STORMWATER MANAGEMENT SUMMARY

RICHARDSON CROSSING
113 Central Street, Acton, MA
June 19, 2009
6729

EXISTING RUNOFF PATTERNS

The site is located on the northerly side of Central Street immediately to the east of the intersection of Central Street and the Commuter Rail train tracks and currently consists of a single family residence with a detached garage. The property is bounded on the north by an apartment complex located at 117 Central Street and on the eastern and southern property lines by residential properties.

There are no wetland resource areas located on the property and the site is located above the 500 year flood zone elevation as referenced on FIRM Map, Community Panel 250176-0003 C, dated January 6, 1988. Topography at the site slopes gently to moderately from a high elevation located in the northern portion of the property to a low elevation along the property frontage adjacent to Central Street. Surface characteristics of the property are mostly wooded, with small amounts of grassy lawn surfaces and impervious surfaces consisting of roof and a driveway.

Currently surface runoff collects and flows in a north to south direction towards Central Street. There are no point source discharges.

SURFICIAL GEOLOGY

The site is shown to be located on a drumlin (USGS 1948) and soils consisted of till soils containing ground rock fragments ranging from silt size particles to boulders.

STORMWATER MANAGEMENT SYSTEM

The proposed stormwater collection system for the project consists of a series of deep sump hooded catch basins, interceptor drains, piping/cleanout network and subsurface recharge areas. The stormwater collection system and recharge areas have been sized accordingly to collect, store and recharge the projected increase in runoff volume at the site for a 10-year Type III storm event (see Recharge for Post-Development Drainage calculation sheet). There is a slight increase in the rate of runoff for the proposed project, however the increase is minimal and should have no impact on downstream flooding.

The stormwater management system utilizes areas known to be suitable for subsurface recharge for the recharge chambers which were selected to allow the design of a stormwater management system that could increase recharge to the local aquifer, minimize the impacts of stormwater runoff as well as providing water quality treatment for runoff from the proposed driveway area.

STORMWATER MANAGEMENT SUMMARY

RICHARDSON CROSSING
113 Central Street, Acton, MA
June 19, 2009
6729

The proposed stormwater management system collects surface runoff through the deep sump hooded catch basins and from the interceptor trenches located on the site and recharges runoff on-site. Overflow occurring from the recharge areas exceeding storage volumes for storm events exceeding a 10 year storm discharge through the overflow pipe network at Central Street as currently occurs at the site.

RESULTS OF STORMWATER MODEL

As shown by the following results of the Recharge for Post-Development Drainage calculation sheet and information from the HydroCad computer analysis; insignificant increases in the rate and volume of runoff occur and should have no effect on down stream flooding effects.

METHODOLOGY FOR STORMWATER CALCULATIONS

Calculations were performed based on TR-20 methods with a computer model created with the use of HydroCAD software [Version 8].

A complete data sheets for the model is included as well as the results of the HydroCAD modeling.

Acton Survey & Engineering, Inc.
P.O. Box 666, 97 Great Rd. #6, Acton, MA 01720
Phone: (978) 263-3666 Fax: (978) 635-0218
Email: actonsurvey@verizon.net

6729 W161
WESTCHESTER HOMES
113 CENTRAL ST - ACTON

DRAINAGE CALCS - 12/23/08

ENTIRE SITE
PRE - to Central Street
POST - to Central Street

STORM FREQ	PRE Q (cfs)	POST Q (cfs)	ΔQ (cfs)	PRE Vol (acre-ft)	POST Vol (acre-ft)	ΔVol (acre-ft)
2	1.11	1.43	0.32	0.090	0.110	0.020
10	2.18	2.60	0.42	0.173	0.200	0.027
25	2.82	3.30	0.48	0.225	0.255	0.030
100	3.82	4.35	0.53	0.306	0.340	0.034

NOTE: Does not include attenuation by any recharge trenches
*** SEE HAND CALCS ***

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Acton, MA 01720-0666
(978) 263-3666 Fax (978) 635-0218
Email: actonsurvey@verizon.net

JOB 6729 W161 113 Central St., Acton
SHEET NO. 1 OF
CALCULATED BY BDA DATE 12/23/08
CHECKED BY DATE
SCALE

RECHARGE for POST-DEVELOPMENT DRAINAGE

SOILS ARE PAXTON FINE SANDY LOAM

USE INFILTRATION RATE = $1.02 \frac{IN}{hr}\left(\frac{1 FT}{12 IN}\right) = 0.085 \frac{FT}{hr}$

