

**PROPERTY OF HORTON BROTHERS, LLC  
HEBRON, CONNECTICUT  
VILLAGE GREEN DISTRICT  
PUBLIC WORKS IMPACT STATEMENT**

- **STORMWATER SYSTEMS**
- **LIGHTING**
- **PARKING**
- **WASTEWATER**

**AUGUST, 2004**

**PREPARED BY  
MARK W. FRIEND  
P.E., SOIL SCIENTIST**

## TABLE OF CONTENTS

Section	Page Number
Title Page	
Table of Contents.....	1
1.0 Introduction.....	3
2.0 Site Description.....	4
2.1 Location.....	4
2.2 Characteristics.....	4
2.0 Potential Impacts.....	5
3.1 Stormwater.....	5
3.2 Lighting.....	5
3.3 Parking.....	5
3.4 Wastewater.....	5
4.0 Responses Within Master Concept Plan.....	7
4.1 Stormwater.....	7
Controls Specific to the MCP & DS.....	8
4.1.1 Site Layout.....	8
4.1.2 Source Controls.....	9
4.1.3 Treatment Controls.....	9
4.1.3a Infiltration practices.....	9
4.1.3b Filtering practices.....	9
4.1.3c Settling practices.....	9
4.1.3d Management of peak flows.....	10
4.1.3e Structural measures (Secondary Controls).....	10
Table 1.....	11
4.2 Lighting.....	12
4.2.1 General.....	12
4.3 Parking Layout.....	12

TABLE OF CONTENTS (cont'd)

4.4 Wastewater.....	12
5.0 Summary of Conclusions .....	13
5.1 Stormwater Systems.....	13
5.2 Lighting.....	13
5.3 Parking.....	13
5.4 Wastewater.....	13

**Appendices**

Appendix A Master Site Plan

Appendix B Estimated Wastewater Flows

Appendix C Letter from Dennis J. Greci to Rob Hust 01/31/00

Appendix D Table No. 4 , Sec. IV Design Flows from Connecticut Public Health Code

Appendix E Wastewater Flow Tables from “Wastewater Engineering Treatment Disposal & Reuse”

Appendix F Correspondences with the Water Pollution Control Authority

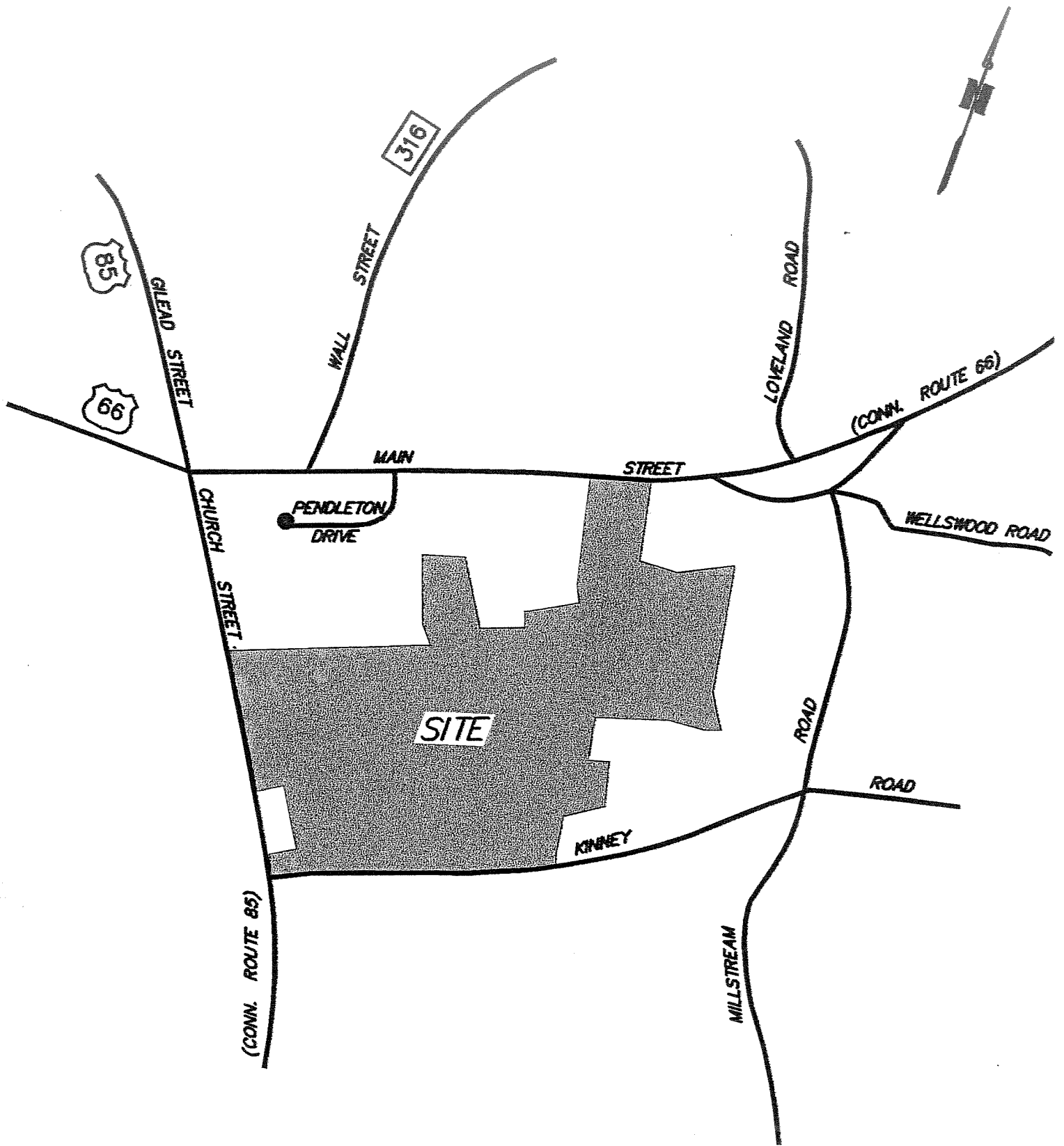
SECTION 1.0  
INTRODUCTION

This statement is intended to satisfy Section 5.10.4 (4) c of the Hebron Zoning Regulations as amended through January 1, 2004. Not all of the items listed under this section are addressed here. Items i, ii, iii are covered in their entirety. Only the wastewater portion of item iv is covered. Separate impact statements for the water supply and other utility systems will be provided in a separate report.

