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60% Design Technical Memorandum

To:	Bruce Thomas, P.E. – Town of Hooksett	File: 2447.08
From:	David J. Mercier, P.E., Senior Project Manager	
Cc:	Ed Rushbrook, Robert Saunders, Liz Philpott, Keith Pratt	
Date:	April 13, 2021	
Subject:	60% Design – Route 3A Utilities Expansion – Contract 1	

BACKGROUND

On January 22, 2020, Underwood Engineers submitted the final version of the Route 3A Utilities Expansion Project Planning Stage Technical Memorandum to the Town. That Memorandum recommended water and sewer utilities expansion in the Route 3A area of Hooksett under four major projects as follows:

Contract 1 – consisting of sewering the Phase 1 and Phase 2 areas, immediately surrounding the Route 93/ Exit 10 exchange. In addition to \sim 14,250 feet of gravity sewer, this contract includes construction of a new pump station serving the Kimball Drive area, a twin force main under the Merrimack River to transmit flows to the existing Martins Ferry Pump Station, and an upgrade of the existing Martins Ferry Pump Station.

Contract 2 – consisting of the Phase 3 construction of the Tri-Town Ice Arena Wastewater Pumping Station and gravity sewer main and water main through the Bayview Terrace Road and Meadowcrest Road neighborhoods to West River Road (3A) (~4,000 feet).

Contract 3 – consisting of the Phase 4 proposed gravity sewer main north of the Tri-Town Ice Arena Pumping Station to Hackett Hill Road (~4,800 feet).

Contract 4 – consisting of the Phase 5 gravity sewer main from the intersection of West River Road (3A) and Meadowcrest Road south to the Dunkin Donuts property (~5,700 feet), including a water main interconnection between the Hooksett Village Water Precinct and the Manchester Water Works (~3,650 feet). **Refer to the Workplan Drawings 1-3 for a graphical depiction of Contracts 1-4 (Phases 1-5) contained in Appendix A.**



The Town is committed to the expansion of utilities along the Route 3A corridor and to initiate that process, has authorized preliminary and final design to be performed on all four contracts. However, given the magnitude of these four contracts (~\$21M) and limited funding currently available, a decision was made to give priority to the preliminary and final design of Contract 1 at this time. Preliminary and final design of Contract 1 is currently scheduled to be completed by June 2021, while the preliminary and final design of the other three contracts is currently anticipated for completion by the end of 2021.

The purpose of this Memorandum is to provide a description of the concepts being evaluated in the final design process. The issuance of this 60% Design Technical Memorandum focuses on Contract 1. It will be amended over time to provide details on the other three contracts as the overall project progresses.

CONTRACT 1 SUMMARY

The goal of Contract 1 is to establish municipal sewer service to the existing businesses that are within the Route 93/Exit 10 exchange area. Several of these existing businesses are known to have problematic private subsurface systems and several business owners have expressed a desire for municipal sewer service in the area. Given the limited Town funding available from the Tax Incremental Finance (TIF) zone that has been established, this project will focus on constructing sewers from the low point on Kimball Drive to the north and south sides of the Rte 93/Exit 10 exchange, ending at Rte 3A within a reasonable distance of the large businesses in order to make it affordable for them to construct additional sewer and sewer services to their individual businesses. In order for this concept to be successful, financial participation by Walmart, Bass Pro Shops, Market Basket, Dunkin Donuts and Subway will be required.

The proposed municipal sewer infrastructure to be constructed by the Town under Contract 1 includes a new wastewater pumping station located on a 0.5 acre easement between Quality Drive and Kimball Drive at the low point, new gravity sewer extending both north and south from the new Kimball Drive Pumping Station up to Rte 3A, a new double-barrel force main directionally drilled under the Merrimack River, and upgrades to the existing Martins Ferry Pumping Station on the east side.

The design flows being assumed in these evaluations are the projected 20-year flows for both the Kimball Drive Pump Station and Martins Ferry Pump Station.

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GRAVITY SEWERS

Approximately 14,250 feet of gravity sewers are being designed under this contract (refer to *Appendix A*). It is assumed that ~9,250 feet will be constructed by the Town and ~5,000 feet by local businesses wishing to connect.

A further breakdown would be ~4,250 feet by the Town and ~3,800 feet by local businesses in Zone 1, and ~4,100 feet by the Town and ~1,200 feet by local businesses in Zone 2. An additional ~900 feet along Rte 3A in Zone 2 would be constructed by the Town to serve residential homes, but that piece is recommended to be postponed to a later date when the need arises. All sewer pipe is proposed to be either 8" or 10" SDR-35 PVC sewer.

Workplan 1 in *Appendix A* shows the proposed Town constructed sewers in solid purple and green; the private business constructed sewers are shown in solid pink. The 60% design drawings for all of the new gravity sewers (except Technology Drive) consists of 17 sheets and is contained in *Appendix B (Dwg No.'s C4-C20)*.

KIMBALL DRIVE PUMPING STATION

The Town of Hooksett is in the process of obtaining a 0.5 acre permanent easement on Lot 29-64-3 for construction of the new pumping station. The site is adequate in size to site a new submersible pumping station with room for growth and is accessible from both Kimball Drive and Quality Drive, with the main access being from Quality Drive.

Given the projected magnitude of wastewater flows, the pump station is proposed as a submersible pump station with the entire station fully enclosed within a small building footprint to provide ease of maintenance as well as protection from harsh winter weather conditions. The building consists of three sections including a) a fully-enclosed wetwell area which will house a grinder for the raw wastewater and two wetwells, each with a submersible pump; b) a drywell area which will consist of electrical and control components on the first floor level and a valve pit and flow meter on the below-grade level; and c) an enclosed building space to house a backup generator for the facility at ground level rather than in a stand-alone exterior enclosure.

The building structure will consist of concrete masonry unit block on the interior and split face architectural block on the exterior, with a flat, sloped concrete plank roof with membrane roofing. The overall dimensions of the proposed building are approximately 14' wide x 36' long with an 11' first floor ceiling height. The building layout can be seen on the 60% design floor plan included in *Appendix B, Dwg No. P1*. The ground floor of the station will be constructed at elevation 188.0', 2-feet above the 100-year flood elevation for flood protection.



