Stormwater Management in Arlington, Massachusetts

Presented by
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October 13, 2015

GALA SIMON ASSOCIATES, INC.
LEXINGTON, MA

Overview

- Arlington Bylaw
- Environmental Permitting
- Hydrologic Analysis
- Design Considerations
- Best Management Practices (BMP)
- Example Projects

Town Bylaw Title V; Article 15

Definitions

Stormwater:
Water which results from precipitation events and snowmelt.

Impervious Surface:
A surface that does not readily absorb or retain water, which prevents the infiltration of stormwater runoff.

Runoff:
Rainfall, snowmelt, or irrigation water flowing over the ground surface or directed through a pipe or culvert.

Runoff Rate:
The speed and volume of stormwater which flows over the surface.

Applicability

Previously undeveloped vacant lots:

- Proposed structure's building footprint + other impervious surfaces exceeds 500 square feet

Developed properties:

- Proposed alteration results in an increase to the impervious area of the lot by 350 square feet

Does not apply to private ways, owned in common with abutting lot owners, or that serve purposes similar to public ways

Requirements & Regulations

No project subject to this bylaw may increase the surface water runoff rate relative to the pre-development runoff rate.

Pre-development runoff rate $\leq$ **Post-development runoff rate**


Conservation

Local


TOWN
ELECTION
SATURDAY
APRIL 4th
POLLS OPEN
8am - 8pm
NAPA AUTO PARTS
781-646-4330
AUTO PARTS
verizon

Conservation Commission

Arlington, Massachusetts

When you must file:

- Work within 100 feet of wetland or pond
- Work within 200 feet of a river or stream
- Work in any area that may cause additional runoff into a wetland, river or stream

What you must file:

- Request for Determination of Applicability (RDA)

  or
- Notice of Intent (NOI)

Conservation Commission

When to file an RDA vs. NOI
Request for Determination of Applicability vs. Notice of Intent.

The Commission will require the filing of a Notice of Intent (instead of a Request for Determination of Applicability) when the Commission has jurisdiction and the proposed activity:

(a) is within 50 feet of a lake, stream, brook, pond, river, or wetland;
(b) is in an area with a moderate or steep slope;
(c) involves excavation, grading, or use of heavy equipment;
(d) involves stockpiling of materials or soils;
(e) extensive (more than 50%) removal of vegetation); or
(f) when a cumulative adverse impact occurs.

- Arlington Regulations for Wetlands Protection, Jan. 20, 2011, Section 8B (4).

Federal

Environmental Protection Agency (EPA)

<u>More than 1 acre is disturbed</u>

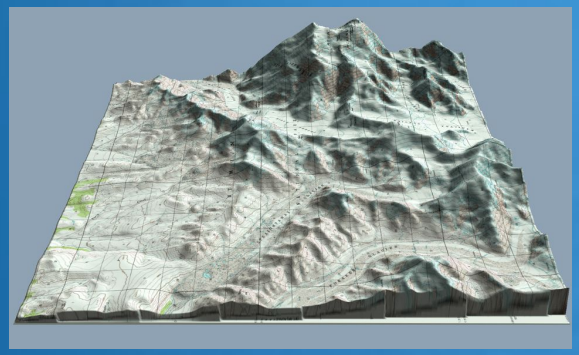
Must apply for **National Pollutant Discharge Elimination System (NPDES)** permit

Submit an eNOI @ https://cdx.epa.gov/

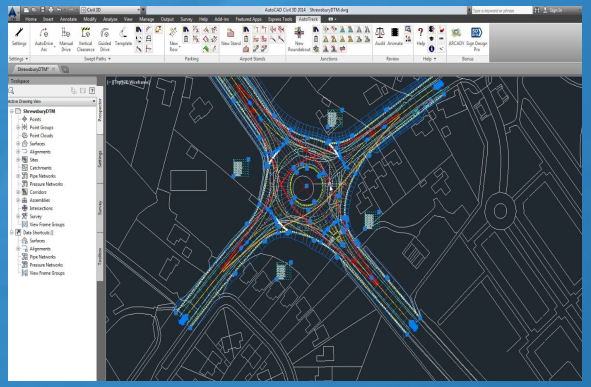
More info @ http://water.epa.gov/polwaste/npdes/basics/eNOI.cfm

