Carmina & Wood, P.C.

Architecture
Engineering
Interior Design

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ENGINEER'S REPORT
FOR
HAMBURG CROSSING
CAMP ROAD @ I-90
HAMBURG, NEW YORK

GENERAL

This project consists of the construction of retail/restaurant buildings and a hotel on a 79.93 acre parcel. The proposed retail and restaurant buildings total 652,815 g.s.f. of floor area, the hotel is proposed to have approximately 115 rooms. The location is on the south side of Camp Road, and is adjacent to the NYS Thruway and Commerce Place, in the Town of Hamburg. It is proposed to rezone the development site to C2 to allow this development, the majority is currently zoned C2 with a portion zoned M2 and RA. A portion of the site is currently occupied by the Fisher Bus Service building, a former Days Inn hotel and a former travel plaza, with a majority of the site vacant. The existing structures will be demolished.

EXISTING CONDITIONS

Storm Sewer

The existing site's topography slopes from southeast to northwest and discharges to (4) four different points.

1. The existing Fisher Bus Service portion of the site has a storm water collection system which discharges to the property to the northwest via a 12" CMP pipe. This portion of the site also picks up sheet drainage from a large portion of the vacant land.
2. The storm water runoff from the former hotel portion of the property is collected in a series of catch basins and also discharges to the property to the northwest via a 24" RCP pipe which upsizes to a 30" CMP prior to discharge. This 24"/30" pipe also picks up discharge from twin 24" and twin 42" pipes which discharge from the I-90 on ramp.
3. A small amount of the vacant portion sheet drains onto the existing residential properties to the west.
4. A portion of the vacant land also sheet drains to Berricks Creek which crosses the southwest corner of the site.

An existing 42" RCP storm pipe from Commerce Place crosses the south portion of the site and discharges to Berricks Creek, this pipe will remain.

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Sanitary Sewer

A 30" RCP public sanitary sewer is located along the west property line, this sewer flows north. This sewer enters the site from the south property line abutting the NYS Thruway and is located in a 20' wide easement. An 8" PVC public sanitary sewer enters the site from the current terminus of Commerce Place and continues west. This sewer connect to the 30" RCP sewer discussed above and is also located in a 20' wide easement. There is also an 8" VTP public sanitary sewer located along Camp Road.

The Fisher Bus Service building discharges to the existing 30" sewer via a 6" lateral. The former hotel building discharges to the 8" Camp Road sewer via an 8" lateral and ties into an existing manhole located along the ROW.

Water System

There is an existing 12" ECWA main located on the north side of Camp Road. Current hydrant flow information provided by the ECWA indicates that the static pressure in the main to be 104 psi, with a residual of 78 psi at a hydrant flow of 2,326 gpm. The residual hydrant was the 1st hydrant north of Commerce Place.

There is an existing 8" ECWA main located on the north side of Commerce Place. Current hydrant flow information provided by the ECWA indicates that the static pressure in the main to be 96 psi, with a residual of 56 psi at a hydrant flow of 1,840 gpm. The residual hydrant was the 3rd hydrant southwest of Camp Road.

The existing Fisher Bus Service Building, former hotel and travel plaza are services off of the Camp Road main. There is an existing 8" fire service which supplies water to the existing on-site hydrant located the north property line.

PROPOSED FACILITIES

Storm Sewer

The storm sewer system consists of a series of catch basins connected by smooth interior HDPE and CMP pipes. A mixture of detention basins, underground pipe detention and water quality treatment will be provided. The majority of the site will discharge to Berricks Creek located in the southwest portion of the site with the north portion, adjacent to the 81,245 gsf building, discharging to the existing 24" RCP pipe located in the northeast portion of the site.

The existing 12" discharge from the Fisher Bus Service area will be abandoned/removed.

In general, the on-site system will consist of a series of catch basins, yard drains, area drains and manholes which will collect the runoff generated from the parking lots, buildings and green areas. A pipe network will connect the structures and convey the water to the detention basins and fields of underground detention piping. Outlet control structures will be installed to control the discharge flow rates off-site to pre-construction conditions. The storm water will flow through a water quality treatment system prior to outletting.

The underground pipe detention field will consist of parallel, perforated CMP pipes surrounded by washed stone. The stone will be wrapped with geotextile fabric to keep it separated from the surrounding soil. The pipes, along with the voids in the stone, will be used to temporarily store the storm water during high intensity storm events. The basins will act in the same manner and provide an area for the storm water to back up in to and be temporarily stored during high intensity storm events prior to discharge.

The portion of the site that discharges to Berricks Creek will be divided into (6) six distinct drainage sub-areas. Each of these areas will have its own collection, detention, water quality treatment system and outlet control structure. Each of these systems will tie into a "common" pipe which will run from the north portion of the site to the outlet point into Berricks Creek. This concept will allow the runoff from the individual sub-areas to be collected, temporarily stored, treated and discharged at a rate equal to the existing runoff. There will be only one new discharge point into Berricks Creek and the rate will be equivalent to pre-construction conditions.

