KOSSMAN DEVELOPMENT COMPANY

PERMIT NO. 18-SPR-00131

McKINNEY LANE

STEEP SLOPE OVERLAY

Clifford B. Levine, Esquire
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Pittsburgh, PA  15222-3152
(412) 297-4900
KOSSMAN DEVELOPMENT COMPANY
PERMIT NO. 18-SPR-00131
McKINNEY LANE - STEEP SLOPE OVERLAY

EXHIBITS

1. Aerial Photos of Site Location

2. Full Site Plan Identifying Steep Slope Areas and Area of Haul Road

3. Portion of Map Depicting 3.8-Acre Area with Slopes between 25 and 40% (light green); 1.39-Acre Area with Slope > 40% (dark green) and Haul Road Location

4. April 2020 Stormwater Management Plan for Haul Road (Excerpt)
Aerial Photos of Site Location
THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.
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Full Site Plan Identifying Steep Slope Areas and Area of Haul Road
Portion of Map Depicting 3.8-Acre Area with Slopes between 25 and 40% (light green); 1.39-Acre Area with Slope > 40% (dark green) and Haul Road Location
April 2020 Stormwater Management Plan for Haul Road (Excerpt)
STORMWATER MANAGEMENT PLAN

HAUL ROAD

SITUATE IN:
CITY OF PITTSBURGH, 20TH WARD
ALLEGHENY COUNTY, PENNSYLVANIA

PREPARED FOR:
Kossman Development Company
Eleven Parkway Center, Suite 300
Pittsburgh, PA 15220

Project Number 3674
Original Submission: December 2019
Revision #1 Submission: April 2020

1712 Mt. Nebo Road 2nd Floor Sewickley, PA 15143
Phone: 412-219-4509 - Fax: 412-528-1974
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Project Description

Travel Directions:

From Pittsburgh International Airport, Points West/South

- Head east on I-376 E
- Take exit 67 for PA-121 N
- Use the left lane to turn left onto PA-121 S/Greentree Rd
- Continue straight onto Greentree Rd
- Turn right onto McKinney Ln

From Monroeville, Points East

- Head west on I-376 W
- Take exit 68 for Parkway Center Dr
- Continue onto Parkway Center Dr S
- Turn right onto Greentree Rd
- Turn right onto McKinney Ln

From Interstate 279, Points North

- Head south on I-279 S
- Use the right 2 lanes to merge onto I-376 W/Fort Pitt Bridge - Continue to follow I-376 W
- Take exit 68 for Parkway Center Dr
- Continue onto Parkway Center Dr S
- Turn right onto Greentree Rd
- Turn right onto McKinney Ln
Total Project Area: **24.88 acres** for Select Tree Removal- Approved Plan
Haul Road Area (within the Project Area) for SWM Site Plan Approval = **0.99 acres**
Road Construction and Site Description:

Road Type: Temporary Haul Road for Previously Approved Plan for Select (8” DBH and greater) Tree Removal Operations

- Length: 2,518 feet
- Width: 10 feet
- Grade: Varies, 15% maximum
- Stormwater Management Controls: Channels, Underground Detention, Cross Culverts with Rock Sumps and Riprap Aprons.
- In accordance with Title 25, Chapters 102 and 105 as well as Allegheny County Act 167 Plan

Any earthmoving operation on lands of this project shall be done in compliance with PA Code Chapters 102 and 78, the Clean Streams Law, and the PA Department of Environmental Protection Erosion Control Best Management Practice (BMP) Manual (Technical Guidance Number 363-2134-008).

All log (haul) roads, skid trails, and landings, or other openings will be laid out by the person in charge. New roads and trails shall be constructed on slopes of no more that 15%. All roads and landings shall be drained by a system of ditches, culverts, and filter berms or filter strips. At no time shall water lay on a road, landing, or ditch or run across a road. Roads shall always be kept in good condition with maintained grade for positive drainage, sediment cleaned from controls and culverts clear of debris. Areas where roads are closer than 100 feet from a stream will require special sedimentation control including compost filter sock and filter strips. Bridges will be used when crossing streams, seasonal streams, and drainage gullies. Roads shall be closed using water bars, seeding when necessary, crowning and draining.