Essential to the design of the station is the estimated 20-year design wastewater flow and the eventual full buildout flow projection. Projected flows at this station are based on available data given that the majority of the properties in Zone 1 and Zone 2 are occupied and currently served by municipal water from the Manchester Water Works (MWW). Utilizing a combination of existing water meter data from years 2016 to 2018, and assuming reasonable allocations for development on undeveloped lots based on the Hooksett Sewer Commission's sewer use ordinance and NHDES commercial flow contributions guidelines, Underwood calculated the 20-year design and buildout flows which can be seen in *Table 1* below.

Zone	20-year Flow Avg Day (GPD)	20-year Flow Peak Hour (GPD)	Build-out Flow Avg Day (GPD)	Build-out Flow Peak Hour (GPD)
Zone 1	56,000	168,000	141,000	423,000
Zone 2	16,000	48,000	28,000	84,000
KDPS Design Q	72,000	216,000	169,000	507,000

TABLE 1 – KIMBALL DRIVE PUMP STATION BASIS OF DESIGN FLOWS

Note: A peaking factor of 3 was utilized as all flow is from commercial businesses assumed to be generated during the 8-hr work day.

From *Table 1*, the average day and peak hour 20-year design flows for the Kimball Drive Pumping Station serving Zone 1 and Zone 2 are 0.072 MGD and 0.216 MGD.

Fortunately, both the projected 20-year and build-out design flows are reasonable for a single 10.1 pump to handle operating with a variable frequency drive motor. Two (2) pumps will be provided in duty/standby fashion, with one pump being capable of handling peak flows all the way to build-out. The pump can be operated from 352 gpm down to 175 gpm.

KIMBALL DRIVE PUMPING STATION FORCE MAIN

It will be necessary to convey flows from the Kimball Drive Pump Station to the east side of the river into the existing sewer. This will be provided by constructing a 1,000 linear foot long twin force main from the Kimball Drive Pumping Station to the Martins Ferry Pumping Station directionally drilled under the Merrimack River. The key constraints that exist for a directional drill are the need to maintain a minimum of 30 feet below the bottom of the riverbed at all points to minimize the potential for a "frac out", with a maximum pipe slope of 20%. In order to make cleaning/servicing of the directional drilled force main pipes easier, an access vault with valving will be constructed on both sides of the river.



Given the effort required to perform a directional drill of this magnitude, Underwood recommends that two independent force mains be installed side-by-side under the river (a double-barrel force main) to provide backup capacity should either of the force mains become compromised in the future. Evaluations of the cost of a single versus a twin force main indicates that the difference in cost is relatively small since a majority of the cost is in the drilling process and not the pipe materials. The valve vaults on both sides of the river will allow an operator to choose which of the force mains to have online at any given time.

It is recommended that the directionally drilled force mains be constructed of 6" high-density polyethene (HDPE) pipe, which will result in a velocity of 4.0 feet per second at the projected buildout peak hour flow of 0.507 MGD or 352 gpm. In order to provide a minimum desired flushing velocity of 2.0 feet per second, the minimum pump flow rate provided should be at least 175 gpm. (Refer to *Appendix B, Dwg No. C3* to view the 60% design configuration of the proposed double-barrel force main between the Kimball Drive Pumping Station and the Martin's Ferry Pumping Station.)

It is important to note that the Kimball Drive Pump Station will pump right to the existing Martins Ferry Pump Station. The existing Martins Ferry Pumping Station cast iron force main is only 8" in diameter, is 50+ years old, and will be difficult and costly to replace given it is located within the PanAm Railroad right-of-way. At some point in the near future, the economic hydraulic capacity of the 8" CI force main will be exceeded and replacement is advisable.

Two options that have been evaluated to deal with this issue are a) design new pumps for the Martins Ferry Pump Station sized to force the required flows through the existing 8" force main (results in the need for 167 HP pumps pumping at 273 feet of TDH), or b) design new pumps for the Martins Ferry Pump Station that are large enough to handle the next 5 to 10 years of flow utilizing the existing force main, and also sized appropriately to handle the 20-yr design flows through a new larger and shorter force main directionally drilled under the adjacent wetlands and onto and across land owned by Manchester Sand and Gravel to a new gravity sewer to the WWTF. Given the location, age, and condition of the existing force main, and the fact that the larger pumps that would be needed to continue to use it long term are large, costly, and operating at the very edge of their capability, we recommend that option b) be pursued and the 60% design information below reflects that. It should also be noted that the Hooksett Sewer Commission is in full agreement with this approach and is committed to replacing the force main in the near future.



MARTINS FERRY PUMPING STATION UPGRADES

The Martins Ferry Pumping Station was originally constructed in 1968 and underwent one major upgrade in 1985. New pumps and controls were later installed in 2006. The station is a wetpit/drypit station. The wet wells on the wetpit side of the station are extremely small by standard practices. The station houses an influent channel with a mechanical grinder which then discharges to the two wet wells, each with a capacity of only 1,300 gallons.

On the dry side, electrical and controls and the backup generator exist on the ground-floor level. Two centrifugal pump motors are also located at the ground level with drive shafts extending to the pumps at the basement level. A mezzanine level walkway/stairwell exists as well. The rated design capacity of the pumps, based on the 2006 upgrade, is indicated as 738 gpm at 130 feet TDH. Due to age of the equipment and/or the condition of the force main, pump tests performed by Underwood show the pumps currently max out at a flow of 650 gpm, or 88% of the initially rated capacity.

Current average flows to the Martins Ferry Pumping Station based on 5 years of data collected from 2015-2019 are 0.293 MGD. Because the chart recorder data is questionable in terms of calibration, the actual peak hourly flow is unknown. For the purpose of these evaluations, Underwood has assumed that the peak hour flow is equal to 650 gpm (0.936 MGD) because a second pump has not been called in the last year. This equates to a peak hour peaking factor of of 3.2.

