




99 North State Street
Concord, New Hampshire 03301
Tel: 603-230-9898 Fax: 603-230-9899

Technical Memorandum

To: Bruce Thomas, Town Engineer – Town of Hooksett File: 2447.08

cc: Robert Saunders, Elizabeth Philpott, Phil MacDonald, Keith Pratt – UE

From: David J. Mercier, P.E., Senior Project Manager 

Date: Draft December 18, 2019; Final January 22, 2020

Subject: **HOOKSETT, NH – Route 3A Water & Sewer Project**
FINAL Planning Stage Technical Memorandum

BACKGROUND:

The Town of Hooksett, NH has been considering sewerage the Route 3A corridor from its intersection with Route 93 at Exit 10 to its intersection with Route 93 at Exit 11. Specifically, this study encompasses the Route 3A corridor from the Manchester/Hooksett town line to the Route 3A/Hackett Hill intersection near Exit 11. No sewer currently exists along Route 3A through this section. Manchester Water Works supplies water on the southern end and the Hooksett Village Water Precinct supplies water on the northern end with a gap in service in between.

The most recent studies have looked at the potential to provide sewer to Route 3A via a directionally drilled double-barrel force main under the Merrimack River located at the Tri-Town Ice Arena lot. This piping was actually installed in 2018. An existing gravity sewer interceptor exists on the east side of the Merrimack River that the new force main ties into just above the existing wastewater treatment facility. A new pumping station located at the Tri-Town Ice Arena lot could then collect gravity sewer flow from Route 3A from both the north and south directions.

The purpose of this study is to look more closely at the hydraulics of the above-described sewer concept utilizing NH GRANIT 2-foot contour data to determine if crossing the Merrimack River in only one location at the Tri-Town Ice Arena is best, and to establish what the preferred sewer routing would be at both ends of the project to maximize new connections and minimize total project cost.

SEWER ROUTING REVIEW:

As a first step, Underwood recommended that the project area be broken up into multiple zones to make analysis of the very large area more manageable. Working with the Town Engineer, a map was developed which segregated the area to be sewerage into three (3) zones numbered south to north. A map depicting of the extent of these zones is included in *Appendix A*.

Zone 1 consists of the areas on either side of Route 3A on the south side of the Route 93 Exit 10 exchange. **Zone 2** consists of the area immediately north of the Route 93 Exit 10 exchange on both sides of Route 3A extending north to a local highpoint at 121 West River Road (Route 3A). **Zone 3** extends from this local highpoint all the way north until the intersection with Hackett Hill Road at the Route 93 Exit 11 exchange, covering both sides of Route 3A.

Early on in the process, it was decided that Underwood should analyze each of the zones independently and appear before the Tax Increment Financing (TIF) Advisory Board in three consecutive months to present the results of our analysis. The following schedule was established:

- Present Zone 1 Alternatives to the TIF Advisory Board on August 21, 2019
- Present Zone 2 Alternatives to the TIF Advisory Board on September 25, 2019
- Present Zone 3 Alternatives to the TIF Advisory Board on October 16, 2019

NOTE: The agenda and maps presented at all three meetings are attached in *Appendix B*.

ZONE 1 ANALYSIS

On August 21, 2019, Underwood presented alternatives for sewerage the Zone 1 area to the TIF Advisory Board. Two conceptual alternatives were presented. Alternative 1 consisted of installing gravity sewer in the majority of the Zone 1 area, bringing it to a low point on Kimball Drive in the Zone 2 area, and then pumping the collected wastewater back south over the town line to an existing sewer manhole in the City of Manchester, NH for treatment and disposal. Alternative 2 consisted of installing a similar amount of gravity sewer in Zone 1, bringing it to the same low point on Kimball Drive in Zone 2, directionally drilling a new double-barrel force main under the Merrimack River, and pumping the collected wastewater to the existing Hooksett sewer collection system on the east side of the river. A summary of major components and pros/cons of the two alternatives is provided in *Table 1* below.

TABLE 1 – INITIAL ZONE 1 ANALYSIS

ALTERNATIVE 1: All Zone 1 Flow to Manchester	ALTERNATIVE 2: All Zone 1 Flow to Hooksett under River
DETAILS: <ul style="list-style-type: none"> • Properties served = 11 (all TIF) • Average daily flow at start up = ~39,000 gpd (confirm) • Conceptual Cost = \$9.25M (or \$6.25M with 20-yr \$0.2M payment to Manchester) 	DETAILS: <ul style="list-style-type: none"> • Properties served = 14 (all TIF) • Average daily flow at start up = ~39,000 gpd (confirm) • Conceptual Cost = \$8.5M

ALTERNATIVE 1: All Zone 1 Flow to Manchester	ALTERNATIVE 2: All Zone 1 Flow to Hooksett under River
PROS: <ul style="list-style-type: none"> Manchester buy-in (\$3.0M) can be paid over 20 years 	PROS: <ul style="list-style-type: none"> Keeps customers in Hooksett Does not require separate billing district for sewer Won't be subject to Manchester cost changes Eliminates need for separate pump station for Zone 2 Picks up 3 more TIF properties
CONS: <ul style="list-style-type: none"> Sends customers to Manchester Requires separate billing district for sewer Will be subject to Manchester cost changes Still need separate pump station in Zone 2 	CONS: <ul style="list-style-type: none"> May be a larger up-front cost