This statement is based on a review of the Master Concept Plan (MCP) and Design Standards (DS) submitted with this report. The conclusions are based on these conceptual plans with the assumption detailed studies will be done with the development of individual site plans . These individual site plans and reports must coordinate with the MCP & DS.

This statement is also intended to be coordinated with the "Town Center Storm Water Management Study" Town of Hebron, Connecticut by Nathan L. Jacobson & Associates, Inc. The contents of this study and requirements of any stormwater management regulations adopted by the town are integral to the MCP & DS and the development of this property.

This statement is organized into four sections. The first section is a description of the site. The second describes potential impacts from the proposed activities. The third section details the responses in the MCP & DS to mitigate potential impacts. The fourth is a summary of conclusions.



**FIGURE 1**  
**SITE LOCATION MAP**

SCALE: 1 inch = 1000 ft.

**SECTION 2.0**  
**SITE DESCRIPTION**

**2.1 LOCATION**

This site is a 140 acre parcel which is located, generally, in the block of land located between Route 66, Route 85, Kinney Road and Millstream Road. It has frontage on Route 66, Route 85 and Kinney Road. It is not the only property in this quadrant, but is the largest single piece. A location map is included in Figure 1. The site is located within the Raymond Brook watershed. The watercourses on and adjacent to the site are classified "A". They have excellent water quality and are considered fishable/swimmable.

**2.2 CHARACTERISTICS**

A majority of the site consists of active agricultural fields. Several wetland corridors traverse exist through the site. A more detailed description of the site can be found in the Natural Resources Impact Statement submitted with this application.

The slopes on a majority of the site are in the 3% to 8% range. Some steeper slopes exist in the southeasterly corner of the property which vary from 10% to 20%. In general, most of the site is gentle rolling agricultural fields. The site is broken up into several minor watersheds which drain to the various wetland corridors generally running north and south through the property.

SECTION 3.0  
POTENTIAL IMPACTS

**3.1 STORMWATER**

A project of this magnitude has the potential for several impacts to the onsite and offsite wetland and watercourse systems. A very good enumeration, which is taken from a draft of the Town Center Storm Water Management study by Nathan L. Jacobson & Associates, is as follows:

- Accumulation and transport of soluble and particulate pollutants to surface waters, both from impervious surfaces and managed pervious surfaces.
- Decline in stream bed quality and degradation of instream habitat.
- Transport of higher temperature runoff directly to surface water (thermal impacts).
- Lower diversity of aquatic species.
- Increase in peak discharges of stormwater runoff.
- Increase in volume of stormwater runoff.
- Decrease in the time in which stormwater runoff reaches wetlands or surface waters.
- Increased frequency in duration of time which a watercourse experiences certain discharge rates.
- Increased velocities of flow within stream channels.
- Stream channel instability (channel widening, channel bed downcutting, aggradation and/or degradation).
- Sediment deposition.
- Increase in peak discharges of stormwater runoff beyond the capacity of natural channels and manmade conveyance systems and structures.
- Flood plain expansion.

### **3.2 LIGHTING**

The potential impacts of lighting for the site would be as follows:

- Undesirable color hues.
- Lighting intensity that is disruptive to neighboring properties (light pollution).
- Safety issues such as too little lighting in areas needing security, and glare, which could blind drivers and impede ability to safely operate a vehicle.
- Pole heights not aesthetically or architecturally consistent with landscaping and building architecture.
- Fixture and pole styles not consistent with the overall building architecture and character of the project.

### **3.3 PARKING**

The potential issues of the design and layout of the parking areas which relate to the feasibility and safety for use by the public are as follows:

- Safety concerns related to conflicts between pedestrian and vehicular traffic.
- Safety concerns related to adequate lighting of parking areas.
- Aesthetic concerns related to visibility of parking lots from main traveled ways and public views.
- Environmental concerns related to warming of storm water runoff from large areas of exposed pavement.

### **3.4 WASTEWATER**

Because this site will be serviced by a public sewer system, the main concern with regard to wastewater is to ensure the conveyance system and sewage treatment plant have the capacity to accept the average daily and peak flows generated by the project. The other potential impact is the release of hazardous materials into the stormwater treatment system.



**SECTION 4.0**  
**RESPONSES WITHIN THE MASTER CONCEPT PLAN AND**  
**DESIGN STANDARDS TO ADDRESS POTENTIAL IMPACTS**

#### **4.1 STORMWATER**

##### **Management Controls**

As enumerated in Section 1.4 of the Town Center Storm Water Management Study for the Town of Hebron by Nathan L. Jacobson & Associates, Inc., in "Table 1 Stormwater Management Controls", the following applicable stormwater management controls are considered in the development of the MCP & DS and must be considered in the design of each individual site plan.

##### **Land Use Controls**

- Stream buffer requirements
- Floodplain Restrictions
- Wetland Protection
- Steep Slope Area Restrictions
- Open Space
- Cluster Development
- Erosion and Sediment Control

##### **Source Controls**

- Public Education
- Materials Management
- Illicit Discharge and Connection
- Spill Prevention and Clean-up
- Dumping Prevention
- Street and Parking area Cleaning
- Storm Drainage System Maintenance

##### **Treatment Controls**

- Infiltration Practices
- Filtering Practices
- Settling Practices

As enumerated in table 2 of the Jacobson study the following is a list of the controls used in land development design practices:

##### **Storage Controls**

- Rooftop Storage
- Parking Area Storage
- Storm Sewer Storage
- Detention Facilities

### **Infiltration Controls**

- Lot Grading to Create Ponding Areas
- Roof Water Collection and Infiltration
- Vegetated Swales or Channels
- Vegetated Buffer Areas
- Infiltration Storm Sewers
- Infiltration Basins or Structures

### **End-of-Pipe Controls**

- Oil/Grit Separators
- Dry Ponds
- Wet Ponds
- Constructed Wetlands
- Filtering Practices
- Infiltration Practices

### **Controls Specific to The MCP & DS**

#### **4.1.1 Land Use Controls**

- Stream buffer requirements – The layout shown on the MCP maintains the natural stream belt systems and buffers. Table 1 shows the minimum distance from parking lots and buildings to any wetlands to be 50'. The average encroachment into the 100 regulated area is 12'.
- Floodplain Restrictions – No 100 year floodplains exist on the property. As shown on table 1 only 1.7% of the wetland areas on the site would be Disturbed in the MCP. This will maintain the natural flood storage capacity of the wetlands of the site along the minor stream corridors.
- Wetland Protection – See above.
- Steep slope protection – No significant slopes over 20% exist onsite.
- Open Space – Significant open space is proposed on the MCP. This is shown as both active and passive open space. The total open space shown on the MCP comprises 55.6% of the site.
- Cluster Development – The MCP shows the utilization of clustering of development resulting in the substantial open space described above. Residential as well as commercial areas are located in pods.