No earthmoving operations shall take place during the wet periods of March 1 to April 15 and October 1 to November 15 without special written permission.

Any created opening greater than two acres and having no established regeneration or vegetative covering must be replanted or seeded depending on future site use.

Low lying areas will be avoided and if necessary, operation will occur in the winter when the ground is frozen.

In general, all operations will affect less than 25 acres. If more area than above stated is affected, then the operator will apply for an E&S permit from the Department of Environmental Protection.

Interim Stabilization:

Description of BMPs and description of seeding and/or placement of geotextiles to prevent erosion. The site access road will involve the disturbance of approximately 0.95 acre. Temporary sediment traps shall be utilized only when necessary to control the disturbed areas exceed the capacities of other, less intrusive BMP devices. Any small areas not draining to the proposed control facilities will be controlled with compost filter socks and erosion control blanketing. A rock construction entrance will be installed at the location shown on the plan to help
prevent mud from being tracked out onto the roadway. Diversion channels will be installed on the upper perimeter of the road to convey undisturbed runoff away from the construction area, discharging to a rock outlet protection control and then to an existing vegetative filter strip. Roadside collection channels will be lined with erosion control blanketing, convey flow to rock sumps before discharging through culvert pipes connected to the underground pipe detention systems. A pond basin exists on the property however, runoff from the haul road will not enter this pond. After the haul (logging) road has been restored to vegetation, the channels and underground detention systems will remain in place for permanent stormwater control.

All uncompleted disturbed areas on which activity will cease for more than four (4) days shall be seeded with annual ryegrass (PennDOT Formula E). Completed slope areas will be seeded immediately with PennDOT Formula B or a lawn grass seed and stabilized by mulch. After construction is complete and all areas are stabilized, all temporary control measures shall be removed, and all monitoring will cease. Stabilization is defined as the establishment of a uniform 70% perennial vegetative cover over the disturbed areas.

<table>
<thead>
<tr>
<th></th>
<th>% by Weight</th>
<th>Purity</th>
<th>Min. % Germination</th>
<th>Max. % Weed Seed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lawn Seed (PennDOT Formula B)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kentucky Bluegrass (4 or more varieties - none greater than 25% of total Bluegrass component)</td>
<td>50</td>
<td>98</td>
<td>80</td>
<td>0.20</td>
</tr>
<tr>
<td>Pennfine Perennial Ryegrass</td>
<td>20</td>
<td>98</td>
<td>90</td>
<td>0.15</td>
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<tr>
<td>Creeping Red Fescue</td>
<td>30</td>
<td>98</td>
<td>85</td>
<td>0.15</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>% by Weight</th>
<th>Purity</th>
<th>Min. % Germination</th>
<th>Max. % Weed Seed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temporary Seeding (PennDOT Formula E)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual Ryegrass</td>
<td>100</td>
<td>98</td>
<td>90</td>
<td>0.15</td>
</tr>
</tbody>
</table>

**BMP Maintenance:**

- BMPs will be inspected on a weekly basis and after each measurable rainfall event.
- Culverts will be cleaned out, repaired or replaced as necessary.
- Filter strips will be maintained and respected (timber may be harvested in filter strips).
- Haul roads and skid roads will be repaired where signs of accelerated erosion are detected.
- Seeding and mulching will be repeated in those areas that appear to be failing or have failed.
- Maintenance checks shall include inspecting compost filter sock for undercutting, tears, etc. and depths of
sediment accumulations, and repairs of damaged filter sock shall be performed immediately to ensure that it meets design specifications.

- Collection and diversion channels will have sediment deposits removed when silt has accumulated. Channels should be inspected weekly and after each runoff event.
- All areas to be stabilized by erosion control blanketing (ECB) shall be inspected for rills or gullies, bare soil patches, or accumulation of sediment at the toe of slopes. Eroded areas shall be regraded, and ECB shall be re-installed, re-seeded and mulched as specified on the plans.

**Receiving Waters: Designated/Existing Use:**

The earth disturbance lies within the Sawmill Run Watershed (25 PA Code, Chapter 93), either directly or via an unnamed tributary. Sawmill Run is classified as WWF (warm water fishes). Sawmill Run ultimately discharges to the Ohio River.

