CITY OF ALBUQUERQUE

Richard J. Berry, Mayor

March 2, 2017

Steven Morrow, P.E.
Molzen-Corbin & Associates
2701 Miles Road SE
Albuquerque, NM 87106

RE: **Aviation Center of Excellence Drainage Report**
Engineer's Stamp Date: 2/8/17
Hydrology File: M16D024N

Dear Mr. Morrow:

Based upon the information provided in your submittal received 2/8/17, the Drainage Report is not approved for Grading Permit. The following comments need to be addressed for approval of the above referenced project:

1. The first flush ponds need to be designed as part of these improvements. This information includes pond dimensions, bottom of pond, side slopes, maximum water surface elevation, and pond volume.

2. Waterblocks are necessary where the private roads meet public roads (Girard and Gibson).

It is Hydrology's understanding that these are low-speed, local roads, and the use of dip sections and curb cuts in accordance with standard drawing 2422 is acceptable. If you have any questions, please contact me at 924-3695 or dpeterson@cabq.gov.

Sincerely,

Dana Peterson, P.E.
Senior Engineer, Planning Dept.
Development Review Services

PO Box 1293

Albuquerque

New Mexico 87103

www.cabq.gov

Orig: Drainage File

City of Albuquerque

Planning Department

Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET (REV 09/2015)

Project Title: Aviation Center of Excellence Building Permit #: _____ City Drainage #: M16D024N

DRB#: 1000270 EPC#: 14EPC-40024 Work Order#: 751580

Legal Description: A portion of Tract A-1, Sunport Municipal Addition

City Address: Southeast Corner of Gibson Blvd. SE and Girard Blvd. SE

Engineering Firm: Molzen Corbin Contact: Steve Morrow

Address: 2701 Miles Road

Phone#: 505-242-5700 Fax#: _____ E-mail: smorrow@molzencorbin.com

Owner: City of Albuquerque Aviation Dept. Contact: Jim Hinde

Address: P.O. Box 1293

Phone#: _____ Fax#: _____ E-mail: JHinde@cabq.gov

Architect: _____ Contact: _____

Address: _____

Phone#: _____ Fax#: _____ E-mail: _____

Other Contact: _____ Contact: _____

Address: _____

Phone#: _____ Fax#: _____ E-mail: _____

Check all that Apply:

DEPARTMENT:

__X__ HYDROLOGY/ DRAINAGE

_____ TRAFFIC/ TRANSPORTATION

_____ MS4/ EROSION & SEDIMENT CONTROL

TYPE OF SUBMITTAL:

_____ ENGINEER/ ARCHITECT CERTIFICATION

_____ CONCEPTUAL G & D PLAN

_____ GRADING PLAN

_____ DRAINAGE MASTER PLAN

__X__ DRAINAGE REPORT

_____ CLOMR/LOMR

_____ TRAFFIC CIRCULATION LAYOUT (TCL)

_____ TRAFFIC IMPACT STUDY (TIS)

_____ EROSION & SEDIMENT CONTROL PLAN (ESC)

_____ OTHER (SPECIFY) _____

CHECK TYPE OF APPROVAL/ACCEPTANCE SOUGHT:

_____ BUILDING PERMIT APPROVAL

_____ CERTIFICATE OF OCCUPANCY

_____ PRELIMINARY PLAT APPROVAL

_____ SITE PLAN FOR SUB'D APPROVAL

_____ SITE PLAN FOR BLDG. PERMIT APPROVAL

_____ FINAL PLAT APPROVAL

_____ SIA/ RELEASE OF FINANCIAL GUARANTEE

_____ FOUNDATION PERMIT APPROVAL

__X__ GRADING PERMIT APPROVAL

_____ SO-19 APPROVAL

_____ PAVING PERMIT APPROVAL

_____ GRADING/ PAD CERTIFICATION

_____ WORK ORDER APPROVAL

_____ CLOMR/LOMR

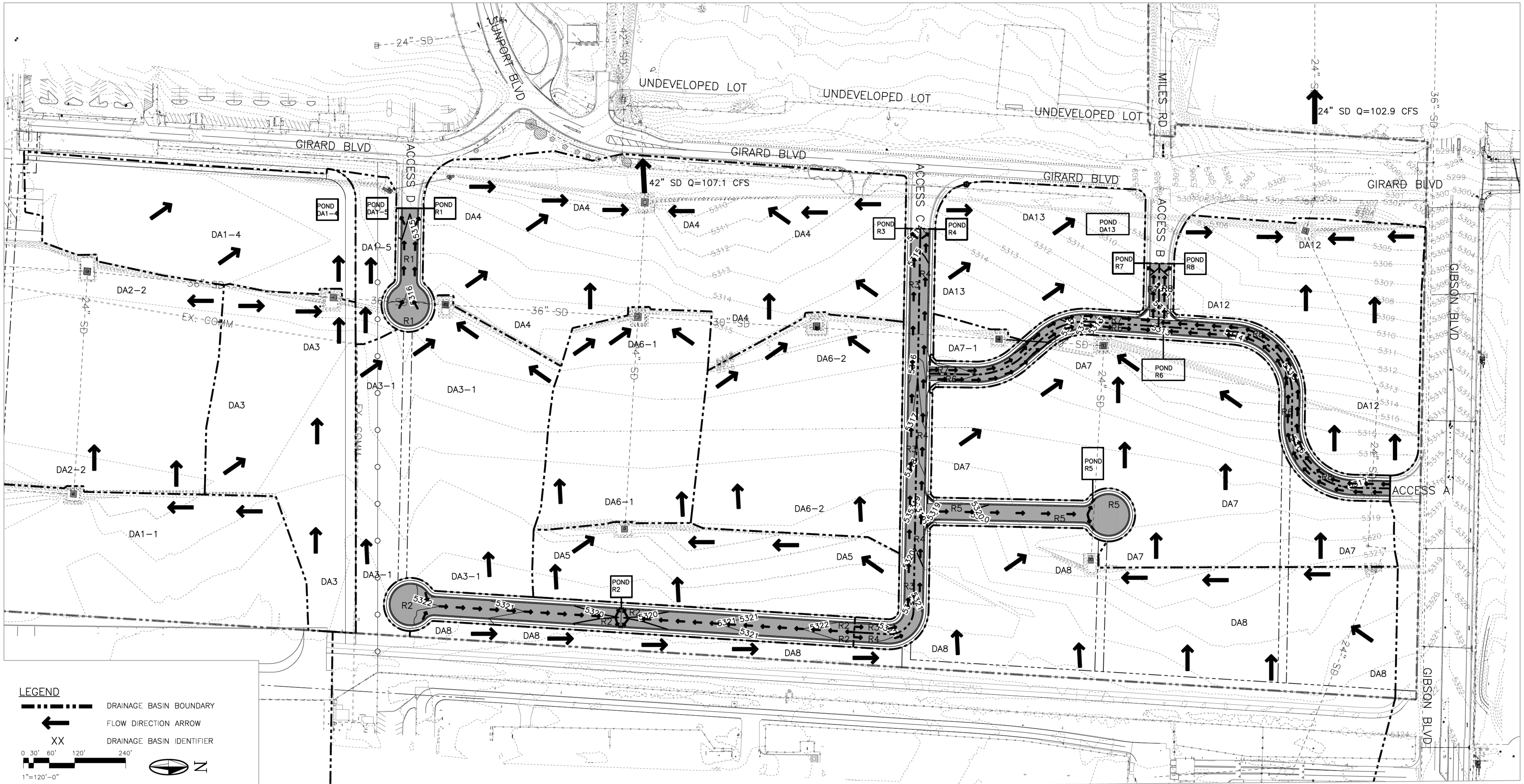
_____ PRE-DESIGN MEETING

_____ OTHER (SPECIFY) _____

IS THIS A RESUBMITTAL?: _____ Yes __X__ No

DATE SUBMITTED: 02-08-17 By: Steve Morrow

COA STAFF: ELECTRONIC SUBMITTAL RECEIVED: ___



PROJECT DESCRIPTION & SITE LOCATION:

THE ALBUQUERQUE INTERNATIONAL SUNPORT IS PLANNING TO DEVELOP 115 ACRES ON THE SITE OF DECOMMISSIONED RUNWAY 17–35 FOR COMMERCIAL, RETAIL, OFFICE, INDUSTRIAL, MANUFACTURING, WAREHOUSING, AND OFFICE USE. THE DEVELOPMENT OF THE AVIATION CENTER OF EXCELLENCE (ACE) WILL OCCUR IN 4 PHASES: 1. MASS DEMOLITION AND GRADING OF THE AREA WITHIN THE AIRFIELD. 2. PERIMETER ROAD IMPROVEMENTS ON GIBSON BLVD AND GIRARD BLVD. 3. THE UTILITY WORK FOR THE ENTIRE SITE. 4. THE DEVELOPMENT OF THE INTERIOR ROADS. THE INDIVIDUAL PLANNED LOTS WILL BE DEVELOPED AS THEY ARE LEASED.

THIS DRAINAGE REPORT IS FOR PHASE 4: THE INTERIOR ROAD IMPROVEMENTS THAT ARE TO BE COMPLETED FOR LEASED LOT ACCESS WITHIN THE ACE SITE. PROPOSED DRAINAGE IMPROVEMENTS ARE CONSISTENT WITH THE AVIATION CENTER OF EXCELLENCE MASTER DRAINAGE PLAN APPROVED 1–15–16 (FILE: M16D024N).

HYDROLOGIC CRITERIA:

THE HYDROLOGIC CRITERIA FOR THIS DRAINAGE REPORT IS THE CITY OF ALBUQUERQUE DEVELOPMENT PROCESS MANUAL (DPM). HYDROLOGIC CALCULATIONS WERE BASED ON THE 100YR, 24HR STORM. PRECIPITATION DATA WAS USED FROM THE DPM, WITH THE SITE LOCATION BEING CONSIDERED AS ZONE 2. 100 YEAR, 24 HOUR, STORM AS REQUIRED BY ALBUQUERQUE INTERNATIONAL AIRPORT DRAINAGE MASTER PLAN.