While the up-front cost of Alternative 1 to send Zone 1 to the City of Manchester is less expensive, Manchester requires each new community that connects to its system to purchase a minimum volume of capacity in their plant and to contribute a buy-in fee which, for Hooksett, is estimated to be in excess of \$3M. In addition to losing some autonomy by being part of a wastewater intermunicipal agreement for Zone 1, Hooksett would have to establish a separate rate structure and billing structure for Zone 1 as it would not be part of the Hooksett Sewer Commission and would require additional staff and expense to administer. For these reasons, the TIF Advisory Board determined that they would prefer to pursue Alternative 2 for Zone 1 and spend the money that would be going to the City of Manchester for buy-in on Hooksett infrastructure instead. Further, this approach will keep the maximum number of sewer users connected to the Hooksett sewer system to assist with spreading future costs out over a larger user base.

ZONE 2 ANALYSIS

On September 25, 2019, Underwood presented a conceptual plan for sewerage Zone 2 to the TIF Advisory Board. Only one alternative was presented as sewerage Zone 2 is fairly straight forward given that Zone 2 is in a low area and cannot flow by gravity to either Zone 1 or Zone 3 without being pumped. Since the option selected for Zone 1 included constructing a pump station at the low point on Kimball Drive in Zone 2, the obvious solution for Zone 2 was to collect all flow and bring it by gravity to the same pump station location. In this way, the same force main under the Merrimack River to the east side where the existing Hooksett Sewer Commission sewer collection system exists can be utilized. **Table 2** below presents the major components proposed in Zone 2.

TABLE 2 – INITIAL ZONE 2 ANALYSIS

One Alternative Developed	<ul style="list-style-type: none"> • All Zone 2 flow is directed to Zone 1 pump station • Will require controls upgrades at Martins Ferry PS and a wet well expansion • Martins Ferry PS force main may have to be upsized as TIF flows increase • Existing force main can handle initial flows from Zone 1/Zone 2. Rate of new development will drive how long before a new force main is needed.
Details for Zone 2	<ul style="list-style-type: none"> • Properties served = 45 (20 TIF) • Total linear footage of pipe = 12,000 • Average daily flow at start up = ~35,000 gpd (confirm) • Conceptual Cost = \$7.35M • Will need to decide how much of proposed pipe should be built by Town

A major discussion point of Zone 2 is how much of the area should be sewerred at this time and how much should be left for private developments to construct. It should also be noted that a new cross-country route was proposed at this time from Kimball Drive up to Route 3A adjacent to the existing public storage facility located at 101 West River Road (Route 3A). This will allow additional properties further north to be directed by gravity to Zone 2 rather than to Zone 3 as previously proposed by others.

ZONE 3 ANALYSIS

On October 16, 2019, Underwood presented conceptual alternatives for sewerred Zone 3 to the TIF Advisory Board. Given its size, Zone 3 was broken up into a Zone 3 South Project and a Zone 3 North Project, with the dividing line being the Tri-Town Ice Arena property located at 311 West River Road (Route 3A). For Zone 3 South, the concept presented consisted of running a new gravity sewer main down the shoulder of Route 3A the entire distance from the end of Zone 2 until Bayview Terrace Road, just before the Tri-Town Ice Arena property. It then followed Bayview Terrace Road down to where it would run cross-county across one private lot and onto the Tri-Town Ice Arena property to the proposed location of the new wastewater pumping station. This routing was chosen mainly as it was the most direct route to pick up the maximum number of TIF properties and also allows for the sewer main and pumping station to be as shallow as possible.

To reduce pipe installation costs, Underwood noted that the TIF Advisory Board and Town should consider the potential to install the new main in Zone 3 South through the residential zones east of Route 3A as much as possible. This would also maximize the total number of connected users and potential income on Day 1 of project completion.

For Zone 3 North, the proposed route consisted of one that follows the top of bank of the Merrimack River and the eastern shoulder of Route 3A from the proposed pumping station location to a point approximately 300 feet south of the Hackett Hill Road intersection where it would then turn 90°, cross under Route 3A, and then be installed cross-country to Hackett Hill Road and continue on to 47 Hackett Hill Road. From 47 Hackett Hill Road, only short sewer extensions would be required to pick up multiple TIF properties located further west along the Hackett Hill Road corridor.

Table 3 below presents the major components of both Zone 3 South and Zone 3 North conceptual plans.

