

February 19, 2016

Project 151.06127

Ms. Shukria Wiar, Planner  
City of Portland, Planning Division  
389 Congress Street, 4<sup>th</sup> Floor  
Portland, Maine 04103

RE: Response to Comments  
Level II Site Plan Application  
Academy for Active Learners  
134 Warren Avenue  
Portland, Maine

Dear Shukria:

Ransom Consulting, Inc. (Ransom), on behalf of our client, Delta Realty, is providing the responses below to the City staff's comments. For clarity, the comment is bolded and the response provided unbolded.

**Comments Submitted by: Shukria Wiar/Planning on 02/12/2016**

**We recommend that the dumpsters be screened. The fence is a chain linked and this does not qualify for adequate screening.**

**Comments Submitted by: David Margolis-Pineo/Engineering DPS on 2/9/2016**

- 1. City Technical Standards require the back of the sidewalk to be place along the street right of way (property line). This allows for a greater esplanade area. Please move the sidewalk to reflect this requirement.**

Response: The sidewalk was placed to align with the existing sidewalk in front of Keeley's. This proposed sidewalk has been revised to be at the property line with an area of adjustment to connect with the adjacent sidewalk. This is shown on C-100

- 2. This area of Warren Ave is under a Street Moratorium until October 12, 2016. Savings can be realized if utility and curbing cuts can be avoided until after that date.**

Response: As was stated in the previous response to comments, it is intended that utility and curb cuts will be made after the moratorium has expired.

Ms. Shukria Wiar  
City of Portland

- 3. For a six inch sewer lateral, the installation of a manhole is not required at the sewer main. Cutting in a wye connection or a "Core-n-tee" is allowed.**

Response: The manhole structure has been removed. However, since the existing sewer has been identified as vitrified clay, a PVC wye connection will be placed in the line rather than attempting a Core-n-Tee. Refer to C-101.

- 4. Is the proposed 1" water lateral adequate for fire protection?**

Response: A fire suppression system is not required and therefore the 1" line is for domestic water service only.

- 5. Please add Note to Plan C-105 stating that "All construction within the street right of way shall meet City of Portland Technical Manual standards." Please note that some of the plan details do not reflect City standards.**

Response: A note has been added to Sheet C-105.

**Comments Submitted by: David Senus/Civil Engineering on 1/8/2016**

- 1) In accordance with Section 5 of the City of Portland Technical Manual, a Level II development project is required to submit a stormwater management plan pursuant to the regulations of MaineDEP Chapter 500 Stormwater Management Rules, including conformance with the Basic, General, and Flooding Standards. We offer the following comments:**

- a) Basic Standards: The Applicant has provided plans, notes, and details that address erosion and sediment control requirements, inspection and maintenance requirements, and good housekeeping practices in general accordance with Appendix A, B, & C of MaineDEP Chapter 500; however, the following additional items should be noted on the plan:**

- i. The plans should include a location for a stabilized construction entrance, and a detail should be provided.**
- ii. Outlet protection should be shown/noted for the two 4" foundation drain outlets.**

Response: Sheet C-102 has been revised to show a stabilized construction entrance and the detail has been added to Sheet C-103.

- b) General Standards: The Applicant proposes to provide water quality treatment for 98% of the proposed new impervious area (12,329 SF) and 84% of the overall developed area through the use of roof drip edge filters and underdrained soil filters. The proposed BMP's provide an acceptable means of treatment for the site under the General Standards.**

Response: No response required.

- c) Flooding Standard: The Applicant proposes to manage the rate of stormwater discharge from the site through the use of a subsurface R-Tank storage system. The Pre/Post Development stormwater management model indicates that the proposed R-Tank system will manage the post-development discharge rate to a level that is near or below the pre-development condition, meeting the requirements of the Flooding Standard.**

Response: No response required.

- 2) The Applicant has shown evidence of requesting confirmation of capacity to serve the water and sewer needs for the proposed development from the Portland Water District and the**

Ms. Shukria Wiar  
City of Portland

**Portland Department of Public Works, respectively, and has noted that confirmation from each will be forwarded upon receipt.**

Response: No response required.

**3) The Utility Plan (Sheet C-101) indicates that a new sewer manhole will be installed in Warren Avenue at the 6" sewer service connection. Unless specifically requested by Public Works, City standard would be to connect to the sewer main by means of a wye, tee/wye, Inserta-Tee or similar approved method (Technical Manual 2.6.7).**

Response: The manhole has been removed and a wye connection has been added to Sheet C-101.

**4) The original submittal included a 4" water service for domestic water and fire protection. The new plans only show a 1" domestic water service. Does the building not include a fire suppression system?**

Response: A fire suppression system is not required for this building and therefore only the 1" domestic water is proposed.

**5) The following details should be revised to City Standard Details:**

- a) Trench Repair (Technical Manual detail II-12)
- b) Bituminous Sidewalk (Technical Manual detail I-12)

Response: Sheet C-103 has been revised to reflect the changes.

**6) Will the R-Tank system include an impervious liner system? Current details on sheet C-104 indicate "impermeable liner if required".**

Response: An impervious liner system is not required, however, a non-woven geotextile will be used to segregate the system stone from adjacent soil materials. The detail on Sheet C-104 has been revised.

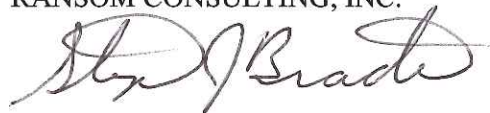
**7) The Landscaping Plan (L-101) indicates 7 viburnum trees and 3 flowering maple trees along the edge of the underdrained soil filter. Will these trees be installed on the backslope of the filter system? Are these tree species tolerant of the soil conditions that may be present at these locations (saturated soils and droughty soils with salt exposure)?**

Response: Yes, the trees are to be placed on the backslope of the filter system. The trees selected are tolerant of the saturated soils. The Landscape Plan, L-101 has been revised.

