4. APPLICATIONS

d. Stone Bridge Crossing – 1953, 2037, 2061 Highland Avenue & MBL: 3-51

i. Memo

WRIGHT-PIERCE
Engineering a Better Environment

MEMORANDUM

TO:	Water Pollution Control Authority	**DATE:**	3/19/2021
FROM:	Dennis Dievert Jr.	**PROJECT NO.:**	20458
SUBJECT:	Final Design/Award of Capacity Approval Stone Bridge Crossing – PRELIMINARY COMMENTS		

The application is for the proposed construction of a gravity sewer main, pump station and force main to serve the proposed Stone Bridge Crossing Development. A preliminary review of the submitted application and supporting documentation received on March 11th, 2021 has been completed and the comments are summarized below for review and further discussion:

1. Submit a draft developer's agreement to accompany the application for review and discussion.

2. Provide a construction cost estimate for the project.

3. The phasing plan is unclear. This application only shows Phase I. Provide additional details on all phases.

4. Consider installing cross culverts beneath the 10 to12 foot deep fill sections at STA 8+00 and 9+00.

5. The force main pipe changes material type four times over its short run. It goes from ductile, to HDPE, to insulated ductile, then back to HDPE. Suggest going ductile all the way to the bridge and transition from ductile to insulated ductile over the bridge. Upon further review, there also does not appear to be a need for the downhill section of force main unless it can be justified. This section should be changed to gravity with sewer manholes every 300-feet+/- and 8" SDR-35 PVC pipe. This will also eliminate the need for the air/vacuum release valve and manhole which are historically problematic.

6. The force main in the town ROW will be subject to the requirements of a street excavation permit.

7. It is unclear how the town will access the sewer easement in the future. Suggest installing a second gate in the back of the pump station for access. This location will also need to be designed to avoid conflict with the proposed swale which may prohibit access to the sewer main.

8. Provide details on the sewer easement and how it will be constructed. At a minimum, install 4" of topsoil and plant grass seed over the sewer main within the easement areas. Easements also need to be flat and have the ability for town truck access to maintain, clean and inspect the sewer main.

9. Note clearing to be conducted at the driveway entrance to the pump station off Dickerman Road to maximize line of sight.

10. Eliminate the crushed stone mow strip around the pump station site pave to at least 1-foot beyond the outside of the fence line.

11. The town and towns engineer shall review all sewer and pump station component submittals during construction.

12. The sanitary sewer must extend into Route 10.

13. An exterior generator and electrical enclosure are not acceptable. Please design for a building to house the generator and electrical controls similar to all other town owned pump stations.

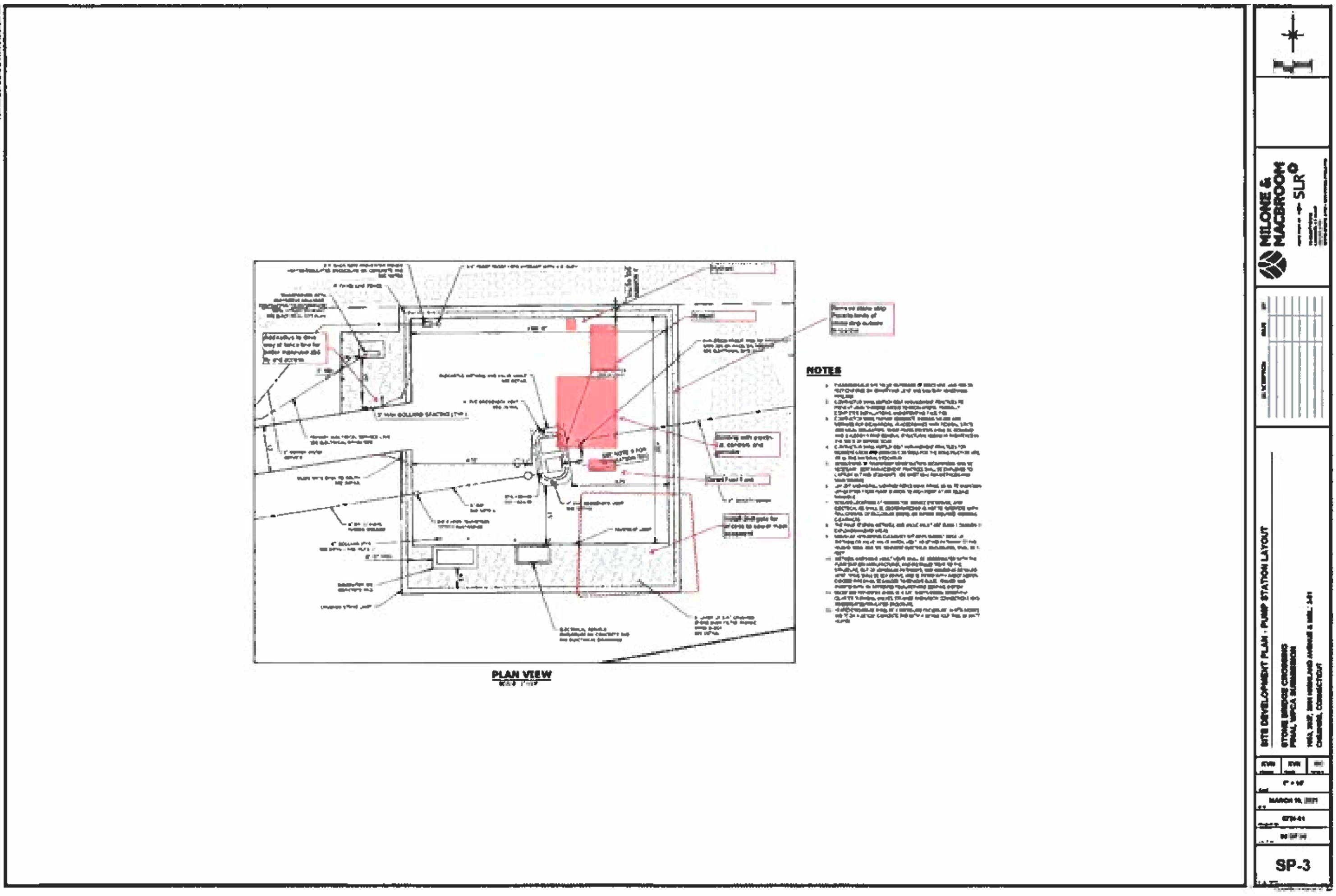
14. The integral valve vault and wetwell is not acceptable. Provide separate wetwell and separate valve vault structures.

15. See attached comments to the pump station site plan layout to allow for ample vehicle turn around, snow plowing, easement access, etc.

16. What is the structure shown on the force main outside the pump station?

17. Add valve outside station on force main for isolation and ability to work on/change out the flowmeter.

18. Verify that 460V, 3-phase power is or will be available for the pump station site from Dickerman Road.



PLAN VIEW
NOTES
MILONE & MACBROOM
SLR
SITE DEVELOPMENT PLAN - PUMP STATION LAYOUT
STONE BRIDGE CROSSING
CHESHIRE, CONNECTICUT
MARCH 10, 2021
SP-3

Town of Cheshire—Department of Public Works

Application for Final Design and Award of Capacity Approval For Extension of Public Sanitary Sewers

Received
Town of Cheshire Public Works Dept
MAR 10 2021
BY:

Project Name: Stone Bridge Crossing Project Address: Highland Ave

Zoning District: ICSDD Assessor's Map #: See attached Lot #: ____

Applicant's Name: See attached Applicant's Telephone Number: See attached

Applicant's Address: See attached

Property Owner's Name: See attached Property Owner's Telephone Number: See attached

Property Owner's Address: See attached

Contractor's Name: TBD Contractor's Telephone Number: TBD

Contractor's Address: TBD

I. Project Details

■ New Discharge ☐ Substantial change in the volume or character of pollutants being discharged.
Explain: Gravity sewer in proposed development to new pump station and new forcemain in Dickerman to connect to existing MH near West Johnson Ave.

■ Residential Number of Units 570 Sewer capacity requested in Gallons per Day 96,330

■ Commercial Square footage 241,000 Sewer capacity requested in Gallons per Day 34,135

☐ Industrial Square Footage ____ Sewer capacity requested in Gallons per Day ____

Total, estimated capacity required: 130,465 (gallons per day)

Is food preparation occurring on the property or will it occur as part of this project? Yes If yes, provide the Public Health Code Classification: __ [Note: Class 3 and Class 4 must comply with DEEP Fats, Oil and Grease Regulations.] TBD by director of health

Connecticut Conservation and Development Plan and Map Designation [check one]:

☐ Neighborhood Conservation Area (Map Color Code: Pink)—An extension of public sanitary sewers IS permitted in this area

■ Growth Area (Map Color Code: Beige)—An extension of public sanitary sewers IS permitted in this area

☐ Existing Preserved Open Space (Map Color Code: Dark Green)—An extension of public sanitary sewers is NOT permitted in this area

- ☐ Preservation Areas (Map Color Code: Medium Green)—An extension of public sanitary sewers is NOT permitted in this area
- ☐ Conservation Areas (Map Color Code: Light Green)—An extension of public sanitary sewers is NOT permitted in this area
- ☐ Rural Lands (Map Color Code: White)—An extension of public sanitary sewers is NOT permitted in this area

II. Type of Project

☐ [12.10.B DPW] The property is located on an existing, public sanitary sewer line; AND

☐ The property has been assessed for public sanitary sewers; OR

☐ The owner has paid or is required to pay a connection charge for connection to a privately installed public sanitary sewer line but has not yet connected to the sewer line.

☐ [12.10.C.1.a DPW] The property owner is seeking a ☐ building permit or ☐ Certificate of Occupancy for new construction on approved single residential lots which do not require public or private extension of the sanitary sewer.

☐ [12.10.C.1.b DPW] The property owner is seeking a building permit for an addition to an existing residential structure or residential use or a change in residential use, which structure or use is presently connected to a public sanitary sewer line.

☐ [12.10.C.1.b DPW] The property owner is seeking a building permit for an addition to an existing commercial or industrial structure or commercial or industrial use or a change in commercial or industrial use, which structure or use is presently connected to a public sanitary sewer line; AND

☐ The additional, estimated flow for such addition or change in use DOES NOT exceed 227 gallons per day; OR

☐ The additional, estimated flow for such addition or change in use DOES NOT exceed the actual flow for the use already permitted prior to the addition or change in use.

☐ [12.10.C.1.b WPCA] The property owner is seeking a building permit for an addition to an existing commercial or industrial structure or commercial or industrial use or a change in commercial or industrial use which structure or use is presently connected to a public sanitary sewer line; AND

☐ The additional, estimated flow for such addition or change in use DOES exceed 227 gallons per day; OR

☐ The additional, estimated flow for such addition or change in use DOES exceed the actual flow for the use already permitted prior to the addition or change in use.

■ [12.10.C.1.c DPW] The property owner has been granted final design approval by the WPCA for extensions of the public sanitary sewer system for a project for which the sewers have not yet been extended AND the extension does not go into an area classified as Existing Preserved Open Space (Map Color Code: Dark Green), Preservation Areas (Map Color Code: Medium Green), Conservation Areas (Map Color Code: Light Green), or Rural Lands (Map Color Code: White) as shown on the June, 2005 Conservation and Development Plan and Map of the State of Connecticut (as may be amended).

Town of Cheshire—Department of Public Works

III. Assessment/Occupancy Information

1. Date of Feasibility Approval: 1/28/2021 Date of Final Design Approval: TBD

2. Date of Sewer Assessment: N/A Amount: $N/A Caveats?____ If yes, please provide a copy of the caveat.

3. Estimated date of occupancy--include estimated occupancy dates for each structure for which a Certificate of Occupancy is required:
Summer 2022

4. Will the property be developed in phases? Yes If yes, how many? 2 If yes, provide the information detailed in attachment #7 below.

5. Describe the project and include all pertinent information necessary for an informed decision to be made on the application.
See attached letter

IV. Detailed Project Information

Attach the following to this application:

1. A copy of the letter describing the project which was submitted with the application for feasibility approval. together with a statement of any changes in the proposed sanitary sewer system since feasibility approval was granted, and including such additional, pertinent information necessary for an informed decision to be made on the application.
2. A copy of the Feasibility Approval granted by the WPCA.
3. Separate drawings for each of the sanitary sewers proposed, drawn at the Town's standard scale of horizontal 1"=40', vertical 1"=4', showing the following:
   a. Contours at two-foot vertical intervals and/or centerline elevations at fifty-foot intervals;
   b. Location of buildings and building connections;
   c. Sill elevations;
   d. Existing and/or proposed utilities;
   e. Other, major physical features; and
   f. Easements to be acquired in connection with construction of the sanitary sewer system or in connection with future construction of extensions of the system.
4. Final flow calculations (average daily and peak flow rates) for the following:
   a. Immediate service area.
   b. Future service area.
5. A color copy of the June 2005 (or more recent) Conservation and Development Plan and Map of the State of Connecticut on which the location of the property has been clearly indicated.
6. A proposed developer's agreement (as set forth in Section 12.4.C of the Cheshire Sewer Regulations) which is acceptable to the WPCA and the Town Attorney and which details all the conditions required by the WPCA.
7. If the property will be developed in phases, attach plans detailing, phase by phase, the planned construction, the timetable of planned construction, the timetable of estimated occupancy for all uses in each phase, the sanitary sewage flow rate for each connection within the phase, and such other data or information as may be requested by the Director or the WPCA.
8. Ten duplicate sets of the application, including all attachments.

Town of Cheshire—Department of Public Works

By signing below, I hereby agree and certify as follows:

1. The statements made, and the information provided, in this application and in all supporting documentation are true to the best of my knowledge and belief.
2. I have reviewed, understand, and will comply with The Town of Cheshire Sewer Regulations.
3. I will provide such other data or information as may be requested by the Director or the WPCA as he or it deems necessary to make a decision on the application.
4. Official representatives and agents of the Town of Cheshire, including the Building Official, the Director of Public Works, WPCD staff, or their designees, are authorized to enter the property, at reasonable times, for purposes of inspection, observation, measurement, sampling, and testing.

Applicant's Signature [signature] member Date: 3/10/2021

Property Owner's (or authorized agent's) Signature [signature] member Date: 3/10/2021

[Printed name of authorized agent] _____

Contractor's Signature _____ Date: _____

********** **FOR OFFICE USE ONLY** **********

Dates:

_____ Submitted to Public Works

_____ Statutory "Date of Receipt"

_____ Approved by Planning & Zoning Commission

_____ Approved by Inland Wetlands & Watercourse Commission (write "N/A" if IWWC approval is not required)

_____ Feasibility approval granted

_____ Town Engineer final design review report received

_____ Final Design approval: ☐ Granted ☐ Denied

_____ Developer's agreement (as set forth in Section 12.4.C of the Cheshire Sewer Regulations, acceptable to the WPCA and the Town Attorney, and which details all the conditions required by the WPCA) filed.

_____ Additional requirements per Director of Public Works:

_____

_____

☐ Approval of Award of Capacity of _____ gallons per day, or denied ☐

Applicant

Miller, Napolitano, Wolff, LLC and Tristar Development, LLC
P O BOX 1018, CHESHIRE CT 06410
Phone #: (203) 710-9101

Property Owners

1. Property ID # 3-51, 4-6, and 4-13
   Miller, Napolitano and Wolff, LLC
   Mailing Address: P O BOX 1018
   CHESHIRE CT 06410

2. Property ID # 3-51
   Tristar Development, LLC
   Mailing Address: P O BOX 1018
   CHESHIRE CT 06410

3. Property ID # 4-4
   Anthony & Meredith Drozd
   Mailing Address: 10 SPRING LN
   CHARLESTOWN RI 02813

Applicant

Miller, Napolitano, Wolff, LLC and Tristar Development, LLC
P O BOX 1018, CHESHIRE CT 06410
Phone #: (203) 710-9101

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   CHARLESTOWN RI 02813

March 10, 2021

Mr. Paul Bowman
Miller, Napolitano and Wolfe, LLC
P.O. Box 1018
Cheshire, CT 06410

Re: Design Basis for Dickerman Road Pumping System
SLR #141.16731.00001.001x

Dear Paul:

The mixed-use development proposed for resubdivision of the lands between Route 10 and Dickerman Road, and I-691 and the Southington border, includes a gravity sewer system routed to a parcel near the southwest corner of this acreage where a sewage pump station is proposed to be located. We are providing for your use herein a letter report describing the design basis for the sanitary sewer system, including the gravity collection portion, pump station, and the force main which includes a bridge crossing over I-691, and connection to existing sanitary sewerage system tributary to the existing West Johnson Avenue Pump Station.

1.0 INTRODUCTION

The pump station site was selected due to the topography of the parcel and its proximity to a crossing point by which to get sanitary flows from the development into the existing sanitary sewer system for the Town of Cheshire. It is proposed that a permanent easement be established for the sewer system and pump station site, in favor of the Town of Cheshire, as illustrated on the project drawings.

2.0 UTILITY SERVICES

The proposed concept provides for all utilities except for sanitary service to be provided to the improvements located along Route 10 from that road and similarly for the housing units accessible from Dickerman Road. Sanitary service is the most complex of utilities being provided and must be in place and operational before subsequent development can progress to completion. Sanitary service is proposed to be provided via a gravity sewer system of PVC pipe routed through a utility easement as indicated on the drawings. The route utilizes a proposed pedestrian bridge to cross the Tenmile River, where the pipe will utilize the same concept for crossing I-691, described below.

3.0 SEWER FLOW ESTIMATE

The proposed mixed-use development has been divided into seven building lots numbered 1 through 7. Lots 1 through 6 are located on the east side of the Tenmile River, and lot 7 is the only lot to the west. The

overall development is currently envisioned to be constructed in three separate phases. An estimate of average daily sewer flow was calculated for each lot based upon proposed size and use. A peaking factor of 3.0 was applied to the average daily flow to estimate the maximum day sewer flow as shown in Table 1 below.

As requested by the Town of Cheshire, a flow allocation was included for the offsite development land that consists of the state-owned land on the east side of Route 10 (43.6 acres) and the lot on the west side of Dickerman Road (6.3 acres). An average daily sewer flow of 600 gallons per day (gpd) per acre was allocated as required by the town for this land use zone.

The total estimated average daily sewer flow for the proposed development is 130,465 gpd (91 gpm) and 160,405 gpd (111 gpm) with the offsite parcels included in the flow estimate.

The total estimated maximum day sewer flow for the proposed development is 391,395 gpd (272 gpm) and 481,215 gpd (334 gpm) with the offsite parcels included in the flow estimate. Therefore, each pump in the pump station will be designed for this maximum day flow rate of 334 gpm.

SLR

Table 1 Sewer Flow Estimate

Phase 1

Development Description	Unit	Quantity	Avg Day Demand (gpd/unit)	Avg Day Total (gpd)	Max Day Peaking Factor	Max Day Total (gpd)
Lot 7 - Single Family Residential	home	180	206	37,080	3.0	111,240
			Subtotal =	37,080		111,240

Phase 2

Development Description	Unit	Quantity	Avg Day Demand (gpd/unit)	Avg Day Total (gpd)	Max Day Peaking Factor	Max Day Total (gpd)
Lot 1 - Gas/Convenience Store	SF	5500	0.05	275	3.0	825
Lot 3 - Multifamily Residential	unit	300	160	48,000	3.0	144,000
Lot 4a - Medical Offices	SF	19,500	0.08	1,560	3.0	4,680
Lot 4b - Active Adult	unit	90	125	11,250	3.0	33,750
			Subtotal =	61,085		183,255

Phase 3

Development Description	Unit	Quantity	Avg Day Demand (gpd/unit)	Avg Day Total (gpd)	Max Day Peaking Factor	Max Day Total (gpd)
Lot 2 - Hotel	rooms	150	60	9,000	3.0	27,000
Lot 5 - Retail	SF	98,000	0.05	4,900	3.0	14,700
Lot 5a - Restaurant	seats	200	20	4,000	3.0	12,000
Lot 5b - Restaurant	seats	420	20	8,400	3.0	25,200
Lot 6 - Restaurant	seats	300	20	6,000	3.0	18,000
			Subtotal =	32,300		96,900
			Total of Phases 1 through 3 =	130,465		391,395

Potential Offsite Development by Others

Development Description	Unit	Quantity	Avg Day Demand (gpd/unit)	Avg Day Total (gpd)	Max Day Peaking Factor	Max Day Total (gpd)
Route 10 - East Side	AC	43.6	600	26,160	3.0	78,480
Dickerman Road - West Side	AC	6.3	600	3,780	3.0	11,340
			Subtotal =	29,940		89,820
			Grand Total =	160,405		481,215 gpd

	334	gpm

NOTES:

1. Potential offsite development by others is estimated using 600 gpd/acre for this zone.

4.0 SANITARY SEWER PUMPING SYSTEM

The sanitary sewer system consists of a gravity sewer collection system conveying flows to the selected pump station site. Due to existing elevations and available routes, to cost effectively transport sewage from the project site to the Town of Cheshire sanitary collection system and to minimize future operations and maintenance considerations, a pump station is required to pump sewage through a force main routed across I-691 via the existing Dickerman Road bridge. From that bridge, the force main can access the existing sanitary system via a manhole just north of the intersection of Dickerman Road and West Johnson Avenue. The pumping system consists of a pump station, force main piping, modifications to the receiving manhole, and appurtenant structures, as described below.

4.1 Pump Station

As flows from the sanitary pump station supporting the proposed development are relatively small in comparison to average municipal pump stations, the concept of a prefabricated submersible station was selected over conventional construction in order to maximize quality of the product while supporting construction efficiency. Precast concrete construction was selected over alternate materials for the ultimate strength and durability required for municipal service.

Two concepts were considered. The first is often used for private and municipal sewage pumping stations and includes a wetwell structure consisting of essentially a large diameter vertical concrete pipe with flat slab top and a separate additional precast concrete vault to house pump discharge isolation valves and a flow meter requested by the town. The second concept is a unique design offered by Oldcastle of Avon, Connecticut, that combines the valve vault into the unused upper portion of the wetwell. The structure has a wetwell base section that is rectangular with rounded corners and is fabricated in vertically stacking sections as is done with conventional vertical concrete pipe-type wetwells. The upper section with integral valve vault is constructed monolithically. Advantages of this design include minimization of the excavation footprint and elimination of differential settlement between separate structures, but primarily it allows assembly of pumps, piping, supports, and finishes under indoor controlled conditions where the work of all trades is coordinated by a single source responsible party to result in a higher quality end product than field assembly of component parts by different subcontractors. Pumps, valves, and internal components are coordinated and provided by G.A. Fleet in partnership with Oldcastle for single source responsibility from construction through startup. G.A. Fleet is one of the larger manufacturer's representatives for sales and service of Flygt pumps, which are among the two pump brands accepted by the WPCA for their ruggedness and reliability.

The proposed pump station is illustrated in Attachment No.1. Features of the proposed pump station include separate access hatches with hinged safety grates for wetwell and valve vault area. Conduit penetrations for pump power and wetwell level instrumentation and for valve vault flood sensing are cast into the walls via watertight penetrations. The pump control and wetwell level alarm employs redundant backup, described below. The vault includes pump discharge check and isolation valves on each pump discharge pipe, converging into a header with a valved emergency pump-out connection. With the force main isolation valve immediately outside the structure, the bypass connection may be used to either manually fill a tanker truck using station pumps or to use a portable pump to pump into the force main from the wetwell. A magnetic flowmeter is also provided in the valve vault.

4.2 Pumps

Xylem Flygt pumps are among the two manufacturers of submersible pumps acceptable to the WPCA due to their ruggedness and reliability. The recommended Flygt pump employs an "N-type" impeller, which is a semi-open, self-cleaning design that improves markedly over conventional closed impeller "non-clog" sewage pumps. The impeller design also permits small axial movement upon encountering a large object, which aids in passing things that can get through the inlet.

The pumps are capable of operating without the upper portion housing the motor submerged for cooling, which increases wetwell usable depth if necessary. The pump motors are equipped with embedded overtemperature sensing and leakage detection, which are reported to a control relay to be incorporated into their respective starter enclosures, and alarm at the PSCP.

There will be local pump disconnects adjacent to the wetwell to meet lockout/tagout (LOTO) requirements. The pump starter enclosures are also equipped with full voltage emergency bypass starters and selector switches for manual vs. automatic operation, and a SSRV vs. across-the-line starting, in the event the SSRV fails.

The recommended pump is a Flygt model "NP3127 HT3~ Adaptive 488", 3 phase 480V with an 11 Hp premium efficient motor.

4.3 Design Flow Rate

A hydraulic analysis was performed to establish a system curve for determination of the pump duty point. Using accepted values for the Hazen-Williams friction head coefficient for cement-lined ductile iron pipe of 120, and 150 for HDPE and PVC pipe, the duty point for the pumps was determined to be 334 gpm at 48 feet. To allow for aging of the system with resulting increased friction loss, results in the duty point would be 334 gpm @ 50 ft. The design basis pump duty point is therefore 334 gpm at 50 ft.

The closest match of available pump impeller sizes to the design duty pump is 211 mm, which will deliver up to 425 gpm at a 50 ft head condition.

SLR

4.4 Force Main Piping

The piping system was sized at 6" for best pumping efficiency and reasonable velocities. Ductile iron piping (DIP) is recommended exiting the pump station for a short distance over the adjacent disturbed area and where exposed for bridge crossings due to its strength, rigidity, and minimal support requirements compared to High Density Polyethylene (HDPE), for both the Dickerman Road highway crossing over I-691 and the pedestrian bridge over the Tenmile River.

HDPE was selected for the majority of the force main length due to its flexibility, longevity, and cost effectiveness. There are many wall thickness schedules available. DR17 was selected for cost effectiveness and because it has a working pressure rating of 125 psi, which is reasonable for this system. The normal system operating pressure is 50 ft or 21.6 psi, resulting in a safety factor (SF) of 5.7, and compared to pump shutoff head, a SF of 1.5.

Transition couplings between HDPE and DIP would be the same as used for DIP to DIP except that a stainless steel sleeve insert is required to prevent deflection of the HDPE at the points where the teeth of the retaining wedges grip the pipe wall. The sleeve would be used in concert with a restrained coupling, for which we recommend the EBAA Iron 3800 Series due to its robust design and high pressure ratings.

The HDPE portion of the force main terminates in a manhole immediately adjacent to the receiving manhole, discussed below. C900 PVC is recommended from there to the receiving manhole due to its rigidity, pressure rating, relative compactness of fittings for construction of the drop to the invert table, and ability to include a gasketed joint for flexibility between new and existing manholes in case of settlement of new work because the existing manhole is pile supported.

4.5 Combination Air Release/Vacuum Breaker Valve Vault

Existing conditions and topography dictate that the force main have a high point immediately north of the Dickerman Road bridge over I-691. Air and other dissolved gasses in sewage will accumulate at the high point, reducing the effective diameter of the pipe and interfering with pumping operations. In addition, the long downhill force main from high point to receiving manhole will empty out between pumping cycles and will result in undesirable negative pressure downstream of the high point. To address these issues, a combination automatic air release/vacuum breaker valve is required to be installed at the high point. This will be accomplished via a reducing tee turned up on the force main, with plug valve in the vertical for isolation, with operating shaft and square nut facing up for operation from above. We recommend an A.R.I. Model D-025 valve, as it is specifically designed for sewage service with entrained solids. Because the unit is relatively shallow but cannot be lowered due to high point constraints, we propose a 4' square vault instead of a round manhole, so the interior surfaces can accommodate fastening 2" thermoplastic board insulation.

4.6 Force Main Bridge Crossing Design

Factory pre-insulated, TRFlex® DIP is recommended for bridge crossings. The TRFlex® joint is a restrained joint that allows movement while remaining restrained, preventing pullout of the spigot from the bell. As the bridge flexes with traffic load, the pipe also flexes and remains intact. Roller-type bottom supports are recommended to allow for thermal expansion and contraction. The assembly method for the TRFlex® joint results in built-in capability to suit expansion and contraction of the piping span without the need for additional, specific expansion/contraction fittings.

