

## **DUNN & SGROMO ENGINEERS, PLLC**

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5800 HERITAGE LANDING DRIVE, EAST SYRACUSE, NEW YORK 13057  
Telephone (315) 449-4940 Facsimile (315) 449-4941

May 16, 2011

Kurt W. Hauk, P.E., City Engineer  
City of Watertown  
City Hall, Room 305  
245 Washington Street  
Watertown, NY 13601-3380

Re: Watertown City Center Plaza  
File No: 1174.012

Dear Mr. Hauk:

The owner of the Watertown City Center Plaza, Millennium Development, LLC, is seeking approval of the next phase of development of the Plaza. As indicated on the attached drawings, this phase will include two 2,500-square foot restaurants, attached as a single building, as well as two attached retail buildings totaling 15,100 square feet.

This proposal includes a minor modification to the previously approved Overall Planned Development Plan, prepared by GYMO Engineers. The restaurants will be located on the pad previously showing a bank, and the retail buildings will occupy the pad previously proposed as Restaurant 2.

In an effort to clarify the proposed build-out of the site, the Engineering Report addresses the development of all four building pads located immediately east of the Holiday Inn. As discussed in the Report, the existing utilities anticipated the full build-out of the plaza and have capacity to serve this phase. Also, since there is no proposed increase in impervious area, for the four pads addressed in the Report, the existing stormwater management facilities are sized appropriately for the proposed construction.

Attached for review by the City of Watertown and Jefferson County Planning Board is the following:

- Four sets of the Site Plan Application package including:
  - Cover letter
  - Site Plan Application Form
  - Short Environmental Assessment Form
  - Full-size copies (24"x36") of all plans plus one set of stamped/signed originals
  - Engineering Report
  - Originally approved Overall Planned Development Plan
  - Architectural Plan and Elevations for Restaurant

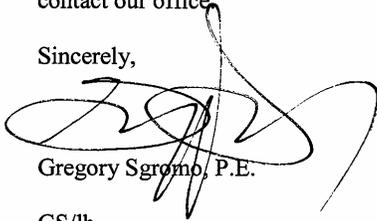
Kurt W. Hauk, P.E., City Engineer  
Watertown City Center Plaza

May 16, 2011  
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- Thirteen sets of the above package (less Engineer's Report) with reduced (11"x17") drawings
- One electric copy of the above package submittal as:
  - A single pdf including the cover letter, Site Plan Application form, Short Environmental Assessment Form, and Engineering Report
  - A single pdf containing all drawings

If you have any questions, comments, or require additional information, please do not hesitate to contact our office.

Sincerely,

A handwritten signature in black ink, appearing to read 'Gregory Sgromo', is written over the typed name. The signature is stylized and somewhat illegible.

Gregory Sgromo, P.E.

GS/lb

Enclosures

cc: Patrick Donegan, Millennium Development (w/enc.)



**CITY OF WATERTOWN  
SITE PLAN APPLICATION  
AND  
SHORT ENVIRONMENTAL  
ASSESSMENT FORM, PART 1**

\*\* Provide responses for all sections. INCOMPLETE APPLICATIONS WILL NOT BE PROCESSED. Failure to submit required information by the submittal deadline will result in not making the agenda for the upcoming Planning Board meeting.

**PROPERTY LOCATION**

Proposed Project Name: Watertown City Center Plaza  
Tax Parcel Number: 8-53-101.0 and 8-53-102.1  
Property Address: 1290 Arsenal Street  
Existing Zoning Classification: PDD

**OWNER OF PROPERTY**

Name: Millennium Development, LLC  
Address: 23590 Iroquois Island Shore Road  
Alexandria Bay, NY 13607  
Telephone Number: (315)788-1234  
Fax Number: (315)788-1233

**APPLICANT**

Name: Millennium Development, LLC  
Address: 23590 Iroquois Island Shore Road  
Alexandria Bay, NY 13607  
Telephone Number: (315)788-1234  
Fax Number: (315)788-1233

**ENGINEER/ARCHITECT / LAND SURVEYOR**

Name: Dunn & Sgromo Engineers, PLLC  
Address: 5800 Heritage Landing Drive  
East Syracuse, NY 13057  
Telephone Number: (315) 449-4940  
Fax Number: (315) 449-4941

**PROJECT DESCRIPTION**

Describe project and proposed use briefly:

**Construct commercial buildings (retail, restaurant) with paved parking on**  
**property zoned PDD.**  
\_\_\_\_\_  
\_\_\_\_\_

Is proposed Action:

- New       Expansion       Modification/Alteration

Amount of Land Affected:

Initially:   3.2   Acres    Ultimately:   6.7   Acres

Will proposed action comply with existing zoning or other existing land use restrictions?

- Yes                       No                      If no, describe briefly

\_\_\_\_\_

What is present land use in vicinity of project?

- Residential       Industrial       Commercial       Agriculture  
 Park/Forest/Open Space       Other

Describe: \_\_\_\_\_

Does project involve a permit approval, or funding, now or ultimately from any other Governmental Agency (Federal, State or Local)?

- Yes       No      If yes, list agency(s) and permit/approval(s)

**SWPPP and NYSDOT Permit**

Does any aspect of the project have a currently valid permit or approval?

- Yes       No      If yes, list agency(s) and permit/approval(s)

**City of Watertown – PD Zone**

As a result of proposed project, will existing permit/approval require modification?

Yes       No

Proposed number of housing units (if applicable):           N/A          

1 Proposed building area: 1<sup>st</sup> Floor   28,293   Sq. Ft.

2<sup>nd</sup> Floor                    Sq. Ft.

3<sup>rd</sup> Floor                    Sq. Ft.

Total   28,293   Sq. Ft.

Area of building to be used for the boiler room, heat facilities, utility facilities

and storage:                                   N/A                                   Sq. Ft.

Number of parking spaces proposed:                                   241                                  

Construction Schedule:                                   July 2011 thru October 2011                                  

Hours of Operation:                                   varies by business                                  

Volume of traffic to be generated:                                   212 (PM peak hour)                                   ADT

**REQUIRED DRAWINGS:**

\*\* The following drawings with the listed information **ARE REQUIRED, NOT OPTIONAL.** If the required information is not included and/or addressed, the Site Plan Application will not be processed.

**ELECTRONIC COPY OF ENTIRE SUBMISSION** (PDF preferred)

**BOUNDARY & TOPOGRAPHIC SURVEY**

(Depict existing features as of the date of the Site Plan Application. This Survey and Map must be performed and created by a Professional Land Surveyor licensed and currently registered to practice in the State of New York. This Survey and Map must be stamped and signed with an original seal and signature on at least one copy, the rest may be copies thereof

All elevations are National Geodetic Vertical Datum of 1929 (NGVD29).

1' contours are shown & labeled with appropriate spot elevations.

All existing features on and within 50 feet of the subject property are shown and labeled.

All existing utilities on and within 50 feet of the subject property are shown and labeled.

All existing easements and/or right-of-ways are shown and labeled.

Existing property lines (bearings & distances), margins, acreage, zoning, existing land use, reputed owner, adjacent reputed owners & tax parcel numbers are shown and labeled.

The north arrow & graphic scale are shown.

**DEMOLITION PLAN** (If Applicable)

All existing features on and within 50 feet of the subject property are shown and labeled.

All items to be removed are labeled in darker text.

**SITE PLAN**

All proposed above ground features are depicted and clearly labeled.

All proposed features are clearly labeled "proposed".

All proposed easements & right-of-ways are shown and labeled.

- Land use, zoning, & tax parcel number are shown.
- The Plan is adequately dimensioned including radii.
- The line work & text for all proposed features is shown darker than existing features.
- All vehicular & pedestrian traffic circulation is shown including a delivery or refuse vehicle entering and exiting the property.
- Proposed parking & loading spaces including ADA accessible spaces are shown and labeled.
- Refuse Enclosure Area (Dumpster), if applicable, is shown. Section 161-19.1 of the Zoning Ordinance states, "No refuse vehicle or refuse container shall be parked or placed within 15 feet of a party line without the written consent of the adjoining owner, if the owner occupies any part of the adjoining property".
- The north arrow & graphic scale are shown.
- GRADING PLAN**
  - All proposed below ground features including elevations & inverts are shown and labeled.
  - All proposed above ground features are shown and labeled.
  - The line work & text for all proposed features is shown darker than existing features.
  - All proposed easements & right-of-ways are shown and labeled.
  - 1' existing contours are shown dashed & labeled with appropriate spot elevations.
  - 1' proposed contours are shown & labeled with appropriate spot elevations.
  - All elevations are National Geodetic Vertical Datum of 1929 (NGVD29).
  - Sediment & Erosion control are shown & labeled on the grading plan unless separate drawings have been provided as part of a Stormwater Pollution Prevention Plan (SWPPP).

## UTILITY PLAN

- All proposed above & below ground features are shown and labeled.
- All existing above & below ground utilities including sanitary, storm water, water, electric, gas, telephone, cable, fiber optic, etc. are shown and labeled.
- All proposed easements & right-of-ways are shown and labeled.
- The Plan is adequately dimensioned including radii.
- The line work & text for all proposed features is shown darker than existing features.
- The following note has been added to the drawings stating, "All water main and service work must be coordinated with the City of Watertown Water Department. The Water Department requirements supercede all other plans and specifications provided."

## LANDSCAPING PLAN

- All proposed above ground features are shown and labeled.
- All proposed trees, shrubs, and other plantings are shown and labeled.
- All proposed landscaping & text are shown darker than existing features.
- All proposed landscaping is clearly depicted, labeled and keyed to a plant schedule that includes the scientific name, common name, size, quantity, etc.
- For additional landscaping requirements where nonresidential districts and land uses abut land in any residential district, please refer to Section 310-59, Landscaping of the City's Zoning Ordinance.
- Site Plan complies with and meets acceptable guidelines set forth in Appendix A - Landscaping and Buffer Zone Guidelines (August 7, 2007).**

## PHOTOMETRIC PLAN (If Applicable)

- All proposed above ground features are shown.
- Photometric spot elevations or labeled photometric contours of the property are clearly depicted. Light spillage across all property lines shall not exceed 0.5 foot-candles.

**☐ CONSTRUCTION DETAILS & NOTES**

- ☐ All details and notes necessary to adequately complete the project including, but not limited to, landscaping, curbing, catch basins, manholes, water line, pavement, sidewalks, trench, lighting, trash enclosure, etc. are provided.
- ☐ Maintenance & protection and traffic plans & notes for all required work within City streets including driveways, water laterals, sanitary laterals, storm connections, etc. are provided.
- ☐ The following note must be added to the drawings stating:  
"All work to be performed within the City of Watertown margin will require sign-off from a Professional Engineer, licensed and currently registered to practice in the State of New York, that the work was built according to the approved site plan and applicable City of Watertown standards. Compaction testing will be required for all work to be performed within the City of Watertown margin and must be submitted to the City of Watertown Codes Department."

**☐ PRELIMINARY ARCHITECTURAL PLANS (If Applicable)**

- ☐ Floor plan drawings, including finished floor elevations, for all buildings to be constructed are provided.
- ☐ Exterior elevations including exterior materials and colors for all buildings to be constructed are provided.
- ☐ Roof outline depicting shape, slope and direction is provided.

**☐ ENGINEERING REPORT**

**\*\* The engineering report at a minimum includes the following:**

- ☐ Project location
- ☐ Project description
- ☐ Existing & proposed sanitary sewer flows & summary
- ☐ Water flows & pressure
- ☐ Storm Water Pre & Post Construction calculations & summary
- ☐ Traffic impacts
- ☐ Lighting summary
- ☐ Landscaping summary

**GENERAL INFORMATION**

- ALL ITEMS ARE STAMPED & SIGNED WITH AN ORIGINAL SIGNATURE BY A PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR SURVEYOR LICENSED AND CURRENTLY REGISTERED TO PRACTICE IN THE STATE OF NEW YORK.
- If required, a copy of the Stormwater Pollution Prevention Plan (SWPPP) submitted to the NYSDEC will also be sent to the City of Watertown Engineering Department.
- If required, a copy of all submittals sent to the New York State Department of Environmental Conservation (NYSDEC) for the sanitary sewer extension permit will also be sent to the City of Watertown Engineering Department
- If required, a copy of all submittals sent to the New York State Department of Health (NYSDOH) will also be sent to the City of Watertown Engineering Department.
- Signage will not be approved as part of this submission. It requires a sign permit from the Codes Department. See Section 310-52.2 of the Zoning Ordinance.
- Plans have been collated and properly folded.
- Explanation for any item not checked in the Site Plan Checklist.  
*Photometric Plan provided and approved during previous submittal.*  

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*All lighting has been installed.*  

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*Demolition Plan is not applicable to this submittal.*  

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- Completed SEQR – Short Environmental Assessment Form – Part I.  
\*A copy of the SEQR Form can be obtained from the City of Watertown website.

**SIGNATURE**

I certify that the information provided above is true to the best of my knowledge.

Applicant (please print) \_\_\_\_\_

Applicant Signature \_\_\_\_\_ Date: \_\_\_\_\_



**PART II - IMPACT ASSESSMENT (To be completed by Lead Agency)**

<p>A. DOES ACTION EXCEED ANY TYPE I THRESHOLD IN 6 NYCRR, PART 617.4? If yes, coordinate the review process and use the FULL EAF.  <input type="checkbox"/> Yes    <input type="checkbox"/> No</p>
<p>B. WILL ACTION RECEIVE COORDINATED REVIEW AS PROVIDED FOR UNLISTED ACTIONS IN 6 NYCRR, PART 617.6? If No, a negative declaration may be superseded by another involved agency.  <input type="checkbox"/> Yes    <input type="checkbox"/> No</p>
<p>C. COULD ACTION RESULT IN ANY ADVERSE EFFECTS ASSOCIATED WITH THE FOLLOWING: (Answers may be handwritten, if legible)</p> <p>C1. Existing air quality, surface or groundwater quality or quantity, noise levels, existing traffic pattern, solid waste production or disposal, potential for erosion, drainage or flooding problems? Explain briefly:</p> <p>C2. Aesthetic, agricultural, archaeological, historic, or other natural or cultural resources; or community or neighborhood character? Explain briefly:</p> <p>C3. Vegetation or fauna, fish, shellfish or wildlife species, significant habitats, or threatened or endangered species? Explain briefly:</p> <p>C4. A community's existing plans or goals as officially adopted, or a change in use or intensity of use of land or other natural resources? Explain briefly:</p> <p>C5. Growth, subsequent development, or related activities likely to be induced by the proposed action? Explain briefly:</p> <p>C6. Long term, short term, cumulative, or other effects not identified in C1-C5? Explain briefly:</p> <p>C7. Other impacts (including changes in use of either quantity or type of energy)? Explain briefly:</p>
<p>D. WILL THE PROJECT HAVE AN IMPACT ON THE ENVIRONMENTAL CHARACTERISTICS THAT CAUSED THE ESTABLISHMENT OF A CRITICAL ENVIRONMENTAL AREA (CEA)?  <input type="checkbox"/> Yes    <input type="checkbox"/> No    If Yes, explain briefly:</p>
<p>E. IS THERE, OR IS THERE LIKELY TO BE, CONTROVERSY RELATED TO POTENTIAL ADVERSE ENVIRONMENTAL IMPACTS?  <input type="checkbox"/> Yes    <input type="checkbox"/> No    If Yes, explain briefly:</p>

**PART III - DETERMINATION OF SIGNIFICANCE (To be completed by Agency)**

**INSTRUCTIONS:** For each adverse effect identified above, determine whether it is substantial, large, important or otherwise significant. Each effect should be assessed in connection with its (a) setting (i.e. urban or rural); (b) probability of occurring; (c) duration; (d) irreversibility; (e) geographic scope; and (f) magnitude. If necessary, add attachments or reference supporting materials. Ensure that explanations contain sufficient detail to show that all relevant adverse impacts have been identified and adequately addressed. If question D of Part II was checked yes, the determination of significance must evaluate the potential impact of the proposed action on the environmental characteristics of the CEA.

<input type="checkbox"/> Check this box if you have identified one or more potentially large or significant adverse impacts which <b>MAY</b> occur. Then proceed directly to the FULL EAF and/or prepare a positive declaration.
<input type="checkbox"/> Check this box if you have determined, based on the information and analysis above and any supporting documentation, that the proposed action <b>WILL NOT</b> result in any significant adverse environmental impacts <b>AND</b> provide, on attachments as necessary, the reasons supporting this determination.
<p>_____ Name of Lead Agency</p> <p>_____ Date</p> <p>_____ Print or Type Name of Responsible Officer in Lead Agency</p> <p>_____ Title of Responsible Officer</p> <p>_____ Signature of Responsible Officer in Lead Agency</p> <p>_____ Signature of Preparer (if different from responsible officer)</p>

**Reset**

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# ENGINEER'S REPORT

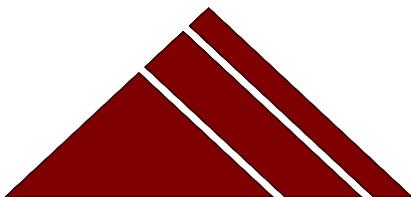
## *WATERTOWN CITY CENTER PLAZA PHASE III*

**City of Watertown  
Jefferson County  
New York**

Prepared for:

Millennium Development, LLC  
P.O. Box 802  
Alexandria Bay, New York 13607  
Patrick Donegan (315) 436-6567

May 2011



DUNN & SGROMO ENGINEERS, PLLC  
5800 Heritage Landing Drive  
East Syracuse, New York 13057  
(315) 449-4940

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**FIGURES**

- 1 Overall Planned Development**
- 2 Site Plan**
- 3 Impervious Area Comparison**
- 4 ITE – Trip Generation Data**

**APPENDIX**

- A GYMO Engineering Report**



## 1.0 Site and Project Descriptions

### 1.1 Location

The site is located on the northeastern side of the Intersection 81 and New York State Route 3 (Arsenal Street) intersection. The entrance to the Plaza is from Western Boulevard, also under the jurisdiction of the New York State Department of Transportation. The site consists of four separate City of Watertown tax parcels: 8-53-102.001, 8-53-103.1, 8-53-106.1, and 8-53-114. The area proposed for development encompasses  $\pm 27.43$  acres (FIGURE 1).

### 1.2 Project Description

This project involves the development of a portion of the Watertown City Center Plaza. Phase I included the development of six buildings as follows: three restaurants, a Starbucks coffee shop, a Holiday Inn Hotel, and a small retail building. Two additional building pads were also developed for retail use and remain vacant.

Phase II of the project included site plan approval of a  $\pm 30,890$  square foot, four-story, 132-room hotel, with a  $\pm 4,000$ -square foot banquet hall, a  $\pm 6,900$ -square foot retail building, a  $\pm 6,510$ -square foot restaurant (Proposed Restaurant 4), two  $\pm 5,300$ -square foot restaurants (Proposed Restaurants 3 and 5) and a  $\pm 2,900$ -square foot bank.

This report will discuss the development of four buildings: a  $\pm 2,900$ -square foot bank at the site of the proposed Retail 1 and  $\pm 15,100$  square feet of retail at the site of the proposed Restaurant 2, both sites previously approved as part of Phase 1. Additionally, the sites shown on the overall planned development as a  $\pm 2,900$ -square foot bank, and a  $\pm 5,300$ -square foot restaurant in Phase II are currently proposed for development of a building with two 2,500-square foot restaurants on the original bank site, and a  $\pm 5,300$ -square foot restaurant (same as originally proposed) on the other.

The access roads, water, sanitary sewers, storm sewer, site lighting, underground electric and communication facilities, and landscaping, were all installed as part of the previous site development. This infrastructure was designed to accommodate the completion of the Phase II development as previously approved by the City of Watertown (FIGURE 1). A portion of the sanitary sewer and water system will require relocation as part of this project.

### 1.3 Zoning/Parking

Zoning of the entire project area is Planned Development District (PDD). Parking for this project was developed in accordance with the City Code (Section 310-47) for retail, bank, and restaurant uses in the minimum amount of five spaces for each 1,000 square feet of floor area.



The minimum required number of parking spaces for each of the four building parcels is as follows:

- two 2,500-square foot restaurants      - 25 spaces required  
74 spaces provided  
(14 spaces reserved for future need)
  
- ±5,290-square foot restaurant      - 26 spaces required  
49 spaces provided
  
- ±2,900-square foot bank      - 15 spaces required  
35 spaces provided
  
- ±15,100-square foot retail      - 76 spaces required  
83 spaces provided

**1.4 Site Topography**

The area encompassing the four proposed building pads ranges in elevation from 419 on the road adjacent to the ±5,290-square foot restaurant, to elevation 405 along Western Boulevard. The four parcels will be graded to drain to existing catch basins, which drain ultimately to the stormwater management pond that was installed during development of Phase I of Plaza development. This pond outlets into another pond managed by the New York State Department of Transportation, located across Western Boulevard, southeast of this development. The DOT pond outlets through the DOT stormwater system to the south, under Arsenal Street, before discharging underground, into a rock crevice.

**1.5 Soil Classification**

The soils in the area of the proposed building parcels is primarily Canandaigua silt loam, Niagara silt loam, Farmington loam, and Hudson silt loam, according to the Jefferson County Soil Survey, prepared by the United States Department of Agriculture, Natural Resources Conservation Service. The Farmington, Hudson and Niagara soils are all classified as Hydrologic Soil Group C, while the Canandaigua soil is classified as Hydrologic Soil Group D. See APPENDIX A for the soil descriptions.

**2.0 Water Facilities**

**2.1 Existing Water Facilities**

Approximately 550 lineal feet of 12-inch water main travels through the site in a north-south direction approximately 200 feet from the east property line. In addition, approximately 320 feet of 8-inch main runs along the access road at the north end of the four-building parcels, approximately 160 feet of 8-inch main serves the two easterly parcels and approximately 130 feet of 8-inch main runs along the access road to the south of these parcels before heading southwest through the commercial development along Arsenal Street. All of those mains are ductile iron and were installed as part of Phase I of



the project (see FIGURE 1). The 12-inch main is owned and operated by the City of Watertown while the 8-inch mains are owned and operated by the project developer.

These water mains include four hydrants that will provide fire protection to this site. One hydrant will be relocated to accommodate construction of the ±15,100-square foot retail building.

**2.2 Proposed Water Facilities**

No new water mains are proposed for this phase of development. The existing 12-inch diameter main and the previously installed 8-diameter loop will provide service to the proposed buildings. The 6-inch diameter water line running east from the 12-inch main and terminating at a hydrant near the east property line is proposed to be moved in a southerly direction approximately 50 feet. This will be done in order to accommodate the proposed building layout on the northeast parcel.

**2.3 Water Demand**

For design purposes, water demands are assumed to be equivalent to average daily sewage flows generated. These water demands were determined using NYSDEC guidelines. According to the NYSDEC, each seat in a restaurant generates 28 gallons per day (gpd) and a retail facility generates .08 gpd per square foot. The resulting water demand for the four proposed parcels is 10,400 gpd as tabulated below:

<i>Parcel Orientation</i>	<i>Use</i>	<i>Demand Factor</i>	<i>Rate</i>	<i>Water Demand (gpd)</i>
Southwest	Two 2500-sf. Restaurants	120 seats	28 gpd/seat	3,360
Northwest	5,286-s.f. Restaurant	200 seats	28 gpd/seat	5,600
Northeast	Retail	15,100 s.f.	.08 gpd/s.f.	1,208
Southeast	Bank/retail	2,907 s.f.	.08 gpd/s.f.	232
<b>Total</b>				<b>10,400 gpd</b>

**Total Demand:      10,400 gpd**  
**7.2 gpm average**  
**28.9 gpm peak**



**2.4 Water Supply**

Hydrant flow testing performed by GYMO, P.C. on February 6, 2010, at the hydrant located along the north edge of the subject property, indicates a static pressure of 95 psi. With a flow of 1,475 gpm, the pressure dropped to 70 psi. Calculations using this data results in a flow of 2,670 gpm at 20 psi (APPENDIX A, GYMO Engineering Report). The available flow and pressure compared to the recommended standards (Ten States Standards) are tabulated below:

	<i>Static Pressure (psi)</i>	<i>Flow at 20 psi (gpm)</i>
Ten States Standards	60 to 80	500 minimum
Available On-site	95	2,670

The proposed development with peak demand of 29 gpm would use 1% of available capacity and have no significant effect on pressure in the system.

**3.0 Sanitary Sewers**

**3.1 Existing Sanitary Sewer Facilities**

An 8-inch gravity sewer main runs through the center of the site from just west of the stormwater management pond, south approximately 200 feet and then east toward Western Boulevard. Construction of the proposed 15,100-s.f. retail building will require relocation of a portion of the sewer. In addition, service for the proposed restaurants will require an extension of the sewer.

**3.2 Proposed Sanitary Sewer Facilities**

This phase of construction will require the relocation of a section of the existing 8-inch gravity sewer and the installation of two manholes. In addition, an extension of the sewer will be required to serve the proposed restaurants (see Site Plan).

The proposed sewers will be 8-inch PVC, SDR-35 gravity lines with a minimum slope of 0.4%. The limiting factor for capacity will be the relocated sewer slope (0.4%).

