

**AGREEMENT FOR
STORM WATER SYSTEM MAINTENANCE**

THIS STORM SEWER SYSTEM MAINTENANCE AGREEMENT is made this 15th day of March, 2019, by and between the City of Rochester Hills, Oakland County, Michigan (the "City"), 1000 Rochester Hills Drive, Rochester Hills, Michigan 49309-3033 and Crestline Homes LLC, a Michigan limited liability company, (the "Developer"), whose address is 2553 Twenty Three Mile Road, Shelby Township, Michigan 48316

WITNESSETH:

WHEREAS, Developer is the owner of certain 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");

WHEREAS, the Developer intends to develop said real property described in Exhibit "A" attached hereto as a Condominium Project to be known as Berkshire (hereinafter known as the "Development");

WHEREAS, the Developer will record a certain Master Deed for Berkshire (the "Master Deed") which among other things will establish an association of owners which will operate and maintain the storm water detention facilities;

WHEREAS, The Development will alter the natural flow of surface and storm water;

WHEREAS, the Developer desires to extend to the future owners of Condominium Units 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;

WHEREAS, 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 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 delineated in Exhibit B attached hereto; and

WHEREAS, the Developer also intends to bind the future 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 Berkshire Condominium and of the mutual promises contained herein, the parties hereto agree as follows:

1. **Storm Sewer System.** Pursuant to the Master Deed, Developer hereby makes available and will grant to each of the Condominium Unit owners in the Development the right to utilize, maintain, replace the repair the Storm Sewer System, including but not limited to the detention basin areas and the storm sewer lines existing in the areas exiting within the development and delineated in Exhibit B hereto. Components of the Storm Water System, including any and all water conveyance, detention facilities and devices, storm sewer pipe, catch basins, manholes, end-sections, ditches, swales, open water courses and rip-rap, shall be used solely for the purposes of conveying and detaining storm and surface drainage in the Development until such time as: (i) The City determines and notifies Developer of 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 draining 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. **Berkshire Association.** Control and jurisdiction over the Storm Sewer System shall be vested in the Berkshire Association (hereinafter referred to as "Association"). The Association will be organized as a non-profit corporation for a perpetual term under the laws of the State of Michigan. 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 By-Laws of the Association shall provide for a Board of Directors of 5 members.

The Association members shall each bear their prorata share of the total costs of maintaining the Storm System (including without limitation, the real and personal property taxes assessed against it and insurance policies maintained with respect to it), which shall constitute a lien against each member's lot or parcel. The prorated share of the cost shall be shared equally by all of the Condominium Unit owners in the Development.

Each Association member shall be entitled to vote according to the number of Condominium Units in which he has an ownership interest, with the following restrictions:

a. there shall be a total of (1) vote allowed with respect to each Condominium Unit of the Development; and

b. when two or more members hold an ownership interest in a particular Condominium Unit as co-owners, whether as tenants-in-common, joint tenants or otherwise, the vote attributable to such Condominium Unit shall be exercised as such co-owners shall among themselves determine.

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.

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 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 at 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 the storm sewer and catch basins upstream from the detention basin; (ix) inspection and replacement of stone around the outlet pipe; 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 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 an asking of the Storm Sewer System, nor vest in the public any rights to use or enter 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 appropriate corrective action.

5. **Charges.** The cost of 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 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 prorata share of the total costs of maintaining the Storm Sewer System (including, without limitation, the real or personal property taxes assessed against the Storm Water System), which prorata share of the cost shall constitute a lien against each members' parcel 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 costs shall be based on the proration of each parcel to the total number of the lots in the Development. The cost of maintenance by the City shall be assessed against the Association or the Association members 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:

Crestline Homes LLC
2553 Twenty Three Mile Road
Shelby Township, Michigan 48316

To the City:

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

To the Association:

Berkshire Association
2553 Twenty Three Mile Road
Shelby Township, Michigan 48316

7. **Successors and Assigns.** 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.

