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Engineering Report

**Irving Tissue Sewer  
Main Relocation Feasibility Study**

**Washington County Sewer District #2**

**Village of Fort Edward  
Washington County, New York**

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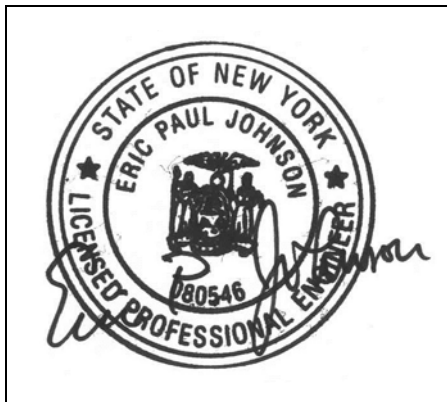
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## TABLE OF CONTENTS

<b>1.0</b>	<b>INTRODUCTION.....</b>	<b>1</b>
<b>2.0</b>	<b>PROJECT PLANNING AREA.....</b>	<b>2</b>
<b>2.1</b>	<b>Project Location .....</b>	<b>2</b>
<b>2.2</b>	<b>Environmental Resources.....</b>	<b>3</b>
<b>3.0</b>	<b>EXISTING SEWER FACILITIES .....</b>	<b>5</b>
<b>3.1</b>	<b>Existing Sewer Facilities.....</b>	<b>5</b>
<b>4.0</b>	<b>BUILD OUT DESIGN .....</b>	<b>6</b>
<b>4.1</b>	<b>McCrea Street Service Area.....</b>	<b>6</b>
<b>4.2</b>	<b>Anticipated Flows .....</b>	<b>6</b>
<b>4.3</b>	<b>Sewer Collection System Schematic Design .....</b>	<b>8</b>
<b>4.4</b>	<b>Separated Storm Sewer Schematic Design.....</b>	<b>8</b>
<b>4.5</b>	<b>River Street Pump Station Design.....</b>	<b>10</b>
<b>5.0</b>	<b>PROPOSED COLLECTION SYSTEM IMPROVEMENTS .....</b>	<b>11</b>
<b>5.1</b>	<b>Project Description .....</b>	<b>11</b>
<b>5.2</b>	<b>Environmental Impacts.....</b>	<b>12</b>
<b>5.3</b>	<b>Land Requirements.....</b>	<b>13</b>
<b>5.4</b>	<b>Opinion of Probable Construction Cost .....</b>	<b>13</b>
<b>6.0</b>	<b>PROJECT FINANCING.....</b>	<b>12</b>
<b>7.0</b>	<b>ANNUAL USER COST ANALYSIS .....</b>	<b>14</b>
<b>8.0</b>	<b>REQUIRED APPROVALS AND OTHER ACTIONS .....</b>	<b>17</b>
<b>9.0</b>	<b>CONCLUSIONS AND RECOMENDATIONS .....</b>	<b>17</b>

## APPENDICES

Appendix A:	Locus Map
Appendix B:	Existing Conditions Map
Appendix C:	Topographic Map
Appendix D:	Village of Fort Edward Zoning Map
Appendix E:	Washington County Soils Survey and Aztech Geoprobe Location Map
Appendix F:	Regulated Resource Maps
Appendix G:	Proposed Sewer Map
Appendix H-1:	Proposed Storm Drain Separation Map
Appendix H-2:	Proposed Storm Drain Calculations
Appendix I:	McCrea Street Survey Maps
Appendix J:	Pump Station Design and Cut Sheets
Appendix K:	Cost Estimate
Appendix L:	Smart Growth Assessment

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## 1.0 INTRODUCTION

The purpose of this study is to evaluate the feasibility of relocating a combined sewer main owned by Washington County Sewer District #2 (WCSD#2) in the Village of Fort Edward, from private property owned by Irving Tissue, to a public right of way in the adjacent McCrea Street. The need for this feasibility study has been prompted by an anticipated expansion within the Irving Tissue site that is expected to conflict with the existing combined sewer main.

The existing sewer system on Irving Tissue property is a combined sanitary and storm sewer system that typically discharges to the WCSD#2 collection system for treatment at the WCSD#2 Wastewater treatment plant located in the Village of Fort Edward. Two combined sewer overflows (CSO) are connected to the combined sewer infrastructure in the area by diversion structures. CSO's to the Hudson River are witnessed several times each year at these locations. The conceptual design solution proposed herein includes separation of the sanitary sewer and storm sewer systems in the areas tributary to McCrea Street. This further includes abandoning the existing combined sewer on Irving Tissue property and redirecting sanitary sewer flows to McCrea Street.

It is proposed that sanitary flows currently tributary to the Irving Tissue combined sewer be redirected into McCrea Street. The existing combined sewer system on McCrea Street is proposed to be replaced with larger mains that convey only sanitary sewer flows to the connection point with the WCSD#2 trunk sewer located along Route 4. Existing sanitary sewer laterals would be connected to the new sanitary sewer system.

Stormwater is proposed to be collected from the areas tributary to McCrea Street including Oak Street, Seminary Street, Chestnut Street, Frank Street, King Street, Valley Street, Clarks Lane, Underwood Street, Mechanic Street, Ridge Street, Windcrest Drive, Williams Street, Beverly Street and Marion Street. The stormwater would be directed to the existing CSO outfalls to the Hudson River. Drywells are proposed where soils are favorable, to promote stormwater infiltration and minimize the flow conveyed through the storm sewer to the Hudson River. Separation of these sewers would benefit the environment, and improve capacity within the system.

