



**Massachusetts Department of Environmental Protection**  
**Bureau of Resource Protection - Wetlands**  
**WPA Form 5 – Order of Conditions**  
 Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:  
 090-1369  
 MassDEP File #  
 eDEP Transaction #  
 Andover  
 City/Town

**A. General Information**

**Please note:**  
 this form has been modified with added space to accommodate the Registry of Deeds Requirements

**Important:**  
 When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



1. From: Andover  
 Conservation Commission

2. This issuance is for (check one):  
 a.  Order of Conditions      b.  Amended Order of Conditions

3. To: Applicant:  
William      Ashton  
 a. First Name      b. Last Name

IQHQ Rea Estate Investment Trust  
 c. Organization

One Boston Place, 201 Washington Street, Suite 3920  
 d. Mailing Address

Boston      MA      02108  
 e. City/Town      f. State      g. Zip Code

4. Property Owner (if different from applicant):  
 \_\_\_\_\_  
 a. First Name      b. Last Name

IQHQ-4 Corporate LLC  
 c. Organization

674 Via De La Valle, Site 206  
 d. Mailing Address

Solana Beach      CA      92075  
 e. City/Town      f. State      g. Zip Code

5. Project Location:  
4 Corporate Drive      Andover  
 a. Street Address      b. City/Town

167      12  
 c. Assessors Map/Plat Number      d. Parcel/Lot Number

Latitude and Longitude, if known:      42.6d85m55s      71.2d06m37s  
 d. Latitude      e. Longitude





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**A. General Information (cont.)**

6. Property recorded at the Registry of Deeds for (attach additional information if more than one parcel):  
Essex North  
 a. County Essex North b. Certificate Number (if registered land) 270  
16218 c. Book 270 d. Page August 3, 2021  
 c. Book 270 d. Page August 3, 2021 e. Date of Issuance August 9, 2021
7. Dates: a. Date Notice of Intent Filed May 4, 2021 b. Date Public Hearing Closed August 3, 2021 c. Date of Issuance August 9, 2021
8. Final Approved Plans and Other Documents (attach additional plan or document references as needed):  
Locus Plan and Drawing List Truck Loading Area and Site Improvements  
 a. Plan Title Locus Plan and Drawing List Truck Loading Area and Site Improvements  
 b. Prepared By Linden Engineering c. Signed and Stamped by Richard G. Cutts, P.E.  
5/4/2021 d. Final Revision Date 5/4/2021 e. Scale 1"=60'  
Notice of Intent f. Additional Plan or Document Title Notice of Intent g. Date 5/4/2021

**B. Findings**

1. Findings pursuant to the Massachusetts Wetlands Protection Act:  
 Following the review of the above-referenced Notice of Intent and based on the information provided in this application and presented at the public hearing, this Commission finds that the areas in which work is proposed is significant to the following interests of the Wetlands Protection Act (the Act). Check all that apply:
- a.  Public Water Supply b.  Land Containing Shellfish c.  Prevention of Pollution  
 d.  Private Water Supply e.  Fisheries f.  Protection of Wildlife Habitat  
 g.  Groundwater Supply h.  Storm Damage Prevention i.  Flood Control
2. This Commission hereby finds the project, as proposed, is: (check one of the following boxes)

**Approved subject to:**

- a.  the following conditions which are necessary in accordance with the performance standards set forth in the wetlands regulations. This Commission orders that all work shall be performed in accordance with the Notice of Intent referenced above, the following General Conditions, and any other special conditions attached to this Order. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, these conditions shall control.





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**B. Findings (cont.)**

Denied because:

- b.  the proposed work cannot be conditioned to meet the performance standards set forth in the wetland regulations. Therefore, work on this project may not go forward unless and until a new Notice of Intent is submitted which provides measures which are adequate to protect the interests of the Act, and a final Order of Conditions is issued. **A description of the performance standards which the proposed work cannot meet is attached to this Order.**
- c.  the information submitted by the applicant is not sufficient to describe the site, the work, or the effect of the work on the interests identified in the Wetlands Protection Act. Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides sufficient information and includes measures which are adequate to protect the Act's interests, and a final Order of Conditions is issued. **A description of the specific information which is lacking and why it is necessary is attached to this Order as per 310 CMR 10.05(6)(c).**
- 3.  Buffer Zone Impacts: Shortest distance between limit of project disturbance and the wetland resource area specified in 310 CMR 10.02(1)(a) \_\_\_\_\_ a. linear feet

**Inland Resource Area Impacts:** Check all that apply below. (For Approvals Only)

Resource Area	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
4. <input type="checkbox"/> Bank	_____ a. linear feet	_____ b. linear feet	_____ c. linear feet	_____ d. linear feet
5. <input type="checkbox"/> Bordering Vegetated Wetland	_____ a. square feet	_____ b. square feet	_____ c. square feet	_____ d. square feet
6. <input type="checkbox"/> Land Under Waterbodies and Waterways	_____ a. square feet	_____ b. square feet	_____ c. square feet	_____ d. square feet
	_____ e. c/y dredged	_____ f. c/y dredged		
7. <input type="checkbox"/> Bordering Land Subject to Flooding	_____ a. square feet	_____ b. square feet	_____ c. square feet	_____ d. square feet
Cubic Feet Flood Storage	_____ e. cubic feet	_____ f. cubic feet	_____ g. cubic feet	_____ h. cubic feet
8. <input type="checkbox"/> Isolated Land Subject to Flooding	_____ a. square feet	_____ b. square feet		
Cubic Feet Flood Storage	_____ c. cubic feet	_____ d. cubic feet	_____ e. cubic feet	_____ f. cubic feet
9. <input type="checkbox"/> Riverfront Area	_____ a. total sq. feet	_____ b. total sq. feet		
Sq ft within 100 ft	_____ c. square feet	_____ d. square feet	_____ e. square feet	_____ f. square feet
Sq ft between 100-200 ft	_____ g. square feet	_____ h. square feet	_____ i. square feet	_____ j. square feet





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## B. Findings (cont.)

**Coastal Resource Area Impacts:** Check all that apply below. (For Approvals Only)

	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
10. <input type="checkbox"/> Designated Port Areas	Indicate size under Land Under the Ocean, below			
11. <input type="checkbox"/> Land Under the Ocean	_____	_____		
	a. square feet	b. square feet		
	_____	_____		
	c. c/y dredged	d. c/y dredged		
12. <input type="checkbox"/> Barrier Beaches	Indicate size under Coastal Beaches and/or Coastal Dunes below			
13. <input type="checkbox"/> Coastal Beaches	_____	_____	_____ cu yd	_____ cu yd
	a. square feet	b. square feet	c. nourishment	d. nourishment
14. <input type="checkbox"/> Coastal Dunes	_____	_____	_____ cu yd	_____ cu yd
	a. square feet	b. square feet	c. nourishment	d. nourishment
15. <input type="checkbox"/> Coastal Banks	_____	_____		
	a. linear feet	b. linear feet		
16. <input type="checkbox"/> Rocky Intertidal Shores	_____	_____		
	a. square feet	b. square feet		
17. <input type="checkbox"/> Salt Marshes	_____	_____	_____	_____
	a. square feet	b. square feet	c. square feet	d. square feet
18. <input type="checkbox"/> Land Under Salt Ponds	_____	_____		
	a. square feet	b. square feet		
	_____	_____		
	c. c/y dredged	d. c/y dredged		
19. <input type="checkbox"/> Land Containing Shellfish	_____	_____	_____	_____
	a. square feet	b. square feet	c. square feet	d. square feet
20. <input type="checkbox"/> Fish Runs	Indicate size under Coastal Banks, Inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above			
	_____	_____		
	a. c/y dredged	b. c/y dredged		
21. <input type="checkbox"/> Land Subject to Coastal Storm Flowage	_____	_____		
	a. square feet	b. square feet		
22. <input type="checkbox"/> Riverfront Area	_____	_____		
	a. total sq. feet	b. total sq. feet		
Sq ft within 100 ft	_____	_____	_____	_____
	c. square feet	d. square feet	e. square feet	f. square feet
Sq ft between 100-200 ft	_____	_____	_____	_____
	g. square feet	h. square feet	i. square feet	j. square feet





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## B. Findings (cont.)

\* #23. If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.5.c (BVW) or B.17.c (Salt Marsh) above, please enter the additional amount here.

23.  Restoration/Enhancement \*:

a. square feet of BVW \_\_\_\_\_

b. square feet of salt marsh \_\_\_\_\_

24.  Stream Crossing(s):

a. number of new stream crossings \_\_\_\_\_

b. number of replacement stream crossings \_\_\_\_\_

## C. General Conditions Under Massachusetts Wetlands Protection Act

### The following conditions are only applicable to Approved projects.

1. Failure to comply with all conditions stated herein, and with all related statutes and other regulatory measures, shall be deemed cause to revoke or modify this Order.
2. The Order does not grant any property rights or any exclusive privileges; it does not authorize any injury to private property or invasion of private rights.
3. This Order does not relieve the permittee or any other person of the necessity of complying with all other applicable federal, state, or local statutes, ordinances, bylaws, or regulations.
4. The work authorized hereunder shall be completed within three years from the date of this Order unless either of the following apply:
  - a. The work is a maintenance dredging project as provided for in the Act; or
  - b. The time for completion has been extended to a specified date more than three years, but less than five years, from the date of issuance. If this Order is intended to be valid for more than three years, the extension date and the special circumstances warranting the extended time period are set forth as a special condition in this Order.
  - c. If the work is for a Test Project, this Order of Conditions shall be valid for no more than one year.
5. This Order may be extended by the issuing authority for one or more periods of up to three years each upon application to the issuing authority at least 30 days prior to the expiration date of the Order. An Order of Conditions for a Test Project may be extended for one additional year only upon written application by the applicant, subject to the provisions of 310 CMR 10.05(11)(f).
6. If this Order constitutes an Amended Order of Conditions, this Amended Order of Conditions does not extend the issuance date of the original Final Order of Conditions and the Order will expire on \_\_\_\_\_ unless extended in writing by the Department.
7. Any fill used in connection with this project shall be clean fill. Any fill shall contain no trash, refuse, rubbish, or debris, including but not limited to lumber, bricks, plaster, wire, lath, paper, cardboard, pipe, tires, ashes, refrigerators, motor vehicles, or parts of any of the foregoing.





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### C. General Conditions Under Massachusetts Wetlands Protection Act

8. This Order is not final until all administrative appeal periods from this Order have elapsed, or if such an appeal has been taken, until all proceedings before the Department have been completed.
9. No work shall be undertaken until the Order has become final and then has been recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land upon which the proposed work is to be done. In the case of the registered land, the Final Order shall also be noted on the Land Court Certificate of Title of the owner of the land upon which the proposed work is done. The recording information shall be submitted to the Conservation Commission on the form at the end of this Order, which form must be stamped by the Registry of Deeds, prior to the commencement of work.
10. A sign shall be displayed at the site not less than two square feet or more than three square feet in size bearing the words,
 

"Massachusetts Department of Environmental Protection" [or, "MassDEP"]  
"File Number            090-1369 "
11. Where the Department of Environmental Protection is requested to issue a Superseding Order, the Conservation Commission shall be a party to all agency proceedings and hearings before MassDEP.
12. Upon completion of the work described herein, the applicant shall submit a Request for Certificate of Compliance (WPA Form 8A) to the Conservation Commission.
13. The work shall conform to the plans and special conditions referenced in this order.
14. Any change to the plans identified in Condition #13 above shall require the applicant to inquire of the Conservation Commission in writing whether the change is significant enough to require the filing of a new Notice of Intent.
15. The Agent or members of the Conservation Commission and the Department of Environmental Protection shall have the right to enter and inspect the area subject to this Order at reasonable hours to evaluate compliance with the conditions stated in this Order, and may require the submittal of any data deemed necessary by the Conservation Commission or Department for that evaluation.
16. This Order of Conditions shall apply to any successor in interest or successor in control of the property subject to this Order and to any contractor or other person performing work conditioned by this Order.





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**C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)**

17. Prior to the start of work, and if the project involves work adjacent to a Bordering Vegetated Wetland, the boundary of the wetland in the vicinity of the proposed work area shall be marked by wooden stakes or flagging. Once in place, the wetland boundary markers shall be maintained until a Certificate of Compliance has been issued by the Conservation Commission.
18. All sedimentation barriers shall be maintained in good repair until all disturbed areas have been fully stabilized with vegetation or other means. At no time shall sediments be deposited in a wetland or water body. During construction, the applicant or his/her designee shall inspect the erosion controls on a daily basis and shall remove accumulated sediments as needed. The applicant shall immediately control any erosion problems that occur at the site and shall also immediately notify the Conservation Commission, which reserves the right to require additional erosion and/or damage prevention controls it may deem necessary. Sedimentation barriers shall serve as the limit of work unless another limit of work line has been approved by this Order.
19. The work associated with this Order (the "Project")
- (1)  is subject to the Massachusetts Stormwater Standards
- (2)  is NOT subject to the Massachusetts Stormwater Standards

**If the work is subject to the Stormwater Standards, then the project is subject to the following conditions:**

- a) All work, including site preparation, land disturbance, construction and redevelopment, shall be implemented in accordance with the construction period pollution prevention and erosion and sedimentation control plan and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Construction General Permit as required by Stormwater Condition 8. Construction period erosion, sedimentation and pollution control measures and best management practices (BMPs) shall remain in place until the site is fully stabilized.
- b) No stormwater runoff may be discharged to the post-construction stormwater BMPs unless and until a Registered Professional Engineer provides a Certification that:
- i.* all construction period BMPs have been removed or will be removed by a date certain specified in the Certification. For any construction period BMPs intended to be converted to post construction operation for stormwater attenuation, recharge, and/or treatment, the conversion is allowed by the MassDEP Stormwater Handbook BMP specifications and that the BMP has been properly cleaned or prepared for post construction operation, including removal of all construction period sediment trapped in inlet and outlet control structures;
  - ii.* as-built final construction BMP plans are included, signed and stamped by a Registered Professional Engineer, certifying the site is fully stabilized;
  - iii.* any illicit discharges to the stormwater management system have been removed, as per the requirements of Stormwater Standard 10;





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**C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)**

*iv.* all post-construction stormwater BMPs are installed in accordance with the plans (including all planting plans) approved by the issuing authority, and have been inspected to ensure that they are not damaged and that they are in proper working condition;

*v.* any vegetation associated with post-construction BMPs is suitably established to withstand erosion.

*c)* The landowner is responsible for BMP maintenance until the issuing authority is notified that another party has legally assumed responsibility for BMP maintenance. Prior to requesting a Certificate of Compliance, or Partial Certificate of Compliance, the responsible party (defined in General Condition 18(e)) shall execute and submit to the issuing authority an Operation and Maintenance Compliance Statement ("O&M Statement") for the Stormwater BMPs identifying the party responsible for implementing the stormwater BMP Operation and Maintenance Plan ("O&M Plan") and certifying the following:

*i.)* the O&M Plan is complete and will be implemented upon receipt of the Certificate of Compliance, and

*ii.)* the future responsible parties shall be notified in writing of their ongoing legal responsibility to operate and maintain the stormwater management BMPs and implement the Stormwater Pollution Prevention Plan.

*d)* Post-construction pollution prevention and source control shall be implemented in accordance with the long-term pollution prevention plan section of the approved Stormwater Report and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Multi-Sector General Permit.

*e)* Unless and until another party accepts responsibility, the landowner, or owner of any drainage easement, assumes responsibility for maintaining each BMP. To overcome this presumption, the landowner of the property must submit to the issuing authority a legally binding agreement of record, acceptable to the issuing authority, evidencing that another entity has accepted responsibility for maintaining the BMP, and that the proposed responsible party shall be treated as a permittee for purposes of implementing the requirements of Conditions 18(f) through 18(k) with respect to that BMP. Any failure of the proposed responsible party to implement the requirements of Conditions 18(f) through 18(k) with respect to that BMP shall be a violation of the Order of Conditions or Certificate of Compliance. In the case of stormwater BMPs that are serving more than one lot, the legally binding agreement shall also identify the lots that will be serviced by the stormwater BMPs. A plan and easement deed that grants the responsible party access to perform the required operation and maintenance must be submitted along with the legally binding agreement.

*f)* The responsible party shall operate and maintain all stormwater BMPs in accordance with the design plans, the O&M Plan, and the requirements of the Massachusetts Stormwater Handbook.





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**C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)**

- g) The responsible party shall:
1. Maintain an operation and maintenance log for the last three (3) consecutive calendar years of inspections, repairs, maintenance and/or replacement of the stormwater management system or any part thereof, and disposal (for disposal the log shall indicate the type of material and the disposal location);
  2. Make the maintenance log available to MassDEP and the Conservation Commission ("Commission") upon request; and
  3. Allow members and agents of the MassDEP and the Commission to enter and inspect the site to evaluate and ensure that the responsible party is in compliance with the requirements for each BMP established in the O&M Plan approved by the issuing authority.
- h) All sediment or other contaminants removed from stormwater BMPs shall be disposed of in accordance with all applicable federal, state, and local laws and regulations.
- i) Illicit discharges to the stormwater management system as defined in 310 CMR 10.04 are prohibited.
- j) The stormwater management system approved in the Order of Conditions shall not be changed without the prior written approval of the issuing authority.
- k) Areas designated as qualifying pervious areas for the purpose of the Low Impact Site Design Credit (as defined in the MassDEP Stormwater Handbook, Volume 3, Chapter 1, Low Impact Development Site Design Credits) shall not be altered without the prior written approval of the issuing authority.
- l) Access for maintenance, repair, and/or replacement of BMPs shall not be withheld. Any fencing constructed around stormwater BMPs shall include access gates and shall be at least six inches above grade to allow for wildlife passage.

Special Conditions (if you need more space for additional conditions, please attach a text document):

**See Special Conditions Attached**

20. For Test Projects subject to 310 CMR 10.05(11), the applicant shall also implement the monitoring plan and the restoration plan submitted with the Notice of Intent. If the conservation commission or Department determines that the Test Project threatens the public health, safety or the environment, the applicant shall implement the removal plan submitted with the Notice of Intent or modify the project as directed by the conservation commission or the Department.





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**D. Findings Under Municipal Wetlands Bylaw or Ordinance**

1. Is a municipal wetlands bylaw or ordinance applicable?  Yes  No
2. The Andover \_\_\_\_\_ hereby finds (check one that applies):  
 Conservation Commission
- a.  that the proposed work cannot be conditioned to meet the standards set forth in a municipal ordinance or bylaw, specifically:

\_\_\_\_\_ 1. Municipal Ordinance or Bylaw \_\_\_\_\_ 2. Citation

Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides measures which are adequate to meet these standards, and a final Order of Conditions is issued.

- b.  that the following additional conditions are necessary to comply with a municipal ordinance or bylaw:

Andover Wetlands Protection By-Law \_\_\_\_\_ By-Law  
 1. Municipal Ordinance or Bylaw \_\_\_\_\_ 2. Citation

3. The Commission orders that all work shall be performed in accordance with the following conditions and with the Notice of Intent referenced above. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, the conditions shall control.
- The special conditions relating to municipal ordinance or bylaw are as follows (if you need more space for additional conditions, attach a text document):

See Special Conditions Attached



## 4 CORPORATE DRIVE-TRUCK DOCKS

DEP FILE NO. 090-1369 SPECIAL CONDITIONS

1 FINDING - NOTICE OF JURISDICTION UNDER THE MASSACHUSETTS WETLANDS PROTECTION ACT, M.G.L.C. 131, S. 40. The Andover Conservation Commission hereby finds that all or part of the property on which the work authorized by this Order is proposed is subject to jurisdiction under the Massachusetts Wetlands Protection Act, M.G.L.C. 131, s. 40. The owner is hereby notified of his or her responsibility to comply with the provisions of that statute. **This condition shall remain in effect in perpetuity and shall survive the issuance of a Certificate of Compliance.**

2 FINDING – ANDOVER WETLANDS PROTECTION BY-LAW. The Conservation Commission finds that all conditions set forth in this Order of Conditions are necessary to protect the interest described in the Andover Wetlands Protection By-Law. The owner is hereby notified of his or her responsibility to comply with the provisions of that By-Law. **This condition shall remain in effect in perpetuity and shall survive the issuance of a Certificate of Compliance.**

3 FINDING – BORDERING VEGETATED WETLAND. The Conservation Commission finds that the Boundary of Bordering Vegetated Wetland, as reviewed is depicted by wetland flags on the approved plan.

4 FINDING – PROHIBITION ON USE OF LAWN CHEMICALS WITHIN 100 FEET OF WETLAND. The Conservation Commission finds that in order to minimize the potential for adverse impacts on water quality, the Applicant has voluntarily agreed to a permanent prohibition on the use of lawn chemicals, including herbicides and nitrogen-based fertilizers, within the area 100 feet horizontally outward from the boundary of Bordering Vegetated Wetland depicted on the approved plans. **This restriction shall remain in effect in perpetuity.** This condition will be enforceable by the Andover Conservation Commission against the owner and/or its successors.

5 FINDING - 25 FOOT PERMANENT BUFFER STRIP PROTECTED. The Andover Conservation Commission hereby finds that the “25’ NON-DISTURBANCE ZONE” depicted on the approved plan. No building or alteration is to occur in this restricted area. The markers noted on the plan shall be installed as noted on the approved plan. **No work other than installation of erosion controls the Non-Disturb Markers have been installed and approved by the Conservation Agent or Commission’s Site Monitor.** Such bounds shall consist of Berntsen Feno Survey Markers with permanent medallions (information can be provided by the Conservation Commission), bearing the following inscription: “25 FOOT NON-DISTURBANCE ZONE TO WETLAND. PER ORDER OF ANDOVER CONSERVATION COMMISSION. DO NOT REMOVE.” The condition will be enforceable by the Andover Conservation Commission against the owner and /or its successors. **This condition shall remain in effect in perpetuity.**

6 FINDING – OPERATION & MAINTENANCE MANUAL. The Conservation Commission finds that the “Operation & Maintenance Manual for” dated \_\_\_\_\_, prepared by



will be attached to this Order of Conditions and duly recorded at the Registry of Deeds. **This condition shall remain in effect in perpetuity.**

7 FINDING – STOCKPILING OF MATERIAL WITHIN THE JURISDICTIONAL 100 FOOT BUFFER ZONE. The Conservation Commission finds that there shall be no stockpiling of material within the 100 foot buffer zone (as stated on Sheet ).

8 FINDING - NON-DISTURBANCE ZONE – REQUIRED DEED LANGUAGE. Any Deed (as defined below) for all or any portion of the property subject to this Order of Conditions which includes a non-disturbance zone shall contain the following language "This property is subject to a non-disturbance zone in which no alteration of land or vegetation may occur. The non-disturbance zone is shown on the plans entitled "[insert title].", recorded at the Essex County Registry of Deeds, North District, at Book \_\_\_\_, Page \_\_\_\_, and/or registered with the Land Registration Office of the Essex County Registry District as Document No. \_\_\_\_\_ and as described in the Order of Conditions recorded in the same Registry at Book \_\_\_\_, Page \_\_\_\_, and/or in the same Registry District as Document \_\_\_\_\_. In accordance with said Order of Conditions, this language shall be incorporated in full into all future deeds, easements, mortgages, leases, licenses, occupancy agreements or any other instrument of transfer, whereby an interest in and/or a right to use the property or a portion thereof is conveyed (a "Deed")."

The plans referenced in this Order of Conditions shall be recorded with the Order of Conditions and cross referenced thereto in the Essex County Registry of Deeds and/or the Essex County Registry District. **This condition shall remain in effect in perpetuity.**

9 FINAL APPROVED PLAN AND OTHER DOCUMENTS. Work shall conform to the plans referenced on Page 1 of this Order and to the materials submitted by the applicant and which are on file with the Andover Conservation Commission.

10 RELIANCE UPON PEER REVIEW. The Conservation Commission is in partial reliance upon a peer review of the filing completed by **Janet Bernardo PE of Horsley Witten**. The documentation for this review is comprised of a **letter report Dated July 20, 2021**

11 WORK AUTHORIZED UNDER THIS ORDER – Only work explicitly described in the above-referenced plans and Notice of Intent is authorized under this Order of Conditions.

12 INSTALLATION OF EROSION CONTROL. Prior to commencement of work the applicant shall retain the services of the design professional or a Professional Land Surveyor to stake out the location of the proposed sediment controls. The applicant shall then install *appropriate* sediment controls in accordance with the above-referenced plans *that have been approved by an Agent for the Commission and are specific to site conditions*.

A written request for inspection of the erosion control shall be submitted to the Conservation Commission, and a satisfactory inspection performed before any land-disturbing activity may commence. The Conservation Commission or its agents may require other sediment controls as



field conditions warrant. The siltation control device shall be the Limit of Construction beyond which no earth-disturbing activity shall occur or heavy equipment shall be allowed. All siltation and erosion controls shall be maintained in a state of good repair. The siltation control devices shall not be removed until the commission or its agent has reviewed and found satisfactory the stabilization of the disturbed area.

13 CERTIFIED FOUNDATION PLAN. Within ten days of the installation of the building foundation, **but in every case prior to framing or further construction of the building**, the applicant shall submit to the Conservation Commission a Certified Foundation Plan prepared by a Registered Land Surveyor. Said plan shall be sufficiently detailed to show the horizontal location of the foundation with respect to the property lines and the top of foundation elevation, or elevations if more than one level, and the location of any major openings, including, but not limited to, garage entrance, if one shall be provided for. No framing or further construction of the building may occur until the Certified Foundation Plan has been approved by the Conservation Agent or Commission's Site Monitor.

14 STORMWATER MANAGEMENT. The Applicant or his successors in interest shall be responsible in perpetuity to maintain all drainage and stormwater management features, including stormwater best management practices (BMPs) in good working order. The Conservation Commission reserves the right to enter upon the property and make independent examination of these BMP measures, and to require the Applicant or his successors in interest to perform such maintenance as is needed in its judgment. The Conservation Commission shall provide prior notice to the property owner of its intent to perform such inspection not less than forty-eight hours prior to such inspection. **This condition shall remain in effect in perpetuity and shall survive the issuance of a Certificate of Compliance.**

15 CERTIFICATE OF COMPLIANCE. Not more than thirty days following completion of the project, the applicant shall submit to the Commission and the Commission's Site Monitor with their request for a Certificate of Compliance, an affidavit prepared by a professional engineer or land surveyor registered in the Commonwealth of Massachusetts, stating that the site has been developed in accordance with the requirements of this Order of Conditions, based upon an on-site inspection and the referenced site plan. This affidavit should include a listing of any deviations from the approved plan.

An as-built drawing, prepared by a Professional Land Surveyor or Professional Engineer, registered in the Commonwealth of Massachusetts, and depicting the final and actual condition of all areas within the jurisdiction of the Massachusetts Wetlands Protection Act shall accompany such request.

16 EXCAVATION DEWATERING. In the event that excavation dewatering is required within any area subject to jurisdiction of the Wetlands Protection Act the applicant shall notify the Conservation Commission and the Commission's Site Monitor in advance of such work, and shall be responsible to ensure that such water is free of suspended solids before being discharged into either a wetland or into any storm water drainage system. This condition applies to all forms of dewatering, including pumping and trenching.



17 NOTIFICATION OF COMMENCEMENT OF WORK. The applicant shall notify the Conservation Commission and the Commission's Site Monitor, in writing, 48 hours before any activity commences on the project site and shall advise the Conservation Commission and the Commission's Site Monitor of the name(s) and telephone number(s) of the person(s) responsible on site for compliance with this Order. This list shall be resubmitted if any changes are made to it.

The developer or contractor responsible for the project's completion shall be notified of, and understand, the requirements of this Order of Conditions. The developer and/or contractor shall acknowledge receipt of the Order of Conditions by submitting a letter to that effect to the Conservation Commission. A copy of this Order, as well as copies of the above-mentioned documents, plans, and reports shall be on-site while activities regulated by this Order are being performed.

This Order of Conditions shall be made part of all construction documents for this project. All contractors working at the site shall be made aware of the provisions contained within this Order of Conditions and shall adhere to all the Special Conditions contained herein. The applicant, or his designee, shall, at all times, have a copy of the Final Order of Conditions at the site and shall monitor compliance with the provisions of this Order.

18 CONSTRUCTION OVERVIEW BY DESIGN ENGINEER / REPORTS. In accordance with Massachusetts General Laws Chapter 44, §53G, the Conservation Commission requires that the applicant provide funds **prior to commencement of work** to the Commission for the reasonable fees of a consultant with professional credentials to be selected by the Commission to review and/or approve the inspection of work thereunder. Such fees shall be an estimate of inspections which shall take place during once every 7 calendar days and within 24 hours of the end of a storm event having ½ inch of rainfall or greater within a twenty-four hour period, throughout the duration of the project. This period shall begin when siltation controls are installed, and shall end with issuance of a Certificate of Compliance. **Since the fees are an estimate, additional fees may be required pending the duration of the project and/or overpayment returned to the applicant upon the issuance of a Certificate of Compliance.**

Where submission of a certified foundation plan is otherwise required under this Order of Conditions a copy of said certified foundation plan shall be attached to the next inspection report following installation of the foundation. The weekly logs/reports shall be submitted on a monthly basis to the Conservation Commission and shall state whether such work is in his or her opinion in compliance with the Order of Conditions. The Conservation Commission reserves the right to require submission of such reports on a more frequent interval. **The Conservation Commission also reserves the right to authorize the consultant to reduce the number of weekly inspections submitted on a monthly basis at their discretion.**

The applicant must request approval for temporary cessation of reports in writing prospectively. **This request must have the prior approval of an Agent for the Commission.** Failure to submit satisfactory reports shall be deemed sufficient cause for revocation of this permit without further review.



19 CLEAN FILL. All fill used in connection with this project shall be clean borrow. The following shall be prohibited: chemically contaminated material; concrete and asphalt rubble; stumps and other solid waste.

20 GRADING AND STABILIZATION. Grading shall conform to the plans and data referenced above. In all cases final grades shall have a minimum of two inches of topsoil (measured in place) over all disturbed areas. In all cases exposed soil areas shall be stabilized with vegetation, e.g., grass or some form of ground cover plant. In no case shall wood chips, mulch, or similar covering be acceptable on sloping ground in lieu of vegetation.

21 STOCKPILING. All debris, fill and excavated material stockpiles within 100 feet of a wetland area must be surrounded by staked hay bales to prevent sediment from surface runoff from entering the wetland.

22 CONTROL OF CONSTRUCTION DEBRIS. No construction debris (paper, wood, metal, concrete, etc.) may be allowed to enter the wetland resource areas at any time. Windblown material shall be promptly removed from wetland resource areas.

23 DAMAGES TO RESOURCE AREAS. Any damage caused as a direct result of this project to any wetland resource areas, beyond that authorized by the Order, is the responsibility of the applicant to repair, restore or replace. Sedimentation or erosion into these areas shall be considered damage to wetland resource areas. The Conservation Commission shall be promptly notified of any damage to wetland resource areas. Following notification, the applicant must submit a plan for abatement of the problem and restoration. This plan must be approved by the Conservation Commission prior to implementation.

24 SURPLUS EARTH MATERIALS. It shall be the responsibility of the Applicant to ensure that any and all surplus materials that are not needed for use on the project are lawfully disposed of outside any area subject to protection under M.G.L.c 131, s. 40, unless such disposal area and activity are regulated under either a valid Order of Conditions or Determination of Applicability.

25 FINDING. MADEP File No. 090-0877 classified the existing pond as a stormwater basin.





Massachusetts Department of Environmental Protection  
 Bureau of Resource Protection - Wetlands  
**WPA Form 5 – Order of Conditions**  
 Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

090-1369

MassDEP File #

eDEP Transaction #

Andover

City/Town

### E. Signatures

This Order is valid for three years, unless otherwise specified as a special condition pursuant to General Conditions #4, from the date of issuance.

Please indicate the number of members who will sign this form.

This Order must be signed by a majority of the Conservation Commission.

The Order must be mailed by certified mail (return receipt requested) or hand delivered to the applicant. A copy also must be mailed or hand delivered at the same time to the appropriate Department of Environmental Protection Regional Office, if not filing electronically, and the property owner, if different from applicant.

*August 9, 2021*

1. Date of Issuance

*5*

2. Number of Signers

Signature *Thomas Brady*

Signature *Ellen Townson*

Signature *Jan Honora*

Signature *Floyd Stewart*

Signature *Alexandra Driscoll*

Printed Name  
**THOMAS BRADY**

Printed Name  
**Ellen Townson**

Printed Name  
**Jan Honora**

Printed Name  
**Floyd Stewart**

Printed Name  
**Alexandra Driscoll**

Signature

Printed Name

by hand delivery on

by certified mail, return receipt requested, on

Date

Date





Massachusetts Department of Environmental Protection  
 Bureau of Resource Protection - Wetlands  
**WPA Form 5 – Order of Conditions**  
 Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

090-1369

MassDEP File #

eDEP Transaction #

Andover

City/Town

## F. Appeals

The applicant, the owner, any person aggrieved by this Order, any owner of land abutting the land subject to this Order, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the appropriate MassDEP Regional Office to issue a Superseding Order of Conditions. The request must be made by certified mail or hand delivery to the Department, with the appropriate filing fee and a completed Request for Departmental Action Fee Transmittal Form, as provided in 310 CMR 10.03(7) within ten business days from the date of issuance of this Order. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

Any appellants seeking to appeal the Department's Superseding Order associated with this appeal will be required to demonstrate prior participation in the review of this project. Previous participation in the permit proceeding means the submission of written information to the Conservation Commission prior to the close of the public hearing, requesting a Superseding Order, or providing written information to the Department prior to issuance of a Superseding Order.

The request shall state clearly and concisely the objections to the Order which is being appealed and how the Order does not contribute to the protection of the interests identified in the Massachusetts Wetlands Protection Act (M.G.L. c. 131, § 40), and is inconsistent with the wetlands regulations (310 CMR 10.00). To the extent that the Order is based on a municipal ordinance or bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.





**Massachusetts Department of Environmental Protection**  
 Bureau of Resource Protection - Wetlands  
**WPA Form 5 – Order of Conditions**  
 Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

090-1369

MassDEP File #

eDEP Transaction #

Andover

City/Town

### G. Recording Information

Prior to commencement of work, this Order of Conditions must be recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land subject to the Order. In the case of registered land, this Order shall also be noted on the Land Court Certificate of Title of the owner of the land subject to the Order of Conditions. The recording information on this page shall be submitted to the Conservation Commission listed below.

Andover

Conservation Commission

Detach on dotted line, have stamped by the Registry of Deeds and submit to the Conservation Commission.

-----

To:

Andover

Conservation Commission

Please be advised that the Order of Conditions for the Project at:

4 Corporate Drive

Project Location

MassDEP File Number

Has been recorded at the Registry of Deeds of:

Essex North

County

Book

Page

for:

Property Owner

and has been noted in the chain of title of the affected property in:

Book

Page

In accordance with the Order of Conditions issued on:

Date

If recorded land, the instrument number identifying this transaction is:

Instrument Number

If registered land, the document number identifying this transaction is:

Document Number

Signature of Applicant







# OPERATIONS AND MAINTENANCE MANUAL

## STORMWATER MANAGEMENT SYSTEM 4 CORPORATE DRIVE ANDOVER, MA

August 3, 2021

Property Owner:  
IQHQ-4 Corporate, LLC  
c/o Ms. Chrissy Gabriel  
One Boston Place, 201 Washington St, Suite 3920  
Boston, MA 02108

Property Manager:  
Stacy Browne, Senior Real Estate Manager  
CBRE Property Management  
One Tech Drive, Andover, MA 01810

Prepared by:  
LINDEN ENGINEERING PARTNERS, LLC  
100 TradeCenter, Suite G700  
Woburn, MA 01801-1851

  
Digitally  
signed by  
Christina  
Gabriel  
Date:  
2021.08.04  
18:10:31-04'00'

**OPERATIONS AND MAINTENANCE MANUAL  
STORMWATER MANAGEMENT SYSTEM  
4 Corporate Drive, Andover, MA**

**Property Description:**

The property which is the subject of this O & M Manual is located at 4 Corporate Drive in Andover, MA. The land area of the property consists of 18.04± acres and the land is located to the east of Shattuck Road and to the west of Interstate Route 93.

Stormwater from the improvements on the land and the adjacent property at 1 Corporate Drive is collected in a series of catch basins and conveyed by drainage pipes to a stormwater management basin located on the east side of the property near Interstate Route 93. The discharge from this basin is conveyed via a constructed drainage channel in a utility and drainage easement north to a culvert under River Road and subsequently to the Merrimac River.

**Operation and Maintenance Plan**

In accordance with the Stormwater Management Regulations issued by the Department of Environmental Protection (DEP) and the Town of Andover Stormwater Management Bylaw, Linden Engineering Partners, LLC has prepared the following Operation and Maintenance Plan for the 4 Corporate Drive property.

This plan is broken into two major sections. The first section describes operational management practices. The second section is devoted to the operation and maintenance plan.

Basic Information

**Property Owner & Financially Responsible Party:**

IQHQ-4 Corporate, LLC, c/o Ms. Chrissy Gabriel  
One Boston Place, 201 Washington St, Suite 3920, Boston, MA 02108  
Tel: 617-314-9620; Mobile 603-401-9603  
Email: cgabriel@iqhqreit.com

**Property Manager and Person Responsible for Maintenance and Repairs:**

Stacy Browne, Senior Real Estate Manager  
CBRE, Property Management  
One Tech Drive, Andover, MA 01810  
Tel: 1 978 683 5224; Cell: 1 617 594 8883  
Email: Stacy.Browne@cbre.com

OPERATIONS AND MAINTENANCE MANUAL  
STORMWATER MANAGEMENT SYSTEM  
4 Corporate Drive, Andover, MA

**Good Housekeeping BMP's (Construction and Post Construction Periods)**

The following good housekeeping practices will be followed onsite during and after the construction project:

- An effort will be made to store only enough product required to do a particular job. All materials stored onsite will be stored in a neat, orderly manner in their appropriate containers and, if possible under a roof or other enclosure.
- Products will be kept in their original containers with the original manufacturer's label.
- Substances will not be mixed with one another unless recommended by the manufacturer.
- Whenever possible, all of a product will be used up before disposing of the container.
- Manufacturer's recommendations for proper use and disposal will be followed.

**Material Handling and Waste Management**

*Hazardous Products:*

These practices will be used to reduce the risks associated with hazardous materials. Material Safety Data Sheets (MSDSs) for each substance with hazardous properties that is used on the property will be obtained and used for the proper management of potential wastes that may result from these products. An MSDS will be posted in the immediate area where such product is stored and/or used and another copy of each MSDS will be maintained in the property management office. Each employee who must handle a substance with hazardous properties will be instructed on the use of MSDS sheets and the specific information in the applicable MSDS for the product they are using, particularly regarding spill control techniques.

- Products will be kept in original containers unless they are not re-sealable.
- Original labels and material safety data will be retained; they contain important product information.
- If surplus product must be disposed of, manufacture's or local and State recommended methods for proper disposal will be followed.

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*Hazardous Waste*

All hazardous waste material will be disposed of in the manner specified by local, state, and/or federal regulations and by the manufacturer of such products. Site personnel will be instructed in these practices by the job site superintendent, who will also be responsible for seeing that these practices are followed.

*Sanitary Wastes*

All sanitary waste will be disposed of by means of the municipal sewer system connected to the buildings on the property

**Equipment Fueling**

No fuel shall be stored on the property except for fuel stored in approved containers as part of equipment. All fueling areas will be inspected and cleaned weekly as necessary.

**Spill Prevention and Control Plan**

The property manager will train all personnel in the proper handling and cleanup of spilled materials. No spilled hazardous materials or hazardous wastes will be allowed to come in contact with storm water discharges. If such contact occurs, the storm water discharge will be contained on site until appropriate measures in compliance with state and federal regulations are taken to dispose of such contaminated storm water. It shall be the responsibility of the job site superintendent to properly train all personnel in spill prevention and clean up procedures.

In order to minimize the potential for a spill of hazardous materials to come into contact with storm water, the following steps will be implemented:

1. All materials with hazardous properties (such as pesticides, petroleum products, fertilizers, detergents, chemicals, acids, paints, paint solvents, cleaning solvents) will be stored in a secure location, with their lids on, under cover, when not in use.
2. The minimum practical quantity of all such materials will be kept on the property at all times.

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STORMWATER MANAGEMENT SYSTEM  
4 Corporate Drive, Andover, MA

3. A spill control and containment kit (containing, for example, absorbent materials, acid neutralizing powder, brooms, dust pans, mops, rags, gloves, goggles, plastic and metal trash containers, etc.) will be provided at the storage site. Catch basin inlet cover blankets and inflatable pipe plugs will be used to seal the openings in the outlet control structure and isolate product in the wet basin should a spill occur.
4. Manufacturer's recommended methods for spill cleanup will be clearly posted and site personnel will be trained regarding these procedures and the location of the information and cleanup supplies.

In the event of a spill, the following procedures should be followed:

1. All spills will be cleaned up immediately after discovery.
2. The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with the hazardous substances.
3. The property manager will be notified immediately.
4. Spills of toxic or hazardous materials will be reported to the appropriate federal, state, and/or local government agency, regardless of the size of the spill.

The property manager will be the spill prevention and response coordinator. He/she will designate the individuals who will receive spill prevention and response training. These individuals will each become responsible for a particular phase of prevention and response. The names of these personnel will be posted in the property management office.

### **Allowable Non-Stormwater Discharge Management**

Certain types of discharges are allowed under the NPDES Permit System, and it is the intent of this O & M Plan to allow such discharges. These types of discharges will be allowed under the conditions that no pollutants will be allowed to come into contact with the water prior to or after its discharge. The control measures that have been outlined previously in this O & M Plan will be strictly

**OPERATIONS AND MAINTENANCE MANUAL  
STORMWATER MANAGEMENT SYSTEM  
4 Corporate Drive, Andover, MA**

followed to ensure that no contamination of these non-stormwater discharges takes place. The following non-stormwater discharges that may occur from the job site include:

- Discharges from fire-fighting activities
- Fire Hydrant flushings
- Waters used to wash vehicles where detergents are not used
- Water used to control dust in accordance with off-site vehicle tracking
- Potable water including uncontaminated water line flushings
- Routine external building wash down that does not use detergents
- Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used
- Uncontaminated air conditioner compressor condensate
- Uncontaminated ground water or spring water
- Foundation or footing drains where flows are not contaminated with process materials such as solvents
- Uncontaminated excavation dewatering
- Landscape irrigation

## **STORMWATER MANAGEMENT SYSTEM MAINTENANCE**

### **Stormwater BMP's**

Several types of structural and non-structural water quality controls in various combinations are proposed to treat stormwater generated on the site. These measures include deep sump catch basins, stormwater treatment units, underground infiltration systems and a wet basin. These Water quality treatment measures will result in the removal of most of the total suspended solids (TSS) load in runoff prior to discharge from the site, consistent with DEP's TSS removal standards.

The following best management practices are specified in the proposed development program to mitigate the increase in stormwater runoff from the site.

### **BMPs Used**

- Deep Sump Catch basins – 50 Catch basins

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4 Corporate Drive, Andover, MA

- Trench Drains – 2 Trench Drains
- Stormwater Treatment Units (Stormceptors) – 1 STC 900
- Underground Infiltration Structures – 1 System
- Wet Basin – 1 Basin

*Post-Development Activities*

1. Paved Areas: Paved Areas shall be mechanically swept during the dry weather to remove excess sediments, thereby reducing the amount of sediments that the drainage system will have to remove from the runoff. Paved areas shall be mechanically swept a minimum of two times each year ( in the spring after all snow and ice have melted and late in the fall prior to snowfall).
2. The use of salt or chemicals for de-icing on the paved areas during the winter months shall be limited to the minimum amount necessary to maintain pedestrian and vehicle safety. Alternative measures to sodium chloride are encouraged for use at the site.
3. Deep Sump Catch Basins: All Catch basins shall be inspected at least four times/year (once in the spring at the end of snowfall and once at the end of the fall foliage season and two other times spaced throughout the year) to verify that the inlet openings are not clogged by debris and to determine if the sump needs to be cleaned). Any debris shall be removed from the inlet grates and disposed of properly. The catch basin sumps shall be inspected and cleaned whenever the depth of the sediment is 25% or more of the sump depth or cleaned a minimum of twice annually. Material shall be removed from the catch basins and disposed of in accordance with all applicable regulations.
4. Trench Drains: All Trench Drains shall be inspected at least four times/year (once in the spring at the end of snowfall and once at the end of the fall foliage season and two other times spaced throughout the year) to verify that the inlet and outlet openings are not clogged by debris and to determine if they need to be cleaned). Any debris shall be removed from the inlet grates and disposed of properly. The trench drains shall be

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inspected and cleaned whenever the depth of the sediment is 25% or more of the depth or cleaned a minimum of twice annually. Material shall be removed from the trench drains and disposed of in accordance with all applicable regulations.

5. The Stormwater Treatment Units (Stormceptor): Stormwater Treatment Units shall be cleaned and inspected a minimum of four times per year for the first year and twice per year thereafter if the silt trap is not full in six months . Cleaning shall be in strict conformance with the manufacturer's written instructions which are attached to this Operations and Maintenance Plan.
6. The Subsurface (Underground) Infiltration Structures and the inlet/outlet pipes shall be inspected a minimum of twice/year for signs of accumulated water, debris and rodent activity. Remove any debris that is observed. Implement appropriate corrective action if any issues are discovered during the inspections.
7. Inspect the Wet Basin at least once per year to ensure the basin is operating as designed. Inspect the outlet pipes and structure for evidence of clogging or excessive outflow releases. Potential problems to check include: subsidence, erosion, cracking or tree growth on the embankment, damage to the emergency spillway, sediment accumulation around the outlet, inadequacy of the inlet/outlet channel erosion control measures, changes in the condition of the pilot channel, erosion within the basin and banks, and the emergence of invasive species. Make any necessary repairs immediately. During inspections, note any changes to the wet basin or the contributing watershed area because these may affect basin performance. At least twice a year, mow the upper-stage, side slopes, embankment and emergency spillway. Remove sediment from the basin as necessary, and at least once every 10 years.
8. All sediments removed from the site drainage facilities shall be disposed of properly and in accordance with all applicable local and state regulations.
9. All vegetated slope areas on the site shall be stabilized following completion of construction and maintained to control erosion. Any disturbed areas shall be re-seeded and stabilized by the application of jute mesh if the slope exceeds 3 feet horizontal to 1 foot vertical.

OPERATIONS AND MAINTENANCE MANUAL  
STORMWATER MANAGEMENT SYSTEM  
4 Corporate Drive, Andover, MA

10. **Maintenance Responsibilities:** All post-construction maintenance activities shall be documented and kept on file and made available to the Town of Andover Conservation Commission. Post-construction maintenance shall be the responsibility of the Property Owner.

All structural BMP's and maintenance responsibilities as identified on the site plans and within this document will be owned and maintained by the owner of the property and shall run with the title of the property.

**Annual Reporting Form**

The Owner of the facility shall keep complete records of all BMP maintenance activities. Annual reports shall be made to the Andover Conservation Commission using the following form:

**OPERATIONS AND MAINTENANCE MANUAL  
STORMWATER MANAGEMENT SYSTEM  
4 Corporate Drive, Andover, MA**

**OPERATION AND MAINTENANCE PLAN**  
**Project:** 4 Corporate Drive  
**Location:** 4 Corporate Drive, Andover, MA

**Date:** August 3, 2021

Structure or Task	Inspection Schedule	Inspection Performed		Method	Notes/Remarks
		Date	By:		
Street Sweeping	April / May			Power broom or vacuum walks and pavement	
Catch Basins & Trench Drains, Total 50 CB's, 2 Trench Drains	March			Clam shell or vacuum sumps, vacuum trench drains	Clean when sediment is 12" deep in catch basins or 25% of deep in trench drains or at least twice annually
	June				
	September				
	December				
TSS Removal Systems (Stormceptor Units) Total 1 Unit	March			Remove debris in accordance with manufacturer's recommendations vacuum sumps	Reduce to bi-annual inspections after first year of operations
	June				
	September				
	December				
Subsurface Infiltration Systems Total 1 System	April / May			Inspect Units through observation manholes	Remove any debris and correct any problems observed
	Sept. / Oct.				
Wet Basin	April / May			Inspect banks and bottoms	Remove accumulated debris and silt
	Sept. / Oct.				

Party responsible for O & M Plan:

**Name:** IQHQ-4 Corporate, LLC  
**Address:** One Boston Place, 201 Washington Street Suite 3920, Boston, MA 02108  
**Contact:** Mr. David Surette  
**Phone:** (617) 314-7906

**NOTE:** This form must be submitted to the Andover Conservation Commission yearly by November 1st.

OPERATIONS AND MAINTENANCE MANUAL  
STORMWATER MANAGEMENT SYSTEM  
4 Corporate Drive, Andover, MA

**Annual Operating Budget**

The estimated annual operating budget for the O & M Plan for the 4 Corporate Drive property is \$10,000.

**Plan of BMP's**

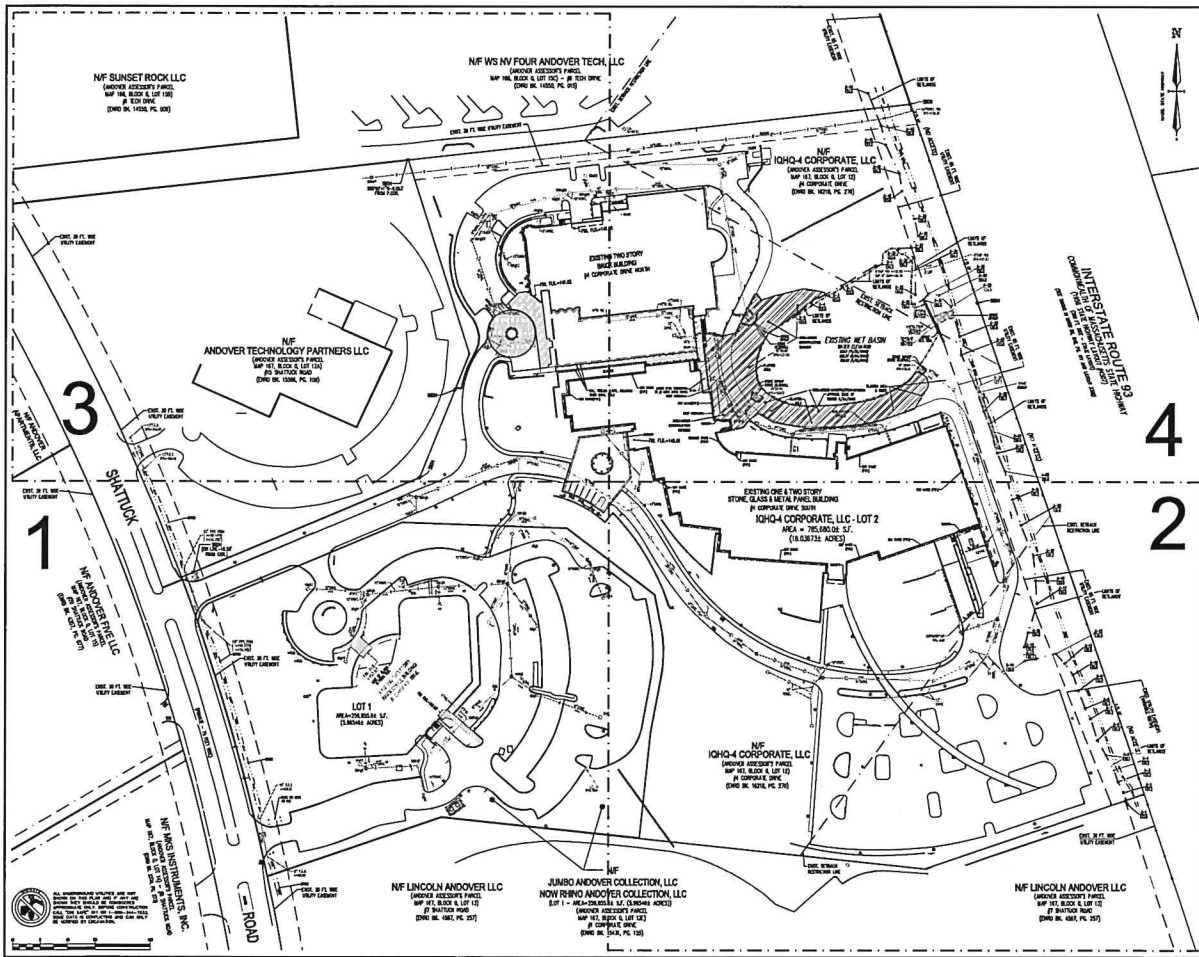
Reference is made to the As-Built Title Insurance Survey for the location of all BMP's.

**Conclusion**

The construction of the proposed site development as proposed will provide runoff control for the completed development as required by the MADEP Stormwater.

OPERATIONS AND MAINTENANCE MANUAL  
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4 Corporate Drive, Andover, MA

SYSTEM PLANS

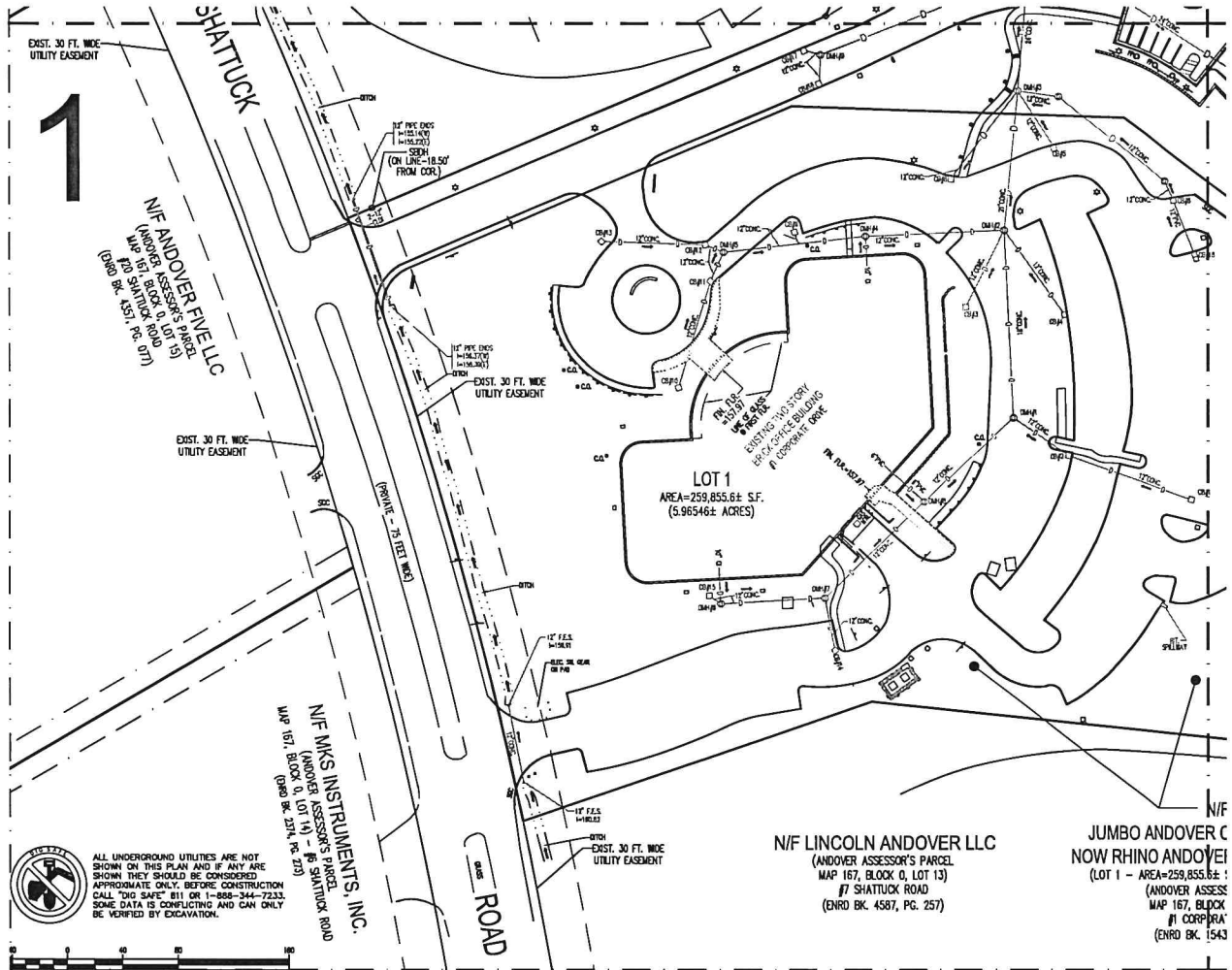


**TITLE INSURANCE SURVEY SHEET**  
**LOT 1**  
**ONE CORPORATE DRIVE**  
**ANDOVER, MASSACHUSETTS**

PREPARED FOR: **QPR REAL ESTATE INVESTMENT TRUST**  
 ONE BOSTON PLACE, 2ND FLOOR, BOSTON, MA 02111  
 TEL: (617) 344-7871

PREPARED BY: **ØLINDEN ENGINEERING PARTNERS LLC**  
 100 WASHINGTON STREET, 2ND FLOOR, BOSTON, MA 02111  
 TEL: (617) 344-7871

NO.	DATE	DESCRIPTION
1	08/14/2014	PRELIMINARY SURVEY
2	08/14/2014	FINAL SURVEY



1

EXIST. 30 FT. WIDE UTILITY EASEMENT

N/F ANDOVER FIELLC  
(ANDOVER ASSESSOR'S PARCEL  
MAP 167, BLOCK 0, LOT 13)  
(ENRD BK. 4587, PG. 257)

EXIST. 30 FT. WIDE UTILITY EASEMENT

12" PIPE DECS  
IN LINE  
FROM COR.

EXIST. 30 FT. WIDE UTILITY EASEMENT

EXISTING TWO STORY  
BLACK CORE BUILDING  
#1 CORPORATE DRIVE

LOT 1  
AREA=259,855.6± S.F.  
(5.96546± ACRES)

(PRINTED TO LEFT SIDE)

ROAD

12" P.E.S.  
IN LINES

EXIST. 30 FT. WIDE UTILITY EASEMENT

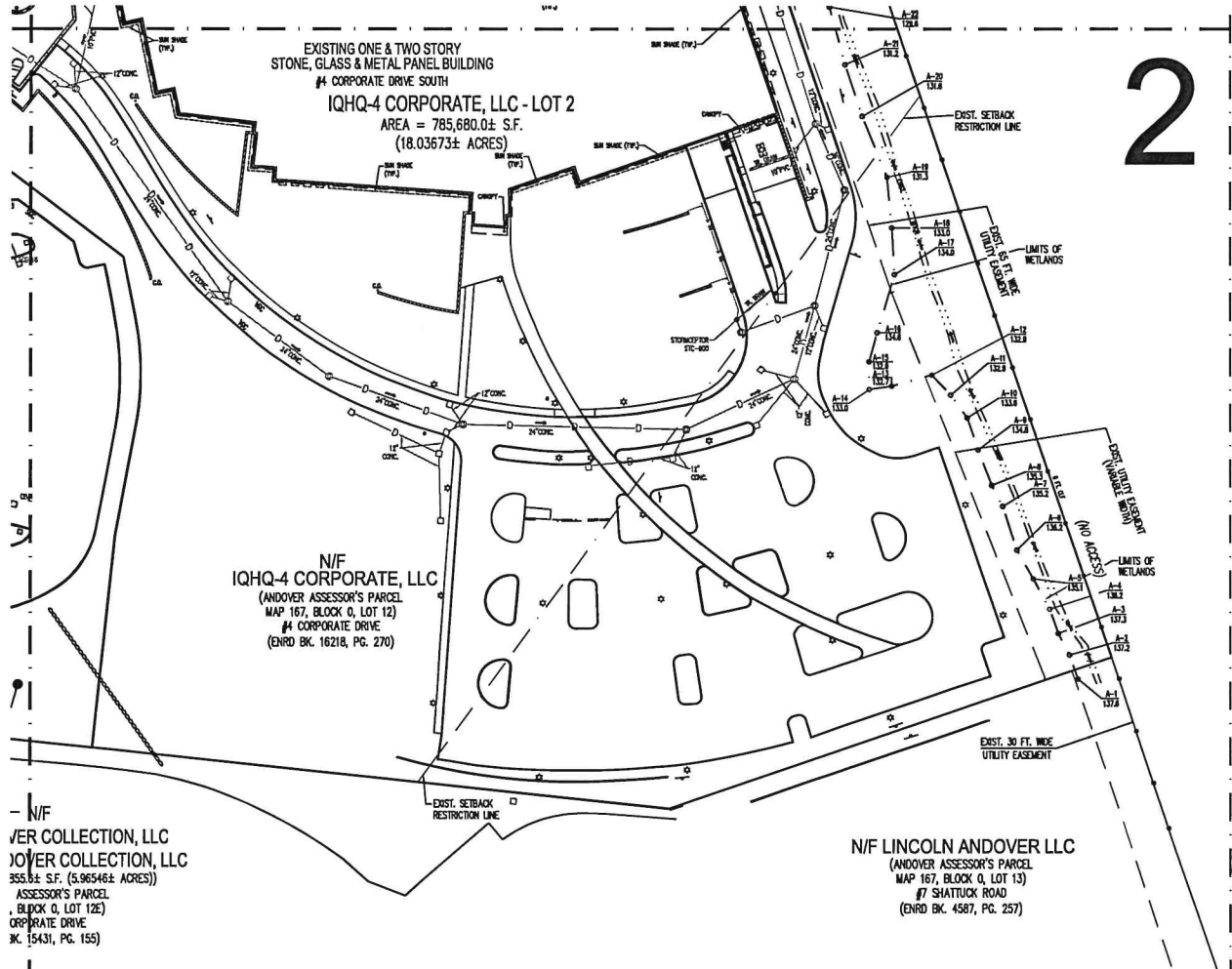
ALL UNDERGROUND UTILITIES ARE NOT SHOWN ON THIS PLAN AND IF ANY ARE SHOWN THEY SHOULD BE CONSIDERED APPROXIMATE ONLY. BEFORE CONSTRUCTION CALL "811" OR 1-888-344-7233. SOME DATA IS CONFLICTING AND CAN ONLY BE VERIFIED BY EXCAVATION.



N/E MKS INSTRUMENTS, INC.  
(ANDOVER ASSESSOR'S PARCEL  
MAP 167, BLOCK 0, LOT 11 - #8 SHATTUCK ROAD  
(ENRD BK. 2374, PG. 273))

N/F LINCOLN ANDOVER LLC  
(ANDOVER ASSESSOR'S PARCEL  
MAP 167, BLOCK 0, LOT 13)  
#7 SHATTUCK ROAD  
(ENRD BK. 4587, PG. 257)

N/F JUMBO ANDOVER C  
NOW RHINO ANDOVEI  
(LOT 1 - AREA=259,855.6± :  
(ANDOVER ASSES  
MAP 167, BLDCK  
#1 CORPORA  
(ENRD BK. 1543



N/F SUNSET ROCK LLC  
(ANDOVER ASSESSOR'S PARCEL  
MAP 166, BLOCK 0, LOT 158)  
#1 TECH DRIVE  
(ENRD BK. 14550, PG. 009)

N/F WS NV FOUR ANDOVER TECH, LLC  
(ANDOVER ASSESSOR'S PARCEL  
MAP 166, BLOCK 0, LOT 15C) - #6 TECH DRIVE  
(ENRD BK. 14550, PG. 015)

N/F  
ANDOVER TECHNOLOGY PARTNERS LLC  
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EXIST. 30 FT. WIDE UTILITY EASEMENT

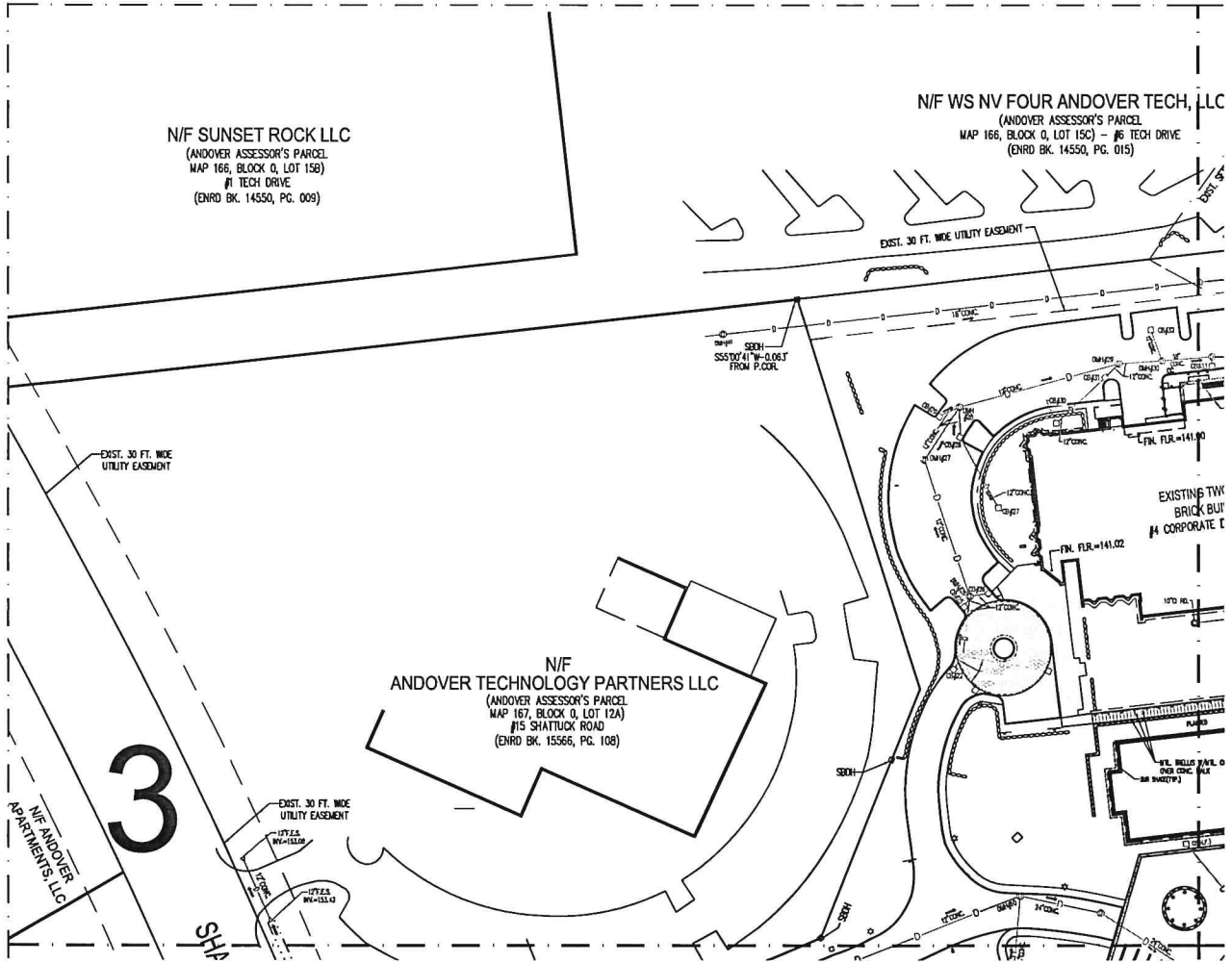
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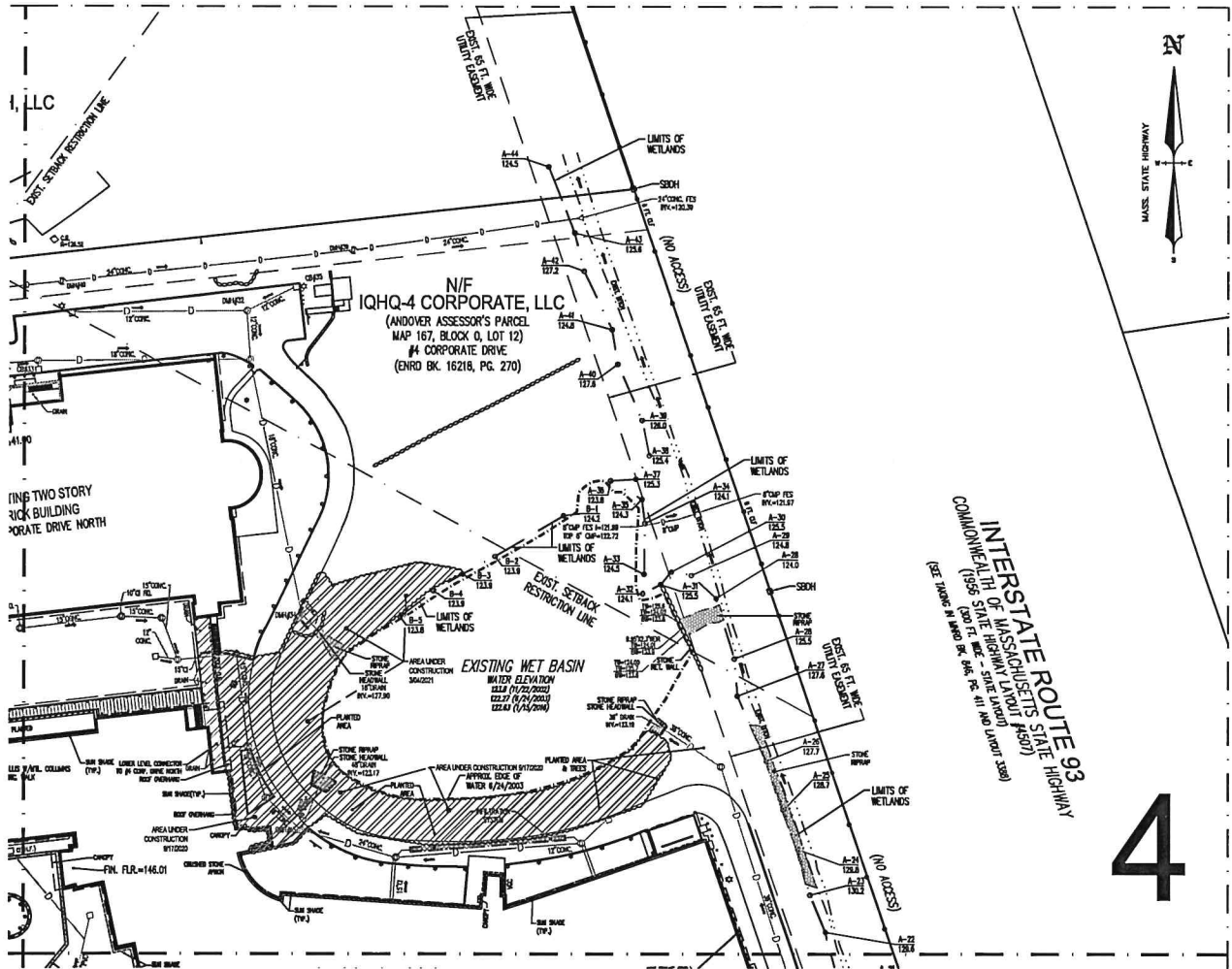
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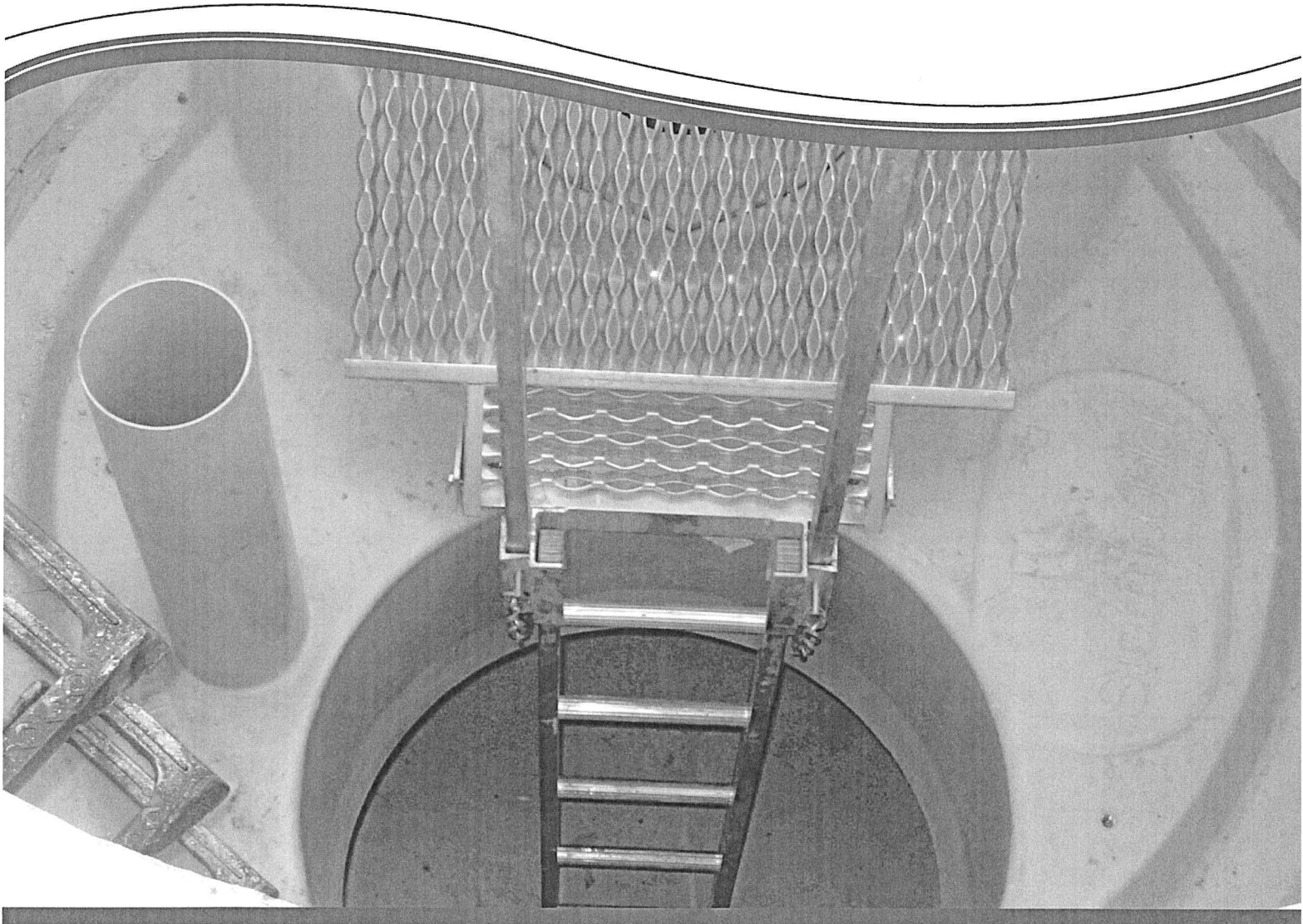




OPERATIONS AND MAINTENANCE MANUAL  
STORMWATER MANAGEMENT SYSTEM  
4 Corporate Drive, Andover, MA

# STORMCEPTOR MAINTENANCE INSTRUCTIONS

**Stormceptor<sup>®</sup> STC**  
**Operation and Maintenance Guide**



## Stormceptor Design Notes

- Only the STC 450i is adaptable to function with a catch basin inlet and/or inline pipes.
- Only the Stormceptor models STC 450i to STC 7200 may accommodate multiple inlet pipes.

Inlet and outlet invert elevation differences are as follows:

Inlet and Outlet Pipe Invert Elevations Differences			
Inlet Pipe Configuration	STC 450i	STC 900 to STC 7200	STC 11000 to STC 16000
Single inlet pipe	3 in. (75 mm)	1 in. (25 mm)	3 in. (75 mm)
Multiple inlet pipes	3 in. (75 mm)	3 in. (75 mm)	Only one inlet pipe.

Maximum inlet and outlet pipe diameters:

Inlet/Outlet Configuration	Inlet Unit STC 450i	In-Line Unit STC 900 to STC 7200	Series* STC 11000 to STC 16000
Straight Through	24 inch (600 mm)	42 inch (1050 mm)	60 inch (1500 mm)
Bend (90 degrees)	18 inch (450 mm)	33 inch (825 mm)	33 inch (825 mm)

- The inlet and in-line Stormceptor units can accommodate turns to a maximum of 90 degrees.
- Minimum distance from top of grade to crown is 2 feet (0.6 m)
- Submerged conditions. A unit is submerged when the standing water elevation at the proposed location of the Stormceptor unit is greater than the outlet invert elevation during zero flow conditions. In these cases, please contact your local Stormceptor representative and provide the following information:
  - Top of grade elevation
  - Stormceptor inlet and outlet pipe diameters and invert elevations
  - Standing water elevation
  - Stormceptor head loss,  $K = 1.3$  (for submerged condition,  $K = 4$ )



## OPERATION AND MAINTENANCE GUIDE

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# 1. About Stormceptor

The Stormceptor® STC (Standard Treatment Cell) was developed by Imbrium™ Systems to address the growing need to remove and isolate pollution from the storm drain system before it enters the environment. The Stormceptor STC targets hydrocarbons and total suspended solids (TSS) in stormwater runoff. It improves water quality by removing contaminants through the gravitational settling of fine sediments and floatation of hydrocarbons while preventing the re-suspension or scour of previously captured pollutants.

The development of the Stormceptor STC revolutionized stormwater treatment, and created an entirely new category of environmental technology. Protecting thousands of waterways around the world, the Stormceptor System has set the standard for effective stormwater treatment.

## 1.1. Patent Information

The Stormceptor technology is protected by the following patents:

- Australia Patent No. 693,164 • 693,164 • 707,133 • 729,096 • 779401
- Austrian Patent No. 289647
- Canadian Patent No 2,009,208 • 2,137,942 • 2,175,277 • 2,180,305 • 2,180,383 • 2,206,338 • 2,327,768 (Pending)
- China Patent No 1168439
- Denmark DK 711879
- German DE 69534021
- Indonesian Patent No 16688
- Japan Patent No 9-11476 (Pending)
- Korea 10-2000-0026101 (Pending)
- Malaysia Patent No PI9701737 (Pending)
- New Zealand Patent No 314646
- United States Patent No 4,985,148 • 5,498,331 • 5,725,760 • 5,753,115 • 5,849,181 • 6,068,765 • 6,371,690
- Stormceptor OSR Patent Pending • Stormceptor LCS Patent Pending

# 2. Stormceptor Design Overview

## 2.1. Design Philosophy

The patented Stormceptor System has been designed to focus on the environmental objective of providing long-term pollution control. The unique and innovative Stormceptor design allows for continuous positive treatment of runoff during all rainfall events, while ensuring that all captured pollutants are retained within the system, even during intense storm events.

An integral part of the Stormceptor design is PCSWMM for Stormceptor - sizing software developed in conjunction with Computational Hydraulics Inc. (CHI) and internationally acclaimed expert, Dr. Bill James. Using local historical rainfall data and continuous simulation modeling, this software allows a Stormceptor unit to be designed for each individual site and the corresponding water quality objectives.

By using PCSWMM for Stormceptor, the Stormceptor System can be designed to remove a wide range of particles (typically from 20 to 2,000 microns), and can also be customized to remove a specific particle size distribution (PSD). The specified PSD should accurately reflect what is in the stormwater runoff to ensure the device is achieving the desired water quality objective. Since stormwater runoff contains small particles (less than 75 microns), it is important to design a treatment system to remove smaller particles in addition to coarse particles.

## 2.2. Benefits

The Stormceptor System removes free oil and suspended solids from stormwater, preventing spills and non-point source pollution from entering downstream lakes and rivers. The key benefits, capabilities and applications of the Stormceptor System are as follows:

- Provides continuous positive treatment during all rainfall events
- Can be designed to remove over 80% of the annual sediment load
- Removes a wide range of particles
- Can be designed to remove a specific particle size distribution (PSD)
- Captures free oil from stormwater
- Prevents scouring or re-suspension of trapped pollutants
- Pre-treatment to reduce maintenance costs for downstream treatment measures (ponds, swales, detention basins, filters)
- Groundwater recharge protection
- Spills capture and mitigation
- Simple to design and specify
- Designed to your local watershed conditions
- Small footprint to allow for easy retrofit installations
- Easy to maintain (vacuum truck)
- Multiple inlets can connect to a single unit
- Suitable as a bend structure
- Pre-engineered for traffic loading (minimum AASHTO HS-20)
- Minimal elevation drop between inlet and outlet pipes
- Small head loss
- Additional protection provided by an 18" (457 mm) fiberglass skirt below the top of the insert, for the containment of hydrocarbons in the event of a spill.

## 2.3. Environmental Benefit

Freshwater resources are vital to the health and welfare of their surrounding communities. There is increasing public awareness, government regulations and corporate commitment to reducing the pollution entering our waterways. A major source of this pollution originates from stormwater runoff from urban areas. Rainfall runoff carries oils, sediment and other contaminants from roads and parking lots discharging directly into our streams, lakes and coastal waterways.

The Stormceptor System is designed to isolate contaminants from getting into the natural environment. The Stormceptor technology provides protection for the environment from spills that occur at service stations and vehicle accident sites, while also removing contaminated sediment in runoff that washes from roads and parking lots.

### 3. Key Operation Features

#### 3.1. Scour Prevention

A key feature of the Stormceptor System is its patented scour prevention technology. This innovation ensures pollutants are captured and retained during all rainfall events, even extreme storms. The Stormceptor System provides continuous positive treatment for all rainfall events, including intense storms. Stormceptor slows incoming runoff, controlling and reducing velocities in the lower chamber to create a non-turbulent environment that promotes free oils and floatable debris to rise and sediment to settle.

The patented scour prevention technology, the fiberglass insert, regulates flows into the lower chamber through a combination of a weir and orifice while diverting high energy flows away through the upper chamber to prevent scouring. Laboratory testing demonstrated no scouring when tested up to 125% of the unit's operating rate, with the unit loaded to 100% sediment capacity (NJDEP, 2005). Second, the depth of the lower chamber ensures the sediment storage zone is adequately separated from the path of flow in the lower chamber to prevent scouring.

#### 3.2. Operational Hydraulic Loading Rate

Designers and regulators need to evaluate the treatment capacity and performance of manufactured stormwater treatment systems. A commonly used parameter is the "operational hydraulic loading rate" which originated as a design methodology for wastewater treatment devices.

Operational hydraulic loading rate may be calculated by dividing the flow rate into a device by its settling area. This represents the critical settling velocity that is the prime determinant to quantify the influent particle size and density captured by the device. PCSWMM for Stormceptor uses a similar parameter that is calculated by dividing the hydraulic detention time in the device by the fall distance of the sediment.

$$v_{sc} = \frac{H}{\theta_H} = \frac{Q}{A_s}$$

Where:

$v_{sc}$  = critical settling velocity, ft/s (m/s)

H = tank depth, ft (m)

$\theta_H$  = hydraulic detention time, ft/s (m/s)

Q = volumetric flow rate, ft<sup>3</sup>/s (m<sup>3</sup>/s)

$A_s$  = surface area, ft<sup>2</sup> (m<sup>2</sup>)

(Tchobanoglous, G. and Schroeder, E.D. 1987. Water Quality. Addison Wesley.)

Unlike designing typical wastewater devices, stormwater systems are designed for highly variable flow rates including intense peak flows. PCSWMM for Stormceptor incorporates all of the flows into its calculations, ensuring that the operational hydraulic loading rate is considered not only for one flow rate, but for all flows including extreme events.

#### 3.3. Double Wall Containment

The Stormceptor System was conceived as a pollution identifier to assist with identifying illicit discharges. The fiberglass insert has a continuous skirt that lines the concrete barrel wall for a depth of 18 inches (457 mm) that provides double wall containment for hydrocarbons storage. This protective barrier ensures that toxic floatables do not migrate through the concrete wall into the surrounding soils.

## 4. Stormceptor Product Line

### 4.1. Stormceptor Models

A summary of Stormceptor models and capacities are listed in Table 1.

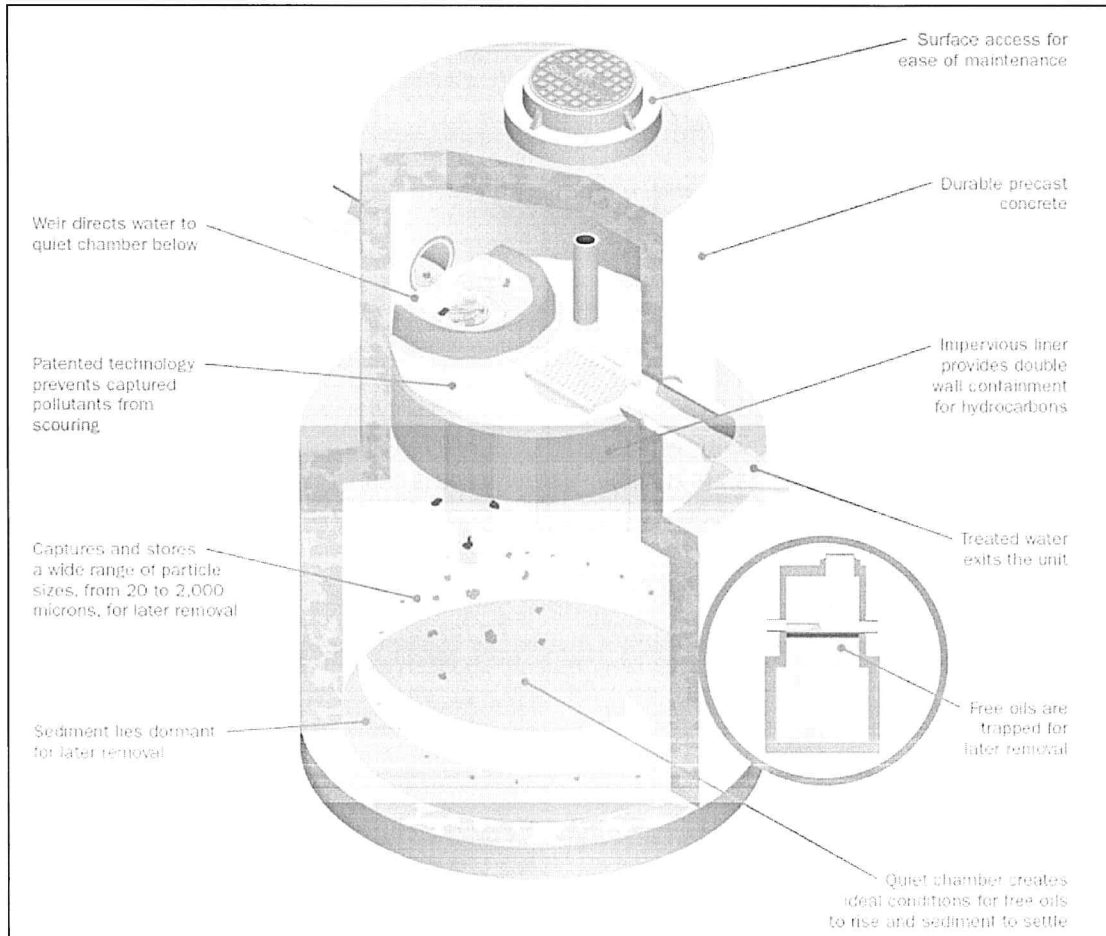
Table 1. Stormceptor Models

Stormceptor Model	Total Storage Volume U.S. Gal (L)	Hydrocarbon Storage Capacity U.S. Gal (L)	Maximum Sediment Capacity ft <sup>3</sup> (L)
STC 450i	470 (1,780)	86 (330)	46 (1,302)
STC 900	952 (3,600)	251 (950)	89 (2,520)
STC 1200	1,234 (4,670)	251 (950)	127 (3,596)
STC 1800	1,833 (6,940)	251 (950)	207 (5,861)
STC 2400	2,462 (9,320)	840 (3,180)	205 (5,805)
STC 3600	3,715 (1,406)	840 (3,180)	373 (10,562)
STC 4800	5,059 (1,950)	909 (3,440)	543 (15,376)
STC 6000	6,136 (23,230)	909 (3,440)	687 (19,453)
STC 7200	7,420 (28,090)	1,059 (4,010)	839 (23,757)
STC 11000	11,194 (42,370)	2,797 (10, 590)	1,086 (30,752)
STC 13000	13,348 (50,530)	2,797 (10, 590)	1,374 (38,907)
STC 16000	15,918 (60,260)	3,055 (11, 560)	1,677 (47,487)

NOTE: Storage volumes may vary slightly from region to region. For detailed information, contact your local Stormceptor representative.

### 4.2. Inline Stormceptor

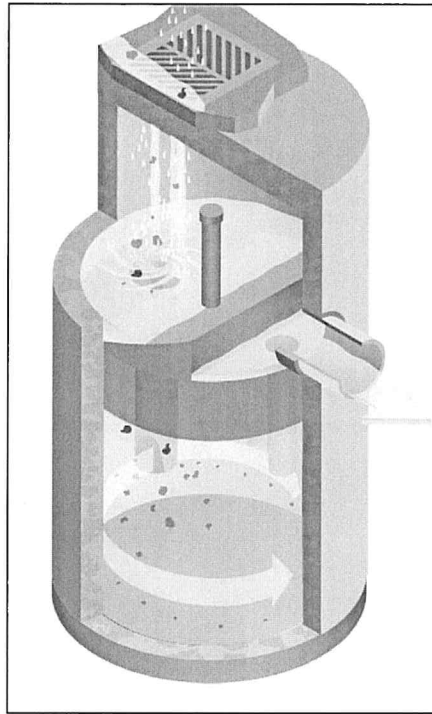
The Inline Stormceptor, Figure 1, is the standard design for most stormwater treatment applications. The patented Stormceptor design allows the Inline unit to maintain continuous positive treatment of total suspended solids (TSS) year-round, regardless of flow rate. The Inline Stormceptor is composed of a precast concrete tank with a fiberglass insert situated at the invert of the storm sewer pipe, creating an upper chamber above the insert and a lower chamber below the insert.



**Figure 1. Inline Stormceptor**

## Operation

As water flows into the Stormceptor unit, it is slowed and directed to the lower chamber by a weir and drop tee. The stormwater enters the lower chamber, a non-turbulent environment, allowing free oils to rise and sediment to settle. The oil is captured underneath the fiberglass insert and shielded from exposure to the concrete walls by a fiberglass skirt. After the pollutants separate, treated water continues up a riser pipe, and exits the lower chamber on the downstream side of the weir before leaving the unit. During high flow events, the Stormceptor System's patented scour prevention technology ensures continuous pollutant removal and prevents re-suspension of previously captured pollutants.



**Figure 2. Inlet Stormceptor**

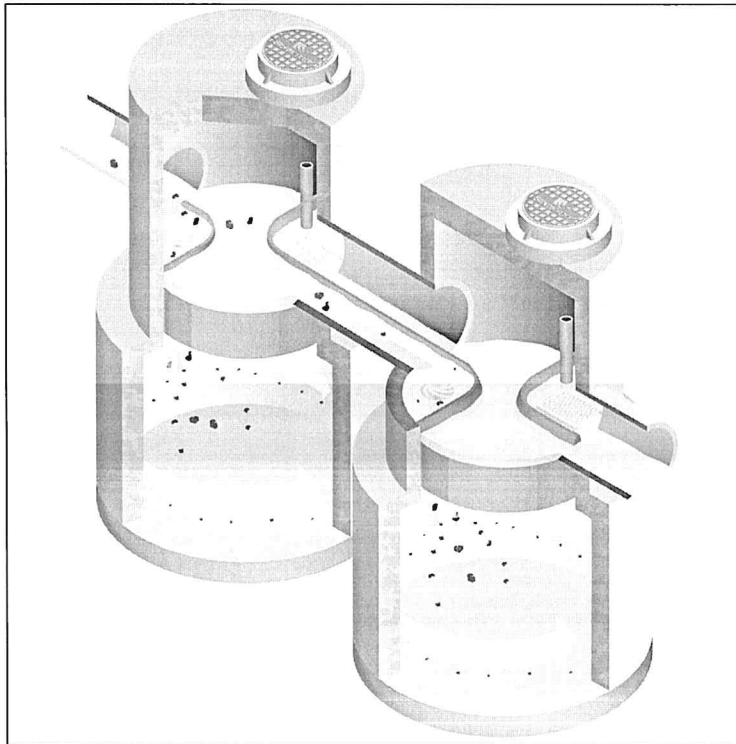
#### **4.3. Inlet Stormceptor**

The Inlet Stormceptor System, Figure 2, was designed to provide protection for parking lots, loading bays, gas stations and other spill-prone areas. The Inlet Stormceptor is designed to remove sediment from stormwater introduced through a grated inlet, a storm sewer pipe, or both.

The Inlet Stormceptor design operates in the same manner as the Inline unit, providing continuous positive treatment, and ensuring that captured material is not re-suspended.

#### **4.4. Series Stormceptor**

Designed to treat larger drainage areas, the Series Stormceptor System, Figure 3, consists of two adjacent Stormceptor models that function in parallel. This design eliminates the need for additional structures and piping to reduce installation costs.



**Figure 3. Series System**

The Series Stormceptor design operates in the same manner as the Inline unit, providing continuous positive treatment, and ensuring that captured material is not re-suspended.

## 5. Sizing the Stormceptor System

The Stormceptor System is a versatile product that can be used for many different aspects of water quality improvement. While addressing these needs, there are conditions that the designer needs to be aware of in order to size the Stormceptor model to meet the demands of each individual site in an efficient and cost-effective manner.

PCSWMM for Stormceptor is the support tool used for identifying the appropriate Stormceptor model. In order to size a unit, it is recommended the user follow the seven design steps in the program. The steps are as follows:

### STEP 1 – Project Details

The first step prior to sizing the Stormceptor System is to clearly identify the water quality objective for the development. It is recommended that a level of annual sediment (TSS) removal be identified and defined by a particle size distribution.

### STEP 2 – Site Details

Identify the site development by the drainage area and the level of imperviousness. It is recommended that imperviousness be calculated based on the actual area of imperviousness based on paved surfaces, sidewalks and rooftops.

### STEP 3 – Upstream Attenuation

The Stormceptor System is designed as a water quality device and is sometimes used in conjunction with onsite water quantity control devices such as ponds or underground detention systems. When possible, a greater benefit is typically achieved when installing a Stormceptor unit upstream of a detention facility. By placing the Stormceptor unit upstream of a detention structure, a benefit of less maintenance of the detention facility is realized.

## STEP 4 – Particle Size Distribution

It is critical that the PSD be defined as part of the water quality objective. PSD is critical for the design of treatment system for a unit process of gravity settling and governs the size of a treatment system. A range of particle sizes has been provided and it is recommended that clays and silt-sized particles be considered in addition to sand and gravel-sized particles. Options and sample PSDs are provided in PCSWMM for Stormceptor. The default particle size distribution is the Fine Distribution, Table 2, option.

Table 2. Fine Distribution

Particle Size	Distribution	Specific Gravity
20	20%	1.3
60	20%	1.8
150	20%	2.2
400	20%	2.65
2000	20%	2.65

If the objective is the long-term removal of 80% of the total suspended solids on a given site, the PSD should be representative of the expected sediment on the site. For example, a system designed to remove 80% of coarse particles (greater than 75 microns) would provide relatively poor removal efficiency of finer particles that may be naturally prevalent in runoff from the site.

Since the small particle fraction contributes a disproportionately large amount of the total available particle surface area for pollutant adsorption, a system designed primarily for coarse particle capture will compromise water quality objectives.

## STEP 5 – Rainfall Records

Local historical rainfall has been acquired from the U.S. National Oceanic and Atmospheric Administration, Environment Canada and regulatory agencies across North America. The rainfall data provided with PCSMM for Stormceptor provides an accurate estimation of small storm hydrology by modeling actual historical storm events including duration, intensities and peaks.

## STEP 6 – Summary

At this point, the program may be executed to predict the level of TSS removal from the site. Once the simulation has completed, a table shall be generated identifying the TSS removal of each Stormceptor unit.

## STEP 7 – Sizing Summary

Performance estimates of all Stormceptor units for the given site parameters will be displayed in a tabular format. The unit that meets the water quality objective, identified in Step 1, will be highlighted.

## 5.1. PCSWMM for Stormceptor

The Stormceptor System has been developed in conjunction with PCSWMM for Stormceptor as a technological solution to achieve water quality goals. Together, these two innovations model, simulate, predict and calculate the water quality objectives desired by a design engineer for TSS removal.

PCSWMM for Stormceptor is a proprietary sizing program which uses site specific inputs to a computer model to simulate sediment accumulation, hydrology and long-term total suspended solids removal. The model has been calibrated to field monitoring results from Stormceptor units that have been monitored in North America. The sizing methodology can be described by three processes:

1. Determination of real time hydrology
2. Buildup and wash off of TSS from impervious land areas
3. TSS transport through the Stormceptor (settling and discharge). The use of a calibrated model is the preferred method for sizing stormwater quality structures for the following reasons:
  - » The hydrology of the local area is properly and accurately incorporated in the sizing (distribution of flows, flow rate ranges and peaks, back-to-back storms, inter-event times)
  - » The distribution of TSS with the hydrology is properly and accurately considered in the sizing
  - » Particle size distribution is properly considered in the sizing
  - » The sizing can be optimized for TSS removal
  - » The cost benefit of alternate TSS removal criteria can be easily assessed
  - » The program assesses the performance of all Stormceptor models. Sizing may be selected based on a specific water quality outcome or based on the Maximum Extent Practicable

For more information regarding PCSWMM for Stormceptor, contact your local Stormceptor representative, or visit [www.imbriumsystems.com](http://www.imbriumsystems.com) to download a free copy of the program.

## 5.2. Sediment Loading Characteristics

The way in which sediment is transferred to stormwater can have a considerable effect on which type of system is implemented. On typical impervious surfaces (e.g. parking lots) sediment will build over time and wash off with the next rainfall. When rainfall patterns are examined, a short intense storm will have a higher concentration of sediment than a long slow drizzle. Together with rainfall data representing the site's typical rainfall patterns, sediment loading characteristics play a part in the correct sizing of a stormwater quality device.

### Typical Sites

For standard site design of the Stormceptor System, PCSWMM for Stormceptor is utilized to accurately assess the unit's performance. As an integral part of the product's design, the program can be used to meet local requirements for total suspended solid removal. Typical installations of manufactured stormwater treatment devices would occur on areas such as paved parking lots or paved roads. These are considered "stable" surfaces which have non – erodible surfaces.

### Unstable Sites

While standard sites consist of stable concrete or asphalt surfaces, sites such as gravel parking lots, or maintenance yards with stockpiles of sediment would be classified as "unstable". These types of sites do not exhibit first flush characteristics, are highly erodible and exhibit atypical sediment loading characteristics and must therefore be sized more carefully. Contact your local Stormceptor representative for assistance in selecting a proper unit sized for such unstable sites.

## 6. Spill Controls

When considering the removal of total petroleum hydrocarbons (TPH) from a storm sewer system there are two functions of the system: oil removal, and spill capture.

'Oil Removal' describes the capture of the minute volumes of free oil mobilized from impervious surfaces. In this instance relatively low concentrations, volumes and flow rates are considered. While the Stormceptor unit will still provide an appreciable oil removal function during higher flow events and/or with higher TPH concentrations, desired effluent limits may be exceeded under these conditions.

'Spill Capture' describes a manner of TPH removal more appropriate to recovery of a relatively high volume of a single phase deleterious liquid that is introduced to the storm sewer system over a relatively short duration. The two design criteria involved when considering this manner of introduction are overall volume and the specific gravity of the material. A standard Stormceptor unit will be able to capture and retain a maximum spill volume and a minimum specific gravity.

For spill characteristics that fall outside these limits, unit modifications are required. Contact your local Stormceptor Representative for more information.

One of the key features of the Stormceptor technology is its ability to capture and retain spills. While the standard Stormceptor System provides excellent protection for spill control, there are additional options to enhance spill protection if desired.

### 6.1. Oil Level Alarm

The oil level alarm is an electronic monitoring system designed to trigger a visual and audible alarm when a pre-set level of oil is reached within the lower chamber. As a standard, the oil

level alarm is designed to trigger at approximately 85% of the unit's available depth level for oil capture. The feature acts as a safeguard against spills caused by exceeding the oil storage capacity of the separator and eliminates the need for manual oil level inspection.

The oil level alarm installed on the Stormceptor insert is illustrated in Figure 4.

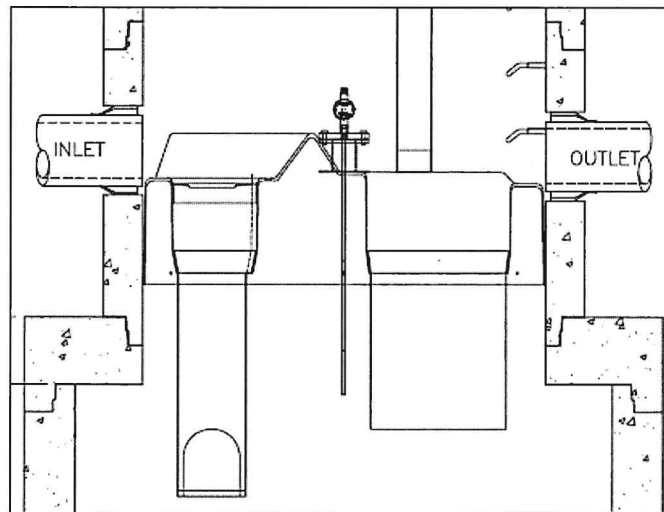


Figure 4. Oil level alarm

### 6.2. Increased Volume Storage Capacity

The Stormceptor unit may be modified to store a greater spill volume than is typically available. Under such a scenario, instead of installing a larger than required unit, modifications can be made to the recommended Stormceptor model to accommodate larger volumes. Contact your local Stormceptor representative for additional information and assistance for modifications.

## 7. Stormceptor Options

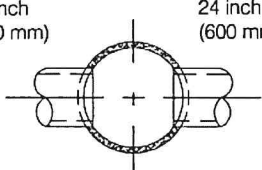
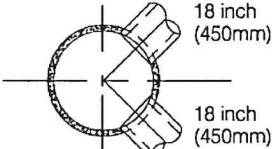
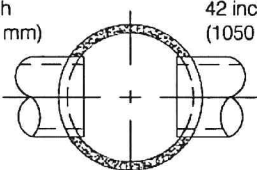
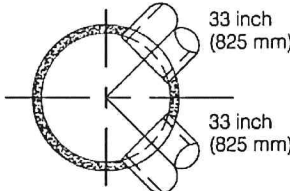
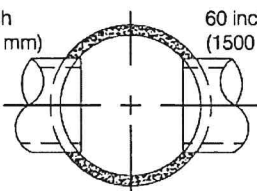
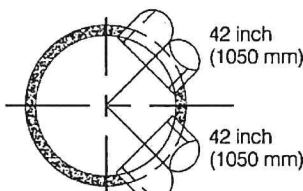
The Stormceptor System allows flexibility to incorporate to existing and new storm drainage infrastructure. The following section identifies considerations that should be reviewed when installing the system into a drainage network. For conditions that fall outside of the recommendations in this section, please contact your local Stormceptor representative for further guidance.

### 7.1. Installation Depth Minimum Cover

The minimum distance from the top of grade to the crown of the inlet pipe is 24 inches (600 mm). For situations that have a lower minimum distance, contact your local Stormceptor representative.

### 7.2. Maximum Inlet and Outlet Pipe Diameters

Maximum inlet and outlet pipe diameters are illustrated in Figure 5. Contact your local Stormceptor representative for larger pipe diameters

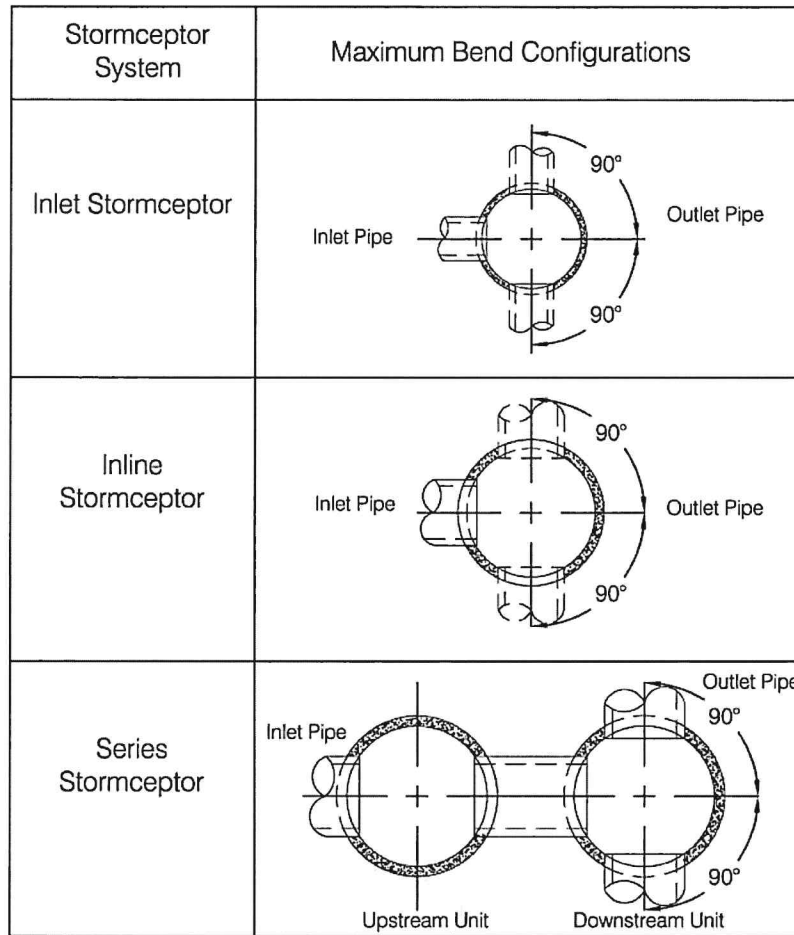
Upper Chamber Diameter	Maximum Pipe Diameters for Straight Through and 90° Bends (Based on Concrete Pipe)	
Inlet Stormceptor	24 inch (600 mm) 	24 inch (600 mm) 
Inline Stormceptor	42 inch (1050 mm) 	33 inch (825 mm) 
Inline Stormceptor or Series Stormceptor	60 inch (1500 mm) 	42 inch (1050 mm) 

**Figure 5. Maximum pipe diameters for straight through and bend applications**

\*The bend should only be incorporated into the second structure (downstream structure) of the Series Stormceptor System

### 7.3. Bends

The Stormceptor System can be used to change horizontal alignment in the storm drain network up to a maximum of 90 degrees. Figure 6 illustrates the typical bend situations of the Stormceptor System. Bends should only be applied to the second structure (downstream structure) of the Series Stormceptor System.



**Figure 6. Maximum bend angles**

#### 7.4. Multiple Inlet Pipes

The Inlet and Inline Stormceptor System can accommodate two or more inlet pipes. The maximum number of inlet pipes that can be accommodated into a Stormceptor unit is a function of the number, alignment and diameter of the pipes and its effects on the structural integrity of the precast concrete. When multiple inlet pipes are used for new developments, each inlet pipe shall have an invert elevation 3 inches (75 mm) higher than the outlet pipe invert elevation.

#### 7.5. Inlet/Outlet Pipe Invert Elevations

Recommended inlet and outlet pipe invert differences are listed in Table 3.

**Table 3. Recommended Drops Between Inlet and Outlet Pipe Inverts**

Number of Inlet Pipes	Inlet System	In-Line System	Series System
1	3 inches (75 mm)	1 inch (25 mm)	3 inches (75 mm)
>1	3 inches (75 mm)	3 inches (75 mm)	Not Applicable

#### 7.6. Shallow Stormceptor

In cases where there may be restrictions to the depth of burial of storm sewer systems. In this situation, for selected Stormceptor models, the lower chamber components may be increased in diameter to reduce the overall depth of excavation required.

#### 7.7. Customized Live Load

The Stormceptor system is typically designed for local highway truck loading (AASHTO HS- 20). When the project requires live loads greater than HS-20, the Stormceptor System may be customized structurally for a pre-specified live load. Contact your local Stormceptor representative for customized loading conditions.

## 7.8. Pre-treatment

The Stormceptor System may be sized to remove sediment and for spills control in conjunction with other stormwater BMPs to meet the water quality objective. For pretreatment applications, the Stormceptor System should be the first unit in a treatment train. The benefits of pre-treatment include the extension of the operational life (extension of maintenance frequency) of large stormwater management facilities, prevention of spills and lower total life-cycle maintenance cost.

## 7.9. Head loss

The head loss through the Stormceptor System is similar to a 60 degree bend at a manhole. The K value for calculating minor losses is approximately 1.3 (minor loss =  $k \cdot 1.3v^2/2g$ ).

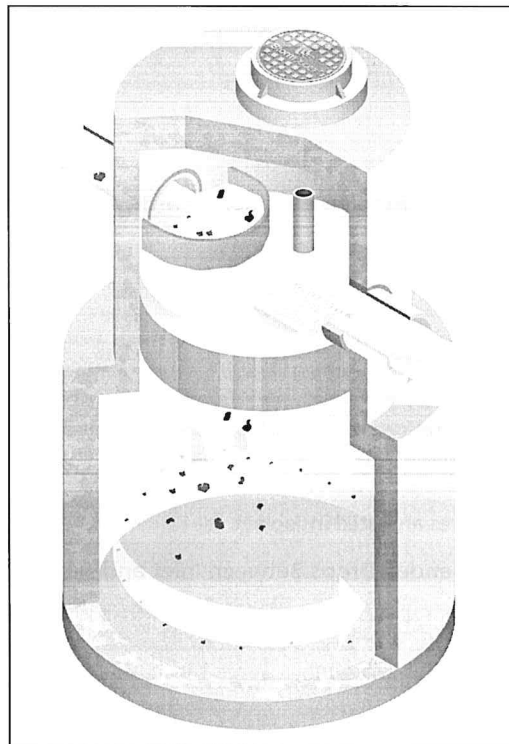
However, when a Submerged modification is applied to a Stormceptor unit, the corresponding K value is 4.

## 7.10. Submerged

The Submerged modification, Figure 7, allows the Stormceptor System to operate in submerged or partially submerged storm sewers. This configuration can be installed on all models of the Stormceptor System by modifying the fiberglass insert. A customized weir height and a secondary drop tee are added.

Submerged instances are defined as standing water in the storm drain system during zero flow conditions. In these instances, the following information is necessary for the proper design and application of submerged modifications:

- Stormceptor top of grade elevation
- Stormceptor outlet pipe invert elevation
- Standing water elevation



**Figure 7. Submerged Stormceptor**

## 8. Comparing Technologies

Designers have many choices available to achieve water quality goals in the treatment of stormwater runoff. Since many alternatives are available for use in stormwater quality treatment it is important to consider how to make an appropriate comparison between “approved alternatives”. The following is a guide to assist with the accurate comparison of differing technologies and performance claims.

### 8.1. Particle Size Distribution (PSD)

The most sensitive parameter to the design of a stormwater quality device is the selection of the design particle size. While it is recommended that the actual particle size distribution (PSD) for sites be measured prior to sizing, alternative values for particle size should be selected to represent what is likely to occur naturally on the site. A reasonable estimate of a particle size distribution likely to be found on parking lots or other impervious surfaces should consist of a wide range of particles such as 20 microns to 2,000 microns (Ontario MOE, 1994).

There is no absolute right particle size distribution or specific gravity and the user is cautioned to review the site location, characteristics, material handling practices and regulatory requirements when selecting a particle size distribution. When comparing technologies, designs using different PSDs will result in incomparable TSS removal efficiencies. The PSD of the TSS removed needs to be standard between two products to allow for an accurate comparison.

### 8.2. Scour Prevention

In order to accurately predict the performance of a manufactured treatment device, there must be confidence that it will perform under all conditions. Since rainfall patterns cannot be predicted, stormwater quality devices placed in storm sewer systems must be able to withstand extreme events, and ensure that all pollutants previously captured are retained in the system.

In order to have confidence in a system’s performance under extreme conditions, independent validation of scour prevention is essential when examining different technologies. Lack of independent verification of scour prevention should make a designer wary of accepting any product’s performance claims.

### 8.3. Hydraulics

Full scale laboratory testing has been used to confirm the hydraulics of the Stormceptor System. Results of lab testing have been used to physically design the Stormceptor System and the sewer pipes entering and leaving the unit. Key benefits of Stormceptor are:

- Low head loss (typical k value of 1.3)
- Minimal inlet/outlet invert elevation drop across the structure
- Use as a bend structure
- Accommodates multiple inlets

The adaptability of the treatment device to the storm sewer design infrastructure can affect the overall performance and cost of the site.

### 8.4. Hydrology

Stormwater quality treatment technologies need to perform under varying climatic conditions. These can vary from long low intensity rainfall to short duration, high intensity storms. Since a treatment device is expected to perform under all these conditions, it makes sense that any system’s design should accommodate those conditions as well.

Long-term continuous simulation evaluates the performance of a technology under the varying conditions expected in the climate of the subject site. Single, peak event design does not provide this information and is not equivalent to long-term simulation. Designers should request long-term simulation performance to ensure the technology can meet the long-term water quality objective.

## 9. Testing

The Stormceptor System has been the most widely monitored stormwater treatment technology in the world. Performance verification and monitoring programs are completed to the strictest standards and integrity. Since its introduction in 1990, numerous independent field tests and studies detailing the effectiveness of the Stormceptor System have been completed.

- Coventry University, UK – 97% removal of oil, 83% removal of sand and 73% removal of peat
- National Water Research Institute, Canada, - scaled testing for the development of the Stormceptor System identifying both TSS removal and scour prevention.
- New Jersey TARP Program – full scale testing of an STC 900 demonstrating 75% TSS removal of particles from 1 to 1000 microns. Scour testing completed demonstrated that the system does not scour. The New Jersey Department of Environmental Protection was followed.
- City of Indianapolis – full scale testing of an STC 900 demonstrating over 80% TSS removal of particles from 50 microns to 300 microns at 130% of the unit's operating rate. Scour testing completed demonstrated that the system does not scour.
- Westwood Massachusetts (1997), demonstrated >80% TSS removal
- Como Park (1997), demonstrated 76% TSS removal
- Ontario MOE SWAMP Program – 57% removal of 1 to 25 micron particles
- Laval Quebec – 50% removal of 1 to 25 micron particles

## 10. Installation

The installation of the concrete Stormceptor should conform in general to state highway, or local specifications for the installation of manholes. Selected sections of a general specification that are applicable are summarized in the following sections.

### 10.1. Excavation

Excavation for the installation of the Stormceptor should conform to state highway, or local specifications. Topsoil removed during the excavation for the Stormceptor should be stockpiled in designated areas and should not be mixed with subsoil or other materials.

Topsoil stockpiles and the general site preparation for the installation of the Stormceptor should conform to state highway or local specifications.

The Stormceptor should not be installed on frozen ground. Excavation should extend a minimum of 12 inches (300 mm) from the precast concrete surfaces plus an allowance for shoring and bracing where required. If the bottom of the excavation provides an unsuitable foundation additional excavation may be required.

In areas with a high water table, continuous dewatering may be required to ensure that the excavation is stable and free of water.

### 10.2. Backfilling

Backfill material should conform to state highway or local specifications. Backfill material should be placed in uniform layers not exceeding 12 inches (300mm) in depth and compacted to state highway or local specifications.

## 11. Stormceptor Construction Sequence

The concrete Stormceptor is installed in sections in the following sequence:

1. Aggregate base
2. Base slab
3. Lower chamber sections
4. Upper chamber section with fiberglass insert
5. Connect inlet and outlet pipes
6. Assembly of fiberglass insert components (drop tee, riser pipe, oil cleanout port and orifice plate)
7. Remainder of upper chamber
8. Frame and access cover

The precast base should be placed level at the specified grade. The entire base should be in contact with the underlying compacted granular material. Subsequent sections, complete with joint seals, should be installed in accordance with the precast concrete manufacturer's recommendations.

Adjustment of the Stormceptor can be performed by lifting the upper sections free of the excavated area, re-leveling the base and re-installing the sections. Damaged sections and gaskets should be repaired or replaced as necessary. Once the Stormceptor has been constructed, any lift holes must be plugged with mortar.

## 12. Maintenance

### 12.1. Health and Safety

The Stormceptor System has been designed considering safety first. It is recommended that confined space entry protocols be followed if entry to the unit is required. In addition, the fiberglass insert has the following health and safety features:

- Designed to withstand the weight of personnel
- A safety grate is located over the 24 inch (600 mm) riser pipe opening
- Ladder rungs can be provided for entry into the unit, if required

### 12.2. Maintenance Procedures

Maintenance of the Stormceptor system is performed using vacuum trucks. No entry into the unit is required for maintenance (in most cases). The vacuum service industry is a well-established sector of the service industry that cleans underground tanks, sewers and catch basins. Costs to clean a Stormceptor will vary based on the size of unit and transportation distances.

The need for maintenance can be determined easily by inspecting the unit from the surface. The depth of oil in the unit can be determined by inserting a dipstick in the oil inspection/cleanout port.

Similarly, the depth of sediment can be measured from the surface without entry into the Stormceptor via a dipstick tube equipped with a ball valve. This tube would be inserted through the riser pipe. Maintenance should be performed once the sediment depth exceeds the guideline values provided in the Table 4.

**Table 4. Sediment Depths Indicating Required Servicing\***

Particle Size	Specific Gravity
Model	Sediment Depth inches (mm)
450i	8 (200)
900	8 (200)
1200	10 (250)
1800	15 (381)
2400	12 (300)
3600	17 (430)
4800	15 (380)
6000	18 (460)
7200	15 (381)
11000	17 (380)
13000	20 (500)
16000	17 (380)
* based on 15% of the Stormceptor unit's total storage	

Although annual servicing is recommended, the frequency of maintenance may need to be increased or reduced based on local conditions (i.e. if the unit is filling up with sediment more quickly than projected, maintenance may be required semi-annually; conversely once the site has stabilized maintenance may only be required every two or three years).

Oil is removed through the oil inspection/cleanout port and sediment is removed through the riser pipe. Alternatively oil could be removed from the 24 inches (600 mm) opening if water is removed from the lower chamber to lower the oil level below the drop pipes.

The following procedures should be taken when cleaning out Stormceptor:

1. Check for oil through the oil cleanout port
2. Remove any oil separately using a small portable pump
3. Decant the water from the unit to the sanitary sewer, if permitted by the local regulating authority, or into a separate containment tank
4. Remove the sludge from the bottom of the unit using the vacuum truck
5. Re-fill Stormceptor with water where required by the local jurisdiction

### 12.3. Submerged Stormceptor

Careful attention should be paid to maintenance of the Submerged Stormceptor System. In cases where the storm drain system is submerged, there is a requirement to plug both the inlet and outlet pipes to economically clean out the unit.

### 12.4. Hydrocarbon Spills

The Stormceptor is often installed in areas where the potential for spills is great. The Stormceptor System should be cleaned immediately after a spill occurs by a licensed liquid waste hauler.

### 12.5. Disposal

Requirements for the disposal of material from the Stormceptor System are similar to that of any other stormwater Best Management Practice (BMP) where permitted. Disposal options for the sediment may range from disposal in a sanitary trunk sewer upstream of a sewage treatment plant, to disposal in a sanitary landfill site. Petroleum waste products collected in the Stormceptor (free oil/chemical/fuel spills) should be removed by a licensed waste management company.

### 12.6. Oil Sheens

With a steady influx of water with high concentrations of oil, a sheen may be noticeable at the Stormceptor outlet. This may occur because a rainbow or sheen can be seen at very small oil concentrations (<10 mg/L). Stormceptor will remove over 98% of all free oil spills from storm sewer systems for dry weather or frequently occurring runoff events.

The appearance of a sheen at the outlet with high influent oil concentrations does not mean the unit is not working to this level of removal. In addition, if the influent oil is emulsified the Stormceptor will not be able to remove it. The Stormceptor is designed for free oil removal and not emulsified conditions.



## SUPPORT

Drawings and specifications are available at [www.ContechES.com](http://www.ContechES.com).

Site-specific design support is available from our engineers.

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