PER DEP TS 00-01

SIZE REQ'D

10-YR $\Delta VOL = 0.027 AC\text{-}FT\left(\frac{43,560 SF}{AC}\right) = 1176 CF$

$$\frac{1176 CF}{\left(0.085 \frac{FT}{HR}\right) \times 24 HR} = \boxed{576 SF \text{ REQ'D}}$$

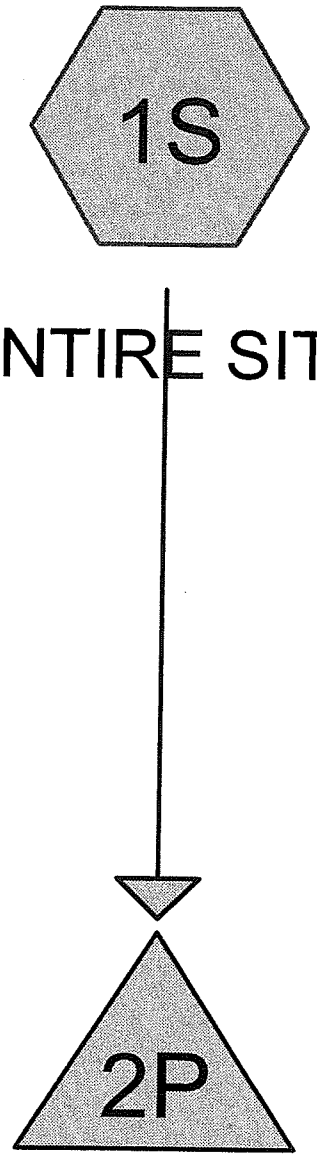
USE CULTEC CONTACTOR 100's

RECHARGE #1,2: $2W \times 3L = 6.5' \times 22.5' = 146 SF \times 2 = 292 SF$

RECHARGE #3-6: $2W \times 2L = 6.5' \times 15' = 97 SF \times 4 = 388 SF$ +

$\boxed{680 SF \text{ PROVIDED}}$

RECHARGE #7: $2W \times 2L = 6.5' \times 15' = 97 SF$



6-14-09

COMMONWEALTH OF MASSACHUSETTS
MARK
DONOHOE
CIVIL
No. 27142
REGISTERED
PROFESSIONAL ENGINEER

Subcat Reach Pond Link

Drainage Diagram for 6729-PRE
Prepared by {enter your company name here} 6/18/2009

Area Listing (all nodes)

Area (acres)	CN	Description (subcats)
0.583	73	Woods, Fair, HSG C (1S)
0.247	79	50-75% Grass cover, Fair, HSG C (1S)
0.146	98	Paved parking & roofs (1S)
0.976		

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: ENTIRE SITE Runoff Area=42,536 sf Runoff Depth>1.10"
Flow Length=228' Tc=11.4 min CN=78 Runoff=1.11 cfs 0.090 af

Pond 2P: CENTRAL STREET Inflow=1.11 cfs 0.090 af
Primary=1.11 cfs 0.090 af

Total Runoff Area = 0.976 ac Runoff Volume = 0.090 af Average Runoff Depth = 1.10"
85.02% Pervious Area = 0.830 ac 14.98% Impervious Area = 0.146 ac

Subcatchment 1S: ENTIRE SITE

Runoff = 1.11 cfs @ 12.17 hrs, Volume= 0.090 af, Depth> 1.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 002 yr Rainfall=3.10"

Area (sf)	CN	Description
6,372	98	Paved parking & roofs
25,393	73	Woods, Fair, HSG C
10,771	79	50-75% Grass cover, Fair, HSG C
42,536	78	Weighted Average
36,164		Pervious Area
6,372		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	50	0.1300	0.14		**Sheet Flow, Through woods** Woods: Light underbrush n= 0.400 P2= 3.10"
4.3	50	0.0400	0.19		**Sheet Flow, Through lawn** Grass: Short n= 0.150 P2= 3.10"
0.7	55	0.0400	1.40		**Shallow Concentrated Flow, Through lawn** Short Grass Pasture Kv= 7.0 fps
0.5	73	0.2200	2.35		**Shallow Concentrated Flow, Through woods** Woodland Kv= 5.0 fps
11.4	228	Total			