Included in the Feasibility Study Engineering Report are:

- Description of the existing facilities;
- Estimation of the sanitary sewer and storm sewer flows, including maximum build out based upon zoning regulations;
- Maps and Description of the proposed schematic designs;
- Maps of the proposed updated sewershed areas;
- Opinion of probable construction cost;

- Discussion of Project Financing Options;
- Estimated debt retirement and operation and maintenance cost; and
- Estimated User Costs.

Criteria outlined in the Great Lakes Upper Mississippi River Board of State Public Health and Environmental Managers (10 State Standards), “Recommended Standards for Wastewater Facilities,” 2004 edition and the New England Interstate Water Pollution Control Commission “TR-16 Guides for the design of Wastewater Treatment Works,” 2011 Edition have been considered in the development of this report.

## 2.0 PROJECT PLANNING AREA

### 2.1 Project Location

The proposed study area is located in the Village of Fort Edward, Washington County, New York, adjacent to the Hudson River; see Locus Map in Appendix A. According to 2012 US Census data, the Village of Fort Edward has a population of 3,351 and has a median household income of \$56,250 (American Fact Finder). Median household income for adjacent municipalities in the WCSD#2 is summarized in Table 1.

**Table 1: Median Household Income  
(American Fact Finder 2012)**

	Median Household Income
Town of Fort Edward	\$49,569
Village of Fort Edward	\$56,250
Town of Kingsbury	\$50,060
Village of Hudson Falls	\$40,497
Town of Queensbury	\$62,233

The study area is bound by topographic conditions within the block delineated by the Village boundary to the north, the Hudson River to the west, Route 4 to the east and the Irving Tissue Property to the south. The study area encompasses the combined sewer area identified by WCSD#2 as FE1A upstream of the Irving Tissue Property and the combined sewer area identified by WCSD#2 as area FE1B north of

McCrea Street. An existing conditions map is presented in Appendix B, illustrating the major combined sewer areas and existing sanitary sewer and storm sewer infrastructure in the area. Further, topographic mapping of areas FE1A and FE1B are depicted in Appendix C.

The study area is predominantly categorized by R-1 zoning with approximately 72.2% of the area, while R-2 zoning accounts for the remaining 27.3%. The remaining 0.5% is industrial. Four small parcels totaling roughly 0.5 acres in size on the south side of McCrea Street are zoned as industrial. One of these lots has been cleared and is surrounded by a large National Grid parcel on 3 sides; it has been assumed this lot would not be redeveloped. It has further been assumed that the National Grid site will not produce flows as it is populated with high voltage lines and a substation. The remaining three properties are at the eastern end of McCrea Street and sum to approximately 0.3 acres combined. Appendix D includes a map of the Village’s zoning in the vicinity of the study area as well as the zoning regulations

## 2.2 Environmental Resources

### Soils

The study area includes several soil types, illustrated in Appendix E, Nassau shaley silt loam (NAC), Hoosic gravelly sandy loam (HoB), Vergennes silty clay loam (VeB), Oakville loamy fine sand (OaC), and Rhinebeck Silt Loam (RhA). Soil types belong to groups A, C and D. High water may be of concern in limited areas of the watershed where Hoosic and Rhinebeck soils are found; however these soil types have limited coverage within the study area. Further detail on the soils within the study area is outlined in Table 2.

Combined sewer area FE1A is comprised primarily of poorly draining soils. Combined sewer area FE1B north of McCrea Street is dominated by well-draining soils. Appendix E includes a map of soil survey information within the study area. This information was taken from the Soil Survey of Washington County, New York, published by the United States Department of Agriculture.

**Table 2: Soil Characteristics**

Soil Name	Hydrologic Group	Depth to Bedrock	Depth to Water Table
NAC	C	48"	>60"
HoB	A	>60"	>60"
VeB	C	54"	18-30"
OaC	A	>60"	>60"
RhA	D	>60"	6-18"

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Further soil information was collected through geoprobes taken by Aztech Technologies, Inc. throughout the study area. Geoprobe locations and boring logs are included within Appendix E. Some areas were found to have a depth to bedrock of less than six feet which may pose a constructability issue in some cases. The bedrock in this area is understood to be made up of shale, according to subsurface investigations and WCSD#2 staff, and may be removable by excavator rather than jacking or blasting. The soil survey data combined with preliminary boring information is considered adequate for planning purposes; however, a detailed subsurface investigation would be warranted with the advancement of design development.

#### Wetlands and Watercourses

The National Wetlands Inventory (NWI) indicated that there are no known wetlands or watercourses in the immediate vicinity of McCrea Street; see Appendix F, Figures F-1 and F-2. However, the NWI does indicate there are wetlands within the study area. The wetlands are located in the northeast portion of the FE1A area, west of Windcrest Drive and the northern portion of the FE1B area east of Thornwood Drive. Any disturbance to a wetland area would require consultation and permitting with the Army Corps of Engineers (ACOE) and the New York State Department of Environmental Conservation (NYSDEC).

#### Floodplains

According to the National Flood Insurance Program Flood Insurance Rate Maps (FIRM) FM3615360001C, Washington County, New York, the entire study area is outside of 100 year designated FEMA flood zones. The study area is designated as Zone C – “Areas of Minimal Flooding.” A clip from this map is included within Appendix F attached, Figure F-2.

#### Cultural Resources

Based on a review of the New York State Office of Parks, Recreation and Historic Preservation’s GIS Public Access Map, there is a potential for cultural resources being present within the project area. Therefore consultation with the New York State Office of Parks, Recreation and Historic Preservation will be necessary with the intent of obtaining a "no adverse effect" clearance or further guidance on the matter, prior to construction being advanced. See Appendix F, Figure F-3.

