Riverside Community College District
Infrastructure Upgrade Project

Utility Program

Moreno Valley Campus

June 22, 2010

PSOMAS

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EXECUTIVE SUMMARY

0.1 INTRODUCTION

The Moreno Valley Campus is fast becoming the health education center of choice in the Inland Empire with strong programs in health sciences, human, and public services. Each semester more than 7,000 students pursue associate's degrees, transfer to a four-year college or university, or a career certificate that qualifies them to enter their chosen field.

The Moreno Valley Campus is one of the three Riverside Community College District (RCCD) campuses. To serve the expanding student body, a number of new academic and support buildings have been identified for this 135 acre campus, in the 2007 Moreno Valley Campus Long Range Educational and Facilities Master Plan (dated January 2008), identified herein as the Master Plan. This report defined that Campus will need to expand to accommodate the student enrollment which is anticipated to grow to 17,000 students by 2024.

0.2 OBJECTIVE

The objective of this Utility Program is to evaluate the existing utility systems currently servicing the facilities and make general recommendations to upgrade and modify the utility systems to support the future development as proposed by the Proposed Future Building Layout. This programming for master planning will be used in establishing the future construction phasing. The Utility Program is also the next step prior to Master Planning, Schematic Design, and Implementation. The following existing utility systems are considered in this report:

- Sanitary Sewer
- Domestic and Fire Water
- Irrigation Water
- Storm Drain
- Chilled Water
- Hot Water
- Electrical
- Telecommunications
- Central Plant Expansion
- Natural Gas

Supporting Psomas as a subconsultant in this report, P2S Engineering has performed assessments of the chilled water, hot water, electrical, telecommunications, central plant expansion, and natural gas systems.

0.3 REPORT OVERVIEW

The various utility systems discussed within this report are broken into discipline specific sections. Corresponding figures and some supporting data tables located at the end of each section.

The following information for each utility system is presented in discipline specific sections, Section 1 through 10, of this report.

- Description of the existing utility system, including existing conditions and identified problems. Information on each utility system was obtained through field surveys, existing documents, record data, and discussions with campus facility staff knowledgeable of specific utility systems.
- Description of methodology for analyzing the utility system for present conditions and to accommodate future growth.
- Analysis of the existing and proposed utility systems.
- Recommendations and modifications to accommodate present and future needs of the campus.
- Figures illustrating the existing utility system layout and proposed utility alignments based on future conditions presented.

0.4 PROJECT BACKGROUND AND SCOPE

Psomas' services included review of existing infrastructure study materials along with and Long Range Facilities Master Plans.

Initial workshop meetings were conducted for this campus to determine project scope, objectives, design criteria, project schedule, condition of existing facilities, deficiencies of systems, and future needs based on the Long Range Facilities Master Plans. Determinations were made relative to current and future utility needs for each campus.

Scope of work included research, review of maps, and evaluation of the existing on campus utility infrastructure. The report also provides general recommendations for improvements to each of the utility systems that will serve the future development as shown in the Proposed Future Building Layout.

The utility research was completed via coordination with the onsite facilities manager to collect record documentation regarding the location of recently constructed underground utilities throughout the Campus. Psomas received utility records and reviewed as-built mapping as provided by RCCD.

Existing utility information included herein is based upon drawings and information supplied by RCCD, and various architects. Using this information, Psomas modified the provided utility base maps for the following existing utility systems:

- Sanitary Sewer
- Domestic and Fire Water
- Irrigation Water
- Storm Drain
- Chilled Water
- Hot Water
- Electrical
- Telecommunications
- Central Plant Expansion
- Natural Gas

The utility alignments shown in the report figures included herein represent the most practical layout based on all information available. Changes in building layouts, locations, and miscellaneous other conditions may require alignment or utility size revisions.

As a subconsultant to Psomas, P2S Engineering has assisted with the utility mapping by updating the mapping for the existing, chilled water, electrical, telecommunication, central plant expansion, and natural gas utility systems, .

0.5 EXISTING AND PROPOSED BUILDING IMPROVEMENTS

The following table identifies the existing buildings on campus and corresponds to the various figures throughout the report. The listed building names and numbers are based upon the campus maps provided by RCCD and illustrated on Figure 0b, Overall Campus Map – Existing Building Layout, included herein. Buildings numbered with the prefix E currently exist but were not listed on the original information provided by RCCD.

Table ES-1: Existing Buildings

Bldg No.	Building Name
1	Library
2	Student Services
3	Science/Technology
4*	Lions Den
5	Mechanical 1
6	Humanities
7	Mechanical 2
8	Bookstore
9*	Administrative Annex
10*	Multi-Purpose
11	Student Activities Center
12*	Warehouse
13	Early Childhood Education Center
14*	Portable- PSC 1
15*	Portable- PSC 2
16*	Portable- PSC 3
17	Headstart
18*	Portable- PSC 4
19*	Portable- PSC 6
20*	Portable- PSC 7
21*	Portable- PSC 8
22*	Portable- PSC 9
23*	Portable- PSC 10
24*	Portable- PSC 11
25*	Portable- PSC 12
26*	Portable- PSC 13
27*	Portable- PSC 14
28*	Portable- PSC 15
29*	Portable- PSC 16
30*	Portable- PSC 17
31*	Portable- PSC 18
E-1*	Portable- PSC 5
E-2*	Portable- PSC 19

Figure 0c, Overall Campus Map – Building Demolition Plan, illustrates existing buildings to be demolished or renovated per discussions with RCCD. Their building names are identified with an asterisk (*) in Table ES-1 above.

Based on the Master Plan and discussions with RCCD, the following proposed buildings have been identified as part of the future development. The building names correspond to the Master Plan and have been numbered as illustrated on Figure 0d, Overall Campus Map – Future Building Layout.

Table ES-2: Proposed Buildings

Bldg No.	Building Name
P1	Parking Structure & Surge Space (Bookstore / Activity Cntr)
P2	Network Operation Center (NOC) Data Center
P3	Instruction & Student Services (Bldg. A)
P4	Instruction (Bldg. B)
P5	Instruction (Bldg. C)
P6	Instruction
P7	Administration (Bldg. D)
P8	Health Science Center

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0.6 REVISION BLOCK SUMMARY

Table R: Revision Block

A Revision Block as been added (below) to document the changes as the report has been re-issued and updated. Detailed discussions and descriptions are identified in the Meeting Minutes in Appendix B.

Revision No.	Date	Description
1	Oct. 23, 2009	Initial DRAFT provided.
2	March 22, 2010	Re-issued DRAFT, w/ new Future Bldg Exhibits
3	May 19, 2010	Re-Issued DRAFT, with Prioritized Summary Table, and graphic updates
4	June 22, 2010	Final Utility Program Study Report with Conceptual Costs included.

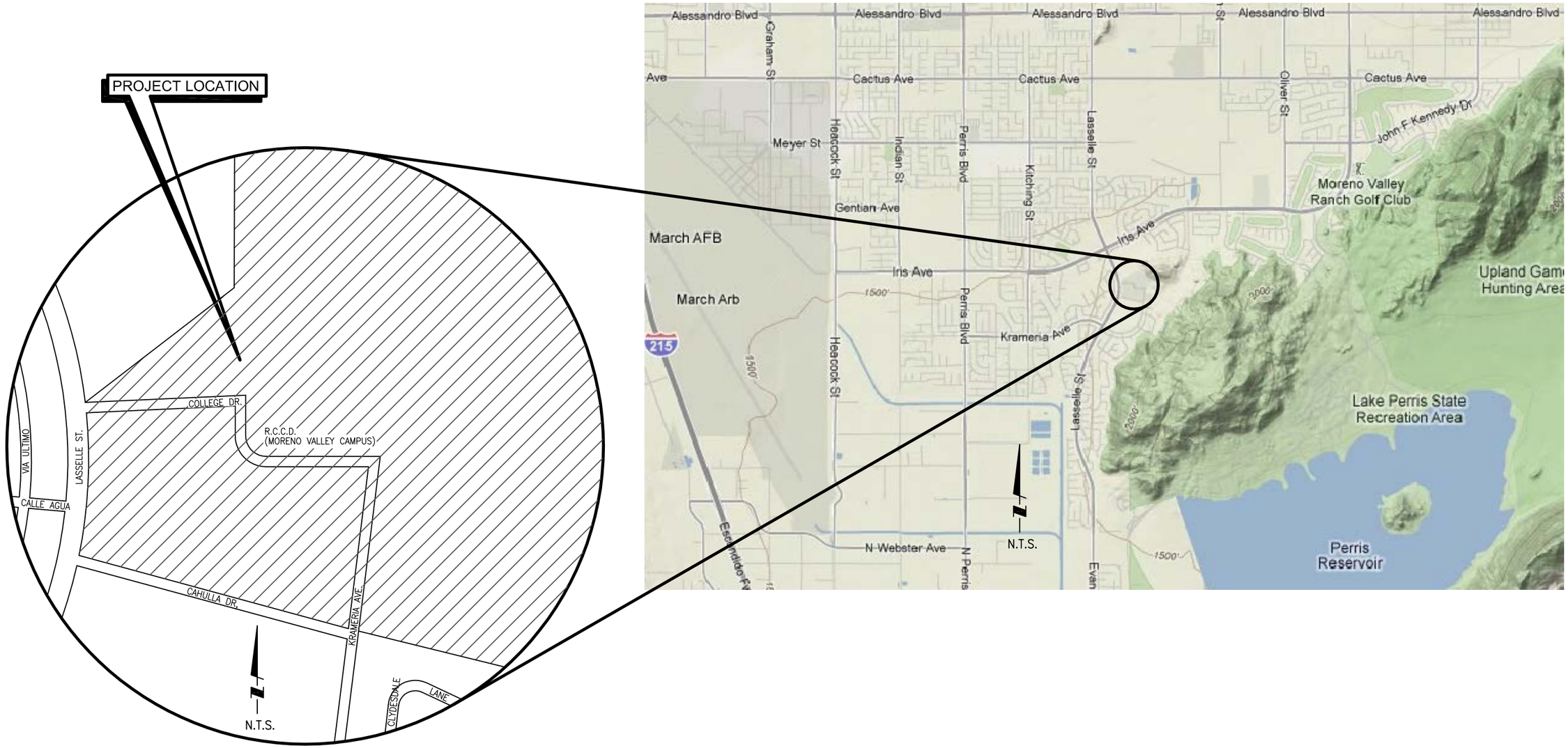


FIGURE 0A
LOCATION MAP

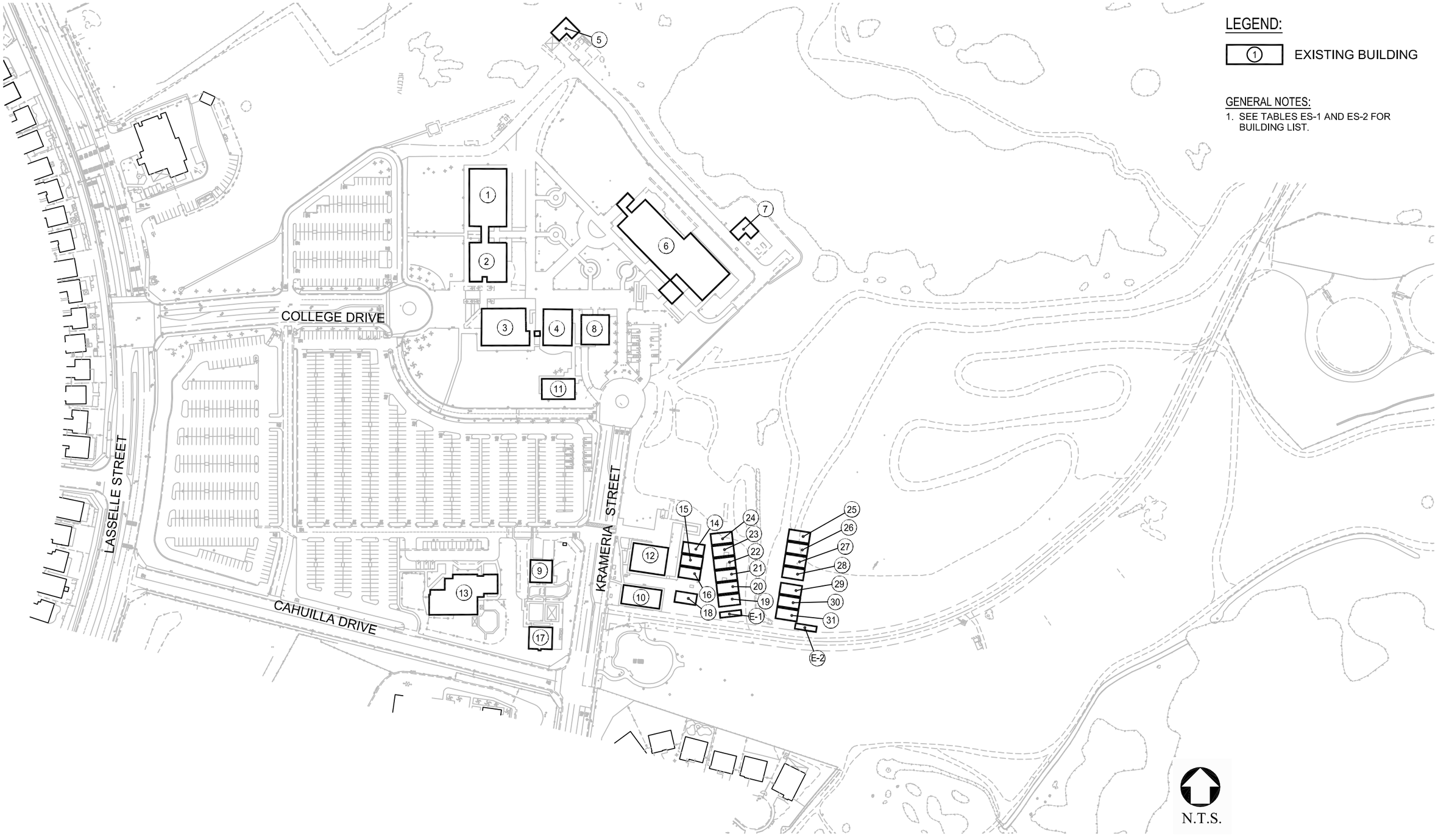


FIGURE 0B
OVERALL CAMPUS MAP - EXISTING BUILDING LAYOUT

FIGURE 0C
OVERALL CAMPUS MAP - BUILDING DEMOLITION PLAN

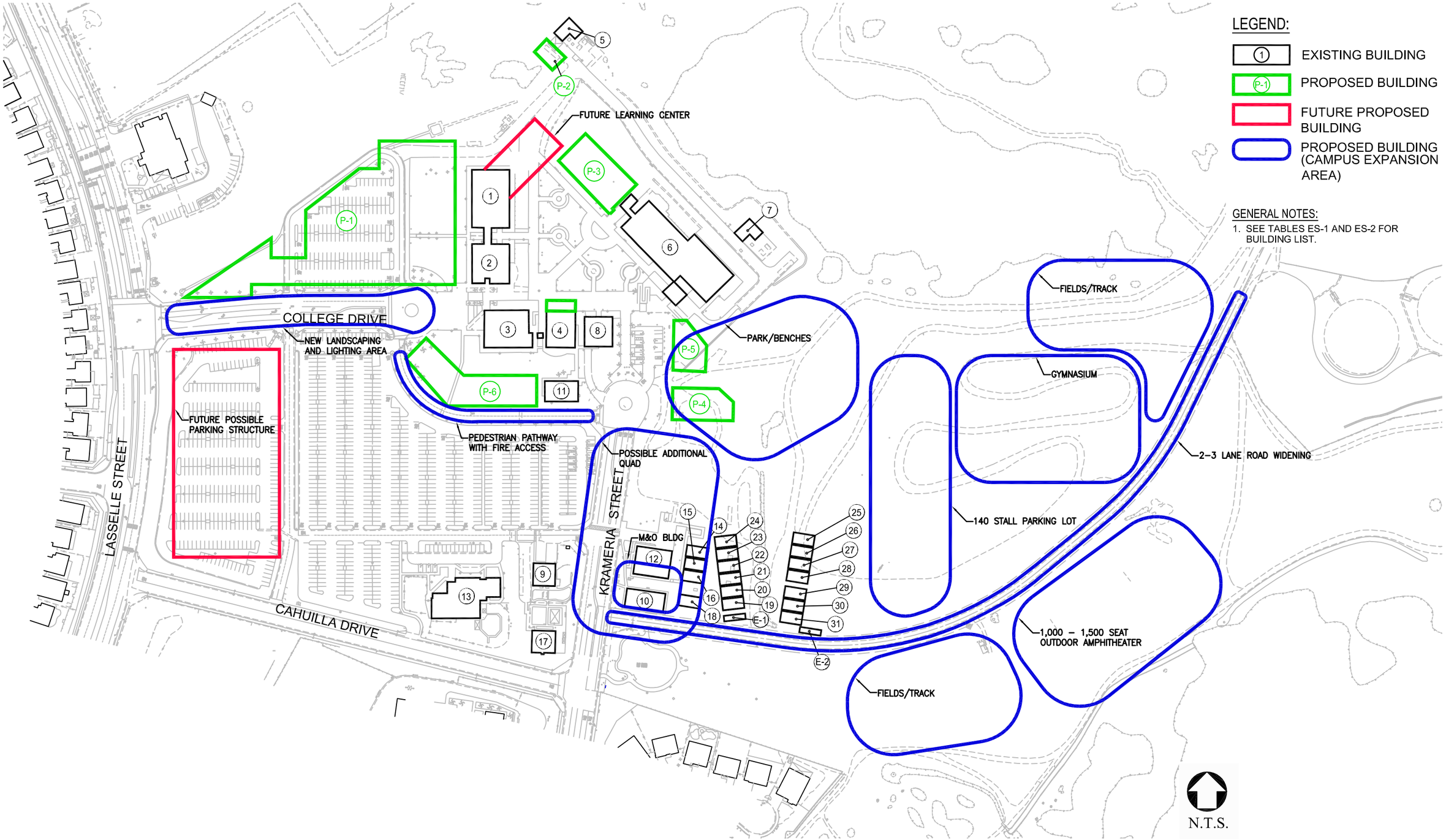


FIGURE 0D
OVERALL CAMPUS MAP - FUTURE BUILDING LAYOUT

SECTION 1 – SANITARY SEWER SYSTEM

1.1 SYSTEM DESCRIPTION

The existing campus is served by two separate sanitary sewer systems.

The first main system flows to the west and joins the 8-inch sewer main in Lasselle Street at College Drive. An 8-inch mainline extends on Campus in College Drive and into the main campus. This 8-inch main line extends north and west through the campus and serves approximately 80% of the existing buildings.

The second main system flows to the south to Krameria Street. This system flows to an 8-inch sewer main located at Cahuila Drive. An 8-inch sewer main connects to the Krameria Street sewer and extends north 200-ft through the main parking lot and onto the Campus. This 8-inch main line then provides laterals east and west through the campus but only serves approximately 20% of the existing buildings.

The existing on-site sanitary sewer system mainline includes 8-inch PVC pipe with building laterals ranging between 4-inches and 6-inches in diameter. The (2) on-site sewer systems are independent and isolated and do not accept offsite upstream flows from any other developments.

1.2 METHODOLOGY

The average day flow generation rates based upon standard design criteria have been used for evaluating the campus sewer system. Standard Sewer Manual guidelines were used for determining the average daily flow and peak flow for the campus buildings. The total flow was established using sewerage generation factors allocated to each building based upon building area. Sewerage generation factors were adjusted to address academic and non-academic buildings

The standard Engineering criteria for new sewer design limits the flow depth to one-half the pipe diameter (i.e. d/D =< 0.50), and requires a minimum velocity of 3 feet per second (fps) at maximum flow. A minimum velocity of 2 fps is typically used in general practice as it is considered to be self-scouring; that is, it prevents deposition of solids.

Per Sewer Manual standards, a peaking factor of 3.0 was used to determine the peak flow rates.

1.3 ANALYSIS OF EXISTING SYSTEM

We summarized the existing campus buildings' square footage, occupancy type, and flow allocation used to determine the average daily flow generated on campus. The existing system analysis includes the existing campus buildings listed in ES-1 of the Executive Summary.

The input and output data from the existing sanitary sewer system model using Manning's equation, provided a calculated maximum velocity and flow for the existing sanitary sewer system. The maximum flow at d/D = 0.5 reviewed against the minimum velocity was used to determine and discuss the capacity of the existing system. The average daily flow is derived from the existing building allocation.

1.4 ANALYSIS OF FUTURE NEEDS

The sanitary sewer system was evaluated with the addition of the proposed buildings listed in Table ES-2 of the Executive Summary. Based on the future development presented in the Master Plan Update and as discussed in the Executive Summary, recommendations have been made to relocate, demolish and replace various existing sanitary sewer pipe lines in order to accommodate the future development. This is conceptually illustrated in Figure 1b, Future Conditions Sanitary Sewer Map.

The proposed system analysis includes the proposed buildings illustrated in the Master Plan Update and listed in Table ES-2 of the Executive Summary and summarizes the proposed campus buildings' square footage (based on the Master Plan Update), occupancy type, and flow allocation used to determine impacts to the average day flow expected to be generated on campus.

1.5 FINDINGS AND RECOMMENDATIONS

Findings

The depths of flow in the existing sewers generally conform to the design criteria. Flow velocities for many of the existing sewers are also within the criteria and the various existing pipelines conform to the standards. Due to the existing topographic elevation fall across this Campus the minimum flow velocities are reached in most cases.

The total sanitary sewer flow enters the same City sewer system downstream of the campus at both existing and proposed conditions.

The sanitary sewer system maximum flow rate (or capacity), average daily flow rate, and peak flow rate for the existing system appears adequate. Also, we reviewed the conceptual impacts to the existing system from the proposed sanitary sewer systems at each pipe segment. Due to increased sewer demand from the future buildings, the peak flow rate in various pipe segments in maintained below the 50% maximum capacity.

- The single mainline to Building 5 has minimal velocities due to minor flows. This should increase based upon proposed expansion.

- (2) Additional existing lines were identified during staff review including : The lateral to Bldg 9 that ties to the Bldg 13 lateral in the main drive. Also, a lateral between Bldgs 10 & 12 that extends along the edge of the access road up to Bldg E-2.

Recommendations

Since no historical sewer flow concerns were expressed by the Campus representatives, and our analysis was favorable, we recommend continued maintenance and inspection of the sewer system to ensure its service in the future.

The recommendations presented herein include: a) extension of the sanitary sewer system to serve proposed buildings presented in the Master Plan Update, b) removal of existing sanitary sewer service laterals which serve existing buildings planned to be demolished to provide a clear site for future development, c) removal and replacement of existing sanitary sewer pipe segments, and d) further investigation of existing sanitary sewer main lines during the campus expansion to ensure it does not exceed maximum capacity.

The following are recommendations for improvements to the existing sanitary sewer system:

1. Relocate existing mainline segment west of Buildings 1 and 2 to accommodate the proposed parking structure.

2. Minor relocation north of proposed building P5.

3. In order to provide a clear site for future development, remove the existing sanitary sewer mains currently serving any existing facilities to be demolished. Existing mainline systems can be cut and capped at the existing manholes.

4. Remove the existing 4-inch sanitary sewer service laterals currently serving any existing buildings to be demolished.

5. It is recommended that the college continue to further investigate the existing pipe condition and capacity to provide further recommendations for improvements as the campus expands.

Based upon information provided in the Master Plan Update, the findings and recommendations presented in this report are determined from sanitary sewer design criteria and standard planning guidelines. In the case that the individual proposed building designs yield larger flow rates than presented herein, it is recommended that the college re-evaluate the data analysis and update the findings.

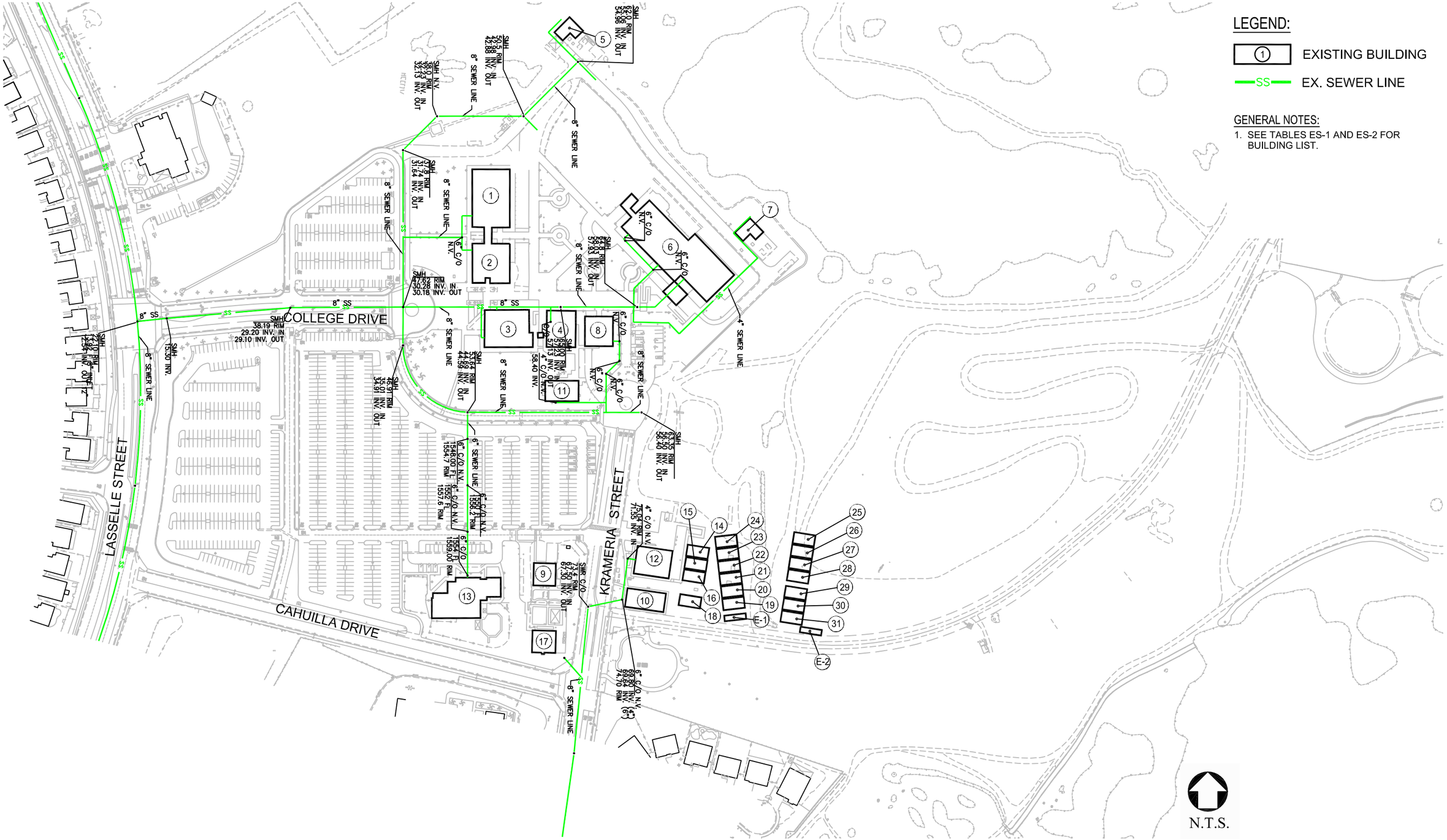


FIGURE 1A
EXISTING SANITARY SEWER SYSTEM

GENERAL NOTES:

1. SEE TABLES ES-1 AND ES-2 FOR BUILDING LIST.

LEGEND:

- (1) EXISTING BUILDING
- (P-1) PROPOSED BUILDING
- FUTURE PROPOSED BUILDING
- PROPOSED BUILDING (CAMPUS EXPANSION AREA)
- SS EX. SEWER LINE
- SS PROP. SEWER LINE

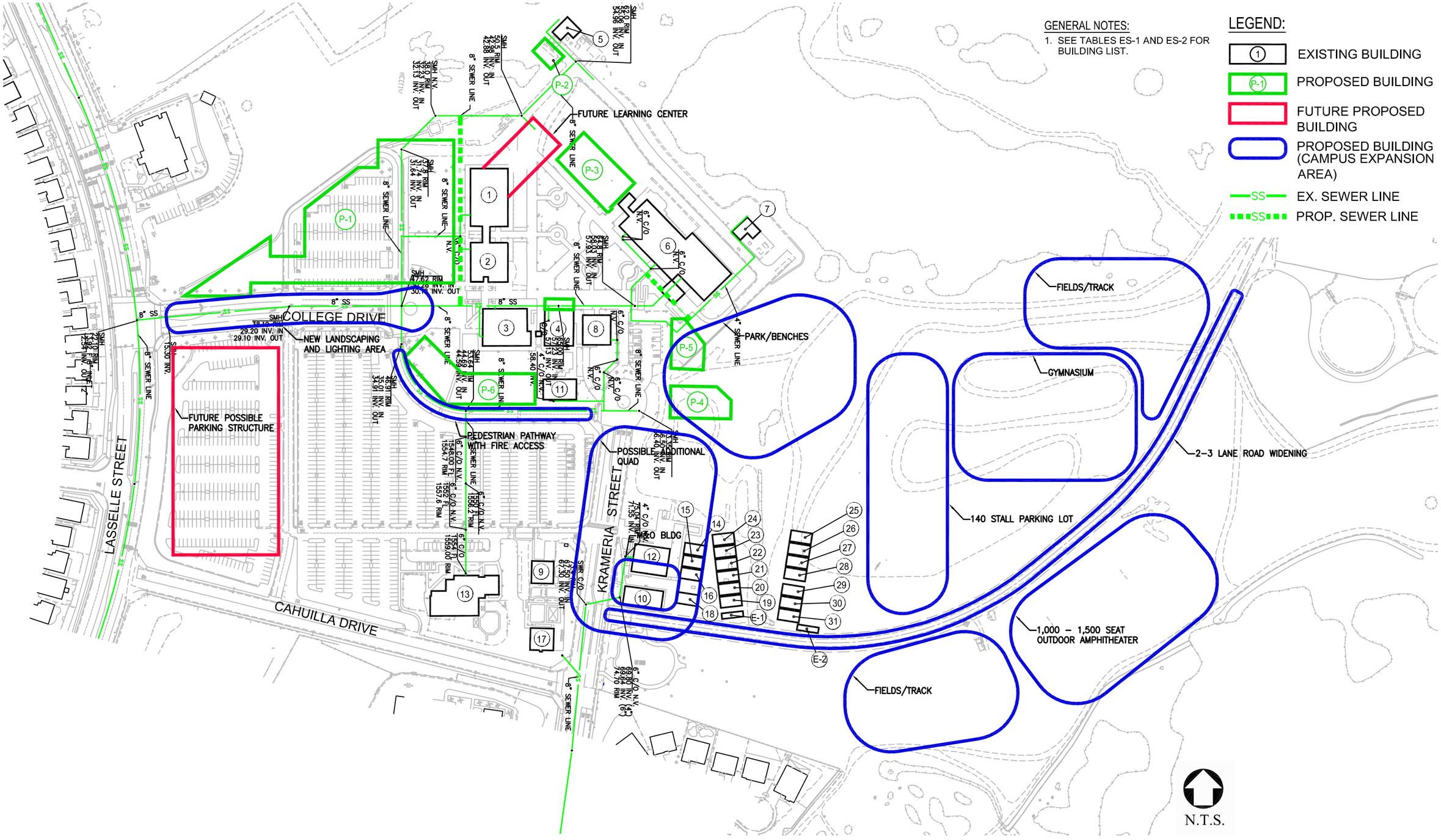


FIGURE 1B
PROPOSED SANITARY SEWER SYSTEM

SECTION 2 – WATER SYSTEM

2.1 SYSTEM DESCRIPTION

The existing water distribution system serving the campus buildings operates separate domestic water and fire water distribution systems. The campus also uses a separate reclaimed water system to supply water for landscape irrigation and is discussed in Section 3 – Irrigation Water System.

The Eastern Municipal Water District (EMWD) provides water to both the domestic and fire water distribution systems. The domestic system is served by one meter and the fire water system is also served by one meter.

1. The existing domestic service enters the campus from the south on Krameria Street, approximately 200 feet north of Cahuilla Drive. The 8-inch service originates at from the 24-inch main in Krameria Street. After passing through an 8-inch meter and reduced pressure principle valve backflow preventer, the water is conveyed north to the campus distribution network via an 8-inch PVC pipe loop.

2. The existing fire service is located parallel to the 8-inch domestic water line (described above.) This 12-inch service originates off a separate 18-inch main in Krameria Street. After passing through a 12-inch meter and double check backflow preventer, the water is conveyed north to the campus distribution network via a 12-inch PVC pipe.

Per the our recent Fire Flow Data (dated September 24, 2009), the Fire Hydrant located at the end of Krameria Street near the center of Campus indicated that the 8-inch service has a minimum static pressure of 72 psi.

The campus domestic water distribution network consists of an 8-inch PVC pipe loop. The existing domestic water distribution system and locations of each connection is shown on Figure 2a, Existing Water Map – Water Distribution.

The campus fire water distribution network consists of a 12-inch PVC pipe loop. The existing fire water distribution system and locations of each connection is shown on Figure 2b, Existing Water Map – Water Distribution.

2.2 METHODOLOGY

Psomas defined the fire flow requirements based upon California Building Code requirements for Fire service. These requirements are consistent with industry standards and indicated that the current and proposed fire water systems shall meet the following criteria for new construction:

- Fire hydrants shall be spaced at a maximum of 300 feet along fire lanes. Buildings shall be within 300 feet of a fire hydrant.
- Fire water system shall have a minimum fire flow of 2,000 gpm from fire hydrants flowing simultaneously.
- Fire Water system shall have a minimum residual water pressure of 20 psi with the required 2,000 gpm flowing.

Existing domestic water usage for the campus was provided by RCCD.

For the preliminary analysis purposes of this report, and since on this campus the fire flows and domestic flows are provided by the same source, our analysis focused on the maximum fire flows taken at a node located adjacent to the largest building on campus. Based upon this most conservative combined method, if minimum pressures were maintained, then we concluded that both the fire and domestic systems were adequate.

2.3 ANALYSIS OF EXISTING SYSTEM

A computer model of the existing fire water network was created with H20Net Version 8.0 to represent the existing conditions on campus. This model was run to test the existing system's ability to satisfy the fire flow criteria set forth by the Fire Flow requirements using data as measured in the fire flow tests.

The same computer model above incorporated the existing domestic water network by using the critical node locations adjacent to the largest buildings on campus.