The Dickerman Road bridge employs reinforced concrete I-beams. Support of the pipe is via threaded rod from the concrete slab above. A horizontal angle is positioned on top of the pipe and spanning between the two support rods to keep the pipe on the bottom rollers during a pressure transient, upset condition, or seismic event. Angle clips are bolted to the ends of the angle to maintain a snug fit to the sides of the concrete beams for required lateral stability. Pipe penetrations through the end walls will be coordinated so that the pipe passes beneath diaphragms connecting the beams without having to cut into them.

Factory application of insulation is accomplished by using the outside HDPE jacket as a form and injecting polyurethane into the annular space between pipe and jacket, resulting in a solid fill of high thermal insulating capability that is rigid enough to support the pipe and its contents, with load spreading rolled plates used with roller supports. Pre-insulated pipe eliminates the time required for the laborious task of field application of insulation and jacket while maintaining costly traffic bypass on I-691 or scaffold and containment systems. We recommend Urecon pre-insulated pipe with nominal 2" polyurethane insulation with HDPE jacket for this purpose. The pedestrian bridge will also utilize pre-insulated DIP for cost effectiveness. In both cases, insulation will extend 5 feet into the embankments beyond the bridge. Because both the I-691 crossing and the pedestrian bridge crossing piping is insulated and sloped for drain down, heat trace will not be necessary.

4.7 Force Main Connection to Existing Sanitary Sewers

The proposed HDPE force main includes a long downhill portion to the receiving manhole. The pipe will empty out between pumping cycles, and a new cycle can send a slug of water before steady state conditions are established. An additional manhole is proposed immediately north of the receiving manhole to dissipate the energy from transient condition or intermittent force main discharge. Flow will then exit the new manhole and enter the receiving manhole for an inside drop to the invert table.

5.0 PUMP STATION INSTRUMENTATION, CONTROL, AND TELEMETRY

The pump station will include a PLC-based industrial control system typical of municipal pumping facilities and comparable to the one used at the West Johnson Avenue Pumping Station and will be provided by an approved Instrument Integrator. The system is specified to utilize the Allen Bradley CompactLogix processor used in the West Johnson Avenue Pump Station and other facilities.

The control system is fully automatic and is automatically backed up with an independent float-controlled relay logic system in the event of failure of any critical component of the normal system, including high wetwell alarming, as described below. Failure of the PLC, and I/O card, power supply, or level transducer will result in automatic engagement of the backup control system, which will remain latched in until reset by an operator following repairs.

Alarm telemetry will utilize the same cellular-based model telemetry device presently in use at all WPCA remote facilities.

5.1 Pump Station Instrumentation and Control

The pump station wetwell will be equipped with a level transducer as well as floats for backup pump control and high- and low-level alarming. A float switch will also be provided in the Valve and Meter Vault to sense a flood condition. Wetwell level and alarm instrumentation signals will be made "Intrinsically Safe" via barrier relays located in an Intrinsically Safe Barrier Panel (ISBP) that reduce the energy in each respective signal circuit to less than would be required to cause ignition of a hazardous atmosphere in the wetwell in the event of a short. This permits maintenance procedures without removal and replacement of EY fitting seals that would otherwise be necessary for transducer or float replacement.

The Pump Station Control Panel (PSCP) includes the PLC and related I/O cards, power supplies, power line conditioner, UPS, and associated devices for controlling and monitoring status of pumps and wetwell level and station flow, as well as the generator and any other points required.

The PSCP includes a "Graphical User Interface" (GUI) or "screens" for display of status and alarms and for operator selection of wetwell level control points for pump start/stop and alarms, pump alternation, alarm history log, trend charting, flow totalization, pump run times, and other functions defined in the SCADA specification or requested by the operators. An "Overview" or home page screen depicts current wetwell level, station flow, pump status, and availability for automatic control. An alarm banner temporarily superimposes over the screen being viewed, upon initiation of an alarm.

5.2 Pump Station Status and Alarm Telemetry

The PSCP will annunciate alarms on its screen and on site via a red alarm strobe. The system will employ the same cellular-based AlarmAgent™ telemetry device manufactured by Raco that is utilized at all other remote WPCA facilities. The AlarmAgent™ can transmit eight discrete alarms and two analog signals. The PSCP will display each specific alarm locally and group related system alarms into common alarms for use with the AlarmAgent™ discrete channels and additionally transmit wetwell level and flow rate.

6.0 SITE IMPROVEMENTS, EMERGENCY GENERATOR, AND UTILITY SERVICES

The pump station site will be fenced, with roll gate. The site will be paved to the generator and electrical enclosure pads to facilitate snow removal. The electrical enclosure will house the PSCP, pump starters, ISBP, AlarmAgent™ Automatic Transfer Switch (ATS), 480V power distribution, lighting transformer, and lighting panel. The enclosure will be equipped with a thermostatically controlled ventilation fan and unit heater to prevent condensing humidity and maintain the electronics at a working temperature.

6.1 Utility Power and Emergency Generator

Utility power will be brought into the site from a new pole at the end of the driveway. A pad mount transformer is shown at the gate to the site. The transformer secondary will be routed to a cold sequence disconnect and meter mounted on the end of the service enclosure.

A 60 kW diesel generator with belly tank and sound-attenuating enclosure will be anchored to a concrete pad to supply the facility during a utility outage. The tank will be sized for no less than 72 hours of run time at 50 percent load. The PSCP receives common warning and alarm conditions from the genset, as well as specific alarms for fuel level, fuel tank leak, Emergency Stop actuated, and "Not In Auto" conditions.

6.2 Water Service

Provisions will be made at the site entrance driveway to bring in a 1" water service when it becomes available on Dickerman Road. The line will be routed on the northern side of site power and terminate in a heated enclosure in the northwest corner of the site. The enclosure will be anchored to a concrete pad and house the required backflow preventer, which will feed an adjacent 3/4" freezeproof hose hydrant, for the purpose of wetwell washdown and pump cleaning during maintenance activities.

Should there be any questions about the project or the recommended design features of the sanitary system, pump station, or other utility services, please contact us at your convenience.

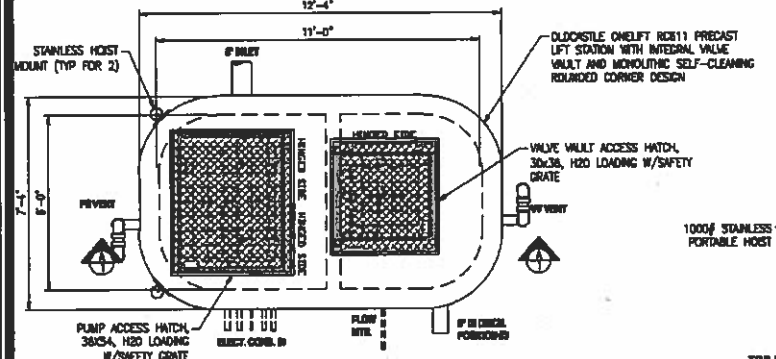
Sincerely,

SLR International Corporation

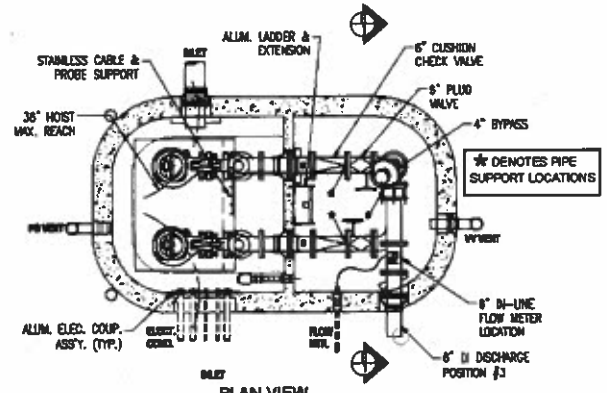
Darin L. Overton, PE
Principal Civil Engineer

Attachment

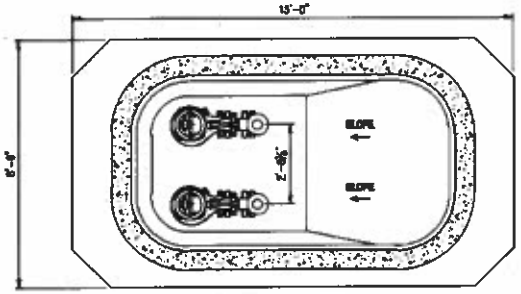
6731.01.01.mr1021.ltr.docx



PLAN VIEW
SCALE: 1/4" = 1'-0"



PLAN VIEW
ROOF REMOVED, SCALE: 1/4" = 1'-0"

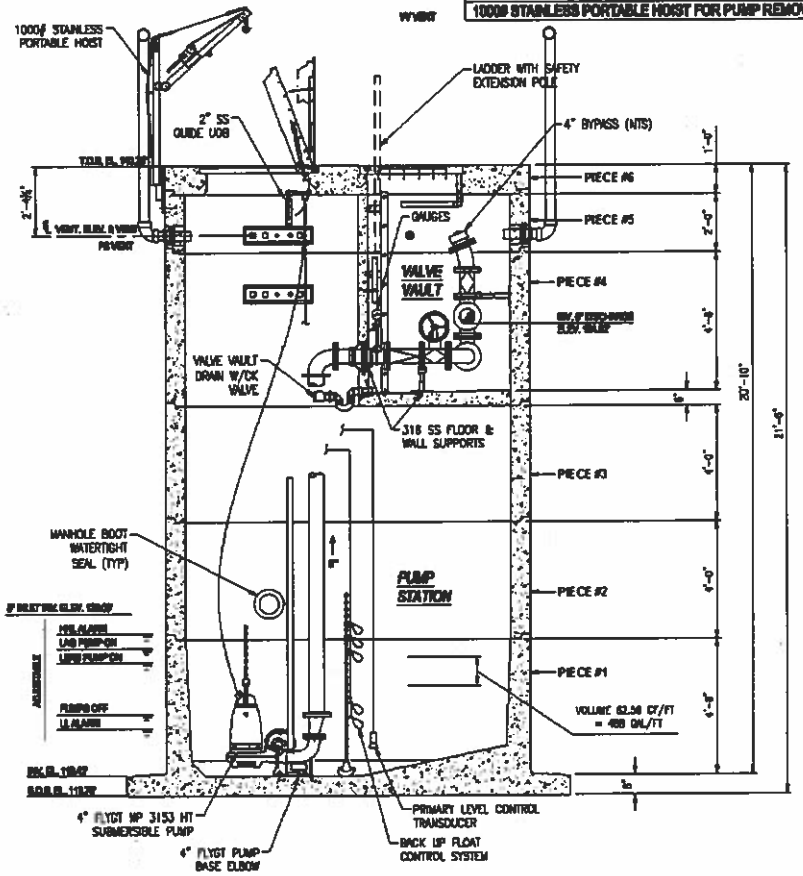


BASE PLAN VIEW
SCALE: 1/4" = 1'-0"

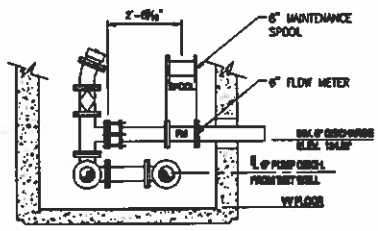
STATION OPTIONS LIST
CONCRETE ADDITIVE FOR H2S PROTECTION
EXTERIOR DAMPPROOFING
ACCESS LADDER UP EXTENSION
6" AIR CUSHION CHECK VALVES
4" BYPASS CONNECTION WITH QUICK CONNECT
EPOXY TOPCOAT ALL DIP & DI FITTINGS, TNEMEC N69
6" IN-LINE FLOW METER
DISCHARGE PRESSURE GAUGES, 0-60 PSI
STAINLESS PIPE SUPPORTS IN VALVE VAULT
ADDITIONAL PASSIVE VENT FOR VALVE VAULT
1000# STAINLESS PORTABLE HOIST FOR PUMP REMOVAL

PACKAGE LIFT STATION NOTES:

- THE LIFT STATION SHALL BE SUPPLIED AS A TURN-KEY PACKAGE WITH FULL MANUFACTURER'S RESPONSIBILITY FOR STRUCTURE, PUMPS, PIPING, VALVES, SUPPORTS, ACCESS EQUIPMENT, DUPLEX PUMP CONTROLS, AND ALL RELATED ITEMS AS SHOWN HEREIN.
- THE LIFT STATION STRUCTURE SHALL SHALL BE REINFORCED CONCRETE, MONOLITHICALLY CAST TO PREVENT LEAKING, BUILD-UP
- THE STRUCTURE SHALL INCLUDE AN INTERNAL WIDE VALLEY AS SHOWN TO ELIMINATE DIFFERENTIAL SETTLEMENT AND PRODUCT PACKAGED EQUIPMENT ABOVE ON THE BASE.
- THE PACKAGE LIFT STATION SHALL BE FACTORY COATED AND ASSEMBLED IN ITS ENTIRETY, AND FACTORY INSPECTED BY OWNER'S REPRESENTATION PRIOR TO LOADING FOR SITE DELIVERY
- THE PACKAGE LIFT STATION SUPPLIER SHALL ASSIMILATE FOR PRODUCT COORDINATION MEETINGS PRIOR TO PRODUCT PRODUCTION, AND ON SITE FOR PRODUCT INSTALLATION SUPERVISION.
- THE PACKAGE LIFT STATION SUPPLIER SHALL BE ON SITE DURING STATION TESTING AND STATION START-UP & TRAINING FOR THE PURPOSES OF PRODUCT ADJUSTMENT, MANUFACTURER, AND PRODUCT TIPS.
- COMPLETE PROGRAM DOCUMENTATION (SUBMITTALS, DRAWINGS AND O&M MANUALS) SHALL BE SUPPLIED UNDER "ONE" BOUND FOLDER SHOWN BY THE PACKAGE LIFT STATION SUPPLIER.
- THE PACKAGE LIFT STATION SUPPLIER SHALL BE RESPONSIBLE FOR COMPLETE PACKAGE WARRANTIES THROUGH THE TIME PERIOD AS SPECIFIED.
- CONTRACTOR'S REPRESENTATIVES SHALL CO-OPERATE AND VERIFY ALL PUMP STATION INLET SIZES AND LOCATIONS, AS WELL AS ALL CRITICAL ELEVATIONS PRIOR TO COMMENCEMENT OF PRODUCT SUBMITTALS.



SECTION A-A
SCALE: 1/4" = 1'-0"



SECTION B-B
ELEVATION VIEW OF FLOW METER AND DISCHARGE
SCALE: 1/4" = 1'-0"

APPROX. WEIGHT:

PIECE #1 - BASE SECTION WITH FILLET - 17.00 TONS
PIECE #2 & #3 - 4' SHIM SECTIONS - 7 TONS EA.
PIECE #4 - VALVE VAULT SECTION - 12.00 TONS
PIECE #5 - 2' VALVE VAULT RISER - 4.25 TONS
PIECE #6 - H20 COVER - 5 TONS
NOTE: PIECES #5 & #6 WILL BE FACTORY ASSEMBLED WITH SEAL - TOTAL ASSEMBLED WEIGHT - 9.25 TONS

NOTE: 1.) EACH JOINT SHALL HAVE (2) ROWS OF CONSEAL CS102 CONTINUOUS AROUND ENTIRE PERIMETER.
2.) CONTRACTOR TO VERIFY ALL HOLES & LOCATIONS

Oldcastle Precast

RC611 PUMP STATION
PUMP STATION LAYOUT
DICKERMAN ROAD PUMP STATION LAYOUT, CHESHIRE, CT
ONELIFT MODEL RC611X2010-2-6D3-4B-6FM

G.A. FLEET & ASSOCIATES - RYE BROOK, NY

DATE	DRAWN	CHECKED	PROJECT	SUBMITTAL
3/09/21	KVN	GGC	---	PROPOSAL

334-2010-029 | SHEET 1 OF 1

DICKERMAN ROAD PUMP STATION LAYOUT RC611X2010-2-6D3-4B-6FM

SLR
99 REALTY DRIVE
CHESHIRE, CT 06410
203.271.1773
SLRCONSULTING.COM

DATE	03/09/21
SCALE	N.T.S.
PROJ. NO.	6731-01
DESIGNED	GGC
DRAWN	KVN
CHECKED	GGC

ATTACHMENT NO. 1

STONE BRIDGE CROSSING
FINAL WPCA SUBMISSION

1953, 2037, 2061 HIGHLAND AVENUE & MBL: 3-51
CHESHIRE, CONNECTICUT

REVISED: ---

PROJECT PHASE:

DRAWING NAME:

NO. 1

MINUTES OF THE TOWN OF CHESHIRE WATER POLLUTION CONTROL AUTHORITY MEETING HELD ON THURSDAY, JANUARY 28, 2021 AT 6:00 P.M.

VIRTUAL MEETING VIA ZOOM

Public access made available through live streaming on YouTube at https://www.youtube.com/channel/UC4_xey3QjJmwe57R_6K94Dw

Public comments accepted at Comments@cheshirect.org and by voice message prior to the meeting at 203 271-6638. Video will be available on Channel 14 and on demand at www.cheshirect.org as soon as possible.

Present
John Perrotti, Chairman; Steve Carroll, Vice Chairman; James Beach, Tom Scannell,
Absent: Aboud Abdelghani, James Urbano, Zack Wellburn
Staff: Scott Hallier, Plant Superintendent; Dennis Dievert Jr. P.E. Wright-Pierce Engineering.

Chairman Perrotti called the meeting to order at 6:00 p.m.

1. PLEDGE OF ALLEGIANCE
The group Pledged Allegiance to the Flag.

2. ROLL CALL
The clerk called the roll and a quorum was determined to be present.

3. PUBLIC COMMUNICATIONS - none

4. APPLICATIONS

a. Tri-Star Development LLC – Stone Bridge Crossing feasibility approval modification

Darin Overton, P.E. SLR represented the applicant, and Paul Bowman represented the ownership of Stone Bridge Crossing.

Chairman Perrotti noted there were a few memos in the packet on this application.

WPCA granted feasibility approval for the development at the December 12, 2018 meeting. The WPCA approved a modification to this approval on April 24, 2020 for a revision on how the sanitary sewers would be constructed on the property.

Mr. Overton explained that the application is before the Authority due to minor changes to planning for the project. The biggest change/modification to the master plan is to

refile the subdivision application with elimination of a portion of the proposed public/town roadway with more commercial development in the northeast part of the site with a private road access. There was a cul de sac road planned to come in off Route 10 near the 691 off ramp. As part of the prior subdivision there is another loop road coming off this cul de sac, looping back to Route 10. That portion of the town road has been eliminated in lieu of a development parcel. There will be a private road accessing this area and not a town road.

Mr. Overton explained the other significant change, which is moving the pump station to the southwest corner with ability to get gravity feed to that pump station. There would not be a gravity line and forced main parallel with each other. In that location the applicant can run all the site sewer, by gravity, to the pump station.

According to Mr. Overton part of this was driven by the former W.S. Development, with plans to bring the forced main over the Route 10 bridge over 691. It has been found it is better to bring it over to Dickerman Road Bridge. The pump station is more logically located in this southwestern corner near Dickerman Road. These are the changes; they are simple; all take place on the site. There is still the plan to bring a gravity sewer main out to Route 10 on the east side to sewer properties along Route 10 or other undeveloped properties in this area.

There was an on-line meeting last week with Wright-Pierce to review some of the changes and history of the project. Mr. Dievert issued a review letter which is favorable for the project.

Mr. Dievert stated the memo was written for the modification to the previously approved feasibility application, only regarding the relocation of the sewer pump station. He has been in conversations with Don Nolte, and received 20 files on the subject project. One concern was leaving the sewer on Route 10.

Regarding if and when the town will assume ownership of the pump station and/or gravity sewer, Mr. Dievert asked about clarification on this issue. Mr. Nolte has sent correspondence from 2018 and 2020 which indicates the town is willing to take ownership of the pump station, but it was unclear for the gravity sewer piece.

Chairman Perrotti stated there were different situations on where the pump station was located. The request was for the east side of Route 10 for the sewer connection.

Mr. Carroll commented on the pump station further to the west working better, and this is not an issue for him. He asked about phases 2 and 3 and there being a gravity feed down to the pump station.

In response, Mr. Overton noted the east side of the site is, generally, higher than the west. With the new configuration they can bring the sewer through the great fill (up higher) as compared to the W.S. project. Under this new scenario the sewer can be brought in with more separation distance because the pads on the east side are a little higher than what was planned. For the subdivision there is more flexibility to vary the grades on the lots. The entire project will be served by gravity, and it is low enough to serve parcels on the opposite side, east side of Route 10, with gravity sewers.

Mr. Dievert stated in the original plans there was a sewer extended out to Route 10, and the town was anticipating being tied into this sewer. There is a State property there which the town is looking at. He said Mr. Nolte wanted to extend into Route 10, and the application will take care of that. He received a call from Sedar about the possibility of providing the pump station. When the time comes for that Mr. Dievert will review everything with Supt. Hallier.

This is continuation of a previously approved feasibility application and Mr. Perrotti said it is a different approach. The WPCA members had a brief discussion about the project modifications and whether a motion was required on the matter. It was determined there are no issues with the applicant's request, and the WPCA looks forward to a final design process.

On behalf of the applicant, Mr. Overton expressed appreciation for the WPCA members' time and feedback as the project continues to move forward.

Mr. Bowman thanked the Authority members for their time and review of the modifications.

b. Cheshire Hillside Village sewer use charge correspondence dated January 6, 2021.

There is a memo in the packet to Mr. Nolte from Wright-Pierce/Mr. Dievert regarding this application and adjustment to sewer charges for the Village.

Cheshire Hillside Village has 150 units; 50 are individually owned units; 100 are rental units.

Mr. Carroll commented on WPCA not seeing requests for adjustments to sewer charges. He said this is an interesting situation, and the commercial rate should be commensurate with the $425 annual residential rate. He reviewed this situation with Mr. Nolte and Mr. Perrotti, and it was found that Cheshire Hillside Village Associates water is measured through a single meter. Past practice has been for them to reduce this by the amount of usage by the 50 condo units and end up with a net for the remainder of the apartments.

Mr. Perrotti and Mr. Carroll have reviewed the sewer regulations.

The context of the regulations is that condominium associations and the like are serviced by a single meter and shall be charged the commercial rate. Individual units with individual meters shall be charged the residential rate. The commercial rate will never be less than the residential rate.

For the subject application, there is a single meter, and Mr. Carroll questions whether the condos being charged a residential rate should be charged a commercial rate. The entire complex is on a single meter and this argues for a commercial rate under the regulations. There may be more to look at in the regulations. Mr. Carroll questions whether Hillside Village is being billed correctly. Based on superficial research, the Village should be charged the commercial rate. The town would lose some money and this would not factor into the decision.

Chairman Perrotti displayed sections of the regulations for members to review

Mr. Carroll stated the WPCA should seek a legal opinion on whether Hillside Village should be charged at the commercial or residential sewer rate.

In this regard, Mr. Dievert had the same question when he looked at this matter, and does not know why it has been this way for 52 years. He asked if there is a written agreement in place between the association and town...but he has not seen one. In talking to former town engineer Mr. Gancarz the understanding is that the 50 privately owned units are to pay $425; the 100 rental units are based on water consumption, which is $234.85 per rental unit.

Chairman Perrotti read an excerpt from the regulations into the record.

Mr. Carroll recommended the WPCA refer this matter to the town attorney for an opinion.

5. PROJECTS

6. SUPERINTENDENT'S REPORT

Supt. Hallier informed the WPCA that everything at the plant is going well. There were high flows in December due to heavy rain; January has normal flows; and nothing major is going on at the plant at this time.

7. ENGINEERING REPORT

Mr. Dievert stated there is nothing to report other than what has been discussed. He is in contact with Mr. Nolte on the Stone Bridge Crossing project. Everything looks good; he has read through all the information; but it is unclear "when" the town takes ownership of the pump station. Mr. Dievert expects the WPCA will be involved in that decision.

The Authority members were told by Supt. Hallier that there have been discussions about the town taking ownership, but there is no definitive date or action for the town doing this.

Mr. Dievert said the town may take ownership after the second connection to the pump station. The developer thought the town was taking ownership from day #1. This can all be worked out during the design review.

According to Mr. Carroll the ownership of the pump station was after the project is completed, not day #1. This requires a mutual understanding.

Mr. Dievert cited a memo of April 16, 2020 in which the applicant asks WPCA to clarify issues on the pump station for the development that received preliminary approval in December 2018. It states "the Town of Cheshire will assume ownership and control of the pump station once completed". There are questions about the meaning of "once completed".

Pump Station Subcommittee – Mr. Carroll talked about I&I issues and asked Mr. Dievert for his experience on these issues.

Mr. Dievert informed the WPCA that he has experience with municipal I&I studies and issues. Many towns do I&I rehab (Fairfield, Norwalk, Waterford) and he can discuss the issues with the committee. There are grants for I&I...about 55% eligibility.

There is a lot of historical data for I&I issues in Cheshire, and Mr. Perrotti said there was metering in areas of Cheshire, hit and miss with cameras, overlay on GIS maps. The costs of these actions were funded through a grant.

Mr. Carroll reported there is funding available to WPCA, particularly for I&I. The town would have to reapply for future work on I&I, stating objectives to get the funding.

It was noted by Mr. Perrotti that the struggle was how to proactively educate the homeowners on what to do when there are problems with a sump pump or meter.

Some towns pay out of pocket for sump pump disconnection. Mr. Dievert reported there is an ongoing program to include sump pump issues/disconnect with the sale of the home, and this being on the inspector's list during the sale process.

Capital Budget – Supt. Hallier reported on the CEP 2022-2023 and 2023-2024; there is a request for $300,000 for each of these two (2) years for I&I study and remediation. If approved by the Town Council the WPCA and staff can seriously address the issues.

Mr. Dievert assumes lots of work is already done, and if the data is over 5-10 years old it is useless. With newer data, Cheshire can drill down on problem areas. With funding

available this work can be undertaken. He will look at the data and discuss the history of I&I with Supt. Hallier.

Following this discussion, Supt. Hallier and Mr. Dievert agreed to schedule a meeting in a few weeks for review of I&I history and related information. There is information on flow metering and camera monitoring in the record.

8. NEW BUSINESS

a. Conflict of Interest Ordinance - Memo

Chairman Perrotti explained that this ordinance requires all Town appointed and elected officials to disclose, on an annual basis, any potential conflicts of interest. The ordinance also requires the Town Manager to distribute this ordinance section to every public officer and employee of the Town. Each Town employee and all elected and appointed officials on Boards, Commissions, Committees has, or will, receive the annual disclosure reminder.

9. OLD BUSINESS - none

10. APPROVAL OF MINUTES – DECEMBER 17, 2020

MOTION by Mr. Scannell; seconded by Mr. Carroll.

MOVED to approve the Minutes of the December 17, 2020 meeting subject to corrections, additions, deletions.

VOTE The motion passed unanimously by those present.

11. ADJOURNMENT

MOTION by Mr. Scannell; seconded by Mr. Perrotti

MOVED to adjourn the meeting at 5:45 p.m.

VOTE The motion passed unanimously by those present.

