ANDOVER WOODS
STORM SEWER SYSTEM MAINTENANCE AGREEMENT

THIS STORM SEWER SYSTEM MAINTENANCE AGREEMENT is made this 10th day of April, 2017 by and between the City of Rochester Hills, a Michigan municipal corporation (the "City") whose address is 1000 Rochester Hills Drive, Rochester Hills, Michigan 49309-3033, and Andover Woods Development, LLC , a Michigan Limited Liability Company ("Developer"), whose address is 2617 Beacon Hill Drive, Auburn Hills, Michigan 48326

RECITALS:

A. Developer is the owner ofcertain real property located in the City of Rochester Hills, Oakland County, Michigan, which real property is more particularly described in Exhibit A attached hereto and incorporated herein (the "Property").

B. Developer intends to develop the Property as a residential community to be known as ANDOVER WOODS, an attached single family development (hereinafter known as the Development).

C. The Development will alter the natural flow of surface and storm water drainage.

D. Developer desires to extend to the future condominium unit owners within the Development the right to utilize and benefit from the storm water detention facilities and to provide a permanent method for the support and upkeep of said detention facilities.

E. Developer has proposed and the City has approved a storm water drainage and detention system (the "Storm Sewer System") as shown in Exhibit B attached hereto and incorporated herein (the "Approved Plan") and both the Developer and the City will benefit from the proper operation, use and maintenance of the Storm Sewer System and desire to enter into this binding contract relative to the use and governance of the areas described and fully delineated in the condominium Development site plan (the "Condominium Subdivision Plan").

F. Developer also intends to bind the condominium unit owners in the Development to this Agreement so this Agreement is intended to run with the land;

NOW, THEREFORE, in consideration of the approval by the City of the Condominium Subdivision Plan and of the mutual promises contained herein, the parties hereto agree as follows:

I. **Storm Sewer System.** Pursuant to the Condominium Subdivision Plan, Developer hereby makes available and will grant to each of the condominium unit owners in the Development the right to utilize, maintain, replace and repair the Storm Sewer System, including but not limited to the detention basin areas and the storm sewer lines existing within the Development and delineated in the Condominium Subdivision Plan Components of the Storm Water System, including any and all water conveyance, detention facilities and devices, stonn sewer pipe, catch basins, manholes, end-sections, ditches, swales, open water courses and rip- rap, shall be used solely for the purpose of conveying and detaining storm and surface drainage in the Development until such time as: (i) the City determines and notifies the Developer or Developer's successors and assigns, including the Association (as defined below), in writing that it is no longer necessary to convey, or detain the storm and surface drainage; and (ii) an adequate alternative for conveying and detaining 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. **Condominium Association for Andover Woods.** Control and jurisdiction over the Storm Sewer System shall be vested in the Andover Woods Condominium Association (hereinafter referred to as "Association"). The Association is organized as a nonprofit corporation for a perpetual term under the laws of the State of Michigan. The Association was incorporated on May 5, 2017. Membership in the Association shall be mandatory for all of the condominium unit owners in the Development. The Association shall be responsible at its sole expense for the proper maintenance of the Storm Sewer System and for compliance with the terms of this Agreement. The Bylaws of the Association shall provide for a Board of Directors of no less than three (3) members and no more than five (5).

The Association members shall each bear their prorata share of the total costs of maintaining the Storm Sewer System (including without limitation, the real and personal property taxes assessed against it, if any, and insurance policies maintained with respect to it), which shall constitute a lien against each member's condominium unit. The prorated share of the cost shall be based on each condominium unit owner's percentage of value as set forth in the Master Deed for Andover Woods Each Association member shall be entitled to vote in accordance with the Master Deed for Andover Woods.

The Association shall have the authority to make and enforce regulations pertaining to the use and maintenance of the Storm Sewer System, which regulations shall be binding upon all members of the Association.

3. **Maintenance of Storm Sewer System.** The Association shall be responsible for the proper maintenance, repair and replacement of the Storm Water System and all parts thereof as detailed in the Maintenance Plan attached hereto as Exhibit C (the "Maintenance Plan"). Proper maintenance of the Storm Water System shall include, but is not limited to: (i) keeping the bottom of the detention basin and inlet pipes free from silt and debris, (ii) removing harmful algae; (iii) managing deleterious vegetative growth; (iv) maintaining the Storm Water System structures, end-sections and safety features; (v) controlling the effects of erosion; (vi) inspection of inlet and outlet pipes for structural integrity, (vii) inspection and replacement of rip-rap at inlet pipes; (viii) inspection and cleaning of storm sewer and catch basins upstream from the detention basin; (ix) inspection and replacement of stone around the outlet pipes, and (x) any other maintenance that is reasonable and necessary to facilitate and continue the proper operation of the Storm Water System. In no event shall the detention basin areas be utilized for any purpose other than detention of surface water without the prior written consent of the Association

4. **Failure to Maintain Storm Sewer System.** In the event the Association fails at any time to maintain the Storm Sewer System (including without limitation the detention basins) in reasonable order and condition, the City may serve written notice upon the Association or upon its members setting forth the manner in which the Association has failed to maintain the Storm Sewer System in a reasonable condition and such notice shall include a demand that deficiencies of maintenance be cured within thirty (30) days thereof. The notice shall further state the date and place of a hearing thereon before the City Council or other such board, body or official to whom the City shall delegate such responsibility, which shall be held at least fourteen (14) days after the date of the notice. At such hearing, the City Council or other designated board, body or official may affirm or modify the list and description of maintenance deficiencies and, for good cause shown, may give an extension of the time within which they shall be cured.

Thereafter, if the deficiencies set forth in the original notice, or in the modification thereof, shall not be cured within the time allowed, the City may maintain the same for a period of one (1) year. Such maintenance by the City shall not be construed as a trespass, constitute a taking of the Storm Sewer System, nor vest in the public any rights to use or enter the Storm Water System. Thereafter, if the Association does not properly maintain the Storm Water System, the City may, after providing similar written notice, schedule and hold another hearing to determine whether the City should maintain the Storm Water System for another year, and subject to a similar notice, hearing and determination in subsequent years.

In the event the City determines an emergency condition caused by or relating to the Storm Water System threatens the public health, safety or general welfare, the City shall have the right to immediately and without notice enter the Storm Water System and undertake corrective action.

5. **Charges.** The cost of any maintenance by the City, plus a ten percent (10%) administrative fee, shall be assessed against the Association and, if not timely paid, added to the tax rolls, which charges shall be a lien on the Storm Water System and shall be collectable and enforceable in the same

manner as general property taxes are collected and enforced. The City shall be, at its option, subrogated to the right of the Association against its members to the extent of that cost and administrative charge, if the City shall, by an official resolution, give thirty (30) days written notice to each member of the Association of the City's election to be subrogated.

The Association members shall bear their prorated share of the total costs of maintaining the Storm Sewer System, which prorate share of the cost shall constitute a lien against each member's condominium unit and if not paid, the City shall have the right to add it to the tax rolls and collect it in the same manner as provided above. The prorated share of the cost shall be based on each condominium unit owner's percentage of value as set forth in the Master Deed for Andover Woods. The cost of maintenance by the City shall be assessed against the Association or the Association member at the City's discretion.

In the event the City declares the existence of an emergency upon, caused by or relating to the Storm Sewer System, and the City takes appropriate corrective action, the City shall have the right to charge and collect the costs for such corrective action, as provided herein.

6. **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 the Developer:
Andover Woods Development, LLC
2617 Beacon Hill Drive
Auburn Hills, Michigan 48326

To the City:
City Clerk
City of Rochester H1Ils
I000 Rochester Hills Drive
Rochester Hills, MI 48309

To the Association·
Andover Woods Condominium Association
2617 Beacon Hill Drive
Auburn Hills, Michigan 48326

7. **Successors and Assigns, etc.** This Agreement shall constitute restrictions and covenants running with the Property. The parties hereto make this Agreement on behalf of themselves and their respective successors and assigns, and hereby warrant that they have the authority and capacity to make this contract

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

IN WITNESS WHEREOF, the parties have executed this Agreement on the date first written above.

Andover Woods Development LLC:

Anthony F. Randazzo
It's Authorized Representative

STATE OF MICHIGAN)
) ss.
COUNTY OF OAKLAND)

Acknowledged before me on April 10, 2017 by Anthony F. Randazzo, Authorized Representative of Andover Woods Development LLC.

ANNA MARIA FERRO
NOTARY PUBLIC - STATE OF MICHIGAN
COUNTY OF OAKLAND
My Commission Expires Nov 19, 2022
Acting in the County of Oakland

Anna Maria Ferro Notary Public
Oakland County, Michigan
Acting in Oakland, County, Michigan
My Commission expires: Nov 19, 2022

John Staran
Approved 5/30/17

CITY OF ROCHESTER HILLS

By: _____
Bryan K. Barnett

Its: Mayor

By: _____
Tina Barton

Its: City Clerk

STATE OF MICHIGAN }
}SS
COUNTY OF OAKLAND}

Acknowledged before me on _____, 2017, by Bryan K. Barnett, Mayor, and Tina Barton, City Clerk, of the City of Rochester Hills, a Michigan Municipal Corporation on behalf of the Corporation.

