FINAL
DRAINAGE REPORT

WILDWOOD ACRES SUBDIVISION
FILING THREE

FRUITA, COLORADO

PREPARED FOR:

FRUITA WILDWOOD, LLC
710 South 15TH Street
Grand Junction, CO 81501
(970) 242-8134

PREPARED BY:

VISTA ENGINEERING CORP.
605 28 1/4 Road, Suite B
Grand Junction, CO 81506
(970) 243-2242

Revised: September 24, 2004

VEC # 4010.03-01

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CERTIFICATION

I hereby certify that this Final Drainage Report for Wildwood Acres Subdivision, Filing Three, was prepared under my direct supervision.

COLORADO REGISTERED
FREDRICK L. LARSEN
34866
PROFESSIONAL ENGINEER

9/20/04

Fredrick L. Larsen
Registered Professional Engineer
State of Colorado, #34866

TABLE OF CONTENTS

FINAL DRAINAGE REPORT
WILDWOOD ACRES SUBDIVISION, FILING THREE

I. LOCATION AND DESCRIPTION OF PROPERTY

PROPERTY LOCATION

Wildwood Acres Subdivision, in entirety, contains approximately 46.36 acres and is located in the City of Fruita, Colorado, between 17 ½ and 18 Roads, south of K 6/10 Road. The project ultimately proposes a total of 137 single family lots. Filing 1 (existing) consists of 14 lots, including a large lot encompassing a home along 18 Road and filing 2 (existing) consists of 64 lots. Filing 3 proposes 59 lots. The site is currently zoned "Community Residential" as is all surrounding property. The final plan shows the location of the property in relationship to the surrounding vicinity.

Existing streets in the vicinity include 18 Road to the east, 17 ½ Road to the west, and K 6/10 Road to the north. A system of urban residential streets is proposed to run through the project providing access and utility corridors in three directions. These streets will create a connection between two designated collectors (17 ½ Road and 18 Road) through existing Wildwood Estates and Hall Minor Subdivisions. A third connection is proposed to extend through another development to the north, ultimately connecting to K 6/10 Road. A walking trail and pedestrian bridge is anticipated to be constructed by the City (during future filings) below the banks of the Little Salt Wash and for connection to Little Salt Wash Park (a 23 acre community park currently under development by the City of Fruita on the property adjacent to the southeast border of the site). The surrounding land uses in the vicinity include single family dwellings on subdivided tracts and scattered undeveloped residential/rural lands on larger tracts.

DESCRIPTION OF PROPERTY

The site currently contains completed infrastructure for Filing 1, located in the southwest corner, and includes a residential structure in the southeast corner along 18 Road. Filing 2 infrastructure construction is underway. Previously, the site was in an agricultural utilization with fields of irrigated livestock pasture. It was recently taken out of agricultural production to eliminate flood-irrigation which can impede the installation of underground utilities. An open drain ditch (The Denton Drain) borders the property on the north, but is contained within the adjacent property. Runoff from the north is thereby intercepted by this drain ditch. The Little Salt Wash borders the property on the south. Hall Minor Subdivision lies between the eastern boundary and 18 Road. Wildwood Estates Subdivision is adjacent to the west, between the west boundary and 17 ½ Road. Topography of the property is relatively "level" in nature, sloping generally to the west and to the southwest at an average rate of less than one percent. Based on the "Soil Survey, Grand Junction Area" (by the USDA Soil Conservation Service Series 1940, No. 19), the on-site soils are described as mainly Ravola fine sandy loam(Rc) and Ravola clay loam (Ra) with smaller areas of Billings silty clay loam (Bc) and Fruita very fine sandy loam (Fp) on 0-2% slopes. These soils are defined mainly within the hydrological soils group "B" having a moderate infiltration rate and moderate to low runoff potential.

II. EXISTING DRAINAGE CONDITIONS

MAJOR BASIN

Wildwood Acres is located within the Little Salt Wash Drainage Basin which consists of approximately 60 square miles situated between the other major watersheds of Adobe Creek and Big Salt Wash. Headwaters for this basin begin in Hunter Canyon on the south face of the Bookcliffs and eventually drain to the Colorado River near 17 ½ Road after passing through the northern and western portions of the current City Limits. A map of this basin is included in the appendix.

A defined floodplain exists along Little Salt Wash, however no Wildwood Acres residential lots are proposed within this 100 year floodplain as delineated by the July 15, 1992 Flood Insurance Rate Maps produced by FEMA (partial copy enclosed in the Appendix). These lots are also outside of the Zone "X" area of the 500 year flood. This was determined by a comparison of the flood contours provided in the FEMA mapping with the ground contours established during topographic mapping of the site during the design phase of this project. After adjustment of vertical datums for both sources, it can be seen that the 100 year flood level is well below the north top-of-bank. This top-of-bank was defined during the data collection for the topo survey and generally used to establish the southern property boundary for the lots along the wash. The area between this lot-line and the center of the wash is a tract of ground which will be dedicated to the City of Fruita for use as a conservation easement and pathway for pedestrian access along Little Salt Wash.

SITE

Currently, the property is partially developed with Filing 1 infrastructure complete and filing 2 underway and housing construction beginning for several lots. The undeveloped portions of the property were recently in an agricultural utilization and drain in a sheet-flow fashion from east to west at an average slope of approximately 0.8 percent. Runoff from the site is collected by streets existing in the recently constructed first filing. These streets collect and carry on-site runoff to the existing storm sewer in Hall Street where it then drains directly into the Little Salt Wash.

OFF-SITE IMPACTS TO THE SITE

An open drain ditch (The Denton Drain) borders the property on the north, but is contained within the adjacent property (currently in the planning stage of development). Runoff from the north is thereby intercepted by this drain ditch. Runoff from the east is diverted by the existing residential development (Hall Minor Subdivision) and by the existing pavement crown of 18 Road. Because of the elevated roadway surface of 18 Road to the east and the large open drain ditch (Denton Drain) along the north, no offsite impacts are created for the site by areas north or east of these boundaries draining directly onto the site. Agreements with the Grand Junction Drainage District, however, require a redirection of the Denton Drain, near the north-central region of the project. This redirection will intercept runoff from the upper Denton Drain basin consisting of approximately 124 acres. The storm sewer proposed in Dean Court and Doug Court will thereby serve to drain both the northeast portions of the site and the upper Denton Drain.

III. PROPOSED DRAINAGE CONDITIONS

CHANGES IN DRAINAGE PATTERNS

No substantial change in the released drainage pattern is proposed for the site. Drainage patterns within the site will be modified to accommodate development and to better control surface flows to designated collection areas. The developed site will consist of two main basins (A and B) discharging to the south directly into the Little Salt Wash, and one other basin (C) which will discharge into Denton Drain, but then be intercepted and directed to the south, through the subdivision, into the wash along with other upstream Denton flows. Un-detained flows will follow the same path as they do now, traveling southwest into the Colorado River. Two of the three developed basins are divided into several sub-basins to determine flows to the proposed storm inlets. These calculated flows are shown in the appendix. The main storm sewer along Hall Street (the westernmost street) is necessary to carry developed flows south to the wash to reduce accumulated flows on the roadway surface and comply with storm water criteria for maximum allowable half-street flows. This street parallels existing contours and would have been difficult to grade entirely to the south. A series of low points was, therefore, designed along the roadway to provide inlets for the storm sewer and eliminate street accumulation. Overall, the roadway is sloped slightly to the south to provide an emergency release route for surface drainage should the proposed storm sewer fail. The drain pipe is, however, designed to carry the 100 year runoff below the surface of the street.

Detailed design information is included for storm sewers within Filings 1, 2, and 3 for this report. Runoff directions and quantities are calculated and indicated on the storm water management plan in the appendix. Discussions with the Grand Junction Drainage District indicate a desire to divert existing flows from the Denton Drain (near it's 90 degree turn to the west) southward through the development and into the Little Salt Wash. This is proposed to be accomplished by routing a diversion pipeline along the property lines (in established easements) the property lines (in established easements) and roadways of this filing almost directly south to the wash while utilizing the same pipeline for discharge of the developed runoff in that particular area (Basin C, consisting of developed Basins 6 & 7). Pipe sizing is provided in this design.

