



July 8, 2014

Bidder:

The City of Traverse City will receive sealed bids in the Office of the City Manager, Second floor, Governmental Center, 400 Boardman Avenue, Traverse City, Michigan, 49684, until **Thursday, July 24, 2014, at 2:00 p.m.** for the following:

**2014/2015 TRAVERSE CITY STORM WATER TREATMENT SYSTEMS  
MAINTENANCE PROJECT**  
(specifications attached)

If the specifications are obtained from the City's website at [www.traversecitymi.gov](http://www.traversecitymi.gov) (services) it is the sole responsibility of the Bidder to check the website for updates and addendums prior to the bid being submitted. You may also register on the website to receive notifications when requests for proposals or bids, updates and addendums are posted.

The City of Traverse City reserves the right to accept or reject any or all bids, waive irregularities, and to accept the bids either on an entire or individual basis that is in the best interest of the City.

The City accepts no responsibility for any expense incurred by the Bidder in the preparation and presentation of a bid. Such expenses shall be borne exclusively by the Bidder.

Only the successful Bidder will be notified. If you so desire, you may call for results.

You must indicate on the outside of the sealed envelope that the bid is for the **"2014/2015 Traverse City Storm Water Treatment Systems Maintenance Project."**

You must submit **TWO (2) bids** to the City Manager's Office prior to the above-indicated time and date or the bid will not be accepted. Telefaxed or E-Mail bids will not be accepted.

Please note that if you have previously submitted an informal quote, you will still need to submit a sealed bid prior to the date and time specified above in order to be considered. Please ensure that all requirements listed in the specifications are met.

If you have any questions, please contact Mark Jones, Streets Superintendent at (231) 922-4900, ext. 112 before the bid is submitted.

PLEASE SUBMIT BID TO: Julie Dalton, Purchasing Agent  
City Manager's Office, Governmental Center  
Second Floor, 400 Boardman Avenue  
Traverse City, MI 49684

## INSTRUCTIONS TO BIDDERS

1. All bids must be submitted to Julie Dalton, Purchasing Agent, City of Traverse City, Governmental Center, Second Floor, 400 Boardman Avenue, Traverse City, Michigan, 49684, **no later than 2:00 p.m. on Thursday, July 24, 2014.**

2. All bids must be submitted in a sealed envelope and clearly marked **“2014/2015 Traverse City Storm Water Treatment Systems Maintenance Project.” TELEFAXED AND E-MAIL BIDS ARE NOT ACCEPTABLE.**

3. The bid form(s) must be completed and signed by an authorized representative of the Bidder.

4. The City reserves the right to accept or reject any or all proposals, waive irregularities, and to accept the bid which in its opinion is in the best interests of the City.

5. All bids must remain firm for a period of thirty (30) days following the City's receipt of the bid.

6. Payment shall be paid within 30 days of satisfactory completion of project. It is the Vendor's responsibility to submit an invoice to the City of Traverse City.

The City's standard practice is to run checks for the payment of bills received, on the 10<sup>th</sup> and 25<sup>th</sup> day of each month. In order to receive payment on the 10<sup>th</sup> or 25<sup>th</sup> of the month, the Vendor shall submit an invoice for all work completed up to the fifth or twentieth day of the month to the Department of Public Services, 625 Woodmere Avenue, Traverse City, Michigan, 49686. This normally allows enough time for the City to review and approve the Vendor's invoice and process it for payment. Failure of the Vendor to properly submit invoices by the fifth or twentieth day of the month may be cause for the City to postpone payment of the invoice until the next scheduled run of checks.

7. The City may withhold any portion of payment as necessary from loss on account of:

- Defective work not remedied, or
- Failure of Vendor to make payments properly to subcontractors for material or labor, or
- Damage to another Vendor, or
- Damage to City Property

8. The City reserves the right to delete 50% of the work without reducing the unit cost.

9. Standards. All work shall be done in accordance with current Michigan Department of State Highways Specifications and the Michigan Manual of Uniform Traffic Control Devices unless otherwise indicated.

10. Completion. Work on Phase 1 is to be completed before September 10, 2014, and work on Phase 2 is to be completed by May 29, 2015.

11. Experience. Bidders shall be experienced in this type of work and evidence of bidder's qualifications may be requested.

12. Insurance: The Vendor agrees not to change and agrees to maintain the following insurance throughout the period of performance of this Agreement. The Vendor will upon execution of this Agreement provide a certificate of insurance to the City Clerk. The policy shall contain endorsements stating that at least a 10-day notice will be given to the City prior to termination or any change in the policy; and in the case where Vendor is required to name the City as additional insured, and shall provide an endorsement stating that the City has been named as an additional insured onto such policy for all claims arising out of the Vendor's work. Should any required insurance be cancelled, materially reduced or expired, all activities under this Agreement shall immediately cease until substitute insurance in compliance with all requirements hereof has been procured and evidence thereof presented to the City.

A. Commercial General Liability. The Vendor shall acquire and maintain commercial general liability insurance coverage in the amount of \$1,000,000 per occurrence with the City being named as additional insured for all claims arising out of the Vendor's work, including completed operations coverage (if required in the Request for Proposals/Bids).

B. Workers Compensation. The parties shall maintain suitable workers compensation insurance pursuant to Michigan law and the Vendor shall provide a certificate of insurance or copy of state approval for self insurance to the City Clerk upon execution of this Agreement.

13. Traffic Control. Traffic shall be maintained during the Vendor's operations in accordance with the current Michigan Manual of Uniform Traffic Control Devices.

**Bidder - Please complete and return**

**BID SUMMARY**

**TITLE: 2014/2015 Traverse City Storm Water Treatment Systems  
Maintenance Projects**

**DUE DATE: Thursday, July 24, 2014 AT 2 PM**

Having carefully examined the attached specifications and any other applicable information, the undersigned proposes to furnish all items necessary for and reasonably incidental to the proper completion of this bid. Bidder submits this bid and agrees to meet or exceed all requirements and specifications unless otherwise indicated in writing and attached hereto.

Bidder certifies that as of the date of this bid the Company or he/she is not in arrears to the City of Traverse City for debt or contract and is in no way a defaulter as provided in Section 152, Chapter XVI of the Charter of the City of Traverse City.

Bidder understands and agrees, if selected as the successful Bidder, to accept a purchase/service order and to provide proof of the required insurance.

The Bidder shall comply with all applicable federal, state, local and building codes, laws, rules and regulations and obtain any required permits for this work.

The Bidder certifies that it is in compliance with the City's Nondiscrimination Policy as set forth in Administrative Order No. 47 and Chapter 605 of the City's Codified Ordinances.

The Bidder certifies that none of the following circumstances have occurred with respect to the Bidder, an officer of the Bidder, or an owner of a 25% or more share in the Bidder's business, within 3 years prior to the bid:

- (a) conviction of a criminal offense incident to the application for or performance of a contract;
- (b) conviction of embezzlement, theft, forgery, bribery, falsification or destruction of records, receiving stolen property, or any other offense which currently, seriously and directly reflects on the Bidder's business integrity;
- (c) conviction under state or federal antitrust statutes;
- (d) attempting to influence a public employee to breach ethical conduct standards; or
- (e) conviction of a criminal offense or other violation of other state, local, or federal law, as determined by a court of competent jurisdiction or an administrative proceeding, which in

the opinion of the City indicates that the bidder is unable to perform responsibility or which reflects a lack of integrity that could negatively impact or reflect upon the City of Traverse City, including but not limited to, any of the following offenses or violations of:

- i. The Natural Resources and Environmental Protection Act.
- ii. A persistent and knowing violation of the Michigan Consumer Protection Act.
- iii. Willful or persistent violations of the Michigan Occupational Health and Safety Act.
- iv. A violation of federal, local, or state civil rights, equal rights, or non-discrimination laws, rules, or regulations.
- v. Repeated or flagrant violations of laws related to the payment of wages and fringe benefits.

(f) the loss of a license or the right to do business or practice a profession, the loss or suspension of which indicates dishonesty, a lack of integrity, or a failure or refusal to perform in accordance with the ethical standards of the business or profession in question

Bidder understands that the City reserves the right to accept any or all bids in whole or part and to waive irregularities in any bid in the best interest of the City. The bid will be evaluated and awarded on the basis of the best value to the City. The criteria used by the City may include, but will not be limited to: ability, qualifications, timeframe, experience, price, type and amount of equipment, accessories, options, insurance, permits, licenses, other pertinent factors and overall capability to meet the needs of the City. The City is sales tax exempt – Government.

Having read and clearly understood the instructions to bidders, specifications for properly cleaning the storm water treatment systems and hauling/dumping the liquids and solids at the City DPS Complex, the quantities estimated and being thoroughly familiar with the work to be performed, I/we hereby submit the following bid as Exhibit A (attached).

## EXHIBIT A

**BIDDER: PLEASE COMPLETE AND RETURN**

**DUE: 2:00 p.m., Thursday  
July 24, 2014**

### **BID**

#### **2014/2015 Traverse City Storm Water Treatment Systems Maintenance Project**

The undersigned bidder, having carefully examined the local conditions affecting the cost of the work and with the specifications, contract documents and any other applicable information, hereby proposes to perform everything required to be performed and to provide and furnish all labor, materials, necessary tools, equipment and all utility and transportation services necessary to perform and complete this project in a workmanlike manner in accordance with the plans and the work description.

Bidder submits this bid and agrees to meet or exceed all of the City of Traverse City's requirements and specifications unless otherwise indicated in writing and attached hereto.

Bidder certifies that as of the date of this bid, Bidder's company or Bidder is not in arrear to the City of Traverse City for debt or contract and is in no way a defaulter as provided in Section 152, Chapter XVI of the Charter of the City of Traverse City.

Bidder understands and agrees, if selected as successful bidder, to enter with the City into the contract included with the specifications.

Bidder understands that the City reserves the right to accept any or all bids in whole or in part and to waive irregularities in any bid in the best interest of the City of Traverse City. The bids will be evaluated and awarded on the basis of the best value to the City. Criteria used will include, but not be limited to, price, accessories, options and overall capability meeting the needs of the City.

Bidder agrees that the bid may not be withdrawn for a period of sixty-three (63) days from the actual date of the opening of the bid.

The prices shown in this bid reflect an anticipated working time of **30** calendar days per phase starting from the dates specified in the "Notice to Proceed". Each phase consists of cleaning each complete system one time within the 30 day period. The Bidder shall be responsible for liquidated damages of Five Hundred Dollars (\$500) per calendar day for each day after the **30 day** working time limit per phase as specified in the Notice to Proceed. It is the intent of the City to have **Phase 1** of this project completed by **September 10, 2014**, and **Phase 2** of this project completed by **May 29, 2015**.

**2014/2015 Traverse City Storm Water Treatment Systems Maintenance Project**

<b>Item No</b>	<b>Est Qty</b>	<b>Unit</b>	<b>Description of Items</b>	<b>Unit Price</b>	<b>Total Price</b>
1	2	EA	Location # 1, Hannah Park, Aqua Swirl (approx. 2500 gallons)		
2	2	EA	Location # 2, Hannah Park, Stormceptor (approx. 2700 gallons)		
3	2	EA	Location # 3, Union St., CDS Technologies (approx. 1400 gallons)		
4	2	EA	Location # 4, Cass St., Vortsentry (approx. 3000 gallons)		
5	2	EA	Location # 5, East Bay Park, 8' Downstream Defender, City Tanks, Helix Filtration Tank (approx. 13800 gallons)		
6	2	EA	Location #6, East 8 <sup>th</sup> Street, 8' Downstream Defender, City Tank (approx. 6900 gallons)		
7	2	EA	Location # 7, Holiday Inn, 6' Downstream Defender, City Tank (approx. 5400 gallons)		
8	2	EA	Location # 8, Woodmere Avenue, City DPS Building, Aqua Swirl (approx. 1250 gallons)		
9	2	EA	Location # 9, Parking Lot C, Aqua Swirl (approx. 1250 gallons)		
10	2	EA	Location # 10, Hardy Parking Deck, Vortechinics, (approx. 1750 gallons)		
11	2	EA	Location # 11, Parking Lot E, City Tank (approx. 3900 gallons)		
12	2	EA	Location # 12, Bryant Park, 6' Downstream Defender, City Tanks (approx. 9300 gallons)		
13	2	EA	Location # 13, East Bay Park, 6' Downstream Defender, City Tank, Helix Filtration Tank (approx. 8400 gallons)		
14	2	EA	Location # 14, East Bay Park, 6' Downstream Defender, City Tank, Helix Filtration Tank (approx. 8400 gallons)		

**Total Bid for Project (Items 1 through 14, inclusive)**

\$ \_\_\_\_\_

**DOLLARS**

(write in amount)

The City reserves the right to delete up to 50% of this work (based on the total proposed bid) with no changes in the as-bid unit prices for the remainder of the work.

Accompanying this bid is a certified check, bank draft or a bid bond in the amount of five percent (5%) of the total bid payable to the City of Traverse City, which it is agreed will be forfeited to said City if the undersigned fails to enter into the contract specified in the specifications within fourteen (14) days after the contract is awarded to the undersigned.

Bidder guarantees that he or she has authority to submit this bid for the firm named below.

Submitted by:

_____ Signature	_____ Company Name
_____ Name and Title (Print)	_____ Company Address
_____ Phone	_____ City, State, Zip
	_____ Sole proprietorship/partnership/corporation
	_____ If corporation, state of corporation

REFERENCES: (include name of organization, address, contact person, daytime phone number, and length of time services have been performed).

1. \_\_\_\_\_  
\_\_\_\_\_
2. \_\_\_\_\_  
\_\_\_\_\_

SUBCONTRACTORS: (include name of organization, address, contact person, daytime phone number, and services to be performed).

1. \_\_\_\_\_  
\_\_\_\_\_
2. \_\_\_\_\_  
\_\_\_\_\_

The Aqua-Swirl<sup>®</sup> design allows for the sediment to accumulate in a semi-conical fashion as illustrated above. That is, the depth to sediment as measured below the water surface may be less in the center of the swirl chamber; and likewise, may be greater at the edges of the swirl chamber.

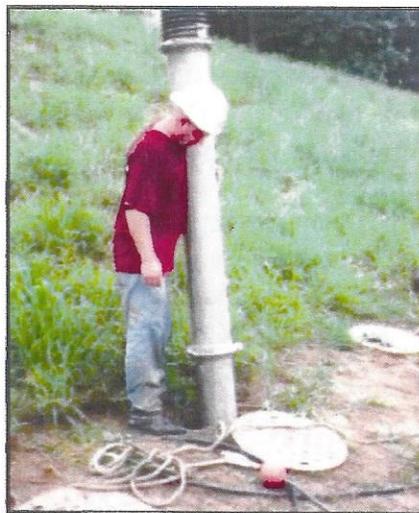
### **Aqua-Swirl<sup>®</sup> Cleanout Procedure**

Cleaning the Aqua-Swirl<sup>®</sup> is simple and quick. Free-floating oil and floatable debris can be observed and removed directly through the 30-inch service access riser provided. A vacuum truck is typically used to remove the accumulated sediment and debris. An advantage of the Aqua-Swirl<sup>®</sup> design is that the entire sediment storage area can be reached with a vacuum hose from the surface (reaching all the sides). Since there are no multiple or limited (hidden or “blind”) chambers in the Aqua-Swirl<sup>®</sup>, there are no restrictions to impede on-site maintenance tasks.

### **Disposal of Recovered Materials**

Disposal of recovered material is typically handled in the same fashion as catch basin cleanouts. AquaShield<sup>™</sup> recommends that all maintenance activities be performed in accordance with appropriate health and safety practices for the tasks and equipment being used.

AquaShield<sup>™</sup> also recommends that all materials removed from the Aqua-Swirl<sup>®</sup> and any external structures (e.g, bypass features) be handled and disposed in full accordance with any applicable local and state requirements.



Vacuum truck quickly cleans the Aqua-Swirl<sup>®</sup>  
from a single chamber

***Aqua-Swirl<sup>®</sup> Inspection and Maintenance Work Sheets  
on following pages***



## Recommended Stormceptor Maintenance Procedure

Maintenance of Stormceptor is performed using a vacuum truck.

No entry into the unit is required for maintenance. **DO NOT ENTER THE STORMCEPTOR CHAMBER** unless you have the proper personal safety equipment, have been trained and are qualified to enter a confined space, as identified by local Occupational Safety and Health Regulations (e.g. 29 CFR 1910.146 or Canada Occupational Safety and Health Regulations – SOR/86-304). Without the proper equipment, training and permit, entry into confined spaces can result in serious bodily harm and potentially death. Consult local, provincial, and/or state regulations to determine the requirements for confined space entry. Be aware, and take precaution that the Stormceptor fiberglass insert may be slippery. In addition, be aware that some units do not have a safety grate to cover the outlet riser pipe that leads to the submerged, lower chamber.

- Ideally maintenance should be conducted during dry weather conditions when no flow is entering the unit.
- Stormceptor is to be maintained through a standard surface manhole access cover.
- Insert the oil dipstick into the oil inspection port. If oil is present, pump off the oil layer into separate containment using a small pump and tubing.
- Maintenance cleaning of accumulated sediment is performed with a vacuum truck.
  - For 6-ft (1800 mm) diameter models and larger, the vacuum hose is inserted into the lower chamber via the 24-inch (610 mm) outlet riser pipe.
  - For 4-ft (1200 mm) diameter model, the removable drop tee is lifted out, and the vacuum hose is inserted into the lower chamber via the 12-inch (305 mm) drop tee hole.

Figure 5.

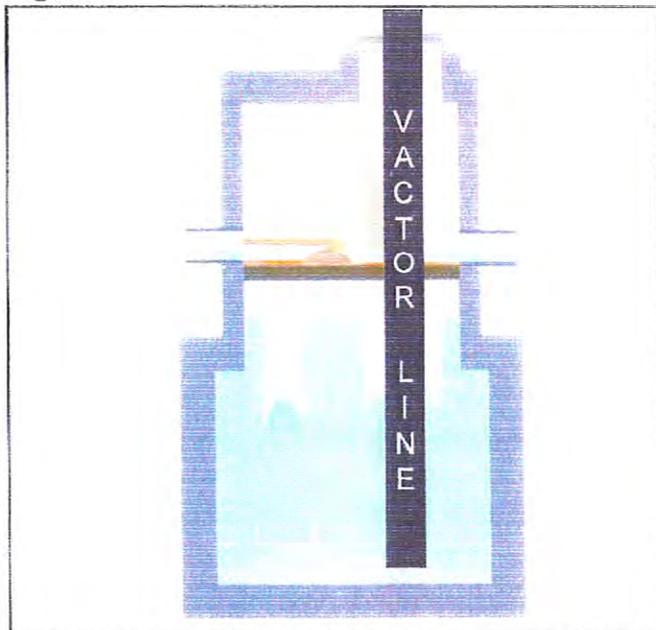
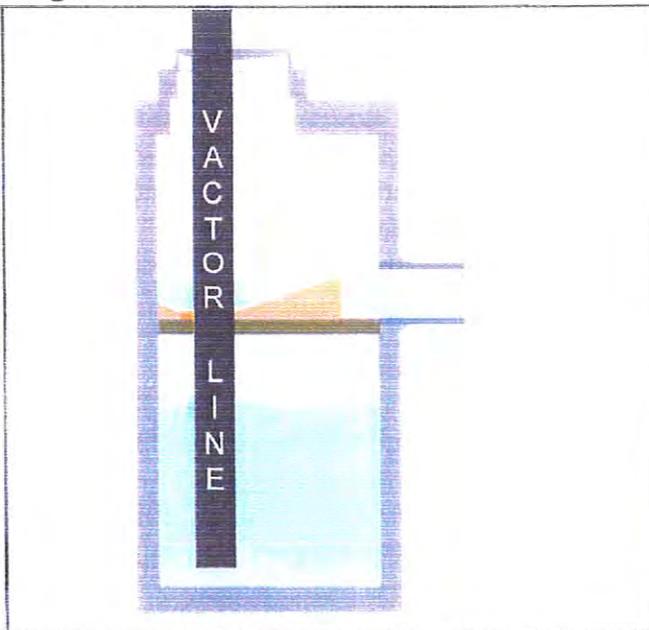


Figure 6.

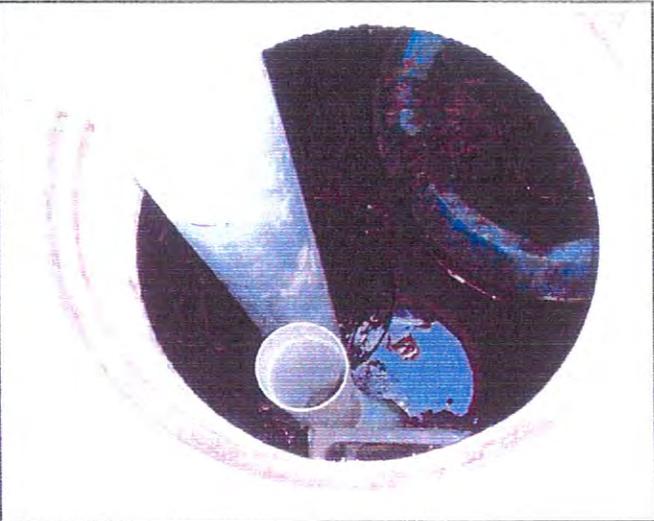


- Using the vacuum hose, decant the water from the lower chamber into a separate containment tank or to the sanitary sewer, if permitted by the local regulating authority.
- Remove the sediment sludge from the bottom of the unit using the vacuum hose. For large Stormceptor units, a flexible hose is often connected to the primary vacuum line for ease of movement in the lower chamber.
- Units that have not been maintained regularly, have surpassed the maximum recommended sediment capacity, or contain damaged components may require manned entry by trained personnel using safe and proper confined space entry procedures.

**Figure 5.**



**Figure 6.**



*A maintenance worker stationed at the above ground surface uses a vacuum hose to evacuate water, sediment, and debris from the system.*

***What is required for proper disposal?***

The requirements for the disposal of material removed from Stormceptor units are similar to that of any other stormwater treatment Best Management Practices (BMP). Local guidelines should be consulted prior to disposal of the separator contents. In most areas the sediment, once dewatered, can be disposed of in a sanitary landfill. It is not anticipated that the sediment would be classified as hazardous waste. This could be site and pollutant dependent. In some cases, approval from the disposal facility operator/agency may be required.

***What about oil spills?***

Stormceptor is often implemented in areas where there is high potential for oil, fuel or other hydrocarbon or chemical spills. Stormceptor units should be cleaned immediately after a spill occurs by a licensed liquid waste hauler. You should also notify the appropriate regulatory agencies as required in the event of a spill.

***What if I see an oil rainbow or sheen at the Stormceptor outlet?***

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 hydrocarbon rainbow or sheen can be seen at

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## Maintenance

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The Vortechs System should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit, e.g., unstable soils or heavy winter sanding will cause the grit chamber to fill more quickly but regular sweeping will slow accumulation.

### Inspection

Inspection is the key to effective maintenance and is easily performed. CONTECH Stormwater Solutions recommends ongoing quarterly inspections of the accumulated sediment. Pollutant deposition and transport may vary from year to year and quarterly inspections will help insure that systems are cleaned out at the appropriate time. Inspections should be performed more often in the winter months in climates where sanding operations may lead to rapid accumulations, or in equipment washdown areas. It is very useful to keep a record of each inspection. A simple form for doing so is provided.

The Vortechs System should be cleaned when inspection reveals that the sediment depth has accumulated to within six inches of the dry-weather water surface elevation. This determination can be made by taking 2 measurements with a stadia rod or similar measuring device; one measurement from the manhole opening to the top of the sediment pile and the other from the manhole opening to the water surface. The System should be cleaned out if the difference between the two measurements is six inches or less. Note: to avoid underestimating the volume of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Finer, silty particles at the top of the pile typically offer less resistance to the end of the rod than larger particles toward the bottom of the pile.

### Cleaning

Maintaining the Vortechs system is easiest when there is no flow entering the system. For this reason, it is a good idea to schedule the cleanout during dry weather. Cleanout of the Vortechs system with a vacuum truck is generally the most effective and convenient method of excavating pollutants from the system. If such a truck is not available, a "clamshell" grab may be used, but it is difficult to remove all accumulated pollutants with such devices.

In installations where the risk of large petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, an oil or gasoline spill should be cleaned out immediately. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use adsorbent pads since they are usually cheaper to dispose of than the oil water emulsion that may be created by vacuuming the oily layer. Trash can be netted out if you wish to separate it from the other pollutants.

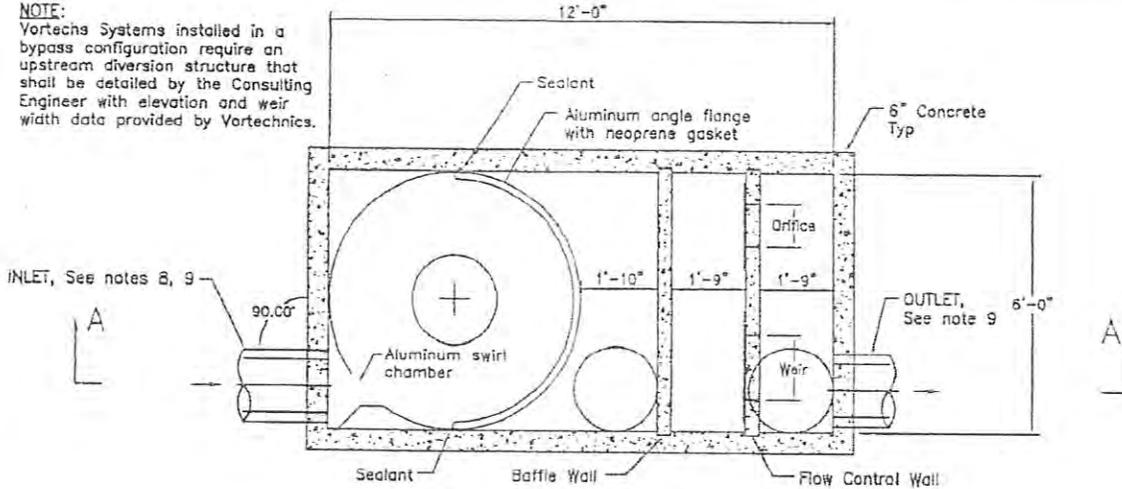
Accumulated sediment is typically evacuated through the manhole over the grit chamber. Simply remove the cover and insert the vacuum hose into the grit chamber. As water is evacuated, the water level outside of the grit chamber will drop to the same level as the crest of the lower aperture of the grit chamber. It will not drop below this level due to the fact that the bottom and sides of the grit chamber are sealed to the tank floor and walls. This "Water Lock" feature prevents water from migrating into the grit chamber, exposing the bottom of the baffle wall. Floating pollutants will decant into the grit chamber as the water level there is drawn down. This allows most floating material to be withdrawn from the same access point above the grit chamber.

If maintenance is not performed as recommended, sediment may accumulate outside the grit chamber. If this is the case, it may be necessary to pump out all chambers. It is a good idea to check for accumulation in all chambers during each maintenance event to prevent sediment build up there.

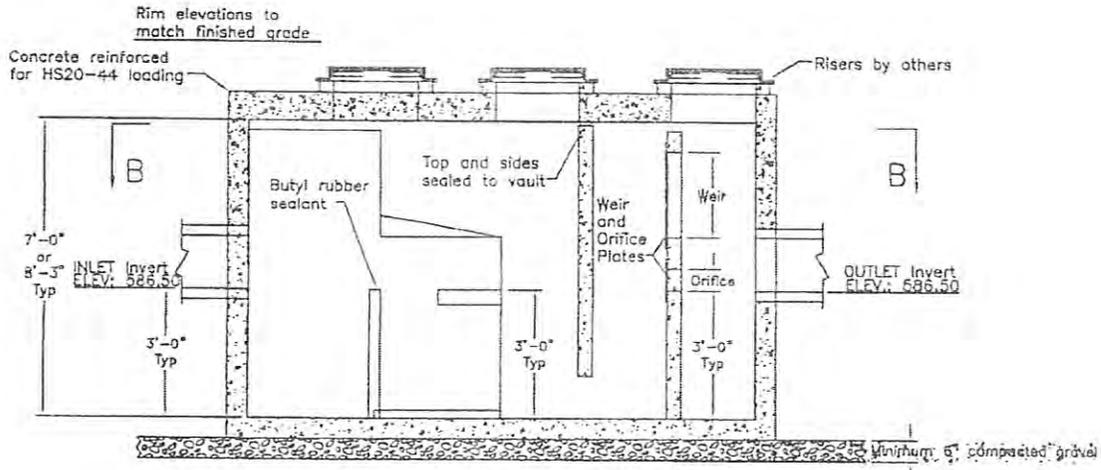
Manhole covers should be securely seated following cleaning activities, to ensure that surface runoff does not leak into the unit from above.

**NOTE:**

Vortechs Systems installed in a bypass configuration require an upstream diversion structure that shall be detailed by the Consulting Engineer with elevation and weir width data provided by Vortechs.



PLAN VIEW B - B



SECTION A - A

**NOTES:**

1. Stormwater Treatment System (SWTS) shall have:
  - Peak treatment capacity: 6 cfs
  - Sediment storage: 2.5 cu yd
  - Sediment chamber dia: 6' min
2. SWTS shall be contained in one rectangular structure
3. SWTS shall remove 80% of annual TSS loading
4. SWTS shall retain floatables and trapped sediment up to and including peak treatment capacity
5. SWTS inverts in and out shall be at the same elevation
6. SWTS shall not be compromised by effects of downstream tailwater
7. SWTS shall have no internal components that obstruct maintenance access
8. Inlet pipe must be perpendicular to the structure
9. Pipe orientation may vary; see site plan for size and location
10. Purchaser shall not be responsible for assembly of unit
11. Manhole frames and perforated covers supplied with system, not installed
12. Purchaser to prepare excavation and provide lifting equipment
13. Contact Vortechs © (207) 878-3662 Ext. 123 for ordering information

This CADD file is for the purpose of specifying stormwater treatment equipment to be furnished by Vortechs, Inc. and may only be transferred to other documents exactly as provided by Vortechs. Title block information, excluding the Vortechs logo and the Vortechs Stormwater Treatment System designation and patent number may be deleted if necessary. Revisions to any part of this CADD file without prior coordination with Vortechs shall be considered unauthorized use of proprietary information.



41 Evergreen Drive  
Portland, ME 04103  
Tel: 207-878-3662  
Fax: 207-878-8507

STANDARD DETAIL  
STORMWATER TREATMENT SYSTEM  
VORTECHS™ MODEL 4000 U.S. PATENT No. 5,759,415  
PROPRIETARY INFORMATION - NOT TO BE USED FOR CONSTRUCTION PURPOSES

DATE 10/14/99 SCALE 1/4" = 1'-0" FILE NAME STD4K DRAWN BY AP/NDG CHECKED BY KJM

# VortSentry® HS Maintenance

The VortSentry HS system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit, i.e., unstable soils or heavy winter sanding will cause the treatment chamber to fill more quickly, but regular sweeping will slow accumulation.

## Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant deposition and transport may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (i.e. spring and fall) however more frequent inspections may be necessary in equipment washdown areas and in climates where winter sanding operations may lead to rapid accumulations of a large volume of sediment. It is useful and often required as part of a permit to keep a record of each inspection. A simple inspection and maintenance log form for doing so is available for download at [www.contechstormwater.com](http://www.contechstormwater.com).

The VortSentry HS should be cleaned when the sediment has accumulated to a depth of two feet in the treatment chamber. This determination can be made by taking two measurements with a stadia rod or similar measuring device; one measurement from the manhole opening to the top of the sediment pile and the other from the manhole opening to the water surface. If the difference between these measurements is less than the distance given in Table 1, the VortSentry HS should be maintained to ensure effective treatment.

VortSentry HS Model	Diameter		Distance				Sediment Storage		Oil Spill Storage	
			Between Water Surface and Top of Storage Sump							
	in.	m	ft.	m	yd <sup>3</sup>	m <sup>3</sup>	gal.	liter		
HS36	36	0.9	3.6	1.1	0.5	0.4	83	314		
HS48	48	1.2	4.7	1.4	0.9	0.7	158	598		
HS60	60	1.5	6.0	1.8	1.5	1.1	258	978		
HS72	72	1.8	7.1	2.2	2.1	1.6	372	1409		
HS84	84	2.1	8.4	2.6	2.9	2.2	649	2458		
HS96	96	2.4	9.5	2.9	3.7	2.8	845	3199		

Table 1: VortSentry HS Maintenance Indicators and Sediment Storage Capacities.

## Cleaning

Cleaning of the VortSentry HS should be done during dry weather conditions when no flow is entering the system. Cleanout of the VortSentry HS with a vacuum truck is generally the most effective and convenient method of excavating pollutants from the system. Simply remove the manhole cover and insert the vacuum hose into the sump. All pollutants can be removed from this one access point from the surface with no requirements for Confined Space Entry.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, an oil or gasoline spill should be cleaned out immediately. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use adsorbent pads, which solidify the oils. These are usually much easier to remove from the unit individually, and less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Floating trash can be netted out if you wish to separate it from the other pollutants.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and also to ensure proper safety precautions. If anyone physically enters the unit, Confined Space Entry procedures need to be followed.

Disposal of all material removed from the VortSentry HS should be done in accordance with local regulations. In many locations, disposal of evacuated sediments may be handled in the same manner as disposal of sediments removed from catch basins or deep sump manholes. Check your local regulations for specific requirements on disposal.

## Maintenance

The CDS system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit. For example, unstable soils or heavy winter sanding will cause the grit chamber to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

## Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (e.g. spring and fall) however more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment washdown areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

The visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet and separation screen. The inspection should also quantify the accumulation of hydrocarbons, trash, and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided.

Access to the CDS unit is typically achieved through two manhole access covers. One opening allows for inspection and cleanout of the separation chamber (cylinder and screen) and isolated sump. The other allows for inspection and cleanout of sediment captured and retained outside the screen. For deep units, a single manhole access point would allow both sump cleanout and access outside the screen.

The CDS system should be cleaned when the level of sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated. If absorbent material is used, it should be replaced when significant discoloration has occurred. Performance will not be impacted until 100% of the sump capacity is exceeded however it is recommended that the system be cleaned prior to that for easier removal of sediment. The level of sediment is easily determined by measuring from finished grade down to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile *carefully*. Particles at the top of the pile typically offer less resistance to the end of the rod than consolidated particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine whether the height of the sediment pile off the bottom of the sump floor exceeds 75% of the total height of isolated sump.

## Cleaning

Cleaning of a CDS system should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole covers and insert the vacuum hose into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The area outside the screen should also be cleaned out if pollutant build-up exists in this area.

*In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill should be cleaned out immediately. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. The screen should be power washed to ensure it is free of trash and debris.*

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and also to ensure that proper safety precautions have been followed. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the CDS system should be done in accordance with local regulations. In many jurisdictions, disposal of the sediments may be handled in the same manner as the disposal of sediments removed from catch basins or deep sump manholes.



**MAINTENANCE/CLEANING  
PROCEDURES FOR  
PRECAST CONCRETE TANK  
WITH STAINLESS STEEL SCREEN  
AND SNOUT INSTALLED**

1. REMOVE LID FROM CASTING #'S 1 AND 2 (SEE PLAN IN MANUAL)
2. USING VAC TRUCK, SUCK OIL, DEBRIS AND SEDIMENT FROM CHAMBERS THRU ACCESS PROVIDED BY CASTING # 1 AND 2.
3. PULL SCREEN OUT OF CHANNEL AND CLEAN/REPLACE.
4. REMOVE LID FROM CASTING # 3 AND CLEAN OUT DEBRIS AND SEDIMENT.
5. REPLACE LIDS.

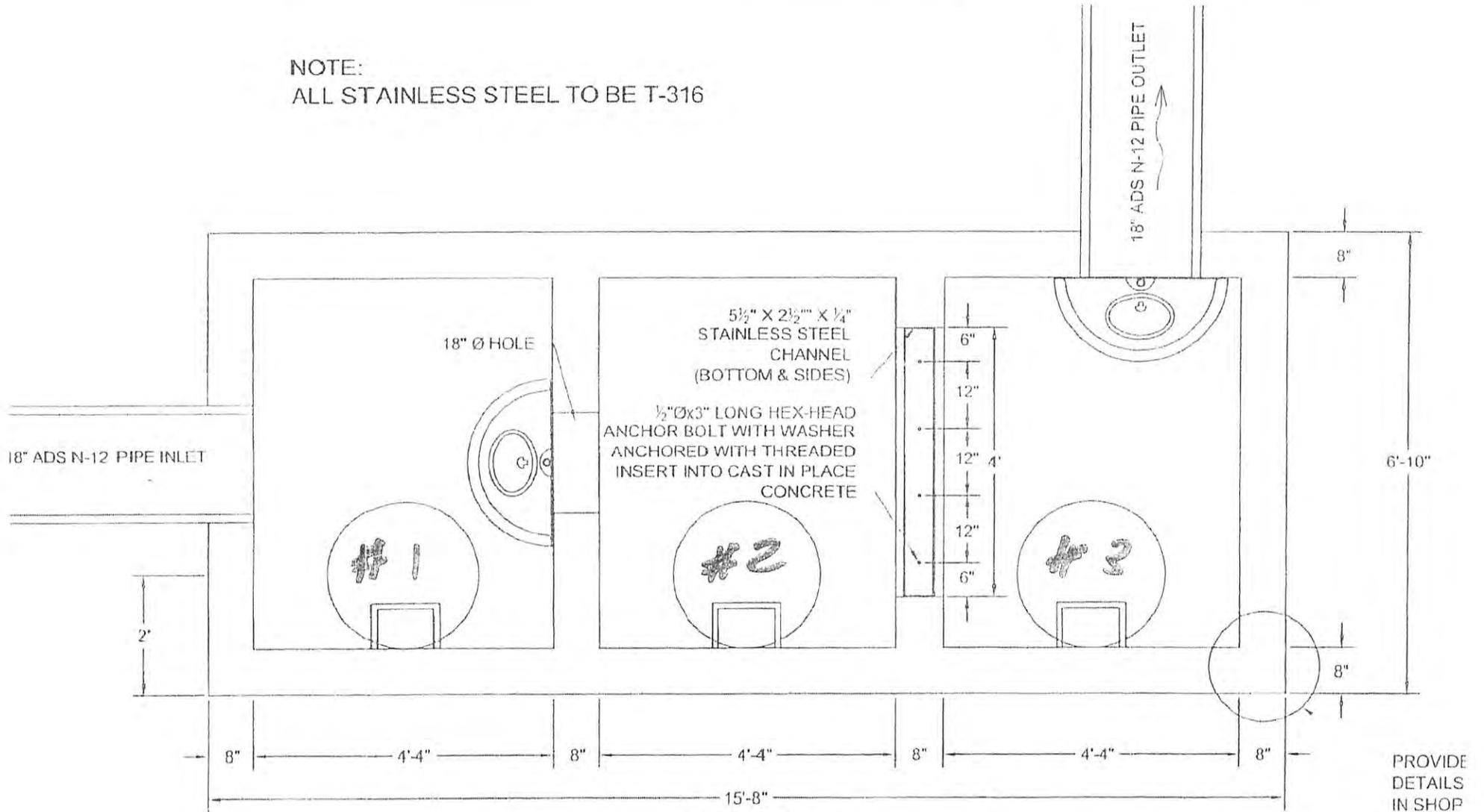
OUTFALL -

SWIRL / FILTRATION

5 - 3.5

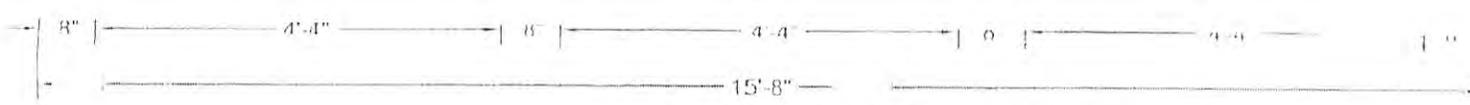
HYDRO INTERNATIONAL AS S' W N ON PLA

NOTE:  
ALL STAINLESS STEEL TO BE T-316



**TOP VIEW**

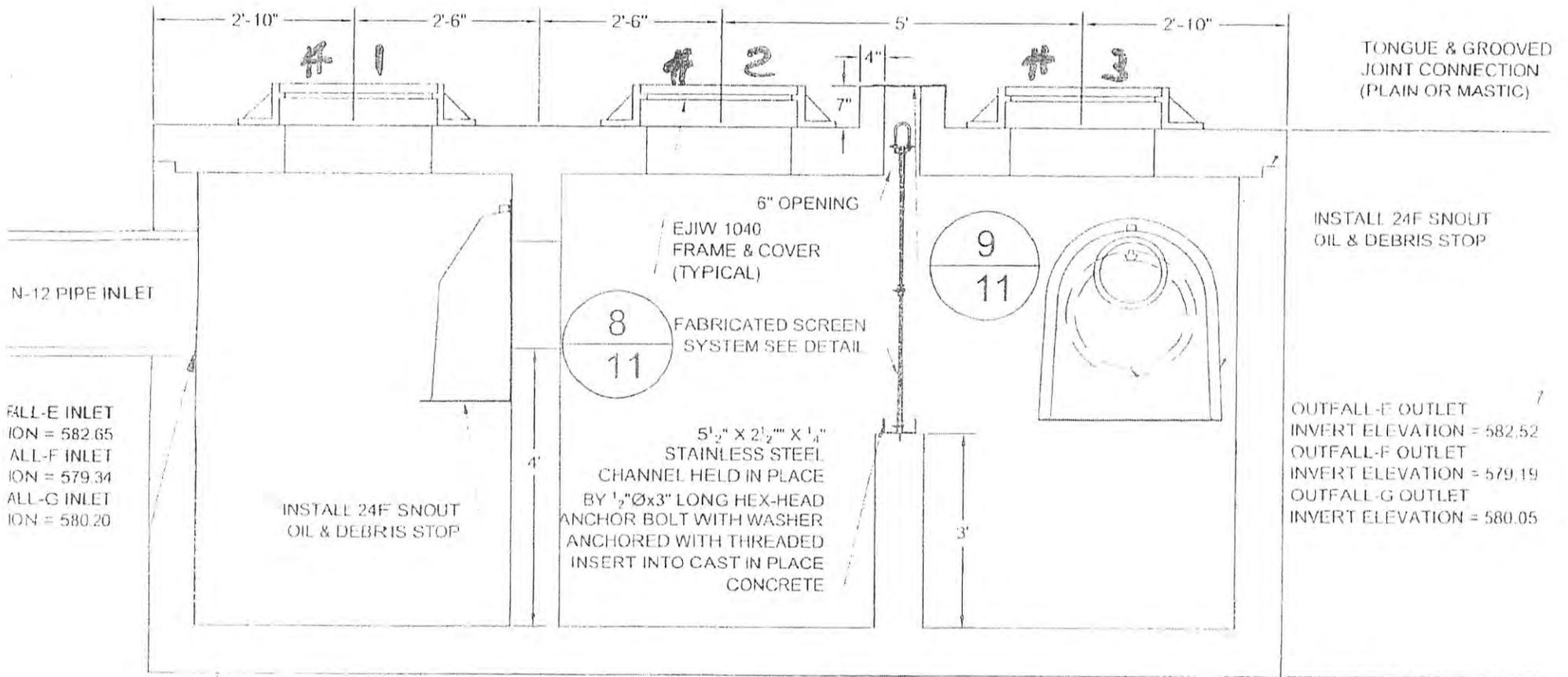
N.T.S.



PROVIDE STEEL TAILS, INCLUDE SHOP DRAWING

**TOP VIEW**

N.T.S.



**SIDE VIEW**

N.T.S.

**15'-8" X 6'-10" X 7'-8" PRECAST CONCRETE TANK WITH H2O TREATMENT SYSTEM**

*Recommended Equipment*

- Safety Equipment (traffic cones, etc)
- Crow bar or other tool to remove grate or lid
- Pole with skimmer or net (if only floatables are being removed)
- Sediment probe (such as a Sludge Judge®)
- Vactor truck (6-inch/150mm diameter flexible hose recommended)
- Downstream Defender® Maintenance Log

*Floatables and Sediment Clean Out Procedures*

1. Set up any necessary safety equipment around the access port or grate of the Downstream Defender® as stipulated by local ordinances. Safety equipment should notify passing pedestrian and road traffic that work is being done.
2. Remove the lids to the manhole NOTE: The 4-ft (1.2m) Downstream Defender® will only have one lid.
3. Without entering the vessel, look down into the chamber to inspect the inside. Make note of any irregularities.
4. Using the Floatables Port for access, remove oil and floatables stored on the surface of the water with the vactor hose or the skimmer net (Fig.9, top).
5. Using a sediment probe such as a Sludge Judge®, measure the depth of sediment that has collected in the sump of the vessel and record it in the Maintenance Log (Pg.9).
6. Once all floatables have been removed, drop the vactor hose to the base of the sump via the Central Access Port. Vactor out the sediment and gross debris off the sump floor (Fig.6 and 9).

7. Retract the vactor hose from the vessel.
8. On the Maintenance Log provided by Hydro International, record the date, unit location, estimated volume of floatables and gross debris removed, and the depth of sediment measured. Also note any apparent irregularities such as damaged components or blockages.
9. Securely replace the grate or lid.

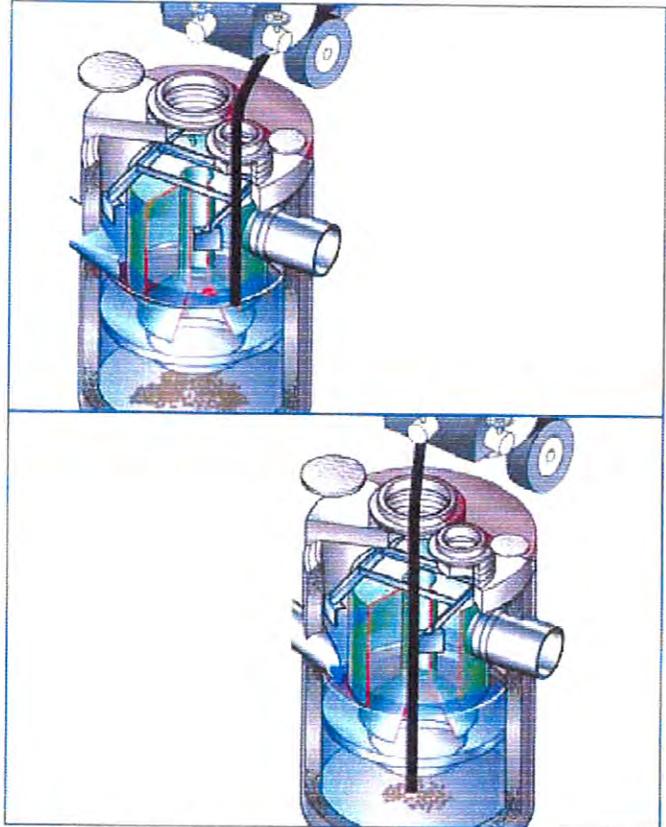


Fig.9 Floatables and sediment are removed with a vactor hose

**Maintenance at a Glance**

Activity	Frequency
Inspection	- Regularly during first year of installation - Every 6 months after the first year of installation
Oil and Floatables Removal	- Once per year, with sediment removal - Following a spill in the drainage area
Sediment Removal	- Once per year or as needed - Following a spill in the drainage area

NOTE: For most cleanouts it is not necessary to remove the entire volume of liquid in the vessel. Only removing the first few inches of oils/floatables and the sediment storage volume is required.



Cleaning

If cleaning or helical filter replacement is deemed necessary, the following procedure is recommended:

1. Secure the worksite with the appropriate safety equipment in accordance with local and OSHA regulations.
2. Remove both the 36" and 30" manhole access covers located over the influent and effluent chambers of the StormSafe. Allow several minutes for the chambers to vent.
3. Perform an internal and external visual inspection of the vault's general condition including both access manhole covers and castings, as well any exposed concrete surfaces. Record any visual anomalies such as cracks, gouges, hollows, excess wear or settling.
4. Without entering the vault, both the Influent and effluent chambers can be cleaned using a typical vacuum truck or similar vacuum equipment with sufficient storage capacity.
5. Both the influent and effluent chambers are designed to accommodate standard suction hoses typical to vacuum equipment. Thoroughly vacuum liquids, debris and sediment from both chambers.