The north portion of the site which discharges into the existing 24" RCP pipe will also have its own collection, detention, water quality treatment system and outlet control structure. This area will have both underground pipe detention and a detention basin to provide temporary storage. A storm water treatment device will be installed prior to discharging into the existing 24" RCP pipe. There will be two connection points to this pipe and the rate will be equivalent to pre-construction conditions.

In addition to the above, a series of underground detention pipes will be installed and connected to the 24" RCP pipe to provide temporary storage associated with existing flow through this pipe. As previously mentioned, a substantial amount of water enters this 24" pipe from pipes exiting the NYS Thruway on-ramp property. In order to alleviate back up and potential flooding on-site when the flow in the 24" pipe exceeds its capacity, these underground pipes will be installed to provide a place for temporary storage.

The Town of Hamburg requires attenuation of the proposed 25-year storm event to the existing 10-year conditions. At the storage elevation for this storm event the outlet control structures will be engineered to allow an outflow equal to the existing 10-year peak runoff.

NYSDEC Stormwater Management Design Manual requires (4) four different criteria be considered when designing a stormwater management system. Those criteria are Water Quality, Channel

Protection, Overbank Flooding and Extreme Storm Protection. Below is a summary of each item and how it is incorporated into this project.

Water Quality:
The NYSDEC requires a water quality device prior to discharge; this will be accommodated by constructing a water quality basin or installing a water quality treatment system. A water quality treatment system device would be designed to remove the majority of suspended solids and floatables. The devices will be chosen from the NYSDEC list of Verified Proprietary Stormwater Management Practices list.

Channel Protection:
The NYSDEC requires that extended detention be provided for the proposed 1-year storm event. This volume will be accommodated in the detention basins and underground pipe detention system. The outlet control structure will be designed to allow this volume to discharge over a 24 hour period.

Overbank Flooding:
The NYSDEC requires that the 10-year proposed storm event be attenuated with detention and that the outlet be restricted to the 10-year existing storm event. This volume will be accommodated in the detention basins and underground pipe detention system. The outlet control structure will be designed to allow discharge at the storage elevation of less than or equal to the existing 10-year storm event.

Extreme Storm Protection:
The NYSDEC requires that the 100-year proposed storm event be attenuated with detention and the outlet to be restricted to the 100-year existing storm event. This volume will be accommodated in the detention basins and underground pipe detention system. The outlet control structure will be designed to allow discharge at the storage elevation of less than or equal to the existing 100-year storm event.

Design Criteria

Storm pipes:	10-year storm
Detention:	Comparison of the existing 1-year vs. the proposed 1-year runoff.
	Comparison of the existing 10-year vs. the proposed 10-year runoff.
	Comparison of the existing 100-year vs. the proposed 100-year runoff.
	Comparison of the existing 10-year vs. the proposed 25-year runoff.

Summary of Runoff:

To Berricks Creek:

	Existing	Proposed
1-Year Storm:	2.18 cfs	90.89 cfs
10-Year Storm:	12.14 cfs	169.14 cfs
100-year:	23.7 cfs	236.24 cfs

To 24" RCP pipe:

	Existing	Proposed
1-Year Storm:	19.32 cfs	23.16 cfs
10-Year Storm:	36.72 cfs	43.03 cfs
100-year:	51.61 cfs	60.0 cfs

Summary of Detention:

<u>To Berricks Creek</u>

Water Quality Volume:
Required: 135,160 cf

1-Year Storm:
Detention Required: 304,513 cf
24-hour extended detention outflow @ this elev. = 3.52 cfs

10-Year Ex. vs. 10-Year Pro. Storm:
Detention Required: 534,093 cf
outflow @ this elev. = < ex. 10-year

100-Year Ex. vs. 100-Year Pro. Storm:
Detention Required: 726,045 cf
outflow @ this elev. = 23.7 cfs (ex. 100-year)

10-Year Existing vs. 25-Year Proposed:
Detention Required: 610,610 cf
outflow @ this elev. = 12.14 cfs (ex. 10-year)

To Existing 24" RCP Pipe

Water Quality Volume:	
Required:	26,875 cf
1-Year Storm:	
Detention Required:	46,737 cf
24-hour extended detention outflow @ this elev. =	0.54 cfs
10-Year Ex. vs. 10-Year Pro. Storm:	
Detention Required:	23,273 cf
outflow @ this elev. =	< ex. 10-year
100-Year Ex. vs. 100-Year Pro. Storm:	
Detention Required:	35,530 cf
outflow @ this elev. =	51.61 cfs (ex. 100-year)
10-Year Existing vs. 25-Year Proposed:	
Detention Required:	41,620 cf
outflow @ this elev. =	36.72 cfs (ex. 10-year)

Water System

Water service to the site will be provided through a private 8" AWWA C-900 PVC water main. The private main will looped through the site and will tap the Commerce Place and Camp Road mains, the Camp Road tap will reuse the existing 8" fire service tap. Two 8" RPZs and meters will be installed inside insulated enclosures on site. Both enclosures will be located at their respective tap locations and be set back from the R.O.W. per Town zoning requirements. Electricity will be provided to these enclosures for heat, drainage from testing and failure will be via gravity to a nearby catch basin. The owner will be responsible for removing snow and debris from the discharge path.