OFFSITE IMPACTS FROM THE SITE

Runoff impacts from this site to downstream properties should not be adverse given the storm water management concept proposed. Site runoff will be intercepted and prevented from sheet flowing off the site to the west by proposed streets, storm sewers, and elevated building site areas along the western boundary. Direct-discharge is recommended by the Storm water Management Master Plan for the City of Fruita (June, 1998) for developments discharging to the Little Salt Wash. This project is in accordance with this recommendation which was developed to discharge surface runoff from sites located within the lower portions of the major basin prior to arrival of larger flows developed upstream in the majority of the watershed. In addition, development of this site will provide a storm drain "interceptor" which will divert upstream flows from the existing Denton Drain, through the project, and into Little Salt Wash, thereby providing a reduction of flows to the lower reaches of the Denton Drain.

MAINTENANCE

Access to the storm water management facility will be by existing streets and platted tracts and easements as required. The home owners will provide maintenance responsibility for the surface improvements related to the facility. Operation and maintenance of the underground storm sewers will be the responsibility of the City of Fruita.

IV. DRAINAGE DESIGN CRITERIA AND APPROACH

REGULATIONS

The City of Grand Junction and Mesa County Storm water Management (SWM) Manual (May 1996) was used as the basis for analysis and facility design criteria. Also utilized was information from the Storm water Management Master Plan (June, 1998) written for the City of Fruita. Surrounding developments have been approved and constructed within the guidelines of the SWM manual, as will this development, to assure minimal impacts to the downstream properties. Haestad Methods software ("Pondpack" and "Flowmaster") was used to perform the calculations. Copies of all calculations discussed below are included in the appendix of this final report.

HYDROLOGICAL CRITERIA

Because the project is a residential development consisting of several onsite basins ranging in size from less than one acre to approximately eight acres, the "Rational Method" was used to calculate the historic and developed flow rates onsite. Runoff for the upper Denton Drain was determined using TR-55 methods given that the basin contains approximately 124 acres. As required by the "Storm water Management (SWM) Manual", the minor storm event is considered to be the 2 year frequency storm and the major storm event is considered to be the 100 year frequency event. Developed runoff was calculated for the site (excluding direct runoff from the north bank of the wash, comprising approximately 6 acres) for each individual storm inlet basin and collectively for the 3 main developed basins.

Runoff Coefficients and intensity-duration-frequency data used in the computations were based on the most recent SWM Manual criteria defined above. Coefficients were assigned based on land use and existing hydrological soils groups.

HYDRAULIC CRITERIA

All site facilities and conveyance elements (including streets and inlets) were designed in accordance with the City of Grand Junction SWM Manual and the City of Fruita Design Standards and Construction Specifications. Peak flows were analyzed for both sides of the street and corresponding inlets to insure adequate capacity at all design points.

Open channels and pipelines were analyzed using Manning's Equation and roughness coefficients found in the SWM Manual. The storm sewer pipeline along Hall Street to the Little Salt Wash was sized to carry un-detained flows (direct discharge) of the 100 year peak.

Lag times were calculated for the upper Denton Drain basin and compared with times of concentration for the developed onsite basins (6 & 7) which will share the Denton interceptor. These lag times indicated that the peak flows for the Denton Drain will occur much later than Basin 6 & 7 peaks. In addition, information provided by the Grand Junction Drainage District indicated upstream culvert sizes of 12", each, on both legs of the upper Denton Drain (at 18 Road and K 6/10 Road). These culverts will restrict flows from the upper basin, prior to entering the Wildwood/Denton Interceptor. The combined capacity of these culverts, with 6 feet of headwater, is estimated at approximately 9 cfs (nomograph enclosed in appendix). The interceptor was therefore sized only to accommodate flows from onsite and offsite areas individually. Offsite flows are estimated at 9 cfs and Basin 7 flows are estimated at just over 6 cfs. The 18" interceptor at 1.00% slope will have a non-submerged capacity of approximately 13.5 cfs and a submerged capacity approaching 20 cfs.

V. RESULTS AND CONCLUSIONS

RUNOFF COEFFICIENTS - "C"

Bare / Agricultural	- 0.22 (2 yr.)	0.27 (100 yr.)
Developed (¼ ac./unit)	- 0.33 (2 yr.)	0.42 (100 yr.)

DIRECT-DISCHARGE "DRAINAGE IMPACT FEE"

D.I.F. = $12,000 ($C_{d100}$ - C_{h100}) $A^{0.7}$ = $12,000 (0.42 - 0.27) $(15.338)^{0.7}$ = **$ 12,170.56**

DISCHARGE TABLE

BASIN	AREA	t_c (minutes)	Q_2 (cfs)	Q_{100} (cfs)
Basin 1-a	- 3.92 Acres	23	0.83	4.13
Basin 1-b	- 7.94 Acres	21	1.76	8.77
Basin 2-a	- 0.36 Acres	11	0.11	0.53
Basin 2-b	- 2.08 Acres	19	0.48	2.42
Basin 3-a	- 0.24 Acres	11	0.07	0.35
Basin 3-b	- 3.01 Acres	20	0.68	3.41
Basin 4-a	- 2.47 Acres	19	0.57	2.87
Basin 4-b	- 3.19 Acres	20	0.72	3.62
Basin A (TOTAL)	23.21 Acres	25	4.67	23.30
Basin 5	- 4.33 Acres	20	0.97	4.91
Basin B (TOTAL)	4.33 Acres	20	0.97	4.91
Basin 6	- 8.24 Acres	19	1.90	9.59
Basin 7	- 4.71 Acres	15	1.23	6.15
Basin C (Onsite)	12.95 Acres	19	3.13	15.64
Basin E (Denton)	124 Acres	66	-	20
Basin D (Restricted Culverts)		-	-	9

CONCLUSION

The developed site will discharge runoff directly to the Little Salt Wash in accordance with recommendations of the City's SWMP. This storm water management plan is therefore in conformance with criteria established by the City.