2.4 ANALYSIS OF FUTURE NEEDS

The water system was evaluated with the addition of proposed buildings listed in Table ES-2 of the Executive Summary. Based on the future development presented in the Master Plan Update as discussed in the Executive Summary, recommendations have been made to construct new water pipes, relocate and demolish various existing water lines in order to accommodate the future development. This is conceptually illustrated in Figure 2b, Future Conditions - Water Distribution Map.

A second computer model was not required for the proposed condition since the integrity of the existing system was maintained and segments were only relocated around proposed buildings that interfered with the existing system. Also, new loops were added when needed to expand the system and maintain redundancy.

2.5 FINDINGS AND RECOMMENDATIONS

Findings

An evaluation of the existing domestic water system revealed that the existing water system adequately supports the demand for existing buildings with no significant pipe losses due to pipe size or elevation. In addition, the computer model shows that the existing water pressures throughout the campus satisfy a minimum requirement of 20 psi.

Conceptual review of the proposed conditions indicates that the existing domestic water system can also adequately support the demand for proposed buildings.

An evaluation of the existing fire water system revealed that the existing fire water system adequately supports the demand for existing buildings with no significant pipe losses due to pipe size or elevation and with adequate fire flows at hydrants. In addition, the computer model shows that the existing fire water pressures throughout the campus satisfies the minimum pressure / flow requirements

Conceptual review of the proposed conditions indicates that the existing fire water system can also adequately support the demand for proposed buildings.

- During discussions with staff (2) additional existing laterals were identified: (1) lateral near the tank site access drive intersection that runs west and then tees to serve Bldgs 9, and 17. Also (1) lateral that runs east between Bldgs 10 & 12 that extends to Bldg 31 then onto Bldg 25 to serve the portable buildings.

Recommendations

Based on the findings above, recommendations include providing new services to proposed buildings, re-routing water lines that are in conflict with proposed buildings, as depicted in the Master Plan Update. As illustrated in Figure 2b, Future Conditions– Water Distribution Map, the following are recommendations for improvements to the existing domestic and fire water system:

1. Install new 8-inch domestic water service loop to serve the future buildings and provide redundancy. This second loop would tie to the 24-inch line in Lasselle Street.

2. It is also recommended that a second 12-inch domestic connection from the existing 24-inch water main in Lasselle Street be added at the Campus entry during the next major expansion to provide redundancy and provide a secondary water source for maintenance or repair.

3. Remove and/or relocate existing domestic water or fire water pipes that may be in conflict with new building footprints. Mainline water systems can be cut and capped at the proposed project limits.

4. Install new fire hydrants as needed within 300 feet of proposed buildings per requirements.

5. Review the California Building Code requirements for Fire service with the addition of each proposed building, since the requirements are based upon final building type, size, height, and occupancy use.

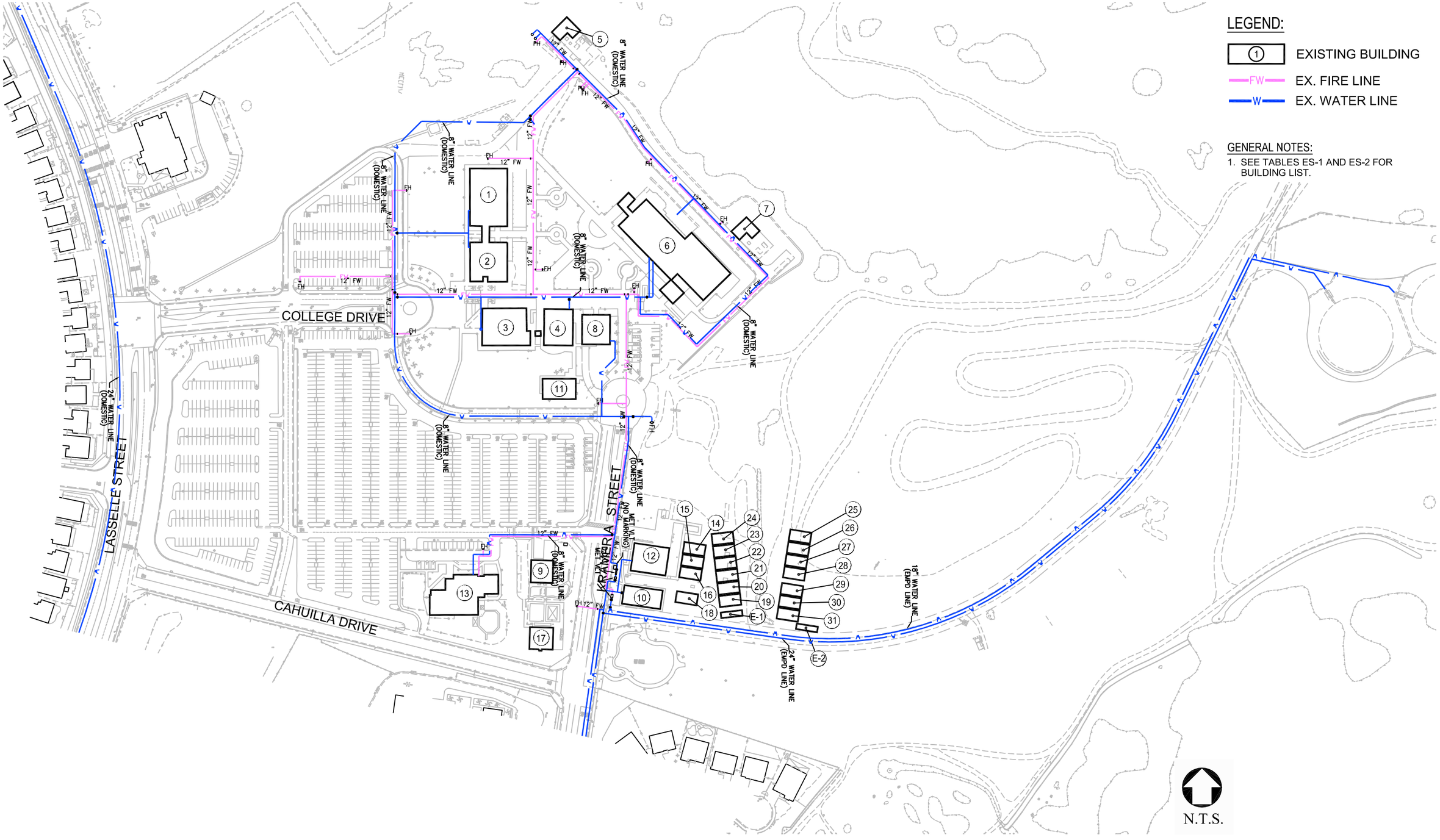


FIGURE 2A
EXISTING WATER DISTRIBUTION

GENERAL NOTES:

1. SEE TABLES ES-1 AND ES-2 FOR BUILDING LIST.

LEGEND:

- EXISTING BUILDING
- PROPOSED BUILDING
- FUTURE PROPOSED BUILDING
- PROPOSED BUILDING (CAMPUS EXPANSION AREA)
- EX. FIRE LINE
- EX. WATER LINE
- PROP. FIRE LINE
- PROP. WATER LINE

FUTURE LEARNING CENTER
NEW LANDSCAPING AND LIGHTING AREA
FUTURE POSSIBLE PARKING STRUCTURE
PEDESTRIAN PATHWAY WITH FIRE ACCESS
POSSIBLE ADDITIONAL QUAD
M&O BLDG
FIELDS/TRACK
GYMNASIUM
PARK/BENCHES
2-3 LANE ROAD WIDENING
140 STALL PARKING LOT
1,000 – 1,500 SEAT OUTDOOR AMPHITHEATER
COLLEGE DRIVE
LASSELLE STREET
CAHUILLA DRIVE
KRAMERIA STREET
8" WATER LINE (DOMESTIC)
24" WATER LINE (DOMESTIC)
18" WATER LINE (EMPD LINE)
24" WATER LINE (EMPD LINE)
MET VAULT
NO MARKING
N.T.S.

FIGURE 2B
PROPOSED WATER DISTRIBUTION

SECTION 3 – IRRIGATION WATER SYSTEM

3.1 SYSTEM DESCRIPTION

The campus uses reclaimed water for landscape irrigation. The single domestic meter to the campus provides water to the irrigation system. During the on-site review of the water system, no irrigation concerns were documented related to pressure or availability.

The existing reclaimed water system is connected to the Lasselle Street water main at Campus Drive in two parallel locations. Reclaimed water passes through a reduced principal backflow devised and (2) meters are located along the edge of Lasselle Street. A 10-inch irrigation water main extends east on campus to serve the main part of campus. Also, the second meter serves the irrigation within the lower parking lot area.

The existing small (2-inch or less) PVC irrigation water distribution system is a campus network of lines that gets relocated, modified, lengthened, and abandoned, as required to accommodate Campus expansion projects. Backflow prevention is provided and installed during modification projects.

3.2 METHODOLOGY

Existing irrigation water flows for the campus can be estimated based on a percentage of the overall domestic use. The average day usage is the average annual amounts divided by 365 days. The peak month average day considers only the higher meter readings for the dry months between June and November. Irrigation is typically performed between 10pm and 6am, seven days per week, so these peak month amounts were multiplied by 3 (8 hrs./24 hrs.) to get an 8 Hour Irrigation Average Use. The 8 Hour Irrigation Peak Use is twice the previous average to account for the maximum day during those summer months and the fact that the irrigation system cannot be fine-tuned to completely average out the demands over an eight-hour period. The percentage of campus water use dedicated to irrigation use is typically based upon similar campuses of similar sizes located in Southern California.

3.3 ANALYSIS OF EXISTING SYSTEM

An analysis described above provides a conceptual model of the existing irrigation water network and represents the existing condition on campus. The Campus currently uses standard water preservation methods to minimize runoff and avoid overwatering through observation and regular maintenance programs.

3.4 ANALYSIS OF FUTURE NEEDS

The irrigation water system can be evaluated with the addition of proposed buildings listed in Table ES-2 of the Executive Summary. Based on the future development presented in the Master Plan Update as discussed in the Executive Summary, recommendations will include relocation and demolition of various existing irrigation water lines in order to accommodate the future development.

A second estimate was not needed to represent the future conditions on campus since additional proposed buildings will reduce the amount of landscape area available for irrigation. Maximum daily flow demands will decrease by the relative percentage of buildable area that replaces the current open landscaped areas.

3.5 FINDINGS AND RECOMMENDATIONS

Findings

An evaluation of the existing irrigation water system revealed that the existing irrigation water system adequately supports the demand of existing buildings and landscape areas with no significant pipe losses due to pipe size or elevation. The existing irrigation system can also adequately support the demand for proposed buildings and landscape areas as depicted in the Master Plan Update.

- No figures and illustrations are provided in this section since the detailed network of small piping is not readable at the scale illustrated on a single sheet overall campus map.

Recommendations

Based on the findings above, recommendations include providing re-routing irrigation lines that are in conflict with proposed buildings, and replacing old irrigation pipes as needed during campus improvement expansion over parking areas and roadway improvements.

It is also recommended that the college pursue its efforts in finding a potential source for future reclaimed water service.

1. Proposed new irrigation piping shall be purple PVC pipe and maintain minimum horizontal and vertical clearances with adjacent potable water lines.
2. Upgrade water sensor technology, as needed, during expansion projects to stay up to date on water saving technological advances.
3. Install and maintain back flow prevention devices as needed to ensure water quality safety.

SECTION 4 – STORM DRAIN SYSTEM

4.1 SYSTEM DESCRIPTION

The existing campus storm drain mainline system consists of a Riverside County Flood Control District mainline (varies from 36-inch RCP to 54-inch RCP) made of reinforced concrete pipe.

The following is a summary of the on-site storm water collection system:

- Off-site storm water from the east is captured upstream in a 36-inch County maintained main line and flows through the campus to a 54-inch outlet pipe and continues in a pipe into Lasselle Street.
- The campus building roof drains and landscape areas are drained though a system of small (6”, 10”, 12”) pipes and area drains that connect to one of the mainlines - described above.
- A small on-site water quality basin is located along the northwestern edge to provide an opportunity for natural vegetation and to provide a water quality element.
- The existing parking lots sheet flow to catch basins and then into the Lasselle Street storm drain mainline.
- Small and large on-site storm water detention basins are provided upstream.
- Small swale areas between buildings collect roof drainage and storm water runoff. This storm water is then recollected by area drains and discharged into the County main line system.

4.2 METHODOLOGY

The existing storm drain system was evaluated using concept level hydrology (existing and proposed conditions) by identifying major sub-areas and using County flood control data when needed.

4.3 ANALYSIS OF EXISTING SYSTEM

The existing conditions have been evaluated using concept level hydrology using simplified Riverside County Flood Control Hydrology Methods. Storm flows have been routed to the existing backbone on-site drainage systems using a series of surface flows and pipe flows. This includes:

- Delineate primary drainage sub-areas for on-site and off-site tributary areas.
- Prepared existing condition hydrology model and estimated peak flow runoff rates for 100-year design storms.
- Verified on-site pipe capacity.

4.4 ANALYSIS OF FUTURE NEEDS

The proposed re-alignments do not require major horizontal re-routing and the tributary areas are constant with the current condition.

Therefore, a conceptual review of the hydrology analysis for the proposed campus conditions were reviewed to determine if the proposed system is in conformance with the existing simplified Riverside County Flood Control Hydrology Methods and if pipe sizes for relocations would match the existing conditions. This is based upon the following review.

- Overlay of the proposed campus master plan onto the existing condition base map.
- Review of the developed condition hydrology analysis for the 100-year storm events.
- Review of potential storm water quality detention facilities to reduce developed peak flows to pre-master plan conditions.
- Review of on-site storm drain mainline system with pipe sizes necessary to convey run-off for the proposed conditions.
- Annually clean existing storm drain lines due to upstream siltation.
- Based upon staff review, an existing dry well exists west of the Bldg 3.
- An storm drain lateral runs along the east side of Bldg 2, and 1 then it ties to the Inlet north west of Bldg 1.

4.5 FINDINGS AND RECOMMENDATIONS

The existing storm drain mainline systems are adequately sized to address the current design storm conditions. No immediate concerns were identified.

The proposed campus development will impact many of the existing mainline alignments and will require relocations to avoid the planned building footprints. Additional storm water quality detention basins may be provided at the lower parking areas to address future water quality requirements.

The following is a summary of the modifications related to the proposed on-site storm water mainline system:

1. Relocation of the west side mainline to re-establish the flow from the small detention basin back into the mainline system. This will need to be located between the proposed Building P1 and the existing slope.

Sufficient elevation change across the campus site also allows flexibility and opportunities for future storm drain alignments to avoid any significant design elements.

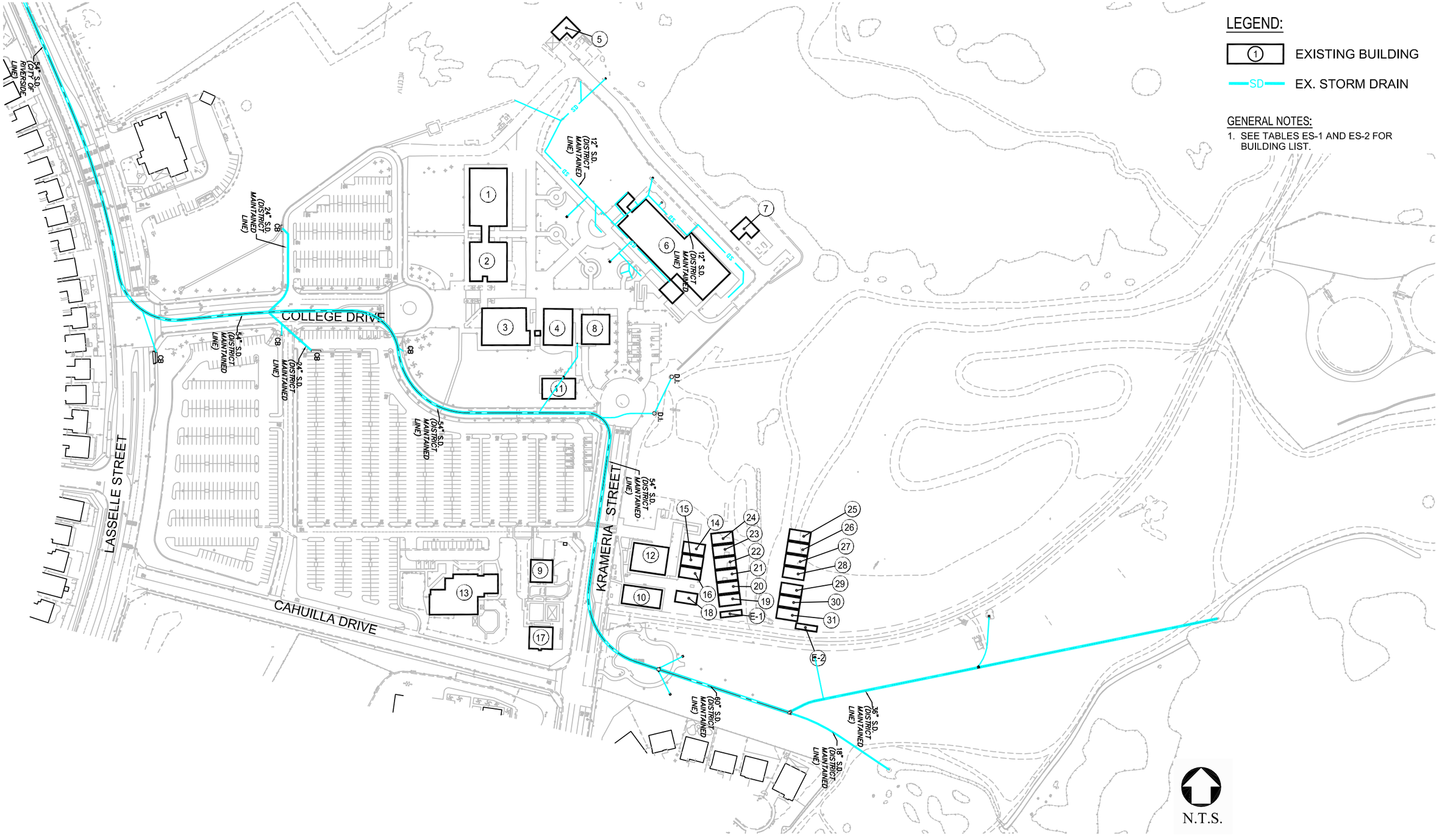


FIGURE 4A
EXISTING STORM DRAIN SYSTEM

GENERAL NOTES:

1. SEE TABLES ES-1 AND ES-2 FOR BUILDING LIST.

LEGEND:

- EXISTING BUILDING
- PROPOSED BUILDING
- FUTURE PROPOSED BUILDING
- PROPOSED BUILDING (CAMPUS EXPANSION AREA)
- EX. STORM DRAIN
- PROP. STORM DRAIN

FUTURE LEARNING CENTER
COLLEGE DRIVE
NEW LANDSCAPING AND LIGHTING AREA
FUTURE POSSIBLE PARKING STRUCTURE
PEDESTRIAN PATHWAY WITH FIRE ACCESS
POSSIBLE ADDITIONAL QUAD
M&O BLDG
PARK/BENCHES
FIELDS/TRACK
GYMNASIUM
2-3 LANE ROAD WIDENING
140 STALL PARKING LOT
1,000 – 1,500 SEAT OUTDOOR AMPHITHEATER
FIELDS/TRACK
LASSELLE STREET
KRAMERIA STREET
CAHUILLA DRIVE
24" S.D. (DISTRICT MAINTAINED LINE)
54" S.D. (DISTRICT MAINTAINED LINE)
12" S.D. (DISTRICT MAINTAINED LINE)
60" S.D. (DISTRICT MAINTAINED LINE)
36" S.D. (DISTRICT MAINTAINED LINE)
18" S.D. (DISTRICT MAINTAINED LINE)
N.T.S.

FIGURE 4B
PROPOSED STORM DRAIN SYSTEM

SECTION 5 – CHILLED WATER SYSTEM

5.1 SYSTEM DESCRIPTION

The campus has two central cooling plants. The first plant was built to serve the Library, Student Services, Science and Technology, and the Tiger's Den. The second plant was built to serve the Humanities building.

Each plant has two air cooled chillers. The first plant has two 130 ton Trane air cooled chillers. The chillers and pumps use a high flow rate and energy inefficient distribution scheme. The second plant uses the same approach. It has two 110 ton Carrier air-cooled chillers. Distribution piping carries chilled water to each of buildings in that phase of construction.

The Moreno valley campus was built in 2 phases with a third phase planned next to the Humanities building. In addition to the chilled water system cooling, the campus has some small split systems for telecom room cooling and local packaged systems for some buildings.

The east part of the campus is independent of the centralized campus chilled water systems. There is the modular faculty offices, the warehouse, the multipurpose building, the administration annex, the early childhood Center, and several relocatable classrooms to the north. All of these buildings have split systems, wall hung units or rooftop packed units.

5.2 METHODOLOGY

P2S has been charged with evaluating the existing cooling generation and distribution system. Our review of the current systems and the proposed new facilities will allow us to make cost-effective and specific recommendations to alter, upgrade, or modify the existing mechanical infrastructure to support the current and new proposed master plan buildings that form part of the proposed campus Facilities Master Plan. Our recommendations are based on the campus master plan being constructed over the next few phases of construction.

5.3 ANALYSIS OF EXISTING SYSTEM

Mechanical Bldg 1

The West part of the campus is served by two 140 ton air cooled chillers located at building M1. M1 also houses two 1 million BTU Raypak boilers for providing the heating hot water requirements. Twelve inch chilled water supply and return pipes are shown leaving the central plant, and then splitting up to 6" and 10" mains. The heating hot water loop has 4" and 6" mains.

The Library Building is served by 4" chilled water pipes and 2" heating hot water pipes. .

The Student Services Building is served by 3" chilled water pipes and 1-1/2" heating hot water pipes.

The Science and Technology Building is served by 3" chilled water pipes and 2" heating hot water pipes.

The Tigers Den is served by 2-1/2" chilled water pipes and 1" heating hot water pipes. This building is planned to be demo'd in phase 2.

Mechanical Bldg 2

The Humanities Building is served by 4" chilled water pipes and a 2-1/2" heating hot water pipes.

Both systems are set up for constant flow and so are energy inefficient. The chilled water valves were recently replaced with two way valves to increase the efficiency of the pumping system, but the chillers lack isolation valves and the pumps lack VFD's to take full advantage of this retrofit. The buildings are served by 4 pipe fan coils and are design for approximately 10°F differential on the chilled water supply temperatures. For a campus environment this is a very low differential and leads to large pipe sizes and large pumping requirements vs a larger temperature differential design.

5.4 ANALYSIS OF FUTURE NEEDS

Peak central cooling capacity for all future buildings will need to increase to about 764 tons. Peak capacity for new buildings will be 472 tons. Existing Peak capacity of 292 tons is served by air-cooled chillers.

Refer to Load Summaries for existing and future loads at the end of Section 9.

5.5 FINDINGS AND RECOMMENDATIONS

New Construction

- For maximum energy savings, peak demand reduction and reduced carbon footprint, a Chilled Water Thermal Energy Storage (TES) tank is proposed on the hilltop overlooking the campus. This tank might also be useful for firefighting needs.
- For energy efficiency reasons an evaporative cooled, chilled water plant is proposed that would also feed the TES tank. A comparison of full load and part load efficiencies is noted below for current state of the art chillers.
- The air-cooled chillers should be transitioned to water-cooled chillers sometime in the future.
- Chilled Water piping should be added for all proposed buildings that will be fed from the central chilled water system. Piping should be added as new buildings are added. See drawings for existing and proposed chilled water piping at the end of section 9 – Central Plants.
- New buildings should be provided with air handlers instead of fan coils to make better use of air side economizers and also greater delta T's through the chilled water coils. This is essential for maximizing the capacity of the Chilled Water TES tank.
- All buildings should have BTU metering capabilities and tie into a Central DDC system with robust energy management capabilities.
- Retrofit existing large buildings with BTU monitoring capabilities.

Chiller Type	Chiller	Condenser Water Pumps	Cooling Tower Fans	Total kW/ton	Notes
Air-Cooled kW/ton (IPLV)	0.55	0	0	0.55	Ambient @ 90°F
Air-Cooled kW/ton (full load)	1.10	0	0	1.10	Ambient @ 115°F
Evap Chiller (400 ton Smardt) kW/ton (IPLV)	0.37	0.03	0.04	0.44	Condensing at 75°F
Evap Chiller (400 ton Smardt) kW/ton (full load)	0.53	0.03	0.06	0.62	Condensing at 90°F
Evap Chiller (750 ton Trane) kW/ton (IPLV)	0.39	0.03	0.04	0.46	Condensing at 75°F
Evap Chiller (750 ton Trane) kW/ton (full load)	0.56	0.03	0.06	0.65	Condensing at 90°F

COMPARISON OF EFFICIENCIES BY CHILLER TYPES

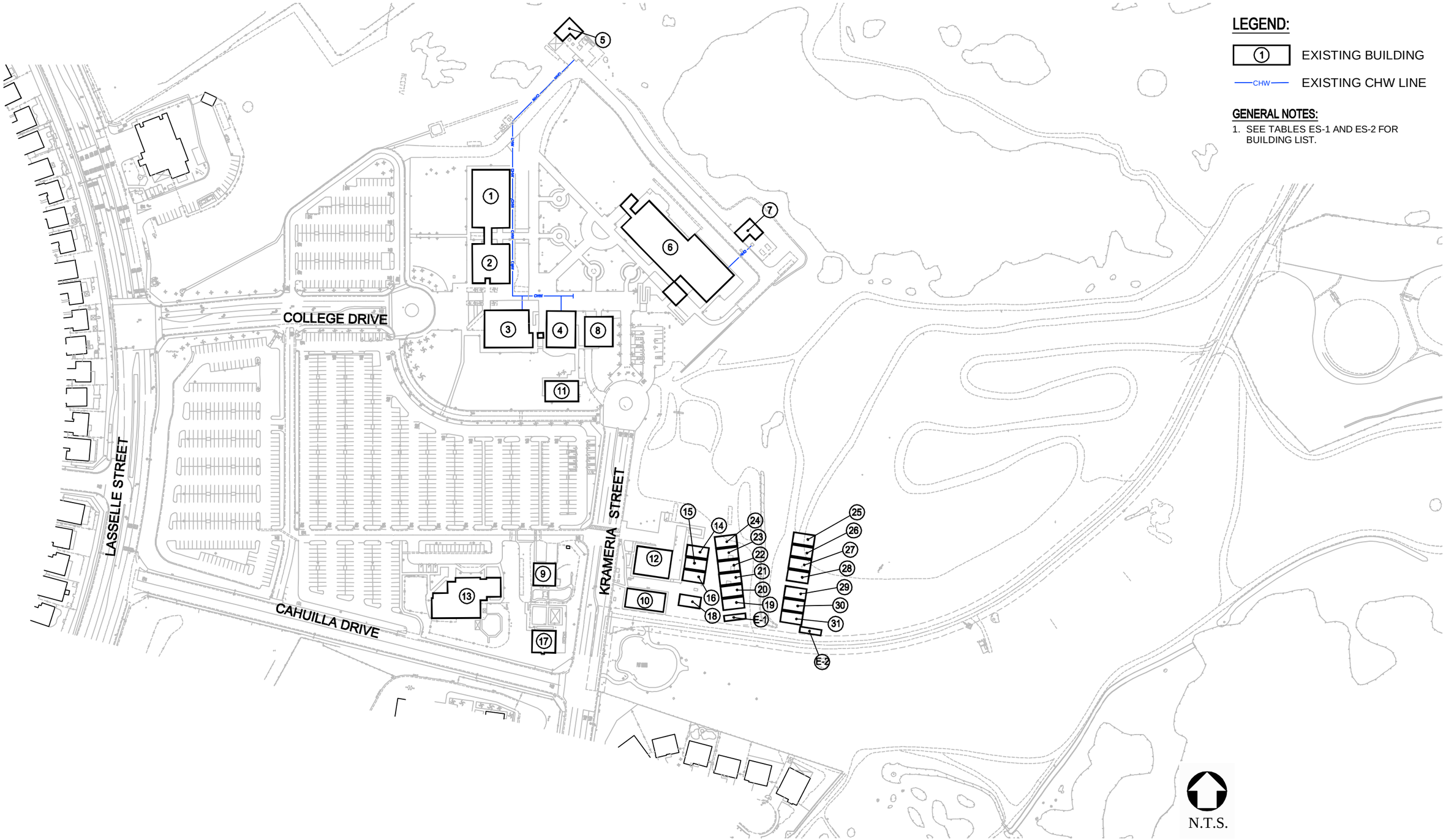


FIGURE 5a
EXISTING UTILITY MAP - CHILLED WATER

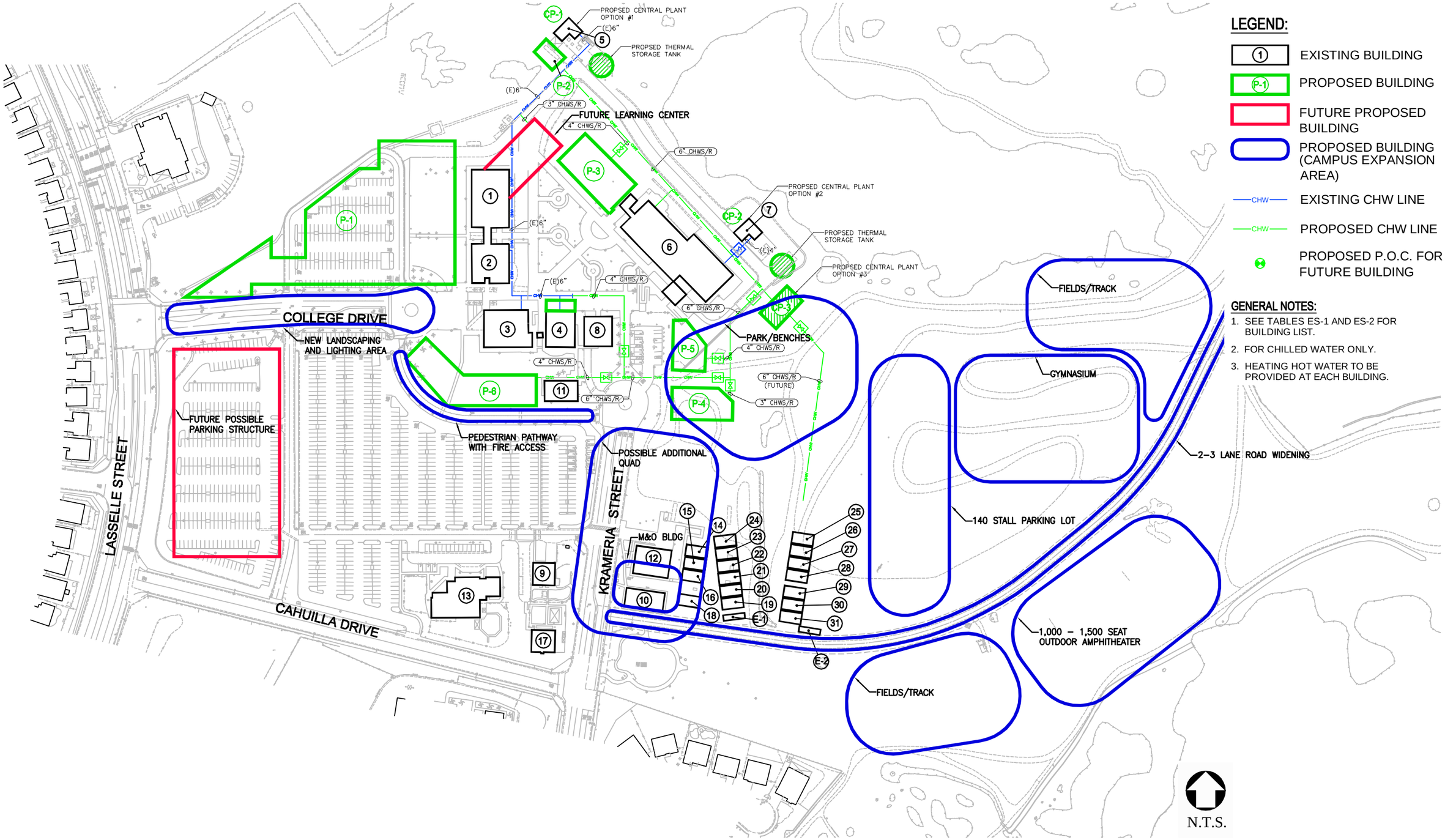


FIGURE 5b
FUTURE CONDITIONS UTILITY MAP - CHILLED WATER

SECTION 6 – HOT WATER SYSTEM

6.1 SYSTEM DESCRIPTION

The campus has two central heating plants. The first plant was built to serve the Library, Student Services, Science and Technology, and the Tiger's Den. The second plant was built to serve the Humanities building.

Each plant has two gas-fired boilers. The first plant has two boilers. The chillers and pumps use a high flow rate and energy inefficient distribution scheme. The second plant uses the same approach. It has two 110 ton Carrier air-cooled chillers. Distribution piping carries chilled water to each of buildings in that phase of construction.

The Moreno valley campus was built in 2 phases with a third phase planned next to the Humanities building. In addition to the chilled water system cooling, the campus has some small split systems for telecom room cooling and local packaged systems for some buildings. The east part of the campus is independent of the centralized campus chilled water systems. There is the modular faculty offices, the warehouse, the multipurpose building, the administration annex, the early childhood Center, and several relocatable classrooms to the north. All of these buildings have split systems, wall hung units or rooftop packed units.

6.2 METHODOLOGY

P2S has been charged with evaluating the existing cooling generation and distribution system. Our review of the current systems and the proposed new facilities will allow us to make cost-effective and specific recommendations to alter, upgrade, or modify the existing mechanical infrastructure to support the current and new proposed master plan buildings that form part of the proposed campus Facilities Master Plan. Our recommendations are based on the campus master plan being constructed over the next few phases of construction.

6.3 ANALYSIS OF EXISTING SYSTEM

Mechanical Bldg 1

F1 houses two 1 million BTU Raypak boilers for providing the heating hot water requirements. The heating hot water loop has 4" and 6" mains.

The Library Building is served by 2" heating hot water pipes.

The Student Sevices Building is served by 1-1/2" heating hot water pipes. .

The Science and Technology Building is served by 3" chilled water pipes and 2" heating hot water pipes. .

The Tigers Den is served by 2-1/2" chilled water pipes and 1" heating hot water pipes. This building is planned to be demo'd in phase 2.

Mechanical Bldg 2

The Humanities Building is served by 2-1/2" heating hot water pipes.

Both systems are set up for constant flow and so are energy inefficient. The heating water valves were recently replaced with two way valves to increase the efficiency of the pumping system, but the chillers lack isolation valves and the pumps lack VFD's to take full advantage of this retrofit.

