

**Richland/Sandy Creek Joint Water Project**

**Town of Richland & Town of Sandy Creek  
Oswego County, New York**

**Preliminary Engineering Report**

**August 2016**



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Town of Richland & Town of Sandy Creek, Oswego County, New York

Preliminary Engineering Report

August 2016

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## Table of Contents

<u>Section</u>	<u>Page</u>
1.0 Introduction	1
2.0 Existing Facilities	2
3.0 Public Water Needs	4
4.0 Target Service Area	9
5.0 Service Area Municipal Water Demand	10
6.0 Source of Supply	12
7.0 Proposed Facilities	13
8.0 Project Financing	16
9.0 Environmental Review	21
10.0 Agricultural Districts	23
11.0 Smart Growth	24
12.0 Conclusions and Recommendations	25

### Exhibits

Exhibit A	Proposed Facilities Figure 1: Project Location Map Figure 2: Proposed Facilities
Exhibit B	Survey and Results Figure 3: Survey Results
Exhibit C	Public Water Systems Within Service Area
Exhibit D	Hydraulic Modeling Figures 4a,4b,4c: Hydraulic Model
Exhibit E	Budgetary Project Cost Estimate
Exhibit F	Figure 5: Agricultural Districts
Exhibit G	Figure 6: Land Cover Types
Exhibit H	Figure 7: FEMA Flood Zones
Exhibit I	Figure 8: Wetland Locations
Exhibit J	Project Endorsements

## **1.0 Introduction**

In May, 2016 the Sandy Creek Town Board commissioned this study to evaluate the possibility of providing residents within the Town of Sandy Creek and the Town of Richland with safe drinking water. The Towns of Sandy Creek and Richland are located in Oswego County, New York along the eastern shore of Lake Ontario. A location map is included in Exhibit A.

Target service areas were identified based on evaluation of water interest survey results, aerial mapping, population densities, health department records, existing and planned water main routes in the Towns of Richland and Sandy Creek, as well as through discussions with the Town Boards of both Richland and Sandy Creek. Interest survey results indicate a strong demand for municipal water supply, including Public Water Systems in need.

Potential sources of water supply were identified and evaluated and water demands were projected. Preliminary sizing and layout of the water system (hereafter referred to as Richland/Sandy Creek Joint Water Project) was prepared and associated costs were estimated. Consideration was given to potential funding sources for the project, and user costs were estimated based on the most likely funding scenario. This report is intended to be used to seek initial consideration from funding agencies and to present the proposed project to the public.

## 2.0 Existing Facilities

The Towns of Richland and Sandy Creek have recently completed construction of Eastern Shore Water System – a joint water project that delivers clean, safe drinking water and fire protection services to over 1,500 residents and businesses. The project constructed over 40 miles of water main, one (1) 175,000 gallon elevated water storage tank, a disinfection and chlorine metering station, several pressure control valves, and further development of the Town of Richland’s Schoeller Well Field. The Eastern Shore Water System is comprised of the Town of Richland Water District No. 3, and the Town of Sandy Creek Water District No. 1. Richland WD3 serves areas in along Maltby Road, Canning Factory Road, Springbrook Road, State Route 3, Rainbow Shores Road, Centerville Road, and several other roads in the Town of Richland. Sandy Creek WD1 primarily serves areas around South Sandy Pond and North Sandy Pond, as well as areas along State Route 3 and Tryon Road in the Town of Sandy Creek.

Collectively, the Town of Richland has four (4) water districts consisting of approximately 65 miles of water mains, five (5) automated control valve stations and two (2) 150,000 gallon elevated steel water storage tanks. Potable water is provided via the Fernwood Well Site and the Schoeller Well Site with a combined, permitted capacity of 1,281,600 gallons per day (Water Supply Permit 7-3550-00257). Water is provided via four (4) wells on the Schoeller Well Site and two (2) wells on the Fernwood Well Site. These facilities are all relatively new and in good condition.

The Town of Sandy Creek has two (2) water districts consisting of approximately 25 miles of water mains, a metering and re-chlorination station and a 175,000 gallon elevated water storage tank. Water is supplied to the Town of Sandy Creek WD1 via the Town of Richland. Water is supplied to the Town of Sandy Creek WD2 via the Villages of Sandy Creek and Lacona.

The existing water systems and service areas are shown in Figure 2. Residents outside of the aforementioned water systems are generally supplied water via private wells, although some privately owned water systems exist, which will be discussed later in Section 3.0.

### **3.0 Public Water Need**

#### Town of Richland

While the Town of Richland has successfully completed four (4) water districts serving a large portion of the Town residents and businesses with public water, there remains a great deal of unmet water supply need in the Town. A Town-wide general interest survey was conducted in 2015 to canvass the properties in the Town on private wells. 330 survey responses were received, with 46% of the returned surveys were in favor of public water. Results of the interest survey are included in Exhibit B.

In addition to the demonstrated unmet water supply need, water is supplied to a great portion of the existing Richland and Sandy Creek Water Districts from the Schoeller Well Site through a 50-year old epoxy lined asbestos cement transmission main along the CSX railroad that was acquired by the Town with the purchase of the well site in 2008. While the transmission main is in good shape, it is the backbone and single point of connection from the Schoeller Well Site to the distribution systems. A redundant water main from the Schoeller Well Site would allow for future maintenance and repairs of the existing transmission main without having to be concerned about the source of supply during the repairs.

#### Town of Sandy Creek

Completion of Water District Nos. 1 and 2 spurred interest in furthering the public water supplies in the Town of Sandy Creek as well. A Town-wide general interest survey was conducted in 2015. The survey and results are included in Exhibit B. 701 survey responses were received. Of the returned surveys, 53% were in favor of public water. After further evaluation of the surveys, it was determined that residents along

and adjacent to the Sandy Pond area were generally more in favor of public water than residents in areas between Sandy Pond and the Village of Sandy Creek. There is generally little interest in public water supply east of Interstate Route 81.

Upon refining the service area of the Richland/Sandy Creek Joint Water Project with respect to need and engineering feasibility, 76% of residents within the proposed service area are in favor of public water. The surveys also revealed numerous properties along the proposed water system service routes that have low capacity, insufficient yielding, foul smelling, or contaminated private wells. A summary of the survey results from those residing along the proposed Richland/Sandy Creek Joint Water Project route is as follows:

- 182 (18%) occasionally run out of water
- 52 (5%) report their well as being or having been contaminated
- 207 (20%) claim their well has poor taste
- 434 (42%) are concerned about fire protection

#### Public Water Systems In Need

The proposed Richland/Sandy Creek Joint Water Project would provide water to the following public water systems:

- Greene Point MHP & Marina, LLC
- The Elms Golf Club Restaurant
- Sandy Pond Beach, Inc.
- Sandy Island Beach State Park
- Charlottes Pizza
- John and Suz's Motel & Diner

In all, these Public Water Systems represent a service population of 1,125. It should be noted that while two (2) of these are RV campgrounds, their residents often live on the premises for six (6) months or more per year. U.S. EPA records for these Public Water Systems are included in Exhibit C.

#### Greene Point MHP & Marina, LLC

Greene Point MHP & Marina, LLC (Greene Point) operates a campground/ Recreation Vehicle (RV) Park located at the northern portion of the proposed Richland/ Sandy Creek Joint Water Project in the Town of Sandy Creek (PWSID NY3721195). Greene Point has 138 campers and trailers on the campground in four (4) different areas that receive water service. The campers are primarily immobilized with long-term and repeat tenancy while the park is in operation. Additionally there are several private properties that surround the campground, six (6) of which are provided water from the Greene Point water system. The Greene Point water system provides water to all of its water system customers generally from April 15<sup>th</sup> through October 15<sup>th</sup>. After about October 15<sup>th</sup>, service is shut-off to all users except the park store for the Winter. According to NYSDOH/USEPA records, Greene Point serves a total population of 440. One (1) surface water well supplies the water source to a water treatment building where water is treated with membrane filters, Ultraviolet Treatment and chlorine disinfection. There is redundancy with well pumps, membrane filters, UV treatment equipment and chemical feed pumps; however, there is a single hydropneumatic tank and the source and distribution piping are not redundant. The distribution system of the PWS generally consists of shallow piping with various depths, diameters (mostly 1.5-inch and less) and materials. The PWS is operated by the owners of Greene Point Marina.

### Elms Golf Club Restaurant

Elms Golf Club Restaurant is located on a golf course near North Sandy Pond in Sandy Creek (PWSID NY3706749). They operate during the April to October vacation season. The Restaurant water supply is groundwater under influence of surface water serving a population of 200. Water is treated with membrane filters and UV treatment.

### Sandy Pond Beach, Inc.

Sandy Pond Beach, Inc. operates a campground/RV park located on County Route 15 adjacent to Sandy Island Beach State Park, in Sandy Creek (PWSID NY3702043). Sandy Pond Beach, Inc. has a groundwater source and serves a population of 200 seasonal residents.

### Sandy Island Beach State Park

Sandy Island Beach State Park is a NYSOPRHP State Park located on County Route 15 in the Town of Sandy Creek (PWSID NY3713442). Sandy Island Beach State Park has a groundwater source and serves a transient population of 200 people according to NYSDOH and USEPA records.

### Charlottes Pizza

Charlottes Pizza is a restaurant located on NYS Route 11 in the Town of Sandy Creek (PWSID NY3730180). They operate year round and serve many customers between the Town of Sandy Creek and Town of Richland. The restaurant water supply is ground water, serving a population of 25.

John and Suz's Motel & Diner

John and Suz's Motel & Diner offers lodging and dining on NYS Route 3 in the Town of Sandy Creek (PWSID NY3719777). The water supply is ground water, serving a population of 60.

#### **4.0 Target Service Area**

The Target Service Area of the proposed Richland/Sandy Creek Joint Water Project was developed to provide public water to residents, businesses and existing public water supplies that are in need of and desire public water as discussed above in Section 3.0. The proposed Richland/Sandy Creek Joint Water Project would also allow for and promote future inter-municipal water system connections. The proposed facilities include a redundant 12-inch transmission main to provide redundancy for the existing 14-inch transmission main which supplies water to the system(s) from the Schoeller Well Site. Additionally, the proposed new water main along County Route 62, Hilton Road and County Route 15 provide an alternate feed to the Northern portion of the existing and proposed water service areas in the Town of Sandy Creek. This added redundancy will allow flexibility for the system operators in the event of an emergency ensuring consistent water supply to the water system users.

## 5.0 Service Area Municipal Water Demand

Initial water demand projections are based on aerial photography, 2013 real property tax records, and discussions with Town officials. Future public water demand projections are based on historical Census data from 1980 and 2010 and anticipated service area expansion. Estimated water demands are based on an average daily demand of 200 gallons per day per EDU (typical single-family home) included in the water district. Maximum (peak) daily demands are calculated using a peaking factor of 1.5. For planning purposes, the water system is projected to expand by twenty percent (20%) to account for water system service area infill and expansion.

Census data for the Towns of Richland and Sandy Creek is shown in Table 1 below.

<b>Table 1: Population Data Taken from U.S. Census</b>			
<b>Town</b>	<b>1980 Population</b>	<b>2010 Population</b>	<b>30-Year Growth</b>
<b>Richland</b>	5,594	5,718	2.2%
<b>Sandy Creek</b>	3,256	3,939	21%

Based on the Census data above and to account for service area infill and expansion, the future demand is estimated to be a 30% increase from the initial estimated water demand. Table 2 illustrates the initial and future estimated water demands for the proposed Richland/Sandy Creek Joint Water Project.

<b>Table 2: Estimated Water Demands (gpd)</b>					
<b>Town</b>	<b>Initial EDU Count</b>	<b>Initial Avg. Daily Demand (ADD)</b>	<b>Projected EDU Count</b>	<b>Projected ADD</b>	<b>Projected Peak Daily Demand (PDD)</b>
(Ex)Richland WD1	1,092	218,400 gpd	1,419.5	283,900 gpd	425,850 gpd
(Ex)Richland WD2	648.5	129,700 gpd	843	168,600 gpd	252,900 gpd
(Ex)Richland WD3	211	42,200 gpd	274	54,800 gpd	82,200 gpd
(Ex)Sandy Creek WD1	830.5	166,100 gpd	1,080	216,000 gpd	324,000 gpd
<b>Richland WD5</b>	189.5	37,900 gpd	246.5	49,300 gpd	73,950 gpd
<b>Sandy Creek WD3</b>	479.5	95,900 gpd	623.5	124,700 gpd	187,050 gpd
<b>Total</b>	<b>3,426</b>	<b>685,200 gpd</b>	<b>4,486.5</b>	<b>897,300 gpd</b>	<b>1,345,950 gpd</b>

As shown above, the combined total projected PDD is 1,345,900 gpd (1.346 MGD).

## 6.0 Source of Supply

To serve the anticipated 2,600 residents of the proposed Richland/Sandy Creek Joint Water Project, approximately 261,000 gallons per day would be needed as discussed in Section 5.0. The Town of Richland operates two (2) well sites; Schoeller Well Site and Fernwood Well Site. Fernwood Well Site acts as the source of water supply for the existing Town of Richland Water District No. 1, and a redundant source of water for Water Districts No. 2 and 3. The Fernwood Site is permitted for 200 gpm (.288 MGD). The Schoeller Well Site has a permitted capacity of 1,295 gpm (1.865 MGD). The Schoeller and Fernwood Well Sites have a combined pumping capacity of 2.153 MGD, and a permitted capacity (capacity with largest well out of service) of 1,281,600 gpd (1.281 MGD). Additionally, the Water District No. 2 Emergency Interconnect Station provides a 500 gpm (0.72 MGD) back-up water supply to/from the Village of Pulaski.

Based on its readily available source capacity and favorable water pumping and treatment costs, the Town of Richland's Schoeller Well Site was identified as the most feasible and environmentally responsible water supply. Source alternatives, such as being supplied water from the Village of Sandy Creek/Lacona Joint Waterworks and/or investigating and developing a new well source were evaluated on a preliminary basis. However, both source alternatives could not compete with the low pumping and treatment costs of the Schoeller Well Site made possible by the site's relatively high elevation and exceptional groundwater quality. It is further noted that the Village of Sandy Creek/Lacona Joint Waterworks source alternative would require water transmission through sparsely populated areas of the town that, per the public water survey, do not desire public water at this time.

## **7.0 Proposed Facilities**

As discussed in Section 4.0, the target service area of the proposed Richland/Sandy Creek Joint Water Project is defined to serve residents and existing public water supplies in need of and in favor of public water. A map of the proposed facilities is included in Exhibit A.

### Schoeller Well Field

As discussed in Section 2.0, the Schoeller Well Field has a permitted capacity of 1.281 MGD. To accommodate the additional demands of the proposed Richland/Sandy Creek Joint Water Project, additional well rehabilitation and pumping/controls improvements would be completed. It is anticipated that well B-29 would be improved and brought online as it has a reported capacity of 100 gpm (144,000 gpd) which would bring the total capacity above the estimated future PDD. An inter-municipal agreement between the water district(s) and the Town of Richland would be necessary to utilize the well field's excess source capacity.

### Richland/Sandy Creek Joint Water Project

The proposed Richland/Sandy Creek Joint Water Project includes approximately 30 miles of water distribution piping and appurtenances within the Towns of Richland and Sandy Creek. In general, areas to be served include those around North Pond in Sandy Creek, areas along County Route 62 and NYS Route 3 in Sandy Creek as well as several areas scattered across the Towns of Richland and Sandy Creek will also be served to complete loops expand service from the current water service areas. The aforementioned proposed facilities are shown on Figure 2 attached within Exhibit A. Hydrants would be installed at approximate 600-foot intervals along the proposed water main routes and at dead-ends. Isolation valves would be installed at 600 to 800-foot intervals and at branch connections. Water Services would be provided for water using

structures, installed to the edge of the road right-of-way/easement. A new 12-inch diameter transmission main would be installed on County Route 2. This transmission main would supplement the existing 14-inch asbestos cement water main that is located within the railroad right-of-way and provides the sole hydraulic connection from the Schoeller Wellfield to the existing Town of Richland Water System and Town of Sandy Creek Water District No. 1. Two (2) redundant connections to the existing Sandy Creek Water District No. 1 would be accomplished by water mains along NYS-3 and County Route 62, removing critical dependence on the Rainbow Shores water main to supply the Sandy Creek system.