APPENDIX

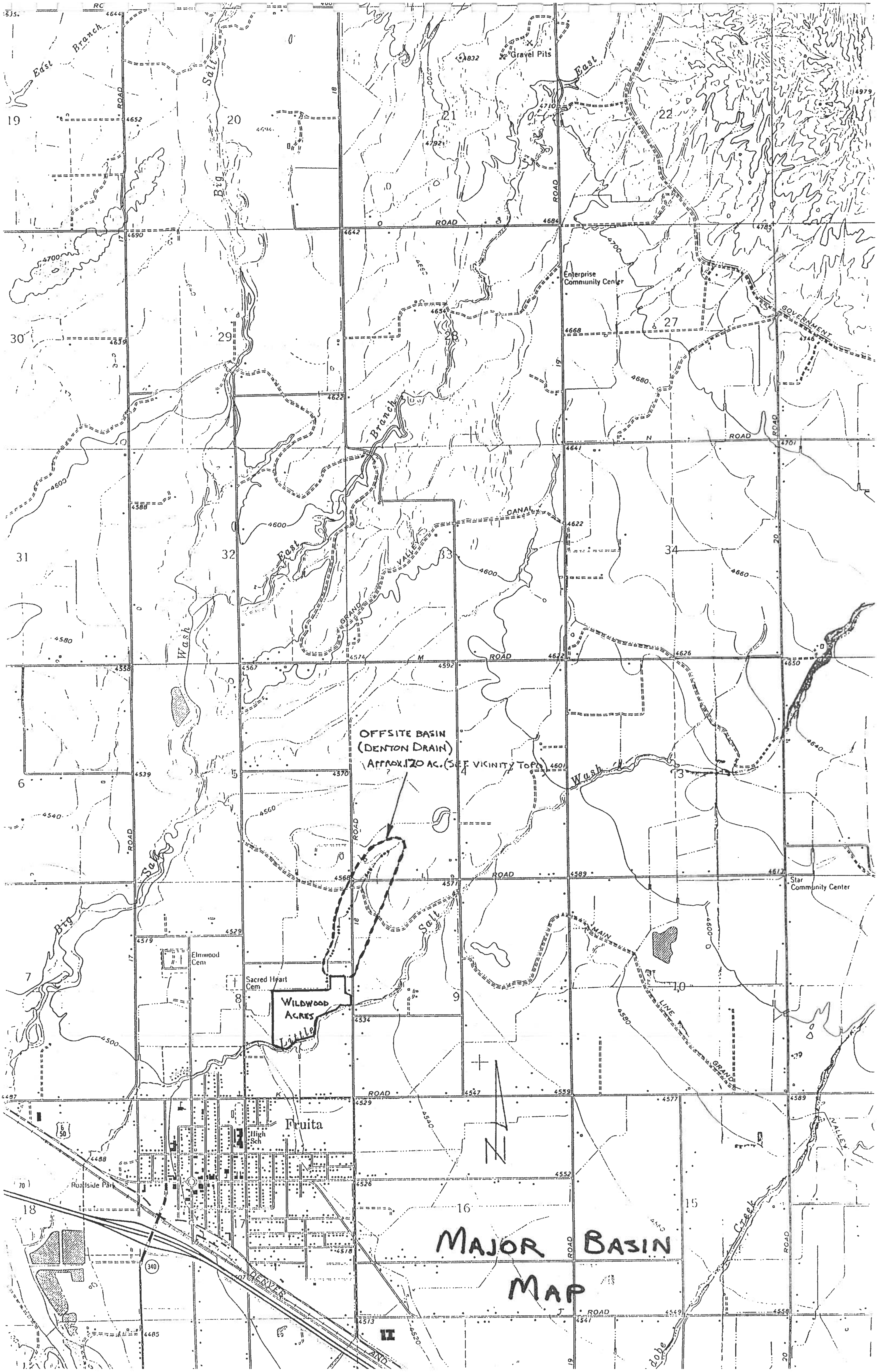
1. **<u>FINAL PLANS AND SITE MAPPING</u>**
   MAJOR BASIN MAP
   VICINITY TOPO MAP
   EXISTING CONDITIONS MAP
   PRELIMINARY PLAN
   GRADING PLAN
   OVERALL DRAINAGE AND STORMWATER MANAGEMENT PLAN
   STORM DRAIN PLAN AND PROFILE (HALL STREET)
   STORM DRAIN PLAN AND PROFILE (DOUG/DEAN COURT)
   F.E.M.A. FLOOD MAP

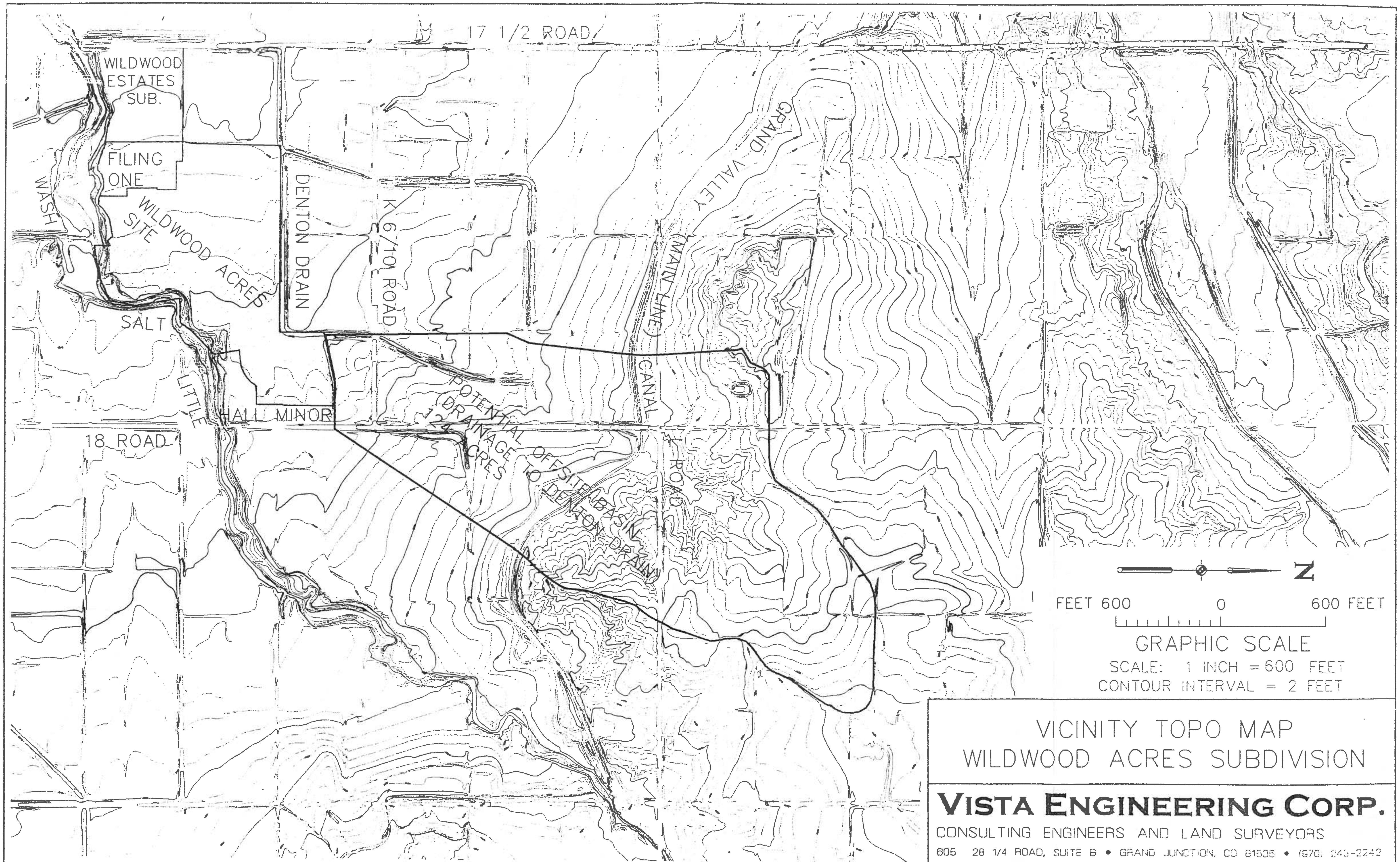
2. **<u>HYDROLOGY</u>**
   "C" VALUES - (Rational Method)
   "CN" NUMBERS - (TR-55 Method)
   TIMES OF CONCENTRATION
   DEVELOPED RUNOFF - 2 & 100 YEAR (ALL BASINS)

