Hydrology Calculations

The following calcualtions are based on Albuquerque's Development Process Manual, Seciton 22.2

Runoff Rate:

Treatment Type Areas

Subbasin	Area$_A$ (ac)	Area$_B$ (ac)	Area$_C$ (ac)	Area$_D$ (ac)	Total (ac)
Subbasin 1	0.00	0.02	0.02	0.37	0.41
Subbasin 2	0.00	0.02	0.02	0.37	0.41
Subbasin 3	0.00	0.01	0.01	0.21	0.23
Subbasin 4	0.00	0.00	0.00	0.04	0.04
Total	0.00	0.04	0.04	1.00	1.09

Peak Discharge values based on Zone 2 from Table A-9

Q_A = 1.56 cfs/ac Q_B = 2.28 cfs/ac Q_C = 3.14 cfs/ac Q_D = 4.70 cfs/ac

Peak Discharge calculation for a 100-yr, 24-hr storm event from equation A-10

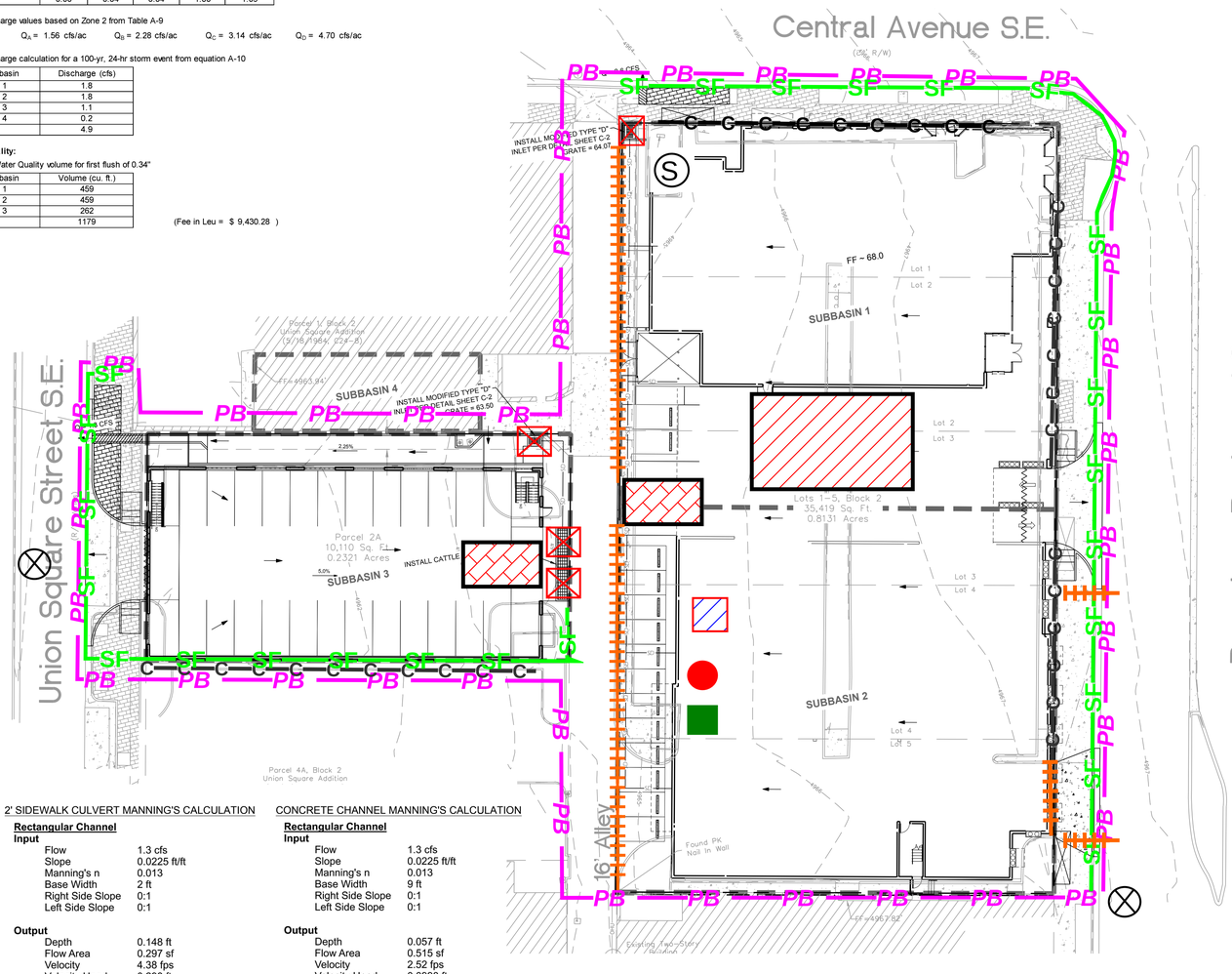
Subbasin	Discharge (cfs)
Subbasin 1	1.8
Subbasin 2	1.8
Subbasin 3	1.1
Subbasin 4	0.2
Total	4.9