Attest:

_____

Marilyn W. Milton, Clerk

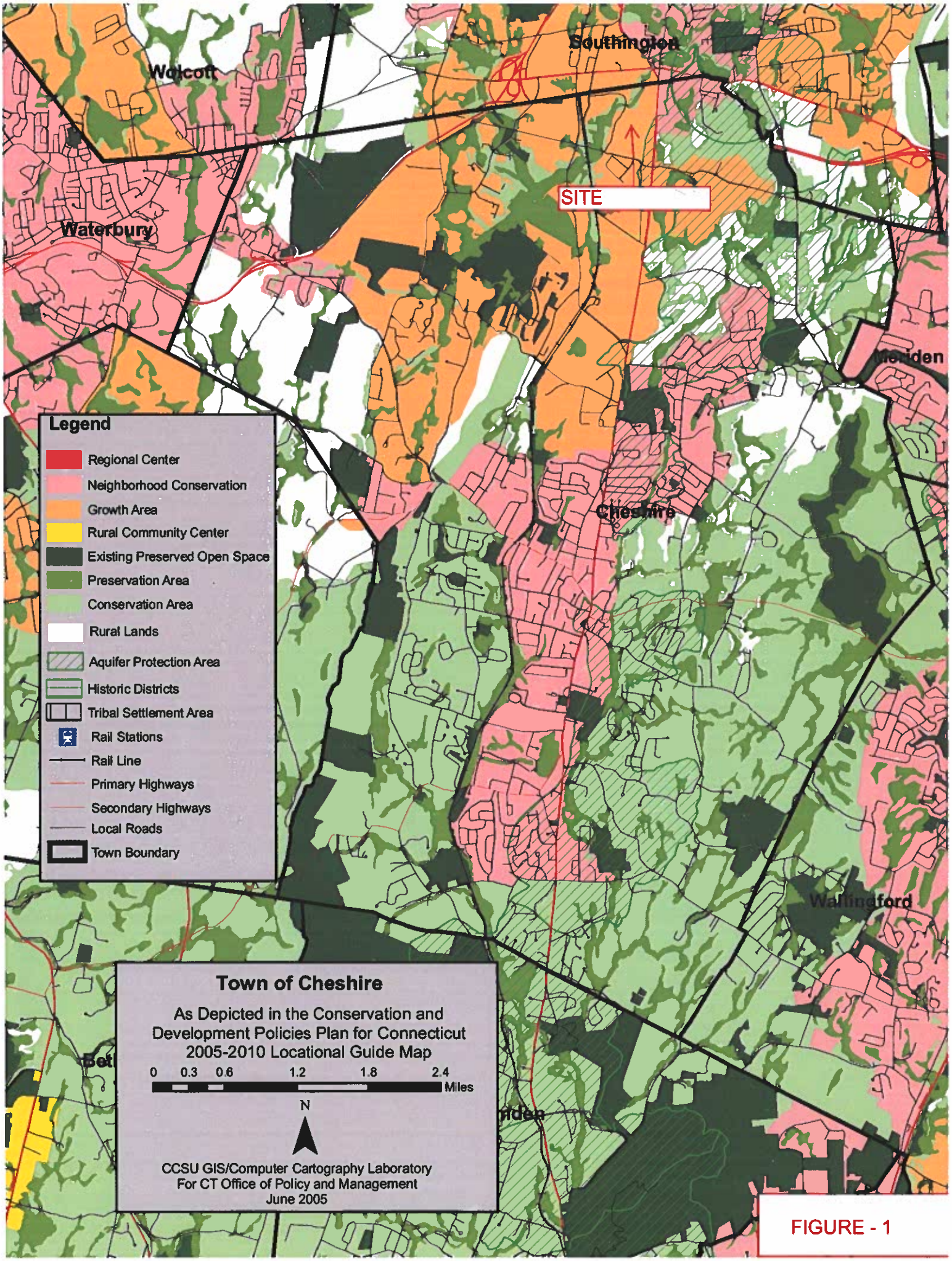
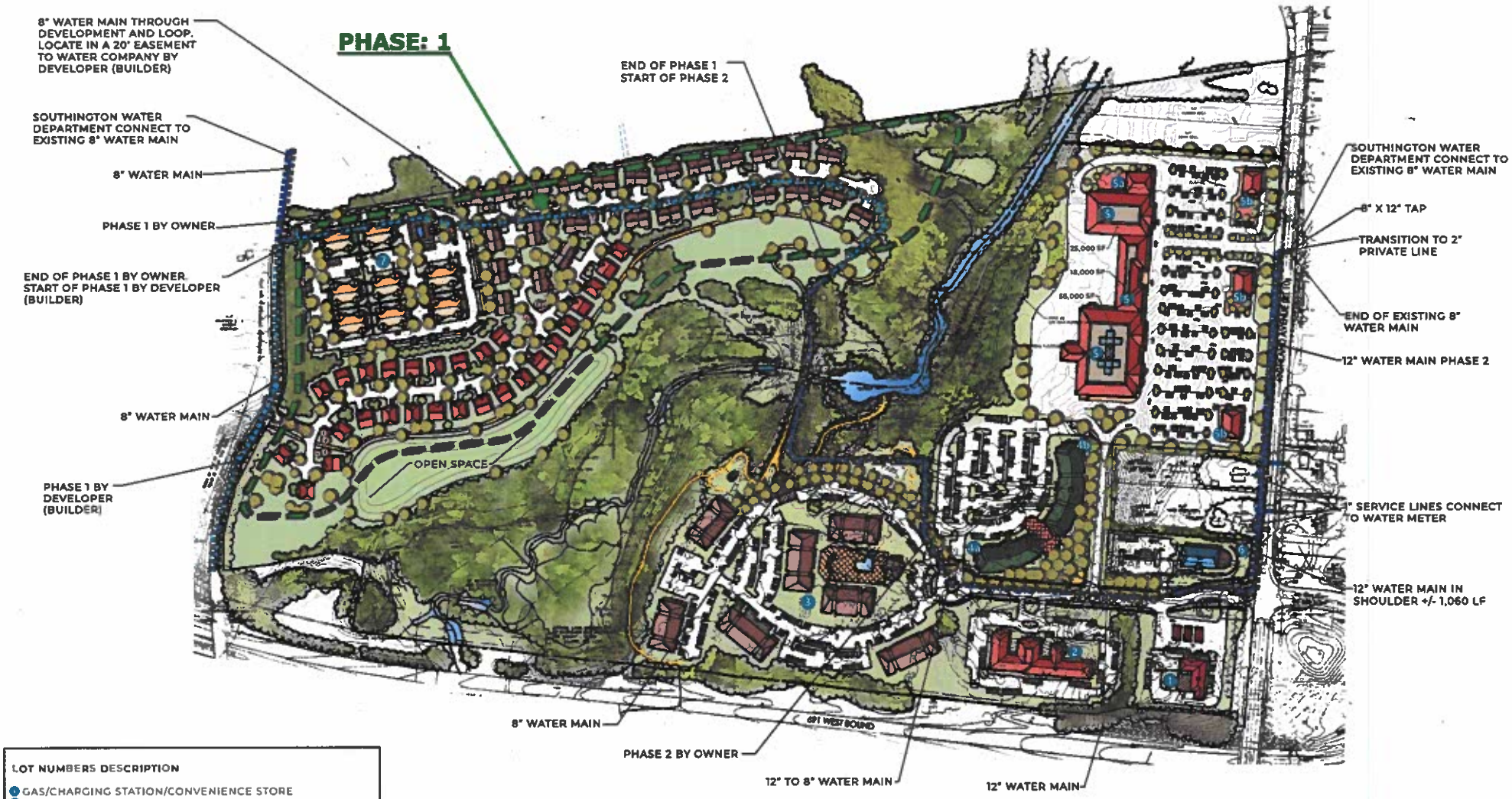

Wolcott
Southington
SITE
Waterbury
Cheshire
Wallingford
Legend
Regional Center
Neighborhood Conservation
Growth Area
Rural Community Center
Existing Preserved Open Space
Preservation Area
Conservation Area
Rural Lands
Aquifer Protection Area
Historic Districts
Tribal Settlement Area
Rail Stations
Rail Line
Primary Highways
Secondary Highways
Local Roads
Town Boundary
Town of Cheshire
As Depicted in the Conservation and Development Policies Plan for Connecticut 2005-2010 Locational Guide Map
0 0.3 0.6 1.2 1.8 2.4
Miles
N
CCSU GIS/Computer Cartography Laboratory
For CT Office of Policy and Management
June 2005

FIGURE - 1

NOTE:
INSTALL FIRE HYDRANTS WITH 300' MAX SPACING ALONG PAVED ROADS



LOT NUMBERS DESCRIPTION

- GAS/CHARGING STATION/CONVENIENCE STORE
- 150 ROOM HOTEL
- +/- 300 UNIT MULTI-FAMILY RESIDENTIAL
- MEDICAL OFFICES (+/- 19,500 SF)
- +/- 90 ACTIVE ADULT HOUSING UNITS
- RETAIL (+/- 98,000 SF)
- RESTAURANT (+/- 5,000 SF)
- PAD SITE/ RESTAURANT WITH DRIVE THRU - 3 BUILDINGS (+/- 3,500 SF EA.)
- RESTAURANT OR URGENT CARE (+/- 7,500 SF)
- RESIDENTIAL DEVELOPMENT AREA (+/- 180 UNITS)

ATTACHMENT A: OVERALL CONCEPT - WATER SUPPLY

SPECIAL DEVELOPMENT PLAN NORTH END PARCEL

CHESHIRE CONNECTICUT

February 05, 2021

MILONE & MACBROOM

0' 120' 240' 360' 480'
1" 2"
1"=240'
N

SECTION 11600
DICKERMAN ROAD PUMPING SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK:

A. The work of this section of the project specifications is to provide an automated duplex submersible wastewater pumping station and force main system complete to the receiving manhole, fully compatible and coordinated as described both herein and elsewhere in the project plans and specifications. The general contractor is responsible for delineating the scope of supply and installation among his respective subcontractors and suppliers.

B. The Contractor is to furnish and install the following structures, equipment, piping systems, and related components, of the dimensions and configurations shown on the contract drawings and approved shop drawings, at the Wastewater Pumping Station location:

1. One (1) complete, below-ground precast concrete Wastewater Pumping Station consisting of Wet Well with integral Valve and Flow Meter Vault, outfitted internally and externally with pumping system, accessories, and appurtenances shown on the drawings, described herein, and/or required for the stated purpose.

2. Related site electrical, instrumentation, and control supplied with the pumps and to the extent shown on the drawings, and signal conduit, wiring, boxes, equipment, and devices as shown on the drawings, described herein and in the Electrical Specification Section.

3. Force main system from pump station to receiving manhole on West Johnson Avenue, including Combo Air release manhole, bridge crossing, new manhole structures, piping, valves, supports, and appurtenant items necessary for a complete and functioning system, whether shown or not.

C. The major components of the Wastewater Pumping Station are further described as including, but not limited to:

1. One (1) prepackaged, pretested pump station complete with submersible pumps, precast concrete pump chamber with integral valve vault structure with antiflotation provisions, slide rail pump removal system, ductile iron discharge piping with required supports and fittings, discharge check and plug valves, access hatches with safety gratings and accessories, valve vault access manhole

rungs, liquid level controls, flow meter, duplex pump control panel and alarm telemetry system as specified separately, pump hoist with base, vents, internal wiring and other required appurtenances.

2. The prepackaged pump station shall be built and tested off site to ensure product quality and consistency. The prepackaged pump station supplier shall provide sole-source responsibility to the owner through the warranty period.

3. Vendor services for construction phase guidance, coordination with required control and alarm telemetry, equipment startup, demonstration, and operator training

D. Documentation and Submissions:

1. Shop drawings for all equipment, parts, and components shall be submitted to the Owner/Engineer for review and approval prior to fabrication and/or installation.

2. Operation and Maintenance Manuals (O&Ms) for all equipment

3. As-built drawings for all work, including but not limited to site configuration, structures, piping and equipment, electrical, instrumentation and control

4. Factory test reports and vendor startup reports for applicable equipment and/or as specified

E. Coordination, Startup, and Demonstration:

1. The contractor shall coordinate with the site work contractor, foundation preparation contractor, and installing contractor for power, control, and signal conduit and devices; location; influent and force main piping elevations; and related work.

2. The contractor shall coordinate with the Instrument Integrator supplying the facility instrumentation, controls, and telemetry and the project electrician, for installation of instrumentation, wiring, and related devices.

3. Provision of adequate water for startup testing and demonstration (A tanker truck is envisioned.)

4. Coordination with the town for startup, testing, demonstration, and operations.

1.2 RELATED WORK:

Standard Specifications "Form 818, Standard Specifications for Roads, Bridges, and Incidental Construction, State of Connecticut, Department of Transportation" and supplements

Division 2 Sections for Clearing and Grubbing, Earthwork, Construction Dewatering, Trenching, Sanitary Gravity Sewer piping, manholes, and related work

Division 13 Sections for Instrumentation and Control, Telemetry, and Startup and Testing

Division 16 Sections for electrical and control work

1.3 SUBMITTALS:

A. The following documentation shall be submitted to the Engineer for approval. Equipment shall be in full compliance with this specification.

1. Partial/incomplete submittals will not be reviewed but will be returned as Incomplete. Submittals shall be complete and comprehensive. Lack of the requested and complete data is cause for rejection.

2. Pump product data, including, but not limited to:
   a. Pump performance curves
   b. Pump outline drawing
   c. Pump hoisting cable/devices, hardware, and accessories
   d. Electrical motor data, including motor torque, current, power factor, input/output Kw and efficiency; include starting characteristics
   e. Control component drawings and data
   f. Power and Control wiring diagrams, including pump motor overtemperature and seal leak device(s)
   g. Access cover drawings
   h. Weights
   i. Typical installation drawings and guides
   j. Technical manuals
   k. Parts lists
   l. Written warranties
   m. Manufacturer's equipment storage recommendations
   n. Manufacturer's standard recommended startup report form

3. Precast concrete structures, accessories, and appurtenances, including but not limited to:

a. Calculations sealed by a Professional Engineer registered in the State of Connecticut, for the design of the precast concrete structures used on this project. Include the following:
   - Lateral load imposed by surrounding soils and groundwater
   - Buoyancy forces resulting from a groundwater level equal to the surface elevation of the site. Demonstrate that the dead weight of the empty structures is greater than the buoyant force by a Factor of Safety of at least 1.25.
   - Analysis of load on connecting hardware for any supplemental antiflotation collar, slab, or mass

b. Jointing materials between structure sections
c. Dampproofing and chemical resistance admixtures
d. Pipe sleeve/seals material
e. Valves
f. Supports
g. Pressure gages
h. Anticipated service life statement
i. Station drawing for accessories
j. Access hatch/cover
k. Hoisting system, including base and winch
l. Quality Control Submittal: Submit manufacturers' certification indicating compliance with specified performance and design requirements.

4. Force main piping system valves, piping, components, accessories, and appurtenances

5. O&Ms for all products included in this wastewater pumping station specification. O&Ms shall include as-built elevation, as-built control wiring diagrams, and any other site-specific data. Provide in advance of startup and operator training.

6. As-built records shall be provided, including but not limited to facility drawings, electrical one-line diagrams, wiring diagrams, control parameter settings, control programs, and related project-specific locations and elevations of structures.

1.4 QUALITY ASSURANCE:

A. Installer Qualifications: Engage an experienced Installer to perform work of this Section who has specialized in installing wastewater pumping stations similar to the one required for this project.

B. At a minimum, the manufacturers of pumps, equipment, and major components specified herein shall be certified per ISO 9001 as having a quality assurance program governing the manufacture of their products.

C. Materials installed for this project, or used in the manufacture of products installed for this project, processing, and testing, shall meet the requirements of the following standards where governing or where specified:

1. ANSI (American National Standards Institute)
2. ASTM (American Society of Testing and Materials)
3. AWWA (American Water Works Association)
4. NFPA (National Fire Protection Association, specifically the National Electrical Code)

D. Perform all ancillary construction associated with this Section as per requirements of authorities having jurisdiction.

Unless stated otherwise, Form 818 - State of Connecticut Department of Transportation "Standard Specifications for Road, Bridges, and Incidental Construction" latest edition, shall be used for applicable materials, compliance, and execution of the work in this section.

E. Piping system pressure testing and pumping equipment and control startup and testing shall follow the requirements of this section and the control system section in addition to the vendor's specific requirements necessary for validating a warrantable installation.

F. Factory Service: Factory-approved service facilities with qualified factory-trained mechanics shall be available for prompt emergency and routine service of all major station components and equipment. This representation shall be within a 90-mile driving radius of the project.

G. Guarantee: The pump manufacturer shall warrant the pumps and related equipment package for 5 years from the date of startup. The warranty shall be in printed form and previously published as the manufacturer's standard warranty for all similar units manufactured.

H. Manufacturers: The pump, mechanical seals, and motor shall be from the same manufacturer. The pump, mechanical seals, and motor manufacturer shall be Xylem Flygt, or approved equal.

I. Pump Station Single Source Responsibility: To ensure that all equipment required for the installation of the prepackaged pump station, integrated control, and telemetry system is properly coordinated and will function as a unit in accordance with the intent of these specifications, the Contractor shall obtain all the equipment specified under this Section from a single supplier in whom the responsibility for the proper function of all equipment, regardless of manufacturer, as an integrated and coordinated system shall be vested. The intent of this paragraph is to establish unit

responsibility for all the equipment with the equipment supplier. The use of the word irresponsibility relating to the equipment supplier is in no way intended to relieve the Contractor's ultimate responsibility for equipment coordination, installation, operation, and guarantee.

1.5 WARRANTY

A. Provide a warranty certificate typed on manufacturer's letterhead.

B. The manufacturer's standard one (1) year warranty on all pump station static components and five (5) years on pumps and motor shall apply.

C. In addition, the manufacturer shall guarantee all components of the equipment specified to be furnished under this Section to be free from defects in design, materials, and workmanship for a period of one (1) year commencing on the date of the Manufacturer's Startup Report, that being the day that the pump was placed into permanent, automatic, and consistent, fault-free operation.

D. In addition, the pump supplier shall warranty for a minimum of two (2) years from acceptance that the pump impeller will not clog with rags, resulting in greater than 10 percent loss in flow. Any clog events during this period will be considered warranty work and will require the pump supplier to remove the rags within 72 hours of notification at no cost to the owner.

Impeller shall not lose more than 10 percent flow and head performance over the 5-year warranty period due to wear. In the event the pump loses more than 10 percent performance, the pump supplier shall adjust or replace the impeller and the wear plate to bring the pump to original 10 percent tolerance at no cost to the town.

E. The warranty shall be in printed form and previously published as the manufacturer's standard warranty for all similar units manufactured.

PART 2 - PRODUCTS

2.1 PRECAST CONCRETE PUMP STATION WITH INTEGRAL VALVE AND METER VAULT

A. General Requirements:

1. Provide a precast concrete wetwell with integral valve and meter vault structure of the dimensions and configurations shown on the drawings, in coordination and outfitted with the piping, valves, and equipment shown and included in the scope of supply of this specification section and in coordination with the site work of other trades or contractors and with the lines, grades, and locations shown.

2. Reference section 1.3 of this specification for submittal requirements relative to the work of this section.

3. The following references apply to the materials, manufacture, and installation of precast concrete structures:

   a. State of Connecticut DOT – Form 818

   b. ASTM A185 — Steel Welded Wire Fabric for Concrete Reinforcement

   c. ASTM C33 — Concrete Aggregates

   d. ASTM C39 — Compressive Strength Cylinder Specimens

   e. ASTM C478 — Precast Reinforced Concrete Manhole Sections

   f. ASTM C497 — Testing of Manhole Sections

   g. ASTM C990 — Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants

   h. ASTM C 1244 — Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test

   i. AASHTO M199 — Precast Reinforced Concrete Manhole Sections

   j. AASHTO M198 — Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants

B. Precast Pump Station Design Criteria

1. Structural design calculations for the Pump Station with Integral Valve Vault shall be prepared and sealed by a registered Professional Engineer in Connecticut and shall be submitted for approval prior to fabrication.
2. Precast Concrete sections shall conform to the latest requirements of ACI 318.
3. The structural design shall take into account discontinuities in the structure produced by openings. All slabs and walls shall be fully reinforced on both surfaces with minimum reinforcing of #5 @ 12" each way. Additional reinforcing shall be provided around all openings.
4. The Precast Pump Station with Integral Valve vault shall be designed to support its own weight as well as the minimum superimposed loads tabulated below. All additional equipment shall be accounted for in the design of the elements.

   a. Top Slab - Live Load – AASHTO HS-20 Loading; minimum thickness 8"

b. Floor Slab (valve/meter vault) - Live Load - 200 psf plus dynamic piping loads
c. Exterior Walls - All exterior walls below finished grade shall be designed for an equivalent fluid pressure of 90.0 psf caused by saturated earth pressure. The top of the pressure diagram is assumed to originate at finished grade. In addition to the soil pressure, a 2'-0" Live Load Surcharge shall be applied to a depth of 8'-0".

5. When the design yield strength "fy" for tension reinforcement exceeds 40,000 psi, the "z" value referred to in ACI 318 shall not exceed 95 ksi for the wet well and 115 ksi for the pump station. The flexural stress in reinforcement under service loads "fs" shall be calculated and shall not be greater than 50 percent of the specified yield strength "fy."

6. The structures shall be designed to prevent floatation without the benefit of skin friction and the weight of mechanical equipment when the groundwater level is at finished ground surface. The factor of safety against uplift calculated as a ratio of the total resisting force (excluding skin friction and the weight of the equipment) to the total hydrostatic uplift force shall be at least 1.25. The net uplift force shall be transferred to the antibuoyancy collar.

C. General Pump Station Unit Requirements:

1. The Pump Station with Integral Valve and Meter Vault shall be composed of precast reinforced concrete units, rectangular in shape with rounded corners. The precast structures shall be monolithically cast and have minimum interior dimensions of 6' wide by 11' long with 2' radius corners. The precast base section will be supplied with an extended buoyancy collar to withstand upward buoyant forces with groundwater at grade. Overall structure heights shall be as shown on the contract drawings.

2. Exterior Walls shall be a minimum of 9" thick, integral valve and meter vault common wall and floor shall be a minimum or 6 inches thick, station floor and buoyancy footing shall be a minimum of 8 inches thick, and the roof slab with hatches shall be a minimum of 12 inches thick.

3. The Integral Valve and Meter Vault shall be monolithically cast into the pump station structure as shown on the contract drawings.

4. The Precast Structures shall be comprised of the least number of sections to keep the joints to a minimum.

5. The Pump Station Manufacturer shall have a sufficiently sized production facility in which all work associated with fabricating, assembling, and testing the pump station will be performed. The building shall keep the pump station components protected from the elements and kept at an ambient temperature of at least 45 degrees Fahrenheit. No concrete shall be batched and placed when the ambient temperature is below 50 degrees Fahrenheit.

6. All wall penetrations shall be formed utilizing hole-formers for manhole boots, or galvanized threaded couplings with waterstops for electrical connection.

7. All cast wall openings for ductile iron, PVC, or galvanized steel pipe shall incorporate adjustable rubber manhole boots for a watertight seal.
8. All precast components shall be fabricated on steel forms with machined rings to form accurate bell and spigot joint surfaces to ensure watertightness.
9. The horizontal joints between precast sections shall be sealed with a vulcanized butyl rubber joint material conforming to AASHTO M-198. The joint material shall be "Conseal CS-102" as manufactured by Concrete Sealants, or approved equal.
10. All surfaces of the precast structures shall be smooth, even, and free from roughness, irregularities, and other defects. The surfaces shall be suitable for receiving exterior treatments as specified elsewhere herein.
11. The pump station shall be model RC611, as manufactured by Oldcastle, or approved equal.

D. Pump Station/Valve and Meter Vault Precast Concrete

1. Concrete used in the manufacture of the various structural components of the precast concrete pump station and integral valve and meter vault shall be factory batched and shall meet the following requirements:
   a. Portland cement shall be Type I, II, or III conforming to ASTM C-150.
   b. Fine aggregate shall consist of natural sand conforming to ASTM specification C-33.
   c. Coarse aggregate shall consist of 3/4" nominal well graded crushed stone conforming to ASTM specification C-33.
   d. Air entrainment admixture shall conform to ASTM C260. The air-entrained content shall be not less than 4 percent nor greater than 7 percent.
   e. A superplasticizer shall be used and shall conform to ASTM C494 type A or F. Concrete shall be placed at a slump of between 5 and 8 inches.
   f. An antimicrobial concrete additive shall be used to protect the structure against deterioration from harsh H2S environments. The product shall be an EPA-registered liquid, integral concrete admixture for the prevention of microbial-induced corrosion (MIC) typically found in concrete tanks, pipes, manholes, and other structures/elements in sewage and drainage systems. The admixture shall molecularly bond to cement hydration products to rupture the cell membrane of harmful bacteria and other microorganisms on contact through an electrophysical mechanism. The admixture shall create a concrete surface that is not conducive to the growth of harmful microorganisms. Dose rate of additive shall be per manufacturers' recommendations but should not be less than 1 gallon per cubic yard of concrete mix. All concrete used for the structural components and nonstructural components (including fill concrete, common interior wall, and floor of integral valve vault) shall include the admixture as described above.

g. The "Integral Antimicrobial Admixture" shall be MasterLife AMA 100, as manufactured by BASF Corporation, Cleveland, OH, or engineer-approved equal.

h. A Crystalline Waterproofing Additive shall be used to cause the concrete to become sealed against the penetration of liquids from any direction and shall protect the concrete, surface to surface, from deterioration due to harsh environmental conditions. The Waterproofing Additive shall be Xypex Admix C-100, as manufactured by XYPEX Chemical Corporation, Richmond, B.C., Canada, or approved equal.

2. All concrete used for the structural components and nonstructural components (including fill concrete and common interior wall and floor of integral valve vault) shall attain a minimum 28-day compressive strength of 5,000 psi.

3. The pump station manufacturer shall conduct concrete strength tests on 4" x 8" cylinders. An adequate number of tests shall be performed to certify and ensure the strength meets or exceeds the design strength. Concrete strength test results for all specific precast structures supplied must be made available in written reports, per PCI standards, at the request of the review engineer.

E. Pump Station/Valve and Meter Vault Steel Reinforcing

1. Reinforcing steel shall be new billet steel meeting the requirements of ASTM A615. Welded wire fabric shall conform to ASTM A185.

2. Minimum Cover over reinforcement shall be 1 inch. Minimum bar lap shall be 30 bar diameters.

3. All reinforcement shall be free from loose rust, oil, and contaminants which reduce bond. Any foreign material shall be removed by suitable means prior to installation.

4. Provide supports for reinforcement including chairs, bolster bars, and other devices for spacing and securing reinforcing in accordance with CRSI requirements. Legs of all supports in contact with exposed-to-view surfaces shall be plastic coated in accordance with CRSI, Class I.

F. Hazardous Location Compliance:

1. The wet well and the area within 5 feet of the wet well has been classified as a Class 1, Division 1 Hazardous Location as defined by the National Electrical Code. All electric wiring and motors located within the subject area shall be either rated for the area or provided as Intrinsically Safe. The shop drawings carry the manufacturer's certification that all equipment located in the subject area meets the requirements of NEC Class 1, Division 1 Criteria and the Underwriter's Laboratory (UL).

G. Manufactured Accessory Products

1. Access Frames and Covers
   a. Wetwell Access:
      Furnish and install (1) aluminum pump access hatch, 36" x 54" single door, flush with precast cover, H20 loading with 316 stainless steel hardware. Cover will be ¼" diamond plate with stainless steel slam lock and weather plug, lift handle which sits flush with cover, recessed pad lock clip (pad lock by others), hold open arm to lock cover in 90-degree position, heavy duty stainless hinges. Frame to be angle style with continuous 1 ½" anchor flange and full slab-height skirt to show no exposed concrete when hatch is open, exterior surfaces in contact with concrete to receive one coat bituminous paint. Pump access hatch to be supplied with integral safety grating system.

   b. Valve and Meter Vault Access:
      Furnish and install (1) aluminum valve vault access hatch, 30" x 36" single door, flush with precast cover, H20 loading rating with 316 stainless steel hardware. Cover will be ¼" diamond plate with stainless steel slam lock and weather plug, lift handle which sits flush with cover, recessed pad lock clip (pad lock by others), hold open arm to lock cover in 90-degree position, heavy duty stainless hinges. Frame to be channel style with 1 ½" NPT drain port, continuous 1 ½" anchor flange and full slab-height skirt to show no exposed concrete when hatch is open, exterior surfaces in contact with concrete to receive one coat bituminous paint. Valve and meter vault access hatch to be supplied with integral safety grating system.

   c. Safety Grating System:
      The safety grate shall be made of 6061-T6 aluminum and designed per the "Specifications for Aluminum Structures." The grating shall be designed to withstand H20 loading. Each grate shall be provided with a permanent hinging system, which will lock the grate in the 90-degree position once opened. Grate shall be coated with an OSHA-type safety orange color; base coat is a thermosetting epoxy powder coat finish with a minimum thickness of 2-4 mils. The top coat is a mar-resistant, TGIC polyester powder coating with a minimum thickness of 2-4 mils. Each coat shall be baked at 350-375 degrees F until cured.