**Natural Drainage Pattern and Runoff Control Note:**

The natural drainage pattern (direction of flow) will be maintained to the point of interest (POI). The temporary 10-foot wide, dirt, haul road will follow the direction of the existing contours with minimum excavation (less than 10 feet) and not changing the flow direction. The haul road will contribute a small increase of volume and rate of runoff, which has been mitigated with this plan for during operations and after restoration. No impervious areas are being created and the conditions of this plan are temporary. Design was completed in accordance with City of Pittsburgh Zoning Code Title 13 Stormwater Management Plan, and PADEP Chapter 102, as referred to in the Zoning Code to be used for volume and rate control. Per the Release Rate Maps recently provided by the City of Pittsburgh and in accordance with the Act 167 Plan, this area has a release rate of 100%.

**Project Site Soils Information**

According to the USDA Natural Resources Conservation Service Soil Survey of Allegheny County (see Figure 2), the following soils exist on site:

<table>
<thead>
<tr>
<th>Soil Name</th>
<th>Map Symbol</th>
<th>Hydrologic Soil Group</th>
<th>Hydric Soil</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clarksburg silt loam, 8 to 15 percent slopes</td>
<td>CkC</td>
<td>C/D</td>
<td>Not Hydric</td>
<td>A – L, N</td>
</tr>
<tr>
<td>Dormont silt loam, 3 to 8 percent slopes</td>
<td>DoB</td>
<td>D</td>
<td>Not Hydric</td>
<td>A – L, N</td>
</tr>
<tr>
<td>Dormont silt loam, 8 to 15 percent slopes</td>
<td>DoC</td>
<td>D</td>
<td>Not Hydric</td>
<td>A – L, N</td>
</tr>
<tr>
<td>Dormont silt loam, 15 to 25 percent slopes</td>
<td>DoD</td>
<td>D</td>
<td>Not Hydric</td>
<td>A – L, N</td>
</tr>
<tr>
<td>Gilpin-Upshur complex, very steep</td>
<td>GQF</td>
<td>C</td>
<td>Not Hydric</td>
<td>A – C, E – I, M</td>
</tr>
<tr>
<td>Guernsey silt loam, 8 to 15 percent slopes</td>
<td>GuC</td>
<td>C/D</td>
<td>Not Hydric</td>
<td>A-C, E-J, M, P, Q</td>
</tr>
<tr>
<td>Guernsey silt loam, 15 to 25 percent slopes</td>
<td>GuD</td>
<td>C/D</td>
<td>Not Hydric</td>
<td>A-C, E-J, M, P, Q</td>
</tr>
<tr>
<td>Strip mines, 0 to 8 percent slopes</td>
<td>SmB</td>
<td>C</td>
<td>Not Hydric</td>
<td></td>
</tr>
<tr>
<td>Strip mines, 25 to 75 percent slopes</td>
<td>SmF</td>
<td>C</td>
<td>Not Hydric</td>
<td></td>
</tr>
<tr>
<td>Urban land-Guernsey complex, gently sloping</td>
<td>UGB</td>
<td>C/D</td>
<td>Not Hydric</td>
<td></td>
</tr>
</tbody>
</table>
Soil Limitations

A. Cutbanks Cave
B. Corrosive to concrete or steel
C. Easily erodible
D. Depth to saturated zone / seasonal high water table
E. Hydric / Hydric Inclusions
F. Low strength / landslide prone
G. Slow percolation
H. Piping
I. Poor source of topsoil
J. Frost Action
K. Shrink - Swell
L. Potential Sinkhole
M. Droughty
N. Wetness
O. Large Stone Content
P. Slope
Q. Depth to hard bedrock.

A description of this soil and planning guidelines are appended with this report, along with the map taken from the USDA Natural Resources Conservation Service Soil Survey as shown in Figure 2.