Should sufficient project funds be available, the project would additionally include the optional service areas shown on Figure 2 attached within Exhibit A as well as additional transmission improvements, automation improvements and site improvements throughout the project area.

#### Hydraulic Modeling

Hydraulic modeling, attached within Exhibit D, shows the estimated pressures within the proposed water system. According to the hydraulic modeling, available fire flows within the service area exceed 500 gpm (> 2,000 gpm available fire flow in some areas), while maintaining a minimum of 20 psi within the remainder of the connected water facilities (including existing Town of Richland and Town of Sandy Creek facilities). Estimated normal pressures within the service area are a minimum of 35 psi.

#### Energy Conservation Measures

The proposed Richland/Sandy Creek Joint Water Project will incorporate the following energy conservation measures:

- The elevation of the proposed Schoeller Well site is such that the entire existing Richland water districts and the proposed Richland/Sandy Creek Joint Water Project would be served entirely by gravity from the main water storage reservoir located at the well site, thus dramatically reducing energy-intensive pumping needs. Average daily water demands of existing users within the proposed Richland/Sandy Creek Joint Water Project could be accommodated by submersible well pumps, effectively eliminating the need to operate over 600 individual private well pumps (typically 0.5 horsepower or more each).
- The quality of the proposed well site's source water is such that no treatment beyond simple chlorination would be required to meet NYSDOH water quality standards. It is noted that the proposed system would allow for the elimination of numerous power-consuming private household water softening and ultra-violet disinfection systems prevalent in the proposed service area.
- Submersible well pumps and below-grade magnetic flow meter pits would be utilized to eliminate the need for above-grade enclosures and corresponding heating & ventilating requirements.
- Cleared areas of the Schoeller Well Site would continue to be maintained by pre-approved local farmers who are permitted to plant and harvest hay crops in return for maintaining the cleared areas of the well site in good condition (the application of pesticides and/or fertilizers is prohibited). Fuel and labor intensive traditional lawn mowing would be avoided.

## 8.0 Project Financing

Capital costs would be accrued during the design and construction of the proposed Richland/Sandy Creek Joint Water Project facilities, and include construction, engineering, legal and administrative costs. Upon completion of construction, Operation and Maintenance (O&M) and water usage costs would also be incurred.

### Project Costs

The Towns of Sandy Creek and Richland would finance the capital costs for the Sandy Creek Water District No. 3 and the Richland Water District No. 5 (Richland/Sandy Creek Joint Water Project) jointly. It is expected that the Town of Sandy Creek would act as the “lead agency,” but users in each Water District would pay the same user costs. Capital debt would be designated to each Town based upon EDUs served. For the purpose of this report, capital costs are considered jointly.

Capital costs for the proposed Richland/Sandy Creek Joint Water Project are estimated to be \$13,994,000 (inflated to 2020 dollars, see project timeline below). The construction of the project would be publicly bid. District residents would be responsible for paying the annual capital costs. The Town of Richland and the Town of Sandy Creek would both be responsible for EDU assessment and debt collection for the project’s capital costs on behalf of their respective district residents. Itemized preliminary estimates of probable project costs are included in Exhibit F.

### Project Funding

Various state and federal assistance programs are available for financing water distribution projects. The Towns will apply for a hardship loan through the New York State Environmental Facilities Corporation (NYSEFC) in the amount of approximately

\$12 Million. According to the 2017 Drinking Water State Revolving Fund (DWSRF) Draft Intended Use Plan (IUP), hardship eligibility criteria for the hardship loan program includes:

- *Must be a municipally-owned or NYS PSC Regulated Privately owned drinking water infrastructure project.*
- *Must be listed in the Annual List with a score at or above that of the Hardship Application Eligibility line.*
- *Municipal population less than 300,000 – total population is 9,697 as of 2010 census.*
- *2013 Median Household Income (MHI) less than or equal to statewide 2013 MHI (\$58,003) to be evaluated for grant.*
- *Total Project Cost is less than \$14 million dollars.*

Additionally, the project may apply for Round 3 of the NYS Water Infrastructure Grant program for which applications are anticipated to be due Spring 2017. This program may provide up to the lesser of \$2M or 60% of project costs for qualifying projects. The hardship grant has separate eligibility requirements from the hardship loan criteria. All candidates for grant must meet all following criteria:

- *Eligible for hardship (meet the hardship eligibility criteria above).*
- *2013 MHI must be:*
  - *Less than \$46,402 which is 80% of statewide 2013 MHI*
  - *If the MHI is 80% to 100% of the 2013 statewide MHI (\$46,402 - \$58,003) then the family poverty rate must be greater than or equal to the 2013 ACS statewide average family poverty rate (15.3%).*
  - *Projects that serve communities with MHI above \$58,003 are not eligible for grants.*
- *Construction cannot reach substantial completion prior to October 1st of the year in which grant funding is awarded.*

Since the proposed Richland/Sandy Creek Joint Water Project would be undertaken as a joint project between two (2) municipalities, a weighted average will be used to determine the current TSC<sup>1</sup> for users within the project service area. The 2013 MHI for the Towns of Richland and Sandy Creek are \$46,966 and \$41,603, respectively. Using the estimated 479.5 EDUs within the Sandy Creek District and 189.5 EDUs within the Richland district, the resulting combined MHI is \$43,122 – roughly 74% of the statewide 2013 MHI (\$58,003). Because the combined 2013 MHI is less than 80% of the statewide 2013 MHI, this project would be eligible for the Water Infrastructure Grant Program. The maximum grant award for this project is \$2 million, and no combination of projects can receive more than \$2 million of grant. The poverty rates in Richland (16.9%) and Sandy Creek (12.5%) are greater than the 2013 statewide ACS family average (11.7%).

The Towns of Sandy Creek and Richland would apply for a 30-year direct loan (no interest) through the Drinking Water State Revolving Fund (DWSRF) administered by the NYSEFC. Repayment of this loan would be allocated such that the amount of any annual installment payment would not exceed the amount of any preceding payment by more than fifty percent (50%). Revenues for payment of this debt service would be collected through a user fee for capital improvements paid by all users within the Water District(s). Each user in the district would be charged based on an equivalent dwelling unit (EDU) basis. There are approximately 669 EDUs within the proposed Richland/Sandy Creek Joint Water Project, each would have an estimated first year annual debt service cost of \$478 per year. The total estimated first year service charge would therefore be \$668 per EDU which consists of the debt service cost, operation & maintenance costs and water purchase costs.

U.S. Department of Agriculture and Markets' Rural Development is an alternative funding source for this water project. The Target Service Charge (TSC) for Rural Development is estimated to be \$647 (1.5% of MHI). Recent available financing from Rural Development consists of a grant (up to \$500,000) and as low as 2.75% Market Rate financing over 38 years. Estimated debt service per EDU with 2.75% RD Market Rate financing, and \$500,000 grant is projected at \$690/EDU. After considering O&M and water purchase costs, the total annual service charge would be \$879 per EDU, a premium of \$212 over the most favorable DWSRF funding option.

Connection Costs:

District residents would be responsible for installing their own service laterals from the right-of-way edge/property line to their point of connection. The connection to the water main, service lateral installation to the right-of-way edge/property line, and the curb box would be included as part of the proposed project. All property owners connecting to the public water supply system would be required to disconnect from their current water supply system in accordance with NYSDOH requirements.

Each user would be required to purchase a water meter from their respective Town. Additional costs that may be incurred by the property owner for meter pit installation (properties where the meter would be installed beyond 150 feet from the road or could not be protected from freezing), pressure-reducing valve (PRV), and service lateral installation. The estimated costs of these items for a typical water service are as follows:

- Water meter                      \$180
- PRV                                      \$60
- Service Lateral                      \$15 to \$25 per foot
- Meter Pit                              \$700

Typical connection costs for a typical house lateral would be in the range of \$800 to \$2,000.

## 9.0 Environmental Review

Consideration was given throughout the evaluation of the Richland/Sandy Creek Joint Water Project so as to minimize any potential adverse environmental effects of the proposed project. Potential impacts were considered for the following.

- **Wetlands:** Areas of NYSDEC wetland and/or their 100-foot buffer zones are located within or adjacent to the proposed water main route. A Stormwater Pollution Prevention Plan (SWPPP) will be developed to include erosion and sediment control measures to minimize impacts to wetlands. Existing cover types will be replaced and restored upon final project restoration, and permanent impacts to wetlands are not anticipated since proposed facilities will be installed below-grade.
- **Population Growth:** The Richland/Sandy Creek Joint Water Project is being designed to accommodate moderate population growth over the next 30 years.
- **Air Quality:** Air quality is not anticipated to be affected. The proposed project does not produce air pollution. Construction efforts will not significantly impact air quality, dust control measures will be in place.
- **Noise Levels:** Construction vehicles will create additional noise above ambient noise levels during construction of the project. The proposed project is not anticipated to produce noise pollution.
- **Water Quality:** Appropriate stormwater protection measures will be taken to mitigate water quality effects during construction. After construction, the proposed project is not expected to produce any water pollution.
- **Water Supply:** With the proposed improvements herein, the Schoeller and Fernwood Well Sites have sufficient capacity to provide clean and reliable drinking water and fire protection to the proposed project. Projected Peak Daily Demands do not exceed the projected permitted capacity of these well sites.

- Floodplains: Portions of the proposed water main installation are located within a 100-year FEMA flood zone. There are no proposed structures located within the flood zone, and no permanent impacts to the flood zone are anticipated.
- Environmentally sensitive areas: A majority of the Richland/Sandy Creek Joint Water Project will be installed in previously developed sites and along existing transportation right-of-ways. A small portion of the project is located adjacent to the Great Lakes Dunes (Barrier Beach).

This project would be subject to the New York State Environmental Quality Review Act (SEQR) as a Type I action. The Towns would prepare a full Environmental Assessment Form and address environmental considerations as identified by the New York State Office of Parks, Recreation and Historic Preservation (NYSOPRHP), State and County Departments of Transportation, the Department of Health, and any other involved agencies that may require permits for construction. In addition, the Towns would file a Joint Application for Permit from the U.S. Army Corps of Engineers and NYSDEC for wetlands, stream disturbance, and water supply.

## **10.0 Agricultural Districts**

Some lands adjacent to the proposed utility corridor are currently designated as an agricultural district as identified by the New York State Department of Agriculture and Markets. The Towns would file the required Notice of Intent with the New York State Department of Agriculture and Markets and incorporate the applicable requirements within the construction contracts to minimize impacts to agricultural district lands. At a minimum, occupied Agricultural District residents will be subject to standard district user charges. Landowners would have the option to extend water service to their remaining agricultural facilities beyond the standard district user charge. Vacant Agricultural District properties would not be charged (0 EDU).

## **11.0 Smart Growth**

The project is located in a rural area and is intended to provide drinking water to portions of the community that are not serviced with safe, reliable drinking water or fire protection, it will not contribute to suburban sprawl. This project will improve existing infrastructure, by recommissioning an existing well on the Schoeller well site. This project is located in a poverty area: the Town of Richland has a reported poverty rate of 23.4% and the Town of Sandy Creek has a reported poverty rate of 16.0%. This project will bring jobs to the Towns, during all phases of the project lifetime including design, construction, and operations. This project will enhance the quality of life of these rural communities. Existing water districts do not appear to be contributing to sprawl, and this project is consistent with the goals of the Comprehensive Plans of Richland and Sandy Creek. Interested parties have submitted letters of endorsement for the project, and these are included in Exhibit J.

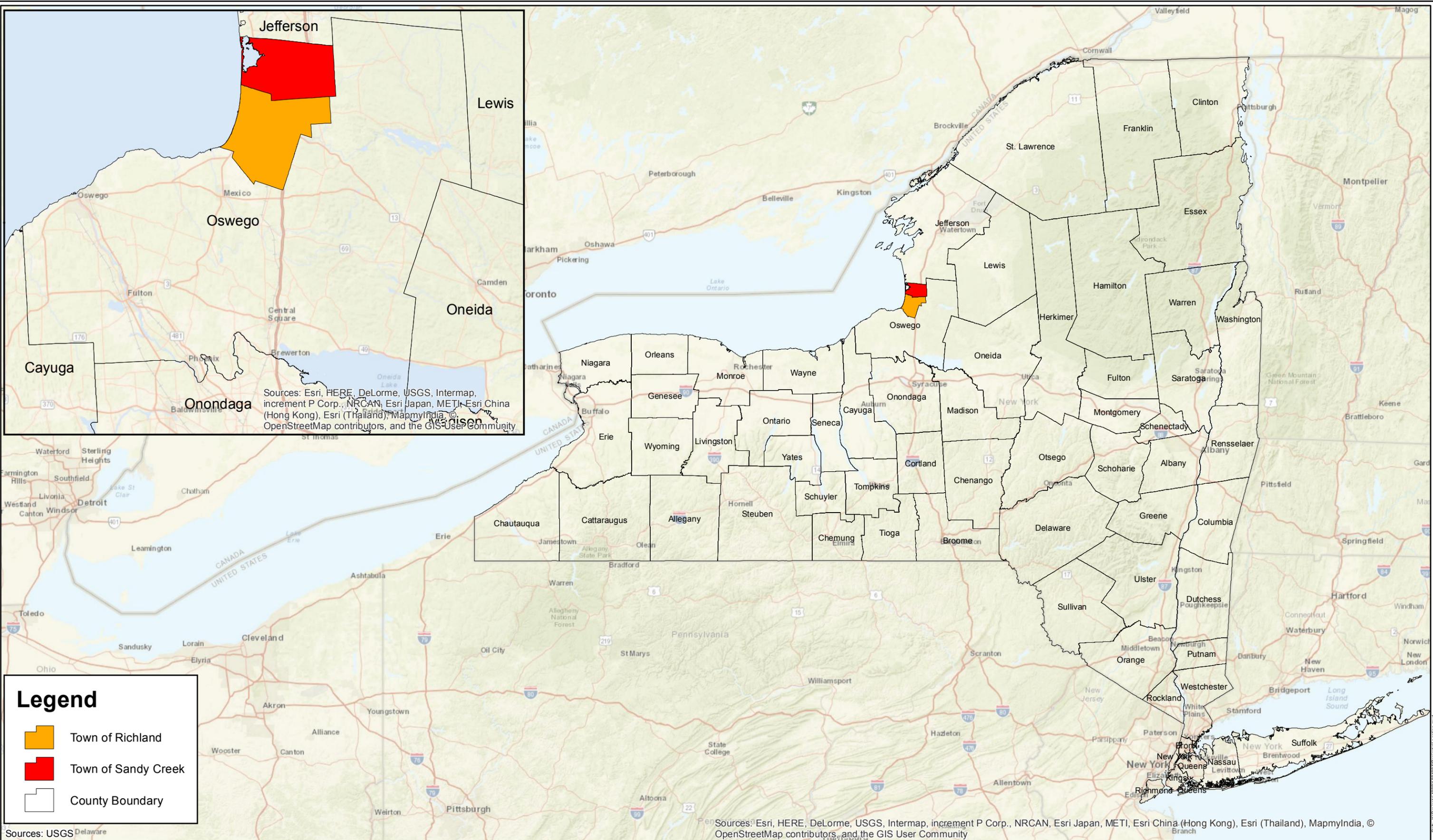
## 12.0 Conclusions and Recommendations

It is recommended that this report be presented to the NYS Department of Health and potential funding agencies. Additional steps to proceed include the following:

1. Submit this Preliminary Engineering Report and completed IUP pre-application for inclusion into the NYSEFC Intended Use Plan (August 2016).
2. Project scored and listed in the Final Intended Use Plan (Fall 2016).
3. Receive preliminary funding commitment (Spring 2017).
4. Complete an environmental review to satisfy SEQR/SERP requirements (Spring 2017).
5. Authorize the preparation of a Map, Plan and Report and form Water District(s) in accordance with the New York State Town Law through petition of the residents (Article 12), or by action of the Town Board (Article 12A) (Spring 2017).
6. Form Sandy Creek and Richland Water Districts (Summer 2017).
7. Draft inter-municipal agreements and pass bond resolutions (Summer 2017).
8. Submit DWSRF application (Fall 2018).
9. Prepare design plans and specifications (Winter 2018 – Winter 2019).
10. Secure regulatory and funding agency approvals (Winter 2019 – Summer 2019).
11. Receive bids and award construction contracts (Summer 2019).
12. Construction of proposed facilities and infrastructure (Summer 2019 – Fall 2020).