Below in *Table 2* are the suggested 20-year design flows for the Martins Ferry Pumping Station, assuming 10% growth and the addition of the Kimball Drive Pumping Station flows.

	Current Flow Avg Day (GPD)	Current Flow Peak Hour (GPD)	20-year Flow Avg Day (GPD)	20-year Flow Peak Hour (GPD)		
MFPS Basin	293,000	936,000	322,000	1,030,000		
KDPS Basin	0	0	72,000	216,000		
MFPS Design Q	293,000	936,000	394,000	1,246,000		

TABLE 2 – MARTINS FERRY PUMPING STATION BASIS OF DESIGN FLOWS

Note: 20-year design flows include 10% growth within MFPS sewer shed plus Kimball Drive Pumping Station Flows

From *Table 2*, the average day and peak hour 20-year design flows for the Martins Ferry Pumping Station are 0.394 MGD and 1.25 MGD. The existing lead/lag pumps are each 50 HP and the backup generator is a 60 KW unit. To accommodate the future 20-year design flows



using the existing force main, the pumps would have to be upsized to 150 HP and the backup generator would need to be significantly increased in size as well. Instead, we have designed the new 70 HP pumps to be able to handle short term peak flows up to 760 gpm (1.1 MGD) through the existing force main, and up to 1,078 gpm (1.55 MGD) through a new larger and shorter force main to the Manchester Sand and Gravel property.

In addition, Underwood recommends that the wet well capacity at the station be increased to prevent short cycling of the pumps during low flow periods overnight, and to accommodate new flows from the Kimball Drive Pumping Station. As a rule of thumb, the wet wells should be sized based on a filling time of 30 minutes or less at design average day flows. This would translate to 8,208 gallons at 0.394 MGD. The most cost-efficient way to accomplish this would be to provide additional wet well capacity (8,208-2,600=5,608gal) in the form of new exterior storage provided via a precast concrete tank installed immediately adjacent to the existing pumping station wet wells on the west side of the station.

For the 60% design, it has been assumed that a 10,000-gallon precast concrete storage tank would be provided as shown in the 60% preliminary drawings attached in *Appendix B (Dwg No.'s C2, P4 & P5)*. Note: For the new tanks, not all 10,000 gallons is usable given the available pump operating band.

MARTINS FERRY PUMPING STATION FORCE MAIN EVALUATIONS

During 60% design development, Underwood investigated the condition of the existing 8" CI force main via pump flow rate and discharge pressure tests at the station. The existing pumps were designed in 2006 for 738 gpm, but in early 2020 were only able to pass 525 gpm. This suggested the force main might be constricted due to heavy scale buildup. However, after a series of investigations/corrections supervised by Underwood, including testing with temporary flow meters, replacing an inoperable air relief valve on the force main, and clearing the pump discharge lines and check valves at the station, it was determined that the existing pumps can pass 650 gpm through the existing 8" CI force main.

As noted previously, the force main will require replacement in the near future to economically pass future buildout flows.



COST OPINIONS

For Contract 1, Underwood has updated the conceptual cost opinion based on the 60% design documents. The 60% design engineer's opinion of probable project cost, including the design of Contracts 2-4, but not including business constructed sewers, is \$9.27M. A breakdown is as follows:

Gravity Sewer south along Kimball Drive to Rte 3A serving Zone 1:	\$2.73M
Gravity Sewer north along Kimball Drive and cross-country in Zone 2:	\$1.54M
Kimball Drive Pumping Station:	\$2.0M
Kimball Drive Pumping Station Force Main and Vaults:	\$0.75M
Martins Ferry Pumping Station Upgrades:	\$1.5M
Contribution to Pinnacle Hill Water Main Extension:	\$0.0M
Final Design of Contracts 2-4:	<u>\$0.75M</u>
TOTAL=	\$9.27M
Business constructed sewers along Rte 3A and Technology Drive:	\$3.24M

For a more detailed breakdown of Contract 1 costs, refer to the cost opinions contained in *Appendix C*.

FUNDING

The Town has the following available and proposed funding to put towards the Route 3A Utilities Expansion Project:

Available:	
Existing Remaining Funding from HSC	\$1.2M
Existing Funding from 2019 Warrant Article	\$2.5M
Existing Funding from TIF (\$450K per year, 2018-2019)	\$0.9M
Existing Funding from TIF (\$150K per year, 2020-2022)	<u>\$0.45M</u>
Subtotal	\$5.05M
Proposed:	
Proposed Funding from 2022 Warrant Article	<u>\$2.45M</u>
Subtotal	\$2.45M
TOTAL	\$7.50M

Notes:

1. Existing 2019 Warrant Article TD Bank Loan payment is ~\$300K for 10 years (2020-2029).



- 2. Proposed 2022 Warrant Article assumes 20-yr bank loan at 2% or \$143K/yr (2023-2042).
- **3.** If the non-engineering portion of the 2019 Warrant Article loan (\$1.25M) can be refinanced to a 20-yr bank loan at 2%, then an additional \$1.2M can be borrowed with annual TIF income.