The buildings are served by 4 pipe fan coils and are design for approximately 10°F differential on the chilled water supply temperatures. For a campus environment this is a very low differential and leads to large pipe sizes and large pumping requirements vs a larger temperature differential design.

6.4 ANALYSIS OF FUTURE NEEDS

Based on the list of proposed buildings, there will be a need for 2.6 million Btuh added peak heating capacity.

6.5 FINDINGS AND RECOMMENDATIONS

New Construction

- It is recommended to localize the generation of heating hot water rather than grouping it all in one location. Current SCAQMD regulations limit economical boiler sizing to less than 2.0 million BTU per boiler.

- New point of use boilers should be minimum 84% efficient boilers. Condensing boilers should be considered, too.

For energy efficiency reasons

- New buildings should be provided with air handlers instead of fan coils to make better use of greater delta T's through the heating water coils. This is essential for maximizing the efficiency of the boilers.

- All buildings should have BTU metering capabilities and tie into a Central DDC system with robust energy management capabilities.

- Retrofit existing large buildings with BTU monitoring capabilities.

SECTION 7 – ELECTRICAL SYSTEM

7.1 SYSTEM DESCRIPTION

Background and Scope

Moreno Valley College, one of three colleges within the Riverside Community College District, is a two-year public community college situated in the suburban community of Moreno Valley, California. The campus was built in two phases with the majority of the buildings being built in phase one. The Moreno Valley Campus is fast becoming the health education center of choice in the Inland Empire with strong programs in health sciences, human and public services. Each semester more than 7,000 students pursue associate's degrees, transfer to a four-year college or university or receive career certificates that qualify them to enter their chosen field.

The campus derives its power from Southern California Edison via a 12kV high voltage primary metering and distribution system. This power is then transformed down to low voltage where it is distributed throughout the site. P2S has evaluated the existing power distribution system currently serving the existing Moreno Valley College Campus.

Objective

The objective of this report is to evaluate the existing power distribution system and its adequacy to support new buildings, major renovations, and building retrofits that form part of the proposed campus Facilities Master Plan.

7.2 METHODOLOGY

The following methodology was adopted in formulating our electrical utility infrastructure master plan. The methodology presented below outlines the critical tasks that were performed in development of this master plan report.

- A critical aspect in the evaluation of the existing electrical system serving a facility is a detailed and accurate field investigation of the current system. Meetings and discussions with the campus helped gather existing information and any potential problems faced with the system. Existing conditions, together with potential problems, were discussed and identified. The existing system information was gathered through available record drawings and meetings with the campus facilities staff.

- A load flow study of the existing and future loads was developed and existing and proposed capacity requirements were developed. A watts/sqft of proposed facilities was assumed in our load studies. For all existing buildings, existing installed capacities of the substations/transformers were taken to estimate the total loads.

- The Electrical system was then evaluated for capacity, functionality, reliability, ease of maintenance, age, and its ability to serve the present and future needs of the campus.

- Alterations/upgrade/modifications necessary to support new buildings, major renovations, and building retrofits that form part of the proposed campus facilities master plan were identified.

- Recommendations were developed to support new buildings, major renovations, and building retrofits that form part of the proposed campus facilities master plan were identified.

- Alterations/upgrades/modifications necessary to support new buildings, major renovations and building retrofits that will form part of the proposed campus facilities were identified.

7.3 ANALYSIS OF EXISTING SYSTEM

Our following report will provide an analysis of the present electrical distribution currently serving the campus. It identifies potential problems associated with the system, defines future requirements and outlines recommended solutions.

The following are included in this survey submittal:

- Executive summary

- High voltage system description.

- Low voltage system description.

- Review of the current power consumption including current electric rate structure, peak KW demand per meter, and total electric consumption.

- PDF'S of drawings of the existing electrical site distribution system as well as single line drawings for both the north and south campus. The north campus has two options for electrical distribution; **option 1** is for a 12KV system only and **option 2** is for a 12KV system for the new buildings and a 480V system for the existing buildings. The list of drawings is as follows:

  Figure 7a Existing Utility Map-Electrical

  Figure 7b Future Conditions Utility Map-Electrical Option #1

  Figure 7b Future Conditions Utility Map-Electrical Option #2

  Figure 7c Existing Electrical System South Campus Single-Line Diagram

  Figure 7d Proposed Electrical System South Campus Single-Line Diagram

  Figure 7e Existing Electrical System North Campus Single-Line Diagram

  Figure 7f Proposed Electrical System North Campus SLD Option#1

  Figure 7g Proposed Electrical System North Campus SLD Option#2

7.4 ANALYSIS OF FUTURE NEEDS

An analysis of the current electrical distribution system of the Moreno Valley Campus was conducted to evaluate a) the impact of proposed facilities on the existing electrical system and b) modifications required to support the future additions to the campus.

The current electrical distribution was also analyzed for electrical duct-banks/manholes that will be in conflict with the proposed facilities and will require relocation. A campus site plan identifying electrical duct-banks/manholes that require demolition/relocation and extension of feeders to new facilities to serve the planned facilities is provided in our proposed electrical site plan Figure 7b option 1 and Figure 7b option 2.

An evaluation of the existing electrical system currently serving the campus revealed that a new 12kV electrical infrastructure is required to provide the campus with a closed loop/primary selective arrangement to support existing and future planned facilities. In addition, an evaluation of the existing system revealed that the existing system provides limited redundancy because of its open loop configuration rather than being a closed loop system or a primary selective system. Since the campus will operate and maintain the 12kV switchgear and the electrical distribution system, the campus requires an electrical system that must:

(a) Provide improved system reliability

(b) Provide ease of maintenance and isolation of circuits either during a fault or during a regular maintenance without interrupting power to every building on campus

(c) Be sized to accommodate existing loads and planned future loads resulting from new buildings addition as well as additions to existing buildings

(d) Be well coordinated to eliminate nuisance tripping of upstream protective devices

(e) Have all equipment listed for the short circuit availability at the point of installation.

An evaluation of the recent master plan revealed that a net additional 1,278,000 square feet of buildings, parking, and event space is planned at the campus. A review of these proposed facilities and their usage revealed that the campus would add an additional installed capacity of 5,982 kVA to their existing installed capacity. Based on a demand factor of 40%, the campus will see an additional demand of only 3,509kVA. After subtracting the demand for the demolished buildings of 158KVA the total demand for the campus would be 4,128kVA. Note that the total square footage of the campus, not including the parking structures or track and fields will increase by 74%. Table 7.1 has made some assumptions for the size of the future learning center gymnasium.

A review of future installed capacity and existing installed capacity of the campus revealed that the two 3000AMP 480V switchgear will be loaded to 82% and are adequate to meet the demands of existing and future facilities. However both of SCE's 750KVA transformers will be **inadequate** to meet the future demands of the campus. The SCE transformers will need to be increased in size to 2500kVA each to meet the future demand. The campus currently has a peak demand of 909kVA with an assumed power factor of 0.8 current peak demand of the campus per SCE is 727kW. See Table 7-3. That number is expected to grow to approximately 4,128kVA with the addition of new facilities and additions. This future estimate is projected based on the campus current ratio of installed capacity versus its current demand.

The following **Table 7-1** depicts projected installed capacities and demand of proposed facilities shown in the master plan. The capacities are calculates based on standard industry watts/square foot in absence of a design for these facilities.

TABLE 7-1

Bldg #	Building Name	Occupancy Type	Gross sqft	Load Factor W/sqft	Required Capacity in KVA	Demand in KVA @ 40% of Installed Capacity
P1	Parking Struct. & Surge Space/Book Store	parking structure	358,000	1.8	644	258
P2	Data Center	office	4,700	50	235	235
P3	Instruction & Student Services (Bldg. A)	academic/office	38,025	12	456	183
P4	Instruction (Bldg. B)	academic	19,505	12	234	94
P5	Instruction (Bldg. C)	academic	38,577	12	463	185
P6	Health Science Center	academic	52,017	12	624	250
	New Kramera Street Mechanical Yard		3,000		854	667
	Future Learning Center	academic	25,000	12	300	120
	Future Parking Structure	parking structure	300,000	1.5	450	180
	Future Track & Field /Amphitheater		140,000	2.5	350	140
	Future Track & Field		100,000	2.5	250	100
	Future Gymnasium		100,000	2.5	250	100
	500 stall parking lot		100,000	1	100	40
	Total Proposed Capacity		1,278,824		5,211	2,551
E	Total Existing Buildings	Mixed Use	161,757	12	1,941	776
E	Existing to Buildings Remove	Mixed Use	-32,839	12	-394	-158
E	Total Existing to Buildings to Remain	Mixed Use	128,918	12	1,547	619
	Total Campus Capacity				6,785	3,170

7.5 FINDINGS AND RECOMMENDATIONS

Electrical Power Distribution

Findings

HIGH VOLTAGE DISTRIBUTION

The site is presently fed by Southern California Edison from two different locations. The north campus is fed by 12kV high voltage distribution system that enters the site on the northwest corner of Lasselle Ave and Campus Drive. These 12kV XLP underground conductors are extended through a single 5" conduit and a series of manholes to a Southern California 12KV switch. The switch then back feeds into a capacitor bank. Service then continues with 12 kV XLP underground conductors to a 750 KVA transformer and an additional capacitor bank located at Mechanical Building No. 1. A second 12kV XLP conductor run is extended in a single 5" conduit through a manhole to another 750 KVA transformer located at Mechanical Building No. 2. These SCE transformers then transform from 12kV primary voltage to a 480Y/277 V, 3-phase, 4-wire system with a 3000 A main switchboard at each location.

It should be noted that the two 3000 A 480/277 V switchboards were once each metered individually, however these meters have been removed and a new radio transmitting meter and antenna has been installed in the 12kV high voltage switch enclosure. The present system provides for a combined load of 6000 Amps of secondary distribution at 480/277 V, 3-phase, 4-wire. There is a 5" empty conduit stubbed out from Southern California Edison manhole E-4 located at Mechanical Building No.2 to the west for future expansion of the 12kV system.

The south campus area is fed by a 12kV high voltage underground distribution system that extends from a Southern California Edison manhole located on Krameria Street through a single 5" conduit to a 150 KVA transformer located on the corner of Cahuilla Ave. and Krameria Street. The 12kV feeder dead-ends at this location. The 150 KVA SCE transformer then transforms the 12 kV to 208/120 Volt, 3-phase, 4-wire. There is an 800 Amp switchboard and meter located adjacent to the Head Start building. This switchboard sub-feeds a 400 Amp switchboard and meter located adjacent to the existing warehouse facility as well as back-feeding the old 400 A switchboard. It should be noted that even though there are no provisions for future expansion at this location, the 5" conduit feeding the transformer allows for an increase in available capacity. These buildings have their own SCE feed and will not be added to the campus loop.

LOW VOLTAGE DISTRIBUTION SYSTEM

North Campus

The Southern California Edison transformer presently feeds a 3000 A main switchboard (designated as 'MSB') located at Mechanical Building No.1. The main switchboard is protected by a 3000 A ground fault interrupter main circuit breaker. The primary voltage of 480/277 V is used to feed the chillers and the mechanical equipment as well as extending via manholes and pullboxes throughout the campus to the various buildings. These buildings are listed as follows:

- The library is fed with an 800 Amp circuit breaker and feeder to an 800 A secondary distribution switchboard. The 480 Volts are then transformed to 120/208 Volts for secondary distribution. It should be noted that this 800 A circuit breaker feeder indicated a maximum high leg conductor reading of 67 Amps at the time of this report.

- The Science Tech Building has a 1200 A circuit breaker and feeder to a 1200 Amp secondary 480/277 V distribution switchboard. The 480 Volts is then transformed to 120/208 for secondary distribution. It should be noted that this 100 A circuit breaker feeder indicated a maximum high leg conductor reading of 81 Amps at the time of this report.

- The Student Services Building appears to be fed by a 100 A circuit breaker and 200 A conductor (because of voltage drop) feeding a 400 A, 480/277 V, secondary distribution switchboard. The 480 Volts is then transformed to 120/208 for secondary distribution. It should be noted that this 100 Amp circuit breaker feeder indicated a maximum high leg conductor reading of 34 Amps at the time of this report.

- The Bookstore and Student Activity Buildings are fed with a single 100 Amp circuit breaker and 100 Amp conductors. This single feeder is then provided with a 600 Volt disconnect switch which feeds a 75 KVA transformer and secondary 208/120 Volt panel at each building. It should be noted that this 100 Amp circuit breaker feeder indicated a maximum high leg conductor reading of 17 Amps at the time of this report.

- The Humanities building is fed with a 1200 Amp circuit breaker and 1200 Amp conductors to a 1200 Amp secondary 480/277 V distribution switchboard. The 480 Volts is then transformed down to 208/120 Volts for secondary distribution. It should be noted that this 1200 Amp circuit breaker indicated a maximum high leg conductor reading of 143 Amps at the time of this report.

South Campus

The Southern California Edison 150 KVA transformer feeds an 800 Amp 208/120 Volt main switchboard and meter which sub-feeds the old switchboard feeders, the President's office, and the Head Start building. It should be noted that the campus is presently paying for the power consumption for the Head Start building.

The same 150 KVA transformer also feeds a 400 Amp main switchboard which feed the warehouse, multi-purpose, and portable buildings. Note: the SCE T/F is 1/2 full with 50% spare capacity. The peak 12-month demand on this switchboard is 61 kW or 169 A at 208 V.

Underground Distribution Network

The secondary distribution network throughout the campus is by a series of duct banks with 4" and 5" conduits and manholes. There are spare conduits throughout the system.

Conclusions

The existing Edison substructure is in very good condition and is adequately sized for the campus' present needs. The existing 15 kV conductors have the capability of feeding all major additions. The Southern California Edison transformers have a combined capacity of 1500 kVA. The demand factor is currently at 49% for the SCE transformers. Edison and all other utilities size their equipment for a 40% demand factor. At the present time there is 6000 Amps of capacity in the two main switchboards with a combined 12-month peak demand load of 727 kW or 1094 Amps at 480 Volts, 3-phase.

Based upon a design load of 12 Watts per square foot, an additional 53,000 square feet of new building could be added to the two existing main switchboards, transformers, and primary feeder. However based on current demand of 6 watts per square feet for the campus 106,000 square feet of new buildings could be added. The available spare capacity would accommodate any anticipated upgrades or renovations throughout the existing campus buildings.

The secondary distribution switchboards are all adequately sized for any additional loads, retrofits or remodels that may be required. The maximum connect load is 12% of the rated switchboard (This is for the Humanities Building). All others are even more lightly loaded.

Recommendations

1. We recommend a **new 12 KV closed loop system be installed** to serve each building on the campus. It is recommended that a new **campus owned primary 15kV metering section and switchgear be installed**. The use of selector switches shall be provided to serve each building on campus through a closed loop system. This arrangement will facilitate isolation of buildings without shutting off the main system.

2. We recommend that the **configuration of the future Learning Center be adjusted** to avoid the electrical feeders to existing buildings on campus.

3. A **Short Circuit / Arc Flash** study be conducted to coordinate the proposed system.

4. Conduct a **coordination study** of the proposed system to effectively coordinate all protective devices in the campus.

5. The existing north campus distribution network is adequate to accommodate 106,000 square feet of expansion without modifying the system. If additional capacity (above 106,000 square feet) is required, it is recommended that **Southern California Edison be requested to upgrade the (2) 750KVA transformers**. It is recommended that **SCE be notified** every time a new load or building is added to the system.

6. We recommend **the use of proper digging equipment** for trenching any new electrical feeders as it is well known that the campus has a granite base. The amount of time and the rental of proper equipment should be included in the base bid of any job at Moreno Valley Campus where trenching is involved and not included in a change order as “discovery” after the fact.

7. We recommend **the use of a wireless multi-metering system**. The system should have an energy software package for energy analysis, 3 phase wireless meter transceivers for wireless metering and be capable of metering at 480 volts as well as 208 volts.

8. We recommend **the use of aluminum cables** rather than copper cables. Aluminum cables shall be used for all medium voltage cables and low voltage cables larger than 4/0 in an effort to save money. Note: The infrastructure exhibits and report are designed for copper conductors.

9. The existing south campus is fed from a Southern California Edison 12 kV network via a manhole on Krameria Street with a 5” conduit to the present 150 KVA transformer. Their system can easily be expanded by SCE and a new 12 KV feeder installed to accommodate one or two new transformers similar to the north campus and could provide an additional 6000 Amps of capacity at 480 Volts. It is not recommended that the two campuses be combined on a single feeder. However, at some future date they could be extended to a neutral point and a high voltage selector switch installed which would allow the ability to switch from one high voltage feeder to the other in the event of a major loss of power on either feeder (both of which are fed from the same substation).

Installed Capacities by Substation/ Feeders

TABLE-7-2 OPTION 1

Feeder	Building	Installed Capacity In kVA	Demand In Kva
Feeders 1 & 2	Bldg. 1 Library	292kVA	117kVA
	Bldg 2 Student Services	162kVA	65kVA
	Future Learning Center	225kVA	90kVA
	Bldg P3 Instruct. & Student Services (Bldg. A)	456kVA	183kVA
	Bldg 3 & 4 Science/Technology & Lions Den	223kVA	90kVA
	P6 Health Science Center	624kVA	250kVA
	Future Parking Structure	150kVA	150kVA
	New Kramera Street Mechanical Yard	854kVA	667kVA
	Future Gymnasium	250kVA	100kVA
	Future track & field and Amphitheater	350kVA	140kVA
	Bldg P4 Instruction (Bldg. B)	234kVA	94kVA
	Bldg P5 Instruction (Bldg. C)	463kVA	185.2kVA
	Future 500 Stall Parking Lot	100kVA	40kVA
	Future Track & field	250kVA	100kVA
	Bldg 6 Humanities	638kVA	255.8kVA
	Bldg 7 Mech 2	250kVA	250kVA
	Bldg P2 Network Operation Center-NOC	94kVA	94kVA
	Bldg 5 Mech 1	250kVA	250kVA
Total		**5865kVA 282Amps**	**3,120kVA 150Amps**
Feeder 3	Bldg P1 Parking Structure & Surge Space	644kVA	248kVA
Total		**644kVA 31Amps**	**248kVA 12Amps**
Grand Total 12kv Load		**6509kVA 313Amps**	**3368kVA 162 Amps**

TABLE-7-2 OPTION 2

Building	Installed Capacity In kVA	Demand In kVA
Bldg P1 Parking Structure & Surge Space	644kVA	248kVA
P6 Health Science Center	624kVA	250kVA
Future Parking Structure	150kVA	150kVA
New Kramera Street Mechanical Yard	854kVA	667kVA
Future Gymnasium	250kVA	100kVA
Future track & field and Amphitheater	350kVA	140kVA
Bldg P4 Instruction (Bldg. B)	234kVA	94kVA
Bldg P5 Instruction (Bldg. C)	463kVA	185.2kVA
Future 500 Stall Parking Lot	100kVA	40kVA
Future Track & field	250kVA	100kVA
Bldg 7 Mech 2	888kVA	505kVA
Bldg P3 Instruct. & Student Services (Bldg. A)	456kVA	183kVA
Future Learning Center	225kVA	90kVA
Bldg 5 Mech 1	927kVA	522kVA
Bldg P2 Network Operation Center-NOC	94kVA	522kVA
	6509kVA 313Amps	**3368kVA 162Amps**

The following Table 7-3 depicts all the existing SCE meters currently on the campus and there locations. The total KW is given and the total kVA is factored in at the bottom.

TABLE 7-3 ELECTRIC METER LOCATIONS

Moreno Valley Campus

1 year Max. Demand

Address	Location	Meter #	Switchboard Rating	Voltage	Peak KW Demand	Amps
16130 Lasselle Street	SCE Meter Cabinet near Building #5	V345N-000754	1200A	12,000 3Ø	688	33
28360 Cahuilla Ave.	Head Start Building	349-012540	800A	120/208, 3Ø	39	108
				Total kW	727	35
				Power Factor	0.8	
				Total kVA	**909**	

The SCE company has increased their transmission and their distribution charge effective Oct.1, 2009. These rates apply to Time Of Use (TOU) Large users and taken from the Schedule TOU-8 for 2kV to 50kV meters.

(a) Summer Season on peak $0.1746/kWH

(b) Winter Season on peak $0.14906/kWH

(c) Customer Charge $284.75/Meter

(d) Demand Charge Transmission ..... $2.10/kW of billing demand

(e) Demand Charge Distribution ..... $8.32/kW of billing demand

(f) Time Related Summer on peak $22.71

7.6 SITE LIGHTING SYSTEM DESCRIPTION

Objective

The purpose of this study is to evaluate the existing exterior lighting system at Moreno Valley Campus of the Riverside Community College and provide recommendations to create a visually comfortable, safe, and aesthetically pleasing exterior environment. Our study references Illuminating Engineering Society Handbook (ninth edition) and IES RP-33 recommended practice as the reference documents in evaluating the exterior lighting system.

Summary of scope

The following aspects of the exterior lighting system are addressed in this study:

- Type and photometric distribution (Photometric distribution provides luminous intensity of luminaries in specified planes and angles) of existing exterior light fixtures.
- Evaluation of fixture types with respect to energy usage, light output, quality of light, brightness, and maintenance.
- Type of lamps, their color temperatures, and their wattages.
- Existing lighting levels.
- Glare.
- Safety and Comfort.
- Standardization of equipment. (Light fixtures and Lamp source).

Conclusion

A number of exterior light fixtures equipped with a range of lamp sources currently illuminate the walkways, roadways, parking lots and building exteriors of the Moreno Valley Campus. It is apparent that the campus is starting to add exterior light fixtures in various phases of campus development without an adequate effort to standardize around a central equipment type or a lamp source.

Although a few areas meet or exceed the light levels currently recommended by the Illuminating Engineering Society (IES), the majority of the campus light levels fall below these recommended levels. Some of the contributing factors for the inconsistent exterior lighting throughout the Moreno Valley campus are:

- Incorrect spacing and mounting heights of light fixtures
- Use of different light sources (high pressure sodium, metal halide, and fluorescent) with different color temperatures and different wattages
- Wrong application of fixtures (photometric distributions and light sources)
- Inadequate light fixtures
- Burned out lamps

Standardization of equipment coupled with its correct application and correct photometric distribution is recommended to improve the existing exterior lighting at the campus. Standardization of equipment would not only result in lower maintenance and inventory costs, but also would also reduce energy costs of the campus.

To accomplish the above, we recommend the following steps:

- A single lamp source is selected for illuminating roadways, parking lots, and pathways leading to the campus buildings. Since a high-pressure sodium lamp has a lower color temperature and provides a warm color, we recommend that this lamp be standardized for campus exterior lighting.
- All roadways and parking lots in the campus are illuminated with shoe box type fixtures equipped with full cutoff optics. We recommend replacement/addition of light fixtures as required in these parking lots to achieve IES recommended light levels.
- All existing post top fixtures, and other decorative fixtures in the campus be replaced with a common cut off decorative fixture (A cutoff luminaire is defined by I.E.S as a luminaire that produces a luminous intensity of 10% or less at a vertical angle of 80 degrees above nadir) that will provide a visually comfortable environment and aesthetically blend with the architectural buildings in the campus. The cut off fixtures would also prevent glare. These new fixtures will be spaced to meet the current IES recommended light levels for pathways.
- Bollard lights should be avoided as much as possible to illuminate pathways within the campus due to their narrow distribution and inability to illuminate wider pathways effectively. The bollards are also particularly vulnerable to vandalism because of their lower mounting heights,
- Metal Halide lamps are recommended to highlight the architecture of buildings due to their high color rendering index and high color temperature
- Illumination levels of all pathways, roadways and parking lots in the campus shall be designed to meet the current recommended light levels by IES (an average of at least 0.5fc with a uniformity ratio of 4:1. Uniformity ratios are a measure of luminance differences between surfaces or areas and are expressed as ratio of maximum or average illumination to minimum illumination for a given area. Higher uniformity ratios with in the field of view can reduce the ability to see a task, create a safety hazard and cause annoyance). This will not only provide a visually comfortable environment, but also a safe environment, since people often associate higher or greater luminance with safer surroundings.

The campus exterior lighting at RCCD Moreno Valley presently consists of a designed central theme of exterior light fixtures that currently illuminate the pathways, parking lots and roadways of the campus. However, it is apparent that some exterior light fixtures have been added in various phases of campus development without an adequate effort to standardize around a central equipment type or a lamp source.

The majority of the exterior light fixtures currently lighting the parking lots are shoe box fixtures and have sharp cut off characteristics. Almost all of these fixtures are equipped with high pressure sodium vapor lamps. The walkways are illuminated with post top fixtures. These fixtures are equipped with high pressure sodium lamps.

The lighting levels around the campus vary extensively from almost .08 footcandle in some parking areas to as high as 17 fc directly under the shoe box fixtures with uniformity ratios (average foot-candles to minimum foot-candles in excess of 10:1 in certain areas). The footcandle readings were recorded using a digital light meter (model EA30 manufactured by Extech instruments) during the month of October 2009.

The following description provides type of fixture, existing footcandle levels and type of lamps being used in each area of the campus.

Pathways

Pedestrian walkways throughout the campus are illuminated with post top fixtures that offer some cutoff. The fixtures are mounted on 12' 4”square poles. The fixtures are equipped with 70 watt high pressure sodium lamps. Due to a visible reflector and the lamp source, these fixtures are not well shielded and contribute to glare. The walkway light levels ranging from .02 foot-candles to 4 fc in certain areas. The uniformity ratios (which are a measure of the (maximum or average footcandle/minimum footcandle) are high and are above the normally recommended (4:1) uniformity ratios by the Illuminating Engineering Society (IES) thus creating a high contrast environment.

Parking Lots

Parking Lot A is illuminated with modern shoebox light fixtures mounted on 25' high poles. The fixtures are equipped with high pressure sodium vapor lamps. The parking lot has footcandle readings ranging from 0.08 foot-candles at the edge of the lot and 9 foot-candles under the fixture. This parking lot has higher footcandle readings than other parking lots but still lack a sufficient number of poles around the perimeter. This lot is scheduled to be demolished to make room for the new parking structure. The uniformity ratios (average footcandle / minimum footcandle) are high and above the normally recommended (4:1) uniformity ratios by the Illuminating Engineering Society (IES).

Parking Lot B is illuminated with modern shoebox light fixtures mounted on 25' high poles. The fixtures are equipped with high pressure sodium vapor lamps. The parking lot has footcandle readings ranging from 0.2 foot-candles between the fixtures 17 foot-candles under the fixture. There are dark areas where the foot-candles fall below .1 due to obstructions (trees). The west end of the lot has better lighting due to the 400 watt flood light pointing towards lot A. The presidents building is scheduled for demolition and the light will be demolished. The uniformity ratios (average footcandle / minimum footcandle) here again are extremely high and are far above the normally recommended (4:1) uniformity ratios by the Illuminating Engineering Society (IES).

Parking Lot C is illuminated with modern shoebox light fixtures mounted on 25' high poles. The fixtures are equipped with high pressure sodium vapor lamps. The parking lot has footcandle readings ranging from 0.1 foot candles between the fixtures 15 foot candles under the fixture. The dark area down the center of the lot is due to the large spacing between fixtures. There are dark areas where the foot candles fall below .1 due to obstructions (trees). The uniformity ratios (average footcandle / minimum footcandle) here again are extremely high and are far above the normally recommended (4:1) uniformity ratios by the Illuminating Engineering Society (IES).

Parking Lot D is a well lit parking lot and is illuminated with modern shoebox light fixtures mounted on 25' high poles. The fixtures are equipped with high pressure sodium vapor lamps. The parking lot has footcandle readings ranging from 2.7 foot-candles between the fixtures 13 foot-candles under the fixture. The perimeter has some areas where the footcandle readings are .5fc. The uniformity ratios (average footcandle / minimum footcandle) are acceptable, about 5 to 1 near the recommended (4:1) uniformity ratios by the Illuminating Engineering Society (IES).

Parking Lot E is illuminated with modern shoebox light fixtures mounted on 25' high poles. The fixtures are equipped with high pressure sodium vapor lamps. The parking lot has footcandle readings ranging from 0.8 foot-candles at the edge of the lot and 9 foot-candles under the fixture. This lot is scheduled to be demolished to make room for the new parking structure and building D.

Parking Lot—Early Childhood is a well lit parking lot and is illuminated with vandal resistant light fixtures mounted on 12' high poles. The fixtures are equipped with high pressure sodium vapor lamps. The parking lot has footcandle readings ranging from 1.8 foot-candles between the fixtures 4.4 foot-candles under the fixture. The perimeter has some areas where the footcandle readings are .63fc. The uniformity ratios (average footcandle / minimum footcandle) are acceptable, about 3 to 1 within the recommended (4:1) uniformity ratios by the Illuminating Engineering Society (IES).

Warehouse Parking Lot / Portables are illuminated with wall packs and surface mounted light fixtures. The fixtures are equipped with high pressure sodium vapor lamps. The parking lot has footcandle readings ranging from 0.1 foot-candles at the edge of the lot and 8 foot-candles under the fixture. This lot is scheduled to be demolished to make room for the new building P4 & P5.

Roadways

Perimeter Road is void of any concept lighting. Only one or two flood lights and some building facade lighting illuminate the entire north perimeter road and Maintenance building areas.

7.7 SITE LIGHTING RECOMMENDATIONS

The Moreno Valley campus is currently designed with a central theme of exterior light fixtures that illuminate the pathways, parking lots and roadways of the campus. However, it is apparent that some exterior light fixtures have been added in various phases of campus development without an adequate effort to standardize around a central equipment type or a lamp source.

Standardization of equipment coupled with its correct application and photometric distribution is recommended to improve the existing exterior lighting at the campus.

The following key exterior lighting design issues form part of a well designed exterior lighting system.

- Appearance of Space and Luminaires
- Direct Glare
- luminance (vertical)
- Light distribution on surfaces
- Light Pollution/Trespass
- Modeling of faces or objects.
- Point(s) of interest
- Reflected glare

The above issues have been kept in mind while providing our recommendations and selection of fixtures for each area on campus. In order to achieve our objective and have a well designed exterior lighting system in the campus, we prioritize our recommendations as follows:

1. All existing post top fixtures and other decorative fixtures in the campus be replaced with a common cut off decorative fixture that will provide a visually comfortable environment and aesthetically blend with the architectural buildings in the campus. The cut off fixtures would also prevent glare. These new fixtures will be spaced to meet the current IES recommended light levels for pathways.

2. A single lamp source be selected for illuminating roadways, parking lots, and pathways leading to the campus buildings. Since a high-pressure sodium lamp has a lower color temperature and provides a warm color, we recommend that this lamp be standardized for campus exterior lighting.

3. Illumination levels of all roadways and parking lots in the campus be designed to meet the current recommended light levels by IES (an average of at least 0.5fc with a uniformity ratio of 4:1). This would include addition/ deletion of light fixtures (based on footcandle readings) to achieve the IES recommended light levels. This will not only provide a visually comfortable environment, but also a safe environment, since people always associate higher or greater luminance with safer surroundings.

4. Provide a lighting control panel and photocells to control all light fixtures at the same time. If a control panel is not a viable solution then replace the existing time clocks with astronomical time clocks.

5. Metal Halide lamps be used to highlight the architecture of buildings owing to their high color rendering index and high color temperature.