#### Threatened and Endangered Species

Based on a review of the New York State Department of Environmental Conservation’s Environmental Resource Mapper, there are no known rare plants and animals to be encountered within the project area. However, consultation with New York State Department of Environmental Conservation will be necessary with the intent of obtaining a "no adverse effect" clearance or further guidance on the matter, prior to any construction.

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## 3.0 EXISTING

### 3.1 Existing Combined Sewer Facilities

Currently, the study area is served by a combined storm sewer and sanitary sewer collection system. In general, stormwater and sanitary sewage flow through the study area via a combined system from north to south, then east to the 30" main combined trunk sewer located along Route 4. The trunk sewer conveys flows to the WCSD#2 wastewater treatment plant (WWTP) on Cortland Street in the Village of Fort Edward. The WWTP collects combined storm and sanitary sewer from the Village of Fort Edward, the Village of Hudson Falls and parts of the Towns of Fort Edward, Queensbury and Kingsbury and is permitted to treat 2.5 million gallons per day on a 12 month rolling average. WCSD#2 operates 11 permitted CSO outfalls. Two of which are directly impacted by the areas considered in this study.

The WCSD#2 has delineated the collection system into sub areas for management purposes. This study considers two such areas, identified as FE1A and FE1B. The FE1A area encompasses the area tributary to the sewer main located on the Irving Tissue property. The existing sewer main is believed to be undersized and currently sees overflows and backups on Irving Tissue property. The sewer system is a combined sewer system within a primarily residential area of roughly 90 acres in size. A combined sewer overflow, identified by WCSD#2 as CSO-10 (NY0183695), serves this area and is located just to the West of the Irving Tissue site. CSO-10 discharges, on average, six times per year to the Hudson River according to WCSD#2 records.

The FE1B area is tributary to a sewer main located in the eastern portion of McCrea Street. The portion of FE1B tributary to the McCrea Street sewer is primarily residentially zoned and roughly 55 acres in size. Sewer area FE1B is also largely combined and tributary to CSO 013 (NY0183695) to the east of the Irving Tissue site. CSO 013 conveys overflows from an upstream CSO 005 as well as from portions of combined sewer area FE1B through an overflow structure located in McCrea Street. CSO-4 also contributes flows near CSO 013; however, these flows are resultant of a portion of the collection system beyond the scope of this study. Overflow records from 2004 to 2009 have been summarized in Table 3.

The current volume and rate of stormwater flow in the combined sewer cannot be readily modeled as the majority of the catch basins throughout the area are full of sediment and it is unclear to what extent this restricts the quantity and rate of storm flow in the collection system. These restrictions may provide a means to protect the combined sewer system from slugs of stormwater inflow and backups. In its current state the collection system is understood to be undersized for receiving both sanitary and stormwater flows. The WCSD#2 has indicated that backups or overflows have occurred on the Irving Tissue property on average twice per year.



**Table 3: Combined Sewer Overflow Summary 2004-2009**

Year	CSO 010		CSO 013	
	<i>Number of Overflows</i>	<i>Total Volume (MG)</i>	<i>Quantity</i>	<i>Total Volume (MG)</i>
2009	7	0.0438	0	0
2008	8	0.057	0	0
2007	4	0.0424	0	0
2006	10	0.5786	0	0
2005	4	0.05	0	0
2004	6	0.0323	4	.724

#### **4.0 SEWER MAIN RELOCATION DESIGN**

The study has been prompted by a proposed redevelopment on the Irving Tissue property that is expected to conflict with the existing combined sewer main. Conceptually two plans were proposed for evaluation. The first involves relocating the combined sewer main from the center of the Irving tissue property to the northern border along a railway at the edge of the Irving Tissue property. The second involves separating the storm sewer from the sanitary sewer and relocating the new sanitary sewer main into a public way, along McCrea Street. Initial investigations proved the route along the railway to be not viable. Concerns in this area include the substantial depth of the combined sewer as well as proximity to buildings and retaining walls. Further, maintenance difficulties due to inaccessibility were also a factor. Thus, the first option has not been evaluated in further detail.

This report evaluates in detail the option for relocation of the sanitary sewer main into McCrea Street. Prior to analyzing the size of the McCrea Street sanitary sewer it is essential to determine the necessary capacity. As such, a build out flow analysis has been conducted for consideration in sizing the proposed main. The proposed main has been sized using the build out flow rates, as described below, as well as topographic considerations for pipe slope and the assumption that storm inlets will not be tied into the proposed new sanitary sewer main.

#### **4.1 McCrea Street Service Area**

The study area consists of a portion of sewer area FE1A upstream of the Irving Tissue site as well as some vacant land to the north that is hydraulically contiguous with FE1A. This area totals roughly 90 acres. The study area further includes a portion of sewer area FE1B north of McCrea Street and west of Route 4. This area totals roughly 55 acres. The proposed combined sewer main relocation solution would involve the construction of a gravity sanitary sewer the length of McCrea Street to serve the 145 acre residential area. In order to support development in the area to the maximum extent practicable the study area was evaluated for full build out by the most conservative zoning allotment.

## 4.2 Anticipated Flows

Chazen has estimated the average daily and peak hourly flow rates for the proposed service area and evaluated the existing infrastructure of the WCSO#2 system relative to direction and conveyance of these flows. For the purposes of this study, the connection point of the relocated sanitary sewer has been assumed to have no effect on the downstream infrastructure. Both in the existing and proposed condition flows will be tributary to a 30" combined sewer trunk sewer along Route 4. The proposed connection point is roughly 860 feet, along the route of the trunk sewer, upstream of the existing connection point at the intersection of Eddy Street. No new flows are currently proposed in conjunction with the sanitary sewer main relocation.

