

OPERATIONS AND MAINTENANCE PLAN FOR PAINTED HILLS PRD FLOOD CONTROL SYSTEM

Owner: Black Realty Inc.

Party responsible for Operations & Maintenance: Painted Hills PRD Homeowners Assn.

Parent Parcel Number(s): 45336.9191, 45334.0106, .0108, .0109, .0110, .0113, .0114, .9135, 44040.9144
LOCATED IN SECTION 33 & 34, T25N, R44E & SECTION 4, T24N, R44E, W.M.
SPOKANE COUNTY, WASHINGTON

The above parent parcels contain the Painted Hills PRD flood control drainage and levee system.

The residential lot owners, commercial property owners and multi-family property owners of Painted Hills PRD are benefitting from these flood control facilities. The homeowners association of this project is responsible for (details described later):

- The continued operations and maintenance, including repair and replacement as needed, of these facilities,
- Providing funds to finance the continued operation and maintenance of these facilities,
- The administration of this agreement with each property owner being bound by this agreement and with the responsibilities to be shared equally between each Painted Hills PRD property owner, and,
- Establishing a maintenance committee and designating a member to be responsible for the administration of this plan.

This operations and maintenance plan runs with the land and is binding upon the Painted Hills PRD Homeowners Association property owners, their heirs, successors and assigns.

The City of Spokane Valley assumes no responsibility at all for any operations or maintenance of facilities mentioned herein or the administration of this plan.

1.00 PURPOSE

This plan is to provide:

1. General operations and maintenance responsibilities for the facilities described herein, and
2. Cost estimates of the assessments to be paid by each property owner mentioned herein for the funding of this maintenance.

2.00 GENERAL OPERATIONAL CHARACTERISTICS

Drainage Facilities

The Painted Hills PRD flood control drainage and levee system is intended to collect and discharge stormwater runoff generated by upstream basins and, possibly, stormwater from adjacent properties that has historically flowed into the property and identified on FEMA panel as compensatory storage. The drainage facilities consist of a box culvert under Thorpe Road, a five foot wide concrete channel, a 48" and 60" concrete pipe mainline, manholes, a bio-infiltration swale and a drywell/gravel gallery infiltration field with associated pipe, manholes and headwalls. The system includes 4-18" culverts under Madison Road. A levee along the northerly side of Chester Creek between Thorpe Road and Dishman-Mica Road and then extending along the northerly side of Dishman-Mica Road to Wilbur Road is also a part of the system.

A portion of stormwater runoff from the upstream basins south of the project flows in the Chester Creek channel under Thorpe Road continuing northwesterly under Dishman-Mica Road. The levee provides flood protection of the development site from Chester Creek.

The remainder of stormwater runoff from upstream basins south of the project flows under Thorpe Road via the box culvert, enters the concrete channel, then flows in the pipe system, through the bio-infiltration swale into the drywell/gravel gallery infiltration field at the north end of the site where the flow is stored and infiltrated into the ground.

Stormwater runoff from upstream basins east of the project flows under Madison Road in 18" culverts and outfalls into the 60" pipeline via manholes.

It is important to provide adequate maintenance activities to ensure that the flood control facilities remain silt and debris free, as this silt and debris will affect their performance. Additionally, vegetation must be maintained to prevent erosion of the levee. Maintenance details are discussed below in Section 3.0.

3.00 MAINTENANCE REQUIREMENTS AND SCHEDULES

Drainage Facilities

The drainage facilities consist of several elements including: box culverts, stream channel, levee, concrete channel, storm drain mainline, culverts, outlet structure, bio-infiltration swale, inlet structure, drywell/gravel gallery infiltration field, manholes, catch basins, access roads, headwalls with trash racks and fencing. These elements are located as shown on the attached exhibit. The following describes these facilities and the recommended maintenance.