The capacity of the 8-inch sewer at 0.4% is 449 gpm (64,627 gpd). As indicated in the Water Demand section of the report, the estimated flows from the four parcels proposed in this phase is 10,400 gpd. The following calculations show that the capacity of the existing sewer exceeds that needed for this phase:

$$\begin{aligned}
 &10,400 \text{ gpd} / 1,440 \text{ min./day} = 7.2 \text{ gpm (average)} \\
 &4 = \text{peak factor multiplier} \\
 &7.2 \text{ gpm} \times 4 = 28.8 \text{ gpm (peak)} \\
 &\text{Existing: 8-inch sewer capacity} = 449 \text{ gpm}
 \end{aligned}$$



## 4.0 Hydrologic and Hydraulic Analysis

### 4.1 Existing Drainage

All drainage facilities installed during Phase I/II construction will remain in place and serve this phase of construction. The Phase II Engineering Report and the Stormwater Management Report for the off-site Stormwater Detention Pond Infill Project, both prepared by GYMO, PC, as well as the Phase II Stormwater Pollution Prevention Plan (SWPPP), provided analysis of the site to demonstrate the adequacy of the on-site stormwater management pond for full build-out. The City of Watertown and the New York State Department of Transportation have both reviewed these reports.

### 4.2 Proposed Drainage

The proposed modifications to the site for this phase of construction will not result in an increase in impervious area (FIGURE 3) and therefore no increase in peak flow will occur. Any new storm sewer piping installed for this phase will be designed to carry the runoff from a 10-year storm event. In addition, a surface flood route will be provided to avoid flooding of the buildings.

## 5.0 Traffic Analysis

### 5.1 Estimated Additional Daily Traffic

Using the ITE Trip Generation Manual, 8<sup>th</sup> Edition, the amount of traffic that would be generated by the proposed restaurants, bank, and retail building during the peak hour would be 212 trip ends. The peak hour referred to is the PM peak hour (4:00 PM to 6:00 PM) of adjacent street traffic. See FIGURE 4 for calculations.

## 6.0 Lighting

### 6.1 Site Lighting

The lighting for this phase of development was installed as approved during Phase I. Except for the minor relocation of four light poles to accommodate revised parking, no other changes to the lighting layout are planned. See the Site Plan for the proposed light pole relocations.

## 7.0 Summary

This phase of the Watertown City Center Plaza will meet all required standards of the City of Watertown as well as other concerned approving agencies. The facilities proposed will provide a positive addition to the Plaza and its continued success.



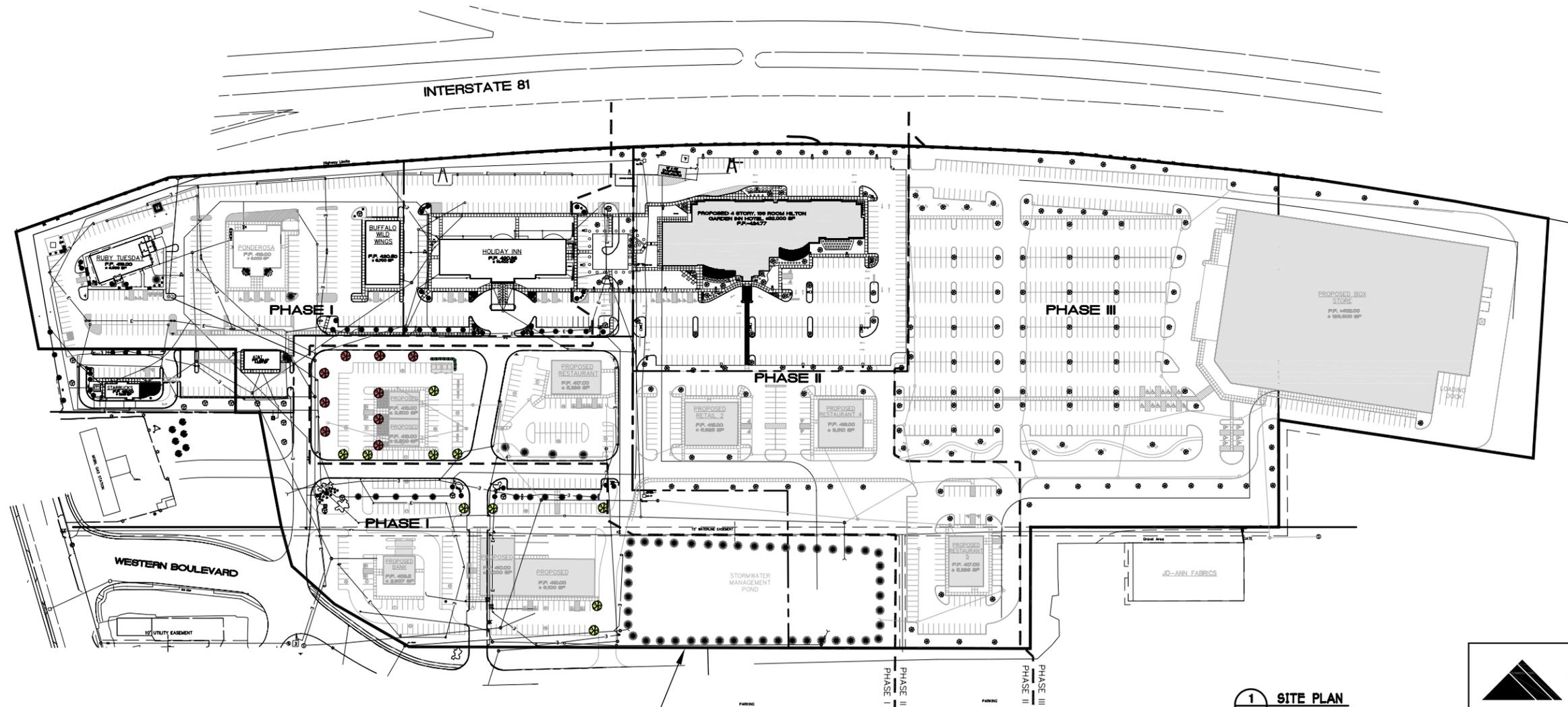
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PROJECT LOCATION MAP: 1"=2000'±

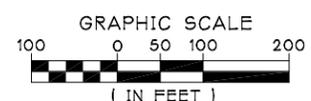
LEGEND	EXISTING	PROPOSED
5' CONTOUR	--- 420 ---	
1' CONTOUR	--- 417 ---	
SETBACK	=====	
EASEMENT	=====	
MARGIN	=====	
PROPERTY LINE	=====	
EDGE OF PAVEMENT	=====	
CURBED ROAD	=====	
BUILDING	=====	=====
PHASE BOUNDARY	=====	=====
ELEC LINE	-----	-----
SEWER LINE	-----	-----
FORCE MAIN	-----	-----
STORM LINE	-----	-----
WATER LINE	-----	-----
LIGHT POLE	⊙	⊙
TREE	⊙	⊙
SHRUB	⊙	⊙
PLANTING	⊙	⊙
SEWER MANHOLE	⊙	⊙
STORM MANHOLE	⊙	⊙
WATER VALVE	⊙	⊙
HYDRANT	⊙	⊙
CATCH BASIN	⊙	⊙
BENCH	⊙	⊙

SIGNAGE			
PREVIOUSLY APPROVED	SF	PROPOSED	SF
HOLIDAY INN EXPRESS	600	HILTON GARDEN INN HOTEL	600
RUBY TUESDAY	300	FUTURE RESTAURANT 4 (PHASE 2)	300
PONDEROSA	300	FUTURE RESTAURANT 4 (PHASE 2)	300
STARBUCKS	300	FUTURE RETAIL (19,100 S.F.)	300
AT&T	300	FUTURE RETAIL (6,000 S.F.)	300
FUTURE RETAIL (BIG BOX)	800	RESTAURANT (PHASE 2)	300
BUFFALO WILD WINGS	300	TOTAL	2,100
FUTURE FACILITY AT SMP 1A (BANK)	300		
FUTURE FACILITY AT SMP 1B (REST 3)	300		
TOTAL	3,500		



OVERALL PLANNED DEVELOPMENT DISTRICT (PDD) BOUNDARY

1 SITE PLAN  
SCALE: 1"=40'



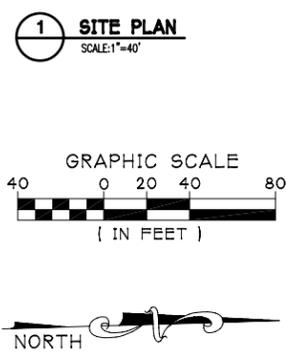
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THIS PLAN HAS NOT RECEIVED FINAL APPROVAL OF ALL REVIEWING AGENCIES. THIS PLAN IS SUBJECT TO REVISION UNTIL ALL APPROVALS ARE OBTAINED AND SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.

 <b>DUNN &amp; SGROMO ENGINEERS</b> E. SYRACUSE, NEW YORK 5800 HERITAGE LANDING DRIVE (315)449-4940 (315)449-4941 FAX	 STATE UNIVERSITY OF NEW YORK GREGORY SGROMO LICENSED PROFESSIONAL ENGINEER 072882	IT IS A VIOLATION OF THE NEW YORK STATE EDUCATION LAW FOR ANY PERSON, UNLESS ACTING UNDER A LICENSED, REGISTERED ENGINEER, TO ALTER AN ITEM ON THIS DOCUMENT IN ANY WAY.																					
		© DUNN & SGROMO ENGINEERS - 2011 ALL RIGHTS RESERVED																					
WATERTOWN, NY ARSENAL ST/ I-81 <b>WATERTOWN CITY CENTER PLAZA</b>	<table border="1"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>REVISION</th> <th>BY</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>			NO.	DATE	REVISION	BY																
	NO.	DATE	REVISION	BY																			
<b>OVERALL PLANNED DEVELOPEMENT</b>	SCALE: AS NOTED DESIGNED BY: GS DRAWN BY: RPG CHECKED BY: GS	FILE NO.: 1174.012 DATE: 05.16.2011 DWG. NO.:	<b>FIG 1</b>																				

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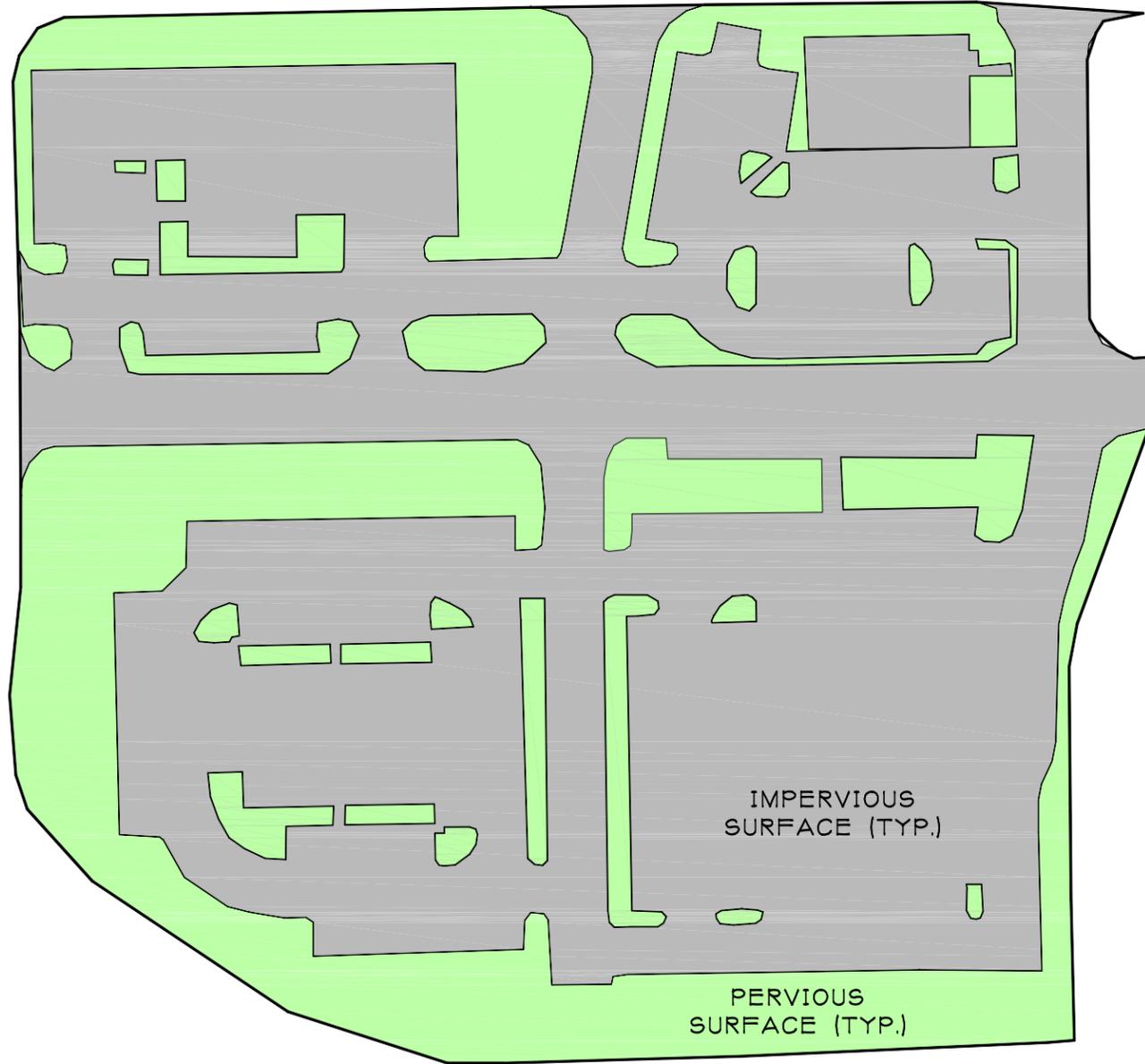
LEGEND

	EXISTING	CURRENT PROPOSAL
BUILDING		
PARKING		
PROPERTY LINE		
SANITARY MANHOLE		
SANITARY LINE		
UTILITY LINES TO BE ABANDONED		
CATCH BASIN		
STORM LINE		
GAS LINE		
WATER LINE		
HYDRANT		
UNDERGROUND POWER		
LIGHTS		
LANDSCAPING		



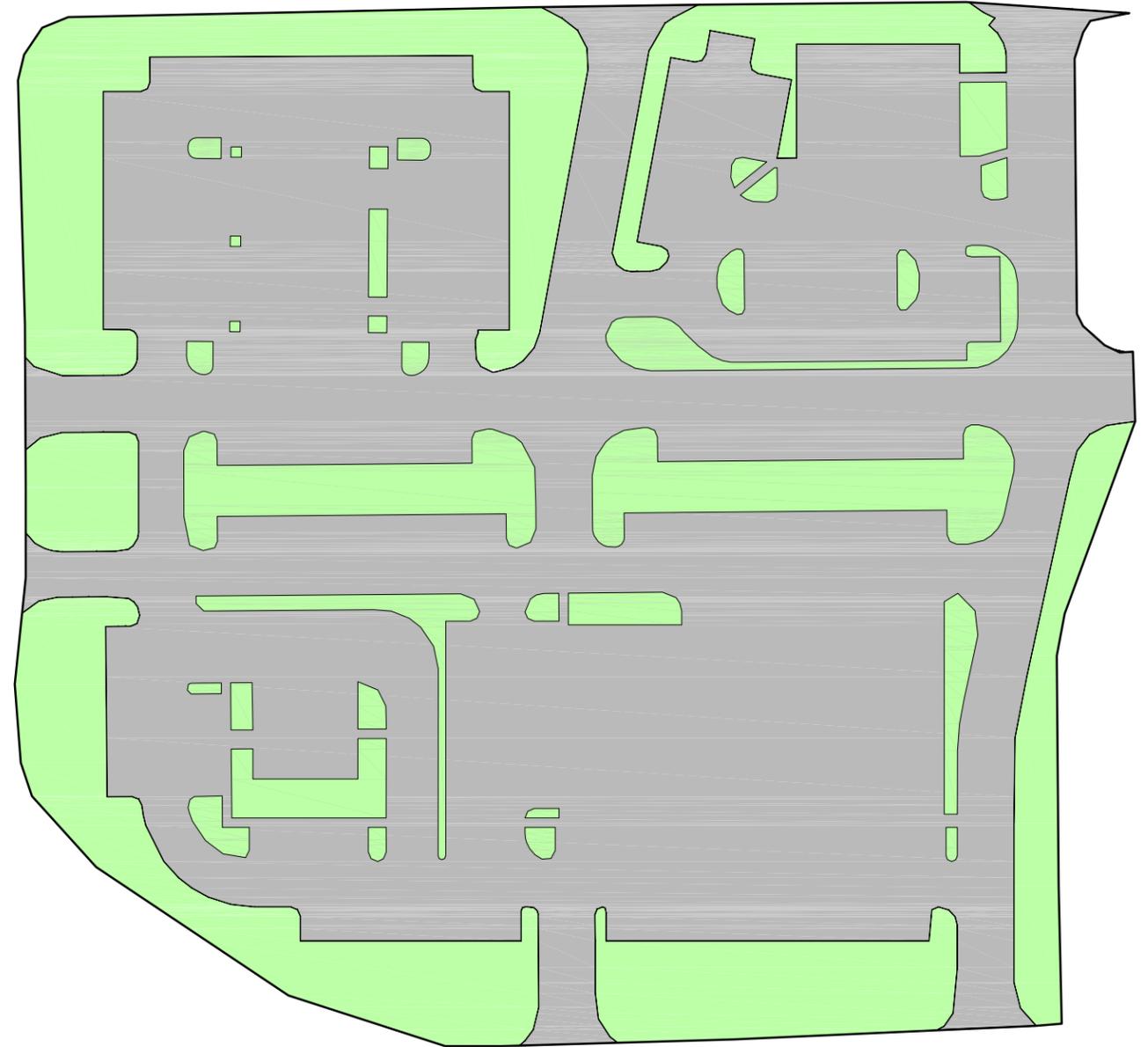
DEVELOPER: MILLENIUM DEVELOPMENT, LLC 23590 IROQUOIS ISLAND SHORE ROAD ALEXANDRIA BAY, NY 13607		TAX PARCEL NOS. 8-53-102.1 8-53-101.0		<b>NOT FOR CONSTRUCTION</b> THIS PLAN HAS NOT RECEIVED FINAL APPROVAL OF ALL REVIEWING AGENCIES. THIS PLAN IS SUBJECT TO REVISION UNTIL ALL APPROVALS ARE OBTAINED AND SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.	
<b>DUNN &amp; SGROMO ENGINEERS</b> E. SYRACUSE, NEW YORK 5800 HERITAGE LANDING DRIVE (315)449-4940 (315)449-4941 FAX		<b>NOT FOR CONSTRUCTION</b> IT IS A VIOLATION OF THE NEW YORK STATE EDUCATION LAW FOR ANY PERSON, UNLESS ACTING UNDER A LICENSED, REGISTERED ENGINEER, TO ALTER AN ITEM ON THIS DOCUMENT IN ANY WAY. © DUNN & SGROMO ENGINEERS - 2011 ALL RIGHTS RESERVED		NO. DATE REVISION BY	
				WATERTOWN, NY ARSENAL ST/ I-81 <b>WATERTOWN CITY CENTER PLAZA</b>	
<b>SITE PLAN</b>					

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**1** IMPERVIOUS AREA - PREVIOUSLY APPROVED PLAN  
SCALE: 1"=40'

4.6 ACRES  
IMPERVIOUS



**2** IMPERVIOUS AREA - REVISED PLAN  
SCALE: 1"=40'

4.6 ACRES  
IMPERVIOUS



**NOT FOR CONSTRUCTION**  
THIS PLAN HAS NOT RECEIVED FINAL APPROVAL OF ALL REVIEWING AGENCIES. THIS PLAN IS SUBJECT TO REVISION UNTIL ALL APPROVALS ARE OBTAINED AND SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.

 <b>DUNN &amp; SGROMO ENGINEERS</b> E. SYRACUSE, NEW YORK 5800 HERITAGE LANDING DRIVE (315)449-4940 (315)449-4941 FAX	<b>NOT FOR CONSTRUCTION</b>	<small>IT IS A VIOLATION OF THE NEW YORK STATE EDUCATION LAW FOR ANY PERSON, UNLESS ACTING UNDER A LICENSED, REGISTERED ENGINEER, TO ALTER AN ITEM ON THIS DOCUMENT IN ANY WAY.</small> <small>©DUNN &amp; SGROMO ENGINEERS - 2011 ALL RIGHTS RESERVED</small>		
		NO.	DATE	REVISION
WATERTOWN, NY ARSENAL ST/ I-81 <b>WATERTOWN CITY CENTER PLAZA</b>		SCALE: AS NOTED	FILE NO.: 1174.012	
<b>IMPERVIOUS AREA COMPARISON</b>		DESIGNED BY: GS	DATE: 05.16.2011	
		DRAWN BY: RPG	DWG. NO:	
		CHECKED BY: GS		<b>FIG. 3</b>

ITE - Trip Generation Data																			
Description/ Code	ITE Vehicle Trip Generation Rate										Total								
	Peak hours are for peak hour of adjacent street traffic.										Generated Trips								
	Units	Week- day	AM Hour	PM Hour	Pass- by	AM In	AM Out	PM In	PM Out	Expected Units	Daily	AM hour	PM hour	AM In	AM Out	PM In	PM Out	Pass- by	
High Turnover Sit Down Restaurant (932)	*KSF <sup>2</sup>	127.15	11.52	11.15	43%	52%	48%	59%	41%	5.0	636	58	56	30	28	19	13	**NA	24
Quality Restaurant (931)	*KSF <sup>2</sup>	89.95	.81	7.49	44%	NA	NA	67%	33%	5.3	477	4	40	NA	NA	15	7	**NA	18
Drive-in Bank (912)	*KSF <sup>2</sup>	148.15	12.35	25.82	47%	56%	44%	50%	50%	2.9	430	36	75	20	16	20	20	**NA	35
Specialty Retail Center (814)	*KSF <sup>2</sup>	44.32	NA	2.71	NA	NA	NA	44%	56%	15.1	669	NA	41	NA	NA	18	23	**NA	NA

\*KSF<sup>2</sup> = Units of 1,000 square feet

\*\*NA = Not available in the ITE Trip Generation Handbook

Specialty Retail Center is used as the Land Use for the retail building.

**FIGURE 4**

## ENGINEERING REPORT

**Watertown City Center Plaza – Phase II**  
City of Watertown  
Jefferson County

Millennium Development, LLC  
P.O. Box 802  
Alexandria Bay, New York 13607

Contact: Patrick Donegan  
(315)-436-6567

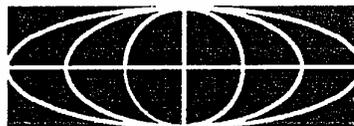
2009-215E  
16 February 2010



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**Patrick J. Scordo, P.E.**  
**Director of Engineering**

The above Engineer states that to the best of his knowledge, information and belief, the plans and specifications are in accordance with the applicable requirements of New York State. It is a violation of New York State Law for any person, unless acting under the direction of a licensed professional engineer to alter this document in any way. If altered, such licensee shall affix his or her seal and the notation "altered by" followed by his or her signature, date, and a specific description of alteration.



**GYMO**

ARCHITECTURE, ENGINEERING & LAND SURVEYING, P.C.

220 STERLING STREET-WATERTOWN, NY - O: (315)788-3900 F: (315)788-0668

2009-215E

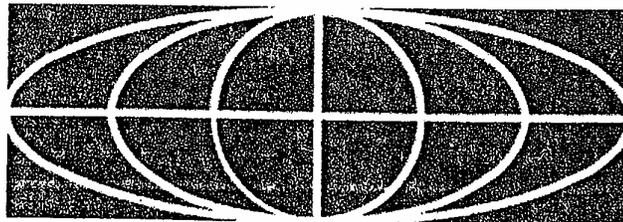
ENGINEERING REPORT

**WATERTOWN CITY CENTER PLAZA  
PHASE II**

**WATERTOWN, NEW YORK  
JEFFERSON COUNTY**

**MILLENNIUM DEVELOPMENT**

16 February 2010



**GYMO**

ARCHITECTURE, ENGINEERING & LAND SURVEYING, P.C.

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  - Appendix #4
    - Sanitary Sewer Pump Station Calculations
  - Appendix #5
    - Traffic Analysis

## **1.0 SITE AND PROJECT DESCRIPTIONS**

### **1.1 Location**

The site is located on the northeastern corner of the Interstate 81 and NYS Route 3 (Arsenal Street) intersection. The entrance to the Plaza is from Western Boulevard. The site consists of four separate City of Watertown tax parcels: 8-53-102.001, 8-53-103.1, 8-53-106.1 and 8-53-114 in the City of Watertown. The area proposed for development encompasses ±27.43 acres.

### **1.2 Project Description**

The proposed project involves the development of Phase II of the Watertown City Center Plaza. Phase I included the development of six buildings as follows: three restaurants, a Starbucks coffee shop, a Holiday Inn Hotel, and a small retail building. Two additional building pads were also developed for retail use and remain vacant.

Phase II of the project involves the site plan approval of a 30,889 square foot (sf), 4-story, 132 room hotel, with a ±4,000 sf banquet hall. Also included in Phase II is the development of five additional buildings as follows: a 6,925 sf retail building (Proposed Retail 2), a 6,510 sf restaurant (Proposed Restaurant 4), two (2) 5,286 sf restaurants (Proposed Restaurants 3 and 5) and a 2,907 sf bank. City of Watertown Site Plan Approval is anticipated for only the hotel portion of Phase II and where the remaining buildings involved in Phase II are discussed, it is for informational purposes of future development only. No site plan approval is sought for these remaining buildings of Phase II.

The access roads, water, sanitary sewer, storm sewers, site lighting, landscaping and parking areas necessary for the Hilton Garden Inn will be constructed as part of the initial Phase II. This infrastructure is being designed to accommodate the overall Phase II development when possible. Sanitary sewer, and water systems will be discussed in more detail in other sections of this report. Storm sewer will be discussed in detail in the Storm Water Pollution Prevention Plan (SWPPP) report.