_____
, notary public

_____ County, Michigan

My commission expires:

Drafted By:

Anthony W. Randazzo
2617 Beacon Hill Dr.
Auburn Hills, MI 48326

When Recorded, Return To:

Clerks Dept.
City of Rochester Hills
1000 Rochester Drive
Rochester Hills, MI 48309

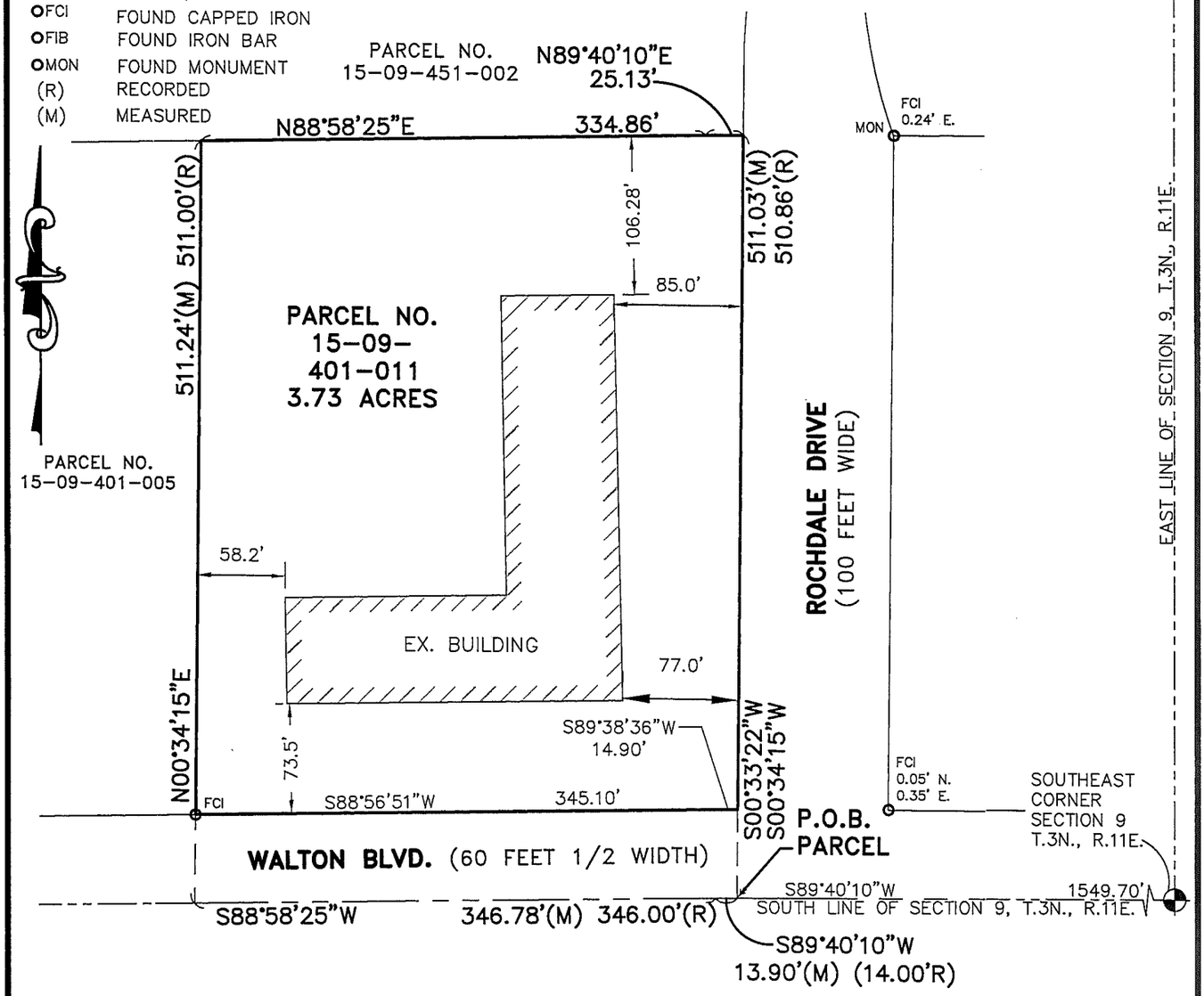
EXHIBIT A

BEARING BASIS:

BEARINGS BASED ON THE WEST LINE OF ROCHDALE DRIVE AND SOUTH LINE OF "VALLEY STREAM", LIBER 164, PG. 21–23, O.C.R.

LEGEND

○FCI	FOUND CAPPED IRON
○FIB	FOUND IRON BAR
○MON	FOUND MONUMENT
(R)	RECORDED
(M)	MEASURED



LEGAL DESCRIPTION

PARCEL NO. 15–09–401–011 (BY OTHERS):

SITUATED IN THE CITY OF ROCHESTER HILLS, OAKLAND COUNTY, MICHIGAN, DESCRIBED AS:
SITUATED IN THE CITY OF ROCHESTER HILLS, OAKLAND COUNTY, MICHIGAN, A PART OF THE SOUTHEAST 1/4 OF SECTION 9, TOWN 3 NORTH, RANGE 11 EAST, CITY OF ROCHESTER HILLS, OAKLAND COUNTY, MICHIGAN, MORE PARTICULARLY DESCRIBED AS: **BEGINNING** AT A POINT SOUTH 89 DEGREES 40 MINUTES 10 SECONDS WEST, 1549.70 FEET ALONG THE SOUTH LINE OF SAID SECTION 9, FROM THE SOUTHEAST CORNER OF SAID SECTION 9; THENCE SOUTH 89 DEGREES 40 MINUTES 10 SECONDS WEST 14.00 FEET; THENCE SOUTH 88 DEGREES 58 MINUTES 25 SECONDS WEST 346.00 FEET; THENCE NORTH 00 DEGREES 34 MINUTES 15 SECONDS EAST 511.00 FEET; THENCE NORTH 88 DEGREES 58 MINUTES 25 SECONDS EAST 334.86 FEET; THENCE NORTH 89 DEGREES 40 MINUTES 10 SECONDS EAST 25.13 FEET; THENCE SOUTH 00 DEGREES 34 MINUTES 15 SECONDS WEST 510.86 FEET TO THE **POINT OF BEGINNING.** EXCLUDING THE SOUTHERLY 60 FEET OF ROAD PURPOSES CONTAINING 3.72 ACRES, MORE OR LESS, AND SUBJECT TO ANY EASEMENTS, OR RESTRICTIONS OF RECORD.

REV. 6–12–17

I HEREBY CERTIFY THAT I HAVE SURVEYED THE PROPERTY HEREIN DESCRIBED, AND THAT THERE ARE NO VISIBLE ENCROACHMENTS UPON THE ABOVE DESCRIBED PROPERTY, EXCEPT AS SHOWN HEREON. I FURTHER CERTIFY THAT I HAVE FULLY COMPLIED WITH THE REQUIREMENTS OF PUBLIC ACT 132 OF 1970, AS AMENDED, AND THAT THE ERROR OF CLOSURE OF THIS SURVEY WAS NOT GREATER THAN 1 PART IN 5,000.

STATE OF MICHIGAN
PAUL W. KINNUNEN
PROFESSIONAL SURVEYOR
No. 48781
LICENSED PROFESSIONAL SURVEYOR

BY: _____
PAUL W. KINNUNEN P.S. #48781

GREENTECH ENGINEERING, INC.
CIVIL ENGINEERS & LAND SURVEYORS
51111 W. Pontiac Trail
Wixom, MI 48393
Phone: (248) 668–0700
Fax: (248) 668–0701