6. Replace all burned out lamps and ballasts.

7. Trim the trees and obstructions.

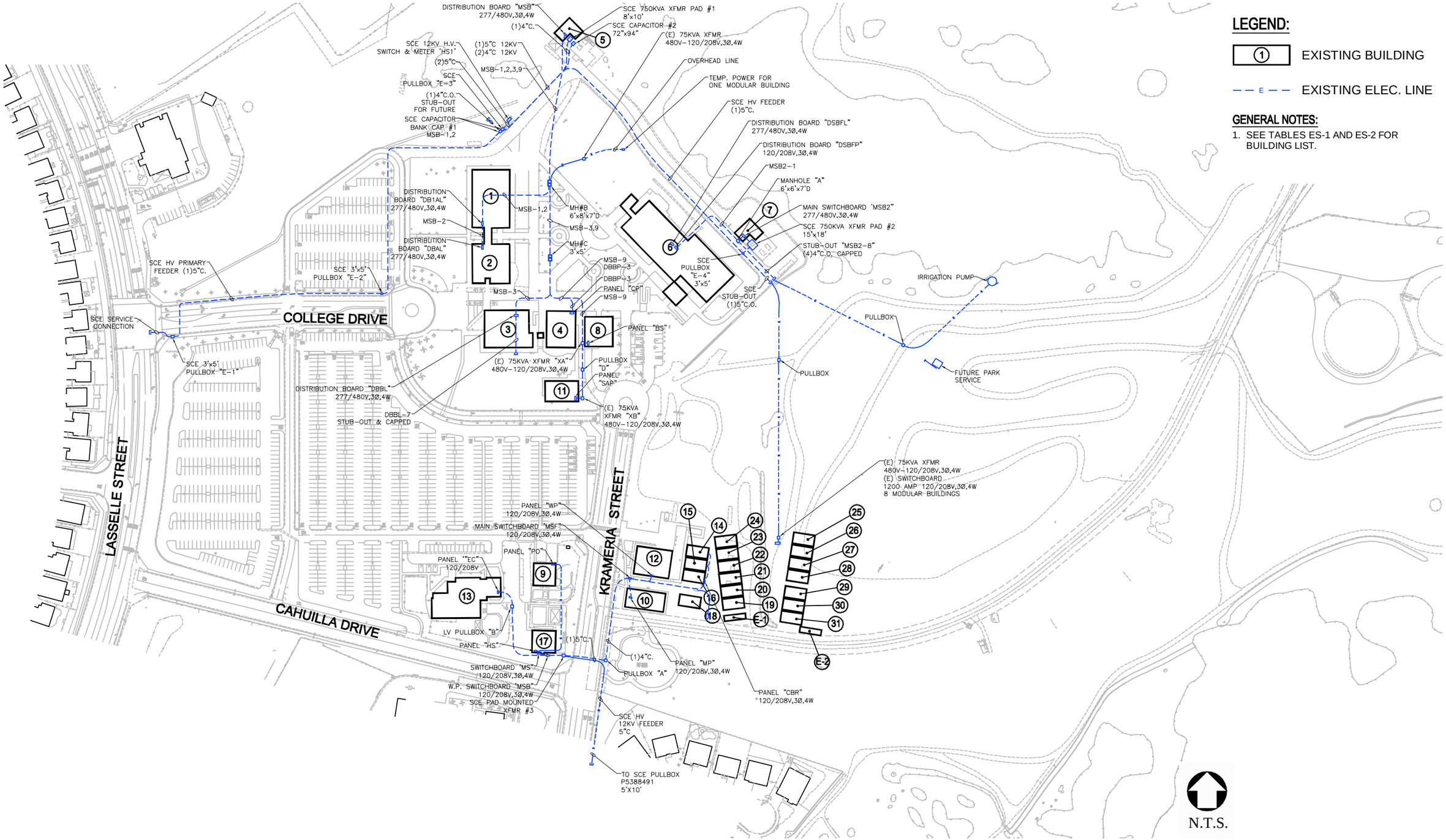
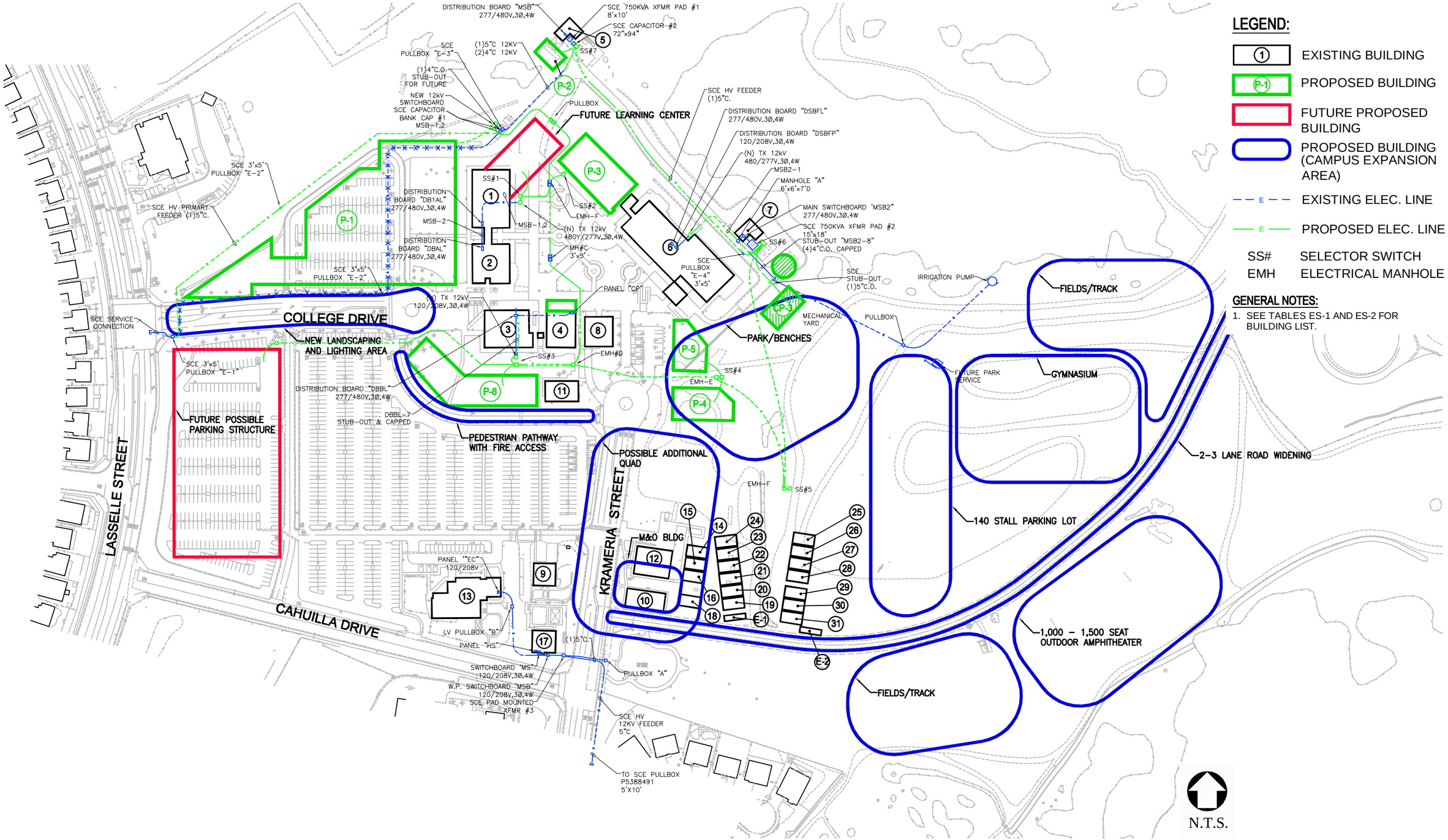


FIGURE 7a
EXISTING UTILITY MAP - ELECTRICAL



LEGEND:

- EXISTING BUILDING
- PROPOSED BUILDING
- FUTURE PROPOSED BUILDING
- PROPOSED BUILDING (CAMPUS EXPANSION AREA)
- EXISTING ELEC. LINE
- PROPOSED ELEC. LINE
- SS# SELECTOR SWITCH
- EMH ELECTRICAL MANHOLE

GENERAL NOTES:

1. SEE TABLES ES-1 AND ES-2 FOR BUILDING LIST.

FIGURE 7b - OPTION #1
FUTURE CONDITIONS UTILITY MAP - ELECTRICAL
12kV SYSTEM

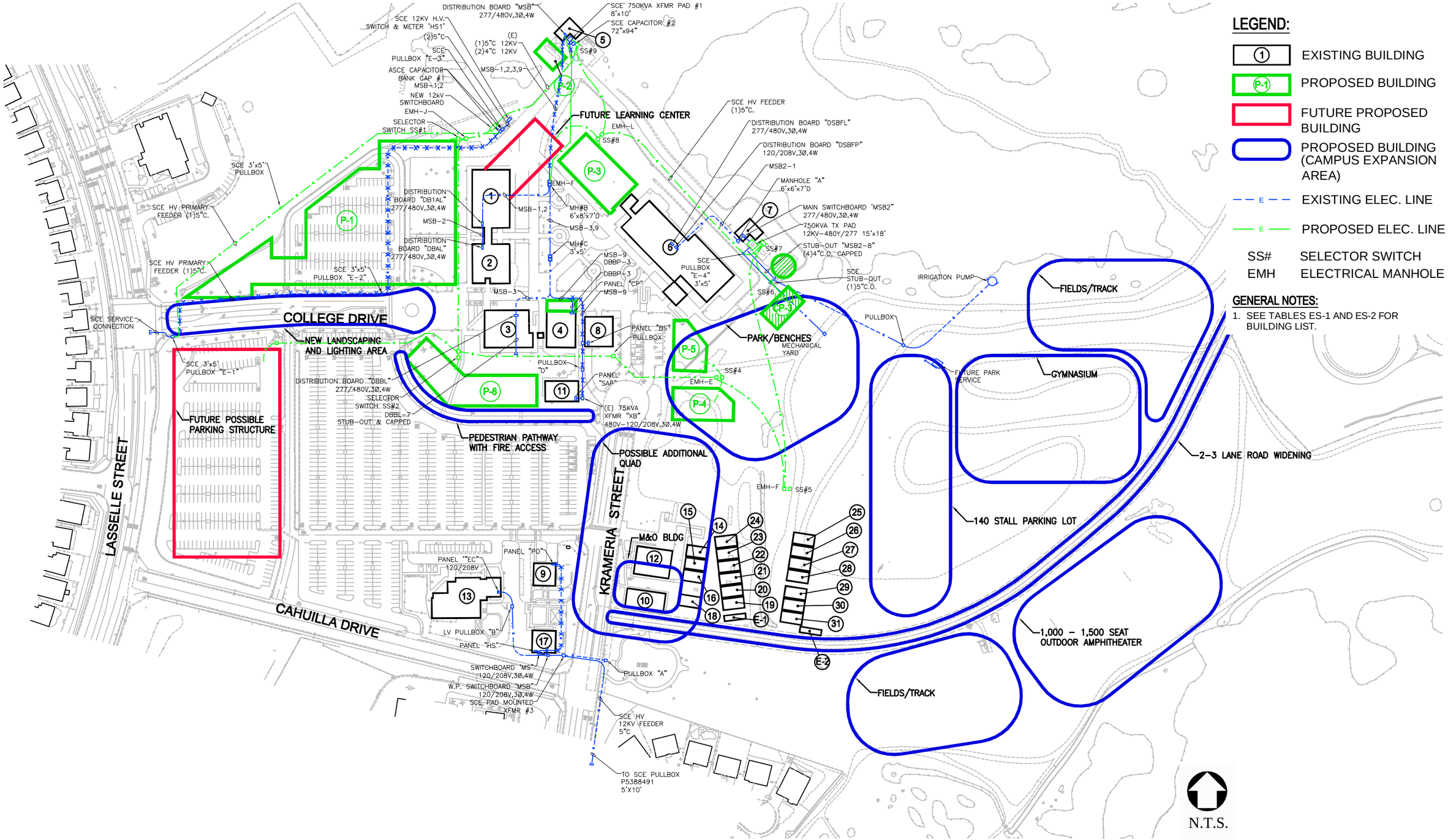


FIGURE 7b - OPTION #2
FUTURE CONDITIONS UTILITY MAP - ELECTRICAL
12kV SYSTEM & EXISTING 480V SYSTEM

LEGEND:

EXISTING ELEC. LINE

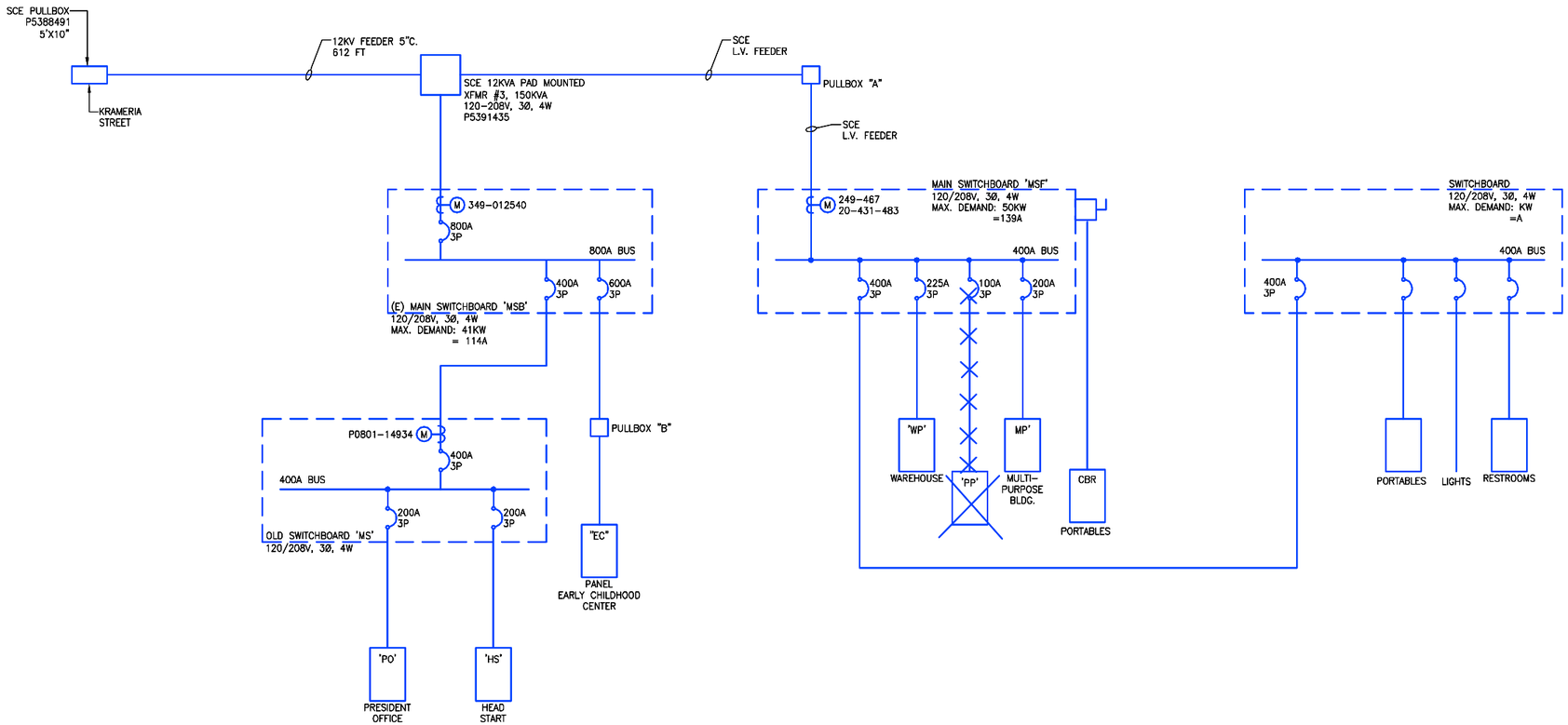


FIGURE 7c
EXISTING ELECTRICAL SYSTEM - SOUTH CAMPUS SINGLE LINE DIAGRAM

LEGEND:

EXISTING ELEC. LINE

PROPOSED ELEC. LINE

SS# SELECTOR SWITCH

EMH ELECTRICAL MANHOLE

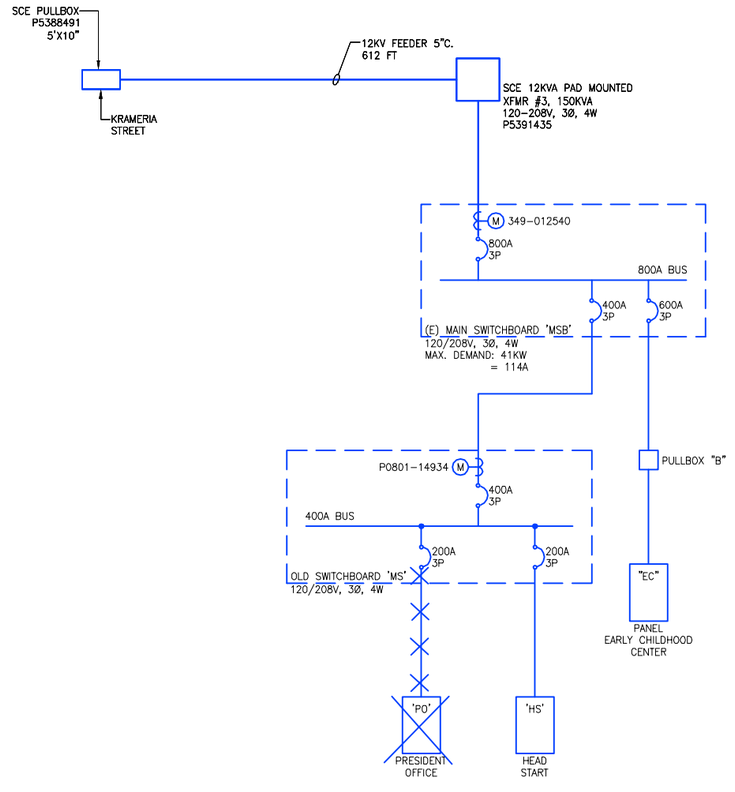


FIGURE 7d
PROPOSED ELECTRICAL SYSTEM - SOUTH CAMPUS SINGLE LINE DIAGRAM

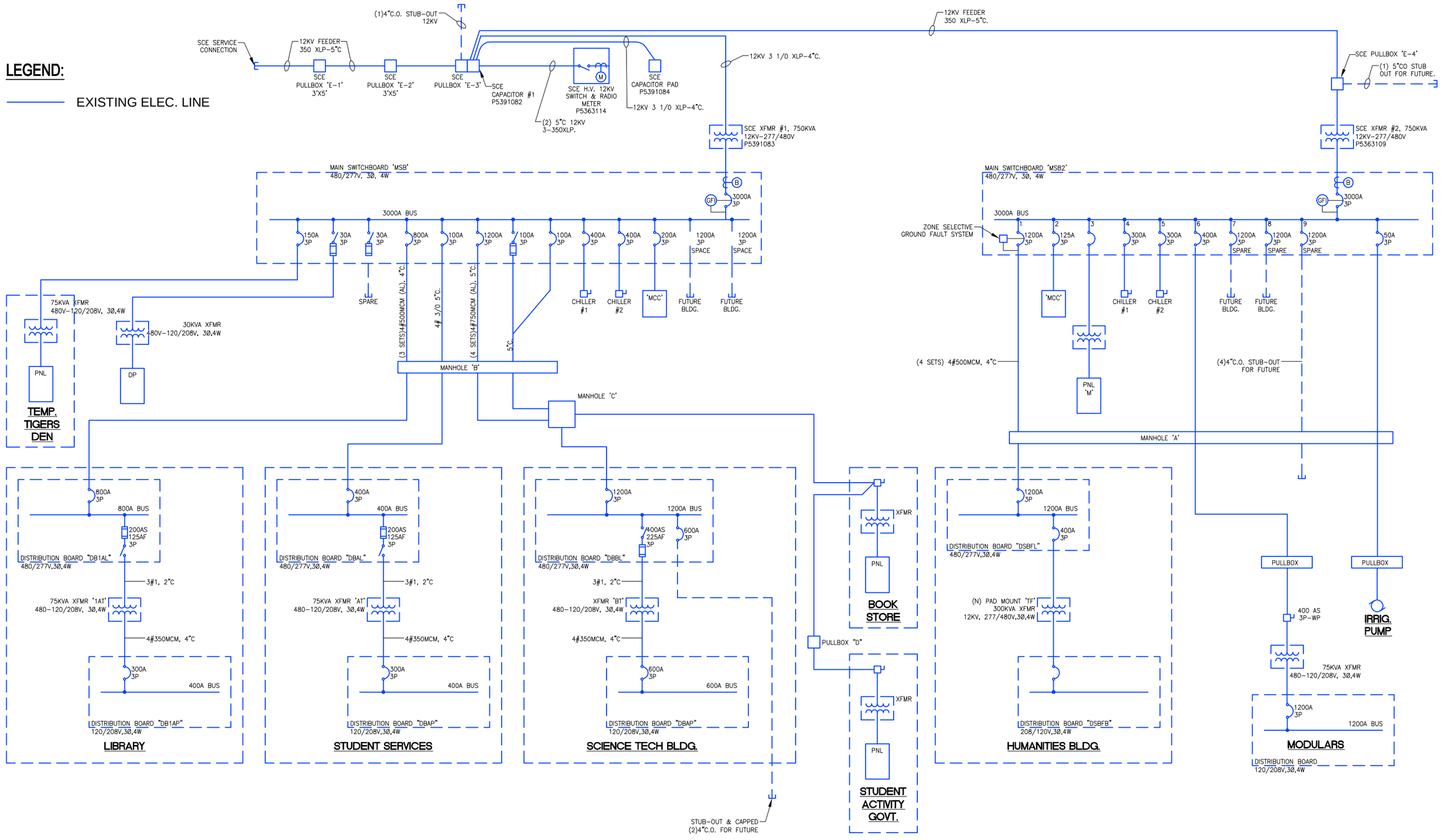


FIGURE 7e
EXISTING ELECTRICAL SYSTEM - NORTH CAMPUS SINGLE LINE DIAGRAM

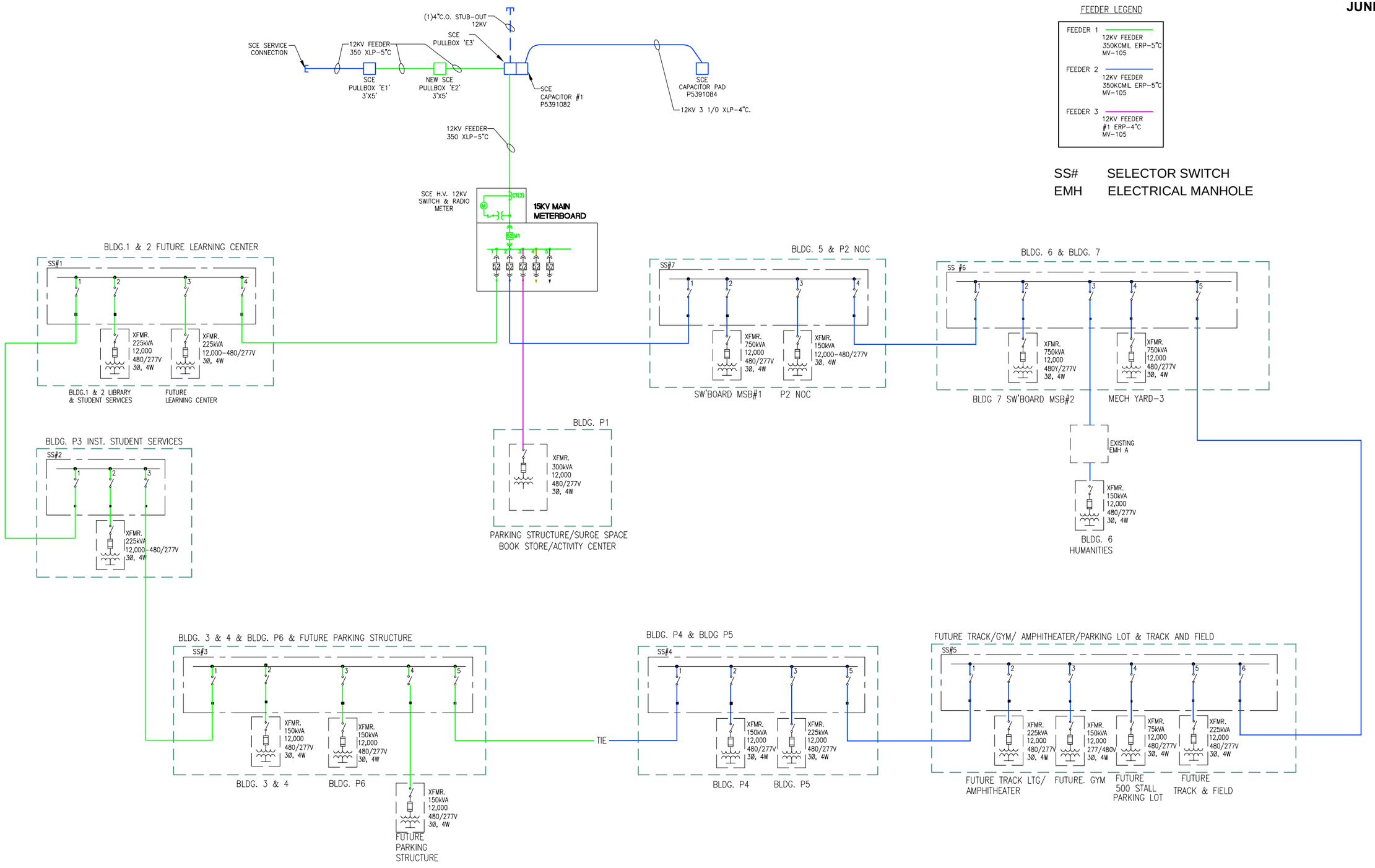


FIGURE 7f
PROPOSED ELECTRICAL SYSTEM - NORTH CAMPUS SINGLE LINE DIAGRAM
12KV SYSTEM ONLY OPTION-1

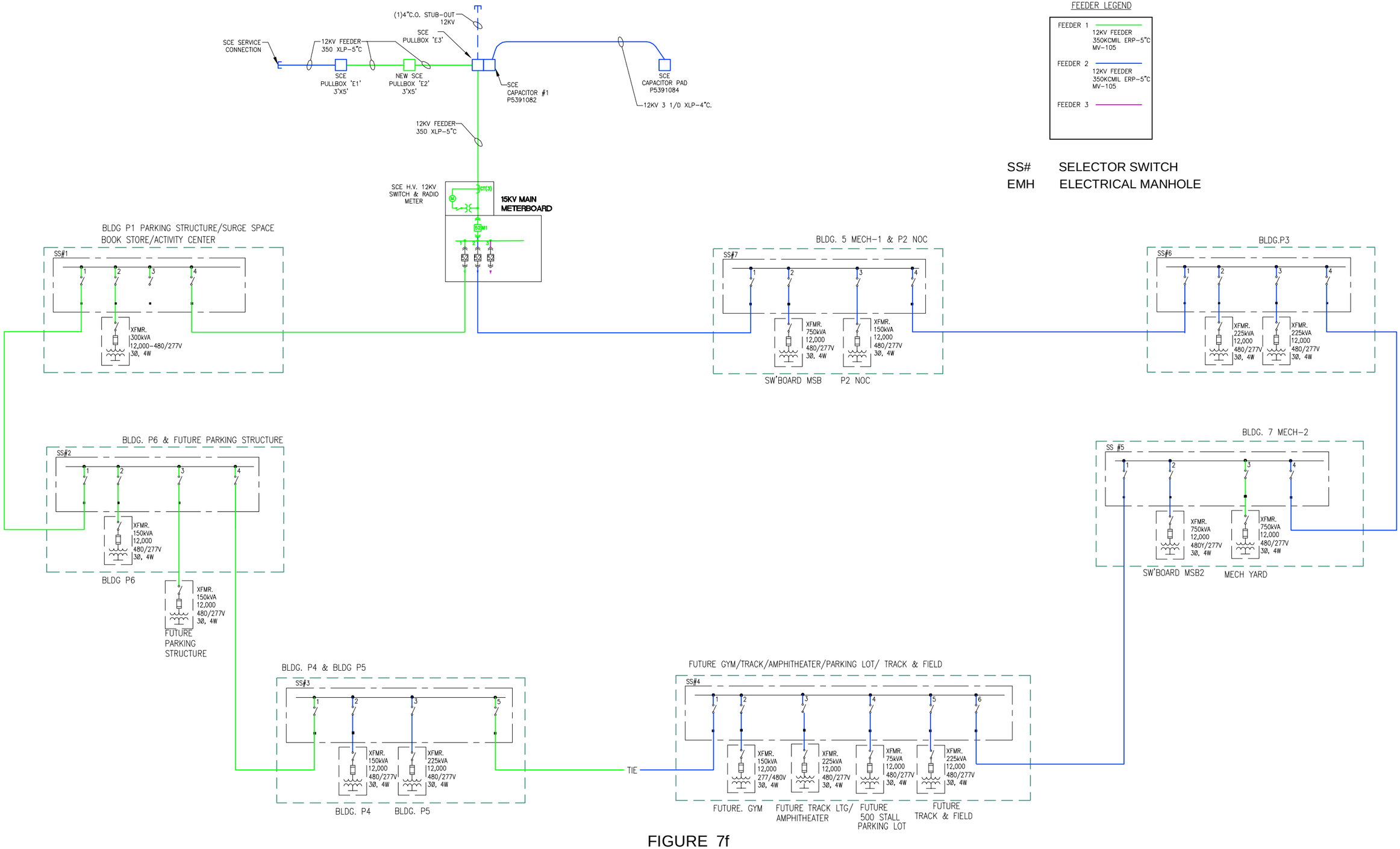


FIGURE 7f
PROPOSED ELECTRICAL SYSTEM - NORTH CAMPUS SINGLE LINE DIAGRAM
12KV AND 480 VOLT SYSTEM OPTION-2

SECTION 8 – TELECOMMUNICATIONS

8.1 SYSTEM DESCRIPTION

The local telecommunication services are currently provided by Verizon Corporation who is the Local Exchange Carrier (LEC) for the voice network. The (LEC) provides a 200 pair copper cable terminated on 4488 protector blocks. The Moreno Valley Community College voice network consists of a NEC 2400 PBX Voice Switch. The main distribution facility (MDF) is located in the Library Building #1.

The fiber optic service is provided by the Southern California Edison Company. The fiber optic cable is currently terminated in the Library Building #1 MDF room. A secondary fiber optic cable is provided by Sunesys from a telecommunication pole on the corner of Lasselle Street and Cahuilla Drive to the Head-Start Building BDF.

8.2 METHODOLOGY

The following methodology was adopted in formulating our utility infrastructure master plan.

A critical aspect in the evaluation of the existing telecommunications systems serving a facility is a detailed and accurate field investigation of the current systems. A detailed survey of the existing telecommunications system that currently serve the facilities at the Moreno Valley College campus and existing conditions, together with potential problems, are being identified. The surveyed information has been verified through available record drawings, field investigations and meetings with the campus facilities staff.

Alterations/upgrade/modifications necessary to support new buildings, major renovations and building retrofits that will form part of the proposed campus facilities were identified.

8.3 ANALYSIS OF EXISTING SYSTEMS

The existing MDF that serves the campus is in fair condition however, it will require major upgrading and expansion to meet the needs of the new proposed buildings and the modernization of any existing buildings.

The campus Networking Operating Center (NOC) is located on the roof of the Science and Technology Building #3. The current NOC is inadequate to meet the future needs of the campus and is to be replaced. Current design plans have the location of the new NOC at the north end of campus near the M1 Mechanical Building.

The existing inter-building telecommunication pathways are found to be adequate for most existing buildings located around the John M. Coudures Jr. Plaza.

The existing inter-building telecommunication pathways are found to be inadequate for the existing buildings at the south end of the campus. The following buildings are included; Book Store, Student Activities Center, PCS Warehouse, Parkside Complex Portables, PCS Multi-Purpose, Administration Annex (President and Vice President offices, Early Childhood Education Center and the Head -Start Building.

Two new communications manholes, CMH#5A Northwest of the Humanities Building and CMH#7 North of the PCS Portables, with (3) 4” conduits were added to serve the additional portables placed on the Parkside Complex. (3) 4” conduits also leave CMH#7 to Hand Hole #BB. CMH#5A may be in the construction site of proposed structure “P-3 Instruction and Student Services” detailed in the campus master plan. The proposed location of building “P-6” may be able to take advantage of the existing (6) 4” and (6) 2” conduits stubbed out from the south side of the existing Science Tech Building

The existing building BDF’s are inadequate and lack proper grounding, lighting, HVAC and Security Access.

In some buildings, the telecommunications equipment, cables and pathways are co-located with high voltage.

The Southern California Edison fiber optic cable is currently located in pull boxes that have high voltage present which should be separated..

The existing fiber optic cable backbone consists of traditional multi-mode 62.5mm and single-mode fiber optic cables. Some of the inter-building fiber optic cables are rated of intra-building use and not recommended for outside use.

8.4 ANALYSIS OF FUTURE NEEDS

To meet the changing needs of the campus, the existing campus Telecommunication Infrastructure System has been evaluated and will require upgrading as necessary to accommodate the plan expansion.

Replace much of the existing conduit system with a new telecommunication conduit system including manholes/pull boxes. This should be part of the electrical infrastructure upgrade that is required for campus distribution. This new infrastructure could be designed as one project and constructed in phases as the funding became available. The extent of the replacement needed would be dependent upon the final proposed locations of future buildings.

The best design for a campus network would be to link each building directly to the NOC in a Star Topology for the inter-building backbone. Another consideration for larger inter-building networks is a Hierarchical Star configuration. This allows for a small number of buildings to be connected to a centralized location that supports the area in a star topology with the centralized building linked directly to the NOC.

Provide new fiber optic cables from the new (NOC) to each building on campus. Recommend that the minimum fiber optic cables to be 24 strands single mode and 12 strands of 50um (OM3) multi-mode cable. Provide for new copper cable for all buildings on the campus. Copper cable to be sized 1 pair for each voice outlet.

8.5 FINDINGS AND RECOMMENDATIONS

Adopt Telecommunication Infrastructure Design Standards. The Telecommunication Infrastructure Design Standards document is intended to provide the Architect, Electrical Engineer, HVAC Consultant, Civil Consultant and Telecommunication Consultant with the basic requirements and standards for network cabling infrastructure in a new or remodeled facility.

Replace existing conduit system, as needed based on locations of new proposed structures in master plan, with a new telecommunication conduit system including manholes/pull boxes. This should be part of the electrical infrastructure upgrade that is required for campus distribution. This new infrastructure could be designed as one project and constructed in phases as the funding became available.

The new NOC should not utilize the existing conduit pathways to connect to the Local Exchange Carriers for the main campus copper and fiber feed. The new proposed “P1 Parking Structure” may disrupt the existing Verizon and Edison conduit structure which houses the main copper and fiber optic feed to the campus. A new dedicated pathway should be implemented to combine the Verizon copper and Edison fiber optic cables to run north east along the service road on the edge of campus to the new proposed NOC location.

The secondary fiber line from Sunesys should also feed the new NOC as a secondary fiber feed for the campus if possible.

The existing (12) 4” conduits that stub out from CMH#5 just past the Humanities Building should be tested for usability by pulling a mandrel through the conduits to see if any of the conduits may be used to help feed the south end of the campus.

It is recommended that the location of the proposed Future Learning Center be adjusted so as not to disrupt the existing main communications feed of (12) 4” and (2) 3” conduits that will feed the entire campus from the new NOC.

It is recommended that the location of the new proposed Instruction and Student Services Building P-3 be adjusted so as not to interfere with existing communication manholes #5 and #5A.