### **1.3 Zoning/Parking**

Zoning of the project area is currently Planned Development District (PDD). An amendment to the current PDD will be necessary for this project and will be submitted under separate cover to the City of Watertown. Parking for this project was analyzed for the Hilton Garden Inn which is to be constructed. The required number of parking spaces for this hotel equates to 1.1 x 132 rooms, or 146 spaces. 285 spaces are proposed for the Hilton Garden Inn. As there is demolition occurring between the proposed Hilton Garden Inn and the existing Holiday Inn Express, it is necessary to re-evaluate the parking for this facility. The required number of parking spaces for the 80 room Holiday Inn Express is 1.1 x 80 rooms, or 88 spaces. 108 spaces are still available for the Holiday Inn Express.

### **1.4 Site Topography**

The site contains a high point of elevation 437 at the northwestern corner of Phase II and slopes downward predominately in a southeasterly direction to approximately elevation 410 in the southeast corner of Phase II. The entire site drains to the existing stormwater management pond, constructed during Phase I of the project. The outlet of the existing pond connects into a NYS Department of Transportation (DOT) stormwater pond located

to the north of Dunkin Donuts, which ultimately drains under Arsenal Street and flows behind Friendly's, before discharging into a rock crevice.

## **1.5 Soil Classification**

According to the United States Department of Agriculture, Natural Resources Conservation Service (USDA NRCS), working from the southern end of the site to the north end of the site, you will find: Ca-Canandaigua silt loam (0.4% of area of interest), NoA-Niagara Silt Loam (8.2%), FaB-Farmington Loam (49.0%), HuB-Hudson Silt Loam (2.4%), CnB-Collamer Silt Loam (19.0%), GIB-Galway silt loam (19.4%), and GIA-Galway Silt Loam (1.5%).

According to the Jefferson County Soil Survey, NoA, HuB, FaB, and CnB are all class C soils. This amounts to the majority of the project soils (78.6%) being classified as hydrologic class C soils. The next most predominant soil classification on site is class B, consisting of the Galway silt loams (GIA and GIB, 20.9%) A small portion of the site consists of type D soil, exclusive to soil Ca-Canandaigua Silt Loam. See the attached USDA/NRCS Jefferson County Soil Survey descriptions for more information on the specific soil type properties in Appendix #1.

The soil has been disturbed by human activities. The land originally was a farm, which was abandoned and razed and allowed to overgrow. Within the last 10 years, it was cleared of a majority of the trees and brush. The site is currently undeveloped, and groundcover is mainly overgrown grassland, and brush with some small saplings.

## **2.0 WATER FACILITIES**

### **2.1 Existing Water Facilities**

Approximately 1300 feet of City-owned 12" ductile iron travels through the site in a north-south direction approximately 200' from and nearly perpendicular to the eastern property line. This connects in with the 8" main on Arsenal Street to the south and ultimately ends up connecting into the main on Coffeen Street to the north. The main location and depth has been verified throughout the site by excavation and data collection with surveying equipment.

In addition, approximately 1,760 feet of 8" ductile iron water main currently loops around the western portion of the Phase I site as shown on the plans. This loop has five hydrants feeding off of it and was installed as part of the Phase I project.

### **2.2 Proposed Water Facilities**

Both the 12" main and the 8" loop will be utilized for connection of the proposed water supply. The project sponsor proposes ±1,644-feet of 8-inch ductile iron (DI) water main with three fire hydrants. The 8-inch DI will loop around the interior of Phase II as shown on the civil plans in Appendix #2. The hydrants will be connected into the 8" DI main via a total of 95-ft of 6" DI pipe.

The 8-inch water main and hydrants are proposed to be owned, operated, and maintained by the owner. The water lines will remain as private lines, will be the property owner's responsibility and will be installed to City of Watertown Specifications. The developer understands that full time inspection is required.

### 2.3 Water Demand

For design purposes, water demands are assumed to be equivalent to average daily sewage flows generated. These water demands were determined utilizing NYS DEC guidelines. According to NYS DEC, each seat in a restaurant generates 35 gallons per day (gpd) each room in a hotel generates 120 gpd, and a retail facility generates 0.1 gpd per square foot. See the table on below for calculation:

BUILDING	APPLICATION RATE	FACTOR	FLOW [gpd]
RESTAURANT 3	35 GPD/SEAT	200 SEATS	7,000
RESTAURANT 4	35 GPD/SEAT	204 SEATS	7,140
RESTAURANT 5	35 GPD/SEAT	220 SEATS	7,700
HOTEL	120 GPD/ROOM	132 ROOMS	15,840
BANQUET HALL	20 GPD/SEAT	211 SEATS	4,220
RETAIL 2	0.1 X SF	6,925 SF	693
BANK/RETAIL	0.1 X SF	2,907 SF	291
<b>TOTAL</b>			<b>42,884</b>

### 2.4 Hydraulic Analysis

A hydrant flow test was conducted by GYMO, P.C. on 6 February, 2010 with the hydrant near the northeast corner of the Holiday Inn on the 8-inch loop acting as the monitored hydrant and the hydrant approximately 250 feet east on the 8-inch water main serving as the flowed hydrant. The flowed hydrant, located approximately 575 feet southeast of the proposed hotel and at an approximate elevation of 413.0 ft, was flowed at a value of 1,475 gpm, while the pressure dropped from 95 to 70 pounds per square inch (psi). The projected available fire flow at the flowed hydrant was 2,670 GPM at 20 psi. This hydrant flow test data was utilized in a hydraulic WaterCAD model. All Phase II facility domestic demands were considered for this analysis.

Three separate scenarios were modeled as follows:

Scenario A was modeled with the domestic demands from section 2.3, an outside hose connection of 500 gallons per minute (gpm) placed at the highest proposed hydrant, located northwest of the Hilton Garden Inn at an elevation of 424.0 ft. Scenario B was modeled with the domestic demands from section 2.3, and an outside hose connection of 1000 gpm placed at the aforementioned hydrant. Scenario C was modeled with domestic demands from section 2.3 and projected available fire flow at the highest hydrant @ 20 psi.

Scenario A shows that 1,495 gpm is available at 20 psi, at the hotel, in addition to the 500 gpm outside hose connection that can be dedicated to fire flow in the hotel. Scenario B shows that 960 gpm is available at 20 psi, at the hotel, in addition to the 1,000 gpm outside hose connection, that can be dedicated to fire flow in the hotel. Scenario C

shows that 1,800 gpm is available at 20 psi at the highest hydrant. Refer to Appendix #3 for the hydraulic analysis and hydraulic modeling report.

### **3.0 SANITARY SEWER FACILITIES**

#### **3.1 Existing Sanitary Sewer Facilities**

An 8" gravity sanitary sewer main exists north of Jo-Ann Fabrics. The 8" gravity flows east through Stateway Plaza and to a pump station along Gaffney Drive, where flows are then pumped to a sewer main along Coffeen Street. There is an existing manhole north of Jo-Ann Fabrics that will be utilized for connection of the Phase II sewer force main.

#### **3.2 Proposed Sanitary Sewer Facilities**

The Watertown City Center Plaza Phase II sanitary sewers are proposed to be constructed with a series of 8-inch SDR-35 PVC gravity sewers and precast manholes throughout the site which lead to a pump station on the southeastern corner of Phase II near the existing stormwater management pond, as shown on the plans. The approximately 625 linear foot proposed gravity sewer running west to east through the center of Phase II will serve the Hotel/Banquet Hall, and Retail 2 before flowing to the proposed pump station. This section of gravity sanitary sewer and the pump station has been designed to accommodate Restaurant 3 and the proposed Bank, if necessary for Phase II full build out.

As part of the full buildout of Phase II in the future, an additional 8" gravity main will be installed running north to west from Restaurant 5 to the proposed pump station. The approximately 500 foot new sewer will serve Restaurant 4 and Restaurant 5.

Gravity sewer services are proposed to be 6-inch SDR-35 PVC gravity lines at a minimum of 1% slope for all facilities except the Hotel, which is 8-inch.

The pump station was designed to handle flow from the seven facilities as shown in the Water Demand section of this report per NYS DEC guidelines. Additional details of the pump station design can be reviewed in the attached calculations (Appendix #4) and site plans.

$42,884 \text{ gpd}/1440 \text{ min/day} = 29.78 \text{ gpm (average)}$

4 = peaking factor

$29.78 \text{ gpm} * 4 = 119.12 \text{ gpm (peak)}$

A Flygt Submersible Pump Model CP3102.181, 5 HP will be utilized. A 4-inch force main will convey the sewage from the pump station north through the development to the aforementioned manhole north of Jo-Ann Fabrics.

The City of Watertown is currently in the process of securing the necessary easements for the force main connection into the existing manhole.

### **4.0 HYDROLOGIC AND HYDRAULIC ANALYSES**

#### **4.1 Existing Drainage**

As described briefly in the beginning the report, Phase I has been developed and consists of six buildings. There are two potential building pad areas that remain vacant in Phase I which have been assumed to be impervious for drainage purposes. Since the initial development of the site, several improvements to the surrounding properties have

been performed which effect the drainage on site, including the Arsenal Street Reconstruction Project by the NYSDOT that has taken some portions of the original onsite drainage area and redirected the storm water flows to other areas.

Two ponds constructed during Phase II have since been infilled. These two ponds were originally designed to function as offsite water detention ponds for storm water runoff coming from the western side of Interstate 81. This storm water has since been rerouted to flow south along Interstate 81 and into Beaver Meadows, which eliminated the need for the ponds. An onsite storm water pond exists in the northeastern corner of the development. This pond will continue to serve the development into the future. Considering there is extra discharge capacity available that was originally allocated to the aforementioned offsite detention ponds, an additional outlet is being added to this pond in order to increase its capacity for incoming runoff while keeping proposed discharges under the original overall existing conditions discharges, as required. Refer to Storm Water Management Report for the Offsite Storm Water Detention Pond Infill Project prepared by GYMO, P.C for the Watertown City Center Plaza by Vision Development, dated August 4, 2008 for more information on stormwater conditions. The City of Watertown and the NYSDOT should be in possession of this report and will both be provided was an updated Storm Water Pollution Prevention Plan (SWPPP).

#### **4.2 Proposed Drainage**

The proposed drainage analysis will be performed as part of the Stormwater Pollution Prevention Plan (SWPPP) report. The aforementioned onsite stormwater pond and its additional available capacity will be utilized for required stormwater quality and quantity treatment. The increase in peak flow will be attenuated in accordance with the NYS State Pollutant Discharge Elimination System (SPDES) requirements of no increase of the peak runoff from existing to proposed conditions of the 100 year - 24 hour storm event.

#### **4.3 Proposed Storm Sewer Piping**

The storm drainage piping will be designed to carry, at a minimum, the peak runoff of the 10 year - 24 hour storm event. Critical piping such as the roof drain leaders will carry the peak runoff of the 100 year - 1 hour storm event in accordance with building permit requirements. In addition, a 100-year overland flood route will be designed to avoid flooding of the building.

#### **4.4 Proposed Storm Water Management**

The outlets of the existing stormwater pond will be adjusted, as necessary, to comply with NYS SPDES guidelines for discharges from construction projects. The SWM pond will provide quantity control of the peak runoff from a 100 year - 24 hour storm event, and provide quality treatment of the first 0.9-inch of runoff from all new impervious surfaces, through the use of 24 hour extended detention.

### **5.0 TRAFFIC ANALYSIS**

#### **5.1 Estimated Additional Daily Traffic**

By using the Trip Generation, 8<sup>th</sup> Edition by the Institute of Transportation Engineers, the amount of additional traffic that would be generated by a hotel and banquet hall is 1,650 Average Daily Trip Ends. See Appendix #5 for calculations.

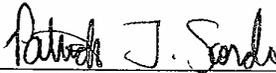
**6.0**     **LIGHTING**

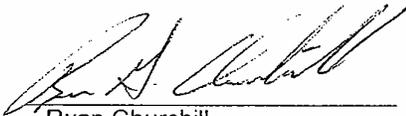
**6.1**     **Site Lighting**

The site will generally be lit by a combination of 100 watt metal halide lights installed on 12' poles and 1000 watt metal halide lights installed on 40' poles. Light spillage over the property line has been kept under 0.5 footcandles as required. Refer to Sheet C101 of the site plans in Appendix #1.

**7.0**     **SUMMARY**

The Watertown City Center Shopping Plaza Phase II will continue to build on the success that Phase I has had in the City of Watertown. Phase II will not cause the City of Watertown's infrastructure to be exceeded, provided the improvements discussed in this report are performed. Additionally, we believe this project, as is Phase I, to be of great value to the City of Watertown.

  
\_\_\_\_\_  
Patrick J. Scordo, P.E.  
Director of Engineering

  
\_\_\_\_\_  
Ryan Churchill  
Project Engineer

APPENDIX #1

USDA/NRCS SOILS INFORMATION



Soil Map—Jefferson County, New York  
(Watertown City Center Plaza Phase II)

**MAP LEGEND**

- Area of Interest (AOI)
  - Area of Interest (AOI)
- Soils
  - Soil Map Units
- Special Point Features
  - Blowout
  - Borrow Pit
  - Clay Spot
  - Closed Depression
  - Gravel Pit
  - Gravelly Spot
  - Landfill
  - Lava Flow
  - Marsh or swamp
  - Mine or Quarry
  - Miscellaneous Water
  - Perennial Water
  - Rock Outcrop
  - Saline Spot
  - Sandy Spot
  - Severely Eroded Spot
  - Sinkhole
  - Slide or Slip
  - Sodic Spot
  - Spoil Area
  - Stony Spot
- Special Line Features
  - Gully
  - Short Steep Slope
  - Other
- Political Features
  - Cities
- Water Features
  - Oceans
  - Streams and Canals
- Transportation
  - Rails
  - Interstate Highways
  - US Routes
  - Major Roads
  - Local Roads
- Very Stony Spot
- Wet Spot
- Other

**MAP INFORMATION**

Map Scale: 1:2,840 if printed on A size (8.5" x 11") sheet.  
 The soil surveys that comprise your AOI were mapped at 1:15,840.  
 Please rely on the bar scale on each map sheet for accurate map measurements.  
 Source of Map: Natural Resources Conservation Service  
 Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>  
 Coordinate System: UTM Zone 18N NAD83  
 This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.  
 Soil Survey Area: Jefferson County, New York  
 Survey Area Data: Version 7, Feb 5, 2010  
 Date(s) aerial images were photographed: 7/16/2006  
 The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

Jefferson County, New York (NY045)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ca	Canandaigua silt loam	0.1	0.4%
CnB	Collamer silt loam, 3 to 8 percent slopes	3.9	19.0%
FaB	Farmington loam, 0 to 8 percent slopes	10.0	49.0%
GIA	Galway silt loam, 0 to 3 percent slopes	0.3	1.5%
GIB	Galway silt loam, 3 to 8 percent slopes	4.0	19.4%
HuB	Hudson silt loam, 3 to 8 percent slopes	0.5	2.4%
NoA	Niagara silt loam, 0 to 3 percent slopes	1.7	8.2%
<b>Totals for Area of Interest</b>		<b>20.5</b>	<b>100.0%</b>

TABLE 17. --SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Risk of corrosion		
		Frequency	Duration	Months	Depth Ft	Kind	Months	Depth In	Hardness	Potential frost action	Uncoated steel	Concrete
BmC*, BmD*: Bice	B	None	---	---	>6.0	---	---	>60	---	Low	Low	High.
Pinckney	C	None	---	---	1.5-2.0	---	Feb-May	>60	---	Moderate	Low	Moderate.
BnA, BnB, BnC: Blasdell	A	None	---	---	>6.0	---	---	>60	---	Moderate	Low	Moderate.
BoA, BoB Bombay	B	None	---	---	1.5-2.0	Perched	Mar-May	>60	---	Moderate	Moderate	Low.
BpB, BpC Bonaparte	A	None	---	---	>6.0	---	---	>60	---	Low	Low	Moderate.
Bt Boots	A/D	Occasional	Long	Nov-May	+1-1.0	Apparent	Nov-Aug	>60	---	High	Moderate	Low.
Ca, Cb Canandaigua	D	None	---	---	+1-1.0	Apparent	Nov-May	>60	---	High	High	Low.
Cc Carbondale	A/D	None	---	---	+1-1.0	Apparent	Sep-May	>60	---	High	High	Moderate.
Cd Carlisle	A/D	None	---	---	+5-1.0	Apparent	Sep-Jun	>60	---	High	High	Low.
ChB Chatfield	B	None	---	---	>6.0	---	---	20-40	Hard	Moderate	Low	Moderate.
CkC*, CkE*: Chatfield	B	None	---	---	>6.0	---	---	20-40	Hard	Moderate	Low	Moderate.
Rock outcrop.												
ClA, ClB Chaumont	D	None	---	---	0.5-1.5	Perched	Dec-May	20-40	Hard	High	High	Low.
CmA, CmB Claverack	C	None	---	---	1.5-2.0	Perched	Nov-May	>60	---	Moderate	Low	Moderate.
CnB, CnC, CnC3 Collamer	C	None	---	---	1.5-2.0	Apparent	Mar-May	>60	---	High	Moderate	Low.
CoB Collamer	C	None	---	---	1.5-2.0	Apparent	Mar-May	40-60	Hard	High	Moderate	Low.
Cp Covington	D	None	---	---	0.5-1.0	Apparent	Oct-May	>60	---	Moderate	High	Moderate.

See footnote at end of table.

TABLE 17. --SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Risk of corrosion		
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Potential frost action	Uncoated steel	Concrete
DcB, DcC, DcD Danley	C	None	---	---	1.5-2.0	Perched	Mar-May	>60	---	High	High	Low.
DdA, DdB, DdC Darlen	C	None	---	---	0.5-1.5	Perched	Dec-May	>60	---	High	High	Low.
DeB, Deerfield	B	None	---	---	1.5-3.0	Apparent	Dec-Apr	>60	---	Moderate	Low	High.
Dp*, Dumps												
EA, EIB Elmridge	C	None	---	---	1.5-3.0	Perched	Nov-May	>60	---	High	Moderate	Moderate.
Em Ensley	B/D	None	---	---	+1-1.0	Apparent	Nov-Jun	>60	---	High	High	Low.
En Ensley	B/D	None	---	---	+1-0.5	Apparent	Nov-Jun	>60	---	High	High	Low.
FaB Farmington	C	None	---	---	>6.0	---	---	10-20	Hard	Moderate	Low	Moderate.
Fu*, Fluvaquents.												
Udifluvents.												
GaA, GaB Galen	B	None	---	---	1.5-2.0	Apparent	Mar-May	>60	---	Moderate	Moderate	Low.
GbB*, Galoo	C/D	None	---	---	>6.0	---	---	2-10	Hard	Moderate	Low	Low.
Rock outcrop.												
GcB*, Galoo	C/D	None	---	---	>6.0	---	---	2-10	Hard	Moderate	Moderate	High.
Rock outcrop.												
GLA, GLB, GIC, GnC Galway	B	None	---	---	1.5-3.0	Perched	Mar-Apr	20-40	Hard	Moderate	Low	Low.
Gr Granby	A/D	None	---	---	+1-1.0	Apparent	Nov-Jun	>60	---	Moderate	High	Low.

See footnote at end of table.

TABLE 17. SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Risk of corrosion		
		Frequency	Duration	Months	Depth Ft	Kind	Months	Depth In	Hardness	Potential frost action	Uncoated steel	Concrete
HrB*: Hollis	C/D	None	---	---	>6.0	---	---	10-20	Hard	Moderate	Low	High.
Rock outcrop.												
HuB, HuC Hudson	C	None	---	---	1.5-2.0	Perched	Nov-Apr	>60	---	High	High	Low.
HvB*: Hudson	C	None	---	---	1.5-2.0	Perched	Nov-Apr	>60	---	High	High	Low.
Chatfield	B	None	---	---	>6.0	---	---	20-40	Hard	Moderate	Low	Moderate.
Rock outcrop.												
HyE3*: Hudson	C	None	---	---	1.5-2.0	Perched	Nov-Apr	>60	---	High	High	Low.
Vergennes	D	None	---	---	1.0-3.0	Apparent	Dec-May	>60	---	Moderate	High	Low.
InB*: Insulia	D	None	---	---	>6.0	---	---	8-20	Hard	Moderate	Low	Moderate.
Quetico	D	None	---	---	>6.0	---	---	4-8	Hard	Low	Low	Moderate.
IoB*: Insulia	D	None	---	---	>6.0	---	---	8-20	Hard	Moderate	Low	Moderate.
Rock outcrop.												
IrB, IrC Ira	C	None	---	---	1.5-2.0	Perched	Feb-Mar	>60	---	Moderate	Moderate	High.
Ju Junius	C	None	---	---	0.5-1.5	Apparent	Dec-May	>60	---	Moderate	High	Moderate.
KgA, KgB Kingsbury	D	None	---	---	0.5-1.5	Perched	Dec-May	>60	---	High	High	Moderate.
Kr*: Kingsbury	D	None	---	---	0.5-1.5	Perched	Dec-May	>60	---	High	High	Moderate.
Livingston	D	None	---	---	0-1.0	Apparent	Sep-Jul	>60	---	High	High	Low.
LaB*, LaC*: Lagross	A	None	---	---	>6.0	---	---	>60	---	Moderate	Low	Moderate.
Haight	B	None	---	---	2.0-3.0	Apparent	Feb-Apr	>60	---	Moderate	Moderate	Low.

See footnote at end of table.

TABLE 17. SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Risk of corrosion		
		Frequency	Duration	Months	Depth Ft	Kind	Months	Depth in	Hardness	Potential frost action	Uncoated steel	Concrete
NDF*: Nassau	C	None	---	---	>6.0	---	---	10-20	Hard	Moderate	Low	High.
Manlius	C	None	---	---	>6.0	---	---	20-40	Hard	Moderate	Low	Moderate.
NLA, NIB, NIC, NID Nellis	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low	Low.
NmF*: Nellis	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low	Low.
Madrid	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low	Moderate.
Nh Newstead	C	None	---	---	0.5-1.0	Perched	Dec-May	20-40	Hard	High	High	Low.
NoA, NoB Niagara	C	None	---	---	0.5-1.5	Apparent	Dec-May	>60	---	High	High	Low.
NpB Niagara	C	None	---	---	0.5-1.5	Apparent	Dec-May	40-60	Hard	High	High	Low.
Pa Palms	A/D	None	---	---	+1-1.0	Apparent	Nov-May	>60	---	High	High	Moderate.
PhA, PhB Pheips	B	None	---	---	1.5-2.0	Apparent	Mar-May	>60	---	High	Moderate	Low.
PkB*: Pinckney	C	None	---	---	1.5-2.0	Perched	Feb-May	>60	---	Moderate	Low	Moderate.
Ensiey	B/D	None	---	---	+1-1.0	Apparent	Nov-Jun	>60	---	High	High	Low.
Pm*, Ph* Pits	A	None	---	---	>6.0	---	---	>60	---	Low	Low	High.
PpD*: Plainfield	A	None	---	---	>6.0	---	---	>60	---	Low	Low	High.
Windsor	A	None	---	---	>6.0	---	---	>60	---	Low	Low	High.
Ps Pootatuck	B	Frequent	Brief	Nov-Apr	1.5-2.5	Apparent	Nov-Apr	>60	---	Moderate	Moderate	Moderate.

See footnote at end of table.

range from 20 to more than 100 acres. Slope is less than 1 percent.

Typically, the surface layer is covered by a layer of live sphagnum moss about 5 inches thick. The surface layer is very dark gray and dark reddish brown muck (sapric material) about 11 inches thick. The subsurface layer, about 89 inches thick, is dark reddish brown to dark brown mucky peat. Below that, to a depth of 140 inches or more, is a layer of clay and silt.

Included with this soil in mapping are small areas of Palms and Willette soils at the edge of some bogs where the organic deposits are thin. Also included are small areas of Saprists, Aquents, Fluvaquents, and Udifluvents.

The seasonal high water table in this Boots soil is commonly within 1 foot of the surface from November through August. Some areas are subject to occasional flooding or ponding by as much as 1 foot of water. The rate of water movement through the soil is moderate or moderately rapid. Runoff is very slow, or the soil is ponded. The capacity of the soil to store water available for plant growth is high. The surface layer ranges from moderately acid to neutral.

Most areas of this soil are woodland. The largest area is in a sphagnum-black spruce bog on the north side of Perch Lake. No areas have been cleared and drained for crops. In some places the soil is used as habitat for wetland wildlife.

This soil is not suited to crops or pasture because of prolonged wetness. Leaving areas in natural vegetation to serve as wildlife habitat is generally a suitable management practice.

Potential productivity for tamarack is moderate. The prolonged seasonal high water table limits equipment use, causes a high rate of seedling mortality, and restricts rooting depth, which causes uprooting of trees during windy periods.

The prolonged seasonal high water table, flooding, ponding, seepage, and excess humus are limitations to use of this soil for sanitary facilities. In addition, poor stability and potential frost action are limitations for other urban uses. Potential for habitat for wetland wildlife is good.

The capability subclass is Vw.

→ **Ca—Canandaigua silt loam.** This is a nearly level, very deep, poorly drained soil mainly in smooth, broad, nearly level areas and in slight depressions on plains. Areas range from 10 to 40 acres. Slope ranges from 0 to 3 percent.

Typically, the surface layer is very dark grayish brown silt loam and very dark gray clay loam about 10 inches thick. The subsoil is mottled and 48 inches thick. It is very dark grayish brown to grayish brown silt loam. The substratum is mottled, dark grayish brown silty clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Collamer soils and somewhat

poorly drained Niagara soils on knolls and slightly raised benches. Also included are small areas of somewhat poorly drained Minoa soils and poorly drained and very poorly drained Lamson soils.