Pond 2P: CENTRAL STREET

Inflow Area = 0.976 ac, Inflow Depth > 1.10" for Middlesex 002 yr event
Inflow = 1.11 cfs @ 12.17 hrs, Volume= 0.090 af
Primary = 1.11 cfs @ 12.17 hrs, Volume= 0.090 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: ENTIRE SITE Runoff Area=42,536 sf Runoff Depth>2.13"
Flow Length=228' Tc=11.4 min CN=78 Runoff=2.18 cfs 0.173 af

Pond 2P: CENTRAL STREET Inflow=2.18 cfs 0.173 af
Primary=2.18 cfs 0.173 af

Total Runoff Area = 0.976 ac Runoff Volume = 0.173 af Average Runoff Depth = 2.13"
85.02% Pervious Area = 0.830 ac 14.98% Impervious Area = 0.146 ac

Subcatchment 1S: ENTIRE SITE

Runoff = 2.18 cfs @ 12.16 hrs, Volume= 0.173 af, Depth> 2.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 010 yr Rainfall=4.50"

Area (sf)	CN	Description
6,372	98	Paved parking & roofs
25,393	73	Woods, Fair, HSG C
10,771	79	50-75% Grass cover, Fair, HSG C
42,536	78	Weighted Average
36,164		Pervious Area
6,372		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	50	0.1300	0.14		**Sheet Flow, Through woods** Woods: Light underbrush n= 0.400 P2= 3.10"
4.3	50	0.0400	0.19		**Sheet Flow, Through lawn** Grass: Short n= 0.150 P2= 3.10"
0.7	55	0.0400	1.40		**Shallow Concentrated Flow, Through lawn** Short Grass Pasture Kv= 7.0 fps
0.5	73	0.2200	2.35		**Shallow Concentrated Flow, Through woods** Woodland Kv= 5.0 fps
11.4	228	Total			

Pond 2P: CENTRAL STREET

Inflow Area = 0.976 ac, Inflow Depth > 2.13" for Middlesex 010 yr event
Inflow = 2.18 cfs @ 12.16 hrs, Volume= 0.173 af
Primary = 2.18 cfs @ 12.16 hrs, Volume= 0.173 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: ENTIRE SITE Runoff Area=42,536 sf Runoff Depth>2.76"
Flow Length=228' Tc=11.4 min CN=78 Runoff=2.82 cfs 0.225 af

Pond 2P: CENTRAL STREET Inflow=2.82 cfs 0.225 af
Primary=2.82 cfs 0.225 af

Total Runoff Area = 0.976 ac Runoff Volume = 0.225 af Average Runoff Depth = 2.76"
85.02% Pervious Area = 0.830 ac 14.98% Impervious Area = 0.146 ac

Subcatchment 1S: ENTIRE SITE

Runoff = 2.82 cfs @ 12.16 hrs, Volume= 0.225 af, Depth> 2.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 025 yr Rainfall=5.30"

Area (sf)	CN	Description
6,372	98	Paved parking & roofs
25,393	73	Woods, Fair, HSG C
10,771	79	50-75% Grass cover, Fair, HSG C
42,536	78	Weighted Average
36,164		Pervious Area
6,372		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	50	0.1300	0.14		**Sheet Flow, Through woods** Woods: Light underbrush n= 0.400 P2= 3.10"
4.3	50	0.0400	0.19		**Sheet Flow, Through lawn** Grass: Short n= 0.150 P2= 3.10"
0.7	55	0.0400	1.40		**Shallow Concentrated Flow, Through lawn** Short Grass Pasture Kv= 7.0 fps
0.5	73	0.2200	2.35		**Shallow Concentrated Flow, Through woods** Woodland Kv= 5.0 fps
11.4	228	Total			

Pond 2P: CENTRAL STREET

Inflow Area = 0.976 ac, Inflow Depth > 2.76" for Middlesex 025 yr event
Inflow = 2.82 cfs @ 12.16 hrs, Volume= 0.225 af
Primary = 2.82 cfs @ 12.16 hrs, Volume= 0.225 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: ENTIRE SITE Runoff Area=42,536 sf Runoff Depth>3.76"
Flow Length=228' Tc=11.4 min CN=78 Runoff=3.82 cfs 0.306 af

Pond 2P: CENTRAL STREET Inflow=3.82 cfs 0.306 af
Primary=3.82 cfs 0.306 af

Total Runoff Area = 0.976 ac Runoff Volume = 0.306 af Average Runoff Depth = 3.76"
85.02% Pervious Area = 0.830 ac 14.98% Impervious Area = 0.146 ac