A comprehensive visual inspection of the complete flood control drainage facilities should be conducted twice a year. More frequent inspections for various elements may be required as described below. For long duration storms, greater than 24 hours, the drainage facilities should be inspected during the storm event to identify any developing problems and safely correct them before they become major problems. Signs shall be posted notifying all residents to look for "potential" problems and to notify the homeowners' association of those observations.

In general it is important to provide adequate maintenance activities to ensure that the vegetated areas and structures remain silt, dirt and debris free because accumulations of these will affect the facilities function for stormwater storage volume as well as the ability of the drywells/gravel galleries to discharge

stormwater. Should these facilities fill up or become clogged, the flood control system will not function as intended putting areas at risk of flooding. Therefore, periodic maintenance is a must.

Box Culvert:

There are three box culverts adjoining the project site. These box culverts are within the public road right of way and will be maintained by the agency having jurisdiction (AHJ) of the roadway. Any problems noticed while inspecting or maintaining other elements of the system should be reported to the AHJ.

Chester Creek and Levee:

Chester Creek extends across the southwest corner of the site from Thorpe Road northwesterly for approximately 900 feet where it crosses under Dishman-Mica Road. The creek carries seasonal flows from the foothills to the south. The site is protected from flood flows by a levee along the northerly side of the creek. The creek channel and levee need to be maintained to ensure flood flows are prevented from entering the site. Maintenance of the channel and levee shall be the responsibility of the Painted Hills PRD Homeowner's Association.

Maintenance items include:

- Regular mowing, grass should be kept at about 2-4 inches in height,
- Removing trash, debris, noxious weeds plus items that reduce the amount of vegetative cover,
- Removing any starts of woody vegetation that appear in the channel or on the levee side slopes,
- Repairing any holes caused by animals on the levee side slopes,
- Inspecting the levee side slopes and channel bottom making sure there are no breaches or breaks or erosion. Immediately repair with a sandy loess soil, compacted in place and follow up after the storm event with seeding or sodding the repair and more substantial maintenance activities if needed,
- Repairing mowing damage,
- Removing and replacing of the grass and underlying soil if it becomes contaminated to the extent that the grass is not healthy.

Concrete Channel:

There is approximately 370 feet of 5 foot wide concrete open channel extending from the easterly box culvert under Thorpe Rd to the corner of Thorpe Road and Madison Road. At Madison Road the channel flow enters into a 48" pipe fitted with a trash rack. The channel needs to be maintained to ensure there is no debris or vegetation blocking the flow out of the box culvert and along the channel. Additionally, the trash rack at the end of the channel needs to be kept clear. Maintenance of the channel shall be the responsibility of the Painted Hills PRD Homeowner's Association.

Maintenance items include:

- Visually inspecting twice a year the walls and floor surface of the channel for damage or wear that would compromise the channel integrity.
- Prior to each rainy season (August or September), inspecting the channel ensuring that there is no debris present.
- Following large storm events or rapid snow melt events performing a visual inspection and

- remove any deleterious debris and trash.
- Instructing those performing other maintenance functions on the system to report any observed damage to the channel.

Storm Drain Mainline:

The storm drain mainline consists of 277 feet of 48” and 2174 feet of 60” RCP pipe from the downstream end of the concrete channel at Thorpe Rd and Madison Rd, running parallel to Madison Rd and ending at the bio-infiltration swale at the north end of the site. Additionally, there is 630 feet of 36” HDPE pipe from the downstream end of the bio-infiltration swale to the drywell/gravel gallery infiltration field. The pipes need to be maintained to prevent sediment and trash build-up in the bio-infiltration swale and the drywell/gravel gallery infiltration field. Maintenance of the storm drain mainline shall be the responsibility of the Painted Hills PRD Homeowner’s Association.

Maintenance items include:

- Annually inspecting the pipe openings on each end to ensure there is no blockage or damage to the ends.
- Every three years or after substantial storm runoff, performing a TV inspection of the pipe looking for blockages, damage, etc.,
- Removing sediment build-up from the pipe,
- Repairing any sections of damaged pipe.