It is noted that steps 3 through 6 would be required for the project to meet the anticipated application requirements of Round 3 of the NYS Water Infrastructure Grant program for which applications are anticipated to be due April 2017.

**Exhibit A**  
**Proposed Facilities**



Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

**Legend**

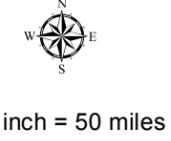
-  Town of Richland
-  Town of Sandy Creek
-  County Boundary

Sources: USGS, Delaware

Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community



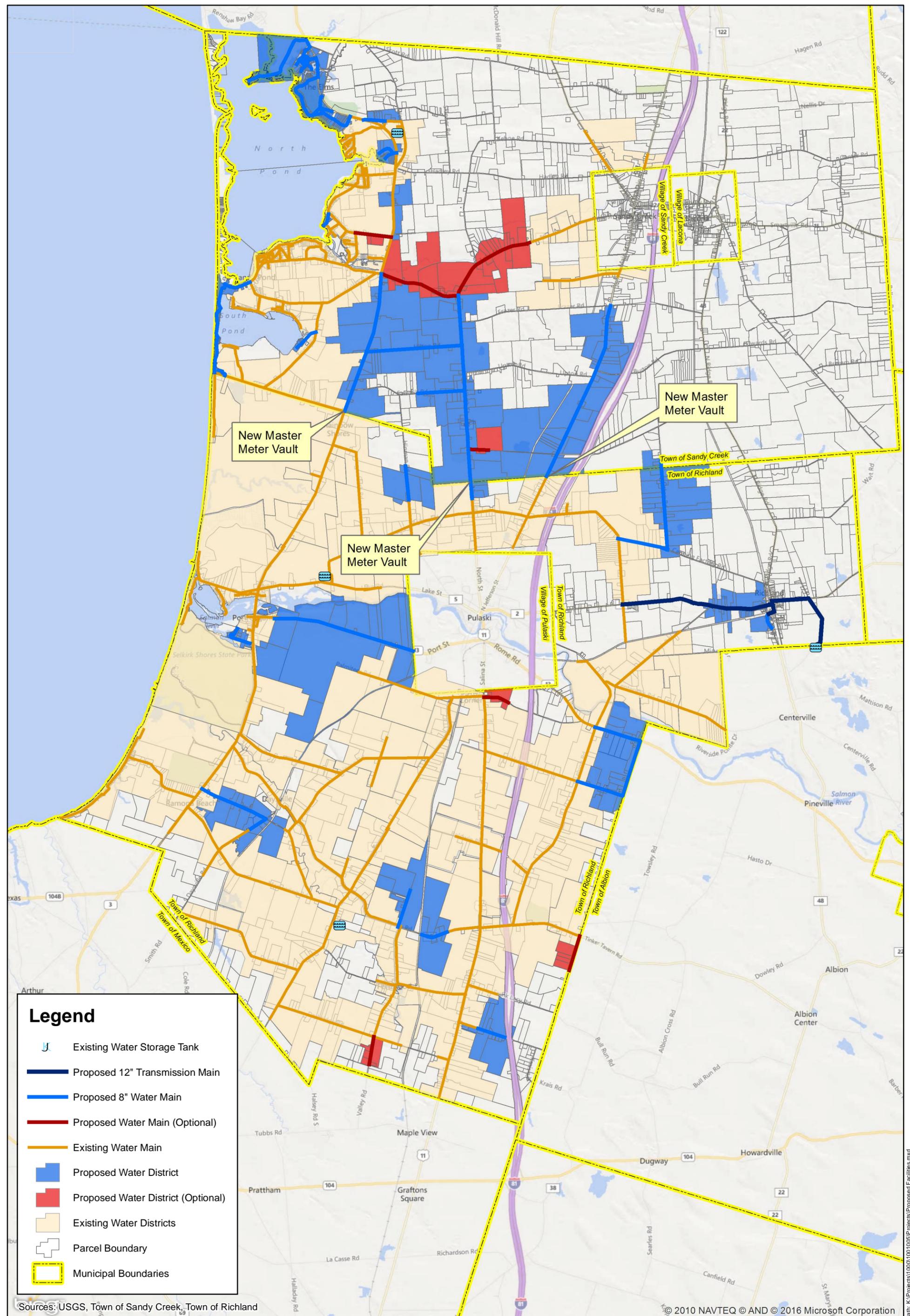
**Barton & Loguidice, D.P.C.**  
 Engineers • Environmental Scientists • Planners • Landscape Architects



1 inch = 50 miles

**Town of Richland / Sandy Creek**  
**Project Location**  
 Oswego County      August 2016      New York

Figure  
1  
Project No.  
1001.005

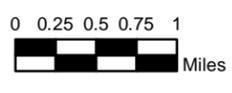


**Legend**

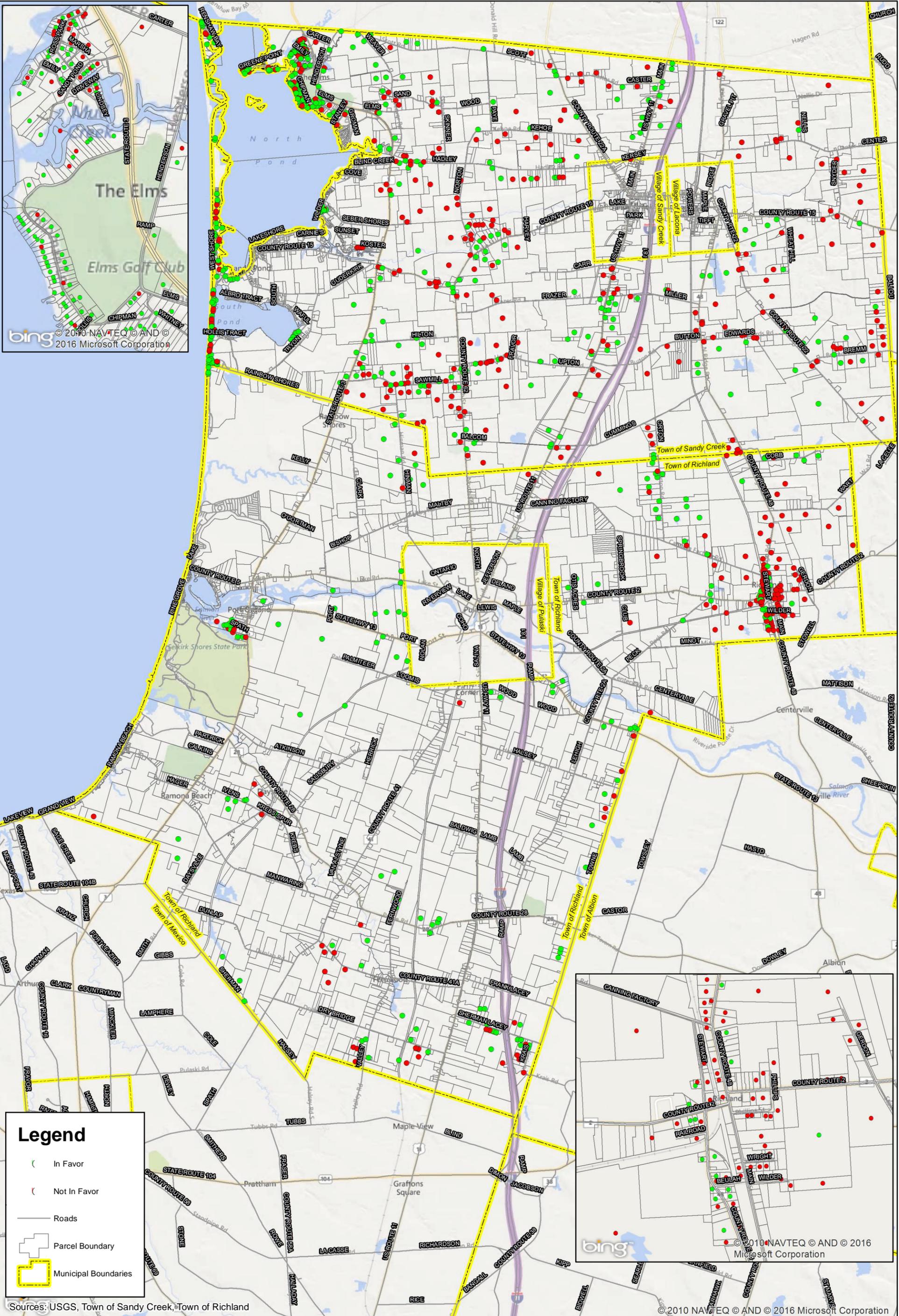
- Existing Water Storage Tank
- Proposed 12" Transmission Main
- Proposed 8" Water Main
- Proposed Water Main (Optional)
- Existing Water Main
- Proposed Water District
- Proposed Water District (Optional)
- Existing Water Districts
- Parcel Boundary
- Municipal Boundaries

Sources: USGS, Town of Sandy Creek, Town of Richland

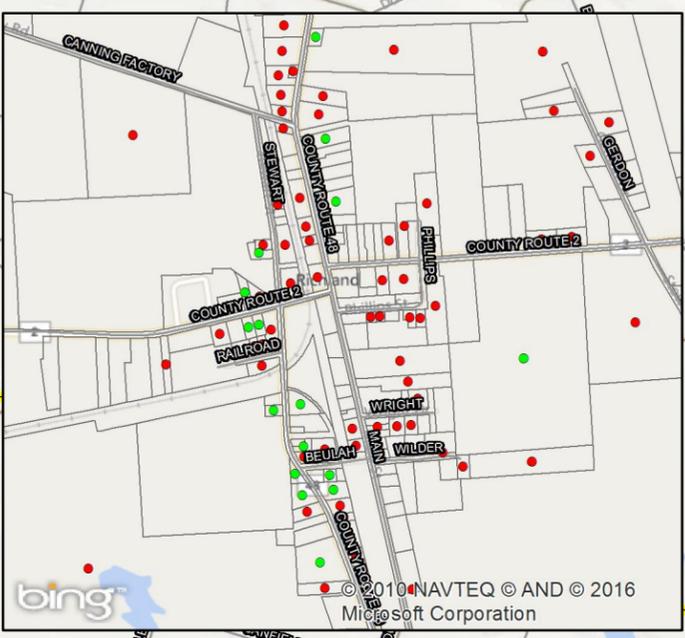
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**Exhibit B**  
**Survey Results**



bing © 2010 NAVTEQ © AND © 2016 Microsoft Corporation

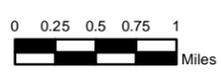


**Legend**

- In Favor
- Not In Favor
- Roads
- Parcel Boundary
- ⬡ Municipal Boundaries

Sources: USGS, Town of Sandy Creek, Town of Richland

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Path: K:\Projects\1001.005\Projects\SURVEY\SURVEY.mxd

**Exhibit C**

**Public Water Systems Within Service Area**

## Public Water System

Town of Richland & Town of Sandy Creek

Name	Location	PWSID	Classification	Population Served	Source
Charlottes Pizza Take Out	5625 US-11, Sandy Creek	NY3730180	Transient Non-Community	25	Ground water
Elms Golf Club Restaurant	2 Country Club Lane, Sandy Creek	NY3706749	Transient Non-Community	200	Groundwater under influence of surface water
Greene Point MHP & Marina, LLC	206 Greene Point Rd, Sandy Creek	NY3721195	Transient Non-Community	440	Groundwater under influence of surface water
Sandy Pond Beach Inc	County Route 15, Sandy Creek	NY3702043	Transient Non-Community	200	Ground water
John and Suz's Motel & Diner	8438 Scenic Hwy (NYS-3), Sandy Creek	NY3719777	Transient Non-Community	60	Ground water
Sandy Island Beach State Park	Route 15, Sandy Creek	NY3713442	Transient Non-Community	200	Ground Water

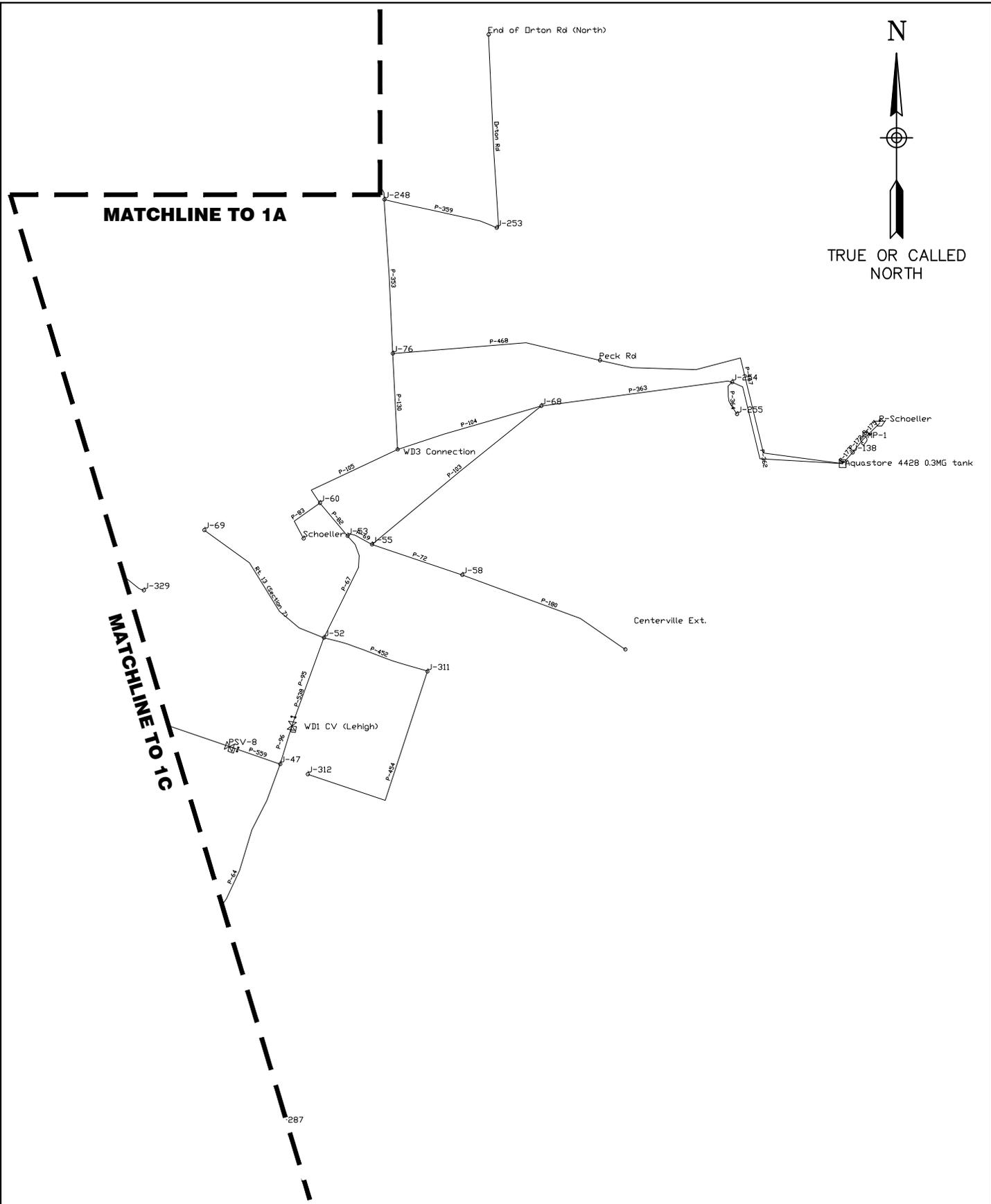
\*Source USEPA Envirofacts accessed July 15 2016

[https://iaspub.epa.gov/enviro/sdw\\_form\\_v3.create\\_page?state\\_abbr=NY](https://iaspub.epa.gov/enviro/sdw_form_v3.create_page?state_abbr=NY)