Hydrologic Analysis 101

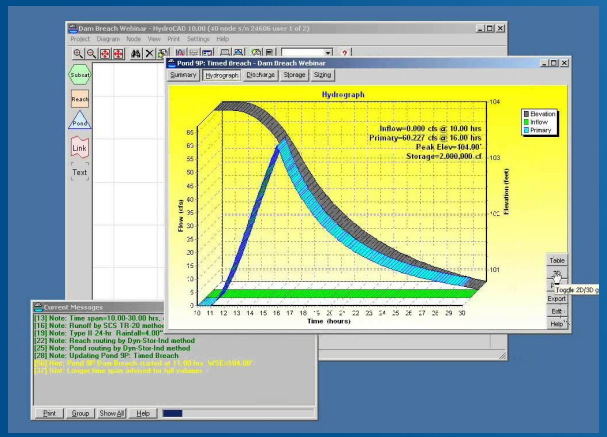
Soil/Percolation test

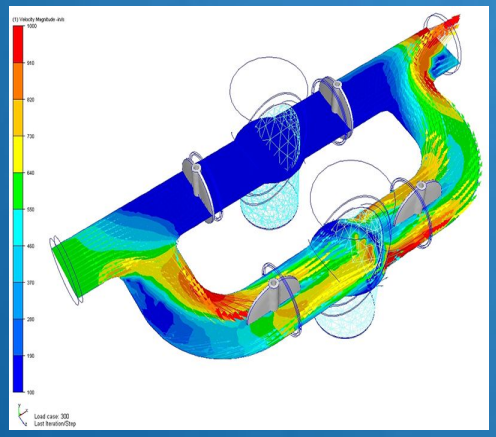


Topography



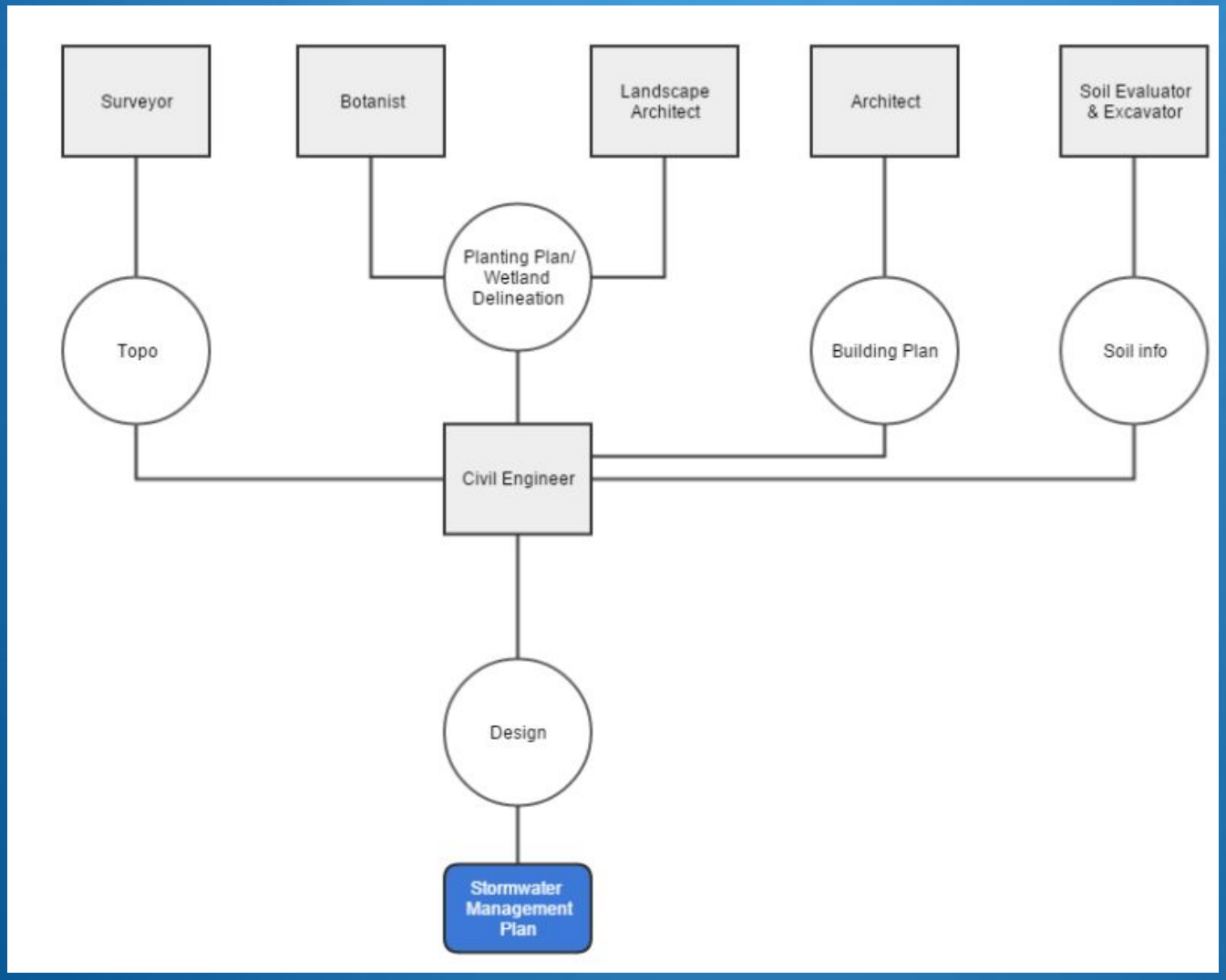
Drafting





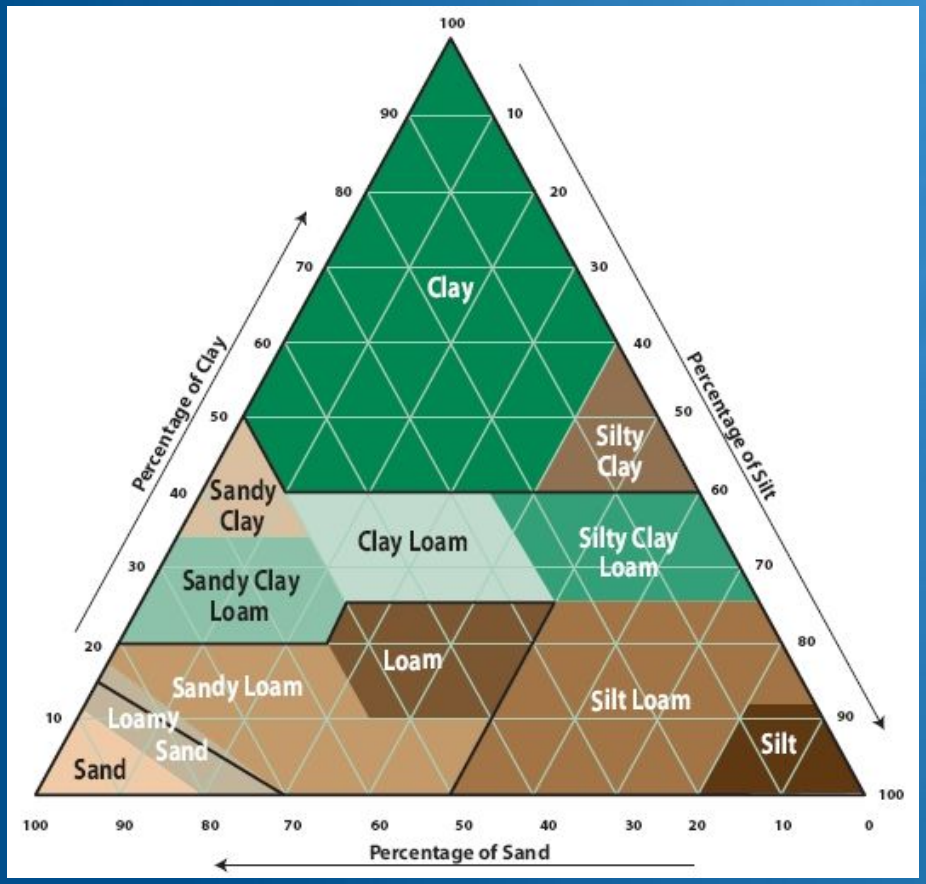
