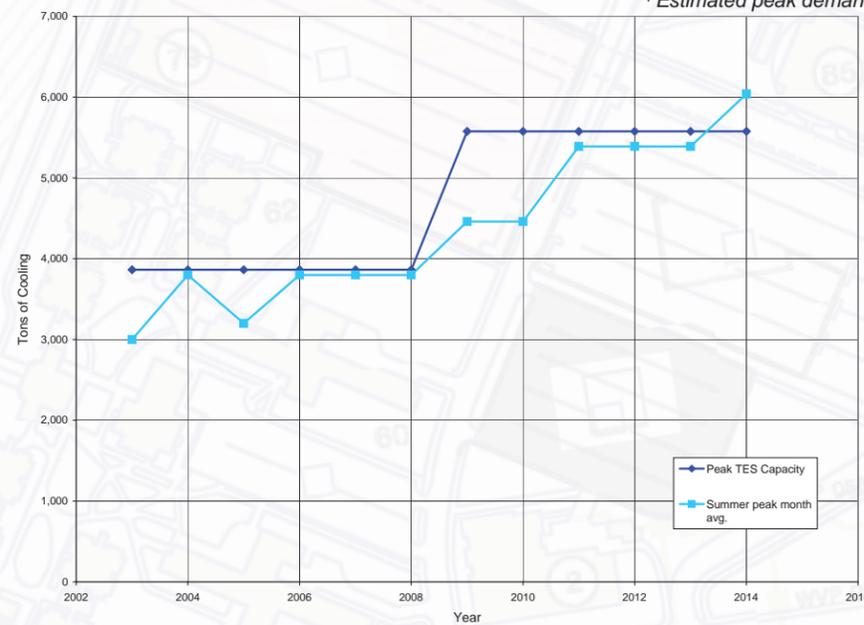
¹ Estimated peak demand over peak hours does not include any storage analysis. No TES used for HHW.



Summary of Load Impact Assessment

Name of the Utility: Chilled Water Thermal Energy Storage												
Phase #	Completion Date	Project Name	Building #	Area	Buildings Being Replaced	Estimated Peak Demand (Tons)	Diversity Factor	Demand on Central Plant (Tons)	Estimated Total Diversified Peak Demand Over Campus Applicable Peak Window (Tons-hrs) ¹	Estimated Cumulative Peak Demand Diversified (Tons)	Peak Capacity Deficit (Ton-hrs)	Comments
1	2009	Peterson Hall 3 and Replacement Building	F39	160,000	39, 40, 42, 43	1,045	51%	533	2,800	540	2,800	Peak Capacity deficit assumes full load on TES.
1	2009	University Music Center	F71	66,476	N/A	129	93%	120	700	660	3,500	
2	2011-2014	Nursing Building Addition	F3.5	5,000	N/A	30	55%	17	100	680	3,600	
2	2011-2014	Outpost Replcement Building	F82	8,000	82	0	55%	0	0	680	3,600	Not State Building. Not proposed to put on Central Plant
2	2011	Liberal Arts Building (Phases 1 & 2)	F37.5	155,000	37,38,45	532	55%	292	1,600	980	5,200	
2	2011-2014	Student Recreation Center	F93	120,000	N/A	582	75%	436	2,300	1,420	7,500	
3	2014-2016	Liberal Arts Complex	F12	155,000	11, 12, 13, 16, 17, 18	564	55%	310	1,700	1,730	9,200	
3	2014-2016	Student Services Complex	F1.5	70,000	N/A	318	55%	175	1,000	1,910	10,200	
3	2014-2016	Engineering 3 & 4 Replacement	F52	80,000	52, 53	291	55%	160	900	2,070	11,100	

Cooling Capacity & Campus Load Trends (TES Only)



Notes:

¹ Estimated peak demand over peak hours is from 11 am to 6 pm during SCE defined summer season for TOU-8 rate structure.



Natural Gas System

The new 120,000 square-foot Recreation Center is proposed for construction within five to eight years, which is approximately 2011 to 2014. Within approximately 2011, the existing 4-inch pipe adjacent to the Corporation Yard should be extended and branched out with the proposed 2-inch line to serve the new Recreation Center shown on proposed gas distribution plan.

The expansion of the Liberal Arts Buildings (Building 11, 12, and 13) and the Faculty Office 2 Building (Building 16) is proposed for construction within eight to ten years, which is approximately 2014 to 2016. Within approximately 2014, the piping modifications to accommodate the building expansions shown on proposed gas distribution plan should begin to serve the buildings.

The rest of the buildings will be served from the existing gas infrastructure.

The old steel and pvc pipes should be considered for replacement by 2008.



Electrical

The following table provides phasing and completion dates for modifications to the existing electrical system.