The existing wastewater flow rate has been estimated based upon features logged in the Village's parcel GIS data tables and assuming 110 gpd per bedroom (NYSDOH manual 2012 – Residential Onsite Wastewater Treatment Systems), each residence was evaluated for the number of bedrooms on record or an assumed number of 3 bedrooms for a single family residence. We have assumed no significant commercial users are located within the study area. This calculation produced an estimated average daily wastewater flow of 118,140 gpd.

The area has also been evaluated for the full build out scenario by the current zoning regulations for R-1 and R-2 categories. Vacant and occupied lots have been evaluated for future subdivision. The minimum lot size permitted in R-1 and R-2 is 15,000 square feet, thus any property over 30,000 square feet was considered for subdivision. All developable vacant lots within R-1 were assigned a conservative flow rate for a typical 3 bedroom single family home, of 330 gpd. Lots within zoning area R-2 are permitted to have multi-family housing, therefore; all developable vacant lots within zoning area R-2 were evaluated assuming an average flow rate of 990 gpd for the purposes of this study (9 bedrooms). The predicted build out future flow for the area has been calculated at 286,770 gpd. Calculated sanitary sewer flows are summarized in Table 4. A build out peak hourly flow has also been calculated with a peaking factor of 4.0 to support collection system design. The peaking factor is an empirically derived estimate for the peak hour flows expected in an area with the represented population. The pipes have been sized to adequately convey this peak flow to minimize the risk of backups.

**Table 4: Estimated Wastewater Flow**

Location	Units @330 gpd	Estimated Current Flow (gpd)	Units @ 330 gpd	Build Out Flow (gpd)	Build Out Peak Flow (gpm)
East McCrea Street (FE1A)	79	26,070	99	32,670	92
West McCrea Street (FE1B)	258	85,140	707	233,310	648
River Street (FE1A)*	21	6,930	63	20,790	58
Total Study Area	358	118,140	869	286,770	798

\*River Street Area considered in the build out condition to support optimum gravity size. It is not recommended that the Pump Station be sized for the build out flows at this time.

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### 4.3 Sanitary Sewer Collection System Schematic Design

This proposed schematic design requires storm sewer and sanitary sewer separation including construction of a new gravity main the length of McCrea Street. The proposed plan will eliminate the sanitary sewer connection to CSO-10. The outfall will be maintained and connected to the proposed storm sewer collection system. CSO-13 will also be disconnected from the McCrea Street sanitary sewer system, though the outfall will continue to carry CSO-005 flow as well as stormwater flows conveyed through the Irving Tissue property.

Construction of the proposed gravity sanitary sewer main in McCrea Street will require removal or abandonment of the existing combined sewer main in McCrea Street as well as interconnections with the sewers currently flowing from the north to McCrea Street. In support of this report and to determine the feasibility of relocating the sanitary sewer main to McCrea Street, McCrea Street was surveyed. According to a preliminary survey of existing combined sewer infrastructure conducted by Geomatics Land Surveying, PC, and included in Appendix I, all of the adjacent side streets to the north will be able to tie into the new proposed alignment with the exception of Clarks Lane. Approximately 200 LF of 8" sanitary sewer would need to be replaced in this side street for the service of 3-4 properties, such that the Clark Street sanitary sewer could connect to the proposed main.

It is recommended that the proposed gravity sanitary sewer main in McCrea Street be sized for the full build out flow of the study area, as the depth and length of the sanitary sewer are substantial, and the sanitary sewer is expected to remain in operation for many decades. The majority of the study area can be conveyed by gravity to the main combined sewer trunk sewer located along Route 4. However, flows from the 20 properties within the River Street Area will need to be conveyed by a pump station to the new McCrea Street gravity main. The new gravity main will include approximately 1,110 LF of 8" sanitary sewer, and 2,085 LF of 12" sanitary sewer. The schematic sanitary sewer design has been depicted in map form under Appendix G. Based upon the calculated flows, summarized in Table 4, the theoretical peak flow at the connection point to the combined sewer trunk sewer is 1,147,080 gpd (800 gpm). The theoretical capacity for the proposed sanitary sewer main at this point is 1,456,250 gpd (1,010 gpm). Figure G-1 in Appendix G depicts the schematic of the proposed sanitary sewer main on McCrea Street, including estimated peak flow at full build out as well as the capacity of the pipe.

### 4.4 Separated Storm Sewer Schematic Design

The proposed schematic design requires separate storm sewer collection systems and has been depicted in a map in Appendix H. Storm sewer sizing has been schematically designed using peak flows for the 10 year storm. Existing storm sewer conveyances through and two former CSO outfalls will be utilized to the extent practicable. These routes traverse the Irving Tissue property. The existing CSO conveyances will require inspection and potential repair between McCrea Street and the outfalls through Irving Tissue property as current routing, sizing and condition are unknown. Further, easement conveyances between Ridge Street and Seminary Street as well as Seminary Street and McCrea Street should also be inspected to confirm capacity.

Peak flows for the delineated areas during the 10 year storm have been summarized in Table 5. Peak flows have been calculated based upon existing land cover information. It has been assumed that any future development will be required to meet or reduce peak runoff rates generated from individual

sites. In order to estimate the peak runoff flows from the existing conditions, a hydrologic analysis was performed using the Natural Resources Conservation Service Technical Release 20 (TR-20) and Technical Release 55 (TR-55) methodologies. HydroCAD, developed by HydroCAD Software Solutions LLC of Tamworth, New Hampshire, is a Computer-Aided-Design (CAD) program for analyzing the hydrologic and hydraulic characteristics of a given watershed and associated stormwater management facilities. HydroCAD uses the TR-20 algorithms and TR-55 methods to create and route runoff hydrographs.