EXISTING CONDITIONS:

THE EXISTING SITE HAS BEEN PREVIOUSLY GRADED IN PHASE 1 TO DIRECT RUNOFF TO THE EXISTING INLETS WITHIN THE SITE VIA SOIL SWALES. THE INLETS HAVE SEDIMENTATION BASINS TO CAPTURE SEDIMENT BEFORE ENTERING THE STORM SYSTEM. THE INLETS SOUTH OF MILES RD WILL ROUTE IT TO THE 42" SYSTEM. THAT SYSTEM OUTFALLS INTO THE KIRTLAND CHANNEL AND EVENTUALLY THE SOUTH DIVERSION CHANNEL. THE NORTHERN INLETS NEAR GIBSON BLVD, DRAIN TO A 24" SYSTEM THAT EVENTUALLY CONNECTS TO THE GIBSON BLVD STORM SYSTEM NEAR COLUMBIA BLVD. THE FINAL OUTFALL OF THE GIBSON BLVD STORM SYSTEM IS GENEVA'S ARROYO, AND TERMINATES IN THE SOUTH DIVERSION CHANNEL

DEVELOPED CONDITIONS:

PHASE 4 WILL CONSTRUCT THE INTERIOR ROADS FOR THE ACE DEVELOPMENT. ALL ROAD RUNOFF WILL BE INTERCEPTED ON SITE AND PONDED ONSITE, OR ROUTED THROUGH A SEDIMENTATION BASIN TO THE EXISTING STORM DRAIN NETWORK. THE ROADS ARE SHOWN IN THE ABOVE BASIN MAP. THE ROADS WILL HAVE TYPE C INLETS BUILT TO DRAIN THE ROADS. THESE INLETS WILL OUTFALL TO A POND NEAR THE INLET LOCATION SHOWN ON THE BASIN MAP. THIS IS TO ALLOW FOR FUTURE FLEXIBILITY OF THE ENTIRE SYSTEM. WHERE INTERIOR ROADS ARE CONNECTING TO GIRARD OR GIBSON, RUNDOWNS WILL BE CONSTRUCTED TO INTERCEPT AND DIVERT RUNOFF SO IT DOES NOT EXIT THE SITE. THE EXISTING BASINS WILL BE CHANGED BY CONSTRUCTION OF THE INTERIOR ROADS. THESE BASINS WILL HAVE NEW PONDING LOCATIONS OR GRADED TO A NEW INLET AS SHOWN ON THE BASIN MAP.

REFER TO THIS SHEET FOR PROPOSED BASIN LOCATIONS. SEE GRADING AND DRAINAGE SHEET FOR INLET LOCATIONS. THESE NEW INLETS MUST BE MAINTAINED TO OPERATE AS DESIGNED IN THIS REPORT.

Basin	Area (ac)	Q(24 hr) (cfs)	V(24 hr) (cf)	Inlet Allow Q (CFS)	Q from Pond (CFS)
R1	0.54	2.30	4,334.7	12.00	0.00
R2	1.89	8.11	15,291.1	12.00	0.00
R3	0.85	3.63	6,851.3	12.00	0.00
R4	0.86	3.74	7,069.8	12.00	0.00
R5	0.79	3.40	6,393.0	12.00	0.00
R6	0.96	4.06	7,618.3	12.00	0.00
R7	0.51	2.17	4,096.8	12.00	0.00
R8	0.65	2.76	5,180.2	12.00	0.00
DA1–4	4.61	14.43	18,902.5	0.00	0.00
DA1–5	0.78	2.46	3,217.9	0.00	0.00
DA3	4.73	14.82	19,411.2	22.00	14.82
DA3–1	6.45	20.20	26,469.6	22.00	20.20
DA4	9.98	31.23	40,917.5	22.00	22.00
DA5	3.64	11.38	14,914.4	22.00	11.38
DA6–1	4.01	12.55	16,445.1	22.00	12.50
DA6–2	5.24	16.40	21,484.1	22.00	16.40
DA7–1	0.36	1.12	1,464.9	22.00	1.12
DA7	5.24	16.40	21,484.1	22.00	16.40
DA8	8.96	28.06	36,763.5	22.00	22.00
DA12	3.54	11.07	14,500.6	22.00	11.07
DA13	5.42	16.98	22,247.1	0.00	0.00

MOLZENCORBIN
2701 Miles Road SE Albuquerque, New Mexico 87106

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING DEVELOPMENT GROUP

TITLE: SUNPORT ACE GIBSON AND GIRARD IMPROVEMENTS

PROPOSED BASIN MAP AND DRAINAGE REPORT

Design Review Committee	City Engineer Approval	Last Design Update	Mo./Day/Yr.	Mo./Day/Yr.

City Project No.	Zone Map No.	Sheet X Of X
770081	M-16	G-006

AS BUILT INFORMATION
CONTRACTOR / WORK STAKED BY / INSPECTOR'S ACCEPTANCE BY / FIELD VERIFICATION BY / DRAWINGS CORRECTED BY — DATE

MICRO-FILM INFORMATION
RECORDED BY — DATE — NO.

