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DRAFT

**CIVIL ENGINEERING
BASIS OF DESIGN**

**Prepared for:
SAN DIEGO STATE UNIVERSITY**

**c/o Gatzke Dillon & Balance LLP
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J-18150**



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1. Introduction

The San Diego State University (SDSU) Mission Valley Project (SDSU) is comprised of a 35,000 seat Aztec stadium, 1,600,000 million square foot campus, 400 Hotel room, 95,000 square feet of retail, and 4,600 residential units and a River Park with active and passive recreational facilities. In order to implement the project, the following “big picture” sequencing will occur for opening day:

- Demolition of the existing SDCCU Stadium
- Removal of the existing asphalt parking lots and facilities
- Earthwork and import to elevate the site above the 100-year floodplain
- Construction of Aztec stadium
- Construction of required infrastructure including roads, water, sewer, fire system and storm drain facilities
- Construction of the SDSU/Community Riverpark

There will be required temporary facilities as shown in the Civil Engineering Design Development Drawings and Improvements required to the adjacent City of San Diego streets for tie-in of the proposed project.

2. Improvements and Utilities

All improvement and utilities design and construction standards and specifications shall as a minimum comply with the “Greenbook” and “Whitebook” Standard Specifications, City of San Diego Standard Drawings and SDSU Standard Drawings and Specifications, as required. The following are specific civil engineering scope of work items for a Basis of Design:

3. Demolition

In order to complete the work required for the SDSU project, surface improvement demolition and utility demolition for the following will be needed:

- Asphalt pavement
- Concrete pavement and structures
- SDCCU Stadium and all associated facilities

- Miscellaneous out-structure buildings
- Utilities, water, sewer and storm drain
- Electrical facilities and parking lot lighting
- CATV, telephone facilities
- All existing concrete and asphalt pavement shall be recycled and be used within the project fill or as road base as allowed by the Geotechnical Engineer.

4. **Field Surveying and Topography**

The existing aerial topography as shown in the Civil Engineering Design Development Drawings are at 1' contour interval and at NAVD88 vertical datum. Additional field surveys will be required by the Engineer of Record to tie-in adjacent improvements, locate horizontally and vertically all subsurface utilities and improvements. Potholing or additional utility location detection means (potholing, GPR, etc.) will be required to identify and locate underground facilities. All facilities and utilities shown on the Civil Engineering Design Development Drawings are approximate in size and location and shown from existing as-built information. This information shall be verified by the Contractor and Engineer of Record. The exact location needs to be determined with proper field verification.

5. **Roads and Streets**

All proposed roads for the SDSU project shall include a pavement structural section per the Geotechnical Engineer and SDSU requirements. These road sections will be evaluated based upon the ADT and TI from the project traffic study and as a minimum provide fire truck H2O loading. The existing parking lot/road paving shall be reused as allowed by the Geotechnical Engineer for road base and asphalt per geotechnical requirements.

The proposed roadway cross-sections are illustrated in the architectural and Civil Engineering Design Development Package. These street cross-sections are based upon the City of San Diego Street Design Manual, dated March 2017. The proposed street classifications and design criteria for design speeds are as determined in the SDSU Traffic Study (see Figure 1). Therefore, all required horizontal street radii, street slope (vertical alignments) and vertical curve requirements are derived from this traffic analysis and resulted in modified street cross-sections and design criteria as shown in the Civil Engineering Design Development Drawings.