Mike Taunt Approved 8/17/17

CLIENT: *ANDOVER WOODS, LLC.*

PARCEL SKETCH

PARCEL NO. 15–09–401–011

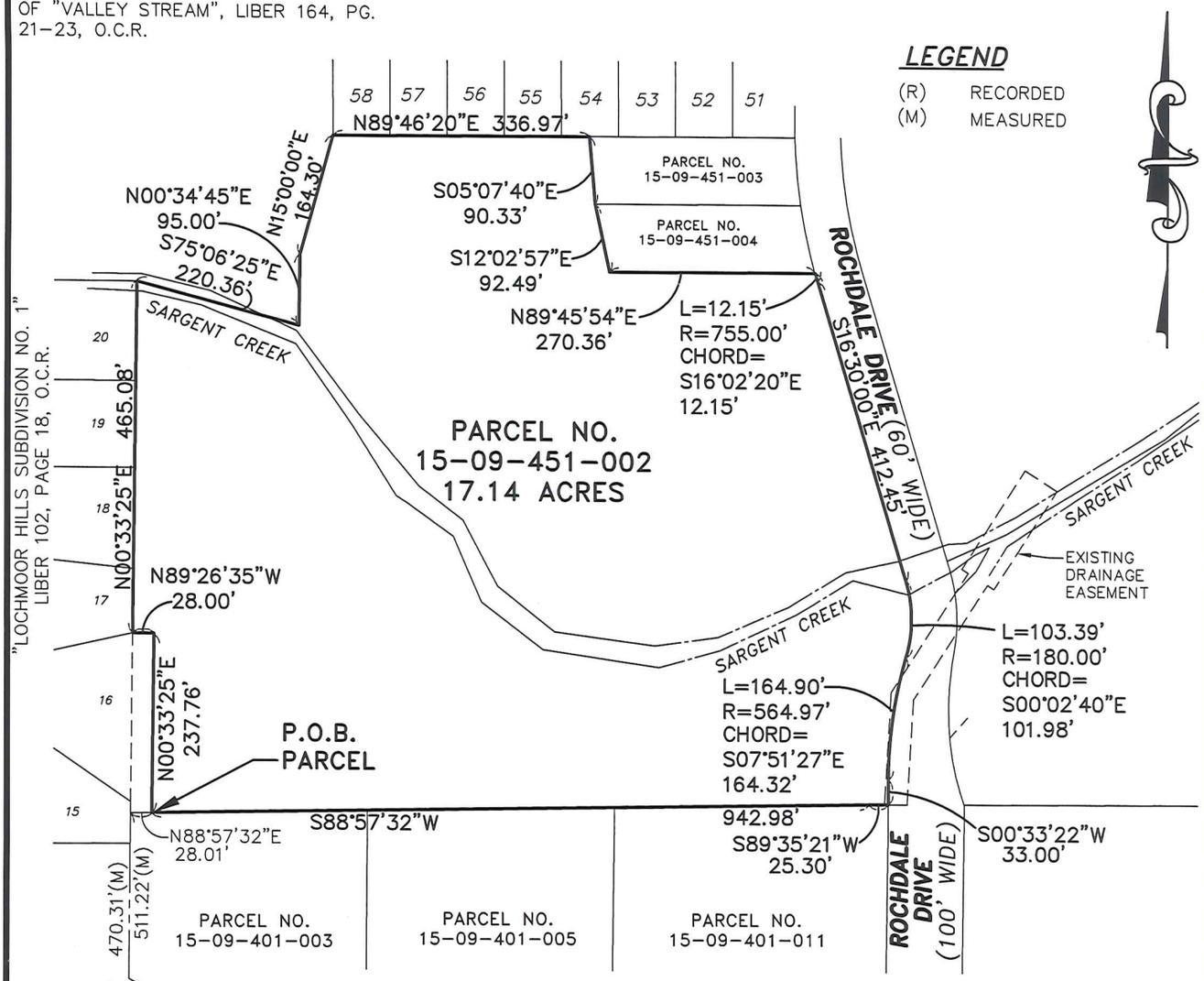
SECTION: 9 TOWNSHIP: 3 N. RANGE: 11 E.
CITY OF ROCHESTER HILLS
OAKLAND COUNTY
MICHIGAN

DATE: 2–13–2017
DRAWN BY: PWK
CHECKED BY: DJL
0 50 100
FBK: --
CHF: --
1/3
12–120
SCALE HOR 1"=100 FT.
VER 1"= -- FT.

EXHIBIT A

BEARING BASIS:

BEARINGS BASED ON THE WEST LINE OF ROCHDALE DRIVE AND SOUTH LINE OF "VALLEY STREAM", LIBER 164, PG. 21–23, O.C.R.



SOUTH 1/4 CORNER SECTION 9 T.3N., R.11E. CITY OF ROCHESTER HILLS, OAKLAND COUNTY, MI.

LEGAL DESCRIPTION PARCEL NO. 15-09-451-002:

A PART OF THE SOUTHEAST 1/4 OF SECTION 9, T.3N., R.11E., CITY OF ROCHESTER HILLS, OAKLAND COUNTY, MICHIGAN AND BEING DESCRIBED AS: COMMENCING AT THE SOUTH 1/4 CORNER OF SAID SECTION 9; THENCE N00°33'25"E 511.22 FEET ALONG THE NORTH–SOUTH 1/4 LINE OF SAID SECTION; THENCE N88°57'32"E 28.01 FEET TO THE **POINT OF BEGINNING**; THENCE N00°33'25"E 237.76 FEET; THENCE N89°26'35"W 28.00 FEET TO THE EAST LINE OF "LOCHMOOR HILLS SUBDIVISION NO. 1," AS RECORDED IN LIBER 102, PAGE 18 OF PLATS, OAKLAND COUNTY RECORDS, SAID LINE ALSO BEING THE NORTH–SOUTH 1/4 LINE OF SAID SECTION 9; THENCE N00°33'25"E 465.08 FEET ALONG SAID LINE TO THE SOUTHERLY LINE OF SAID "VALLEY STREAM SUBDIVISION"; THENCE THE FOLLOWING FOUR COURSES ALONG SAID LINE (1) S75°06'25"E 220.36 FEET (REC. 220.86 FEET), (2) N00°34'45"E 95.00 FEET, (3) N15°00'00"E 164.30 FEET, AND (4) N89°46'20"E 337.15 FEET (REC. 336.97 FEET); THENCE S05°07'40"E 90.33 FEET; THENCE S12°02'57"E 92.49 FEET (REC. 91.95 FEET); THENCE N89°45'54"E 270.36 FEET TO A POINT ON THE WESTERLY LINE OF ROCHDALE DRIVE (60 FEET WIDE) AS RECORDED IN SAID "VALLEY STREAM SUBDIVISION"; THENCE ALONG SAID WESTERLY LINE THE FOLLOWING 5 COURSES, (1) 12.15 FEET (REC. 12.73 FEET) ALONG A CURVE TO THE LEFT, SAID CURVE HAVING A RADIUS OF 755.00 FEET, A DELTA ANGLE OF 00°55'19" AND A CHORD BEARING S16°02'20"E 12.15 FEET (REC. 12.73 FEET), (2) S16°30'00"E 412.45 FEET, (3) 103.39 ALONG A CURVE TO THE RIGHT, SAID CURVE HAVING A RADIUS OF 180.00 FEET, A DELTA ANGLE OF 32°54'39" AND A CHORD BEARING S00°02'40"E 101.98 FEET, (4) 164.90 FEET (REC. 164.97 FEET) ALONG A CURVE TO THE LEFT, SAID CURVE HAVING A RADIUS OF 564.97 FEET, A DELTA ANGLE OF 16°43'23" AND A CHORD BEARING S07°51'27"W 164.32 FEET (REC. 164.38 FEET) AND (5) S00°33'22"W 33.00; THENCE S89°39'17"W 25.13 FEET; THENCE S88°57'32"W 942.98 FEET TO THE **POINT OF BEGINNING** AND CONTAINING 17.14 ACRES OF LAND, AND SUBJECT TO ANY EASEMENTS, OR RESTRICTIONS OF RECORD, IF ANY.

GREENTECH ENGINEERING, INC.
CIVIL ENGINEERS & LAND SURVEYORS
51147 W. Pontiac Trail
Wixom, MI 48393
Phone: (248) 668–0700
Fax: (248) 668–0701