**Exhibit D**  
**Hydraulic Modeling**



Plotted: Aug 08, 2016 - 4:52PM SYR By: gbk  
 C:\Users\gbk\appdata\local\temp\AcPublish\_4276\WaterCAD Model (ID 1042222).dwg



TOWN OF RICHLAND & TOWN OF SANDY CREEK  
 JOINT WATER PROJECT

**WATERCAD MODEL  
 RICHLAND EAST**

Figure Number

**4B**

Project Number

1001.005.001  
 418.022.001

Date  
 AUGUST, 2016

Scale  
 1" = 4000'

OSWEGO COUNTY

NEW YORK



Richland / Sandy Creek Joint Water Project  
 Fireflow Analysis Report

ID	Label	Static Demand (gpm)	Static Pressure (psi)	Static Head (ft)	Fire-Flow Demand (gpm)	Residual Pressure (psi)	Available Flow @Hydrant (gpm)	Available Flow Pressure (psi)
97	J-1	0	55.36	474.96	500	51.89	2000	32.46
98	J-2	5	71.35	474.9	505	63.06	2005	32.46
99	J-4	5	81.99	474.5	505	50.51	2005	28.79
100	Brennans Beach End	200	91.97	473.57	700	56.78	1597	20
101	J-6	19	103.34	473.85	519	35.16	1336	20
102	Lake Road End	19	96.83	473.82	519	20	1103	32.46
103	Pine Grove End	24	88.18	473.81	524	20	1091	20
104	J-9	10	90.41	473.97	510	22.23	1545	20
105	Riverview End	19	92.57	473.95	519	20	1344	32.46
106	J-11	5	81.36	476.05	505	48.87	1857	20
107	St Rt 13 End	5	67.52	476.05	505	35.17	1348	20.02
108	Scharoun End	10	92.61	476.05	510	48.3	1861	20
109	J-14	19	77.52	476.16	519	44.67	1882	20
110	J-15	5	77.04	476.06	505	44.67	1806	20
111	J-16	24	88.61	479.82	524	59.34	2024	30.44
112	J-17	10	98.41	559.47	510	27	1706	20
113	J-18	10	110.3	559.93	510	50.99	1883	20
114	CR 28 End	10	105.97	559.92	510	20	1790	21.49
115	J-20	10	90.39	560.92	510	42.63	1756	20
116	Van Alstyne End	10	86.93	560.92	510	20	1504	23.2
117	J-22	10	105.24	561.25	510	68.75	1662	20
118	CR 41 End	10	66.62	566.98	510	20	1297	20.34
119	J-24	10	85.04	561.56	510	54.56	2010	20.12
120	J-25	10	91.71	561.97	510	46.57	1450	20.01
121	J-26	14	89.91	562.82	514	53.07	1330	20
122	41A East End	14	79.34	563.39	514	42.4	1286	20
123	41A West End	14	70.44	562.8	514	20	1194	23.76
124	WD1 Valley End	14	74.25	562.62	514	32.86	1332	20.01
125	CR 5 End	5	60.53	474.9	505	29	2005	32.46
126	State Park	43	88.43	479.4	543	57.92	2043	30.66
127	J-31	4	83.71	480.48	504	40.46	2004	29.2
128	J-32	4	84.61	480.57	504	38.9	2004	29.1
129	J-33	4	90.5	561.18	504	54.78	1852	20
130	J-34	11	97.42	480.17	511	28.66	1146	20
131	J-35	22	88.76	480.15	522	20.02	1047	32.46
132	J-36	14	93.08	480.13	514	20.01	854	32.46
133	J-37	4	85.06	561.61	504	30.4	1887	20
134	J-38	4	65.06	562.38	504	27.79	1162	20
135	J-39	7	55.07	567.29	507	23.47	1051	20
136	J-40	11	59.38	567.25	511	20	678	28.84
137	J-41	4	53.24	568.05	504	20.53	1065	20
138	Frank Lacey End	4	67.08	568.05	504	20	1012	21.76

139	J-44	7	76.15	574.01	507	42.12	1207	20.01
140	J-45	7	66.91	569.66	507	22.17	1277	20
141	J-47	7	61.37	586.84	507	31.94	1172	20.01
142	J-48	4	67.87	572.86	504	43.42	924	20
143	J-50	7	67.69	578.46	507	38.58	905	20
144	J-51	7	68.56	578.46	507	28.87	905	20
145	J-52	2	63.41	608.55	502	22.82	1564	20
146	J-49	14	67.73	574.54	514	44.66	833	20
147	J-53	14	78.17	629.69	514	49.51	2014	25.08
148	J-55	18	81.54	631.05	518	53.5	2017	20
149	J-58	7	70.54	631.05	507	42.5	954	20
150	Schoeller	30	87.46	632.15	530	50.39	2030	28.75
151	J-60	0	87.47	632.17	500	63.75	2000	28.75
152	J-59	12	69.03	574.54	512	45.96	717	20
153	J-61	3	97.21	561.68	503	38.98	1653	20.01
154	J-62	5	93.82	561.85	505	38.69	1469	20.01
155	J-63	5	69.73	562.16	505	24.82	1263	20
156	J-64	0	98.07	561.66	500	20	1316	22.16
157	J-65	8	100.23	561.65	508	20.05	1197	26.54
158	J-66	0	68.11	567.43	500	20.94	1295	20
159	J-67	7	76.76	567.42	507	20.04	951	28.39
160	J-68	0	69.74	633.2	500	51.85	2000	30.72
161	J-69	35	79.35	608.4	535	20.03	1030	31.81
162	J-70	10	79.36	573.42	510	42.52	1097	20.01
163	J-71	3	74.96	573.26	503	39.51	1054	20.01
164	J-72	5	79.25	573.18	505	45.16	1034	20.01
165	J-73	3	74.96	573.26	503	23.35	1054	20
166	J-74	5	106.71	561.65	505	20.02	995	32.46
167	WD3 Connection	0	79.12	632.87	500	59.04	2000	30.37
169	J-76	7	82.03	633.6	507	56.32	2007	42.3
322	Selkirk Shores SP	0	88.18	473.81	500	20	860	32.46
324	J-101	7	102.7	632.38	507	74.99	572	40.3
329	J-102	6	94.2	632.72	506	69.51	684	43.32
332	J-103	7	62.7	461.92	507	51.06	1191	36.78
334	J-104	6	61.84	461.93	506	37.75	1323	36.78
337	J-105	6	77.43	461.96	506	82.57	541	26.91
339	J-106	6	68.35	461.97	506	69.38	683	27.64
341	J-107	10	72.27	462.04	510	36.64	1366	20
343	J-108	5	79.72	462.25	505	35.51	1458	20.02
345	J-109	8	75.81	462.22	508	20.06	1465	21.93
347	J-110	12	82.73	462.21	512	24.1	1517	20
349	J-111	14	91.81	462.21	514	36.48	1529	20.03
351	J-112	14	91.84	462.27	514	33.46	1548	20.05
353	J-113	14	84.49	462.29	514	23.2	1531	20
355	J-114	12	81.5	462.37	512	26.41	1505	20.06
357	J-115	10	90.26	462.47	510	35.37	1498	20.06
359	J-116	10	91.58	462.56	510	36.12	1540	20.03
361	J-117	10	92.17	463.03	510	38.21	1653	20.02

367	J-120	15	79.68	463.16	515	20.05	1683	20.7
369	J-121	5	79.28	463.24	505	20.05	1649	23.43
371	J-122	12	88.24	463.95	512	20.05	1693	26.1
373	J-123	12	88.74	465.11	512	20	1763	31.72
375	J-124	10	91.27	465.96	510	27.12	1860	20.04
377	J-125	12	92.15	467	512	48.99	2011	31.08
381	J-127	7	85.79	468.3	507	39.03	2007	22.28
383	J-128	12	90.53	468.24	512	20.03	1496	23.59
385	Streamside Campground	14	96.34	468.23	514	20.08	1215	34.53
392	J-130	3	74.14	471.37	503	57.59	2003	52.63
402	J-137	0	94.26	467.87	500	57.72	2000	42.02
409	J-138	0	33.75	638	500	32.77	2000	32.46
425	Centerville Ext.	2	48.04	631.05	502	20.01	610	32.46
433	J-140	1	85.72	463.13	501	33.87	1645	20.01
435	J-141	8	90.69	463.71	508	26.75	1759	20.03
445	J-145	5	91.74	462.03	505	41.21	1395	20
447	J-146	10	88.6	462.03	510	26.22	1424	20
452	J-149	7	100.61	632.53	507	73.74	643	41.15
461	J-151	8	87.49	462.21	508	43.84	1437	20
508	Clark Low	0	80.88	461.93	500	49.99	1383	36.81
514	Tryon High Pt	0	54.97	462.06	500	20.01	1327	28.8
566	J-155 (Deer Cr)	0	96.03	461.96	500	97.37	530	28.09
572	J-157 (Rt 3 High)	6	55.19	473.57	506	20	1122	67.41
577	J-158 (MCS)	0	74.42	462	500	35.03	1407	20.02
591	J-163	3	85.45	468.54	503	39.83	2003	22.78
594	J-164	10	80.7	464.52	510	20.05	1711	28.47
602	J-167	0	85.84	468.24	500	37.95	1775	20
604	J-168	0	75.06	467.84	500	27.18	1371	20
610	J-170	0	80.05	476.09	500	47.42	1853	20
613	J-171	0	77.16	476.09	500	44.34	1836	20
618	J-172	0	89.44	461.96	500	92.17	530	28.09
621	J-173	0	70.07	461.96	500	72.03	531	23.11
626	J-175	0	89.05	462.48	500	31.32	1513	20.04
632	J-177	0	90.31	462.37	500	32.71	1500	20.05
636	J-178	0	90.75	462.36	500	32.62	1506	20.05
644	J-181	0	91.59	462.29	500	30.63	1522	20.04
649	J-183	0	91.24	462.32	500	29.08	1515	20.04
659	Sunset End	2	89.2	463.16	502	20.08	1446	32.42
661	J-187	0	92.18	463.07	500	36.35	1655	20.01
673	J-192	0	80.66	465.44	500	20.05	1690	41.99
687	J-197	0	94.08	468.24	500	20.03	1349	22.29
690	Doreen End	0	96.35	468.24	500	20.04	1302	24.77
694	Rainbow Shores End	0	83.08	462.03	500	20.03	964	64.71
703	Wilder End	6	94.3	463.95	506	20.07	1508	32.46
711	J-208	0	78.85	466.75	500	30.97	902	20
716	J-210	10	82.3	466.78	510	34.42	928	20
719	J-211	5	90.68	466.7	505	41.07	915	20.01
721	J-212	8	80.09	466.74	508	31.68	912	20

723	Emily Ln	14	92.77	465.47	514	22.28	669	20
725	J-214	0	90.66	465.49	500	22.46	662	20
730	Ross Park Dr	14	91.75	465.47	514	23.14	674	20
732	J-217	0	90.67	465.48	500	22.22	659	20
734	J-218	0	89.56	465.48	500	21.34	659	20
738	J-219	0	92.51	465.48	500	23.83	658	20
740	J-220	0	92.59	465.48	500	22.45	658	20
742	J-221	0	88.2	465.48	500	20	655	21.91
746	J-222	1	87.17	465.79	501	20.03	781	21.06
749	J-223	0	89.93	465.57	500	21.73	677	20
752	J-224	0	93.12	465.42	500	20.79	660	20
755	J-226	0	93.05	465.39	500	20.07	649	21.69
757	Greene Point End	44	94.96	465.04	543	20	593	37.17
761	Route 15 @ Rte 3	5	82.4	463.27	505	26.96	1678	20.03
765	Rte 3 @ Hilton	5	119.3	632.17	505	57.73	634	20.01
768	Route 62 @ Hilton	3	108.45	632.17	503	56.68	632	20
770	Rte 62 @ Rte 15	10	142.37	632.16	510	85.34	638	20.06
773	End of Rte 15	5	96.75	632.16	505	29.97	634	20
779	End of Rte 11 Sandy Cree	16	67.27	632.47	516	20.01	619	32.46
781	J-236	20	111.3	632.24	520	66.37	692	23.08
784	Balcom End	1	116.17	632.24	500	64.2	673	21.68
788	J-239	0	91.82	462.22	500	20.08	1225	60.88
790	J-240	0	85.05	462.18	500	20.05	1692	23.05
793	J-241	3	88.06	462.18	503	20.06	1367	45.45
795	J-242	0	89.89	467.99	500	45.85	2000	36.01
798	J-243	2	93.33	467.99	502	20.02	1887	39.58
800	J-244	0	91.15	467.99	500	32.74	2000	34.47
803	J-245	1	92.88	467.99	501	20.04	1669	45.81
805	J-246	0	76.81	470.19	500	42.94	2000	37.93
810	J-248	0	70.57	633.12	500	53.51	739	50.95
819	End of Orton Rd (North)	10	61.91	633.1	510	20.04	819	31.37
821	J-253	0	59.32	633.11	500	20	993	22.59
825	J-254	0	49.43	635.75	500	38.4	2000	32.46
828	J-255	3	47.05	635.75	503	20	1451	32.46
831	J-256	1	78.28	466.74	501	23.91	905	20
834	J-257	2	67.88	466.75	502	20	852	35.28
836	J-258	0	66.25	461.92	500	37.89	1116	20.06
838	J-259	3	67.71	461.92	503	35.46	978	20.04
841	J-260	0	86.84	476.71	500	51.58	1950	20.01
844	J-261	6	95.92	476.71	506	20	1605	29.04
846	J-262	12	32.46	430.02	512	20	683	33.75
848	J-263	0	90.4	479.94	500	58.54	2000	32.46
853	J-265	0	109.87	559.93	500	44.11	2000	32.46
856	J-266	0	89.46	559.91	500	31.5	1994	20
860	J-267	0	84.46	480.45	500	44.21	2000	27.49
865	J-269	0	107.07	559.92	500	36.89	2000	32.46
869	J-270	4	78.73	561.96	504	20	1127	27.74
871	J-271	0	79.98	572.86	500	42.45	920	20

873	J-272	4	79.12	572.86	504	26.9	924	20
875	J-273	0	59.16	481.73	500	20.02	1857	27.92
879	J-274	0	69.97	481.73	500	20	1486	32.46
882	J-275	0	89.06	561.85	500	20.31	1464	20.02
898	J-281	0	59.39	567.26	500	20.02	772	20.02
901	J-282	0	59.39	567.26	500	20.01	739	22.93
903	J-283	0	65.88	567.26	500	20.01	721	21.68
905	J-284	0	61.55	567.27	500	29.96	833	20
908	J-285	0	57.23	567.27	500	25.63	750	20
910	J-286	4	51.6	567.27	504	20	635	32.46
912	J-287	0	43.07	574.54	500	20.06	541	22.22
914	J-288	0	45.23	574.54	500	20.06	541	20.11
916	J-289	0	57.27	562.38	500	20.02	876	32.46
918	J-290	0	70.25	562.38	500	20	1114	22.49
920	J-291	0	76.71	562.93	500	30.16	1458	20.01
924	J-292	0	87.33	462.03	500	28.48	1406	20
927	J-293	5	91.73	462.03	505	20.6	1411	20
929	Chipman Ln	20	92.68	466.11	520	25.51	905	20
932	J-295	0	73.3	462.42	500	20.06	1451	26.64
935	J-296	0	119.68	632.17	500	46.88	629	20
938	Rt 3 High	0	93.09	632.17	500	26.23	629	20
941	Hinman High	0	48.42	461.92	500	20.04	975	39.33
950	Co Rt 62 High	2	68.01	632.19	502	20.02	631	26.29
962	J-308	14	84.99	462.04	514	20.07	1414	21.74
969	J-309	0	72.01	481.45	500	24.25	1703	20
971	J-310	0	62.84	481.23	500	20	1539	32.46
975	J-311	4	65.67	608.55	504	20.03	1200	22.84
978	J-312	4	68.48	608.55	504	20.02	868	32.46
986	J-315	1	73.09	632.2	501	25.08	640	20
989	End of Sawmill	3	74.5	632.2	503	20.01	606	24.38
1024	Peck Rd	3	56.08	635.32	503	33.25	2003	32.46
1197	J-329	2	66.91	569.66	502	20	922	28.19
1226	J-331	0	32.46	430.02	500	20.02	528	47.02