FIGURE 1

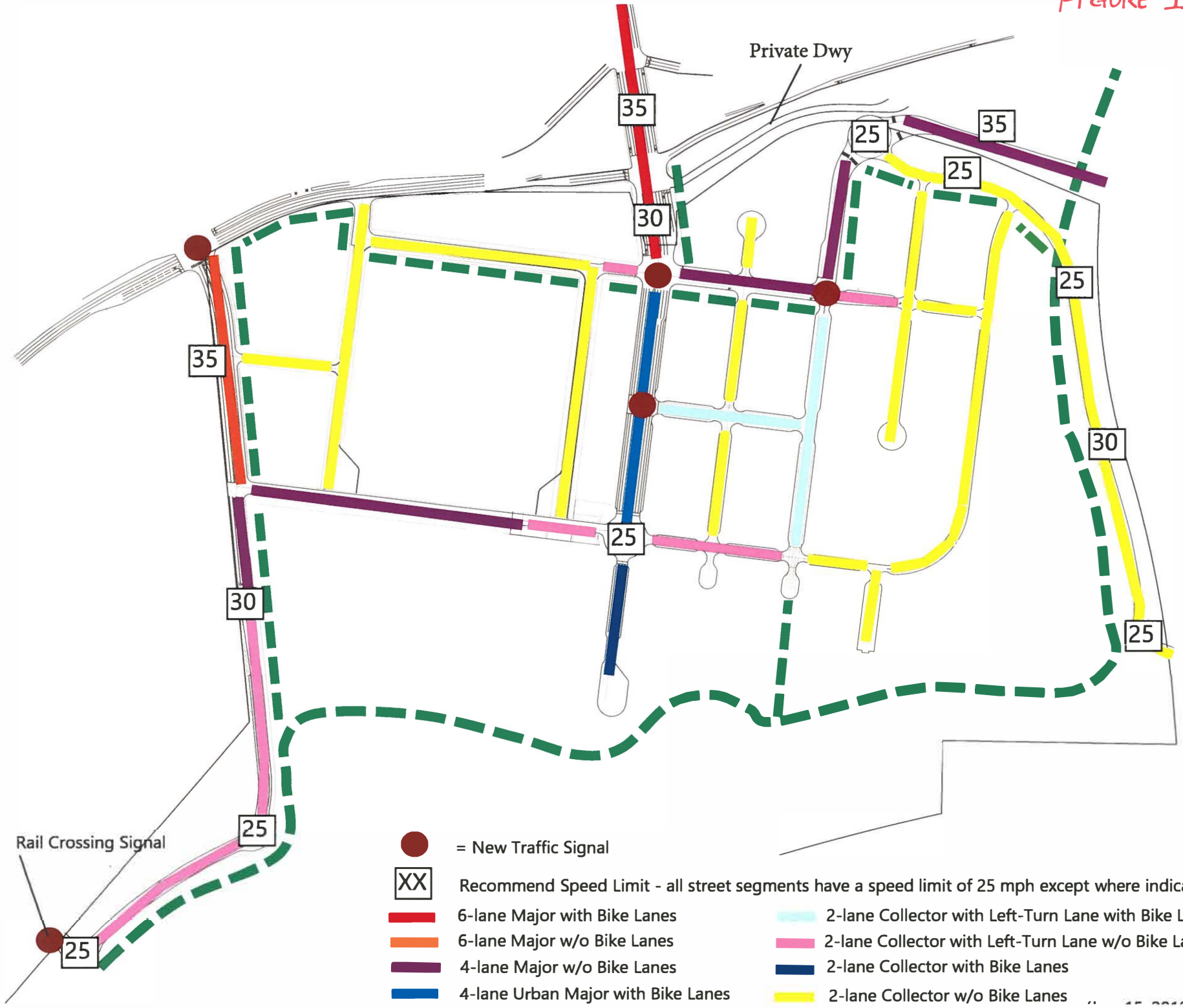


FIGURE 1

The following are specific design objectives:

- All City of San Diego roadways within the public right-of-way shall utilize Schedule “J” paving per the City of San Diego Standard Drawings.
- All horizontal and vertical alignments shall comply with the current AASHTO Highway Design Manual, the Caltrans Highway Design Manual and the City of San Diego Street Design Manual as appropriate. The minimum street vertical alignment shall be at 0.6% per the City of San Diego Transportation and Stormwater Design Manual, dated January 2017.
- All horizontal and vertical alignments as shown on the Civil Engineering Design Development Drawings are preliminary and the Engineer of Work shall prepare plans and specifications to meet applicable engineering and SDSU standards.
- All roadway accessibility standards shall meet California Title 24 Accessibility Standards and Federal/CSU ADA Standards.
- All traffic signals, crosswalks and pedestrian ramps and intersection control signage are to be designed to meet current MUTCD and ADA standards.
- All street lighting to be designed per the City of San Diego Street Design Manual dated March 2017, SDSU requirements and Carrier Johnson Design Guidelines. Additional photometric lighting studies may be required to meet the minimum lighting foot candle requirements of the ANSI/IES RP-8-14 Roadway Lighting Manual.
- All temporary parking facilities will either utilize asphalt cement (AC) pavement per Geotechnical Engineer’s recommendation or a $\frac{3}{4}$ ” gravel base per Geotechnical Engineer and/or SDSU’s directive.
- All PCC flatwork for urban parkways, shared use bike path, River Community Park trails and amenities, bike paths, and curb and gutter shall meet either the City of San Diego “Greenbook” and “Whitebook” Specifications for Public Works Construction or the Landscape Development Package Specifications as required by SDSU. In addition, all PCC surfaces shall maintain a minimum static coefficient of friction of 0.5.

