

Technical Document #WTS-14

Pumping Station Design & Submittal Criterion

Introduction: Complete plans and specifications for all pumping stations that will be used to convey untreated, partially treated or fully treated wastewater shall be submitted to the Nevada Division of Environmental Protection's (NDEP) Bureau of Water Pollution Control (BWPC) and approved prior to the start of construction. This is in accordance with Nevada Revised Statutes (NRS) 445A.425, NRS 445A.585 and Nevada Administrative Code (NAC) 445A.283. Before BWPC can begin a design review of the pump station, the applicant shall have a current discharge permit for the wastewater treatment facility or it shall submit a complete application for a discharge permit which covers these facilities. Review and approval of plans and specifications may occur before the discharge permit has been issued, but construction of the pumping station shall not start until after the discharge permit has been issued.

All supporting documents submitted for review shall be bound in a three-ring binder. Loose plans or document leaflets shall not be accepted.

NDEP's minimum requirements for a complete and acceptable pumping station design submittal are listed on the following pages. Additionally, NDEP uses the following references as guidelines for review and approval of pumping stations: Recommended Standards for Sewage Works by the Great Lakes - Upper Mississippi River Board of State Sanitary Engineers (also known as the Ten State Standards), American Society of Civil Engineers Manual of Practice (MOP FD-4) and U.S. Environmental Protection Agency Manuals. The complete application can be submitted to the following address:

Technical Services Branch
Bureau of Water Pollution Control
Nevada Division of Environmental Protection
901 S. Stewart St, Suite 4001
Carson City, NV 89701

WTS-14 can also be downloaded from NDEP's website at: <http://ndep.nv.gov/bwpc/wts-14.pdf>

Revised January 2012



MINIMUM REQUIREMENTS FOR A COMPLETE AND ACCEPTABLE PUMPING STATION DESIGN SUBMITTAL

1. List the name of the Owner, the Permittee and the permit number of the existing or pending Discharge Permit along with contact information for the Owner and/or Permittee who is responsible for the operation and maintenance of the pumping station.
2. Provide plans and specifications for the pumping station that have been prepared by or under the direction of a Nevada Registered Professional Engineer. Preliminary plans which meet the minimum requirements for a complete and acceptable submittal will receive a preliminary review by BWPC. Final approval will only be given after BWPC receives a complete set of plans and specifications that have been wet-stamped and signed in non-black ink by a currently registered Nevada Civil or Environmental Professional Engineer.
3. Provide a service area map of the proposed area to be served by the pumping station along with a discussion of the current and expected future development of the area.
4. Provide calculations of the design average daily flow and peak hourly flow with justification of the selected rates.
5. Provide a site map showing the elevation of the 25-year, 24-hour storm event and the 100-year, 24-hour storm event. Describe the measures for protecting the pumping station during these storm events from erosion and flooding. Describe plans to keep the pumping station working during these storm events.
6. Provide details of the enclosure with a lockable gate to prevent vandalism.
7. Provide a full-size sheet(s) showing the plan and profile of the force main, air relief valves and a detail of the force main discharge location.
8. Provide an analysis that demonstrates that the hydraulic conduits downstream of the pumping station can handle the expected flow.
9. Provide a profile drawing, similar to Figure 1, showing the elevation of all critical components, including: pump intake inverts, control and alarm levels, top of wet well, top of dry well, influent and discharge line invert(s) and the inverts of any overflow to emergency storage.
10. Provide a drawing that shows all hydraulic conduits on the upstream side of the pumping station with identification of the point where an overflow would occur if all electrical and mechanical systems should fail. Please note that the design of most new sewer lines and interceptors must be approved by BWPC prior to construction. Contact BWPC's Technical Services Branch for clarification of which plans must be submitted.