Date: Monday, August 8, 2016

GBK

Richland / Sandy Creek Joint Water Project  
 Junction Report

ID	Label	Elevation (ft)	Static Head (ft)	Static Pressure (psi)
97	J-1	347	475.04	55.4
98	J-2	310	475.1	71.43
99	J-4	285	475.63	82.48
100	Brennans Beach End	261	475.46	92.79
101	J-6	235	475.52	104.06
102	Lake Road End	250	475.51	97.57
103	Pine Grove End	270	475.51	88.91
104	J-9	265	475.54	91.09
105	Riverview End	260	475.53	93.25
106	J-11	288	477.73	82.09
107	St Rt 13 End	320	477.75	68.25
108	Scharoun End	262	477.73	93.33
109	J-14	297	477.86	78.25
110	J-15	298	477.75	77.77
111	J-16	275	481.43	89.31
112	J-17	332	561.98	99.5
113	J-18	305	562.07	111.22
114	CR 28 End	315	562.06	106.89
115	J-20	352	562.69	91.15
116	Van Alstyne End	360	562.69	87.69
117	J-22	318	562.86	105.94
118	CR 41 End	413	570.14	67.99
119	J-24	365	562.3	85.36
120	J-25	350	564.22	92.68
121	J-26	355	565.54	91.09
122	41A East End	380	566.28	80.59
123	41A West End	400	565.54	71.62
124	WD1 Valley End	391	565.24	75.38
125	CR 5 End	335	475.1	60.62
126	State Park	275	481.08	89.16
127	J-31	287	482.05	84.39
128	J-32	285	482.11	85.28
129	J-33	352	562.31	90.99
130	J-34	255	482	98.21
131	J-35	275	481.99	89.56
132	J-36	265	481.99	93.88
133	J-37	365	562.61	85.49
134	J-38	412	564.73	66.08
135	J-39	440	570.95	56.65
136	J-40	430	570.94	60.98
137	J-41	445	571.76	54.85
138	Frank Lacey End	413	571.76	68.69

139	J-44	398	577.56	77.69
140	J-45	415	573.04	68.38
141	J-47	445	589.23	62.4
142	J-48	416	576.75	69.55
143	J-50	422	582.08	69.26
144	J-51	420	582.07	70.12
145	J-52	462	608.21	63.26
146	J-49	418	578.51	69.44
147	J-53	449	625.33	76.29
148	J-55	442.6	626.72	79.66
149	J-58	468	626.72	68.67
150	Schoeller	430	626.82	85.15
151	J-60	430	626.83	85.16
152	J-59	415	578.51	70.74
153	J-61	337	562.97	97.77
154	J-62	345	563.45	94.51
155	J-63	401	564.25	70.63
156	J-64	335	562.97	98.63
157	J-65	330	562.97	100.79
158	J-66	410	570.64	69.5
159	J-67	390	570.64	78.15
160	J-68	472	628.71	67.8
161	J-69	425	608.19	79.26
162	J-70	390	577.2	80.99
163	J-71	400	577.08	76.62
164	J-72	390	577.02	80.91
165	J-73	400	577.08	76.62
166	J-74	315	562.96	107.28
167	WD3 Connection	450	627.28	76.7
169	J-76	444	626.44	78.93
322	Selkirk Shores SP	270	475.51	88.91
324	J-101	395	578.39	79.34
329	J-102	415	597.43	78.93
332	J-103	317	566.22	107.82
334	J-104	319	556.65	102.82
337	J-105	283	534.45	108.79
339	J-106	304	527.88	96.86
341	J-107	295	512.32	94.02
343	J-108	278	503.17	97.42
345	J-109	287	502.42	93.2
347	J-110	271	501.95	99.92
349	J-111	250	501.71	108.9
351	J-112	250	499.9	108.12
353	J-113	267	499.47	100.58
355	J-114	274	498.82	97.27
357	J-115	253.85	498.08	105.67
359	J-116	250.9	497.57	106.72

361	J-117	250	495.42	106.18
367	J-120	279	494.46	93.22
369	J-121	280	494.06	92.61
371	J-122	260	490.9	99.9
373	J-123	260	487.33	98.35
375	J-124	255	485.25	99.62
377	J-125	254	483.09	99.12
381	J-127	270	477.97	89.98
383	J-128	259	477.96	94.73
385	Streamside Campground	245.55	477.96	100.55
392	J-130	300	476.78	76.48
402	J-137	250	481.13	100
409	J-138	560	638	33.75
425	Centerville Ext.	520	626.72	46.17
433	J-140	265	495.42	99.69
435	J-141	254.1	493.05	103.38
445	J-145	250	510.84	112.85
447	J-146	257.24	508.98	108.91
452	J-149	400	589.81	82.12
461	J-151	260	504.43	105.76
508	Clark Low	275	551.38	119.58
514	Tryon High Pt	335	511	76.15
566	J-155 (Deer Cr)	240	534.45	127.4
572	J-157 (Rt 3 High)	346	475.46	56.01
577	J-158 (MCS)	290	521.19	100.03
591	J-163	271.05	477.78	89.44
594	J-164	278	490.29	91.85
602	J-167	269.84	477.78	89.97
604	J-168	294.35	477.7	79.33
610	J-170	291.08	477.77	80.77
613	J-171	297.74	477.77	77.89
618	J-172	255.22	534.45	120.81
621	J-173	300	534.45	101.44
626	J-175	256.66	498.05	104.43
632	J-177	253.64	498.79	106.07
636	J-178	252.6	498.93	106.57
644	J-181	250.59	499.67	107.77
649	J-183	251.44	499.36	107.26
659	Sunset End	257	494.46	102.74
661	J-187	250	495.18	106.08
673	J-192	279	486.51	89.78
687	J-197	250.78	477.96	98.29
690	Doreen End	245.55	477.96	100.55
694	Rainbow Shores End	270	508.98	103.39
703	Wilder End	246	490.9	105.95
711	J-208	284.51	477.46	83.48
716	J-210	276.55	477.46	86.93

719	J-211	257.1	477.45	95.33
721	J-212	281.62	477.46	84.73
723	Emily Ln	251.05	477.22	97.85
725	J-214	255.95	477.23	95.74
730	Ross Park Dr	253.4	477.22	96.84
732	J-217	255.91	477.22	95.75
734	J-218	258.48	477.23	94.64
738	J-219	251.65	477.22	97.6
740	J-220	251.46	477.22	97.68
742	J-221	261.61	477.22	93.29
746	J-222	264.31	477.28	92.14
749	J-223	257.71	477.24	94.98
752	J-224	250.18	477.21	98.23
755	J-226	250.31	477.21	98.17
757	Greene Point End	245.55	477.14	100.2
761	Route 15 @ Rte 3	272.82	494.78	96.03
765	Rte 3 @ Hilton	356.43	578.35	96.01
768	Route 62 @ Hilton	381.51	578.35	85.16
770	Rte 62 @ Rte 15	303.11	578.34	119.08
773	End of Rte 15	408.54	578.34	73.47
779	End of Rte 11 Sandy Cre	477	589.8	48.8
781	J-236	375	578.36	87.98
784	Balcom End	363.74	578.36	92.86
788	J-239	250	502.42	109.21
790	J-240	265.6	505.71	103.89
793	J-241	258.64	505.71	106.89
795	J-242	260.22	480.15	95.15
798	J-243	252.28	480.15	98.59
800	J-244	257.31	480.15	96.41
803	J-245	253.32	480.15	98.14
805	J-246	292.65	477.2	79.84
810	J-248	470	612.07	61.47
819	End of Orton Rd (North	490	612.06	52.81
821	J-253	496	612.07	50.22
825	J-254	521.5	633.66	48.53
828	J-255	527	633.66	46.15
831	J-256	285.81	477.46	82.92
834	J-257	309.85	477.46	72.52
836	J-258	308.79	566.22	111.38
838	J-259	305.43	566.22	112.83
841	J-260	276	478.42	87.58
844	J-261	255	478.42	96.66
846	J-262	355	477.74	53.11
848	J-263	271	481.55	91.1
853	J-265	305.99	562.06	110.79
856	J-266	353.15	561.78	90.26
860	J-267	285.24	482.02	85.14

865	J-269	312.46	562.02	107.97
869	J-270	380	564.22	79.7
871	J-271	388	576.75	81.66
873	J-272	390	576.75	80.8
875	J-273	345	482.87	59.65
879	J-274	320	482.87	70.47
882	J-275	356	563.45	89.76
898	J-281	430	570.94	60.98
901	J-282	430	570.94	60.98
903	J-283	415	570.94	67.47
905	J-284	425	570.95	63.14
908	J-285	435	570.95	58.82
910	J-286	448	570.95	53.19
912	J-287	475	578.51	44.78
914	J-288	470	578.51	46.94
916	J-289	430	564.73	58.29
918	J-290	400	564.73	71.27
920	J-291	385.62	565.39	77.78
924	J-292	260.17	509.63	107.93
927	J-293	250	509.63	112.33
929	Chipman Ln	251.9	477.34	97.54
932	J-295	293	498.43	88.88
935	J-296	355.55	578.35	96.39
938	Rt 3 High	417	578.35	69.81
941	Hinman High	350	566.22	93.55
950	Co Rt 62 High	475	578.35	44.71
962	J-308	265.6	507.52	104.67
969	J-309	315	482.68	72.55
971	J-310	336	482.54	63.4
975	J-311	456.77	608.21	65.52
978	J-312	450.27	608.21	68.34
986	J-315	463.26	578.35	49.79
989	End of Sawmill	460	578.35	51.2
1024	Peck Rd	505.7	631	54.21
1197	J-329	415	573.04	68.38
1226	J-331	355	477.74	53.11

Date: Monday, August 8, 2016  
GBK

Richland / Sandy Creek Joint Water Project  
Pipe Report

ID	From Node	To Node	Length (ft)	Diameter (in)	Material	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/kft)
203	J-1	WD1 North Tank	1206.3	10.6	Ductile Iron	120	-110	0.4	0.04	0
204	J-1	J-2	671.8	10.6	Ductile Iron	120	110	0.4	0.06	0
205	J-4	J-2	5225.64	10.6	Ductile Iron	120	-100	0.37	0.4	0
206	J-4	Brennans Beach End	3186.03	10.6	Ductile Iron	120	206	0.75	0.93	0
207	J-6	Lake Road End	3506.87	8.6	Ductile Iron	120	19	0.11	0.04	0
208	J-6	Pine Grove End	2638.41	8.6	Ductile Iron	120	24	0.13	0.04	0
209	J-4	J-9	2933.48	8.6	Ductile Iron	120	91	0.51	0.53	0
210	J-9	J-6	1306.13	8.6	Ductile Iron	120	62	0.35	0.12	0
211	J-9	Riverview End	1706.5	8.6	Ductile Iron	120	19	0.11	0.02	0
212	J-11	J-4	2011.19	8.6	Ductile Iron	120	202	1.11	1.55	0.001
213	J-11	Scharoun End	563.94	8.6	Ductile Iron	120	10	0.05	0	0
215	J-15	J-11	253.91	8.6	Ductile Iron	120	50	0.28	0.02	0
216	J-15	St Rt 13 End	1063.65	8.6	Ductile Iron	120	17	0.09	0.01	0
218	J-17	J-18	4534.27	8.6	Ductile Iron	120	-67	0.37	0.46	0
220	J-20	J-18	5222.94	8.6	Ductile Iron	120	94	0.52	0.99	0
221	J-20	Van Alstyne End	1914.69	8.6	Ductile Iron	120	10	0.05	0.01	0
222	J-20	J-22	1209.26	8.6	Ductile Iron	120	-113	0.63	0.33	0
224	WD1 South Tank	J-24	1469.08	8.6	Ductile Iron	120	122	0.67	0.44	0
225	J-22	J-25	4659.05	8.6	Ductile Iron	120	-83	0.47	0.72	0
226	J-25	J-26	4161.78	8.6	Ductile Iron	120	-97	0.54	0.85	0
227	J-26	41A East End	704.62	8.6	Ductile Iron	120	-204	1.14	0.57	0.001
228	J-26	41A West End	2160.92	8.6	Ductile Iron	120	14	0.08	0.01	0
229	J-26	WD1 Valley End	1405.32	8.6	Ductile Iron	120	78	0.44	0.19	0
230	J-2	CR 5 End	2728.71	10.6	Ductile Iron	120	5	0.02	0	0
231	WD 2 CV (Atkinson)	J-16	7220.38	8.6	Ductile Iron	120	193	1.08	5.24	0.001
232	WD 2 CV (Atkinson)	J-17	548.97	8.6	Ductile Iron	120	-193	1.08	0.4	0.001
233	J-16	State Park	689.77	10.6	Ductile Iron	120	306	1.12	0.42	0.001
236	J-31	J-32	830.98	10.6	Ductile Iron	120	-117	0.43	0.09	0
237	J-22	J-33	1403.02	8.6	Ductile Iron	120	44	0.25	0.07	0
238	J-33	J-24	896.4	8.6	Ductile Iron	120	-143	0.8	0.38	0
239	J-31	J-34	5991.78	8.6	Ductile Iron	120	47	0.26	0.32	0
240	J-34	J-35	1546.81	8.6	Ductile Iron	120	22	0.12	0.02	0
241	J-34	J-36	6528.57	8.6	Ductile Iron	120	14	0.08	0.04	0
242	J-24	J-37	2076.93	8.6	Ductile Iron	120	-31	0.17	0.05	0
243	WD1 Valley End	J-38	2607.96	8.6	Ductile Iron	120	64	0.36	0.25	0
244	41A East End	J-39	4250.37	8.6	Ductile Iron	120	-219	1.22	3.9	0.001
246	J-39	J-41	696.08	8.6	Ductile Iron	120	-241	1.34	0.76	0.001
247	J-41	Frank Lacey End	2509.75	8.6	Ductile Iron	120	4	0.02	0	0
248	J-44	J-45	3845.77	8.6	Ductile Iron	120	245	1.37	4.35	0.001
250	J-48	J-41	4159.54	8.6	Ductile Iron	120	248	1.39	4.82	0.001
251	J-47	J-50	7526.92	8.6	Ductile Iron	120	243	1.36	8.38	0.001
252	J-50	J-51	1918.18	8.6	Ductile Iron	120	7	0.04	0	0
254	J-53	J-52	3434.33	8.6	Ductile Iron	120	620	3.43	21.13	0.006
255	J-55	J-53	830.05	8.6	Ductile Iron	120	305	1.68	1.37	0.002
256	J-55	J-58	2877.44	8.6	Ductile Iron	120	9	0.05	0.01	0
259	J-53	J-60	1296.53	8.6	Ductile Iron	120	-330	1.82	2.48	0.002
260	J-60	Schoeller	1546.53	10.6	Ductile Iron	120	30	0.11	0.01	0
261	J-50	J-49	3938.96	8.6	Ductile Iron	120	228	1.28	3.92	0.001
262	J-49	J-59	1347.03	8.6	Ductile Iron	120	12	0.07	0.01	0
263	J-37	J-61	2466.94	8.6	Ductile Iron	120	-34	0.19	0.07	0