CRESTLINE HOMES LLC, a Michigan limited liability company

By: 
FRANCESCO BARTOLOTTA

Its: member

CITY OF ROCHESTER HILLS,
a Michigan Municipal corporation

By: _____

Its Mayor

By: _____

Its City Clerk

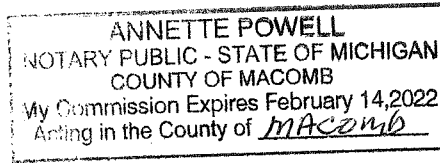
STATE OF MICHIGAN)
COUNTY OF Macomb)SS.

The foregoing was acknowledged before me this 1st day of MARCH, 2019, by FRANCESCO BARTOLOTTA Member of Crestline Homes LLC, a Michigan limited liability company, on behalf of the company.


Notary Public

John Staran
Approved 3/6/19

Acting in MACOMB County, Michigan
My commission expires:



STATE OF MICHIGAN)
)SS.
COUNTY OF OAKLAND)

The foregoing was acknowledged before me this ___ day of _____, 2019, by _____ respectively the Mayor and Clerk of the City of Rochester Hills, a Michigan municipal corporation on behalf of the corporation.

Notary Public
Acting in _____ County, Michigan
My commission expires:

DRAFTED BY:
Mark J. Abdo, Attorney at Law
12900 Hall Road, Suite 403
Sterling Heights, Michigan 48313

AND WHEN RECORDED RETURN TO: Clerks Dept.
CITY OF ROCHESTER HILLS
1000 Rochester Hills Drive
Rochester Hills, Michigan 48309

EXHIBIT A

DESCRIPTION OF THE PROPERTY

See Attached Drawing.

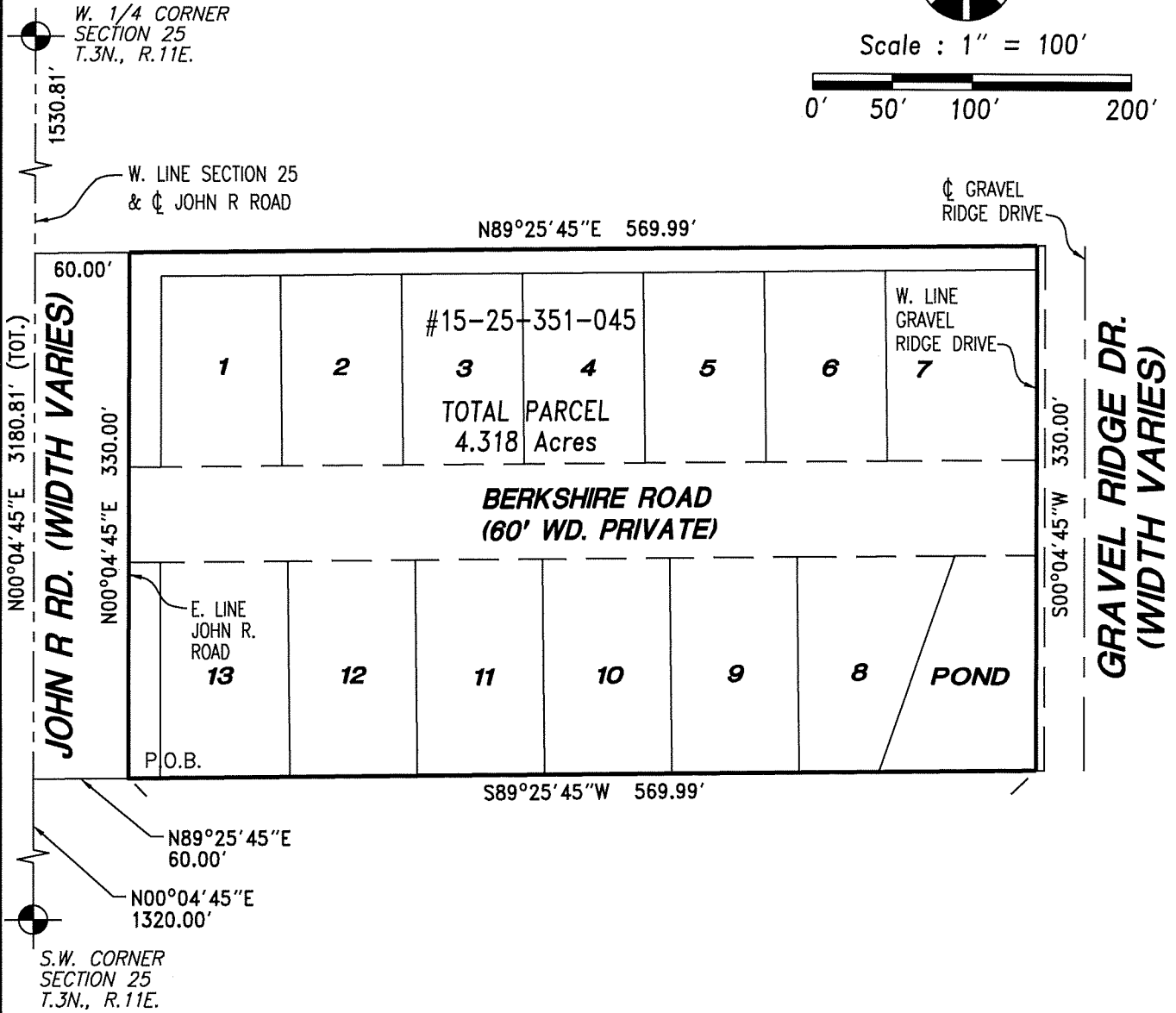
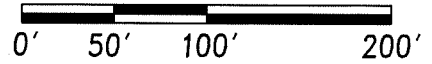
EXHIBIT "A"