Water Quality:

Required Water Quality volume for first flush of 0.34"

Subbasin	Volume (cu. ft.)
Subbasin 1	459
Subbasin 2	459
Subbasin 3	262
Total	1179

(Fee in Lieu = $ 9,430.28)



2' SIDEWALK CULVERT MANNING'S CALCULATION

Rectangular Channel

Input

Flow	1.3 cfs
Slope	0.0225 ft/ft
Manning's n	0.013
Base Width	2 ft
Right Side Slope	0:1
Left Side Slope	0:1

Output

Depth	0.148 ft
Flow Area	0.297 sf
Velocity	4.38 fps
Velocity Head	0.298 ft
Top Width	2.00 ft
Froude Number	2.01
Critical Depth	0.236 ft
Critical Slope	0.00529 ft/ft

CONCRETE CHANNEL MANNING'S CALCULATION

Rectangular Channel

Input

Flow	1.3 cfs
Slope	0.0225 ft/ft
Manning's n	0.013
Base Width	9 ft
Right Side Slope	0:1
Left Side Slope	0:1

Output

Depth	0.057 ft
Flow Area	0.515 sf
Velocity	2.52 fps
Velocity Head	0.0990 ft
Top Width	9.00 ft
Froude Number	1.86
Critical Depth	0.087 ft
Critical Slope	0.00571 ft/ft

2' SIDEWALK CULVERT MANNING'S CALCULATION

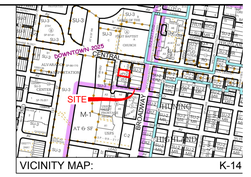
Rectangular Channel

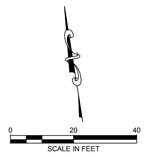
Input

Flow	3.6 cfs
Slope	0.015 ft/ft
Manning's n	0.013
Base Width	2 ft
Right Side Slope	0:1
Left Side Slope	0:1

Output

Depth	0.327 ft
Flow Area	0.654 sf
Velocity	5.50 fps
Velocity Head	0.471 ft
Top Width	2.00 ft
Froude Number	1.70
Critical Depth	0.465 ft
Critical Slope	0.00529 ft/ft





BACKGROUND

LOTS 1 THRU 5, BLOCK 2, HUNING'S HIGHLAND ADDITION AND PARCEL 2-A, UNION SQUARE ADDITION ACCOUNT FOR APPROXIMATELY 1 ACRE IN THE CITY OF ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO. THE PROPERTIES ARE LOCATED SOUTH OF CENTRAL AVENUE, NORTH OF GOLD AVENUE, WEST OF BROADWAY BOULEVARD, AND EAST OF UNION SQUARE STREET. THE SITE HAS BEEN DEVELOPED AS A PARKING LOT AND THE PROPOSED PROJECT IS A HOTEL ON LOTS 1 THRU 5 AND A PARKING STRUCTURE ON PARCEL 2-A. LOTS 1 THRU 5 RECEIVE NO OFFSITE FLOWS. PARCEL 2-A RECEIVES FLOWS FROM SOME OF THE ROOF RUNOFF GENERATED BY THE BUILDING ON PARCEL 1, WHICH IS THE PROPERTY NORTH OF PARCEL 2-A. THERE IS NO FLOODPLAIN ON THE SITE. THERE ARE DRAINAGE ANALYSES DONE BY SPROUL ENTERPRISES FOR LOTS 1 THRU 5 (K14D017) AND BY MCDOWELL ENGINEERING FOR PARCEL 2-A (K14D056). THESE FILES SHOULD BE REFERENCED FOR GENERAL BACKGROUND RELATED TO THESE PROPERTIES.