BENCH MARKS
19-L16 – 3 1/4 INCH ALUMINUM DISC N=479188.5779, E=532270.698, EL=5297.51
14-L17 – 3 1/4 INCH ALUMINUM DISC N=480697.724 E=534906.820
NAD 83 NAVD 88 – CENTRAL ZONE

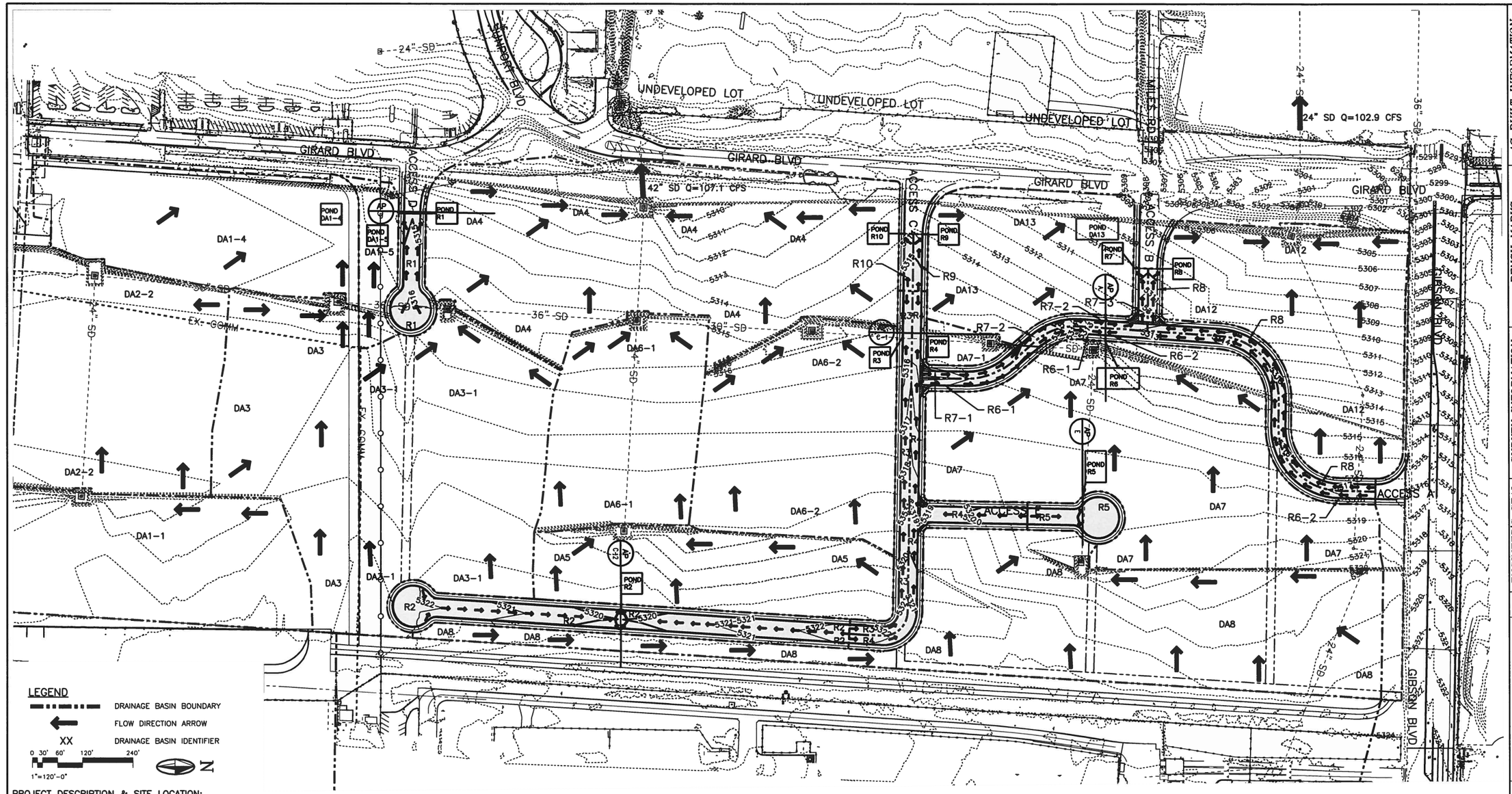
SURVEY INFORMATION
FIELD NOTES
NO. BY DATE

ENGINEER'S SEAL
STEVEN K. MORROW NEW MEXICO 13679 PROFESSIONAL ENGINEER
2-8-17

NO.	DATE	REMARKS	BY
		REVISIONS	
		DESIGN	

DESIGNED BY SM / RD DATE FEB. 2017
DRAWN BY RD DATE FEB. 2017
CHECKED BY SM DATE FEB. 2017

GAB-006 2/8/17 1:1



LEGEND

- DRAINAGE BASIN BOUNDARY
- FLOW DIRECTION ARROW
- XX DRAINAGE BASIN IDENTIFIER

0 30' 60' 120' 240'

1"=120'-0"