NOTE:

• DESCRIPTION OF RECORD BASIS OF BEARING: "EDINSHIRE SUBDIVISION NO. 1" AS RECORDED IN L.141, P.15-17 O.C.R.



Scale : 1" = 100'



Condominium Description

A parcel of land in the SW 1/4 of Section 25, T.3N.,R.11E., City of Rochester Hills, Oakland County, Michigan is more particularly described as: Commencing at the SW Corner of Section 25; thence N.00°04'45"E., 1320.00 feet along the West line of Section 25 and the centerline of John R Road; thence N.89°25'45"E., 60.00 feet to the Point of Beginning; thence N.00°04'45"E., 330.00 feet along the East line of John R Road; thence N.89°25'45"E., 569.99 feet; thence S.00°04'45"W., 330.00 feet along the West line of Gravel Ridge Drive; thence S.89°25'45"W., 569.99 feet to the Point of Beginning and containing 4.318 acres.

#15-25-351-045

Jenny M.
Approved 3/22/19

Rev. 3-21-19
Rev. 3-18-19



PHONE 586 731-8030
FAX 586 731-2605

URBAN LAND CONSULTANTS ©

CIVIL ENGINEERS PLANNERS LAND SURVEYORS
GPS CONSULTANTS
8800 23 MILE ROAD SHELBY TWP., MI 48316-4516

LEGEND
 FIB = Found Bar ●
 FIP = Found Pipe ●
 SIB = Set Bar/Cap ○
 SMN = Set Mag Nail ○
 P.O.B. = Point of Beginning
 P.O.C. = Point of Commencing
 P.O.E. = Point of Ending
 EASE. = Easement

EXHIBIT "A"
CONDOMINIUM DESCRIPTION

Date 10-26-18
Drawn D.K.Z.
Check W.C.A.
Sheet 1 of 1
Job No. 170254-215

EXHIBIT B

SKETCH OF STORM SEWER & DETENTION SYSTEM

See Attached Drawing.