Subcatchment 1S: ENTIRE SITE

Runoff = 3.82 cfs @ 12.16 hrs, Volume= 0.306 af, Depth> 3.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 100 yr Rainfall=6.50"

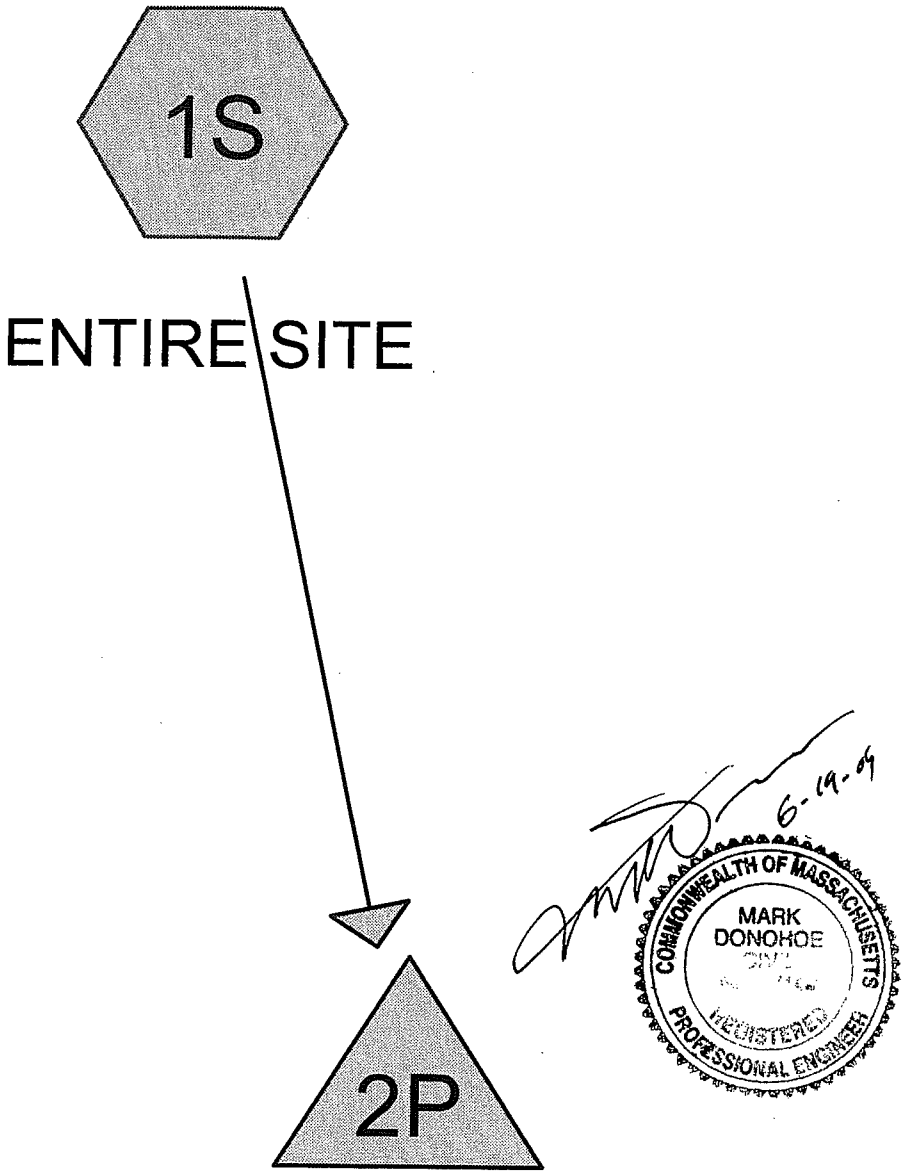
Area (sf)	CN	Description
6,372	98	Paved parking & roofs
25,393	73	Woods, Fair, HSG C
10,771	79	50-75% Grass cover, Fair, HSG C
42,536	78	Weighted Average
36,164		Pervious Area
6,372		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	50	0.1300	0.14		**Sheet Flow, Through woods** Woods: Light underbrush n= 0.400 P2= 3.10"
4.3	50	0.0400	0.19		**Sheet Flow, Through lawn** Grass: Short n= 0.150 P2= 3.10"
0.7	55	0.0400	1.40		**Shallow Concentrated Flow, Through lawn** Short Grass Pasture Kv= 7.0 fps
0.5	73	0.2200	2.35		**Shallow Concentrated Flow, Through woods** Woodland Kv= 5.0 fps
11.4	228	Total			