APPENDIX A

WORKPLAN DRAWINGS 1-3







APPENDIX C

COST OPINIONS

4/13/2021		Opinion of Probable Construction Cost: Hooksett Zone 1									
		Parcels Served	Linear Feet of Sewer					Number of:			Cost
		Total (TIF)	Cross Town Along Route Crossing Country Road Comments 3A Route 3A N			Manholes	Parcel Easements		Segment		
Publicly	DC 24 via Kimball	17/9)		5000			50	20	1	ć	2 720 000 00
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Constructed	To Regal	4(4)	1367	200		/50		13	L	Ş	1,170,950.00
	To NH Uncology	1(1)		300				1		Ş	150,000.00
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		Opinion (of Probab	le Consti	uction Cost	t: Hooksett 2	Zone 2				
		Parcels							-		
		Served	Linear Feet of Sewer					Num	mber of: Cost		
		Total (TIF)	Cross Country	Town Road	Comments	Along Route 3A	Crossing Route 3A	Manholes	Parcel Easements		Segment
Publicly											
Constructed	PS to 3A Quality	31(14)	1925	1200			40	18	2	\$	1,543,750.00
Privately											
Constructed	To Irving	5(5)				1300		7	1	\$	960,000.00
Future	To Gosselin Ave	7(0)					1175	5		\$	1,250,000.00

Privately Constructed Total \$ 3,238,700.00

Hooksett Rte 3A Sewer Construction Costs					
Item	Unit	Costs			
Cross Country Sewer	LF	\$350.00			
Town Road Sewer	LF	\$450.00			
Town Road Deep Sewer (>12ft)	LF	\$550.00			
US Route 3A Sewer	LF	\$650.00			
Sewer Crossing Route 3A	LF	\$1,000.00			
Manhole	each	\$15,000.00			
Bridge Crossing	each	\$200,000.00			
Parcel Easements	each	\$10,000.00			
Sewer Under the River	LS	\$750,000.00			

Hooksett Water Main Construction Costs						
ltem	Costs					
Cross Country	LF	\$250.00				
Town Road	LF	\$350.00				
Route 3A	LF	\$550.00				
Hydrants	each	\$5,000.00				
Bridge Crossings	each	\$200,000.00				
Parcel Easements	each	\$10,000.00				

*Note: Water costs assume construction is concurrent with sewer. If constructed separately, costs will be higher.