TABLE 3 – INITIAL ZONE 3 ANALYSIS

ZONE 3 SOUTH: Tri-Town Ice Area South to Zone 2 border	ZONE 3 NORTH: Tri-Town Ice Arena North to 47 Hackett Hill Road
DETAILS: <ul style="list-style-type: none"> • Properties served = 62 (16 TIF) • Total linear footage of pipe = 9,950 • Total new pump stations = 1 • Average daily flow at start up = ~31,000 gpd (confirm) • Conceptual Cost = \$8.27M 	DETAILS: <ul style="list-style-type: none"> • Properties served = 11 (10 TIF) • Total linear footage of pipe = 6,500 • Total new pump stations = 0 (assumes station is built with Zone 3 South) • Average daily flow at start up = ~3,000 GPD (confirm) • Conceptual Cost = \$4.16M

Much discussion ensued at the October 16, 2019 TIF Advisory Board meeting relative to the total conceptual costs of all three zones being \$28.3M. The general consensus of the TIF Advisory Board and the Hooksett Sewer Commission was to focus efforts on the existing built-up areas around the Route 93, Exit 10 exchange in the Zone 1 and Zone 2 areas. However, a private development group (Supreme Industries) looking to develop a large tract of property located in the Zone 3 North area attended the September and October TIF Advisory Board meetings and expressed interest in working with the Town to install a significant amount of sewer at their cost assuming that the Town would move forward with construction of the Tri-Town Ice Arena pumping station. At the end of the meeting, the TIF Advisory Board challenged Supreme Industries to present a revised concept and amount of pipe they would be willing to install towards establishing the Zone 3 North collection system for Underwood to factor into our evaluations. The TIF Advisory Board further challenged Underwood to continue to analyze all three zones and to prepare and present on a recommended funding and sewer implementation plan at the TIF Advisory Board meeting scheduled for December 18, 2019.

ROUTE 3A WATER MAIN IMPROVEMENTS:

Existing public water service exists along a majority of the project length with the exception of a 3,650-foot gap in Zone 3 South and into Zone 2. Water service is available in Zone 1 and most of Zone 2 from the Manchester Water Works, and from the Hooksett Village Water Precinct in Zone 3 North and a large portion of Zone 3 South. Several improvements to the existing water system in the project area have been suggested by others including:

- A new water main linking the new Hooksett Village Water Precinct water tank on Pinnacle Hill cross-country to Route 3A at the Hackett Hill Road intersection
- A new section of water main extending the existing Hooksett Water Precinct water main south 3,650 feet to make an inter-municipal connection with the existing Manchester Water Works water main
- A new water main loop under the Merrimack River from the west side to the east side to provide greater redundancy and resiliency within the Hooksett Village Water Precinct distribution system

Given the high total cost of all three proposed water improvements along the Route 3A corridor, Underwood recommends the focus at this time be on the new cross-country main from the Pinnacle Hill tank first, followed by the 3,650-foot extension to interconnect with the Manchester Water Works system. Both of these improvements are important to the development of the TIF District given that the current water volumes and pressures available along Route 3A are lower than desired. Further, both the existing Hooksett Village Water Precinct main and the Manchester Water Works main are long dead end runs with no emergency water source.

A NHDES Drinking Water Groundwater Trust Fund (DWGTF) application was submitted by the Town in September 2019 for the cross-country main from the Pinnacle Hill tank to Route 3A on behalf of the Hooksett Village Water Precinct. Given that this water main is required to allow development of the TIF District in Zone 3, the TIF Advisory Board voted to consider providing \$300,000 towards the project. As the project is already fully designed, if the DWGTF decides to fund this project, it is possible that it could be constructed in 2020. The Town Council would then have to formally vote to contribute the \$300,000 toward the project.

The 3,650-foot section of water to establish an inter-municipal connection with Manchester Water Works is located mostly in the Zone 3 South area, and a little bit into Zone 2. Underwood Engineer's opinion of conceptual construction cost for this piece of water main is \$2.03M. As this water main extension is not critical, it is recommended that for economy of scale it be constructed at the same time as sewer is constructed in the Zone 3 South area.

With regard to constructing a water loop in the Hooksett Village Water Precinct System from the west side of the Merrimack River back to the east side of the river, Underwood was directed to not include an evaluation in our scope of services at this time.

Note: Additional water main improvements are recommended in Zone 3 (see Page 10 of this Technical Memorandum).

COST OPTIMIZATION:

At the October 16, 2019 TIF Advisory Board meeting, the Board requested that Underwood Engineers take a harder look at how the new sewer infrastructure proposed could be optimized to provide a functional project in each zone that would be more affordable to the community.

ZONE 1

For Zone 1 (and Zone 2) the most critical components of new sewer infrastructure would be a new wastewater pumping station at the low point on Kimball Road, a new double-barrel force main under the Merrimack River, and improvements at the existing Martin's Ferry Pump Station on the east side of the river. This infrastructure is required regardless of how many new connections are made in Zone 1 (and Zone 2).

The biggest potential area for cost reductions in Zone 1 would be to reduce the total linear footage of gravity sewer main to be constructed within the Route 3A corridor by the Town. Underwood recommends that new gravity sewer be constructed south along Kimball Drive to its intersection with Route 3A and across Route 3A. This will get new gravity sewer to within a few thousand feet of all major existing box stores such as Bass Pro Shops, Walmart, and Market Basket. In the event that stores and businesses such as these in the Zone 1 area wish to connect to the sewer, the level of investment required on their part to extend the sewer further to their own properties will be reasonable. A Work Plan for Zone 1 is included in *Appendix C* as *Drawing 1*. The plan shows not only the new infrastructure proposed for construction by the Town but also conceptual routing of extensions to the existing occupied properties in Zone 1 that could be privately funded. **Note:** It is assumed that the existing occupied properties will cooperate among themselves to allow their connections to pass through adjacent commercial properties to ultimately reach the Town's new gravity sewer. *Table 4* below presents the revised recommended sewer infrastructure for Zone 1.