Multi-Tenant Retail Buildings:
Each multi-tenant retail building will have a 6" AWWA C-900 PVC combined service tapped off the private 8" main. This service will split into a 2" Type "k" copper service and a 6" AWWA C-900 PVC fire service prior to entering the building. Each larger multi-tenant building will have multiple services, (1) one into each possible tenant space.

Single-Tenant Retail/Restaurant Buildings:
Each single-tenant retail building will have a 4" AWWA C-900 PVC combined service tapped off the private 8" main. This service will split into a 2" Type "k" copper service and a 4" AWWA C-900 PVC fire service prior to entering the building.

Private hydrants will also be installed throughout the site in order to provide fire protection within a maximum distance of 600' from each structure, as the hose is layed out.

Summary of domestic demand:

Peak Operating Demand:	218 gpm
Water Main:	Ex. 12" on Camp Rd & 8" on Commerce Pl
Static Pressure:	104 psi Camp Rd, 96 psi Commerce Pl (per ECWA)
Friction Loss:	0 psi
Loss through meter/RPZ:	13 psi
Elevation Loss:	0 psi
Pressure after meter/RPZ:	91 psi Camp Rd, 83 psi Commerce Pl

Summary of fire flow demand:

Peak Operating Demand:	1,490 gpm (@ furthest bldg. from tap)
Water Main:	Ex. 12" on Camp Rd & 8" on Commerce Pl
Static Pressure:	104 psi Camp Rd, 96 psi Commerce Pl (per ECWA)
Friction Loss:	23.2 psi
Loss through meter/RPZ:	13 psi
Elevation Loss:	0 psi
Pressure at base of riser:	67.8 psi

Repairs to all devices will be made during off hours, dual backflow preventers are not required. The site is not located in a 100-year flood plain.

Design of the sprinkler systems will be by others.

Disinfection of the water service following installation will be continuous feed, according to AWWA C-651, latest revision.

Sanitary Sewer

This proposed development will tie into the pubic sanitary sewer mains at several different points.

1. The retail buildings along the west (165,840 sf, 15,218 sf, 132,840 sf buildings) will have a private 8" SDR-35 PVC main at 0.4% minimum slope which will pick up these building laterals and tie into the 30" RCP sewer.
2. The buildings along the north and the outparcel (81,245 sf, 5,000 sf, 3,750 sf buildings) will reuse the existing 8" private sewer which ties into the 8" Camp Road main. Any new sewer installed will be 8" SDR-35 PVC main at 0.4% minimum slope.

3. The 155,996 sf building will have its lateral tie directly into the 30" RCP sewer.
4. The proposed hotel and its outparcel buildings (4,960 sf, 6,400 sf buildings) will have a private 8" SDR-35 PVC main at 0.4% minimum slope which will pick up these building laterals and tie into the 8" PVC main which extends from Commerce Place.
5. The grouping of outparcel buildings on the north side of Commerce Place (2-8,200 sf, 2-20,437 sf, 2-6,400 sf, 5,900 sf buildings) will have a private 8" SDR-35 PVC main at 0.4% minimum slope which will pick up these building laterals and tie into the 8" PVC main on Commerce Place.
6. The 5,600 sf building will have its lateral tie directly into the 8" PVC main which extends from Commerce Place.

Design Parameters

Shopping Center: 0.1 gal/day/sf
Q = 0.1 gal/day/sf x 652,815 sf = 65,282 gpd

Hotel: 120 gpd/room
Q = 120 gpd/room x 115 rooms = 13,800 gpd
Total = 79,082 gpd

Retail/Restaurant/Hotel Buildings:
Each single or multi-tenant retail building will have a 6" SDR-35 PVC lateral @ 1.0% min.

Each restaurant building will have a 6" SDR-35 PVC sanitary lateral. Each building will also have a 6" cast iron grease line exiting the building into a grease trap. 6" SDR-35 PVC will exit the grease trap and tie into the sanitary lateral prior to tapping the main. All piping shall be run at a slope of 1.0% minimum. Grease traps will be sized in accordance with NYSDEC regulations once individual tenants are known.

The hotel will have an 8" SDR-35 PVC lateral at 0.4% minimum slope. A grease trap sized in accordance with NYSDEC standards will be installed on any grease line which will be required.

The hydraulic loading rate is per "Design Standard for Wastewater Treatment Works" 1988, NYSDEC.