2. Aluminum Valve and Meter Vault Ladder
   a. The valve vault shall be supplied with an aluminum (6061-T6) wall-mount access ladder. The ladder shall be fastened to the concrete with 316 stainless expansion bolts and shall meet OSHA standard 1910.27 requirements.

   b. The ladder rails and supports shall be all welded aluminum construction. Rails and wall supports shall be solid 3/8" x 2 ½" flat stock, and rungs shall be 15/16" square with serrated top surface extruded into the rung for slip resistance. The minimum design live load shall be a single concentrated load of 200 lbs.

c. Rung spacing shall be uniform and not exceed 12", the minimum clear length of rungs shall be 18", and the distance from the center line of the rung to the nearest permanent object shall not be less than 7".

d. The aluminum ladder shall be manufactured by USF Fabrication, Inc., Hialeah, FL, or approved equal.

e. The ladder shall be provided with a "pop-up" extension assembly constructed of aluminum and stainless steel. The aluminum housing shall mount to the ladder by means of Type 316 stainless steel channel clamps secured to the ladder rungs with Type 316 stainless steel "U" bolts. The aluminum telescoping post shall extend 42" above the top of the housing and lock into position with a grade 316 stainless steel pin.

3. Portable Cranes – Provide a painted steel portable crane of minimum 1,000 lb. capacity at the radius required from mounting bracket location to furthest pump, in coordination with pump and hatch locations. The crane shall consist of a vertical wall-mounted pedestal base, removable mast, handle, telescoping boom with screw-jack boom angle adjustment, and winch. The unit shall break down for storage and transport. The mast shall be free to rotate 360° on a pin and sleeve bearing in the base. The winch shall be zinc-plated, hand-operated spur gear with load control brake, and quick-disconnect anchorage for accommodating a ball swaged stainless steel hoist cable, supplied with the pumps and coiled in the wetwell. Provide accessories as necessary for intended pump hoisting use, and coordinate drum and cable anchorage and required cable size and length so as to permit the operator to uncoil and thread the cable from the desired pump through the boom cable sheave, and attach to the winch drum for pump removal without overfilling the drum with excess cable. Provide tightly fitting base cover to keep rainwater out of the base when not in use. Crane shall be Series 5110 Portable davit Crane by Thern, or approved equal, coordinated by the pump station manufacturer. Coordinate base location, boom angle, and pump cable attachment hardware so as to permit the pumps to be hoisted over the corner of the open hatch cover and placed on the top slab, within the load capability of the crane at the selected radius. Base anchorage shall be Type 316 stainless steel.

H. Pump Station/Valve and Meter Vault Piping, Valves, Supports, and Accessories

1. Ductile Iron Pipe and Fittings
   a. Piping and fittings shall be centrifugally cast ductile iron grade 60-42-10 with screw-on flanges, Class 52 with a minimum working pressure of 350 psi, in the sizes shown, and manufactured in accordance with AWWA C151, C115, and C606. Flanges shall be drilled per ANSI B16.1, Class 125. Flanges shall be faced and sealed with a rust-inhibitive coating to be removed at time of assembly.

b. Ductile Iron fittings shall be flanged joint conforming to ANSI/AWWA C104, rated for 250 psi working water pressure, with flanges faced and drilled per ANSI B16.1, Class 125.

c. Pipe and fittings shall be double cement lined per ANSI A26.51 and seal coated per ANSI A21.4. Exterior surfaces shall be primed and finish coated with Tnemec N69 Hi-Build Epoxoline or approved equal.

d. Flange gaskets shall be full face "Flange-Tyte"™ three-bulb ring type, black molded SBR per ANSI/AWWA C111/A21.1 rated for 350 psi. No other gaskets are acceptable.

2. Check valves shall be single disc, swing type, and designed to allow full diameter passage, and conforming to AWWA C508. Bodies shall be cast iron, with bronze renewable seat rings, bronze gate ring, cast-iron gate, stainless steel hinges, stainless steel shaft, bolted flange top, and bronze stuffing box and air cushion chamber assemblies. Valves shall have external counterweight, with articulating linkage to adjustable air cushion piston and cylinder assembly. Valves shall have flanged ends, faced and drilled to ANSI B16.1, Class 125. Valve working water pressure shall not be less than 250 psi. Valves shall operate without slamming.

3. Plug valves shall be nonlubricated, eccentric plug type, with resilient neoprene-faced plug and flanged ends faced and drilled to ANSI B16.1, Class 125, and rated for a minimum of 175 PSI for water service. Valve bodies and plugs shall be ASTM A126 Class B cast iron. Valve seats and plug shaft seals shall be corrosion resistant and comply with AWWA C504 and C507. Seats shall be welded nickel. Plugs shall be balanced, with Neoprene or approved coating. Seals shall be replaceable without valve disassembly. Valves shall incorporate an adjustable stop and seal drip-tight at full pressure rating. Valve bodies shall be factory tested to 300 psi. Valves shall be provided with lever actuators.

4. Flanged Adapter Couplings shall be restrained type, comprised of A536 ductile iron, flanges conforming to ANSI/AWWA C111/A21.11, flange facing per ANSI/AWWA C207, and ANSI B16.5 Class 150/125 bolting pattern. Restraint is via wedge-type retainer bolts with torque limiting heads. Rated working pressure for 6" size on ductile iron pipe shall be 350 psi. Flanged adapter couplings shall be EBBA Iron Series 2100 Megaflange or approved equal.

5. Service Saddles (saddle clamps) shall be utilized where indicated, in lieu of drilling and tapping the pipe wall for pressure indicators or other services. Saddle clamps shall have a ductile iron body with fusion-bonded epoxy finish coating, tapered Buna-N gasket cemented in place, and be suitable for a working pressure up to 300 psi. Bales, nuts, and washers shall be heavy duty Type 304 stainless steel. Provide NPT threaded outlet

coordinated for gage connection. The assembly shall meet AWWA C800; Smith Blair Series 311 or approved equal.

6. Gages and Trim Fittings:
   a. Pressure gages shall be liquid filled, temperature compensated, min 4" dial, Bourdon tube, with minimum 3/8" connection. Accuracy shall be no less than 1 percent of span. The exterior case and all wetted parts shall be Type 316 stainless steel. The gage window shall be polycarbonate. Gages shall be Ashcroft type 1009 or approved equal. Range shall be 0 – 60 psi.

   b. Gage connections shall utilize service saddles as specified. Gage connections shall not be tapped directly into the pipe wall. Gage and diaphragm seal isolator assemblies shall be installed on a ½" NPT tee with the run connected to the service saddle valve and the branch provided with an open-ended valve as a flushing point. All nipples shall be close, with lengths as short as possible. All valves and fittings shall be type 316 stainless steel, ½" NPT, with Type 316 stainless steel bushings to adapt to gage and service saddle.

   c. Gage isolation and vent valves shall be ball type. All wetted parts shall be Type 316 stainless steel. Stem packing, seal, thrust washer, and seats shall be reinforced PTFE. Ball valves shall be rated for a minimum of 150 psi working pressure.

   d. Gages shall be assembled to diaphragm seal isolators with fill/bleed connection and filled with silicon oil. Diaphragm and case shall be Type 316 stainless steel. Diaphragm seal isolators shall be Ashcroft Type 100 or approved equal.

7. Pipe Supports
   a. Piping shall be supported in the valve vault by means of adjustable stainless steel floor support stands which cradle the pipe/valve flanges. The support stands shall be floor mounted with 316-stainless expansion bolting hardware. Where piping enters and exits the vault structure, aluminum wall support angles with 304-stainless U-bolts and 316-stainless expansion bolt wall-mounting hardware shall be utilized in (3) locations.

   b. Piping shall be supported in the pump station by means of a common 304-stainless fabricated angle brace spanning the width of the station and mounted with wall brackets and 316-stainless hardware. Both vertical discharge pipes shall be supported from the brace by means of individual 316-stainless U-bolts and bolting hardware. Provide mid-length supports on vertical pipe risers.

8. Wall Penetrations:
   a. Where wall penetrations are called for on the plans, mechanical piping shall utilize cast or cored openings with flexible manhole boots. Flexible rubber boots shall consist of EPDM polymer compounds meeting ASTM C923 material performance requirements. Expansion banding and strap shall be 316-stainless material, and the

connection between boot and structure shall utilize an expansion wedge system with 316-stainless wedge and hardware components.

b. Electrical conduit penetrations will utilize galvanized electrical couplings assemblies with 2" wide minimum waterstop embedded in the structure at casting, or cored openings with mechanical rubber seals to fill the annular spacing between electrical conduit and precast wall structure. Mechanical seals shall be Link Seal by Thunderline Corp. or approved equal and shall utilize 316-stainless assembly hardware.

9. Pressure Testing

a. The connecting force main piping shall be pressure tested through the Valve and Meter Vault to the pump isolation valves, as specified in Part 3, by the contractor. The pump station manufacturer is responsible for adequate, permanent pipe supports to resist test pressure. The pump station manufacturer is responsible for repair of any leaks, to the satisfaction of the Owner/Engineer.

10. Painting

a. Following completion of pipe, valve, and support assembly and successful pressure testing, all ferrous surfaces shall be prepared and primed as required and painted with the manufacturer's standard Tnemec N69 Hi-Build Epoxoline finish coating system.

2.2 UNDERGROUND GRAVITY SEWER AND RECEIVING MANHOLE DROP PIPING:

A. Underground gravity sewer pipe and fittings shall be PVC of the type, sizes, and configuration indicated on the drawings.

1. Off-road gravity sewer pipe shall be bell and spigot push-on type with gasketed joints, in compliance with ASTM D 3034, SDR 35, with ASTM F477 elastomeric seals.

2. Pipe and fittings between the new manhole and the receiving manhole, and the drop piping inside the receiving manhole, shall conform to ANSI/AWWA C900-16, DR18 PVC pressure pipe:
   a. Pipe compound: ASTM D1784 Cell Class 12454
   b. Gasket: ASTM F477
   c. Integral bell joint: ASTM D3139
   d. Nominal laying length: 20 ft.

2.3 UNDERGROUND AND EXPOSED FORCE MAIN PIPING, VALVES, AND APPURTENANCES:

A. Sanitary force main piping shall be High Density Polyethylene (HDPE), restrained ductile iron, and PVC, where indicated on the drawings.

B. Ductile iron piping (DIP) shall be furnished in lay lengths of approximately 18 ft. Piping shall conform to AWWA/ANSI C151/A21.51, latest revision, and to the additional requirements following. DIP shall be pressure class 350 psi and furnished in thickness class 52 within the pump station site, and Class 54 in roadways, and suspended from bridges. A minimum of 10 percent of the piping order shall be furnished and marked as "gage pipe," with average barrel roundness within tolerances for field cutting and joint makeup. All pipe shall be marked with the manufacturer's name, date of manufacturing, origin, material, and size.

1. DIP fittings shall be ductile iron conforming to AWWA/ANSI C110/A21.10, Pressure Class 350 minimum.

2. Pipe/fitting joint type shall be coordinated for full restraint at each joint and shall not require the use of concrete thrust blocks, which may be added where additionally directed by the Engineer. Pipe may be TR Flex®, or Tyton Joint® with Field Lok 350® gaskets, all as manufactured by US Pipe, or approved equal. Mechanical joint fittings may also be utilized, with Megalug retainer glands. Valves and specials with MJ ends are to utilize Megalug retainer glands. Cor-Ten® bolts and nuts shall be utilized for mechanical joints. The joint shall permit deflection prior to completion of assembly and shall be rated for 350 psi in 6" size.

3. Pipe, fittings, and specials shall be cement mortar lined in accordance with AWWA C104, to "double thickness" standard, and seal coated.

4. All bolting hardware, interconnecting pieces, and miscellaneous parts not having an approved factory coating shall be given two heavy coats of coal tar epoxy, each allowed to dry, prior to backfill.

5. Provide polyethylene encasement per ANSI/AWWA C105/A21.5, for portions of piping runs installed below water table, or as directed on the drawings.

C. Exposed piping at bridge crossings and extending underground to the limits indicated, shall be factory preinsulated and jacketed ductile iron, as finish manufactured by Urecon, or approved equal. Core pipe shall be Pressure Class 350, furnished in Thickness Class 54 DIP with TR-Flex restrained joints, as per this specification.

1. Insulation for factory-insulated TRFlex DIP shall be foamed in-place closed cell polyurethane which completely fills the annular space between the carrier pipe

and the exterior casing. The insulation shall have the following physical properties:

- Minimum Density (lb./cu. ft.)- 2.1 ASTM D-1622
- "K" Factor BTU/Hr. sq. ft. °F/in. -0.147 ASTM C-518
- Minimum 90 % Closed Cell content ASTM D-2856
- Minimum compressive strength (lbs/in2)- 30 ASTM D-1621
- Water Absorption (max % by volume) 4 ASTM D2842

2. Exterior casing (jacket)* shall be seamless, UV inhibited, 50 mil, HDPE, ASTM D1248, with the following physical properties:
   - ASTM D-638.....Ultimate Elongation 850%
   - ASTM D-638.....Tensile Yield Strength 3,300 psi
   - ASTM D-3350.....Resin Type III, Grade P34
   - ASTM D-790.....Tangent Flexural Modulus 175,000 psi
   - *No tape casings will be allowed.

   The manufacturer shall provide joint kits for field installation of insulation and casing at joints.

3. Pipe supports and related hardware shall be provided as indicated on the drawings.

D. Restrained couplings for joining DIP to DIP shall consist of a coupling sleeve of ductile iron per ASTM A536, with end restraint rings of ductile iron per ASTM A536, with gaskets and corrosion-resistant, low alloy high strength, double ended threaded rods with nuts per AWWA C111/A21.11. Steel sleeves or steel restraint rings shall not be used. Wetted parts shall be lined with a minimum 15 mil fusion bonded epoxy coating per ANSI/AWWA C213. Restraint rings shall have a heat-cured protective coating and shall employ heat-cured epoxy-coated serrated wedges with torque limiting nuts to grip the connecting pipe. Set screw types shall not be used. The restrained coupling assembly shall be rated for 350 PSI. Restrained couplings shall be Series 3800 by EBAA Iron, Eastland, TX, or approved equal.

E. Adapter couplings for joining DIP to HDPE shall utilize the EBAA Iron Series 3800 restrained coupling, or approved equal, in concert with a stainless steel stiffening sleeve insert, to permit application of locking wedges without deflecting the pipe.

F. Underground valves for sewage service/force main isolation shall be resilient wedge type, non-rising stem, conforming to AWWA C515, and as further detailed:

1. Valve body, bonnet, gland, and operating nut shall be cast from thick wall patterns using ductile iron per ASTM A536. All ferrous surfaces shall be coated inside and out, with fusion bonded epoxy conforming to AWWA C550.

2. The valve body shall have the manufacturer's name, pressure rating and year of manufacture cast in or included on a noncorrodible label. The valve waterway shall be smooth, unobstructed, and free of pockets, depressions, or cavities in the seat area. Valve body and bonnet pressure retaining joints shall be sealed with O-rings installed in a machined groove. Flat gaskets shall not be used.

3. The wedge shall be totally encapsulated with EPDM rubber, permanently bonded per ASTM D429, and configured to provide bubble-tight seating in either direction at 250 psi. The wedge nut shall be bronze, and replaceable separate from the wedge.

4. The valve stem shall be stainless steel or noncorrodible copper alloy, nonrising, and with integral thrust collar. Stems shall include two O-ring seals above the thrust collar and one below. Stem seals shall be replaceable with the valve fully open and pressurized, in service.

5. The operating nut shall be 2" square, incorporate an opening direction arrow and the word "OPEN," and be secured to the stem shaft in a positively locking manner that will not permit it to slip down to disengage from the curb key operator. Opening direction shall be as per Town of Cheshire standard.

6. Valve shall be hydrostatically tested per AWWA C515, prior to shipment.

7. Valves shall be Clow Model 2638 or approved equal.

G. Road Boxes for accessing underground force main isolation valves shall be heavy duty cast iron 2-section sliding type, 5-1/4" ID, with base diameter or arch shape sized so as to not bear on the valve body. Provide drop-in cast iron cover lettered "SEWER."

H. High Point Combo Air Release/Vacuum Breaker Assembly shall be installed in a precast concrete vault, as specified herein and shown on the drawings. Internal components shall be as follows:
   1. Plug valves shall be nonlubricated, eccentric plug type, with resilient neoprene-faced plug and flanged ends faced and drilled to ANSI B16.1, Class 125, and rated for a minimum of 175 psi for water service. Valve bodies and plugs shall be ASTM A126 Class B cast iron. Valve seats and plug shaft seals shall be corrosion resistant and comply with AWWA C504 and C507. Seats shall be welded nickel. Plugs shall be balanced, with Neoprene or approved coating. Seals shall be replaceable without valve disassembly. Valves shall incorporate an adjustable stop, and seal drip-tight at full pressure rating. Valve bodies shall be factory tested to 300 psi. Valves shall be suitable for installation underground in the vertical position and shall be provided with a gear operator oriented so that the operating shaft is vertical. Operating shafts shall be provided with a 2" square nut pinned to the shaft. Set screws shall not be used unless a collar is provided to prevent slippage of the operating nut down

the shaft. Valve shall be coordinated so that the operating shaft does not interfere with the body of the attached air release valve.

2. Combination air release/vacuum breaker valve shall be designed specifically for wastewater applications and shall employ 3 modes of operation – high volume air venting from initial fill of the line, high volume air admission upon drain down and upon water column separation, and low volume release of accumulated air during pressurized system operation. The valve shall have the following features:
   - Working pressure 0.05 – 10 bar
   - Test pressure 16 bar
   - Working temperature to 60° C
   - Internal valve linkage metallic parts are constructed of stainless steel
   - Spring-guided independent internal linkage between lower float assembly and upper float seal device to eliminate unsealing of the vent seal mechanism due to vibration or turbulence
   - Body shape designed to maintain an air gap to keep liquid from contact with the upper valve sealing mechanism
   - 1-1/2" threaded discharge outlet
   - Ball valve for draining/pressure venting for maintenance
   - 4" flanged inlet

   Combo air release/vacuum breaker valve shall be Model D-025 by A.R.I Flow Control Accessories Ltd.

2.4 PRECAST CONCRETE SANITARY MANHOLES AND VAULTS

A. Materials:

1. Manhole Bases: Manhole base sections shall be constructed to have a monolithic base slab with riser barrel conforming to ASTM C478, AASHTO M199, and be designed for AASHTO HS-20 loading.

2. Manhole Risers: Riser sections shall have a minimum 5" walls and conform to ASTM C478 and AASHTO M199 and be designed for AASHTO HS-20 loading.

3. Vault Structures: Vault structures shall be constructed of monolithic floor and wall section, with slab top, of the dimensions and configuration shown on the drawings. Minimum wall thickness shall be 6". Minimum top slab thickness shall be 8", and larger as required for span, required penetrations, and point loads. Vaults shall conform to ASTM C478 and AASHTO M199 and be designed for AASHTO HS-20 loading.

4. Antibuoyancy Anchorage: If not practical to incorporate in the base slab thickness for manhole and vault structures, provide supplemental concrete slab foundations for countering buoyant forces, sized and configured as per submitted calculations.

All exposed structural steel members and anchorage hardware between foundation and manhole or vault bottom slabs shall be Type 316 stainless steel.

5. Manhole and Vault Top Slabs: Top Slabs (if required) shall have a minimum thickness of 8" and conform to ASTM C478 and designed for AASHTO HS-20 loading.

6. Manhole Steps: Manhole steps shall be ½" diameter steel reinforced copolymer polypropylene conforming to ASTM C478, AASHTO M-199, and OSHA 29 CFR 1910.27. Steps shall be placed in vertical alignment in preformed holes as per step manufacturer's instructions. The steps shall resist a pullout force of over 1,500 lbs. End lugs shall have a reflecting material insert. The steps shall not exceed spacing greater than 16" on center.

7. Concrete: Concrete shall be air entrained in accordance with project specifications and have a minimum concrete compressive strength of 5,000 psi at 28 days. Concrete shall be placed in forms and vibrated in such a manner as to make a dense uniform product. Concrete shall comply with Form 818 with respect to mix design/admixtures, placement, curing, and testing.

8. Coating: Exterior surfaces of manholes shall have two coats of an approved asphalt coating applied according to manufacturer's recommendations. An alternate to the exterior coating may be a concrete admixture that is applied to the concrete with batching and demonstrates a reduction in water absorption below 5 percent, as submitted and approved by the Engineer.

9. Piping and Conduit connections: Gravity sewer piping shall be connected to the applicable structure by using an approved flexible sleeve. Approved connections shall be A-Lok or Z-Lok by A-Lok Products, or approved equal conforming to ASTM C990. Force main connections shall utilize cast-in-place hot-dip-galvanized (HDG) steel sleeves with continuous waterstop ring, or cored hole, and double modular link seals with Type 316 stainless steel hardware with antiseize coating. Conduit connections shall utilize cast-in-place HDG steel sleeves with continuous waterstop ring, or cored hole with modular link seals with Type 316 stainless steel hardware with antiseize coating. Vent and/or other piping shall utilize cast-in-place HDG steel sleeve with continuous waterstop ring and/or sleeve with double modular link seals with Type 316 stainless steel hardware, with antiseize coating, or where indicated, DIP "wall pipe" FLG x FLG section with continuous waterstop ring, cast flush and "two holed" for alignment square to structure.

10. Joint Sealant: Joint sealant shall be an approved butyl rubber, conforming to ASTM C478 and ASTM C990, and placed in double rows, with joints staggered. Joints shall achieve watertight condition.

11. Insulation: The Combo Air Release/Vacuum Breaker Vault shall be insulated on internal walls and underside of top slab. Insulation shall be 2" thick extruded polystyrene (XPS) rigid foam insulation, manufactured via a process that does not use HFC blowing agents. Insulation shall be Foamular® NGX™ 250 as manufactured by Owens Corning in rigid pink-colored board, to be neatly cut to suit interior surfaces of the vault and adhered with adhesive recommended by the manufacturer for concrete surfaces. Coordinate with the precast concrete vault manufacturer to ensure that curing compounds and/or form release agents are compatible with the adhesive used for applying the insulation board.

2.5 SUBMERSIBLE SEWAGE PUMPS

A. General Requirements:

1. Provide a complete, duplex submersible pumping system including two pumping units, each with discharge shoe, two guide rails, and attached hoisting hardware, such that each pump can be independently removed without personnel entering the wetwell. Included are rail/discharge pipe supports, with integral rack for suspending floats/transducer cables, anchorage hardware, components as depicted on Oldcastle RC611 pump station drawings, and all specified and/or incidental accessories and appurtenances necessary for a complete and operational pumping system, whether or not illustrated or called out in this specification.

B. Performance

1. The pump shall be supplied with a mating cast iron 4-inch discharge connection and be capable of delivering 380 GPM at 52 ft TDH at full speed with a wire-to-water efficiency of 65 percent. At full speed, pump curve should include the following points:

Condition	Flow (gpm)	Pressure (ft)
a. Shut-off	0	80
b. Design Point	334	50

2. The pump(s) shall be automatically and firmly connected to discharge shoe connection upon lowering into place, guided by no less than two guide bars extending from the top of the station to the discharge connection. There shall be no need for personnel to enter the wet-well to seat the pump. Sealing of the pumping unit to the discharge connection shall be accomplished by a machined metal-to-metal watertight contact. Sealing of the discharge interface with a diaphragm, O-ring, or profile gasket will not be acceptable. No portion of the pump shall bear directly on the sump floor. Each pump shall be fitted with an

adequate length of stainless steel lifting chain or stainless steel cable. The working load of the lifting system shall be 50 percent greater than the pump unit weight.

3. Pump case sealing design shall incorporate metal-to-metal contact between machined surfaces. Critical mating surfaces where watertight sealing is required shall be machined and fitted with Nitrile or optional Viton rubber O-rings. Sealing will be accomplished as a result of controlled compression of rubber O-rings in two planes and O-ring contact of four sides without the requirement of a specific torque limit. Rectangular cross-sectioned gaskets requiring specific torque limits to achieve compression shall not be considered as adequate or equal. No secondary sealing compounds, elliptical O-rings, grease, or other devices shall be used.

4. Motor cooling shall be sufficient for continuous operation under full nameplate load in a dry environment. The pump(s) shall be capable of handling pumped media up to 104 degrees F.

C. Pump Impellers
   1. The impeller shall be of Hard-Iron™ (ASTM A-532 [Alloy III A] 25 percent chrome cast iron), dynamically balanced, semi-open, multivane, back-swept, nonclog design. The impeller vane leading edges shall be mechanically self-cleaned upon each rotation as they pass across a spiral groove located on the volute bottom. The internal volute bottom shall provide effective sealing between the pump volute and the multivane, semi-open impeller. The sharp spiral groove(s) shall provide the shearing edge(s) across which each impeller vane leading edge shall cross during its rotation in order to remain unobstructed. The clearance between the internal volute bottom and the impeller leading edges shall be adjustable.

D. Pump Volute/Suction Cover:
   1. The pump volute shall be a single piece grey cast iron, ASTM A-48, Class 35B, nonconcentric design with smooth passages of sufficient size to pass any solids that may enter the impeller. Minimum inlet and discharge size shall be as specified.

   2. The volute shall have a replaceable suction cover insert ring in which are cast spiral-shaped, sharp-edged groove(s). The spiral groove(s) shall provide trash release pathways and sharp edge(s) across which each impeller vane leading edge shall cross during rotation so as to remain unobstructed.

   3. The insert ring shall be cast of Hard-Iron™ (ASTM A-532 [Alloy III A] 25 percent chrome cast iron) when used with Hard-Iron™ impellers and provide effective sealing between the multivane semi-open impeller and the volute housing.

E. Pump Shafts:
   1. The pump and motor shaft shall be a single piece unit. The pump shaft is an extension of the motor shaft. Shafts using mechanical couplings shall not be acceptable. The shaft shall be stainless steel - ASTM A479 S43100-T. Shaft sleeves will not be acceptable.

F. Pump Bearings:
   1. The pump shaft shall rotate on two bearings. Motor bearings shall be permanently grease lubricated. The upper bearing shall be a single deep groove ball bearing.

   2. The lower bearing shall be a two-row angular contact bearing to compensate for axial thrust and radial forces. Single-row lower bearings are not acceptable. The minimum L10 bearing life shall be 50,000 hours at any usable portion of the pump curve.

G. Pump Mechanical Seals:
   1. Each pump shall be provided with a positively driven dual, tandem mechanical shaft seal system consisting of two seal sets, each having an independent spring. The lower primary seal, located between the pump and seal chamber, shall contain one stationary and one positively driven rotating corrosion and abrasion resistant tungsten-carbide ring. The upper secondary seal located between the seal chamber and the seal inspection chamber shall be a leakage-free seal. The upper seal shall contain one stationary and one positively driven rotating corrosion and abrasion-resistant tungsten-carbide seal ring. The rotating seal ring shall have small back-swept grooves laser inscribed upon its face to act as a pump as it rotates, returning any fluid that should enter the dry motor chamber back into the lubricant chamber. All seal rings shall be individual solid sintered rings. Each seal interface shall be held in place by its own spring system. The seals shall not depend upon direction of rotation for sealing. Mounting of the lower seal on the impeller hub is not acceptable. Shaft seals without positively driven rotating members or conventional double mechanical seals containing either a common single or double spring acting between the upper and lower seal faces are not acceptable. The seal springs shall be isolated from the pumped media to prevent materials from packing around them, limiting their performance.

   2. Each pump shall be provided with a lubricant chamber for the shaft sealing system. The lubricant chamber shall be designed to prevent overfilling and shall provide capacity for lubricant expansion. The seal lubricant chamber shall have one drain and one inspection plug that are accessible from the exterior of the motor unit. The seal system shall not rely upon the pumped media for lubrication.

   3. The area about the exterior of the lower mechanical seal in the cast iron housing shall have an integral concentric spiral groove. This groove shall protect the seals

by causing abrasive particulate entering the seal cavity to be forced out away from the seal due to centrifugal action.

4. A separate seal leakage chamber shall be provided so that any leakage that may occur past the upper, secondary mechanical seal will be captured prior to entry into the motor stator housing. Such seal leakage shall not contaminate the motor lower bearing. The leakage chamber shall be equipped with a float-type switch that will signal if the chamber should reach 50 percent capacity.

H. Pump Power and Control Cables:
   1. The power cable shall be sized according to the NEC and ICEA standards and shall be of sufficient length to reach the junction box without the need of any splices. The outer jacket of the cable shall be oil-resistant chlorinated polyethylene rubber. The cable shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet or greater.