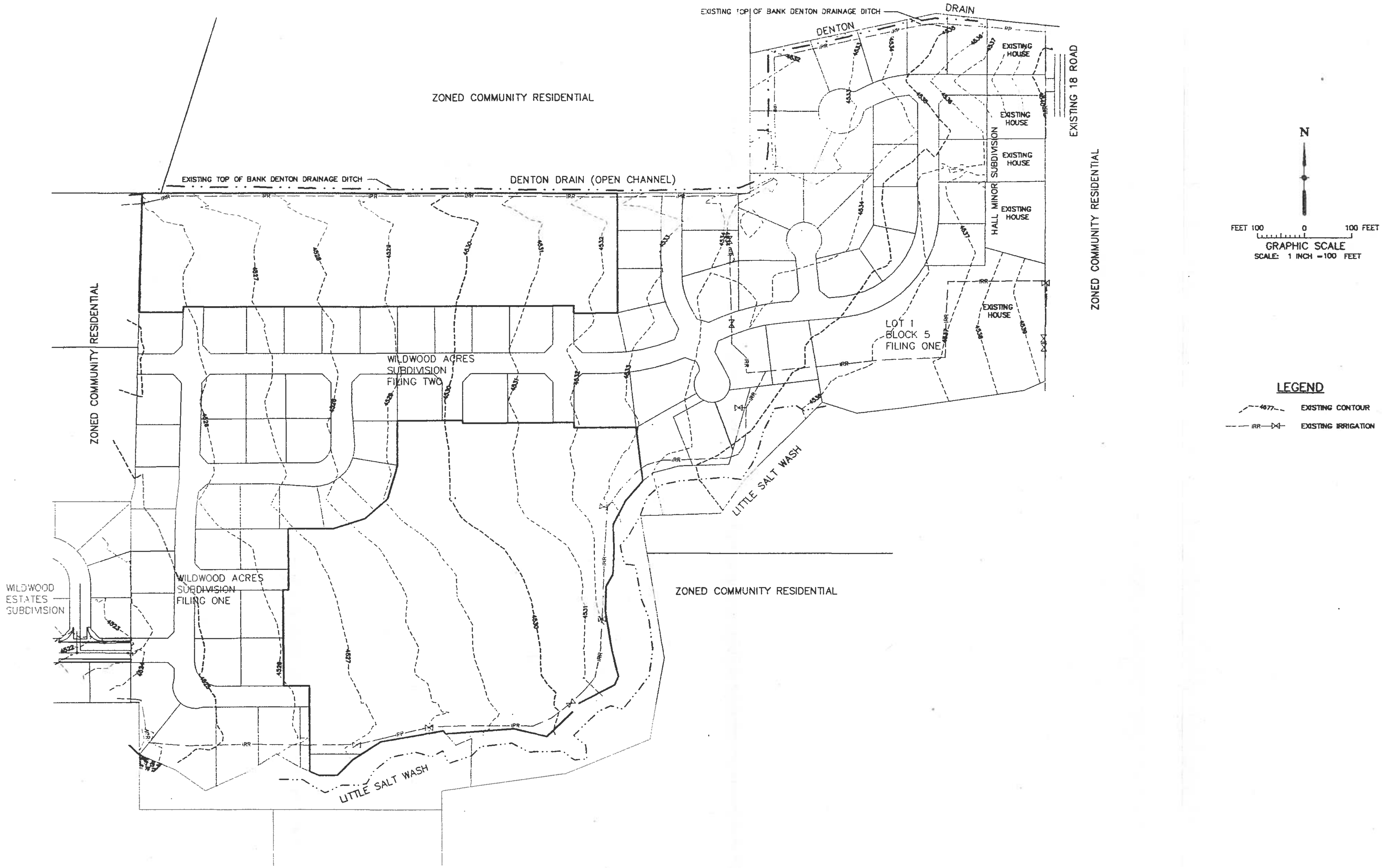
3. **<u>HYDRAULICS</u>**
   MAXIMUM HALF-STREET CAPACITIES - GJ SWM MANUAL
   MAXIMUM INLET CAPACITIES - SUMP CONDITION
   MAXIMUM INLET CAPACITIES - ON-GRADE
   NEENAH TRIPLE-GRATE INFORMATION
   DENTON DRAIN - 12" CULVERT NOMOGRAPH
   STORM SEWER RATING TABLES (12", 18", AND 24")

SECTION 1

FINAL PLANS AND SITE MAPPING

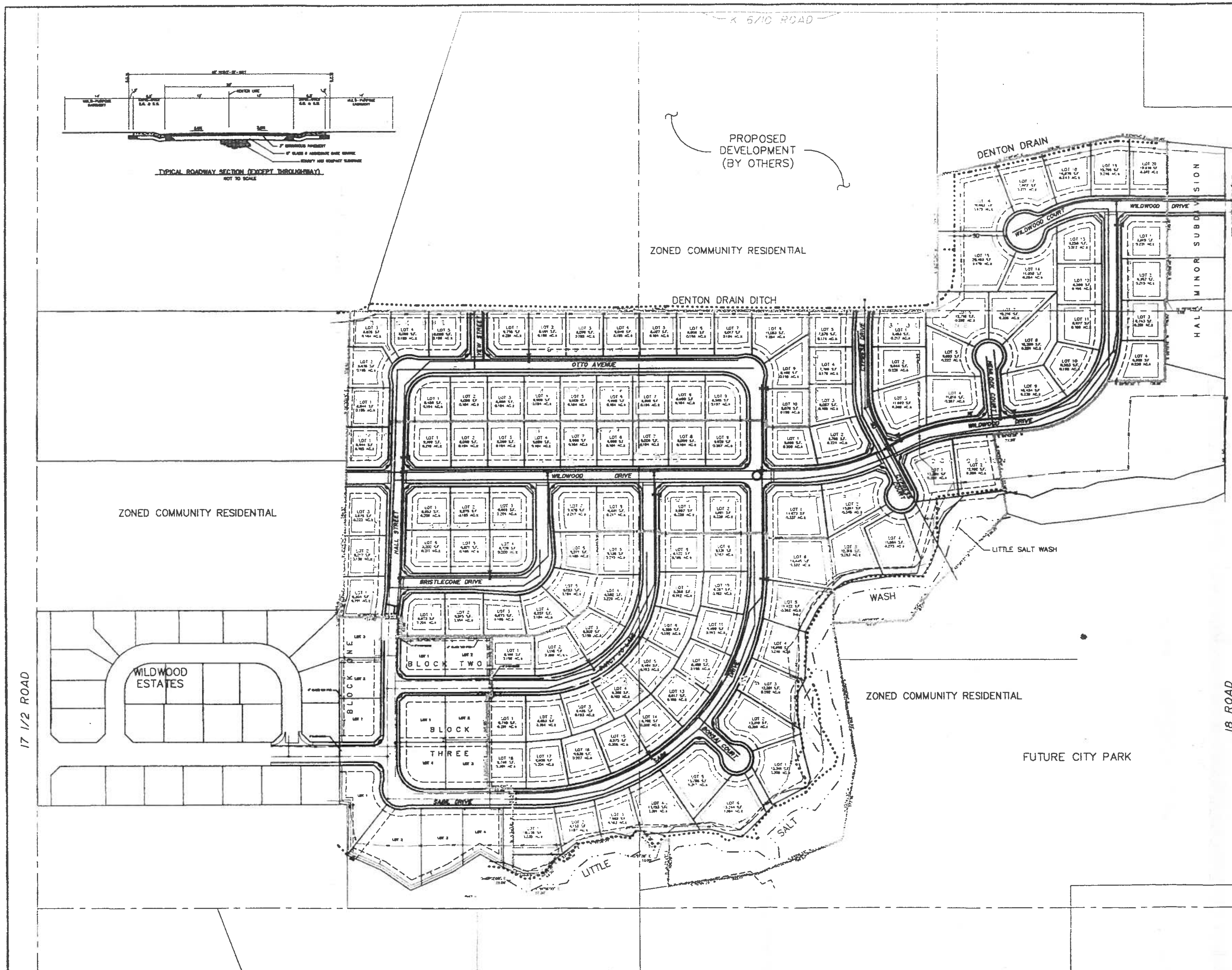

OFFSITE BASIN
(DENTON DRAIN)
APPROX. 120 AC. (SEE VICINITY TOPO)
WILDWOOD ACRES
MAJOR BASIN MAP
Fruita
Enterprise Community Center
Star Community Center
Gravel Pits
Elmwood Cem
Sacred Heart Cem
High Sch
Roadside Park
GOVERNMENT
GRAND VALLEY CANAL
GRAND VALLEY MAIN LINE
East Branch
Big Salt Wash
Little Salt Wash
Adobe Creek
DENVER AND

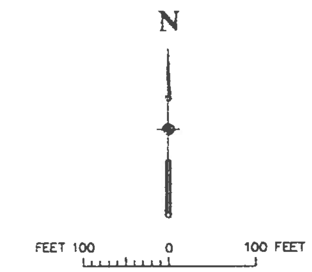

17 1/2 ROAD
WILDWOOD ESTATES SUB.
FILING ONE
WILDWOOD ACRES SITE
WASH
SALT
LITTLE
DENTON DRAIN
K 6/10 ROAD
GRAND VALLEY (MAIN LINE) CANAL
HALL MINOR
18 ROAD
POTENTIAL OFFSITE BASIN (DRAINAGE TO DENTON DRAIN) 124 ACRES
L ROAD
N
FEET 600
0
600 FEET
GRAPHIC SCALE
SCALE: 1 INCH = 600 FEET
CONTOUR INTERVAL = 2 FEET
VICINITY TOPO MAP
WILDWOOD ACRES SUBDIVISION
VISTA ENGINEERING CORP.
CONSULTING ENGINEERS AND LAND SURVEYORS
605 28 1/4 ROAD, SUITE B • GRAND JUNCTION, CO 81506