Manholes & Catch Basins:

The mainline pipe system has manholes at pipe junctions and angle points. Along Madison Road there are catch basin connected by pipe to the mainline pipe system to drain overflow from the roadside swales. Manholes and catch basins need to be maintained to prevent blockage of flow within the system. Contact a professional to remove the debris, trash and sediment buildup. **HOMEOWNERS ARE NOT TO ENTER THE MANHOLES.** Maintenance of the manholes and catch basins shall be the responsibility of the Painted Hills PRD Homeowner’s Association.

Maintenance items include:

- During routine landscape maintenance of roadside swales, removing any debris from catch basin grates.
- Annually inspecting catch basins for trash and sediment build-up and removing trash.
- When sediment build-up fills ½ the depth of the sump (about 1 foot), removing the sediment.
- Annually inspecting manhole lids and catch basin grates to ensure they are properly seated and are structurally sound.
- Every five years, inspecting the structure walls to ensure the concrete walls are in good condition and the joints remain sealed.
- Instructing those performing other maintenance functions on the system to report any missing lids or grates.

Cross Culverts:

The cross culverts consist of 18" CMP pipe crossing under Madison Road flowing from east to west in four locations. The culverts connect into manholes on the 60" storm drain mainline. The cross culverts need to be maintained to prevent the reduction of seasonal flows within the pipes. The reduction in flow may be caused by sediment or trash build-up within the pipe or obstruction of the pipe entrance on the east side of Madison Rd. Maintenance of the cross culverts shall be the responsibility of the Painted Hills PRD Homeowner's Association.

Maintenance items include:

- Annually inspecting the culvert openings on the east side of Madison Rd to ensure there is no blockage or damage to the culvert end.
- Every five years performing a TV inspection of the pipe looking for blockages, damage, corrosion, etc.,
- Removing sediment build-up from the pipe,
- Repairing any sections of damaged or corroded pipe.

Bio-infiltration Swale:

The bio-infiltration swale consists of a grass lined channel approximately 450 feet long with a 6 foot bottom width and 3:1 side slopes. The swale needs to be maintained to perform the function of removing any remaining contaminants prior to storm water entering the infiltration field. Maintenance of the bio-infiltration swale shall be the responsibility of the Painted Hills PRD Homeowner's Association.

Maintenance items include:

- Annually inspecting the channel bottom and side slopes to ensure there is a covering of grass.
- Reseeding any bare or dead areas of grass.
- Removing any noxious weeds.

Drywells/Gravel Gallery Infiltration Field:

The drywell/gravel gallery infiltration field consists of four trenches (10' wide by 13' deep by 450' long) filled with rock, 24" pipe running the length of each trench and drywells located at each end and at the middle. The drywells need to be maintained to prevent or reduce sediment buildup in the drywell barrel so as to not reduce infiltration into the surrounding ground. Maintenance of the drywells/gravel gallery infiltration field shall be the responsibility of the Painted Hills PRD Homeowner's Association.

Maintenance items include:

- Visually inspecting twice a year the inside of the drywell barrel(s) by removing the lid to look into the structure. Have all debris and trash removed. Sediment must be removed before buildup reaches the bottom of the lowest slot out of the drywell in the barrel wall. Contact a professional to remove the debris, trash and sediment buildup. **HOMEOWNERS ARE NOT TO ENTER THE DRYWELL.**

Headwalls/Trash Racks:

The trash racks at the headwalls need to be maintained to ensure there is no debris preventing the flow of storm water through the system. Additionally, the trash racks need to be inspected for physical integrity to ensure that no one can enter into the pipe system unless required for inspection/repair. Maintenance of the headwalls/trash racks shall be the responsibility of the Painted Hills PRD Homeowner's Association.