   2. The cable entry seal design shall preclude specific torque requirements to insure a watertight and submersible seal. The cable entry shall consist of dual cylindrical elastomer grommets, flanked by washers, all having a close tolerance fit against the cable outside diameter and the entry inside diameter. The grommets shall be compressed by the cable entry unit, thus providing a strain relief function. The assembly shall provide ease of changing the cable when necessary using the same entry seal. The cable entry junction chamber and motor shall be sealed from each other, which shall isolate the stator housing from foreign material gaining access through the pump top. Epoxies, silicones, or other secondary sealing systems shall not be considered equal.

   3. The power cable shall be sized according to the NEC and ICEA standards and shall be of sufficient length to reach the junction box without the need of any splices. The power cable shall be of a shielded design in which an overall tinned copper shield is included, and each individual phase conductor is shielded with an aluminum coated foil wrap. The outer jacket of the cable shall be oil-resistant chlorinated polyethylene rubber. The cable shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet or greater.

I. Pump Motors:
   1. The pump motor shall be a premium efficient 11 HP, 480 volt, 3 phase, 1,745 rpm, 12 amp FLA NEMA B design, induction type with a squirrel cage rotor, shell type design, housed in an air-filled, watertight chamber. The stator windings shall be insulated with moisture-resistant Class H insulation rated for 180°C (356°F). The stator shall be insulated by the trickle impregnation method using Class H monomer-free polyester resin resulting in a winding fill factor of at least 95 percent. The motor shall be inverter duty rated in accordance with NEMA MG1,

Part 31. The stator shall be heat-shrink fitted into the cast iron stator housing. The use of multiple step dip and bake-type stator insulation process is not acceptable. The use of pins, bolts, screws, or other fastening devices used to locate or hold the stator and that penetrate the stator housing are not acceptable. The motor shall be designed for continuous duty while handling pumped media of up to 104°F. The motor shall be capable of no less than 30 evenly spaced starts per hour. The rotor bars and short circuit rings shall be made of aluminum. Three thermal switches shall be embedded in the stator end coils, one per phase winding, to monitor the stator temperature. These thermal switches shall be used in conjunction with and supplemental to external motor overload protection and shall be connected to the motor control panel. Thermal switches "clipped" or tied to stator windings are not acceptable.

2. The junction chamber shall be sealed off from the stator housing and shall contain a terminal board for connection of power and pilot sensor cables using threaded compression-type terminals. The use of wire nuts or crimp-type connectors is not acceptable. The motor and the pump shall be produced by the same manufacturer.

3. The motor service factor (combined effect of voltage, frequency, and specific gravity) shall be 1.15. The motor shall have a voltage tolerance of +/- 10 percent. The motor shall be designed for continuous operation in up to a 40°C ambient and shall have a NEMA Class B maximum operating temperature rise of 80°C. A motor performance chart shall be provided exhibiting curves for motor torque, current, power factor, input/output kW, and efficiency. The chart shall also include data on motor starting and no-load characteristics.

4. Motor horsepower shall be sufficient so that the pump is non-overloading throughout its entire performance curve, from shut-off to run-out. The motor and cable shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet or greater.

5. A leakage sensor shall be provided to detect water in the stator chamber. The Float Leakage Sensor (FLS) is a small float switch used to detect the presence of water in the stator chamber. When activated, the FLS will send an alarm both local and/or remote.

6. The thermal switches and FLS shall be connected to a Mini CAS (Control and Status) monitoring unit. The Mini CAS shall be designed to be mounted in any control panel. The manufacturer shall provide Mini-CAS relays to the control system manufacturer for incorporation into the system control panel.

J. Pump Cooling System
   1. Each unit shall be provided with an integral motor cooling system. A stainless steel motor cooling jacket shall encircle the stator housing, providing for dissipation of motor heat regardless of the type of pump installation. An impeller, integral to the cooling system and driven by the pump shaft, shall provide the necessary circulation of the cooling liquid through the jacket. The cooling liquid shall pass about the stator housing in the closed loop system in turbulent flow providing for superior heat transfer. The cooling system shall have one fill port and one drain port integral to the cooling jacket. The cooling system shall provide for continuous pump operation in liquid or ambient temperatures of up to 104°F (40°C.). Operational restrictions at temperatures below 104°F are not acceptable. Fans, blowers, or auxiliary cooling systems that are mounted external to the pump motor are not acceptable.

K. EXPLOSIONPROOF PUMPS
   1. The pump system including the pump, motor, and power cable shall be approved for use in areas classified as hazardous locations in accordance with the NEC Class I, Div. 1, Group C and D service as determined and approved by a U.S. nationally recognized testing laboratory (U.L., FM, CSA) at the time of the bidding of the project. As required by Factory Mutual (FM), the motor shall be capable of operating in pumped media up to 104 degrees F. Motor thermal switches shall monitor and protect the motor from excessive temperature. An internal Float Switch shall be available, as an option, in the motor chamber. Service of explosionproof submersible units shall be performed by qualified FM experienced personnel. The pump manufacturer must provide training schools to qualify personnel in the proper service and repair of explosionproof pumps.

L. DESIGN BASIS
   1. The design basis pumps shall be NP 3127 HT 3~Adaptive 488 by Xylem Flygt or approved equal.

2.6 PUMPING SYSTEM CONTROLS, INSTRUMENTATION, AND TELEMETRY

A. The pump station manufacturer shall engage the services of an Instrument Integrator (Integrator) to provide system controls as specified in Section 13000 Pump Station SCADA System. The pump station manufacturer shall coordinate with the Integrator for scope of supply of the instruments listed in the specification, and with the contractor regarding responsibility for installation, assuming sole-source responsibility for the coordinated pumping system. Section 13000 assumes the Pump Station Control Panel (PSCP) and the AlarmAgent® telemetry unit will be supplied by the Integrator and installed and wired by the site electrician.

PART 3 - EXECUTION

3.1 GENERAL

A. Install pump station wetwell with integral valve and meter vault sections per manufacturer's instructions. Install connecting gravity and force main piping as per drawing details and related specifications and references herein.

B. Installation of structures shall include overexcavation as necessary to permit installation of any antiflotation slabs, or structures that have deeper base slabs for antiflotation purposes approved via shop drawings, vs. the bottom elevation shown on the drawings. Provide compacted gravel subgrade per drawings, or structure manufacturer's requirements, if more conservative or as directed by the Engineer for as-found site conditions.

C. Coordinate installation of structures, backfill, and compaction, with connecting piping and conduit installation, rack/backboard for exposed electrical junction/pull boxes, and other buried items.

D. All areas disturbed by construction that are beneath or within 5 ft of permanent pavement, sidewalks, or foundations shall be backfilled in 8" lifts to specified elevation and compacted to a minimum of 95 percent standard Proctor density.

E. Excavation means and methods, including provisions for safe shoring of trenches and structural excavations, are the responsibility of the installing contractor. When temporary sheeting is used, calculations sealed by a professional engineer registered in the State of Connecticut shall be submitted for review.

F. Construction dewatering, including wind and water-borne sedimentation and erosion controls as per Town of Cheshire and Connecticut DEEP regulations, is the responsibility of the installing contractor.

3.2 GRAVITY SANITARY SEWER PIPING SYSTEM

A. Pipe, pipe fittings, and accessories shall be handled, stored, installed, jointed, and protected by the Contractor in strict accordance with the printed recommendations of the manufacturer of the materials and as further specified on the drawings and in this specification. All materials found to be defective during the execution of the work will be rejected by the Owner/Engineer, and the Contractor shall promptly remove such defective material from the job site. All defective material shall be replaced by the Contractor with new sound material at no additional expense to the Owner.

B. Install gravity sanitary sewer piping per trenching and bedding details shown on the drawings. Install piping true to grades and alignment indicated with unbroken

continuity of invert. The trench bottom and bedding shall be shaped and compacted to give substantially uniform unyielding circumferential support to the lower quarter of pipe along its entire length. Bell holes shall be excavated so that after placement only the barrel of the pipe receives bearing pressure from the trench bottom. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for using lubricants, cements, and other installation requirements.

C. Changes in direction may only take place in manholes and/or designated structures. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

D. Install PVC sewer piping according to ASTM D 2321 and ASTM F 1668. Clear interior of piping of dirt and superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed. Place plug in end of incomplete piping at end of day and when work stops.

E. Gravity sanitary sewer pipe jointing shall be as recommended by the pipe manufacturer's instructions and according to ASTM D2321 and ASTM D3034. Dissimilar pipe materials, if condition arises, shall be joined only as directed by the Engineer.

F. Backfill shall comply with material and installation details shown on the drawings. No rocks greater than 2" in diameter shall be permitted in fill material. Pipe Bedding shall conform to the drawing details. Geotextile fabric wrap shall be used where indicated or directed by the Engineer.

G. Field Quality Control and Testing of gravity sanitary sewer pipe shall be as follows:

1. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place and again at completion of Project.

   a. Submit separate report for each system inspection.

   b. Defects requiring correction include the following:
      1) Alignment: Less than full diameter of inside of pipe is visible between structures.
      2) Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
      3) Crushed, broken, cracked, or otherwise damaged piping.
      4) Infiltration: Water observed leaking into piping at any visible rate.

5) Exfiltration: Water leakage from or around piping, observed or discovered from tests outlined below.

c. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.

d. Reinspect and repeat procedure until results are satisfactory.

2. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.

a. Do not enclose, cover, or put into service before inspection and approval.

b. Test completed piping systems according to requirements of authorities having jurisdiction.

c. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.

d. Submit separate report for each test.

e. A deflection mandrel test shall be performed if required by the Authority Having Jurisdiction:
   1) The mandrel outside diameter shall be no less than 95 percent of the inside diameter of the pipe being tested and be constructed of metal or rigid plastic capable of withstanding 200 psi without deflection.
   2) The mandrel length shall be at least 75 percent of the ID of the pipe being tested and shall have an odd number no less than 9, of "legs" or "runners", and shall not be adjustable in a way that will permit it to collapse under load.
   3) Provide a proving ring for each mandrel. Ring shall be ½" thick by 3" wide steel, to an OD of 0.02" larger than approved mandrel OD.
   4) Piping lengths where the mandrel will not pass shall be removed, the root cause corrected to the satisfaction of the Engineer/Authority Having Jurisdiction, and retested until satisfactory.

f. All gravity sanitary sewer piping shall be air tested per ASTM F1417, modified as per Town of Cheshire requirements, summarized as follows:
   1) Extend piping as necessary to accommodate a 4-1/2" calibrated pressure gage of 0-10 psi range, or as approved by the town. Plug both ends.
   2) Pressurize piping to a minimum of 4 psig. For the length and size of gravity influent sewer from the nearest manhole to the pump station wetwell only (within the scope of this procedure), test pressure shall be held for no less than 7.5 minutes. The length of time required for the test pressure to drop

from 4.0 psig to 3.0 psig shall be recorded and shall exceed 7.5 minutes for the test to be considered acceptable.

3) Any piping segments not passing this test shall be excavated, corrected using only new materials in a manner acceptable to the Engineer and the Town, and be subsequently retested until satisfactory.

g. CCTV inspection: All gravity sanitary sewer piping shall be inspected by use of a camera with acceptable lighting and resolution, pulled through the piping with means to correlate distance to manhole(s):
   1) A qualification package for the proposed testing firm shall be submitted for Engineer and Town approval.
   2) Operations shall not commence without notice to, and approval of the town and Engineer.
   3) Prepare inspection log documenting relevant project specifics, and no less than the following additional information – pipe location; manhole segment; line type, size, and depth; compass direction of viewing; direction of camera travel; and distance counter reading.
   4) Discrepancies shall be immediately called to the attention of the Engineer and town, for correction by the contractor using only new materials, and subsequent reinspection.
   5) An as-built package shall be prepared documenting the final condition and copies submitted on CD or other requested or approved media.

H. Testing of Wetwell and Manhole Structures (excludes nonwetted underground structures)

1. Sanitary manhole and wetwell (internally wetted with sewage) structures shall be vacuum tested prior to backfill, as per ASTM C1244, with the following notes:

   a. Plug and brace all connections. Plugs should be located 6" beyond outboard surface of structure.

   b. Evacuate manhole to a minim of 10" Hg negative pressure. Vacuum shall be held for a minimum of 100 seconds.

   c. If decrease in vacuum exceeds 1" Hg in allotted test time, leaks shall be located and repaired in a manner acceptable to the Engineer and the town and the structure retested until satisfactory.

2. Sanitary manhole and wetwell (internally wetted with sewage) structures shall additionally be hydrostatically exfiltration tested:

   a. Seal all penetrations and fill with fresh water to top of concrete slab. Establish a reference mark acceptable to the Engineer/town.

b. A period of stabilization in a wet condition is permitted if desired, during which the structure may be refilled as necessary.

c. Measure and record the drop in water level over a one-hour period.

d. Calculate the volume lost from the cross-sectional area of the opening where measurement is made. The volume lost shall not exceed 0.025 gallons per foot diameter per foot of total structure depth per hour.

e. If water loss exceeds the stated criteria, locate leaks and repair in a manner acceptable to the Engineer/town and retest until satisfactory.

3.3 FORCE MAIN PIPING INSTALLATION

A. General Requirements:

1. All pipe, fittings, valves, hydrants, and accessories shall be carefully inspected by the Contractor for defects before installation, and all defective, unsound, or damaged materials shall be rejected.

2. No pipe joints shall be covered in any way until the joints have been inspected.

3. The Contractor shall furnish to the Engineer for his use, copies of the printed recommendations of the pipe manufacturer for the handling, storing, protection, and installation of pipe, fittings, valves, and appurtenant devices.

4. The contractor shall obtain and pay for all permits required for installation of the piping system on Dickerman Road and on the Dickerman Road bridge over I-691. The contractor's work on the bridge is subject to DOT approval, coordination, and inspection.

B. Installation:

1. The interior of pipe, fittings, valves, and hydrants shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations.

2. The trench bottom and bedding shall be shaped and compacted to give substantially uniform unyielding circumferential support to the lower quarter of pipe and valves along their entire length. Bell holes shall be excavated so that after placement only the barrel of the pipe receives bearing pressure from the trench bottom.

3. Pipe, pipe fittings, valves, hydrants, and accessories shall be handled, stored, installed, jointed, and protected by the Contractor in strict accordance with the printed recommendations of the manufacturer of the materials and as specified herein.

4. Pipe, fittings, valves, hydrants, specials, and accessories shall be installed in conformance with AWWA Standard C 600 (latest revision), and the additional requirements specified herein, as indicated on the drawings, and as directed by the Owner.

5. All materials found to be defective during the process of the work will be rejected by the Owner/Engineer, and the Contractor shall promptly remove such defective material from the job site. All defective material shall be replaced by the Contractor with new sound material at no additional expense to the Owner. The Contractor shall be responsible for the safe storage of all material.

6. No rocks greater than 2" in diameter shall be permitted in fill material. Pipe bedding shall conform to the drawing details. Geotextile fabric wrap shall be used where indicated or directed by the Engineer.

7. TRFlex piping spanning I-691 over the Dickerman Road bridge shall be installed per the manufacturer's recommendations. Note that full extension of the piping is required after joint makeup. Pipe supports shall be adjusted to maintain clearances indicated on the drawings, to result in a constant slope across the bridge. Pipe supports shall be in place and lateral bracing adjusted snug prior to pressure testing. Insulation joint kits shall be installed after successful pressure testing.

C. FORCE MAIN TESTING

1. The force main, in-structure piping, valves and fittings, and vault or structure connecting piping shall be subjected to hydrostatic pressure tests. These tests shall be made after the pipe and appurtenances have been installed and the trench has been partially backfilled except at the joints and a second time after the trench has been completely backfilled. The piping shall be braced by permanent or by temporary means acceptable to the Engineer to prevent movement during the test. The duration of the pressure tests shall be two hours. All tests shall be performed under the direction and to the satisfaction of the Engineer. No leakage or drop in pressure is allowed.

2. Each section of pipe to be tested shall be slowly filled with water and all air evacuated. The use of air or other gas as the test media is not permitted. A test pressure of 90 psi at the lowest point is to then be applied by means of a pump

connected to the pipe. Provide calibrated gage, vent, drain, and pump connections in a manner satisfactory to the Engineer.

3. The system will be carefully examined during the test. All leaks shall be repaired and made tight. Any cracked or defective pipes, fittings, valves, or other devices evident from the test shall be removed and replaced and the test performed again until satisfactory to the Engineer.

4. The contractor shall furnish at his expense all such material, supplies, apparatus, labor, and equipment as necessary for carrying out the tests. The contractor shall provide water for test purposes and shall pump out and dispose of water at his expense, when required for repair or for system operation, in a manner consistent with sedimentation and erosion control requirements.

5. Testing of force main piping on the pump station site shall be coordinated with testing of all other portions of the force main, such that the test pressure applied to the assembled piping system does not exceed that applied to the lowest point on the pump station site during previous tests.

3.4 INSTALLATION AND STARTUP SERVICES:

A. The equipment manufacturer shall furnish the services of a qualified factory-trained field service engineer to check installation of the pump discharge shoes, and guide rail assembly in progress, so that deficiencies can be corrected before water fill and startup.

B. The installing contractor shall coordinate with the equipment manufacturer for installation inspection as well as final installation inspection, startup, and operator training. The installing contractor shall coordinate with the Instrument Integrator for Pump Station Control Panel and AlarmAgent® telemetry panel installation, prepump startup checkout of level measurement, alarm, and other field instrumentation, as well as for support during startup and check out of equipment and telemetry.

C. The equipment manufacturer shall furnish the services of a qualified factory-trained field service engineer for one full 8-hour working day at the site to inspect the final installation and startup and to instruct the owner's personnel on the operation and maintenance of the pumping units. Refer to contract specifications for Startup and Testing Protocol. After the pumps have been completely installed and wired, the contractor shall have the manufacturer do the following, as a minimum:

1. Megger stator and power cables.
2. Check seal lubrication.
3. Check for proper rotation.
4. Check power supply voltage.

5. Measure motor operating load and no-load current.
6. Check level control operation and sequence.
7. Check operation of the seal leak and overtemperature devices.
8. Start and operate pumps and accessories through complete cycles. Record motor current, voltage, discharge pressure, and flow rate (from installed flow meter), for comparison to pump curve. Record data at normal system head, as well as two induced points via throttling the discharge valve. Also record shutoff head.
9. Adjust setpoints as necessary.
10. Demonstrate system control strategy and alarm telemetry.

D. Following successful startup, the manufacturer's service representative shall review recommended operation and maintenance procedures with the owner's operating personnel.

E. The contractor shall furnish water required for pump tests and shall provide temporary fittings, calibrated gages, and any other means necessary to determine pump discharge pressure and flow delivery.

F. The Instrument Integrator shall perform startup, testing, and demonstration of the SCADA control and telemetry system, and train contractor and Owner operating personnel, as per Section 13000.

G. A report shall be provided documenting that the requirements above were conducted to the satisfaction of the Owner/Engineer. Copies of the report shall be provided to the Owner and Engineer, and final acceptance of the station will not happen until said report is reviewed and accepted. The warranty period shall commence at that time.

END OF SECTION

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SECTION 13000
PUMP STATION SCADA SYSTEM

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS:

A. Refer to other Divisions and Sections of the Specifications, drawings, and contract documents to determine the type and extent of work therein affecting the work required by this trade or this specification, whether or not mentioned herein.

B. All codes, standards, and specifications referred to herein shall be latest issue.

C. Attention is directed to the Contract General Conditions and subsequent contract sections and Division 1 requirements, which are made a part of this specification.

D. Attention is directed to Appendix A of this specification (attached), wherein the control strategies for pump station equipment, are delineated. See Appendix B (attached) for a listing of pump station control panel microprocessor inputs and outputs for which field wiring is required. This is provided for estimating convenience and may not reflect the final requirements as they are affected by the particular equipment to be supplied.

1.2 DESCRIPTION OF WORK:

A. The work required by this specification includes provision of designated field instrumentation as well as a complete and operational Pump Station Control Panel and alarm telemetry device. Any related auxiliary panels and components, including but not limited to Intrinsically Safe Barrier Panels (ISBP) which are required to isolate instruments located in hazardous areas from their respective UL-rated Pump Station Control Panels, are also included.

B. The Pump Station Control Panel (PSCP) and all field instrumentation, unless specified otherwise, shall be furnished by a single responsible control system and instrumentation integrator (Integrator), and coordinated in all respects with the purpose of automating facility operations, as well as providing backup pumping control, together with status and alarm telemetry as described herein.

C. The PSCP will be installed by others and be started up by the Integrator in coordination with the Owner and Engineer. The Integrator shall schedule and coordinate delivery of field instrumentation and the PSCP to support the project schedule.

D. The Integrator shall furnish all materials, equipment, software, installation details, coordination, logic development, supervision, calibration, startup, testing,

demonstration, and operator training required for field instruments, PSCP, ISBP, and their respective components. The Integrator shall furnish submittals for the PSCP and its components as well as for any operational and development software or hardware required to support operation of the PSCP. The Integrator shall furnish closeout documentation, including As-Built wiring diagrams and copies of operational and development software As-Built program loads.

E. It is not the intent of this specification to describe every component or every detail of hardware, software, or control strategy required to provide for station automation and telemetry. The Integrator shall coordinate design of the PSCP, including hardware components and logic development necessary to fully automate the pump station facility for sewage pump control and telemetry, as well as for all other facility equipment as shown and as described herein, and in the balance of the contract documents.

F. The Integrator shall coordinate PSCP I/O with field instruments specified herein and as shown on the drawings, and additionally as necessary to interface with equipment and devices provided by others, to accomplish automated facility control and telemetry. The Integrator shall provide additional components as may be necessary, whether or not shown on contract documents, to complete automated facility control and telemetry as called out or described on plans, specifications, and control strategies.

G. The Integrator's scope of work includes but is not limited to provision of the following:

1. Complete shop drawing submittals and O&Ms for all instruments, control panels, and components included in the Integrator's scope of supply, including installation and mounting details.

2. Mounting hardware for all field instruments supplied in accordance with existing conditions and approved installation and mounting detail submittals.

3. Development of control logic and corresponding Graphical User Interface (GUI) graphics or "screens" as required for automated pump station operations, as depicted, shown and described in the contract documents, and whether or not elaborated upon further in this specification, including related status monitoring, control and alarm telemetry, and as further described herein. Pump station operations include but are not limited to the following:
   a. Sewage pumping and related monitoring
   b. Flow monitoring
   c. Facility monitoring including but not limited to, the emergency generator

4. Development of backup sewage pumping control relay logic and incorporation of necessary components into the PSCP and any related coordination with electronic soft starter pump controllers to permit interim pumping operations pending operator response to PSCP digital equipment failure.

5. Development of control logic and corresponding graphics for any miscellaneous processes and instrumentation described herein and in the balance of contract documents.

6. PSCP – Completely coordinated, shop assembled, and tested, including components and features specified herein and as necessary to perform the control and automation functions required.

7. It is anticipated that ownership of the facility will eventually pass to the Town of Cheshire WPCA. Status and alarm telemetry as described herein and shown on the drawings shall be provided via an alarm telemetry device of the same make and model and/or compatible with or otherwise acceptable to the Town of Cheshire WPCA operators, regardless of the initial operator of this facility. The alarm telemetry device shall be provided and installed by this contractor and set up for communication with the initial facility operators in a manner that does not prevent its eventual reprogramming and/or repurposing to communicate with the Town of Cheshire Water Pollution Control Facility. Location of accessories and external antennae to support communications shall take this ultimate repurposing into account.

8. ISBP – Completely coordinated and shop assembled, including components and features specified herein and as necessary to perform intrinsically safe barrier functions for normal and backup wetwell level instrumentation for the facility sewage wetwell.

9. Field instruments as specified herein and/or shown on the drawings, complete with required accessories and instructions.

10. The PSCP shall be shop tested in the Integrator's facility to demonstrate functionality to the Owner and the Engineer prior to installation on site. The Integrator shall provide auxiliary I/O devices and demonstration software if required to display control strategy performance and status and alarm telemetry, and shall make any adjustments or modifications deemed necessary by the Owner, the Town of Cheshire WPCA, and/or the Engineer.

11. Coordination with equipment manufacturers as necessary to confirm I/O, signal/communication and range characteristics, and any other interface requirements necessary to insure compatibility.

12. Attendance and participation in coordination meetings with the general contractor, Owner, Engineer, other subcontractors, and vendors as necessary and as requested to support temporary pumping and telemetry, PSCP startup, and transition from existing equipment, control, and telemetry to new

13. Field instrumentation calibration and commissioning, with documentation

14. Startup of PSCP, ISBP, and support of startup of pumps and soft starters and all other interfacing equipment to confirm I/O, adjustment and tuning of instrument loops, and coordination of existing, temporary, and permanent control and telemetry.

15. Operation of PSCP, ISBP, and telemetry equipment during demonstration and commissioning periods.

16. Operator Training, using prepared materials and hands-on demonstration, both initially and post-acceptance refresher, for both the initial facility operator and the Town of Cheshire WPCA operators.

17. Factory and field calibration certificates for field instrumentation provided.

18. As-Builts documentation of PSCP and alarm telemetry systems, including wiring schematics, "As-Left" set points and parameter tabulations, and final program loads.

19. Follow-up system checks, with adjustment as required, during the warranty period, as described herein.

1.3 REFERENCES:

A. Materials, components, panel fabrications, and installations shall be in accordance with the latest revisions of applicable codes and standards for instrumentation and controls for sewage pumping facilities, including but not limited to the following:

1. National Electrical Code (NEC) – NFPA 70
2. Electrical Standard for Industrial Machinery – NFPA 79
3. National Electrical Manufacturer's Association (NEMA) – ICS 6
4. Underwriters Laboratories – UL 508
5. Underwriters Laboratories – UL 698A
6. Instrument Society of America – ANSI/ISA 50.00.01
7. Instrument Society of America – ANSI/ISA RP 60.3
8. Instrument Society of America – ANSI/ISA RP 60.4

1.4 RELATED WORK:

A. Division 11 – Various equipment specifications for their components and installation

B. Division 16 – Various requirements for components and their installation

1.5 QUALITY ASSURANCE:

A. The proposed Integrator shall be a control system integrator regularly engaged in the design of control and telemetry systems for the wastewater industry. The proposed Integrator shall maintain a full-time staff capable of design, assembly, calibration, testing, troubleshooting, and servicing all system controls, equipment, telemetry devices, and instrumentation provided for this project.

B. The general contractor shall submit the qualifications of the proposed Integrator. The Owner and Engineer will determine the acceptability of the proposed Integrator based upon this qualification package. The following shall be included, as a minimum:

1. Corporate resume and/or supplementary materials demonstrating technical expertise and financial stability to satisfy the requirements of this project within the scheduled project duration and warranty period
2. Resumes of Integrator's staff scheduled for work on this project
3. List of current and/or recently completed projects, with Owner contact information
4. Methods of documentation control
5. Startup and testing, training, and documentation protocol

C. The proposed Integrator and the Integrator's shop facility shall be located within a 30-mile radius from the project.

D. The PSCP shall be designed and manufactured to applicable UL standards by a shop qualified to UL-508. A copy of the UL-508 certificate shall be provided.

E. The PSCP shall be shop tested in the Integrator's facility prior to delivery to its respective pump station. The Owner, the Town of Cheshire operators, and the Engineer shall be given sufficient notice for witnessing shop tests. Shop testing shall show the proper function of PSCP components, Graphical User Interface, and ancillary devices and demonstrate control strategy performance as well as status and alarm telemetry. The Integrator shall make any additions, modifications, or adjustments to GUI display graphics and shall make any control strategy modifications deemed necessary by the Owner or Engineer.

1.6 SUBMITTALS:

A. Submittals shall include complete dimensional, assembly, installation, mounting, wiring, and schematic details for all assemblies, components, and instrumentation proposed for this project.

B. The Integrator shall coordinate and verify the accuracy and completeness of all drawings, vendor drawings, and submittal data prior to submission.

C. General Submittal requirements:

1. A Bill of Material, layout drawing, wiring diagrams, and mounting instructions and details shall be provided for each enclosure or instrument.

2. All manufacturers' technical literature shall be clearly marked to indicate materials and options being offered and to differentiate proposed characteristics among multiple selections available.