HydroCAD has the capability of computing hydrographs, (which represent discharge rates characteristic of specified watershed conditions, precipitation, and geologic factors) combining hydrographs and routing flows through pipes, streams and ponds. HydroCAD can also calculate the center of mass detention time for various hydraulic features. Documentation for HydroCAD can be found on their website: <http://www.hydrocad.net/>. HydroCAD calculations have been performed in support of this design and can be found in Appendix H-2.

For this analysis, the study area was broken down into two major watersheds, based upon their tributary CSO. Watershed characteristics for each subcatchment were then assessed from United States Geological Service (USGS) 7.5-minute topographic maps, Land Cover (NOAA), aerial photographs, a topographical survey, soil surveys, and site investigations. The area is generally densely developed residential, with portions of the northern areas both pasture and forested.

Table 5: Peak Runoff Flow Rate for the 10 year Storm

Location	Estimated Peak Flow (cfs)
McCrea West 1	31.24
McCrea West 2	20.42
River Street	24.85
McCrea East 1	11.64
McCrea East 2	5.44
McCrea East 4	8.06
McCrea East 5	28.62
McCrea East 6	6.87
Mechanic	10.77

General pipe sizing has been selected utilizing design peak flows for the 10 year storm and assuming that pipe slopes will be roughly equivalent to land slope as depicted in USGS mapping. Areas tributary to the western portion of McCrea Street (McCrea West Areas 1 and 2) and River Street will be conveyed to CSO-10. This area is roughly 21.7 acres of primarily medium to low density residential. Little is known about the line that conveys flows from this area to CSO-10. It is recommended that a detailed survey of the line south of River Street to the outfall as well as CCTV of the line be conducted before a final design solution is chosen. The size of the pipe and topography may provide adequate slope such that the pipe does not need to be rebuilt. It is noted that the existing line passes through the vicinity of a closed landfill on Irving Tissue property, which may contain hazardous material and may require additional environmental considerations. However this remains to be investigated. For the purposes of this study

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it has been assumed that a new 30" pipe would be installed to convey stormwater flows from this area, and special environmental considerations of remediation would not be required.

The majority of McCrea East Areas 1, 2 and 4 will continue to be conveyed by an existing storm sewer conveyance between Marion Street and Seminary Street. The soil characteristics described in the county soil survey indicate that the soils in this area are expected to be favorable for infiltration. It is recommended that dry wells be installed where feasible to infiltrate stormwater runoff. The plan discussed herein has assumed that drywells could be installed to infiltrate stormwater runoff in portions of Marion Street, Windcrest Drive, the eastern portion of Seminary Street and Mechanic Street. A boring taken in Windcrest drive indicates bedrock may be an issue in some areas. However, WCSD#2 has successfully installed drywells in adjacent neighborhoods. Additional borings are recommended prior to final design.

The quantity of dry wells necessary for this area has assumed a spacing of two drywells per 200 linear feet of roadway, with an additional 25% factor of safety. It has been assumed that the drywells can be installed within the road right of way; however if this is not the case, additional funds may be needed for the WCSD#2 to seek easements. The stormwater in Williams Street and Thornwood Drive is currently being managed by drywells in some locations and does not connect to the collection system. The WCSD#2 may install standalone catch basin and dry well systems, or chose to connect them, to accommodate overflows in heavy storm events. An optional line item has been included within the cost estimate to accommodate connection of overflows from drywells in these areas to adjacent drywell systems as well as the existing storm sewer collection system discharging to the Hudson River. Existing pipes through easements and open channels have not been resized in this area.

Stormwater flow from McCrea East Areas 5 and 6 will combine with the flow conveyed through the Seminary Street Culvert and discharge to a stone arch culvert on Irving Tissue lands. According to record plans, this conveyance discharges through CSO-013 however detailed survey will be needed to confirm the size and orientation across the Irving Tissue facility. For the purposes of this study, it has been assumed that the conveyance will be upgraded and relocated as necessary in conjunction with Irving Tissue development plans. Detailed quantities and pricing have been summarized within appendix K for this schematic system.

#### **4.5 River Street Pump Station Design**

The relocation of the sanitary sewer collection system from the Irving Tissue property to McCrea Street, up gradient, requires the sanitary sewer collection system on River Street to be conveyed by pump station to convey sanitary sewer flows to the new system.

Population projections for Washington County do not suggest significant growth in the coming decades (Cornell University, US Census). The pump station will serve a small area of approximately 21 parcels, all of which are believed to currently be single family homes. However, zoning permits multifamily homes in this district and full build out may have greater flows. The redevelopment of this area is unlikely as such we recommend pumps be sized for the current condition. Should redevelopment occur the pumps may be changed out to accommodate additional flows. To optimize pump station accessibility, it is recommended that the pump station be located just off the edge of pavement at the eastern end of

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River Street. Property in this area is believed to be owned by National Grid, and an easement or property acquisition will be required to construct the station.

It is estimated that the new pump station will pump through roughly 290 feet of 2" force main to reach the new gravity main in McCrea Street. The route will be refined at the time of final design and property acquisition. It is understood that the WCSD#2 has standardized on Myers pumps. The pump recommended for preliminary design and construction cost estimates is Myers WG20 which will produce flows of 43 gpm. Two submersible pumps will be installed with rails for easy removal and maintenance in a 6 foot diameter wet well. A duplex control configuration will be employed to provide redundancy. Design assumptions and pump information has been detailed in Appendix J.