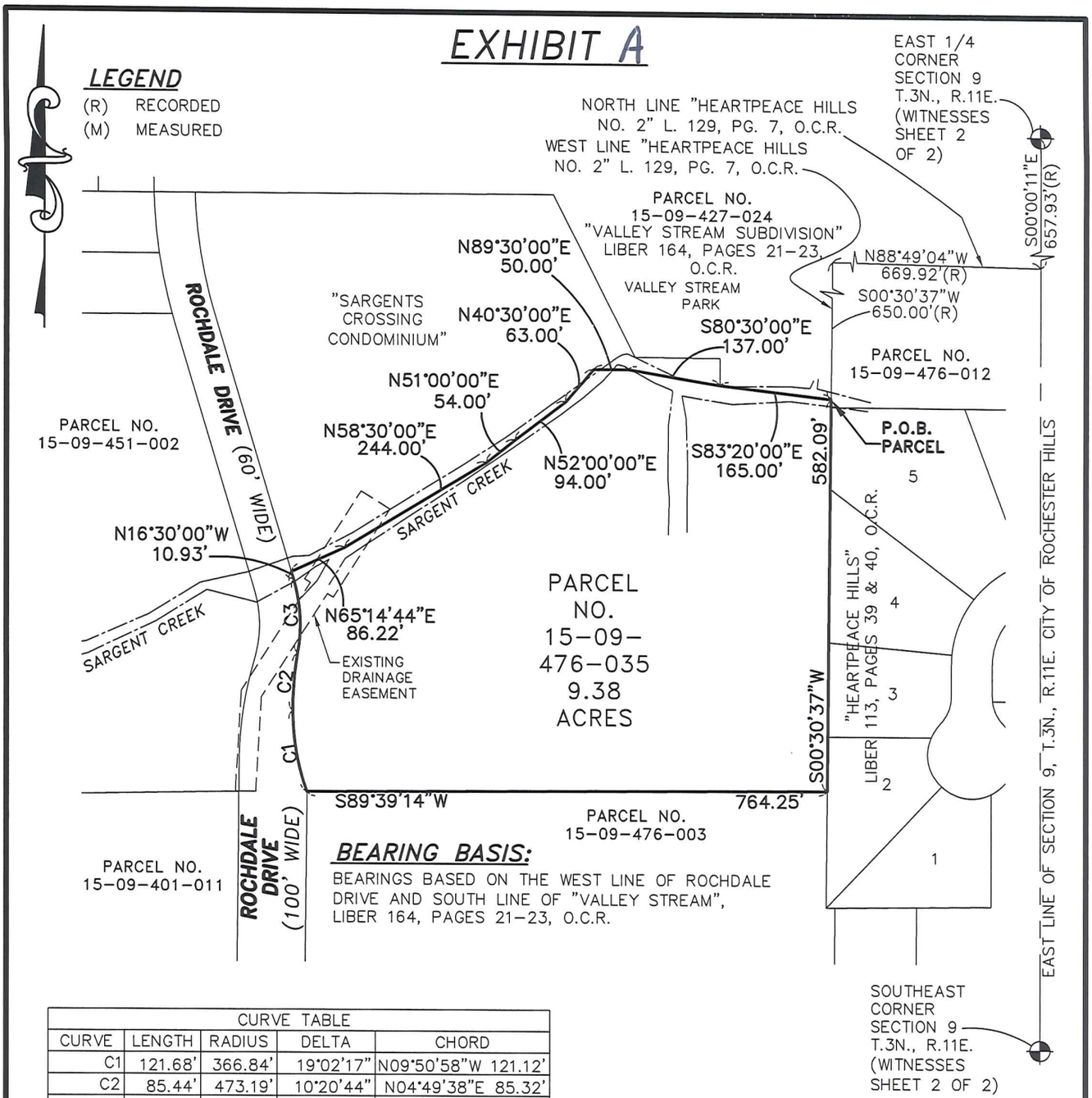
CLIENT: ANDOVER WOODS, LLC.

PARCEL SKETCH

PARCEL NO. 15-09-451-002
SECTION: 9 TOWNSHIP: 3N. RANGE: 11E.
CITY OF ROCHESTER HILLS
OAKLAND COUNTY
MICHIGAN

DATE: 2–09–2017
DRAWN BY: PWK
CHECKED BY: DJL
0 100 200
FBK: --
CHF: --
2/3
12–120
SCALE HOR 1"= 200 FT.
VER 1"= -- FT.

EXHIBIT A



BEARING BASIS:

BEARINGS BASED ON THE WEST LINE OF ROCHDALE DRIVE AND SOUTH LINE OF "VALLEY STREAM", LIBER 164, PAGES 21-23, O.C.R.

CURVE TABLE				
CURVE	LENGTH	RADIUS	DELTA	CHORD
C1	121.68'	366.84'	19°02'17"	N09°50'58"W 121.12'
C2	85.44'	473.19'	10°20'44"	N04°49'38"E 85.32'
C3	111.00'	240.00'	26°29'57"	N03°15'00"W 110.01'

LEGAL DESCRIPTION - PARCEL NO. 15-09-476-035 (BY OTHERS):

A PART OF THE SOUTHEAST 1/4 OF SECTION 9, T.3N., R.11E., CITY OF ROCHESTER HILLS, OAKLAND COUNTY, MICHIGAN AND BEING DESCRIBED AS:
BEGINNING AT A POINT BEING S00°00'11"E 657.93 FEET ALONG THE EAST LINE OF SAID SECTION 9, AND N88°49'04"W 669.92 FEET ALONG THE NORTH LINE OF "HEARTPEACE HILLS NO. 2," AS RECORDED IN LIBER 129, PAGE 7 OF PLATS, OAKLAND COUNTY RECORDS, AND S00°30'37"W 650.00 FEET ALONG THE WEST LINE OF SAID SUBDIVISION FROM THE EAST ¼ CORNER OF SECTION 9; THENCE S00°30'37"W 582.09 FEET; THENCE S89°39'14"W 764.25 FEET (REC. S89°39'17"W 764.24 FEET) TO A POINT ON THE EAST LINE OF NORTH ROCHDALE DRIVE 60 FT. WIDE AND POINT OF CURVATURE; THENCE ALONG A CURVE TO THE RIGHT WITH AN ARC LENGTH OF 121.68 FEET (REC. 121.67 FEET), A RADIUS OF 366.84 FEET (REC. 366.70 FEET), AND A CHORD OF N09°50'58"W 121.12 FEET (REC. N09°51'02"W 121.11 FEET); THENCE ALONG A CURVE TO THE RIGHT WITH AN ARC LENGTH OF 85.44 FEET, A RADIUS OF 473.19 FEET, AND A CHORD OF N04°49'38"E 85.32 FEET; THENCE ALONG A CURVE TO THE LEFT WITH AN ARC LENGTH OF 111.00 FEET, A RADIUS OF 240.00 FEET, AND A CHORD OF N03°15'00"W 110.01 FEET; THENCE N16°30'00"W 10.93 FEET; THENCE N65°14'44"E 86.22 FEET; THENCE N58°30'00"E 244.00 FEET; THENCE N51°00'00"E 54.00 FEET; THENCE N52°00'00"E 94.00 FEET; THENCE N40°30'00"E 63.00 FEET; THENCE N89°30'00"E 50.00 FEET; THENCE S80°30'00"E 137.00 FEET; THENCE S83°20'00"E 165.00 FEET TO THE POINT OF BEGINNING. CONTAINING 9.38 ACRES.

GREENTECH ENGINEERING, INC.
CIVIL ENGINEERS & LAND SURVEYORS
51147 W. Pontiac Trail
Wixom, MI 48393
Phone: (248) 668-0700
Fax: (248) 668-0701

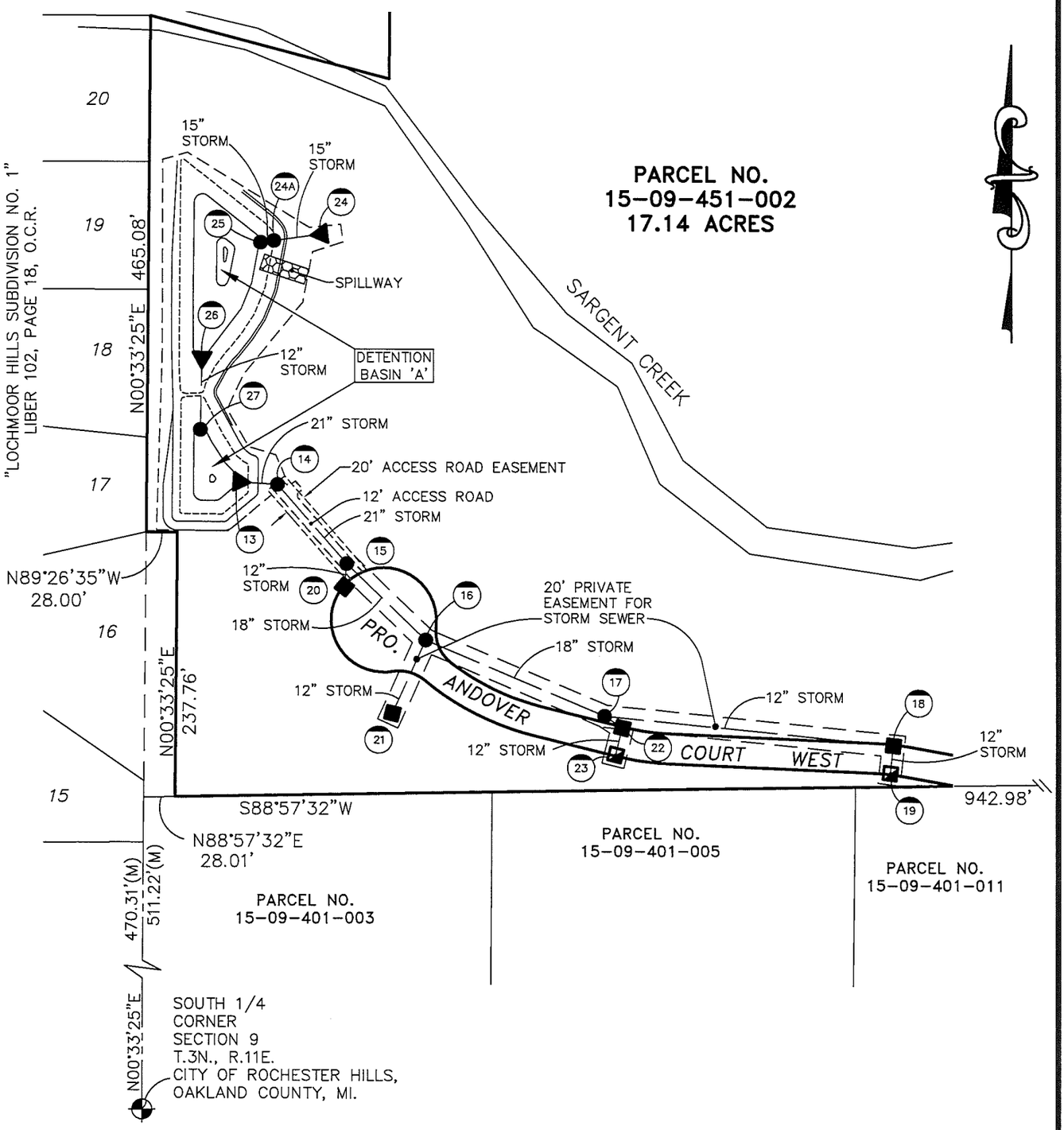
CLIENT: ANDOVER WOODS, LLC.