The seasonal high water table in this Canandaigua soil is commonly between the surface and a depth of 1 foot from November through May. The rate of water movement through the soil is moderate in the surface layer and moderately slow in the subsoil and the substratum. Runoff is very slow. The capability of the soil to store water available for plant growth is high. The surface layer is moderately acid to mildly alkaline.

Most areas have been cleared and are used for cultivated crops. Some areas are used as pasture or woodland.

This soil is moderately suited to cultivated crops. Drainage is needed if the soil is used for cultivated crops. Unless drained, most areas are better suited to long-term hay. Returning crop residue and adding manure to the soil and using winter cover crops help to improve soil tilth and the content of organic matter.

If used for pasture, this soil requires a management program that minimizes overgrazing and restricts grazing when the soil is too wet. Suitable management practices are proper stocking rates, pasture renovation, pasture reseeded, and application of lime and fertilizers.

Potential productivity of this soil for red maple is moderate. The seasonal high water table limits equipment use, causes high seedling mortality, and restricts rooting depth, causing uprooting of trees during windy periods.

The seasonal high water table, moderately slow percolation, and potential frost action are limitations of this soil for urban uses. Potential for habitat for wetland wildlife is good.

The capability subclass is Illw.

**Cb—Canandaigua mucky silt loam.** This is a nearly level, very deep, very poorly drained soil mainly in depressions and bogs on plains. Areas range from 10 to 40 acres. Slope ranges from 0 to 3 percent.

Typically, the surface layer is black to very dark grayish brown mucky silt loam and very dark clay loam about 10 inches thick. The subsoil is mottled and 48 inches thick. It is very dark grayish brown to grayish brown silt loam. The substratum is mottled, dark grayish brown silty clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of somewhat poorly drained Niagara soils on slightly raised benches. Also included, where the soils are loamy, are small areas of somewhat poorly drained Minoa soils and poorly drained and very poorly drained Lamson soils.

The seasonal high water table of this Canandaigua soil is commonly between the surface and a depth of 1 foot from November through May. Ponding is common in early spring. The rate of water movement through the soil is moderate in the surface layer and moderately slow

other urban uses. Potential for habitat for both openland and woodland wildlife is good.

The capability subclass is IIw.

**CmB—Claverack loamy fine sand, 3 to 8 percent slopes.** This is a gently sloping, very deep, moderately well drained soil mainly in short, concave, sloping areas on the sides of ridges, knolls, and benches. Areas range from 10 to 50 acres.

Typically, the surface layer is very dark grayish brown loamy fine sand about 8 inches thick. The subsoil is mottled and about 32 inches thick. It is pale brown and brown loamy sand in the upper part and dark grayish brown silty clay in the lower part. The substratum is dark grayish brown silty clay loam to a depth of 60 inches or more.

Included with this soil in mapping, where the soil deposits are loamy rather than sandy, are small areas of moderately well drained Galen and Elmridge soils. Also included, in areas that do not have a sandy mantle, are somewhat poorly drained Rhinebeck soils and moderately well drained Hudson soils. Also included are small clay spots.

The seasonal high water table in this Claverack soil is commonly within 1 1/2 to 2 feet of the surface from March through May. The rate of water movement through the soil is rapid in the upper part of the subsoil and slow or very slow in the lower part of the subsoil and the substratum. Runoff is slow or medium. The capacity of the soil to store water available for plant growth is low or moderate. The surface layer is strongly acid to neutral.

Many areas of this prime farmland soil have been cleared and are used for cultivated crops. Some previously cleared areas have been planted to conifers. Some areas are used as pasture or woodland. A few areas are idle.

This soil is well suited to cultivated crops. The seasonal high water table somewhat delays planting and harvesting crops. In cultivated areas drainage is commonly needed for wet spots. Erosion is a moderate hazard if slopes are bare of vegetation. Conservation tillage, contour farming, crop rotation, using winter cover crops, and returning crop residue and adding manure to the soil help to control erosion, to maintain soil tilth and the content of organic matter, and to conserve water needed for plant growth.

If used for pasture, this soil requires a management program that minimizes overgrazing and restricts grazing when the soil is too wet or too dry. Suitable management practices are proper stocking rates, pasture renovation, pasture reseeding, and application of lime and fertilizers.

Potential productivity of this soil for sugar maple is moderate. There are no major management concerns for woodland uses.

The seasonal high water table, seepage, the clayey texture, and rate of water movement through the lower

part of the subsoil and the substratum are limitations to use of this soil as sites for sanitary facilities. Also, the seasonal high water table and poor stability are limitations for shallow excavations and buildings with basements. The seasonal high water table, potential frost action, and droughty conditions are limitations to other urban uses. Potential for habitat for both openland and woodland wildlife is good.

The capability subclass is IIw.

→ **CnB—Collamer silt loam, 3 to 8 percent slopes.**

This is a gently sloping, very deep, moderately well drained soil mainly in convex, sloping areas on plains. Areas range from 2 to 60 acres.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The subsurface layer is yellowish brown silt loam about 6 inches thick. The subsoil is mottled and about 18 inches thick. It is light brownish gray to brown silt loam and silty clay loam. The substratum is mottled, grayish brown, stratified silt, fine sand, and clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of somewhat poorly drained Niagara soils and poorly drained and very poorly drained Canandaigua soils in flat areas and in depressions. Also included, where bedrock is within 40 to 72 inches of the surface, are small areas of Collamer soils. Also included are small areas that have a clayey surface texture. Also included are small sandy areas.

The seasonal high water table of this Collamer soil is commonly within 1 1/2 to 2 feet of the surface from March through May. The rate of water movement through the soil is moderate in the surface and the subsurface layers and slow or moderately slow in the subsoil and the substratum. Runoff is medium. The capacity for the soil to store water available for plant growth is high. The surface layer is strongly acid to neutral.

Most areas of this soil have been cleared and are used for cultivated crops for dairy farming. Some areas are highly productive, farm woodlots. Some areas are in urban use. A few areas are in pasture.

This soil is well suited to cultivated crops. If it is properly managed, row crops can be grown intensively. Erosion is a severe hazard if slopes are bare of vegetation. The seasonal high water table somewhat delays planting and harvesting crops. Random drainage is commonly needed in areas used for cultivated crops. Conservation tillage, till and plant on the contour for short slopes, and strip cropping on the contour for longer slopes are suitable management practices. Crop rotation, using winter cover crops, and returning crop residue and adding manure to the soil help to control soil erosion, to maintain soil tilth and the content of organic matter, and to conserve moisture needed for plant growth.

If used for pasture, this soil requires a management program that minimizes overgrazing and restricts grazing

when the soil is too wet. Suitable management practices are proper stocking rates, pasture renovation, pasture reseeded, and application of lime and fertilizers.

Potential productivity of this soil for sugar maple is moderate. There are no management concerns for woodland uses.

The seasonal high water table, rate of water movement through the subsoil and the substratum, and potential frost action are limitations to use of this soil for most urban uses. Erosion is a severe hazard on building sites. Low soil strength is also a limitation for some urban uses. There are few limitations on sites for sewage lagoons and area landfills and for lawns and landscaping. Potential for habitat for both openland and woodland wildlife is good.

The capability subclass is IIe.

**CnC—Collamer silt loam, 8 to 15 percent slopes.**

This is a sloping, very deep, moderately well drained soil mainly on the shoulders of short and narrow, convex ridges, knolls, and benches on lowland plains. Areas range from 8 to 100 acres.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The subsurface layer is yellowish brown silt loam about 6 inches thick. The subsoil is mottled and about 18 inches thick. It is light grayish brown to brown silt loam to silty clay loam. The substratum is mottled, grayish brown, stratified silt, fine sand, and clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of somewhat poorly drained Niagara soils and poorly drained and very poorly drained Canandaigua soils in low, flat areas and in depressions. Also included, where bedrock is within 40 to 72 inches of the surface, are small areas of Collamer soils. Also included are small areas of soils that have a clay surface layer. Also included are small sandy areas.

The seasonal high water table of this Collamer soil is commonly within 1 1/2 to 2 feet of the surface from March through May. The rate of water movement through the soil is moderate in the surface and subsurface layers and slow or moderately slow in the subsoil and the substratum. Runoff is medium or rapid. The capacity of the soil to store water available for plant growth is high. The surface layer is strongly acid to neutral.

Most areas of this soil have been cleared and are used for cultivated crops for dairy farming. Some areas are in urban use or are highly productive, farm woodlots. A few areas are used as pasture or woodland.

This soil is moderately suited to cultivated crops, but requires careful management to control erosion. Erosion is a severe hazard if slopes are bare of vegetation. The seasonal high water table somewhat delays planting and harvesting crops. Conservation tillage, till and plant on the contour on the short slopes, and stripcropping on the contour on the longer slopes are suitable management

practices. Crop rotation with long periods of hay, using winter cover crops, and returning crop residue and adding manure to the soil help to control erosion, to maintain soil tilth and the content of organic matter, and to conserve moisture needed for plant growth.

If used for pasture, this soil requires a management program that minimizes overgrazing and restricts grazing when the soil is too wet. Suitable management practices are proper stocking rates, pasture renovation, pasture reseeded, and application of lime and fertilizers.

Potential productivity of this soil for sugar maple is moderate. Erosion is a moderate hazard. During logging operations careful management is required to control erosion.

The seasonal high water table, slope, rate of water movement through the subsoil and the substratum, and potential frost action are limitations to use of this soil for most urban uses. Erosion is a severe hazard on building sites. Low soil strength is also a limitation for some urban uses. There are few limitations on sites for area landfills and shallow excavations and for lawns and landscaping. Potential for habitat for both openland and woodland wildlife is good.

The capability subclass is IIIe.

**CnC3—Collamer silt loam, 8 to 15 percent slopes, severely eroded.**

This is a sloping, very deep, moderately well drained, severely eroded soil mainly on the shoulders of short and narrow, convex ridges, knolls, and benches on lowland plains. The surface layer commonly incorporates the upper part of the subsoil. Areas range from 10 to 150 acres.

Typically, the surface layer is brown silt loam about 8 inches thick. It is not as dark as that of the uneroded Collamer soils, and is as little as 2 inches thick. The subsoil is mottled and extends to a depth of 32 inches. It is light grayish brown to brown silt loam and silty clay loam. The substratum is mottled, stratified silt, fine sand, and clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of somewhat poorly drained Niagara soils on foot slopes and small areas of Collamer soils that have bedrock within 40 to 72 inches of the surface. Also included are small areas of soils where the surface layer is not severely eroded.

The seasonal high water table in this Collamer soil is commonly within a depth of 1 1/2 to 2 feet of the surface from March through May. The rate of water movement through the soil is moderate in the surface and subsurface layers, and slow or moderately slow in the subsoil and the substratum. Runoff is rapid. The capacity of the soil to store water available for plant growth is high. The surface layer is strongly acid to neutral.

Most areas of this soil are in pasture, have been replanted to conifers, or are idle. Some areas are used for cultivated crops.

brown sandy loam in the upper part and grayish brown gravelly sandy loam in the lower part. The substratum is grayish brown, mottled, gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Carbondale soils in bogs and Sapristis and Aquents in areas that are inundated with water most of the year. Also included are some areas where the surface layer is mucky. Also included are well drained Bice soils on the lower hillsides and ridges.

The seasonal high water table in this Ensley soil is commonly between the surface and a depth of 1 foot from November through June. Many areas are ponded for brief periods in spring. Stones and a few boulders cover 0.1 to 3 percent of the surface. The rate of water movement through the soil is moderately rapid in the surface layer, moderate in the subsoil, and moderately rapid in the substratum. Runoff is very slow or ponded. The capacity of the soil to store water available for plant growth is moderate. The surface layer is slightly acid to mildly alkaline.

Most areas of this soil are woodland. Some areas are in pasture or are reverting to brush. Some areas are in county and state forest tracts.

This soil is not suited to cultivated crops. Large stones and a few boulders on the surface and the prolonged seasonal high water table impede tillage.

If used for pasture, this soil requires a management program that minimizes overgrazing and restricts grazing when the soil is too wet. Suitable management practices are proper stocking rates, pasture renovation, pasture reseeding, and application of lime and fertilizers.

Potential productivity of this soil for red maple is moderate. The prolonged seasonal high water table limits equipment use, causes high seedling mortality, and restricts rooting depth, resulting in uprooting of trees during windy periods.

Large stones on the surface, the prolonged seasonal high water table, ponding, seepage, and potential frost action are limitations of this soil for urban uses. Potential for habitat for wetland wildlife is good.

The capability subclass is VIIc.

↔ **FaB—Farmington loam, 0 to 8 percent slopes.** This is a nearly level to gently sloping, shallow, well drained and somewhat excessively drained soil mainly in broad or oblong, undulating areas on upland till plains. Bedrock is at a depth of 10 to 20 inches. Areas range from 10 to 60 acres.

Typically, the surface layer is brown loam about 8 inches thick. The subsoil is dark yellowish brown to brown loam about 11 inches thick. Gray limestone bedrock is at a depth of 18 inches.

Included with this soil in mapping are small areas of moderately deep, well drained and moderately well drained Galway soils, shallow, somewhat excessively drained and excessively drained Benson soils, and very

shallow, excessively drained and somewhat excessively drained Galoo soils on uplands. Also included are small, stony areas, clayey areas, sandy areas, and wet spots.

Bedrock in this Farmington soil is at a depth of 10 to 20 inches. The rate of water movement through the soil is moderate. Runoff is slow or medium. The capacity of the soil to store water available for plant growth is low. The surface layer is strongly acid to slightly acid.

Most areas of this soil have been cleared and are used for cultivated crops. Some areas are used as pasture or woodland. A few areas are idle. A few wooded areas are stands of predominantly red cedar.

The soil is moderately suited to cultivated crops. Droughtiness is a limitation during the growing season. Row crops can be grown intensively. In the more sloping areas erosion is a moderate hazard if slopes are bare of vegetation. Conservation tillage, contour farming, crop rotation, using winter cover crops, and returning crop residue and adding manure to the soil help to control erosion, to maintain soil tilth and the content of organic matter, and to conserve moisture needed for plant growth.

If used for pasture, this soil requires a management program that minimizes overgrazing and restricts grazing when the soil is too dry. Suitable management practices are proper stocking rates, pasture renovation, pasture reseeding, and application of lime and fertilizers. These practices help to control erosion.

Potential productivity of this soil for sugar maple is moderate. Depth to bedrock and droughtiness cause high seedling mortality and results in a moderate rate of uprooting of trees during windy periods.

Shallow depth to bedrock is a limitation of this soil for most urban uses. Potential for habitat for openland and woodland wildlife is poor.

The capability subclass is IIIc.

**Fu—Fluvaquents-Udifluvents complex, frequently flooded.** This map unit consists of nearly level to gently sloping, deep, well drained to very poorly drained soils adjacent to streams. These soils are subject to frequent flooding, which causes stream scour, lateral erosion, and shifting of soil deposits from place to place. Slope ranges from 0 to 8 percent, but is dominantly less than 3 percent. Most areas are long and narrow and adjacent to secondary streams. A few areas are wider and adjacent to larger streams and rivers. Areas range from 10 to 30 acres.

The soils in this unit have little or no soil profile development. The unit is about 45 percent Fluvaquents, 45 percent Udifluvents, and 10 percent other soils. Soil characteristics, including texture, gravel content, and drainage, differ so greatly within short distances that the soils could not be mapped separately at the scale selected for mapping.

Fluvaquents have a surface layer of dark brown to black very gravelly fine sand to silty clay about 5 to 9



Figure 7.—Exposed ledges of hard limestone bedrock are common in areas of Galoo-Rock outcrop complex, 0 to 8 percent slopes. The bedrock is a limitation to most urban uses, such as roads, that require subsurface excavations.

inches. Bedrock of dolomitic sandstone and Theresa sandstone is at a depth of 7 inches. Typically, it is buff colored and the grains are cemented by carbonates.

Included with this unit in mapping are small areas of shallow, well drained and somewhat excessively drained Hollis soils, shallow, poorly drained and very poorly drained Ruse soils, and moderately deep, well drained and somewhat excessively drained Chatfield soils on ridges. Also included are small areas of moderately deep, somewhat poorly drained Chaumont soils between bedrock ridges and poorly drained and very poorly drained Guffin soils in depressions. Also included are small areas where stones and boulders are on the surface.

Bedrock in the Galoo, acid, soil is at a depth of less than 10 inches. The rate of water movement through the soil is moderate. Runoff is slow or medium. The capacity of the soil to store water available for plant growth is very low. The surface layer is very strongly acid or strongly acid.

Most areas of the Galoo, acid, soil are in pasture, are reverting to brush, or are poor quality woodland.

The Galoo, acid, soil is not suited to cultivated crops because of very shallow depth to bedrock, rock outcrops, and droughtiness.

The Galoo, acid, soil is poorly suited to pasture. If used for pasture, it requires a management program that minimizes overgrazing and restricts grazing when the soil is too dry. Suitable management practices are proper stocking rates, restricted grazing during dry periods, pasture renovation, pasture reseeding, and application of lime and fertilizers.

Potential productivity of the Galoo, acid, soil for red maple is moderate. Depth to bedrock, rock outcrops, and droughtiness cause high seedling mortality, and restricted rooting depth results in uprooting of trees during windy periods.

Depth to bedrock and rock outcrops are limitations of this soil as sites for sanitary facilities and for other urban uses. Potential for habitat for wildlife is poor.

The capability subclass is VIIc.

→ **GIA—Galway silt loam, 0 to 3 percent slopes.** This is a nearly level, moderately deep, well drained and

moderately well drained soil mainly in smooth, oblong, flat areas on uplands. Bedrock is at a depth of 20 to 40 inches. Areas range from 10 to 80 acres.

Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsoil is about 14 inches thick. It is yellowish brown gravelly silt loam in the upper part, and mottled, dark grayish brown to brown gravelly loam in the lower part. The substratum is brown to grayish brown very gravelly loam to a depth of 36 inches. Gray limestone bedrock is at a depth of 36 inches.

Included with this soil in mapping are small areas of shallow, well drained and somewhat excessively drained Farmington soils and moderately deep, somewhat poorly drained and poorly drained Newstead soils. Also included are small areas of very deep, well drained Nellis soils and very deep, moderately well drained Amenia soils. Also included are areas of Galway soils that have a channery or very channery surface layer. Also included are small areas of rock outcrops, bedrock escarpments, stony areas, and wet areas.

The seasonal high water table in this Galway soil is commonly within 1 1/2 to 3 feet of the surface in March and April. Bedrock is at a depth of 20 to 40 inches. The rate of water movement through the soil is moderate. Runoff is slow. The capacity of the soil to store water available for plant growth is low or moderate. The surface layer is moderately acid to neutral.

Most areas of this prime farmland soil have been cleared and are used for cultivated crops in dairy farming. A few areas are used as pasture or woodland. A few areas are in urban use.

This soil is well suited to cultivated crops. It is somewhat droughty during the drier summer months. Row crops can be grown intensively. Conservation tillage, crop rotation, using winter cover crops, and returning crop residue and adding manure to the soil help to maintain soil tilth and the content of organic matter and to conserve moisture needed for plant growth.

If used for pasture, this soil requires a management program that minimizes overgrazing and restricts grazing when the soil is too dry. Suitable management practices are proper stocking rates, pasture renovation, pasture reseeding, and application of lime and fertilizers.

Potential productivity of this soil for sugar maple is moderate. There are few or no major management concerns for woodland use.

Depth to bedrock is a limitation to use of this soil as sites for sanitary facilities, shallow excavations, and dwellings with basements. Depth to bedrock is a limitation of this soil for local roads and streets. The thin layer of soil over bedrock is a limitation for lawns and landscaping. Potential for habitat for openland and woodland wildlife is good.

The capability subclass is IIs.

→ **GIB—Galway silt loam, 3 to 8 percent slopes.** This is a gently sloping, moderately deep, well drained and moderately well drained soil mainly in convex, sloping areas on uplands. Bedrock is at a depth of 20 to 40 inches. Areas range from 10 to 80 acres.

Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsoil is about 14 inches thick. It is yellowish brown gravelly silt loam in the upper part and mottled, dark grayish brown and brown gravelly loam in the lower part. The substratum is brown and grayish brown very gravelly loam to a depth of 26 inches. Gray limestone bedrock is at a depth of 26 inches.

Included with this soil in mapping are small areas of shallow, well drained and somewhat excessively drained Farmington soils on knolls and moderately deep, somewhat poorly drained and poorly drained Newstead soils in low, flat areas. Also included are small areas of very deep, well drained Nellis soils and moderately well drained Amenia soils. Also included are Galway soils that have a channery and very channery surface layer. Also included are small areas of rock outcrops, bedrock escarpments, stony areas, and wet spots.

The seasonal high water table in this Galway soil is commonly within 1 1/2 to 3 feet of the surface layer in March and April. Bedrock is at a depth of 20 to 40 inches. The rate of water movement through the soil is moderate. Runoff is slow or medium. The capacity of the soil to store water available for plant growth is low or moderate. The surface layer is moderately acid to neutral.

Most areas of this prime farmland soil have been cleared and are used for cultivated crops in dairy farming. A few areas are used for pasture or woodland. A few areas are in urban use.

This soil is well suited to cultivated crops. It is somewhat droughty during the drier summer months. Row crops can be grown intensively, but erosion is a moderate hazard if slopes are bare of vegetation. Conservation tillage, contour farming with strip crops on the contour on the longer slopes, crop rotation, using winter cover crops, and returning crop residue and adding manure to the soil help to maintain soil tilth and the content of organic matter and to conserve moisture needed for plant growth.

If used for pasture, this soil requires a management program that minimizes overgrazing and restricts grazing when the soil is too dry. Suitable management practices are proper stocking rates, pasture renovation, pasture reseeding, and application of lime and fertilizers.

Potential productivity of this soil for sugar maple is moderate. There are few or no major management limitations for woodland use.

Depth to bedrock is a limitation to use of this soil as sites for sanitary facilities, shallow excavations, and dwellings with basements. Depth to bedrock is a limitation of the soil for most other urban uses. Potential

frost action is a limitation for local roads and streets. A thin layer of soil over bedrock is a limitation for lawns and landscaping. Potential for habitat for openland and woodland wildlife is good.

The capability subclass is IIe.

**GIC—Galway silt loam, 8 to 15 percent slopes.** This is a sloping, moderately deep, well drained and moderately well drained soil mainly in convex, sloping areas on uplands. Bedrock is at a depth of 20 to 40 inches. Areas range from 10 to 80 acres.

Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsoil is about 14 inches thick. It is dark yellowish brown gravelly silt loam in the upper part and mottled, dark grayish brown to brown gravelly loam in the lower part. The substratum is mottled, brown to grayish brown very gravelly loam to a depth of 26 inches. Gray limestone bedrock is at a depth of 26 inches.

Included with this soil in mapping are small areas of shallow, well drained and somewhat excessively drained Farmington soils and moderately deep, somewhat poorly drained and poorly drained Newstead soils in low, flat areas. Also included are small areas of very deep, well drained Nellis soils and moderately well drained Amenia soils. Also included are Galway soils that have a channery and very channery surface layer. Also included are small areas of rock outcrops, bedrock escarpments, stony areas, and wet spots.

The seasonal high water table in this Galway soil is commonly within 1 1/2 to 3 feet of the surface in March and April. Bedrock is at a depth of 20 to 40 inches. The rate of water movement through the soil is moderate. Runoff is medium. The capacity of the soil to store water available for plant growth is low or moderate. The surface layer is moderately acid to neutral.

Most areas of this soil have been cleared and are used for cultivated crops in dairy farming. A few areas are used for pasture or woodland. A few areas are in urban use.

This soil is moderately suited to cultivated crops. It is somewhat droughty during the growing season. Erosion is a severe hazard if slopes are bare of vegetation. Conservation tillage, contour farming on the short slopes, crop rotation with long-term hay crops, using winter cover crops, and returning crop residue and adding manure to the soil help to control erosion, to maintain soil tilth and the content of organic matter, and to conserve moisture needed for plant growth.

If used for pasture, this soil requires a management program that minimizes overgrazing and restricts grazing when the soil is too dry. Suitable management practices are proper stocking rates, pasture renovation, pasture reseeding, and application of lime and fertilizers.

Potential productivity of this soil for sugar maple is moderate. There are no major management concerns for woodland use.

Depth to bedrock is a limitation to use of this soil as sites for sanitary facilities, shallow excavations, and dwellings with basements. Depth to bedrock and slope are limitations of this soil for most other urban uses. Slope and potential frost action are limitations for local streets and roads. Slope and a thin layer of soil over bedrock are limitations for lawns and landscaping and golf fairways. Potential for habitat for openland and woodland wildlife is good.

The capability subclass is IIIe.

**GmC—Galway very stony silt loam, 0 to 15 percent slopes.** This is a nearly level to sloping, moderately deep, well drained soil mainly in broad, irregularly shaped, undulating and rolling areas on uplands. Bedrock is at a depth of 20 to 40 inches. Stones and boulders 5 to 25 feet apart cover 3 percent of the surface. Areas range from 20 to 100 acres or more.

Typically, the surface layer is very dark grayish brown gravelly silt loam about 9 inches thick. The subsoil is about 14 inches thick. It is yellowish brown gravelly silt loam in the upper part and mottled, dark grayish brown to brown gravelly loam in the lower part. The substratum is brown to grayish brown very gravelly loam to a depth of 36 inches. Gray limestone bedrock is at a depth of 36 inches.

Included with this soil in mapping are a few areas of very stony, well drained Nellis soils, moderately well drained Amenia soils, and well drained Lowville soils. Also included are well drained Madrid soils, moderately deep, somewhat poorly drained and poorly drained Newstead soils, and deep, poorly drained and very poorly drained Sun soils. Also included are small areas of very stony, shallow, somewhat excessively drained and excessively drained Benson soils and very shallow, excessively drained and somewhat excessively drained Galoo soils.