The enclosed application materials, responses and revised plans are being submitted to address the above comments. Should you have any questions or concerns, please feel free to contact me at 207 772-2891.

Sincerely,

RANSOM CONSULTING, INC.



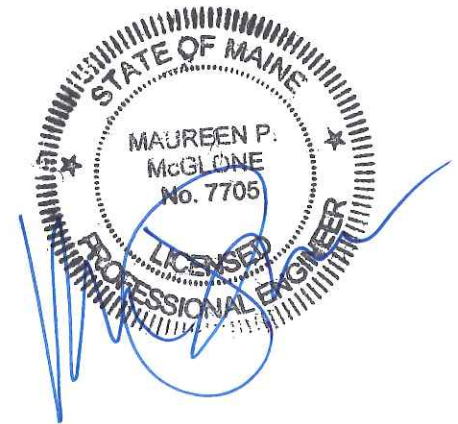
Stephen J. Bradstreet, P.E.  
Principal/Senior Project Manager

SJB:mpm

# Academy for Active Learners Stormwater Management Report

Date: December 01, 2015; Revised 1/29/16; Revised 02/19/16  
To: Academy for Active Learners  
From: Maureen P. McGlone, P.E.  
Peer Review: Stephen J. Bradstreet, P.E.  
Location: 134 Warren Avenue, Portland, Maine

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## List of Appendices:

- Appendix A: Post Construction Stormwater Compliance Requirements
- Appendix B: Stormwater BMP Inspection and Maintenance Requirements
- Appendix C: Stormwater Quality Calculations
- Appendix D: Pre Development Hydro CAD Calculations
- Appendix E: Post Development Hydro CAD Calculations

## Existing Conditions:

The site is a 56,622 SF (1.30 acre) lot located on the south side of Warren Avenue, adjacent to Keeley's Catering. The parcel is rectangular in shape and is primarily vegetated (wooded/scrub brush) on the southern 1/2 of the site and gravel parking with some grass on the northern 1/2 of the site adjacent to Warren Avenue. The northern portion is currently being used as overflow parking for Keeley's Catering and is fairly flat but sloping gently in a southerly direction. The more wooded southern portion of the site includes a steep bank sloping to the railroad tracks south of the site. Stormwater runoff from the site flows down the embankment then off-site and onto the rear of the abutting Keeley property (shown on the Pre-Development Plan as Analysis Point A). A portion of the site slopes in an easterly direction. Stormwater runoff from this area of the site flows across the eastern property line to an abutting property (shown on the Pre-Development Plan as Analysis Point B), but eventually heads south, then back west across the southern portion of this site toward Analysis Point A. This stormwater management report evaluates both Analysis Points A and B.

## Proposed Development:

The applicant, Delta Realty, proposes to construct a 1 story daycare building with a playground. The site will have 31 total parking spaces (including accessible parking), a playground, and landscaped areas. The proposed building, pavement and sidewalk areas will increase the impervious area (gravel parking lot) from 16,575 SF to 24,404 SF.

**Stormwater Management – Basic Standards:**

Erosion and sedimentation control measures are detailed within the design plans. Good housekeeping practices will be in accordance with Maine DEP Best Management Practices. A post construction stormwater management plan is provided in Appendix A. Stormwater BMP inspection and maintenance requirements are provided in Appendix B.

**Stormwater Management – Quality (General Standards):**

The existing site is currently a mix of grass and vegetated (wooded/scrub brush) with a gravel parking area (16,575 SF) which is considered impervious surface. The City of Portland has identified 19,416 SF of impervious surface on the site in its evaluation for the stormwater fee; however, it would appear from GIS mapping that a portion of that area is actually on an adjacent property. The site currently drains to the southwest corner of the property which then drains onto the adjacent Keeley property. The site's proposed impervious area is now 24,404 SF, which is a difference of 7,829 SF. There are multiple water quality treatment systems on-site with capacity to treat 35, 588 SF of the site's developed area; 20,201 SF of which is impervious surface.

The site design incorporates a roof dripline filter system along the rear of the building. This system will capture roof runoff and is comprised of a 42-inch thick x 5-foot wide layer of 3/4" crushed stone running along the length of the building. Beneath the stone is a 12-inch thick structural backfill layer for filtration of the roof runoff. A 6-inch perforated underdrain pipe sits in stone above the foundation footer and discharges to an R-Tank system below the parking area that will be used for detention during larger storm events. A Nyloplast structure with beehive grate is connected to the discharge piping and will capture bypass volume from the larger storm events for storage. A grass underdrained soil filter is included on the western edge of the parking area for treatment of a portion of the parking lot runoff. The grass channel includes an 18-inch thick soil filter over a 14-inch thick layer of course sand with a 6-inch perforated underdrain pipe. A Nyloplast structure with beehive grate is connected to the underdrain discharge piping and transports volume from the larger storms to the R-Tank detention system. Lastly, a 3-foot wide x 27-inch thick stone underdrained filter (construction similar to the roof dripline) is being proposed on the south edge of the parking lot to capture and treat runoff from the remainder of the parking area. A Nyloplast structure is included to connect the system to the R-Tanks during larger storm events. Calculations have been included in Appendix C.

**Stormwater Management – Quantity (Flooding Standards):**

The use of the R-Tanks has been included to facilitate on-site detention of the stormwater so that runoff approximates the pre-development conditions. The proposed detention system connects all three treatment systems and is sited beneath the pavement in the rear of the building. Stormwater from the R-Tanks will flow into an outlet control structure that will control the flow with orifices and a weir. The stormwater then discharges to a rip rap slope and down the embankment to follow the current drainage path to the southwest corner of the site. During larger storm events the Nyloplast structures identified above will collect the additional stormwater and direct it into the R-Tank system for detention.

**Hydraulic Analysis:**

Stormwater runoff calculations for quantity were made using the HydroCAD 10.0 computer program, which is based on the Soil Conservation Service’s TR-20 methodology. Runoff hydrographs are generated based on a standard Type III 24 hour storm. Calculations using Hydro CAD for Pre- and Post-Development conditions are included in Appendix D and Appendix E, respectively.

