Pacific West Engineering, Inc.

PRELIMINARY
STORM WATER STUDY
FOR
M-2-08
DATE: 8-2008

Prepared By:

Pacific West Engineering Inc.

P.O. Box 70026

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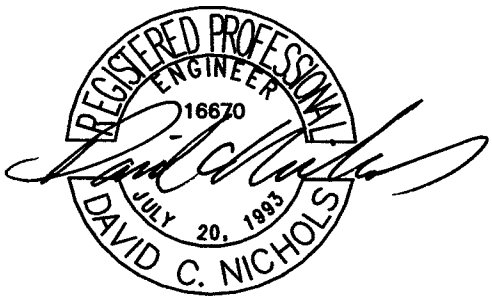
Eugene, Oregon 97401



EXPIRES: 12-31-2008

GENERAL INFORMATION:

This preliminary study is prepared for the M-2-08 Subdivision site. The study is to address storm water drainage for the Parcels 1 through 3 and the future parcels that could be developed within Parcel 3. A Final Study will be performed at the time building permits are applied for in order to identify that exact impervious areas and the method and sizing of the stormwater detention and treatment facility for each Parcel.

The grassy detention swale analysis was performed using "HydroCad" version 6.0. The detention swale is sized to detain the runoff difference of the 10-year peak discharge using the difference between the pre-development and post-development peak flow rates as determined by the SCS TR-20 Method. Rainfall used in the HydroCad program was 4.5 inches based on the 10-year, 24-hour NOAA Atlas and the storm type was 1A-24-hour for Western Oregon. The discharge from the detention swale was limited to the pre-development peak discharge rate based on the above input and as described in the following statements.

HISTORIC SITE RUNOFF:

The site drains generally to the west into an existing drainage way that flows in a northwest direction. The drainage way is located to the west of the property on tax lot 500. The area surrounding the drainage way is very flat and has resulted in wetlands that flare out and encroach into the site. The wetland boundary has been delineated by Coyote Creek Environmental Services Inc. and identified in a report dated January 2008. The wetland boundary has been shown on the tentative site plans. In addition, there is a portion of the FEMA 100-year Floodplain that encroaches into the northwest portion of the site. This boundary has also been shown on the plans.

PROPOSED SITE RUNOFF:

Runoff from Parcel 1 will be based on the existing roof area and driveway area. Parcel 1 will not require any detention because historically the roof area has discharged to the existing drainage way and there is not any additional runoff being proposed on Parcel 1. Runoff from Parcel 2 will be based on the future home site and driveway area. Runoff from Parcel 3 will be based on the future re-division of that Parcel into 4 lots. The difference between the 10-year storm event pre-development flow and post-development flow will be detained in the grassy swales prior to being released into the existing drainage way. The release will be at pre-development flow rates.

Parcel 1:

Existing Roof Impervious Area:	1,950 s.f. (no detention required)
Existing Gravel Driveway pervious Area:	N/A
Total impervious area to detain:	N/A

Parcel 2:

Roof Impervious Area:	2,400 s.f.
Driveway Impervious Area:	600 s.f.
Total impervious area to detain:	3,000 s.f.

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Parcel 3:
(4 Future Lots each contain the following):

Roof Impervious Area:	2,400 s.f.
Driveway Impervious Area:	600 s.f.
Total impervious area to detain:	3,000 s.f.

Grassy detention swales were sized to accommodate the above impervious areas for each parcel and have been included in this study (See Appendix A). Each grassy swale is 6-feet wide and 40-feet in length. In order to release the 10-year pre-development flow from each swale, a 1" diameter pipe would be required.