Respectfully submitted,

Carmina & Wood, P.C. Architecture and Engineering

R. Christopher Wood, PE
September 26, 2007
(Rev 12/12/07)

Water & Sewer Calcs

Carmina & Wood, P.C.

Architecture
Engineering
Interior Design

HAMBURG CROSSINGS

SANITARY & WATER CALCS

SANITARY:

652,815 GSF SHOPPING CENTER
115 ROOM HOTEL

Q = 0.1 GPD/SF FOR S.C.
Q = 120 GPD/RM FOR HOTEL

$Q = (652815 \times 0.1) + (115 \times 120) = 79,082$ GPD

* NOTE: PROPOSED RESTAURANT LOCATIONS ARE NOT KNOWN AT THIS TIME, GREASE TRAPS WILL BE INSTALLED WHEN LOCATION AND SIZE ARE DETERMINED

WATER:

* ASSUME 110% of SEWAGE

$Q = 1.1 \times 79082$ GPD $= 86,990$ GPD

* ASSUME 12 hr DAY AVG

$Q = 86990 \frac{GAL}{D} \frac{D}{12hr} \frac{hr}{60m} = 121$ GPM

* USE 1.8 PEAKING FACTOR

$Q_{PEAK} = 121 \times 1.8 = 218$ GPM

FIRE: 1490 GPM @ 50 PSI RESIDUAL

HEADLOSS (FIRE FLOW)

$L = 1600$ LF ±

$$h_L = \frac{10.44\, L\, Q^{1.85}}{C^{1.85} D^{4.866}} = \frac{10.44\,(1600)\,(1490)^{1.85}}{(140)^{1.85}\,(8)^{4.866}}$$

$= 53.5$ FT

$= 23.2$ PSI

FROM CAMP RD TAP

STATIC = 104 PSI
- 23.2 PSI
80.8 PSI

Δ ELEV ≈ 0 PSI

LOSS THROUGH METER ≈ 1.0 PSI

LOSS THROUGH PIPE ≈ 12.0 PSI

RESIDUAL = 80.8 - 1.0 - 12.0 = 67.8 PSI

:HI090 HYDRANT FLOW TEST PRINT ROUTINE RUN DATE 9/21/2007

MJP RESIDUAL HYDRANT: G17-H02 DATE: 9/20/2007 TIME: 13:00 PAGE 1

RESIDUAL HYDRANT
LOCATION.....: 5161 CAMP RD SIDE: E
1ST HYD N/O DARTMOUTH ST

TOWN OF HAMBURG
WATER DISTRICT: 012 SIZE OF MAIN: 12
FIRE DISTRICT.: 48027 SIZE BRANCH.: 6

PERFORMED BY: BM, RLS

COMMENTS....: HYDRANT FLOW TEST REQUESTED BY CHRISTOPHER WOOD
CARMINA & WOOD, PHONE: 842-3165, FAX: 842-0263

DISCHRGE COEF: .90
PRESSURE RDGS: ELVTN USGS(FT): .0 STATIC(PSI): 104 RESIDUAL(PSI): 78
TOTAL FLOW(GPM): 2,326 GALLONS USED: 6,960
REQUIRED RESIDUAL PRESSURE...: 20 FLOW AT REQD RESIDUAL PRESSURE.: 4,382

HYD FL NO	LOCATION OF FLOW HYDRANTS						
G17-H11A	5203 CAMP RD			1ST HYD N/O COMMERCE PL			
	TOWN OF HAMBURG SS: E						
NZLE	SIZE	PITOT	FLOW	WATER DST: 012	FIRE: 48027	SIZE MAIN: 12	BRCH: 6
1.	2.50	48.0	1,163	COMMENTS:			
2.	2.50	48.0	1,163				
3.			TOT FLOW:	2,326			