3. Any proposed deviations from specified components, properties, or characteristics, etc, shall be clearly marked for the Engineer's attention for evaluation during the submission process as a desirable alternate, or where proposed as an "or equal" to that specified.

D. Submit a schedule including activities, durations and milestones for submittals, resubmittals, material delivery, fabrication, shop testing, and site delivery.

E. Submit complete information and pertinent data for all instruments provided by the Integrator. Instrument submittals shall include but not be limited to the following:

1. Dimensional data
2. Functional description
3. Relevant technical details
4. Complete model number, indicating attribute and option selections
5. Range and span, with units indicated
6. Input and output characteristics
7. NEMA classification
8. Factory calibration
9. ISA configuration data sheet
10. Wiring schematics
11. Location and mounting details specific to this project
12. Tag number

F. A complete PSCP submittal shall be made. Items to be addressed include but are not limited to the following:

1. Dimensioned and scaled drawings of the PSCP enclosures, including layout and assembly information, and Bill of Material. All internal and external components shall be indicated.

2. Enclosure field anchorage and seismic bracing points and allowable conduit entry locations shall be indicated. It is the intention that conduit entry not be allowed directly above the CPU, I/O rack, power supplies, or other critical device. This demarcation shall also be clearly indicated inside and/or on the outside surface of the enclosure when shipped to the installer/site.

3. Complete enclosure wiring diagrams, clearly showing PLC I/O, and field wiring termination points, including those dedicated for the alarm telemetry unit.

4. Instrument loop wiring diagrams, showing all interconnections, including field terminations and PSCP terminations.

5. A digital hardware submittal shall be made to include but not be limited to PLC, rack, I/O modules, power supplies, TVSS, GUI, and related components.

6. Submit heat load calculations as required to demonstrate adequacy of heat dissipation from the PSCP under 120° F ambient conditions inside the Service Enclosure. Include supplementary cooling provisions if necessary.

G. Submit complete information for the Intrinsically Safe Barrier Panels (ISBP), including but not limited to enclosures, barriers, internal components, and power requirements (coordinated with PSCP UPS as necessary).

H. Proposed GUI graphics shall be developed to include functions and features as described herein and submitted for Owner and Engineer approval.

I. Submit Integrator's procedures for PSCP and system testing as well as operator training plan covering field instrumentation, control strategies, and use of the GUI.

1.7 MATERIAL DELIVERY, STORAGE, AND HANDLING:

A. The general contractor shall be responsible for the delivery, storage, and handling of all products in accordance with the manufacturer's recommendations. Upon delivery of the equipment to the job site or installer, the Integrator shall take inventory of the shipment and promptly resolve any discrepancies between the equipment manufacturer's packing lists and shipping documents.

B. Integrator fabricated enclosures and factory supplied components shall be packaged for long-term storage prior to shipment unless delivered from the Integrator's shop for same-day installation.

C. The Integrator shall verify that the equipment is off-loaded and protected against damage during onsite storage and installation. Specific storage instructions shall be submitted for all material delivered to the site when not immediately installed.

1.8 WARRANTY:

The Integrator shall warrant that all equipment supplied for this project is free of defects in design, materials, and workmanship for 1 full year from the date of substantial completion. The Integrator will provide a complete labor, material, and expenses replacement warranty for the entire warranty period.

PART 2 – MATERIALS

2.1 FIELD INSTRUMENTS:

A. A tabulation of field instruments is as follows:

TAG	INSTRUMENT TYPE	FUNCTION	LOCATION	COMMENT
LT-101	Hydrostatic Pressure Transmitter	Wetwell Level Measurement	Station Wetwell	
FS-102	Float Switch	Backup Start – Pump 1	Station Wetwell	Intrinsically Safe Circuit required
FS-103	Float Switch	Backup Stop – Pump 1	Station Wetwell	Intrinsically Safe Circuit required
FS-104	Float Switch	Backup Start – Pump 2	Station Wetwell	Intrinsically Safe Circuit required
FS-105	Float Switch	Backup Stop – Pump 2	Station Wetwell	Intrinsically Safe Circuit required
FS-106	Float Switch	Backup Wetwell Hi-Hi Level Alarm	Station Wetwell	Intrinsically Safe Circuit required
FS-107	Float Switch	Backup Wetwell Lo-Lo Level Alarm	Station Wetwell	Intrinsically Safe Circuit required
FE/FIT-108	Magnetic Flow Meter	Station Discharge Flow Measurement	Flow Element - Valve Vault or Meter Vault; Transmitter located in Service Enclosure	Flow tube NEMA 7 in Oldcastle Vault or NEMA 6 in exterior vault or Intrinsically Safe; FIT NEMA 4X; Provided by others
FS-109	Float Switch	Flood Condition	Valve Vault	Intrinsically Safe Circuit required
FS-110	Float Switch	Flood Condition	Meter Vault (required only if separate from valve vault)	NEMA 4
PI-111	Pressure Gage	Sewage Pump disch pressure	Valve Vault	Provided by others – Div. 11
PI-112	Pressure Gage	Sewage Pump disch pressure	Valve Vault	Provided by others – Div. 11

B. MAGNETIC FLOWMETER:

Transmitter:

Operation:

Functional Requirements:	Current output proportional to flow rate, empty pipe detection, internal flow totalization, digital output for pulse totalization; transmitter display of instantaneous and totalized flow
Max Measuring Error:	0.5% of rate including sensor
Signal Output:	4-20mA, 800Ω max load
Digital Output:	Max 30VDC, 110mA, Time constant 0.1 – 30s (adjustable)
Relay Output:	2A@42VAC, 1A@24VDC
Low-Flow Cut Off:	0-9.9 % of maximum flow
Display:	3x20 character, background illumination w/alphanumeric LCD
Power Requirements:	115-230 VAC 50/60 Hz

Physical:

Mounting:	Wall mount
Enclosure Rating:	NEMA 4X; *See note
Temperature Range:	-5 to 150°F

Sensor:

Operation:

Measuring Principle:	Electromagnetic Induction

Physical:

Flanges and Housing:	Carbon Steel, ANSI/ASME B16.5, Class 150
Measuring Pipe:	304 stainless steel
Liner Material:	PTFE
Electrode Material:	Platinum-20% Iridium
Grounding Electrodes:	316 Stainless Steel
Process Connection:	150 lb flange style connections
Media Temp Range:	-4 to 300 °F
Operating Pressure Range:	to 150 psi.
Standard Enclosure Rating:	NEMA 6 and 7 (submersible to 3 meters H_2O, indefinitely) *See note

Manufacturers:

Rosemount, or approved equal (see note regarding flow tube enclosure)

Notes:

- The flow tube is located in an explosion hazard area, and the enclosure must be suitable or the wiring between flow sensor and transmitter classified as "Intrinsically Safe." The transmitter will be mounted in a nonhazardous exterior area.
- Provide ground rings.
- Include manufacturer's cable of suitable length to connect flow tube to

transmitter without splices.
- Provide screen for transmitter to permit visibility and to protect from sunlight.
- Include manufacturer's calibration report.

C. HYDROSTATIC PRESSURE TRANSMITTERS:

Sensor:
Operation:

Measuring Principle:	Submersible pressure transmitter, solid state piezo-resistive or strain gage technology, with current output proportional to hydrostatic pressure
Power Requirements:	10 - 28 VDC (Loop Power)
Surge Suppression:	Dual arrestors grounded to case, for both lightning ground strikes and power supply surges
Signal Output:	4-20 mA
Accuracy:	+/- 0.25% FS
Range:	0 to 700 ft of water
Span:	To be determined in field
Physical:	
Body:	316 stainless steel
Diaphragm:	Large non-fouling diaphragm – min 2.5" diameter, 316 stainless steel
Temperature Range:	-18 to 80 deg. C
Protection Rating:	NEMA 6P, IP 68
Cable Jacket Material:	Polyurethane
Pull Strength:	200 lb. minimum

Manufacturers:
Mercoid/Dwyer Series PBLT2, or approved equal
Notes:
- Factory calibrate range to match application.
- Include desiccant filter assembly for atmospheric reference tube.
- Include diaphragm guard for sewage application.
- Include bail option for suspension cable attachment to body.

D. FLOAT SWITCH (VERTICAL HANGING BULB TYPE)

Sensor:

Operation:	Intrinsically Safe
Measuring Principle:	Float on cord with rolling ball-actuated snap-action switch

Physical:

Wetted Float Material:	Noncorroding plastic
Switch type:	Mercury free, snap-action
Switch/Rating:	20 VA minimum, SPST, Normally Open (see notes)

Manufacturers:

Anchor Eco-Float, or approved equal

Supply Coordination / Installation Notes:

- Include cord-mounted weight
- Coordinate cord length sufficient to reach J-Box; minimum 20-foot-long Neoprene waterproof cable (18/2)
- Suitable for intrinsically safe application

2.2 PUMP STATION CONTROL PANELS:

A. PSCP construction shall include the following requirements:

1. The PSCP shall be assembled in a UL-certified shop and affixed with the UL label.

2. Enclosure shall be wall mounted, suitable for installation within an exterior enclosure also containing electrical service entrance and power distribution equipment, set on a concrete housekeeping pad. The Integrator shall coordinate PSCP dimensions with the dimensions and exterior door location of the Service Enclosure it is mounted in so that the Service Enclosure door permits opening of the PSCP door a minimum of 90 degrees without an opposing grounded surface.

3. Enclosures shall be NEMA 4 painted steel with painted steel backboard on rear and sides. Doors shall be full piano hinge, with three-point latching hardware. The door shall be bonded to the backboard.

4. Enclosure shall include flange-mounted circuit breaker disconnect, interior service light, and convenience receptacle.

5. Installation within the Service Enclosure places overall size and allowable conduit entry location restrictions on the PSCP, requiring careful consideration of internal layout, UPS location, and with reserve space for future devices. The Integrator shall coordinate with the project electrician and/or enclosure installer for allowable conduit entry location and shall clearly label the allowable conduit entry areas on exterior enclosure surfaces when shipping/delivering to the installer.

6. Enclosure components shall be permanently labeled on the backboard. The Pump Station Control Panel shall be fully spelled out as such on the panel door, with an engraved nameplate with 1" high characters. Panel front-mounted components shall include engraved nameplates. The Integrator shall coordinate labeling fonts and sizes. In addition, the enclosure shall include interior and exterior warning

signage stating, **"Voltage may be present from other sources when this panel is de-energized"**.

B. PSCP Features:

1. Each PSCP shall contain internally a Programmable Logic Controller (PLC) complete with all related I/O and communications modules, power supplies, line conditioning, transient voltage surge suppression, backup power supply, and all devices, accessories, and options required to perform necessary and specified functions for automated pump station control, monitoring, and telemetry, whether or not such functions are fully detailed.

2. Each PSCP shall include a door-mounted Graphical User Interface (GUI), a white "Control Power On" and red "Common Alarm" pilot lights, an alarm horn, and a horn "Silence" pushbutton. In addition, each PSCP shall include door-mounted selector switch(es)s for disabling or enabling backup pump control manually or in automatic mode. The PSCP shall also include a door-mounted digital wetwell level display with minimum 1/2"-high characters for use with backup wetwell control. Provide pilot lights to indicate normal and backup control modes as well as a pushbutton to unlatch automatic backup control mode upon repair of the PSCP controller. Backup wetwell level indication and control shall be wired and configured to operate independently of the PLC and GUI, using relay logic.

3. Each PSCP shall be coordinated for external mounting of the RACO alarm telemetry device to be provided per Town of Cheshire WPCA standard, as described herein. It is anticipated the telemetry device will mount within the Service Enclosure, but may be mounted on the PSCP if desired, and coordinated with its antenna location to be mounted on top of the Service Enclosure based upon field signal check.

4. Each PSCP shall include a relay to sense loss of external 120VAC power to its UPS. This shall be independent of generator and automatic transfer switch status and used to signal power failure.

5. The PSCP controller shall monitor analog inputs for discrepancies in signal character (e.g., below 4 mA, or above 20 mA) and include such in the alarming functions.

6. The PSCP shall include relay logic and pilot devices for an automatic, simple backup pump control system should the PLC or any of its components or the wetwell level transducer fail. The system shall seamlessly switch to backup control until manually reset by the operator upon repair of affected components, as described in the Control Strategies in Appendix A.

7. The PSCP shall incorporate reasonable means to accommodate maintenance of field and connected devices while maintaining automatic pumping control.

C. Control Panel Power Conditioning

1. Power for PSCP PLC, GUI, I/O devices, instruments, telemetry equipment (including that provided by others), and related control uses shall be protected by a Transient Voltage Surge Suppressor and line conditioning device (line conditioner), SEPARATE from the Un-interruptible Power Supply (UPS). The line conditioner shall include the following attributes:

   a. Ferroresonant transformer-based technology
   b. ± 3% voltage regulation, minimum
   c. Noise attenuation to 120 dB, common mode & 60 dB transverse mode
   d. Harmonic filtering
   e. Surge suppression tested to ANSI/IEEE C62.41, latest edition, Class A and Class B Waveform (<10V pass through)
   f. 25 year MTBF (mean time between failure)
   g. The minimum standard of quality for performance and reliability for line conditioners provided for this project is the SOLA HD MCR Series.
   h. The line conditioner will be externally mounted for heat dissipation and shall be located high within the Service Enclosure to avoid getting liquid or debris into its numerous top cooling openings.

2. Provide a UPS for the PLC, GUI, I/O devices, instruments, telemetry equipment, and related control uses, sized to maintain indication, alarm, communication, and telemetry equipment (including that supplied by others) operational for a minimum of 5 minutes at full calculated load without power to the PSCP but no less than 1500 VA. The UPS shall include the following attributes:

   a. "Double conversion" online IGBT-type technology
   b. UPS shall automatically restart loads after battery shutdown, upon restoration of "line" power to the PSCP.
   c. UPS design shall accommodate replacement of batteries while online.
   d. 10 year battery life in 21-27°C environment
   e. UPS shall provide dry contacts for PLC monitoring of conditions of UPS running on battery power, low UPS battery, and UPS fault.
   f. Temperature range -22 °C to +50°C
   g. Humidity range 10-95% non-condensing
   h. LCD display for monitoring
   i. Surge suppression tested to ANSI/IEEE C62.41, latest edition, Class A and Class B waveform
   j. Minimum efficiency of 88%
   k. Voltage regulation ± 2%
   l. Harmonic distortion < 3% for linear load, <5% non-linear

m. Overload withstand 150% instantaneous, 125% for 18 seconds, and 110% for 40 sec
n. The minimum standard of quality for performance and reliability for UPS provided for this project is the Falcon UPS, SSG Series.

3. The PSCP will include wiring from UPS to PLC DI to provide means for the PLC to detect loss of line power to the PSCP. The PLC will utilize this signal in the pump control strategy.

4. Enclosure lighting and convenience receptacles may be excluded from TVSS protection, line conditioning, and UPS feed.

5. The PSCP shall include provisions to power the wetwell level transmitter, station flow meter, and Intrinsically Safe Barrier Panel via individual circuit breakers from UPS backed up power.

D. Enclosure Wiring Requirements:

1. Control wiring conductors shall be minimum 16 AWG in size and with type MTW thermoplastic insulation with a temp rating to 90°C

2. Analog signal wiring shall be minimum 18 AWG in size, twisted and shielded. Use red-colored PVC insulation for positive signal and black-colored insulation for common.

3. The Integrator shall utilize color coded conductors to differentiate wiring function and provide an engraved nameplate inside the enclosure identifying such. The following shall be differentiated, as a minimum, by color:

a. Black - Ungrounded control circuits conductors operating at supply voltage
b. Red - Ungrounded AC control circuits operating at supply voltage or less
c. Blue - Ungrounded DC control circuit conductor
d. Yellow - Ungrounded control circuits that remain energized when the panel supply voltage is removed
e. White or Natural Gray - Grounded AC control circuits, regardless of voltage
f. White with Blue Stripe - Grounded DC control circuit conductor
g. White with Yellow Stripe - Grounded AC control circuits that remain energized when panel supply voltage is disconnected
h. Green with Yellow Stripe - Ground conductors

4. Signal wiring shall be segregated from AC conductors

5. Conductors shall be neatly bundled and laced. Applicable wiring shall include adequate additional length as a service loop.

6. Provide plastic wireway with snap-on covers, sized for 50% fill, including field wiring.

7. Provide adequate wireway for field wiring to termination point. All field wiring, including wiring out to the telemetry device, shall terminate on DIN rail-mounted, barriered, screw connection compression type terminal strips. Terminal points shall be labeled.

8. All wiring shall be neatly labeled, with labels oriented in the same direction. Twisted/shielded cables shall have the outer jacket stripped back uniformly and approximately 6 inches and include a length of heat-shrink tubing over the shield.

E. Provisions shall be made for effective bonding of all conductive frames, hinged doors, and components to a common ground. Provide a screw-terminal-type ground bar on the backboard large enough to accommodate all panel and field grounds plus a minimum of 20% spare terminals.

F. Miscellaneous PSCP devices:

1. Terminal strips for I/O field wiring shall be DIN rail mounted and include individual knife blade disconnects and fuses.

2. Provide transient voltage surge suppression meeting UL 1449 and IEEE 587 for all field wiring connections external to the Service Enclosure, both discrete and analog, including designated spare I/O.

3. Control relays shall be used for isolation of all discrete outputs. Relays shall be SPDT and include LEDs indicating coil energization, with DIN rail-mounted base. Relay contacts shall be rated for 10A at 300 VAC.

4. Pilot lights shall be 30 MM, heavy duty industrial type, metal body, press-to-test type, with LED bulbs.

5. Pushbuttons shall be 30 MM, heavy duty industrial type, momentary contact, metal body with flush plastic button.

6. Integrator shall provide an external red alarm strobe for mounting on top of the Service Enclosure by the site electrician. The strobe enclosure shall be NEMA 4X.

G. Digital hardware:

1. Programmable Logic Controllers

a. PLC attributes shall include the following:
- 10k/10/ configurable User Program/Data Space

- 128kB/64kB Data Logging/Recipe Storage
- Minimum 2MB user memory
- Battery backup
- Built-in LCD screen for diagnostics
- Discrete I/O –16DI & 16 DO embedded, expandable to 256
- Analog I/O – 6 embedded, expandable to 56
- Embedded PID loop control
- Real-time clock
- Floating point math
- Online editing capability
- RS-232 and RS-485 ports
- Embedded Ethernet
- Optional program memory module
- 120VAC power
- ± 2kV line to earth transient surge on com ports

b. The PLC shall be selected to include the attributes and performance characteristics necessary to provide the control, indication, and datalogging capability required for normal sewage pump station operations, and in accordance with the control strategies specified and required, and the features specified herein. Provide options, expansion devices, and accessories necessary to achieve the required and specified functionality, whether or not specifically called out.

c. While the minimum standard of quality for performance and reliability for PLCs provided for the PSCP on this project is the Allen Bradley CompactLogix Series, this shall not be construed as mandating the CompactLogix unit when the required processor capability exceeds its recommended limits. Selection of the processor shall employ the customary Allen Bradley selection criteria and guidance procedures and also take into account the number of I/O points and types, the memory capacity required for the tasks performed by the processor, including I/O and communications, and also the above-specified attributes. Should the manufacturer's selection guidelines indicate that a processor with greater capability is advisable, the processor with the greater capability shall be supplied, with all such options and accessories as may be required to perform the functions described or required to support the facility operations depicted in the contract documents.

d. Provide power supplies, cabling, mounting chassis, expansion devices, and all components and accessories necessary to support PLC, I/O, GUI, and related communications.

e. Provide additional I/O cards for discrete input, discrete output, analog input, and analog output as required for this project, with a minimum of 10% spare of each type (rounded to next highest integer), installed, wired, and functional. Analog Input and Output cards shall each be differential type, 4-20mA, DC.

2. Graphical User Interface (GUI)

a. Provide a flat screen color LCD-type monitor, mounted in the door of the PSCP, for operator interface with the PLC and control strategies.
b. The GUI attributes shall include the following:
    - Modular design with logic, display, and communications modules
    - Minimum 9" viewable screen
    - Minimum 800 x 480 WVGA 18 bit color graphics
    - Trending, expression, and data logging functions, with advanced graphics capability and direct browsing of Logix addresses
    - Min 1 GB RAM, 512 MB Storage, ± 80 MB User, nonvolatile storage
    - Analog resistive touch screen
    - NEMA 12 rating
    - Two 10/100Base-T, Auto MDI/MDI-X Ethernet ports
    - Two USB ports
    - Real-time monitoring
    - Conformal coated circuit boards
    - Additional accessory modules as necessary to support communication, display, and logic
c. Provide power supply and accessories as necessary for fully functional system.
d. The minimum standard of quality for performance and reliability for GUIs provided for the PSCPs on this project is the Allen Bradley Panelview Plus 7.

3. Ethernet switch:

    a. Provide a "smart" hardened industrial Ethernet switch for communications among digital hardware, external devices, programming and diagnostic laptop, and related uses and devices. Switch shall include automatic detection of transmission speed, configurable via web-based management, SNMP, or local interface, port mirroring, LLDP topology detection, MRP ring capable.
    b. The switch shall be managed, with at least six 10/100Mbps fast Ethernet Ports and two gigabit TP/SFP combo interfaces for gigabit/fiber uplink capability.
    c. Port configuration – Minimum six ports 10/100Base - TX RJ-45; two ports gigabit TP/SFP combo interface – SFP (mini-GBIC) supports 100/1000 dual mode
    d. Switch shall have hardened enclosure for free-fall, shock, and vibration resistance, -40°C through 75°C operating temp; relative humidity to 95% non-condensing
    e. Power supply: 12-48VDC external; Instrument Integrator to coordinate power supply within PSCP
    f. The minimum standard of quality for performance and reliability for the Ethernet switch for PSCPS on this project is the Phoenix Contact FL SWITCH SMCS series.
4. The Integrator shall supply and install all required interconnecting cables among all digital hardware components and any special cables required for laptop connection, telemetry connection, etc.

6. Separate power supplies shall be provided for Ethernet switch, processor, and each I/O chassis, of adequate ampacity at each supply voltage. Optimize rack and card configuration so as not to exceed power supply current capacity.

6. The Integrator shall provide any additional digital components, accessories, and devices necessary to achieve the operational capability customary and as described herein and as necessary to satisfy customary and specified control strategies.

H. Software

1. The Integrator shall obtain licensed software as required for development and operation of PLC control and GUI display functions.

2. PLC and GUI software shall be derived from a common architecture and integrated for seamless and complimentary connectivity and communications.

3. PLC programming software shall include features for developing and editing relay ladders, function blocks, and sequential function charts as well as structured text and functions for Ethernet software.

4. GUI software shall include features for data logging, activity logging, alarming and alarm logging, real time, and historical trending functions.

5. The Integrator shall provide any USB dongle or similar devices if necessary for full, permanent activation of all operating and automation software running on the PLC, GUI, and any other system components.

6. The Integrator shall develop the PLC and GUI operating programs for pump and facility control, monitoring, and status and alarm telemetry based upon the Control Strategies outlined in Appendix A and system I/O listed in Appendix B of this specification.

I. SPARE PARTS

1. Provide one each of the following for each type (discrete, analog, and other) used on this project, unless the quantity is listed otherwise:

   a. Input Card with Terminal Block
   b. Output Card with Terminal Block
   c. Power Supply
   d. Controller CPU
   e. Five each of each size power fuse
   f. Ten each of each size I/O fuse
   g. Two each of each color LED pilot light

J. GUI Graphics

1. The Integrator shall develop graphics for display on the GUI for functions including but not limited to indication of status and alarm conditions associated with pump station facilities and equipment, and for operator control of equipment as per control strategies, adjustment of control parameters, and response to alarm conditions, as well as for datalogging of alarms and process variables, and historical data.

2. Graphics shall include but not be limited to the following screens:

   a. Overview of facility status depicting current wetwell level, sewage pump availability and operational status, current station flow, date/time, vault(s) flood condition, facility power status, Hi-Hi and Lo-Lo float status, and any other features desired by the Operators or the Engineer. Stationary and "moving" icons, color, and text may be used as appropriate.

   b. Pump Control screen(s) depicting availability and operational status of submersible sewage pumps, with indication for motor overtemp, seal leak, operator-selectable wetwell levels for lead/lag pump start, stop, and alarm setpoints, current flow, and date/time. Include provision for enabling and disabling lead pump alternation, selection of lead pump, and alternation selections based upon cycle vs. selectable time interval. Provide mechanisms for operator to implement control strategies as per Appendix A.

   c. Miscellaneous screen(s), generator, balance of facility status and alarms, and any other features desired by the Operators or the Engineer.

   d. Trending screens permitting operator selection of graph generation for any analog signal.

   e. Alarm history screen showing alarms, with date/time of initiation, date/time acknowledged, and date/time cleared or reset.

   f. An I/O screen listing appropriate I/O with capability for enabling vs. disabling with respect to control logic (e.g., empty storage container sensor – disabling this input will not cause the normal action of pump shut down).

   g. Minor screen modifications requested by the Operators or the Engineer during the demonstration period.

3. Control logic and graphics development shall include but not be limited to the following features:

a. An Alarm Banner shall be visible on the bottom of each screen, displaying current alarms, and acknowledged but not cleared or reset alarms, with date/time stamp.

b. Menu buttons shall be displayed on each screen as applicable for navigation among screens.

c. Touching an icon for particular equipment shall result in a "Pop-up" text box, with pushbuttons for automatic-off-manual control, start/stop, and speed control as applicable as well as any other pertinent control parameter.

d. "Pop-up" text boxes for remote and automatic pump alternation, alternation schemes, and pump failover sequence shall also be provided.

e. Tabular listing via screen, -"Pop-up" text box, or other approved means, of time delays for program logic associated with each, with capability for Operator entry (e.g., time delay for High Wetwell Level).

f. Minor modifications as requested by the Operators or the Engineer during the onsite demonstration period.

4. Control logic and associated graphics shall be developed as required to fulfill the stated purpose of the facility, to constructively utilize available I/O, and to implement the control strategies outlined in Appendix A to this specification. The need for additional development may become apparent during startup and commissioning of the pump station facility or as requested by the Owner.

2.3 TELEMETRY COORDINATION:

A. Overview – While the pump station will be initially operated by the contractor and/or his designated, licensed Operator, the Town of Cheshire requires alarm monitoring capability also be provided to them as backup.

B. A wireless cellular alarm telemetry system shall be provided for the pump station, which is fully compatible with the system used by the Town of Cheshire at all of its pump stations. The Town currently uses the AlarmAgent® wireless, web based alarm detection and notification system by RACO. The local RACO representative who provided/installed the existing Town system is:

JWB Company	Contact:	Jamie Birkenberger
65 August Avenue		203.879.6959
Wolcott, CT 06716		jwbcompany@aol.com

C. The Integrator shall coordinate and provide a dedicated power supply from a line conditioned, UPS backed-up circuit from the PSCP for the AlarmAgent® unit, which will

be installed in the Service Enclosure. The antenna will be installed on top of the Service Enclosure unless site conditions or the RACO representative require otherwise. Penetration fittings for Service Enclosure and PSCP shall be watertight by virtue of factory provided gaskets and seals and shall not require upon field-installed caulk.

D. The Integrator shall work with the vendor representative to coordinate location, program the unit and determine acceptable signal strength, and relocate or extend the antenna if necessary. The unit shall be set up so that the Contractor or his designated Operator will receive alarms, and if there has been no response within the programmed time, the Town of Cheshire will be notified.

E. The AlarmAgent® unit will receive one discrete alarm direct-wired from a relay in the PSCP actuated by the Hi-Hi wetwell float switch, and the remaining discrete alarm/status signals and analog signals will originate from PSCP outputs, grouped as described in Appendices A and B, with the listed tags.

F. The Integrator will coordinate with the Town's telemetry device/service provider, and with contractor and Town operating personnel for startup and demonstration of the system, and any training needs.

2.5 INTRINSICALLY SAFE BARRIER PANELS:

A. Provide an Intrinsically Safe Barrier Panel (ISBP) for installation in the Service Enclosure for isolating analog and discrete signals from instrumentation located in a hazardous area (e.g., wetwell) that are connected to the PSCP. Barrier relays are to be UL listed for the intended purpose. Barrier relays and enclosure configuration shall satisfy ISA-RP 12.2 with respect to limiting the electrical or thermal energy released from any circuit in the hazardous area to a level insufficient to permit ignition of a hazardous atmosphere typical of municipal sewage.