11. Provide calculations of the total volume of emergency storage capacity that includes the volumes in the wet well, collection system and emergency storage containment which is above the alarm level but below the elevation at which a spill would occur. The emergency storage capacity needs to be sized to provide 3.5 times the average hourly flow for 2-hours. If this storage capacity is not available, then emergency power with an automatic switch-over device shall be provided. When the pumping station is at a treatment works that is continuously staffed the switch from regular power to emergency power may be manually done.
12. Provide a quick connect to the force main for emergency pumping within the valve vault (refer to Figures 2 & 3).
13. Discuss whether any containment used for emergency storage in conjunction with a wet well will be continuously available without the need for an operator to switch valves or diversions. The emergency storage must have an alarm to indicate that it contains fluid. It is acceptable to allow the wet well high-level alarm to serve this function if the emergency storage is constructed such that all fluid will drain back to the wet well once the liquid level subsides.
14. Describe the measures that will be used to protect the rivers, waterways, storm drains and other properties caused by a spill due to any failure of the pumping station.
15. Describe the alarm system and provide specifications. Also, discuss how the responsible person will be notified and the expected response time. NDEP requires a high-level wet well alarm at all pumping stations. The potential environmental and health consequences of a spill, emergency storage capacity, reliability of equipment, and expected response time should all be considered when the alarm system is selected. The minimum alarm is an audio-visual alarm at the pumping station site with a battery backup or an alternative power source. Either a visual or audible alarm will be acceptable when the lift station is at a continuously staffed treatment works.
16. Discuss how the pumping station will be constructed without interfering with existing flows.
17. Describe the method of disposing of groundwater from dewatering if any dewatering is expected. Also, provide a calculation of the expected quantity and quality of the water. Check BWPC's website at: [Nevada Division of Environmental Protection, Bureau of Water Pollution Control](#) to see whether a permit is required for any dewatering.
18. Provide documentation that states that the raw sewage pumps are capable of passing a 3-inch sphere, are grinder pumps or are protected by a screen or rack that will only allow acceptably sized solids to pass.

19. NDEP requires a minimum of 2 independent pumps. The pumps shall be sized so that the remaining pump(s) can handle the expected peak flow with any one pump out of service.
20. NDEP requires all pumps to be capable of automatically re-priming if for any reason they should lose their prime.
21. Submit complete pump specifications from the pump manufacturer that includes pump curves, net positive suction head requirements and the types of fluids which may be pumped (e.g. raw sewage).
22. Provide evidence that individual check valves and shut-off valves for each pump are located outside of the wet well.
23. Provide calculations showing the estimated pumping times for average and peak flows and the estimated times between pump shutoff and startup. A minimum of 10 minutes between successive starts is recommended by MOP FD-4 with longer times recommended for larger pumps.
24. Provide the 24-hour emergency telephone number that will be posted at the pumping station if the pumping station is not located within a treatment facility. The plans and specifications must include the same information. A provision must be made to alert the responsible person to problems at the pumping station when the telephone number is called.
25. Provide a copy of the Standard Operating Procedure outlining the schedule and frequency of maintenance from the entity that will operate and maintain the facility.