Pond 2P: CENTRAL STREET

Inflow Area = 0.976 ac, Inflow Depth > 3.76" for Middlesex 100 yr event
Inflow = 3.82 cfs @ 12.16 hrs, Volume= 0.306 af
Primary = 3.82 cfs @ 12.16 hrs, Volume= 0.306 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs



6-19-09

COMMONWEALTH OF MASSACHUSETTS
MARK DONOHOE
REGISTERED PROFESSIONAL ENGINEER

Subcat Reach Pond Link

Drainage Diagram for 6729-POST
Prepared by {enter your company name here} 6/18/2009
HydroCAD® 8.00 s/n 000857 © 2006 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcats)
0.667	74	>75% Grass cover, Good, HSG C (1S)
0.310	98	Paved parking & roofs (1S)
0.976		

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: ENTIRE SITE Runoff Area=42,536 sf Runoff Depth>1.35"
Tc=10.0 min CN=82 Runoff=1.43 cfs 0.110 af

Pond 2P: CENTRAL STREET Inflow=1.43 cfs 0.110 af
Primary=1.43 cfs 0.110 af

Total Runoff Area = 0.976 ac Runoff Volume = 0.110 af Average Runoff Depth = 1.35"
68.29% Pervious Area = 0.667 ac 31.71% Impervious Area = 0.310 ac

Subcatchment 1S: ENTIRE SITE

Runoff = 1.43 cfs @ 12.15 hrs, Volume= 0.110 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 002 yr Rainfall=3.10"

Area (sf)	CN	Description
13,488	98	Paved parking & roofs
29,048	74	>75% Grass cover, Good, HSG C
42,536	82	Weighted Average
29,048		Pervious Area
13,488		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, over entire site**

Pond 2P: CENTRAL STREET

Inflow Area = 0.976 ac, Inflow Depth > 1.35" for Middlesex 002 yr event
Inflow = 1.43 cfs @ 12.15 hrs, Volume= 0.110 af
Primary = 1.43 cfs @ 12.15 hrs, Volume= 0.110 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: ENTIRE SITE Runoff Area=42,536 sf Runoff Depth>2.46"
Tc=10.0 min CN=82 Runoff=2.60 cfs 0.200 af

Pond 2P: CENTRAL STREET Inflow=2.60 cfs 0.200 af
Primary=2.60 cfs 0.200 af

Total Runoff Area = 0.976 ac Runoff Volume = 0.200 af Average Runoff Depth = 2.46"
68.29% Pervious Area = 0.667 ac 31.71% Impervious Area = 0.310 ac

Subcatchment 1S: ENTIRE SITE

Runoff = 2.60 cfs @ 12.14 hrs, Volume= 0.200 af, Depth> 2.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 010 yr Rainfall=4.50"

Area (sf)	CN	Description
13,488	98	Paved parking & roofs
29,048	74	>75% Grass cover, Good, HSG C
42,536	82	Weighted Average
29,048		Pervious Area
13,488		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, over entire site**

Pond 2P: CENTRAL STREET

Inflow Area = 0.976 ac, Inflow Depth > 2.46" for Middlesex 010 yr event
Inflow = 2.60 cfs @ 12.14 hrs, Volume= 0.200 af
Primary = 2.60 cfs @ 12.14 hrs, Volume= 0.200 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: ENTIRE SITE Runoff Area=42,536 sf Runoff Depth>3.14"
Tc=10.0 min CN=82 Runoff=3.30 cfs 0.255 af

Pond 2P: CENTRAL STREET Inflow=3.30 cfs 0.255 af
Primary=3.30 cfs 0.255 af

Total Runoff Area = 0.976 ac Runoff Volume = 0.255 af Average Runoff Depth = 3.14"
68.29% Pervious Area = 0.667 ac 31.71% Impervious Area = 0.310 ac

Subcatchment 1S: ENTIRE SITE

Runoff = 3.30 cfs @ 12.14 hrs, Volume= 0.255 af, Depth> 3.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 025 yr Rainfall=5.30"

Area (sf)	CN	Description
13,488	98	Paved parking & roofs
29,048	74	>75% Grass cover, Good, HSG C
42,536	82	Weighted Average
29,048		Pervious Area
13,488		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, over entire site**