PARCEL SKETCH

PARCEL NO. 15-09-476-035
SECTION: 9 TOWNSHIP: 3N. RANGE: 11E.
CITY OF ROCHESTER HILLS
OAKLAND COUNTY
MICHIGAN

DATE: 2-27-2017
DRAWN BY: PWK
CHECKED BY: DJL
0 100 200
FBK: --
CHF: --
3/3
12-120
SCALE HOR 1"= 200 FT.
VER 1"= -- FT.

EXHIBIT B



Mike Taunt
Approved 8/17/17

REV. 6-12-17

GREENTECH ENGINEERING, INC.
CIVIL ENGINEERS & LAND SURVEYORS
51147 W. Pontiac Trail
Wixom, MI 48393
Phone: (248) 668-0700
Fax: (248) 668-0701

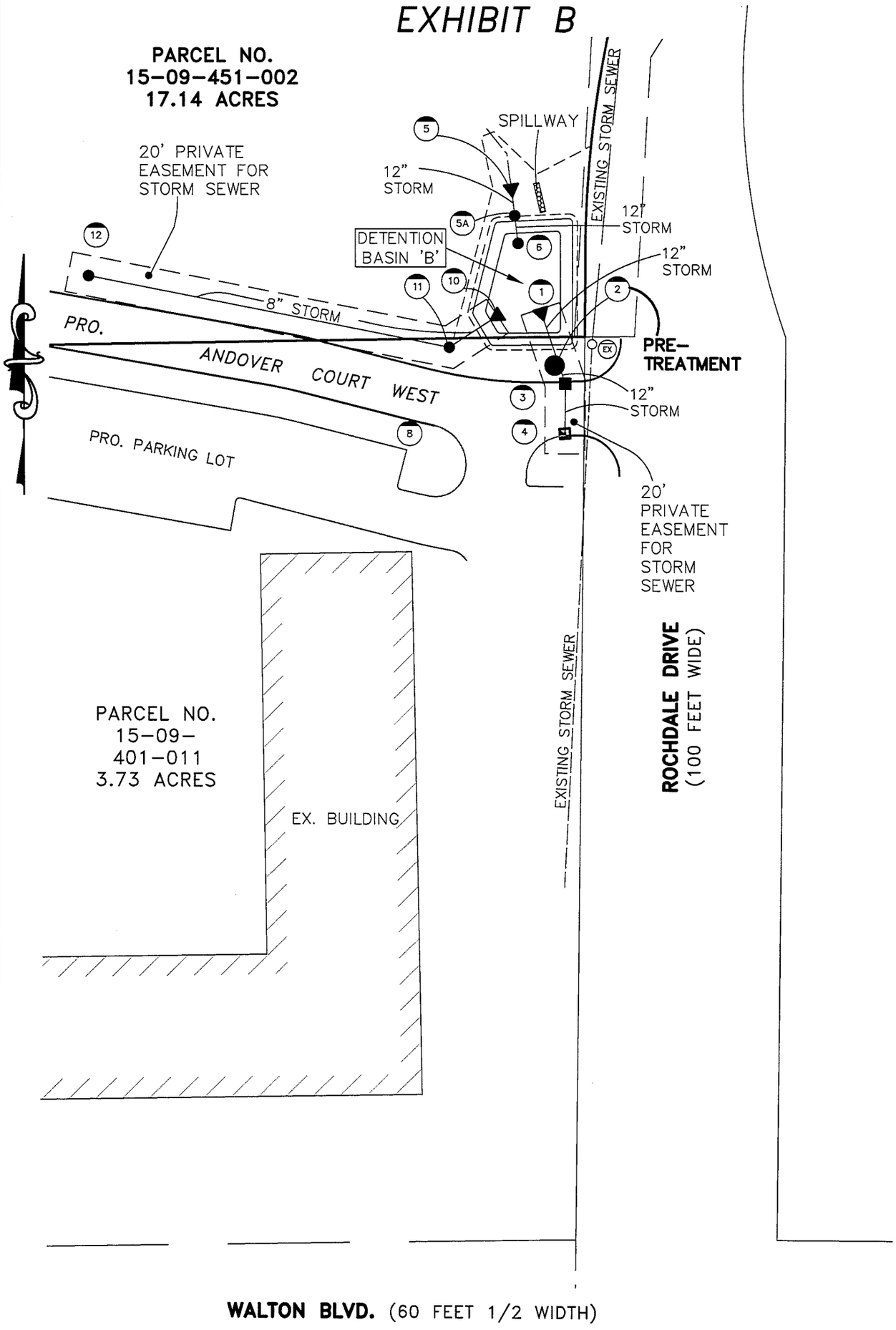
CLIENT: ANDOVER WOODS, LLC.

STORM WATER MAINTAINENCE

PARCEL NO. 15-09-451-002
SECTION: 9 TOWNSHIP: 3N. RANGE: 11E.
CITY OF ROCHESTER HILLS
OAKLAND COUNTY
MICHIGAN

DATE: 2-28-2017
DRAWN BY: PWK
CHECKED BY: DJL
0 60 120
FBK: --
CHF: --
1/3
12-120
SCALE HOR 1"=120 FT.
VER 1"= -- FT.

EXHIBIT B



REV. 6-12-17

GREENTECH
ENGINEERING, INC.
CIVIL ENGINEERS & LAND SURVEYORS
51147 W. Pontiac Trail
Wixom, MI 48393
Phone: (248) 668-0700
Fax: (248) 668-0701

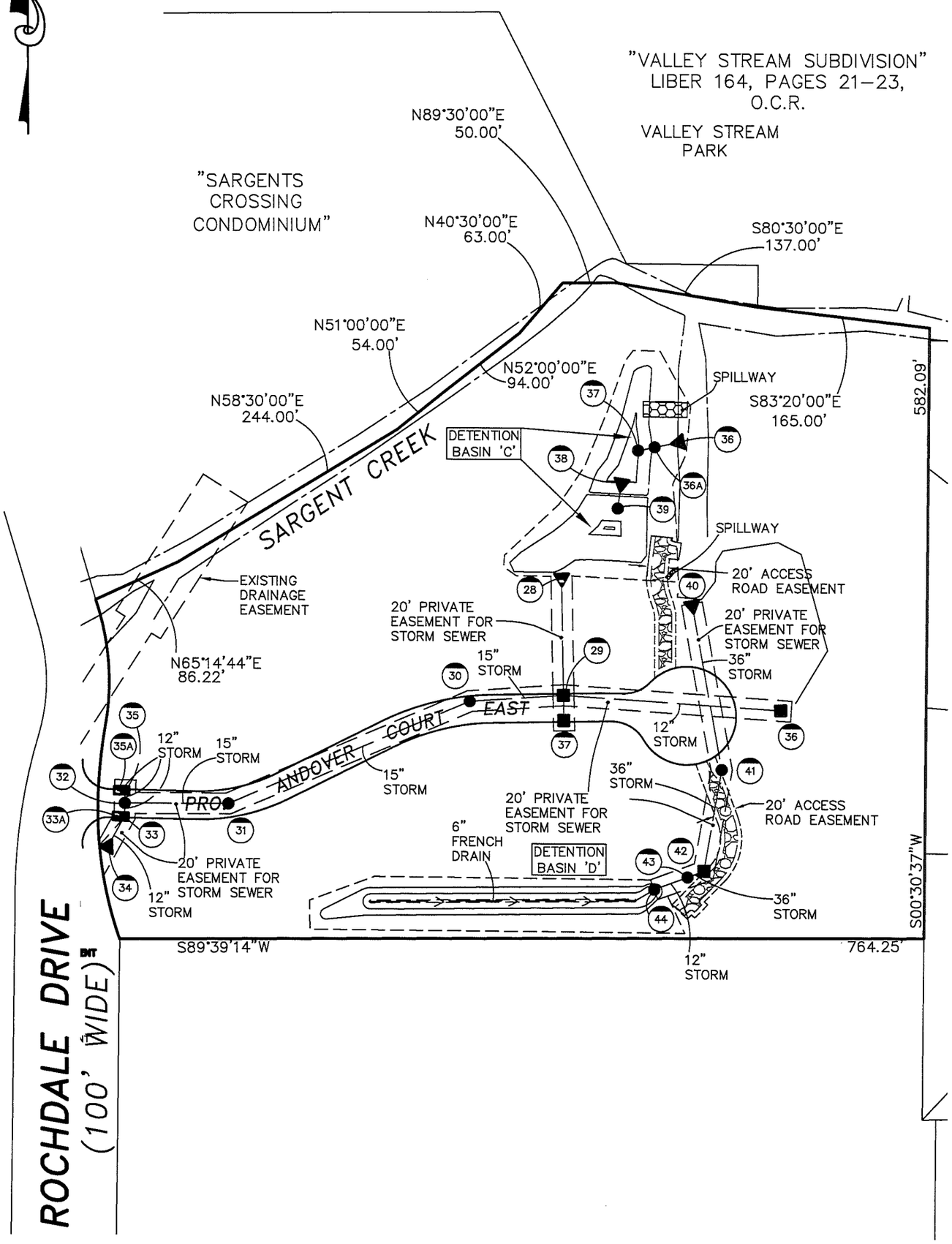
CLIENT:
ANDOVER WOODS, LLC.