HOOKSETT, NH KIMBALL DRIVE PUMP STATION 60% DESIGN OPINION OF PROBABLE PROJECT COST

ITEM QUANTITY UNIT UNIT General Requirements (12%) 1 LS S IU Site Work Allowance 1 LS S IU Site Work Allowance 1 LS S S Parking Lot Subbase - Canabad gravel, 6", compacted 03 CY Parking Lot Subbase - Canabad gravel, 6", compacted 03 CY Parking Lot Subbase - Canabad gravel, 6", compacted 03 CY Parking Lot Subbase - Canabad gravel, 6", compacted 03 CY Parking Lot Subbase - Canabad gravel, 6", compacted 03 CY Parking Lot Subbase - Canabad gravel, 6", compacted 03 CY Parking Lot Subbase - Canabad gravel, 6", compacted 03 CY Parking Lot Subbase - Canabad gravel, 6", compacted 03 CY Parking Lot Subbase - Canabad gravel, 6", compacted 03 CY Subbase - Canabad gravel, 6", compacted 04 04 03 CY Subbase - Canabad gravel, 6", compacted 04 CA <t< th=""><th></th><th>4/9/2021</th></t<>		4/9/2021
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Slabs 20 CY \$ Foondagion 18,70 CY \$ Foundations Walls 27,00 CY \$ Wetwell separation wall 12x7.5'x0.67" and Inlet box 4.2 CY \$ Fill Concrete in Wetwell 6 CY \$ Painting Allowance 1 LS \$ Tim 1 LS \$ \$ Mandoors/Doos 5 EA \$ \$ Mandors/Doos 1 LS \$ \$ Matians 1 LS \$ \$ Static Gates 3 EA \$ \$ New Submersible Pump 1 EA \$ \$ Sink and Dehamidifie 1 LS \$ \$ FRACESS PIPING 1 LS \$ \$ Frow Submersible Pump 100 LF \$ \$ Sike Gates 3 EA \$ \$ Sike Mandobehamidifie 1 <td>29.00</td> <td>\$18,705</td>	29.00	\$18,705
rootings 18.70 CY S reundations Walls 27.00 CY S Wetwell separation will L2%7.5/x0.67° and Inlet box 4.2 CY S Painting Allowance 1 LS S T Tim 1 LS S T Mandoard/Doors 5 EA S Handrails, Beams, Miscellaneous Metals Allowance 1 LS S Charden 1 LS S T Otheral Statis 1 LS S T Grinder 1 EA S S S Soluce Cates 3 EA S S S New Submersible Pumpe 2 EA S S S New Submersible Pumpe 1 LS S S S File Lockout/legouk kit, Knoxbox 1 LS S S S File Lockout/legouk kit, Knoxbox 1 EA S S <t< td=""><td>750.00</td><td>\$15,000</td></t<>	750.00	\$15,000
Contractions 27.00 C1 3 Wetwell separation wall $12\times7.5\times0.67$ and inlet box 4.2 CY $\$$ Fill Concrete in Wetwell 6 CY $\$$ Painting Allowance1LS $\$$ Trim1LS $\$$ Mandoors/Doors $\$$ EAA $\$$ Handrails, Beams, Miscellancous Metals Allowance1LS $\$$ Wetal Stairs1LS $\$$ $\$$ Offmder152SF $\$$ \bullet Contractor Optime2EAA $\$$ State Cates3EAA $\$$ New Submersible Pumps2EAA $\$$ Alweinum floor hatches2EAA $\$$ Sink and Dehumidifie1EA $\$$ Fit, Lockout/Lapout kit, Knoxbox1LS $\$$ Process PIPING100LF $\$$ Inside PS1EA $\$$ of 'D Degree Elbows6EA $\$$ of 'D West1EA $\$$ of 'S degree elbows1EA $$$ of 'S degree elbows1EA $$$ of 'D State1EA $$$ of act cates1EA $$$ of act cates1EA $$$ of act cates1EA $$$ of 'D Veg	750.00	\$14,025
$\begin{tabular}{ c c c c c } \hline label{eq:transform} label{eq:tran$	750.00	\$27,000
Painting Allowance 1 LS \$ Trim 1 LS \$ 1 Mandoors/Doors 5 EA \$ 1 Handrails, Beams, Miscellaneous Metals Allowance 1 LS \$ 5 Diamond plate 152 SF \$ EQUIPMENT - Grinder 1 EA \$ - S Alumitum floor hatches 2 EA \$ - Sinke Gates 3 EA \$ - Sinke AD Dehumidifie 1 EA \$ - FE, Lockou/Tiggent kit, Knoxbox 1 LS \$ - FE, Lockou/Tiggent kit, Knoxbox 1 EA \$ - 6" DPipe 100 LF \$ - - 6" DY Degree Elbows 6 EA \$ - - 6" Or Degree Elbows 1 EA \$ - - 6" Stagere elbows 1 EA	750.00	\$4,500
Trim I LS S Handraits, Beams, Miscellaneous Metals Allowane 1 LS S Mandors/Doors 1 LS S Z Metal Stairs 1 LS S Z Diamond plate 152 SF S S EQUIPMENT	5,000.00	\$75,000
Mandaors/Doors 5 EA § Indurits, Beams, Miscellaneous Metals Allowance 1 LS § Metal Stairs 1 LS § T Metal Stairs 1 LS § T Metal Stairs 1 LS § T Grinder 1 EA \$ T Grinder 1 EA \$ A New Submersible Pumps 2 EA \$ S Aluminum floor bratches 2 EA \$ S Sink and Dehumidifie 1 EA \$ S FL, Lockout/lagout kit, Knoxbox 1 LS \$ S Frequent Installation Allowance (35%) 1 LS \$ S Process PIPING	5,000.00	\$5,000
riancarus, preams, miscellaneous Metais Sation 1 LS \$ Diamond plate 152 SF \$ EQUIPMENT	2,500.00	\$12,500
International I LS S Diamond plate 12 SF S EQUIPMENT	.5,000.00	\$25,000
EQUIPMENT Image: Second	75.00	\$8,500
Grinder 1 EA S Sluice Gates 3 EA S New Submersible Pumps 2 EA S Aluminum floor hatches 2 EA S Sink and Dehumidifies 1 EA S Sink and Dehumidifies 1 EA S FF, Lockout/lagout kit, Knoxbox 1 LS S Equipment Installation Allowance (35%) 1 LS S PROCESS PIPING 100 LF S 6° Di Pipe 100 LF S 6° Plug Valves 4 EA S 6° Plug Valves 4 EA S 6° Hug Valves 1 EA S 6° Hauer Fittings 2 EA S 6° Bauer Fittings 2 EA S 6° So degree elbows 1 EA S 6° Plag Valut 1	10100	\$11,100
Shuice Gates 3 EA S New Submersible Pumps 2 EA S Aluminum floor hatches 2 EA S Valve Pit Sump Pump 1 EA S Sink and Dehumidifie 1 EA S Sink and Dehumidifies 1 LS S Equipment Installation Allowance (35%) 1 LS S PROCESS PIPING	0,000.00	\$40,000