DRAWN BY: S.G.S.	REVIEWED ______ DATE: ______ FOR ______	**VISTA ENGINEERING CORP.**	REVISION	DATE	DESCRIPTION	BY	CHD	FRUITA WILDWOOD, LLC — GRAND JUNCTION, COLORADO
DESIGNED BY: P.M.O.		CONSULTING ENGINEERS AND LAND SURVEYORS						EXISTING CONDITIONS MAP
CHECKED BY: P.M.O.	REVIEWED ______ DATE: ______ FOR VISTA ENGINEERING CORP	605 28 1/4 ROAD, SUITE B • GRAND JUNCTION, CO 81506 • (970) 243-2242						WILDWOOD ACRES SUBDIVISION, FILING THREE

SCALE: 1" = 100' | JOB NO: 400.03-01 | DATE: 9-17-04 | SHEET NO: 1 of 1





GRAPHIC SCALE
SCALE: 1 INCH = 100 FEET

LEGEND

W	EXISTING WATER LINE AND HYDRANT
S	EXISTING SEWER LINE AND MANHOLE
IRR	EXISTING IRRIGATION
	PROPOSED SEWER LINE AND MANHOLE
	PROPOSED WATER LINE & FIRE HYDRANT
SD	PROPOSED STORM SEWER
	PROPOSED BUILDING ENVELOPE

PUBLIC FACILITIES

SANITARY SEWER	City of Fruita
DOMESTIC WATER	Ute Water
GAS AND ELECTRIC	Public Service Company of Colorado
TELEPHONE	US West Communications
CABLE TV	TCI of Western Colorado
STORM SEWER	Grand Junction Drainage District
IRRIGATION	Grand Valley Irrigation Company

DRAWN BY: F.J.B.	REVIEWED ____ DATE: ____ FOR ____	**VISTA ENGINEERING CORP.**	REVISION	DATE	DESCRIPTION	BY	CHD
DESIGNED BY: P.M.O.		CONSULTING ENGINEERS AND LAND SURVEYORS					
CHECKED BY: P.M.O.	REVIEWED ____ DATE: ____ FOR VISTA ENGINEERING CORP.	605 28 1/4 ROAD, SUITE B • GRAND JUNCTION, CO 81506 • (970) 243-2242					

FRUITA WILDWOOD, LLC — GRAND JUNCTION, COLORADO

PRELIMINARY PLAN
WILDWOOD ACRES SUBDIVISION, FILING THREE

SCALE: 1" = 100' | JOB NO: 4010.02-02 | DATE: 9-17-04

SHEET NO: 8 of 31

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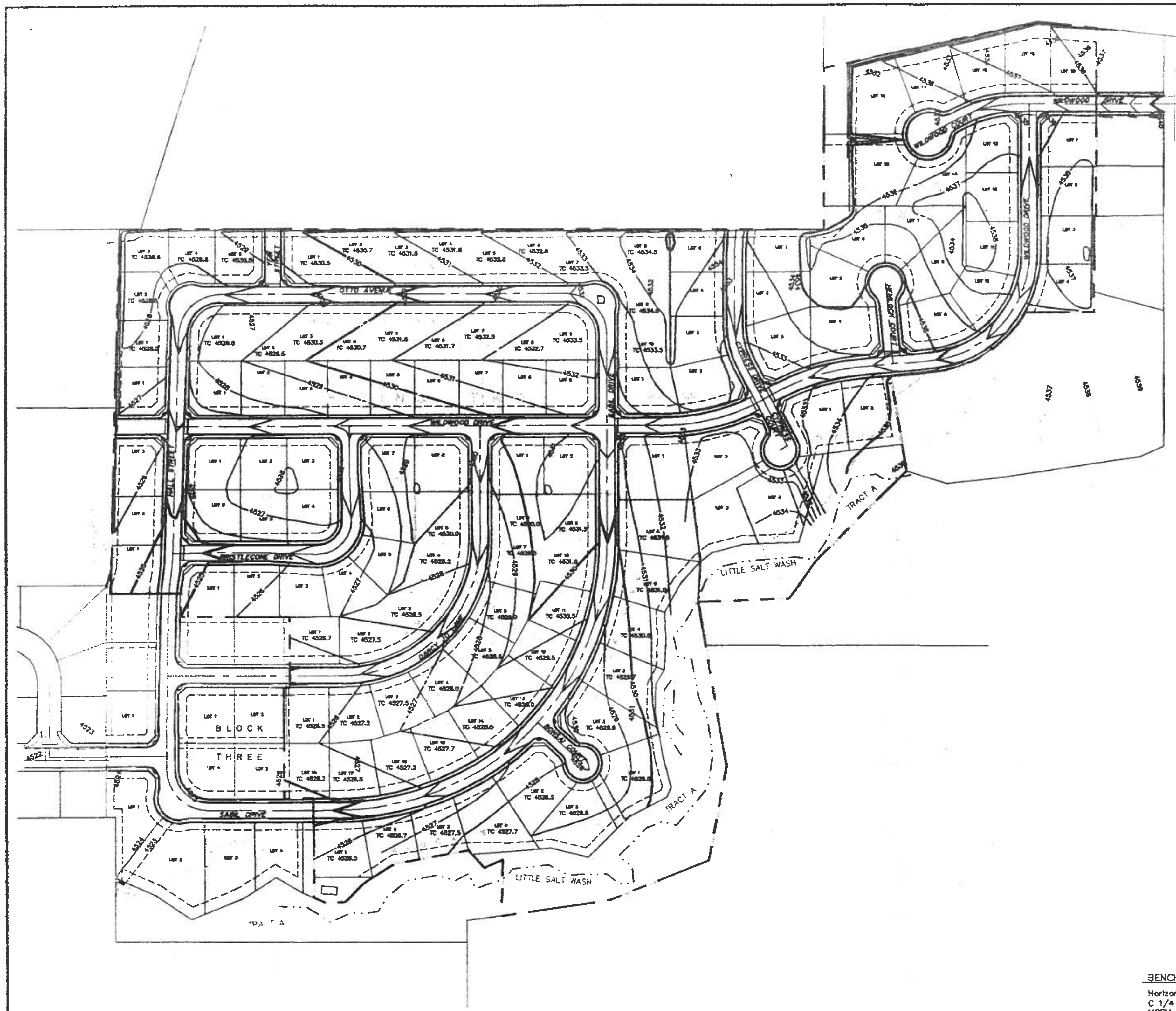
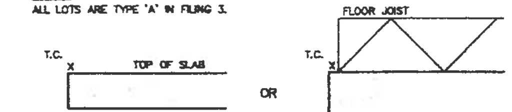
FRANCES



WILDWOOD ACRES SUBDIVISION
TOP-OF-CONCRETE ELEVATION TABULATION
9/09/04

LOT	BLOCK	(MINIMUM) T.C. ELEV.	(MAXIMUM) T.C. ELEV.	LOT	BLOCK	(MINIMUM) T.C. ELEV.	(MAXIMUM) T.C. ELEV.
1	1	4528.5	4529.0	1	5	4526.5	4527.0
2	1	4528.5	4529.0	2	5	4527.2	4527.7
3	1	4528.8	4529.3	3	5	4527.5	4528.0
4	1	4529.8	4530.3	4	5	4528.0	4528.5
5	1	4530.5	4531.0	5	5	4528.5	4529.0
				6	5	4529.0	4529.5
1	2	4530.5	4531.0	7	5	4529.5	4530.0
2	2	4530.7	4531.2	8	5	4530.0	4530.5
3	2	4531.5	4532.0	9	5	4531.5	4532.0
4	2	4531.8	4532.3	10	5	4531.0	4531.5
5	2	4532.5	4534.0	11	5	4530.5	4531.0
6	2	4532.8	4533.3	12	5	4529.5	4530.0
7	2	4533.5	4535.0	13	5	4529.0	4529.5
8	2	4534.5	4536.0	14	5	4528.5	4529.0
9	2	4534.5	4536.0	15	5	4527.7	4528.2
10	2	4533.5	4535.0	16	5	4527.2	4527.7
				17	5	4526.5	4527.0
1	3	4529.0	4529.5	18	5	4526.2	4526.7
2	3	4529.5	4530.0				
3	3	4530.5	4531.0	1	6	4526.5	4527.0
4	3	4530.7	4531.2	2	6	4526.7	4527.2
5	3	4531.5	4532.0	3	6	4527.5	4528.0
6	3	4531.7	4531.2	4	6	4527.7	4528.2
7	3	4532.5	4533.0	5	6	4528.5	4529.0
8	3	4532.7	4533.2	6	6	4529.5	4530.0
9	3	4533.5	4534.0				
				1	7	4529.5	4530.0
1	4	4526.7	4527.2	2	7	4529.5	4530.0
2	4	4527.5	4528.0	3	7	4529.7	4530.2
3	4	4528.5	4529.0	4	7	4530.5	4531.0
4	4	4529.2	4529.7	5	7	4531.0	4531.5
5	4	4530.0	4530.5	6	7	4531.5	4532.0

NOTE:
ALL LOTS ARE TYPE 'A' IN FILING 3.