Pond 2P: CENTRAL STREET

Inflow Area = 0.976 ac, Inflow Depth > 3.14" for Middlesex 025 yr event
Inflow = 3.30 cfs @ 12.14 hrs, Volume= 0.255 af
Primary = 3.30 cfs @ 12.14 hrs, Volume= 0.255 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: ENTIRE SITE Runoff Area=42,536 sf Runoff Depth>4.18"
Tc=10.0 min CN=82 Runoff=4.35 cfs 0.340 af

Pond 2P: CENTRAL STREET Inflow=4.35 cfs 0.340 af
Primary=4.35 cfs 0.340 af

Total Runoff Area = 0.976 ac Runoff Volume = 0.340 af Average Runoff Depth = 4.18"
68.29% Pervious Area = 0.667 ac 31.71% Impervious Area = 0.310 ac

Subcatchment 1S: ENTIRE SITE

Runoff = 4.35 cfs @ 12.14 hrs, Volume= 0.340 af, Depth> 4.18"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 100 yr Rainfall=6.50"

Area (sf)	CN	Description
13,488	98	Paved parking & roofs
29,048	74	>75% Grass cover, Good, HSG C
42,536	82	Weighted Average
29,048		Pervious Area
13,488		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, over entire site**

Pond 2P: CENTRAL STREET

Inflow Area = 0.976 ac, Inflow Depth > 4.18" for Middlesex 100 yr event
Inflow = 4.35 cfs @ 12.14 hrs, Volume= 0.340 af
Primary = 4.35 cfs @ 12.14 hrs, Volume= 0.340 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

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JOB RICHARDSON CROSSING 6729

SHEET NO. 1 OF 1

CALCULATED BY MTD DATE 5-17-09

CHECKED BY DATE

SCALE

WATER BALANCE

COMMONWEALTH OF MASSACHUSETTS
MARC DOMENICHELLI
23461
REGISTERED PROFESSIONAL ENGINEER
6/17/09

SITE ALTERATIONS WILL REQUIRE REMOVAL OF MATURE PINES & OTHER TREES RESULTING IN A DECREASE IN EVAPO TRANSPIRATION (LOSS OF WATER TO ATMOSPHERE) — DECREASE IN LOSS

ON SITE RUNOFF IS CONTROLLED BY STORAGE AND RECHARGE TO GROUNDWATER FOR SMALL EVENTS — NO NET LOSS

WATER IS SUPPLIED BY AWD AND SEWAGE DISPOSAL IS ON SITE

9 NEW BEDROOMS @ 70 GPD/BEDROOM = 630 GPD (AUG DAY)

630 × 365 / 7.48 = 31,000 CUBIC FEET / YEAR — GAIN

NOTE: 31,000 CF/GAIN = 9" OF RAINFALL ON SITE
31,000 / 13,500 SF IMPERVIOUS = 2.3' ON IMP SURFACES

CONCLUSION BY INSPECTION THERE IS A GAIN IN RECHARGE AND THE REQUIREMENTS OF 4.3.6.2 ARE MET

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Email: actonsurvey@verizon.net