B. ISBP enclosure shall be NEMA 4X, stainless steel, with painted steel backboard and piano hinge door with latch mechanism and engraved plastic nameplate as per PSCP specification. Provide painted steel barriers as required. Relays and backboard shall be labeled specific to the instrument served. Provide numbered terminal strip for field connections.

C. The Instrument Integrator shall coordinate provision of UPS power from the PSCP to the ISBP, as required.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS:

A. The Integrator shall determine from the project schedule his schedule for timely submission to support material delivery, panel fabrication, program development, testing, delivery, installation, field supervision, calibration, startup, demonstration, and operator training for field instrumentation and for the Pump Station Control Panel for each facility. The Integrator shall coordinate with the General Contractor regarding project schedule and the startup sequence.

B. The Integrator shall coordinate setup of the telemetry system for use by the Owner's operators as well as for monitoring and use by the Town of Cheshire operators.

C. When scheduled by the General Contractor prior to commencement of field conduit installation by the electrical subcontractor, the Integrator will coordinate allowable conduit entry location for the PSCP with the electrical subcontractor, as well as any pertinent field instrument installation provisions, for the electrical subcontractor's proper planning.

3.2 SPECIFIC INSTALLATION REQUIREMENTS:

A. Requirements for installation of magnetic flow meter transmitter:

1. The transmitter for the magnetic flow meter shall be located in the Service Enclosure.

2. Installation location and orientation shall also allow for ready access to the transmitter for totalizer reset.

B. Requirements for installation of wetwell level transducer:

1. The transducer shall be suspended from a stainless steel cable fastened to a bail fitting on the housing and a suitable hook and secured using all Type 316 stainless steel hardware. The signal cable shall be loosely looped around the suspension cable and secured using a strain relief fitting.

2. Care shall be taken so as not to pinch the capillary reference pressure tubing incorporated into the instrument cable with the sensor wiring.

3. The cable shall be permanently marked after installation to coincide with a convenient reference point so as to readily determine if it has slipped.

4. The reference pressure capillary tube in the transducer cord shall not be cut or unsealed until ready to immediately connect it to the desiccant filter in the vented

NEMA 4X J-Box. The transducer will be wired to an Intrinsically Safe Barrier relay in the ISBP located in the Service Enclosure, and an EY seal fitting is required on the home run, thus the field J-Box must be vented to obtain a proper atmospheric reference pressure for the transducer diaphragm. As the circuit is Intrinsically Safe, a sealed explosion proof J-Box is not required and would defeat the required transducer venting function. All wiring in the field instrumentation J-Box shall be exclusively Intrinsically Safe – non-intrinsically safe circuits shall not pass through this box. All splices in the field J-Box shall be waterproof, signal grade.

3.3 INSTALLATION SUPERVISION:

A. Instruments:

1. The Integrator will deliver or receive on site, each instrument, inspect for damage and resolve with the shipper as necessary, and apply tag number if not already equipped.

2. The Integrator will review installation instructions with the applicable trade and will review wiring and loop diagrams with the electrical subcontractor.

3. The Integrator will inspect each instrument installation and work with the trade and the general contractor as necessary to correct any deficiencies.

B. Pump Station Control Panel (PSCP), ISBP, and supplementary panels, if supplied:

1. The Integrator will deliver or ship the PSCP and ISBP to the pump station site, inspect upon delivery, and oversee offload and placement by the electrical subcontractor as well as anchorage and seismic bracing.

2. The Integrator will again review PSCP, ISBP, and telemetry panel conduit entry limitations with the electrical subcontractor, as well as internal routing for bundles of field wiring, so as to prevent conduit entry or wiring bundles from passing over the PLC, power supplies, I/O devices, or other sensitive electronics to prevent potential condensate drips from damaging the PSCP or ISBP.

3.4 FACTORY TESTING:

A. The Integrator will conduct factory acceptance tests of each PSCP, ISBP, and any other panels in his scope of supply to verify function as required and as specified. The Integrator will provide the Owner and the Engineer with a minimum of 2 weeks advance notice to witness if desired.

B. Each PSCP, and any other panel, shall be complete, with control logic and graphics loaded and ready for demonstration at the time of factory testing.

C. Factory testing shall simulate all appropriate variables, (e.g., wetwell level, among others), as necessary, to demonstrate all functional logic such as pump control, failover, status and alarm conditions, and outputs to the telemetry system.

D. The Integrator shall verify each loop and document the performance of the system during the factory test. A documentation package shall be submitted for record.

3.5 FIELD TESTING, STARTUP, AND COMMISSIONING:

A. The Integrator shall verify field wiring connections to the PSCP, ISBP, telemetry panel, and any other panels in his scope of supply prior to energization of the panel or any of the field instrument loops.

B. The Integrator shall coordinate with the general contractor for the contractor's scheduling of vendor representation for equipment being tested and for scheduling and coordination of startup for each train of equipment monitored or controlled by the PSCP.

C. The Integrator shall verify all control functions of the PSCP, field instrumentation, and alarm telemetry and correct, modify, and adjust as necessary to achieve a complete and operational facility.

D. The Integrator shall investigate and resolve any issues that may arise with sewage pump SSRVs, instrumentation transmitters, telemetry devices, or any other connected equipment related to ground reference or any other anomaly that affects system operation, speed control or feedback, and items of the like in coordination with the electrical subcontractor and controlled equipment manufacturer.

E. The Integrator shall demonstrate the PSCP and field instrumentation and support demonstration of the Owner's telemetry system to the satisfaction of the Owner's operators, Town of Cheshire operators, and the Engineer.

F. The Integrator shall train the Owner's operators and the Town of Cheshire operators in operation and maintenance of field instrumentation and of the PSCP. Training shall include startup and shutdown procedures, response to emergency conditions, and troubleshooting. Training shall use O&Ms prepared by the Integrator sufficiently in advance to allow review and approval by the Engineer.

G. The Integrator shall turn over spare parts, closeout items, and documentation, including but not limited to verified final system As-Builts, including wiring and loop diagrams, "As-Left" parameter loads, and copies of PLC program loads (on media specified by the Owner).

End of Specification
(Appendices Follow)

Section 13000
Pump Station Instrumentation and Control

Appendix A
Pump Station Control Panel
Control Strategies

Table of Contents

Raw Sewage Pumping and Level Control

1. Pump Control Strategy:

Summary:

Two submersible sewage pumps are installed in a common wetwell. The pumps are sized for Duty-Standby service and will operate at constant speed in Lead-Lag fashion to maintain wetwell level between programmed start and stop setpoints. While wetwell level is normally sensed for pump control and alarms via a hydrostatic level transducer, there are also backup floats to provide both independent alarming of Hi-Hi and Lo-Lo level conditions as well as backup pump start/stop permissives. An additional set of floats will, when automatically or manually enabled, control operation of a simplified backup pump control system.

Pumps may be operated manually (Local) via their associated Solid State (Electronic) Reduced Voltage "soft starters (SSRVs)" located in the Service Enclosure next to the Pump Station Control Panel (PSCP) or automatically (Remotely) via the PSCP. The PSCP includes a door-mounted Graphical User Interface (GUI) or "screen," with appropriate graphics for each process or administrative function, and touch-sensitive features for operator selection and control of equipment, processes, and parameters. Automatic pump sequencing and level control logic are described herein.

Limited automatic pump operation may also occur in PSCP "Backup Mode" should the logic controller, critical component, or wetwell level transducer fail and is also described herein.

Local Control:

The SSRV enclosure panels also include Full Voltage Non-Reversing (FVNR) emergency bypass contactors rated for across-the-line starting. The SSRV enclosure(s) will include a Hand-Off-Auto (HOA) selector switch and a Normal-Bypass (NB) selector switch. When the NB switch is in "Normal" mode, pump starting will utilize the SSRV function to control starting current inrush, accelerating to full speed at an adjustable rate. When the NB switch is in "Bypass" mode, the SSRV is not utilized, and starting takes place in across-the-line mode via the emergency FVNR.

When the HOA switch is placed in "Hand" position, the pump will immediately start in the mode selected by the NB switch. When the HOA switch is in "Automatic" position, start-stop control is performed by the PSCP. When the HOA is in "Off" position, the pump will not run. Placing the HOA in "Off" position while the pump is operating will result in immediate de-energization of the pump, after which it will coast to a stop. "Normal" mode stopping of the pump via the PSCP will utilize the ramp-down function of the SSRV.

Automatic Control Sequence (Normal Operation):

Automatic system control in Normal Mode requires availability of hydrostatic wetwell level sensing as well as availability of pumps to run in automatic mode. The operator will also select the desired lead and lag pump call sequence or an automatically alternating sequence for both pumps. The appropriate GUI screen graphic(s) will always indicate the pump call sequence, and in Alternation mode, will indicate the next pump to run.

Automatic Pump Start/Stop and Alarm – Normal Mode:

- The PSCP GUI screen(s) for sewage pumping control will include provision for Hand-Off-Automatic control of each sewage pump from the PSCP.
- The PSCP shall monitor the position of the HOA selector switch of each pump's SSRV panel. The PSCP shall only attempt to control SSRVs that are in "Remote" or "Automatic" mode.
- The PSCP will not attempt to utilize a pump SSRV for which an alarm or fail interlock condition is active.
- Upon rise in controlling wetwell liquid level to the operator-programmed "Lead Pump Start" setpoint, the PSCP will start the lead pump after an adjustable time delay.
- Upon rise in wetwell level to the operator-programmed "Lag Pump Start" setpoint, the designated pump will start, after an adjustable time delay, that exceeds the time delay associated with the Lead Pump (to stagger starts when on generator power).
- Upon further rise in wetwell level to the operator programmed "High Level Alarm," same will be initiated after an adjustable time delay.
- Upon further rise in wetwell level, a "High-High Alarm" is generated upon actuation of the backup high level float and shall result in a start command to both pumps, if available. Staggered starting applies.
- Upon wetwell liquid level falling below the "High-High" and "High" alarm respective actuation levels, these alarms shall clear after an adjustable time delay.
- Upon wetwell liquid level dropping below the operator-programmed "Lag Pump Stop" setpoint, the PSCP will stop the designated pump after an operator adjustable time delay.
- Upon wetwell liquid level dropping below the operator-programmed "Lead Pump Stop" setpoint, the PSCP will stop the designated pump after an operator adjustable time delay.
- Upon further drop in wetwell liquid level to the operator programmed "Low Level Alarm," same will be initiated after an adjustable time delay, and a programmed run permissive to both pumps shall be removed.
- Upon further drop in wetwell level, a "Low-Low Alarm" is generated upon actuation of the backup low level float and a removal of the "Run" command to both pumps.

Alarm Conditions (reported at PSCP, annunciated, and telemetered separately or as part of a "common alarm" condition, as defined below):

- Pump SSRV Failure – This generated when the SSRV signals an internal fault, and the condition has been present for longer than the programmed time delay. (telemetered as a common pumping system alarm)
- Pump Fail to Start – This is generated when neither the SSRV nor the FVNR returns a "Run" status to the PSCP within the operator-programmed time delay after the PSCP has output a "Start" command. (telemetered as a common pumping system alarm)
- Pump bypass contactor overload – This is generated when the SSRV bypass FVNR contactor thermal overload has been tripped. (telemetered as a common pumping system alarm)
- Pump Low Flow alarm – This is generated when the operator-programmed flow level is not reached within the operator-programmed time delay after a pump start. (telemetered as a common pumping system alarm)
- Wetwell Low Level – This is generated when wetwell level drops to the associated operator-programmable setpoint and remains there or below for the programmed time delay. (telemetered as a common Wetwell Hi/Lo Level alarm)
- Wetwell Low-Low Level – This is generated when the wetwell level drops to actuate the backup low level float and shall inhibit all automatic pump operation and shall result in immediate removal of the "Run" commands to all operating pumps. This condition is telemetered as a common Wetwell Hi/Lo Level alarm.
- Wetwell High Level – This is generated when the wetwell level rises to the associated operator-programmable setpoint and remains there or above for the programmed time delay. (telemetered as a common Wetwell Hi/Lo Level alarm)
- Wetwell High-High Level – This is generated when wetwell level rises to actuate the high level/backup float (telemetered as a common Wetwell Hi/Lo Level alarm). In order to ensure automatic transmission of this most critical Hi-Hi Wetwell level condition, actuation of this float shall, in turn, actuate a "Hi-Hi" alarm relay with a dedicated set of dry contacts providing closure to the RACO AlarmAgent® point assigned for transmission of the Hi/Lo Wetwell Common Alarm condition. Another set of dry contacts on the "Hi-Hi" relay will provide input of this condition to the PSCP. A PSCP dry contact output for all other designated common Wetwell Hi/Lo Level alarm conditions will be paralleled on this telemetry input point.

Status Points to the PSCP:

- SSRV panel HOA in "Automatic" mode
- SSRV "Run" status
- SSRV Fault
- SSRV FVNR Bypass "Run" status
- SSRV Bypass Overload condition
- Status of SSRV NB switch

Interlock Conditions:

Automatic pump run in Normal Mode is inhibited for any of the following:

- HOA switch in SSRV is in "Off" or "Hand" position
- Pump "failure" from either SSRV failure or its bypass RVNR overload trips, as applicable
- Loss of valid wetwell level signal
- Wetwell "Low" or "LO-LO Level" Alarm exists

Pump Alternation:

The operator shall be able to select either Lead - Lag fixed conditions for pumps as 1-2 or 2-1, or automatically alternating Lead-Lag pump running.

The rotation sequence shall be triggered automatically for any of the alternation schemes described below, and in the event of failure of any pump, or loss of pump interlocks or selection of Automatic Mode. Changes in rotation shall be seamless, with a newly called pump starting as the operating pump is being ramped down to stop. Rotation sequence shall be indicated on the appropriate GUI screen graphic(s). The operator shall select from the following three alternation modes:

- **Disabled** – Pumps will not alternate
- **Cycle Based** – The rotation sequence will trigger whenever the PSCP executes a normal level-based shutdown of all pumps.
- **Time Based** – The operator will be able to select daily vs. weekly, and time of day based upon 24-hour clock, and day of week, for the rotation sequence to trigger.

Pump Failover:

Upon pump failure as sensed by alarm conditions, the affected pump will be "locked out" from automatic control until the alarm condition is corrected and reset by Operator action, and the remaining pump will take over for the failed pump.

Automatic Control Sequence (PSCP Backup Operation):

Automatic system control in PSCP Backup Mode is limited and is only intended to prevent station flooding until an operator responds to the PSCP failure alarm, and repairs are made. Control is relay-logic driven, independent of programmable logic controller/GUI operation, and does not provide automatic pump alternation or failover features, excepting for staggered starting. Automatic latch-in of system control in PSCP Backup Mode results from failure of the PSCP, I/O card, power supply or other critical component, or from failure of the wetwell level transducer.

The PSCP programmable logic controller (PLC) shall include an output (called "PSCP Fail") that automatically results in changing the state of a relay configured so as to sense failure of the PLC

and/or any input/output (I/O) board, power supply, or component necessary for PLC operation. The PSCP shall include a door-mounted selector switch for Bypass On (Hand)-Bypass Disabled (Off)-Bypass Enabled (Auto) mode selection. The PSCP shall also include a pushbutton to unlatch bypass control when necessary repairs have been made and related alarms cleared, and pilot lights to indicate "Normal" and "Bypass" pump control modes. An additional set of floats is provided for start-stop control of each pump in PSCP "Bypass" mode. The "Start" and "Stop" float elevations for each pump must be physically coordinated so that their actuation points occur within programmed normal operating setpoints, and within the backup Hi-Hi and Lo-Lo floats, to avoid unnecessary alarms.

Automatic Pump Start/Stop – **Backup Mode:**

- Upon both failure of the PSCP system or wetwell level transducer, and rise in wetwell level to actuate the lowest pump "Start" float, relay logic shall latch in "PSCP Backup" pump control mode, which will remain in service until unlatched by operator action.
- With PSCP Backup Mode operational, the first and all subsequent actuations of the lowest pump "Start" float, PSCP relay logic will signal the associated pump to start. The pump will start in either normal SSRV or FVNR mode, depending on the position of their respective NB selector switch.
- Upon fall in associated wetwell level and de-actuation of the "Stop" float, the relay logic "Backup Run" signal to the designated pump will be removed, and the pump will decelerate to a stop at the programmed rate.
- If flows increase to the point of requiring a second pump, or if the first pump fails or is manually disabled, the second pump will be automatically started and stopped in similar fashion, by relay logic control based upon associated float actuation.
- Upon operator action of either depressing the PSCP Backup Unlatch pushbutton or placing the Backup control selector switch in Backup Disable (Off) position, PSCP Backup Mode shall be disabled and pump control returned to the PSCP controller.

Alarm Conditions (reported at PSCP, annunciated, and telemetered as a Common Pumping System Alarm):

- PSCP Backup pump control latched in (telemetered as a common pumping system alarm)

Status Points to the PSCP:

- PSCP Backup pump control enabled/disabled
- PSCP Backup relay logic control system active

Interlock Conditions:

- PSCP Backup relay logic control system active

2. Wetwell Level Transmitter

Summary:

The pump station wetwell is equipped with a loop-powered direct reading hydrostatic level sensor. Wetwell level is to display on the GUI, as well as via independent display on the PSCP door, to inform the Operator for use in hand and backup control mode, or when the PSCP PLC system is not working. A GUI screen will be provided with "popup" windows for Operator programming of the designated alarm levels.

Alarm Conditions (reported individually at PSCP, annunciated, and telemetered as a "Common Pumping System" alarm):

- Wetwell Lo Level – An alarm is generated if water level remains below programmed setpoint for greater than 5 seconds (adjustable).
- Wetwell High Level – An alarm is generated if water level remains above programmed setpoint for greater than 20 seconds (adjustable).
- Wetwell Hydrostatic Transmitter Signal Invalid – An alarm is generated if the hydrostatic transmitter signal goes below 4 mA, or above 20 mA, by more than the programmed allowable tolerance, for more than the programmed length of time. The PSCP will go into Backup Pump Control Mode (float control) upon initiation of the alarm.

Status Points to the Pump Control Panel:

- Wetwell level (0-17 ft, to be field confirmed)

3. Raw Sewage Flow Indicating Transmitter

Summary:

A flow meter will monitor and totalize the combined flow rate of all operating station pumps and provide a 4-20 mA signal to the PSCP.

Alarm Conditions (reported at PSCP, annunciated, and telemetered as a "Common Pump Station Alarm"):

- Flow rate invalid signal – An alarm is generated if the flow signal is below 4 mA or higher than 20 mA.

Status Points to the Pump Control Panel:

- Station Discharge Raw Sewage Flow rate

Miscellaneous

1. Wetwell Flood / Empty

Summary:

Float switches will be provided in the wetwell at elevations specified by the Engineer for sensing Hi-Hi and Lo-Lo wetwell level conditions.

Status Points to the Pump Control Panel:

- Wetwell Hi-Hi or Flood detected
- Wetwell Lo-Lo or Empty condition detected

Alarm Conditions (reported at PSCP, annunciated, and telemetered as a "Common Pump Station Alarm"):

- Wetwell Hi-Hi condition, or flood detected – An alarm is generated if the float switch discrete input remains active for greater than 5 seconds (adjustable).
- Wetwell Lo-Lo condition, or empty wetwell – An alarm is generated if the float switch discrete input changes state for greater than 5 seconds (adjustable).

Interlock Conditions:

- Run condition is enabled for both sewage pumps upon Hi-Hi condition detected.
- Run condition is removed for both sewage pumps upon Lo-Lo condition detected.

2. Valve Vault Flood

Summary:

A float switch will be provided in the Valve Vault to detect a flood condition.

Status Points to the Pump Control Panel:

- Valve Vault Flood detected

Alarm Conditions (reported at PSCP, annunciated, and telemetered as a "Common Pump Station Alarm"):

- Valve Vault flood condition – An alarm is generated if the float switch discrete input remains active for greater than 5 seconds (adjustable).

3. Emergency Generator and Automatic Transfer Switch Status and Alarms

Summary:

The emergency generator shall provide separate contacts for specified alarm conditions, input to the PSCP. The PSCP will indicate the conditions separately, annunciate alarms, and telemeter status and combinations of alarms as indicated below.

The ATS shall provide separate contacts for the specified condition inputs to the PSCP. The PSCP will indicate these and telemeter the conditions indicated below.

Condition Inputs to the Pump Station Control Panel:

The emergency generator shall provide the following condition inputs to the PSCP:

- Generator Running
- Generator Not In Auto
- Generator Low Fuel
- Generator E-Stop
- Generator Fuel Tank Leak
- Generator Common alarm

The Automatic Transfer Switch (ATS) shall provide the following condition inputs to the PSCP:

- ATS in Normal Utility Power position
- ATS in Emergency or Generator power position

Status and Alarm Conditions to be shown at the PSCP and telemetered as indicated:

- Generator Running – Status to be indicated on the appropriate GUI screens and telemetered as a Generator Running status
- Generator Not In Auto – Alarm to be indicated as such, annunciated, and telemetered as a "Generator Common Alarm"
- Generator Low Fuel – Alarm to be indicated as such, annunciated, and telemetered as a "Generator Common Alarm"
- Generator E-Stop – Alarm to be indicated as such, annunciated, and telemetered as a "Generator Common Alarm"
- Generator Fuel Tank Leak – Alarm to be indicated as such, annunciated, and telemetered as a "Generator Common Alarm"
- Generator Common alarm – Alarm to be indicated as such, annunciated, and telemetered as a "Generator Common Alarm"
- ATS in Normal Utility Power Position – Status to be indicated on GUI; not annunciated or telemetered

- ATS in Emergency Generator Power Source Position – Status to be indicated on GUI; not annunciated or telemetered

4. Facility Alarms

A. Meter Vault Flood (if separate from Valve Vault)

Summary:

A float switch will be provided in the station Flow Meter Vault to detect a flood condition.

Status Points to the Pump Control Panel:

- Flow Meter Vault Flood detected

Alarm Conditions (reported at PSCP, annunciated, and telemetered as a "Common Pump Station Alarm"):

- Flow Meter Vault flood condition – An alarm is generated if the float switch discrete input remains active for greater than 5 seconds (adjustable).

B. Loss of Utility Power

Summary:

A relay shall be provided in the Automatic Transfer Switch (ATS) to provide a dry contact for status of utility power. ATS position shall not be used to indicate loss of utility power.

Status Points to the Pump Station Control Panel:

- Loss of utility power

Alarm Conditions (reported at PSCP, annunciated, and telemetered as a "Loss of Utility Power Alarm"):

- Loss of Utility Power

Section 13000
Dickerman Road Pump Station SCADA System

Appendix B
Pump Station Control Panel I/O List

	Point Description	I/O	SIGNAL TYPE	INT or EXT to PSCP	COMMENT
1	Pump 1 Run Command	Output	Discrete	EXT	
2	Pump 2 Run Command	Output	Discrete	EXT	
3	Pump 1 Running	Input	Discrete	EXT	
4	Pump 2 Running	Input	Discrete	EXT	
5	Pump 1 Fail - Overload/Overtemp	Input	Discrete	EXT	From SSRV
6	Pump 1 Seal Leak	Input	Discrete	EXT	From MiniCas
7	Pump 1 Soft Starter Fail	Input	Discrete	EXT	From SSRV
8	Pump 1 SSRV in Bypass Mode	Input	Discrete	EXT	From SSRV
9	Pump 1 Running in SSRV Bypass	Input	Discrete	EXT	From SSRV
10	Pump 2 Fail - Overload/Overtemp	Input	Discrete	EXT	From SSRV
11	Pump 2 Seal Leak	Input	Discrete	EXT	From MiniCas
12	Pump 2 Soft Starter Fail	Input	Discrete	EXT	From SSRV
13	Pump 2 SSRV in Bypass Mode	Input	Discrete	EXT	From SSRV
14	Pump 2 Running in SSRV Bypass	Input	Discrete	EXT	From SSRV
15	Wetwell Level	Input	Analog	EXT	Hydrostatic
16	Wetwell Backup Hi-Hi Level Float	Input	Discrete	EXT	Backup Float switch to relay to PSCP and Telemetry for independent signals
17	Wetwell Lo-Lo Level Float	Input	Discrete	EXT	Backup Float switch
18	Backup Pump 1 Start Float	Input	Discrete	EXT	Backup Float switch
19	Backup Pump 2 Start Float	Input	Discrete	EXT	Backup Float switch
20	Backup Pump 1 Stop Float	Input	Discrete	EXT	Backup Float switch
21	Backup Pump 2 Stop Float	Input	Discrete	EXT	Backup Float switch
22	Station Effluent Flow	Input	Analog	EXT	
23	Exterior Station Common Alarm Strobe	Output	Discrete	EXT	

	Point Description	I/O	SIGNAL TYPE	INT or EXT to PSCP	COMMENT
24	Valve Vault Flood	Input	Discrete	EXT	Float switch
25	Meter Vault Flood (if vault req'd)	Input	Discrete	EXT	Float switch
26	Generator Fuel Tank Leak	Input	Discrete	EXT	Containment
27	Generator Low Fuel	Input	Discrete	EXT	
28	Generator E-Stop	Input	Discrete	EXT	
29	Generator Not In Auto	Input	Discrete	EXT	
30	Generator Common Alarm	Input	Discrete	EXT	
31	Generator Run	Input	Discrete	EXT	
32	Utility Power Fail	Input	Discrete	EXT	From source or added relay in ATS, NOT from ATS position
33	PSCP UPS operating on battery power	Input	Discrete	INT	UPS
34	PSCP UPS Common Alarm	Input	Discrete	INT	Low battery, internal fail, and other alarms common at UPS
35	ATS in Normal Utility Power Source position	Input	Discrete	EXT	ATS
36	ATS in Emergency Generator Source position	Input	Discrete	EXT	ATS
37	Activate Backup Float Control System	Output	Discrete	INT	Upon loss of "normal" output from PLC, or transducer failure, backup relay control logic engages; provide number of outputs necessary
38	Unlatch Backup Float Control	Input	Discrete	INT	
39	Hard-wired spare	Input	Discrete	EXT	
40	Hard-wired spare	Input	Discrete	EXT	
41	Hard-wired spare	Input	Discrete	EXT	
42	Hard-wired spare	Input	Discrete	EXT	
43	Hard-wired spare	Output	Discrete	EXT	
44	Hard-wired spare	Output	Discrete	EXT	
45	Hard-wired spare	Output	Discrete	EXT	
46	Hard-wired spare	Output	Discrete	EXT	

	Point Description	I/O	SIGNAL TYPE	INT or EXT to PSCP	COMMENT
47	Hi/Lo Wetwell Level	Output to telemetry	Discrete	EXT	Telemetry Point 1
48	Common Pumping System Alarm	Output to telemetry	Discrete	EXT	Telemetry Point 2
49	Common Pump Station Facility Alarm	Output to telemetry	Discrete	EXT	Telemetry Point 3
50	Loss of Utility Power	Output to telemetry	Discrete	EXT	Telemetry Point 4
51	Generator Run	Output to telemetry	Discrete	EXT	Telemetry Point 5
52	Generator Common Alarm	Output to telemetry	Discrete	EXT	Telemetry Point 6
53	Backup High level Alarm (from float switch signal duplicating relay in PSCP independent of PLC)	Output to telemetry	Discrete	EXT	Telemetry Point 7
54	Spare	Output to telemetry	Discrete	EXT	Telemetry Point 8
55	Wetwell Level	Output to telemetry	Analog	EXT	Telemetry Point 9
56	Pump Station Flow	Output to telemetry	Analog	EXT	Telemetry Point 10

4. APPLICATIONS

e. Proposed Residential Infill Development – 687 South Main Street

i. Memo

WRIGHT-PIERCE
Engineering a Better Environment

MEMORANDUM

TO:	Water Pollution Control Authority	**DATE:**	3/15/2021
FROM:	Dennis Dievert Jr.	**PROJECT NO.:**	20458
SUBJECT:	Final Design/Award of Capacity Approval 687 South Main Street Ricci Construction Group		

The application is for residential infill of seven 3-bedroom units on the corner of South Main Street (Route 10) and Higgins Road. The area is within the town's Sewer Service Area Map as an infill property with sewer frontage. The previous use on this property was served by a subsurface sewage disposal system and there is no known lateral stub available. There is also an Environmental Land Use Restriction (ELUR) on the property that limits depth of excavation to 4-feet from existing grade. Due to this ELUR, the original sewer feasibility application included two separate grinder pump stations to serve this development.