SAS RESIDUAL HYDRANT: G17-H36 DATE: 8/02/2007 TIME: 14:15 PAGE 1

RESIDUAL HYDRANT
LOCATION.....: COMMERCE PL SIDE: N
2ND HYD W/O CAMP RD

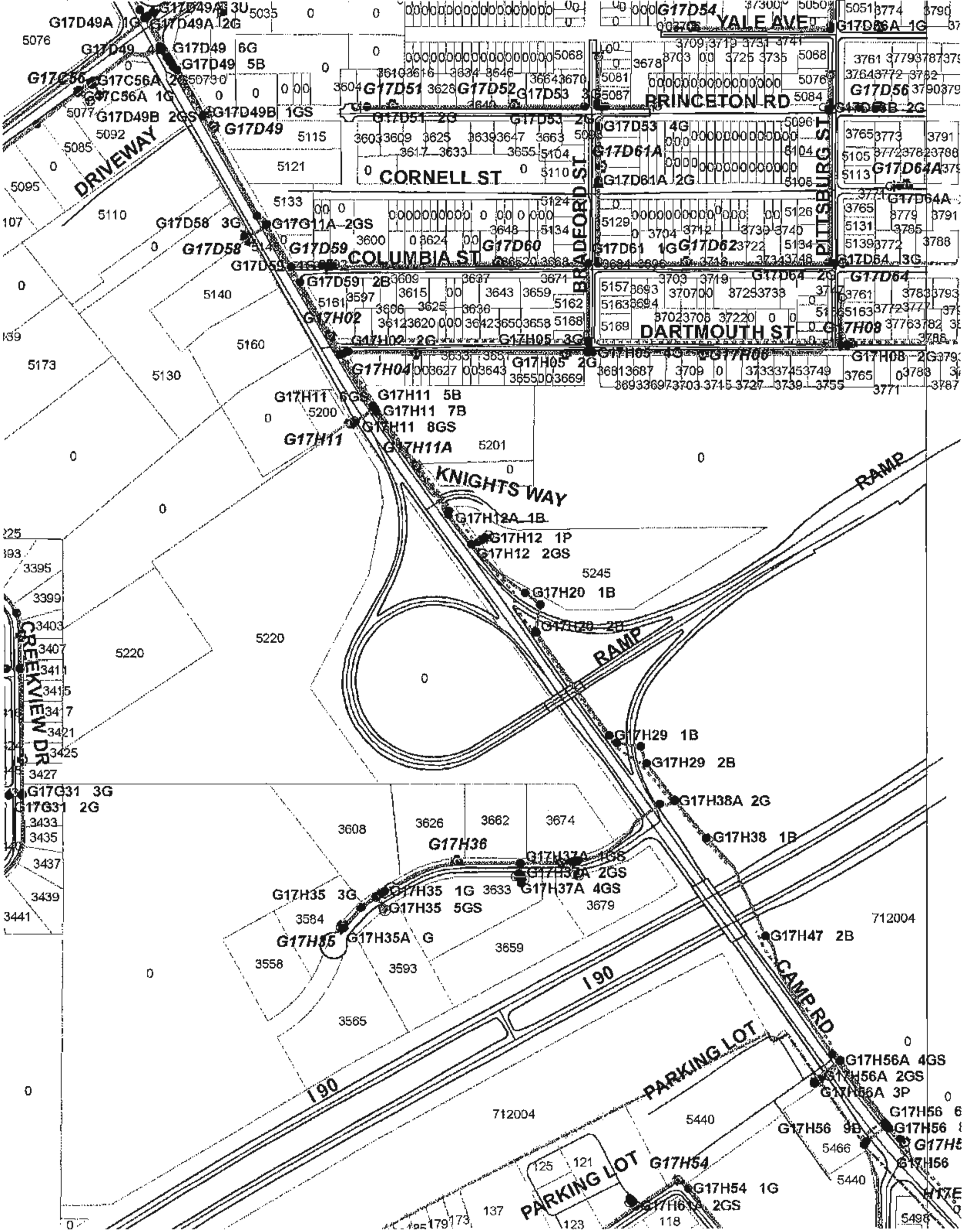
TOWN OF HAMBURG
WATER DISTRICT: 012 SIZE OF MAIN: 8
FIRE DISTRICT.: 99999 SIZE BRANCH.: 6

PERFORMED BY: BM, RLS

COMMENTS....: HYDRANT FLOW TEST REQUESTED BY TOM WIK, ECWA

DISCHRGE COEF: .90
PRESSURE RDGS: ELVTN USGS(FT): .0 STATIC(PSI): 96 RESIDUAL(PSI): 56
TOTAL FLOW(GPM): GALLONS USED: 5,520
REQUIRED RESIDUAL PRESSURE...: 20 FLOW AT REQD RESIDUAL PRESSURE.: 2,602

HYD FL NO	LOCATION OF FLOW HYDRANTS						
G17-H35	COMMERCE PL 3RD HYD SW/O CAMP RD TOWN OF HAMBURG SS: NW						
NZLE	SIZE	PITOT	FLOW	WATER DST: 849	FIRE: 48027	SIZE MAIN: 8	BRCH: 6
1.	2.50	30.0	920	COMMENTS:			
2.	2.50	30.0	920				
3.			TOT FLOW: 1,840				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CORNELL ST
COLUMBIA ST
DARTMOUTH ST
BRADFORD ST
PITTSBURG ST
DRIVEWAY
KNIGHTS WAY
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RAMP
CREEKVIEW DR
CAMP RD
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PARKING LOT
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G17D49A 1G
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G17H35 3G
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G17H35A G
G17H35
G17H47 2B
G17H56A 4GS
G17H56A 2GS
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G17H56 9B
G17H54
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G17H61A 2GS
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Storm Water Calcs

NYSDEC SPDES Calculation Sheet

Ref: NYSDEC Storm Water Management Design Manual

Project:	Hamburg Crossings	Project Area (ac):	10.40 ac
	Area to 24 inch pipe	Impervious Area (ac):	9.1 ac
Location:	Hamburg, NY	Greenspace (ac):	1.3 ac
Date:	9/26/2007		
Prepared by:	C. Wood		