JOB RICHARDSON CROSSING

SHEET NO. 1 OF 2

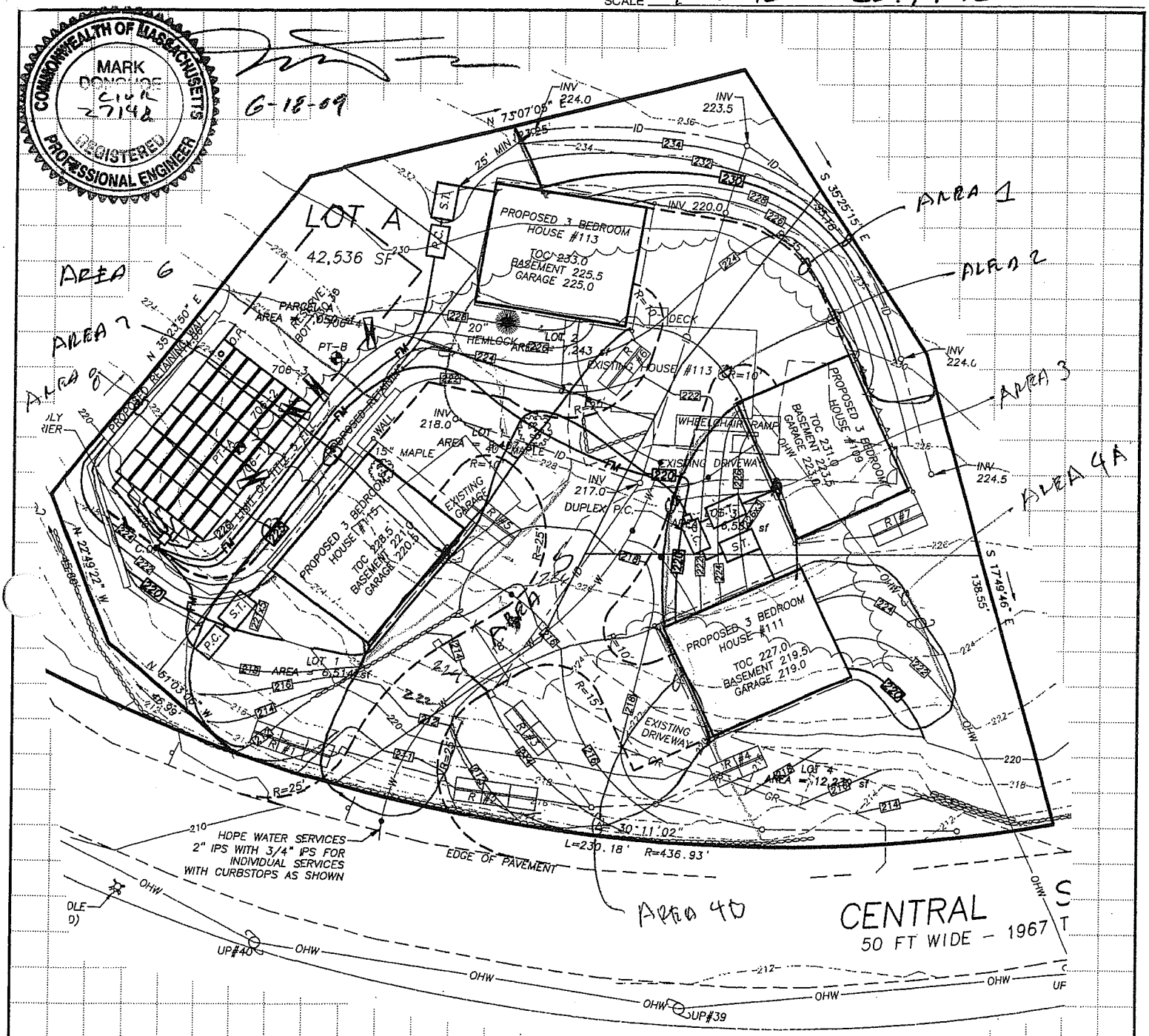
CALCULATED BY MTO DATE 6-19-09

CHECKED BY _____ DATE _____

SCALE 1" = 40' CUT/FILL

COMMONWEALTH OF MASSACHUSETTS
MARK DONOHOE
CIVIL
27148
REGISTERED
PROFESSIONAL ENGINEER

6-18-09



PURPOSE OF ESTIMATE IS TO DETERMINE QUANTITIES OF MATERIALS TO ALLOW FOR JUDGEMENT OF EXTENT OF CONSTRUCTION ACTIVITIES AND TRAFFIC - ESTIMATES SHALL NOT BE USED AS BASIS OF BIDS OR FOR CONSTRUCTION

Acton Survey & Engineering, Inc.
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(978) 263-3666 Fax (978) 635-0218
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JOB RICHARDSON CROSSING 6729
SHEET NO. 2 OF 3
CALCULATED BY MB DATE 6-19-09
CHECKED BY DATE
SCALE

PROCESSED MATERIALS

DRIVEWAY BASE (1.1 SHRINKAGE FACTOR)