The final design plans submitted with this application have been revised to show only one new private pump station to serve the four western units. The pump station will discharge to a private common manhole that also collects gravity flow from the three eastern units. Flow is conveyed from that common manhole via a new 8" gravity line to an existing manhole on the existing 8" gravity main in the shoulder of South Main Street. The revised layout no longer requires any excavation or restoration within South Main Street. Flows are estimated at 1,442 gallons per day and the flows are within expected limits.

We have the following comments and questions that were noted in our feasibly application approval memorandum and have still to been addressed:

1. How will sewer flows from the pump station be conveyed in the event of a power outage?
2. Confirm each unit will have its own water meter or if there will be a common water meter for the entire development.
3. Provide additional details and sizing for the grinder pumps and force main.
4. All sanitary sewer improvements will remain privately owned up to. but not including the existing sanitary discharge manhole along South Main Street (MH 1).
5. If the existing subsurface disposal system is to be abandoned, please provide details on how this will be done.

The overall layout for the new sewer connections are acceptable. With the stipulations outlined above, this project is recommended for approval to the WPCA.

The project would be required to pay capacity fees as outlined in the WPCA regulations. The method of annual sewer fees will be based on the applicant's responses to the above comments regarding water service and meter(s) location.

March 2, 2021

Mr. John Perrotti
Water Pollution Control Authority Chairperson
Town of Cheshire
84 South Main Street
Cheshire, CT 06410

Re: Proposed Residential Infill Development
687 South Main Street
Cheshire, Connecticut
SLR #11418.00056.0400

Dear Mr. Perrotti,

On behalf of 687 South Main, LLC, SLR International Corporation (SLR) has prepared an Application for Final Design and Award of Capacity Approval for Extension of Public Sanitary Sewers in support of a proposed residential infill development that would include seven 3-bedroom units located at 687 South Main Street in Cheshire, Connecticut. This project received feasibility approval by the Water Pollution Control Authority (WPCA) Commission on December 17, 2020. The project site is located on the corner of South Main Street and Higgins Road. The western four units are proposed to be served by a pump system that will connect to the proposed gravity sewer serving the eastern three units. This gravity sewer will connect to the existing gravity sanitary sewer main just off the edge of South Main Street. This method of providing sanitary sewer service to the property is proposed due to an environmental land use restriction (ELUR) on the property, which limits the depth of excavation to 4 feet from the existing grade, while providing gravity sewer to as many units as possible. The previous use on the property was served by a subsurface sewage disposal system. Based upon as-built records, there is no existing lateral stub provided to serve the property.

Using Cheshire WPCA standards for sewage generation on a per-dwelling-unit basis, the total estimated wastewater generation from the proposed 7-unit residential development is approximately 1,442 gallons per day (gpd), calculated as follows:

$$7\ units\ \times 206\ \left(\frac{gpd}{unit}\right) = 1{,}442\ gpd$$

At this time, we are requesting final design and award of capacity approval. Should you have any further questions, please do not hesitate to contact me at (203) 271-1773.

Sincerely,

SLR International Corporation

John M. Milone, PE
US Sector Lead, Built Environment

11418.00056.0040.mr221.ltr.docx

Town of Cheshire—Department of Public Works

Application for Final Design and Award of Capacity Approval For Extension of Public Sanitary Sewers

Project Name: Proposed Residential Infill Development Project Address: 687 South Main Street

Zoning District: R-20A Assessor's Map #: 71 Lot #: 32

Applicant's Name: 687 South Main, LLC Applicant's Telephone Number: 203-272-4323

Applicant's Address: 986 South Main Street, Cheshire, CT 06410

Property Owner's Name: 687 South Main, LLC Property Owner's Telephone Number: 203-272-4323

Property Owner's Address: 986 South Main Street, Cheshire, CT 06410

Contractor's Name: Ricci Construction Group, Inc. Contractor's Telephone Number: 203-272-4323

Contractor's Address: 986 South Main Street, Cheshire, CT 06410

I. Project Details

■ New Discharge ☐ Substantial change in the volume or character of pollutants being discharged.
Explain:

■ Residential Number of Bedrooms 21 Sewer capacity requested in Gallons per Day 1,442

☐ Commercial Square footage _____ Sewer capacity requested in Gallons per Day _____

☐ Industrial Square Footage _____ Sewer capacity requested in Gallons per Day _____

Total, estimated capacity required: 1,442 (gallons per day)

Is food preparation occurring on the property or will it occur as part of this project? No If yes, provide the Public Health Code Classification: __ [Note: Class 3 and Class 4 must comply with DEEP Fats, Oil and Grease Regulations.]

Connecticut Conservation and Development Plan and Map Designation [check one]:

■ Neighborhood Conservation Area (Map Color Code: Pink)—An extension of public sanitary sewers IS permitted in this area
☐ Growth Area (Map Color Code: Beige)—An extension of public sanitary sewers IS permitted in this area
☐ Existing Preserved Open Space (Map Color Code: Dark Green)—An extension of public sanitary sewers is NOT permitted in this area

Town of Cheshire—Department of Public Works

- ☐ Preservation Areas (Map Color Code: Medium Green)—An extension of public sanitary sewers is NOT permitted in this area
- ☐ Conservation Areas (Map Color Code: Light Green)—An extension of public sanitary sewers is NOT permitted in this area
- ☐ Rural Lands (Map Color Code: White)—An extension of public sanitary sewers is NOT permitted in this area

II. Type of Project

■ [12.10.B DPW] The property is located on an existing, public sanitary sewer line; AND

☐ The property has been assessed for public sanitary sewers; OR

■ The owner has paid or is required to pay a connection charge for connection to a privately installed public sanitary sewer line but has not yet connected to the sewer line.

☐ [12.10.C.1.a DPW] The property owner is seeking a ☐ building permit or ☐ Certificate of Occupancy for new construction on approved single residential lots which do not require public or private extension of the sanitary sewer.

☐ [12.10.C.1.b DPW] The property owner is seeking a building permit for an addition to an existing residential structure or residential use or a change in residential use, which structure or use is presently connected to a public sanitary sewer line.

☐ [12.10.C.1.b DPW] The property owner is seeking a building permit for an addition to an existing commercial or industrial structure or commercial or industrial use or a change in commercial or industrial use, which structure or use is presently connected to a public sanitary sewer line; AND

☐ The additional, estimated flow for such addition or change in use DOES NOT exceed 227 gallons per day; OR

☐ The additional, estimated flow for such addition or change in use DOES NOT exceed the actual flow for the use already permitted prior to the addition or change in use.

☐ [12.10.C.1.b WPCA] The property owner is seeking a building permit for an addition to an existing commercial or industrial structure or commercial or industrial use or a change in commercial or industrial use which structure or use is presently connected to a public sanitary sewer line; AND

☐ The additional, estimated flow for such addition or change in use DOES exceed 227 gallons per day; OR

☐ The additional, estimated flow for such addition or change in use DOES exceed the actual flow for the use already permitted prior to the addition or change in use.

☐ [12.10.C.1.c DPW] The property owner has been granted final design approval by the WPCA for extensions of the public sanitary sewer system for a project for which the sewers have not yet been extended AND the extension does not go into an area classified as Existing Preserved Open Space (Map Color Code: Dark Green), Preservation Areas (Map Color Code: Medium Green), Conservation Areas (Map Color Code: Light Green), or Rural Lands (Map Color Code: White) as shown on the June, 2005 Conservation and Development Plan and Map of the State of Connecticut (as may be amended).

Town of Cheshire—Department of Public Works

III. Assessment/Occupancy Information

1. Date of Feasibility Approval: 12/17/20 Date of Final Design Approval: _____

2. Date of Sewer Assessment: _____ Amount: $_____ Caveats?____ If yes, please provide a copy of the caveat.

3. Estimated date of occupancy--include estimated occupancy dates for each structure for which a Certificate of Occupancy is required:
   July 2021

4. Will the property be developed in phases? No If yes, how many? _____ If yes, provide the information detailed in attachment #7 below.

5. Describe the project and include all pertinent information necessary for an informed decision to be made on the application.
   The proposed development is a residential infill development that would include seven 3-bedroom units. Three units would be served by a gravity sewer with the remaining units served by a pump system. The proposed gravity sewer would connect into the existing gravity sewer main in the South Main Street right of way.

IV. Detailed Project Information

Attach the following to this application:

1. A copy of the letter describing the project which was submitted with the application for feasibility approval. together with a statement of any changes in the proposed sanitary sewer system since feasibility approval was granted, and including such additional, pertinent information necessary for an informed decision to be made on the application.
2. A copy of the Feasibility Approval granted by the WPCA.
3. Separate drawings for each of the sanitary sewers proposed, drawn at the Town's standard scale of horizontal 1"=40', vertical 1"=4', showing the following:
   a. Contours at two-foot vertical intervals and/or centerline elevations at fifty-foot intervals;
   b. Location of buildings and building connections;
   c. Sill elevations;
   d. Existing and/or proposed utilities;
   e. Other, major physical features; and
   f. Easements to be acquired in connection with construction of the sanitary sewer system or in connection with future construction of extensions of the system.
4. Final flow calculations (average daily and peak flow rates) for the following:
   a. Immediate service area.
   b. Future service area.
5. A color copy of the June 2005 (or more recent) Conservation and Development Plan and Map of the State of Connecticut on which the location of the property has been clearly indicated.
6. A proposed developer's agreement (as set forth in Section 12.4.C of the Cheshire Sewer Regulations) which is acceptable to the WPCA and the Town Attorney and which details all the conditions required by the WPCA.
7. If the property will be developed in phases, attach plans detailing, phase by phase, the planned construction, the timetable of planned construction, the timetable of estimated occupancy for all uses in each phase, the sanitary sewage flow rate for each connection within the phase, and such other data or information as may be requested by the Director or the WPCA.
8. Ten duplicate sets of the application, including all attachments.

Town of Cheshire—Department of Public Works

By signing below, I hereby agree and certify as follows:

1. The statements made, and the information provided, in this application and in all supporting documentation are true to the best of my knowledge and belief.
2. I have reviewed, understand, and will comply with The Town of Cheshire Sewer Regulations.
3. I will provide such other data or information as may be requested by the Director or the WPCA as he or it deems necessary to make a decision on the application.
4. Official representatives and agents of the Town of Cheshire, including the Building Official, the Director of Public Works, WPCD staff, or their designees, are authorized to enter the property, at reasonable times, for purposes of inspection, observation, measurement, sampling, and testing.

Applicant's Signature _____ Date: 3/1/21

Property Owner's (or authorized agent's) Signature _____ Date: 3/1/21

[Printed name of authorized agent] Don Dicer

Contractor's Signature _____ Date: 3/1/21

********** **FOR OFFICE USE ONLY**********

Dates:

_____ Submitted to Public Works

_____ Statutory "Date of Receipt"

_____ Approved by Planning & Zoning Commission

_____ Approved by Inland Wetlands & Watercourse Commission (write "N/A" if IWWC approval is not required)

_____ Feasibility approval granted

_____ Town Engineer final design review report received

_____ Final Design approval: ☐ Granted ☐ Denied

_____ Developer's agreement (as set forth in Section 12.4.C of the Cheshire Sewer Regulations, acceptable to the WPCA and the Town Attorney, and which details all the conditions required by the WPCA) filed.

_____ Additional requirements per Director of Public Works:

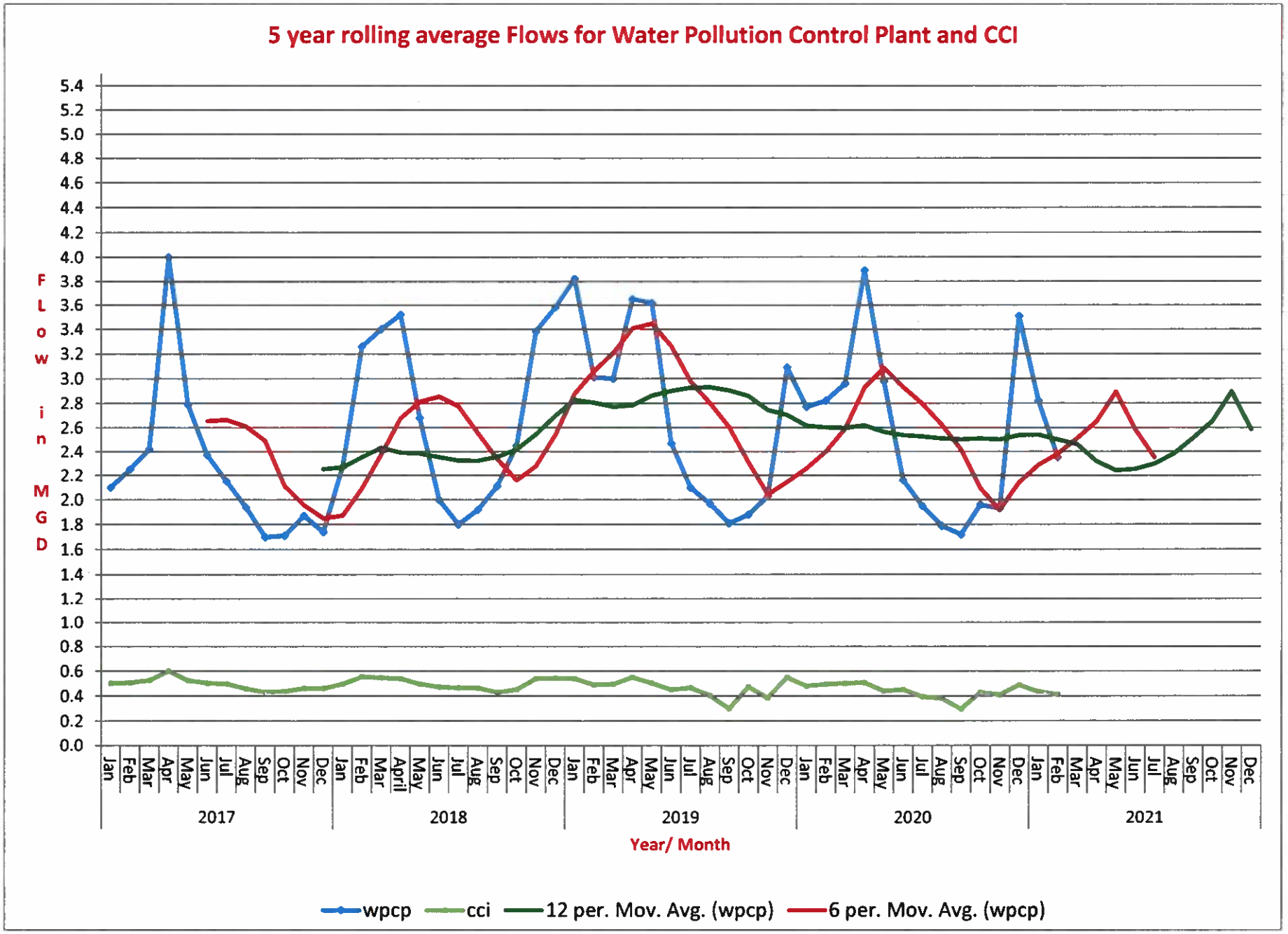
_____

_____

☐ Approval of Award of Capacity of _____ gallons per day, or denied ☐

5. PROJECTS -None

6. Superintendent's Report


5 year rolling average Flows for Water Pollution Control Plant and CCI
Flow in MGD
5.4
5.2
5.0
4.8
4.6
4.4
4.2
4.0
3.8
3.6
3.4
3.2
3.0
2.8
2.6
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
2017
Jan Feb Mar April May Jun Jul Aug Sep Oct Nov Dec
2018
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
2019
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
2020
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan
2021
Year/ Month
wpcp
cci
12 per. Mov. Avg. (wpcp)
6 per. Mov. Avg. (wpcp)

Histroical Flows (MGD) at Water Pollution Control Plant and CCI			
Year	Month	WPCP	CCI
2017	Jan	2.1	0.502
	Feb	2.25	0.506
	Mar	2.42	0.525
	Apr	4	0.6
	May	2.79	0.525
	Jun	2.37	0.503
	Jul	2.15	0.497
	Aug	1.94	0.458
	Sep	1.7	0.429
	Oct	1.71	0.436
	Nov	1.87	0.46
	Dec	1.74	0.46
2018	Jan	2.27	0.495
	Feb	3.26	0.554
	Mar	3.4	0.547
	April	3.52	0.539
	May	2.68	0.498
	Jun	2	0.471
	Jul	1.80	0.466
	Aug	1.92	0.464
	Sep	2.11	0.429
	Oct	2.45	0.452
	Nov	3.38	0.539
	Dec	3.58	0.543
2019	Jan	3.82	0.54
	Feb	3.01	0.492
	Mar	3	0.495
	Apr	3.65	0.55
	May	3.62	0.505
	Jun	2.47	0.451
	Jul	2.1	0.466
	Aug	1.97	0.406
	Sep	1.81	0.3
	Oct	1.88	0.474
	Nov	2.03	0.386
	Dec	3.09	0.55
2020	Jan	2.77	0.481
	Feb	2.82	0.496
	Mar	2.96	0.503
	Apr	3.89	0.509
	May	2.98	0.441
	Jun	2.16	0.452

	Jul	1.95	0.394
	Aug	1.79	0.382
	Sep	1.72	0.296
	Oct	1.96	0.43
	Nov	1.93	0.41
	Dec	3.51	0.489
2021	Jan	2.82	0.435
	Feb	2.35	0.411
	Mar		
	Apr		
	May		
	Jun		
	Jul		
	Aug		
	Sep		
	Oct		
	Nov		
	Dec		

7. Engineering Report - None

8. New Business - None

9. Old Business - None

10. Approval of Minutes/Meeting Notes

a. Meeting Minutes-February 25, 2021

i. Meeting Corrections

WPCA MEETING, FEBRUARY 25, 2021

Corrections:

Page 2, para. #5, line #3 – should read **"used"** hops (not original hops)

Page 3, para. #1, lines 1 and 2 – should read **"spent"** (not spec)

MINUTES OF THE TOWN OF CHESHIRE WATER POLLUTION CONTROL AUTHORITY MEETING HELD ON THURSDAY, FEBRUARY 25, 2021 AT 6:00 P.M.

VIRTUAL MEETING VIA ZOOM

Public access made available through live streaming on YouTube at https://www.youtube.com/channel/UC4_xey3QjJmwe57R_6K94Dw

Public comments accepted at Comments@cheshirect.org and by voice message prior to the meeting at 203 271-6638. Video will be available on Channel 14 and on demand at www.cheshirect.org as soon as possible.

Present
John Perrotti, Chairman; Steve Carroll, Vice Chairman; James Beach, Tom Scannell, James Urbano
Absent: Aboud Abdelghani and Zack Wellburn.
Staff: Scott Hallier, WWTP Superintendent; Dennis Dievert Jr. P.E. Wright-Pierce Engineering; Anne McBain, Executive Assistant, PW Department

Chairman Perrotti called the meeting to order at 6:00 p.m.

1. PLEDGE OF ALLEGIANCE
The group Pledged Allegiance to the Flag.

2. ROLL CALL
The clerk called the roll and a quorum was determined to be present.

3. PUBLIC COMMUNICATIONS

4. APPLICATIONS

a. Malpractice Brewery LLC – 830 South Main Street
i. Wright Pierce Memo

Kyle Bonura, Applicant, presented the Malpractice Brewery LLC application.

The small craft brewery will be located at 830 South Main Street, the Bovano property, and the square footage of the brewery will be 2,040 S.F. which will be smaller than the other two breweries in town. The site will be utilized for manufacturing, selling and limited distribution of a craft beer.

The goal is to utilize the existing lateral currently connected to the building, which connects to the gravity main on South Main Street. The status of the lateral is unknown and will be checked out.

The plan is to operate a 3-barrel (BBL) brewery; the tap room occupancy is currently pending; assumptions are for a 40 person occupancy. The usage of the sewer will be the daily sanitary use. The tap room will only be open on a Friday, Saturday, Sunday, which can be changed, and operating under limited time availability.

Calculations – the discharge is done according to the Brewery Association recommendations for the capacity. The smaller breweries have the largest discharge or lowest efficiency when it comes to discharge. The applicant has over estimated the discharge with everything done to repurpose what is being put through the system, so there is not as much down the sewers. The applicant plans on a three barrel brew house; this would be about 31.5 gallons; and calculations used take into consideration the amount of barrels required to make one barrel. For the amount of space and volume produced it is estimated 320gpd per day, including the daily patron estimated at 2gpd per day.

The new square footage of 2,040 s.f. will not affect the amount of discharge being produced. For the final application there will be exact numbers and chemical makeup of any product being used, particularly what is put down the drain.

Mr. Dievert stated there is an existing sewer connection, but it is uncertain of the condition, size, and location. The application for feasibility is acceptable with more information provided by the application on what is being put down the drain.

Chairman Perrotti commented on the discharge to the sewers, types of residual hops along with other materials. When the applicant comes for the design approval, there will be a closer look on capturing the original hops.

Supt. Hallier stated there has to be a look at the sample of discharge, but there is no problem with feasibility.

With regard to hops particulars, Mr. Bonura asked if it is the amount going down or just the condition in which it goes down. He questioned issues with other breweries putting together a filtration of some sort.

There are three (3) breweries in town and at this time Mr. Perrotti said there is nothing running into the Cheshire system. The existing sewer regulations prohibit any types of hop material. Supt. Hallier will be requesting a sample.

Lateral – Mr. Dievert will speak to the property owner. He said the lateral is active in the sense there is a restroom connected which is used periodically, but not for what it was originally in place. There will be cameras used to check the lateral.

For the hop material, Mr. Bonura asked if this goes to spec grain. He said there is no plan to put straight mash down the drain, but spec grains sometimes find their way into the system.

Supt. Hallier said there can be a screen devise before it goes into the actual sewer to capture anything coming through.

This is the 3rd brewery to come forward, and Mr. Carroll noted certain regulations prohibit certain material/particulars from entering the sewer system. More definition is needed, and applicants are responsible for screening as much as reasonable. Mr. Carroll pointed out that everyone is learning as we go.

MOTION by Mr. Carroll; seconded by Mr. Scannell

MOVED that the Water Pollution Control Authority approve the application for feasibility for the Malpractice Brewery LLC located at 830 South Main Street, Cheshire CT.

Discussion
Chairman Perrotti commented on this being the 3rd brewery in town with everyone learning more as things move along. He requested Supt. Hallier reach out to other treatment plant superintendents for information and feedback on their interaction with breweries and their sewer regulations.

Supt. Hallier agreed to this request.

VOTE The motion passed unanimously by those present.

b. Danna and Stephen Cobbe – 1369 Cheshire Street

i. Wright Pierce Memo

Danna and Stephen Cobbe, applicants, and Cheri Paulson, realtor, were present for the 1369 Cheshire Street application.

Mr. Dievert summarized the application and informed the WPCA members that the property at 1369 Cheshire Street was originally scheduled to close in January 2021. The reason the closing was prevented from taking place is that the home was connected to the sewer system in 1987. The septic tank was abandoned with documentation of the installation of the lateral and abandonment of the septic system…which were in the WPCA meeting packet. However, the town has no record of "disconnection" being made. The lateral was televised; it was professionally installed; there is a clean-out in an appropriate location; and connection to the main is proper. The lateral was televised and dye tested January 2021. The applicant is seeking for the WPCA to recognize this connection in order to sell the home.

Chairman Perrotti stated that the WPCA has a new application for the sewer that meets all the requirements at this time. His opinion on the matter is formalizing the process so the sewer is recognized, put into the drawings, and have feasibility approved. Mr. Perrotti said the feasibility approval and award capacity can be done in one motion.

According to Mr. Carroll there are no problems with approval and award. WPCA can do both with a single omnibus motion.

Mr. Scannell agreed with one motion, and asked about the timing of the town being paid in what period of time.

Chairman Perrotti said the time would begin as of February 25, 2021. There have been multiple owners in the transaction history of this matter

It was noted by Mr. Carroll that the Cheshire real estate market in the 1970's and 1980's was wild, and there is uncertainty if the subject transaction was documented back then. By the WPCA action there would be correction of a wrong and things move forward.

Mr. Urbano said WPCA knows what is the right thing to be done, and cannot go back to the past and sort the matter out now. The right thing is to just move forward.

Mr. Beach agreed.

MOTION by Mr. Perrotti; seconded by Mr. Carroll.

MOVED that the Water Pollution Control Authority approve the feasibility application and award of capacity for Danna and Stephen Cobbe, 1369 Cheshire Street, Cheshire CT, for the recognition of the map to be updated and shown as a sewered property.

VOTE The motion passed unanimously by those present.

5. PROJECTS
None

6. SUPERINTENDENT'S REPORT

Supt. Hallier reported that the treatment plant is working well; the numbers are down and this is good. With the cold weather this year there have been no issues at the treatment plant.

Bypass Pump – Supt. Hallier informed the WPCA that Finance Director Jaskot reported to him on a balance of funds (about $1M) from the West Johnson Rehab project. Supt. Hallier is looking into purchase of a Bypass Pump for this station. During construction a bypass piping system was installed. With the extra funds he would like to

purchase a bypass pump in the event something goes wrong. This pump can be used in the other pump sites. At this time, Supt. Hallier is looking into initial costs, which range from $65,000 to $75,000. He will continue to get details and information, and provide it to the WPCA.

Mr. Divert advised that a portable system is the way to go, and there cannot be reliance on the bypass company to get to the problem in time.

The WPCA was informed by Supt. Hallier that it will be a diesel pump. He is looking at 6 inch pumps that can be reduced to 4 inch for the smaller stations, and used throughout the plant. Finance Director Jaskot is ok with allocation of the funds for the pump. This is the direction Supt. Hallier will be going if it is okay with the WPCA.

Regarding the cold weather, Supt. Hallier reported there was no effect on the plant. There was no cold rain along with the cold weather...we had snow instead. The Southington CT plant was affected by the cold and snow melt, and Cheshire donated some micro-organisms to Southington to get them restarted and running again.

7. ENGINEERING REPORT

a. Update on engineering review process

Chairman Perrotti requested an update on the review process, what can be done to fine tune things, and move forward.

Mr. Dievert reviewed the engineering process and information with the WPCA. He said the first few months there were "growing pains". There is now a good system in place... he talks to Don Nolte regularly, a few times a week. The talks are not always WPCA related, and Mr. Dievert is working on separation of engineering matters. There are also discussions with Supt. Hallier for his comments which are included in a memo to Mr. Nolte. One additional step will be to send a memo to the WPCA prior to meetings.

For sending a memo, Chairman Perrotti asked that it be sent to him and Mr. Carroll for review and forwarding to Authority members. This could come under Public Communications on the agenda. Mr. Dievert agreed, and noted the Authority members would look at the memo in a different way, and provide good input.

This is part of the new process and Mr. Carroll said the memos can be reviewed and adjustments made.

Mr. Dievert is attending many meetings with Mr. Nolte and Mr. Bombero regarding Stone Bridge. In the invoices sent to Mr. Nolte there is a breakdown of the time spent on individual projects. Mr. Dievert has an understanding of the importance of consulting with Supt. Hallier.

Chairman Perrotti stated more information will be coming about Stone Bridge. He is pleased with engineering services provided by Mr. Dievert, the process as it is being done, and for a job well done.

Supt. Hallier is also pleased with the transition and said things are working out very well.

8. NEW BUSINESS

9. OLD BUSINESS

10. APPROVAL OF MINUTES – JANUARY 28, 2021

MOTION by Mr. Scannell; seconded by Mr. Beach

MOVED that the WPCA approve and accept the minutes of January 28, 2021 subject to corrections, additions, deletions.

VOTE The motion passed unanimously by those present.

11. ADJOURNMENT

MOTION by Mr. Scannell; seconded by Mr. Urbano

MOVED to adjourn the meeting at 6:32 p.m.

VOTE The motion passed unanimously by those present.

ATTEST:

Marilyn W. Milton, Clerk