STORM WATER MAINTENANCE

PARCEL NOS. 15-09-401-011 & 15-09-451-002
SECTION: 9 TOWNSHIP: 3 N. RANGE: 11 E.
CITY OF ROCHESTER HILLS
OAKLAND COUNTY
MICHIGAN

DATE: 2-28-2017
DRAWN BY: PWK
CHECKED BY: DJL
0 30 60
FBK: --
CHF: --
2/3
12-120
SCALE HOR 1"=60 FT.
VER 1"= -- FT.

EXHIBIT B



REV. 6–12–17

GREENTECH
ENGINEERING, INC.
CIVIL ENGINEERS & LAND SURVEYORS
51147 W. Pontiac Trail
Wixom, MI 48393
Phone: (248) 668–0700
Fax: (248) 668–0701

CLIENT:
ANDOVER WOODS, LLC.

STORM WATER MAINTENANCE

PARCEL NO. 15–09–476–035
SECTION: 9 TOWNSHIP: 3N. RANGE: 11E.
CITY OF ROCHESTER HILLS
OAKLAND COUNTY
MICHIGAN

DATE: 2–27–2017
DRAWN BY: PWK
CHECKED BY: DJL

0 60 120

FBK: --
CHF: --

3/3

12–120

SCALE HOR 1"=120 FT.
VER 1"= -- FT.

EXHIBIT C

MAINTENANCE PLAN AND SCHEDULE: ANDOVER WOODS

TASKS	COMPONENTS								
	STREETS	STORM SYSTEM	CATCH BASIN SUMPS	CATCH BASIN INLET CASINGS	DITCHES & SWALES	OUTLET CONTROL STRUCTURES	ENERGY DISSAPATER	SEDIMENT BASIN	SCHEDULE
INSPECT FOR SEDIMENTATION ACCUMULATION		X	X		X	X	X	X	ANNUALLY
REMOVAL OF SEDIMENTATION ACCUMULATION		X	X		X	X	X	X	EVERY 2 YEARS AS NEEDED
INSPECTION OF FLOATABLES & DEBRIS				X	X	X	X	X	ANNUALLY
CLEANING OF FLOATABLES & DEBRIS				X	X	X	X	X	ANNUALLY
INSPECT FOR EROSION					X	X	X	X	ANNUALLY
RE-ESTABLISH PERMANENT VEGITATION ON ERODED SLOPES					X		X	X	AS NEEDED
REPLACEMENT OF STONE						X			EVERY 3-5 YEARS AS NEEDED
CLEAN STREETS AND MAINTAIN ACCESS DR	X								SEMI-ANNUALLY
MOWING					X		X	X	0-4 TIMES/YEAR
INSPECT STORM WATER SYSTEM COMPONENTS DURING WET WEATHER & COMPARE TO AS-BUILT PLANS		X	X		X	X	X	X	ANNUALLY
MAKE ADJUSTMENTS OR REPLACEMENTS AS DETERMINED BY ANNUAL WET WEATHER INSPECTIONS		X	X		X	X	X	X	AS NEEDED

(APPLIES TO ALL 4 DETENTION BASINS)

GREENTECH ENGINEERING, INC.
CIVIL ENGINEERS & LAND SURVEYORS
51147 W. Pontiac Trail
Wixom, MI 48393
Phone: (248) 668-0700
Fax: (248) 668-0701

CLIENT:
ANDOVER WOODS, LLC.

STORM WATER MAINTENANCE

PARCEL NO. 15-09-476-035
SECTION: 9 TOWNSHIP: 3N. RANGE: 11E.
CITY OF ROCHESTER HILLS
OAKLAND COUNTY
MICHIGAN

DATE: 2-27-2017
DRAWN BY: PWK
CHECKED BY: DJL
0 100 200
FBK: --
CHF: --
12-120
SCALE HOR 1"= 200 FT.
VER 1"= -- FT.

EXHIBIT C

Aqua-Swirl®
Stormwater Treatment System

Inspection and Maintenance Manual

AquaShield™, Inc.
2705 Kanasita Drive
Chattanooga, TN 37343
Toll free (888) 344-9044
Phone: (423) 870-8888
Fax: (423) 826-2112
Email: info@aquashieldinc.com
www.aquashieldinc.com

March 2013

Table of Contents

AquaShield™, Inc.
2705 Kanasita Drive
Chattanooga, Tennessee 37343
Toll free (888) 344-9044
Fax (423) 870-2112
www.aquashieldinc.com

AquaShield™, Inc
Stormwater Treatment Solutions

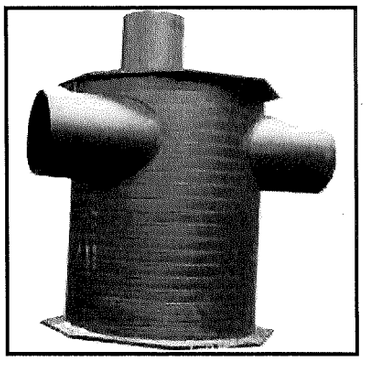
The highest priority of AquaShield™, Inc. (AquaShield™) is to protect waterways by providing stormwater treatment solutions to businesses across the world. These solutions have a reliable foundation based on over 20 years of water treatment experience.

Local regulators, engineers, and contractors have praised the AquaShield™ systems for their simple design and ease of installation. All the systems are fabricated from high performance, durable and lightweight materials. Contractors prefer the quick and simple installation of our structures that saves them money.

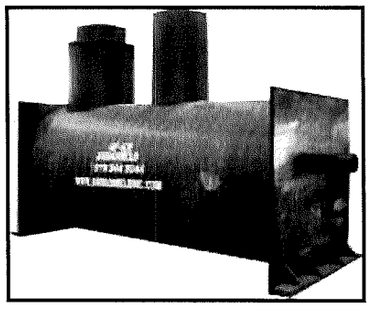
The patented line of AquaShield™ stormwater treatment products that provide high levels of stormwater treatment include the following:

- **Aqua-Swirl® Stormwater Treatment System:** hydrodynamic separator, which provides a highly effective means for the removal of sediment, floating debris and free-oil.

- **Aqua-Filter™ Stormwater Filtration System:** treatment train stormwater filtration system capable of removing gross contaminants, fine sediments, waterborne hydrocarbons, heavy metals and total phosphorous.



Aqua-Swirl® Stormwater Treatment System

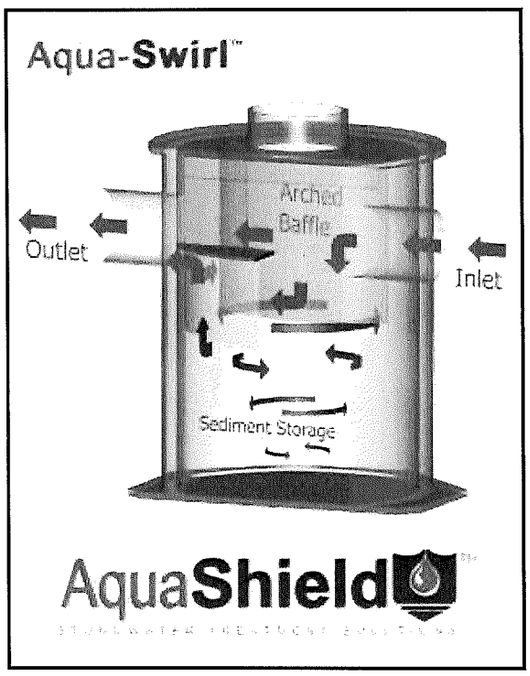


Aqua-Filter™ Stormwater Filtration System

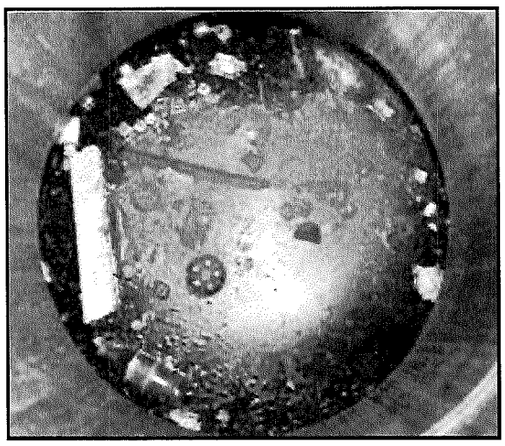
Aqua-Swirl® Stormwater Treatment System

The patented Aqua-Swirl® Stormwater Treatment System is a single chamber hydrodynamic separator which provides a highly effective means for the removal of sediment, free oil, and floating debris. Both treatment and storage are accomplished in the swirl chamber without the use of multiple or "blind" chambers. Independent laboratory and field performance verifications have shown that the Aqua-Swirl® achieves over 80% suspended solids removal efficiency on a net annual basis.