Notes: **1.** NYSDEC requirements limit overland flow used in runoff calculations to 150 ft for the pre-development condition and 100 ft for the post-development condition **2.** soils on site consist of 100% C type soils

Existing Runoff Values (from TR-55):

			1yr	10yr	25yr	100yr
Area (ac):	8.6					
Tc (hr):	0.1					
CN:	94	Q (cfs)	19.32	36.72	n/a	51.61
		Volume (in.)	1.112	2.568	n/a	3.976

Proposed Runoff Values (from TR-55):

			1yr	10yr	25yr	100yr
Area (ac):	10.4					
Tc (hr):	0.132					
CN:	95	Q (cfs)	23.16	43.03	48.27	60
		Volume (in.)	1.238	2.74	3.226	4.229

1. Water Quality Volume (WQv):

WQv = P(Rv)A / 12

		P =	0.85 Buffalo
Percent Impervious, I =	87.5	=	0.85 Syracuse
Rv = 0.05 + 0.009 I	0.84	=	0.82 Rochester
90% Rainfall Event, P =	0.85 (from Figure 4.1)		

WQv = 0.62 ac-ft
26875 cf

Q (WQv) 24-hr = 0.31 cfs

Required Forebay Volume = 2687 cf min. (min. 10% of WQv)
Micropool Volume Required if 24hr = 5375 cf (20% of WQv if Micropool Extended Detention Pond is used)
extended detention is provided 26875 cf (100% of WQv if Wet Detention Pond is used)

2. Channel Protection (CPv):

Requirement: Provide 24 hour extended detention for the post-development, 1yr, 24 hr storm event

Post development 1yr volume = 46737 cf

Q (CPv) 24-hr = 0.54 cfs

Q (cpV) actual = 4.0 cfs (from outlet orfice calculation)

Detention time provided = 0.1 hrs

3. Overbank Flood Control (Qp):

Requirement: provide storage to attenuate the post-development 10yr, 24 hr peak

Pre-Development 10 yr volume =	80168 cf
Post-Development 10 yr volume =	103440 cf
Required Volume =	23273 cf
	0.534 ac-ft

Qp = 36.72 cfs

4. Extreme Flood Control (Qf):

Requirement: provide storage to attenuate the post-development 100yr, 24 hr peak

Pre-Development 100 yr volume =	124123 cf
Post-Development 100 yr volume =	159653 cf
Required Volume =	35530 cf
	0.816 ac-ft

Qf = 51.61 cfs

5. Municipality Requirement:

Requirement: provide storage to attenuate the post-development 25yr storm to pre-

Pre-Development 10 yr volume =	80168 cf
Post-Development 25 yr volume =	121788 cf
Required Volume =	41620 cf
	0.955 ac-ft

Qf = 36.72 cfs

NYSDEC SPDES Calculation Sheet

Ref: NYSDEC Storm Water Management Design Manual

Project:	Hamburg Crossings Area to Berricks Creek	Project Area (ac): Impervious Area (ac):	53.50 ac 45.7 ac
Location:	Hamburg, NY	Greenspace (ac):	7.8 ac
Date:	9/26/2007		
Prepared by:	C. Wood		

Notes: **1.** NYSDEC requirements limit overland flow used in runoff calculations to 150 ft for the pre-development condition and 100 ft for the post-development condition **2.** soils on site consist of 79% C type and 21% D type soils

Existing Runoff Values (from TR-55):

			1yr	10yr	25yr	100yr
Area (ac):	15.9					
Tc (hr):	0.604					
CN:	70	Q (cfs)	2.18	12.14	n/a	23.7
		Volume (in.)	0.127	0.945	n/a	1.943

Proposed Runoff Values (from TR-55):

			1yr	10yr	25yr	100yr
Area (ac):	53.5					
Tc (hr):	0.329					
CN:	95	Q (cfs)	90.89	169.14	189.96	236.24
		Volume (in.)	1.568	3.031	3.425	4.316

1. Water Quality Volume (WQv):

WQv = P(Rv)A / 12

		P =	0.85 Buffalo
Percent Impervious, I =	85.4	=	0.85 Syracuse
Rv = 0.05 + 0.009 I	0.82	=	0.82 Rochester
90% Rainfall Event, P =	0.85 (from Figure 4.1)		

WQv = 3.10 ac-ft
135160 cf

Q (WQv) 24-hr = 1.56 cfs

Required Forebay Volume = 13516 cf min. (min. 10% of WQv)
Micropool Volume Required if 24hr = 27032 cf (20% of WQv if Micropool Extended Detention Pond is used)
extended detention is provided 135160 cf (100% of WQv if Wet Detention Pond is used)