- Erosion and Sediment Control – The specific methods to be used must be shown on individual site plans at the time of submittal. The MCP is not intended to show this level of detail.

#### **4.1.2 Source Controls**

- The Design Standards (DS), which are part of the Master Concept Plan (MCP) outline the source controls.

#### **4.1.3 Treatment Controls**

**4.1.3a Infiltration practices** – The MCP depicts the following practices:

- Sheet flow to parking lot islands.
- Sheet flow from roads to shoulders.
- Stormwater management basins.
- Subsurface retention/detention and recharge systems.
- Linear bio-swales.
- Roof water collection and subsurface infiltration systems.

**4.1.3b Filtering practices** - The MCP depicts the following practices:

- Sheet flow to parking lot islands.
- Sheet flow to road shoulders.
- Stormwater management basins.
- Linear bio-swales

**4.1.3c Settling practices** - The MCP depicts the following practices:

- Lot grading to create ponding areas.
- Stormwater management basins.

#### 4.1.3d Storage Controls

- Rooftop and parking lot storage of runoff are not applicable for this site.
- Detention facilities and subsurface detention/retention and recharge systems are shown on the MCP.

#### 4.1.3e End of Pipe Controls – The DS specify the use of the following standards:

- Oil/grit separators – These are only necessary with direct discharges into wetlands and watercourses.
- Dry ponds/wet ponds & constructed wetlands – A combination of these is shown on the MCP and prescribed in the DS as bio-remediation basins.

Filtering/infiltration practices – This will occur in the bio-remediation basins shown on the MCP.

TABLE 1

Total area of site =	140 Ac. – (100.0%)
Total area of wetlands =	41.5 Ac. – (29.6%)
Total area of 100' regulated area beyond wetland boundaries =	30.8 Ac. – (22.0%)
Total regulated area =	72.3 Ac. – (51.6%)
Total area of parking lots & buildings w/I 100' reg. area =	3.8 Ac. – (12.0% of 100' reg. area)
Minimum distance from parking lots or buildings to wetland boundaries =	50'
Average distance from parking lots or buildings to any wetland boundary =	88'
Total area of roads w/I 100' reg. area =	2.3 Ac. – (7.5% of 100' reg. area)
Total area of hiking trails w/I 100' reg. area =	0.5 Ac. – (1.6% of 100' reg. area)
Total area of bio-remediation & stormwater management areas w/I 100 reg. area =	6.3 Ac. – (20.4% of 100' reg area)
Total area of roads w/I wetland areas =	0.5 Ac. – (1.2% of wetland areas)
Total area of hiking trails w/I wetland areas =	0.2 Ac. – (0.5% of wetland areas)

## **4.2 LIGHTING**

### **4.2.1 General**

The design standards submitted with the MCP & DS give standards to minimize impacts. The standards and guidelines given in the design standards are as follows:

- Lamp types to achieve white light and avoid yellows.
- Specify illumination levels.
- Conceal lighting poles from the Boulevard.
- Use shoe box fixtures only in public streets and parking areas to avoid glare for safety reasons.
- Use lantern style lights only in the screened areas such as the market square, walks and plazas
- Incorporate safety features such as shatterproof lenses on low light fixtures.
- Coordinate design with architecture and location on the site..
- Specifying pole heights.
- Limiting illumination levels to one-half foot candle at the property line or beyond pedestrian and traffic areas.

## **4.3 PARKING LAYOUT**

- Grid design to keep high volume of traffic out of parking areas.
- Separate and break up parking lots with islands.
- Screen views of parking from main traveled ways by location to the side or behind buildings and with landscaping and stonewalls.
- Shade parking areas with landscaping to prevent unnecessary heating of surface runoff.

## **4.4 WASTEWATER**

Calculations of estimated flows generated from the site are included in appendix B. This information was sent to the WPCA. The first WPCA correspondence and our response is included in appendix F. We are awaiting a follow up response from the WPCA.

**SECTION 5.0**  
**SUMMARY OF CONCLUSIONS**

**SECTION 5.1 – STORM WATER**

The Master Concept Plan and Design Standards are laid out such that an effective storm water management system can be designed which will minimize the negative effects that are normally associated with storm water discharges. The plan attacks this problem from a multitude of different areas to produce a strategy that treats storm water as close to the source as possible rather than collecting it all to be discharged to one location for treatment. A lot of these techniques are taken from low impact development philosophy. An adequate buffer is left between the development and the wetlands boundary to achieve this effectiveness. The burden of design will be on the consultants used in the individual site plans. The intent of the Master Concept Plan and Design Standards is to set the framework and foundation for these designs. Consequently, the conclusion is the effects of the storm water discharges will be minimal if the ultimate designs incorporate the techniques shown on the Master Concept Plan and within the Design Standards for drainage.

**SECTION 5.2 – LIGHTING**

The primary concern with the effects of lighting of a project of this magnitude are with regard to the surrounding wetland and adjoining properties. The Master Concept Plan includes a lighting plan and design standards which give guidelines to minimize these impacts. In addition, these specify the appropriate use of lighting within the project to provide an aesthetically pleasing result. This is achieved through the appropriate use of white lighting and architecturally compatible fixtures. Consequently, the conclusion is the lighting will be a coordinated element of the project that will not be objectionable or disruptive to the surrounding open space and/or adjacent properties.

**SECTION 5.3 – PARKING**

Parking has been laid out on the Master Concept Plan to hide large numbers of cars from the public view, but provide safe and convenient access to the uses on the site. The Master Concept Plan shows parking which is convenient and safely located in the vicinity of the intended users, but also screened from view by the use of topography, stone walls and landscaped features. Consequently, the conclusion is that the parking will be safe and convenient and aesthetically compatible with the site.