- All roundabouts shall be designed using the National Cooperative Highway Research Program (NCHRP) Report, CA MUTCD, and California Department of Transportation Highway Design Manual.
- The MTS at grade crossings at Fenton Parkway shall comply with MTS/CPUC Standards for crossing design, signage, signalization and permitting.
- All knuckles shall be designed to the County of San Diego Standard Drawing DS-15 (Figure #2) criteria. Modifications can be made utilizing engineering design standards for justification. The EIR Traffic Study is the basis of the requirement and traffic mitigation for the knuckle locations.
- All signage and traffic calming requirements to meet AASHTO and MUTCD Standards.

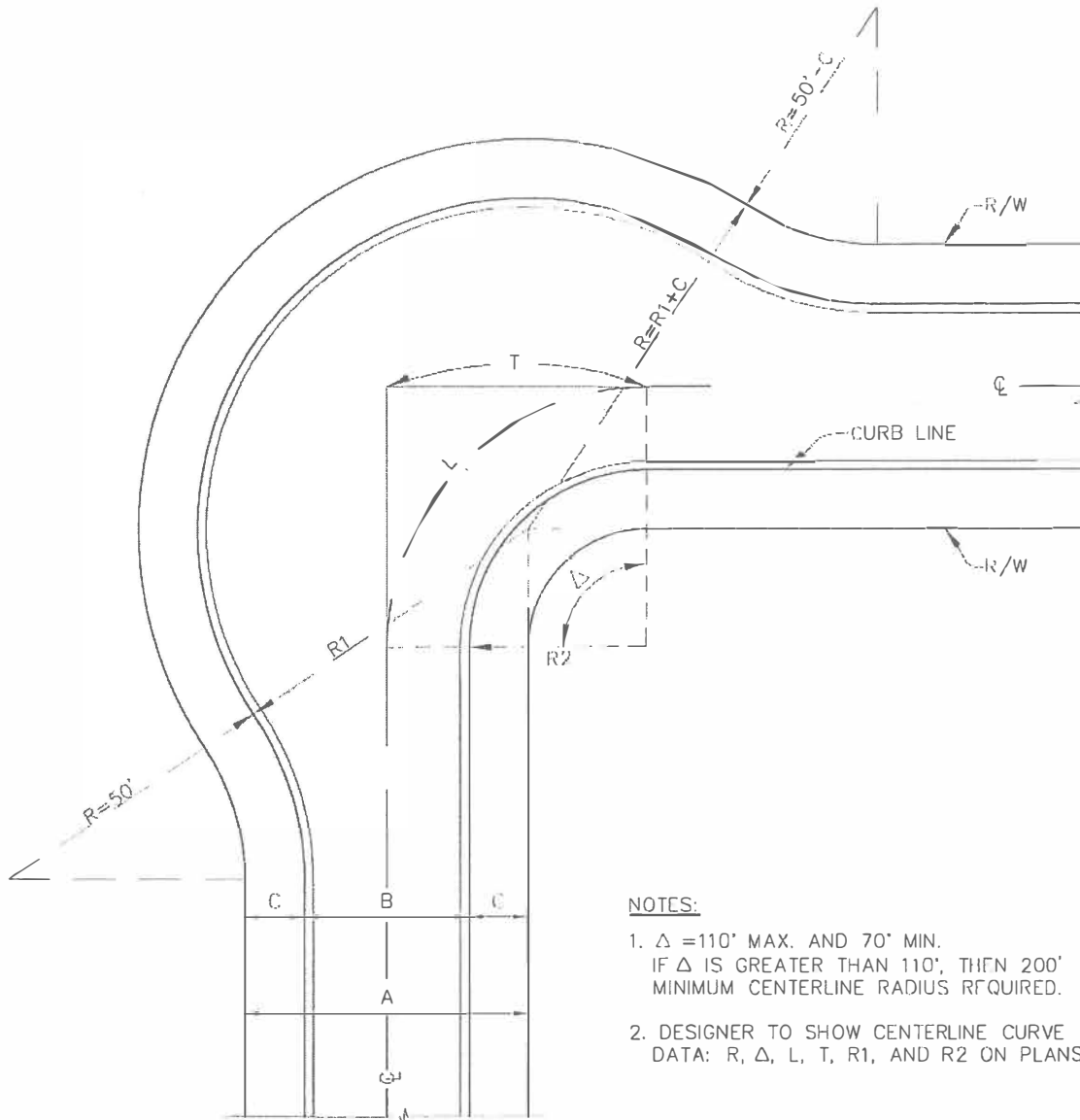
6. Water Distribution (Domestic and Fire)