New Submersible Pump: 2 EA \$ Valve Pit Sump Pump 1 EA \$ Sink and Dehumidifie 1 EA \$ FE, Lockoutlagout kit, Knoxbox 1 LS \$ Equipment Installation Allowance (35%) 1 LS \$ PROCESS PIPING 1 LS \$ \$ for D Pipe 100 LF \$ \$ \$ 6" DD pipe 100 LF \$ \$ \$ 6" Plug Valves 4 EA \$ \$ \$ 6" Vayes 1 EA \$ \$ \$ 6" Vayes 1 EA \$ \$ \$ 6" Vayes 1 EA \$ \$ \$ \$ 6" Segree clows 1 EA \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ <td< td=""><td>8,000.00</td><td>\$24,000</td></td<>	8,000.00	\$24,000
Aluminum floor hatches 2 EA \$ Sink and Dehumidifiei 1 EA \$ Sink and Dehumidifiei 1 LA \$ FE, Lockout/lagout kit, Knoxbox 1 LS \$ Equipment Installation Allowance (35%) 1 LS \$ PROCESS PIPING	1,500.00	\$23,000
Control Sump Tamp 1 LA 3 Sink and Dehmidlifie: 1 LS \$ FF, Lockout/lagout kit, Knoxbox 1 LS \$ PROCESS PIPING 1 LS \$ Inside PS 1 LS \$ Of D1 Pipe 100 LF \$ 6" 9D Degree Elbows 6 EA \$ 6" Valves 3 EA \$ 6" Valves 4 EA \$ 6" Check Valves 3 EA \$ 6" Valves 1 EA \$ 6" Stagree elbows 1 EA \$ 6" Stagree elbows 1 LF \$ 6" da degree elbows 2 EA \$ 6" Plue for elbows 2 EA \$ 6" Plumbing Allowance 1 EA \$ 6" Humbing Allowance 1 EA \$ 6" Stagree elbows 2 EA \$ 6" Plupe	1,500.00	\$15,000 \$1,500
FE, Lockout/lagout kit, Knoxbox 1 LS \$ Equipment Installation Allowance (35%) 1 LS \$ Inside PS 1 LS \$ 1 6" DI Pipe 100 LF \$ 5 6" DI Pipe 100 LF \$ 6 6" OP Degree Elbows 6 EA \$ \$ 6" Vayes 3 EA \$ \$ 6" Vayes 1 EA \$ \$ 6" Vayes 1 EA \$ \$ 6" Sauer Fittings 2 EA \$ \$ Presure gauge assemblies 2 EA \$ \$ 6" Pauer Fittings 2 EA \$ \$ Plumbing Allowance 1 LS \$ \$ 10 degree elbows 1 EA \$ \$ 6" Page elbows 1 EA \$ \$ 6" Page elbows 1 EA \$ \$ 6" Page elbows 1 EA \$ \$ 6"	1,000.00	\$1,000
Equipment Installation Allowance (35%) 1 LS \$ 1 PROCESS PIPING	500.00	\$500
PROCESS PIPING Imside PS 6" DI Pipe 100 LF \$ 6" DD Pipe 100 LF \$ 6" Ping Valves 4 EA \$ 6" Check Valves 3 EA \$ 6" Check Valves 3 EA \$ 6" Check Valves 3 EA \$ 6" Check Valves 1 EA \$ 6" Check Valves 1 EA \$ 6" Stagree elbows 1 EA \$ Presure gauge assemblies 2 EA \$ 10mbing Allowance 1 LS \$ 10mbing Allowance 1 EA \$ 6" 9 degree elbows 1 EA \$ 6" 90 degree elbows 2 EA \$ 6" Wyes 3 EA \$ 6" Blind flange 2 EA \$ 6" Waves 6 LF \$ 6" Yat Gegree elbows 4 EA <t< td=""><td>6,750.00</td><td>\$36,750</td></t<>	6,750.00	\$36,750
Inside PS 100 LF \$ 6" DI Pipe 100 LF \$ 6" 90 Degree Elbows 6 EA \$ 6" Wyes 1 EA \$ 6" dS degree elbows 1 EA \$ Presure gauge assemblies 2 EA \$ 6" Bauer Fittings 2 EA \$ Pinmbing Allowance 1 LS \$ Inside Vault 1		
b) 11 pc 100 EA S 6" 90 Degree Elbows 6 EA \$ 6" Check Valves 3 EA \$ 6" Wyes 1 EA \$ 6" Valves 1 EA \$ 6" 45 degree elbows 1 EA \$ 6" 45 degree elbows 2 EA \$ 6" Bauer Fittings 2 EA \$ 6" Bauer Fittings 2 EA \$ 6" Bauer Fittings 2 EA \$ 6" 45 degree elbows 1 EA \$ 6" 45 degree elbows 2 EA \$ 6" Wyes 3 EA \$ 6" Wyes 3 EA \$ 6" Pipe dalves 7 EA \$ 6" Wyes 3 EA \$ 6" Baue fitting faulton fauge 6 LF \$ 6" Pipe dalves 4 EA \$ 6" Ping dalves 4 <	75.00	\$7.500
6" Plug Valves 4 EA \$ 6" Plug Valves 3 EA \$ 6" Wyes 1 EA \$ 6" Vyes 1 EA \$ 6" 45 degree elbows 1 EA \$ 6" Bauer Fittings 2 EA \$ Presure gauge assemblies 2 EA \$ 6" Bauer Fittings 2 EA \$ Plumbing Allowancc 1 LS \$ Inside Vault 1	500.00	\$3,000
6" Check Valves 3 EA \$ 6" Wyes 1 EA \$ 6" 45 degree elbows 1 EA \$ Presure gauge assemblies 2 EA \$ 6" Bauer Fittings 2 EA \$ Plumbing Allowance 1 LS \$ Inside Vault 1 1 LS \$ 6" Pige 12 LF \$ 6" 45 degree elbows 1 EA \$ 6" 90 degree elbows 2 EA \$ 6" 90 degree elbows 2 EA \$ 6" 90 degree elbows 7 EA \$ 6" Pige 1 EA \$ 6" Wyes 3 EA \$ 6" Blind flange 2 EA \$ 6" Tees 1 EA \$ 6" Pipe 6 LF \$ 6" 45 degree elbows 4 EA \$ 6" Pipe 6 LF \$ 6" 9 Lipe 6 LF \$ <td< td=""><td>1,000.00</td><td>\$4,000</td></td<>	1,000.00	\$4,000
6" Wyes 1 EA \$ 6" 45 degree elbows 1 EA \$ Presure gauge assemblies 2 EA \$ 6" Bauer Fittings 2 EA \$ Plumbing Allowancc 1 LS \$ Inside Vault 1	1,500.00	\$4,500
6" 45 degree elbows 1 EA \$ Presure gauge assemblies 2 EA \$ 0" Bauer Fittings 2 EA \$ Plumbing Allowancx 1 LS \$ Inside Vault 1	750.00	\$750
Presure gauge assemblies 2 EA \$ of Bauer Fittings 2 EA \$ Plumbing Allowance 1 LS \$ Plumbing Allowance 1 LS \$ Of Pipe 12 LF \$ Of "Pipe 12 LF \$ Of Vegee elbows 2 EA \$ Of Vege 3 EA \$ Of Wyes 3 EA \$ Of Wyes 3 EA \$ Of Wyes 3 EA \$ Of Tees 1 EA \$ Air/Vac Relief valve 1 EA \$ Inside Vault 2	500.00	\$500
D Bade Fittings 2 LA 3 Plumbing Allowance 1 LS \$ Inside Vault 1	500.00	\$1,000
Inside Valit 1 Image of the second seco	2 500.00	\$2,500
6" Pipe 12 LF \$ 6" 90 degree elbows 2 EA \$ 6" 90 degree elbows 2 EA \$ 6" Plug Valves 7 EA \$ 6" Wyes 3 EA \$ 6" Wyes 3 EA \$ 6" Blind flange 2 EA \$ 6" Teres 1 EA \$ Air/Vac Relief valve 1 EA \$ Inside Vault 2	2,000100	\$2,500