N

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Basin	Area (ac)	Q(24 hr) (cfs)	V(24 hr) (cf)	90th % V(CF)	Inlet Cap. Q (CFS)	Pond Q out (CFS)
R1	0.54	2.30	4,334.7	713.0	12.00	0.00
R2	1.89	8.11	15,291.1	2,514.6	12.00	0.00
R3	0.74	3.16	5,964.3	980.5	12.00	0.00
R4	1.14	4.93	9,325.6	1,540.5	12.00	0.00
R5	0.45	1.94	3,656.8	602.4	12.00	0.00
R6–1	0.34	1.43	2,684.4	437.6	12.00	0.00
R6–2	0.62	2.63	4,932.6	800.8	12.00	0.00
R7–1	0.18	0.78	1,463.7	239.4	12.00	0.00
R7–2	0.19	0.81	1,532.7	252.4	12.00	0.00
R7–3	0.17	0.74	1,398.7	233.6	12.00	0.00
R8	0.65	2.76	5,180.2	846.3	12.00	0.00
R9	0.11	0.47	886.7	145.6	0.00	0.00
R10	0.11	0.47	887.1	145.7	0.00	0.00
DA1–4	4.61	14.43	18,902.5	–	0.00	0.00
DA1–5	0.78	2.46	3,217.9	–	0.00	0.00
DA3	4.73	14.82	19,411.2	–	22.00	14.82
DA3–1	6.45	20.20	26,469.6	–	22.00	20.20
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DA6–2	5.24	16.40	21,484.1	–	22.00	16.40
DA7	0.36	1.12	1,464.9	–	22.00	1.12
DA7–1	5.24	16.40	21,484.1	–	22.00	16.40
DA8	8.96	28.06	36,763.5	–	22.00	22.00
DA12	3.54	11.07	14,500.6	–	22.00	11.07
DA13	5.42	16.98	22,247.1	–	0.00	0.00

STREET		
Analysis Point	Carrying Cap. CFS	Q Calc. CFS
A	6.75	2.76
C–1	15.45	4.93
C–2	11.32	4.06
D	9.05	1.15
E	7.00	0.87

$V_{FIRST\ FLUSH} = \frac{0.44\ IN}{12(IN/FT)} \times AREA_{LAND\ TREATMENT\ D}$

$V_{FIRST\ FLUSH} = 9{,}452.6\ CF$

AS BUILT INFORMATION

CONTRACTOR
WORK PERFORMED BY — DATE
INSPECTION & ACCEPTANCE BY — DATE
VERIFICATION BY — DATE
DRAWINGS DESIGNED BY — DATE

MICRO–FILM INFORMATION
RECORDED BY — DATE
NO.

BENCH MARKS
19–L16 – 3 1/4 INCH ALUMINUM DISC
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N=480697.724 E=534906.820
NAD 83 NAVD 88 – CENTRAL ZONE

SURVEY INFORMATION
FIELD NOTES

NO.	BY	DATE

ENGINEER'S SEAL

PRELIMINARY NOT FOR CONSTRUCTION

NO.	DATE	REMARKS	BY
		REVISIONS	
		DESIGN	
		DESIGNED BY SM / RD	DATE FEB. 2017
		DRAWN BY RD	DATE FEB. 2017
		CHECKED BY SM	DATE FEB. 2017

MOLZENCORBIN
2701 Miles Road SE Albuquerque, New Mexico 87106

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING DEVELOPMENT GROUP

TITLE: SUNPORT ACE SITE ROADWAYS AND UTILITIES IMPROVEMENTS

PROPOSED BASIN MAP
AND DRAINAGE REPORT

Design Review Committee	City Engineer Approval	Last Design Update	Mo./Day/Yr.	Mo./Day/Yr.

City Project No.	Zone Map No.	Sheet X Of X
751581	M-16	G-006

GAB–DRAX 2/10/17 1:1

Access A East Street Calculations: Analysis Point A

$$y = z\left(\frac{QnS_x}{S^{1/2}}\right)^{3/8}$$

Equation 10-1

where:

y = depth of water in the curb and gutter cross section (ft. or m)

Q = gutter flow rate (cfs or m^3/s)

n = Manning's roughness coefficient

S = longitudinal slope (ft./ft. or m/m)

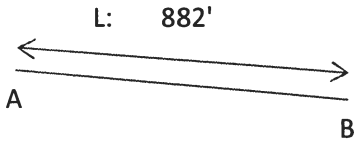
S_x = pavement cross slope = 1/x (ft./ft. or m/m)

z = 1.24 for English measurements or 1.443 for metric.

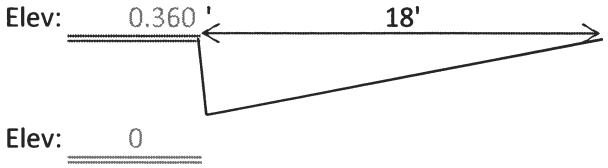
The table below presents suggested Manning's "n" values for various pavement surfaces. Department recommendation for design is the use of the rough texture values.

Mannings, z:	1.24	(U.S.)
Flow Capacity, Q:	2.73	CFS (R6-2)
Mannings #, n:	0.017	
Slope, S:	0.0058	FT/FT
Pvmt. Cross Slope, Sx:	0.02	FT/FT
Solving for Depth, y=	0.23749	ft
Converting y, y=	2.85	IN
18'*.02(x-slope)=	0.36	FT

Channel Profile



Channel Section



Length:	881.61 feet	Channel Width:	18 feet
Elev. A :	5317.65 feet	Depth:	0.36 feet
Elev. B :	5312.62 feet	Area:	3.24 ft. sq.
Δ Elev. :	5.03 feet	Wetted Perimeter:	18.36 feet
Slope:	0.005707 ft/ft	Hydraulic Radius, R:	0.176436 feet
		Looked up coefficient, n:	0.017

$$Q = VA = \left(\frac{1.49}{n}\right)AR^{\frac{2}{3}}\sqrt{S} \quad [U.S.]$$ Flow Capacity, Q: 6.75 CFS

Access A North West Street Calculations: Analysis Point A

$$y = z\left(\frac{QnS_x}{S^{1/2}}\right)^{3/8}$$

Equation 10-1

where:

y = depth of water in the curb and gutter cross section (ft. or m)

Q = gutter flow rate (cfs or m^3/s)

n = Manning's roughness coefficient

S = longitudinal slope (ft./ft. or m/m)

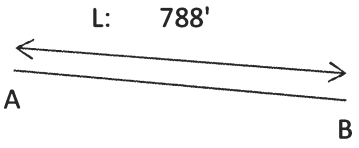
S_x = pavement cross slope = 1/x (ft./ft. or m/m)

z = 1.24 for English measurements or 1.443 for metric.