It is noted that "10 State Standards" recommends that raw sewage force mains be installed no smaller than 4 inches in diameter with a cleansing velocity of at least two feet per second. At the calculated low flow rates, and limited static head available it is recommended the force main be sized at 2" to produce a reasonable cleansing velocity. We understand that WCSD#2 operates a pump station with similar hydraulic loading and utilizes the same pump model recommended herein. We understand the WCSD#2 is satisfied with the operation of that pump station. The WCSD#2 should be aware that a 2" force main may be more prone to clogging than a larger force main.

The preliminary electric design for the pump station includes a 100-amp 120/240-volt electrical service. It is unclear at this time whether the telephone and electrical services will need to be brought overhead or underground to the new outdoor stanchion at this time. We have planned for underground for the purpose of this study. A 100-amp main breaker panel within a NEMA 3R enclosure will be mounted on a unistrut stanchion. The pump station control panel, auto-dialer, 100-amp portable generator plug, manual transfer switch and GFCI receptacle are also proposed for this station. Further, the proposed two 2-hp pumps will be provided with power and control wiring, as required from this service. While there may be no charge from the power or telephone company for their work on this project, we have included within our cost estimates an allowance for their work, for budgetary purposes.

## **5.0 PROPOSED COLLECTION SYSTEM IMPROVEMENTS**

### **5.1 Project Description**

Currently, the collection system area FE1A conveys combined stormwater and sanitary sewer flows through the Irving Tissue property. Adjacent system FE1B conveys combined stormwater and sanitary sewer flows through a combined sewer in McCrea Street. Under the proposed plan, discussed previously, the FE1A and FE1B sewer systems will be conveyed through new separated sanitary and storm sewer systems. Sanitary sewer flows will be conveyed along McCrea Street, eliminating the need for maintenance of a large conveyance along the length of the private Irving Tissue site. Stormwater runoff will be conveyed to existing outfalls or allowed to infiltrate through drywells where soils are favorable. Irving Tissue will need to reconfigure their private sanitary sewer laterals to reconnect to WCSD#2 mains as part of their expansion.

The proposed sanitary sewer improvements will consist of approximately 1,110 LF of 8-inch SDR 35 PVC gravity main; and 2,085 LF of 12" SDR 30 PVC C900 PVC gravity main, an estimated 1,760 LF of 4" sanitary sewer laterals; 290 LF of 2" force main and associated appurtenances. The sanitary sewer main

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will pick up flows from existing mains along McCrea Street as well as the proposed River Street force main then connect to the existing 30-inch main trunk sewer located along Route 4. The capacity of the main at the intersection of Route 4 and McCrea Street is believed to be adequate for the redirected flow previously tributary to the Irving Tissue combined sewer line as the main trunk sewer size does not change between these two points. This trunk sewer was recently replaced (within 10 years) as part of a DOT project that included the full reconstruction of Route 4 in this area. Further, wet weather volumes conveyed are expected to be reduced due to the separation of stormwater flows. At this time, no additional sewer treatment is recommended as no new development is planned in conjunction with the sewer line relocation. The proposed collection system has been sized to support future build out. However, downstream conveyance and treatment options will need to be evaluated separately or at the time additional flows are proposed. The drawing in Appendix G illustrates the proposed sewer alignment.

The proposed storm sewer improvements will consist of approximately 5,440 LF of 12-inch SDR 35 PVC gravity main; 1,530 LF of 15" HDPE storm sewer main; 210 LF of 18" HDPE storm sewer Main; 890 LF of 24" HDPE storm sewer main and 610 LF of 30" HDPE storm sewer main; an estimated 25 drywells; an estimated 84 catch basins and associated appurtenances. Stormwater runoff from the western segment of the study area, former FE1A, will be conveyed to the existing CSO 010 outfall. The stormwater runoff from the eastern portion of the study area will be conveyed to a mix of dry wells and the existing CSO 013 outfall. Dry wells will be installed in the vicinity of existing catch basins in the northeastern portions of the study area where favorable soils are expected according to the USGS geological survey. It is expected that stormwater conveyance and drywells will generally be installed within existing road right of ways where available. However, there may be some cases where easements may be required; this will need to be determined with final survey and design. The drawing in Appendix H illustrates the proposed storm sewer schematic.

It is the intention of the WCSD#2 to maintain the completed sanitary sewer system. However, the proposed storm sewer system will be designed in consultation with the Village of Fort Edward and ultimately ownership will be transferred to the Village of Fort Edward.

## **5.2 Environmental Impacts**

It is expected that the project will be identified as an Un-listed action under the State Environmental Quality Review Act (SEQRA). The water quality of the Hudson River is expected to improve with the reduction of annual combined sewer overflows. In general, direct environmental impacts are limited to use of the land for the facilities; and odor, noise, dust and construction traffic associated with the construction of the improvements. The project may have an effect on development patterns within the Village and land use on property adjoining the project as it provides additional growth opportunity both within the district and on the fringe areas with the introduction of additional capacity in the sanitary sewer collection system.

Construction related jobs will be generated and local contractors when construction is to occur will have an equal opportunity to bid on the work. Local suppliers of building materials will benefit. The aesthetics of the immediate construction area will be temporarily affected until restoration is complete. The short term adverse environmental impacts associated with construction activities will be minimal in

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comparison to the long term facility improvements that will be available to the residents of Village of Fort Edward.

Some temporary environmental impacts may be expected that are associated with erosion and sediment control. These impacts will be minimized by the use of erosion control and sedimentation best management practices to be selected during the design phase.