Six storm events were modeled as follows:

1. 1” storm: The 1” storm event was analyzed to simulate a heavy weather event that would typically happen multiple times over a given year and may impact the CSO frequency and volume.
2. 1.6” storm: The 1.6” storm event was analyzed to simulate a heavy weather event that would typically happen multiple times over a given year. The 1.6” storm is being used to determine stormwater credits as part of the City’s Stormwater Impact fee.
3. 2-year frequency flood event: 3.10” rainfall
4. 10-year frequency flood event: 4.60” rainfall
5. 25-year frequency flood event: 5.80” rainfall
6. 100-year frequency flood event: 8.10” rainfall

Runoff Curve numbers were determined based on land coverage and hydro-geological soil type B. Times of concentration were developed based on runoff flow paths for each subarea and shown on the Pre and Post-Development plans. A minimum Tc of 6 minutes was set in the HydroCAD model.

Peak runoff flow rates and runoff volumes are provided at the analysis point, which is identified on the Pre and Post-Development plans.

Storm Event	PRE-Development Peak Runoff RATES cubic feet per second (CFS)	PRE-Development Peak Runoff RATES cubic feet per second (CFS)
	Analysis Point A	Analysis Point B
1” Storm	0.03*	0.00
1.6” Storm	0.26	0.05
2 Year Frequency Storm	1.36	0.25
10 Year Frequency Storm	2.70	0.50
25 Year Frequency Storm	3.84	0.71
100 Year Frequency Storm	6.09	1.12

Storm Event	POST-Development Peak Runoff RATES cubic feet per second (CFS)	POST-Development Peak Runoff RATES cubic feet per second (CFS)
	Analysis Point A	Analysis Point B
1" Storm	0.05*	0.00
1.6" Storm	0.30	0.00
2 Year Frequency Storm	1.30	0.11
10 Year Frequency Storm	2.22	0.30
25 Year Frequency Storm	2.95	0.47
100 Year Frequency Storm	4.60	0.85

Storm Event	PRE-Development Runoff VOLUMES acre feet (AF) volume of water 1' deep over one acre	PRE-Development Runoff VOLUMES acre feet (AF) volume of water 1' deep over one acre
	Analysis Point A	Analysis Point B
1" Storm	0.003	0.00
1.6" Storm	0.018	0.003
2 Year Frequency Storm	0.087	0.013
10 Year Frequency Storm	0.177	0.027
25 Year Frequency Storm	0.256	0.040
100 Year Frequency Storm	0.419	0.065

Storm Event	POST-Development Runoff VOLUMES acre feet (AF) volume of water 1' deep over one acre	POST-Development Runoff VOLUMES acre feet (AF) volume of water 1' deep over one acre
	Analysis Point A	Analysis Point B
1" Storm	0.008	0.00
1.6" Storm	0.027	0.001
2 Year Frequency Storm	0.101	0.007
10 Year Frequency Storm	0.195	0.018
25 Year Frequency Storm	0.278	0.029
100 Year Frequency Storm	0.446	0.052

\*It should be noted that while the 1-inch storm was evaluated using HydroCAD, the program does not consider the attenuation during filtration through the water quality treatment systems used. Add

While the model indicates slight increases in the more frequent storms, these increases are statistically insignificant. Overall, the total stormwater runoff from the site has decreased between the pre- and post-development conditions.



**APPENDIX A**

Post Construction Stormwater Compliance Requirements

Academy for Active Learners  
134 Warren Avenue  
Portland, Maine

**Ransom Consulting, Inc.**  
Project 151.06127

## **Academy for Active Learners Post-Construction Stormwater Compliance Requirements**

The Applicant shall maintain the BMPs in accordance with the approved plan and shall demonstrate compliance with the plan as follows:

- (a) *Inspections.* The owner or operator of a BMP shall hire a qualified post-construction stormwater inspector to at least annually, inspect the BMPs, including but not limited to any parking areas, catch basins, drainage swales, detention basins and ponds, pipes and related structures, in accordance with all municipal and state inspection, cleaning and maintenance requirements of the approved post-construction stormwater management plan.
- (b) *Maintenance and repair.* If the BMP requires maintenance, repair or replacement to function as intended by the approved post-construction stormwater management plan, the owner or operator of the BMP shall take corrective action(s) to address the deficiency or deficiencies as soon as possible after the deficiency is discovered and shall provide a record of the deficiency and corrective action(s) to the department of public services ("DPS") in the annual report.
- (c) *Annual report.* The owner or operator of a BMP or a qualified post-construction stormwater inspector hired by that person, shall, on or by June 30 of each year, provide a completed and signed certification to DPS in a form provided by DPS, certifying that the person has inspected the BMP(s) and that they are adequately maintained and functioning as intended by the approved post-construction stormwater management plan, or that they require maintenance or repair, including the record of the deficiency and corrective action(s) taken.
- (d) *Filing fee.* Any persons required to file an annual certification under this section shall include with the annual certification a filing fee established by DPS to pay the administrative and technical costs of review of the annual certification.
- (e) *Right of entry.* In order to determine compliance with this article and with the post-construction stormwater management plan, DPS may enter upon property at reasonable hours with the consent of the owner, occupant or agent to inspect the BMPs.

**APPENDIX B**

**Stormwater BMP Inspection and Maintenance Log**

Academy for Active Learners  
134 Warren Avenue  
Portland, Maine

## Academy for Active Learners Stormwater Inspection and Maintenance Plan

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### **Inspection and Maintenance Contract:**

Long-term inspection and maintenance by a DEP approved stormwater maintenance inspector shall be regularly provided under a five-year binding inspection and maintenance contract that must be renewed prior to contract expiration. A legal agreement shall be established with responsibility for inspection and maintenance and should list specific maintenance responsibilities (including timetables) as well as provide for funding for the long-term inspection and maintenance. Debris and sediment buildup shall be removed from the forebay, basin, stone filter, or paver system as needed.