The seasonal high water table in this Galway soil is commonly within 1 1/2 to 3 feet of the surface in March and April. Large stones and a few boulders are on the surface. Bedrock is at a depth of 20 to 40 inches. The rate of water movement through the surface layer is moderate. Runoff is slow or medium. The capacity of the soil to store water available for plant growth is low or moderate.

Most areas of this soil are permanent pasture or woodland or are idle. Some cleared areas that previously were used for pasture are planted to conifers.

This soil is not suited to cultivated crops because of large stones and a few boulders on the surface. If used for pasture, it requires a management program that minimizes overgrazing and restricts grazing when the soil is too dry. Suitable management practices are proper stocking rates, pasture renovation, pasture reseeding, and application of lime and fertilizers.

loam to a depth of about 16 inches. Potsdam sandstone and dolomite bedrock is at a depth of 16 inches.

Typically, the Galoo, acid, soil has a surface layer of dark brown silt loam about 4 inches thick. The subsoil is reddish brown channery silt loam to a depth of about 7 inches. Dolomite or Theresa sandstone bedrock is at a depth of 7 inches.

Included with this soil complex in mapping are small areas of moderately deep, well drained and somewhat excessively drained Chatfield soils, and shallow, poorly drained and very poorly drained Ruse soils on flats and in depressions. Also included are small areas where stones and boulders are on the surface, sand spots, and clay spots.

Depth to bedrock is 10 to 20 inches in the Hollis soil and less than 10 inches in the Galoo, acid, soil. Runoff is medium or slow, depending on relief. The capacity of these soils to store water available for plant growth is very low. The surface layer ranges from very strongly acid to moderately acid in the Hollis soil and is very strongly acid or strongly acid in the Galoo soil.

Most areas are used for permanent pasture. Some areas are used as woodland or are reverting to brush. Some areas are idle. A few areas are used for cultivated crops.

These soils are poorly suited to cultivated crops because of depth to bedrock and rock outcrops. Erosion is a slight hazard if slopes are bare of vegetation. Long-term hay or sod crops are effective in controlling erosion. If the soils are used for cultivated crops, using winter cover crops and returning crop residue and adding manure to the soil help to maintain soil tilth and the content of organic matter, to control erosion, and to conserve moisture needed for plant growth.

If used for pasture, these soils require a management program that minimizes overgrazing and restricts grazing when the soils are too dry. Suitable management practices are proper stocking rates, pasture renovation, pasture reseeding, and application of lime and fertilizers.

Potential productivity is moderate for northern red oak on the Hollis soil and for red maple on the Galoo, acid, soil. Depth to bedrock and rock outcrops cause moderate seedling mortality and restrict rooting depth, resulting in a moderate rate of uprooting of trees during windy periods on the Hollis soil and a high rate on the Galoo, acid, soil.

Depth to bedrock, rock outcrops, and seepage are limitations of these soils for urban uses. Potential for habitat for openland and woodland wildlife is poor.

The capability subclass is IVs.

**HrB—Hollis-Rock outcrop complex, 0 to 8 percent slopes.** This map unit consists of shallow, well drained and somewhat excessively drained Hollis soil and areas of Rock outcrop. The Hollis soil makes up about 50 percent of the unit, Rock outcrop makes up about 30 percent, and other soils make up 20 percent. Areas of

this soil and Rock outcrop are undulating or flat and on the tops of terraces, and on plains. Areas range from 15 to 80 acres or more.

Typically, the surface layer of the Hollis soil is covered by a thin, organic layer. The surface layer is dark brown fine sandy loam about 4 inches thick. The subsoil is brown to dark yellowish brown gravelly fine sandy loam to a depth of 16 inches. Potsdam sandstone and dolomite bedrock is at a depth of 16 inches or more.

Typically, Rock outcrop consists of areas of exposed sandstone and dolomite. The sandstone is poorly cemented and buff colored. The dolomite is made up of magnesium carbonate.

Included in mapping are small areas of very shallow, somewhat excessively drained Galoo soils, moderately deep, well drained and somewhat excessively drained Chatfield soils, and in low, flat areas, shallow, poorly drained and very poorly drained Ruse soils. Also included, in clayey deposits between bedrock ridges, are small areas of moderately deep, somewhat poorly drained Chaumont soils and poorly drained and very poorly drained Guffin soils in depressions. Also included are small areas where stones and boulders are on the surface and areas of steep slopes.

Bedrock in the Hollis soil is at a depth of 10 to 20 inches. The rate of water movement through the soil is moderate or moderately rapid. Runoff is slow or medium. The capacity of the soil to store water available for plant growth is very low. The surface layer ranges from very strongly acid to moderately acid.

Most areas of the Hollis soil is in permanent pasture. Some areas are used as woodland or are reverting to brush. Some areas are idle.

The Hollis soil is not suitable for farming because of rock outcrop and shallow depth to bedrock. Erosion is a moderate hazard if slopes are bare of vegetation.

The Hollis soil is suitable for pasture. If used for pasture, it requires a management program that minimizes overgrazing and restricts grazing when the soil is too dry. Suitable management practices are proper stocking rates, pasture renovation, pasture reseeding, and application of lime and fertilizers.

Potential productivity of the Hollis soil for northern red oak is moderate. Shallow depth to bedrock causes moderate seedling mortality and restricts rooting depth, resulting in uprooting of trees during windy periods.

Shallow depth to bedrock, rock outcrops, and seepage are limitations of this Hollis soil for urban uses. Potential for habitat for openland and woodland wildlife is poor.

The capability subclass is VI<sub>s</sub>.

**HuB—Hudson silt loam, 3 to 8 percent slopes.** This is a gently sloping, very deep, moderately well drained soil mainly in smooth, irregularly shaped areas and on convex slopes. Areas range from 3 to 100 acres.

Typically, the surface layer is brown silt loam about 8 inches thick. The subsurface layer is mottled, brown silt

loam about 4 inches thick. The subsoil is mottled and about 47 inches thick. It is brown to dark brown silty clay loam in the upper part, brown silty clay in the middle part, and yellowish brown silt loam in the lower part. The substratum is mottled, brown silty clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of somewhat poorly drained Rhinebeck soils in nearly level and concave, sloping areas and very poorly drained Madalin soils in depressions. Also included are small wet spots and sand spots.

The seasonal high water table in this Hudson soil is commonly within 1 1/2 to 2 feet of the surface layer from November through April. The rate of water movement through the soil is moderately slow or moderate in the surface layer and slow or very slow in the subsoil and the substratum. The rate of water movement through the soil is moderately slow or moderate in the surface layer and slow or very slow in the subsoil and the substratum. Runoff is medium. The capacity of the soil to store water available for plant growth is high. The surface layer is strongly acid to neutral.

Most areas of this soil have been cleared and are used for cultivated crops in dairy farming. Some areas are highly productive woodlots and sugarbushes. Some areas are in urban use.

This soil is well suited to cultivated crops. If it is properly managed, row crops can be grown intensively. Land smoothing and surface drainage with suitable outlets are effective in draining this soil for cultivated crops. Plowing in fall is common. Erosion is a serious hazard if slopes are bare of vegetation. Contour farming, crop rotation, using winter cover crops, and returning crop residue and adding manure to the soil help to control erosion, to maintain soil tilth and the content of organic matter, and to conserve moisture needed for plant growth.

If used for pasture, this soil requires a management program that minimizes overgrazing and restricts grazing when the soil is too wet. Suitable management practices are proper stocking areas, pasture renovation, pasture reseeding, and application of lime and fertilizers. These practices help to control erosion.

Potential productivity of this soil for sugar maple is moderate. There are few or no major management concerns for woodland use.

The seasonal high water table and rate of water movement through the subsoil and the substratum are limitations to use of this soil as sites for septic tank absorption fields. The seasonal high water table and the clayey texture are limitations for trench landfills and area landfills. The seasonal high water table is a limitation for shallow excavations and dwellings with basements. Shrinking and swelling and the seasonal high water table are limitations for dwellings without basements and small commercial buildings. Potential frost action and low soil

strength are limitations for local roads and streets. Potential for habitat for openland and woodland wildlife is good.

The capability subclass is IIe.

**HuC—Hudson silt loam, 8 to 15 percent slopes.**

This is a sloping, very deep, moderately well drained soil mainly in long and narrow, or irregularly shaped areas, and on convex slopes. Areas range from 15 to 60 acres.

Typically, the surface layer is brown silt loam about 8 inches thick. The subsurface layer is mottled, brown silt loam about 4 inches thick. The subsoil is mottled and about 47 inches thick. It is brown to dark brown silty clay loam in the upper part, brown silty clay in the middle part, and yellowish brown silt loam in the lower part. The substratum is mottled, brown silty clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of somewhat poorly drained Rhinebeck soils on foot slopes. Also included are small wet spots and sand spots.

The seasonal high water table in this Hudson soil are commonly within 1 1/2 to 2 feet of the surface from November through April. The rate of water movement through the soil is moderately slow or moderate in the surface layer and slow or very slow in the subsoil and the substratum. Runoff is medium. The capacity of the soil to store water available for plant growth is high. The surface layer is very strongly acid to neutral.

Most areas of this soil have been cleared and are used for cultivated crops in dairy farming. Some areas are in highly productive woodlots and in sugar bushes. Some areas are in urban uses.

This soil is moderately suited to cultivated crops. Erosion is a very serious hazard if slopes are bare of vegetation. Contour farming and field strips or strip cropping help to control erosion. Crop rotation with long-term hay crops or sod, using cover crops, and returning crop residue and adding manure to the soil help to control erosion, to maintain soil tilth and the content of organic matter, and to conserve moisture needed for plant growth.

If used for pasture, this soil requires a management program that minimizes overgrazing and restricts grazing when the soil is too wet. Suitable management practices are proper stocking rates, pasture renovation, pasture reseeding, and application of lime and fertilizers. These practices help to control erosion.

Potential productivity of this soil for northern red oak is moderately high. Erosion is a moderate hazard.

The seasonal high water table and rate of water movement through the subsoil and the substratum are limitations to use of this soil as sites for septic tank absorption fields. The seasonal high water table and the clayey texture are limitations for trench landfills. The seasonal high table and slope are limitations for area landfills. The seasonal high water table is a limitation for shallow excavations and dwellings with basements.

substratum is brown to light brownish gray gravelly fine sandy loam to a depth of 60 inches or more.

Typically, the surface layer of the Madrid soil is grayish brown sandy loam about 8 inches thick. In the upper part the subsoil is brown sandy loam to dark brown fine sandy loam about 11 inches thick. In the lower part it is dark brown fine sandy loam about 6 inches thick. The substratum is dark brown, firm gravelly fine sandy loam to a depth of 60 inches or more.

Included with these soils in mapping are small areas of Lowville soils. Also included are small severely eroded areas. Also included are areas where few stones or boulders are on the surface and areas of rock outcrops.

The rate of water movement through the Nellis soil is moderate in the subsoil and moderately slow or slow in the substratum, and through the Madrid soil is moderate in the surface layer and the upper part of the subsoil, moderately slow or moderate in the lower part of the subsoil, and moderately slow in the substratum. Runoff is rapid. The capacity of these soils to store water available for plant growth is high. The surface layer is moderately acid to neutral in the Nellis soils and strongly acid to neutral in the Madrid soils.

Most areas of these soils are woodland or are reverting to brush. Some areas are in permanent pasture or are idle.

These soils are not suited to cultivated crops because of slope.

If used for pasture, these soils require a management program that minimizes overgrazing and restricts grazing when the soils are too dry or too wet. Suitable management practices are proper stocking rates, pasture renovation, pasture reseeding, and application of lime and fertilizers. These practices help to control erosion.

Potential productivity of these soils for sugar maple is moderate. The main management concerns are the moderate erosion hazard and the moderate equipment limitation, both because of slope. Careful management is needed to control erosion during logging operations.

Slope is a limitation of these soils for urban use. Potential for habitat is good for woodland wildlife.

The capability subclass is VIIe.

**Nn—Newstead silt loam.** This is a nearly level, moderately deep, somewhat poorly drained and poorly drained soil in long, narrow or large, irregularly shaped areas on uplands. Slope ranges from 0 to 3 percent, but is dominantly less than 2 percent. Areas range from 10 to 100 acres.

Typically, the surface layer is very dark grayish brown silt loam about 8 inches thick. The subsoil is mottled and about 14 inches thick. It is grayish brown silt loam in the upper part and grayish brown gravelly loam in the lower part. The substratum is mottled, grayish brown gravelly sandy loam to a depth of 30 inches. Gray limestone bedrock is at a depth of 30 inches.

Included with this soil in mapping are small areas of very deep, somewhat poorly drained and poorly drained Massena soils and very poorly drained and poorly drained Sun soils. Also included are small areas of somewhat excessively drained and excessively drained Benson soils and well drained and moderately well drained Galway soils on the drier parts of the landscape. Also included are small stony areas.

The seasonal high water table in this Newstead soil is commonly within 1/2 to 1 foot of the surface from December through May. The rate of water movement through the soil is moderate in the surface layer, the subsoil, and the substratum. Runoff is slow. The capacity of the soil to store water available for plant growth is moderate. The surface layer ranges from moderately acid to mildly alkaline.

Most areas of this soil are used for hay crops or pasture. Some areas are forest or are reverting to brush. This is a prime farmland soil, where drained.

This soil is moderately suited to cultivated crops. The seasonal high water table is the main limitation. Drainage is needed if the soil is used for cultivated crops. Using cover crops and returning crop residue and applying manure to the soil help to improve soil tilth in the surface layer and to maintain the content of organic matter.

If used for pasture, this soil requires a management program that minimizes overgrazing and restricts grazing when the soil is too wet. Suitable management practices are proper stocking rates, pasture renovation, pasture reseeding, and application of lime and fertilizers.

Potential productivity of this soil for red maple is moderate. The seasonal high water table limits equipment use, causes high seedling mortality, and restricts rooting depth, resulting in uprooting of trees during windy periods.

The prolonged seasonal high water table, depth to bedrock, and potential frost action are limitations of this soil for urban uses. Potential for habitat is fair for wetland wildlife.

The capability subclass is IIIw.

➔ **NoA—Niagara silt loam, 0 to 3 percent slopes.** This is a nearly level, very deep, somewhat poorly drained soil in smooth, broad, irregularly shaped areas on lowland plains. Areas range from 10 to 40 acres.

Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsurface layer is mottled, dark grayish brown silt loam about 4 inches thick. The subsoil is mottled and about 22 inches thick. It is brown to dark brown silt loam in the upper part and dark grayish brown silt loam in the lower part. The substratum is mottled, dark grayish brown to dark brown silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Collamer soils, poorly drained and very poorly drained Canandaigua soils, and, where bedrock is at a depth of 40 to 72 inches, Niagara soils.

Also included are small areas of moderately deep, poorly drained and very poorly drained Guffin soils in depressions.

The seasonal high water table in this Niagara soil is commonly within 1/2 to 1 1/2 feet of the surface from December through May. The rate of water movement through the soil is moderate in the surface layer and moderately slow in the subsoil and the substratum. Runoff is slow. The capacity of the soil to store water available for plant growth is high. The surface layer is strongly acid to neutral.

Most areas of this soil have been cleared and are used for cultivated crops. This is a prime farmland soil, where drained. Some areas are used as pasture or forest.

This soil is moderately suited to crops. The main limitation is the seasonal high water table. If the soil is properly managed, row crops can be grown intensively. Drainage is needed if the soil is used for cultivated crops. Conservation tillage, crop rotation, using winter cover crops, and returning crop residue and applying manure to the soil help to improve soil tilth, to maintain the content of organic matter, and to conserve moisture needed for plant growth.

If used for pasture, this soil requires a management program that minimizes overgrazing and restricts grazing when the soil is too wet. Suitable management practices are proper stocking rates, pasture renovation, pasture reseeding, and application of lime and fertilizers.

Potential productivity of this soil for sugar maple is moderate. The seasonal high water table somewhat limits equipment use, causes moderate seedling mortality, and somewhat restricts rooting depth, resulting in uprooting of trees during windy periods.

The seasonal high water table, rate of water movement through the soil, and potential frost action are limitations of this soil for urban uses. Potential for habitat is good for openland and woodland wildlife.

The capability subclass is IIIw.

**NoB—Niagara silt loam, 3 to 8 percent slopes.** This is a gently sloping, very deep, somewhat poorly drained soil in concave, oblong areas on lowland plains. Areas range from 10 to 40 acres.

Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsurface layer is mottled, dark grayish brown silt loam about 4 inches thick. The subsoil is mottled and about 22 inches thick. It is brown to dark brown silt loam in the upper part and dark grayish brown silt loam in the lower part. The substratum is mottled, dark grayish brown silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Collamer soils, poorly drained and very poorly drained Canandaigua soils, and Niagara soils where bedrock is at a depth of 40 to 72 inches. Also included are small areas of moderately deep, poorly

drained and very poorly drained Guffin soils in depressions.

The seasonal high water table in this Niagara soil is commonly within 1/2 to 1 1/2 feet of the surface from December through May. The rate of water movement through the soil is moderate in the surface layer and moderately slow in the subsoil and the substratum. Runoff is slow or medium. The capacity of the soil to store water available for plant growth is high. The surface layer is strongly acid to neutral.

Most areas of this soil have been cleared and are used for cultivated crops. This is a prime farmland soil, if drained. Some areas are used as pasture or forest.

This soil is moderately suited to cultivated crops. The main limitation is the seasonal high water table. If the soil is properly managed, row crops can be grown intensively. Drainage is needed if the soil is used for cultivated crops. Erosion is a moderate hazard if slopes are bare of vegetation. Conservation tillage, contour farming, crop rotation, using winter cover crops, and returning crop residue and applying manure to the soil help to control erosion, to improve soil tilth, to maintain the content of organic matter, and to conserve moisture needed for plant growth.

If used for pasture, this soil requires a management program that minimizes overgrazing and restricts grazing when the soil is too wet. Suitable management practices are proper stocking rates, pasture renovation, pasture reseeding, and application of lime and fertilizers. These practices help to control erosion.

Potential productivity of this soil for sugar maple is moderate. The seasonal high water table somewhat limits equipment use, causes moderate seedling mortality, and somewhat restricts rooting depth, resulting in uprooting of trees during windy periods.

The seasonal high water table, rate of water movement through the soil, and potential frost action are limitations of this soil for urban use. Potential for habitat is good for openland and woodland wildlife.

The capability subclass is IIIw.

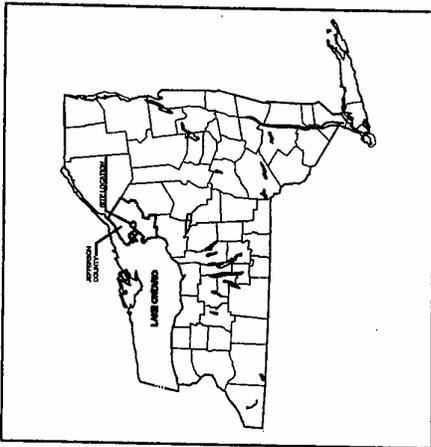
**NpB—Niagara silt loam, bedrock substratum, 2 to 6 percent slopes.** This is a gently sloping, very deep, somewhat poorly drained soil in concave or undulating areas on lake plains. Areas range from 10 to 20 acres.

Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsurface layer is mottled, dark grayish brown silt loam about 4 inches thick. The subsoil is mottled and about 16 inches thick. It is brown to dark brown silt loam in the upper part and dark grayish brown silt loam in the lower part. The substratum is mottled, dark grayish brown silt loam to a depth of 48 inches. Bedrock is at a depth of 48 inches.

Included with this soil in mapping are small areas of moderately well drained Collamer soils and, where bedrock is at a depth of 40 to 72 inches, poorly drained and very poorly drained Canandaigua and Niagara soils.

**APPENDIX #2**

**CIVIL PLANS**



NEW YORK STATE LOCATION MAP  
APPROXIMATE SCALE 1" = 57 MILES

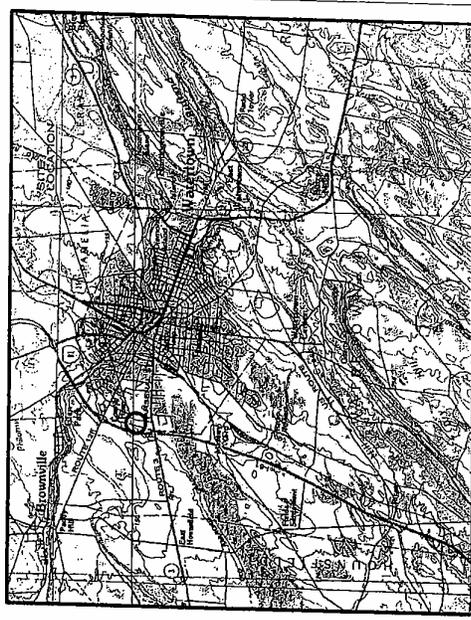


# HILTON GARDEN INN HOTEL

WATERTOWN CITY CENTER PLAZA / PHASE TWO  
WATERTOWN, JEFFERSON COUNTY, NEW YORK

## SITE DEVELOPMENT PLANS

FEBRUARY 16, 2010



LOCATION MAP  
APPROXIMATE SCALE 1" = 2400'

INDEX OF DRAWINGS:

- C001 - GENERAL INFORMATION PAGE
- C100 - OVERALL PLAN/INDEX
- C101 - SITE AND LANDSCAPING PLAN
- C102 - GRADING PLAN
- C103 - UTILITY PLAN
- C501 - SITE DETAILS
- C502 - SITE DETAILS
- C503 - WATER AND SANITARY SEWER DETAILS
- C504 - TRENCH DETAILS
- C505 - STORM WATER AND ESC DETAILS
- C506 - TEMPORARY ESC DETAILS
- C507 - SEWAGE PUMPING STATION DETAILS

FOR APPROVALS ONLY  
NOT FOR CONSTRUCTION

PREPARED FOR:  
MILBERMAN DEVELOPMENT, LLC  
CONTRACT NO. PATRICK CORDMAN  
080-000-000

PATRICK J. BOCCARDI, P.E.  
New York State Reg. No. 00000

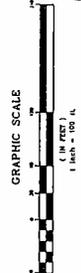


ARCHITECTURE  
ENGINEERING &  
LAND SURVEYING  
P.C.

200 ASTORING STREET  
WATERTOWN, NEW YORK, 13601



FOR CONTRACTOR'S INFORMATION ONLY. NO SCORE(S) OF WORK ARE SPECIFIED ON THIS SHEET.