TABLE 4 – ZONE 1 OPTIMIZED

Components of Zone 1 Zone 1/2 MFPS Upgrades Zone 1/2 Force Main Zone 1/2 Pump Station Zone 1 Gravity Sewer	<ul style="list-style-type: none"> • \$0.5M (Controls Upgrade and New Wet Well) • \$1.0M (KDPS to MFPS) • \$3.0M (Wet Pit/Dry Pit Station) • \$1.91M (KDPS south to Route 3A)
Details for Zone 1	Town Funded: <ul style="list-style-type: none"> • Properties served = 17 (8 TIF) • Total footage of pipe = 4,260 • Average daily flow at start up = 15,100 gpd • Connection fees at start up = \$416K Private Funded: <ul style="list-style-type: none"> • Properties served = 13 (12 TIF) • Total footage of pipe = 5,880 • Average daily flow at start up = 40,900 gpd • Connection fees at start up = \$1.1M



Martin's Ferry Pumping Station Force Main

The Martin's Ferry Pumping Station is a wet pit/dry pit station built in the 1960's. Its force main was also constructed in the 1960's and consists of approximately 8,300 feet of 8" C.I. pipe installed mostly within the PanAm Railroad bed directly along the eastern bank of the Merrimack River.

All new flow generated in Zone 1/Zone 2 is proposed to be pumped under the Merrimack River from west to east via the proposed Kimball Drive pumping station and force main and then through the Martin's Ferry pumping station force main. This could be accomplished in two ways: one would be to discharge the force main of the Kimball Drive pumping station to the gravity sewer upstream of the Martin's Ferry pumping station; the second would be to make a direct connection between the Kimball Drive pumping station force main and the Martin's Ferry pumping station force main such that the Kimball Drive station could pump all the way to the end of the Martin's Ferry force main on its own. The second option would require coordination between the two stations so they were not called to run at the same time.

An initial review of the Martin's Ferry Pumping Station flow data revealed that the pumps, while capable of pumping in excess of 500 gallons per minute, were in fact being limited to closer to 400 gallons per minute. As this was effectively throttling the capacity of the station and forcing it to run longer than it would need to, Underwood worked with Hooksett Sewer Commission (HSC) staff to modify the operational settings so that the pumps can go to full speed when needed. This will need to be monitored through the wet season of 2020 but it is anticipated that it will result in the pumps running significantly less than they have in the past. The major issue identified at the Martin's Ferry Pump Station is an extremely small wet well capacity which, if increased, will provide longer periods of time between necessary pumping cycles. This could be done to accommodate coordination with the proposed Kimball Drive pumping station such that they could share the same force main.

It should be noted that the HSC has been wanting to replace/upsized the Martin's Ferry Pumping Station force main for some time. The requirements of the PanAm Railroad have become increasingly stringent which will affect the eventual cost of replacement of this pipeline. Given that there have been no issues reported with the operation or condition of the existing force main and the fact that the generally expected useful life of a cast iron main is one hundred years, this puts the existing main slightly over half its useful life with a potential forty years remaining.

As a rule of thumb, designs exceeding a ten foot per second velocity within a force main should be avoided due to high head losses and resultant power costs. For the existing eight-inch force main, this would mean peak hourly flows exceeding 2.26 million gallons per day (mgd). Based on historical data provided by the HSC, the current annual average flow of the Martin's Ferry Pumping Station is 0.4 mgd, with a maximum day flow of 0.6 mgd. With the average day to max day peaking factor being so low, it suggests that infiltration and inflow (I/I) is not a huge factor at this station and that there is still room for growth if a larger wet well, larger pumps, and a larger backup generator were provided.

In order to maximize the useful life of the existing force main, Underwood recommends that additional wet well capacity be constructed at the Martin's Ferry Pumping Station and that the

proposed Kimball Drive Pumping Station force main be tied into the existing force main downstream of the Martin's Ferry Pumping Station in a easily accessible and serviceable building with at-grade access to avoid confined space entry. This would allow the full capacity of the force main (2.26 MGD) to be utilized by both the Martin's Ferry collection basin and the Kimball Drive collection basin, provided that sufficient wet well capacity and coordination of the two pumping stations run times are performed. This will require additional evaluation during the design stage of the project.

ZONE 2

Similar to Zone 1, in Zone 2 the most critical new infrastructure is the new pumping station at the low point on Kimball Drive, the double-barrel force main under the Merrimack River, and improvements to the existing Martin's Ferry Pumping Station. The greatest opportunity for cost reduction is building less gravity sewer in Route 3A and the major existing paved roads serving the developed and undeveloped properties in Zone 2. Underwood Engineers recommends that the only sewer to be constructed by the Town within Zone 2 be along Kimball Drive to the north of the new pumping station and then cross country to the west along the property line bordering the self-storage facility to and across Route 3A. Based on a review of available planning board documents made available by the Town for the existing developed properties in Zone 2, it should be possible for all of the properties in Zone 2 located along Quality Drive to connect to this proposed sewer pipe by gravity, and most of the properties could connect via cross country services if they are willing to cooperate with one another. Those properties near Technology Drive could connect by private funded short sewer extensions. The Work Plan attached in *Appendix C* entitled *Drawing 1* depicts the proposed sewer for construction by the Town and also conceptual extensions to each of the developed properties' service connections. *Table 5* below presents the revised recommended sewer infrastructure for Zone 2.