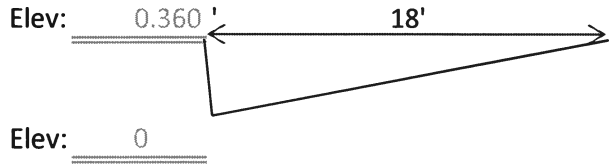
The table below presents suggested Manning's "n" values for various pavement surfaces. Department recommendation for design is the use of the rough texture values.

Mannings, z:	1.24	(U.S.)
Flow Capacity, Q:	2.76	CFS (R8)
Mannings #, n:	0.017	
Slope, S:	0.0049	FT/FT
vmt. Cross Slope, Sx:	0.02	FT/FT
Solving for Depth, y=	0.246125	ft
Converting y, y=	2.95	IN
18'*.02(x-slope)=	0.36	FT

Channel Profile



Channel Section



Length:	788.47 feet	Channel Width:	18 feet
Elev. A :	5317.65 feet	Depth:	0.36 feet
Elev. B :	5313.14 feet	Area:	3.24 ft. sq.
Δ Elev. :	4.51 feet	Wetted Perimeter:	18.36 feet
Slope:	0.005716 ft/ft	Hydraulic Radius, R:	0.176436 feet
		Looked up coefficient, n:	0.017

$$Q = VA = \left(\frac{1.49}{n}\right)AR^{\frac{2}{3}}\sqrt{S} \quad [U.S.]$$ Flow Capacity, Q: 6.75 CFS

Access C North Street Calculations: Analysis Point C-1

$$y = z\left(\frac{QnS_x}{S^{1/2}}\right)^{3/8}$$

Equation 10-1.

where:

y = depth of water in the curb and gutter cross section (ft. or m)

Q = gutter flow rate (cfs or m^3/s)

n = Manning's roughness coefficient

S = longitudinal slope (ft./ft. or m/m)

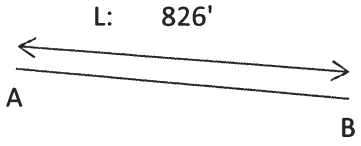
S_x = pavement cross slope = 1/x (ft./ft. or m/m)

z = 1.24 for English measurements or 1.443 for metric.

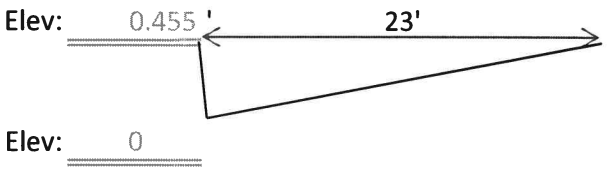
The table below presents suggested Manning's "n" values for various pavement surfaces. Department recommendation for design is the use of the rough texture values.

Mannings, z:	1.24	(U.S.)
Flow Capacity, Q:	4.93	CFS (R4)
Mannings #, n:	0.017	
Slope, S:	0.0093	FT/FT (C-207)
Pvmt. Cross Slope, Sx:	0.02	FT/FT
Solving for Depth, y=	0.271302	ft
Converting y, y=	3.26	IN
22.75'*.02(x-slope)=	0.455	FT

Channel Profile



Channel Section



Length:	826.03 feet	Channel Width:	22.75 feet
Elev. A :	5322.57 feet	Depth:	0.455 feet
Elev. B :	5315.48 feet	Area:	5.175625 ft. sq.
Δ Elev. :	7.09 feet	Wetted Perimeter:	23.21 feet
Slope:	0.008583 ft/ft	Hydraulic Radius, R:	0.222995 feet
		Looked up coefficient, n:	0.017

$$Q = VA = \left(\frac{1.49}{n}\right)AR^{\frac{2}{3}}\sqrt{S} \quad [U.S.]$$ Flow Capacity, Q: 15.45 CFS

Access C South Street Calculations: Analysis Point C-1

$$y = z\left(\frac{QnS_x}{S^{1/2}}\right)^{3/8}$$

Equation 10-1.

where:

y = depth of water in the curb and gutter cross section (ft. or m)

Q = gutter flow rate (cfs or m^3/s)

n = Manning's roughness coefficient

S = longitudinal slope (ft./ft. or m/m)

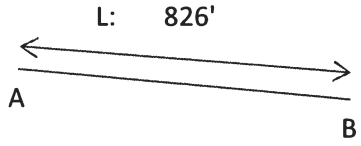
S_x = pavement cross slope = 1/x (ft./ft. or m/m)

z = 1.24 for English measurements or 1.443 for metric.