**SECTION 5.4 - WASTEWATER**

We are awaiting a response from the WPCA to evaluate the capacity of the system

**APPENDIX A**  
**SITE LAYOUT PLAN**



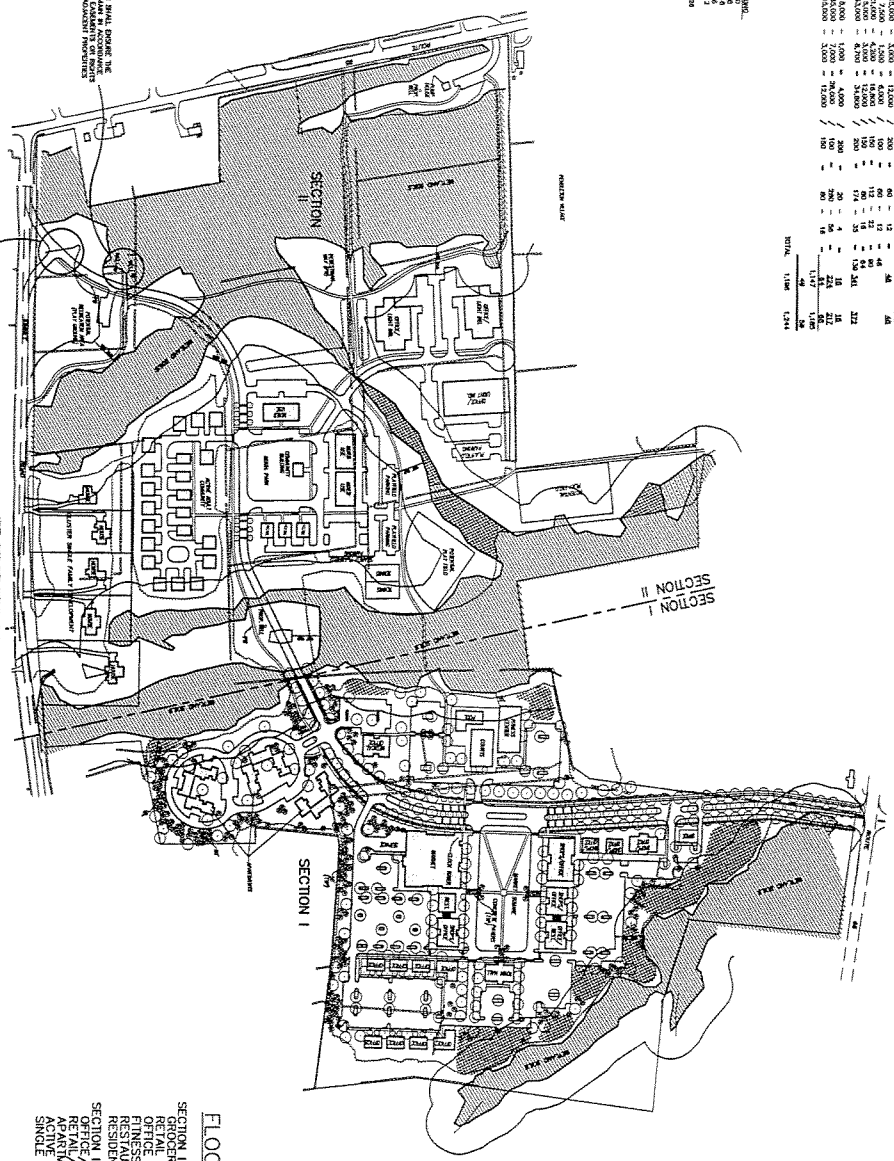
**SITE INFORMATION**

FIGURE 1

AREA	DATE ACQUIRED	ACRES	NET ACRES	# PARCELS	PERCENTAGE OF TOTAL	PERCENTAGE OF NET
51	12/20/00	23.000	23.000	100	100	100
52	7/20/01	15.000	15.000	200	39	61
53	06/03/00-04/00	40.000	40.000	300	71	100
54	12/20/00	15.000	15.000	100	35	59
55	12/20/00	21.000	21.000	100	48	78
56	12/20/00	42.000	42.000	200	95	100
57	12/20/00	15.000	15.000	100	35	59
58	12/20/00	15.000	15.000	100	35	59
<b>TOTAL</b>		<b>174.000</b>	<b>174.000</b>	<b>1,000</b>	<b>100</b>	<b>100</b>

FIGURE 2

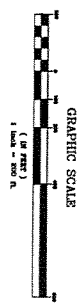
AREA OF THE PROPOSED DEVELOPMENT IS 150,000 SQ. FT. (3.47 ACRES). THE DEVELOPMENT IS LOCATED ON THE WEST SIDE OF THE ROAD, BETWEEN THE EXISTING WETLANDS AND THE EXISTING INDUSTRIAL PARK. THE DEVELOPMENT IS TO BE CONSTRUCTED IN PHASES. THE FIRST PHASE IS TO BE CONSTRUCTED IN 2005 AND THE SECOND PHASE IS TO BE CONSTRUCTED IN 2006. THE DEVELOPMENT IS TO BE CONSTRUCTED IN PHASES TO THE WEST OF EXISTING INDUSTRIAL PARK.



FINAL ROAD DESIGN SHALL COMPLY WITH THE REQUIREMENTS OF THE CONNECTICUT DEPARTMENT OF TRANSPORTATION AND SHALL BE SUBJECT TO THE REVIEW AND APPROVAL OF THE CONNECTICUT DEPARTMENT OF TRANSPORTATION.

NOTE: DEVELOPER SHALL BE RESPONSIBLE FOR THE FINAL DESIGN OF THE DEVELOPMENT AND SHALL BE SUBJECT TO THE REVIEW AND APPROVAL OF THE CONNECTICUT DEPARTMENT OF TRANSPORTATION AND THE CONNECTICUT DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES.

NOTE: COME WITH YOUR OWN COPY OF THE SITE PLAN TO THE MEETING.



MINIMUM SET BACK FROM WETLANDS  
BUILDINGS 50'  
PARKING LOTS 50'

**FLOOR AREA TABLE**

SECTION	USE	AREA (S.F.)	UNITS
SECTION I	RETAIL	52,000	
SECTION I	OFFICE	153,000	
SECTION I	RESIDENTIAL	25,000	49 UNITS
SECTION II	OFFICE/LIGHT INDUSTRIAL	75,000	
SECTION II	RETAIL/SERVICE	23,400	
SECTION II	ACTIVE ADULT	24	
SECTION II	SINGLE FAMILY HOMES	6	

DATE	8-10-04
SCALE	1"=200'
SHEET	1 OF 3
APP NO	002-271-99-547

MASTER CONCEPT PLAN  
OVERALL SITE LAYOUT PLAN  
**HEBRON VILLAGE GREEN DISTRICT**  
HEBRON, CONN.

**MEGSON & HEAGLE**  
CIVIL ENGINEERS & LAND SURVEYORS, LLC  
81 RANKIN ROAD  
GLASTONBURY, CONN. 06033  
PHONE (860)-659-0587

**APPENDIX B**  
**ESTIMATED SEWER FLOWS**

ESTIMATED SEWER  
FLOWS

I. FLOW GENERATORS

SECTION I

USE

AREA (S.F.)