TABLE 5 – ZONE 2 OPTIMIZED

Components of Zone 2 Zone 1/2 MFPS Upgrades Zone 1/2 Force Main Zone 1/2 Pump Station Zone 2 Gravity Sewer	<ul style="list-style-type: none"> • Included in Zone 1 • Included in Zone 1 • Included in Zone 1 • \$1.77M (KDPS north to Route 3A)
Details for Zone 2	Town Funded: <ul style="list-style-type: none"> • Properties served = 19 (9 TIF) • Total footage of pipe = 4,080 • Average daily flow at start up = 10,300 gpd • Connection fees at start up = \$285K Private Funded: <ul style="list-style-type: none"> • Properties served = 5 (5 TIF) • Total footage of pipe = 1,200 • Average daily flow at start up = 4,800 gpd • Connection fees at start up = \$132K

ZONE 3

The most critical piece of new sewer infrastructure in Zone 3 would be a new wastewater pumping station located at the Tri-Town Ice Arena property and connected to the existing double-barrel force main underneath the Merrimack River to existing gravity sewer on the east side of the river.

Zone 3 is a different animal than Zone 1 & Zone 2. The TIF properties in Zone 3 are unoccupied for the most part and a greater volume of residential properties exists than in Zone 1 and Zone 2. In particular, Zone 3 South is a very large zone, and as it is located in the middle of the Route 93 Exit 10 and Exit 11 interchanges, the likelihood for significant new commercial development is lower than in Zone 3 North. For these reasons, Underwood recommends that the first phase of infrastructure construction in the Zone 3 area be Zone 3 North.

For Zone 3 North, Underwood recommends constructing gravity sewer south from the pumping station through the first two residential areas on the east side of Route 3A, then up Meadowcrest Road to Route 3A, and north on Route 3A to Cross Road. It is recommended that private developers pay for sewer extensions up Cross Road to the 17/31 Cross Road property line, and then cross-country through NHDOT property and Supreme Industries property all the way north to Hackett Hill Road, within a short distance of multiple TIF properties. Not only will constructing sewer in the residential areas and cross-country areas be less expensive than constructing sewer in Route 3A, this routing will ensure there are multiple connected users at the point of construction completion.

For Zone 3 South, all pipe is proposed to be gravity sewer from Meadowcrest Road south to 124 West River Road (Route 3A).

Table 6 below presents the revised recommended sewer and water infrastructure for Zone 3 North and South. **Note:** **Table 6** contains an entry for new water main from the Tri-Town Pumping Station (TTPS) to Cross Road which was added on January 7, 2020 after a joint meeting between the Town, HSC, and HVWP. Work Plans are included in **Appendix C** as **Drawings 2 and 3**.

TABLE 6 – ZONE 3 OPTIMIZED

Components of Zone 3 North	
Zone 3 N/S Pump Station	• \$3.0M (Wet Pit/Dry/Pit Station)
Zone 3 N Gravity Sewer	• \$2.44M (TTPS to Cross Road)
Zone 3 N Water	• \$1.30M (TTPS to Route 3A)
Zone 3 N Water from Pinnacle Hill tank	• \$0.3M (recommended Town contribution to project)
Components of Zone 3 South	
Zone 3 S Gravity Sewer	• \$3.82M (Meadowcrest Road to 124 West River Road)
Zone 3 S Water Interconnection	• \$2.03M (Sunrise Boulevard to Dunkin Donuts)

Details for Zone 3 North	Town Funded: <ul style="list-style-type: none"> • Properties served = 32 (3 TIF) • Total footage of sewer pipe = 4,440 • Average daily flow at start up = 10,400 gpd • Connection fees at start up = \$285K Private Funded: <ul style="list-style-type: none"> • Properties served = 28 (23 TIF) • Total footage of sewer pipe = 11,880 • Average daily flow at start up = 6,100 gpd • Connection fees at start up = \$168K
Details for Zone 3 South	Town Funded: <ul style="list-style-type: none"> • Properties served = 47 (11 TIF) • Total footage of pipe = 5,700 • Average daily flow at start up = 14,400 gpd • Connection fees at start up = \$396K

WATER

It should be noted that relative to water main improvements, Underwood recommends that the cross-country water main extension from Pinnacle Hill down to Route 3A be performed with the Zone 1 and Zone 2 sewer work (Phase 1 and Phase 2 projects). The Phase 3 project in Zone 3 North should include 4,020 feet of new water main from TTPS to Route 3A. The Phase 4 project should include the 3,650-foot water main extension in Zone 3 South to make the interconnection with Manchester Water Works.