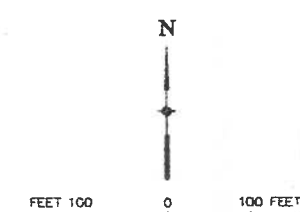
T.C. = TOP OF CONCRETE
(MINIMUM ELEVATION)
NOT TO SCALE

LEGEND

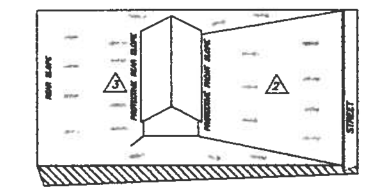
- EXISTING CONTOUR
- 4677 — PROPOSED CONTOUR
- 4677.6 T.C. — PROPOSED TOP-OF-CONCRETE ELEVATION (MINIMUM)

NOTES:

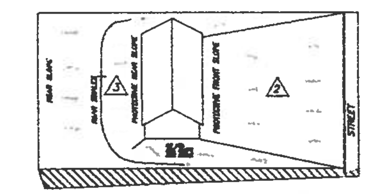
1. ELEVATION CONTOURS ARE BASED UPON A FIELD SURVEY PERFORMED BY VISTA ENGINEERING CORP..
2. MAXIMUM TOP-OF-CONCRETE ELEVATIONS SHALL NOT EXCEED LEVELS CREATING DRIVEWAY SLOPES GREATER THAN MAXIMUM ALLOWED BY CODE.



GRAPHIC SCALE
SCALE: 1 INCH = 100 FEET



TYPE 'B' TYPICAL LOT GRADING



TYPE 'A' TYPICAL LOT GRADING

NOTES:

1. *ALL LOTS ARE TYPE 'A' UNLESS MARKED OTHERWISE ON PLAN.*
2. *MINIMUM ELEVATION OF TC (TOP OF SLAB OR FOUNDATION) SHALL BE 1.0 FT. + 2% OF STBACK (25') MEASURED FROM FLOWLINE OF GUTTER.*
3. *MINIMUM SIDE AND REAR SLOPES SHALL BE 6" DROP FROM FOUNDATION IN FIRST 10'.*

NOTE:
TC = MINIMUM FINISHED CONCRETE ELEVATION

BENCHMARK:

Horizontal Control:
C 1/4 Section 8, T. 1 N., R. 2 W., Ute PM
MCSM No. 888, GPS ID No. S312

Vista Engineering Corp. Project Control:
N = 73,829.960
E = 44,620.163

SIMS Database:
N = 73,830.015
E = 44,620.139

Vertical Control:
C 1/4 Section 8, T. 1 N., R. 2 W., Ute PM
MCSM No. 888, GPS ID No. S312

Vista Engineering Corp. Project Control:
Elevation = 4524.24 feet

SIMS Database:
Elevation = 4524.66 feet

The Datum shift going from Vista Engineering Corp. Project Control to the SIMS Database is +0.42 feet.

CALL
1-800-922-1987
UTILITY NOTIFICATION CENTER OF COLORADO

APPROVED FOR CONSTRUCTION:
CITY OF FRUITA — DATE

ACCEPTED AS CONSTRUCTED:
CITY OF FRUITA — DATE

DRAWN BY: S.G.S.	REVIEWED ______ DATE: ______ FOR ______	**VISTA ENGINEERING CORP.** CONSULTING ENGINEERS AND LAND SURVEYORS 605 28 1/4 ROAD, SUITE B • GRAND JUNCTION, CO 81506 • (970) 243-2242
DESIGNED BY: P.M.O.		
CHECKED BY: P.M.O.	REVIEWED ______ DATE: ______ FOR VISTA ENGINEERING CORP.	

REVISION	DATE	DESCRIPTION	BY	CH'D

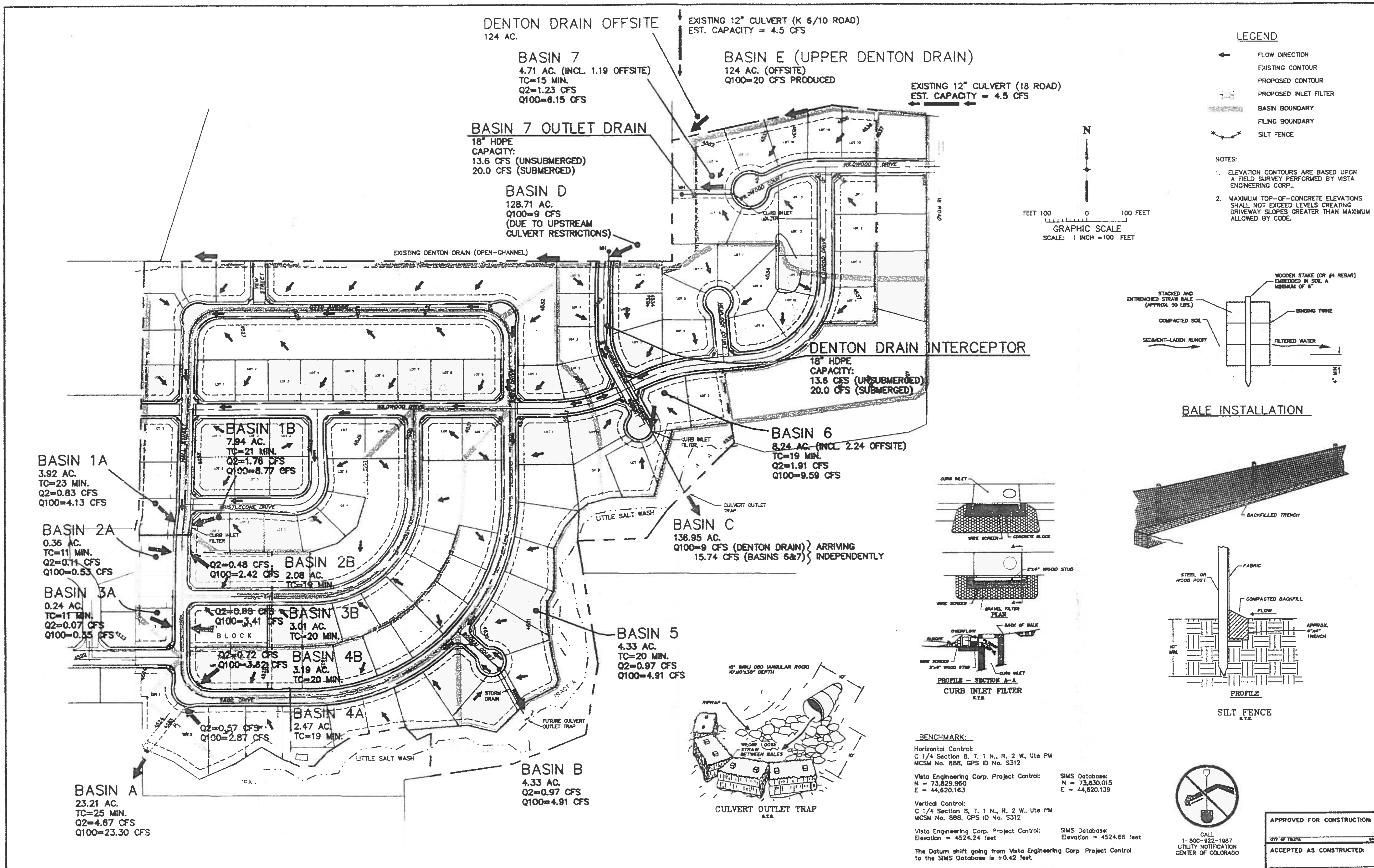
FRUITA WILDWOOD, LLC — GRAND JUNCTION, COLORADO