Soil Resolutions

1. All construction work at the site will be performed within the soil types delineated on the plans.
2. The contractor shall undertake proper testing and/or compaction procedures to prevent against unwanted settlement.
3. **SOILS SUBJECT TO CUT BANKS AND CAVE:** The contractor to utilize trench boxes for all utility piping installations.
4. **SOILS CAUSING CORROSION TO CONCRETE AND STEEL:** The contractor to use epoxy coated steel and rebar for all subsurface installations. For below grade concrete installations, the contractor shall, at a minimum, apply bituminous coating to all subsurface concrete or apply adhesive barrier (i.e., rubber membrane, etc.) as warranted by actual soil conditions.
5. **HIGHLY ERODIBLE SOILS:** These soil types shall be stabilized with seed or stone immediately after earthmoving activities cease. Turf reinforcement matting or erosion control blankets may need to be applied immediately upon direction of design engineer, PADEP, or county conservation district.
6. **SOILS SUBJECT TO SEASONAL HIGH-WATER TABLE:** It is recommended to conduct site earthmoving during summer or fall; spring construction should be avoided when possible. Contractor may also install perforated underdrain to protect below-grade installations as may be recommended by design engineer, PADEP, or county conservation district.
7. **HYDRIC SOILS:** Existing wetlands have been delineated for the site. No work shall be performed within 100 feet of any wetland area.
8. **LOW STRENGTH / LANDSLIDE PRONE**: Diversion channels will be implemented to channel water away from the excavation area. Contractor shall note any unusual cracks or bulges at the soil surface. Contractor shall never remove soil from the toe or bottom of a slope or add soil to the top of a slope. Remove minimal amount of surface vegetation as possible.

9. **SLOW PERCOLATION**: Should infiltration facilities be used at the site, infiltration tests shall be performed to determine proper percolation rates. Soils will be amended accordingly based on the results of the testing.

10. **SOILS SUBJECT TO PIPING**: The contractor shall install anti-seep collars or trench plugs as recommended by design engineer, PADEP, or county conservation district and seal all pipe joints watertight.

11. **SOILS SUBJECT TO POOR TOPSOIL**: Contractor shall perform soil testing on all disturbed areas to ensure soil is properly amended to establish required vegetative cover. Soil test kits can be obtained from the county cooperative extension service. Test kits should be submitted to the Penn State University testing laboratory for determining soil deficiencies. The contractor shall condition the soil as recommended by testing laboratory prior to final seeding.

12. **SOILS SUBJECT TO FROST ACTION**: The contractor shall provide a coarse textured subgrade or base material and proper surface or subsurface drainage to reduce the frost-action potential and enhance soil strength in frost prone areas.

13. **SHRINK - SWELL CONDITIONS**: Should shrink swell conditions be encountered, the contractor shall contact the geotechnical engineer to determine if additional soil test data is needed for the footer designs or roadway bases.

14. **POTENTIAL SINKHOLE**: Should a potential sinkhole arise; the contractor shall contact the geotechnical engineer to direct the removal of all the sinkhole loose sinkhole material to expose the solution void(s) if possible. Excavate the hole beyond the sinkhole sides and install filter materials.

15. **DROUGHTY CONDITIONS**: Contractor shall perform soil testing on all disturbed areas to ensure soil is properly amended to establish required vegetative cover. Special seed mixtures may be needed to achieve stabilization. The contractor shall use the seed mixture recommended by testing laboratory that is tolerant to these special conditions.

16. **WETNESS**: Contractor shall perform soil testing on all disturbed areas to ensure soil is properly amended to establish required vegetative cover. Special seed mixtures may be needed to achieve stabilization. The contractor shall use the seed mixture recommended by testing laboratory that is tolerant to these special conditions. Soil texture can be modified by the addition of coarse sand, or clay, depending on the desired change.

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**Stormwater Management (SWM): General Requirements**

The proposed haul road area is part of the previously approved Select Tree Removal Project Plan. See the Select Tree Removal Project Site Approved Plan provided under separate cover. In accordance with the Select Tree Removal Plan approval stipulations, this SWM Site Plan is to be submitted for the haul (logging) road to the City of Pittsburgh for review.
In accordance with the City of Pittsburgh Zoning Ordinance, Title 13: Stormwater Management, earth disturbance area equal to or greater than 10,000 square feet (sft) requires a Stormwater (SWM) Site Plan approval from the City of Pittsburgh. The project area for construction of the haul road is 43,263 sft (0.99 acre), with a planned earth disturbance area of 41,980 sft (0.96 acre). Therefore, a SWM Site Plan approval from the City of Pittsburgh is required.