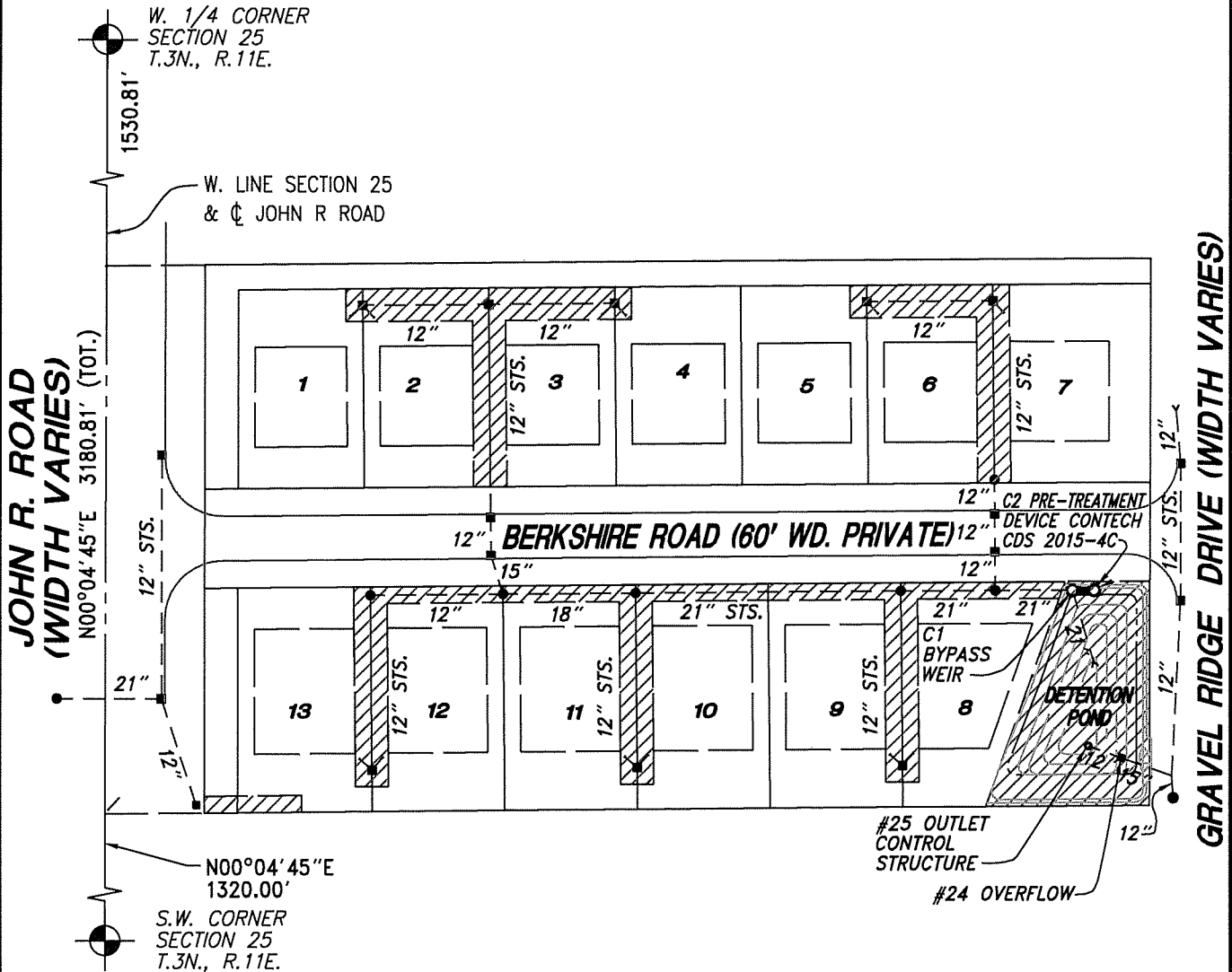
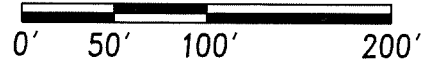
EXHIBIT "B"

NOTE:

- DESCRIPTION OF RECORD BASIS OF BEARING: "EDINSHIRE SUBDIVISION NO. 1" AS RECORDED IN L.141, P.15-17 O.C.R.



Scale : 1" = 100'



UTILITY NOTES:

- UTILITIES SHOWN INDICATE APPROXIMATE LOCATIONS ONLY, AS DISCLOSED BY THE PROPOSED SITE ENGINEERING DRAWINGS AND AS-BUILT TOPOGRAPHY OF EXISTING STRUCTURES. NO GUARANTEE IS GIVEN AS TO THE COMPLETENESS OR ACCURACY THEREOF.
- ALL STORM SEWERS ARE PRIVATE. MAINTENANCE OF STORM SEWER IS THE RESPONSIBILITY OF THE CONDOMINIUM ASSOCIATION.