264	J-61	J-62	2855.64	8.6	Ductile Iron	120	-50	0.28	0.17	0
265	J-62	J-63	4499.03	8.6	Ductile Iron	120	-55	0.31	0.32	0
266	J-61	J-64	3554.86	8.6	Ductile Iron	120	13	0.07	0.02	0
267	J-64	J-65	1666.35	8.6	Ductile Iron	120	13	0.07	0.01	0
268	J-45	J-66	2117.55	8.6	Ductile Iron	120	236	1.32	2.23	0.001
269	J-66	CR 41 End	449.66	8.6	Ductile Iron	120	228	1.28	0.45	0.001
270	J-66	J-67	4908.19	8.6	Ductile Iron	120	7	0.04	0.01	0
272	J-52	WD1 CV (Lehigh)	2850.12	8.6	Ductile Iron	120	0	0	0	0
273	WD1 CV (Lehigh)	J-47	1214.68	8.6	Ductile Iron	120	0	0	0	0
274	J-52	J-69	4992.96	8.6	Ductile Iron	120	35	0.19	0.15	0
275	J-44	J-70	4799.9	8.6	Ductile Iron	120	75	0.41	0.58	0
276	J-70	J-71	1757.19	8.6	Ductile Iron	120	65	0.36	0.16	0
277	J-71	J-72	1082.31	8.6	Ductile Iron	120	59	0.32	0.08	0
278	J-72	J-48	4735.77	8.6	Ductile Iron	120	54	0.3	0.31	0
279	J-71	J-73	2271.71	8.6	Ductile Iron	120	3	0.02	0	0
280	J-38	J-63	2610.96	8.6	Ductile Iron	120	60	0.33	0.21	0
281	J-65	J-74	4533.59	8.6	Ductile Iron	120	5	0.03	0	0
282	J-68	WD3 Connection	4532.12	14	Ductile Iron	120	205	0.43	0.33	0
283	WD3 Connection	J-60	3353.61	14	Ductile Iron	120	360	0.75	0.7	0
310	J-68	J-55	6604.57	12.4	Ductile Iron	120	332	0.88	2.15	0
321	WD3 Connection	J-76	2901.2	9.8	PVC	120	-156	0.66	0.73	0
323	Pine Grove End	Selkirk Shores SP	4309.65	8.6	Ductile Iron	120	0	0	0	0
331	J-101	Maltby Rd CV	1009.78	9.8	PVC	120	0	0	0	0
333	Maltby Rd CV	J-103	3446.56	9.8	PVC	120	0	0	0	0
335	J-103	J-104	3550.42	9.8	PVC	120	-10	0.04	0.01	0
340	J-105	J-106	2477.8	9.8	PVC	120	-22	0.09	0.02	0
346	J-108	J-109	2808.97	8	PVC	120	18	0.12	0.04	0
348	J-109	J-110	1885.1	8	PVC	120	10	0.07	0.01	0
350	J-110	J-111	1064.67	8	PVC	120	-2	0.01	0	0
352	J-111	J-112	1089.82	8	PVC	120	-41	0.26	0.06	0
354	J-112	J-113	880.13	8	PVC	120	-24	0.15	0.02	0
356	J-113	J-114	1482.2	8	PVC	120	-38	0.24	0.07	0
360	J-115	J-116	1299.16	8	PVC	120	-46	0.3	0.09	0
362	J-116	J-117	1550.71	8	PVC	120	-101	0.65	0.47	0
370	J-120	J-121	820.47	9.8	PVC	120	-93	0.4	0.08	0
372	J-121	J-122	2454.39	8	PVC	120	-98	0.63	0.71	0
374	J-122	J-123	2943.41	8	PVC	120	-116	0.74	1.16	0
378	J-124	J-125	1921.51	8	PVC	120	-138	0.88	1.04	0.001
384	J-127	J-128	2236.35	8	PVC	120	26	0.17	0.06	0
403	J-137	J-130	2599.1	8	PVC	120	-226	1.44	3.5	0.001
407	J-137	J-125	408.38	8	PVC	120	290	1.85	0.87	0.002
410	PMP-1	J-138	493.21	14	Ductile Iron	120	0	0	0	0
411	J-138	uastore 4428 0.3MG ta	452.02	14	Ductile Iron	120	0	0	0	0
414	R-Schoeller	PMP-1	716.03	14	Ductile Iron	120	0	0	0	0
421	R-Fernwood	PMP-3	749.9	12	Ductile Iron	120	0	0	0	0
422	PMP-3	WD1 South Tank	695.2	12	Ductile Iron	120	0	0	0	0
423	R-Fernwood	PMP-2	893.36	12	Ductile Iron	120	0	0	0	0
424	PMP-2	WD1 South Tank	750.72	12	Ductile Iron	120	0	0	0	0
426	J-58	Centerville Ext.	5449.58	8.6	Ductile Iron	120	2	0.01	0	0
434	J-108	J-140	4372.79	8	PVC	120	-81	0.51	0.87	0
440	J-140	J-117	2160.04	8	PVC	120	35	0.22	0.09	0
446	J-107	J-145	1567.74	8	PVC	120	8	0.05	0	0
454	J-149	J-101	3890.27	9.8	PVC	120	57	0.24	0.15	0
463	J-151	J-108	1073.75	9.8	PVC	120	-57	0.24	0.04	0

509	J-104	Clark Low	1974.04	9.8	PVC	120	-16	0.07	0.01	0
510	Clark Low	J-105	6332.28	9.8	PVC	120	-16	0.07	0.02	0
515	J-107	Tryon High Pt	1092.19	9.8	PVC	120	-46	0.2	0.03	0
517	J-102	J-149	2520.34	9.8	PVC	120	80	0.34	0.18	0
574	J-157 (Rt 3 High)	Brennans Beach End	2518	9.8	PVC	120	-6	0.03	0	0
578	J-106	J-158 (MCS)	2544.11	9.8	PVC	120	-28	0.12	0.03	0
579	J-158 (MCS)	J-107	3373.87	9.8	PVC	120	-28	0.12	0.04	0
593	J-163	J-127	474.4	8	PVC	120	134	0.85	0.24	0.001
595	J-141	J-164	1668.73	8	PVC	120	-130	0.83	0.8	0
596	J-164	J-125	4487.53	8	PVC	120	-140	0.89	2.48	0.001
603	J-127	J-167	1529.43	8	PVC	120	34	0.22	0.06	0
609	J-168	J-167	968.92	8	PVC	120	-118	0.75	0.39	0
611	J-14	J-170	390.1	10.6	Ductile Iron	120	164	0.6	0.07	0
612	J-170	J-11	202.71	10.6	Ductile Iron	120	167	0.61	0.04	0
614	J-14	J-171	601.57	8.6	Ductile Iron	120	74	0.41	0.07	0
615	J-171	J-15	216.25	8.6	Ductile Iron	120	71	0.4	0.02	0
616	J-170	J-171	230.38	8.6	Ductile Iron	120	-3	0.01	0	0
617	J-104	J-1	3646.21	9.8	PVC	120	0	0	0	0
619	J-105	J-172	2398.48	9.8	PVC	120	0	0	0	0
620	J-172	J-155 (Deer Cr)	1314.35	9.8	PVC	120	0	0	0	0
622	J-172	J-173	708.76	9.8	PVC	120	0	0	0	0
628	J-175	J-116	1201.21	8	PVC	120	-45	0.29	0.08	0
631	J-175	J-115	1775.48	8	PVC	120	12	0.08	0.01	0
634	J-177	J-175	2747.91	8	PVC	120	-33	0.21	0.1	0
635	J-114	J-177	1168.35	8	PVC	120	-13	0.08	0.01	0
638	J-178	J-177	940.38	8	PVC	120	-20	0.13	0.01	0
639	J-114	J-178	1354.38	8	PVC	120	11	0.07	0.01	0
645	J-112	J-181	546.18	8	PVC	120	-32	0.2	0.02	0
650	J-181	J-183	776.48	8	PVC	120	-32	0.2	0.03	0
651	J-183	J-178	1054.78	8	PVC	120	-32	0.2	0.04	0
660	J-120	Sunset End	1402.91	8	PVC	120	2	0.01	0	0
662	J-117	J-187	463.65	9.8	PVC	120	-76	0.32	0.03	0
663	J-187	J-120	1393.8	9.8	PVC	120	-76	0.32	0.09	0
674	J-123	J-192	702.45	8	PVC	120	-128	0.82	0.33	0
675	J-192	J-124	1088.26	8	PVC	120	-128	0.82	0.51	0
688	J-128	J-197	926.42	8	PVC	120	14	0.09	0.01	0
689	J-197	streamside Campground	1272.09	8	PVC	120	14	0.09	0.01	0
691	J-197	Doreen End	468.18	8	PVC	120	0	0	0	0
695	J-146	Rainbow Shores End	4540.92	8	PVC	120	0	0	0	0
704	J-122	Wilder End	1031.89	8	PVC	120	6	0.04	0	0
708	J-167	J-163	1387.1	8	PVC	120	-85	0.54	0.3	0
717	J-168	J-210	2621.42	8	PVC	120	118	0.75	1.07	0
718	J-210	J-208	327.27	8	PVC	120	51	0.33	0.03	0
720	J-210	J-211	755.9	8	PVC	120	57	0.36	0.08	0
722	J-211	J-212	738.3	8	PVC	120	-40	0.26	0.04	0
731	J-214	Ross Park Dr	559.35	8	PVC	120	34	0.22	0.02	0
733	Ross Park Dr	J-217	186.12	8	PVC	120	-23	0.15	0	0
735	J-214	J-218	287.17	8	PVC	120	37	0.24	0.01	0
737	J-217	J-218	473.31	8	PVC	120	-17	0.11	0.01	0
739	J-217	J-219	358.9	8	PVC	120	-6	0.04	0	0
741	J-219	J-220	344.63	8	PVC	120	0	0	0	0
743	J-218	J-221	267.51	8	PVC	120	20	0.13	0	0
744	J-221	Emily Ln	525.54	8	PVC	120	14	0.09	0	0
745	J-219	J-221	618.34	8	PVC	120	-6	0.04	0	0

750	J-222	J-223	1381.25	8	PVC	120	71	0.45	0.22	0
751	J-223	J-214	461.79	8	PVC	120	71	0.45	0.07	0
753	Ross Park Dr	J-224	782.57	8	PVC	120	44	0.28	0.05	0
756	J-224	J-226	529.76	8	PVC	120	44	0.28	0.03	0
758	J-226	Greene Point End	5519.92	8	PVC	120	44	0.28	0.35	0
762	J-140	Route 15 @ Rte 3	372.67	8	PVC	120	-117	0.74	0.15	0
763	Route 15 @ Rte 3	J-141	1025.14	8	PVC	120	-122	0.78	0.44	0
774	Rte 62 @ Rte 15	End of Rte 15	6602.47	9.8	PVC	120	5	0.02	0	0
780	J-149	End of Rte 11 Sandy Cree	16098.38	9.8	PVC	120	16	0.07	0.06	0
785	J-236	Balcom End	1280.79	8	PVC	120	1	0	0	0
789	J-109	J-239	2581.34	8	PVC	120	0	0	0	0
791	Tryon High Pt	J-240	4398.59	9.8	PVC	120	-46	0.2	0.12	0
792	J-240	J-151	1065.12	9.8	PVC	120	-49	0.21	0.03	0
794	J-240	J-241	1736.4	8	PVC	120	3	0.02	0	0
796	J-137	J-242	966.93	8	PVC	120	-64	0.41	0.13	0
797	J-242	J-127	2165.85	8	PVC	120	-67	0.43	0.31	0
801	J-242	J-244	432.87	8	PVC	120	3	0.02	0	0
802	J-244	J-243	732.16	8	PVC	120	2	0.01	0	0
804	J-244	J-245	1366.98	8	PVC	120	1	0.01	0	0
806	J-130	J-246	909.76	8	PVC	120	221	1.41	1.18	0.001
807	J-246	J-163	1271.31	8	PVC	120	221	1.41	1.65	0.001
811	J-76	J-248	4660.93	9.8	PVC	120	96	0.41	0.48	0
812	J-248	J-102	4806.46	9.8	PVC	120	86	0.37	0.4	0
822	J-253	J-248	3506.21	9.8	PVC	120	-10	0.04	0.01	0
823	J-253	End of Orton Rd (North)	5906.96	9.8	PVC	120	10	0.04	0.01	0
826	Quastore 4428 0.3MG ta	J-254	5089.15	14	Ductile Iron	120	539	1.12	2.25	0
827	J-254	J-68	5818.84	14	Ductile Iron	120	536	1.12	2.55	0
829	J-254	J-255	1094.06	8	PVC	120	3	0.02	0	0
832	J-212	J-256	782.09	8	PVC	120	1	0.01	0	0
833	J-212	J-208	137.5	8	PVC	120	-49	0.31	0.01	0
835	J-208	J-257	705.45	8	PVC	120	2	0.01	0	0
837	J-103	J-258	1798.53	8	PVC	120	3	0.02	0	0
842	State Park	J-260	5859.83	10.6	Ductile Iron	120	263	0.96	2.68	0
843	J-260	J-14	1259.07	10.6	Ductile Iron	120	257	0.94	0.55	0
845	J-260	J-261	2297.6	8	PVC	120	6	0.04	0	0
847	St Rt 13 End	J-262	9067.52	9.8	PVC	120	12	0.05	0.02	0
850	J-263	J-16	921.97	10.6	Ductile Iron	120	138	0.5	0.13	0
851	CR 28 End	J-263	5645.49	8	PVC	120	0	0	0	0
854	J-18	J-265	168.55	8.6	Ductile Iron	120	17	0.1	0	0
855	J-265	CR 28 End	1534.9	8.6	Ductile Iron	120	10	0.05	0	0
857	WD 2 CV (Manwaring)	J-266	3054.77	8.6	Ductile Iron	120	-192	1.07	2.19	0.001
858	J-266	J-33	1903.42	8.6	Ductile Iron	120	-184	1.03	1.27	0.001
861	J-31	J-267	805.38	10.6	Ductile Iron	120	67	0.24	0.03	0
862	J-267	J-263	3710.36	10.6	Ductile Iron	120	138	0.5	0.51	0
866	J-265	J-269	806.02	8	Ductile Iron	120	8	0.05	0	0
867	J-269	J-266	5066.17	8	Ductile Iron	120	8	0.05	0.01	0
870	J-25	J-270	2558.96	8	PVC	120	4	0.03	0	0
872	J-48	J-271	2350.26	8.6	Ductile Iron	120	4	0.02	0	0
874	J-271	J-272	1855.38	8	PVC	120	4	0.03	0	0
876	WD 2 CV (Manwaring)	J-273	4617.38	8.6	Ductile Iron	120	192	1.07	3.32	0.001
877	J-273	J-32	3787.29	8.6	Ductile Iron	120	121	0.68	1.16	0
880	J-273	J-274	2000.58	8.6	Ductile Iron	120	0	0	0	0
881	J-274	J-74	3204.7	8	PVC	120	0	0	0	0
883	J-62	J-275	1045.27	8.6	Ductile Iron	120	0	0	0	0