METHODOLOGY

HYDROLOGY CALCULATIONS FOR THE SITE ARE PERFORMED IN ACCORDANCE WITH THE ALBUQUERQUE DEVELOPMENT PROCESS MANUAL (DPM) SECTION 22.2 USING THE RATIONAL METHOD TO CALCULATE PEAK FLOW RATES IN ORDER TO ENSURE ALL FLOW PATHS ARE SUFFICIENT TO CARRY FLOWS. THE REQUIRED WATER QUALITY VOLUME WAS CALCULATED BY MULTIPLYING THE IMPERVIOUS AREA BY THE FIRST FLUSH RUNOFF VALUE OF 0.34". ALL HYDROLOGIC AND HYDRAULIC CALCULATIONS CAN BE FOUND ON THIS SHEET.

EXISTING CONDITIONS

PER THE GRADING PLAN BY SPROUL ENTERPRISES, THE AREA, IN GENERAL, DRAINS FROM EAST TO WEST AT VARYING SLOPES. LOTS 1 THRU 5 WERE INTENDED TO BE DRAINED TO A 2' CHANNEL LOCATED AT THE NORTHWEST CORNER OF THE PROPERTIES THAT DISCHARGES TO CENTRAL PER THE GRADING PLAN BY SPROUL ENTERPRISES. CURRENTLY, LOTS 1, 2 AND THE NORTHERN PORTION OF LOT 3 ARE DRAINING TO THE 2' CHANNEL WHILE LOTS 4, 5 AND THE SOUTHERN PORTION OF LOT 3 IS DRAINING TO THE ALLEY DRIVEWAY AT THE SOUTHWEST CORNER OF THE PROPERTIES. THIS STORM WATER RUNOFF THEN FLOWS SOUTH INTO GOLD AVENUE. PARCEL 2-A DRAINS TO UNION SQUARE THROUGH 4" PVC DRAIN LINES UNDER THE SIDEWALK AT THE NORTHWEST CORNER OF THE SITE.

PROPOSED CONDITIONS

THE BASIN HAS BEEN SPLIT INTO 4 SUBBASINS. SUBBASIN 1 IS THE NORTHERN PORTION OF LOTS 1 THRU 5 AND GENERATES 1.8 CFS. SUBBASIN 2 ENCOMPASSES THE SOUTHERN PORTION OF LOTS 1 THRU 5 AND ALSO GENERATES 1.8 CFS. SUBBASIN 3 IS PARCEL 2-A AND GENERATES 1.1 CFS. SUBBASIN 4 IS THE OFFSITE FLOW RECEIVED FROM PARCEL 1 LOCATED NORTH OF PARCEL 2-A AND GENERATES 0.2 CFS.

SUBBASINS 1 AND 2 INCLUDE THE ROOF OF THE PROPOSED HOTEL. THE ROOF RUNOFF WILL BE COLLECTED AND ROUTED UNDER GROUND IN A STORM DRAIN. THE STORM DRAIN DISCHARGES TO A MODIFIED TYPE "D" INLET THAT WILL ACT AS BOTH A BUBBLER AND A FRENCH DRAIN. SEE DETAIL SHEET C-2. WATER GENERATED BY LARGER STORM EVENTS WILL BUBBLE UP THROUGH THE INLET AND DISCHARGE INTO CENTRAL AVENUE THROUGH A 2 FOOT SIDEWALK CULVERT. THIS IS WHAT WAS THE ORIGINAL DESIGN INTENT FOR THIS PROPERTY. FURTHERMORE, IN A MORE RECENT STUDY DONE BY WSP/PARSONS BRINCKERHOFF IN 2016 (K14-D108), LOTS 1 THRU 5 ARE SHOWN TO DRAIN TO CENTRAL. THE WATER THAT DOES NOT BUBBLE UP THROUGH THE INLET WILL INFILTRATE INTO THE GROUND THROUGH THE BOTTOM OF THE MODIFIED TYPE "D" INLET. THERE IS A PARKING GARAGE WITH ACCESS TO BROADWAY BOULEVARD. THE WATER BLOCK IS SHOWN ON SHEET C-2.