6" 45 degree elbows 1 EA \$ 6 '9 degree elbows 2 EA \$ 6" Plug Valves 7 EA \$ 6" Wyes 3 EA \$ 6" Wyes 3 EA \$ 6" Blug Valves 1 EA \$ 6" Notes 1 EA \$ 6" Tees 1 EA \$ Air/Vac Relief valve 1 EA \$ Inside Vault 2	75.00	\$900
6' 90 degree elbows 2 EA \$ 6'' Plug Valves 7 EA \$ 6'' Wyes 3 EA \$ 6'' Blug Valves 3 EA \$ 6'' Blug Valves 1 EA \$ 6'' Tees 1 EA \$ 6'' Tees 1 EA \$ Air/Vac Relief valve 1 EA \$ 1 mide Vault 2	500.00	\$500
0° Plug Valves 7 EA \$ 0° Wyes 3 EA \$ 0° Wyes 2 EA \$ 0° Tees 1 EA \$ 1 niside Vault 2 1 EA \$ 0° Pipe 6 LF \$ 0° Pipe 6 EA \$ 0° Pipe 1 LS \$ 0° Vyes 4 EA \$ 0° Blind flange 3 EA \$ Process Piping Installation Allowance (35%) 1 LS \$ YARD PIPING 10 LF \$ \$ 0° U Dipe 10 LF \$ \$ 0° U All deg bends 2 EA \$ \$ 8' SD	500.00	\$1,000
0 Wyes 3 EA 3 6" Blind flange 2 EA \$ 6" Tees 1 EA \$ Air/Vac Relief valve 1 EA \$ Inside Vault 2 1 EA \$ 6" Pipe 6 LF \$ 6" Valt 2 6 LF \$ 6" Wyes 4 EA \$ 6" Blind flange 3 EA \$ 70 Cores Piping Installation Allowance (35%) 1 LS \$ YARD PIPING 7 7 \$ \$ YaRD Alge bends 2 EA \$ \$ Yault 2 to SMH 1041 7 \$ \$ \$ 8" SDR 35 PVC 20 LF \$ \$	750.00	\$10,500
6" Tees 1 EA \$ Air/Vac Relief valve 1 EA \$ Inside Vault 2 - - - 6" Pipe 6 LF \$ 6" 45 degree elbows 4 EA \$ 6" Vayes 6 EA \$ 6" Wyes 4 EA \$ 6" Blind flange 3 EA \$ 6" Blind flange 3 EA \$ 7 Process Piping Installation Allowance (35%) 1 LS \$ 2 7 ARD PIPING - - - - - 78 Dt S Vallt 1 - <td< td=""><td>250.00</td><td>\$2,230</td></td<>	250.00	\$2,230
Air/Vac Relief valve 1 EA \$ Inside Vault 2	750.00	\$750
Inside Vault 2 6 Image: Contractor OH&P - 15% 6" Pipe 6 LF \$ 6" 45 degree elbows 4 EA \$ 6" Plug Valves 6 EA \$ 6" Blind flange 3 EA \$ 7 Process Piping Installation Allowance (35%) 1 LS \$ 2 YARD PIPING 1 LS \$ 2 YakD PIPING 10 LF \$ 5 6" JD Pipe 10 LF \$ 5 6" 45 deg bends 2 EA \$ 5 Vault 10	7,500.00	\$7,500
6'' Pipe 6 LF \$ 6'' 45 degree elbows 4 EA \$ 6'' Plug Valves 6 EA \$ 6'' Blind flange 3 EA \$ 6'' Blind flange 3 EA \$ Process Piping Installation Allowance (35%) 1 LS \$ YARD PIPING 1 LS \$? PS to Vault 1 - - 6'' D Pipe 10 LF \$ 6'' 45 deg bends 2 EA \$. . . Vault 2 to SMH 1041 - - - . . . 8'' SDR 35 45 deg PVC bends 3 EA \$. . . 8'' SDR 35 45 deg PVC bends 3 EA \$. . . Gas Unit Heaters 3 EA \$ 		
0 4 EA 5 6" Plug Valves 6 EA \$ 6" Wyes 4 EA \$ 6" Blund flange 3 EA \$ Process Piping Installation Allowance (35%) 1 LS \$ YARD PIPING 1 LS \$ 2 PS to Vault 1	/5.00	\$450
O LA 3 6" Wyes 4 EA \$ 6" Blind flange 3 EA \$ Process Piping Installation Allowance (35%) 1 LS \$ YARD PIPING 1 LS \$? Potess Piping Installation Allowance (35%) 1 LS \$? YARD PIPING 1 LS \$? ? Potess Piping Installation Allowance (35%) 1 LS \$? 6" 01 Pipe 10 LF \$? ? 6" 31 deg bends 2 EA \$? ? 8" SDR 35 45 deg PVC bends 3 EA \$? ? ? Sup 35 45 deg PVC bends 3 EA \$? ? ? Gas Unit Heaters 3 EA \$? ? ? Gas Unit Heaters 3 EA \$? ? Allowance 1 LS	1.500.00	\$2,000
6" Blind flange 3 EA \$ Process Piping Installation Allowance (35%) 1 LS \$ VARD PIPING 1 LS \$ 2 Ps to Vault 1 10 LF \$ 5 6" JD Pipe 10 LF \$ 5 6" 45 deg bends 2 EA \$ Vault 2 to SMH 1041	750.00	\$3,000
Process Piping Installation Allowance (35%) 1 LS \$ 2 YARD PIPING 10 LF \$ 5 Ps to Vault 1 10 LF \$ 5 6" DI Pipe 10 LF \$ 5 6" 45 deg bends 2 EA \$ 5 Vault 2 to SMH 1041	250.00	\$750
YARD PIPING Image: Contractor OH&P - 15% PS to Vault 1 Image: Contractor OH&P - 15% Contractor OH&P - 15% Contractor OH&P - 15%	2,347.50	\$22,348
Ps to Vault 1 Image: Contractor OH&P - 15% Contractor OH&P - 15% Contingency - 10%		
0 D1 rpc 10 L1 3 0 45 deg bends 2 EA \$ Vault 2 to SMH 1041 2 EA \$ 8" SDR 35 PVC 20 LF \$ 8" SDR 35 45 deg PVC bends 3 EA \$ Core existing SMH 1 LS \$ HVAC	150.00	\$1.500
b D	500.00	\$1,500
8" SDR 35 PVC 20 LF \$ 8" SDR 35 45 deg PVC bends 3 EA \$ Core existing SMH 1 LS \$ HVAC	500.00	\$1,000
8" SDR 35 45 deg PVC bends 3 EA \$ Core existing SMH 1 LS \$ HVAC Gas Unit Heaters 3 EA \$ Ventilation Allowance 1 LS \$ ELECTRICAL Allowance 1 LS \$ 2 Contractor OH&P - 15% Contingency - 10%	300.00	\$6,000
Core existing SMH 1 LS \$ HVAC	500.00	\$1,500
It vAC Impact Impac Impac Impac <td>2,500.00</td> <td>\$2,500</td>	2,500.00	\$2,500
Submitted J LA S Ventilation Allowance 1 LS \$ 4 ELECTRICAL 1 LS \$ 2 Allowance 1 LS \$ 2 SUBTOTAL 5 2 2 Contractor OH&P - 15% 5 2 Contingency - 10% 1 2	7 500 00	\$22.500
ELECTRICAL I LS \$ Allowance 1 LS \$ 2: SUBTOTAL Contractor OH&P - 15% Contingency - 10%	0.000.00	\$40,000
Allowance 1 LS \$ 2: SUBTOTAL Contractor OH&P - 15% Contingency - 10%	.,	\$10,000
SUBTOTAL Contractor OH&P - 15% Contingency - 10%	0,000.00	\$250,000
SUBIOIAL Contractor OH&P - 15% Contingency - 10%		e1 337 000
Contingency - 10%		\$1,327,000
Contingency - 10/0		\$199,000
TOTAL PROBABLE CONSTRUCTION COST		\$1,659,000
Admin, Engineering and Construction Services		\$331,800
TOTAL PROJECT COSTS YEAR 2021		\$1,991,000
Notes:		