BASIS OF DESIGN:

In order to properly size the new wastewater pumping stations and gravity sewer mains in the Route 3A corridor, it is necessary to evaluate the potential sanitary waste flows that would be created both at initial startup and at the point of full build out. Underwood worked with the Town and with the Southern New Hampshire Regional Planning Commission to create a spreadsheet summarizing all existing lots along the proposed sewer in each zone including their current status and zoning potential. Based on this information, projected sanitary waste production volumes were assigned to each lot based on a combination of criteria including existing water meter data from Manchester Water Works, zoning criteria, and required design flow rates as per NHDES ENV-WQ 1022.28 (see *Appendix D*). Based on those calculations, a summary of the projected flows after initial construction and at full build-out were compiled for each of the zones (see *Table 7* below).

TABLE 7 – ROUTE 3A SEWER BASIS OF DESIGN FLOWS

Zone	Initial Flow Avg Day (GPD)	Initial Flow Peak Hour (GPD)	Build-out Flow Avg Day (GPD)	Build-out Flow Peak Hour (GPD)
Zone 1	56,000	336,000	187,000	935,000
Zone 2	17,000	102,000	37,000	222,000
Zone 3 North	37,000	222,000	311,000	1,430,600
Zone 3 South	15,000	90,000	65,000	390,000

Note: Peak hour flows to be confirmed

From **Table 7**, the average day and peak hour build-out design flows for the Kimball Drive Pumping Station serving Zone 1 and Zone 2 are 0.224 mgd and 1.16 mgd, and the average day and peak hour build-out design flows for the Tri-Town Ice Arena Pumping Station serving Zone 3 are 0.376 mgd and 1.82 mgd. **Note:** Not all properties in the zones were included in this build-out projection.

PROJECT FUNDING ASSESSMENT:

OUTSIDE FUNDING

The most common sources of outside funding for municipal water and sewer projects are as follows:

- NH Dept. of Environmental Services Clean Water & Drinking Water State Revolving Loan Funds (SRF)
- NH Dept. of Environmental Services Wastewater State Aid Grant Program (SAG)
- NH Dept. of Environmental Services NH Drinking Water and Groundwater Trust Fund Program (DWGTF)
- NH Community Development Finance Authority (CDFA) Community Development Block Grant Program (CDBG)
- US Dept. of Agriculture Rural Development Funding Program (RD)
- US Economic Development Administration Funding Program (EDA)

Underwood has investigated the potential to use of each of these sources for funding the Hooksett Route 3A Sewer and Water Expansion Project. Unfortunately, we have found that the Town is not eligible for CDBG or RD funds due to total population and median household income. Further, through working with the Southern NH Regional Planning Commission, we have learned that the project is not eligible for EDA funding at this time, but may become eligible in the future (2-3 years). Thus, the outside funding focus must be on the NHDES SRF, SAG, and DWGTF programs.



The SRF Program does offer some principal forgiveness; however, user rates must be a significant percentage of median household income and the forgiveness amounts vary on an annual basis. With interest rates currently as low as 2.0% (1.704% for water), SRF should be a major component of any funding package utilized by the Town of Hooksett for this project.

The SAG Program, which is currently unfunded but has occasionally been funded to some degree in recent years, has the potential to contribute 20% to 30% grant funds towards all eligible wastewater work. We highly recommend that all bidding documents be prepared in compliance with the SAG program's rules so that eligibility will be maintained if the program is funded to some degree in the future.

We also recommend that the DWGTF program be pursued. Although they do offer fairly low interest loans, they require that a community apply for SRF funding first. If significant need is shown and multiple sources of funding have been utilized, it is possible a grant could be obtained through this program for needed water infrastructure.

To date, the Town has submitted pre-applications to both the Clean Water & Drinking Water SRF programs and also an application to the DWGTF program, specifically for the cross-country water main extension from the Pinnacle Hill tank down to the existing water main on Route 3A. The CWSRF pre-application did not score high enough to make the funded list as the monies were not proposed to be spent this year (2019). The DWSRF pre-application was denied as the Town cannot apply on behalf of the Hooksett Village Water Precinct who is the owner of the utility. The DWGTF application was not funded in the general round, but will be considered as a stand-alone application in January/February 2020.

While the initial results of pre-applications to these programs were unsuccessful, Underwood highly recommends that the Town re-apply for all of these programs again in 2020 with a definitive plan and definitive schedule for construction as outlined in this memo.

LOCAL FUNDING

The single largest source of local funding for construction of water and sewer utilities along the Route 3A corridor will be funds generated by the Tax Increment Financing District or TIF District. Currently the annual revenue being raised by the TIF District is approximately \$450,000 per year which will continue to increase as property values increase. The second largest source of local funding comes from the Hooksett Sewer Commission who has committed \$2,000,000 to the project. To date, \$0.8M of that money has been spent on installing the double -barrel force main under the Merrimack River at the Tri-Town Ice Arena location, and the remainder of the money is available for use on future aspects of the project. The remaining funding will have to be generated through a combination of private funded sewer, new user connection fees, or contributions from the tax base.