900	J-281	J-40	2734.63	8.6	Ductile Iron	120	11	0.06	0.01	0
902	J-281	J-282	793.94	8.6	Ductile Iron	120	0	0	0	0
904	J-282	J-283	1632.25	8	PVC	120	0	0	0	0
906	J-39	J-284	2038.57	8.6	Ductile Iron	120	15	0.08	0.01	0
907	J-284	J-281	2763.32	8.6	Ductile Iron	120	11	0.06	0.01	0
909	J-284	J-285	1364.39	8.6	Ductile Iron	120	4	0.02	0	0
911	J-285	J-286	2062	8	PVC	120	4	0.03	0	0
913	J-59	J-287	3623.74	8.6	Ductile Iron	120	0	0	0	0
915	J-287	J-288	2027.08	9.8	PVC	120	0	0	0	0
917	J-38	J-289	1999.1	8	PVC	120	0	0	0	0
919	J-38	J-290	1966.59	8.6	Ductile Iron	120	0	0	0	0
921	CR 41 End	J-291	4409.66	8.6	Ductile Iron	120	219	1.22	4.05	0.001
922	J-291	J-22	10959.83	8.6	Ductile Iron	120	83	0.47	1.68	0
923	J-17	J-291	6619.25	8	PVC	120	-136	0.87	3.46	0.001
925	J-145	J-292	1299.03	8	PVC	120	3	0.02	0	0
926	J-292	J-146	725.91	8	PVC	120	-2	0.01	0	0
928	J-292	J-293	707.53	8	PVC	120	5	0.03	0	0
930	J-211	Chipman Ln	2305.7	8	PVC	120	92	0.59	0.59	0
931	Chipman Ln	J-222	1961.39	8	PVC	120	72	0.46	0.32	0
933	J-114	J-295	688.17	8	PVC	120	-49	0.31	0.05	0
934	J-295	J-115	605.04	8	PVC	120	-49	0.31	0.05	0
939	J-296	Rt 3 High	1527.81	8	PVC	120	0	0	0	0
940	Rt 3 High	Rte 3 @ Hilton	1360.13	8	PVC	120	0	0	0	0
942	J-258	Hinman High	1199.1	8	PVC	120	3	0.02	0	0
943	Hinman High	J-259	1178.82	9.8	PVC	120	3	0.01	0	0
963	J-146	J-308	1675.86	8	PVC	120	-12	0.08	0.01	0
964	J-308	J-111	7073.58	8	PVC	120	-26	0.16	0.17	0
970	J-273	J-309	2562.22	8.6	Ductile Iron	120	71	0.39	0.28	0
973	J-310	J-267	4996	8	PVC	120	71	0.45	0.78	0
974	J-309	J-310	1390.14	8	PVC	120	71	0.45	0.22	0
977	J-311	J-52	3313.76	9.8	PVC	120	-7	0.03	0	0
980	J-311	J-312	6568.06	9.8	PVC	120	4	0.01	0	0
990	End of Sawmill	J-315	2691.64	8	PVC	120	-3	0.02	0	0
1025	uastore 4428 0.3MG ta	Peck Rd	9682.94	11.7	PVC	120	261	0.78	2.68	0
1026	Peck Rd	J-76	6334.95	11.7	PVC	120	258	0.77	1.72	0
1034	J-155 (Deer Cr)	PRV-5	477.23	9.8	Ductile Iron	120	0	0	0	0
1035	PRV-5	J-157 (Rt 3 High)	1668.13	9.8	Ductile Iron	120	0	0	0	0
1075	J-130	North Pond Tank	648.2	8	PVC	120	-450	2.87	3.13	0.005
1120	J-315	Co Rt 62 High	762.67	9.8	PVC	120	25	0.11	0.01	0
1150	Co Rt 62 High	Route 62 @ Hilton	2439.79	9.8	PVC	120	23	0.1	0.02	0
1182	J-236	J-315	4156.54	9.8	PVC	120	29	0.12	0.05	0
1184	J-101	PSV-3	1781.02	9.8	Ductile Iron	120	50	0.21	0.05	0
1185	PSV-3	J-236	2710.47	9.8	Ductile Iron	120	50	0.21	0.08	0
1186	Rte 3 @ Hilton	Route 62 @ Hilton	6693.52	9.8	PVC	120	-5	0.02	0	0
1187	Route 62 @ Hilton	Rte 62 @ Rte 15	3533.39	9.8	PVC	120	15	0.06	0.01	0
1189	Rte 3 @ Hilton	PSV-4	1120.67	8	Ductile Iron	120	0	0	0	0
1190	PSV-4	Route 15 @ Rte 3	4536.42	8	Ductile Iron	120	0	0	0	0
1192	J-106	PSV-5	1059.05	8	Ductile Iron	120	0	0	0	0
1193	PSV-5	J-296	599.12	8	Ductile Iron	120	0	0	0	0
1195	Rte 62 @ Rte 15	PSV-6	451.41	8	Ductile Iron	120	0	0	0	0
1196	PSV-6	Route 15 @ Rte 3	5282.67	8	Ductile Iron	120	0	0	0	0
1198	J-45	J-329	2584.83	8	PVC	120	2	0.01	0	0
1211	J-52	J-47	4043.16	8.6	Ductile Iron	120	576	3.18	21.71	0.005
1215	J-48	J-49	2183.6	8.6	Ductile Iron	120	-202	1.12	1.68	0.001

1216	J-44	J-47	6848.99	8.6	Ductile Iron	120	-327	1.8	12.84	0.002
1227	J-262	J-331	1558.18	8	PVC	120	0	0	0	0

Date: Monday, August 8, 2016

GBK

**Exhibit E**

**Budgetary Project Cost Estimate**

Tabel 1 - Budgetary Project Cost Estimate

Richland - Base Sections

Survey Results

Section	Location	Length	Main Size	Total Estimated			In Favor	Against	% Favor
				Cost	EDUs	Cost/EDU			
1	Canning Factory Rd to Orton Rd	9,500	8	\$512,950	29	\$17,688	15	0	100%
2	Hinman Rd	2,400	8	\$131,000	5	\$26,200	6	0	100%
3	Ivens Rd & Daysville Rd	6,300	8	\$337,250	18.5	\$18,230	6	1	86%
4	N. Fernwood Rd	3,000	8	\$159,200	8	\$19,900	5	0	100%
5	Petrie Rd	1,900	8	\$101,150	6.5	\$15,562	5	0	100%
6	Route 13 West of Pulaski	10,100	8	\$529,050	9.5	\$55,689	11	0	100%
7	Co Rte 48 Richland from Transmission Main South	1,100	8	\$100,350	24	\$4,181	7	0	100%
8	Sherman Lacy Rd West of 81	2,100	8	\$114,450	10.5	\$10,900	6	2	75%
9	Spath Dr	2,500	8	\$142,750	14	\$10,196	12	5	71%
10	Towne Road, Halsey Road, Route 13 Loop	10,700	8	\$581,050	29.5	\$19,697	7	3	70%
11	Redundant Transmission Main (North along Stowell Rd, Main St, Co Rt 2 to Springbrook)	18,300	12	\$1,288,400	35	\$36,811	7	8	47%
12	Install 2 New Valves on Transmission Main @ Springbrook)		14	\$40,000					
		9.4	miles 8"	\$4,102,600	189.5	\$21,650	87	19	82%
		3.5	miles 12"						

Richland - Optional Sections

Survey Results

Section	Location	Length	Main Size	Total Estimated			In Favor	Against	% Favor
				Cost	EDUs	Cost/EDU			
13	West Wood Rd	1,800	8	\$95,700	2.5	\$38,280	2	0	100%
14	Valley Rd	2,100	8	\$110,850	5.5	\$20,155	3	2	60%
15	Towne Rd	2,600	8	\$139,800	3.5	\$39,943	3	0	100%
16	Daysville Rd to Dunlap Rd	3,200	8	\$170,500	2	\$85,250	2	0	100%
17	Peck Rd Transmission (From Co Rt 2 to Existing Transmission)	2,800	12	\$147,100	2.5	\$58,840	1	0	100%

Sandy Creek - Base Sections

Survey Results

Section	Location	Length	Main Size	Total Estimated			In Favor	Against	% Favor
				Cost	EDUs	Cost/EDU			
1	South Sandy Pond Inlet Rd	2,300	8	\$127,850	17.5	\$7,306	8	1	89%
2	North Rainbow Shores Rd	4,600	8	\$261,700	44.5	\$5,881	24	10	71%
3	Route 15 (Between Ouderkerk and State Park)	1,900	8	\$100,850	4.5	\$22,411	3	0	100%
4	US Route 11	13,000	8	\$681,600	33.5	\$20,346	16	7	70%
5	Hilton Rd, North Street	10,300	8	\$557,950	18.5	\$30,159	8	2	80%
6	State Route 3 (Rainbow Shores to Rt. 15)	10,100	8	\$535,950	20.5	\$26,144	12	3	80%
7	Whitney Lane	2,950	8	\$168,625	23.5	\$7,176	8	3	73%
8	Chipman Lane	5,100	8	\$316,750	70.5	\$4,493	45	7	87%
9	State Route 3 (Chipman Ln to Sandy Pond Inlet)	1,400	8	\$73,500	2	\$36,750	0	0	0%
10	Country Club Ln (Includes Elms Rd extending toward Rt. 3)	2,400	8	\$143,000	9	\$15,889	4	1	80%
11	Sandy Pond Inlet	1,780	8	\$96,790	20.5	\$4,721	5	4	56%
12	Lindsey Drive	650	8	\$40,775	13	\$3,137	4	2	67%
13	Emily Lane	650	8	\$41,075	5	\$8,215	3	2	60%
14	Laura Drive	500	8	\$32,750	8.5	\$3,853	3	0	100%
15	Marsha Drive	550	8	\$34,725	7.5	\$4,630	4	3	57%
16	Ross Park Drive & Mona Lane	1,700	8	\$107,050	31.5	\$3,398	15	9	63%
17	Greene Point Rd (Including Rte 3 to Mona Ln)	6,100	8	\$460,950	65.5	\$7,037	11	7	61%
18	Beaver Lane / Deer Run Road	2,100	8	\$105,950	8.5	\$12,465	3	1	75%
19	Waful Tract Drive	1,750	8	\$95,525	6	\$15,921	4	0	100%
20	Wilder Dr	950	8	\$64,425	18	\$3,579	6	2	75%
21	County Route 62 (Richland WD3 to Hilton Rd)	11,000	8	\$605,700	28.5	\$21,253	8	9	47%
22	Elms Rd (Route 3 to existing Elm's Rd Water Main)	1,500	8	\$88,750	4.5	\$19,722	4	1	80%
23	Private Rd off of Rainbow Shores (Near Ontario RV Park)	750	8	\$50,825	11	\$4,620	5	2	71%
24	State Route 3 (Punkin Hood Dr to Haldey Rd)	-	8	\$6,000	7.5	\$800	2	3	40%
		15.8	miles	\$4,799,065	479.5	\$10,008	205	79	72%

Sandy Creek - Optional Sections

Survey Results

Section	Location	Length	Main Size	Total Estimated			In Favor	Against	% Favor
				Cost	EDUs	Cost/EDU			
24	County Route 15 (Lake Street)	6,600	8	\$355,000	14.5	\$24,483	9	8	53%
25	Hadley Rd (to Skinner)	3,900	8	\$219,950	12.5	\$17,596	5	6	45%
26	County Route 15 (from Rt. 3 to Lake Street)	5,700	8	\$293,950	31.5	\$9,332	4	8	33%
27	Seber Shores Rd	2,500	8	\$137,750	2	\$68,875	0	0	0%
28	Balcom Dr (Off Co. Rt. 62)	1,400	8	\$76,900	2.5	\$30,760	1	1	50%
<b>TOTAL</b>							<b>322</b>	<b>123</b>	<b>72%</b>

## Table 2: Budgetary Cost Estimate

*Joint Water Project (Richland WD5, SC WD3)*

Table 1: *Budgetary Project Cost Estimate, Base Project*

ITEM	QUANTITY	UNITS	UNIT COST	ESTIMATED COST (2016 Dollars)
<i>Distrubution System (Richland)</i>	1	LS	\$4,102,600	\$4,102,600
<i>Distribution System (Sandy Creek)</i>	1	LS	\$4,799,065	\$4,799,065
<i>Control Valves</i>	1	EA	\$80,000	\$80,000
<i>Schoeller Well Site Improvements</i>	1	LS	\$150,000	\$150,000
<i>Master Meters</i>	3	EA	\$20,000	\$60,000
<i>Instrumentation &amp; Control</i>	1	LS	\$60,000	\$60,000
Construction Total				\$9,251,665
Contingency (10%)				\$925,167
Subtotal				\$10,176,832
2020 Subtotal (10% Inflation)				\$11,195,000
Estimated Engineering, Legal, Administration (25%)				\$2,799,000
<b>Total Estimated Project Capital Cost</b>				<b>\$13,994,000</b>

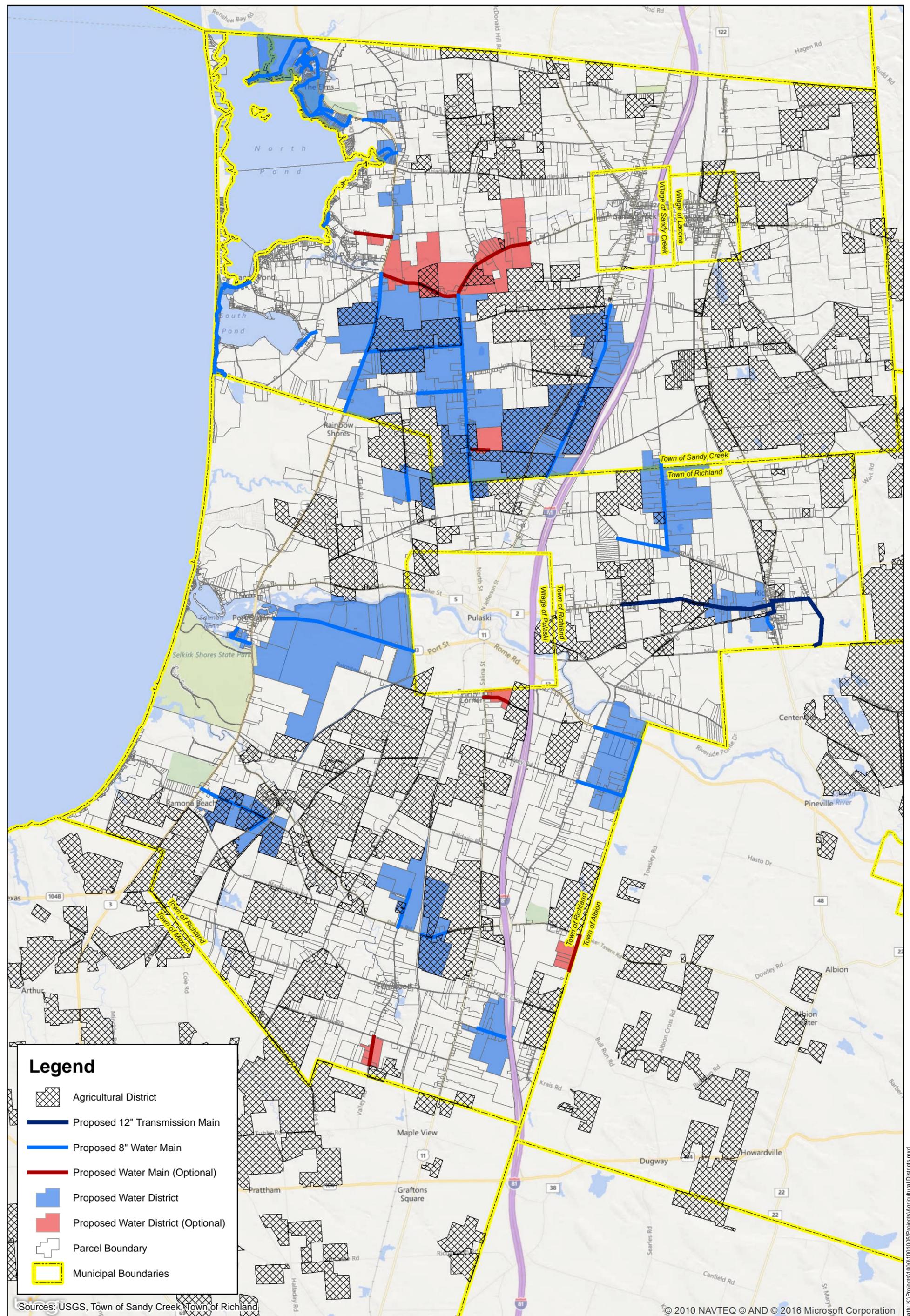
### Table 3: Budgetary Project Cost Estimate

User Cost Estimate

### Joint Water Project (Richland WD5, SC WD3)

DESCRIPTION	
Base Project Percentage in Favor	72.4%
<i>Total Estimated Project Cost</i>	\$13,994,000
<i>Grant (DWSRF)</i>	\$2,000,000
<i>Total Estimated Project Cost Less Grant</i>	\$11,994,000
<i>EDUs Served - Town of Richland</i>	189.5
<i>EDUs Served - Town of Sandy Creek</i>	479.5
<i>EDUs Served - Total</i>	669.0
<i>2013 Median Household Income (MHI) - Town of Richland</i>	\$46,966.00
<i>2013 MHI - Town of Sandy Creek</i>	\$41,603.00
<i>2013 MHI - Combined Weighted Average</i>	\$43,122.12
<i>Annualized Project Cost (Levelized Payments)</i>	\$399,800
<i>Annualized Project Cost (50% Rule)</i>	\$319,840
<u><i>Costs Per EDU</i></u>	
<i>Annual Debt Service</i>	\$478
<i>Annual O&amp;M (\$90/year plus 2% inflation for 4 years)</i>	\$99
<i>Minimum Annual Water Usage (&lt;40,000 gal @ \$2.10/gal plus 2% inflation for 4 years))</i>	\$91
<b>Total Cost Per EDU</b>	<b>\$668</b>