Typical Design Drawings

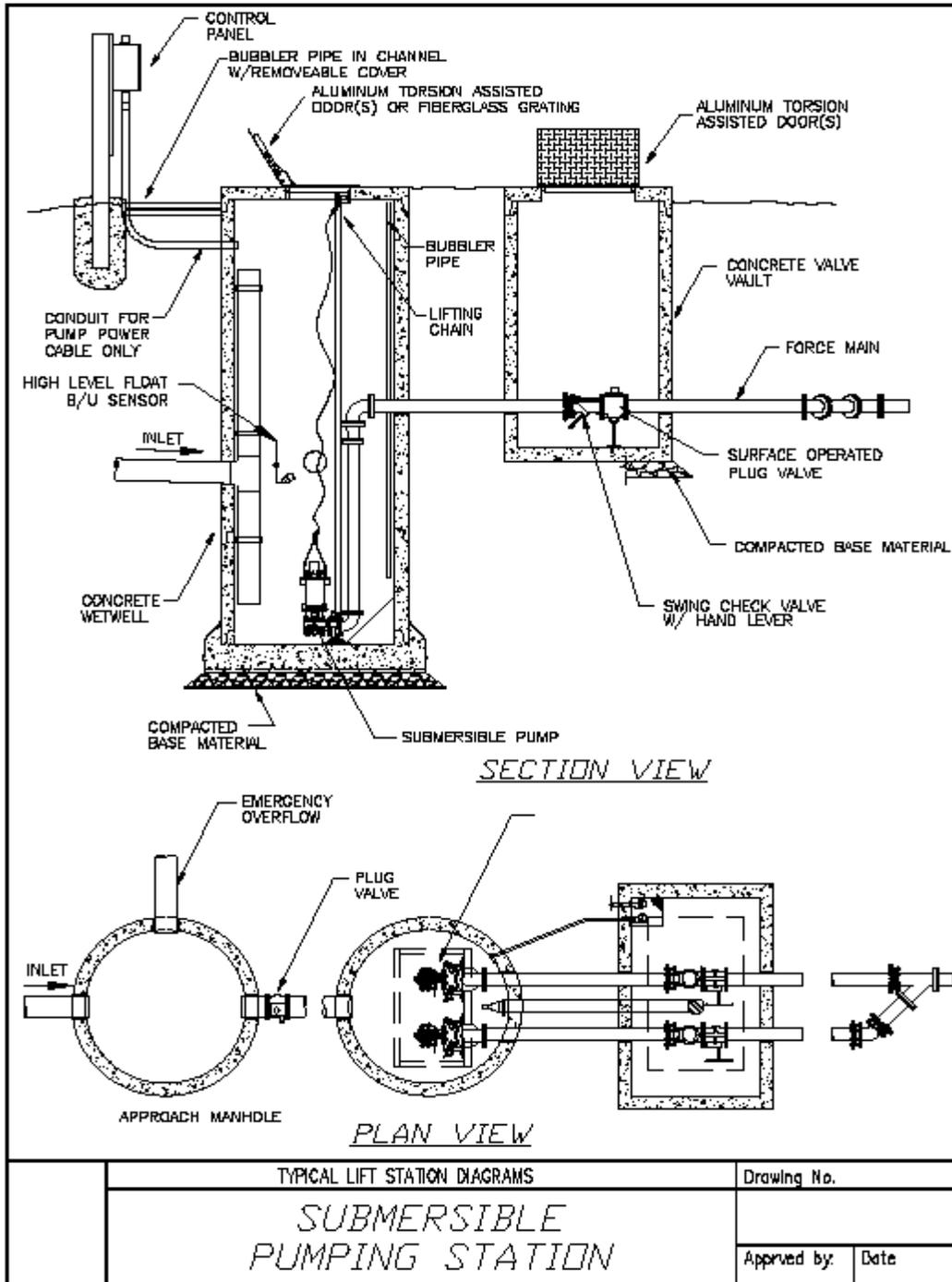


Figure 1