Maintenance items include:

- Visually inspecting twice a year the trash racks for damage or corrosion that would compromise the trash rack integrity.
- Prior to each rainy season (August or September), inspecting each trash rack ensuring that there is no debris present.
- Following large storm events or rapid snow melt events performing a visual inspection and remove any deleterious debris and trash.
- Instructing those performing other maintenance functions on the system to report any observed damage to the trash rack.

Fencing:

The fencing of various system elements needs to be maintained to restrict access to those elements and to protect the public. Maintenance of the fencing shall be the responsibility of the Painted Hills PRD Homeowner's Association.

Maintenance items include:

- Visually inspect twice a year the entire fencing system for damaged fence fabric, posts, gates, etc.
- Prior to each rainy season (August or September), inspecting each access point ensuring that locks and gates are functional.
- Instructing those performing other maintenance functions on the system to report any observed breaches or damage to the fencing.

Access Roads/Parking Pads:

The access roads/parking pads to various system elements need to be maintained to allow maintenance vehicles access to those elements for periodic maintenance and emergency repairs to protect the public. Maintenance of the access roads/parking pads shall be the responsibility of the Painted Hills PRD Homeowner's Association.

Maintenance items include:

- Visually inspecting annually the entire access road/parking pad system for rutting, potholes, etc. Regrade and repair with additional aggregate as needed.
- Removing vegetation from the aggregate surface.
- Instructing those performing other maintenance functions on the system to report any observed damage to the access roads/parking pads.

4.00 SINKING FUNDS

A sinking fund is an account that is set up to receive regular deposits which are to be used for paying off future costs and debts. The sinking fund monies will be used to pay for planned and unplanned operation and maintenance costs along with certain future replacement costs for the storm drainage facilities. The sinking fund calculation should be revised as necessary to account for actual expenses and changes in rates.

In setting up the fund, first the future replacement costs are estimated and then they are converted to annual costs (or deposits) by the following calculations. These calculations assume that the inflation rate is 3% (for estimating the future replacement costs), the typical interest rate is 2% (for estimating the annual costs) and the number of years before replacement is 20. Equations and guidance for using other rates and years can be found in Appendix A.

- 1) Estimate the value that the item will have in the future when it is time to replace it using the following equation:

$$FV = PV * 1.8061, \text{ where: } \begin{array}{l} FV = \text{future value} \\ PV = \text{present value} \end{array}$$

- 2) Estimate how much money will need to be deposited each year in a bank account in order to have enough money accumulated in time to pay for the replacement using the following equation.

$$A = FV * 0.0412, \text{ where: } \begin{array}{l} A = \text{annual payment (or deposit)} \\ FV = \text{future value (from step 1, above)} \end{array}$$

Sinking Fund Calculation Results:

The developer shall provide \$25,000 to initiate the set-up of maintenance funds.

The following values are the results of the calculations which are shown on the following page.

Annual cost for regular operation and maintenance	\$25,954
Annual cost for replacements	\$11,894
Total annual costs	\$37,848
Total monthly costs (= total annual costs /12)	\$3154
Number of units	580
Monthly cost per lot (= total monthly costs /# lots)	\$5.44

Sinking Fund Calculations

REGULAR OPERATION AND MAINTENANCE COSTS

<u>Description</u>	<u>Units</u>	<u>Annual</u> <u>Quantity</u> x	<u>Unit</u> <u>Price</u> =	<u>Annual</u> <u>Cost</u>
Drywell cleaning	EA	12	\$300	\$3,600
Catch Basin cleaning	EA	4	\$300	\$1,200
Mowing	EA	4	\$2,000	\$8,000
Debris removal	EA	4	\$2,000	\$8,000
Channel/Trash Rack inspection	EA	2	\$500	\$1,000
Pipeline TV inspection(3 years-3,053)	LF	1018	\$3	\$3,054
Manhole inspection	EA	11	\$100	\$1,100
			Total	\$25,954

REPLACEMENT COSTS (for more information on calculations in this table see Appendix A)