### **Inspection schedule:**

During the first year of operation, filtration BMPs shall be inspected twice annually and following major storm events. Thereafter, the filter should be inspected every six months to ensure that it is draining within 48 hours following a 1-inch storm. Additionally, a storm that fills the system to overflow should be monitored to confirm in drains in no less than 36 hours and within 60 hours.

### **Vegetated Soil Filter:**

Maintenance criteria for the vegetated soil filter are as follows:

- Debris and sediment buildup shall be removed from the vegetated soil filter system as needed. The removed sediments should be disposed in an appropriate manner.
- Mowing of the grassed basin can occur semi-annually to a height of no less than 6 inches. If mowing is desired only hand-held or push-mowers shall be used (no tractors).
- Any bare areas or erosion rills shall be repaired with new media filter or sandy loam then seeded and mulched. Fertilization of the filter area should be avoided unless absolutely necessary to establish vegetation.
- Harvesting and pruning of excessive growth will need to be done occasionally. Weeding to control unwanted or invasive plants may also be necessary. Add new mulch only as necessary.

Academy for Active Learners

- Maintaining good grass cover will minimize clogging with fine sediments and if ponding exceeds 48 hours, the top of the filter bed must be tilled to reestablish the soil's filtration capacity.
- Should water pond on the surface of the filter bed for longer than 72 hours, the top several inches of the filter shall be replaced with fresh material. The removed material shall be disposed properly.

**R-Tank Stormwater Detention:**

Inspection and Maintenance of the R-Tank shall be in accordance with the manufacturer's recommended practices to provide the performance required by the design. The R-Tank system includes inspection ports and maintenance ports, each of which has a cover at the surface. A visual inspection of all ports should be used to determine the depth of sediments deposited in the R-Tank system. The system should be back-flushed once the sediment accumulation has reached the manufacturer's limits. Once removed, sediment-laden water must be disposed of properly.

**Roof Dripline Filter:**

The roof dripline filter bed is part of the stormwater management plan and requires maintenance similar to the vegetated soil filter basin. Debris and sediment buildup shall be removed from the stone filter bed system as needed and shall be properly disposed. The filter bed must not be paved over or altered in any way.

**Parking Lot Stone Filter:**

The parking lot stone filter bed is part of the stormwater management plan and requires maintenance similar to the vegetated soil filter basin. Debris and sediment buildup shall be removed from the stone filter bed system as needed and shall be properly disposed. The filter bed must not be paved over or altered in any way.

## Academy for Active Learners: Stormwater BMP Inspection Log

**The City of Portland, ME requires ongoing annual inspections to ensure the proper maintenance and operation of stormwater management facilities. Inspections must be conducted by third parties qualified by the City.**

### A. General Information

Use only one Cover Sheet per site with as many specific structural BMP Inspection Report attachments as needed. Attach required color digital photos of site, structures and devices as applicable with captions.

<b>Project Name:</b>	<b>Academy for Active Learners</b>	<b>Inspection Date:</b>	
<b>Parcel Map, Block and Lot:</b>		<b>Current Weather:</b>	
<b>BMP Owner:</b>	<b>Delta Realty</b>	<b>Date / Amount Last Precip:</b>	
<b>Owner Mailing Address:</b>	<b>380 Warren Avenue</b>	<b>3PI Mailing Address:</b>	
	<b>Portland, Maine</b>		
<b>Owner Phone #:</b>			
<b>Owner Email:</b>		<b>Inspector Name:</b>	
		<b>Inspector Phone #:</b>	
		<b>Inspector Email:</b>	

### B. Inspection Report Attachments

Please document the number of each structural BMP type found at this site in the blank spaces provided below. Use additional Attachments if / as needed and submit all Attachments together with the Cover Sheet as a single report.

BMP Type	Number BMPs at site
Vegetated Areas	1
Stormdrain Outlets	1
Stormdrain Structures: Overflow Control and Catch Basin	6
Stone Filters	2
R-Tank Subsurface Detention System	1

Other (describe

**C. Inspection Results**

**FAIL\*\***

\*\* If any one item on an Inspection Report attachment is coded as "Work Needed" then entire BMP fails inspection.

\*\* If a site has multiple BMPs and one fails inspection, mark as "Fail" until all BMPs pass inspection.

**Note:** Applicable BMP Inspection Reports and confirmatory color digital photos summarizing required repairs must be submitted to the City following completion of the preliminary inspection. A re-inspection and certification must be completed within 60 days of the failed preliminary report. It is recommended that the inspector be part of the repair / maintenance process to ensure that repairs are performed properly.

**PASS**

**Note:** a qualified professional (as determined by the City) must sign below and include all applicable Inspection Report attachments and confirmatory digital color photos with captions.

**D. Professional Certification** (as qualified by City of Portland Stormwater Program Coordinator)

*To be completed only when all BMPs at this site are functioning as designed with no outstanding maintenance issues.*

I, \_\_\_\_\_, as a duly qualified third party inspector attest that a thorough inspection has been completed for ALL applicable BMPs that are associated with this particular site. All inspected structural BMPs are performing as designed and intended and are in compliance with the provisions of the City Portland's Standards

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

*Form Adapted from the City of South Portland's Annual Structural BMP Inspection Report Cover Sheet*

<b>Owner: Delta Realty</b>	<b>Operator:</b>
<b>Location &amp; Parcel Id:</b>	<b>Inspector:</b>
	<b>Date:</b>
<b>General Information</b>	<b>Observations</b>
Inspection duration (hours)	
Days since last precipitation	
Quantity of last precipitation (in)	
Type of inspection	
Storm event	
Current weather	
Photos taken	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Nearby natural resources	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Copy of ESC plan	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
MEDEP Permit # (if applicable)	
<b>General info notes</b>	
<b>Vegetated Areas</b>	<b>Observations</b>
Condition of slopes and embankment is good	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
No bare areas (< 90% covered) with sparse growth	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Armored areas have no rill erosion or the flow diverted to onsite areas can withstand concentrated flows	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
<b>Vegetated area notes</b>	
<b>Stormdrain outlets</b>	<b>Observations</b>
Accumulated sediments and debris at the outlet and within the conduit have been removed.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Erosion damage at the outlet have been repaired	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
<b>Outlet notes</b>	