The Aqua-Swirl® is most commonly installed in an "off-line" configuration. Or, depending on local regulations, an "in-line" (on-line) conveyance flow diversion (CFD) system can be used. The CFD model allows simple installation by connecting directly to the existing storm conveyance pipe thereby providing full treatment of the "first flush," while the peak design storm is diverted and channeled through the main conveyance pipe.



The patented Aqua-Swirl® Stormwater Treatment System provides a highly effective means for the removal of sediment, floating debris, and free oil. Swirl technology, or vortex separation, is a proven form of treatment utilized in the stormwater industry to accelerate gravitational separation.



Floatable debris in the Aqua-Swirl®

Each Aqua-Swirl® is constructed of high performance, lightweight and durable materials including polymer coated steel (PCS), high density polyethylene (HDPE), or fiberglass reinforced polymer (FRP). These materials eliminate the need for heavy lifting equipment during installation.

System Operation

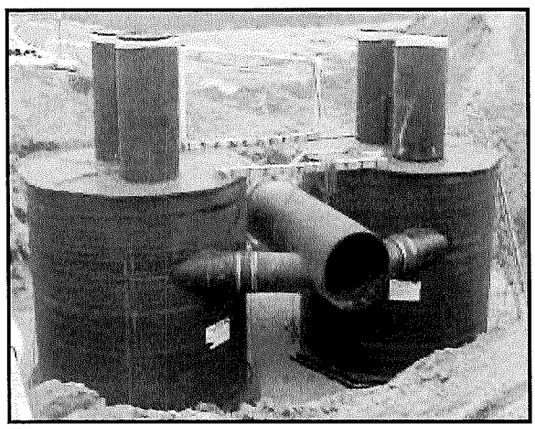
The treatment operation begins when stormwater enters the Aqua-Swirl® through a tangential inlet pipe that produces a circular (or vortex) flow pattern that causes contaminates to settle to the base of the unit. Since stormwater flow is intermittent by nature, the Aqua-Swirl® retains water between storm events providing both dynamic and quiescent settling of solids. The dynamic settling occurs during each storm event while the quiescent settling takes place between successive storms. A combination of gravitational and hydrodynamic drag forces encourages the solids to drop out of the flow and migrate to the center of the chamber where velocities are the lowest.

The treated flow then exits the Aqua-Swirl® behind the arched outer baffle. The top of the baffle is sealed across the treatment channel, thereby eliminating floatable pollutants from escaping the system. A vent pipe is extended up the riser to expose the backside of the baffle to atmospheric conditions, preventing a siphon from forming at the bottom of the baffle.

Custom Applications

The Aqua-Swirl® system can be modified to fit a variety of purposes in the field, and the angles for inlet and outlet lines can be modified to fit most applications. The photo below demonstrates the flexibility of Aqua-Swirl® installations using a "twin" configuration in order to double the

water quality treatment capacity. Two Aqua-Swirl® units were placed side by side in order to treat a high volume of water while occupying a small amount of space.



Custom designed AS-9 Twin Aqua-Swirl®

Retrofit Applications

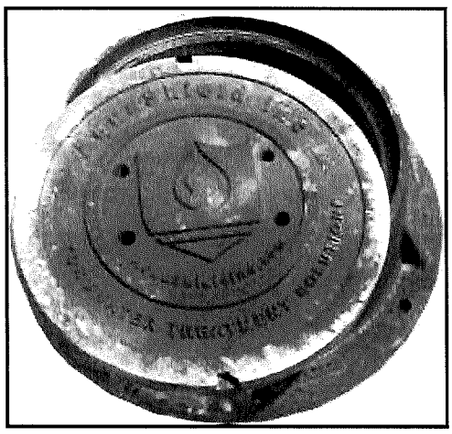
The Aqua-Swirl® system is designed so that it can easily be used for retrofit applications. With the invert of the inlet and outlet pipe at the same elevation, the Aqua-Swirl® can easily be connected directly to the existing storm conveyance drainage system. Furthermore, because of the lightweight nature and small footprint of the Aqua-Swirl®, existing infrastructure utilities (i.e., wires, poles, trees) would be unaffected by installation.

AquaShield™ Product System Maintenance

The long term performance of any stormwater treatment structure, including manufactured or land based systems, depends on a consistent maintenance plan. Inspection and maintenance functions are simple and easy for the AquaShield™ Stormwater Treatment Systems allowing all inspections to be performed from the surface.

It is important that a routine inspection and maintenance program be established for each unit based on: (a) the volume or load of the contaminants of concern, (b) the frequency of releases of contaminants at the facility or location, and (c) the nature of the area being drained.

In order to ensure that our systems are being maintained properly, AquaShield™ offers a maintenance solution to all of our customers. We will arrange to have maintenance performed.



Inspection

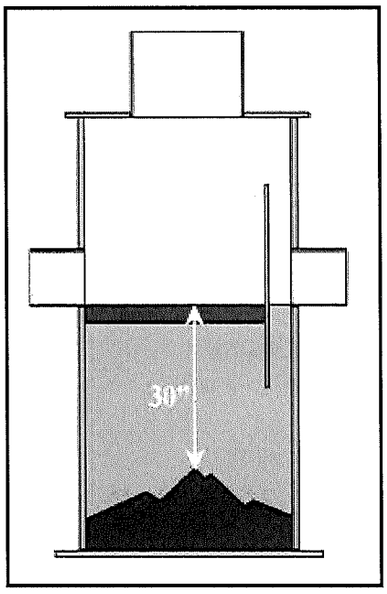
All AquaShield™ products can be inspected from the surface, eliminating the need to enter the systems to determine when cleanout should be performed. In most cases, AquaShield™ recommends a quarterly inspection for the first year of operation to develop an appropriate schedule of maintenance. Based on experience of the system's first year in operation, we recommend that the inspection schedule be revised to reflect the site-specific conditions encountered. Typically, the inspection schedule for subsequent years is reduced to semi-annual inspection.

Aqua-Swirl® Maintenance

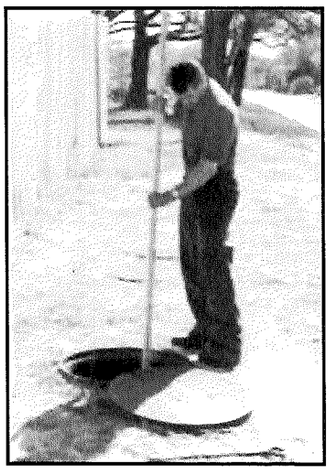
The Aqua-Swirl® has been designed to minimize and simplify the inspection and maintenance process. The single chamber system can be inspected and maintained entirely from the surface thereby eliminating the need for confined space entry. Furthermore, the entire structure (specifically, the floor) is accessible for visual inspection from the surface. There are no areas of the structure that are blocked from visual inspection or periodic cleaning. Inspection of any free-floating oil and floatable debris can be directly observed and maintained through the manhole access provided directly over the swirl chamber.

Aqua-Swirl® Inspection Procedure

To inspect the Aqua-Swirl®, a hook is needed to remove the manhole cover. AquaShield™ provides a customized manhole cover with our distinctive logo to make it easy for maintenance crews to locate the system in the field. We also provide a permanent metal information plate affixed inside the access riser which provides our contact information, the Aqua-Swirl® model size, and serial number.



Maintain system when sediment is 42-48 inches below water surface. Maximum sediment storage capacity reached when sediment is 30 inches below water surface.



Sediment inspection using a stadia rod in a single chamber

The only tools needed to inspect the Aqua-Swirl® system are a flashlight and a measuring device such as a stadia rod or pole. Given the easy and direct accessibility provided, floating oil and debris can be observed directly from the surface. Sediment depths can easily be determined by lowering a measuring device to the top of the sediment pile and to the surface of the water. When the sediment pile is within 42 to 48 inches of the water surface (or sediment pile thickness is 18 to 24 inches as measured from the base), the system should be maintained. The maximum sediment storage capacity of the Aqua-Swirl® is reached when the sediment pile is within 30 inches of the water surface (or sediment accumulation is 36 inches thick as measured from the base).