*OK ARS
3/22/19*

LEGEND

	UNIT NUMBER
	LIMITS OF UNIT OWNERSHIP
	STORM SEWER CATCH BASIN AND 3" LEAD
	STORM SEWER AND MANHOLE
	STORM SEWER AND END OF PIPE
	4' MANHOLE
	3" STAND PIPE
	CONDOMINIUM STORM SEWER SYSTEM MAINTENANCE RESPONSIBILITY

Rev. 3-21-19
Rev. 3-18-19
Rev. 2-20-19



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CIVIL ENGINEERS PLANNERS LAND SURVEYORS
GPS CONSULTANTS
8800 23 MILE ROAD SHELBY TWP., MI 48316-4516

LEGEND
FIB = Found Bar ●
FIP = Found Pipe ●
SIB = Set Bar/Cap ○
SMN = Set Mag Nail ○
P.O.B. = Point of Beginning
P.O.C. = Point of Commencing
P.O.E. = Point of Ending
EASE. = Easement

EXHIBIT "B"
STORM SEWER & DETENTION SYSTEM

Date 10-26-18
Drawn D.K.Z.
Check W.C.A.
Sheet 1 of 1
Job No. 170254-215

EXHIBIT C

OPERATIONS AND MAINTENANCE MANUAL

BERKSHIRE SITE CONDOMINIUM
STORM SEWER SYSTEM MAINTENANCE PLAN
ROCHESTER HILLS, MI

DEVELOPER:
Crestline Homes
2553 23 Mile Road
Shelby Township, Michigan 48316

March 1, 2019

OK ALS
3/4/19

OPERATION AND MAINTENANCE MANUAL

INTRODUCTION:

This manual identifies the ownership, operation, and maintenance responsibilities for all storm-water management systems including the sedimentation and detention basins, and underground storm sewer system, as incorporated into and detailed on the approved Site Plans. In order to comply with the local best management practices (BMP) and 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 BMPs.

DEVELOPER:

Crestline Homes
2553 23 Mile Road
Shelby Township, Michigan 48316

PROPERTY INFORMATION:

This Operations and Maintenance Manual covers the storm water systems located on the property described in Exhibit A to Berkshire Site Condominium Storm Sewer System Maintenance Agreement, dated March 1st, 2019.

STORM WATER MAINTENANCE EXHIBIT:

Exhibit B of the Storm Sewer System Maintenance Agreement is the construction drawings of Berkshire Site Condominium, which sets forth the Storm Water System Plan and provides a clear presentation of all components of the storm sewer 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 structures (manholes, inlets, catch basins, etc.)
- Detention Basin
- Pre-treatment Device Contech Vortechs Model CDS 2015-4C

INSPECTIONS:

The frequency of system inspections outlined in the manual and attached exhibits should be considered the minimum to be conducted if no events warrant additional inspections. The frequency of inspections should be refined 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 BMPs 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 detention basin, sediment basin, and outlet control structures 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. Upon request, 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 on the systems, and contact information for the system inspector, civil engineer, landscape architect, geotechnical engineer, and contractor involved with the systems.

STORM WATER SYSTEMS MAINTENANCE:

Regular inspection and maintenance of BMP's are necessary if these facilities are to consistently perform up to expectations. Storm-water 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 loss of life or property resulting from catastrophic failure of the facility
- Aesthetic or nuisance conditions, such as mosquitoes or reduced property values due to a degraded facility appearance.

Most of these 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 storm-water 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 storm-water 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 the property and perform all necessary work as further described in the Storm Sewer System Maintenance Agreement, dated March 1, 2019.

General Maintenance Items:

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 storm-water 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 or recycling centers.

Storm Water System Maintenance Items:

The following narratives give an overview of the maintenance requirements of the different components of the storm-water 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 and Structures:

Catch basins, inlets, manholes, and 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 based on 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.

Detention Basin Outlet Control Structure and Overflow Structure:

Both the outlet control and overflow structures and connecting pipes should be inspected for sediment accumulation, floatable debris, trash, and any other foreign matter that may impede flow or restrict the devices from working properly. The stone jacket surrounding the outlet control structure should be inspected for sediment build up, and the holes at the base of the outlet control structure should be inspected to make sure they do not become blocked. The grates of the two structures should be inspected for structural integrity and the buildup of debris. The outlet control system should be inspected during a wet weather event to ensure all components are functioning properly. A civil engineer should be retained if problems are thought to exist.