C100

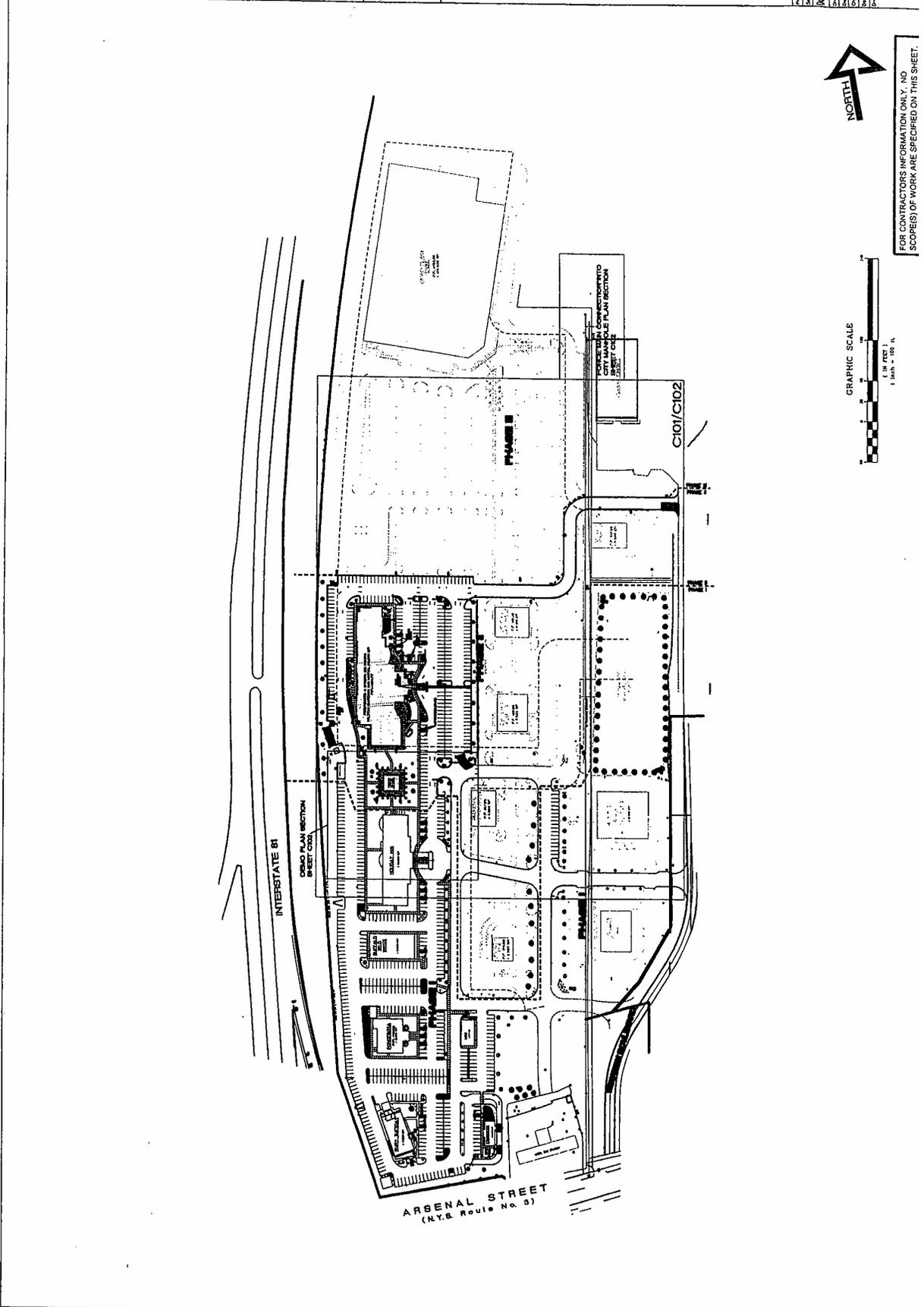
OVERALL PLAN/INDEX SHEET  
HILTON GARDEN INN/PHASE TWO  
WATERTOWN CITY CENTER PLAZA  
ARSENAL ST/I-81, WATERTOWN, NY

PROJECT NO.	1000-1732
DATE	AS SHOWN
DATE	1/1/79
SCALE	AS SHOWN
DESIGNED BY	NYC
CHECKED BY	NYC
DATE ISSUED	7/15/79
DRAWN BY	

OFFICE: 6 0111  
11 W. WASHINGTON ST. 10TH FLOOR  
WATERTOWN, NY 13155  
TELEPHONE: 518-837-1111  
FAX: 518-837-1111



ARCHITECTURE  
ENGINEERING &  
LAND SURVEYING  
P.C.  
230 STEWART STREET  
WATERTOWN, NY 13155  
TELEPHONE: 518-837-1111  
FAX: 518-837-1111





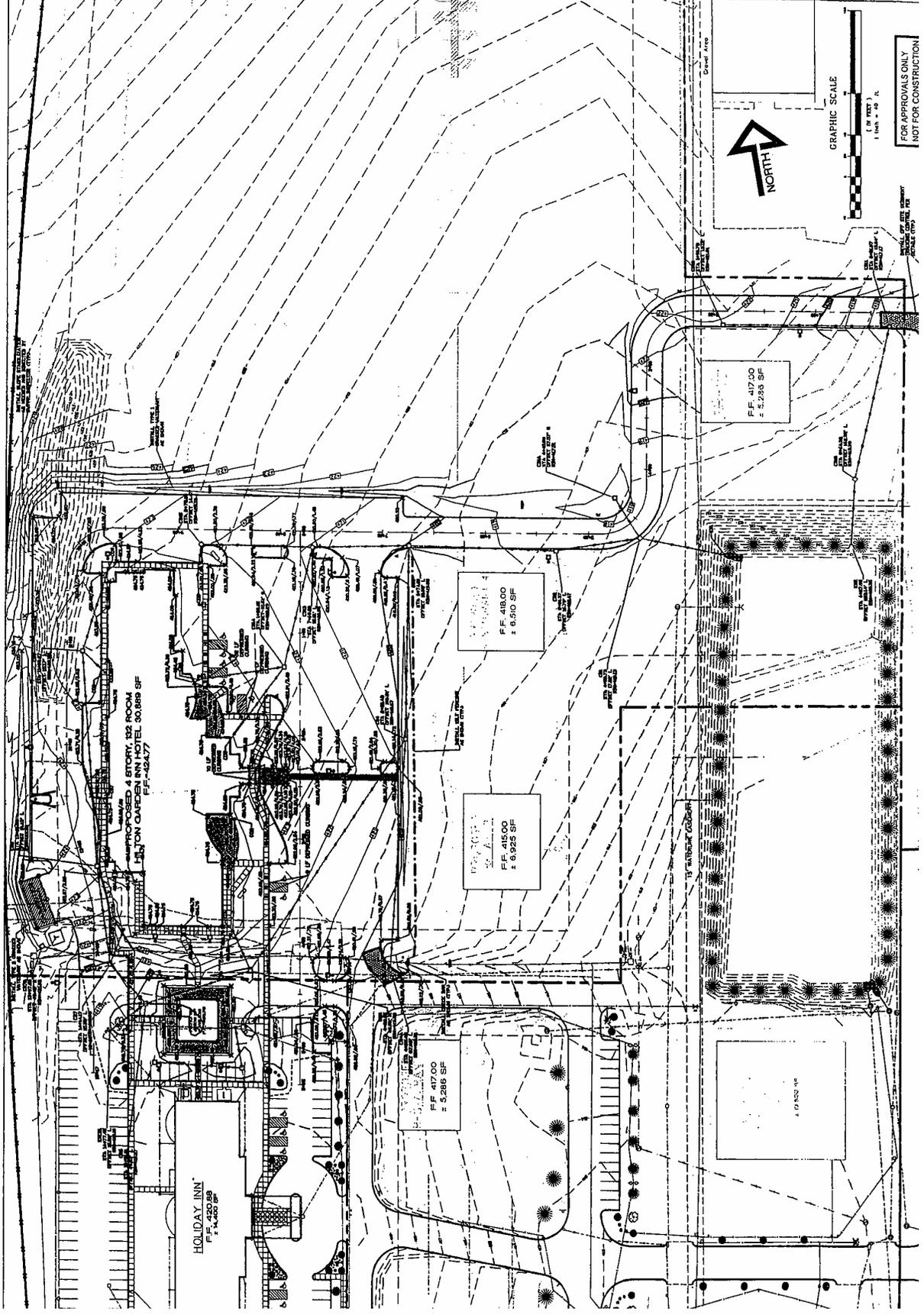
GRADING PLAN

HILTON GARDEN INN/PHASE TWO  
WATERTOWN CITY CENTER PLAZA  
ARSENAL ST/I-81, WATERTOWN, NY

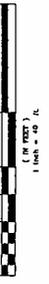
Project No.	2008-215X
Date	1/10/10
Drawn By	WZ
Checked By	
Scale	1" = 40'
Sheet No.	1A/10
Drawn	



CONTRACT NO. 2011  
WATERTOWN CITY CENTER PLAZA  
ARSENAL ST/I-81, WATERTOWN, NY  
HILTON GARDEN INN/PHASE TWO  
GRADING PLAN



GRAPHIC SCALE



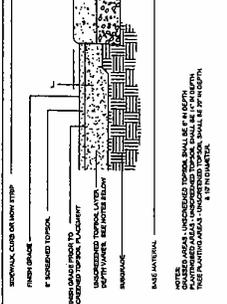
FOR APPROVALS ONLY  
NOT FOR CONSTRUCTION



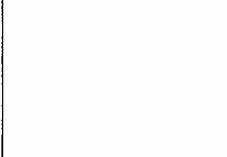




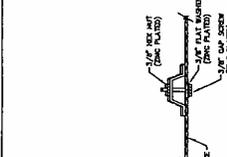
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 PERMANENTLY GUE



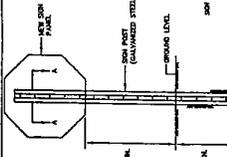
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 PERMANENTLY GUE



**3. TYPICAL HANDICAP SIGN DETAIL**  
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 PERMANENTLY GUE



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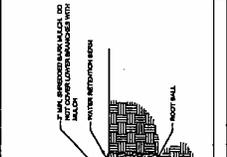
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 PERMANENTLY GUE



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 PERMANENTLY GUE



**7. TYPICAL HANDICAP SIGN DETAIL**  
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 PERMANENTLY GUE



**8. TYPICAL HANDICAP SIGN DETAIL**  
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 PERMANENTLY GUE



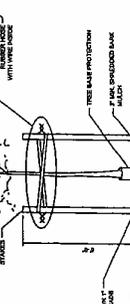
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 PERMANENTLY GUE



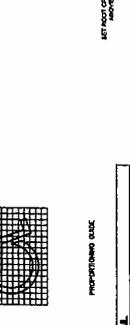
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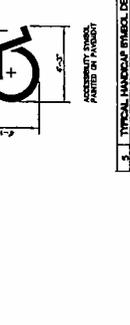
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 PERMANENTLY GUE



**12. TYPICAL HANDICAP SIGN DETAIL**  
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 PERMANENTLY GUE



**13. TYPICAL HANDICAP SIGN DETAIL**  
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 PERMANENTLY GUE



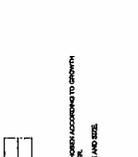
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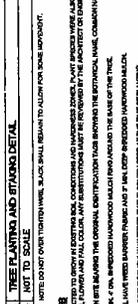
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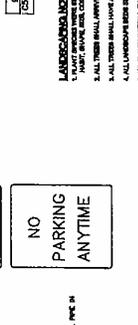
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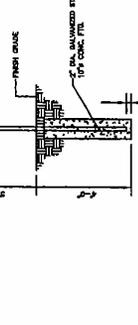
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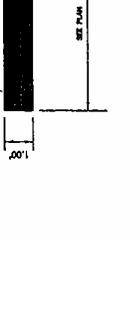
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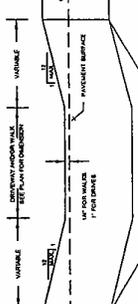
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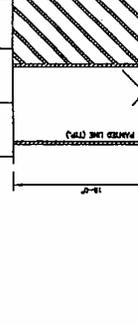
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 PERMANENTLY GUE



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 PERMANENTLY GUE



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 PERMANENTLY GUE



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 PERMANENTLY GUE



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 PERMANENTLY GUE



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 PERMANENTLY GUE



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 PERMANENTLY GUE



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 PERMANENTLY GUE



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 PERMANENTLY GUE



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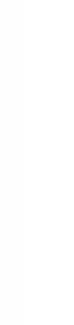
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**46. TYPICAL HANDICAP SIGN DETAIL**  
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**47. TYPICAL HANDICAP SIGN DETAIL**  
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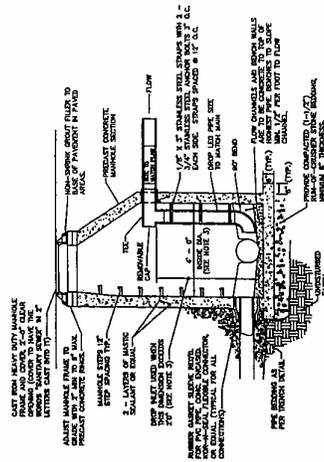


**49. TYPICAL HANDICAP SIGN DETAIL**  
 C502 | NOT TO SCALE | D15-01  
 PERMANENTLY GUE



**50. TYPICAL HANDICAP SIGN DETAIL**  
 C502 | NOT TO SCALE | D

**WATER & SANITARY SEWER DETAILS**



- NOTES:**
1. ALL MANHOLE SECTIONS TO BE 60-30 LAD RATING MANHOLE.
  2. DRAINAGE COATING TO BE APPLIED TO OUTER SURFACE OF MANHOLE SECTIONS.
  3. SEE DETAIL C502 FOR CONNECTION TO STREET.
  4. USE THE DETAIL FOR EXISTING MANHOLE CONNECTIONS ALSO.
- 1. TYPICAL SANITARY SEWER MANHOLE AND DROP MANHOLE DETAIL (SEWER)**  
 C503 - NOT TO SCALE

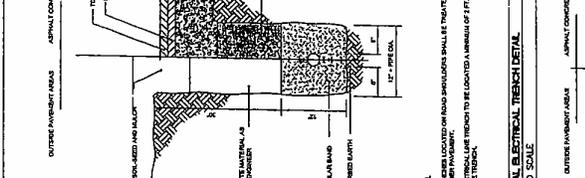


**VALVE ANCHOR SCHEDULE**  
 (SEE ALL VERTICAL/THREAT PRESSURES)

MANHOLE SIZE	VALVE BOX SIZE	VALVE BOX LENGTH	VALVE BOX WIDTH	VALVE BOX HEIGHT
18"	18"	24"	18"	24"
24"	24"	30"	24"	30"
30"	30"	36"	30"	36"
36"	36"	42"	36"	42"
42"	42"	48"	42"	48"
48"	48"	54"	48"	54"
54"	54"	60"	54"	60"
60"	60"	66"	60"	66"
66"	66"	72"	66"	72"
72"	72"	78"	72"	78"
78"	78"	84"	78"	84"
84"	84"	90"	84"	90"
90"	90"	96"	90"	96"
96"	96"	102"	96"	102"
102"	102"	108"	102"	108"
108"	108"	114"	108"	114"
114"	114"	120"	114"	120"
120"	120"	126"	120"	126"
126"	126"	132"	126"	132"
132"	132"	138"	132"	138"
138"	138"	144"	138"	144"
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156"	156"	162"	156"	162"
162"	162"	168"	162"	168"
168"	168"	174"	168"	174"
174"	174"	180"	174"	180"
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468"	468"	474"	468"	474"
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564"	564"	570"	564"	570"
570"	570"	576"	570"	576"
576"	576"	582"	576"	582"
582"	582"	588"	582"	588"
588"	588"	594"	588"	594"
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600"	600"	606"	600"	606"
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612"	612"	618"	612"	618"
618"	618"	624"	618"	624"
624"	624"	630"	624"	630"
630"	630"	636"	630"	636"
636"	636"	642"	636"	642"
642"	642"	648"	642"	648"
648"	648"	654"	648"	654"
654"	654"	660"	654"	660"
660"	660"	666"	660"	666"
666"	666"	672"	666"	672"
672"	672"	678"	672"	678"
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684"	684"	690"	684"	690"
690"	690"	696"	690"	696"
696"	696"	702"	696"	702"
702"	702"	708"	702"	708"
708"	708"	714"	708"	714"
714"	714"	720"	714"	720"
720"	720"	726"	720"	726"
726"	726"	732"	726"	732"
732"	732"	738"	732"	738"
738"	738"	744"	738"	744"
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750"	750"	756"	750"	756"
756"	756"	762"	756"	762"
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768"	768"	774"	768"	774"
774"	774"	780"	774"	780"
780"	780"	786"	780"	786"
786"	786"	792"	786"	792"
792"	792"	798"	792"	798"
798"	798"	804"	798"	804"
804"	804"	810"	804"	810"
810"	810"	816"	810"	816"
816"	816"	822"	816"	822"
822"	822"	828"	822"	828"
828"	828"	834"	828"	834"
834"	834"	840"	834"	840"
840"	840"	846"	840"	846"
846"	846"	852"	846"	852"
852"	852"	858"	852"	858"
858"	858"	864"	858"	864"
864"	864"	870"	864"	870"
870"	870"	876"	870"	876"
876"	876"	882"	876"	882"
882"	882"	888"	882"	888"
888"	888"	894"	888"	894"
894"	894"	900"	894"	900"
900"	900"	906"	900"	906"
906"	906"	912"	906"	912"
912"	912"	918"	912"	918"
918"	918"	924"	918"	924"
924"	924"	930"	924"	930"
930"	930"	936"	930"	936"
936"	936"	942"	936"	942"
942"	942"	948"	942"	948"
948"	948"	954"	948"	954"
954"	954"	960"	954"	960"
960"	960"	966"	960"	966"
966"	966"	972"	966"	972"
972"	972"	978"	972"	978"
978"	978"	984"	978"	984"
984"	984"	990"	984"	990"
990"	990"	996"	990"	996"
996"	996"	1002"	996"	1002"
1002"	1002"	1008"	1002"	1008"
1008"	1008"	1014"	1008"	1014"
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1020"	1020"	1026"	1020"	1026"
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1032"	1032"	1038"	1032"	1038"
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1044"	1044"	1050"	1044"	1050"
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1104"	1104"	1110"	1104"	1110"
1110"	1110"	1116"	1110"	1116"
1116"	1116"	1122"	1116"	1122"
1122"	1122"	1128"	1122"	1128"
1128"	1128"	1134"	1128"	1134"
1134"	1134"	1140"	1134"	1140"
1140"	1140"	1146"	1140"	1146"
1146"	1146"	1152"	1146"	1152"
1152"	1152"	1158"	1152"	1158"
1158"	1158"	1164"	1158"	1164"
1164"	1164"	1170"	1164"	1170"
1170"	1170"	1176"	1170"	1176"
1176"	1176"	1182"	1176"	1182"
1182"	1182"	1188"	1182"	1188"
1188"	1188"	1194"	1188"	1194"
1194"	1194"	1200"	1194"	1200"
1200"	1200"	1206"	1200"	1206"
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1308"	1308"	1314"	1308"	1314"
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1362"	1362"	1368"	1362"	1368"
1368"	1368"	1374"	1368"	1374"
1374"	1374"	1380"	1374"	1380"
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1386"	1386"	1392"	1386"	1392"
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1398"	1398"	1404"	1398"	1404"
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1422"	1422"	1428"	1422"	1428"
1428"	1428"	1434"	1428"	1434"
1434"	1434"	1440"	1434"	1440"
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1458"	1458"	1464"	1458"	1464"
1464"	1464"	1470"	1464"	1470"
1470"	1470"	1476"	1470"	1476"
1476"	1476"	1482"	1476"	1482"
1482"	1482"	1488"	1482"	1488"
1488"	1488"	1494"	1488"	1494"
1494"	1494"	1500"	1494"	1500"
1500				



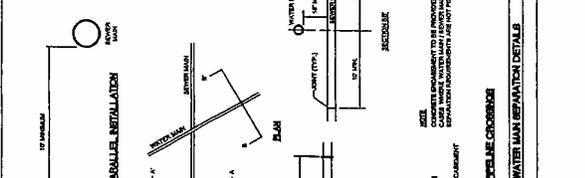
**1. TYPICAL WATER MAIN RELOCATION AND SEPARATION DETAIL**  
 CS&H - NOT TO SCALE  
 DT17-01



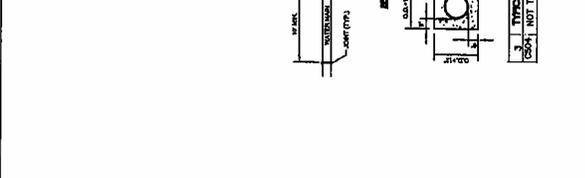
**2. TYPICAL UTILITY LINE TRENCH DETAIL AND PAVEMENT LIMITS**  
 CS&H - NOT TO SCALE  
 DT18-01



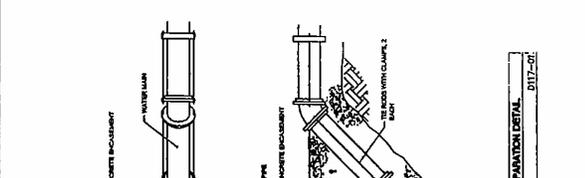
**3. TYPICAL SEWER AND WATER MAIN SEPARATION DETAILS**  
 CS&H - NOT TO SCALE  
 DT19-01



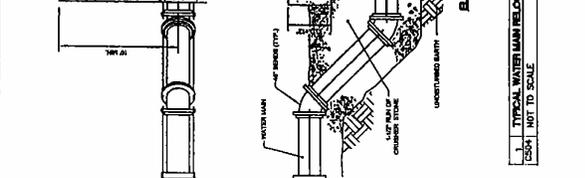
**4. TYPICAL PIPE BEDDING DETAILS AND PAVEMENT LIMITS**  
 CS&H - NOT TO SCALE  
 DT20-01



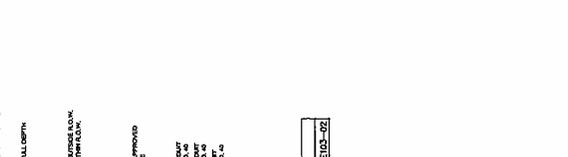
**5. TYPICAL ELECTRICAL TRENCH DETAIL**  
 CS&H - NOT TO SCALE  
 DT21-01



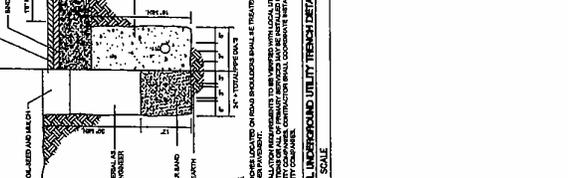
**6. TYPICAL UNDERGROUND UTILITY TRENCH DETAIL**  
 CS&H - NOT TO SCALE  
 DT22-01



**7. TYPICAL TRENCH DETAIL AND PAVEMENT LIMITS**  
 CS&H - NOT TO SCALE  
 DT23-01



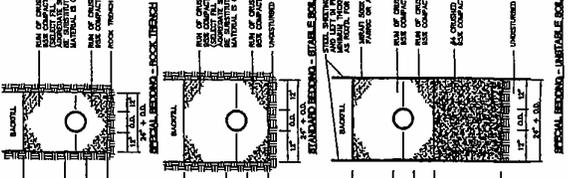
**8. TYPICAL ELECTRICAL TRENCH DETAIL**  
 CS&H - NOT TO SCALE  
 DT24-01



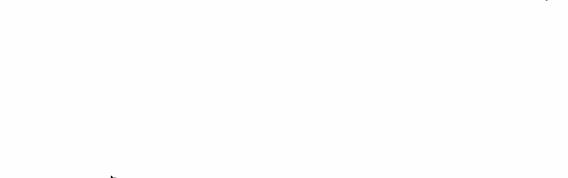
**9. TYPICAL UNDERGROUND UTILITY TRENCH DETAIL**  
 CS&H - NOT TO SCALE  
 DT25-01



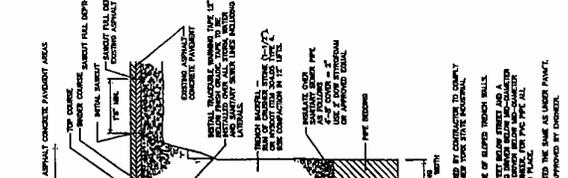
**10. TYPICAL PIPE BEDDING DETAILS AND PAVEMENT LIMITS**  
 CS&H - NOT TO SCALE  
 DT26-01



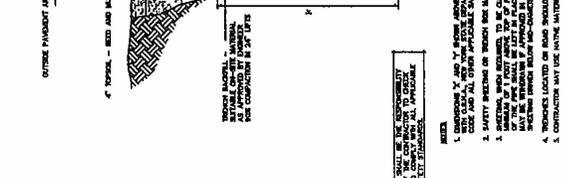
**11. TYPICAL TRENCH DETAIL AND PAVEMENT LIMITS**  
 CS&H - NOT TO SCALE  
 DT27-01



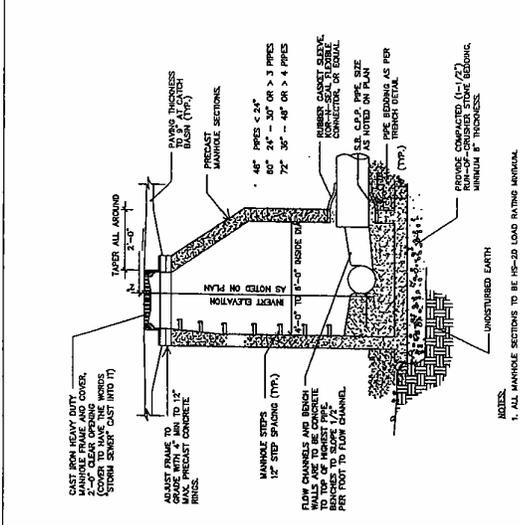
**12. TYPICAL TRENCH DETAIL AND PAVEMENT LIMITS**  
 CS&H - NOT TO SCALE  
 DT28-01



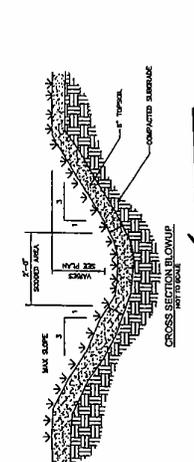
**13. TYPICAL TRENCH DETAIL AND PAVEMENT LIMITS**  
 CS&H - NOT TO SCALE  
 DT29-01



**14. TYPICAL TRENCH DETAIL AND PAVEMENT LIMITS**  
 CS&H - NOT TO SCALE  
 DT30-01



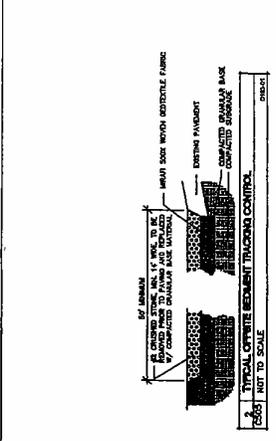
**5 TYPICAL MANHOLE DETAIL (BTM-D)**  
 C505 NOT TO SCALE



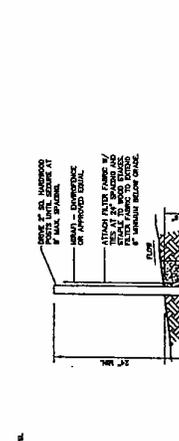
**6 GRASSED WATERWAY**  
 C505 NOT TO SCALE

**CONSTRUCTION SPECIFICATIONS**

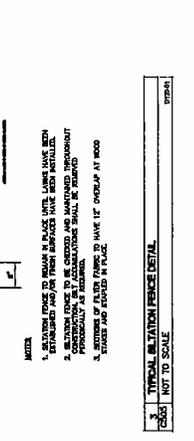
1. ALL TRENCH, SWALE, DRAINAGE, AND OTHER UNREINFORCED MATERIAL SHALL BE REINFORCED AND CONCRETE TO 40 AS PER SECTION 05110.
2. THE WATERWAY SHALL BE CONSTRUCTED ON GRADE OR SLOPE AS SHOWN AND CROSS SECTION AS REQUIRED TO MEET THE DESIGN. UNLESS OTHERWISE NOTED, THE WATERWAY SHALL BE CONSTRUCTED TO THE TOP OF THE CURB OR FINISH GRADE.
3. THE WATERWAY SHALL BE CONSTRUCTED TO THE TOP OF THE CURB OR FINISH GRADE.
4. ALL EXPOSED SURFACES SHALL BE FINISHED TO THE TOP OF THE CURB OR FINISH GRADE.
5. ALL EXPOSED SURFACES SHALL BE FINISHED TO THE TOP OF THE CURB OR FINISH GRADE.
6. ALL EXPOSED SURFACES SHALL BE FINISHED TO THE TOP OF THE CURB OR FINISH GRADE.