**Exhibit F**  
**Agricultural Districts**



**Legend**

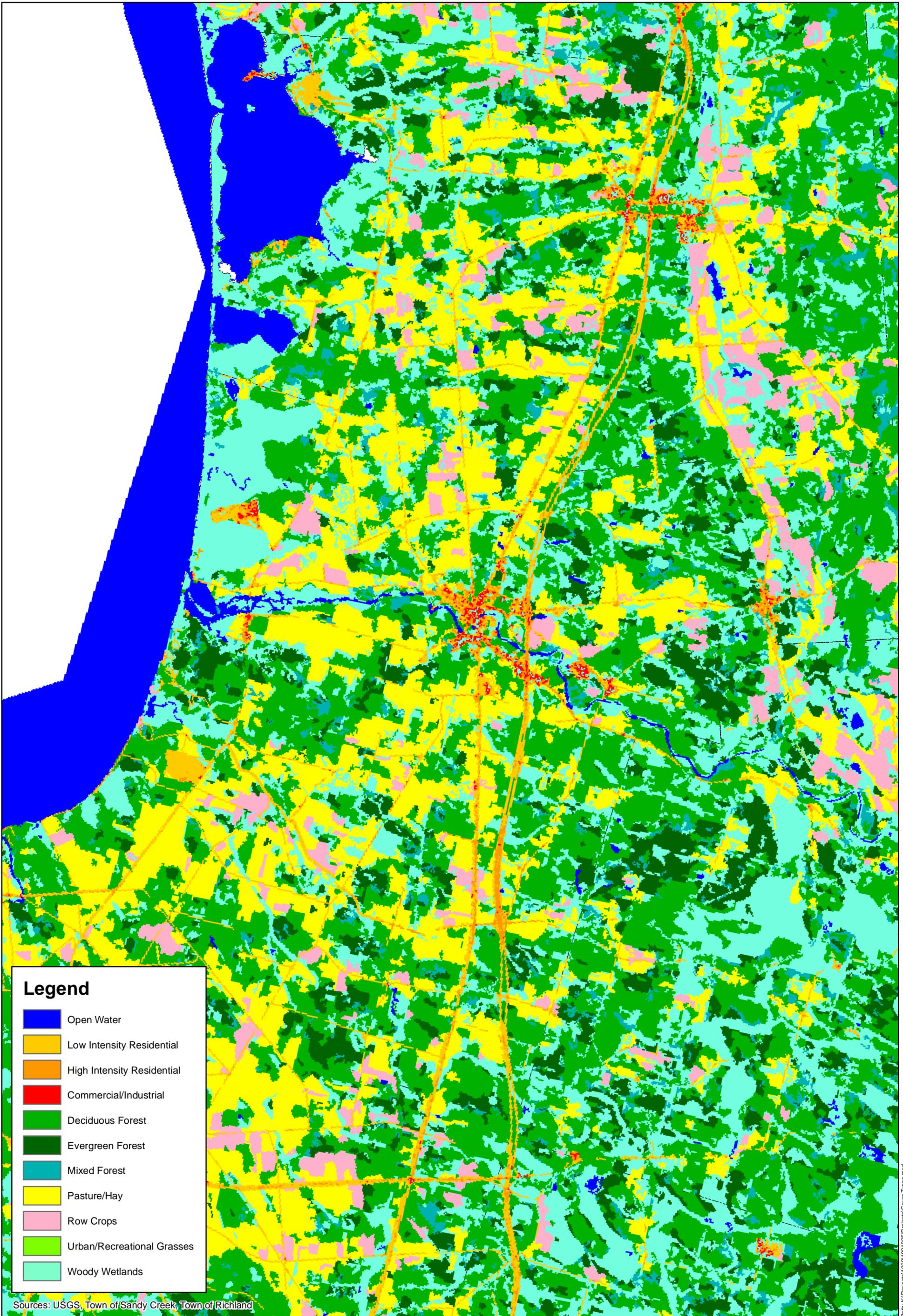
- Agricultural District
- Proposed 12" Transmission Main
- Proposed 8" Water Main
- Proposed Water Main (Optional)
- Proposed Water District
- Proposed Water District (Optional)
- Parcel Boundary
- Municipal Boundaries

Sources: USGS, Town of Sandy Creek, Town of Richland

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Path: K:\Projects\1001.005\Projects\Agricultural Districts.mxd

**Exhibit G**  
**Land Cover Types**

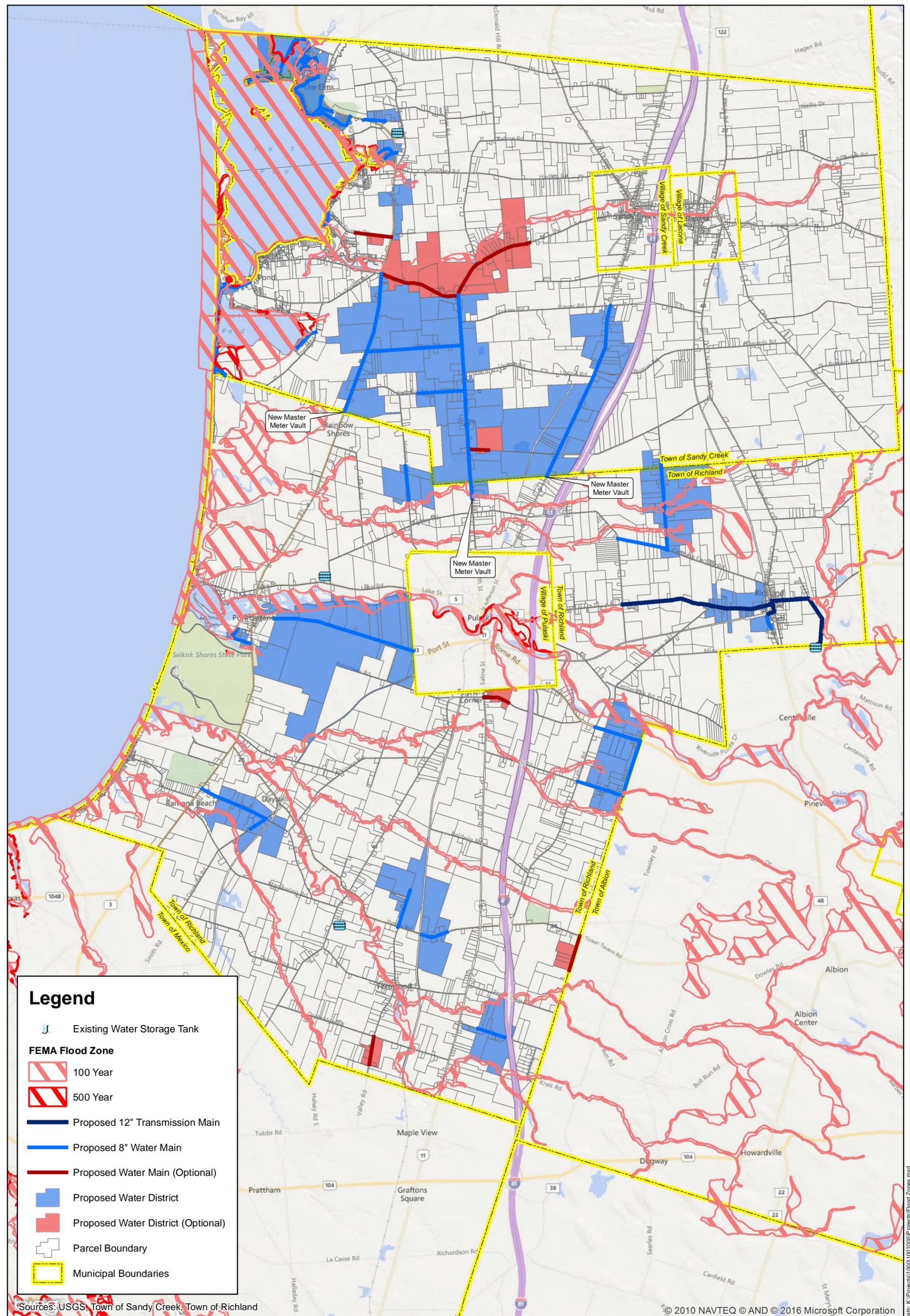


**Legend**

- Open Water
- Low Intensity Residential
- High Intensity Residential
- Commercial/Industrial
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Pasture/Hay
- Row Crops
- Urban/Recreational Grasses
- Woody Wetlands

Sources: USGS, Town of Sandy Creek, Town of Richland

**Exhibit H**  
**FEMA Flood Zones**



**Legend**

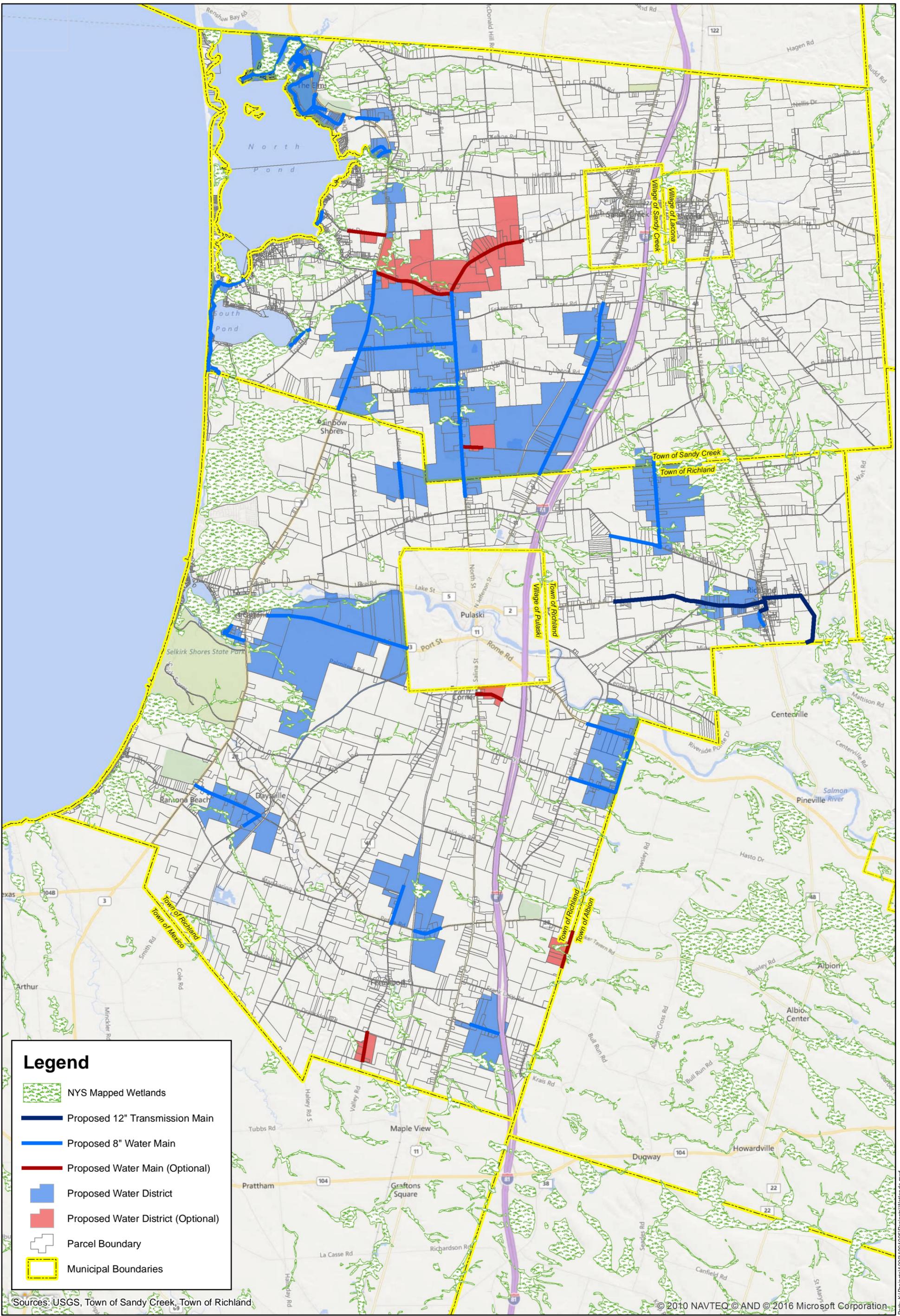
- Existing Water Storage Tank
- FEMA Flood Zone**
- 100 Year
- 500 Year
- Proposed 12" Transmission Main
- Proposed 8" Water Main
- Proposed Water Main (Optional)
- Proposed Water District
- Proposed Water District (Optional)
- Parcel Boundary
- Municipal Boundaries

Sources: USGS, Town of Sandy Creek, Town of Richland

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**Exhibit I**  
**Wetland Locations**



**Legend**

- NYS Mapped Wetlands
- Proposed 12" Transmission Main
- Proposed 8" Water Main
- Proposed Water Main (Optional)
- Proposed Water District
- Proposed Water District (Optional)
- Parcel Boundary
- Municipal Boundaries

Sources: USGS, Town of Sandy Creek, Town of Richland

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## **Exhibit J**

### **Project Endorsements**



**MARGARET A. KASTLER**  
Oswego County Legislator  
District 1  
1695 CO. RT. 15  
LACONA, NY 13083

TELEPHONE (H): (315) 387-5209  
EMAIL: Kastlerm@hotmail.com

August 16, 2016

Honorable Supervisor Nancy Ridgway  
Sandy Creek Town Board Members

I am in full support of the currant water district that is being considered in partnership with the Towns of Sandy Creek and Richland. This water district is in the best interest of the residents and businesses and has been severely needed for many years. The lack of palatable drinking water is a serious health hazard and to see the planning steps is the positive action.

Fire protection has always been difficult for lack of hydrants and enough available water. This new district will provide fire departments with water on demand.

I thank you for taking the proper steps to move this district forward. If there is anything I can do to help and be of service to you, in support of this project, please do not hesitate to give me a call.

The best with this project.

A handwritten signature in blue ink that reads "Margaret A. Kastler".

Margaret A. Kastler  
District #1  
Oswego County Legislator.



WILLIAM A. BARCLAY  
Assemblyman 120<sup>th</sup> District  
Jefferson, Onondaga, and  
Oswego Counties

THE ASSEMBLY  
STATE OF NEW YORK  
ALBANY

DEPUTY MINORITY LEADER  
RANKING MINORITY MEMBER  
Insurance Committee

COMMITTEES  
Energy  
Judiciary  
Rules  
Ways & Means

August 18, 2016

Honorable Nancy Ridgeway  
Supervisor  
Town of Sandy Creek  
1992 Harwood Drive  
P.O. Box 52  
Sandy Creek, New York 13145

Dear Supervisor Ridgeway:

The partnership between the Towns of Richland and Sandy Creek has resulted in thousands of residents having access to public water. Building on this success, the towns are in the final phase of their Eastern Shore Water System Project which will provide 40 miles of a new water main to the town's residents. The towns are now pursuing the Sandy Creek/Richland Joint Water Project. The purpose of this letter is to express my support for this project.

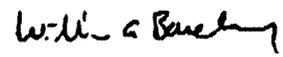
I am pleased to see the towns moving forward on this project as it has received strong support from the residents and businesses in Sandy Creek and in Richland. It is my understanding that 77% responded in favor of receiving municipal water and that it will bring public water to locations such as Sandy Island Beach State Park and Green Point Marina and Campground. The joint water project will connect 650 homes to municipal water and will also integrate 7 public water systems in the area to provide clean drinking water. Replacing the public water systems with municipal water is important because the existing system has had issues with coliform and contaminated water. Bringing municipal water to these water systems would ensure that these rv parks, campgrounds and restaurants have safe clean water.

Further, I am told that the joint project will be 28.7 miles long and will have the potential to connect into the village of Sandy Creek water system. The project is no small undertaking and is estimated to cost nearly \$14 million. I am pleased that you are looking into federal and state grants and funding opportunities. Most small communities would be unable to finance such a project without the assistance of federal and state grants or loan programs. I support your project because it will benefit area residents and businesses and will ensure that Sandy Creek and Richland residents have water that is clean and safe.

Again, thank you for taking the time to contact me on this project. I support the project and I hope it receives the necessary funding. If I may be of any further assistance to you as you apply for grant and loan programs, please do not hesitate to contact my office.

Supervisor Ridgeway  
Page 2  
August 18, 2016

Very truly yours,



William A. Barclay  
Member of the Assembly

WAB/jc