Maintenance will include the removal of any debris, trash, or sediment from the structures or pipes, cleaning of the stone jacket on the outlet control structure, and removal of debris from the structure grates. The stone jacket may need replacement if cleaning does not adequately remove sediment buildup.

Detention Basin:

The inlet pipes to the basin should be inspected for structural integrity (pipes cracked, broken, spalled) and that the grates are free from debris. The area around and immediately downstream of the inlet pipes should be inspected for sediment buildup, erosion, and the rip-rap should be inspected for integrity and sedimentation. Maintenance of the inlet pipes would include removal of any sediment buildup and debris, repair, or replacement of any components that are in need of attention and to restore any areas that have eroded.

The basin should be inspected for healthy grass growth, side slope erosion, and excessive sedimentation. The basin should be inspected during a wet weather event to ensure all aspects of the basin is functioning correctly. A civil engineer should be retained if problems are thought to exist or if the inspection personnel are not familiar with the operating conditions of the basin.

The planted vegetation within the basin should conform to that shown on the construction plans, and any invasive species should be removed. The vegetation should be inspected for healthy growth by a landscape architect if the inspection personnel are not familiar with the specific plantings inside the basin.

Any resident complaints regarding the basin's aesthetics or operation should be investigated during inspections and wet weather operations.

Storm Water Pre-Treatment Device (Vortechs):

Refer to the attached maintenance manual from Contech Engineered Solutions for all inspection and maintenance requirements for the Contech system.

The following pages include inspection checklists for the various components listed above.

STORM WATER SEWER SYSTEM

DATE/TIME OF INSPECTION _____

INSPECTOR _____

STORM WATER SEWER SYSTEM MAINTENANCE AND TASKS SCHEDULE POST CONSTRUCTION

SYSTEM COMPONENTS

Maintenance Activities <u>Monitoring/Inspection</u>	<u>Catch Basin inlets and Manholes</u>	<u>Storm Sewer Pipes</u>	<u>Rip Rap</u>	<u>Buffer Strip</u>	<u>Frequency</u>	<u>Comments</u>
Inspect for Sediment Accumulation	X	X			Annually	_____
Inspect for Floatables, dead vegetation, and debris	X	X		X	Annually and after major rainfall	_____
Inspect for Erosion			X	X	Annually	_____
Inspect all components during wet weather and compare to as-built plans	X	X			Annually	_____
Inspect inside of structures and pipes for cracks, spalling, joint failure settlement, sagging and misalignment	X	X			Annually	_____

PREVENTATIVE MAINTENANCE

Remove accumulated sediment	X	X			Annually or as needed	_____
Remove floatables, dead vegetation, and debris	X	X		X	Annually or as needed	_____

REMEDIAL ACTIONS

Repair/stabilize areas of erosion			X	X	As needed	_____
Structural Repairs	X	X			As needed	_____
Make adjustments/repairs to ensure proper functioning	X	X	X		As needed	_____

SUMMARY

INSPECTORS REMARKS _____

OVERALL CONDITION OF FACILITY _____

RECOMMENDED ACTIONS NEEDED _____

DATES ANY MAINTENANCE MUST BE COMPLETED BY: _____

OUTLET CONTROL AND OVERFLOW STRUCTURES

DATE/TIME OF INSPECTION _____

INSPECTOR _____

OUTLET CONTROL AND OVERFLOW MAINTENANCE AND TASKS SCHEDULE POST CONSTRUCTION

SYSTEM COMPONENTS

Maintenance Activities	<u>Structures</u>	<u>Outlet Pipes</u>	<u>Rip Rap</u>	<u>Grates</u>	<u>Frequency</u>	<u>Comments</u>
<u>Monitoring/Inspection</u>						
Inspect for Sediment Accumulation	X	X	X		Annually	_____
Inspect for Floatables, dead vegetation, and debris	X	X	X	X	Annually and after major rainfall	_____
Inspect for Erosion			X		Annually	_____
Inspect all components during wet weather and compare to as-built plans	X	X	X	X	Annually	_____
Inspect inside of structures and pipes for cracks, spalling, joint failure settlement, sagging and misalignment	X	X			Annually	_____