GROCERY STORE

35,000

RETAIL

51,000

OFFICE

153,000

FITNESS CENTER

35,000

RESTAURANT

7,500  
OR 500 SEATS

RESIDENTIAL

49 UNITS

SECTION II

OFFICE

75,000

RESIDENTIAL APTS.

44 - ZBR UNITS

ACTIVE ADULT HOMES

24 - ZBR UNITS

COMMUNITY BLDG

1500

MEGSON & HEAGLE  
Civil Engineers & Land Surveyors, LLC  
81 Rankin Road  
GLASTONBURY, CONNECTICUT 06033

JOB 221-99 HORTON  
SHEET NO. 2 OF 4  
CALCULATED BY MWF DATE 8-12-04  
CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_

SCALE

## II FLOW RATES

GROCIERY STORE	-	0.1 GPD/SF GR.
RETAIL > 2000 SF	-	0.1 GPD/SF GR
OFFICE	-	15 GPD/PERSON (1 PERSON / 200 SF)
FITNESS CENTER	-	0.15 GPD/SF GR
RESTAURANT	-	10 GPD/MEAL
RESIDENTIAL UNITS	-	200 GPD/HOUSE (AVG 2.5 PERSONS/HO)
COMMUNITY BLDG (SMALL)	-	0.1 GPD/SF GR

III ESTIMATED FLOWRATES (GPD)  
SECTION I

GROCERY STORE  
 $(35,000 \text{ SF})(0.1 \text{ GPD/SF}) = 3500 \text{ GPD}$

RETAIL  
 $(51,000 \text{ SF})(0.1 \text{ GPD/SF}) = 5100 \text{ GPD}$

OFFICE  
 $(153,000 \text{ SF})(\frac{1 \text{ PERSON}}{200 \text{ SF}})(15 \text{ GPD/PERSON}) = 11,475 \text{ GPD}$

FITNESS CENTER  
 $(35,000 \text{ SF})(0.15 \text{ GPD/SF}) = 5250 \text{ GPD}$

RESTAURANT  
 $(500 \text{ SEATS})(5 \text{ MEAL/SEAT})(10 \text{ GPD/MEAL}) = 25,000 \text{ GPD}$

RESIDENTIAL  
 $49 \text{ - 2BD/2B UNITS} \times 200 \text{ GPD/UNIT} = 9800 \text{ GPD}$   
TOTAL =

TOTAL = 60,125 GPD

MEGSON & HEAGLE  
Civil Engineers & Land Surveyors, LLC  
81 Rankin Road  
GLASTONBURY, CONNECTICUT 06033

JOB 221-99 HORTON  
SHEET NO. 4 OF 4  
CALCULATED BY MWF DATE 8-12-04  
CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
SCALE \_\_\_\_\_

SECTION II

OFFICE  
 $(75,000 \text{ SF}) \left( \frac{1 \text{ PERSON}}{200 \text{ SF}} \right) (20 \text{ GPD/PERSON})$   
 $= 7500$

RESIDENTIAL UNITS

68 - 2 BDRM UNITS  $\times 200 \text{ GPD/UNIT} = 13,600$

COMMUNITY BLDG  
 $(1500 \text{ SF}) (0.1 \text{ GPD/SF}) = 150$

TOTAL = 21,250 GPD

GRAND TOTAL = 66,700 GPD

**APPENDIX C**


**LETTER FROM DENNIS J. GRECI,  
SUPERVISING SANITARY ENGINEER,  
DATED 01/31/00 TO ROB HUST**

**RE: ERT FOR HEBRON CENTER  
BUSINESS DISTRICT**

Figure 8.  
DEP Memo

24

# Memo

**To:** Rob Hust  
**From:** Dennis J. Greci, Supervising Sanitary Engineer   
**CC:**  
**Date:** 01/31/00  
**Re:** ERT for Hebron Center Business District

Rob,

I was at first concerned with the absence of input from the WPCA. Since one of the main reasons for re-evaluating this area is the presence of sewers, whose absence prevented such an evaluation from having any real meaning in the past, it would seem appropriate to first review the sewer service area maps and the related local ordinances / regulations. It is my understanding that WPCA (Denise Alexander) was invited on the walk-over, but had to decline due to a scheduling conflict.

After talking with Denise, it is clear that this area is within the town's adopted sewer service district. There is capacity within the town's existing sewerage allocation of roughly 210,000 gpd (per contract with Colchester) to handle the buildout of this area:

Residences: approx 110 @ 200 gpd/household	=	22,000 gpd
Businesses: approx 35 @ 10 employees x 15 gpe	=	5,250 gpd
Retail: approx 20, assume ½ food service		
10 @ 8 employees x 15 gpd/employee	=	1,200 gpd
10 @ 200 customers x 5 gpd/customer	=	10,000 gpd
Total estimated flow	=	38,450 gpd, say 40,000 gpd

The town is currently using approx 100,000 gpd of their capacity, with no significant new development planned, so there would seem to be sufficient contractual capacity for the additional flow. Technically, the sewers are designed to handle substantially more than the contractual limits.

The plan seems to carefully avoid environmentally sensitive areas (wetlands, etc); as long as that separation is maintained, the restrictive conditions in the grant will not come into play here.



**APPENDIX D**

**TABLE NO. 4, SEC. IV DESIGN FLOWS**

**TAKEN FROM**

**“CONNECTICUT PUBLIC  
HEALTH CODE REGULATIONS AND  
TECHNICAL STANDARDS FOR  
SUBSURFACE SEWAGE DISPOSAL SYSTEMS”  
JANUARY, 2004**

**IV. DESIGN FLOWS**

**RESIDENTIAL BUILDINGS:** 150 Gallons per Day per Bedroom

**NON-RESIDENTIAL BUILDINGS and RESIDENTIAL INSTITUTIONS:** Table No. 4 shall be used for determining the daily design flow from non-residential buildings and residential institutions unless specific water use data is available for the facility. Design flow based on metered flows must use a minimum 1.5 safety factor applied to all metered average daily water use.