GRADING PLAN
WILDWOOD ACRES SUBDIVISION, FILING THREE

SCALE:	JOB NO:	DATE:
1" = 100'	4010.03-01	9-08-04

SHEET NO. 20 of 31

C:\...SKP...\401...\01...GRA...dwg, 7/20... 1:49... M, FRANCES

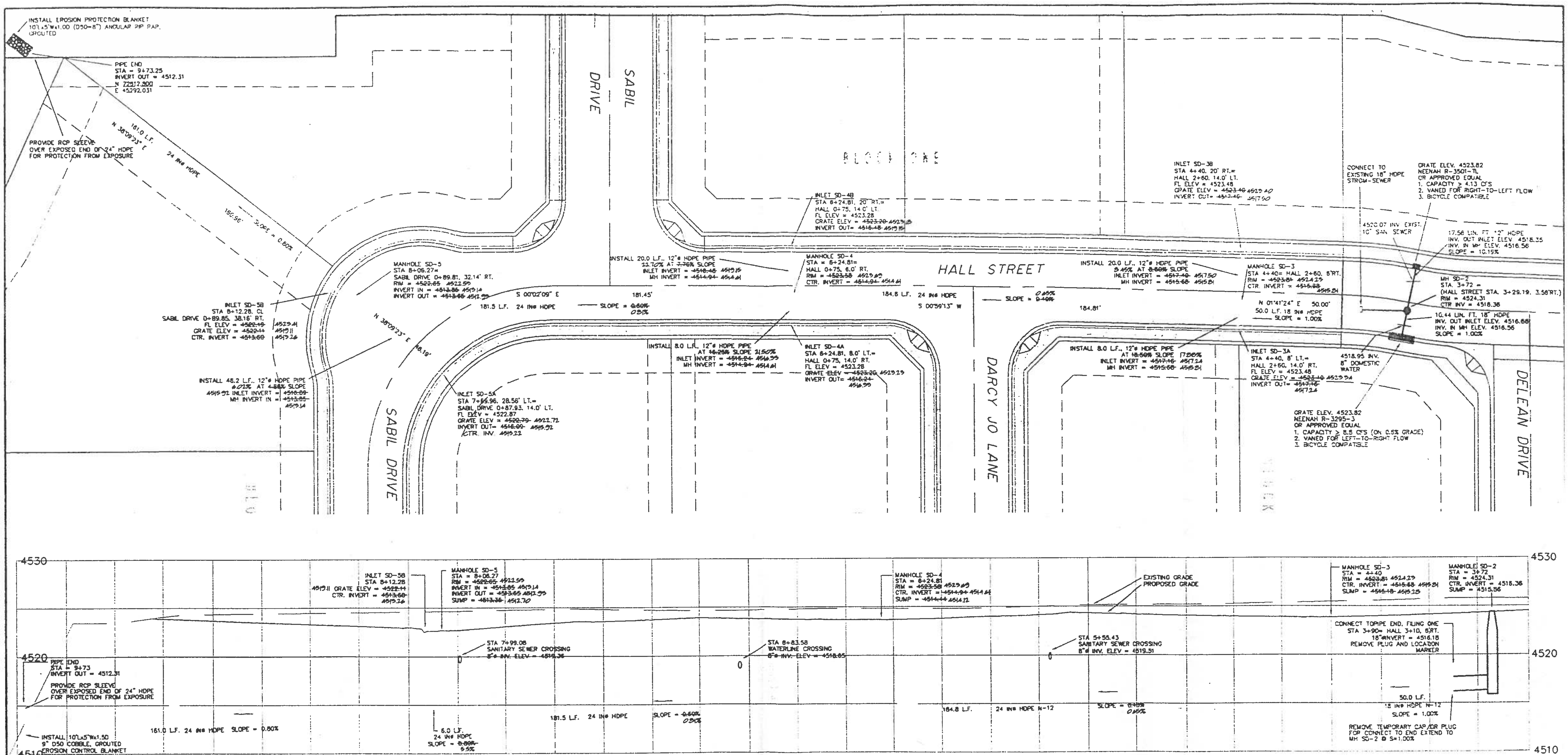


APPROVED FOR CONSTRUCTION:
CITY OF FRUITA DATE

ACCEPTED AS CONSTRUCTED:
CITY OF FRUITA DATE

DRAWN BY: S.G.S.	REVIEWED / DATE: FOR	**VISTA ENGINEERING CORP.**	REVISION	DATE	DESCRIPTION	BY	CHD	FRUITA WILDWOOD, LLC — GRAND JUNCTION, COLORADO	SCALE: 1" = 100'	JOB NO: 4010.03-01	DATE: 9-09-04
DESIGNED BY: P.M.O.	REVIEWED	CONSULTING ENGINEERS AND LAND SURVEYORS						OVERALL DRAINAGE AND STORMWATER MANAGEMENT PLAN	SHEET NO:		
CHECKED BY: F.L.L.	DATE: FOR VISTA ENGINEERING CORP.	605 28 1/4 ROAD, SUITE B • GRAND JUNCTION, CO 81506 • (970) 243-2242						WILDWOOD ACRES SUBDIVISION, FILING THREE	21 of 31		

C:\SDSKPROJ\4010.03-01\dwg\SWMPLAN.dwg, 9/17/2004 11:49:55 AM, Owner, FRANCES



BENCHMARK:

Horizontal Control:
C 1/4 Section 8, T. 1 N., R. 2 W., Ute PM
MCSM No. 888, GPS ID No. 5312

Vista Engineering Corp. Project Control:
N = 73,829.960
E = 44,620.163

SIMS Database:
N = 73,830.015
E = 44,620.139

Vertical Control:
C 1/4 Section 8, T. 1 N., R. 2 W., Ute PM
MCSM No. 888, GPS ID No. 5312

Vista Engineering Corp. Project Control:
Elevation = 4524.24 feet

SIMS Database:
Elevation = 4524.66 feet

The Datum shift going from Vista Engineering Corp. Project Control to the SIMS Database is +0.42 feet.