PREVENTATIVE MAINTENANCE

Remove accumulated sediment	X	X	X		Annually or as needed	_____
Remove floatables, dead vegetation, and debris	X	X	X	X	Annually or as needed	_____
Replace or wash/clean stone filter jacket	X				As needed	_____

REMEDIAL ACTIONS

Repair/stabilize areas of erosion			X		As needed	_____
Structural Repairs	X	X			As needed	_____
Make adjustments/repairs to ensure proper functioning	X	X	X	X	As needed	_____

SUMMARY

INSPECTORS REMARKS _____

OVERALL CONDITION OF FACILITY _____

RECOMMENDED ACTIONS NEEDED _____

DATES ANY MAINTENANCE MUST BE COMPLETED BY: _____

DETENTION BASIN

DATE/TIME OF INSPECTION _____

INSPECTOR _____

DETENTION BASIN MAINTENANCE AND TASKS SCHEDULE POST CONSTRUCTION

SYSTEM COMPONENTS

Maintenance Activities <u>Monitoring/Inspection</u>	Rip Rap at Inlets	Overflow Spillway	Sideslopes & Banks	Buffer Strip	Basins	Frequency	Comments
Inspect for Sediment Accumulation	X	X			X	Annually	_____
Inspect for Floatables, dead vegetation, and debris	X	X	X	X	X	Annually and after major rainfall	_____
Inspect for Erosion	X	X	X	X	X	Annually	_____
Inspect all components during wet weather and compare to as-built plans	X	X			X	Annually	_____
Inspect for invasive plant species			X	X	X	Annually	_____

PREVENTATIVE MAINTENANCE

Remove accumulated sediment	X	X			X	Annually or as needed	_____
Remove floatables, dead vegetation, and debris	X	X	X	X	X	Annually or as needed	_____
Professional application of herbicide for invasive species that may be present			X	X	X	Annually or as needed	_____
Repair Erosion and/or reseed bare areas	X	X	X	X	X	Annually or as needed	_____

REMEDIAL ACTIONS

Repair/stabilize areas of erosion	X	X	X	X	X	As needed	_____
Structural Repairs	X	X				As needed	_____
Make adjustments/repairs to ensure proper functioning	X	X			X	As needed	_____

A civil engineer should be retained to observe basin operation

SUMMARY

INSPECTORS REMARKS _____

OVERALL CONDITION OF FACILITY _____

RECOMMENDED ACTIONS NEEDED _____

DATES ANY MAINTENANCE MUST BE COMPLETED BY: _____

CDS[®] Inspection and Maintenance Guide



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.

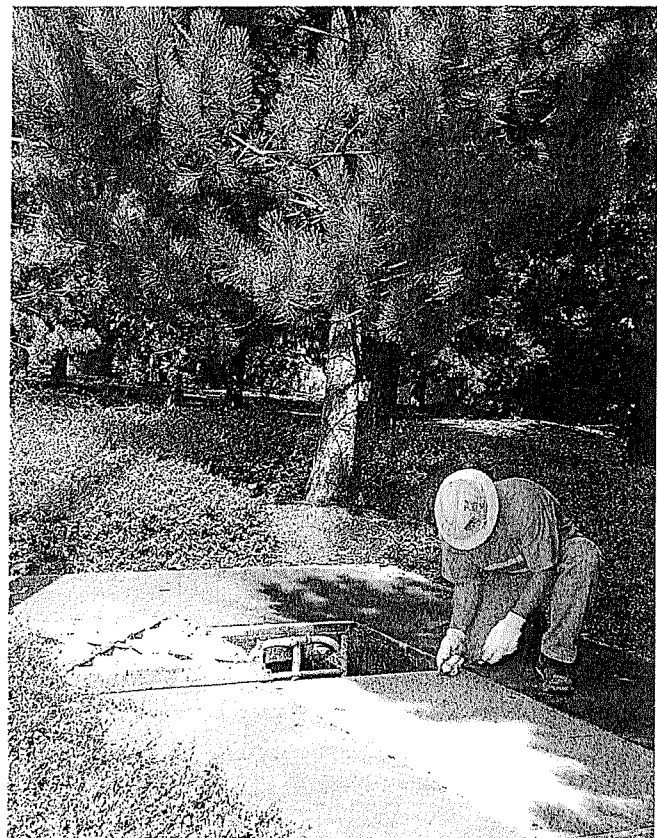
The CDS system should be cleaned when the level of sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated. If absorbent material is used, it should be replaced when significant discoloration has occurred. Performance will not be 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.