Before beginning any construction, it should be confirmed that fees being charged to new users are appropriate. Toward that end, Underwood recommends that the Hooksett Sewer Commission and Hooksett Village Water Precinct consider implementing a three-part fee system for new users



consisting of 1) a tap fee, 2) a system development fee, and 3) a betterment fee. An explanation of each type of fee and how it is recommended to be applied is included in *Appendix E*.

NOTE: Tap fees and system development fees can only be charged to developed properties but betterment fees can be charged to undeveloped properties and as such provide a source of income in the initial years of investment with the hopes that the TIF properties become developed and bring in additional revenue over time.

At this time, the HSC has a combined tap fee and system development fee of \$6,200 per every 225 gpd or \$27.56/gpd. The HVWP has a combined tap fee and system development fee of \$6.00/gpd. Neither entity has a betterment fee at this time.

RECOMMENDED FUNDING APPROACH

Underwood recommends Hooksett expand sewer/water utilities to the Route 3A corridor in four phases as follows:

- Phase 1 – Zone 1 Optimized plus Pinnacle Hill tank water extension - \$6.71M
- Phase 2 – Zone 2 Optimized - \$1.77M
- Phase 3 – Zone 3 North Optimized plus Water (TTPS to Route 3A) - \$6.74M
- Phase 4 – Zone 3 South Optimized plus Water Interconnection - \$5.85M
- **TOTAL PROJECT COST = \$21.07M**

It makes sense that the first project be one that fits within the budget that can be afforded based on TIF income and the remaining HSC contribution which is as follows:

- \$1.2M from HSC
- \$2.25M from TIF (\$450K per year 2018-2022)
- \$2.5M from passed warrant article (2019) – Get CWSRF loan in 2020 at \$153K/yr for 20 years; paid by annual TIF income
- \$4.85M from new warrant article (2021) - Get CWSRF loan in 2021 at \$297K/yr for 20 years; paid by annual TIF income
- **TOTAL FUNDING = \$10.8M**

This funding will allow the Town to build the Phase 1 and Phase 2 projects plus have \$2.32M available towards Phase 3. Phase 3 could then be done after another \$4.42M is raised via connection fees and perhaps EDA funding if the project becomes eligible in the next 2-3 years. Refer to *Appendix D* for potential connection fee income.

A second option should the Town wish to construct all four phases at once is to pay for additional CWSRF loan utilizing annual income from the tax base as follows:

- Hooksett 2019 Valuation = \$2,010,089,370 (with TIF taken out)
- Based on current CWSRF loan rates, every \$1.0M borrowed would result in \$0.03/\$1,000 on the tax rate



- Based on a shortfall of \$10.27M (\$21.07M-\$10.8M), the tax rate increase would be \$0.31/\$1000

Regardless of what option is chosen, Underwood recommends that the Town enter into agreements with the key properties in each zone that will contribute the most flow and the most in connection fees before the Town funded sewer is built. It will be critical to have commitments from each of these entities who will need to fund private sewer to connect to the Town built system once it is complete. If these cannot be obtained, the Town should revise this plan to build new sewer where the highest level of interest exists and where upfront agreements can be obtained to lock in key connections.

SCHEDULE:

A recommended schedule for implementation of the first major project is included in *Appendix F*.

CONCEPTUAL TRAFFIC CONTROL PLAN:

During the development of the Scope and Fee for the Planning and 30% Preliminary Design stages of this project, it was assumed that a great deal of the construction would occur directly along Route 3A, which is a heavily travelled way especially during the weekend and holiday periods. Now that optimized sewer routing has been identified and only a small amount will be constructed within the Route 3A ROW until Phase 4 (Zone 3 South), there is no need to develop a traffic control plan at this time.

NHDOT DISCUSSIONS:

Underwood and the Town have requested a meeting with the NHDOT District 5 group in order to investigate the potential for joining forces with NHDOT for the work to occur within the Route 3A ROW which could allow for economies of scale if roadway improvements and new utilities are constructed at the same time. There is also the potential for some DOT state and federal funding to be contributed to roadway reconstruction, and the potential for widening of the paved area along Route 3A for improved safety and potential addition of a bicycle lane. To date, NHDOT has not agreed to a date for the requested meeting. Currently there is no money in the NHDOT Ten-Year Highway Plan for improvements to this section of Route 3A. However, the need for a traffic study at the northern end of the project has been discussed.

Underwood has also requested a response from District 5 as to how much of the Route 3A corridor within the project area is considered to be LAROW or CAROW, and whether there is a need for the Town to execute a Use and Occupancy Agreement with NHDOT for construction of new utilities in the NHDOT right-of-way in the project area. Underwood has also initiated discussions with NHDOT relative to the Town obtaining easements to cross two NHDOT-owned lots in Zone 3 North with sewer and water utilities.

SURVEY:

As part of the planning and development stage of this project, Underwood retained the services of Doucet Survey to work in conjunction with Eastern Topographics to obtain aerial photography and



convert it to topographical survey for the areas within Zones 1, 2 & 3 where new sewer and water mains are proposed. This work is being supplemented with ground survey to establish control and also wetlands delineation along the prospective new sewer and water main routes. These topographical plans will be utilized for further definition of the sewer routing, development of pipeline profiles, and refinement of the engineer's cost opinions in the next phase (30% Preliminary Design Engineering).