	<u>Un</u> <u>its</u>	<u>Quantity</u> x	<u>Unit</u> <u>Price</u> =	<u>Present Value,</u> <u>PV</u>	<u>n</u>	<u>Inflation</u> <u>Rate, i₁</u>	<u>Future Value,</u> <u>FV</u>	<u>Interest</u> <u>Rate, i₂</u>	<u>Annual</u> <u>Payment, A</u>
Drywell(12)	EA	12	\$4,000	\$48,000	20	0.03	\$86,693	0.02	\$3,572
1/3 Manhole, 84" (9)	EA	3	\$4,100	\$12,300	20	0.03	\$22,215	0.02	\$915
1/4 Manhole, 60" (2)	EA	0.5	\$2,500	\$1,250	20	0.03	\$2,258	0.02	\$93
18" Culvert (280)	LF	280	\$50	\$14,000	20	0.03	\$25,286	0.02	\$1,042
1/4 Catch basin (4)	EA	1	\$1,500	\$1,500	20	0.03	\$2,710	0.02	\$112
Bio-infiltration swale-seeding (13,800)	SF	13,800	\$0.10	\$1,380	20	0.03	2,493\$	0.02	\$103
2" Asphalt pathway	SY	2340	\$10	\$23,400	20	0.03	\$42,263	0.02	\$1,742
6" CSTC Access Rd	CY	210	\$40	\$8,400	20	0.03	\$15,172	0.02	\$625
Grading Access Rd	SF	11,340	\$1.25	\$14,175	20	0.03	\$25,602	0.02	\$1,055
Fencing	LF	1770	\$20	\$35,400	20	0.03	\$63,936	0.02	\$2635
								Total	\$11,894

Notes:

n = number of years to replacement

LS means Lump Sum, EA means Each, SY means square yard

IN WITNESS WHEREOF, the undersigned has reviewed the above information and determined it to be appropriate for the improvements proposed for this plan and has caused this instrument to be executed on this _____ day of _____, 20____.

Signature: _____

Name (print): _____

Title: _____

STATE OF WASHINGTON)
COUNTY OF SPOKANE)
CITY OF SPOKANE VALLEY) ss

I certify that I know or have satisfactory evidence that _____ is/are the individual(s) who personally appeared before me, and who acknowledged that he/she/they executed and signed this instrument and acknowledged it to be his/her/their free and voluntary act for the uses and purposes mentioned in this instrument.

Dated this _____ date of _____, 20____.

NOTARY PUBLIC
In and for the State of Washington,
Residing at _____
My appointment expires: _____

Appendix A

The future replacement costs can be estimated and then converted to annual costs (or deposits) by the following calculations.

- 1) Estimate the value that the item will have in the future when it is time to replace it using an assumed (best estimate) inflation rate and the following equation:

$$FV = PV * (1 + i_1)^n, \text{ where:}$$

FV = future value

i_1 = inflation rate

PV = present value

n = number of years to replacement

Example values for the factor: $(1 + i_1)^n$

		n, years			
		5	10	15	20
i_1	0.02	1.1041	1.2190	1.3459	1.4859
	0.03	1.1593	1.3439	1.5580	1.8061
	0.04	1.2167	1.4802	1.8009	2.1911
	0.05	1.2763	1.6289	2.0789	2.6533

- 2) Estimate how much money will need to be deposited each year in a bank account in order to have enough money accumulated in time to pay for the replacement using an assumed (best estimate) interest rate and the following equation:

$$A = FV * i_2 / [(1 + i_2)^n - 1], \text{ where:}$$

A = annual payment

i_2 = interest rate

FV = future value

n = number of years to replacement

Example values for the factor: $i_2 / [(1 + i_2)^n - 1]$

		n, years			
		5	10	15	20
i_2	0.02	0.1922	0.0913	0.0578	0.0412
	0.03	0.1884	0.0872	0.0538	0.0372
	0.04	0.1846	0.0833	0.0499	0.0336
	0.05	0.1810	0.0795	0.0463	0.0302