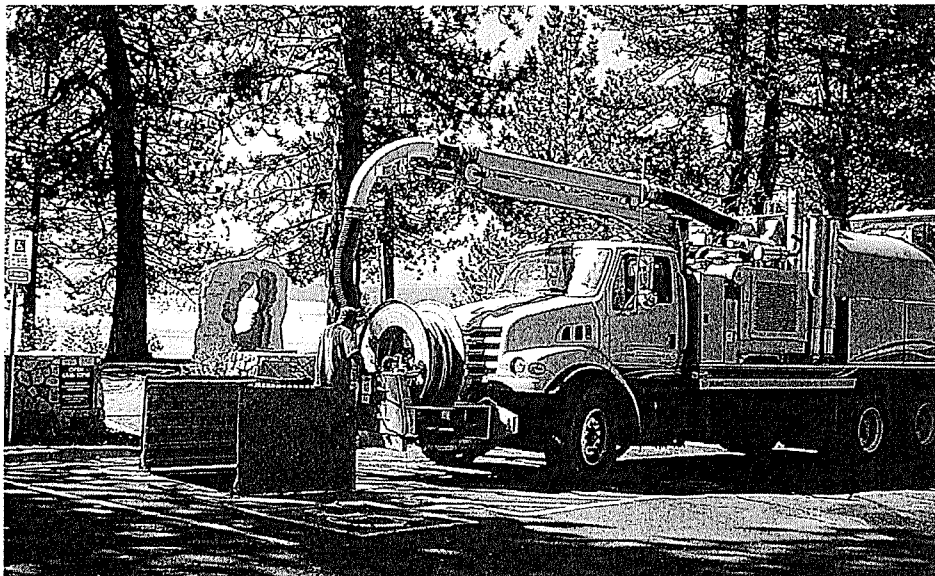
In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill should be cleaned out immediately. Motor oil and other hydrocarbons that accumulate 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.



CDS Model	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	yd3	m3
CDS2015-4	4	1.2	3.0	0.9	0.9	0.7
CDS2015	5	1.5	3.0	0.9	1.3	1.0
CDS2020	5	1.5	3.5	1.1	1.3	1.0
CDS2025	5	1.5	4.0	1.2	1.3	1.0
CDS3020	6	1.8	4.0	1.2	2.1	1.6
CDS3030	6	1.8	4.6	1.4	2.1	1.6
CDS3035	6	1.8	5.0	1.5	2.1	1.6
CDS4030	8	2.4	4.6	1.4	5.6	4.3
CDS4040	8	2.4	5.7	1.7	5.6	4.3
CDS4045	8	2.4	6.2	1.9	5.6	4.3
CDS5640	10	3.0	6.3	1.9	8.7	6.7
CDS5653	10	3.0	7.7	2.3	8.7	6.7
CDS5668	10	3.0	9.3	2.8	8.7	6.7
CDS5678	10	3.0	10.3	3.1	8.7	6.7

Table 1: CDS Maintenance Indicators and Sediment Storage Capacities



Support

- Drawings and specifications are available at www.contechstormwater.com.
- Site-specific design support is available from our engineers.

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CDS Inspection & Maintenance Log

CDS Model: _____ Location: _____

Date	Water depth to sediment ¹	Floatable Layer Thickness ²	Describe Maintenance Performed	Maintenance Personnel	Comments

1. The water depth to sediment is determined by taking two measurements with a stadia rod: 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 values listed in table 1 the system should be cleaned out. Note: to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile.
2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.