Modelling, Simulation & Analysis

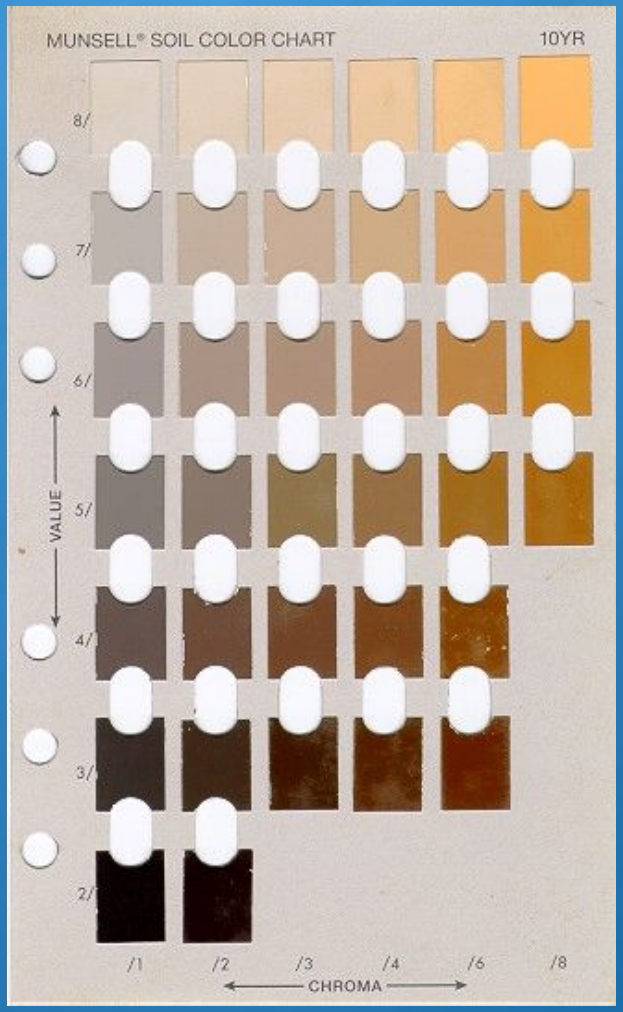
Process


Surveyor
Botanist
Landscape Architect
Architect
Soil Evaluator & Excavator
Planting Plan/ Wetland Delineation
Topo
Building Plan
Soil info
Civil Engineer
Design
Stormwater Management Plan