The proposed project will not detrimentally affect the water quality of the area, air quality, wetlands, wild and scenic rivers or agricultural land. Further, the proposed project will not require the relocation of residents or businesses. The design will contribute to the reduction in frequency and volume of combined sewer overflows to the river providing a substantial environmental benefit. Further removal of stormwater connections will reduce volumes received at the WWTP downstream and may result in an operational cost savings for the WCSD#2.

### **5.3 Land Requirements**

The storm and sanitary sewer mains will be constructed predominately within dedicated road rights-of-way, where available. Permanent easements may be necessary along the proposed route depending on existing property ownership limits and in the event the routes are modified to satisfy field conditions or to minimize adverse environmental impacts that may be encountered. Further, the status of easements for existing storm sewer and CSO outfalls is not fully known at this time and additional land may need to be obtained in locations where the conveyance infrastructure passes through private properties including Irving Tissue. Furthermore, it is anticipated that temporary easements may be necessary to facilitate specific construction activities. Any easements that may be determined necessary will be acquired by WCSD#2 before construction begins and would be defined on the associated construction documents.

### **5.4 Opinion of Probable Construction Cost**

The following opinion of probable cost was developed anticipating construction by publicly let contract subject to prevailing wages. The cost opinions are based upon our understanding of the project and have been developed using recent 2014 construction budgeting values as well as professional experience. Subsequent changes in the project scope or time frame may change project costs. Since there is no control over the costs of labor and materials or competitive bidding and market conditions, the opinion of probable construction costs is made on the basis of past experience and limited available data. These opinions represent our best judgment as a consultant familiar with the construction industry. However, there is no guarantee that proposals, bids or construction costs will not vary from the opinion of probable costs. Costs are summarized in Table 6 and outlined in detail under Appendix K.



**Table 6: Opinion of Probable Cost  
Irving Tissue Sewer Main Relocation and McCrea Street Storm Sewer Separation  
Village of Fort Edward Washington County Sewer District #2**

	<b>Construction Cost</b>
Storm Sewer Utility Cost	\$2,753,530
Sanitary Sewer Utility Cost	\$1,150,159
Total:	\$3,903,689

\*It is noted that for budgeting purposes, it is recommended that a project of this size should carry a 30% contingency at this stage of the project. This is reflected in the opinion of probable cost presented above.

## 6.0 PROJECT FINANCING

At this time it is unclear how the project will be funded for construction. It is our understanding that the WCSD#2 and Irving Tissue Corporation will discuss this at a future date. The project's opinion of probable cost is \$3,903,689. Since the precise portions of cost sharing have yet to be determined, for the purpose of this report, the full price has been evaluated for maximum cost implications to district users.

## 7.0 ANNUAL USER COST ANALYSIS

The intent of this section is to present an analysis of the additional annual debt service costs (Ad Valorem) and Operation and Maintenance (O&M) costs to users associated with the recommended capital improvements presented in this report. The existing user rates and existing budget information is presented below, followed by proposed changes to the aforementioned user costs due to the proposed improvements.

### Existing Capital Budget and Sewer Rents

The current sewer budget is supported through two sources of income. Capital improvements paid for through "debt service cost" (ad valorem) charges which are charges proportional to the assessed value (AV) of properties within the WCSD#2. Operation and maintenance costs are funded separately through biannual billing.

### *Ad Valorem*

The total revenue raised by the WCSD#2 through ad valorem charges in 2014 is \$569,395, according to WCSD#2 records. It is important to note that ad valorem charges differ for communities served within WCSD#2. For example, ad valorem charges for the Town of Kingsbury (which includes the Village of Hudson Falls) is \$0.82/\$1,000 of AV, and the Town of Fort Edward (which includes Village of Fort Edward) is \$0.94/\$1,000 AV. Portions of the Town of Queensbury that are within the district and are billed at a rate of \$0.99/\$1,000 AV. For the purposes of this report, the impact to the total ad valorem

revenue will be discussed, and an example of how it may affect a typical property owner will be presented.

*Operation and Maintenance*

The Operation and Maintenance budget is funded through a biannual billing structure. The billing structure requires a minimum sewer rent of \$40 per year, \$20 per billing. As the rates are currently established, this minimum sewer rent will increase by \$20 per year (\$10/cycle) until the minimum annual sewer rent is equal to \$100 (2017). In 2014, users are billed for 80% of their water usage where meters have been installed, at \$5.33/1,000 gallons. Users without meters are billed a flat rate of \$341.12 per year, which equates to an approximate water usage of 80,000 gallons per year, (220 gallons per day, a reasonable estimate for single family homes) or 64,000 gallons per year of sewer (80% of water usage). It is noted that the total O&M budget for 2014 is \$1,697,695.00.

Capital Cost of Proposed Improvements

For the purpose of this user cost analysis, we have assumed that the current budget is balanced and additional revenue from the customer tax base will be required to accommodate any costs associated with the capital improvements proposed in this report. It is anticipated that Irving Tissue may finance all or some part of the capital cost for the relocation of the sanitary sewer main and associated work. However, as this agreement is not yet in place, the additional cost to the district has been calculated below.

Financing the improvements, valued at \$3,903,689, over a thirty year period at 3% interest produces an annual bond payment amount of \$198,088.14. We further recommend an additional 0.5%, approximately \$990.44, of the annual debt cost be allocated for capital reserve associated with the proposed infrastructure. Thus an annual value of \$199,078.58 is recommended to pay for the debt service associated with the capital improvements as well as a capital reserve for the same. This means that the annual revenue raised by ad valorem taxes to users of the district will raise from \$569,535 to \$768,613.58, which represents a nearly 35% increase. (Refer to Table 7.) It is important to note that any increase to the ad valorem tax to pay for debt service, is subject to the State mandated “2% tax cap” of total County taxes. This will need to be evaluated as part of the total County tax rate before the project is advanced.