SUBBASIN 3 INCLUDES THE UPPER LEVEL OF THE PARKING STRUCTURE THAT HAS ACCESS TO THE ALLEY. THERE IS A LOWER LEVEL WITH ACCESS TO UNION SQUARE STREET. THERE IS A PROPOSED WATER BLOCK AT THE UNION SQUARE ENTRANCE (SEE SHEET C-2). RUNOFF GENERATED BY THE UPPER LEVEL OF THE PARKING STRUCTURE WILL FLOW EAST UNTIL COLLECTED IN THE PROPOSED CATTLE GUARD INLET. A STORM DRAIN CONNECTED TO THE CATTLE GUARD INLET WILL DRAIN TO A MODIFIED TYPE "D" INLET. WATER WILL BUBBLE OUT OF THE INLET INTO THE PROPOSED CHANNEL ALONG THE NORTH SIDE OF THE PARKING STRUCTURE. SEE DETAIL SHEET C-2. SUBBASIN 4 ALSO ENTERS THIS CHANNEL. RUNOFF THEN ENTERS A 2' SIDEWALK CULVERT THAT DISCHARGES TO UNION SQUARE STREET AS THE PROPERTY HAS DONE HISTORICALLY.

LEGEND

EROSION AND SEDIMENT CONTROL PLAN

PROJECT PERIMETER & DISTURBED AREA

SILT FENCE

MULCH SOCKS

FLOW DIRECTION

STAGING AREA

STABILIZED CONSTRUCTION ENTRANCE

TRASH RECEPTACLE

CHEMICAL TOILET

CONCRETE WASHOUT

RETENTION POND

EXISTING CURB

CHECK DAM

DROP INLET PROTECTION

OUTFALL

POSTING SIGN

PRESERVED VEGETATION

ESC NOTES

1. THE STAGING AREA FOR THE PARKING STRUCTURE WILL BE THE HOTEL AREA. THE STAGING AREA FOR THE HOTEL WILL BE DETERMINED AT A LATER DATE.

2. WHERE SILT FENCE IS ATTACHED TO THE SECURITY FENCE ON AN IMPERVIOUS SURFACE, MULCH SOCK/WATTLE WILL BE PLACED AT THE BOTTOM OF THE SILT FENCE.

3. THE WATERLINE TIE IN LOCATION HAS NOT BEEN DETERMINED. MULCH SOCK/WATTLE WILL BE PLACED ON THE DOWNSTREAM SIDE OF THE ASPHALT CUT ONCE CITY OF ALBUQUERQUE ROW WORK HAS BEGUN.

4. DURING CONSTRUCTION OF THE PARKING STRUCTURE, THE EXISTING CURB WILL ACT AS A SEDIMENT BARRIER. ONCE THE CURB IS REMOVED, SILT FENCE AND MULCH SOCK/WATTLE WILL BE INSTALLED.

5. INSTALL INLET PROTECTION ONCE DROP INLETS AND CATTLE GUARD INLET ARE ACTIVE.

RECEIVING WATERS:	**RIO GRANDE: TIER II AND IMPAIRED WITH E. COLI, OXYGEN DEPLETION, PCBs IN FISH TISSUE, AND TEMPERATURE.**
CRITICAL HABITAT:	**CRITERION "A"; NO CRITICAL HABITATS WITHIN PROJECT AREA.**
GPS LOCATION:	**35.0832, -106.6456**

HUGH W. FLOYD NEW MEXICO 18633 LICENSED PROFESSIONAL ENGINEER 7-6-18

Engineer Stamp

CENTRAL & BROADWAY HOTEL

PROJECT TITLE

ALBUQUERQUE, BERNALILLO COUNTY, NM

CITY, COUNTY, STATE

07/05/18 DATE

C. DURKIN DRAWN BY

Inspections Plus, Inc.