It should be noted that in order to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the *top* of the sediment pile. Keep in mind that the finer sediment at the top of the pile may offer less resistance to the measuring device than the larger particles which typically occur deeper within the sediment pile.

The Aqua-Swirl® 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® Cleanout Procedure

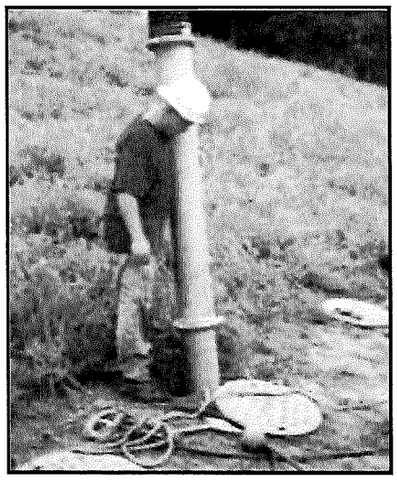
Cleaning the Aqua-Swirl® is simple and quick. Free-floating oil and floatable debris can be observed and removed directly through the 30-inch service access riser provided. A vacuum truck is typically used to remove the accumulated sediment and debris. An advantage of the

Aqua-Swirl® 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®, 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™ recommends that all maintenance activities be performed in accordance with appropriate health and safety practices for the tasks and equipment being used.

AquaShield™ also recommends that all materials removed from the Aqua-Swirl® 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® from a single chamber

Aqua-Swirl® Inspection and Maintenance Work Sheets on following pages

Aqua-Swirl® Inspection and Maintenance Manual
Work Sheets

SITE and OWNER INFORMATION

Site Name: _____

Site Location: _____

Date: _____ Time: _____

Inspector Name: _____

Inspector Company: _____ Phone #: _____

Owner Name: _____

Owner Address: _____

Owner Phone #: _____ Emergency Phone #: _____

INSPECTIONS

I. Floatable Debris and Oil

1. Remove manhole lid to expose liquid surface of the Aqua-Swirl®.
2. Remove floatable debris with basket or net if any present.
3. If oil is present, measure its depth. Clean liquids from system if one half (½) inch or more oil is present.

   Note: Water in Aqua-Swirl® can appear black and similar to oil due to the dark body of the surrounding structure. Oil may appear darker than water in the system and is usually accompanied by oil stained debris (e.g. Styrofoam, etc.). The depth of oil can be measured with an oil/water interface probe, a stadia rod with water finding paste, a coliwasa, or collect a representative sample with a jar attached to a rod.

II. Sediment Accumulation

1. Lower measuring device (e.g. stadia rod) into swirl chamber through service access provided (Figure 1). From a reference point at the top of the service access:
2. Record distance to top of sediment pile (Figure 2): _____ inches
3. Record distance to top of water surface: _____ inches
4. Calculate distance to sediment minus distance to water: _____ inches
5. Schedule cleaning if value in Step #4 is 48 to 42 inches or less. The sediment storage capacity is exceeded when the depth to sediment is within 30 inches of the water surface and maintenance should be performed immediately.

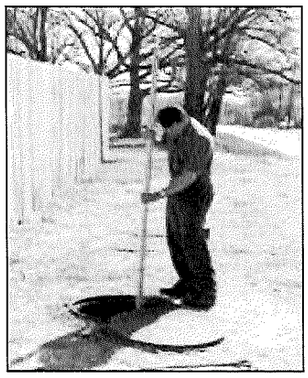


Figure 1. Measuring sediment in swirl chamber using stadia rod. Inspections are performed from the surface through the manhole access cover.

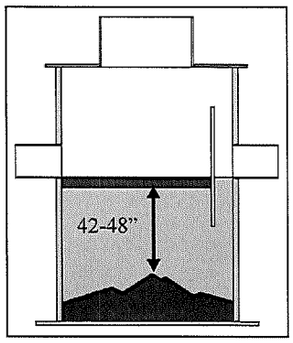


Figure 2. Maintain system when sediment is 42 to 48 inches below water surface to ensure proper system operation and performance. Maximum sediment storage capacity is reached when sediment is 30 inches below water surface.

III. Diversion Structures (External Bypass Features)

If a diversion (external bypass) configuration is present, it should be inspected as follows:

1. Inspect weir or other bypass feature for structural decay or damage. Weirs are more susceptible to damage than off-set piping and should be checked to confirm that they are not crumbling (concrete or brick) or decaying (steel).
2. Inspect diversion structure and bypass piping for signs of structural damage or blockage from debris or sediment accumulation.
3. When feasible, measure elevations on diversion weir or piping to ensure it is consistent with site plan designs.
4. Inspect downstream (convergence) structure(s) for sign of blockage or structural failure as noted above.

CLEANING

Schedule cleaning with local vactor company or AquaShield™ to remove sediment, oil and other floatable pollutants. The captured material generally does not require special treatment or handling for disposal. Site-specific conditions or the presence of known contaminants may necessitate that appropriate actions be taken to clean and dispose of materials captured and retained by the Aqua-Swirl®. All cleaning activities should be performed in accordance with property health and safety procedures.

AquaShield™ always recommends that all materials removed from the Aqua-Swirl® during the maintenance process be handled and disposed in accordance with local and state environmental or other regulatory requirements.

MAINTENANCE SCHEDULE

I. During Construction

Inspect the Aqua-Swirl® every three (3) months and clean the system as needed. The Aqua-Swirl® should be inspected and cleaned at the end of construction regardless of whether it has reached its maintenance trigger (42 to 48 inches below water surface), sediment storage capacity (30 inches below water surface).

II. First Year Post-Construction

Inspect the Aqua-Swirl® every three (3) months and clean the system as needed.

Inspect and clean the system once annually regardless of whether it has reached its sediment or floatable pollutant storage capacity.

III. Second and Subsequent Years Post-Construction

If the Aqua-Swirl® did not reach full sediment or floatable pollutant capacity in the First Year Post-Construction period, the system can be inspected and cleaned once annually.

If the Aqua-Swirl® reached full sediment or floatable pollutant capacity in less than 12 months in the First Year Post-Construction period, the system should be inspected once every six (6) months and cleaned as needed. The Aqua-Swirl® should be cleaned annually regardless of whether it reaches its sediment or floatable pollutant capacity.

IV. Bypass Structures

Bypass structures should be inspected whenever the Aqua-Swirl® is inspected. Maintenance should be performed on bypass structures as needed.

MAINTENANCE COMPANY INFORMATION

Company Name: _____

Street Address: _____

City: _____ State/Prov.:_____ Zip/Postal Code: _____

Contact: _____ Title: _____

Office Phone: _____ Cell Phone: _____

ACTIVITY LOG

Date of Cleaning: _____ (Next inspection should be 3 months from this data for first year).

Time of Cleaning: Start: _____ End: _____

Date of Next Inspection: _____

Floatable debris present: Yes No

Notes: _____

_____

_____

Oil present: Yes No Oil depth (inches): _____

Measurement method and notes: _____

_____

_____

STRUCTURAL CONDITIONS and OBSERVATIONS

Structural damage: Yes No Where: _____

Structural wear: Yes No Where: _____

Odors present: Yes No Describe: _____

Clogging: Yes No Describe: _____

Other Observations: _____

_____

_____

_____

NOTES

Additional Comments and/or Actions To Be Taken	Time Frame

ATTACHMENTS

- Attach site plan showing Aqua-Swirl® location.
- Attach detail drawing showing Aqua-Swirl® dimensions and model number.
- If a diversion configuration is used, attach details showing basic design and elevations (where feasible).

Aqua-Swirl®

TABULAR MAINTENANCE SCHEDULE

Date Construction Started: _____

Date Construction Ended: _____

During Construction

	Month											
Activity	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Inspect and Clean as needed			X			X			X			X
Inspect Bypass and maintain as needed			X			X			X			X
Clean System*												X*

* The Aqua-Swirl® should be cleaned **once a year** regardless of whether it has reached full pollutant storage capacity. In addition, the system should be cleaned at the **end of construction** regardless of whether it has reach full pollutant storage capacity.

First Year Post-Construction

	Month											
Activity	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Inspect and Clean as needed			X			X			X			X
Inspect Bypass and maintain as needed			X			X			X			X
Clean System*												X*

* The Aqua-Swirl® should be cleaned **once a year** regardless of whether it has reached full pollutant storage capacity.

Second and Subsequent Years Post-Construction

	Month											
Activity	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Inspect and Clean as needed												X*
Inspect Bypass, maintain as needed												X*
Clean System*												X*

* If the Aqua-Swirl® did **not** reach full sediment or floatable pollutant capacity in the First Year Post-Construction period, the system can be inspected and cleaned once annually.

If the Aqua-Swirl® **reached** full sediment or floatable pollutant capacity in less than 12 months in the First Year Post-Construction period, the system should be inspected once every six (6) months or more frequently if past history warrants, and cleaned as needed. The Aqua-Swirl® should be cleaned annually regardless of whether it reaches its full sediment or floatable pollutant capacity.