2. Channel Protection (CPv):

Requirement: Provide 24 hour extended detention for the post-development, 1yr, 24 hr storm event

Post development 1yr volume = 304513 cf

Q (CPv) 24-hr = 3.52 cfs

Q (cpV) actual = 4.0 cfs (from outlet orfice calculation)

Detention time provided = 0.9 hrs

3. Overbank Flood Control (Qp):

Requirement: provide storage to attenuate the post-development 10yr, 24 hr peak

Pre-Development 10 yr volume =	54543	cf
Post-Development 10 yr volume =	588635	cf
Required Volume =	534093	cf
	12.261	ac-ft

Qp = 12.14 cfs

4. Extreme Flood Control (Qf):

Requirement: provide storage to attenuate the post-development 100yr, 24 hr peak

Pre-Development 100 yr volume =	112144	cf
Post-Development 100 yr volume =	838189	cf
Required Volume =	726045	cf
	16.668	ac-ft

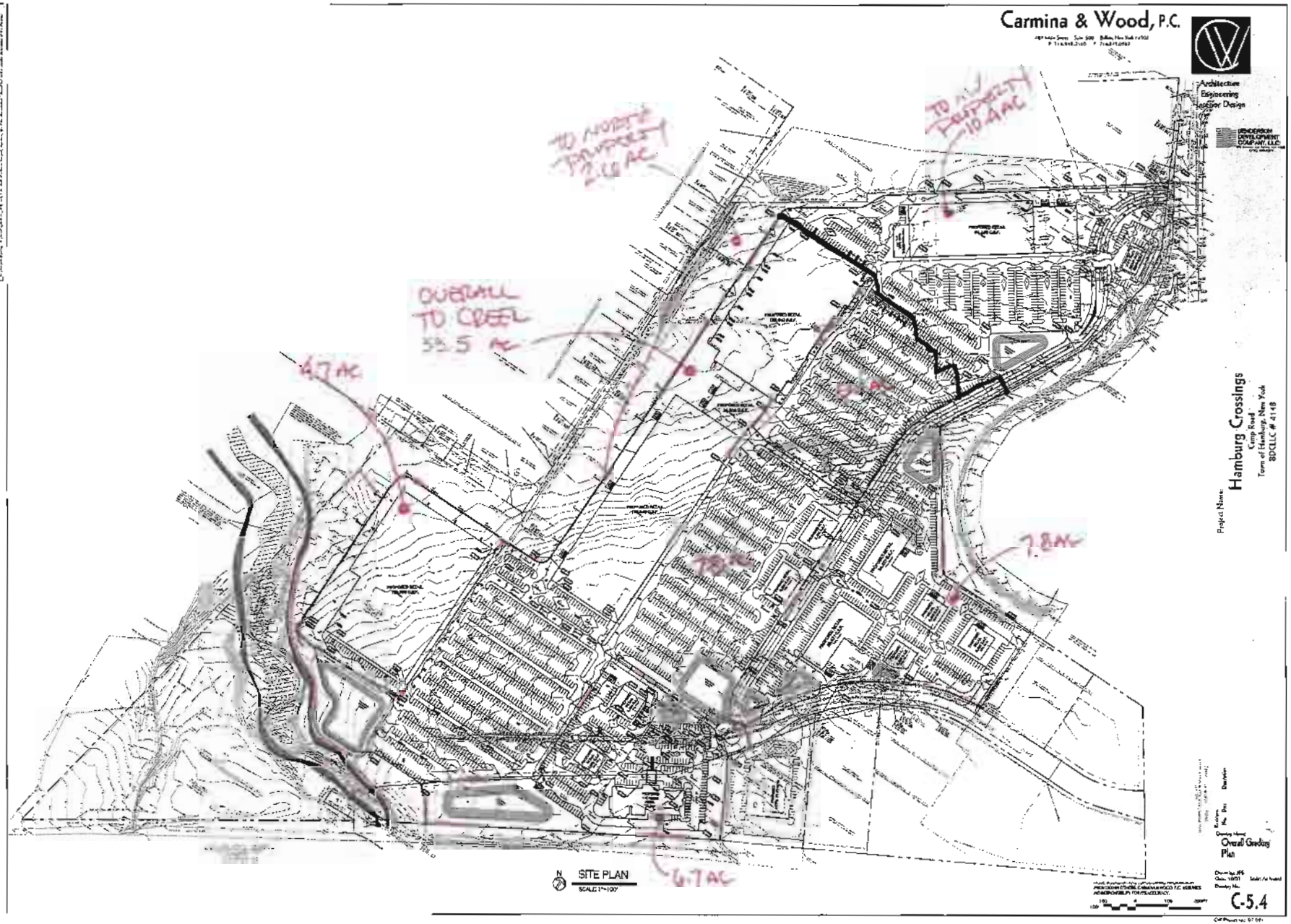
Qf = 23.7 cfs

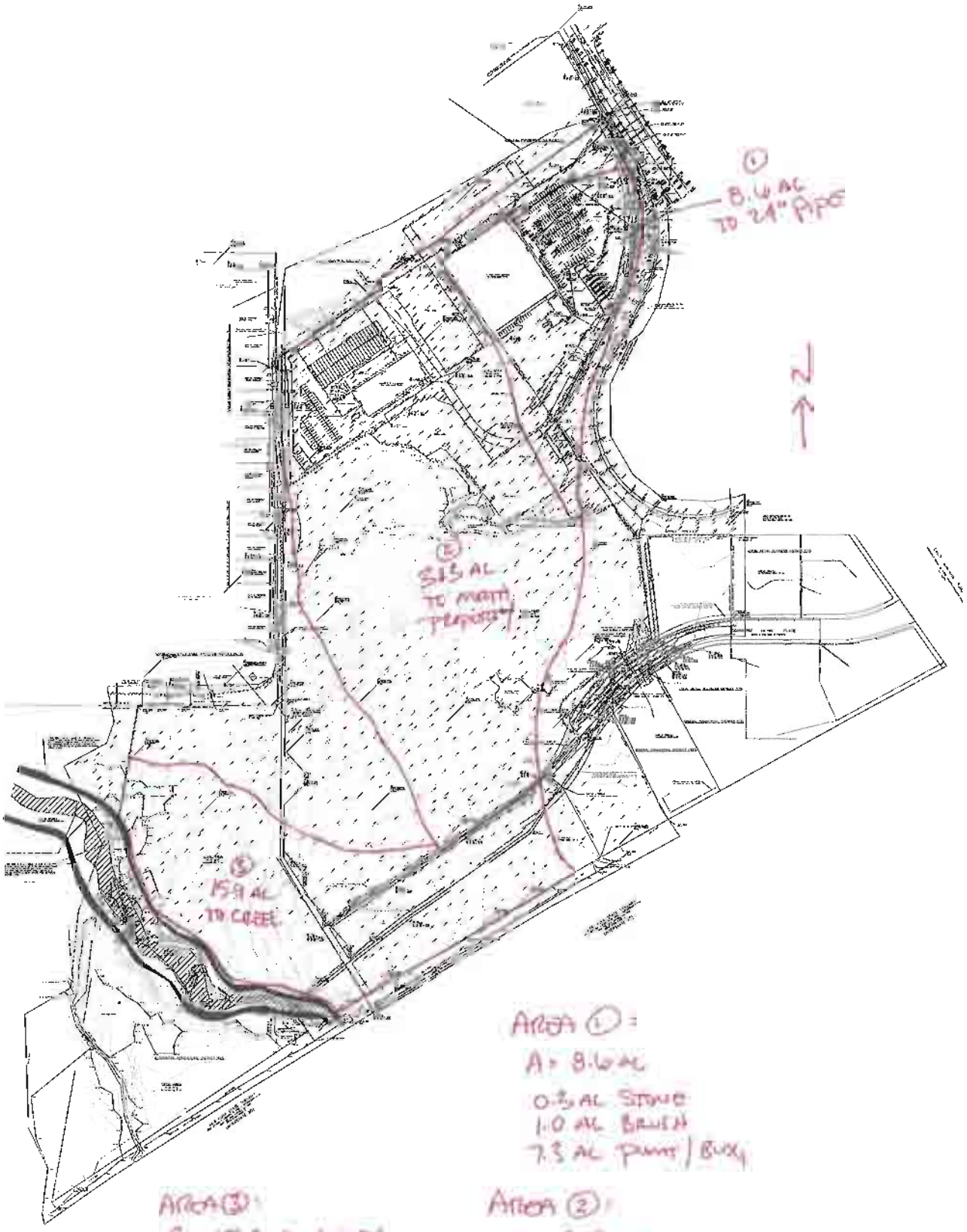
5. Municipality Requirement:

Requirement: provide storage to attenuate the post-development 25yr storm to pre-

Pre-Development 10 yr volume =	54543	cf
Post-Development 25 yr volume =	665152	cf
Required Volume =	610610	cf
	14.018	ac-ft

Qf = 12.14 cfs


Carmina & Wood, P.C.
Architecture
Engineering
Interior Design
TO NORTH PROPERTY 2.6 AC
TO ALL PROPERTY 10.4 AC
OVERALL TO CREEK 55.5 AC
4.7 AC
7.8 AC
6.7 AC
SITE PLAN
Project Name:
Hamburg Crossings
Camp Road
Town of Hamburg, New York
BDCLLC # 4148
Overall Grading Plan
C-5.4



AREA ① =
A = 8.6 AC
0.3 AC STONE
1.0 AC BRUSH
7.3 AC PAVE / BLDG

AREA ③:
A = 15.9 AC WOODS

AREA ②:
A = 31.5 AC
3.6 AC STONE
7.4 AC PAVE
20.3 AC WOODS