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APPENDIX A

Time span=1.00-24.00 hrs, dt=0.05 hrs, 461 points
Runoff by SCS TR-20 method, UH=SCS, Type IA 24-hr Rainfall=4.50"
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PARCEL 2: PARCEL 2

Tc=6.8 min CN=76 Area=3,000 sf Runoff= 0.03 cfs 0.012 af

Runoff Area = 0.069 ac Volume = 0.012 af Average Depth = 2.12"

Subcatchment PARCEL 2: PARCEL 2

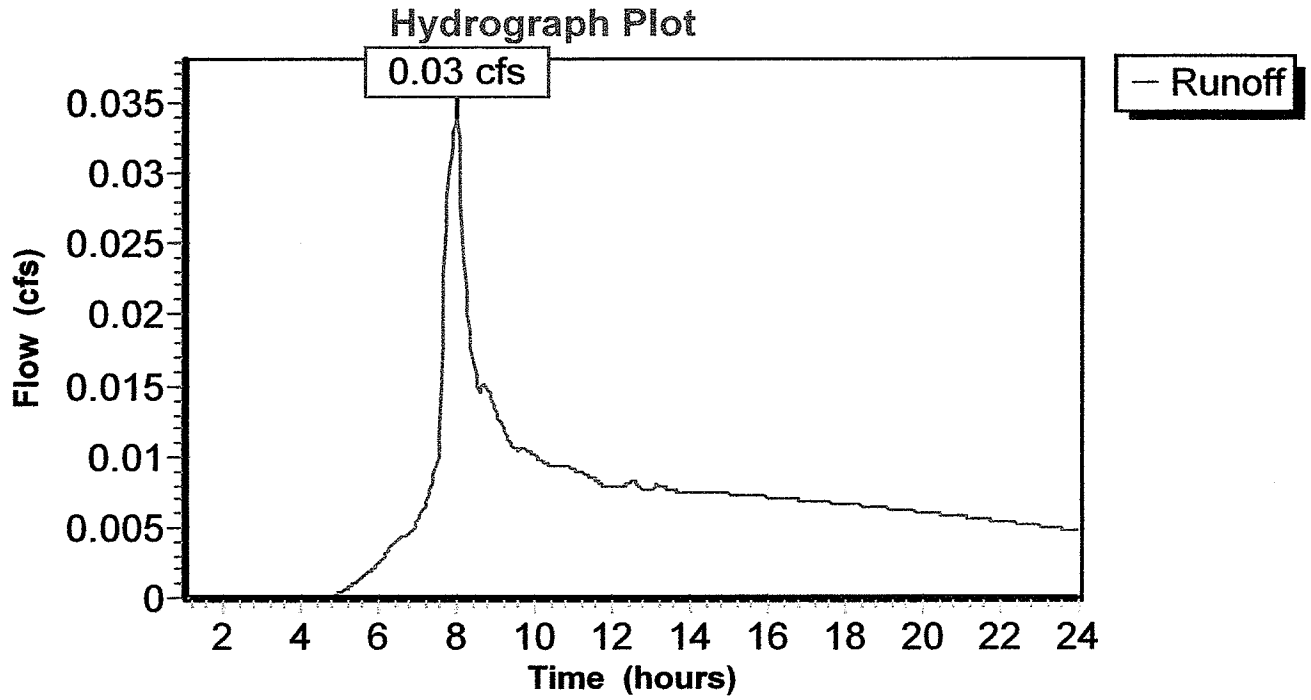
Runoff = 0.03 cfs @ 7.98 hrs, Volume= 0.012 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr Rainfall=4.50"

Area (sf)	CN	Description
3,000	76	>75% Grass cover, Good, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	100	0.0500	0.2		**Sheet Flow, SHEET FLOW** Grass: Short n= 0.150 P2= 3.15"

Subcatchment PARCEL 2: PARCEL 2



Time span=0.10-24.00 hrs, dt=0.05 hrs, 479 points
Runoff by SCS TR-20 method, UH=SCS, Type IA 24-hr Rainfall=4.50"
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment IMPERVIOUS AREA: IMPERVIOUS AREA
Tc=2.0 min CN=98 Area=3,000 sf Runoff= 0.07 cfs 0.024 af

Pond GRASSY SWALE: GRASSY DETENTION SWALE Peak Storage= 168 cf Inflow= 0.07 cfs 0.024 af
Primary= 0.03 cfs 0.024 af Outflow= 0.03 cfs 0.024 af

Runoff Area = 0.069 ac Volume = 0.024 af Average Depth = 4.26"