**TABLE NO. 4**

<u>SCHOOLS, PER PUPIL</u>	<u>GALLONS PER DAY</u>
BASE FLOW (EXCLUDES KITCHEN & SHOWERS)	
HIGH SCHOOL	12
JR. HIGH/MIDDLE SCHOOL	9
KINDERGARTEN/ELEMENTARY SCHOOL	8
KITCHEN	3
SHOWERS	3 to 5
RESIDENTIAL	100
DAY CARE CENTER (NO MEALS PREPARED)	10
<u>COMMERCIAL/INDUSTRIAL BUILDINGS, PER EMPLOYEE</u>	
FACTORY (NO SHOWERS)	25
FACTORY (WITH SHOWERS)	35
OFFICE (AVERAGE 200 SQ.FT./PERSON-GROSS AREA)	20
SMALL RETAIL BUILDING-LESS THAN 2,000 SQ.FT.-GROSS AREA	20
LARGE RETAIL/COMMERCIAL BUILDING-SEE MISCELLANEOUS	
<u>CAMPS</u>	
RESIDENTIAL CAMPS (SEMI PERMANENT), PER PERSON	50
CAMPGROUND WITH CENTRAL SANITARY FACILITIES, PER PERSON	35
CAMPGROUND WITH FLUSH TOILETS (NO SHOWERS), PER PERSON	25
CAMPGROUNDS PER CAMP SPACE (WATER AND SEWER HOOK-UPS)	75
DAY CAMPS, PER PERSON	15
LUXURY CAMPS, PER PERSON	75
PICNIC PARKS (TOILET WASTES ONLY), PER PERSON	5
PICNIC PARKS WITH BATHHOUSES, SHOWERS, FLUSH TOILETS, PER PERSON	10
<u>HEALTH CARE FACILITIES</u>	
HOSPITALS, PER BED	250
REST HOMES, PER BED	150
CONVALESCENT HOMES, PER BED	150
INSTITUTIONS, PER RESIDENT	100
GROUP HOME, PER CLIENT (LARGE TUB/ON-SITE LAUNDRYING USE HIGHER FLOW)	100-150
<u>RESTAURANTS</u>	
RESTAURANTS (PUBLIC TOILETS PROVIDED), PER MEAL SERVED	10
TAKE OUT FOOD SERVICE/RESTAURANTS WITH NO PUBLIC TOILETS, PER MEAL SERVED	5
BARS AND COCKTAIL LOUNGES (NO MEALS) PER PATRON	5
<u>RECREATIONAL FACILITIES</u>	
SWIMMING POOLS, PER BATHER	10
INDOOR TENNIS COURTS, PER COURT	400
OUTDOOR TENNIS COURTS, PER COURT	150
THEATERS, SPORTING EVENTS, PER SEAT	3.5
<u>CHURCHES</u>	
WORSHIP SERVICE ONLY, PER SEAT	1
SUNDAY SCHOOL, PER PUPIL	2
SOCIAL EVENTS (MEALS SERVED) PER PERSON	5
<u>MISCELLANEOUS</u>	
AUTO SERVICE STATIONS, PER CARS SERVICED	5
BEAUTY SALON, PER CHAIR	200
BARBER SHOPS, PER CHAIR	50
DENTAL/MEDICAL OFFICES WITH EXAMINATION ROOMS, PER SQ. FT. OF GR. AREA	0.2
KENNEL DOG RUNS, PER RUN, ROOF MUST BE PROVIDED	25
LARGE RETAIL/COMMERCIAL BLDG., PER SQ. FT. OF GROSS AREA	0.1
LAUNDROMATS, PER MACHINE	400
MOTELS, PER ROOM, (NO FOOD SERVICE, KITCHENETTE OR LAUNDRY FACILITIES)	75
MOTELS, PER ROOM, (WITH KITCHENETTE BUT NO LAUNDRY FACILITIES)	100
MARINAS (BATHHOUSE-SHOWERS PROVIDED), PER BOAT SLIP	20

**APPENDIX E**

**WASTEWATER FLOW TABLES FROM  
“WASTEWATER ENGINEERING  
TREATMENT DISPOSAL & REUSE”  
SECOND EDITION  
METCALF & EDDY, INC.  
MCGRAW-HILL BOOK COMPANY**

# WASTEWATER ENGINEERING: TREATMENT DISP SAL REUSE

SECOND EDITION

METCALF & EDDY, INC.

Revised by  
GEORGE TCHOBANOGLOUS  
Professor of Civil Engineering  
University of California, Davis

McGRAW-HILL BOOK COMPANY

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has well-built sewers and if roof water is excluded, the variation from year to year in the ratio of wastewater to water supply is not great, unless there is a substantial change in the industrial uses of water.

## 2-3 WASTEWATER SOURCES AND FLOWRATES

Data that can be used to estimate average wastewater flows from various domestic and industrial sources and the infiltration/inflow contribution are presented in this section. Variations in the flows that must be established before sewers and treatment facilities are designed are also discussed.

### Sources and Rates of Domestic Wastewater Flows

The principal sources of domestic wastewater in a community are the residential and commercial districts. Other important sources include institutional and recreational facilities. For existing districts, flowrate data should be obtained by direct measurement. Methods for areas that are being developed are considered in the following discussion.

**Residential districts** For small residential districts, wastewater flows are commonly determined on the basis of population density and the average per capita contribution of wastewater. Data on ranges and typical flows are given in Table 2-6. For large residential districts, it is often advisable to develop flowrates on the basis of land-use areas and anticipated population densities. Where possible, these rates should be based on actual flow data from selected typical residential

Table 2-6 Average wastewater flows from residential sources

Source	Unit	Flow, L/unit · d	
		Range	Typical
Apartment	Person	200-340	260
Hotel, resident	Resident	150-220	190
Individual dwelling:			
Average home	Person	190-350	280
Better home	Person	250-400	310
Luxury home	Person	300-550	380
Semimodern home	Person	100-250	200
Summer cottage	Person	100-240	190
Trailer park	Person	120-200	150

Note:  $L \times 0.2642 = \text{gal.}$

Table 2-8 Average wastewater flows from commercial sources<sup>a</sup>

Source	Unit	Flow, L/unit·d	
		Range	Typical
Airport	Passenger	8-15	10
	Vehicle served	30-50	40
Automobile service station	Employee	35-60	50
	Customer	5-20	8
Bar	Employee	40-60	50
	Guest	150-220	190
Hotel	Employee	30-50	40
Industrial building (excluding industry and cafeteria)	Employee	30-65	55
	Machine	1800-2600	2200
Laundry (self-service)	Wash	180-200	190
	Person	90-150	120
Motel	Person	190-220	200
Motel with kitchen	Employee	30-65	55
	Meal	8-15	10
Restaurant	Resident	90-190	150
Rooming house	Toilet room	1600-2400	2000
	Employee	30-50	40
Store, department	Parking space	2-8	4
	Employee	30-50	40
Shopping center	Employee	30-50	40
	Employee	30-50	40

← 15 GPD/PERSON

<sup>a</sup> Adapted in part from Ref. 5.