The earth disturbance area includes construction of the 10’ wide by 2,518-foot long dirt road, one (1) landing pad, and temporary and permanent stormwater management controls.

No riparian buffer areas will be affected by the proposed haul road. No streams or wetlands are within the vicinity of the haul road. An existing stormwater channel will be crossed once by the haul road. A culvert pipe will be installed. If water is in the channel when work is being performed at the crossing, the pump around method will be used to control sedimentation in the channel.

Haul road grading that could potentially impact the stormwater channel will have perimeter compost filter sock located within 50 feet of the channel. Additionally, existing vegetative filter strips will remain in place during haul road construction.

No Impervious or semi-impervious area will be created except for a temporary rock construction entrance at the beginning of the haul road off McKinney Lane. No PennDOT HOP permit will be required since McKinney Lane is not a state road.

The haul road is located near the middle of the parcel of land. A few residential lots are located to the south end of the Project Area. A buffer area will be maintained to protect these adjacent properties from project site runoff.

Stormwater controls to be installed for the haul road includes diversion channels, collection channels, underground storage pipes in gravel beds, riprap aprons, and use of existing vegetative filter strips. The haul road and select tree clearing are temporary conditions and the trees removed will be returned to vegetated open space after operations are complete. Permanent controls will be maintained after construction to manage the runoff increase from tree removal to vegetated open space cover type.

Water quality will be maintained during haul road construction. No impacts are planned to affect floodplains, wetlands, or riparian buffers. Soil disturbances and tree removal for the haul road construction will be kept to the limits of disturbance. In areas of potential erosive flow conditions to natural flow paths, compost filter sock will be placed at the perimeter of the work area to slow down and filter runoff. Thermal impacts are not anticipated because stormwater controls will not detain for a period longer than 72 hours, dewatering will not occur from the top or the detained stormwater, and discharge from controls will be through existing vegetative filters strips before entering nearby drainage ways.

In accordance with City of Pittsburgh Municipal Code Title 13- Stormwater Management, design storm precipitation depths from NOAA Atlas 14 can be used for peak rate analysis. Reference SWM: Volume and Rate of Runoff Design below for more details.

All SWM BMPs are designed in accordance with PADEP regulations for stormwater management and Clean Streams Law. Reference the SWM BMPs Calculations detailed below and attached in the Appendices of this report. Operations and maintenance of BMPs will be accordance with City of Pittsburgh Title 13 and PADEP regulations. Reference SWM: BMPs Operation and Maintenance Plan detailed below.
Most of the project area for the haul road is currently wooded (0.88 acre) and the remainder is open space (0.10 ac). During select tree removal operations on the site, the condition of the road will be dirt. After select tree removal is complete, the road will become vegetated, open space. BMPs will be utilized during and after construction to maintain the volume and rate of runoff to pre-development conditions.

In accordance with Title 13, low impact development practices per the PADEP Stormwater Management Manual (BMP Manual) to be used for this project include: existing vegetative filter strips and underground detention systems contained within infiltration (rock) beds dispersed along the haul road.

The design presented herein includes no increase of total runoff volume from the pre-development conditions. For modeling purposes, non-forested areas are considered meadow in good condition. No impervious areas currently exist or will be created by construction of the temporary, dirt haul road, thus the 20% rule of impervious to meadow in existing conditions does not apply.

The project area is not identified in the Act 167 plan with maximum release rates. The closest mapped area is the northern end of the Monongahela River which has a release rate of 100%. Thus a 100% release rate will be assumed for this project. The design of controls is based on the latest rainfall depths from NOAA Atlas 14, for the required storm events, shown in Table 1 below.

<table>
<thead>
<tr>
<th>Storm (year)</th>
<th>NOAA Rainfall-24 hr (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.96</td>
</tr>
<tr>
<td>2</td>
<td>2.34</td>
</tr>
<tr>
<td>5</td>
<td>2.86</td>
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<tr>
<td>10</td>
<td>3.28</td>
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<tr>
<td>25</td>
<td>3.88</td>
</tr>
<tr>
<td>50</td>
<td>4.37</td>
</tr>
<tr>
<td>100</td>
<td>4.89</td>
</tr>
</tbody>
</table>