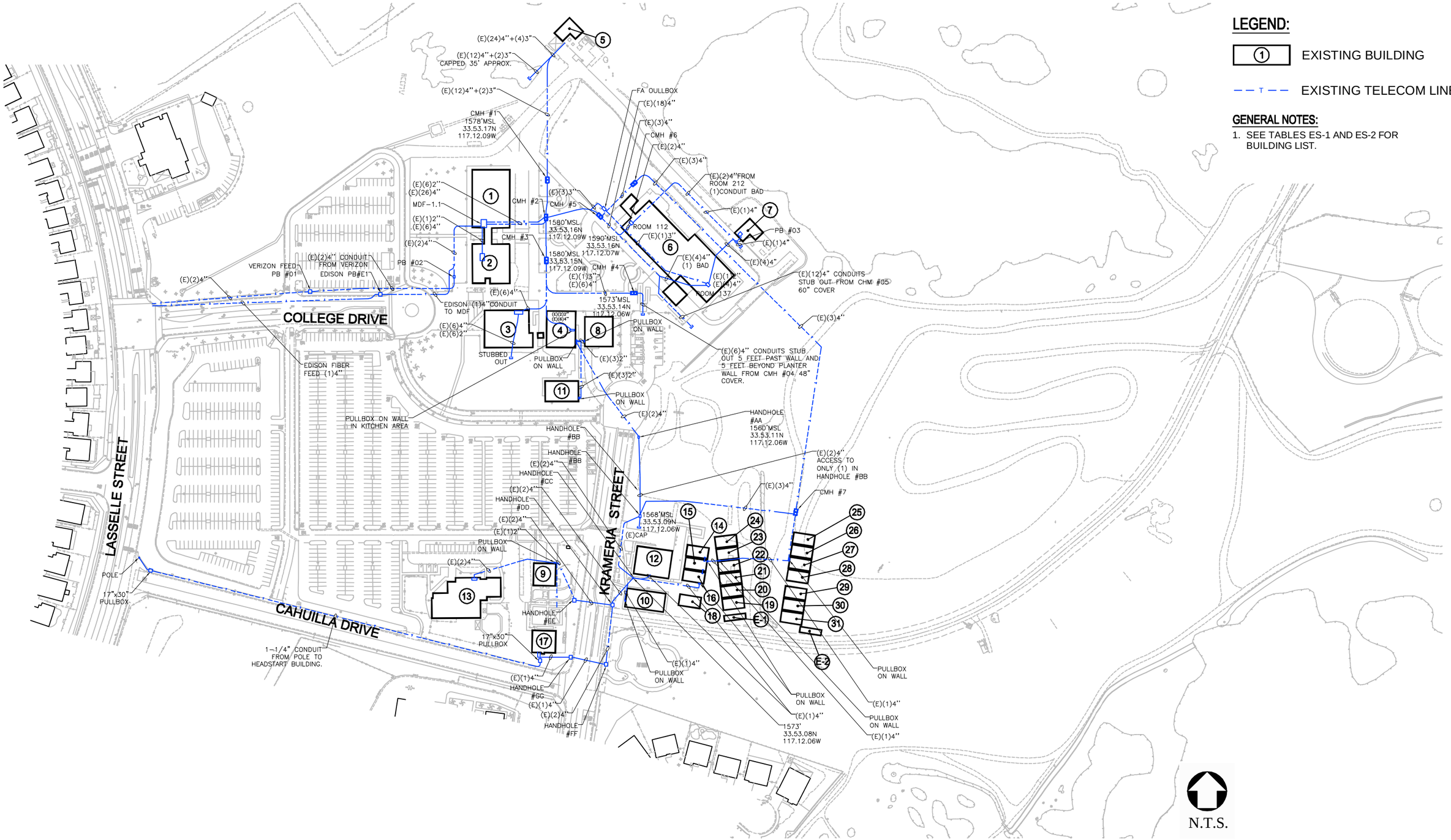


FIGURE 8a
EXISTING UTILITY MAP - TELECOMMUNICATIONS

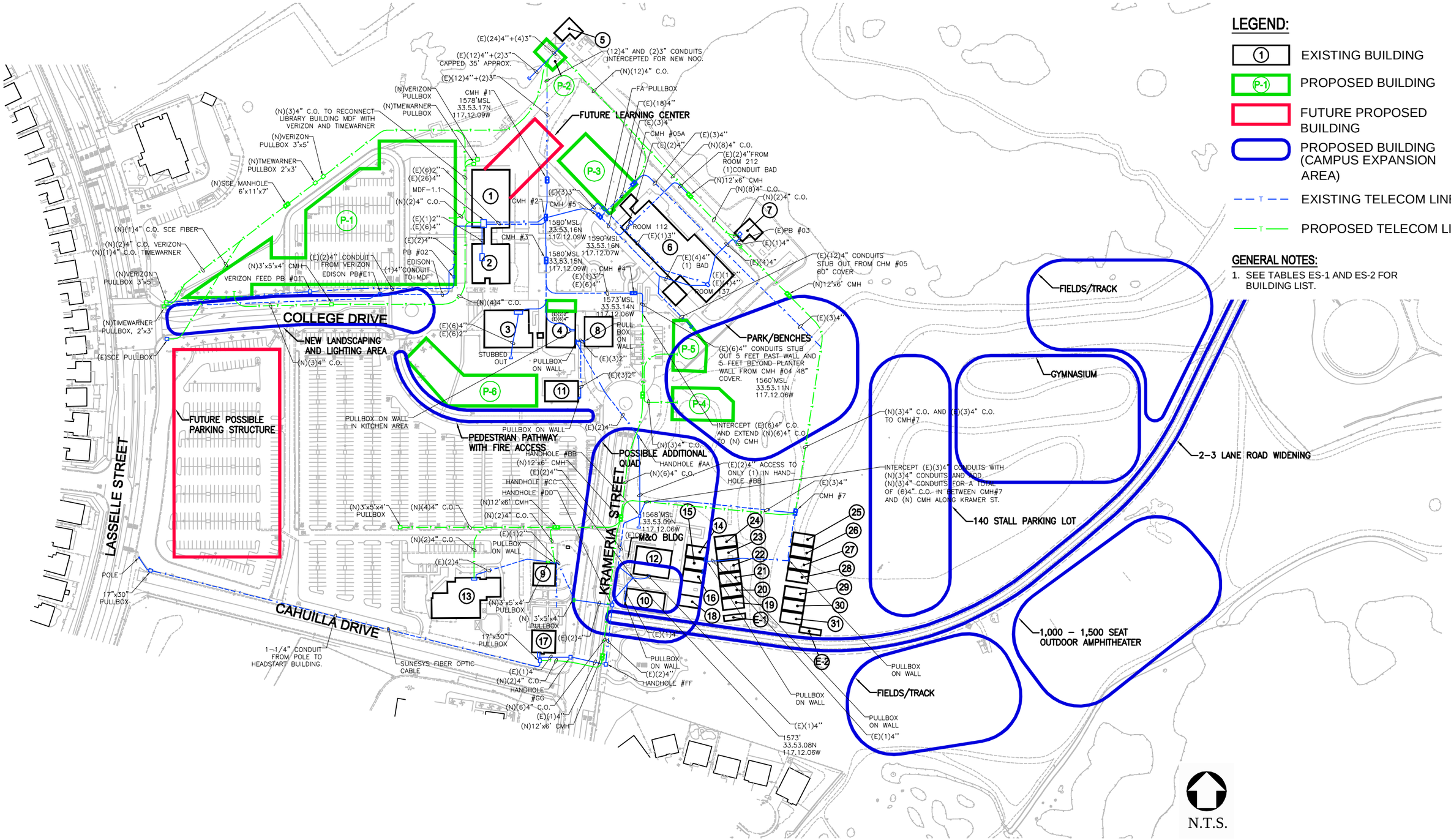


FIGURE 8b
FUTURE CONDITIONS UTILITY MAP - TELECOMMUNICATIONS

SECTION 9 – CENTRAL PLANTS

9.1 SYSTEM DESCRIPTION

The campus has two central cooling plants. The first plant was built to serve the Library, Student Services, Science and Technology, and the Tiger's Den. The second plant was built to serve the Humanities building.

Each plant has two air cooled chillers. The first plant has two 130 ton Trane air cooled chillers. The chillers and pumps use a high flow rate and energy inefficient distribution scheme. The second plant uses the same approach. It has two 110 ton Carrier air-cooled chillers. Distribution piping carries chilled water to each of buildings in that phase of construction.

The Moreno valley campus was built in 2 phases with a third phase planned next to the Humanities building. In addition to the chilled water system cooling, the campus has some small split systems for telecom room cooling and local packaged systems for some buildings.

The east part of the campus is independent of the centralized campus chilled water systems. There is the modular faculty offices, the warehouse, the multipurpose building, the administration annex, the early childhood Center, and several relocatable classrooms to the north. All of these buildings have split systems, wall hung units or rooftop packed units.

Our report will provide an analysis of the future requirements and outline recommended solutions once the master plan is updated.

9.2 METHODOLOGY

P2S has been charged with evaluating the existing cooling generation and distribution system. Our review of the current systems and the proposed new facilities will allow us to make cost-effective and specific recommendations to alter, upgrade, or modify the existing mechanical infrastructure to support the current and new proposed master plan buildings that form part of the proposed campus Facilities Master Plan. Our recommendations are based on the campus master plan being constructed over the next few phases of construction.

9.3 ANALYSIS OF EXISTING LOADS

Mechanical Bldg 1

The East campus is served by two 140 ton air cooled chillers located at building F1. F1 also houses two 1 million BTU Raypak boilers for providing the heating hot water requirements. Eight inch chilled water supply and return pipes are shown leaving the central plant. The heating hot water loop has 4" mains.

The Library Building is served by 4" chilled water pipes and 2" heating hot water pipes. .

The Student Sevices Building is served by 3" chilled water pipes and 1-1/2" heating hot water pipes. .

The Science and Technology Building is served by 3" chilled water pipes and 2" heating hot water pipes. .

The Tigers Den is served by 2-1/2" chilled water pipes and 1" heating hot water pipes. This building is planned to be demo'd in the future.

Mechanical Bldg 2

The Humanities Building is served by 4" chilled water pipes and a 2-1/2" heating hot water pipes.

9.4 ANALYSIS OF FUTURE LOADS

Cooling

The campus has plans for 5 new classroom buildings and a gymnasium. The peak cooling load for the new classroom buildings will increase by 472 tons. The gym may require another 100 tons, depending on seating capacity. It is assumed that all new buildings will be connected to the central cooling system.

The total peak cooling capacity for all remaining buildings and the proposed new buildings will increase to about 765 tons. This includes the existing chilled water loads of 292 tons for the buildings that will remain.

Heating

The peak heating load will increase by 2,650 mbh. It is assumed that all new buildings will have stand alone heating water systems at each building.

The existing buildings that are connected to the central heating systems will remain connected to those heating systems. The current peak heating load is 1,975 mbh. The total connected load of all heating water systems then will be 4,625 mbh.

9.5 RECOMMENDATIONS

Cooling

For energy efficiency reasons an evaporative cooled chilled water plant is proposed. A comparison of full load and part load efficiencies is noted in section 5 for current state of the art chillers.

For maximum energy savings, peak demand reduction and reduced carbon footprint a Chilled Water Thermal Energy Storage (TES) tank is proposed on the hilltop overlooking the campus. This tank might also be useful for firefighting needs

Piping systems from both central plant buildings are set up for constant flow and so they are not energy efficient. The chilled water valves were recently replaced with two way valves to increase the efficiency of the pumping system, but the chillers lack isolation valves and the pumps lack VFD's to take full advantage of this retrofit. Install VFD's and isolation valves.

Install new piping as shown on future piping drawing in advance of new buildings.

The buildings are served by 4 pipe fan coils and are design for approximately 10°F differential on the chilled water supply temperatures. For a campus environment this is a very low differential and leads to large pipe sizes and large pumping requirements compared to a larger temperature differential design.

All new buildings should be served by air-handlers with heating water and chilled water coils.

Provide chilled water temperature reset to raise chilled water supply temperature as cooling loads reduce based on outside air temperature. Higher supply temperature will allow the thermal storage to last longer at lower loads.

All buildings should have BTU metering capabilities and tie into a Central DDC system with robust energy management capabilities. Retrofit existing buildings served by central plants with BTU monitoring capabilities.

Heating

It is recommended to localize the generation of heating hot water rather than grouping it all in one central location. Current SCAQMD regulations limit economical boiler sizing to less than 2.0 million BTU per boiler.

Existing centralized heating water plants should remain as is. Return water to the boilers should be kept as low as possible. This will improve overall thermal efficiency.

Provide supply water temperature reset to lower discharge temperature as heating loads reduce with increased outside air temperature.

SECTION 10 – NATURAL GAS SYSTEM

10.1 SYSTEM DESCRIPTION

Background and Scope

Moreno Valley Campus, one of three colleges within the Riverside Community College District, is a two-year public community college situated in the suburban community of Moreno Valley, California. The campus was built in two phases with the majority of the buildings being built in phase one and a third phase planned next to the Humanities building. The North side of the campus consists of nine buildings. They are the Library, Student Services, Science/Technology, Tigers Den, Humanities, Bookstore, Student Activities and two Central Plants (Mech. 1 & 2). The South side of the campus consists of the Administrative Annex, Multi-Purpose, Warehouse, Early Child Education Center, Headstart and Portable/Modular buildings.

Objective

Natural Gas System master plan consists of evaluating the existing flow capacity available at the meters, the impact of the proposed facilities on the capacity of existing gas distribution system, identifying the required modifications/upgrades to the existing gas distribution system to support the future build out of the campus and to analyze the existing supply distribution for buried gas lines that will be in conflict with the proposed facilities that will require relocation.

10.2 METHODOLOGY

The following methodology was adopted in formulating our Natural Gas utility infrastructure master plan. The methodology presented below outlines the critical tasks that were performed in development of this master plan report.

- A critical aspect in the evaluation of the existing Natural Gas system serving a facility is a detailed and accurate field investigation of the current system. Meetings and discussions with the campus helped gather existing information and any potential problems faced with the system. A detailed survey of the existing Gas system that currently serve the facilities at the Moreno Valley campus was undertaken, and existing conditions, together with potential problems, were identified. The surveyed information was verified through available record drawings and meetings with the campus facilities staff.

- A load flow study of the existing and future loads was developed and existing and proposed capacity requirements were developed. A BTUH/sq.ft. of proposed and existing facilities was assumed in our load studies. For some existing buildings where this information was available, existing installed capacities of the gas fired equipment were taken to estimate the total loads.
- The Natural Gas system was then evaluated for capacity, functionality, reliability, ease of maintenance, age, and its ability to serve the present and future needs of the campus

- Alterations/upgrade/modifications necessary to support new buildings, major renovations, and building retrofits that form part of the proposed campus facilities master plan were identified.

- Recommendations were developed to support new buildings, major renovations, and building retrofits that form part of the proposed campus facilities master plan were identified.
- Costs associated with each of the required utility upgrades were developed and the most cost effective solution was recommended.

10.3 ANALYSIS OF EXISTING SYSTEM

The Moreno Valley Campus is currently served from a single gas meter located on the north-west side of the M1 Central Plant building which serves the M2 central plant, Humanities and Science Tech. buildings. The meter is fed through a 4-inch gas company line deriving its service from a 4-inch high pressure gas main running along Lasselle Street.

Majority of the Campus underground gas infrastructure was installed in the late 1980's and is in good standing condition. Natural Gas service is derived from Southern California Gas Company's high pressure system. The distribution system throughout the campus has undergone several modifications over the years to accommodate campus expansions, renovations and additions such as the addition of the M2 Central Plant and the Humanities building. Gas mains are believed to be plastic pipe and range from 3/4-inch to 4-inches in diameter.

Natural Gas downstream of the meters are distributed at medium pressure at approximately 5 psig throughout the campus. The medium-pressure gas is reduced to low-pressure gas at building connections via gas pressure regulators installed either above grade or in underground vaults. The low-pressure gas is then piped to serve hot water boilers that serve for Space Heating and water heaters that serve for domestic hot water needs to plumbing fixtures. Natural gas is used for domestic water heating and industrial hot water.

The total estimated gas load demand for the existing system (Heating and Domestic) is approximately 8,865 MBH (thousand BTU's per hour). At 1,000 BTU per cubic-foot-per-hour (CFH) natural gas conversion factor, the required gas flow demand is 8,865 CFH.

Figure 10a – Existing Utility Map – Natural Gas shows the existing natural gas distribution piping system throughout the campus.

Table 10-1 provides approximate Heating and Domestic connected load demands based on building square footage in absence of metered data in each building.

TABLE 10-1: EXISTING GAS DEMAND LOADS

Bldg. No.	Building Name	Occupancy Type	Area (Sq. Ft.)	Heating Load Factor (BTUH/sq.ft.)	Estimated Heating Load (CFH)	Estimated Domestic Load (CFH)	Total Gas Load (CFH)
01	Library	Library	24,369	30	*No gas service to this building*		
02	Student Services	Office	16,218	30	*No gas service to this building*		
03	Science/Technology	Classroom/Lab	14,888	35	550	275	825
04	Tiger Den/Expansion	Dining/Retail	2,429	20	*No gas service to this building*		
05	Mechanical 1 - Central Plant	Industrial	1,569	N/A	*2,100 (2) boilers @ 1,050 CFH ea.	-	2,100
06	Humanities	Classroom	53,190	35	1,960	980	2,940
07	Mechanical 2 - Central Plant	Industrial	1,569	N/A	*3,000 (2) boilers @ 1,500 CFH ea.	-	3,000
08	Bookstore (Swing Space)	Retail	3,600	20	*No gas service to this building*		
09	Administrative Annex	Office	2,283	30	*No gas service to this building*		
10	Multi-Purpose	Public Gathering	3,360	40	*No gas service to this building*		
11	Student Activities Center	Public Gathering	2,880	40	*No gas service to this building*		
12	Warehouse	Warehouse	4,500	20	*No gas service to this building*		
13	Early Child Education Ctr.	Classroom	8,235	35	*No gas service to this building*		
14	Portable-PSC 1	Office	960	30	*No gas service to this building*		
15	Portable-PSC 2	Office	960	30	*No gas service to this building*		
16	Portable-PSC 3	Classroom	960	35	*No gas service to this building*		
17	Head Start	Classroom	2,400	35	*No gas service to this building*		
18-31	Portables PSC-4 thru PSC-18	Classroom	-	35	*No gas service to this building*		
E-1	Portable PSC-5	Classroom	555	35	*No gas service to this building*		
E-2	Portable PSC-19	Classroom	555	35	*No gas service to this building*		
	TOTALS						**8,865**

Indicated loads are estimated (based on square footage)

** Indicates Actual load (based on recent as-built drawings or field verification of Installed equipment)*

***Indicates Anticipated load (based on anticipated Installed gas fired equipment)*

10.4 ANALYSIS OF FUTURE NEEDS

An analysis of the current Natural Gas system was conducted to evaluate a) existing flow capacity available at the meters b) the impact of the proposed facilities on the capacity of existing gas distribution system and c) modifications/upgrades required to the existing gas distribution system to support the future build out of the campus. The current gas distribution was also analyzed for buried gas lines that will be in conflict with the proposed facilities and will require relocation. A campus site plan identifying piping that require demolition/relocation and extension of service lines to new facilities to serve the planned facilities is provided in our proposed gas site plan.

An evaluation of the facilities planned as part of the Utility Program master plan revealed that a net additional 510,824 square feet of buildings/spaces are planned at the campus. A review of these proposed facilities and their usage revealed that the campus would add an additional combined load of 8,185 CFH to the existing metered system.

Figure 10b – Future Conditions Utility Map – Natural Gas shows the proposed natural gas distribution piping system throughout the campus.

Table 10-2 provides approximate Heating and Domestic load demands of the proposed facilities that are being added to the campus. The demands are calculated based on building square footage.

TABLE 10-2: FUTURE GAS DEMAND LOADS

Bldg. No.	Building Name	Occupancy Type	Projected Construction Completion Year	Area (Sq. Ft.)	Heating Load Factor (BTUH/sq.ft.)	Estimated Heating Load (CFH)	Estimated Domestic Load (CFH)	Total Gas Load (CFH)
P1	Parking Structure & Surge Space / Book Store / Activity Center	Parking	-	358,000	N/A	*No gas service to this building*		
P2	Data Center (NOC)	Office	-	4,700	30	*No gas service to this building*		
P3	Instruction & Student Services (Bldg. A)	Academic/Office	-	38,025	35	1,400	700	2,100
P4	Instruction (Bldg. B)	Academic	-	19,505	35	720	360	1,080
P5	Instruction (Bldg. C)	Academic	-	38,577	35	1,420	710	2,130
P6	Health Science Center	Academic	-	52,017	35	1,915	960	2,875
	TOTALS			510,824				**8,185**

Indicated loads are estimated (based on square footage)
*** Indicates Anticipated load (based on anticipated Installed gas fired equipment)*

10.5 FINDINGS AND RECCOMENDATIONS

An evaluation of the existing Natural Gas system was undertaken to study the modifications/upgrades required to support the future facilities planned at the campus. The study also evaluated the reliability and redundancy of the existing system.

Basis of the recommendations to upgrade the existing Natural Gas infrastructure at the campus are to (a) Improve system reliability (b) provide ease of maintenance and isolation of lines either during a failure or during a regular maintenance without interrupting gas supply to other buildings on campus and (c) to provide adequate capacity service lines to accommodate existing loads and planned future loads resulting from new buildings addition as well as additions to existing buildings.

A review of the load demands of the future facilities and current load demands with loads of the demolished buildings subtracted from the totals of the campus revealed that the existing main medium pressure distribution lines are adequately sized to meet the demands of existing and future facilities on the campus.

The following is a summary of additional recommendations for improvements to the existing natural gas system:

1. Earthquake valves for emergency gas supply shut-off should be provided at each meter location on the downstream side of the regulator. A Monitoring Switch is an option feature that is available enabling the valves open and closed position to be monitored remotely. The switch uses up to a 24-V AC or 24-VDC current, relays a 250-mA current indicating to the monitoring device whether the valve is in it open/closed position. The signal can be relayed through a signal cable to continuously notify a PLC, PC or alarm system of the valves position.
2. Meter #1: Replacement of existing meter with a higher capacity meter having a max CFH output of no less than 15,000 CFH is required. Southern California Gas Company shall provide this service.
3. Install new meter (#2) with a max. CFH output of no less than 15,000 CFH. This meter shall serve most of the proposed buildings and future campus expansions. Southern California Gas Company shall provide this service.
4. All buildings to be sub-metered to monitor gas consumption and get a clear understanding of the total gas energy being spent at each of the buildings. This will help the campus better manage their energy budget and thus the operating costs at the campus.
5. The use of proper digging equipment for trenching as it is well known that the campus has a granite base. The amount of time and the rental of proper equipment should be included in the base bid of any job at the Moreno Valley Campus where trenching is involved and not included in a change order as “discovery” after the fact.

Table 10-3 provides a description of the impact of work involved with the proposed locations of each building in relation to the existing campus Natural Gas system.

TABLE 10-3: DESCRIPTION OF IMPACT

Bldg. No.	Building Name	Gross Area (Sq. Ft.)	Description
P1	Parking Structure & Surge Space / Book Store / Activity Center	358,000	The proposed building interferes with an existing underground High Pressure city owned gas service line leading into the campus from Lasselle Street serving meter #1. Re-routing of such line will be required. The proposed building will not require gas service.
P2	Data Center (NOC)	4,700	The proposed building does not interfere with the existing underground gas service lines. The proposed building will not require gas service.
P3	Instruction & Student Services (Bldg. A)	38,025	The proposed building does not interfere with the existing underground gas service lines. A supply line shall extend to serve this building. This service will be extended from the existing system fed from Meter #1.
P4	Instruction (Bldg. B)	19,505	The proposed building does not interfere with the existing underground gas service lines. A supply line shall extend to serve this building. This service will be extended from the new system fed from Meter #2.
P5	Instruction (Bldg. C)	38,577	The proposed building does not interfere with the existing underground gas service lines. A supply line shall extend to serve this building. This service will be extended from the new system fed from Meter #2.
P6	Health Science Center	52,017	The proposed building does not interfere with the existing underground gas service lines. A supply line shall extend to serve this building. This service will be extended from the new system fed from Meter #2.

Table 10-4 below provides connected load demands of the existing, future facilities and facilities that are being demolished.

TABLE 10-4: EXISTING/FUTURE GAS DEMAND LOADS

METER 1 - Meter Upgrade		
Bldg. No.	**Building Name**	**Combined Gas Load Heating/Domestic (CFH)**
01	Library	-
02	Student Services	-
03	Science/Technology	825
04	Tiger Den/Expansion	-
05	Mechanical 1 - Central Plant	2,100
06	Humanities	2,940
07	Mechanical 2 - Central Plant	3,000
08	Bookstore (Swing Space)	0
09	Administrative Annex	0
10	Multi-Purpose	0
11	Student Activities Center	0
12	Warehouse	0
13	Early Child Education Ctr.	-
14	Portable-PSC 1	0
15	Portable-PSC 2	0
16	Portable-PSC 3	0
17	Head Start	-
18-31	Portables PSC-4 thru PSC-18	-
E-1	Portable PSC-5	0
E-2	Portable PSC-19	0
FUTURE		
P3	Instruction & Student Services (Bldg. A)	2,100
	TOTALS	**10,965**

METER 2 - New System		
Bldg. No.	**Building Name**	**Combined Gas Load Heating/Domestic (CFH)**
P4	Instruction (Bldg. B)	1,080
P5	Instruction (Bldg. C)	2,130
P6	Health Science Center	2,875
	Allowable Capacity for Future Expansions	8,000
	TOTALS	**14,085**

RED *Indicates buildings to be Demolished. Demand loads are not considered.*

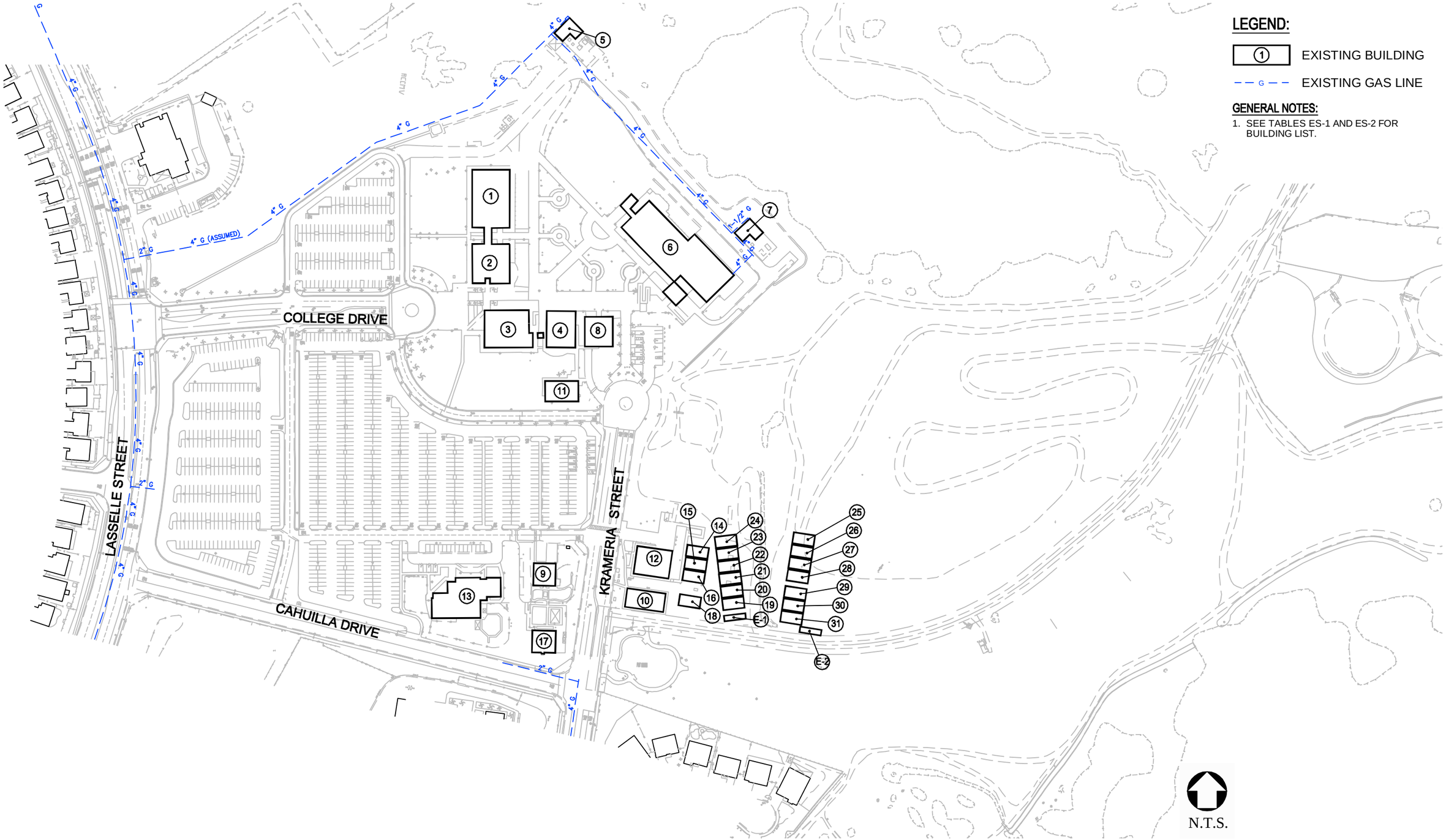
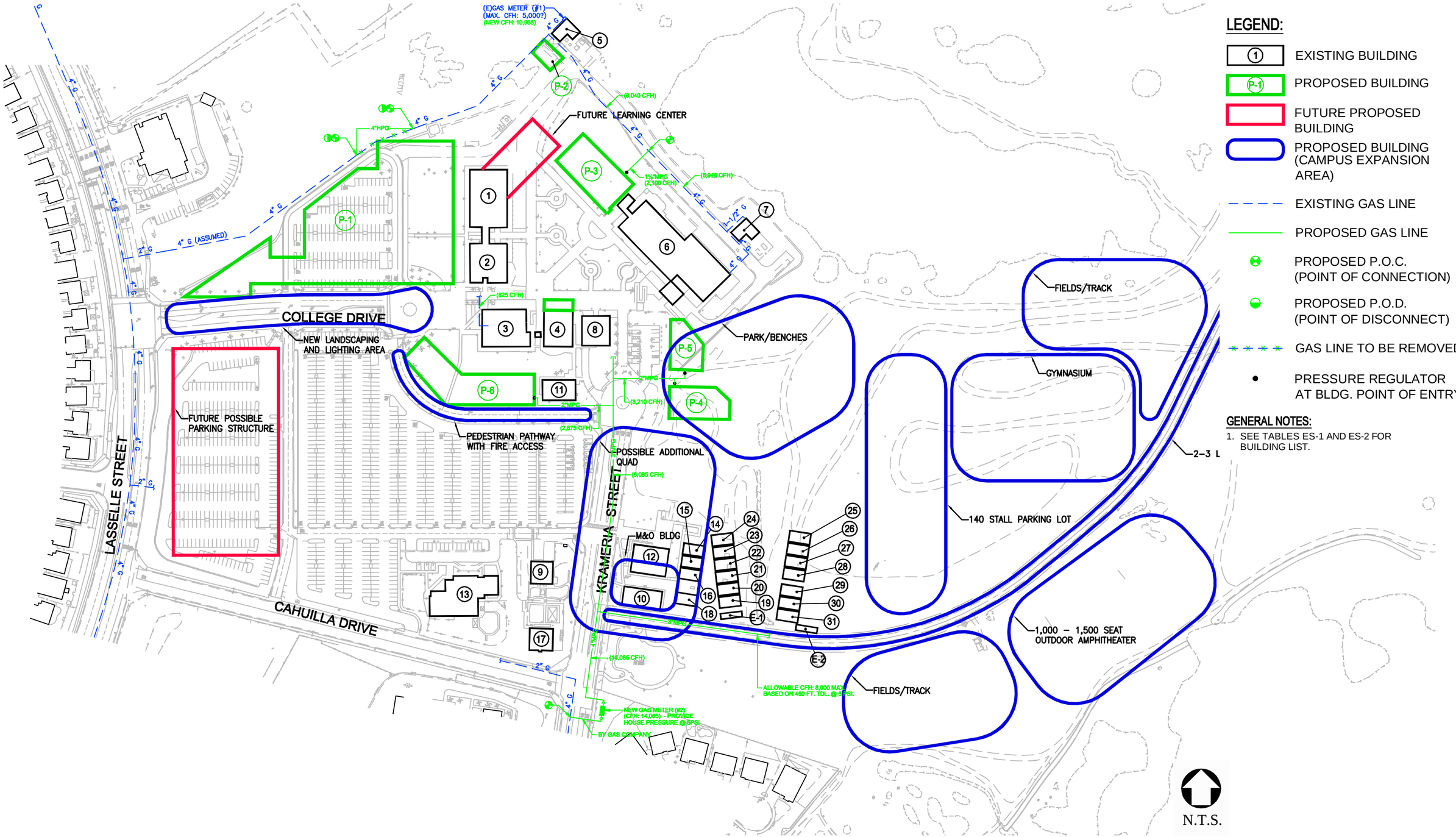


FIGURE 10a
EXISTING UTILITY MAP - NATURAL GAS



LEGEND:

- EXISTING BUILDING
- PROPOSED BUILDING
- FUTURE PROPOSED BUILDING
- PROPOSED BUILDING (CAMPUS EXPANSION AREA)
- EXISTING GAS LINE
- PROPOSED GAS LINE
- PROPOSED P.O.C. (POINT OF CONNECTION)
- PROPOSED P.O.D. (POINT OF DISCONNECT)
- GAS LINE TO BE REMOVED
- PRESSURE REGULATOR AT BLDG. POINT OF ENTRY

GENERAL NOTES:

1. SEE TABLES ES-1 AND ES-2 FOR BUILDING LIST.

FIGURE 10b
FUTURE CONDITIONS UTILITY MAP - NATURAL GAS

APPENDIX A

Workshop Notes, Meeting Minutes, and Campus Reviews and Annotated Drawings

Meeting Re: Riverside Community College District (RCCD) – LRDP Review

MEETING MINUTES

Mtg Date: September 3, 2009
Time: 8:30AM – 12:00 Noon
Location: RCCSO Building
Subject: RCCD Infrastructure – LRDP Review for each Campus
Project: Infrastructure Upgrade Projects

Attendees:

See Distribution below -
RCCD Representatives
Tilden-Coil Representative
PSOMAS Team

The purpose of the meeting was to discuss and review the current status of the existing Long Range Development Plans for each Campus. Topics discussed are described below:

TOPICS DISCUSSED	COMMENTS / ACTIONS REQUIRED
1. Overview of Infrastructure Projects Progress and Schedule.	a. An update overview of the Infrastructure project scope and schedule was discussed.
2. Master Plan Review of Each Campus **a. Moreno Valley Campus (MV)**	a. From RCCD: The MV Campus differs greatly from the 2007 MV - LRDP. The changes discussed were summarized on the Masterplan Mark-up (see attached.) Steinberg Architects can be contacted to obtain a progress print of latest Masterplan. b. From PSOMAS : a schematic Masterplan Working Exhibits will be prepared to reflect the target LRDP to be used for Infrastructure Review.
b. Norco Campus (NC)	a. From RCCD: The Norco Campus has minor changes and anticipated Phasing related to the Jan 2008 NC - LRDP. The changes were summarized on the redline

Meeting Re: Riverside Community College District (RCCD) – LRDP Review

TOPICS DISCUSSED	COMMENTS / ACTIONS REQUIRED
c. Riverside City Campus (RC)	Masterplan mark-up (see attached.) Also, a secondary access outlet to Mountain Ave. will be needed prior to buildout of the LRDP. b. From PSOMAS : a schematic Masterplan Working Exhibits will be prepared to reflect the target LRDP to be used for Infrastructure Review. a. From RCCD: The City Campus has is consistent with the current March 2008 RC - LRDP. Minor alternatives were summarized on the Masterplan Mark-up (see attached.) b. From PSOMAS : The current Masterplan LRDP will used for Infrastructure Review.

Minutes Prepared: Bruce Kirby (PSOMAS) - September 11, 2009

The preceding minutes were prepared by Psomas and are interpretations of items discussed and decisions reached at the above referenced meeting. Any persons desiring to add or otherwise change the minutes, are asked to send their comments in writing to Vicky Cabangbang (Vicky.cabangbang@psomas.com) no later than one week following the date minutes were prepared; otherwise the minutes will stand as written.