Soil Testing

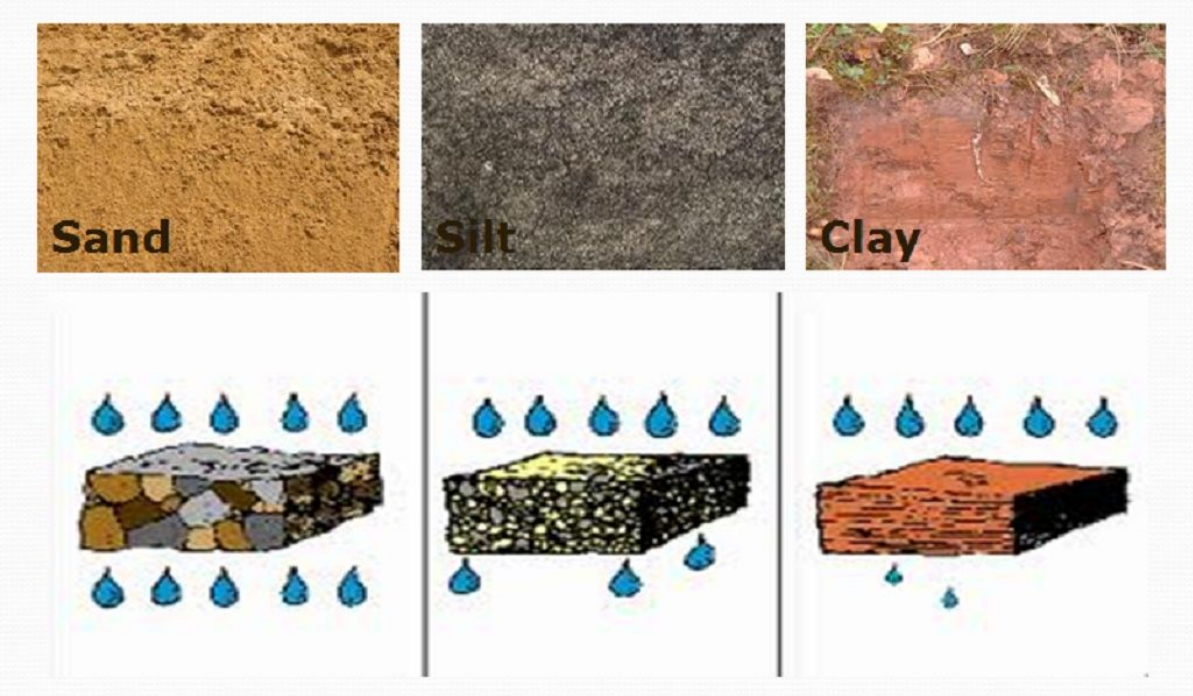
Texture





Soil Testing

Infiltration



Soil Testing

Groundwater level determination

Evaluator looks for signs of water, for example, soil mottling. Water itself may even be found.

Testing can be done at any time of the year

Soil Testing

National Resources Conservation Services (NRCS)
Soil Survey
http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

Soil Testing

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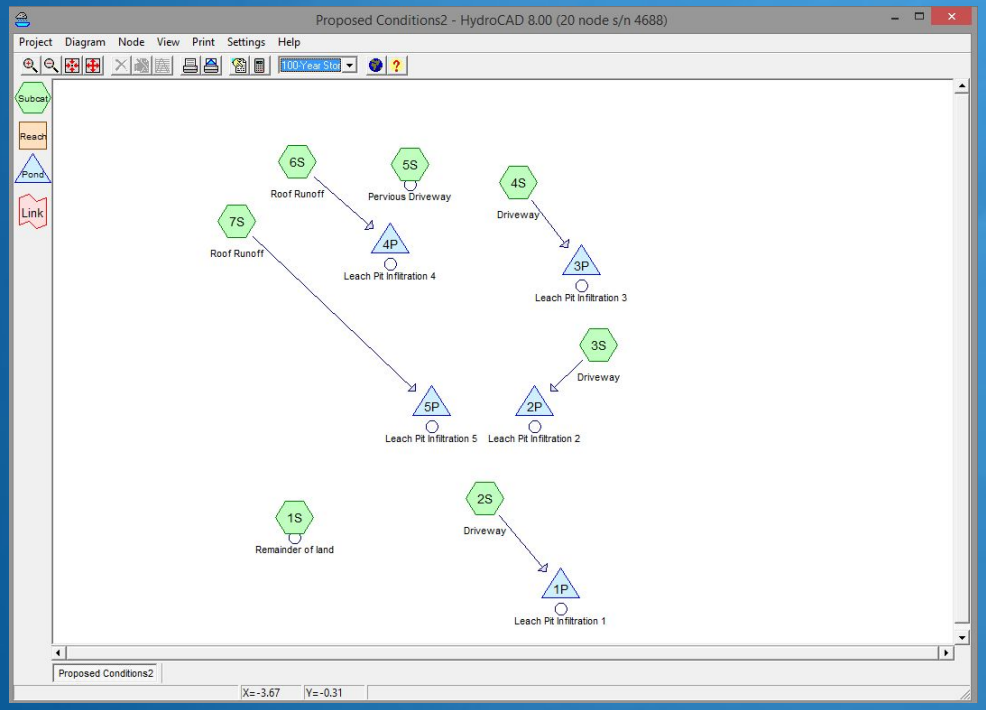
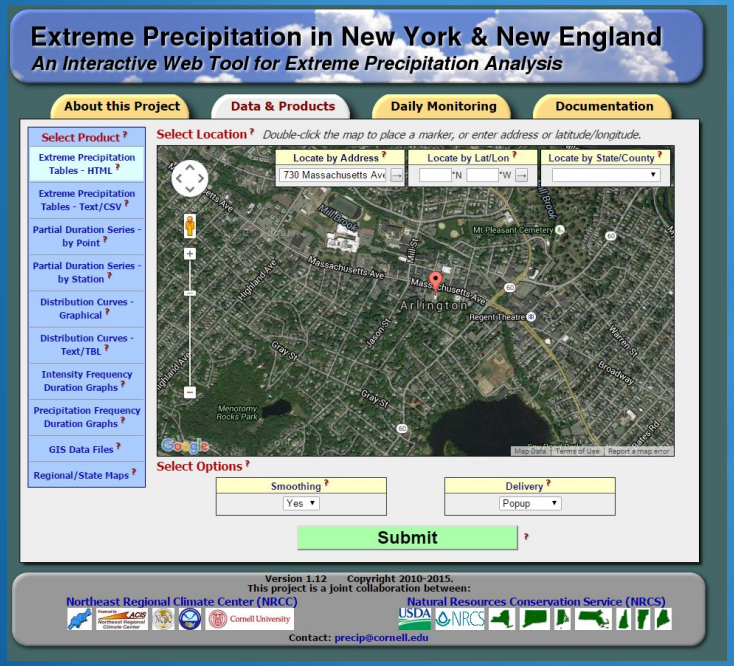
Numerical Analysis



A unique computer model is created for each individual site.