Note: L × 0.2642 = gal.

**Institutional facilities** Some typical flows from institutional facilities, which are essentially domestic in nature, are shown in Table 2-9. Again, it is stressed that flows vary with the region, climate, and type of facility. The actual records of institutions are the best sources of flow data for design purposes.

**Recreational facilities** Flows from many recreational facilities are highly seasonal. Some typical data are presented in Table 2-10.

### Sources and Rates of Industrial Wastewater Flows

Industrial wastewater flowrates vary with the type and size of the industry, the supervision of the industry, the degree of water reuse, and the onsite wastewater-treatment methods used, if any. Peak flows that are often encountered may be reduced by the use of detention tanks and equalization basins. A typical design value for estimating the flows from industrial districts that have no wet-process-type industries is about 50 m<sup>3</sup>/ha·d (~5,000 gal/acre·d). Alternatively, where the nature of each industry is known, data such as those reported in Table 2-4

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**APPENDIX F**

**CORRESPONDENCES WITH THE  
WATER POLLUTION CONTROL AUTHORITY**

MEGSON & HEAGLE  
CIVIL ENGINEERS & LAND SURVEYORS, LLC  
81 RANKIN ROAD  
GLASTONBURY, CONNECTICUT 06033  
PHONE (860) 659-0587  
FAX (860) 657-4429

May 14, 2004

Ms. Denise Cooper  
Hebron Water Pollution Control Authority  
Hebron Town Hall  
15 Gilead Street  
Hebron, CT 06248

Re: Horton Property – Village Green District  
Sewer Impact Statement

Dear Denise:

I am writing because we will soon be making an application to the Hebron Planning and Zoning Commission for approval of a Master Concept Plan for the above referenced property. As part of that application, a Public Works impact statement must be prepared which includes discussion of the anticipated sewerage flows to be generated by the project and the existing system's capacity to handle this flow. Consequently, I am sending my estimated flows for your review and comment.

I have attached calculation sheets which show my assumptions and calculations. The flows are based on our estimate of the ultimate development of the site. This, of course, will change as the site is developed, but we feel this is a reasonable representation of potential flows. As you can see by these calculations, I have broken the flows into phases I and II.

The flows from the site will be discharged into the existing system in two different locations. The discharge from Phase I will connect to the existing system on Route 66 in the immediate vicinity of its intersection with Ted's Supermarket driveway with Route 66. This is the proposed location for access to our site from Route 66. As the calculations show, the anticipated daily flow at this point is 45,450 gallons per day.

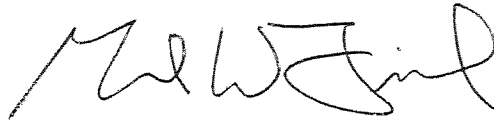
The second location of discharge is at the intersection of Kinney Road and Route 85. This will receive the flows from Phase II of the project. The average daily flow anticipated to enter the existing system at this point is 21,250 gallons per day.



Ms. Denise Cooper  
May 14, 2004  
Page 2

Please review this information and respond as to the capacity of the existing system and treatment plant to handle this flow. As we had discussed on the phone on May 13, 2004, you were also going to discuss this matter with the Town of Colchester and the treatment plant. Any response from those entities would also be greatly appreciated. If you have any questions or comments please do not hesitate to call.

Sincerely,

A handwritten signature in black ink, appearing to read 'Mark W. Friend', written in a cursive style.

Mark W. Friend  
P.E., Soil Scientist, Member

MWF/laa  
Enc.

*Town of Hebron*  
*Water Pollution Control Authority*  
15 Gilead Street  
Hebron, CT 06248  
860-228-5971

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July 14, 2004

Mark W. Friend, P.E., Soil Scientist, Member  
Megson & Heagle  
81 Rankin Road  
Glastonbury, CT 06033

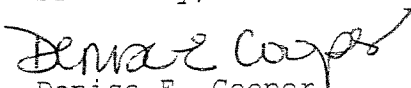
Re: Horton Property - Sewer Impact

Dear Mark,

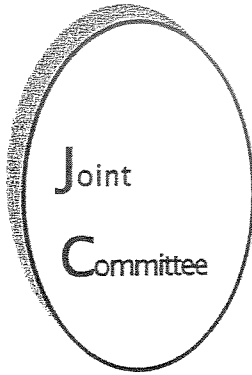
Enclosed please find a response letter dated 6/22/04 from Vincent Susco, Jr., Public Utilities Administrator for Joint Facilities regarding your letter to me dated 5/14/04. Please review and provide to Mr. Susco any additional information that he has requested as soon as possible.

If you have any questions regarding this matter please call me at 228-5971 ext.144.

Sincerely,

  
Denise E. Cooper  
WPCA Administrator

Enclosures



**Colchester ~ East Hampton  
Water Pollution Control Facilities**

P.O. Box 218  
20 Gildersleeve Drive

East Hampton, Connecticut 06424-0218

Telephone	Telephone
Administration	Operations
(860) 267-2536	FAX (860) 267-9913 (860) 267-4142

June 22, 2004

Denise E. Cooper  
WPCA Administrator  
Town of Hebron  
15 Gilead Street  
Hebron, CT. 06248

Subject: Horton Property, Village Green District, Hebron CT

Earth Tech has reviewed the information provided by Hebron related to the Horton property proposed development and the Loveland Road area housing development. We offer the following comments:

The flows provided by Megson & Heagle, Engineers for the Horton property in Hebron, appear reasonable for the types of use anticipated.

Peak sewage flows for this property will need to be provided by the engineer as well as details of their proposed connection point. We need peak flow rates for pump station and collection system capacity evaluation. We will also need to know the location of the tie-in to the existing system and the method of connection (are the flows pumped, pumping rate, peak flow rate, which pumping station will see the flow).

The "Horton Property" as described includes almost all of the open space in the Village Green area. The remaining unconnected properties will provide a relatively minor amount of flow. We have reserved 135,000 gpd for the Village Green area, which is above the estimated proposed development flow of 66,700 gpd.

We estimated flow from the Loveland Hill area at 11,600 gpd. The proposed development includes 54 units of age restricted housing at 2 persons per unit and 70 gpcd or 7,560 gpd, and 42 units of single family housing at 2.77 people per household and 70 gpcd or 8,143 gpd. This is a total of 15,700 gallons per day.

