



Final Construction Documents Submission Basis of Design Report

Install Sewage Lift Station Phoenix VAMC Phoenix, AZ

**Contract Number: VA246-13-D-0019
Project Number: 664-14-204
AES Project Number: VA181 1403**

September 2014



TABLE OF CONTENTS

EXECUTIVE SUMMARY	2
APPLICABLE CRITERIA.....	2
APPLICABLE INDUSTRY CRITERIA	2
APPLICABLE VA CRITERIA	3
PRECEDENCE	3
A. SITE DEVELOPMENT	3
ANALYSIS OF SITE	3
B. CIVIL	4
BUILDING MATERIALS	4
C. PLUMBING.....	4
D. SITE UTILITIES.....	4
E. ELECTRICAL.....	5
F. COST ESTIMATE	5
G. SPECIFICATIONS.....	5

PART 1 – GENERAL DESCRIPTION

EXECUTIVE SUMMARY

The objective of this project is to reroute an existing sanitary sewer line from a lift station to a higher manhole. The sewer line currently exits the building 8 basement and enters an existing lift station. The height at which the sewer line enters the lift station reduces the capacity of the lift station and causes the sewer line to back up. This project will add a small package lift station in-line with the sewer line and redirect the discharge to the main sewer line at a higher elevation.

APPLICABLE CRITERIA

Applicable design and construction criteria references are listed below. Criteria shall be taken from the most current references as of the date of issue of the construction contract. This list is not intended to include all criteria that may apply or to restrict design and construction to only those references listed. Some of the listed standards do not apply in their entirety; only selected provisions of some documents and standards apply as referenced. The designer is to use the most current codes available at the time. References are as follows:

APPLICABLE INDUSTRY CRITERIA

A. American Society of Mechanical Engineers (ASME):

B31Code for Pressure Piping Standards

B. American Society for Testing and Materials (ASTM):

C858-10e1Underground Precast Utility Structures

D1785-06.....Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120

D2464-06.....Threaded Poly (Vinyl Chloride) PVC Pipe Fittings, Schedule 80

D2466-06.....Poly (Vinyl Chloride) (PVC) Pipe Fittings, Schedule 40

D2467-06.....Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80

C. American Water Works Association (AWWA):

C504-10 Rubber-Seated Butterfly Valves

C508-09 Swing-Check Valves for Waterworks Service, 2-In. Through 24-In. (50-mm through 600-mm) NPS

C800-05 Underground Service Line Valves and Fittings
M23-2nd Ed..... PVC Pipe, Design and Installation

APPLICABLE VA CRITERIA

The project shall conform to the following criteria. All requirements of the referenced criteria will be applicable, whether noted or not, unless otherwise specified herein.

PRECEDENCE

In the event of conflict between References and/or other Applicable Criteria, the most stringent requirement will apply, unless otherwise specifically noted in the contract. Where there is a conflict between a general requirement and a specific requirement, the specific requirement will apply.

PART 2 – DESIGN REQUIREMENTS

A. SITE DEVELOPMENT

ANALYSIS OF SITE

SITE PHYSICAL SECURITY

No standoff distances or fencing for force protection have been included as the project is limited utilities work.

PHASING

Proper phasing of construction activities is vital to avoid, to the extent possible, disruption of VA services. We currently see site and building construction activities proceeding as follows:

The existing sewer line runs through the well where the new package lift station will be located. As such, the sanitary sewer line will have to be temporarily rerouted and pumped out of the building. The construction contractor will coordinate the execution of waste water removal.

It is possible some overlap may occur between some phases during construction. Proper erosion and sediment controls are included in each phase of construction.

B. CIVIL

BUILDING MATERIALS

CONCRETE SPECIFICATIONS

1. All concrete shall develop the following 28-day minimum compressive strength:
 - Foundation walls & grade beams 3000 psi
 - Slabs-on-grade 4000 psi
 - Other concrete 3000 psi
2. Reinforcing shall conform to the following standards:
 - Steel bars ASTM a615, grade 60
 - Headed studs ASTM a108 60 ksi minimum tensile strength
3. Concrete shall be proportioned using type I cement. Admixtures containing chloride salts shall not be used.

C. PLUMBING

SANITARY SEWER

The sanitary sewer system drains the basement level of building 8 through a 4" cast iron pipe into an exterior lift station. The total discharge through this pipe amounts to 120 drainage fixture units (DFU). A 4" pipe can support a maximum of 160 DFU. This number is based on the total number of toilets, sinks, lavatories, etc. feeding into the pipe and an average of discharge from each fixture. A rough conversion of DFU to gallons per minute is 2:1, totaling 60 gpm into the sump. The gain in elevation from the bottom of the lift station to the existing manhole will be approximately 15'. The pumps as part of the package lift station were spec'd at 50 gpm and 20' of head. With the lower head pressure and overly conservative conversions, the 50 gpm pumps should be sufficient.

All interior sanitary sewer piping shall be 4" Schedule 80, Type 1, Grade 1, polyvinyl chloride produced and labeled as ASTM D 1784-755 LF.

D. SITE UTILITIES

SANITARY SEWER

The underground sanitary sewer piping shall be 4" Schedule 80, Type 1, Grade 1, polyvinyl chloride produced and labeled as ASTM D 1784-755 LF

STORM SEWER

There is no new storm sewer as part of this project.

E. ELECTRICAL

The pumps and control panel will be powered from the main electrical room to keep all mechanical equipment powered from the same room.

The new equipment requires 230V 3 phase. There is no need for the pump to be on emergency powered thus it would be powered from an existing normal branch panel board. Coordination with VA would be needed to run conduit from basement of building 8 to main electrical panel in building 1.

Installations and specifications will comply with the VA Electrical Design Manual and the NEC Code.

F. COST ESTIMATE

The cost estimate will be provided in a separate document.

G. SPECIFICATIONS

Specifications are provided in a separate document.