Numerical Analysis



http://precip.eas.cornell.edu/

The model is then put through a simulation of multiple storm events. Intensity of the events depends upon location.

Numerical Analysis

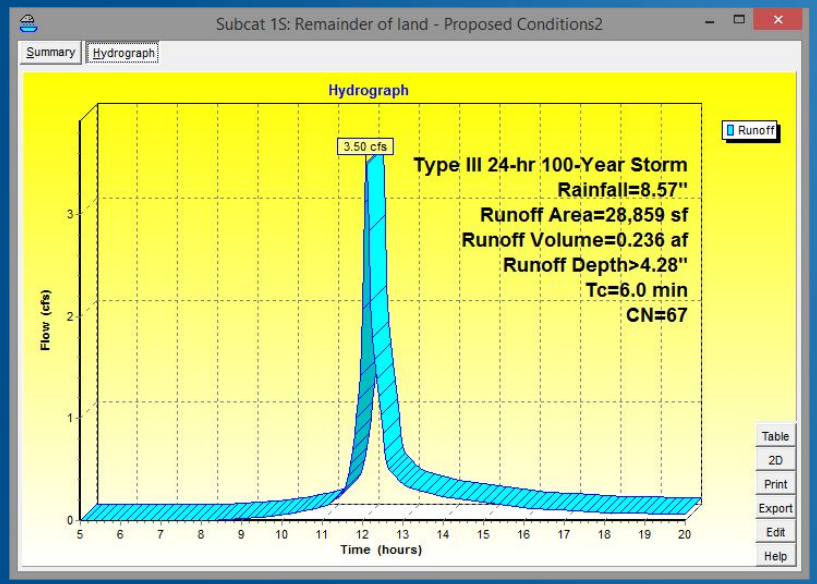
730 Massachusetts Ave
Arlington, MA 02476

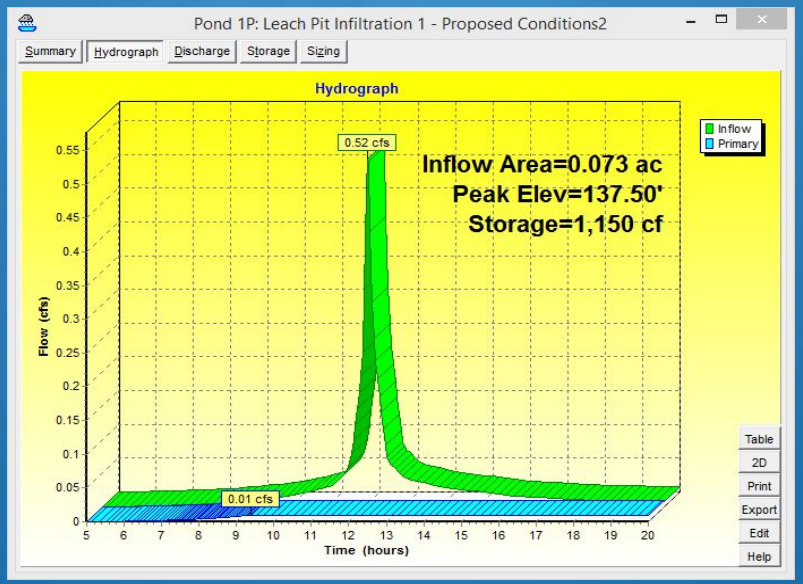
Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr
1yr	0.28	0.43	0.53	0.70	0.87	1.10	**1yr**	0.75	1.04	1.28	1.63	2.09	2.68	2.93
2yr	0.35	0.54	0.67	0.88	1.11	1.40	**2yr**	0.96	1.28	1.62	2.04	2.56	3.23	3.58
5yr	0.42	0.65	0.81	1.09	1.39	1.77	**5yr**	1.20	1.61	2.06	2.59	3.26	4.09	4.55
10yr	0.47	0.74	0.93	1.26	1.64	2.11	**10yr**	1.42	1.91	2.47	3.11	3.91	4.89	5.46
25yr	0.56	0.89	1.13	1.55	2.06	2.67	**25yr**	1.78	2.40	3.12	3.96	4.97	6.20	6.95
50yr	0.63	1.01	1.29	1.81	2.45	3.20	**50yr**	2.11	2.85	3.76	4.77	5.98	7.42	8.35
100yr	0.72	1.16	1.50	2.13	2.91	3.83	**100yr**	2.51	3.40	4.52	5.73	7.17	8.89	10.04
200yr	0.83	1.35	1.75	2.51	3.46	4.58	**200yr**	2.98	4.04	5.41	6.88	8.61	10.65	12.07
500yr	1.00	1.65	2.15	3.11	4.35	5.81	**500yr**	3.76	5.09	6.88	8.76	10.96	13.54	15.41

Numerical Analysis

The simulation accounts for runoff volume and velocity at varying points in the storm. The results show whether or not the system can contain the runoff even at the maximum point of the storm and whether or not runoff has been reduced or held the same as in pre-development.