8000 X 0.75/27 = 250 CY

TITLE 5 SAND

2400 X 4/27 = 400 CY

FOUNDATIONS DRIPLINE - INTERCEPTION

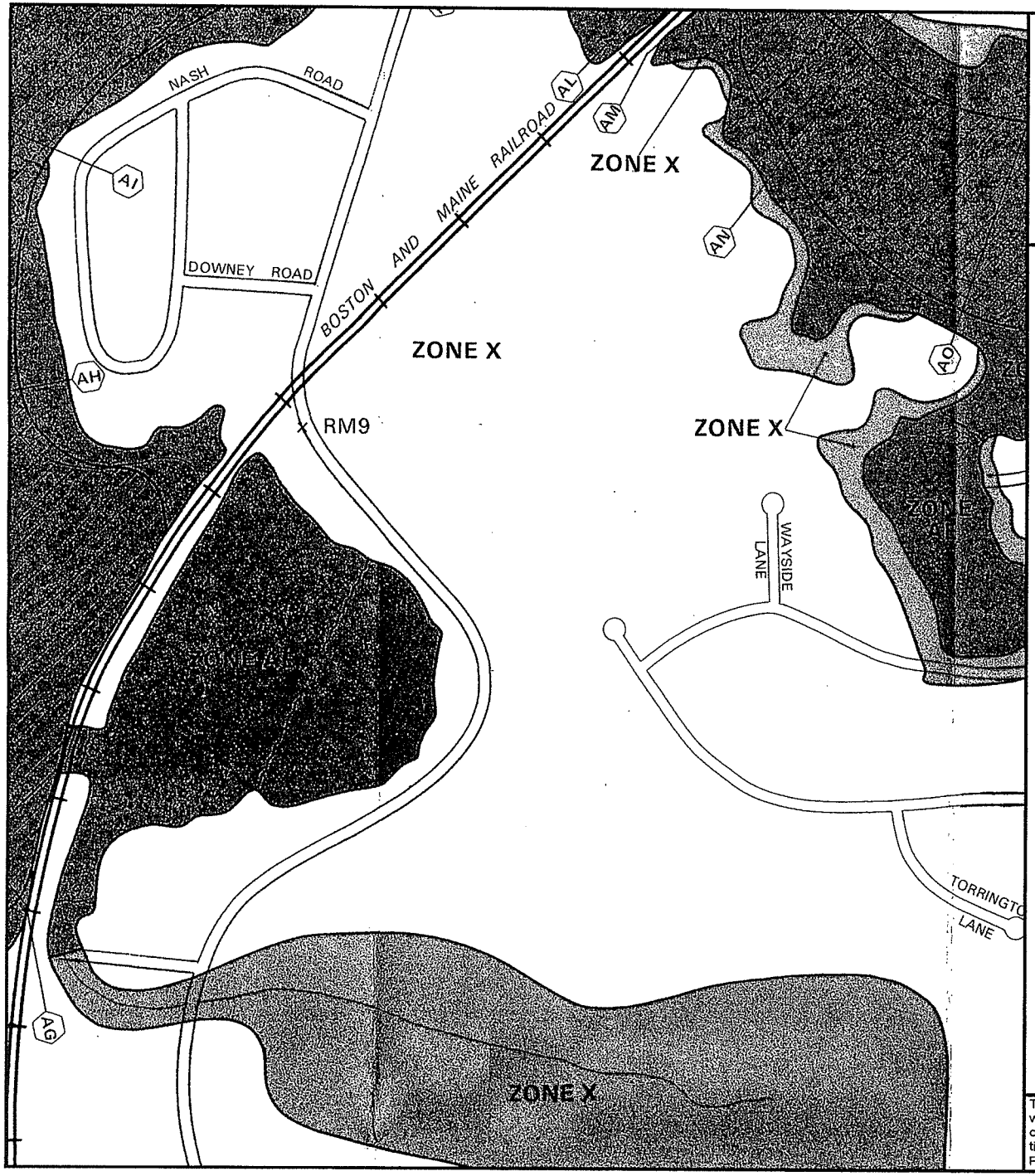
4 X 14.00 X 1 + = 250 CY

160 X 10 = SAY 100

Σ SAY 1,000 CY

CUT & FILLS

AREA	SF X DEPTH	CUT	FILL
1	1800 X 6	400	
2	4500 X 6	1000	
3	1200 X 3	150	
4A	2500 X 2.5	250	
4D	2700 X 4	400	
5	8001 X 8	2600	
6	1200 X 4	200	
7	4200 X 3.5	550	
		5551	MINOR



APPROXIMATE SCALE

400 0 400 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

TOWN OF
ACTON, MASSACHUSETTS
MIDDLESEX COUNTY

PANEL 3 OF 8
(SEE MAP INDEX FOR PANELS NOT PRINTED)

PANEL LOCATION

COMMUNITY-PANEL NUMBER
250176 0003 C

MAP REVISED:
JANUARY 6, 1988

Federal Emergency Management Agency