Phase #	Completion Date	Building/Location	Area (SF)	Installed Proposed Capacity (KVA)	Description of Impact to Campuswide Utilities
1	2006	Peterson Hall 3 Replacement Building	160,000	2000	The proposed replacement building for Peterson Hall 3, and Science Lecture Hall does not conflict with any existing electrical infrastructure systems. Future service to these buildings will be provided by a 15KV, 600A, Selector Switch (S23), Feeder '9' located on north side of the proposed buildings.
2	2011	Liberal Arts Building (Phase 1 & 2)	155,000	1250	The proposed replacement Liberal Arts building is located on top of existing underground conduit and feeders that should be relocated. Future electrical service to these buildings will be provided through a 15KV, 600A, Selector Switch (S25), Feeder '9' located on north and west side of the proposed buildings.
2	2011-2014	Parking Structure 3	416,000	1000	The proposed parking structure building does not conflict with the existing electrical infrastructure system. Future electrical power to this building will be provided by a new 15KV, 600A, Selector Switch (S40), Feeder '5' to feed the building.
2	2011-2014	Student Recreation Center	120,000	2000	The proposed Recreation center does not conflict with the existing electrical infrastructure system. Future electrical power to this building will be provided by a new 15KV, 600A, Selector Switch (S40), Feeder '5' and connecting it to the 12kV network.
2	2011-2014	Nursing Building Addition	5,000	750	The proposed Nursing building addition does not conflict with the existing electrical infrastructure system. Future electrical service will be provided by upgrading the existing 300 kVA padmount transformer to 500 kVA (currently served from 15KV Selector Switch (S18)) that currently serves the Nursing Building.
2	2011-2016	Outpost Replacement Building	8,000	225	The proposed Outpost replacement building is located on top of underground feeders that will be relocated. Future electrical service will be provided by a 15KV, 600A Selector Switch (S3), Feeder '1' located on the south side of the proposed building.
3	2014-2016	Liberal Arts Complex	155,000	2000	The proposed replacement building for Liberal Arts Complex is located on top of existing electrical underground conduit, and feeders that should be relocated. Future electrical service will be provided by 15KV, 600A, Selector Switch (S33), Feeder '11'.
3	2014-2016	Student Service Complex	70,000	750	The proposed Student Service Complex does not conflict with existing electrical infrastructural system. Future electrical service will be provided by a 15KV, 600A Selector Switch (S19), Feeder '4' located on the north east corner of the proposed building.
3	2014-2016	Engineering 3 & 4	80,000	1000	The proposed replacement building for Engineering 3 & 4 does not conflict with existing electrical infrastructural system. Future electrical service to this building will be provided by a 15KV, 600 Selector Switch (S7), Feeder '2' located on the south side of the proposed building.
4	after 2016	Corporate Yard Expansion	71,000	500	The proposed Corporate Yard Expansion does not conflict with any existing electrical systems. Future electrical power will be provided by a 15KV, 600A, Selector Switch (S2), Feeder '1' located on the north and south side of the proposed expansion layout.
		Parking Structure 5 (Lot)	-	1000	The proposed parking structure building does not conflict with existing electrical infrastructural systems. Future electrical power to this building will be provided by a new 5-way 15KV, 600A, Selector Switch (S27), Feeder '10' to feed the building.
		Parking Structure 4 (Lot)	-	500	The proposed parking structure building does not conflict with existing electrical infrastructural systems. Future electrical power to this building will be provided by a 15KV, 600A, Selector Switch (S13), Feeder '3' to feed the building.
		Satellite Dining Facility	-	225	The proposed satellite dining facility does not conflict with existing electrical infrastructural systems. Future electrical power to this building will be provided by a 15KV, 600A, Selector Switch (S13), Feeder '3' to feed the building.
	2025	Miscellaneous	-	-	Replace existing 15kV cables at the end of their lifespan.



Telecommunications

The following is a phasing and implementation plan for the telecommunications system:

PHASE 1

Projects to be completed within the next 3 years.

PHASE 2

Projects to be completed during the next 5 to 8 years.

PHASE 3

Projects to be completed during the next 8 to 10 years.

PHASE 4

Projects to be completed in more than 10 years.

A separate schedule for the Non-State Owned buildings is also included with five phases H-1 through H-5. Listed below are tables showing projects by phase followed by a description of the tasks for each project.

Implementation Plan For University State Owned Buildings

PHASE 1

Project # 5 – Parking Structure 2 (Bldg #91)

(Project was under construction during preparation of this report.)

1. Extend ductbank serving demolished building 77 Temporary Office Building to BDF of new Parking Structure.
2. Provide 100 pair copper cable and 12sm/6mm fiber cable from splices in manhole CMH#28 to BDF of new Parking Structure.

Project # 1 – Peterson Hall III Replacement Building

1. Remove underground copper and fiber cables and entrance conduits serving Peterson Hall III prior to building demolition.
2. Install underground ductbank from existing manhole CMH#16 on East Campus Drive to the new building BDF.
3. Install 600 pair copper building entrance cable from splice in manhole TMH#15 to the new building BDF.
4. Relocate the fiber fusion splice from BDF in PH I to manhole CMH#14. This will require rearrangements of the cables serving building 41, Microbiology and building 45, FO5.
5. Install new underground fiber optic cable with 36 singlemode/18 multimode optics from the existing 96/48 fiber cable in manhole CMH#14 to the new building.