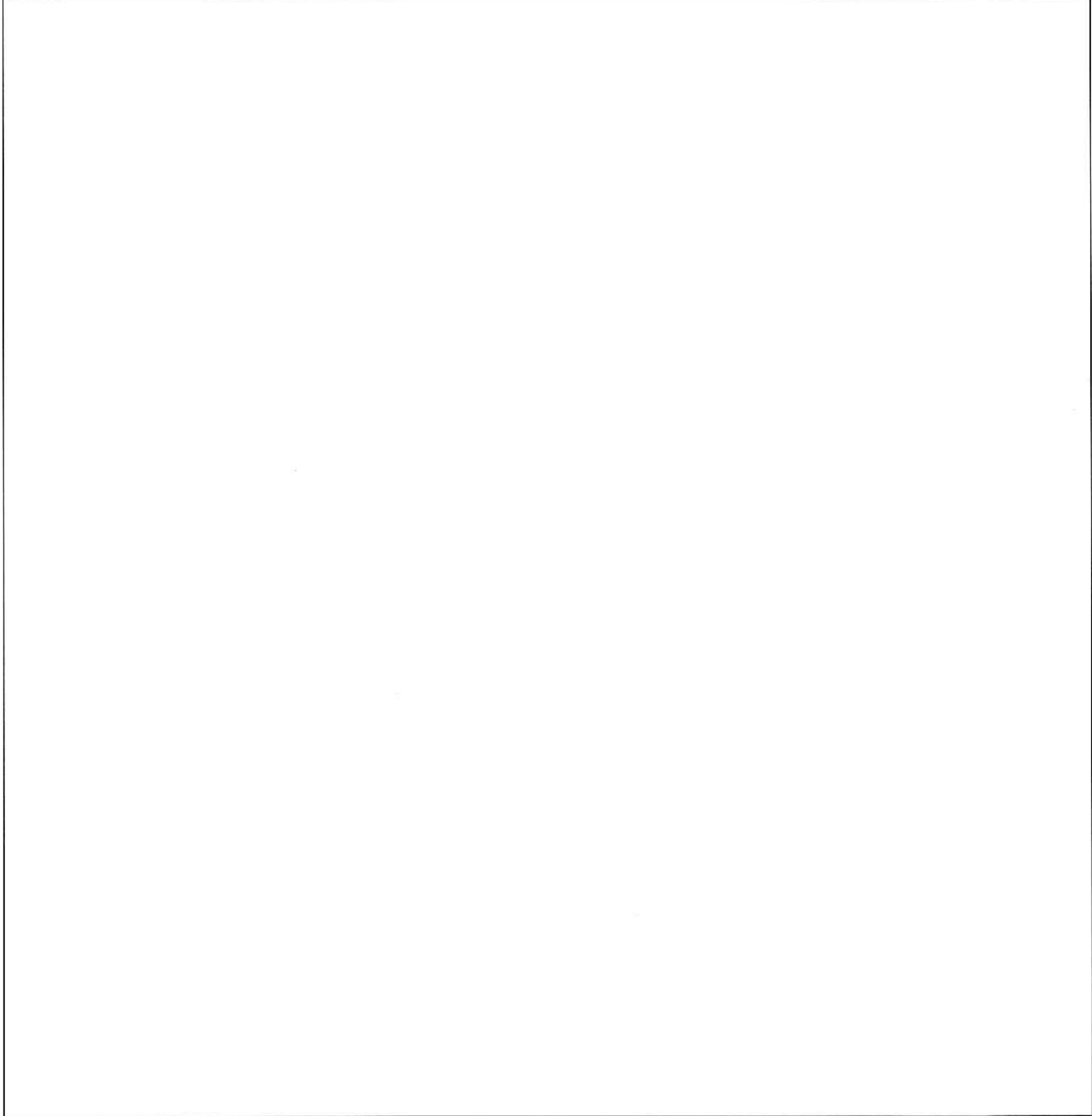
<b>Stormdrain Structures (Require inspection TWICE per year)</b>	<b>Observations</b>
Accumulated sediments from inflow channels, pipes and sumps between basins have been removed and legally disposed of.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Floating debris and floating oils have been removed.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Debris and Sediment Removed From Outlet Control Structure	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA



Academy for Active Learners Post-Construction Stormwater BMP Third Party Inspection Report

Other Comments	Observations
Corrective action needed	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
<i>If corrective action in needed, please explain detail</i>	
Verbal notification provided to responsible party	<input type="checkbox"/> Yes <input type="checkbox"/> No
Verbal notification contact	
Follow up required	<input type="checkbox"/> Yes <input type="checkbox"/> No
<i>Final comment notes</i>	

**Photos (use additional pages as needed)**



**Review Notes**

Date Reviewed:  
Reviewed by:  
Date entered:  
Date edited:  
Edited by:

**APPENDIX C**

Stormwater Quality Calculations

Academy of Active Learners  
134 Warren Avenue  
Portland, Maine

Byfield, Massachusetts  
Providence, Rhode Island  
Portsmouth, New Hampshire  
Portland, Maine  
Hamilton, New Jersey

978-465-1822  
401-433-2160  
603-436-1490  
207-772-2891  
609-584-0090

PROJECT NO. 151.06121 SITE Warren Ave  
SHEET NO. 1 OF Day Care  
CALCULATED BY MPM DATE 11/30/15  
CHECKED BY ASB DATE Rev. 1/25/16  
SCALE N/A Rev. 2/17/16

Objective: Quality and Quantity Requirements

Existing conditions

HSG => BgB or HFB (map B1)

Belgrade: very fine sandy loam 0-8%  
or Hollis: fine sandy loam 3-8%

both are moderately well drained  
assume site is 'B' soils

Lot size: 56,622 sf. ① 49,090 ② 7,532

(impermeable) gravel parking: ~~11,800~~ 16,575 sf. ① (Refer to page 11)

wooded slope: 6406 sf } 8915 sf ①

wooded clump: 2509 sf }

thick understory: 6403 sf ①

450% sparse grass: 29,504 sf ① ~~21981~~ ② 7523

① -Tc Path:

A-B	30	S=0.17	17197sf	shallow sheet
B-C	104	S=0.005	S=0.01	
A-B				shallow sheet
C-D				
D-E	30'			
B-C	33	S=0.17		shallow
E-F				
G-D	17	S=0.26		shallow
F-G				
D-E	181	S=0.02		shallow

Refer to Page 12

Byfield, Massachusetts 978-465-1822  
Providence, Rhode Island 401-433-2160  
Portsmouth, New Hampshire 603-436-1490  
Portland, Maine 207-772-2891  
Hamilton, New Jersey 609-584-0090

PROJECT NO. 15106127 SITE Wardens Ave  
SHEET NO. 1A OF Design  
CALCULATED BY MPM DATE 1/25/16  
CHECKED BY SQA DATE \_\_\_\_\_  
SCALE N/A

② Tc Path: A-B 25' S=0.10 sheet  
B-C 40' S=0.0375 sheet

Post - Development Revisions (from page 3)

subcatchment #4

Total = 14129 sf

imp. = 275

non imp. = 13854

subcatchment #5

Total : 7523 sf

imp. = 0

non imp. = 7523 sf

Byfield, Massachusetts  
 Providence, Rhode Island  
 Portsmouth, New Hampshire  
 Portland, Maine  
 Hamilton, New Jersey

978-465-1822  
 401-433-2160  
 603-436-1490  
 207-772-2891  
 609-584-0090

PROJECT NO. 151.06121 SITE Warren Ave  
 SHEET NO. 2 OF Daycare  
 CALCULATED BY HPM DATE 11/30  
 CHECKED BY JRS DATE Rev. 1/26/16  
 SCALE N/A

Storm Events: Type III 24hr. 2-yr => 3.10"

10-yr => 4.6"

25-yr => 5.8"

100-yr => 8.1"

Rev. 1/25/16  
 Rev. 2/17/16

see sheet 2A

	Pre	Post		
	A			
1" storm	0.01 ✓	0.01 / 0.02	0.00	0.00
1.6" storm	0.17 / 0.14	0.17 / 0.15	0.05	0.00
2-yr storm	1.0 / 0.87	1.0 / 0.95	0.25	0.11
10 yr storm	2.08 / 1.80	2.02 / 1.54	0.50	0.30
25 yr storm	3.01 / 2.61	2.60 / 2.47	0.71	0.47
100 yr storm	4.85 / 4.21	3.98 / 3.66	1.12	0.85

Developed Area = 42,550 sf

Undeveloped Area = 56,622 - 42,550 = 14,072 sf

Draining to street (driveway) imp. = 415 sf

Subcatchment 1: Total = 8,450 sf  
 imp. = 8,013  
 non imp. = 437 sf

Subcatchment 2: Total = 11,395 sf  
 imp. = 6,287 sf  
 non imp. = 5,108 sf

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PROJECT NO. 15106127 SITE Warren Ave  
 SHEET NO. B 2A OF \_\_\_\_\_  
 CALCULATED BY NPM DATE 2/17/10  
 CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 SCALE N.T.S.

## Storm Events

<u>Existing</u>		<u>12x20 R-Tanks</u>	<u>5x5 Stormtech</u>
1"	0.03 cfs	0.05	0.07
1.6"	0.26 cfs	0.30	0.31
2-yr	1.36 cfs	1.30	1.26
10-yr	2.70 cfs	2.22	2.19
25-yr	3.84 cfs	2.95	2.93
100 yr	6.09 cfs	4.60	4.49

### System Size

using same stone inwert

47'x51' area

R-Tank is 1.5 units high

57'x51' area

Stormtech is 740 (30" high)

} Both work w/  
Parking Buldip

R tank uses 6 cy stone

Stormtech uses 81.5 cy stone

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PROJECT NO. 151.06127 SITE Warren Ave  
SHEET NO. 3 OF Day care  
CALCULATED BY MPM DATE 11/30/15  
CHECKED BY AJB DATE Rev. 1/26/16  
SCALE N/A Rev. 2/17/16

Subcatchment 3: Total = 14710 sf  
imp. = 9414  
non imp. = 5296

Subcatchment 4: Total = 21,652 sf  
imp. = 275  
non imp. = 21,377 sf  
*Revised see sheet 1A*

Total impervious: 24,404 sf

Total (developed) non-imp. = 42,550 sf - 24,404 sf  
= 18,146 sf

Existing imp. = ~~11,800~~<sup>16575</sup> sf ∴ new imp. = 24,404 - ~~11,800~~<sup>16575</sup>  
= ~~12604~~<sup>7829</sup> sf

Impervious area treated by

Roof drip edge

= 7908 sf > new imperv.

∴ 100% new imp. treated

Impervious left untreated = 275 sf

% ~~new~~ treated: ~~12,604~~<sup>7829</sup> - 275 = ~~12329~~<sup>1554</sup> / ~~12604~~<sup>17829</sup>

Impervious

= ~~98%~~<sup>96%</sup> > 95%

96% okay

untreated landscaped: 2012 sf

" paved ∴ 275 sf

Total untreated: 2287 sf

% Treated Developed Area: 42,550 - 2287 =

40263 / 42550 = 95% > 80

allowed 8510 sf untreated

*Revised on page 10*



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PROJECT NO. 151.0621 SITE Warren Ave  
SHEET NO. 4 OF Daycare  
CALCULATED BY MPM DATE 11/30/15  
CHECKED BY AJB DATE Rev. 1/2/16  
SCALE N/A

INPUT FOR HYDROCAD:

Subcatch 1: impervious/roof 8013sf  
(8450sf)

Remaining is drip edge 437sf  
(assume CN=30)

Subcatch 2: impervious/parking = 6287  
(11,395 sf) CN=98

drip strip = 420 sf  
(CN=30)

developed (grass) >75% = 1650sf

Remaining/wooded = 3038sf

Subcatch 3: impervious/parking = 9414  
(14,710 sf)

Grass >75% = 4835sf

Remaining/wooded = 461 sf

*Revised 1/25/16  
See sheet SA*

~~Subcatch 4: Grass : 7692  
(21,652 sf) Playground : 11065 sf~~

~~Woods 2620sf~~

Impervious 275

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PROJECT NO. 151.0612-1 SITE Wavren Ave  
 SHEET NO. 5 OF Day care  
 CALCULATED BY MPM DATE 11/30  
 CHECKED BY *ASB* DATE Rev. 1/26/16  
 SCALE N/A

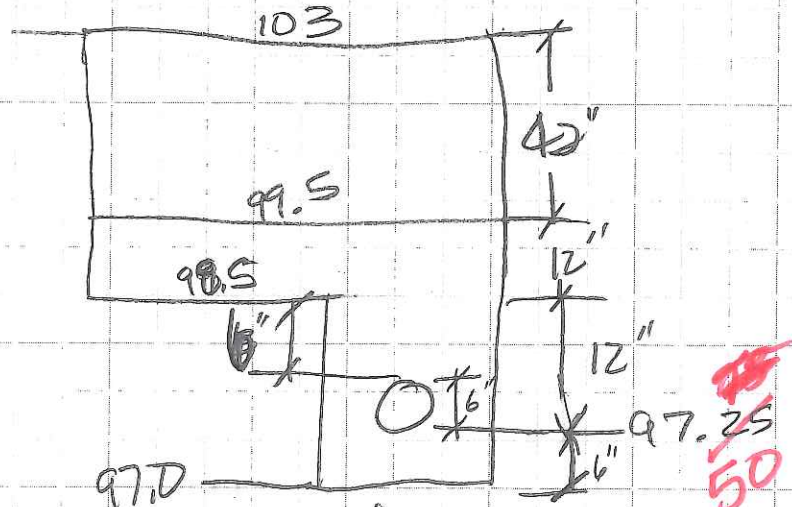
*Revised 1/25/16  
 See Sheet SA*

Subcatch #4 Tc path (all others direct @ bmn)

A-B	120'	S=0.002	shrub/grass
B-C	125'	S=0.004	shallow/wood chips grass
C-D	47'	S=0.07	shallow/grass
D-E	23'	S=0.20	shallow/woods
E-F	177'	S=0.02	shallow/woods

Pond / Reach 12": 6" HDPE solid l=25'  
 ↳ RTanks

Nyloplast



Inv. @ RTanks  
 = 96.0  
 $\therefore S = 0.06$  ft/ft

Roof Line Drop edge

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PROJECT NO. 51.06127 SITE Warren Ave  
SHEET NO. 5A OF Daycare  
CALCULATED BY KPM DATE 1/25/16  
CHECKED BY 190 DATE Rev. 1/26/16  
SCALE N/A

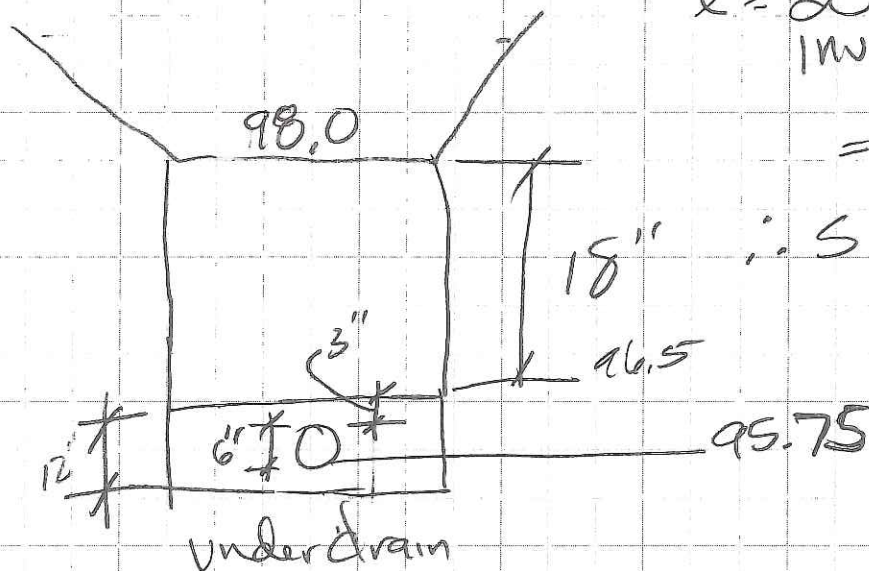
Subcatch 4: Grass 6046 sf > 75% grass  
(14129)  
Playground: 5262 sf CN=69 wood chips  
Woods 2547 sf  
Impervious: 275 sf unconnected pave

Tc PATH (all others direct = 6min)

A-B:	110'	S=0.002	shallow/grass
B-C:	49'	S=5.01	shallow/wood chips
C-D:	29'	S=0.10	shallow/grass
D-E:	10'	S=0.40	shallow/woods
E-F:	199'	S=0.015	shallow/woods

Subcatch 5: Grass: 1647 sf  
(7523)  
Playground: 5803 sf CN=69 wood  
Woods: 73 sf CN=

Pond/Reach 2R: Underdrain pipe to Nyloplast  
 w/ 6" solid to R tanks  
 Nyloplast