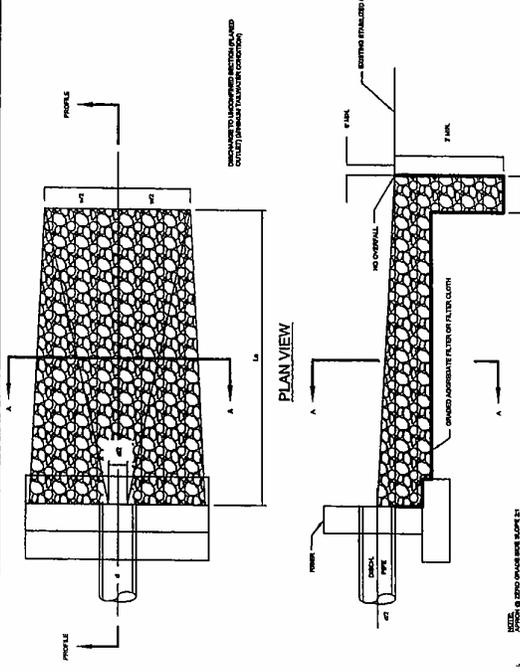
**7 TYPICAL CONCRETE SEDIMENT TRAP CONTROL**  
 C505 NOT TO SCALE



**8 TYPICAL RETENTION FENCE DETAIL**  
 C505 NOT TO SCALE



**9 TYPICAL PRECAST CATCH BASIN DETAIL (CB)**  
 C505 NOT TO SCALE



**10 RIPRAP APRON/OUTFALL SPECIFICATIONS**  
 C505 NOT TO SCALE

**RIPRAP APRON/OUTFALL SPECIFICATIONS**

APPROX. TYPE	NO. OF ROWS	MIN. THICKNESS (IN)	MIN. LENGTH (FT)	MIN. WIDTH (FT)	MIN. AREA (SQ FT)
1	1	18"	12'	24'	288
2	2	18"	12'	24'	576
3	3	18"	12'	24'	864

**NOTES:**

1. RIPRAP SHALL BE PLACED UNDER THE CURB OR FINISH GRADE.
2. THE RIPRAP SHALL BE PLACED UNDER THE CURB OR FINISH GRADE.
3. THE RIPRAP SHALL BE PLACED UNDER THE CURB OR FINISH GRADE.
4. THE RIPRAP SHALL BE PLACED UNDER THE CURB OR FINISH GRADE.
5. THE RIPRAP SHALL BE PLACED UNDER THE CURB OR FINISH GRADE.
6. THE RIPRAP SHALL BE PLACED UNDER THE CURB OR FINISH GRADE.

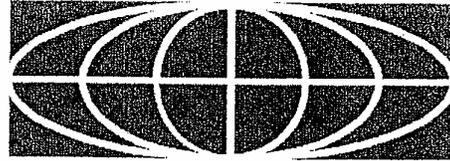




APPENDIX #3

FLOW TEST DATA  
HYDRAULIC CALCULATIONS

HYDRANT FLOW TEST REPORT



**G·Y·M·O**  
 ARCHITECTURE, ENGINEERING & LAND SURVEYING, P.C.  
 220 Sterling Street, Watertown, New York 13601  
 tel. 315.788.3900 fax. 315.788.0668 e-mail. gymopr@gymopc.com

LOCATION: WATERTOWN CITY CENTER PLAZA DATE: 2/6/10

TEST MADE BY: RGC/THR TIME: 4:15 AM

REPRESENTATIVE OF: MILLENIUM DEVELOPMENT

WITNESS: CITY OF WATERTOWN DPW

PURPOSE OF TEST: DETERMINE AVAILABLE FIRE FLOW FOR FUTURE DEVELOPMENT

CONSUMPTION RATE DURING TEST: 1475 GPM

IF PUMPS AFFECT TEST, INDICATE PUMPS OPERATING: N/A

FLOW HYDRANTS:

	A1	A2	A3	TOTAL
SIZE NOZZLE	2.5"			
PITOT READING				
GPM	1475			

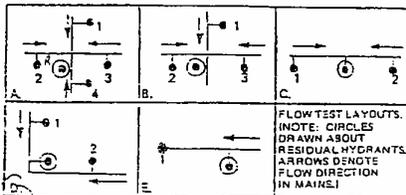
STATIC B: 95 PSI RESIDUAL B: 70 PSI

PROJECTED RESULTS: @ 20 PSI RESIDUAL 2670 GPM; OR @      PSI RESIDUAL      GPM

REMARKS: **SEE ATTACHED CALCULATION FOR PROJECTED FIRE FLOW @ 20 PSI, SEE ATTACHED SKETCH MAP FOR HYDRANT LOCATIONS**

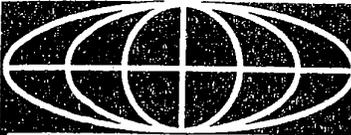
LOCATION MAP: SHOW LINE SIZES AND DISTANCE TO NEXT CROSS CONNECTED LINE. SHOW VALVES, AND HYDRANT BRANCH SIZE. INDICATE NORTH, SHOW FLOWING HYDRANTS – LABEL A1, A2, A3. SHOW LOCATION OF STATIC AND RESIDUAL – LABEL B.

INDICATE B HYDRANT      SPRINKLER      OTHER (IDENTIFY)     



LAYOUT OF TEST. AFTER THE LOCATION AT WHICH THE TEST IS TO BE RUN HAS BEEN DETERMINED A GROUP OF TEST HYDRANTS IN THE VICINITY IS SELECTED. ONCE SELECTED, DUE CONSIDERATION SHOULD BE GIVEN TO POTENTIAL INTERFERENCE TO TRAFFIC FLOW PATTERNS, DAMAGE TO SURROUNDINGS (E.G., ROADWAYS, SIDEWALKS, LANDSCAPES, VEHICLES, AND PEDESTRIANS), AND POTENTIAL FLOODING PROBLEMS BOTH LOCAL AND REMOTE FROM THE TEST SITE. ONE HYDRANT IS CHOSEN TO BE THE RESIDUAL HYDRANT AT WHICH THE NORMAL PRESSURE WILL BE OBSERVED WITH THE OTHER HYDRANTS IN THE GROUP CLOSED AND THE RESIDUAL PRESSURE WILL BE OBSERVED WITH THE OTHER HYDRANTS FLOWING. THIS HYDRANT IS CHOSEN SO THAT THE HYDRANTS WHICH WILL BE FLOWED ARE THE NEXT HYDRANTS BETWEEN IT AND THE LARGER MAINS, WHICH CONSTITUTE THE IMMEDIATE SOURCES OF SUPPLY IN THE AREA.

THE NUMBER OF HYDRANTS TO BE USED IN ANY TEST DEPENDS UPON THE STRENGTH OF THE DISTRIBUTION SYSTEM IN THE VICINITY OF THE TEST LOCATION. TO OBTAIN SATISFACTORY TEST RESULTS FOR THEORETICAL CALCULATION OF EXPECTED FLOWS OR RATED CAPACITIES, SUFFICIENT DISCHARGE SHOULD BE ACHIEVED TO CAUSE A DROP IN PRESSURE AT THE RESIDUAL HYDRANT OF AT LEAST 25 PERCENT OR TO FLOW THE TOTAL DEMAND NECESSARY FOR FIRE FIGHTING PURPOSES. IF THE MAINS ARE SMALL AND THE SYSTEM IS WEAK, ONLY ONE OR TWO HYDRANTS NEED TO BE FLOWED. IF ON THE OTHER HAND, THE MAINS ARE LARGE AND THE SYSTEM IS STRONG, IT MAY BE NECESSARY TO FLOW AS MANY AS SEVEN OR EIGHT HYDRANTS.



**GYMO**

ARCHITECTURE, ENGINEERING & LAND SURVEYING, P.C.

220 Sterling Street, Watertown, NY 13601 Tel: (315) 788-3900 Fax: (315) 788-0668

PROJECT	SHEET	BY	DATE	FILE NO.
Watertown City Center Plaza - Phase II Flow Test	1	RSE	2/6/10	2009-2152

- Hydrant Flow Test performed @ 4:15 AM on 2/6/10 on Watertown City Center Plaza site.

- Residual Hydrant was NE of existing Holiday Inn Express → [B]

- Flow Hydrant was SW of ex. storm water pond → [A]

- See attached mapping for hydrants A + B

- Residual Hydrant B

Static Pressure = 95 PSI

Residual Pressure = 70 PSI

Flow Hydrant A

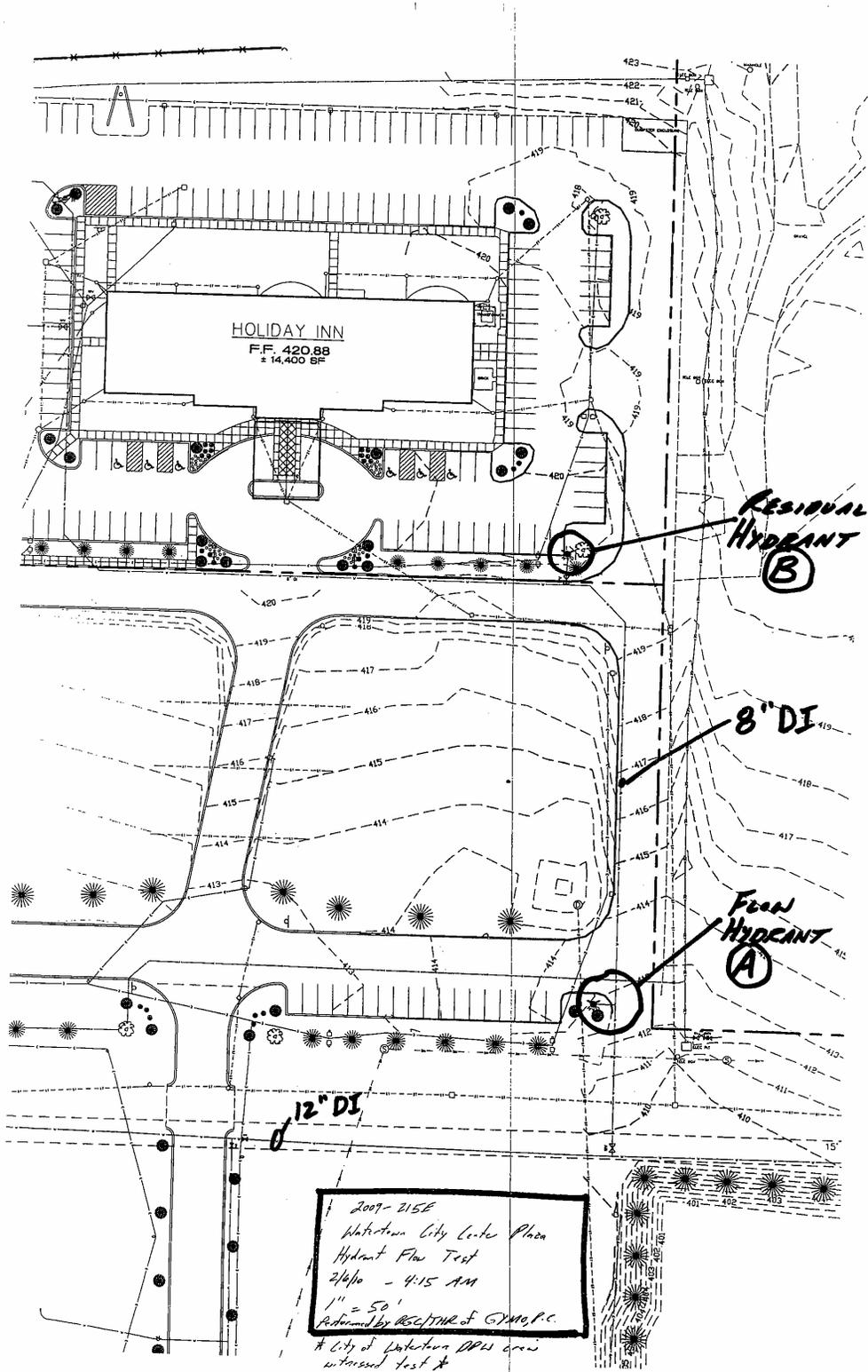
Q = 1475 GPM

Projected Fire Flow @ 20 PSI (Q<sub>20</sub>)

$$Q_0 = Q_1 \left( \frac{P_2 - P_0}{P_1 - P_0} \right)^{0.54}$$

$$Q_{20} = 1475 \left( \frac{95 - 20}{95 - 70} \right)^{0.54}$$

$$Q_{20} = \boxed{2670 \text{ GPM}}$$



2007-215E  
 Watertown City Center Plaza  
 Hydrant Flow Test  
 2/4/08 - 4:15 AM  
 1" = 50'  
 Performed by RES/THR of GYM, P.C.  
 \* City of Watertown DPW crew  
 witnessed test \*

Scenario A:

500 gpm @ Highest hydrant. 1495 gpm available @ Base of hotel.  
 Domestic demands on.

**FlexTable: Pipe Table (watermodel\_w\_gymoflowdata.wtg)**

Current Time: 0.000 hours

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)
35	P-5	295.12	J-3	J-4	8.0
38	P-12	34.49	J-4	J-9	6.0
40	P-11	41.21	J-3	J-9	6.0
42	P-3	341.42	J-1	J-2	8.0
43	P-4	30.06	J-2	J-3	8.0
45	P-10	21.15	J-2	J-8	6.0
71	P-6	264.32	J-5	J-4	8.0
77	P-7	352.70	J-6	J-5	8.0
82	P-1	18.31	R-1	PMP-1	48.0
83	P-2	11.27	PMP-1	J-1	48.0
85	P-32	287.36	J-7	J-16	8.0
86	P-33	59.86	J-16	J-1	8.0
90	P-35	21.98	J-17	J-18	6.0
91	P-36	12.72	J-18	J-16	8.0
93	P-37	375.88	J-18	J-19	6.0
95	P-38	121.08	J-7	J-20	12.0
98	P-40	153.84	J-20	J-21	6.0
100	P-41	227.34	J-20	J-22	12.0
101	P-42	120.05	J-22	J-6	12.0
103	P-43	151.84	J-22	J-23	6.0
105	P-44	101.42	J-6	J-24	12.0
110	P-46	11.41	J-24	J-27	6.0

Material	Hazen-Williams C	Has Check Valve?	Minor Loss Coefficient (Local)	Flow (gpm)	Velocity (ft/s)
Ductile Iron	130.0	True	4.000	563	3.59
Ductile Iron	130.0	False	0.000	500	5.67
Ductile Iron	130.0	True	0.000	1,551	17.60
Ductile Iron	130.0	True	4.000	2,114	13.49
Ductile Iron	130.0	True	4.000	2,114	13.49
Ductile Iron	130.0	True	0.000	0	0.00
Ductile Iron	130.0	False	0.000	-63	0.40
Ductile Iron	130.0	False	0.000	-63	0.40
Ductile Iron	130.0	False	0.000	2,114	0.37
Ductile Iron	130.0	False	0.000	2,114	0.37
Ductile Iron	130.0	True	4.000	20	0.13
Ductile Iron	130.0	True	4.000	0	0.00
Ductile Iron	130.0	False	0.000	-19	0.22
Ductile Iron	130.0	False	0.000	-20	0.13
Ductile Iron	130.0	False	0.000	1	0.01
Ductile Iron	130.0	False	0.000	-20	0.06
Ductile Iron	130.0	False	0.000	2	0.02
Ductile Iron	130.0	False	0.000	-22	0.06
Ductile Iron	130.0	False	0.000	-44	0.12
Ductile Iron	130.0	False	0.000	21	0.24
Ductile Iron	130.0	False	0.000	19	0.06
Ductile Iron	130.0	False	0.000	19	0.22

## FlexTable: Pipe Table (watermodel\_w\_gymoflowdata.wtg)

Current Time: 0.000 hours

Headloss Gradient (ft/ft)	Has User Defined Length?	Length (User Defined) (ft)
0.009	False	0.00
0.021	False	0.00
0.167	False	0.00
0.106	False	0.00
0.449	False	0.00
0.000	True	1.00
0.000	True	1.00
0.000	False	0.00
0.000	True	446.00
0.000	False	0.00

## FlexTable: Junction Table (watermodel\_w\_gymflowdata.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
27	J-1	415.00	<None>	<Collection: 0 items>	0	521.99	46.3
30	J-3	418.60	<None>	<Collection: 0 items>	0	472.23	23.2
34	J-4	418.50	<None>	<Collection: 0 items>	0	469.57	22.1
37	J-10	419.00	<None>	<Collection: 1 items>	500	468.86	21.6
39	J-9	419.00	<None>	<Collection: 2 items>	1,551	465.34	20.0
41	J-2	419.00	<None>	<Collection: 0 items>	0	485.74	28.9
44	J-8	419.00	<None>	<Collection: 0 items>	0	485.74	28.9
52	J-7	405.00	<None>	<Collection: 0 items>	0	469.50	27.9
69	J-5	421.00	<None>	<Collection: 0 items>	0	469.54	21.0
74	J-6	410.50	<None>	<Collection: 0 items>	0	469.50	25.5
84	J-16	414.00	<None>	<Collection: 0 items>	0	469.49	24.0
87	J-17	411.50	<None>	<Collection: 1 items>	19	469.49	25.1
89	J-18	413.00	<None>	<Collection: 0 items>	0	469.49	24.4
92	J-19	409.00	<None>	<Collection: 1 items>	1	469.49	26.2
94	J-20	405.00	<None>	<Collection: 0 items>	0	469.50	27.9
97	J-21	410.50	<None>	<Collection: 1 items>	2	469.50	25.5

## FlexTable: Junction Table (watermodel\_w\_gymoflowdata.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
99	J-22	409.00	<None>	<Collection: 0 items>	0	469.50	26.2
102	J-23	413.00	<None>	<Collection: 1 items>	21	469.49	24.4
104	J-24	414.50	<None>	<Collection: 0 items>	0	469.50	23.8
109	J-27	412.00	<None>	<Collection: 1 items>	19	469.50	24.9

### FlexTable: Pump Table (watermodel\_w\_gymoflowdata.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
81	PMP-1	415.00	Pump Definition - 1	On	415.00	521.99	2,114	106.99

A

HYDRAULIC ANALYSIS

HILTON GARDEN INN/PHASE TWO  
WATERTOWN CITY CENTER PLAZA  
ARSENAL ST/I-81, WATERTOWN

CONTRACT NO. 0111  
DATE: 1/10/11  
PROJECT NO. 1000-10  
DATE: 7/20/10  
SHEET NO. 11

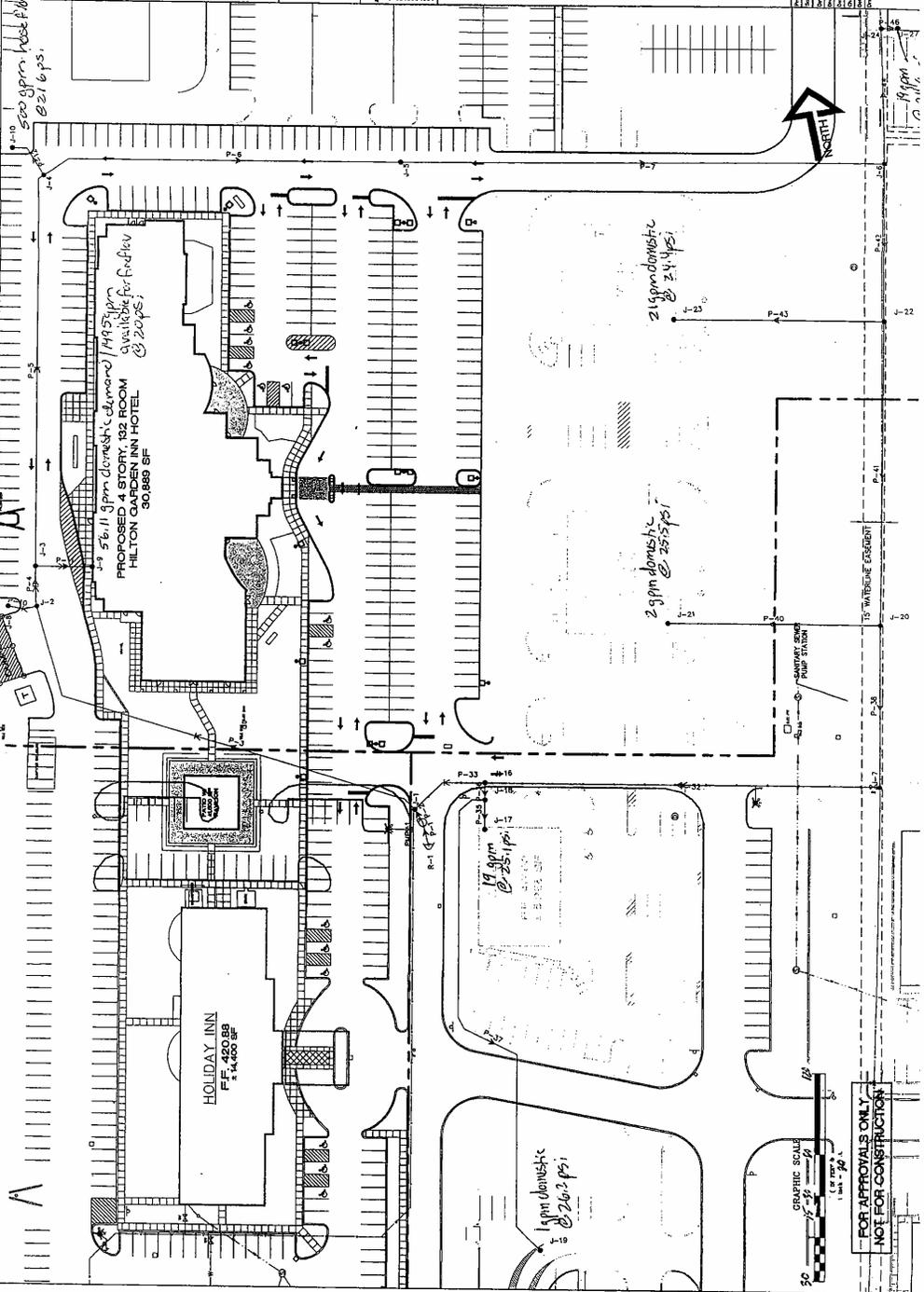
PROJECT: WATERTOWN CITY CENTER PLAZA  
PHASE TWO  
ARSENAL ST/I-81, WATERTOWN

DESIGNED BY: [Signature]  
CHECKED BY: [Signature]  
DATE: 1/10/11

SCALE: 1" = 20'

GRAPHIC SCALE

FOR APPROVALS ONLY  
NOT FOR CONSTRUCTION



50  
GRAPHIC SCALE  
1" = 20'

FOR APPROVALS ONLY  
NOT FOR CONSTRUCTION

Scenario B:

1000 gpm @ Hydrant & hydrant. 960 gpm available @ base of hotel.  
 Domestic demands on.

**FlexTable: Pipe Table (watermodel\_1000gpm@hydrant.wtg)**

Current Time: 0.000 hours

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)
35	P-5	295.12	J-3	J-4	8.0
38	P-12	34.49	J-4	J-9	6.0
40	P-11	41.21	J-3	J-9	6.0
42	P-3	341.42	J-1	J-2	8.0
43	P-4	30.06	J-2	J-3	8.0
45	P-10	21.15	J-2	J-8	6.0
71	P-6	264.32	J-5	J-4	8.0
77	P-7	352.70	J-6	J-5	8.0
82	P-1	18.31	R-1	PMP-1	48.0
83	P-2	11.27	PMP-1	J-1	48.0
85	P-32	287.36	J-7	J-16	8.0
86	P-33	59.86	J-16	J-1	8.0
90	P-35	21.98	J-17	J-18	6.0
91	P-36	12.72	J-18	J-16	8.0
93	P-37	375.88	J-18	J-19	6.0
95	P-38	121.08	J-7	J-20	12.0
98	P-40	153.84	J-20	J-21	6.0
100	P-41	227.34	J-20	J-22	12.0
101	P-42	120.05	J-22	J-6	12.0
103	P-43	151.84	J-22	J-23	6.0
105	P-44	101.42	J-6	J-24	12.0
110	P-46	11.41	J-24	J-27	6.0

Material	Hazen-Williams C	Has Check Valve?	Minor Loss Coefficient (Local)	Flow (gpm)	Velocity (ft/s)
Ductile Iron	130.0	True	4.000	1,063	6.78
Ductile Iron	130.0	False	0.000	1,000	11.35
Ductile Iron	130.0	True	0.000	1,016	11.53
Ductile Iron	130.0	True	4.000	2,079	13.27
Ductile Iron	130.0	True	4.000	2,079	13.27
Ductile Iron	130.0	True	0.000	0	0.00
Ductile Iron	130.0	False	0.000	-63	0.40
Ductile Iron	130.0	False	0.000	-63	0.40
Ductile Iron	130.0	False	0.000	2,079	0.37
Ductile Iron	130.0	False	0.000	2,079	0.37
Ductile Iron	130.0	True	4.000	20	0.13
Ductile Iron	130.0	True	4.000	0	0.00
Ductile Iron	130.0	False	0.000	-19	0.22
Ductile Iron	130.0	False	0.000	-20	0.13
Ductile Iron	130.0	False	0.000	1	0.01
Ductile Iron	130.0	False	0.000	-20	0.06
Ductile Iron	130.0	False	0.000	2	0.02
Ductile Iron	130.0	False	0.000	-22	0.06
Ductile Iron	130.0	False	0.000	-44	0.12
Ductile Iron	130.0	False	0.000	21	0.24
Ductile Iron	130.0	False	0.000	19	0.06
Ductile Iron	130.0	False	0.000	19	0.22

**FlexTable: Pipe Table (watermodel\_1000gpm@hydrant.wtg)**

**Current Time: 0.000 hours**

Headloss Gradient (ft/ft)	Has User Defined Length?	Length (User Defined) (ft)
0.030	False	0.00
0.074	False	0.00
0.076	False	0.00
0.103	False	0.00
0.435	False	0.00
0.000	True	1.00
0.000	True	1.00
0.000	False	0.00
0.000	True	446.00
0.000	False	0.00

### FlexTable: Junction Table (watermodel\_1000gpm@hydrant.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
27	J-1	415.00	<None>	<Collection: 0 items>	0	525.42	47.8
30	J-3	418.60	<None>	<Collection: 0 items>	0	477.22	25.4
34	J-4	418.50	<None>	<Collection: 0 items>	0	468.33	21.6
37	J-10	419.00	<None>	<Collection: 1 items>	1,000	465.77	20.2
39	J-9	419.00	<None>	<Collection: 2 items>	1,016	474.07	23.8
41	J-2	419.00	<None>	<Collection: 0 items>	0	490.29	30.8
44	J-8	419.00	<None>	<Collection: 0 items>	0	490.29	30.8
52	J-7	405.00	<None>	<Collection: 0 items>	0	468.26	27.4
69	J-5	421.00	<None>	<Collection: 0 items>	0	468.30	20.5
74	J-6	410.50	<None>	<Collection: 0 items>	0	468.26	25.0

## FlexTable: Junction Table (watermodel\_1000gpm@hydrant.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
99	J-22	409.00	<None>	<Collection: 0 Items>	0	468.26	25.6
102	J-23	413.00	<None>	<Collection: 1 Items>	21	468.25	23.9
104	J-24	414.50	<None>	<Collection: 0 Items>	0	468.26	23.3
109	J-27	412.00	<None>	<Collection: 1 Items>	19	468.26	24.3

**FlexTable: Pump Table (watermodel\_1000gpm@hydrant.wtg)**

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
81	PMP-1	415.00	Pump Definition - 1	On	415.00	525.42	2,079	110.42



Scenario C:  
 Domestic demands on  
 1800 gpm available @ highest hydrant.