All water facility shown on the Civil Engineering Design Development Drawings are preliminary and the Engineer of Work shall prepare final plans and specifications per City of San Diego Engineering and SDSU Standards.

All private and public water and fire distribution systems shall be governed by the City of San Diego Water Facilities Design Guidelines, the City of San Diego Standard Drawings and AWWA Water Facility Standards. All facilities shall be designed as shown on the Civil Engineering Design Development Drawings prepared by Rick Engineering and the approved Water Study for SDSU Mission Valley prepared by Dexter Wilson Engineering and will operate at the 390 HGL Pressure Zone. Two specific City of San Diego water mains will need to be relocated:

- 1) 48" SCRW water main (536 pressure zone – Alvarado second pipeline)
- 2) 16" AC water main (390 pressure zone)

These public water pipelines/mains will follow the City of San Diego Water Facility Design Guidelines for pipeline requirements, appurtenances (A.V., B.O., fire hydrants, thrust blocks, cathodic protection, valves, pressure reducing stations, etc.) and specifications. These pipeline relocations will require plans and permits from the City of San Diego. All required easement abandonment and new required water easements and access shall be provided for access and maintenance for the water facilities as required by the City of San Diego and as illustrated on the Civil Engineering Design Development Drawings.



NOTES:

1. $\Delta = 110'$ MAX. AND $70'$ MIN.
IF Δ IS GREATER THAN $110'$, THEN $200'$ MINIMUM CENTERLINE RADIUS REQUIRED.
2. DESIGNER TO SHOW CENTERLINE CURVE DATA: R , Δ , L , T , $R1$, AND $R2$ ON PLANS.

PLAN
NO SCALE

A (R/W)	B	R1*	R2*	C*
72'	52'	80'	40'	10'
60'	40'	68'	30'	10'
56'	36'	64'	30'	10'
52'	32'	60'	30'	10'
48'	28'	56'	30'	10'

* DIMENSIONS SHOWN ARE MINIMUMS

DRAWN BY: <u>PBM</u> CHECKED BY: <u>JSM</u> RECOMMENDED BY: JEFF S. MOODY, P.E. APPROVED BY COUNTY ENGINEER <i>Mohamad</i> DATE: <u>10/15/12</u> MOHAMAD FAKHRIYOUNE, P.E. R.C.E. NO. 44520, EXP 3/31/2014	SAN DIEGO COUNTY DESIGN STANDARD STREET KNUCKLE	REVISIONS REV APPROVED JSM DATE 10/2012	DRAWING NUMBER DS-15
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As shown on the water studies and Civil Engineering Design Development Drawings, City of San Diego domestic water meters, fire services and irrigation meters will be required to provide adequate water and fire service to the site. The water/irrigation meters and fire service laterals to be designed, sized, with appropriate easements and access provided, and permitted with the City of San Diego in accordance with the City of San Diego Water Facility Design Guidelines. All onsite private water and fire shall provide redundant water looping as shown in the water study.

As each development parcel or block, campus, stadium etc. are developed, a separate water service with sub meter and fire service with backflow will be required to service each facility. These facilities shall be designed to the current California Unified Building Code and Unified Plumbing Code as appropriate. The Engineer of Work shall prepare an Operations and Maintenance Report for SDSU Facilities and Operations to manage the system.

7. Fire

All fire facilities as shown on the Civil Engineering Design Development Drawings are preliminary and the Engineer of Work shall prepare final plans and specifications per City of San Diego Engineering and SDSU Standards.

All fire access, fire hydrant locations, fire flow requirements for the development parcels, fire mains and appurtenances, fire service and backflow requirements shall meet the City of San Diego, Water Facilities Design Guidelines, AWWA Water Facility Standards, Unified Fire Code, State Fire Marshal and the City of San Diego Standard Drawings requirements as appropriate. The fire main distribution system and lateral connection to the City of San Diego shall be as shown in the Civil Engineering Design Development Drawings and the Water Study. All fire service connections to the City of San Diego facilities shall be sized per the Civil Engineering Design Development Drawings and the approved Water Study and all plans for fire service connections will require City of San Diego permitting.

8. Sanitary Sewer

All sewer facilities as shown on the Civil Engineering Design Development Drawings are preliminary and the Engineer of Work shall prepare final plans and specifications per City of San Diego Engineering and SDSU Standards.

The Sanitary Sewer system is a gravity system with sewer mains ranging from 8" to 18". As the system will be an "engineered sewer system", the sewer design criteria for the sewer system is the City of San Diego Sewer Design Guide, dated May 2015 and the City of San Diego Standard Drawings for the on-site sewer mains. The sewer main system is as shown on the Civil Engineering Design Development Drawings and the preliminary Sewer Study prepared by Rick Engineering. Sewer main locations shall also adhere to the State of California Department of Health Services criteria for the separation of water mains and sanitary sewer mains. All sewer mains shall be PVC and manhole spacing shall follow the City of San Diego Sewer Design Guide. In order to achieve the project goals and construction sequencing, the existing public 8" sewer main that serves 35 homes and a fire station north of the project shall be temporarily relocated during initial construction activities of Aztec Stadium. Once full site construction is underway, the west portion of existing SDCCU stadium is demolished and the sewer main in Aztec Way is constructed, then that 8" sewer main can be tied into that new sewer system as shown on the Civil Engineering Design Development Drawings.

Due to the extremely flat slopes required to convey sewer flow to the existing 84"/96" Mission Valley Trunk Sewer Interceptor, several modifications will be required for the "engineered sewer system":

- Modified connections to the 84"/96" trunk sewer will be required that match the current existing 18" sewer main connection from the existing SDCCU Stadium to the 84"/96" Mission Valley Trunk Sewer.
- No drops across the sewer manholes shall be constructed. The sewer main slope shall be constructed through the manhole. PVC lined sewer manhole bases shall be implemented to minimize flow disruptions.
- The minimum sewer slope shall be 0.3% with a minimum 2 FPS sewer flow velocity in peak flows. The sewer system final engineering shall be designed to maximize sewer slopes in the sewer mains.
- All sewer flows and sewer study shall conform to the City of San Diego Sewer Design Guide for flow estimation.

- Sewer flows shall not exceed a dn/D of 50% for sewer mains of 15" and smaller and a dn/D of 75% for 18" sewer mains.
- All easements and access for City of San Diego sewer facilities shall conform to the City of San Diego Sewer Design Guide and the Civil Engineering Design Development Drawings.
- All public sewer systems and connections to existing sewer systems shall have plans prepared and permitted with the City of San Diego.
- Due to the flat sewer main slopes for the proposed sewer system, SDSU shall monitor the sewer system and provide sewer system inspections and provide preventive cleaning to eliminate any sewer system issues. Engineer of Work to prepare an Operations and Maintenance Report for SDSU Facilities and Operations to manage the system.
- All sewer manhole rims located within the 100-year floodplain shall be fitted with locking and water-tight lids.
- Special design considerations for sewer mains deeper than 15' shall be implemented per the City of San Diego Sewer Design Guidelines.
- Sewer junction structures to the 84"/96" Mission Valley Trunk Sewer will require specialized structural design. See Civil Engineering Design Development Drawings.
- All deep sewer manholes will require specialized structural design.
- All building laterals will be per the Unified Building Code and Plumbing Code and should be sized where possible to utilize a 1% minimum sewer lateral slope and connect to the sewer mains with a manhole connection in location that have vertical constraints.
- Engineer of Work shall prepare final sewer study based upon final sewer main design, which incorporates the proposed stadium uses, the campus development, the residential program, and the hotel development and the retail densities to validate design slopes, velocities and sewer main sizes and shall comply with the City of San Diego Sewer Design Guide for sewer study requirements.