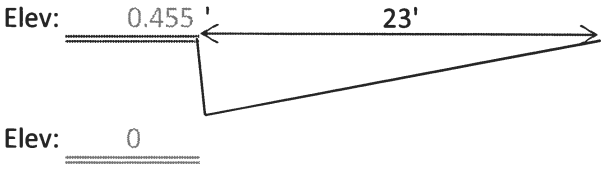
The table below presents suggested Manning's "n" values for various pavement surfaces. Department recommendation for design is the use of the rough texture values.

Mannings, z:	1.24	(U.S.)
Flow Capacity, Q:	3.16	CFS (R3)
Mannings #, n:	0.017	
Slope, S:	0.0093	FT/FT (C-207)
Pvmt. Cross Slope, Sx:	0.02	FT/FT
Solving for Depth, y=	0.229625	ft
Converting y, y=	2.76	IN
22.75'*.02(x-slope)=	0.455	FT

Channel Profile



Channel Section



Length:	826.03 feet	Channel Width:	22.75 feet
Elev. A :	5322.57 feet	Depth:	0.455 feet
Elev. B :	5315.48 feet	Area:	5.175625 ft. sq.
Δ Elev. :	7.09 feet	Wetted Perimeter:	23.21 feet
Slope:	0.008583 ft/ft	Hydraulic Radius, R:	0.222995 feet
		Looked up coefficient, n:	0.017

$$Q = VA = \left(\frac{1.49}{n}\right)AR^{\frac{2}{3}}\sqrt{S} \quad [U.S.]$$ Flow Capacity, Q: 15.45 CFS

Access C South Street Calculations: Analysis Point C-2

$$y = z\left(\frac{QnS_x}{S^{1/2}}\right)^{3/8}$$

Equation 10-1.

where:

y = depth of water in the curb and gutter cross section (ft. or m)

Q = gutter flow rate (cfs or m^3/s)

n = Manning's roughness coefficient

S = longitudinal slope (ft./ft. or m/m)

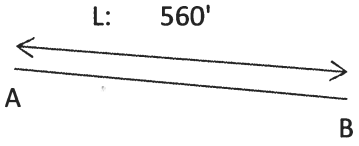
S_x = pavement cross slope = 1/x (ft./ft. or m/m)

z = 1.24 for English measurements or 1.443 for metric.

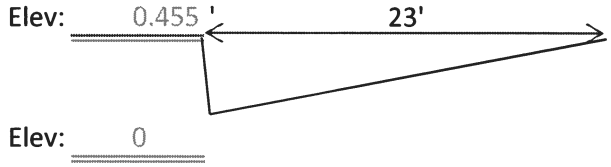
The table below presents suggested Manning's "n" values for various pavement surfaces. Department recommendation for design is the use of the rough texture values.

Mannings, z:	1.24	(U.S.)
Flow Capacity, Q:	2.03	CFS (R8/4)
Mannings #, n:	0.017	
Slope, S:	0.005	FT/FT (C-207)
Pvmt. Cross Slope, Sx:	0.02	FT/FT
Solving for Depth, y=	0.218414	ft
Converting y, y=	2.62	IN
22.75'*.02(x-slope)=	0.455	FT

Channel Profile



Channel Section



Length:	559.89 feet	Channel Width:	22.75 feet
Elev. A :	5322.57 feet	Depth:	0.455 feet
Elev. B :	5319.99 feet	Area:	5.175625 ft. sq.
Δ Elev. :	2.58 feet	Wetted Perimeter:	23.21 feet
Slope:	0.004608 ft/ft	Hydraulic Radius, R:	0.222995 feet
		Looked up coefficient, n:	0.017

$$Q = VA = \left(\frac{1.49}{n}\right)AR^{\frac{2}{3}}\sqrt{S} \quad [U.S.]$$ Flow Capacity, Q: 11.32 CFS

Access C South Street Calculations: Analysis Point C-2

$$y = z\left(\frac{QnS_x}{S^{1/2}}\right)^{3/8}$$

Equation 10-1.

where:

y = depth of water in the curb and gutter cross section (ft. or m)

Q = gutter flow rate (cfs or m^3/s)

n = Manning's roughness coefficient

S = longitudinal slope (ft./ft. or m/m)

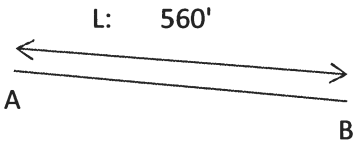
S_x = pavement cross slope = 1/x (ft./ft. or m/m)

z = 1.24 for English measurements or 1.443 for metric.