In summary, we have anticipated a total flow from these two properties of 146,600 gpd when, in actuality, it is 82,400 gpd as proposed. With the current flows from Hebron in the 150-200,000 gpd range, this will bring the total flows from Hebron to about the 250-280,000 gpd range. With the other miscellaneous connections remaining, it is likely that the build-out will be about 300,000 gpd, which is in line with our Facilities Plan projections.

Denise Cooper  
June 22, 2004

Page -2-

The flows from Hebron will not affect the current treatment plant capacity.

Once we receive additional information from the Engineer for the Horton property, we will be able to evaluate the collection system and pumping station capacity situation.

Very truly yours,

A handwritten signature in black ink, appearing to read "V F Susco, Jr.", with a long horizontal flourish extending to the right.

Vincent F. Susco, Jr.  
Public Utilities Administrator

Xc: Mark Decker, email  
Dennis Setzko, email

MEGSON & HEAGLE  
CIVIL ENGINEERS & LAND SURVEYORS, LLC  
81 RANKIN ROAD  
GLASTONBURY, CONNECTICUT 06033  
PHONE (860) 659-0587  
FAX (860) 657-4429

August 4, 2004

Colchester/East Hampton Water Pollution  
Control Facilities  
Attn: Mr. Vincent F. Susco, Jr.  
Public Utilities Administrator  
P.O. Box 218  
20 Gildersleeve Drive  
East Hampton, CT 06424-0218

Re: Horton Property  
Village Green District  
Hebron, CT

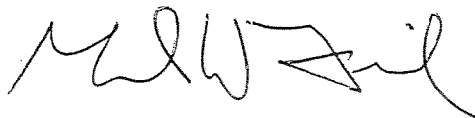
Dear Mr. Susco:

Pursuant to our phone discussion, I am providing you with the additional information requested by Earth Tech. I also spoke with Mr. Dennis Setzko about this information.

The additional information requested by Mr. Setzko included peak flows and the location of these flows from the property. I have enclosed a location map which shows the location and average and peak flows for the anticipated discharges from the property. These are based on the calculations submitted with my previous letter dated May 14, 2004.

Hopefully, this information will enable you to confirm whether or not the existing facilities, with any future expansions, will support a project of this magnitude. If you have any questions or comments please do not hesitate to call.

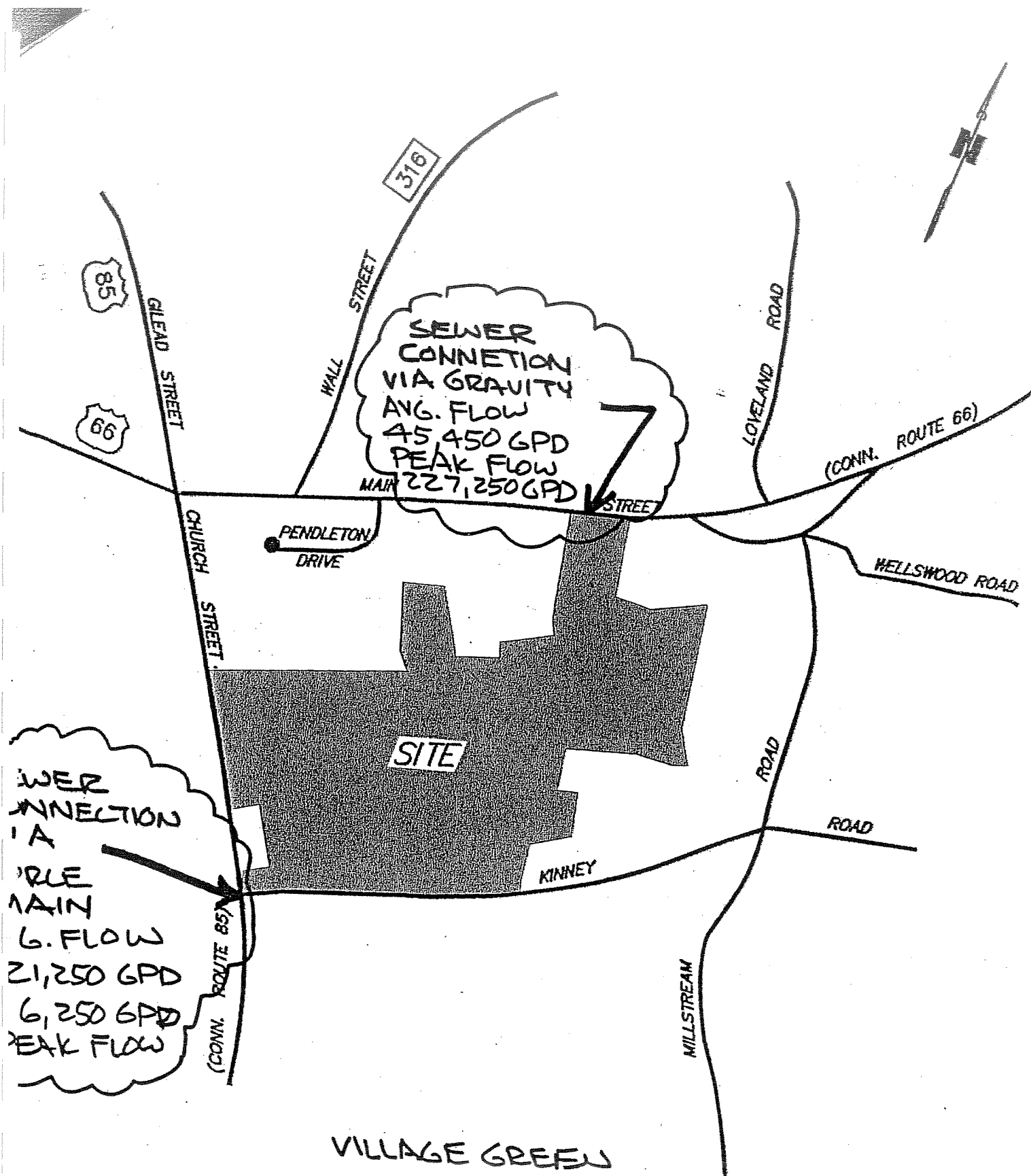
Sincerely,



Mark W. Friend  
P.E., Soil Scientist, Member

MWF/laa  
Enc.

cc: Ms. Denise E. Cooper, WPCA Administrator, Town of Hebron



VILLAGE GREEN  
 FIGURE 1  
SITE LOCATION MAP

SCALE: 1 inch = 1000 ft.