9. **Grading/Storm Drain Facilities**

- All grading, earthwork and soil preparation shall comply with the recommendation in the project geotechnical report, the “Greenbook” and “Whitebook” Standard Specifications and SDSU Standards.
- All permanent slopes shall be a minimum of a 2:1 slope ratio and all slopes within the river parks areas and bioretention basins shall be 3:1 or flatter minimum slope ratio.
- All earthwork calculations and quantities shown on the Civil Engineering Design Development Drawings are preliminary. Engineer of Work to prepare an earthwork analysis to incorporate project grading, geotechnical grading recommendations (bulk, shrink, remedial grading, etc.) street undercut, spoils (utility, foundation, landscape and structures, foundations, bioretention basins, etc.), stadium construction excavations and backfill, existing AC pavement, removal adjustments, existing SDCCU stadium concrete demolition and reuse. This analysis will validate and define the overall grading and earthwork requirements for all grading phases (1a, 1b, 3) of construction. This earthwork evaluation and required site plan elevation adjustments shall determine all fine site grades, earthwork calculations and import/export requirements for the project.
- All storm drain and drainage design shall comply with the City of San Diego Drainage Design Manual, City of San Diego Standard Drawings and “Greenbook” and Whitebook” Standard Specifications.
- All storm drain shall be RCP with water-tight joints due to the high HGL/EGL within the proposed storm drain system.
- All deep and larger storm drain cleanout/junction structures, box culverts, “Bubbler” storm drain outlet structures and storm drain low flow diversion structures will require specialized structural design.

- Due to the Riverpark areas located in the FEMA 100-year floodplain, special engineering design considerations shall be implemented by the Engineer of Work to mitigate the flood flows, the potential erosion impacts, facility improvements (such as park amenities, above ground facilities, bathroom structures and electrical facilities) and future maintenance requirements post storm events.
- All bioretention basins design (infiltration, subdrains, impermeable liners, etc.) shall be based upon geotechnical report requirements and have a 3:1 minimum side slope.

10. Drainage Design

There are currently three (3) main 36-inch storm drain outfalls that discharge runoff from the existing site to the San Diego River, located along the southerly edge of the project. The drainage design for the project includes routing onsite runoff via storm drain designed to convey the peak flow rates towards the proposed River Park, where low flow structures will direct runoff for the small and more frequently occurring storms through permanent storm water BMPs for water quality purposes (as described below), then discharging runoff through each of the three (3) existing storm drain outfalls.

Due to site constraints, utility conflicts, and fixed tie-in points; the proposed onsite storm drain systems have been designed to have an average slope of 0.5%. Although the average slope is relatively flat, the storm drain system shall have self-cleansing velocities of 2 FPS minimum based on preliminary analysis. The proposed storm drain pipes shall be constructed with water tight joints as they are designed for pressure flow and backwater from the San Diego River during large storm events. The proposed storm drain systems will connect into the three (3) existing storm drain systems via modified "Bubbler" structures designed to provide pressure relief during storms in excess of the storm drain capacity. During the preliminary design of the drainage system, attempts have been made to balance the tributary areas to each of the three major storm drain outfalls.

The three (3) existing storm drain outfalls are constructed within and through the existing 84-inch trunk sewer line; this makes the replacement of the existing storm drain outfalls infeasible. Furthermore, connecting the proposed storm drain into the existing storm drain outfalls will help avoid impacts to existing habitat and jurisdictional areas along the edge of the San Diego River,

thus eliminating the need for environmental permits that would otherwise be necessary to replace storm drain and outfalls within the River. The overall acreage and peak flow rate discharging to each outfall has been compared to pre-project and post-project conditions. In the pre-project condition, the westerly outfall receives a significant portion of the site, whereas the central outfall has excess capacity. In order to improve conditions for the westerly and easterly outfalls, the areas have been adjusted to increase the discharge to the central outfall. Despite the increase to the central outfall, the hydraulic grade line (HGL) will remain below ground for the portions of the development not contained in the River Park for storms up to and including the design storm event (100-year). Due to the flat storm drain pipe slopes, increased maintenance on a frequent basis will be required by SDSU to inspect and clean the drainage systems to prevent trash and sediment deposits with the drainage systems.