**Table 7: Ad Valorem Tax Increase for Debt Service**

	2014
2014 Ad Valorem Revenue	\$569,535.00
Proposed Improvements Annual Payment and Additional Capital Reserve	\$199,078.58
Total New Ad Valorem Budget	\$777,578.14

To demonstrate the change in cost to a typical user, we have shown in the table on the following page the average cost increase for a “Median Assessed Value Home” in Village of Fort Edward. We note that

this is an example, as the Ad Valorem tax rates are different in the various communities and users served by the district.

**Table 8: Additional Cost to a “Typical” Single Family Home in Village of Fort Edward**

	<b>Median* Assessed Value</b>	<b>Current Ad Valorum Charge per \$1,000 AV</b>	<b>Total current cost</b>	<b>proposed additiona cost (addition al 35%</b>	<b>Proposed cost</b>
Village of Fort Edward	\$118,200	\$0.94	\$111.11	\$38.89	\$150.00

\*Median Assessed Value of Home taken from the 2012 American Fact Finder Survey (US Census)

Operation and Maintenance Cost of the Proposed Improvements

For the purpose of this user cost analysis, we have assumed that the current budget is balanced and additional revenue from sewer rents will be required to accommodate any costs associated with the O&M of new infrastructure. The scenario below outlines the estimated additional annual O&M cost to the sewer district. The O&M rates have been calculated by assuming the following:

- one part time operator would be needed to maintain the pump station (assumed that this would be filled by an existing WCSD#2 employee at no additional cost);
- The cost to operate the new pump station estimated (\$750, based upon electrical costs for a similarly sized pump station in WCSD#2, Chelsea Square);
- Generator fuel (estimated at \$200 a year).

This results in an estimated total operation and maintenance cost of \$950.00/year. It should be noted that the actual O&M costs may vary from the estimated rates summarized above. Regardless of what the future O&M costs are, the users within the district would be responsible for the costs, and the Total Annual User Cost would be adjusted annually as needed.

As stated previously, the total 2014 O&M budget is \$1,697,695. The total estimated additional O&M costs to the district, associated with the proposed improvements, is \$950. This represents a 0.056% increase of the current budget. Given that most in-district users pay \$5.33/1000 gallons currently, a 0.056% would add approximately \$0.003 to the rate. As such the additional O&M cost may be supported by the existing budget. If it is determined that it cannot be, a rate increase of \$0.01/1000 gallons would provide revenue to support the additional O&M (plus excess). For the “typical” single family home (generating 64,000 gallons of sewage) the rate increase translates into a \$0.64 annual payment increase or \$341.76 per year.

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## 8.0 REQUIRED APPROVALS AND OTHER ACTIONS

In general, the proposed improvements are anticipated to require the following permits and/or approvals:

Collection System Improvements:

- New York State Department of Environmental Conservation (NYSDEC) Plan Review and Approval;
- New York State Environmental Facilities Corporation (NYSEFC) Plan Review and Approval if EFC monies are used;
- New York State Office of Parks Recreation and Historic Preservation (NYSOPRHP) "Letter of No Effect";
- NYS Environmental Quality Review and Resolution of no impact by lead agency. Note that EFC funding requires that coordinated review be conducted.

River Street Pump Station:

- Secure property;
- NYSDEC Plan Review and Approval;
- NYSEFC Plan Review and Approval if EFC monies are used;
- NYSOPRHP "Letter of No Effect";
- NYS Environmental Quality Review Act and Resolution of no impact by lead agency (WCSD#2). Note that EFC funding requires that coordinated review be conducted.

## 9.0 CONCLUSIONS AND RECOMENDATIONS

The Chazen Companies has completed an investigation and analysis of the relocation of the existing sewer main located on property owned by Irving Tissue, on behalf of the Washington County Sewer District #2.

This feasibility study has identified a preliminary plan for the installation of a new sanitary sewer main in McCrea Street. Construction of this main is recommended to coincide with separation of combined sewers from the tributary area. Separation of storm sewers in this area will eliminate a combined sewer overflow as well as reduce wet weather flows to the wastewater treatment plant. The new main will connect into an existing WCSD#2 trunk sewer running parallel to Route 4.

The opinion of probable cost for the project is \$3,903,689 and includes:

Sanitary sewer improvements:

- 1,110 LF of 8-inch SDR 35 PVC gravity main;
- 2,085 LF of 12" SDR 35 PVC gravity main
- 1,760 LF of 4" sewer laterals;
- 290 LF of 2" force main;

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- River Street Pump Station.

Storm sewer improvements:

- 5,440 LF of 12-inch HDPE gravity main;
- 1,530 LF of 15" HDPE gravity main;
- 210 LF of 18" HDPE gravity main;
- 890 LF of 24" HDPE gravity main;
- 610 LF of 30" HDPE C900 PVC gravity main;
- Estimated 25 drywells; and,
- Estimated 84 catch basins and associated appurtenances.

The volume of sanitary sewer received is not expected to increase due to the proposed work. The cost of the proposed improvements is expected to be paid for, at least in part, by Irving Tissue. A portion of the cost may be shared amongst Village of Fort Edward users through WCSD#2 sewer rent adjustments. The proposed infrastructure has been sized with consideration for future build out of the tributary area and will provide a benefit to the users for many years to come.

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# Appendix A:

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# Appendix B:

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## Appendix C:





## Appendix D:

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## Appendix E: