

AGREEMENT FOR MAINTENANCE OF STORM WATER DETENTION SYSTEM

This Agreement for Maintenance of Storm Water Detention System (this "Agreement") is made on 3rd day of June, 2021, by 1401 East South Boulevard, LLC, a Michigan limited liability company, whose address is 1800 Brinston Drive, Troy, Michigan 48083 ("Developer" or "Owner"), and the CITY OF ROCHESTER HILLS (the "City"), whose address is 1000 Rochester Hills Drive, Rochester Hills, MI 48309.

RECITALS:

WHEREAS, Developer owns the property described in attached **Exhibit A** (the "Property"); and

WHEREAS, Developer has proposed, and the City has approved, a storm water drainage and detention system (the "System"), which includes an underground detention system, pre-treatment devices, storm sewer pipe, catch basins, manholes and swales for the Property as described and depicted in the attached **Exhibit B**; and

WHEREAS, the parties will benefit from the proper use and maintenance of the System and desire to enter into this Agreement to provide for the same.

THEREFORE, the parties agree:

1. **Use of the System:** Components of the System, including any and all water conveyance, detention and water quality treatment devices, storm sewer pipe, catch basins, manholes, and swales shall be used solely for the purpose of conveying, detaining and surface drainage on the property until such time as: (i) The City determines and notifies Developer and Developer's successors, grantees or assigns, in writing that it is no longer necessary to convey, detain the storm and surface drainage; and (ii) An adequate alternative for conveying, detaining draining storm and surface drainage has been provided which is acceptable to the City and which includes the granting of any easements to the City or third parties as may be required or necessary for the alternative drainage system.

2. **Maintenance:**

A. Developer shall be responsible for the proper maintenance, repair and replacement of the System and all parts thereof as detailed in the Maintenance Plan attached as **Exhibit C**.

B. Proper maintenance of the System shall include, but not limited to: (i) Removing accumulated sediment, trash and debris from the detention system and inlet pipes; (ii) Maintaining storm sewer and structures; (iii) Controlling the effects of erosion; (iv) Inspection and cleaning; (v) Inspection of inlet and outlet pipes for structural integrity; (vi) Inspection and cleaning of storm sewer and catch basins upstream of detention system; and (vii) Any other maintenance that is reasonable and necessary in to facilitate and continue the proper operation and use of the System.

3. **Action by City:** In the event Developer or its successors, grantees, or assigns, neglects or fails at any time to properly maintain the System or any part thereof, the City may notify Developer or its successors, grantees or assigns, in writing, and the notice shall include a listing and description of maintenance deficiencies and a demand that they must be corrected within thirty (30) days after receipt of said notice. The notice shall further specify the date and place for a hearing to be held at least fourteen (14) days after the date of the notice before the City Council, or such other board or official to whom the City Council may delegate responsibility. At the hearing, the City Council (or other board or official) may endorse or modify the listing and description of deficiencies to be corrected and, for good cause, may extend the time within which the deficiencies must be corrected.

Thereafter, if the maintenance deficiencies are not corrected within the time allowed, the City may undertake and make the necessary corrections, and may maintain the System for a period not to exceed one (1) year. Such maintenance of the System by the City shall not be deemed a taking of the property, nor shall the City's actions be deemed to vest in the public any right to use the property. If the City determines maintenance of the system by the City should continue beyond one year, the City shall hold, and provide advance written notice of, a further hearing at which Developer or its successors, grantees or assigns, will not or cannot properly maintain the System, the City may continue to maintain the System for another year, and subject to a similar hearing and determination, in subsequent years.

In the event the City determines an emergency condition caused by or relating to the System threatens the public health, safety or general welfare, the City shall have the right to immediately and enter the necessary portions of Property containing the System and undertake appropriate corrective action; provided, however, the City will provide notice thereof to Developer as is reasonable under the circumstances. Notwithstanding the foregoing, in the event the City undertakes corrective actions, the City acknowledges and agrees to work with Developer in good faith to coordinate such corrective work in order to minimize interference with Developer's development/construction on and use and enjoyment of the Property and not to unreasonably disturb or disrupt any tenant or occupant of the Property or the business operations then conducted thereon.

4. **Charges:** In the event corrective action is required and taken by the City in accordance with the foregoing terms of Section 3, the City shall charge to the current owner of the Property the cost of maintenance or other corrective action undertaken by the City in accordance with this Agreement, plus a ten percent (10%) administrative fee, which shall be due and payable within thirty (30) days after the current owner's receipt of said notice. If not timely paid, the City may assess the charges on the City's tax roll, which charges shall be a lien on the real property and shall be collectable and enforceable in the same manner general property taxes are collected and enforced.

5. **Notice:** Any notices required under this Agreement shall be sent by certified mail to the address for each party set forth below, or to such other addresses as such party may notify the other parties in writing:

To Developer:

1401 EAST SOUTH BOULEVARD, LLC
1800 Brinston Drive
Troy, Michigan 48083
Attn: Brad Chojnacki
Email: brad@thealangroup.com

To the City:

Clerk
City of Rochester Hills
1000 Rochester Hills Drive
Rochester Hills, MI 48309

6. **Successors and Assigns:** This Agreement shall bind and inure to the benefit of the parties and their respective successors, grantees and assigns. The rights, obligations and responsibilities hereunder shall run with the land and shall bind all current and future owners of the property.

7. **Recording of Agreement:** This Agreement shall be recorded at the Oakland County Register of Deeds.

[signatures on following pages]

1814000

1814000

Developer:

1401 EAST SOUTH BOULEVARD, LLC, a Michigan limited liability company

By: [Signature]
Name: Bradley Chojnacki
Its: Managing Member

STATE OF MICHIGAN)
)ss
COUNTY OF OAKLAND)

The foregoing instrument was acknowledged before me this 3rd day of June, 2021, by Bradley Chojnacki, the ~~Manager~~ of 1401 East South Boulevard, LLC, a Michigan limited liability company, on behalf of said limited liability company.

Managing Member

Taryn Firoz
Notary Public, Oakland Co., MI
Acting in Oakland Co., MI
My Commission Expires June 20, 2021

[Signature]
TARYN FIROSZ, Notary Public
State of Michigan, County of Oakland
My Commission Expires: 6-20-21
Acting in the County of Oakland

CITY OF ROCHESTER HILLS

By: _____
Bryan K. Barnett, Mayor

By: _____
LEANNE SCOTT, City Clerk

STATE OF MICHIGAN
COUNTY OF OAKLAND

This Agreement was acknowledged before me on _____, 20____,
by Bryan K. Barnett, Mayor, and Leanne Scott, Clerk, of the City of Rochester Hills, on behalf of the City.

Drafted By:
Blair Gould
Cousino Law
402 South Lafayette Avenue, Suite 103
Royal Oak, MI 48067

notary public
County, Michigan
My commission expires:

When Recorded Return to:
Clerks Dept.
City of Rochester Hills
1000 Rochester Hills Drive
Rochester Hills, MI 48309

John Staran
Approved 6/10/21

RECEIVED

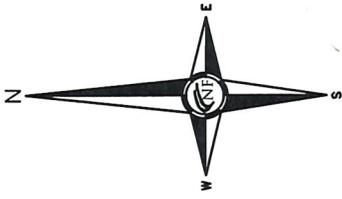
JUN 8 2021

DEPT. OF PUBLIC SERVICES
CITY OF ROCHESTER HILLS

Exhibit A

OVERALL PROPERTY

SOUTH 1/4 CORNER
SECTION 36
T.3N., R.11E. (L-13)
REMON IRON IN BOX
L.14992, P.111



EAST PARCEL LINE
(EAST LINE LOTS 33 & 34)

S02°35'28"W 328.97' (M)

P.O.B.
PARCEL

M-59 EXPRESSWAY (206' WIDE)

S87°29'03"E 457.61' (M)

SOUTH R.O.W. LINE M-59

LOT 33

LOT 34

PROPOSED
MEDICAL BUILDING

PARCEL ID NO.
15-36-376-014

FUTURE 60' 1/2 WIDTH R.O.W. LINE

N86°44'00"W 442.08' (M)

SOUTH LINE LOT 34

SOUTH LINE OF SECTION 36

SOUTH BOULEVARD EAST (WIDTH VARIES)

60.0'

EAST 1/2 OF VACATED ENFIELD ROAD
(POSSIBLE EASEMENT RETAINED)

N03°16'00"E
20.00' (M)

CENTERLINE OF VACATED
ENFIELD ROAD

L = 303.70'(M)
R = 3044.60'(M)
Δ = 5°42'55"(M)
CHD. BRG =
N00°23'32"W
303.57'(M)



NOWAK & FRAUS ENGINEERS
46777 WOODWARD AVE.
PONTIAC, MI 48342-5032
TEL. (248) 332-7931
FAX. (248) 332-8257

PREPARED FOR:
1401 E. SOUTH BOULEVARD, LLC

SCALE
1" = 60'

DATE
05-26-2021

DRAWN
C.E.

JOB NO.
L289

SHEET
1 of 2

Exhibit A

OVERALL PROPERTY DESCRIPTION

LEGAL DESCRIPTION (TAX I.D. NO. 15-36-376-014)

PART OF LOTS 33 AND 34 OF "JOHN R. HIGHLANDS" (L.52, P.22 OF PLATS PER OAKLAND COUNTY RECORDS) A SUBDIVISION OF THE SOUTHWEST 1/4 OF SECTION 36, TOWN 3 NORTH, RANGE 11 EAST, CITY OF ROCHESTER HILLS, OAKLAND COUNTY, MICHIGAN AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS: BEGINNING AT THE SOUTHEAST CORNER OF SAID LOT 34; THENCE NORTH 86 DEGREES 44 MINUTES 00 SECONDS WEST 442.08 FEET ALONG THE SOUTH LINE OF LOT 34 TO THE CENTERLINE OF A VACATED ENFIELD ROAD (50 FEET WIDE); THENCE ALONG SAID CENTER LINE NORTH 3 DEGREES 16 MINUTES 00 SECONDS EAST 20.00 FEET AND 303.70 FEET ALONG THE ARC OF A CURVE CONCAVE TO THE WEST RADIUS IS 3044.60 FEET AND WHOSE CHORD IS DESCRIBED AS NORTH 00 DEGREES 23 MINUTES 32 SECONDS WEST 303.57 FEET; THENCE LEAVING SAID CENTER LINE SOUTH 87 DEGREES 29 MINUTES 03 SECONDS EAST 457.61 FEET ALONG THE SOUTH RIGHT OF WAY LINE OF M-59; THENCE SOUTH 02 DEGREES 35 MINUTES 28 SECONDS WEST 328.97 FEET ALONG THE EAST LINE OF LOTS 33 AND 34 TO THE POINT OF THE BEGINNING. CONTAINING 3.344 ACRES OF LAND.

RECEIVED
JUN 08 2021
CITY OF ROCHESTER HILLS
DEPT. OF PUBLIC SERVICES



NOWAK & FRAUS ENGINEERS
46777 WOODWARD AVE.
PONTIAC, MI 48342-5032
TEL. (248) 332-7931
FAX. (248) 332-8257

PREPARED FOR:
1401 E. SOUTH BOULEVARD, LLC

DATE
05-26-2021

DRAWN
C.E.

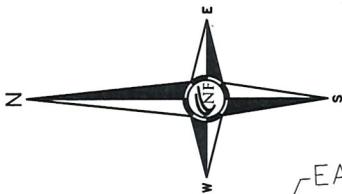
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L289

SHEET
2 of 2

Jenny M.
Approved 6/22/21

Exhibit B

STORM WATER SYSTEM SKETCH



SOUTH 1/4 CORNER
SECTION 36
T.3N., R.11E. (L-13)
REMON IRON IN BOX
L.14992, P.111

EAST PARCEL
LINE (EAST LINE
LOTS 33 & 34)

$S02^{\circ}35'28''W$ 328.97' (M)

C.B.
(TYP.)

P.O.B.
PARCEL

SWALE & E.S.

PR. STORM
SEWER (TYP)

PR. BLDG.
ROOF DRAIN

PR. OFF-LINE
PRE-TREATMENT
(CONTECH CASCADE)

LOT 34

PROPOSED
MEDICAL BUILDING

PARCEL
ID NO.
15-36-376-014

PR. UNDERGROUND
STORM WATER
DETENTION SYSTEM

FUTURE 60' 1/2 WIDTH R.O.W. LINE

$N86^{\circ}44'00''W$ 442.08' (M)

SOUTH LINE LOT 34
SOUTH LINE OF SECTION 36

SOUTH BOULEVARD EAST (WIDTH VARIES)

M-59 EXPRESSWAY (206' WIDE)

$S87^{\circ}29'03''E$ 457.61' (M)

C.B.
(TYP.)

PR. OFF-LINE
PRE-TREATMENT
(CONTECH
CASCADE)

PR. STORM
MANHOLE (TYP)

PR.
RESTRICTED
OUTLET TO
EX. 48"
O.C.W.R.C.
STM DRAIN

EAST 1/2 OF VACATED ENFIELD ROAD
(POSSIBLE EASEMENT RETAINED)

C.B. (TYP.)

PR. OUTLET
CONTROL

PR. STORM
SEWER (TYP)

$N03^{\circ}16'00''E$
20.00' (M)

L = 303.70'(M)
R = 3044.60'(M)
 $\Delta = 5^{\circ}42'55''(M)$
CHD. BRG =
 $N00^{\circ}23'32''W$
303.57'(M)

CENTERLINE OF VACATED
ENFIELD ROAD

EX. 48" DRAIN



NF ENGINEERS
NOWAK & FRAUS ENGINEERS
46777 WOODWARD AVE.
PONTIAC, MI 48342-5032
TEL. (248) 332-7931
FAX. (248) 332-8257

*AK
AFS 6/19/21*



PROPERTY OWNER
STORM SEWER SYSTEM
MAINTENANCE RESPONSIBILITY

PREPARED FOR:
1401 E. SOUTH BOULEVARD, LLC

SCALE
1" = 60'

DATE
05-26-2021

DRAWN
C.E.

JOB NO.
L289

SHEET
1 of 1

EXHIBIT 'C'

OPERATIONS AND MAINTENANCE MANUAL

ROCHESTER HILLS SURGERY CENTER
STORMWATER MAINTENANCE PLAN
ROCHESTER HILLS, MICHIGAN

PROPERTY OWNER:

1401 East South Boulevard, LLC
1800 Brinston Drive, Troy, MI 48083

Phone: (248) 284-1512

Contact: Mr. Brad Chojnacki

Prepared by:

Nowak and Fraus Engineers, PLLC
46777 Woodward Ave.
Pontiac, Michigan 48342
Phone: (248) 332-7931
Contact: Paul Tulikangas, P.E.

*OK ALS
6/22/21*

May 26, 2021

OPERATION AND MAINTENANCE MANUAL

INTRODUCTION:

This manual identifies the ownership, operation and maintenance responsibilities for all storm water management systems including the underground detention system, underground storm sewer system, outlet control structures, and mechanical pre-treatment device as incorporated into and detailed on the approved Construction Plans as Prepared by Nowak and Fraus Engineers, PLLC. In order to comply with the local best management practices (BMP) requirements, this manual should serve as a minimum performance standard. This manual should be retained intact and read in its entirety by all parties responsible for the operations and maintenance of the on-site BMP's.

OWNER:

Brad Chojnacki
1401 East South Boulevard, LLC
1800 Briston Drive
Troy, MI 48083

Phone: (248) 284-1512

PROPERTY INFORMATION:

This Operations and Maintenance Manual covers the storm water systems located at the following subject property:

PARCEL I.D. No. 15-36-376-014

PART OF LOTS 33 AND 34 OF "JOHN R. HIGHLANDS" (L.52, P.22 OF PLATS PER OAKLAND COUNTY RECORDS) A SUBDIVISION OF THE SOUTHWEST 1/4 OF SECTION 36, TOWN 3 NORTH, RANGE 11 EAST, CITY OF ROCHESTER HILLS, OAKLAND COUNTY, MICHIGAN AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS: BEGINNING AT THE SOUTHEAST CORNER OF SAID LOT 34; THENCE NORTH 86 DEGREES 44 MINUTES 00 SECONDS WEST 442.08 FEET ALONG THE SOUTH LINE OF LOT 34 TO THE CENTERLINE OF A VACATED ENFIELD ROAD (50 FEET WIDE); THENCE ALONG SAID CENTER LINE NORTH 3 DEGREES 16 MINUTES 00 SECONDS EAST 20.00 FEET AND 303.70 FEET ALONG THE ARC OF A CURVE CONCAVE TO THE WEST RADIUS IS 3044.60 FEET AND WHOSE CHORD IS DESCRIBED AS NORTH 00 DEGREES 23 MINUTES 32 SECONDS WEST 303.57 FEET; THENCE LEAVING SAID CENTER LINE SOUTH 87 DEGREES 29 MINUTES 03 SECONDS EAST 457.61 FEET ALONG THE SOUTH RIGHT OF WAY LINE OF M-59; THENCE SOUTH 02 DEGREES 35 MINUTES 28 SECONDS WEST 328.97 FEET ALONG THE EAST LINE OF LOTS 33 AND 34 TO THE POINT OF THE BEGINNING. CONTAINING 3.344 ACRES OF LAND.

STORMWATER MAINTENANCE EXHIBIT:

Exhibit 'B' of the Storm Water Maintenance Agreement is the Storm Water System which provides a clear presentation of all components of the storm water system. This system is subject to the long-term operation and maintenance responsibilities detailed in this manual. The system includes:

- Storm Sewer Pipes
- Storm Sewer Collection System & Structures (swales, manholes, inlets, catch basins, etc.)
- Underground Detention System Piping
- Outlet Control Structure
- Flow Diversion Structures
- Pre-Treatment Devices (Contech Cascade Models CS-4 and CS-6)

INSPECTIONS:

The frequency of system inspections outlined in the manual and attached exhibits should be considered the minimum, if no events warrant additional inspections. The frequency of inspections should be fine-tuned over time as system specific conditions are better known and the rate at which certain maintenance operations need to be performed is better understood. Maintenance Inspection Checklists are provided for each of the BMP's in this system. Inspections should be performed by personnel responsible for maintenance and may need to be certified for confined space entry, depending on the component being inspected. Operation of the definition system, outlet control structures and pre-treatment devices may need to be inspected by a practicing civil engineer familiar with their operation.

Records of all routine inspections and any work performed on the system for maintenance, repair, or replacement should be maintained by the owner and kept for a minimum of ten (10) years. A copy of all records should be provided to the City of Rochester Hills Engineering Division. The records should include this manual, all inspection sheets, approved construction plans and as-built documents, a maintenance log of work performed to the system(s) and contact information for the system inspector, civil engineer, landscape architect, geotechnical engineer and contractor involved with the system.

STORM WATER SYSTEMS MAINTENANCE:

Regular inspection and maintenance of BMP's are necessary if these facilities are to consistently perform up to expectations. Stormwater systems are expected to perform quality and quantity control functions as long as the land use they serve exists. Failure to maintain these systems can create the following adverse impacts:

- Increased pollutants to surrounding surface water features
- Potential property damage resulting from excessive flooding.
- Potential loss of life or property resulting from catastrophic failure of the facility
- Aesthetic or nuisance conditions, such as mosquitos or reduced property values due to a degraded facility appearance.

Most of the impacts can be avoided through proper and timely inspection and maintenance. A major concern associated with these impacts is the general public's expectations related to the quality of life provided, in part, by construction of these systems. Inadequate maintenance means the general public

may have a false sense of security. The most common cause of stormwater system failure is the lack of adequate and proper operation, inspection, maintenance, and management.

Good design and construction can reduce subsequent maintenance needs and costs, but they cannot eliminate the need for maintenance altogether. Maintenance requires a long term commitment of time, money, personnel, and equipment. Monitoring the overall performance of the stormwater management system is a major aspect of any maintenance program.

The maintenance responsibilities for these systems lie with the current property owner and transfer with the property in perpetuity. If maintenance of the system is not performed, the City of Rochester Hills reserves the right to enter property and perform all necessary work at the property owners' cost. Refer to the *Agreement for Storm Water Systems Maintenance* for additional details.

General Maintenance Items:

Parking Lot Sweeping:

Routine sweeping of all paved surfaces provides a more attractive appearance and removes accumulations of sediment and trash that tend to migrate into stormwater management systems during rainfall events. Parking lot sweeping should be performed quarterly or as necessary to limit sediment and trash build-up.

Grass Mowing and Maintenance:

Mowing requirements at a facility should be designed to the specific site conditions, grass types and seasonal variations in climate. Grassed areas require periodic fertilizing, de-thatching and soil conditioning in order to maintain healthy growth. Provisions will need to be made to reseed and reestablish grass cover in areas damaged by sediment accumulation, stormwater flow, erosion or other causes. Dead turf will need to be replaced after being discovered. Inspection of the grass areas and other landscaping features should be made annually.

Trash and Debris Removal:

Removal of trash and debris from all areas of the property should be performed monthly. Removal of these items will prevent damage to vegetated areas and eliminate their potential to inhibit the operation of any of the stormwater management systems. Sediment, debris, and trash that are removed and collected should be disposed of according to local, State and Federal regulations at suitable disposal and/or recycling centers.

Stormwater System Maintenance Items:

The following narratives give an overview of the maintenance requirements of the different components of the stormwater system. The inspection checklists attached to this report offer a more complete listing of what should be inspected, when inspection should occur and the likely frequency of maintenance activities.

Storm Sewer, Structures, Underground Detention and Sedimentation Control Structures:

Catch basins, inlets, manholes, outlet control structures, flow control manholes, and storm sewer pipes should be inspected to check for sediment accumulation and clogging, floatable debris, dead vegetation, etc. The structures and sewers should also be observed during a wet weather event to ensure their proper operation. Accumulated sediment and debris should be removed on an annual basis or as needed by observed conditions. Structural repairs or maintenance should occur as needed based on observed conditions such as cracks, spalling, joint failure, leakage, misalignment, or settlement of structures. A civil engineer should be retained if problems are thought to exist.

Stormwater Pre-Treatment Devices:

Refer to the attached maintenance manuals from the manufacturer for all inspection and maintenance requirements for the pre-treatment structures.

The following pages include inspection checklists for the various devices and components listed above as well as the manufacturer's manuals for the stormwater pre-treatment structures.

3/13/2021
3/13/2021
3/13/2021

Exhibit C

STORM WATER SYSTEM MAINTENANCE PLAN & SCHEDULE

STORM WATER MANAGEMENT SYSTEM LONG-TERM MAINTENANCE SCHEDULE								
MAINTENANCE ACTIVITIES	SYSTEM COMPONENTS	Storm Collection System (Sewers, Swales, Catch Basins, Manholes)	Manufactured Treatment System	Underground Detention System	Outlet Control Structure & Outlet Pipe	Flow Diversion Manhole	Pavement Areas	FREQUENCY
Monitoring/Inspection								
Inspect for Sediment Accumulation/Clogging*	X	X	X	X	X	X	X	Annually
Inspect For Floatables, Dead Vegetation & Debris	X	X	X	X	X	X	X	Annually & After Major Events
Inspect For Erosion And Integrity of System	X	X	X	X	X	X	X	Annually & After Major Events
Inspect All Components During Wet weather & Compare to As-Built Plans	X	X	X	X	X	X	X	Annually
Ensure Maintenance Access Remain Open/Clear	X	X	X	X	X	X	X	Annually
Preventative Maintenance								
Remove Accumulated sediments*	X	X	X	X	X	X	X	As Needed (See Note Below)
Remove Floatables, Dead Vegetation & Debris	X	X	X	X	X	X	X	As Needed
Maintain Vegetation Growth and Prevent Invasive Species						X		As Needed
Sweeping of Paved Surfaces							X	As Needed
Remedial Actions								
Repair/Stabilize Areas of Erosion	X					X		As Needed
Structural Repairs	X	X	X	X	X	X	X	As Needed
Make Adjustments/Repairs to Ensure Proper Functioning	X	X	X	X	X	X	X	As Needed

NOTE: *Manufactured treatment system and underground detention system to be cleaned according to the manufacturer's recommendations; at a minimum, whenever sediments accumulate to a depth of 6-12 inches, or if sediment resuspension is observed.

PROJECT: Rochester Hills Surgery Center Rochester Hills, MI 48307 Oakland County, Michigan	PROPERTY OWNER: 1401 E. South Boulevard, LLC 1800 Brinston Drive, Troy, MI 48083 Contact: Brad Chojnacki Phone: (248) 284-1512	ENGINEER: Nowak & Fraus Engineers 46777 Woodward Ave. Pontiac, MI 48342-5032 Phone: (248) 332-7931 Fax: (248) 332-8257
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NOWAK & FRAUS ENGINEERS
 46777 WOODWARD AVE.
 PONTIAC, MI 48342-5032
 TEL. (248) 332-7931
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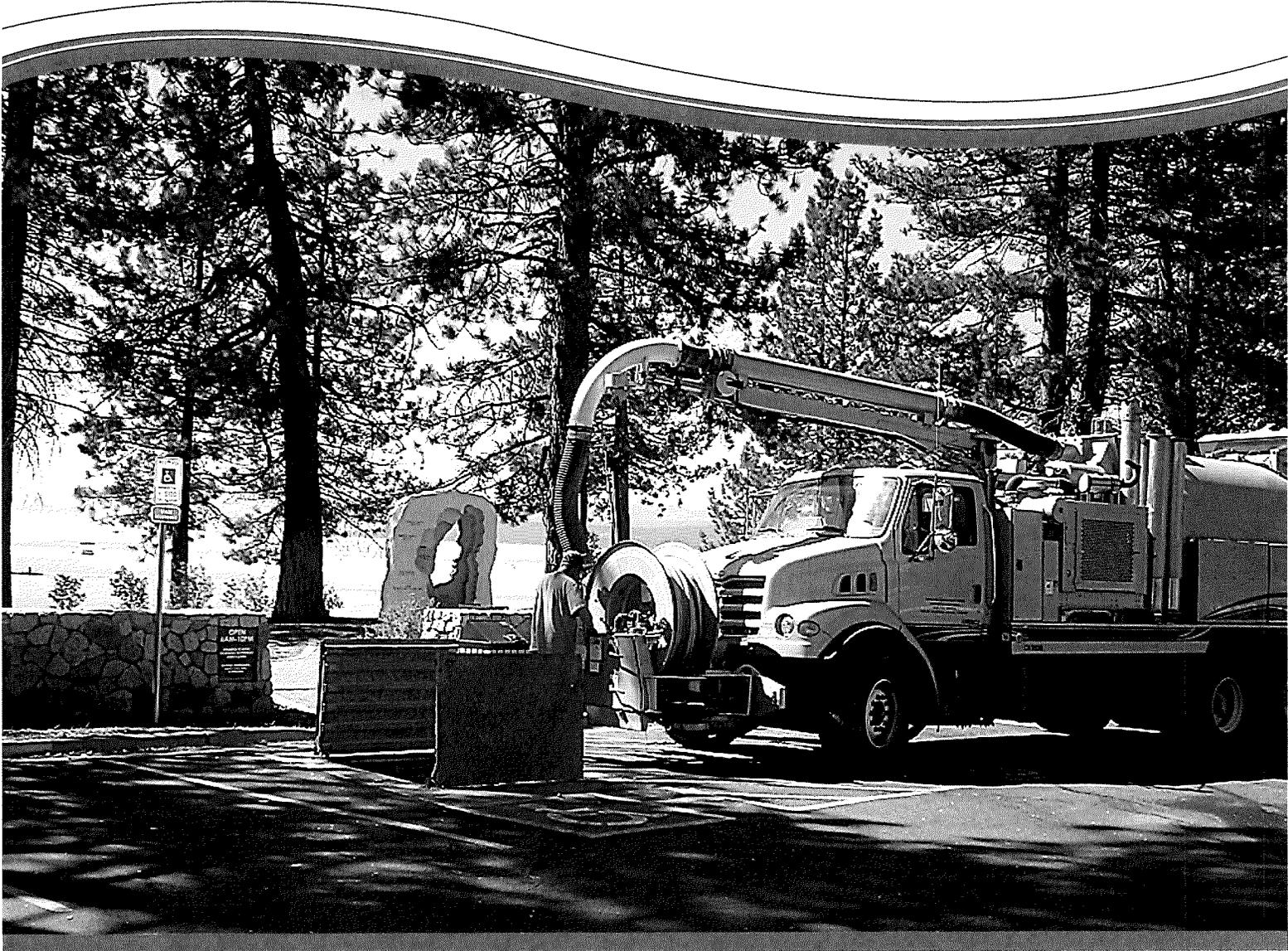
PREPARED FOR:
 1401 E. SOUTH BOULEVARD, LLC

DATE	DRAWN	JOB NO.	SHEET
05-26-2021	C.E.	L289	6 of 6



Cascade Separator® Inspection and Maintenance Guide

3180247



CASCADE
separator®

Maintenance

The Cascade Separator[®] system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects sediment and debris will depend upon on-site activities and site pollutant characteristics. For example, unstable soils or heavy winter sanding will cause the sediment storage sump 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 (i.e. spring and fall). However, more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment wash-down areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

A visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet chamber, flumes or outlet channel. 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 in this Inspection and Maintenance Guide.

Access to the Cascade Separator unit is typically achieved through one manhole access cover. The opening allows for inspection and cleanout of the center chamber (cylinder) and sediment storage sump, as well as inspection of the inlet chamber and slanted skirt. For large units, multiple manhole covers allow access to the chambers and sump.

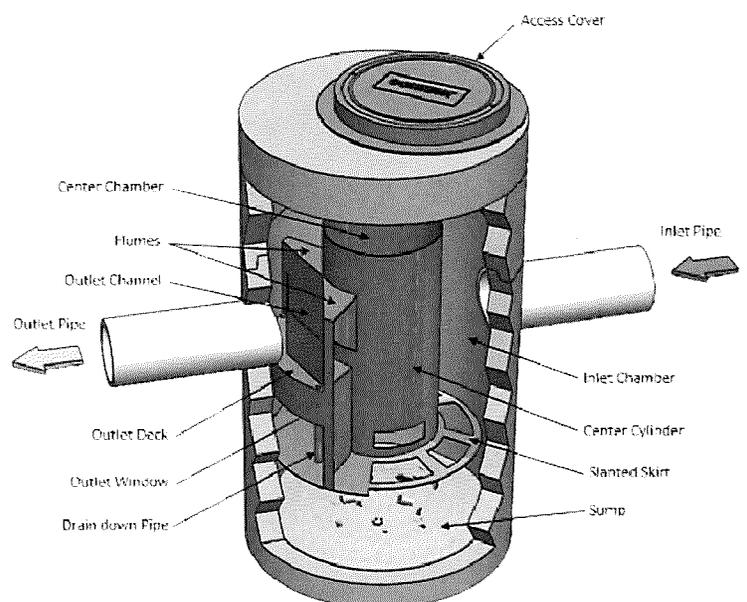
The Cascade Separator system should be cleaned before the level of sediment in the sump reaches the maximum sediment depth and/or when an appreciable level of hydrocarbons and trash has accumulated. If sorbent material is used, it must be replaced when significant discoloration has occurred. Performance may be impacted when maximum sediment storage capacity is exceeded. Contech recommends maintaining the system when sediment level reaches 50% of maximum storage volume. The level of sediment is easily determined by measuring the distance from the system outlet invert (standing water level) 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. 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. Once this measurement is recorded, it should be compared to the chart in this document to determine if the height of the sediment pile off the bottom of the sump floor exceeds 50% of the maximum sediment storage.

Cleaning

Cleaning of a Cascade Separator 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 cover and insert the vacuum tube down through the center chamber and into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The areas outside the center chamber and the slanted skirt should also be washed off if pollutant build-up exists in these areas.

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. 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. Then the system 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 to ensure proper safety precautions. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the Cascade Separator system must 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. If any components are damaged, replacement parts can be ordered from the manufacturer.



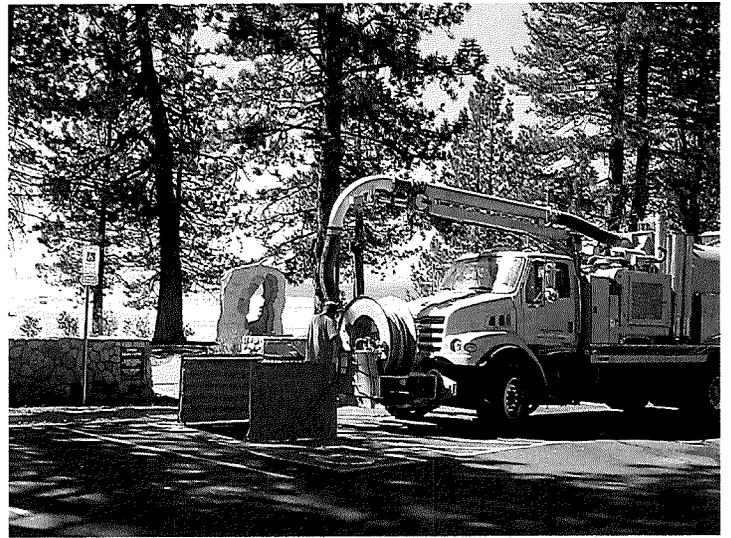
Cascade Separator® Maintenance Indicators and Sediment Storage Capacities

Model Number	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	y ³	m ³
CS-3	3	0.9	1.5	0.5	0.4	0.3
CS-4	4	1.2	1.5	0.5	0.7	0.5
CS-5	5	1.3	1.5	0.5	1.1	0.8
CS-6	6	1.8	1.5	0.5	1.6	1.2
CS-8	8	2.4	1.5	0.5	2.8	2.1
CS-10	10	3.0	1.5	0.5	4.4	3.3
CS-12	12	3.6	1.5	0.5	6.3	4.8

Note: The information in the chart is for standard units. Units may have been designed with non-standard sediment storage depth.



A Cascade Separator unit can be easily cleaned in less than 30 minutes.



A vacuum truck excavates pollutants from the systems.