In addition to those three major outfalls, there are two (2) additional existing storm drain outfalls into the San Diego River along the western edge of the project. There is an existing 96-inch storm drain pipe which outfalls into the River south of the existing trolley tracks, at the terminus of Fenton Parkway. That 96-inch storm drain will be extended downstream an approximate 100 feet to accommodate the extension of Fenton Parkway onto the project site. Runoff from the project site will not be routed to that existing 96-inch storm drain pipe. There is an existing 48-inch storm drain pipe that briefly outfalls north of the existing trolley tracks, outside of the project limits, prior to entering a headwall and being conveyed via the continuation of the 48-inch storm drain into the San Diego River. In the post-project condition, this storm drain will not receive any runoff from the project. The proposed Fenton Parkway extension will go over the 48-inch storm drain pipe and this storm drain pipe will be protected and remain in place.

Currently, there is one (1) existing outfall into Murphy Canyon Creek. An existing 48-inch storm drain runs parallel along the current alignment of San Diego Mission Road prior to exiting into Murphy Canyon Creek. In the proposed condition, portions of the proposed San Diego Mission Road extension will be treated via green street elements (in the form of proprietary small footprint biofiltration units; discussed below) prior to connecting into the existing 48-inch storm drain and discharging into Murphy Canyon Creek. In addition to the above outfall, there is an existing inlet at the southeast corner of the site, close to end of San Diego Mission Village Road. A portion of the improved road will continue to discharge through this existing system; however, after runoff is treated with a similar green street element (i.e. proprietary small footprint biofiltration unit).

Based on the results of the preliminary hydrologic and hydraulic analysis, the project is expected to result in a net decrease in peak flow rates and volume of runoff compared to the pre-project condition. The anticipated reduction can be attributed to the reduction of impervious area for the overall project area. The project has utilized the City of San Diego Drainage Design Manual, dated January 2017, for guidance related to drainage design criteria. Preliminary analysis and results are included as part of the Preliminary Drainage Study for SDSU Mission Valley Campus, prepared by Rick Engineering Company dated January 31, 2019.

Note:

Phasing of drainage, water quality, and temporary BMPs will be an important consideration during final design and construction. From a drainage perspective, the acreage and peak flow rates to each existing outfall should remain similar to pre-project conditions or utilize excess capacity such that the HGL for the design storm event remains below grade. The Engineer of Work shall prepare a final drainage study based upon the final design which incorporates the ultimate SDSU Mission Valley Development Program and shall prepare an Operations and Maintenance Report for SDSU facilities and operations to manage the drainage systems.

11. Stormwater Quality Management Design

In the site's existing condition, the project site consists of over 170 acres of paved parking lots and the stadium, with little to no water quality treatment being provided prior to runoff discharging into the San Diego River. Since SDSU is considered a Phase 2 entity with regards to MS4 Permit requirements, the project is not subject to the requirements of the San Diego Regional MS4 Permit (order R9-2013-0001); however, the project has voluntarily elected to implement permanent storm water BMPs consistent with the requirements of the 2013 Regional MS4 Permit (R9-2013-0001) and the 2018 City of San Diego Storm Water Standards manual. This includes LID site design BMPs, source control BMPs, as well as pollutant control BMPs for water quality treatment. Hydromodification Management will not be required for the project since it discharges directly to the San Diego River, which has been identified as an exempt receiving water along the lower portion of the River.

At this time, the water quality design includes routing runoff from the proposed project area towards a series of biofiltration basins incorporated along the perimeter of the site and integrated into the River Park design to provide water quality treatment prior to discharging back into the River. The biofiltration basins will allow for shallow inundation during storm events, which will soak through a layer of amended soil (typically 1.5-feet in depth) and subsurface aggregate layer (typically 1-foot in depth), which includes a perforated subdrain system to slowly release treated storm water back into the storm drain system prior to discharging into the River. The biofiltration basins should be integrated into the overall park design and shall serve as passive park design features. Creative solutions and further collaboration amongst a variety of design team disciplines will be necessary during final design to further develop and accomplish this goal. Overall, the project will result in significantly improving water quality for storm water runoff as compared to the existing condition (where little to no water quality treatment is currently provided).