The PADEP latest PCSM Volume Table below represents the volume of runoff in the existing condition and post condition. This PADEP worksheet automatically tabulates the CN, Ia, Runoff and Volume in accordance with PADEP stormwater design formulas. Also, included below is a volume table for during logging operations condition. The CN value for during logging operations for the haul road has a higher CN value of 87, compared to post condition when the haul road is vegetated as open space (poor condition) with a CN of 86. Therefore, the highest volume to be managed for this project will be during logging operations condition.
### Volume Management

#### Pre-Construction Conditions:

<table>
<thead>
<tr>
<th>Land Cover</th>
<th>Area (acres)</th>
<th>Soil Group</th>
<th>CN</th>
<th>Q Runoff (in)</th>
<th>Runoff Volume (cf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forested (Good Condition)</td>
<td>0.88</td>
<td>C</td>
<td>70</td>
<td>0.857</td>
<td>1.219</td>
</tr>
<tr>
<td>Pervious as Meadow</td>
<td>0.10</td>
<td>C</td>
<td>71</td>
<td>0.817</td>
<td>0.41</td>
</tr>
</tbody>
</table>

**TOTAL (ACRES):** 0.98  **TOTAL (CF):** 1,871

#### Post-Construction Conditions:

<table>
<thead>
<tr>
<th>Land Cover</th>
<th>Area (acres)</th>
<th>Soil Group</th>
<th>CN</th>
<th>Q Runoff (in)</th>
<th>Runoff Volume (cf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Poor Condition (Grass Cover &lt; 50%)</td>
<td>0.58</td>
<td>C</td>
<td>86</td>
<td>0.326</td>
<td>1.11</td>
</tr>
<tr>
<td>Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover &gt; 75%)</td>
<td>0.40</td>
<td>C</td>
<td>74</td>
<td>0.703</td>
<td>0.52</td>
</tr>
</tbody>
</table>

**TOTAL (ACRES):** 0.98  **TOTAL (CF):** 3,095

**NET CHANGE IN VOLUME TO MANAGE (CF):** 1,723

#### During Operations Conditions:

<table>
<thead>
<tr>
<th>Land Cover</th>
<th>Area (acres)</th>
<th>Soil Group</th>
<th>CN</th>
<th>Q Runoff (in)</th>
<th>Runoff Volume (cf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dirt Road</td>
<td>0.58</td>
<td>C</td>
<td>87</td>
<td>0.30</td>
<td>1.18</td>
</tr>
<tr>
<td>Open Space</td>
<td>0.40</td>
<td>C</td>
<td>74</td>
<td>0.70</td>
<td>0.52</td>
</tr>
</tbody>
</table>

**TOTAL (ACRES):** 0.98  **TOTAL (CFS):** 3240

**NET CHANGE IN VOLUME TO MANAGE (CF):** 1869

As shown in the tables above, the maximum volume to be managed is 1,869 cubic feet for during operations condition of the haul road project, which is more than the storage volume of post conditions of 1,723 cubic feet.

The table below represents the control of the volume by non-structural and structural BMPs. One (1) non-structural BMP, is 1,283 sft of a meadow to be used for a laydown area and will be protected from compaction. The structural BMPs include three (3) underground detention systems (UGD’s) each containing a storm pipe encased in stone. The infiltration rate listed in the table below for each structural BMP was derived from infiltration testing conducted in Spring 2020 at or near the locations of each planned UGD and within the same soil type as each UGD. Field Infiltration testing information is included in the Appendices of this report.
The maximum storage volume required will be from during operation conditions of 1,829 cubic feet (see table in earlier section of this report); which is greater than the post condition of the site of 1,723 cubic feet. The total storage volume provided by the proposed BMPs of 5,514 cubic feet is more than 3 times the volume required for during operations and post condition of the haul road project. The BMP design was governed by the rate of runoff control, which required more storage than volume control. Refer to the Rate of Runoff Design report section below for further detail.

### SWM: Permanent BMP Design & Rate of Runoff Control

In accordance with a project review comment in the letter dated February 25, 2020 received from the City of Pittsburgh, a full hydrological and release analysis for the 2-year, 5-year, 10-year, 25-year, 50-year and 100-year storms during the pre-condition, during logging operations and post logging operations is provided.

