

DIVISION 33 - UTILITIES

33 40 00 STORM DRAINAGE UTILITIES

PART 1 - GENERAL

1.01 SUMMARY

- A. This section provides guidelines for the design, analysis and installation of storm drainage systems required for all new construction on the WSU Pullman campus.
1. Design shall integrate project site hydrology into the hydrology of the entire watershed(s) in which project is located. Detention of storm flow, beyond that volume mandated for any given project, may be banked and used elsewhere within the same hydrologic unit.
 2. Storm flow mitigation, grading and hydraulic design shall be based on hydrologic analysis of the watershed and project site. Start consultations with WSU Facilities Services (Engineering Services, Campus Planning, and Plant Services) prior to 50% Design Development.
 3. Use Best Management Practices for storm flow mitigation to detain on the surface as much surface flow as feasible, as high in the watershed as practicable, for the longest time possible within parameters of watershed planning.
 - i. Direct surface flow to surface detention structures as much as possible before directing into subsurface hydraulics.
 - ii. Bioinfiltration systems do not work in the Palouse soils and climate, and shall not to be used to manage stormwater on the Pullman campus. Use vegetated swales or stormwater ponds.
 - iii. When required, analysis of pre-construction, post-construction and mitigated post-construction hydrology shall be conducted in accordance with the most current edition of Chapter 4, Stormwater Management Manual for Eastern Washington.
 - 1) Analysis shall include, but not be limited to, Return Frequency Events of 10 and 25 years. Include a statement of methods, conditions, and assumptions used in the analysis; the calculations made under these conditions; and Unit Hydrographs derived from those calculations. Analysis shall include, but not be limited to: 1) pre-construction conditions, 2) post-construction conditions without mitigation, 3) calculations documenting mitigation required, and 4) post-construction with each design proposal for mitigation.
 - 2) For project sites with post-construction disturbed soil surface(s) one acre or greater, include additional analysis for rain-over-snow conditions of the mitigated site design.
 - 3) Grading, drainage and hydrologic analysis shall be reviewed by WSU Engineering Services and Campus Planning prior to design approval.

DIVISION 33 - UTILITIES

33 40 00 STORM DRAINAGE UTILITIES

1.02 DESIGN CONSIDERATIONS

A. WSU Standard Detail Drawings:

1. C 31 23 33 "Standard Utility Trench & Pipe Placement"
2. C 33 05 13 "Standard Manhole"
3. C 33 41 00 "Perforated Storm Drain Pipe Placement and Backfill"

B. Surface Grading and Drainage

1. Provide for storm drainage for entire site. Slope all lines to drain away from buildings, athletic fields, parking lots, plazas, streets walks and mall areas.
2. Do not allow any surface flow to drain across any pedestrian surfaces.
3. Use siting, slope, shape and surface materials to minimize as much as possible any increase in peak runoff rate from new impervious surfaces prior to directing surface flow into surface detention structures.
4. Use subsurface flow control and detention structures when available surface capacity is inadequate or when known future construction will remove that surface capacity. Otherwise, use subsurface detention as secondary to surface BMP's for storm flow mitigation. Demonstrate inadequate surface capacity in the hydrologic analysis of the site design.
5. Do not design system to drain to dry wells without approval from WSU Engineering Services, Campus Planning, and Environmental Health and Safety (EH&S). In general, local soils do not allow for rapid percolation of storm runoff.
6. Do not design for retention ponds or cisterns without approval from WSU Engineering Services, Campus Planning, and EH&S. It is against state code to retain stormwater. Detain stormwater for as long as feasible, using swales and ponds.
7. For covered impervious areas (e.g., parking garages, etc.), floor drains shall discharge to the Sanitary Sewer, not the Storm Sewer.
8. Provide for flow control for all drainage from Non Pollutant Generating Impervious Surfaces (NPGIS) and runoff treatment for Pollutant Generating Impervious Surfaces (PGIS), per the most current edition of the WA Dept. of Ecology's Stormwater Management Manual for Eastern Washington.
9. For pervious concrete or asphalt, design shall account for the subsurface detention and flow of water entering subgrade layers beneath pervious surface.
10. Stabilize exposed soil as soon as possible and install grass or seed in accordance with WSU section 32 92 00 (Turf and Grasses).

DIVISION 33 - UTILITIES

33 40 00 STORM DRAINAGE UTILITIES

11. Fully integrate stormwater management designs into site landscape design and site maintenance plan in accordance with WSU section 32 90 00 (Landscaping) and 32 93 43 (Trees).

C. Subsurface Hydraulic Design

1. Design subsurface hydraulics to accommodate future increases in stormwater peak flow rates anticipated by Campus Development Plan. Consult with Engineering Services, Campus Planning, and Plant Services prior to 50% Design Development.
2. When designing subsurface storm hydraulic systems provide a manhole at all major changes in direction, major junctions, or major changes in pipe diameter. Provide a manhole at minimum every 300' along any reach of stormwater utility piping.
3. Storm manholes should be located and constructed for easy access, with fixed ladders designed according to current WA State Health and Safety rules.
4. Do not design the storm drain system to enter any part of the building foundation drainage system. This shall not be permitted under any circumstances.
5. No conditions shall be designed or installed which could directly or indirectly allow sanitary sewage or treated/contaminated water to enter into the stormwater utility system, including overland flow.
 - i. Do not co-locate storm and sanitary utilities within the same trench without specific permission from WSU Engineering Services and WSU EH&S.
 - ii. Direct into the Sanitary Sewer system any surface flow from areas designed or managed to receive animal wastes or body fluids. Do not allow biological contaminants to flow across any un-contaminated surfaces to reach a sanitary inlet. Isolate surfaces receiving contaminants from access by general public.
 - iii. During design development, check with the Pullman Wastewater Treatment Plant to determine their restrictions on how much contaminated stormwater is allowed to be discharged to the sanitary sewer.
 - iv. Do not design hydraulics that, without decontamination, deliver into the stormwater utility any chemically treated (soap, chlorine, etc.) water from swimming pools, fountains, wash racks, fueling points, steam condensers, utility tunnels, beneath loading docks or canopies, or from similar sources. Direct all such treated/contaminated water into the Sanitary Sewer system.

PART 2 - PRODUCTS

2.01 MATERIALS

DIVISION 33 - UTILITIES
33 40 00 STORM DRAINAGE UTILITIES

A. Catch Basins and Storm Drainage Structures

1. Catch basins, storm drain inlets and other storm drainage structures shall be prefabricated concrete. Do not specify hand laid brick and block drain structures.
2. Provide a minimum of a two foot deep sediment sump at the bottom of all drain inlets and catch basins below the lowest pipe invert entering the structure.

A. Grates and Manhole Covers

1. All drain grates and manhole covers shall be cast iron and fabricated to support an HS-20 design axle load.
2. All drain inlet grates shall have the wording "Dump No Waste - Drains to Stream" (fish picture) embossed on them.
3. All drain grates and manhole covers shall be set to final grade by use of concrete rings and adjustment collars made for that purpose.

END OF SECTION