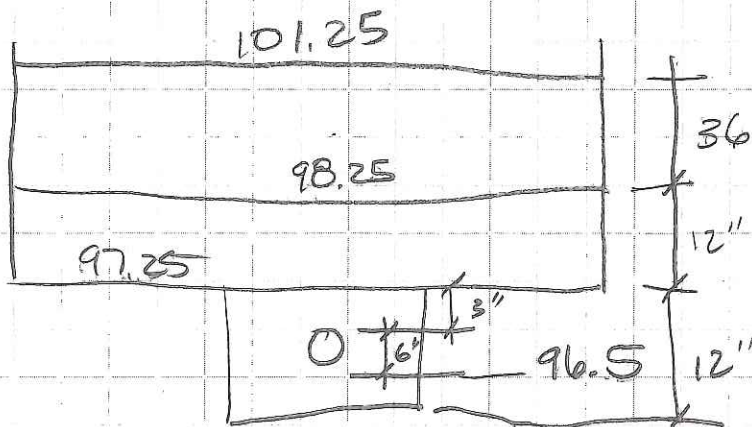


$l = 20'$   
 $1 \text{ in. in @ R tanks}$

$= 95.25$

$\therefore S = 0.025$

Pond/Reach 3R:  
 Nyloplast



6" HDPE solid:

Parking lot stone Filter

$l = 10'$   $1 \text{ in. in @ R tanks} = 96.0 \therefore S = 0.05$

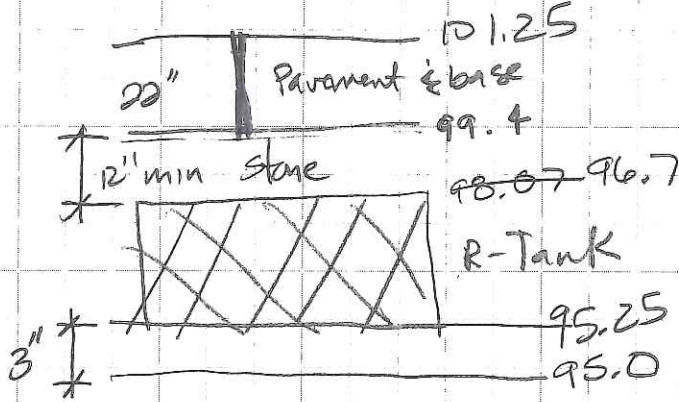
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PROJECT NO. 151.06121 SITE Warren Ave  
SHEET NO. 7 OF Daycare  
CALCULATED BY MPM DATE 12/1/15  
CHECKED BY SPS DATE Rev. 1/26/16  
SCALE N/A

R Tank system:

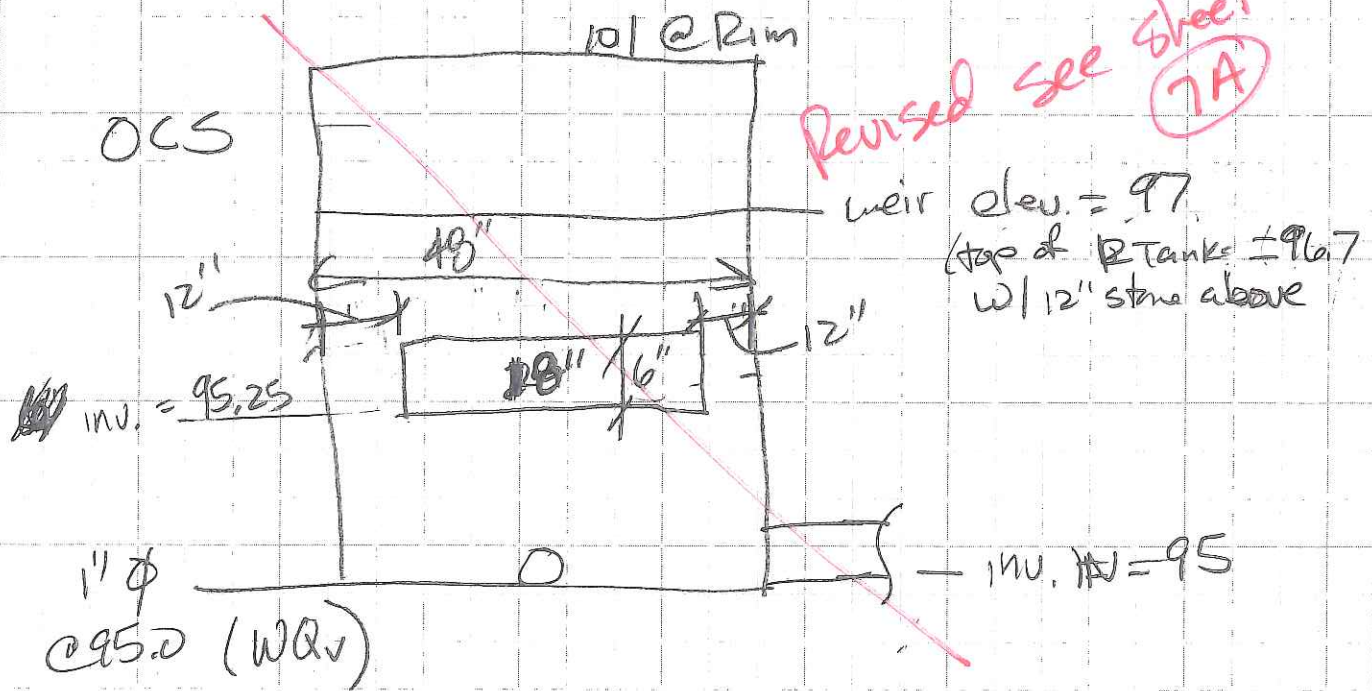
Lowest point in parking lot = 101.25  
Lowest invert in = 95.25 (from #2) single  
using double tanks



$w = 15.75"$   
 $l = 28.15"$   
 $h = 33.86" (2.82')$   
 $= 17.32 (1.44')$

outlet to OCS: 95.25 out  
95.0 in @ OCS

$l = 25'$



Revised see sheet **7A**

weir elev. = 97  
(top of R Tanks = 96.7  
w/ 12" stone above)