DISTRIBUTION / Attendees :
Orin Williams, RCCD
Bart Doering, RCCD
Calvin Belcher, RCCD
Rick Hernandez, RCCD
Reagan Romali, RCCD MV
Dr. Gaither Loewenstein, RCCD NC
Norm Godin, RCCD RC
Jason Howarth, Tilden-Coil
Steve Bastian, P2S (Mech)
Ed Burtch, P2S (Elect)
Bill Leming, P2S (Tele)
Bruce Kirby PSOMAS (S/W/SD)
Jeff Chess, PSOMAS

ATTACHMENTs:
- Sign-In Sheet
- Meeting Agenda
- (3) Masterplan Mark-up (one for each Campus)

9/3/2009 - RCCD WORKSHOP - LRFMP's

Bill Laming	PSOMAS	562-497-2999
CALVIN J. BELCHER	RCCD	951-453-5188
JEFF CHESS	PSOMAS	2135223491
BRUCE KIRBY	PSOMAS	951-300-2827
GAITHER LOEWENSTEIN	RCC-NORCO	951-372-7199
JASON HOWARTH	TRDEN-COEL	951-684-5901
BART DOERING	RCCD	951-201-2779
Steve Bastian	P2S	562-497-2999
ED BURTCH	P2S EHG	562-497-2999

PSOMAS

Balancing the Natural and Built Environment

Meeting Agenda

Date / Time : **September 3, 2009 - 8AM-12Noon**

Type of Meeting: **Development Plan Workshop - Validate LRFMP (Master Plan)**

Meeting Facilitator: **Jeff Chess - PSOMAS**

Invitees: **RCCD Representatives**

Items For Each Campus

I. Issues

a) **Progress Update / Schedule Review**

b) **Master Plan Review - as published**

- **2007 Moreno Valley Campus Long Range Educational & Facilities Masterplan (Jan 2008)**
- **Norco Campus Long Range Facilities Masterplan (Jan 2008)**
- **Riverside City College – Long Range Educational Masterplan (March 2008)**

c) **Identify All Build-out Facilities**

d) **Proposed Facilities – (Confirmation, Documented Changes, Pending Status)**

e) **Identify Known Phasing**

f) **Summarize any Impacts to Schedule**

g) **Next Steps**

II. Adjournment

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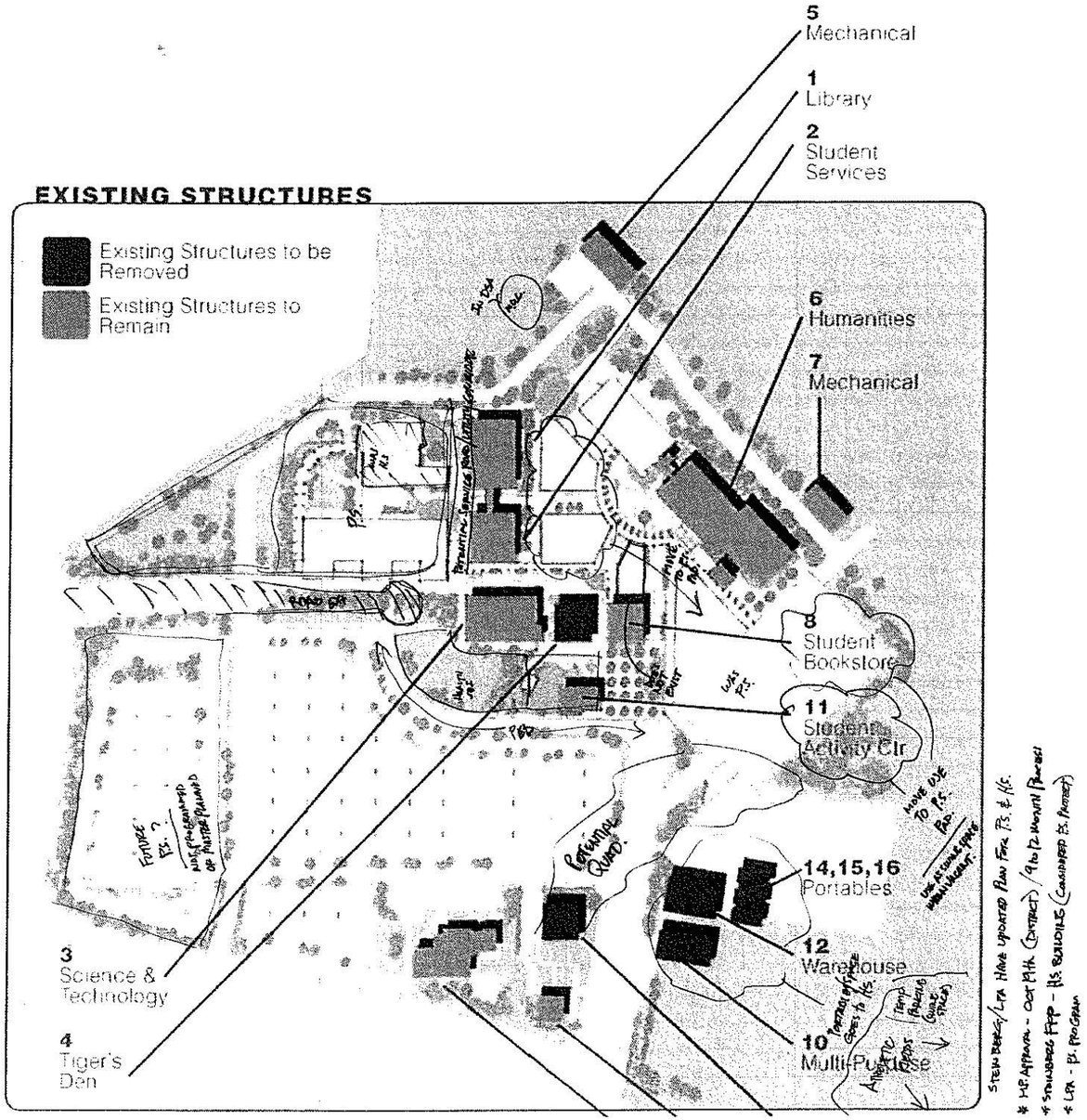
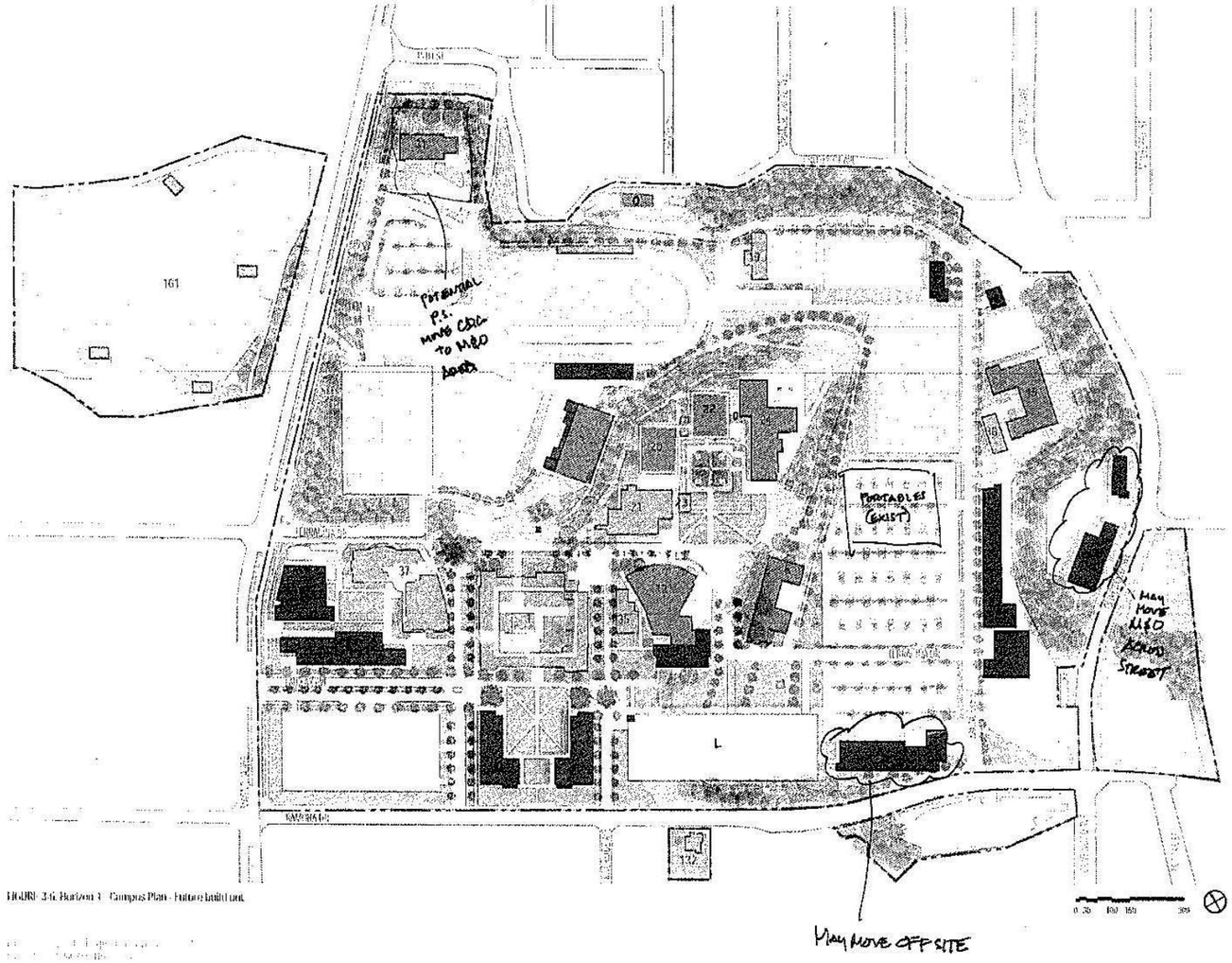
EXISTING STRUCTURES



HORIZON 1 - FACILITIES PLAN



NEW BUILDINGS

- A NURSING & SCIENCES 1
- B NURSING & SCIENCES 2
- C STADIUM
- D AQUATICS COMPLEX
- E ADMINISTRATION
- F STUDENT SERVICES
- G COSMETOLOGY
- H M&O SHIPPING
- I M&O OFFICES
- J APPLIED TECH CENTER
- K AUTO TECHNOLOGY
- L PARKING STRUCTURE
- M BAND BUILDING
- N MUSIC / LANDIS ADD
- O CAMPUS POLICE/SAFETY

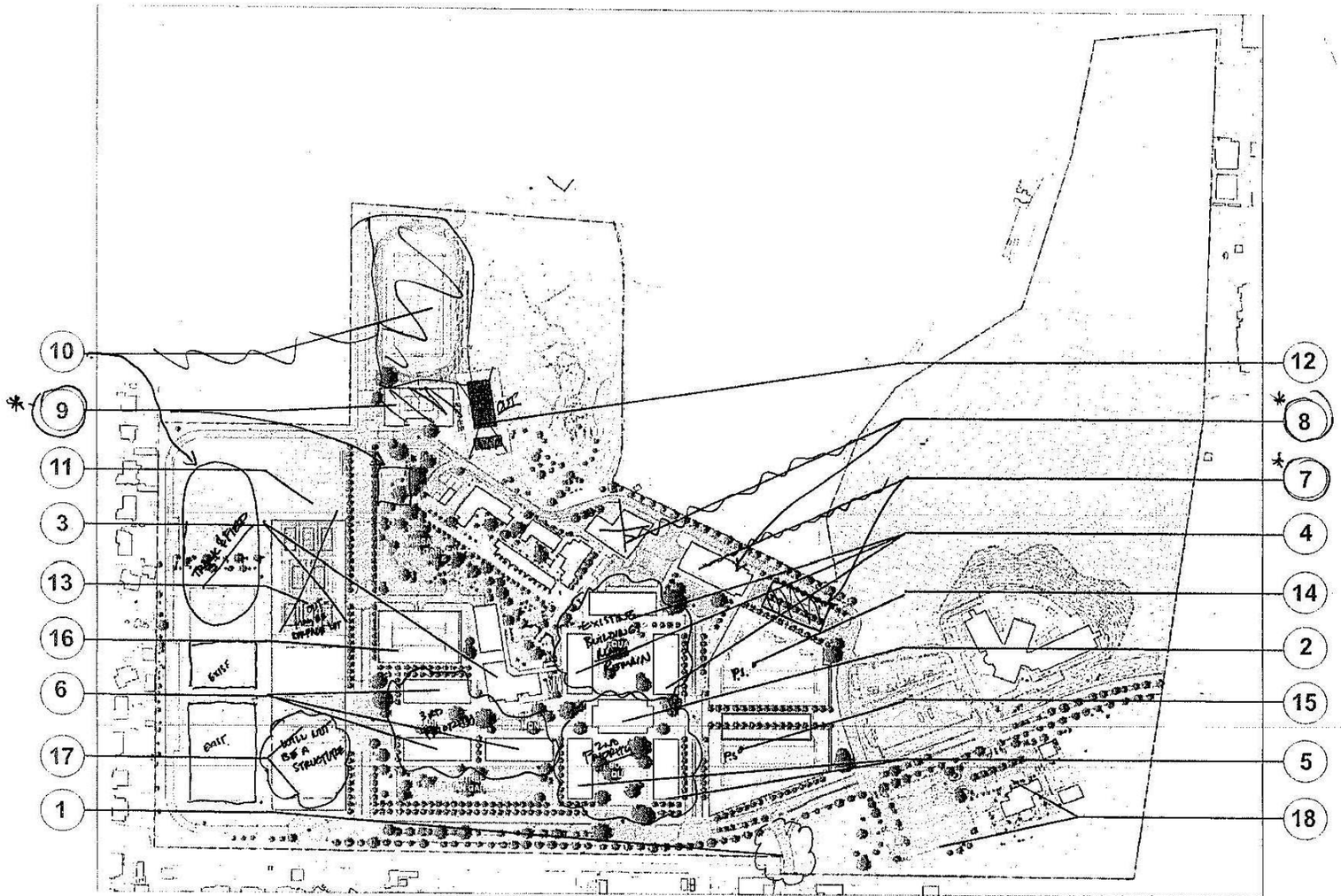
EXISTING BUILDINGS

- 1 QUADRANGLE
- 3 RENO - WHEELOCK
- 6 RENO - (N) ART & CERAMIC
- 12 RENO - LANDIS AUDITORIUM
- 15 RENO - HUNTLEY GYM
- 19 CUTTER POOL
- 20 RENO (N) CLASSROOM / II
- 21 MILK HIGH TECH CENTER
- 22 RENO - (N) BUSINESS ED.
- 23 PLANETARIUM
- 24 RENO - STUDENT CENTER
- 31 RENO - CHILD DEVELOPMENT
- 35 MUSIC HALL
- 36 PILATES
- 37 DIGITAL LIBRARY
- 132 ALUMNI HOUSE
- 161 EVANS SPORTS BUILDINGS

LEGEND

- EXISTING BUILDINGS
- NEW BUILDINGS
- RENOVATION

FIGURE 3-6: Horizon 1 - Campus Plan - Future Institution



The Norco Campus at 16,000 Students. *Simple two and three story rectangular classroom and lab buildings are arranged around simple rectangular quadrangles with grass and trees at the heart of campus. Athletics occupies the west side and northwest corner of campus and visual and performing arts the northeast corner of campus. Two and three level parking structures are situated close to the campus core on its east and west sides.*

* City Does not want Road - Require General Plan Amendment
- Until Limit Buildout *
- Considering Sat. Campus.

(9) Fit Done

MEETING MINUTES

Date: February 15, 2010 3:00 PM to 4:00 PM
Location: RCCD Building – Third Floor Conference Room
3845 Market Street
Riverside, CA 92501
Subject: RCCD – Infrastructure Utility Program Project
Project Coordination Meeting
Project: RCCD Infrastructure Utility Program Project
Project No: 1RCC020100

Attendees:

Bart L. Doering – RCCD
Calvin Belcher - RCCD
Jeff Chess – Psomas
Bruce Kirby – Psomas

Introduction:

This project meeting took place on February 11, 2010 at RCCD Office to discuss the remaining items required to complete the Utility Program Study. The following are the discussion items originating at the meeting.

TOPIC / *COMMENTS*

1. **REMAINING STEPS:**
   - A. **Confirmed (MV) Master Plan** - *RCCD Confirmed that the Master Plan (Future Buildings Exhibit) for the Moreno Valley (MV) that includes the Proposed Campus Expansion Areas (in blue) is complete.*
   - B. **MV Assumptions** – *Psomas agreed to provide a list of "general utility requirements and assumptions for each of the "blue" items identified on the Exhibit.*
   - C. **MV Assumptions Confirmation** – *RCCD agreed to review and confirm these general assumptions.*
   - D. **Confirmed (NC) Master Plan** - *RCCD Confirmed the Master Plan (Future Buildings Exhibit) for the Norco Campus (NC) is complete.*

PSOMAS 2010 Iowa Avenue, Suite 101 Riverside, CA 92507 951.787.8421 951.682.3379 Fax www.psomas.com

Meeting Re: Riverside Community College District (RCCD) Infrastructure Upgrade Project – 1RCC020100

- E. **Confirmed (RC) Master Plan** - *RCCD Confirmed the Master Plan (Future Buildings Exhibit) for the Riverside Campus (RC) is complete.*
- F. **Future Buildings Exhibits** - *Psomas agreed to use these Master Plan Exhibits for all (3) Campuses and then analyze and update the recommendations for each Utility on each Campus.*
- G. **Re-Issue DRAFT Utility Program Study** – *Psomas agreed to re-issue the Study for each Campus.*
- H. **Review DRAFT Utility Program Study** – *RCCD agreed to a review meeting for each Campus Study to confirm limits of proposed Utilities (prior to Cost Estimate.)*
- I. **Final DRAFT Utility Program Study** – *Psomas agreed to incorporate any comment and add Cost element to the Study and issue Final DRAFT*
- J. **District Infrastructure Budget**– *RCCD shared that the District has established an Infrastructure Budget of $6-7M (including soft costs) for all three Campuses. Psomas agreed with RCCD that by inspection this budget is deficient. Remaining Soft Cost will include Final Master Planning and Construction Documents.*
- K. **Prioritized Recommendations Summary** – *RCCD and Psomas agreed to a Meeting that will include Tildon-Coil, and review final costs and also provide a Prioritized List of Recommendations based upon available budgets, to be included in the final report.*
- L. **Presentation of FINAL Study** – *RCCD and Psomas agreed to meet with each Campus representative to present their Report along with our priority list. This list will be edited or confirmed by the Campus Representative(s).*
- M. **Issue FINAL Utility Program Study** – *Psomas agreed to issue Final FINAL Utility Program Study.*

2. **OTHER ITEMS:**
   - A. **Riverside Campus Sewer –** *Psomas to obtain location of recent sewer discovery at the Southwest corner of Campus related to the New Nursing Building.*
   - B. **Remaining Item Schedule** – *For efficiency, each Campus document will be updated on it's own schedule. Psomas to provide a Schedule to address the 'Remaining Items."*

Minutes Issued: February 18, 2009

The preceding minutes were prepared by Psomas and are interpretations of items discussed and decisions reached at the above referenced meeting. Any persons desiring to add or otherwise change the minutes, are asked to send their comments in writing to Bruce Kirby at Psomas (bruce.kirby @psomas.com) no later than one week following the date minutes were prepared; otherwise the minutes will stand as written.

DISTRIBUTION:

See attendees.: cc. Jason Howarth (Tildon-Coil)

ATTACHMENTS:

- Original Meeting Agenda
- Schedule for Remaining Items (to Follow)

MEETING MINUTES

Date: **March 1, 2010 4:00 PM to 5:00 PM**
Location: **RCCD Building – Third Floor Conference Room**
3845 Market Street
Riverside, CA 92501
Subject: **RCCD – Infrastructure Utility Program Project**
Project Coordination Meeting
Project: **RCCD Infrastructure Utility Program Project**
Project No: **1RCC020100**

Attendees:

Bart L. Doering – RCCD
Calvin Belcher - RCCD
Bruce Kirby – Psomas

Introduction:

This project meeting took place on March 1, 2010 at RCCD Office to discuss the remaining item required to complete the Utility Program Study. The following are the discussion items originating at the meeting.

TOPIC / *COMMENTS*

1. REMAINING STEPS:

A. **Confirmed (MV) Master Plan Assumptions** - *Psomas provided a list of "general utility requirements and assumptions for each of the "blue" items identified on the Exhibit. RCCD agreed with these assumptions (listed below.)*

B. **(MV) Assumptions :**

Per our meeting notes, here are the Assumptions for the Campus Expansion Areas (Blue items) on our Future Buildings Exhibit.

A. New Landscape and Lighting Area - electrical lighting, and irrigation needs only.

B. Pedestrian Pathway with Fire Access - electrical lighting needs for walkway lights, and irrigation (No sewer, fire water, tele, gas)

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Meeting Re: Riverside Community College District (RCCD) Infrastructure Upgrade Project – 1RCC020100

C. Park/ Benches - electrical lighting needs for walkway lights, and irrigation (No sewer, tele, gas)

D. Possible Quad Area - electrical lighting needs for walkway lights, and irrigation (No sewer, tele, gas)

E. 500 stall Parking Lot - electrical needs for parking lot lights, irrigation for islands, pavement drainage ,and emergency phones (No sewer, or gas)

F. (2-3) lane road widening - electrical roadway lighting, and re-alignment of backbone utilities to match new alignment (No sewer, tele, gas)

G. 1000-1500 seat Outdoor Amphitheater - outdoor concrete stepped amphitheater with minor 1,000 sf concession stand, one set of restrooms, event lighting, (sewer, water, gas, tele, and elect)

H. Gymnasium – Two basketball courts with bleachers on each side and includes concession stand, one set of restrooms, lighting, weight room, men & women locker rooms, coaches/ staff offices, equipment room, physical education classrooms. A 40,000 sf building is used. (sewer, water, gas, tele, and elect.)

I . Fields / Track (North) - Single 400 meter track with single football field. Include support bldgs such as one set of restrooms and minor 1,00 sf concession buildings. (sewer, water, gas, tele, and elect.)

J. Fields / Track (South) - Single baseball field. Include support bldgs such as one set restrooms and minor 1,000 sf concession buildings. (Sewer, water, gas, tele, and elect.)

These assumptions were confirmed for our purposes in establishing general scale demand calculations.

Minutes Issued: March 9, 2010

The preceding minutes were prepared by Psomas and are interpretations of items discussed and decisions reached at the above referenced meeting. Any persons desiring to add or otherwise change the minutes, are asked to send their comments in writing to Bruce Kirby at Psomas (bruce.kirby @psomas.com) no later than one week following the date minutes were prepared; otherwise the minutes will stand as written.

DISTRIBUTION:

See attendees.: cc. Jason Howarth (Tildon-Coil) : Ed Burch (P2S)

ATTACHMENTS:

None

MEETING MINUTES

Date: March 30, 2010 10:00 AM to 11:30 AM
Location: RCCD Building – Third Floor Conference Room
3845 Market Street
Riverside, CA 92501
Subject: RCCD – Infrastructure Utility Program Project
Review of City Campus DRAFT Study
Project: RCCD Infrastructure Utility Program Project
Project No: 1RCC020100

Attendees:
Bart Doering and Calvin Belcher – RCCD
Jason Howarth – Tilden / Coil - (Not Available)
Steve Bastian and Ed Burtch – P2S
Jeff Chess and Bruce Kirby – Psomas

Introduction:

This project meeting took place on March 30, 2010 at RCCD Office to review the DRAFT Utility Program Study for the City Campus. Also to discuss remaining steps required to complete the Utility Program Study fro all Campuses. The following are the discussion items originating at the meeting.

TOPIC / *COMMENTS*

1. Overview of Each Section - DRAFT Utility Program Study:

A. **Table of Contents / Executive Summary / "Wet" Civil Utilities (Swr/Wtr/SD) Sections** -

Psomas provided a description of each section in the report and received the following comments (below) from RCCD.

B. **Mechanical / Electrical / Plumbing Sections** -

P2S provided a description of each section in the report and received the following comments (below) from RCCD.

C. **General Comments to Study and Exhibits (applies to all sections) -**

RCCD provided input to the report which generated the following list to items:

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Meeting Re: Riverside Community College District (RCCD) Infrastructure Upgrade Project – 1RCC020100

- *Psomas to provide Minor updates to the Exhibit graphics in terms of bold / background / color / text height– for overall clarity of information.*
- *Psomas mentioned that FINAL Reports will be bound with hard covers with tabs at each section.*
- *Psomas to add Revision Box for each version of the Study through Final issuance.*
- *Psomas to prioritize the "Recommendation" sections for each utility.*
- *Psomas to provide DVD copy of Sewer Video to Bart (RCCD).*
- *Psomas to contact GKK and obtain current CD's for Nursing-Science Bldg (currently under constriction) and show as an existing feature.*
- *Psomas to contact Tilden-Coil to get current CD's for the Aquatic Center (currently under constriction) and show as an existing feature.*

2. Next Steps – to finalize DRAFT Utility Program Study:

A. **Checklist Summary** -

Psomas to compile all the Prioritized Recommendations from the Utility Study onto one Master Spreadsheet Checklist. This Checklist will be added as an Appendix to the Study and provided to the Campus Representatives for their review / approval / signature.

B. **Apply Costs** -

Once the Checklist is accepted, Psomas will apply costs to all the recommendations in the Study and add these as an Appendix to the Study.

C. **Schedule** -

Psomas will have the Updated City Campus Report (with Checklist) available 5/20 and will be ready to meet with the City College representative to get sign-off for the prioritization of recommendations.

Minutes Issued: April 5, 2010

The preceding minutes were prepared by Psomas and are interpretations of items discussed and decisions reached at the above referenced meeting. Any persons desiring to add or otherwise change the minutes, are asked to send their comments in writing to Bruce Kirby at Psomas (bruce.kirby @psomas.com) no later than one week following the date minutes were prepared; otherwise the minutes will stand as written.

DISTRIBUTION:

See attendees list

BLDG #	BUILDING NAME
1	LIBRARY
2	STUDENT SERVICES
3	SCIENCE/TECHNOLOGY
4	TIGERS DEN
5	MECHANICAL
6	HUMANITIES
7	MECHANICAL 2
8	BOOKSTORE
9	CALWORKS CHILDCARE
10	MULTI-PURPOSE
11	STUDENT ACTIVITIES
12	WAREHOUSE
13	EARLY CHILDHOOD ED CENTER
14	PORTABLE-1
15	PORTABLE-2
16	PORTABLE-3

Riverside Community College District

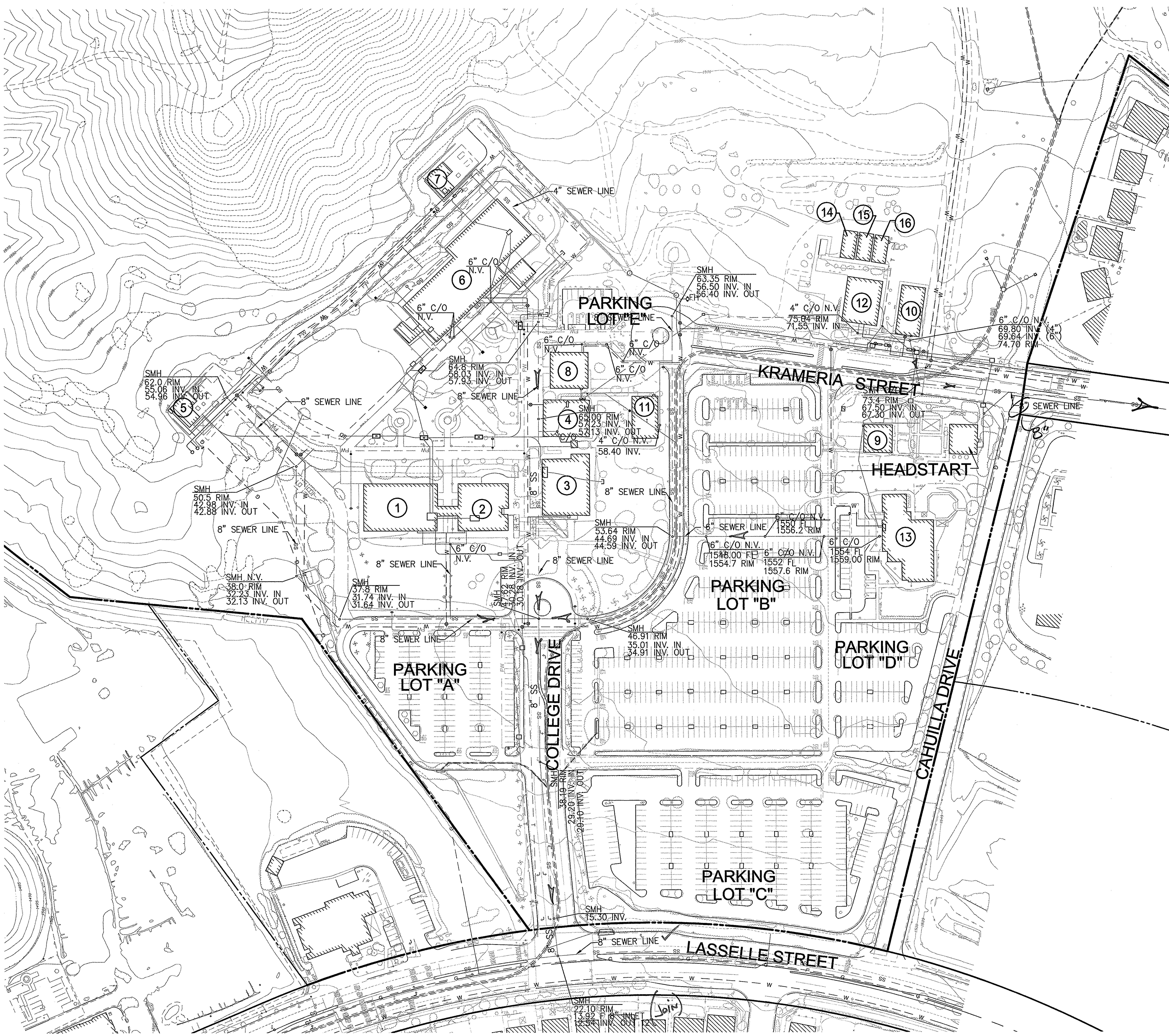
Moreno Valley Campus
Existing WTR Exhibit

PSOMAS

DATE: 7-29-2009 REVISED ON:
JOB No:1RCC020100

SHEET 1 OF 1

Note: For reduced sized prints, original scale is in inches



BLDG #	BUILDING NAME
1	LIBRARY
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4	TIGERS DEN
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6	HUMANITIES
7	MECHANICAL 2
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10	MULTI-PURPOSE
11	STUDENT ACTIVITIES
12	WAREHOUSE
13	EARLY CHILDHOOD ED CENTER
14	PORTABLE-1
15	PORTABLE-2
16	PORTABLE-3

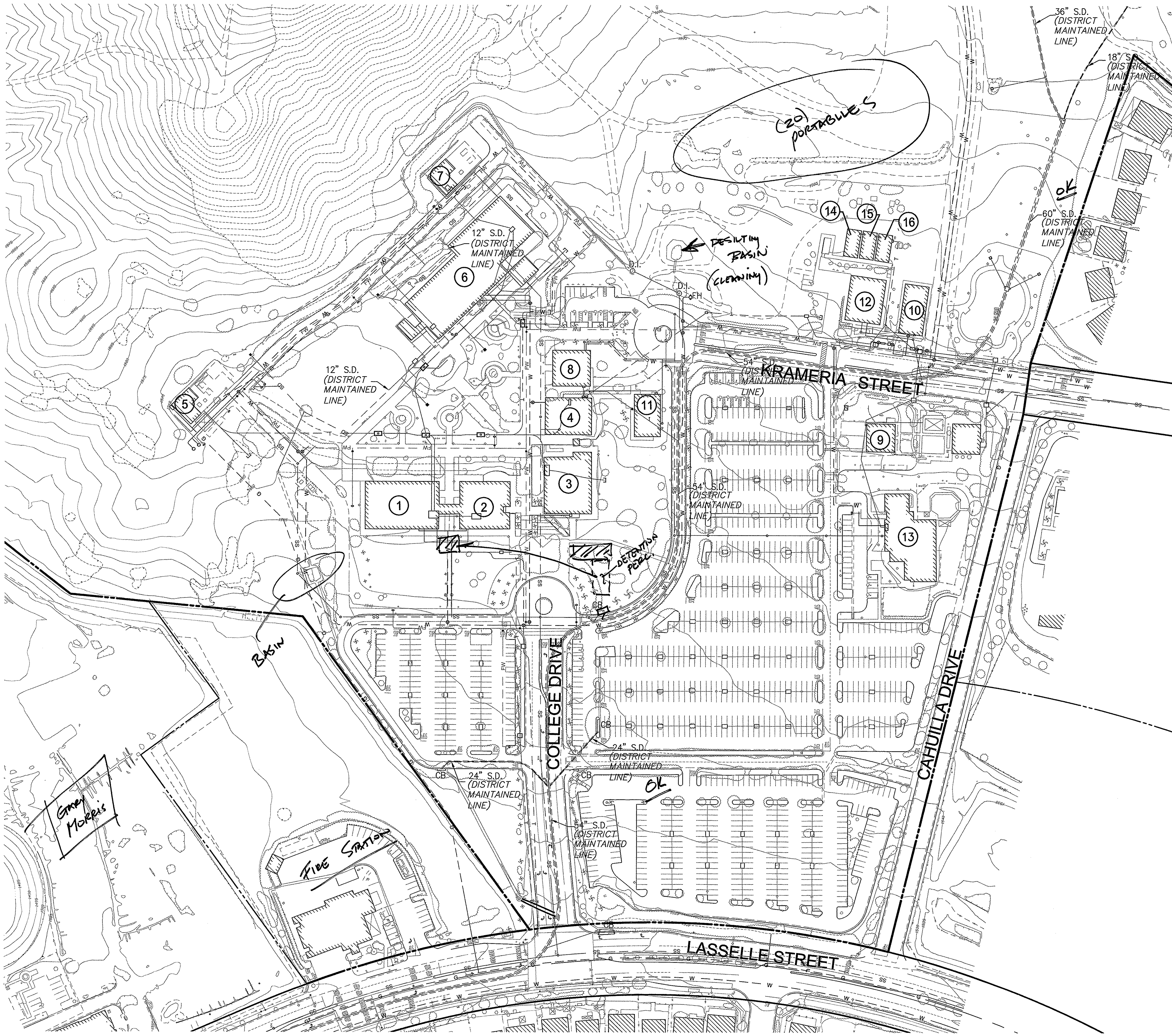
SITE WALK (NOTES) 8/10/09

TBK SET

Riverside Community College District

GRAPHIC SCALE
Note: For reduced sized prints, original scale is in inches

Moreno Valley Campus
Existing SSWR Exhibit
PSOMAS
DATE: 7-29-2009 REVISED ON:
JOB No:1RCC020100
SHEET 1 OF 1