Hydraflow Hydrographs for Autodesk, version 2020 was used to calculate the rate of runoff using the SCS Method. Due to the typical drainage nature of road projects having very short paths of disturbance surrounded by vegetation or relatively undisturbed land, a PADEP acceptable alternate standard used specifically road projects is to evaluate the rate of runoff to a Point of Interest (P.O.I.) reached by the entire length of the road. In this case, two (2) drainage areas encompassing the entire haul (logging) road converge by existing unnamed tributary to an existing endwall noted as the P.O.I. on the drawings.

<table>
<thead>
<tr>
<th>DP No.</th>
<th>BMP No.</th>
<th>BMP Name</th>
<th>BMP DA (acres)</th>
<th>DAI Impervious (acres)</th>
<th>Volume Routed to BMP (CF)</th>
<th>Infiltration / Vegetated Area (SF)</th>
<th>Infiltration Rate (in/hr)</th>
<th>Infiltration Period (hrs)</th>
<th>Vegetated?</th>
<th>Media Depth (ft)</th>
<th>Storage Volume (CF)</th>
<th>Infiltration Credit (CF)</th>
<th>ET Credit (CF)</th>
<th>INfiltration &amp; ET Credit (CF)</th>
<th>MANAGED RELEASE CREDIT (CF)</th>
<th>NET CHANGE IN VOLUME TO MANAGE (CF)</th>
<th>TOTAL CREDITS (CF)</th>
<th>VOLUME REQUIREMENT SATISFIED</th>
</tr>
</thead>
<tbody>
<tr>
<td>001 1</td>
<td>UGD #1</td>
<td>-</td>
<td>0.90</td>
<td>0.08</td>
<td>1,440</td>
<td>216</td>
<td>2.86</td>
<td>72</td>
<td>Yes</td>
<td>0.5</td>
<td>1,216</td>
<td>1,440</td>
<td>0</td>
<td>5,478</td>
<td>206</td>
<td>1,725</td>
<td>5,514</td>
<td>1,725</td>
</tr>
<tr>
<td>001 2</td>
<td>UGD #2</td>
<td>2.15</td>
<td>0.08</td>
<td>3,286</td>
<td>1,200</td>
<td>0.42</td>
<td>72</td>
<td>Yes</td>
<td>0.5</td>
<td>2.722</td>
<td>1,216</td>
<td>1,073</td>
<td>37</td>
<td>5,514</td>
<td>206</td>
<td>1,725</td>
<td>5,514</td>
<td>1,725</td>
</tr>
</tbody>
</table>

| Totals | 5,235   | 243      |                |                        |                           |                                 |                          |                         |            |                    |                     |                         |              |                            |                            |                            |                     |                        |
Drainage Area #1 is 14.90 acres and encompasses the top half of the road with the following controls:

- Two (2) underground detention systems (UGD #1 and UGD #2),
- Two (2) collection channels discharge to UGD #1; one via rock sump with cross culvert pipe connected to the UGD and the other directly to the infiltration rock bed,
- One (1) collection channel discharges to a rock sump with cross culvert pipe connected to UGD #2,
- One (1) diversion channel discharging to a cross culvert pipe with rock sumps on both sides,
- One (1) diversion channel discharging to a riprap apron and outlets to a vegetated level spreader/filter area, and
- Two (2) cross culvert pipes spaced along the road where stormwater will naturally collect along the roadside.
- In this drainage area, a portion of the lower half of the proposed road will follow the natural contours with minimal grading required.

Drainage Area #2 is 10.30 acres and encompasses the lower half of the road with the following controls:

- One (1) underground detention system,
- One (1) collection channel discharging directly to the rock bed of the underground detention system, and
- One (1) cross culvert pipe located where stormwater will naturally collect along the roadside.
- Also, a portion of the beginning of the proposed road will follow the natural contours with minimal grading required.

The division of the drainage areas is by the existing stormwater channel where all project runoff is conveyed. At this division line, the haul road is to cross the channel with a temporary culvert pipe and two (2) check dams will be installed to safely pass the flow below the road during logging operations. This culvert and check dams will be removed after operations are complete and when the haul (logging) road is restored to near existing contour and vegetated condition. Refer to the drainage areas mapped on Sheet 1 of 7, the SWM Overall Plan.