SUBSURFACE EXPLORATION:

As part of the planning and development stage of this project, Underwood also retained R.W. Gillespie & Associates to perform subsurface exploration in the form of borings along the water and sewer utilities routes proposed in Zones 1, 2 and 3. A geotechnical report is pending. The results of this report will be utilized in the next phase (30% Preliminary Design Engineering) to refine methods and costs for utility construction, dewatering efforts, and concrete foundation design for the Kimball Drive Pumping Station.

ENVIRONMENTAL ASSESSMENT AND PERMITTING INVESTIGATIONS:

Given that the long form NHDOT Trench Permit will likely be required for this project, Underwood is currently in the process of contacting the following agencies relative to the presence of cultural resources and endangered plants and animals in the project area:

- US Fish and Wildlife (USFWS)
- Natural Heritage Bureau (NHB)
- NH Fish and Game (NHF&G)
- NH Division of Historical Resources (DHR)

A search of the USFWS Federal IPaC species list indicates the possible presence of two threatened species – the northern long-eared bat (statewide), and the small-whorled pogonia. It is unlikely this project will have an impact on the bat population, since minimal tree clearing is anticipated. At this stage in design, it is unknown if there will be any impacts to areas that could contain habitat that would support the growth of the small-whorled pogonia. This will be addressed as the design progresses.

An online database check of threatened and endangered species and critical habitats was submitted to NHB and NHF&G. There are threatened and endangered plant and animal species within and just outside of the project area. NHB and NHF&G have requested consultation and plans as the routes are solidified and design progresses. Progress plans will be sent to them once available for their review and comment.

Preparation of a Section 106 Request for Project Review (RPR) application package is underway, and will be submitted to DHR soon. There is a cemetery on Route 3A near Sunrise Boulevard. Archaeological monitoring during construction will be required by State law for any excavation within 25' of the cemetery.

NH Granitview mapping was used to search for invasive plant species and floodplains.

- Invasive Species - It appears there are invasive plant species along the edge of the Merrimack River. As design progresses and it appears that disturbance areas will impact known invasive species, the Conservation Commission will be consulted.
- While it appears the floodway of the Merrimack River is contained within the banks, areas of the project run through the flood zones of the Merrimack River and Brickyard Brook. Any sewerage facilities within those areas will follow the Hooksett Floodplain Development Ordinance and will be designed per applicable standards.

There is an area of Prime Wetlands within the project area, to the south of Hackett Hill Road near Saw Hill Road. At this time, no disturbance to the wetland or within the 100' buffer is anticipated.

An online search was also conducted through the NHDES OneStop data mapper for known remediation sites in the project area. Only one open, active remediation site exists within the project area. In Zone 1, a gas station, currently Mr. Gas, had a leaking underground storage tank in 2000. This active NHDES file appears close to closure, as there have been no contaminants above the AGQS detected within the past 2 sampling rounds. The latest correspondence from NHDES indicated that once there are 3 sampling rounds in a row with no contaminants above the AGQS, the file will be closed. At this point, no issue with contaminated soil in this area is anticipated.

With regards to permitting, Underwood anticipates that all projects in this area will require a Shoreland Protection Permit and some a Wetlands Permit. Due to the total anticipated area of disturbance, it is likely that an Alteration of Terrain Permit will also be required. This will be confirmed during the 30% Preliminary Engineering Design stage.

A Phase IA Archaeological Assessment was also done for the total project area. The Project Summary from this report is included in *Appendix G* of this memo. In summary, the report concludes that a Phase IB Archaeological Assessment needs to be performed wherever pipe and buildings are proposed to be installed outside of the existing disturbed roadway and east of Route 3A between the road and the Merrimack River. The Phase IB Assessments will be performed during the 30% Preliminary Engineering Design Phase.

RECOMMENDATIONS:

1. The Town should fund the design of all proposed sewers in roads and cross-country sections that will be turned over to Town. Includes all purple, green and pink lines shown on the *Appendix C* drawings dated 1/8/20.
2. The construction of all purple and green lines should be paid for by Town and all pink lines should be paid for with private funds.
3. The Town should contribute \$0.3M towards the necessary water main construction from Vista Drive to Route 3A. The Town should also support working with Supreme Industries as a funding partner on this water main.
4. The design of the two other water main extensions should be paid for by the Town. The construction should be paid for by the HVWP and Town jointly; split to be determined.

5. The Town should contact/meet with all existing occupied property owners in Zones 1/2/3 to determine who wishes to connect.
6. The Town should pursue a CWSRF loan in June 2020 to refinance the current \$2.5M bank loan.
7. The Town should target completion of Phases 1 and 2 at Exit 10 as the first project for \$8.48M in 2021-2022. This will require a warrant article and second CWSRF loan in 2021.
8. The Town should enter into Agreements with each commercial entity looking to connect and whom will be responsible for paying for sewer that will be turned over to the Town. Agreements would establish connection fees and if reimbursement of construction costs is applicable.
9. The second project, Phase 3 North at Exit 11, should follow completion of the first project. The third project, Phase 4, between Exits 10 and 11, should be pursued upon availability of funding.