Curb Storm Inlet Protection with Wattles

Inlet Filter Installation Instructions:

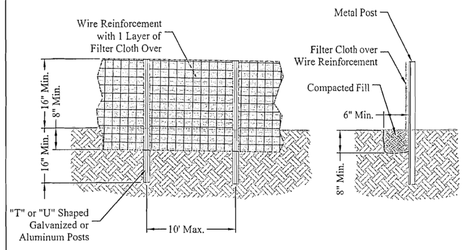
1. Remove sediment, debris, ice and snow from the inlet grate surface and surrounding area.

2. Verify fit by placing filter over inlet grate to ensure that Inlet Filter extends at least one inch beyond the front and both curb ends. The overlap slows water flow and starts filtering sediment and debris before water drops into the inlet.

3. Position the mat. Place Inlet Filter on grate with the net side down, flush to the back edge and extending beyond the grate opening on the front and both sides. The zip ties attach Inlet Filter to the inlet grate cover WITHOUT LIFTING THE GRATE COVER.

4. The filter material covering the inlet can be any material that will prevent the sediment and other foreign matter from entering the storm drain system.

Reinforced Silt Fence



Definition

A temporary barrier of Geotextile Class "F" over wire reinforcement used to intercept sediment laden runoff from small drainage areas.

Purpose

The purpose of silt fence is to reduce runoff where velocity and allow the deposition of transported sediment to occur. Limits imposed by ultraviolet light on the stability of the fabric will dictate the maximum period that the silt fence may be used.

1. Silt fence provides a barrier that can collect and hold debris and soil, preventing the material from entering critical areas, streams, streets, etc.
2. Silt fence can be used where the installation of a dike would destroy sensitive areas; woods, wetlands, etc.

Conditions where the Practice Applies

Silt Fence is limited to intercepting sheet flow runoff from limited distances according to slope. It provides filtering and velocity dissipation to promote gravity settling of sediment.

Design Criteria

Steel posts must be used. Silt fence should be placed as close to the contour as possible. No section of silt fence should exceed a grade of 5 percent for a distance more than 50 feet. Where ends of the geotextile fabric come together, the ends shall be overlapped, folded, and stapled to prevent sediment bypass. The length of the flow contributing to silt fence shall conform to the following limitations.

Slope (%)	Slope Steepness	Slope Length (Ft.) (Maximum)	Silt Fence Length (Ft.) (Maximum)
0-10	0-10:1	Unlimited	Unlimited
10-20	10:1-5:1	200	1,500
20-33	5:1-3:1	100	1,000
33-50	3:1-2:1	100	500
50 +	2:1 +	50	250

Erosion Control Notes

1. All perimeter erosion and sediment control measures shall be installed prior to the execution of any grading work and maintained by the grading contractor for the duration of the grading project. Failure to install and maintain erosion control is a violation of State Law and subject to fine.

2. The appropriate erosion control devise(s) shall be installed prior to the inception of any land disturbing activity and shall be properly maintained for construction activities.

3. All Erosion Control devices and their installation shall meet the standards prescribed in the current guidelines for storm water management for construction activities.

4. Sediment collected behind the sediment filters and silt fences shall be removed when sediment reaches on third the height of the barrier.

5. Inspection of erosion and sediment control and other protective measures are required once every 7 days from July 1st to October 31st and once every 14 days from November 1st to June 30th and after a precipitation event of ¼ inch or greater until the site is considered stabilized by the City. Inspection reports are to be kept by the person or entity authorized to direct construction activities on the site

6. Construction Site Entrance: The contractor shall construct as a minimum one stabilized construction entrance at the location shown on the plans. If additional ingress and egress to the construction site is required, the contractor shall coordinate with the construction manager the location of these additional stabilized construction entrances. Usage of non-stabilized for ingress and egress will not be permitted. The stabilized entrances shall be maintained in a condition which will prevent tracking or flowing of sediment onto public right-of-way and paved driving lanes. This may require periodic top dressing with additional stone as conditions warrant. Repair of the entrances or cleaning of the right-of-way and paved driving lanes that have been soiled shall be performed by the contractor at his own expense satisfactory to the construction manager. When necessary, vehicle wheels and tires shall be cleaned to remove sediment prior to entering onto public right-of-way and public streets. When washing is required, it shall be done on an area stabilized with crushed stone.