University State-Owned Buildings

Phase #	Project #	Project Name	Completion Date
1	1	Peterson Hall 3 and Replacement Building	2009
2	2	Liberal Arts Building (Phases 1 & 2)	2011
2	6	Parking Structure 3	2011-2014
2	7	Student Recreation Center	2011-2014
2	12	Nursing Building Addition	2011-2014
2	9	Outpost Replacement Building	2011-2016
3	3	Liberal Arts Complex	2014-2016
3	11	Student Services Complex	2014-2016
3	8	Engineering 3 & 4	2014-2016
4	4	Parking Structure 5 (Lot 7)	After 2016
4	10	Parking Structure 4 (Lot 14)	After 2016
4	13	Building Site Parking Lot 15	After 2016



PHASE 2

Project #2 – Peterson Halls 1 & 2 Replacement

1. Remove underground copper and fiber cables and entrance conduits serving Peterson Halls I & II, and Faculty Office Building prior to building demolition.
2. Extend (6) 4 inch underground conduits from the cutoff conduits and pull box CPB#14A to BDF in new building.
3. Install 600 pair copper building entrance cable from splice in manhole CMH#14 to the new building BDF.
4. Provide a new underground fiber optic cable with 36 singlemode/18 multimode optics from the existing 96/48 fiber cable in manhole CMH#14 to the new building.

Project #6 – Parking Structure 3 (Building #92)

1. Install (2) 4 inch underground conduits from existing pull box CPB#28A serving Parking Structure 2.
2. Install 50 pair copper building entrance cable from splice in manhole CMH#28 to the new Parking Structure 3 BDF room.
3. Install fiber cable consisting of 12 singlemode and 6 multimode optics in the existing and new ductbank from Building 91, Parking Structure 2

Project #7 –

Student Recreation Center (Building #93)

1. Install (4) 4 inch underground conduits from existing manhole CMH#25.
2. Install 100 pair copper building entrance cable from MDF B.
3. Install fiber cable consisting of 24 singlemode and 12 multimode optics in the existing and new ductbank from MDF B.

Project #9 – Outpost Replacement Building

1. Install (4) 4 inch underground conduits from existing manhole CMH#22A.
2. Install 100 pair copper building entrance cable from splice in manhole CMH#22A.
3. Install fiber cable consisting of 24 singlemode and 12 multimode optics in the existing and new ductbank from MDF B.

Project #12 –

Nursing Building Addition

1. Install (4) 4 inch underground conduits from existing manhole CMH#44.
2. Install 100 pair copper building entrance cable from splice in manhole CMH#44 to the new building BDF.
3. Install fiber cable with 24 singlemode optics and 12 multimode optics in the existing and new ductbank from MDF C.

PHASE 3

Project #3 – Liberal Arts Complex

1. Extend (4) 4 inch underground conduits from the cutoff conduits serving building 16 to existing manhole CMH#6B in the quad to reroute copper and fiber cables in conflict with proposed site.
2. Install 1800 pair copper cable in the new ductbank from manhole CMH#54 to CMH#6B to re-route existing copper cable serving buildings 6, 15, and 94.
3. Install fiber cable consisting of 48 singlemode and 24 multimode optics in the new ductbank from MDF A Building to manhole CMH#6B to re-route existing fiber cables serving buildings 6 and 15.
4. Extend (4) 4 inch conduits from the western site boundary to serve the new building.
5. Provide fiber cable with 24 singlemode and 12 multimode optics from MDF A building to serve the new building.
6. Install 100 pair cable from manhole TMH#114.

Project #8 –

Engineering 3 and 4 Replacement Building

1. Extend (4) 4 inch underground conduits from existing manhole CMH#26A.
2. Install 100 pair copper building entrance cable from splice in manhole CMH#26A.
3. Install fiber cable consisting of 48 singlemode and 24 multimode optics in the existing and new ductbank from MDF B.

Project #11 – Student Services Complex

1. Connect the IDF rooms in the new addition to the BDF and Data Center in Brotman Hall with riser conduits, copper cables, and fiber cables.

PHASE 4

Project #4 – Parking Structure Lot 7

1. Extend (2) 4 inch underground conduits from existing manhole CMH#5.
2. Install 100 pair copper building entrance cable from splice in manhole CMH#5 to the new Parking Structure BDF.
3. Install fiber cable consisting of 12 singlemode and 6 multimode optics in the existing and new ductbank from Building 27, University Theater.

Project #10 – Building Site Parking Lot 15

1. Install (4) 4 inch underground conduits from existing manhole CMH#61.
2. Install 100 pair copper building entrance cable from splice in manhole CMH#37.
3. Install fiber cable consisting of 24 singlemode and 12 multimode optics in the existing and new ductbank from MDF B.

Project #13 – Parking Structure Lot 14

1. Install (2) 4 inch underground conduits from existing manhole CMH#41.
2. Install 100 pair copper building entrance cable from splice in manhole CMH#41 to new Parking Structure.
3. Install fiber cable with 12 singlemode optics and 6 multimode optics in the existing and new ductbank from MDF C.