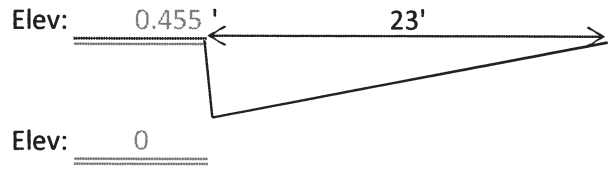
The table below presents suggested Manning's "n" values for various pavement surfaces. Department recommendation for design is the use of the rough texture values

Mannings, z:	1.24	(U.S.)
Flow Capacity, Q:	4.06	CFS (R2/2)
Mannings #, n:	0.017	
Slope, S:	0.005	FT/FT (C-207)
Pvmt. Cross Slope, Sx:	0.02	FT/FT
Solving for Depth, y=	0.283247	ft
Converting y, y=	3.40	IN
22.75'*.02(x-slope)=	0.455	FT

Channel Profile



Channel Section



Length:	559.89 feet	Channel Width:	22.75 feet
Elev. A :	5322.57 feet	Depth:	0.455 feet
Elev. B :	5319.99 feet	Area:	5.175625 ft. sq.
Δ Elev. :	2.58 feet	Wetted Perimeter:	23.21 feet
Slope:	0.004608 ft/ft	Hydraulic Radius, R:	0.222995 feet
		Looked up coefficient, n:	0.017

$$Q = VA = \left(\frac{1.49}{n}\right)AR^{\frac{2}{3}}\sqrt{S} \quad [U.S.]$$ Flow Capacity, Q: 11.32 CFS

Access C South Street Calculations: Analysis Point D

$$y = z\left(\frac{QnS_x}{S^{1/2}}\right)^{3/8}$$

Equation 10-1.

where:

y = depth of water in the curb and gutter cross section (ft. or m)

Q = gutter flow rate (cfs or m^3/s)

n = Manning's roughness coefficient

S = longitudinal slope (ft./ft. or m/m)

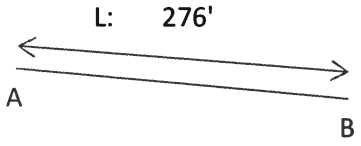
S_x = pavement cross slope = 1/x (ft./ft. or m/m)

z = 1.24 for English measurements or 1.443 for metric.

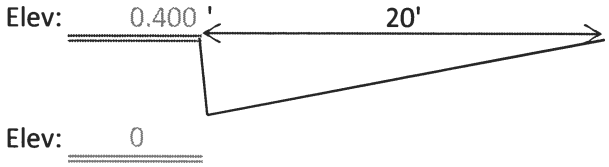
The table below presents suggested Manning's "n" values for various pavement surfaces. Department recommendation for design is the use of the rough texture values.

Mannings, z:	1.24	(U.S.)
Flow Capacity, Q:	1.15	CFS (R1/2)
Mannings #, n:	0.017	
Slope, S:	0.0059	FT/FT (C-207)
Pvmt. Cross Slope, Sx:	0.02	FT/FT
Solving for Depth, y=	0.17118	ft
Converting y, y=	2.05	IN
20'*.02(x-slope)=	0.4	FT

Channel Profile



Channel Section



Length:	276.06 feet	Channel Width:	20 feet
Elev. A :	5316.54 feet	Depth:	0.4 feet
Elev. B :	5314.92 feet	Area:	4 ft. sq.
Δ Elev. :	1.62 feet	Wetted Perimeter:	20.40 feet
Slope:	0.005854 ft/ft	Hydraulic Radius, R:	0.19604 feet
		Looked up coefficient, n:	0.017

$$Q = VA = \left(\frac{1.49}{n}\right)AR^{\frac{2}{3}}\sqrt{S} \quad [U.S.]$$ Flow Capacity, Q: 9.05 CFS

Access C South Street Calculations: Analysis Point E

$$y = z\left(\frac{QnS_x}{S^{1/2}}\right)^{3/8}$$

Equation 10-1.

where:

y = depth of water in the curb and gutter cross section (ft. or m)

Q = gutter flow rate (cfs or m^3/s)

n = Manning's roughness coefficient

S = longitudinal slope (ft./ft. or m/m)

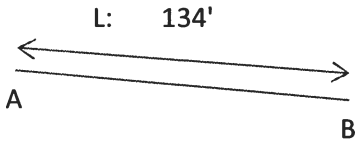
S_x = pavement cross slope = 1/x (ft./ft. or m/m)

z = 1.24 for English measurements or 1.443 for metric.

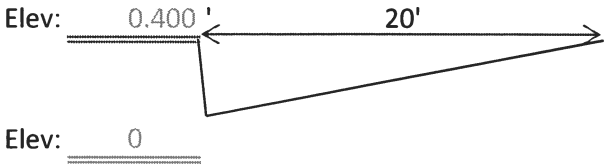
The table below presents suggested Manning's "n" values for various pavement surfaces. Department recommendation for design is the use of the rough texture values.

Mannings, z:	1.24	(U.S.)
Flow Capacity, Q:	0.97	CFS (R5/2)
Mannings #, n:	0.017	
Slope, S:	0.0052	FT/FT (C-207)
Pvmt. Cross Slope, Sx:	0.02	FT/FT
Solving for Depth, y=	0.164443	ft
Converting y, y=	1.97	IN
20*.02(x-slope)	0.4	FT

Channel Profile



Channel Section



Length:	134.17 feet	Channel Width:	20 feet
Elev. A :	5320.92 feet	Depth:	0.4 feet
Elev. B :	5320.45 feet	Area:	4 ft. sq.
Δ Elev. :	0.47 feet	Wetted Perimeter:	20.40 feet
Slope:	0.003503 ft/ft	Hydraulic Radius, R:	0.19604 feet
		Looked up coefficient, n:	0.017

$$Q = VA = \left(\frac{1.49}{n}\right)AR^{\frac{2}{3}}\sqrt{S} \quad [U.S.]$$ Flow Capacity, Q: 7.00 CFS