BLDG #	BUILDING NAME
1	LIBRARY
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3	SCIENCE/TECHNOLOGY
4	TIGERS DEN
5	MECHANICAL
6	HUMANITIES
7	MECHANICAL 2
8	BOOKSTORE
9	CALWORKS CHILDCARE
10	MULTI-PURPOSE
11	STUDENT ACTIVITIES
12	WAREHOUSE
13	EARLY CHILDHOOD ED CENTER
14	PORTABLE-1
15	PORTABLE-2
16	PORTABLE-3

BK SET 8/10/09 SITE WALK (NOTES)

GRAPHIC SCALE
Note: For reduced sized prints, original scale is in inches

Riverside Community College District

Moreno Valley Campus
Existing SD Exhibit
PSOMAS
DATE: 7-29-2009 REVISED ON:
JOB No:1RCC020100
SHEET 1 OF 1

APPENDIX B

Prioritized List and Summary of Proposed Recommendations

	PRIORITIZED LIST AND SUMMARY OF PROPOSED RECOMMENDATIONS	Estimated Construction Cost
SECTION 1 – SEWER SYSTEM		
1	Relocate existing mainline segment west of Buildings 1 and 2 to accommodate the proposed parking structure.	
2	Minor relocation north of proposed building P5.	
3	In order to provide a clear site for future development, remove the existing sanitary sewer mains currently serving any existing facilities to be demolished. Existing mainline systems can be cut and capped at the existing manholes.	
4	Remove the existing 4-inch sanitary sewer service laterals currently serving any existing buildings to be demolished.	
5	It is recommended that the college continue to further investigate the existing pipe condition and capacity to provide further recommendations for improvements as the campus expands.	
	SUBTOTAL:	**$136K**
SECTION 2 – WATER SYSTEM		
1	Install new 8-inch domestic water service loop to serve the future buildings and provide redundancy. This second loop would tie to the 24-inch line in Lasselle Street.	
2	It is also recommended that a second 12-inch domestic connection from the existing 24-inch water main in Lasselle Street be added at the Campus entry during the next major expansion to provide redundancy and provide a secondary water source for maintenance or repair.	
3	Remove and/or relocate existing domestic water or fire water pipes that may be in conflict with new building footprints. Mainline water systems can be cut and capped at the proposed project limits.	
4	Install new fire hydrants as needed within 300 feet of proposed buildings per requirements.	
5	Review the California Building Code requirements for Fire service with the addition of each proposed building, since the requirements are based upon final building type, size, height, and occupancy use.	
	SUBTOTAL:	**$565K**
SECTION 3 – IRRIGATION WATER SYSTEM		
1	Proposed new irrigation piping shall be purple PVC pipe and maintain minimum horizontal and vertical clearances with adjacent potable water lines.	
2	Upgrade water sensor technology, as needed, during expansion projects to stay up to date on water saving technological advances.	
3	Install and maintain back flow prevention devices as needed to ensure water quality safety.	
	SUBTOTAL:	**$1,223K**
SECTION 4 – STORM DRAIN SYSTEM		
1	Relocation of the west side mainline to re-establish the flow from the small detention basin back into the mainline system. This will need to be located between the proposed Building P1 and the existing slope.	
	SUBTOTAL:	**$72K**
SECTION 5 – CHILLED WATER SYSTEM		
	New Construction Phase 1	
1	Peak central cooling capacity will need to increase to about 685 tons. For maximum energy savings, peak demand reduction and reduced carbon footprint, a Chilled Water Thermal Energy Storage (TES) tank is proposed on the hilltop overlooking the campus. This tank might also be useful for firefighting needs.	
2	For energy efficiency reasons an evaporative cooled, chilled water plant is proposed that would also feed the TES tank. A comparison of full load and part load efficiencies is noted below for current state of the art chillers.	
3	New buildings should be provided with air handlers instead of fan coils to make better use of air side economizers and also greater delta T's through the chilled water coils. This is essential for maximizing the capacity of the Chilled Water TES tank.	
4	All buildings should have BTU metering capabilities and tie into a Central DDC system with robust energy management capabilities.	
5	Retrofit existing large buildings with BTU monitoring capabilities.	
6	It is recommended to localize the generation of heating hot water rather than grouping it all in one location. Current SCAQMD regulations limit economical boiler sizing to less than 2.0 million BTU per boiler.	
	New Construction Phase 2	
7	Peak central cooling capacity will need to increase to about xxx tons. Implement plans for a Chilled water Thermal Energy Storage (TES) tank.	
8	Piping distribution system will need to be upgraded to increase size and allow placement of new buildings over current pipe locations.	
9	New buildings should be provided with air handlers and integrated air side economizers, and DDC controls.	
	New Construction Phase 3	
10	Peak central cooling capacity will need to increase to about xxx tons. Provide additional chiller and cooling tower capacity.	
11	Piping distribution system will need to be expanded to new buildings.	
12	New buildings should be provided with air handlers and integrated air side economizers, and DDC controls.	
	SUBTOTAL:	**$136K**

Agreed and Accepted By: _____

	PRIORITIZED LIST AND SUMMARY OF PROPOSED RECOMMENDATIONS	Estimated Construction Cost
	SECTION 6 – HEATING WATER SYSTEM	
	New Construction Phase 1	
1	Peak central heating capacity will need to increase to about xxx mbh. For maximum energy savings, peak demand reduction and reduced.	
2	New buildings should be provided with air handlers instead of fan coils to make better use of greater delta T's through the heating water coils. This is essential for maximizing the efficiency of the boilers.	
3	All buildings should have BTU metering capabilities and tie into a Central DDC system with robust energy management capabilities.	
4	Retrofit existing large buildings with BTU monitoring capabilities.	
	New Construction Phase 2	
5	Peak central heating capacity will need to increase to about xxx mbh.	
6	Piping distribution system will need to be upgraded to increase size and allow placement of new buildings over current pipe locations.	
7	New buildings should be provided with air handlers and integrated DDC controls.	
	New Construction Phase 3	
8	Peak central heatling capacity will need to increase to about xxx mbh. Provide additional boilers and pumping capacity.	
9	Piping distribution system will need to be expanded to new buildings.	
10	New buildings should be provided with air handlers and integrated DDC controls.	
	SUBTOTAL:	**$300K**
	SECTION 7 - ELECTRICAL AND SITE LIGHTING SYSTEM DESCRIPTION	
	Electrical	
1	We recommend a new 12 KV closed loop system be installed to serve each building on the campus. It is recommended that a new campus owned primary 15kV metering section and switchgear be installed. The use of selector switches shall be provided to serve each building on campus through a closed loop system. This arrangement will facilitate isolation of buildings without shutting off the main system.	
2	We recommend that the configuration of the future Learning Center be adjusted to avoid the electrical feeders to existing buildings on campus.	
3	A Short Circuit / Arc Flash study be conducted to coordinate the proposed system.	
4	Conduct a coordination study of the proposed system to effectively coordinate all protective devices in the campus.	
5	The existing north campus distribution network is adequate to accommodate 106,000 square feet of expansion without modifying the system. If additional capacity (above 106,000 square feet) is required, it is recommended that Southern California Edison be requested to upgrade the (2) 750KVA transformers. It is recommended that SCE be notified every time a new load or building is added to the system.	
6	We recommend the use of proper digging equipment for trenching any new electrical feeders as it is well known that the campus has a granite base. The amount of time and the rental of proper equipment should be included in the base bid of any job at Moreno Valley Campus where trenching is involved and not included in a change order as "discovery" after the fact.	
7	We recommend the use of a wireless multi-metering system. The system should have an energy software package for energy analysis, 3 phase wireless meter transceivers for wireless metering and be capable of metering at 480 volts as well as 208 volts.	
8	We recommend the use of aluminum cables rather than copper cables. Aluminum cables shall be used for all medium voltage cables and low voltage cables larger than 4/0 in an effort to save money. Note: The infrastructure exhibits and report are designed for copper conductors.	
9	The existing south campus is fed from a Southern California Edison 12 kV network via a manhole on Krameria Street with a 5" conduit to the present 150 KVA transformer. Their system can easily be expanded by SCE and a new 12 KV feeder installed to accommodate one or two new transformers similar to the north campus and could provide an additional 6000 Amps of capacity at 480 Volts. It is not recommended that the two campuses be combined on a single feeder. However, at some future date they could be extended to a neutral point and a high voltage selector switch installed which would allow the ability to switch from one high voltage feeder to the other in the event of a major loss of power on either feeder (both of which are fed from the same substation).	
	Site Lighting	
1	All existing post top fixtures and other decorative fixtures in the campus be replaced with a common cut off decorative fixture that will provide a visually comfortable environment and aesthetically blend with the architectural buildings in the campus. The cut off fixtures would also prevent glare. These new fixtures will be spaced to meet the current IES recommended light levels for pathways.	
2	A single lamp source be selected for illuminating roadways, parking lots, and pathways leading to the campus buildings. Since a high-pressure sodium lamp has a lower color temperature and provides a warm color, we recommend that this lamp be standardized for campus exterior lighting.	
3	Illumination levels of all roadways and parking lots in the campus be designed to meet the current recommended light levels by IES (an average of at least 0.5fc with a uniformity ratio of 4:1). This would include addition/ deletion of light fixtures (based on footcandle readings) to achieve the IES recommended light levels. This will not only provide a visually comfortable environment, but also a safe environment, since people always associate higher or greater luminance with safer surroundings.	
4	Provide a lighting control panel and photocells to control all light fixtures at the same time. If a control panel is not a viable solution then replace the existing time clocks with astronomical time clocks.	
5	Metal Halide lamps be used to highlight the architecture of buildings owing to their high color rendering index and high color temperature.	
6	Replace all burned out lamps and ballasts.	
7	**SUBTOTAL:**	**$2,438K**

Agreed and Accepted By: _____

	PRIORITIZED LIST AND SUMMARY OF PROPOSED RECOMMENDATIONS	Estimated Construction Cost
SECTION 8 – TELECOMMUNICATIONS		
1	Adopt Telecommunication Infrastructure Design Standards. The Telecommunication Infrastructure Design Standards document is intended to provide the Architect, Electrical Engineer, HVAC Consultant, Civil Consultant and Telecommunication Consultant with the basic requirements and standards for network cabling infrastructure in a new or remodeled facility.	
2	Replace existing conduit system, as needed based on locations of new proposed structures in master plan, with a new telecommunication conduit system including manholes/pull boxes. This should be part of the electrical infrastructure upgrade that is required for campus distribution. This new infrastructure could be designed as one project and constructed in phases as the funding became available.	
3	The new NOC should not utilize the existing conduit pathways to connect to the Local Exchange Carriers for the main campus copper and fiber feed. The new proposed "P1 Parking Structure" may disrupt the existing Verizon and Edison conduit structure which houses the main copper and fiber optic feed to the campus. A new dedicated pathway should be implemented to combine the Verizon copper and Edison fiber optic cables to run north east along the service road on the edge of campus to the new proposed NOC location.	
4	The secondary fiber line from Sunesys should also feed the new NOC as a secondary fiber feed for the campus if possible.	
5	The existing (12) 4" conduits that stub out from CMH#5 just past the Humanities Building should be tested for usability by pulling a mandrel through the conduits to see if any of the conduits may be used to help feed the south end of the campus.	
6	It is recommended that the location of the proposed Future Learning Center be adjusted so as not to disrupt the existing main communications feed of (12) 4" and (2) 3" conduits that will feed the entire campus from the new NOC.	
7	It is recommended that the location of the new proposed Instruction and Student Services Building P-3 be adjusted so as not to interfere with existing communication manholes #5 and #5A.	
	SUBTOTAL:	**$2,612K**
SECTION 9 – CENTRAL PLANT		
1	For energy efficiency reasons an evaporative cooled chilled water plant is proposed that would also feed the TES tank. A comparison of full load and part load efficiencies is noted below for current state of the art chillers	
2	Peak central cooling capacity will need to increase to about xxx tons. For maximum energy savings, peak demand reduction and reduced carbon footprint a Chilled water Thermal Energy Storage (TES) tank is proposed on the hilltop overlooking the campus. This tank might also be useful for firefighting needs	
3	Piping systems from both central plant buildings are set up for constant flow and so they are energy inefficient. The chilled water valves were recently replaced with two way valves to increase the efficiency of the pumping system, but the chillers lack isolation valves and the pumps lack VFD's to take full advantage of this retrofit. The buildings are served by 4 pipe fan coils and are design for approximately 10°F differential on the chilled water supply temperatures. For a campus environment this is a very low differential and leads to large pipe sizes and large pumping requirements vs a larger temperature differential design.	
4	It is recommended to localize the generation of heating hot water rather than grouping it all in one location. Current SCAQMD regulations limit economical boiler sizing to less than 2.0 million BTU per boiler	
5	Piping systems from both central plant buildings are set up for constant flow and so they are energy inefficient. The heating water valves were recently replaced with two way valves to increase the efficiency of the pumping system, but the boilers lack isolation valves and the pumps lack VFD's to take full advantage of this retrofit. The buildings are served by 4 pipe fan coils and are design for approximately 20°F differential on the heating water supply temperatures. For a campus environment this is a very low differential and leads to large pipe sizes and large pumping requirements versus a larger temperature differential design.	
6	Peak central cooling capacity will need to increase to about xxx mbh. Implement plans for a Chilled water Thermal Energy Storage (TES) tank. Peak heating capacity will increase to xxx mbh. Implement plans to add boiler capacity at each new building.	
7	Peak central cooling capacity will need to increase to about xxx tons. Provide additional chiller and cooling tower capacity. Peak heating capacity will increase to xxx mbh. Implement plans to add boiler capacity at each new building.	
	SUBTOTAL:	**$824K**
SECTION 10 – NATURAL GAS SYSTEM		
1	Earthquake valves for emergency gas supply shut-off should be provided at each meter location on the downstream side of the regulator. A Monitoring Switch is an option feature that is available enabling the valves open and closed position to be monitored remotely. The switch uses up to a 24-V AC or 24- VDC current, relays a 250-mA current indicating to the monitoring device whether the valve is in it open/closed position. The signal can be relayed through a signal cable to continuously notify a PLC, PC or alarm system of the valves position.	
2	Meter #1: Replacement of existing meter with a higher capacity meter having a max CFH output of no less than 15,000 CFH is required. Southern California Gas Company shall provide this service.	
3	Install new meter (#2) with a max. CFH output of no less than 15,000 CFH. This meter shall serve most of the proposed buildings and future campus expansions. Southern California Gas Company shall provide this service.	
4	All buildings to be sub-metered to monitor gas consumption and get a clear understanding of the total gas energy being spent at each of the buildings. This will help the campus better manage their energy budget and thus the operating costs at the campus.	
5	The use of proper digging equipment for trenching as it is well known that the campus has a granite base. The amount of time and the rental of proper equipment should be included in the base bid of any job at the Moreno Valley Campus where trenching is involved and not included in a change order as "discovery" after the fact.	
	SUBTOTAL:	**$242K**

Agreed and Accepted By: _____

APPENDIX C

Conceptual Opinion of Cost

RIVERSIDE COMMUNITY COLLEGE DISTRICT

INFRASTRUCTURE UPGRADE PROJECT
UTILITY PROGRAM
MORENO VALLEY CAMPUS

CONCEPTUAL OPINION OF COST

JYI# V1716A2

JUNE 22, 2010

PREPARED FOR:

PSOMAS

BY:

JACOBUS & YUANG, INC.
6477 Telephone Rd.
Suite #10
Ventura, CA 93003
Tel (213) 688-1341 or (805) 339-9434

Prepared by Jacobus & Yuang, Inc.

PROJECT: INFRASTRUCTURE UPGRADE PROJECT - UTILITY PROGRAM		**JYI #:**	**V1716A2**
LOCATION : MORENO VALLEY CAMPUS - RIVERSIDE, CA		**DATE:**	**22-Jun-10**
CLIENT: PSOMAS ASSOCIATES		**REVISED:**	
DESCRIPTION: CONCEPTUAL OPINION OF COST			

ITEM NO.	DESCRIPTION	EST QTY	UNIT	UNIT COST	TOTAL
	SUMMARY OF ESTIMATE				**$**
1.0	SANITARY SEWER SYSTEM	780	LF	174.02	135,734
2.0	WATER SYSTEM	2,960	LF	190.77	564,693
3.0	IRRIGATION WATER SYSTEM	36.14	ACRE	33,855.70	1,223,475
4.0	STORM DRAIN SYSTEM	280	LF	255.67	71,587
5.0	CHILLED WATER SYSTEM	4,360	LF	117.92	514,110
6.0	HEATING WATER SYSTEM	1	LS	300,000.00	300,000
7.0	ELECTRICAL SYSTEM	6,880	LF	354.43	2,438,487
8.0	TELECOMMUNICATIONS	7,740	LF	337.47	2,612,045
9.0	CENTRAL PLANT	1,500	SF	549.42	824,125
10.0	NATURAL GAS SYSTEM	2,100	LF	115.32	242,175
11.0	MISCELLANEOUS	1	LS	100,000.00	100,000
	SUBTOTAL				**9,026,432**
12.0	PRORATES:				
12.1	GENERAL CONDITIONS	8.80%			794,326
12.2	ESCALATION	3.48%			341,786
12.3	MARKET FACTOR - See Below				-
12.4	TRAFFIC MITIGATION	0.50%			50,813
12.5	DESIGN CONTINGENCY	15.00%			1,532,003
12.6	ESTIMATE CONTINGENCY	10.00%			1,095,103
	SUBTOTAL				**12,840,463**
12.7	BONDS + INSURANCES	2.00%			256,809
12.8	CONTRACTOR'S FEE	6.00%			785,836
	TOTAL OF ESTIMATED PRICE				**13,883,108**
	MARKET FACTOR	-5.00%			**(694,155)**
	TOTAL ESTIMATE CONSTRUCTION COST INCLUDING MARKET FACTOR				**13,188,953**
	OPTIONAL PRICING - See end of estimate for detailed backup				
	ELECTRICAL SYSTEM ALTERNATE - PER OPTION #2 SINGLE LINE, IN LIEU OF OPTION #1 (BASE)				**(170,618)**
	CENTRAL PLANT ALTERNATE - OPTION #3 IN LIEU OF OPTION #1 (BASE)				**6,883,286**

PROJECT: INFRASTRUCTURE UPGRADE PROJECT - UTILITY PROGRAM		**JYI #:**	**V1716A2**
LOCATION : MORENO VALLEY CAMPUS - RIVERSIDE, CA		**DATE:**	**22-Jun-10**
CLIENT: PSOMAS ASSOCIATES		**REVISED:**	
DESCRIPTION: CONCEPTUAL OPINION OF COST			

ITEM NO.	DESCRIPTION	EST QTY	UNIT	UNIT COST	TOTAL

ESCALATION CALCULATION

BASE MONTH	Jun-10
CONSTRUCTION START MONTH	Feb-11
CONSTRUCTION DURATION (MONTHS)	13
MID POINT OF CONSTRUCTION	Aug-11
% ANNUAL ESCALATION	3.00%
ALLOWANCE FOR ESCALATION (TO MIDPOINT OF CONSTRUCTION)	3.48%

NOTES:

1) PRICES ASSUME COMPETITIVE BIDS FROM AT LEAST 4-5 RESPONSIBLE GENERAL CONTRACTORS
2) ESTIMATED COSTS ARE BASED ON PREVAILING WAGE RATES
3) NO COST ESCALATION IS INCLUDED BEYOND THE ASSUMPTIONS SHOWN ABOVE. IF THE PROJECT IS PROTRACTED BEYOND THE MID POINT SHOWN ABOVE, ADJUSTMENT NEEDS TO BE MADE TO THE ESTIMATE FOR INFLATIONARY & MARKET CONDITIONS AT THE TIME
4) THE ESTIMATE REFLECTS TYPICAL GENERAL CONTRACTOR'S COSTS FOR THE PROJECT, & DOES NOT INCLUDE SOFT COSTS SUCH AS A/E FEES, CONSTRUCTION & PROJECT MANAGEMENT FEES, CONSTRUCTION CONTINGENCY, OWNER TESTING & INSPECTION & QUALITY MANAGEMENT COSTS, LEGAL FEES, FINANCING CHARGES, OR ANY OTHER TYPICAL SOFT COSTS - IT IS NECESSARY FOR THE USER TO ADD SUCH SOFT COSTS, TO DETERMINE THE TOTAL PROJECT BUDGET.
5) PRICES ARE BASED ON PREVAILING WAGE RATES
6) ESTIMATE IS BASED ON UTILITY PROGRAM AS PREPARED BY PSOMAS, DATED 5/19/2010 AND RECEIVED 6/11/2010.

SPECIFIC EXCLUSIONS:

1) FIRE SPRINKLER RETROFIT OF BUILDINGS IS NOT INCLUDED, BUT LATERALS, VALVING & METERS ARE INCLUDED
2) NO COSTS ARE INCLUDED FOR ASBESTOS & OTHER HAZARDOUS MATERIAL ABATEMENT
3) RETROFIT (E) LARGE BUILDINGS THAT ARE SERVED BY CHILLED WATER W/ BTU MONITORING CAPABILITIES & TIE TO CENTRAL DDC SYSTEM IS NOT INCLUDED.
4) COST FOR REPLACING WALL METAL HALIDES IN BUILDINGS IS NOT INCLUDED
5) HIGHER DESIGN AND ESTIMATE CONTINGENCIES ARE USED TO COVER UNCERTAINTY OF SCOPE. THE COST ESTIMATE WILL CHANGE WHEN MORE DEFINED SCOPE AND DRAWINGS BECOME AVAILABLE.
6) AIR-HANDLERS TO NEW BUILDINGS, DDC CONTROLS, & BTU METERING CAPABILITIES ARE NOT INCLUDED.
7) FIBER AND COPPER CABLES TO TELECOMMUNICATION INFRASTRUCTURE ARE NOT INCLUDED AS SPECIFIC REQUIREMENTS ARE NOT SHOWN ON THE DRAWINGS

PROJECT: INFRASTRUCTURE UPGRADE PROJECT - UTILITY PROGRAM		**JYI #:**	**V1716A2**
LOCATION : MORENO VALLEY CAMPUS - RIVERSIDE, CA		**DATE:**	**22-Jun-10**
CLIENT: PSOMAS ASSOCIATES		**REVISED:**	
DESCRIPTION: CONCEPTUAL OPINION OF COST			

ITEM NO.	DESCRIPTION	EST QTY	UNIT	UNIT COST	TOTAL

OPINION OF COST

An Opinion of Cost is prepared from a survey of the quantities of work-items prepared from written or drawn information provided at the Conceptual or Schematic stage of the design. Historical costs, information provided by contractors and suppliers, plus judgmental evaluation by the Estimator are used as appropriate as the basis for pricing.

Allowances as appropriate will be included for items of work which are not indicated on the design documents, provided that the Estimator is made aware of them, or which, in the judgement of the Estimator, are required for completion of the work.

JYI cannot, however, be responsible for items or work of an unusual nature of which we have not been informed.

BID

An offer to enter a contract to perform work for a fixed sum, to be completed within a limited period of time.

Jacobus & Yuang, Inc., however, cannot and does not guarantee that bids, or cost proposals for construction will not vary from this Opinion of Cost or Estimate.

MARKET CONDITIONS

In the current market conditions for construction, our experience shows the following results on competitive bids, as a differential from JYI final estimates:

Number of bids	Percentage Differential
1.....	+ 25 to 50%
2-3.....	+ 10 to 25%
4-5.....	+ 0 to 10%
6-7.....	+ 0 to - 5%
8 or more....	+ 0 to -15%

Accordingly, it is extremely important to ensure that a minimum of 4-5 valid bids are received

PROJECT: INFRASTRUCTURE UPGRADE PROJECT - UTILITY PROGRAM — **JYI #: V1716A2**
LOCATION : MORENO VALLEY CAMPUS - RIVERSIDE, CA — **DATE: 22-Jun-10**
CLIENT: PSOMAS ASSOCIATES — **REVISED:**
DESCRIPTION: CONCEPTUAL OPINION OF COST

ITEM NO.	DESCRIPTION	EST QTY	UNIT	UNIT COST	TOTAL
1.0	SANITARY SEWER SYSTEM				$
	RELOCATE (E) MAINLINE SEGMENT WEST OF BUILDINGS 1 & 2 TO ACCOMMODATE THE PROPOSED PARKING STRUCTURE				
	DEMO WORK				
	SAWCUT (E) PAVING	700	LF	4.50	3,150
	DEMO/HAUL (E) PAVING DEBRIS	700	SF	4.00	2,800
	REMOVE PORTION OF (E) PLANTING/IRRIGATION	640	SF	1.00	640
	P.O.D. (E) 4" SEWER LINE	2	EA	1,000.00	2,000
	P.O.D. (E) 8" SEWER LINE	2	EA	1,500.00	3,000
	TRENCH/REMOVE (E) SEWER MANHOLE	2	EA	960.00	1,920
	TRENCH/REMOVE (E) 4" SEWER LINE	70	LF	7.50	525
	TRENCH/REMOVE (E) 8" SEWER LINE	600	LF	7.50	4,500
	REMOVE (E) GRADE CLEANOUT	1	EA	260.00	260
	CAP (E) 8" PIPE	1	EA	250.00	250
	RESTORE PAVING, MATCH EXISTING	700	SF	5.00	3,500
	RESTORE PLANTING/IRRIGATION, MATCH EXISTING	640	SF	5.50	3,520
	NEW WORK				
	SAWCUT (E) PAVING	160	LF	4.50	720
	DEMO/HAUL (E) PAVING DEBRIS	160	SF	4.00	640
	REMOVE PORTION OF (E) PLANTING/IRRIGATION	640	SF	1.00	640
	NEW 8" SEWER LINE	400	LF	40.03	16,012
	P.O.C. TO EXISTING, 4"/8"	2	EA	650.00	1,300
	P.O.C. TO EXISTING, 8"/8"	2	EA	812.50	1,625
	GRADE CLEANOUT	1	EA	325.00	325
	RESTORE PAVING, MATCH EXISTING	160	SF	5.00	800
	RESTORE PLANTING/IRRIGATION, MATCH EXISTING	640	SF	5.50	3,520
	MINOR RELOCATION NORTH OF PROPOSED BUILDING #5				
	DEMO WORK				
	SAWCUT (E) PAVING	140	LF	4.50	630
	DEMO/HAUL (E) PAVING DEBRIS	140	SF	4.00	560
	REMOVE PORTION OF (E) PLANTING/IRRIGATION	360	SF	1.00	360
	P.O.D. (E) 4" SEWER LINE	2	EA	178.68	357
	TRENCH/REMOVE (E) 4" SEWER LINE	250	LF	7.50	1,875
	RESTORE PAVING, MATCH EXISTING	140	SF	5.00	700
	RESTORE PLANTING/IRRIGATION, MATCH EXISTING	360	SF	5.50	1,980
	NEW WORK				
	SAWCUT (E) PAVING	40	LF	4.50	180
	DEMO/HAUL (E) PAVING DEBRIS	40	SF	4.00	160
	REMOVE PORTION OF (E) PLANTING/IRRIGATION	220	SF	1.00	220
	NEW 4" SEWER LINE	130	LF	28.63	3,722
	P.O.C. TO EXISTING, 4"/4"	2	EA	487.50	975
	RESTORE PAVING, MATCH EXISTING	40	SF	5.00	200
	RESTORE PLANTING/IRRIGATION, MATCH EXISTING	220	SF	5.50	1,210
	REMOVAL OF (E) SANITARY SEWER MAINS CURRENTLY SERVING ANY EXISTING FACILITIES TO BE DEMOLISHED				
	SAWCUT (E) PAVING	240	LF	4.50	1,080

PROJECT: INFRASTRUCTURE UPGRADE PROJECT - UTILITY PROGRAM — **JYI #: V1716A2**
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CLIENT: PSOMAS ASSOCIATES — **REVISED:**
DESCRIPTION: CONCEPTUAL OPINION OF COST

ITEM NO.	DESCRIPTION	EST QTY	UNIT	UNIT COST	TOTAL
	DEMO/HAUL (E) PAVING DEBRIS	240	SF	4.00	960
	REMOVE PORTION OF (E) PLANTING/IRRIGATION	220	SF	1.00	220
	P.O.D./CAP 6" SS PIPE	2	EA	1,500.00	3,000
	TRENCH/REMOVE (E) 6" SEWER LINE	230	LF	7.50	1,725
	REMOVE (E) GRADE CLEANOUT	3	EA	150.00	450
	RESTORE PAVING, MATCH EXISTING	240	SF	5.00	1,200
	RESTORE PLANTING/IRRIGATION, MATCH EXISTING	220	SF	5.50	1,210
	REMOVAL OF (E) 4" SANITARY SEWER LATERALS CURRENTLY SERVING ANY EXISTING FACILITIES TO BE DEMOLISHED				
	SAWCUT (E) PAVING	40	LF	4.50	180
	DEMO/HAUL (E) PAVING DEBRIS	40	SF	4.00	160
	REMOVE PORTION OF (E) PLANTING/IRRIGATION	420	SF	1.00	420
	TRENCH/REMOVE (E) 4" SEWER LINE	230	LF	8.00	1,840
	REMOVE (E) GRADE CLEANOUT	3	EA	150.00	450
	RESTORE PAVING, MATCH EXISTING	40	SF	5.00	200
	RESTORE PLANTING/IRRIGATION, MATCH EXISTING	420	SF	5.50	2,310
	SITE SEWER FURTHER INVESTIGATION				
	FURTHER INVESTIGATION OF (E) CAMPUS WIDE SEWER PIPE CONDITION & CAPACITY TO PROVIDE FURTHER RECOMMENDATIONS FOR IMPROVEMENTS AS THE CAMPUS EXPANDS	1	LS	8,800.00	8,800
	ALLOWANCE FOR NEW BUILDING LATERAL PIPES, ASSUME 4"	250	LF	28.63	7,158
	ALLOWANCE FOR GRADE CLEANOUT	8	EA	325.00	2,600
	STUB & CAP FOR PROPOSED BUILDINGS	8	EA	375.00	3,000
	P.O.C. TO (E) SEWER MAINS	8	EA	1,250.00	10,000
	MISCELLANEOUS WORK				
	MISC. SEWER PIPING SYSTEM	1	LS	11,173.88	11,174
	PERMITS & TESTING	1	LS	5,586.94	5,587
	MISC. DEMO WORK	1	LS	2,234.78	2,235
	PROTECT-IN PLACE EXISTING UTILITIES	1	LS	2,500.00	2,500
	GENERAL PROTECTION ALLOWANCE, WORK AREA LIMIT	1	LS	2,500.00	2,500
	SUBTOTAL				**135,734**
2.0	WATER SYSTEM				$
	NEW 8" DOMESTIC WATER SERVICE LOOP TO SERVE THE FUTURE BUILDINGS				
	SAWCUT (E) PAVING, ON SITE	1,000	LF	4.50	4,500
	SAWCUT (E) PAVING, STREET	200	LF	5.00	1,000
	DEMO/HAUL (E) PAVING DEBRIS	1,200	SF	4.00	4,800
	NEW 8" DOMESTIC WATER PIPE	600	LF	58.92	35,352
	P.O.C. TO EXISTING, 8"/8", SITE	1	EA	1,985.00	1,985
	P.O.C. TO EXISTING, 8"/24", STREET	1	EA	5,800.00	5,800
	THRUST BLOCKS	2	EA	550.00	1,100
	RESTORE PAVING, MATCH EXISTING, ON SITE	1,000	SF	5.00	5,000

PROJECT: INFRASTRUCTURE UPGRADE PROJECT - UTILITY PROGRAM — **JYI #: V1716A2**
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CLIENT: PSOMAS ASSOCIATES — **REVISED:**
DESCRIPTION: CONCEPTUAL OPINION OF COST

ITEM NO.	DESCRIPTION	EST QTY	UNIT	UNIT COST	TOTAL
	RESTORE PAVING, MATCH EXISTING, STREET	200	SF	7.50	1,500
	RECOMMENDED 12" FW CONNECTION FROM THE (E) 24" WATER MAIN				
	SAWCUT (E) PAVING, ON SITE	1,000	LF	4.50	4,500
	SAWCUT (E) PAVING, STREET	200	LF	5.00	1,000
	DEMO/HAUL (E) PAVING DEBRIS	1,200	SF	4.00	4,800
	NEW 12" FIRE WATER PIPE	600	LF	83.41	50,046
	P.O.C. TO EXISTING, 12"/12", SITE	1	EA	1,137.50	1,138
	P.O.C. TO EXISTING, 12"/24", STREET	1	EA	1,300.00	1,300
	THRUST BLOCKS	2	EA	550.00	1,100
	RESTORE PAVING, MATCH EXISTING, ON SITE	1,000	SF	5.00	5,000
	RESTORE PAVING, MATCH EXISTING, STREET	200	SF	7.50	1,500
	DOMESTIC WATER & FIRE WATER SITE DISTRIBUTION				
	SAWCUT (E) PAVING, ON SITE	1,400	LF	4.50	6,300
	DEMO/HAUL (E) PAVING DEBRIS	1,400	SF	4.00	5,600
	REMOVE PORTION OF (E) PLANTING/IRRIGATION	2,200	SF	1.00	2,200
	NEW 8" DOMESTIC WATER PIPE	500	LF	58.92	29,460
	NEW 12" FIRE WATER PIPE	1,260	LF	83.41	105,097
	THRUST BLOCKS	10	EA	550.00	5,500
	P.O.C. TO EXISTING, BUILDING LATERALS/8"	2	EA	487.50	975
	P.O.C. TO EXISTING, 8"/8", SITE	4	EA	812.50	3,250
	P.O.C. TO EXISTING, 12"/12", SITE	4	EA	1,137.50	4,550
	RESTORE PAVING, MATCH EXISTING, ON SITE	1,400	SF	5.00	7,000
	RESTORE PLANTING/IRRIGATION, MATCH EXISTING	2,200	SF	5.50	12,100
	REMOVE AND/OR RELOCATE (E) DOMESTIC WATER OR FIRE WATER PIPES THAT ARE IN CONFLICT WITH NEW BUILDING				
	REMOVE & RELOCATE (E) FIRE HYDRANT, ALLOWANCE	3	EA	2,000.00	6,000
	SAWCUT (E) PAVING	2,200	LF	4.50	9,900
	DEMO/HAUL (E) PAVING DEBRIS	2,200	SF	4.00	8,800
	REMOVE PORTION OF (E) PLANTING/IRRIGATION	1,520	SF	1.00	1,520
	P.O.D. (E) 8" DW LINE	6	EA	1,250.00	7,500
	P.O.D. (E) 12" FW LINE	5	EA	1,710.00	8,550
	TRENCH/REMOVE (E) 8" DW PIPE	1,010	LF	7.50	7,575
	TRENCH/REMOVE (E) 12" FW PIPE	850	LF	8.50	7,225
	REMOVE (E) FIRE HYDRANT	3	EA	1,100.00	3,300
	RESTORE PAVING, MATCH EXISTING, ON SITE	2,200	SF	5.00	11,000
	RESTORE PLANTING/IRRIGATION, MATCH EXISTING	1,520	SF	5.50	8,360
	INSTALL (N) FIRE HYDRANTS AS NEEDED WITHIN 300 FT OF PROPOSED BUILDINGS				
	ALLOWANCE FOR FIRE HYDRANT, COMPLETE	1	EA	2,750.00	2,750
	REVIEW THE CALIFORNIA BUILDING CODE REQUIREMENTS FOR FIRE SERVICE WITH THE ADDITION OF EACH PROPOSED BUILDING				
	FIRE SERVICE TO PROPOSED BUILDING (ASSUME AV. 4" Ø X 100' + BFP + FDC)	8	EA	9,076.00	72,608
	MISCELLANEOUS WORK				
	MISC. WATER PIPING SYSTEM/VALVES & SPECIALTIES	1	LS	46,854.01	46,854