7. The contractor shall at his own expense, periodically water the site to control dust.

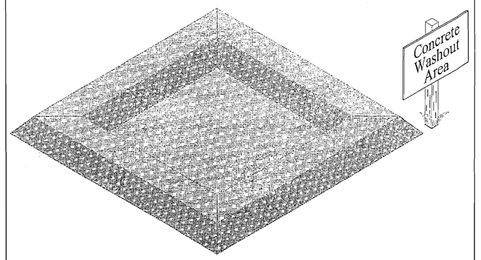
8. Sedimentation and erosion control measures shall be removed following construction or upon permanent stabilization of the disturbed and graded areas, whichever occurs last.

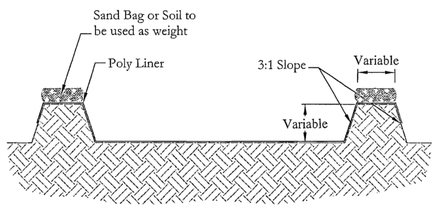
9. All disturbed areas that are not to be paved shall be re-seeded unless noted otherwise.

10. The contractor shall deep the site clean at all times and control dust resulting from the earthwork operation. The contractor shall not track mud onto the public streets.

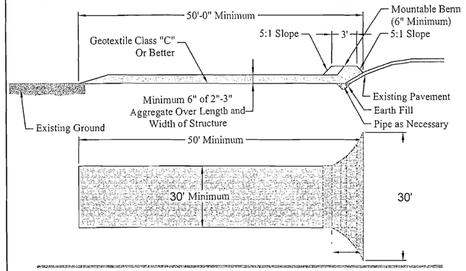
Concrete Washout Area

For use in High Water Table Areas





Stabilized Construction Entrance



Definition

A stabilized layer of aggregate that is underlain with Geotextile Class "C" (See Standards for Geotextile). Stabilized entrances are located at any point where traffic enters or leaves a construction site.

Purpose

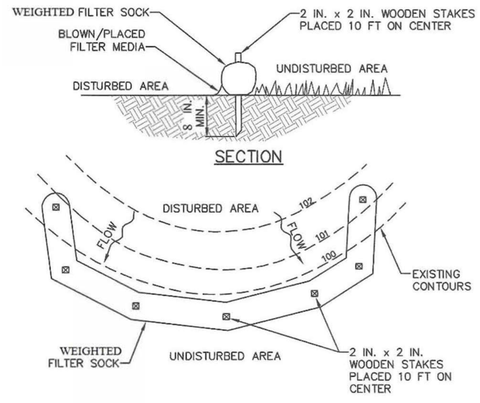
The purpose of the stabilized construction entrance is to reduce tracking of sediment onto streets or public rights-of-way and provide a stable area for entrance or exit from the construction site.

Conditions where the Practice Applies

1. Stabilized construction entrances shall be located at points of construction ingress and egress.
2. For single family residences, the entrance should be located at the permanent driveway.
3. Stabilized construction entrances should not be used on existing pavement.

Design Criteria

1. Length - Minimum of 50'-0"
2. Width - Minimum of 30'-0", should be flared at the existing road to provide a turning radius.
3. Geotextile Class "C" shall be placed over the exiting ground prior to placing stone. The Plan approval authority may not require geotextile fabric for single family residence.
4. Stone-crushed aggregate 2"-3" (See Standards for Geotextile and Rock). Recycled concrete equivalent may be used also. The rock should be placed at least 6" deep over the length and width of the entrance.
5. Surface Water - All the surface water flowing to or diverted toward construction entrances shall be piped under the entrance to maintain positive drainage. Pipe installed under the construction entrance shall be protected with a mountable berm. The pipe shall be sized according to the drainage, with the minimum diameter being 6".
6. Location - A stabilized construction entrance shall be located at every point where construction traffic enters or leaves a construction site. Vehicles leaving the site must travel over the entire length of the stabilized construction entrance.



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