N:\PROJECTS\HOOKSETT, NH\REALNUM\2447 TIF Sewer Expansion\08_Comp\Cost Opinions\2447 KDPS 60percent Cost Opinion

HOOKSETT, NH MARTINS FERRY PUMP STATION UPGRADE 60% DESIGN OPINION OF PROBABLE PROJECT COST

	1	1	1		4/9/2021
ITEM	QUANTITY	UNIT	τ	JNIT PRICE	PROBABLE COST
General Requirements (12%)	1	LS	\$	91,493.25	\$91,000
SITE Develiet Devenue Tech Coo Divine and Date	1	IC		\$5,000,00	£5.000
Demolish Propane Tank, Gas Piping and Pads	1		-	\$5,000.00	\$5,000
Site Work Allowance	1	LS	-	\$5,000,00	\$5,000
Excavation and Backfill of Wet Wel	186	CY		\$15.00	\$2,790
Sheeting and Dewatering Allowance	1	LS		\$200,000.00	\$200,000
Wet Well Subbase - Crushed gravel, 12", compacted	20	CY	\$	30.00	\$600
Parking Lot Repairs - 4" Bituminous Pavement	46	Ton	\$	120.00	\$5,520
Remove and Replace Fence	1	LS	\$	5,000.00	\$5,000
Concrete and Geotechnical Testing Allowance	1	LS	\$	2,500.00	\$2,500
Restoration allowance Precast Concrete Vault for Wet Well	1	EA EA	\$	25,000.00	\$5,000
Manhole risers and covers	3	EA	\$	750.00	\$2,250
Fill Concrete in Wetwell	6	CY	\$	770.00	\$4,620
Precast Concrete Bypass Pump Manhole	1	EA	\$	15,000.00	\$15,000
Bypass Pumping	2	MO	\$	30,000.00	\$60,000
BUILDING					
Structural Demolition	1	LS	\$	10,000.00	\$10,000
CMU Wall Repair	1	LS	\$	10,000.00	\$10,000
Painting Allowance	1		\$	5,000.00	\$3,000
New Double Door	1	EA	\$	10,000,00	\$10,000
Beams, Miscellaneous Metals Allowance	1	LS	\$	20.000.00	\$20,000
EQUIPMENT			Ŧ		+=,
Sluice Gates	2	EA	\$	8,000.00	\$16,000
New Submersible Pumps	2	EA	\$	37,000.00	\$74,000
Equipment Installation Allowance (35%)	1	LS	\$	31,500.00	\$31,500
PROCESS PIPING					
Inside PS	17	LE	¢	100.00	¢1.700
8 Di Fipe 8" 90 Degree Elbows/Elgred Ends	17	E A	¢ ¢	750.00	\$1,700
8" Phig Valves	5	FA	\$	1 500 00	\$3,000
8" 45 Degree Elbows	2	EA	\$	750.00	\$1,500
8" Tees/Coupling	2	EA	\$	1,000.00	\$2,000
8" DI Cross	1	EA	\$	1,500.00	\$1,500
8"x6" Reducer	2	EA	\$	750.00	\$1,500
6" DI Pipe	8	LF	\$	75.00	\$600
6"x4" Increaser	2	EA	\$	500.00	\$1,000
0" 90 Degree Elbows	4	EA	\$	500.00	\$2,000
6 Plug valves	2	EA	\$	1,000.00	\$2,000
6" Wyes	0	EA	\$	750.00	\$3,000
6" 45 degree elbows	0	EA	\$	500.00	\$0 \$0
Presure gauge assemblies	4	EA	\$	500.00	\$2,000
Inside Bypass Manhole					
8" DI Pipe	3	LF	\$	75.00	\$225
8"x6" Wye	1	EA	\$	1,000.00	\$1,000
8" Plug Valves	1	EA	\$	1,500.00	\$1,500
6" 45 degree elbows 6" Phys Values	1	EA	\$	500.00	\$500
6" Bauer Fitting	1	EA EA	\$ \$	500.00	\$1,000
Process Piping Installation Allowance (35%)	1	LS	\$	11.908.75	\$11,909
YARD PIPING	-		+	,	****
PS to Wet Well					
8" DI Pipe	24	LF	\$	300.00	\$7,200
8" Solid Sleeve Couplings	2	EA	\$	1,000.00	\$2,000
Core existing Wet Well	4	LS	\$	2,500.00	\$10,000
At Bypass Pump Manhole	25	LE	¢	200.00	\$10.500
o Diriping 8" Solid Sleeve Countings	33 4	E A	¢ 2	1 500.00	\$10,500
ELECTRICAL		LA	φ	1,500.00	\$0,000
Allowance	1	LS	\$	290,000.00	\$290,000
CUTING OF L			-		8000 000
Contractor OIL-D 150/			-		\$990,000
Contingency 10%			-		\$149,000
TOTAL PROBABLE CONSTRUCTION COST			+		\$1.238.000
Admin, Engineering and Construction Services					\$247,600
TOTAL PROJECT COSTS YEAR 2021					\$1.486.000
Notes:	1		I		\$1,100,000