**FlexTable: Pipe Table (watermodel\_MAX@hydrant.wtg)**

Current Time: 0.000 hours

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)
35	P-5	295.12	J-3	J-4	8.0
38	P-12	34.49	J-4	J-9	6.0
40	P-11	41.21	J-3	J-9	6.0
42	P-3	341.42	J-1	J-2	8.0
43	P-4	30.06	J-2	J-3	8.0
45	P-10	21.15	J-2	J-8	6.0
71	P-6	264.32	J-5	J-4	8.0
77	P-7	352.70	J-6	J-5	8.0
82	P-1	18.31	R-1	PMP-1	48.0
83	P-2	11.27	PMP-1	J-1	48.0
85	P-32	287.36	J-7	J-16	8.0
86	P-33	59.86	J-16	J-1	8.0
90	P-35	21.98	J-17	J-18	6.0
91	P-36	12.72	J-18	J-16	8.0
93	P-37	375.88	J-18	J-19	6.0
95	P-38	121.08	J-7	J-20	12.0
98	P-40	153.84	J-20	J-21	6.0
100	P-41	227.34	J-20	J-22	12.0
101	P-42	120.05	J-22	J-6	12.0
103	P-43	151.84	J-22	J-23	6.0
105	P-44	101.42	J-6	J-24	12.0
110	P-46	11.41	J-24	J-27	6.0

Material	Hazen-Williams C	Has Check Valve?	Minor Loss Coefficient (Local)	Flow (gpm)	Velocity (ft/s)
Ductile Iron	130.0	True	4.000	1,863	11.89
Ductile Iron	130.0	False	0.000	1,800	20.42
Ductile Iron	130.0	True	0.000	56	0.64
Ductile Iron	130.0	True	4.000	1,919	12.25
Ductile Iron	130.0	True	4.000	1,919	12.25
Ductile Iron	130.0	True	0.000	0	0.00
Ductile Iron	130.0	False	0.000	-63	0.40
Ductile Iron	130.0	False	0.000	-63	0.40
Ductile Iron	130.0	False	0.000	1,919	0.34
Ductile Iron	130.0	False	0.000	1,919	0.34
Ductile Iron	130.0	True	4.000	20	0.13
Ductile Iron	130.0	True	4.000	0	0.00
Ductile Iron	130.0	False	0.000	-19	0.22
Ductile Iron	130.0	False	0.000	-20	0.13
Ductile Iron	130.0	False	0.000	1	0.01
Ductile Iron	130.0	False	0.000	-20	0.06
Ductile Iron	130.0	False	0.000	2	0.02
Ductile Iron	130.0	False	0.000	-22	0.06
Ductile Iron	130.0	False	0.000	-44	0.12
Ductile Iron	130.0	False	0.000	21	0.24
Ductile Iron	130.0	False	0.000	19	0.06
Ductile Iron	130.0	False	0.000	19	0.22

**FlexTable: Pipe Table (watermodel\_MAX@hydrant.wtg)**

Current Time: 0.000 hours

Headloss Gradient (ft/ft)	Has User Defined Length?	Length (User Defined) (ft)
0.088	False	0.00
0.220	False	0.00
0.000	False	0.00
0.088	False	0.00
0.371	False	0.00
0.000	True	1.00
0.000	True	1.00
0.000	False	0.00
0.000	True	446.00
0.000	False	0.00

### FlexTable: Junction Table (watermodel\_MAX@hydrant.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
27	J-1	415.00	<None>	<Collection: 0 Items>	0	540.44	54.3
30	J-3	418.60	<None>	<Collection: 0 Items>	0	499.11	34.8
34	J-4	418.50	<None>	<Collection: 0 Items>	0	473.26	23.7
37	J-10	419.00	<None>	<Collection: 1 Items>	1,800	465.67	20.2
39	J-9	419.00	<None>	<Collection: 2 Items>	56	499.10	34.7
41	J-2	419.00	<None>	<Collection: 0 Items>	0	510.26	39.5
44	J-8	419.00	<None>	<Collection: 0 Items>	0	510.26	39.5
52	J-7	405.00	<None>	<Collection: 0 Items>	0	473.20	29.5
69	J-5	421.00	<None>	<Collection: 0 Items>	0	473.24	22.6
74	J-6	410.50	<None>	<Collection: 0 Items>	0	473.20	27.1
84	J-16	414.00	<None>	<Collection: 0 Items>	0	473.19	25.6
87	J-17	411.50	<None>	<Collection: 1 Items>	19	473.19	26.7
89	J-18	413.00	<None>	<Collection: 0 Items>	0	473.19	26.0
92	J-19	409.00	<None>	<Collection: 1 Items>	1	473.19	27.8
94	J-20	405.00	<None>	<Collection: 0 Items>	0	473.20	29.5
97	J-21	410.50	<None>	<Collection: 1 Items>	2	473.20	27.1

**FlexTable: Junction Table (watermodel\_MAX@hydrant.wtg)**

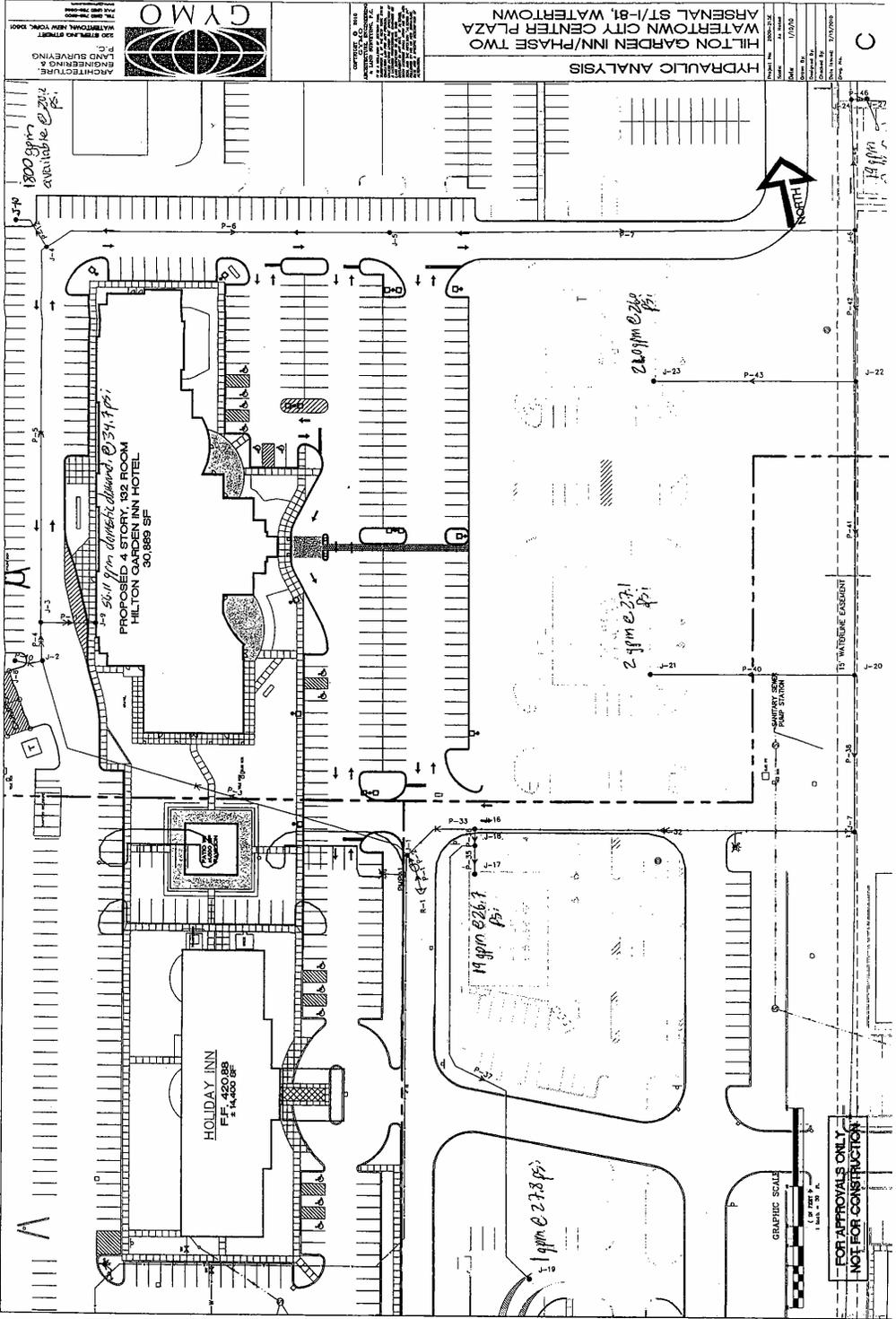
Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
99	J-22	409.00	<None>	<Collection: 0 Items>	0	473.20	27.8
102	J-23	413.00	<None>	<Collection: 1 Items>	21	473.19	26.0
104	J-24	414.50	<None>	<Collection: 0 Items>	0	473.20	25.4
109	J-27	412.00	<None>	<Collection: 1 Items>	19	473.20	26.5

**FlexTable: Pump Table (watermodel\_MAX@hydrant.wtg)**

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
81	PMP-1	415.00	Pump Definition - 1	On	415.00	540.44	1,919	125.44



FOR APPROVALS ONLY  
NOT FOR CONSTRUCTION

GRAPHIC SCALE  
1" = 20' 0"

HYDRAULIC ANALYSIS

HILTON GARDEN INN/PHASE TWO  
WATERTOWN CITY CENTER PLAZA  
ARSENAL ST./-81, WATERTOWN

**GYMO**  
ARCHITECTURE  
ENGINEERING &  
LAND SURVEYING  
320 BRIMFIELD STREET  
WATERTOWN, NEW YORK 12091  
TEL: 518-865-1111  
WWW.GYMO.COM

DATE: 1/23/24  
DRAWN BY: [Name]  
CHECKED BY: [Name]  
SCALE: 1/2" = 10' 0"

**APPENDIX #4**

**SANITARY SEWER PUMPING STATION CALCULATIONS**



**GYMO** ARCHITECTURE, ENGINEERING & LAND SURVEYING, P.C.

220 Sterling Street, Watertown, NY 13601 Tel: (315) 788-3900 Fax: (315) 788-0668

PROJECT	SHEET	BY	DATE	FILE NO.
Watertown City Center Plaza Ph. 2 Pump Station		BSD	2/2/10	2004-121E

- 1) Proposed Retail - 6,925 SF
- 2) Proposed Restaurant - 6,510 SF
- 3) Hilton Hotel - 20,889 SF - 132 Rooms
- 4) Proposed Restaurant - 3-5, 2,26 SF
- 5) Proposed Restaurant - 5- 3,226 SF
- 6) Proposed Bank/Retail - 2,907 SF

- 1) Prop. Retail -  $0.1 \times 6,925 = 692.5$  GPD
  - 2) Prop. Rest -  $220 \text{ seats} \times 35 \text{ GPD/seat} = 7,700$  GPD
  - 3) Hilton Hotel -  $120 \text{ GPD/ROOM} \times 132 \text{ rooms} = 15,840$  GPD  
 Banquet Hall -  $211 \text{ seats} \times 20 \text{ GPD/seat} = 4,220$  GPD
  - 4) Proposed Restaurant -  $3-204 \text{ seats} \times 35 \text{ GPD/seat} = 7,140$  GPD
  - 5) Proposed Restaurant -  $5-200 \text{ seats} \times 35 \text{ GPD/seat} = 7,000$  GPD
  - 6) Proposed Bank/Retail -  $0.1 \times 2,907 \text{ sq ft} = 290.7$  GPD
- TOTAL FLOW = 42,883.2 GPD**

Pump Station

Finished Grade: 7- 410  
 Min Elev. of Bottom of well: 405  
 FM Length = ± 1150'  
 Discharge Manhole Rim = 430.94  
 INV IN = 425.13

AVG FLOW  $42,883.2 \text{ GPD} \times \frac{1 \text{ Day}}{1440 \text{ min}} = 29.78 \text{ gpm} \times 4 \text{ (PHF)} = 119.12 \text{ gpm Peak Total Flow}$

Static:  $\text{inv. in MH (425.13)} - \text{Min Elev. of Bottom of well (405)} = 20.13' \text{ Static Head}$

Dynamic: 1150' to Discharge MH

Bends/Fittings IN Gate Valve, Check Valve, 3-90's 5-45's 1-T  
 = 78'

Equivalent Length  $\rightarrow 1150 + 78' = 1228.00 \text{ ft say } 1230'$



PROJECT	SHEET	BY	DATE	FILE NO.
---------	-------	----	------	----------

1230' of Equir length HDPE pipe (C=140)

FLOW	VELOCITY	Static	Dynamic	TDH
90'	2.3	↓	0.5' / 100ft	29.70'
100	2.5		0.6' / 100ft	31.01
125	3.2		0.9' / 100ft	34.70
150	3.8		1.3' / 100ft	39.62
175	4.5		1.8' / 100ft	45.77
200	5.1		2.3' / 100ft	51.92
225	5.7		2.9' / 100ft	59.30

CP-3102.181

Pumps at 162 gpm @ 42.5' TDH

Avg

Peak

$$Q_{in} = 29.78 \text{ gpm } 6" \text{ MH} = 212 \text{ gals/ft}$$

$$\text{@ 1' Fill} \Rightarrow \frac{212 \text{ gals}}{29.78} = 7.12 \text{ mins}$$

$$Q_{in} = 119.12 \text{ gpm}$$

$$\text{@ 1' Fill} \Rightarrow \frac{212 \text{ gals}}{119.12} = 1.78 \text{ mins}$$

$$\text{Pump} = \frac{212}{162 - 29.78} = \frac{1.60}{8.72 \text{ cycle time}}$$

6.88 cycles/hr ✓

$$\text{Pump} = \frac{212 \text{ gals}}{162 - 119.12} = \frac{4.94}{6.72 \text{ cycle time}}$$

8.93 cycles/hr ✓

check hole only = 11.25 gpm average

CPH = 45 gpm

$$\frac{1}{2} \text{ Fill} = \frac{106}{11.25} = 9.42 \text{ mins}$$

$$\frac{1}{2} \text{ Fill} = \frac{106}{45} = 2.36 \text{ mins}$$

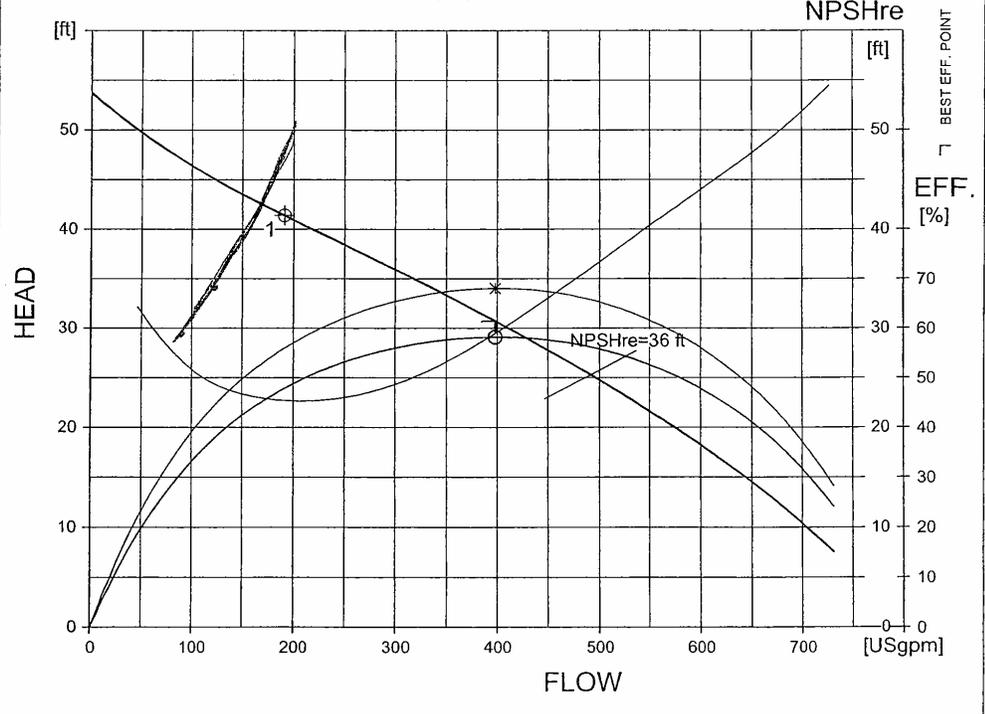
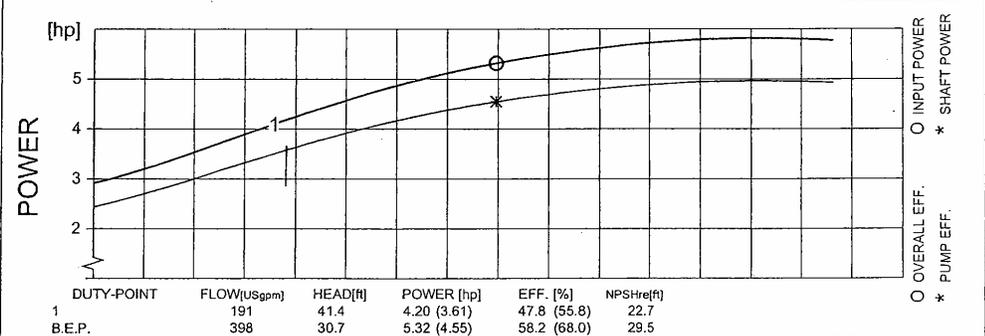
$$\text{Pump} = \frac{106}{162 - 11.25} = \frac{0.70 \text{ mins}}{10.12 \text{ cycle time}}$$

5.93 cycles/hr ✓

$$\text{Pump} = \frac{106}{162 - 45} = \frac{0.91 \text{ mins}}{30.27 \text{ mins}}$$

3.27 cycle time  
18.25 cycles ✓

<b>FLYGT</b>		<b>PERFORMANCE CURVE</b>			PRODUCT <b>CP3102.181</b>	TYPE <b>MT</b>	
DATE <b>2010-02-08</b>		PROJECT			CURVE NO <b>63-432-00-3703</b>	ISSUE <b>3</b>	
POWER FACTOR	1/1-LOAD <b>0.81</b>	3/4-LOAD <b>0.75</b>	1/2-LOAD <b>0.64</b>	RATED POWER ..... STARTING CURRENT ... RATED CURRENT ...	<b>5 hp</b> <b>41 A</b> <b>6.7 A</b>	IMPELLER DIAMETER <b>183 mm</b>	
EFFICIENCY	<b>85.0 %</b>	<b>85.5 %</b>	<b>84.0 %</b>	MOTOR #	<b>18-11-4AL</b>	STATOR <b>61D</b>	REV <b>10</b>
MOTOR DATA	---			RATED SPEED ..... TOT.MOM.OF INERTIA ... NO. OF BLADES	<b>1745 rpm</b> <b>0.044 kgm2</b> <b>1</b>	FREQ. <b>60 Hz</b>	PHASES <b>3</b>
COMMENTS <b>NEVACLOG</b>			INLET/OUTLET <b>- / 4 inch</b>	VOLTAGE <b>460 V</b>		POLES <b>4</b>	
			IMP. THROUGHLET <b>3.0 inch</b>	GEAR TYPE <b>---</b>		RATIO <b>---</b>	



FLYPS3.1.6.2 (20060631)

NPSHre = NPSH3% + min. operational margin  
Performance with clear water and ambient temp 40 °C

<b>FLYGT</b>	<b>HI B Curve</b>
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Water & Wastewater

## Friction Loss - (Hose)

Friction Loss Tables

Issued: 5/89

Supersedes:

2"			3"			4"			6"		
FLOW G.P.M.	VELOCITY FT./SEC.	HEAD LOSS FT./100'									
10	1.0	0.2	30	1.4	0.3	90	2.3	0.5	200	2.3	0.32
15	1.5	0.5	35	1.6	0.4	100	2.5	0.6	225	2.6	0.40
20	2.0	0.9	40	1.8	0.5	125	3.2	0.9	250	2.8	0.49
25	2.5	1.4	45	2.0	0.6	150	3.8	1.3	275	3.1	0.58
30	3.1	2.0	50	2.3	0.7	175	4.5	1.8	300	3.3	0.69
35	3.6	2.7	60	2.7	1.0	200	5.1	2.3	325	3.7	0.80
40	4.1	3.5	70	3.2	1.3	225	5.7	2.9	350	4.0	0.90
45	4.6	4.3	80	3.6	1.7	250	6.4	3.5	375	4.3	1.00
50	5.1	5.2	90	4.1	2.1	275	7.0	4.2	400	4.5	1.10
60	6.1	7.3	100	4.5	2.6	300	7.7	4.9	450	5.1	1.40
70	7.1	9.8	125	5.7	4.0	325	8.3	5.7	500	5.7	1.70
80	8.2	12.6	150	6.8	5.6	350	8.9	6.6	600	6.8	2.40
90	9.2	15.7	175	7.9	7.4	375	9.6	7.4	700	7.9	3.30
100	10.2	18.9	200	9.1	9.6	400	10.2	8.4	800	9.1	4.20
125	12.8	28.6	225	10.2	11.9	450	11.5	10.5	900	10.2	5.20
150	15.3	40.7	250	11.3	14.8	500	12.8	12.7	1000	11.4	6.40
175	17.9	53.4	275	12.5	17.2	600	15.3	17.8	1100	12.5	7.60
200	20.4	68.5	300	13.6	20.3	700	17.9	23.7	1200	13.6	9.20
			325	14.7	23.5				1300	14.7	10.00
			350	15.9	27.0				1400	15.9	11.90
			375	17.0	30.7				1500	17.0	13.60

8"			10"			12"		
FLOW G.P.M.	VELOCITY FT./SEC.	HEAD LOSS FT./100'	FLOW G.P.M.	VELOCITY FT./SEC.	HEAD LOSS FT./100'	FLOW G.P.M.	VELOCITY FT./SEC.	HEAD LOSS FT./100'
400	2.6	0.28	600	2.45	0.21	600	1.70	0.09
450	2.9	0.35	700	2.86	0.28	800	2.27	0.15
500	3.2	0.43	800	3.26	0.36	1000	2.84	0.22
600	3.8	0.60	900	3.67	0.45	1200	3.41	0.31
700	4.5	0.80	1000	4.08	0.55	1500	4.26	0.47
800	5.1	1.10	1200	4.90	0.76	1800	5.11	0.66
900	5.8	1.30	1500	6.12	1.15	2000	5.68	0.81
1000	6.4	1.60	1800	7.35	1.61	2400	6.81	1.13
1100	7.0	1.90	2000	8.16	1.96	2800	7.95	1.50
1200	7.7	2.30	2400	9.80	2.75	3000	8.52	1.71
1300	8.3	2.60	3000	12.20	4.15	3500	9.95	2.27
1400	8.9	3.00	3400	13.90	5.23	4000	11.40	2.91
1500	9.6	3.30	4000	16.30	7.07	4500	12.80	3.62
1600	10.2	3.70	4500	18.40	8.80	5000	14.20	4.40
1800	11.5	4.70	5000	20.40	10.69	6000	17.00	6.16
2000	12.8	5.70	5500	22.40	12.74	7000	19.90	8.75
2500	16.0	8.60	6000	24.50	14.96	8000	22.70	10.48
3000	19.1	12.20						

APPENDIX #5

TRAFFIC ANALYSIS