The water quality design for the proposed roadways improvements adjacent to the project will utilize a Green Street Approach. Per the City of San Diego Storm Water Standards Manual, the project will be exempt from Priority Development Project (PDP) designation, per PDP Exemption Category 2 as stated in Appendix J of the City of San Diego's Storm Water Standards. As such, a Priority Development Project Storm Water Quality Management Plan (PDP SWQMP), and a Hydromodification Management Plan (HMP) are not required. These adjacent improvements include, from west to east, River Park Road, Friars Road, Mission Village Road, San Diego Mission Road, and Murphy Creek Road. The water quality approach for the proposed adjacent improvements will rely upon the use of biofiltration basins, where feasible, or the use of proprietary small footprint biofiltration units (i.e. Modular Wetland System units). Portions of the offsite roadway improvements will be conveyed through the onsite drainage system and treated through the onsite biofiltration basins. Runoff from the extension of Fenton Parkway will be treated via a series of biofiltration basins incorporated along the perimeter of the site to provide water quality treatment prior to discharging back into the River. Runoff from the San Diego Mission Road extension will be treated via a proprietary small footprint biofiltration units, prior to discharging into Murphy Canyon Creek via existing storm drain outfalls. The results from the above mentioned preliminary stormwater design and analysis have been compiled into two (2) reports as follows: *Green Streets Elements for SDSU Mission Valley Campus Adjacent Improvements* and a *Preliminary Water Quality Report for SDSU Mission Valley Campus*, both prepared by Rick Engineering Company and dated January 31, 2019.

Note:

From a water quality perspective, permanent stormwater BMPs for pollutant control should be in place and operational prior to tributary land uses and impervious areas becoming operational. Once installed, it will be important that tributary areas not fully built out have adequate erosion and sediment control BMPs to help protect the permanent biofiltration basins. The Engineer of Work shall prepare a final Stormwater Management Plan based upon the final design which incorporates the ultimate SDSU Mission Valley Development Program and shall prepare an Operations and Maintenance Report for SDSU facilities and operations to manage the systems.

12. Erosion and Sedimentation Control

The project will be subject to the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities, Order No. 2009-0009-DWQ, NPDES No. CAS000002 (adopted September 2, 2009). Therefore, prior to the start of construction, a Storm Water Prevention Pollution Plan (SWPPP) will need to be developed by the Engineer of Work or Contractor in accordance with the 2009 Construction General Permit, and certified by a Qualified SWPPP Developer (QSD). The SWPPP will propose temporary Best Management Practices (BMPs) to help prevent erosion and sediment deposits from entering the existing storm drain systems and downstream receiving water. The temporary BMPs may include but not be limited to the following: silt fence, gravel bags, fiber rolls, tackifier, hydroseed, construction entrance/exit stabilization, and sediment traps or basins. During construction, implementation of the SWPPP and associated temporary BMPs will be monitored by a Qualified SWPPP Practitioner (QSP). A Notice of Termination (NOT) will ultimately be required following final stabilization of the project site.

Note:

As part of the preliminary design effort, a number of temporary sediment traps and basins have been sized. The location and sizing may change during final design, and will likely need to be implemented at various times based on construction phasing. It will be up to engineer of record during final design engineering to adequately confirm sizes and locations for the sediment traps and basins needed during the various phases of construction.

13. Floodplain

Portions of the project site, in particular the River Park, are located within the 100-year floodplain for both the San Diego River and Murphy Canyon Creek. Therefore, the project will be subject to floodplain requirements in accordance with the FEMA National Flood Insurance Program (NFIP). As part of the redevelopment of the site, development areas will be setback from the natural channels allowing for active and passive park areas to be incorporated along the easterly and southerly edge of the development. This will provide a more natural floodplain during larger events, and will reduce or eliminate the commingling of flood waters with developed areas and associated pollutants. As part of the continued planning and design of the project, an effective hydraulic analysis for the existing and proposed conditions should be prepared (using HEC-RAS or similar) by the Engineer of Work to support onsite design and to compare water surface elevations along San Diego River and Murphy Canyon to ensure compliance with FEMA NFIP requirements. The project will need to prepare, process, and obtain approval for a Conditional Letter of Map Revision (CLOMR), as applicable per FEMA NFIP requirements, prior to issuance of a grading permit, to be prepared by others.

Due to the flooding potential of the park facilities, Engineer of Work will prepare a report to identify flood prone areas, incorporate flood mitigation design and improvements into the project plans and shall prepare an Operations and Maintenance Manual to be used for SDSU Facilities and Operations to manage and maintain the park facilities.