Design Considerations

Pre & Post-development

Pre-Development

- Wetlands
- Floodplain
- Erosion control
- Groundwater table
- Basement floor elevation

Post-Development

- Inspection
- Operation & Maintenance
- As-Built Plan

Best Management Practices (BMP)

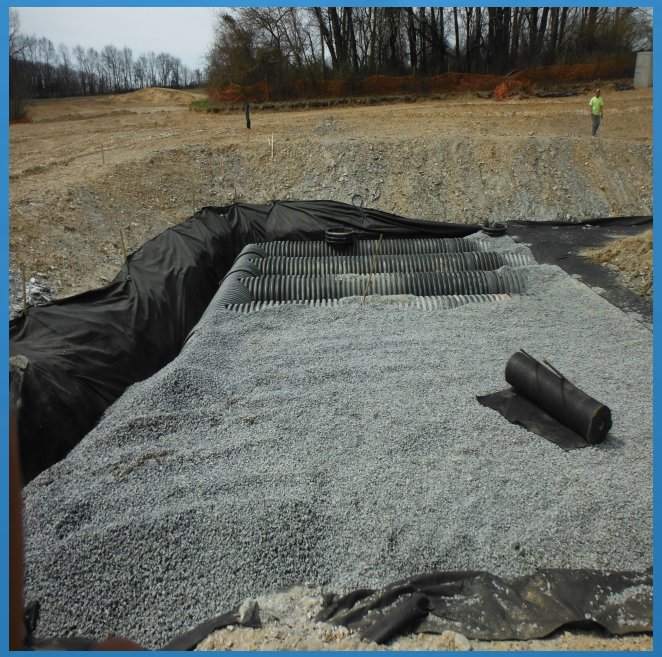
Options:

- Drywells
- Chambers
- Trenches
- Swales
- Rain gardens
- Permeable pavers

Drywells

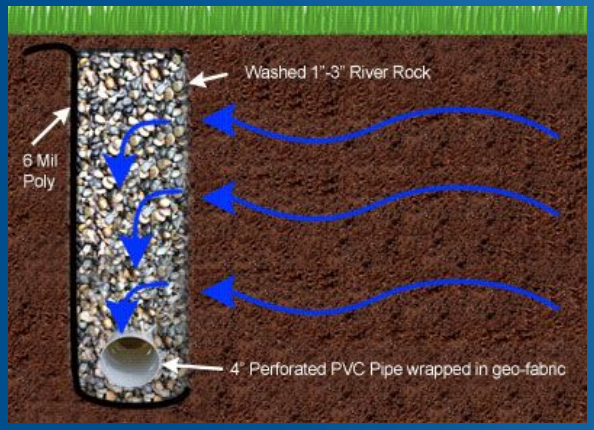
Chambers

Cultec



Trenches

French Drain



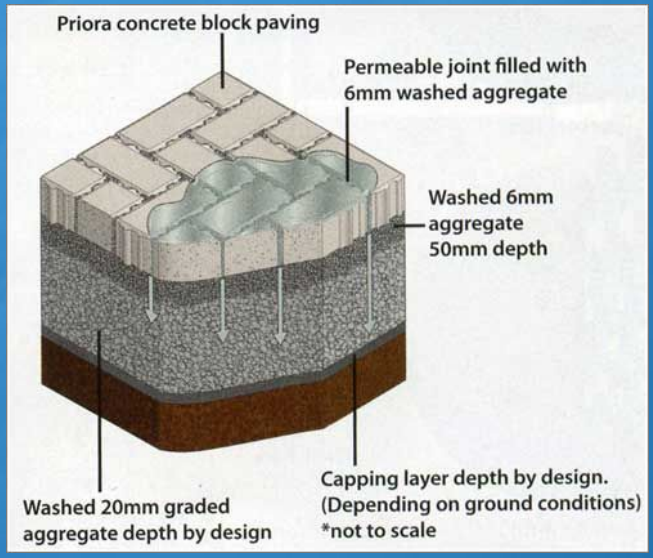
Trench Grate

Swales

Rip-Rap

Rain Gardens

Permeable Pavers

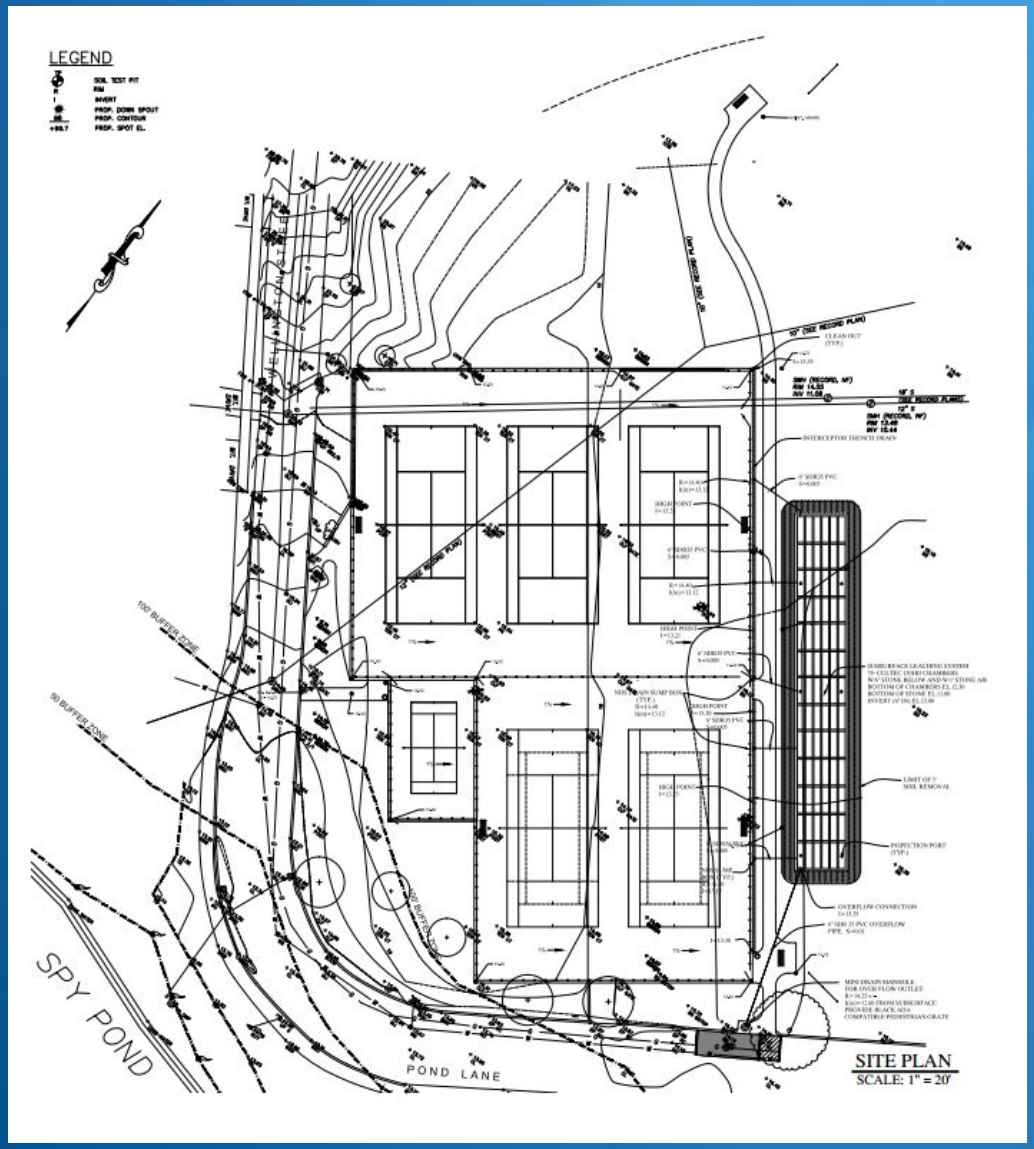


Example Projects

Public

Spy Pond Field

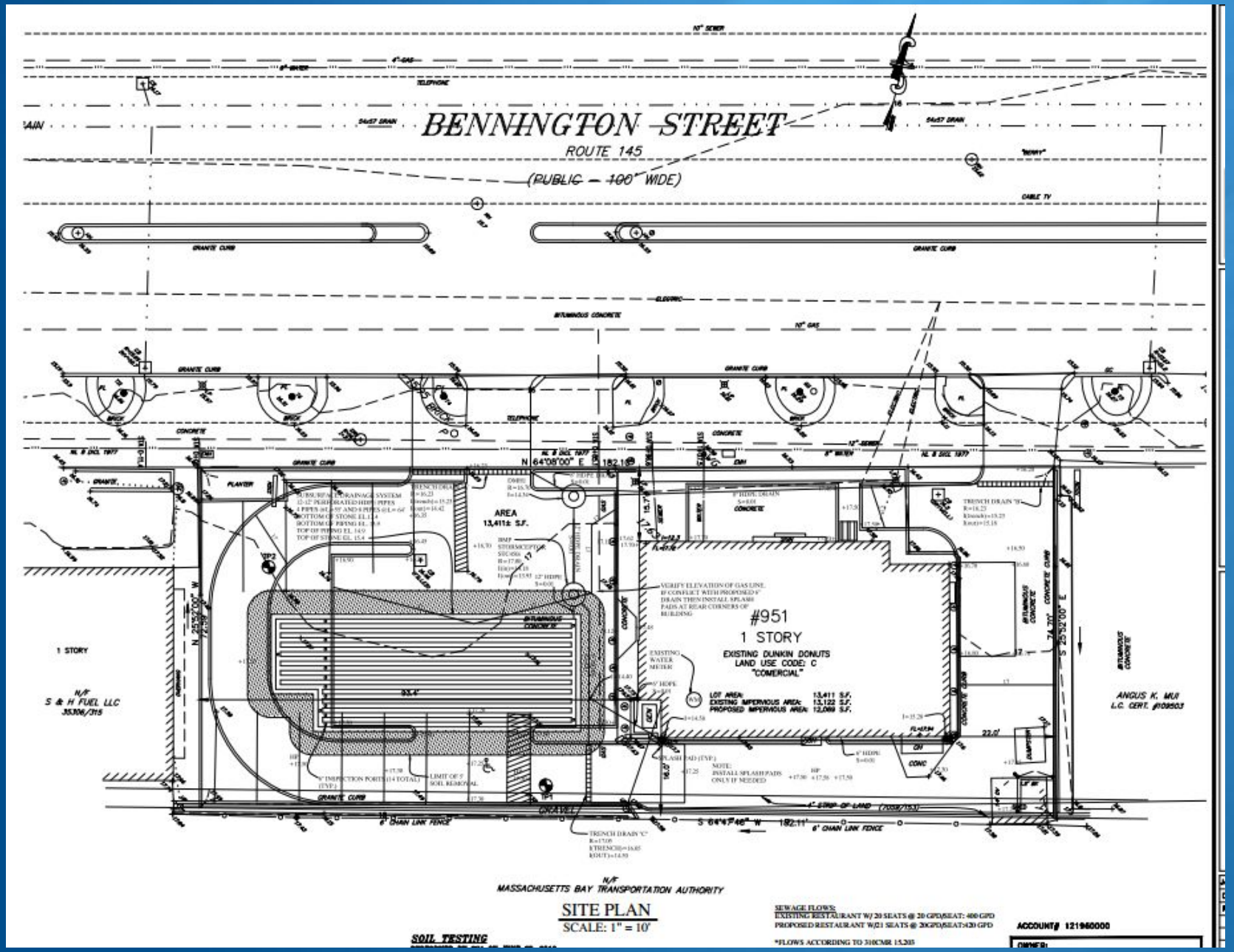
Arlington


LEGEND
SOIL TEST PIT
RIM
INVERT
PROP. DOWN SPOUT
PROP. CONTOUR
PROP. SPOT EL.
100' BUFFER ZONE
50' BUFFER ZONE
SPY POND
POND LANE
INTERCEPTOR TRENCH DRAIN
LIMIT OF 5' SOIL REMOVAL
INSPECTION PORT (TYP.)
OVERFLOW CONNECTION
SITE PLAN
SCALE: 1" = 20'

Commercial

951 Bennington Street

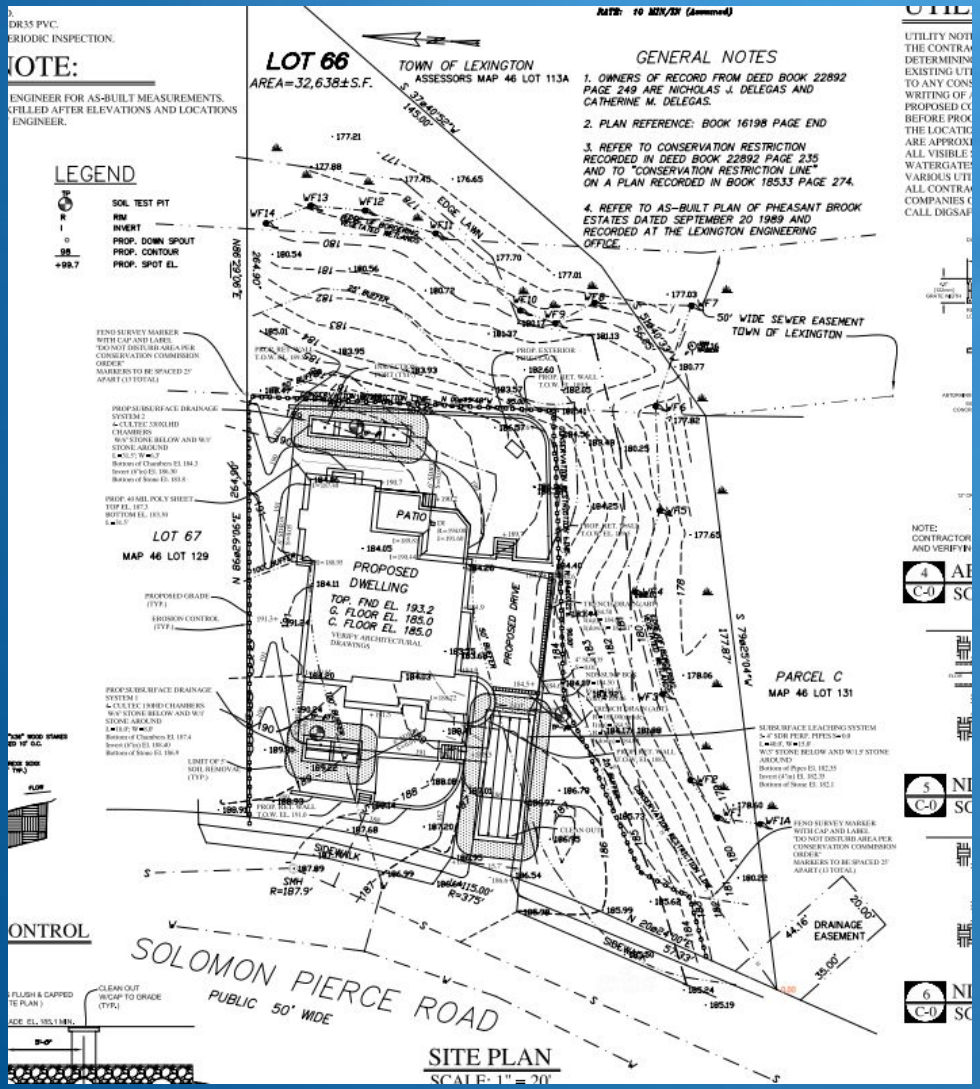
East Boston


BENNINGTON STREET
ROUTE 145
(PUBLIC – 100' WIDE)
#951
1 STORY
EXISTING DUNKIN DONUTS
LAND USE CODE: C
"COMERCIAL"
AREA
13,411± S.F.
LOT AREA: 13,411 S.F.
EXISTING IMPERVIOUS AREA: 13,122 S.F.
PROPOSED IMPERVIOUS AREA: 12,089 S.F.
N 64°08'00" E 182.18'
S 64°47'46" W 182.11'
N 25°52'00" W 74.70'
S 25°52'00" E 74.70'
1 STORY
N/F
S & H FUEL LLC
35306/315
ANGUS K. MUI
L.C. CERT. #108503
N/F
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
SITE PLAN
SCALE: 1" = 10'
SOIL TESTING
SEWAGE FLOWS:
EXISTING RESTAURANT W/ 20 SEATS @ 20 GPD/SEAT: 400 GPD
PROPOSED RESTAURANT W/21 SEATS @ 20GPD/SEAT:420 GPD
*FLOWS ACCORDING TO 310CMR 15.203
ACCOUNT# 121960000
OWNER:

Residential

Solomon Pierce Road

Lexington




Questions?