PROJECT: INFRASTRUCTURE UPGRADE PROJECT - UTILITY PROGRAM — **JYI #: V1716A2**
LOCATION : MORENO VALLEY CAMPUS - RIVERSIDE, CA — **DATE: 22-Jun-10**
CLIENT: PSOMAS ASSOCIATES — **REVISED:**
DESCRIPTION: CONCEPTUAL OPINION OF COST

ITEM NO.	DESCRIPTION	EST QTY	UNIT	UNIT COST	TOTAL
	TESTING & STERILIZATION	1	LS	25,769.71	25,770
	MISC. DEMO WORK	1	LS	13,529.10	13,529
	PROTECT-IN PLACE EXISTING UTILITIES	1	LS	5,000.00	5,000
	GENERAL PROTECTION ALLOWANCE, WORK AREA LIMIT	1	LS	5,000.00	5,000
	SUBTOTAL				**564,693**
3.0	IRRIGATION WATER SYSTEM				$
	IRRIGATION WATER IMPROVEMENTS				
	RE-ROUTING (E) IRRIGATION LINES THAT ARE IN CONFLICT WITH PROPOSED BUILDINGS, AND REPLACING OLD IRRIGATION PIPES AS NEEDED	1	LS	-	INCLUDED
	NEW IRRIGATION PIPING, PURPLE PVC	1	LS	-	INCLUDED
	UPGRADE WATER SENSOR TECHNOLOGY	1	LS	-	INCLUDED
	INSTALL & MAINTAIN BACKFLOW PREVENTION DEVICES	1	LS	-	INCLUDED
	LUMP SUM COST FOR THE ABOVE SCOPES (APPROXIMATE AREA OF PLANTING & IRRIGATION)	36.14	ACRE	32,625.00	1,179,000
	MISCELLANEOUS WORK				
	MISC. IRRIGATION WATER PIPING SYSTEM	1	LS	-	INCLUDED
	PERMITS & TESTING	1	LS	29,475.00	29,475
	MISC. DEMO WORK	1	LS	5,000.00	5,000
	PROTECT-IN PLACE EXISTING UTILITIES	1	LS	5,000.00	5,000
	GENERAL PROTECTION ALLOWANCE, WORK AREA LIMIT	1	LS	5,000.00	5,000
					1,223,475
4.0	STORM DRAIN SYSTEM				
	RELOCATION OF THE WESTSIDE MAINLINE				
	SAWCUT (E) PAVING	560	LF	4.50	2,520
	DEMO/HAUL (E) PAVING DEBRIS	1,680	SF	5.00	8,400
	NEW 24" STORMWATER PIPE	280	LF	104.85	29,358
	P.O.C. TO EXISTING, 24"/24"	2	EA	1,950.00	3,900
	RESTORE PAVING, MATCH EXISTING	1,680	SF	5.00	8,400
	MISCELLANEOUS WORK				
	MISC. STORM WATER PIPING SYSTEM	1	LS	2,628.90	2,629
	PERMITS & TESTING	1	LS	1,380.17	1,380
	MISC. DEMO WORK	1	LS	5,000.00	5,000
	PROTECT-IN PLACE EXISTING UTILITIES	1	LS	5,000.00	5,000
	GENERAL PROTECTION ALLOWANCE, WORK AREA LIMIT	1	LS	5,000.00	5,000
	SUBTOTAL				**71,587**
5.0	CHILLED WATER SYSTEM				
	PHASE 1				
	RETROFIT (E) LARGE BUILDINGS THAT ARE SERVED BY CHILLED WATER W/ BTU MONITORING CAPABILITIES				
	LARGE BUILDINGS	6	EA	-	**N.I.C.**

PROJECT: INFRASTRUCTURE UPGRADE PROJECT - UTILITY PROGRAM	JYI #:	V1716A2
LOCATION : MORENO VALLEY CAMPUS - RIVERSIDE, CA	DATE:	22-Jun-10
CLIENT: PSOMAS ASSOCIATES	REVISED:	
DESCRIPTION: CONCEPTUAL OPINION OF COST		

ITEM NO.	DESCRIPTION	EST QTY	UNIT	UNIT COST	TOTAL
	AIR-HANDLING UNITS, DDC CONTROLS, & BTU METERING CAPABILITIES TO NEW BUILDINGS				
	NEW BUILDINGS	5	EA	-	**N.I.C.**
	PHASE 2 & 3				
	CHILLED WATER PIPE DISTRIBUTION				
	SAWCUT (E) ASPHALT PAVING	1,400	LF	4.50	6,300
	DEMO/HAUL (E) PAVING DEBRIS	3,500	SF	5.00	17,500
	REMOVE PORTION OF (E) PLANTING/IRRIGATION	7,400	SF	1.00	7,400
	NEW 3" CHWS PIPE + INSULATION	70	LF	47.06	3,294
	NEW 3" CHWR PIPE + INSULATION	70	LF	47.06	3,294
	NEW 4" CHWS PIPE + INSULATION	600	LF	62.75	37,650
	NEW 4" CHWR PIPE + INSULATION	600	LF	62.75	37,650
	NEW 6" CHWS PIPE + INSULATION	1,510	LF	78.40	118,384
	NEW 6" CHWR PIPE + INSULATION	1,510	LF	78.40	118,384
	VALVE VAULT	8	EA	1,500.00	12,000
	P.O.C. TO EXISTING, 3"/6"	2	EA	1,200.00	2,400
	P.O.C. TO EXISTING, 4"/4"	2	EA	1,400.00	2,800
	P.O.C. TO EXISTING, 6"/6"	2	EA	2,100.00	4,200
	P.O.C. TO EXISTING BUILDING	1	PR	1,000.00	1,000
	CAP (E) 6" CHWS & R	1	PR	1,000.00	1,000
	BUILDING STUB	5	PR	550.00	2,750
	RESTORE PAVING, MATCH EXISTING	3,500	SF	5.00	17,500
	RESTORE PLANTING/IRRIGATION, MATCH EXISTING	7,400	SF	5.50	40,700
	MISCELLANEOUS WORK				
	MISC. CHWS/R PIPING SYSTEM/VALVES & SPECIALTIES	1	LS	32,565.48	32,565
	PERMITS & TESTING	1	LS	23,338.59	23,339
	MISC. DEMO WORK	1	LS	8,000.00	8,000
	PROTECT-IN PLACE EXISTING UTILITIES	1	LS	8,000.00	8,000
	GENERAL PROTECTION ALLOWANCE, WORK AREA LIMIT	1	LS	8,000.00	8,000
	SUBTOTAL				**514,110**
6.0	HEATING WATER SYSTEM				
	PHASE 1				
	NEW BUILDINGS				
	AIR HANDLERS TO FUTURE BUILDINGS	6	EA	-	**N.I.C.**
	EXISTING BUILDINGS				
	RETROFIT (E) LARGE BUILDINGS W/ BTU MONITORING CAPABILITIES	5	EA	-	**N.I.C.**
	PHASE 2				
	UPGRADE (E) PIPING SITE DISTRIBUTION SYSTEM, ALLOWANC	1	LS	150,000.00	150,000
	FUTURE BUILDINGS W/ DDC CONTROLS	6	EA	-	**N.I.C.**
	PHASE 3				
	EXPAND PIPING SITE DISTRIBUTION TO NEW BUILDINGS, ALLOWANCE	1	LS	150,000.00	150,000
	SUBTOTAL				**300,000**

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CLIENT: PSOMAS ASSOCIATES	REVISED:	
DESCRIPTION: CONCEPTUAL OPINION OF COST		

ITEM NO.	DESCRIPTION	EST QTY	UNIT	UNIT COST	TOTAL
7.0	ELECTRICAL SYSTEM				$
	SOUTH CAMPUS POWER SYSTEM				
	DEMO WORK				
	P.O.D. POWER FROM (E) BUILDINGS	3	EA	2,250.00	6,750
	P.O.D. POWER FROM (E) PORTABLES	3	EA	1,125.00	3,375
	REMOVE (E) 400A SWITCHBOARD	2	EA	605.00	1,210
	TRENCH & REMOVE (E) U/G PULLBOX	1	EA	1,081.60	1,082
	TRENCH & REMOVE (E) SCE FEEDER	160	LF	22.22	3,555
	TRENCH & REMOVE (E) SECONDARY FEEDER	760	LF	22.22	16,887
	RE-WORK TO (E) U/G PULLBOX "A"	1	LS	1,500.00	1,500
	SAWCUT (E) PAVING	240	LF	4.50	1,080
	DEMO/HAUL (E) PAVING DEBRIS	240	SF	5.00	1,200
	REMOVE PORTION OF (E) PLANTING/IRRIGATION	1,480	SF	1.00	1,480
	RESTORE PAVING, MATCH EXISTING	240	SF	5.00	1,200
	RESTORE PLANTING/IRRIGATION, MATCH EXISTING	1,480	SF	5.50	8,140
	MISC. DEMO/RESTORATION WORK	1	LS	1,186.48	1,186
	NORTH CAMPUS POWER SYSTEM - OPTION #1				
	DEMO WORK				
	P.O.D. POWER FROM (E) SCE U/G PULLBOX	1	EA	1,875.00	1,875
	P.O.D. POWER FROM (E) SCE CAPACITOR	1	EA	1,125.00	1,125
	P.O.D. POWER FROM (E) BUILDINGS	6	EA	2,250.00	13,500
	REMOVE (E) 75 KVA TRANSFORMER	4	EA	1,500.00	6,000
	TRENCH & REMOVE (E) U/G PULLBOX	2	EA	1,081.60	2,163
	TRENCH & REMOVE (E) SCE HV PRIMARY FEEDER	2,260	LF	33.33	75,326
	TRENCH & REMOVE (E) SITE HV FEEDER	2,100	LF	33.33	69,993
	REMOVE (E) O/H POWER LINE	80	LF	25.00	2,000
	SAWCUT (E) PAVING	4,560	LF	4.50	20,520
	DEMO/HAUL (E) PAVING DEBRIS	4,560	SF	5.00	22,800
	REMOVE PORTION OF (E) PLANTING/IRRIGATION	2,600	SF	1.00	2,600
	RESTORE PAVING, MATCH EXISTING	4,560	SF	5.00	22,800
	RESTORE PLANTING/IRRIGATION, MATCH EXISTING	2,600	SF	5.50	14,300
	MISC. DEMO/RESTORATION WORK	1	LS	6,375.05	6,375
	MAIN METERBOARD				
	15 KV MAIN METERBOARD & SWITCHGEAR, 5 SECTIONS, ENCLOSED, WP	1	EA	95,000.00	95,000
	EXTRA FOR GROUND FAULT INTERRUPTER	1	EA	14,250.00	14,250
	EXTRA FOR METERING SECTION	1	EA	40,000.00	40,000
	EQUIPMENT GROUNDING	1	EA	1,500.00	1,500
	SELECTOR SWITCH				
	SS #1 THRU SS #7, NEMA-3R + PAD	7	EA	10,000.00	70,000
	EQUIPMENT GROUNDING	7	EA	750.00	5,250
	TRANSFORMERS				
	TRANSFORMER, 150 KVA + PAD	1	EA	19,875.00	19,875
	TRANSFORMER, 225 KVA + PAD	3	EA	29,250.00	87,750
	TRANSFORMER, 75 KVA, NEMA-3R + PAD	1	EA	12,375.00	12,375

PROJECT: INFRASTRUCTURE UPGRADE PROJECT - UTILITY PROGRAM	**JYI #:**	**V1716A2**
LOCATION : MORENO VALLEY CAMPUS - RIVERSIDE, CA	**DATE:**	**22-Jun-10**
CLIENT: PSOMAS ASSOCIATES	**REVISED:**	
DESCRIPTION: CONCEPTUAL OPINION OF COST		

ITEM NO.	DESCRIPTION	EST QTY	UNIT	UNIT COST	TOTAL
	TRANSFORMER, 150 KVA, NEMA-3R + PAD	5	EA	23,625.00	118,125
	TRANSFORMER, 225 KVA, NEMA-3R + PAD	3	EA	34,875.00	104,625
	TRANSFORMER, 300 KVA, NEMA-3R + PAD	1	EA	46,125.00	46,125
	TRANSFORMER, 750 KVA, NEMA-3R + PAD	1	EA	85,500.00	85,500
	EQUIPMENT GROUNDING	15	EA	1,500.00	22,500
	ELECTRICAL MANHOLES				
	EMH	4	EA	3,850.00	15,400
	SCE MANHOLE, 3' X 5'	1	EA	10,000.00	10,000
	PRIMARY CONDUIT				
	(1) - 5" PVC CONDUIT	700	LF	34.74	24,318
	P.O.C. TO (E) CAPACITOR #1	1	EA	1,312.50	1,313
	P.O.C. TO (E) SWITCH & RADIO METER	1	EA	1,500.00	1,500
	CABLING & POC			-	BY SCE CO
	12 KV FEEDERS, "F1", "F2", & "F3"				
	FEEDER "F1" & "F2" - 5" PVC CONDUIT + 350 KCMIL ERP MV-105 ALUMINUM WIRES	2,920	LF	42.94	125,385
	FEEDER "F3" - 4" PVC CONDUIT + #1 ERP MV-105 ALUMINUM WIRES	100	LF	33.73	3,373
	P.O.C. TO (E) ELECTRICAL PULLBOX	4	EA	2,000.00	8,000
	BUILDING STUB	9	EA	550.00	4,950
	TRANSFORMER FEEDERS				
	75 KVA FEEDER, PVC	200	LF	23.93	4,786
	150 KVA FEEDER, PVC	1,410	LF	32.56	45,910
	225 KVA FEEDER, PVC	1,390	LF	56.65	78,744
	750 KVA FEEDER, PVC	160	LF	216.67	34,667
	TRENCH & DUCBANK				
	SAWCUT (E) PAVING	3,940	LF	4.50	17,730
	DEMO/HAUL (E) PAVING DEBRIS	3,940	SF	5.00	19,700
	REMOVE PORTION OF (E) PLANTING/IRRIGATION	9,180	SF	1.00	9,180
	CONCRETE DUCTBANK	6,560	LF	54.00	354,240
	RESTORE PAVING, MATCH EXISTING	3,940	SF	5.00	19,700
	RESTORE PLANTING/IRRIGATION, MATCH EXISTING	9,180	SF	5.50	50,490
OTHER RECOMMENDATIONS					
	SHORT CIRCUIT/ARC FLASH STUDY, ALLOWANCE	1	LS	15,000.00	15,000
	WIRELESS MULTI-METERING SYSTEM (w/ energy software package for energy analysis, 3 phase wireless meter transceivers for wireless metering and be capable of metering 480V & 208V), ALLOWANCE	1	LS	35,000.00	35,000
SITE LIGHTING SYSTEM ALLOWANCES					
	REPLACE ALL (E) POST TOP FIXTURES & OTHER DECO FIXTURES W/ A COMMON CUT-OFF DECO FIXTURES THAT WILL PROVIDE A VISUALLY COMFORTABLE ENVIRONMENT & PREVENT GLARE, AND SPACED TO MEET THE CURRENT "IES" LIGHT LEVELS FOR PATHWAYS (ALLOWANCE BASED ON 5% OF SITE AREAS HAVING LIGHTED PATHWAYS: APPROX. GROSS SITE = 2,620,000SF x 5% = 131,000 SF)	1	LS	131,000.00	131,000

PROJECT: INFRASTRUCTURE UPGRADE PROJECT - UTILITY PROGRAM	**JYI #:**	**V1716A2**
LOCATION : MORENO VALLEY CAMPUS - RIVERSIDE, CA	**DATE:**	**22-Jun-10**
CLIENT: PSOMAS ASSOCIATES	**REVISED:**	
DESCRIPTION: CONCEPTUAL OPINION OF COST		

ITEM NO.	DESCRIPTION	EST QTY	UNIT	UNIT COST	TOTAL
	SINGLE-LAMP SOURCE FOR ILLUMINATING ROADWAYS, PARKING LOTS, & PATHWAYS, HIGH-PRESSURE SODIUM LAMPS (ALLOWANCE BASED ON 18% OF SITE AREAS HAVING LIGHTED ROADS & PARKING LOTS: APPROX. GROSS SITE = 2,620,000SF x 18% = 471,600 SF - ASSUME (E) LIGHTS GET CHANGED TO HPS TYPE)	1	LS	117,900.00	117,900
	LIGHTING CONTROL PANEL & PHOTOCELLS TO CONTROL ALL LIGHT FIXTURES AT THE SAME TIME	1	LS	125,717.74	125,718
	WALL METAL HALIDES IN BUILDINGS	1	LS	-	**N.I.C.**
	REPLACE ALL BURNOUT LAMPS & BALLASTS (ASSUME SITE AREAS ONLY)	1	LS	2,500.00	2,500
	TRIM THE TREES & OBSTRUCTIONS	1	LS	8,160.00	8,160
	MISC. ELECTRICAL SYSTEM	1	LS	93,114.11	93,114
	PERMITS, TESTING & COMMISSIONING	1	LS	47,813.48	47,813
	SUBTOTAL				**2,438,487**
8.0	TELECOMMUNICATIONS				
	SCE SERVICE CONDUIT				
	(1) - 4" PVC CONDUIT	1,080	LF	24.87	26,860
	MANHOLE, 6' X 11' X 7'	1	EA	16,650.00	16,650
	P.O.C. TO (E) SCE PULLBOX, STREET	1	EA	3,000.00	3,000
	VERIZON SERVICE CONDUIT				
	(2) - 4" PVC CONDUIT	970	LF	44.15	42,826
	PULLBOX, 3' X 5'	2	EA	3,510.00	7,020
	TIME WARNER SERVICE CONDUIT				
	(1) - 4" PVC CONDUIT	970	LF	24.87	24,124
	PULLBOX, 2' X 3'	2	EA	1,890.00	3,780
	TELECOM INFRASTRUCTURES, CONDUITS & MANHOLES ONLY, FIBER & COPPER CABLES NOT INCLUDED				
	(2) - 4" PVC CONDUIT	1,360	LF	44.15	60,044
	(3) - 4" PVC CONDUIT	1,080	LF	66.23	71,528
	(4) - 4" PVC CONDUIT	1,150	LF	88.30	101,545
	(6) - 4" PVC CONDUIT	730	LF	132.46	96,696
	(8) - 4" PVC CONDUIT	400	LF	167.89	67,156
	REMOVE (E) HANDHOLE & REPLACE W/ (N) 5' X 3' X 4' U/G PULLBOX	1	EA	5,072.40	5,072
	CPB, 5'L X 3'W X 4'D	3	EA	4,230.00	12,690
	CMH, 12'L X 6'W X 7'D	6	EA	11,880.00	71,280
	INTERCEPT (E) 3 - 4" C.O. & P.O.C. (N) 6 - 4" C.O.	1	EA	1,706.25	1,706
	INTERCEPT (E) 6 - 4" C.O. & P.O.C. (N) 6 - 4" C.O.	1	EA	2,437.50	2,438
	INTERCEPT (E) 12 - 4" C.O. & P.O.C. (N) 12 - 4" C.O.	1	EA	3,656.25	3,656
	P.O.C. (N) 2 - 4" C.O. TO (E) WALL PULLBOX	1	EA	325.00	325
	P.O.C. (N) 2 - 4" C.O. TO (E) PULLBOX/CMH	2	EA	351.00	702
	P.O.C. (N) 3 - 4" C.O. TO (E) PULLBOX/CMH	1	EA	526.50	527
	P.O.C. (N) 4 - 4" C.O. TO (E) PULLBOX/CMH	1	EA	702.00	702
	P.O.C. TO (E) BUILDINGS + PENETRATION	2	EA	554.00	1,108

PROJECT: INFRASTRUCTURE UPGRADE PROJECT - UTILITY PROGRAM — **JYI #: V1716A2**
LOCATION : MORENO VALLEY CAMPUS - RIVERSIDE, CA — **DATE: 22-Jun-10**
CLIENT: PSOMAS ASSOCIATES — **REVISED:**
DESCRIPTION: CONCEPTUAL OPINION OF COST

ITEM NO.	DESCRIPTION	EST QTY	UNIT	UNIT COST	TOTAL
	NEW BUILDING STUB, 3 - 4" C.O.	3	EA	750.00	2,250
	TRENCH & DUCBANK				
	SAWCUT (E) PAVING	6,080	LF	4.50	27,360
	DEMO/HAUL (E) PAVING DEBRIS	6,080	SF	5.00	30,400
	REMOVE PORTION OF (E) PLANTING/IRRIGATION	5,660	SF	1.00	5,660
	CONCRETE DUCTBANK	5,870	LF	75.00	440,250
	RESTORE PAVING, MATCH EXISTING	6,080	SF	5.00	30,400
	RESTORE PLANTING/IRRIGATION, MATCH EXISTING	5,660	SF	5.50	31,130
	OTHER SCOPES				
	REMOVE (E) "NOC" LOCATED AT ROOF OF BUILDING #3 & REPLACE W/ NEW NETWORKING OPERATING CENTER "NOC" LOCATED NEAR (E) BUILDING #5. DATA CENTER, 20' X 25', ALLOWANCE INCLUDES (N) BUILDING, TRANSFER OF EQUIPMENT & IS BASED ON BID PRICE FOR SIMILAR PROJECT AT LB COMMUNITY COLLEGE PER INPUT FROM MR. LARRY GILLEN, COMMUNICATIONS ENGINEER ON 3/18/10	1	LS	1,250,000.00	1,250,000
	MISC. TELECOM SYSTEM & ALLOWANCES	1	LS	121,944.21	121,944
	PERMITS, TESTING & COMMISSIONING	1	LS	51,216.57	51,217
	SUBTOTAL				**2,612,045**
9.0	CENTRAL PLANT				$
	CENTRAL PLANT, OPTION #1 (SIMILAR TO OPTION #2)				
	RE-USE (E) BUILDING + NECESSARY RENOVATION WORK	1,500	SF	200.00	300,000
	ISOLATION VALVES TO (E) CHILLERS & BOILERS (ALLOWANCE)	1	LS	35,000.00	35,000
	VFD TO (E) PUMPS, CHWP & HHWP (SAY 175 HP)	1	LS	67,375.00	67,375
	THERMAL STORAGE TANK	1	EA	400,000.00	400,000
	MISCELLANEOUS WORK				
	PERMITS, TESTING & COMMISSIONING	1	LS	1,750.00	1,750
	MISC. DEMO WORK	1	LS	10,000.00	10,000
	GENERAL PROTECTION ALLOWANCE, WORK AREA LIMIT	1	LS	10,000.00	10,000
	SUBTOTAL				**824,125**
10.0	NATURAL GAS SYSTEM				
	DEMOLITION				
	P.O.D. GAS PIPES	2	EA	273.75	548
	REMOVE (E) U/G GAS PIPINGS + REMOVAL OF (E) PLANTING/IRRIGATION + RESTORATION	140	LF	51.50	7,210
	NEW GAS PIPINGS				
	1 1/2" Ø GAS PIPE	70	LF	19.10	1,337
	2" Ø GAS PIPE	480	LF	22.40	10,752
	3" Ø GAS PIPE	1,050	LF	30.98	32,529
	4" Ø GAS PIPE	400	LF	35.97	14,388
	P.O.C. TO EXISTING	3	EA	161.50	485

Prepared by Jacobus & Yuang, Inc.

PROJECT: INFRASTRUCTURE UPGRADE PROJECT - UTILITY PROGRAM — **JYI #: V1716A2**
LOCATION : MORENO VALLEY CAMPUS - RIVERSIDE, CA — **DATE: 22-Jun-10**
CLIENT: PSOMAS ASSOCIATES — **REVISED:**
DESCRIPTION: CONCEPTUAL OPINION OF COST

ITEM NO.	DESCRIPTION	EST QTY	UNIT	UNIT COST	TOTAL
	CAP 2" GAS PIPE	1	EA	273.75	274
	CAP 3" GAS PIPE	1	EA	319.38	319
	BUILDING STUB	4	EA	450.00	1,800
	SAWCUT (E) PAVING, ON SITE	2,240	LF	4.50	10,080
	DEMO/HAUL (E) PAVING DEBRIS	2,240	SF	4.00	8,960
	REMOVE PORTION OF (E) PLANTING/IRRIGATION	1,760	SF	1.00	1,760
	RESTORE PAVING, MATCH EXISTING, ON SITE	2,240	SF	5.00	11,200
	RESTORE PLANTING/IRRIGATION, MATCH EXISTING	1,760	SF	5.50	9,680
	OTHER SCOPE				
	SEISMIC VALVE, 4"	2	EA	7,035.00	14,070
	MONITORING SWITCH FOR SEISMIC VALVE + LOW VOLTAGE POWER CONNECTION	2	EA	1,250.00	2,500
	GAS SUB-METERS TO ALL BUILDING + PRV/SEISMIC ASSEMBLY, 1 1/2" - 2 1/2"	10	EA	3,600.00	36,000
	WORK BY GAS COMPANY INCLUDING CUTTING & PATCHING TO (E) PAVING				
	REMOVE & REPLACE (E) GAS METER #1, 4" + PRV ASSEMBLY	1	EA	4,700.00	4,700
	NEW GAS METER #2, 4" + PRV ASSEMBLY	1	EA	10,575.00	10,575
	4" MPG, ON SITE	100	LF	35.97	3,597
	P.O.C. TO EXISTING, STREET	1	EA	1,850.00	1,850
	SAWCUT (E) PAVING, STREET	200	LF	5.50	1,100
	DEMO/HAUL (E) PAVING DEBRIS	200	SF	4.00	800
	RESTORE PAVING, MATCH EXISTING, STREET	200	SF	7.50	1,500
	MISCELLANEOUS WORK				
	MISC. GAS PIPING SYSTEM/VALVES AND FITTINGS	1	LS	20,486.39	20,486
	MISC. DEMO WORK	1	LS	7,500.00	7,500
	PROTECT-IN PLACE EXISTING UTILITIES	1	LS	7,500.00	7,500
	PERMITS, TESTING & COMMISSIONING	1	LS	11,174.98	11,175
	GENERAL PROTECTION ALLOWANCE, WORK AREA LIMIT	1	LS	7,500.00	7,500
	SUBTOTAL				**242,175**
11.0	MISCELLANEOUS				$ -
	ALLOWANCE FOR ADDITIONAL RESTORATION TO EXISTING SITE CONDITIONS DISTURBED DURING CONSTRUCTION	1	LS	100,000.00	100,000
	SUBTOTAL				**100,000**

PROJECT: INFRASTRUCTURE UPGRADE PROJECT - UTILITY PROGRAM		**JYI #:**	**V1716A2**
LOCATION : MORENO VALLEY CAMPUS - RIVERSIDE, CA		**DATE:**	**22-Jun-10**
CLIENT: PSOMAS ASSOCIATES		**REVISED:**	
DESCRIPTION: CONCEPTUAL OPINION OF COST			

ITEM NO.	DESCRIPTION	EST QTY	UNIT	UNIT COST	TOTAL
	ADDITIVE ALTERNATES				
1	**ELECTRICAL SYSTEM ALTERNATE - PER OPTION #2 SINGLE LINE, IN LIEU OF OPTION #1 (BASE)**				
	ADD WORK				
	NORTH CAMPUS POWER SYSTEM - OPTION #2				
	DEMO WORK				
	P.O.D. POWER FROM (E) SCE U/G PULLBOX	1	EA	1,875.00	1,875
	P.O.D. POWER FROM (E) SCE CAPACITOR	1	EA	1,125.00	1,125
	P.O.D. POWER FROM (E) BUILDINGS	6	EA	2,250.00	13,500
	REMOVE (E) 75 KVA TRANSFORMER	4	EA	1,500.00	6,000
	TRENCH & REMOVE (E) U/G PULLBOX	2	EA	1,081.60	2,163
	TRENCH & REMOVE (E) SCE HV PRIMARY FEEDER	2,260	LF	33.33	75,326
	TRENCH & REMOVE (E) SITE HV FEEDER	1,220	LF	33.33	40,663
	REMOVE (E) O/H POWER LINE	80	LF	25.00	2,000
	SAWCUT (E) PAVING	4,420	LF	4.50	19,890
	DEMO/HAUL (E) PAVING DEBRIS	4,420	SF	5.00	22,100
	REMOVE PORTION OF (E) PLANTING/IRRIGATION	2,540	SF	1.00	2,540
	RESTORE PAVING, MATCH EXISTING	4,420	SF	5.00	22,100
	RESTORE PLANTING/IRRIGATION, MATCH EXISTING	2,540	SF	5.50	13,970
	MISC. DEMO/RESTORATION WORK	1	LS	5,581.29	5,581
	MAIN METERBOARD				
	15 KV MAIN METERBOARD & SWITCHGEAR, 3 SECTIONS, ENCLOSED, WP	1	EA	95,000.00	95,000
	EXTRA FOR GROUND FAULT INTERRUPTER	1	EA	14,250.00	14,250
	EXTRA FOR METERING SECTION	1	EA	40,000.00	40,000
	EQUIPMENT GROUNDING	1	EA	1,500.00	1,500
	SELECTOR SWITCH				
	SS #1 THRU SS #7, NEMA-3R + PAD	7	EA	10,000.00	70,000
	EQUIPMENT GROUNDING	7	EA	750.00	5,250
	TRANSFORMERS				
	TRANSFORMER, 150 KVA + PAD	2	EA	19,875.00	39,750
	TRANSFORMER, 225 KVA + PAD	3	EA	29,250.00	87,750
	TRANSFORMER, 75 KVA, NEMA-3R + PAD	1	EA	12,375.00	12,375
	TRANSFORMER, 150 KVA, NEMA-3R + PAD	3	EA	23,625.00	70,875
	TRANSFORMER, 225 KVA, NEMA-3R + PAD	2	EA	34,875.00	69,750
	TRANSFORMER, 300 KVA, NEMA-3R + PAD	1	EA	46,125.00	46,125
	TRANSFORMER, 750 KVA, NEMA-3R + PAD	1	EA	85,500.00	85,500
	EQUIPMENT GROUNDING	13	EA	1,500.00	19,500
	ELECTRICAL MANHOLES				
	EMH	6	EA	3,850.00	23,100
	SCE MANHOLE, 3' X 5'	1	EA	10,000.00	10,000
	PRIMARY CONDUIT				
	(1) - 5" PVC CONDUIT	700	LF	34.74	24,318
	P.O.C. TO (E) CAPACITOR #1	1	EA	1,312.50	1,313
	P.O.C. TO (E) SWITCH & RADIO METER	1	EA	1,500.00	1,500

PROJECT: INFRASTRUCTURE UPGRADE PROJECT - UTILITY PROGRAM		**JYI #:**	**V1716A2**
LOCATION : MORENO VALLEY CAMPUS - RIVERSIDE, CA		**DATE:**	**22-Jun-10**
CLIENT: PSOMAS ASSOCIATES		**REVISED:**	
DESCRIPTION: CONCEPTUAL OPINION OF COST			

ITEM NO.	DESCRIPTION	EST QTY	UNIT	UNIT COST	TOTAL
	CABLING & POC			-	BY SCE CO
	12 KV FEEDERS, "F1" & "F2"				
	FEEDER "F1" & "F2" - 5" PVC CONDUIT + 350 KCMIL ERP MV-105 ALUMINUM WIRES	2,960	LF	42.94	127,102
	P.O.C. TO (E) ELECTRICAL PULLBOX	1	EA	2,000.00	2,000
	BUILDING STUB	9	EA	550.00	4,950
	TRANSFORMER FEEDERS				
	75 KVA FEEDER, PVC	200	LF	23.93	4,786
	150 KVA FEEDER, PVC	970	LF	32.56	31,583
	225 KVA FEEDER, PVC	1,450	LF	56.65	82,143
	300 KVA FEEDER, PVC	20	LF	87.35	1,747
	750 KVA FEEDER, PVC	160	LF	216.67	34,667
	TRENCH & DUCBANK				
	SAWCUT (E) PAVING	3,380	LF	4.50	15,210
	DEMO/HAUL (E) PAVING DEBRIS	3,380	SF	5.00	16,900
	REMOVE PORTION OF (E) PLANTING/IRRIGATION	9,580	SF	1.00	9,580
	CONCRETE DUCTBANK	6,480	LF	54.00	349,920
	RESTORE PAVING, MATCH EXISTING	3,380	SF	5.00	16,900
	RESTORE PLANTING/IRRIGATION, MATCH EXISTING	9,580	SF	5.50	52,690
	DEDUCT WORK				
	DEDUCT OPTION #1 ELECTRICAL WORK	(1)	LS	1,813,636.65	(1,813,637)
	SUBTOTAL				**(116,770)**
	ADD PRORATES PER BASE ESTIMATE	46.1%			**(53,848)**
	TOTAL ESTIMATED COST THIS ITEM				**(170,618)**
2	**CENTRAL PLANT ALTERNATE - OPTION #3 IN LIEU OF OPTION #1 (BASE)**				
	ADD WORK				
	CENTRAL PLANT, OPTION #3				
	NEW CP-1 BUILDING	4,000	SF	300.00	1,200,000
	CENTRAL PLANT M,P,& E EQUIPMENT (INCLUDES COOLING TOWER + CHILLER)	1,550	TON	2,500.00	3,875,000
	THERMAL STORAGE TANK	1	EA	400,000.00	400,000
	PERMITS, TESTING & COMMISSIONING	1	LS	50,000.00	50,000
	MISC. DEMO WORK	1	LS	5,000.00	5,000
	GENERAL PROTECTION ALLOWANCE, WORK AREA LIMIT	1	LS	5,000.00	5,000
	DEDUCT WORK				
	DEDUCT OPTION #1	(1)	LS	824,125.00	(824,125)
	SUBTOTAL				**4,710,875**
	ADD PRORATES PER BASE ESTIMATE	46.1%			**2,172,411**
	TOTAL ESTIMATED COST THIS ITEM				**6,883,286**

PSOMAS

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