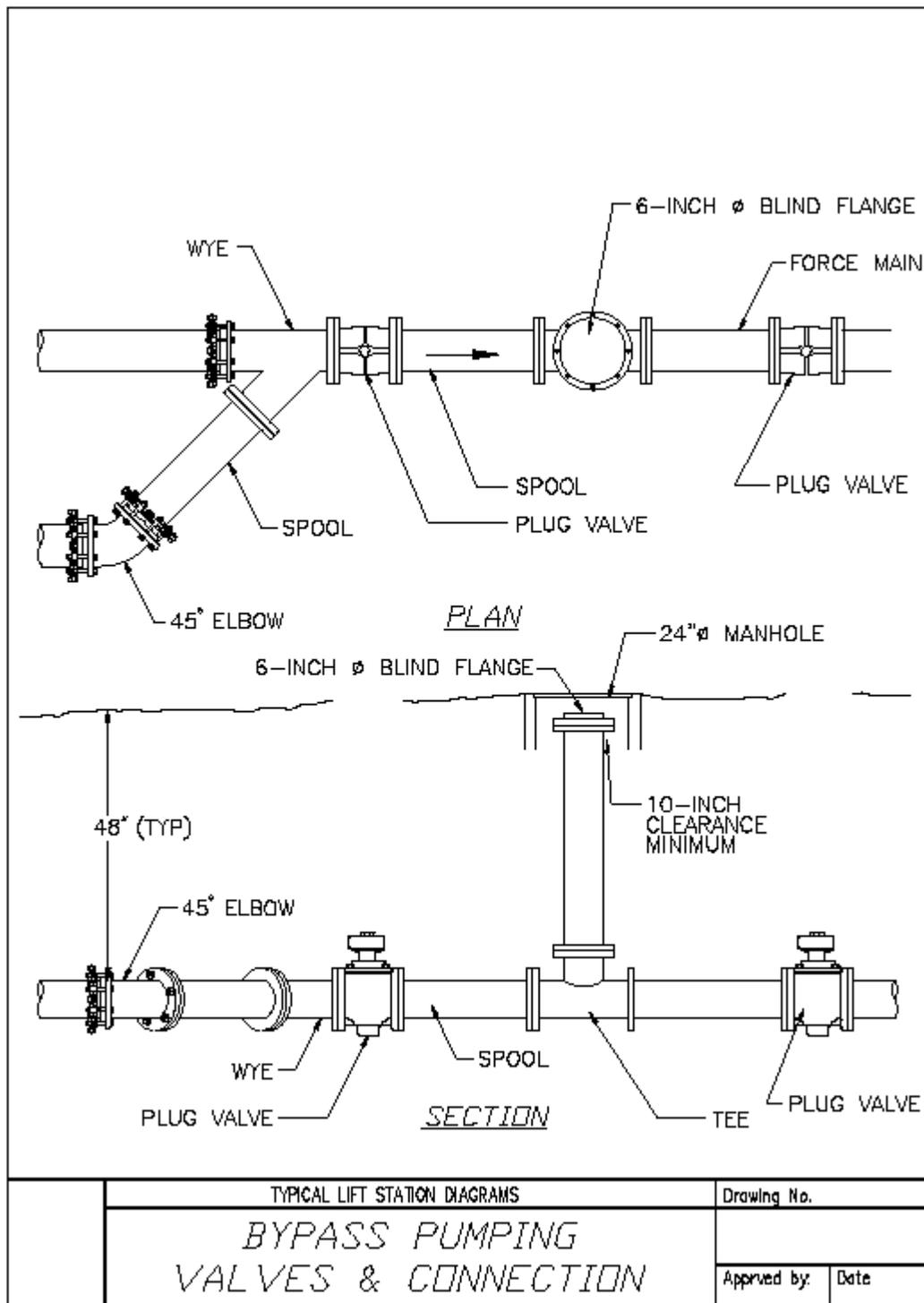


Figure 2

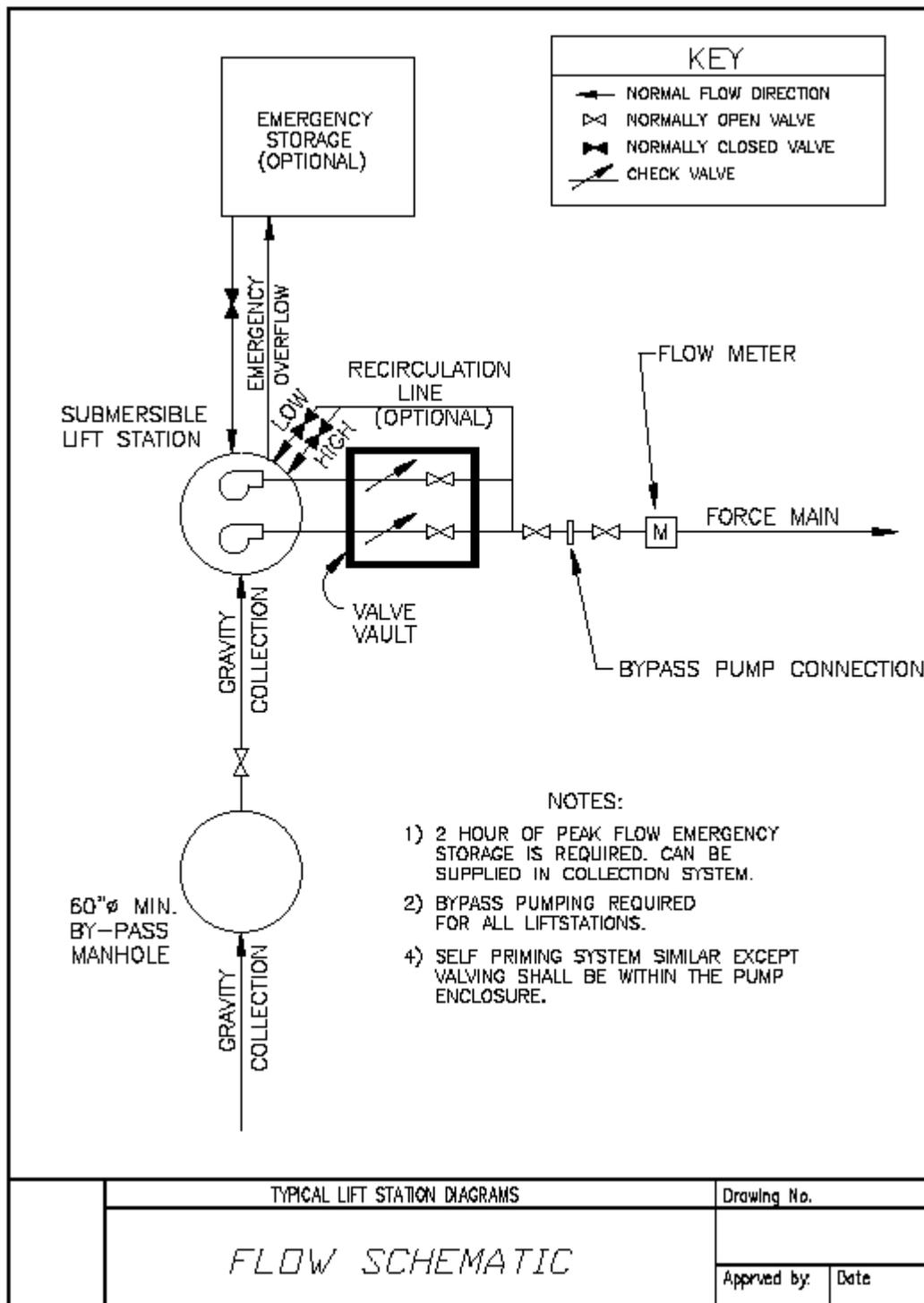


Figure 3