Subcatchment IMPERVIOUS AREA: IMPERVIOUS AREA

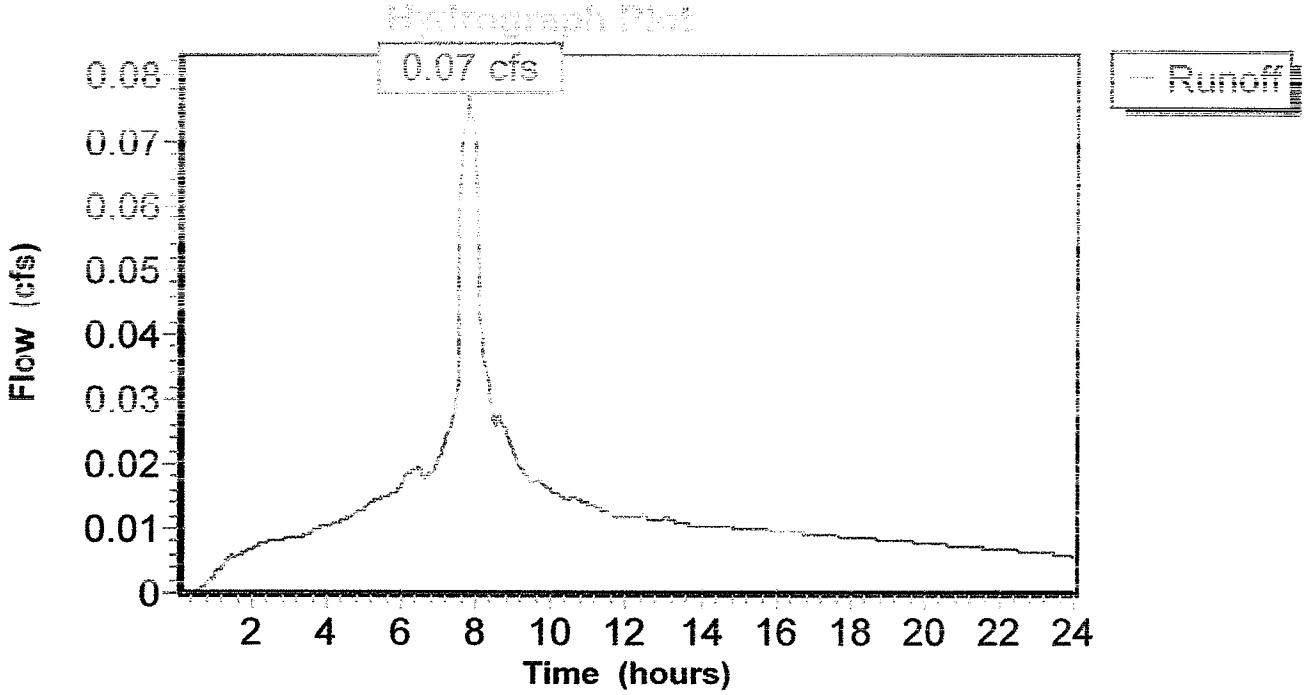
Runoff = 0.07 cfs @ 7.81 hrs, Volume= 0.024 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.10-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr Rainfall=4.50"

Area (sf)	CN	Description
3,000	98	Paved parking & roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					Direct Entry, ROOF DRAINS

Subcatchment IMPERVIOUS AREA: IMPERVIOUS AREA



Pond GRASSY SWALE: GRASSY DETENTION SWALE

Inflow	=	0.07 cfs @	7.81 hrs, Volume=	0.024 af
Outflow	=	0.03 cfs @	8.39 hrs, Volume=	0.024 af, Atten= 62%, Lag= 35.0 min
Primary	=	0.03 cfs @	8.39 hrs, Volume=	0.024 af

Routing by Stor-Ind method, Time Span= 0.10-24.00 hrs, dt= 0.05 hrs

Peak Elev= 1.23' Storage= 168 cf
Plug-Flow detention time= 61.2 min calculated for 0.024 af (99% of inflow)
Storage and wetted areas determined by Prismatic sections

Elevation (feet)	Surf.Area (sq ft)	Inc.Store (cubic feet)	Cum.Store (cubic feet)
0.00	35	0	0
1.25	240	172	172

Primary OutFlow (Free Discharge)
└─1=Orifice/Grate

#	Routing	Invert	Outlet Devices
1	Primary	0.00'	1.0" Vert. Orifice/Grate C= 0.600

Pond GRASSY SWALE: GRASSY DETENTION SWALE