Table 10 below is a summary of the runoff rates for each stated storm event for pre-conditions, during logging operations and post condition in relation to this haul road project based on the analysis criteria stated above. Supporting calculations are provided in the Appendices of this report.

<table>
<thead>
<tr>
<th>Storm (yr)</th>
<th>Pre (cfs)</th>
<th>During (cfs)</th>
<th>Post (cfs)</th>
<th>NET CHANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>5.641</td>
<td>5.468</td>
<td>5.468</td>
<td>-0.173</td>
</tr>
<tr>
<td>5</td>
<td>11.07</td>
<td>10.37</td>
<td>10.37</td>
<td>-0.7</td>
</tr>
<tr>
<td>10</td>
<td>16.24</td>
<td>14.96</td>
<td>14.96</td>
<td>-1.28</td>
</tr>
<tr>
<td>25</td>
<td>24.49</td>
<td>23.68</td>
<td>23.68</td>
<td>-0.81</td>
</tr>
<tr>
<td>50</td>
<td>31.81</td>
<td>31.26</td>
<td>31.26</td>
<td>-0.55</td>
</tr>
<tr>
<td>100</td>
<td>39.98</td>
<td>39.03</td>
<td>39.03</td>
<td>-0.95</td>
</tr>
</tbody>
</table>

As shown in the table above, the rate of runoff will be controlled by the BMPs to less than pre-condition for both the phases of during logging operations and post condition of the haul road.
**SWM: CONCLUSION**

This plan shows stormwater volume and rate of runoff for the temporary, dirt haul road will be controlled to pre-development conditions with underground detention systems during operations (dirt haul road) and post-condition (haul road restored with vegetation). Once the haul road is no longer in use for select-tree removal, it will be seeded to achieve vegetated open space area. The temporary haul road disturbance area is less than 1 acre (0.58 acre) with no impervious area planned.

Additionally, water quality is met in accordance with the PADEP PCSM Quality Worksheet provided in the Appendices of this report. Therefore, the City requirements have been fulfilled by this design.

**SWM: BMPs Operation and Maintenance (O&M) Plan**

The Stormwater Management Plan developed for the Project is supplemented by this Maintenance Plan to help ensure continuing operation of all stormwater facilities. The following is a list of items that shall be inspected, and corrective action taken by the Owner (as appropriate). Owner refers to individual ultimately responsible for storm facility conditions and function.

**Owner: Kossman Development Company**

1. Visual inspection of infiltration beds such as slumping and/or subsidence.
2. Channels and other conveyance devices.

The following actions will be taken by the Owner to help ensure the facilities shown on the plan and identified above are in working order:

1. Replace or repair underground detention system to function as intended.
2. Remove any silt, debris, and trash from stone beds.
3. Disposal of collected silt, debris and trash in a manner that will not adversely affect the environment.
4. Replace eroded material and revegetate eroded areas.

The corrective actions to be taken are not limited to those listed above.

The Owner is required to sign and record the O&M Agreement, as approved by the City of Pittsburgh Reviewer(s).

**SWM: Operation Inspections**

The landowner or the owner’s designee (including the City for dedicated and owned facilities) shall inspect SWM BMPs, facilities and/or structures installed under this Ordinance according to the following frequencies, at a minimum, to ensure the BMPs, facilities and/or structures continue to function as intended:

- Annually for the first five (5) years.
- Once every three (3) years thereafter.
- During or immediately after the cessation of a ten-year or greater storm.

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A written inspection report shall be created to document each inspection. The inspection report shall contain the date and time of the inspection, the individual(s) who completed the inspection, the location of the BMP, facility or structure inspected, observations on performance, and recommendations for improving performance, if applicable. Inspection reports shall be kept onsite and furnished to City/PWSA inspectors upon request.

**Plan Preparer and Reviewer Qualifications**

Katrina A. Harmel, EIT prepared this design, and the design was reviewed by Graham L. Ferry, P.E. Mrs. Harmel and Mr. Ferry have 15 years of design and permitting experience in southwestern Pennsylvania. Both Mrs. Harmel and Mr. Ferry have attended E&S design courses with the local conservation districts and have had several plans approved. Preparer and Review Qualifications are provided in the attached Appendices.