CALL 1-800-922-1987
UTILITY NOTIFICATION CENTER OF COLORADO

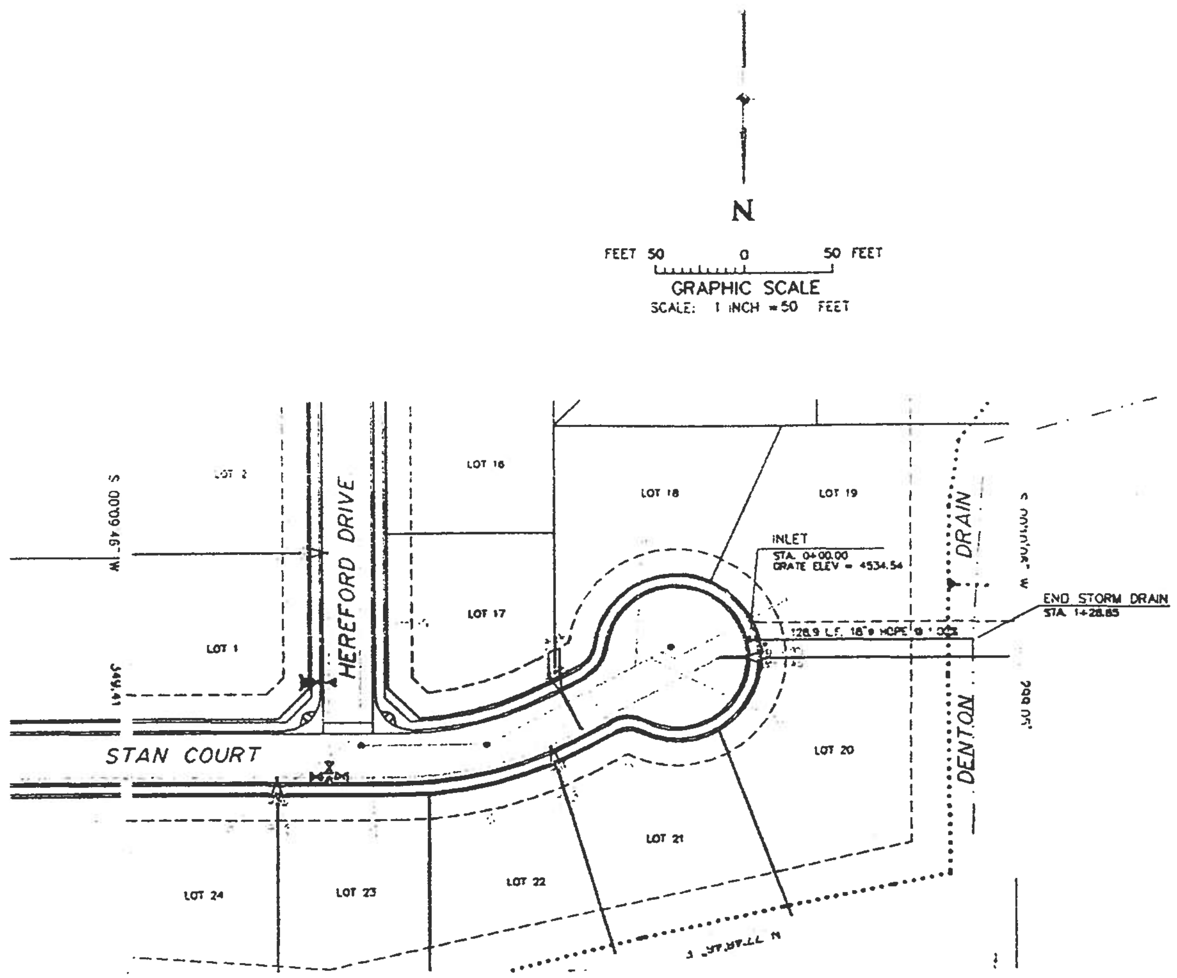
APPROVED FOR CONSTRUCTION
CITY OF FRUITA DATE
ACCEPTED AS CONSTRUCTED
CITY OF FRUITA DATE

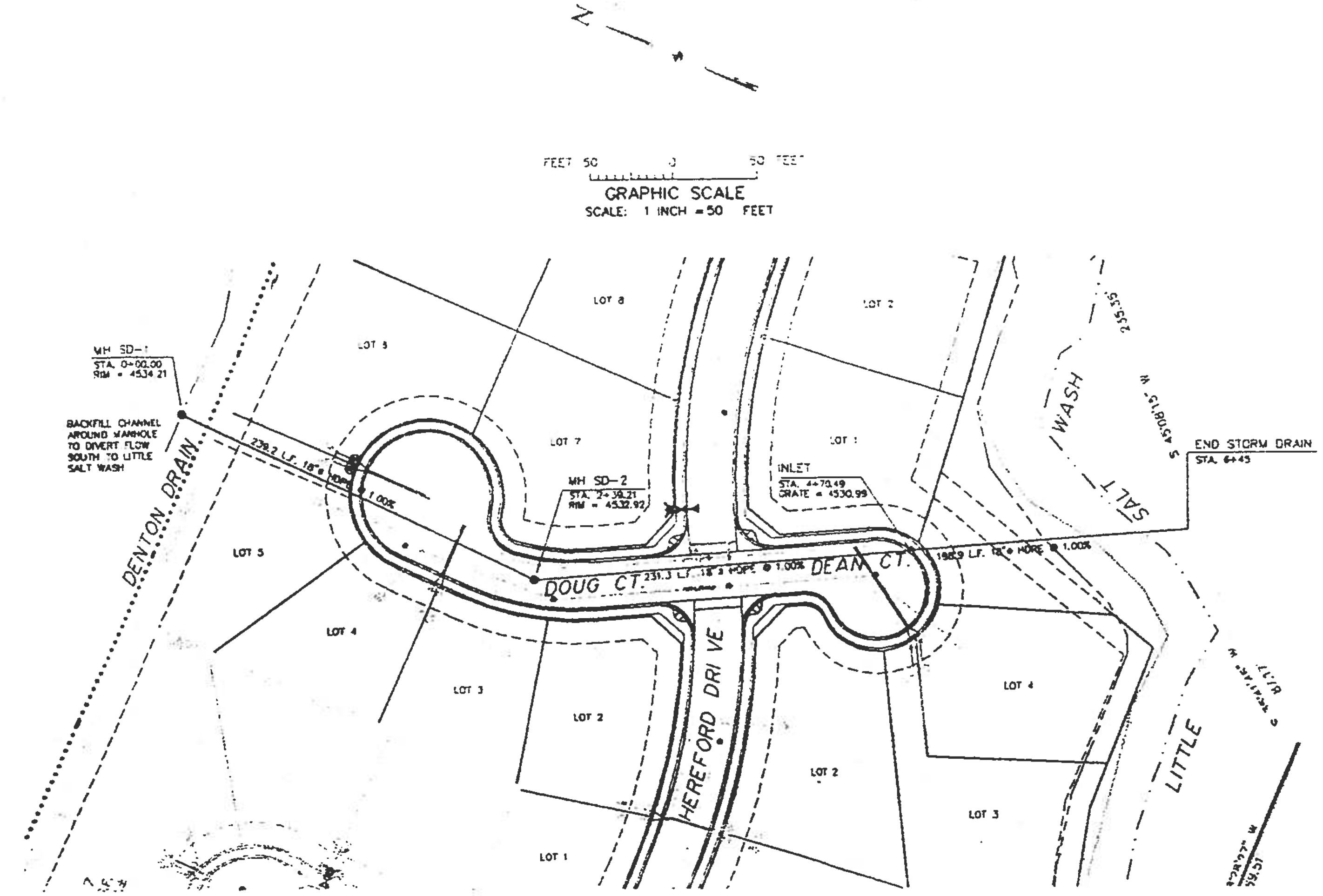
DRAWN BY: SGS	REVIEWED ____ DATE: ____ FOR ____	VISTA ENGINEERING CORP.	REVISION	DATE	DESCRIPTION	BY	CH'D
CHECKED BY: PMO	REVIEWED ____ DATE: ____ FOR VISTA ENGINEERING CORP.	CONSULTING ENGINEERS AND LAND SURVEYORS 606 28 1/4 ROAD, SUITE B • GRAND JUNCTION, CO 81506 • (970) 243-2242					

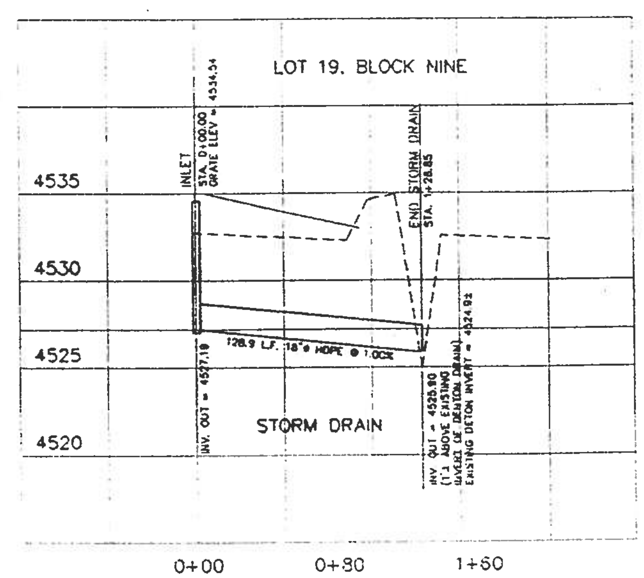
FRUITA WILDWOOD, LLC — FRUITA, COLORADO

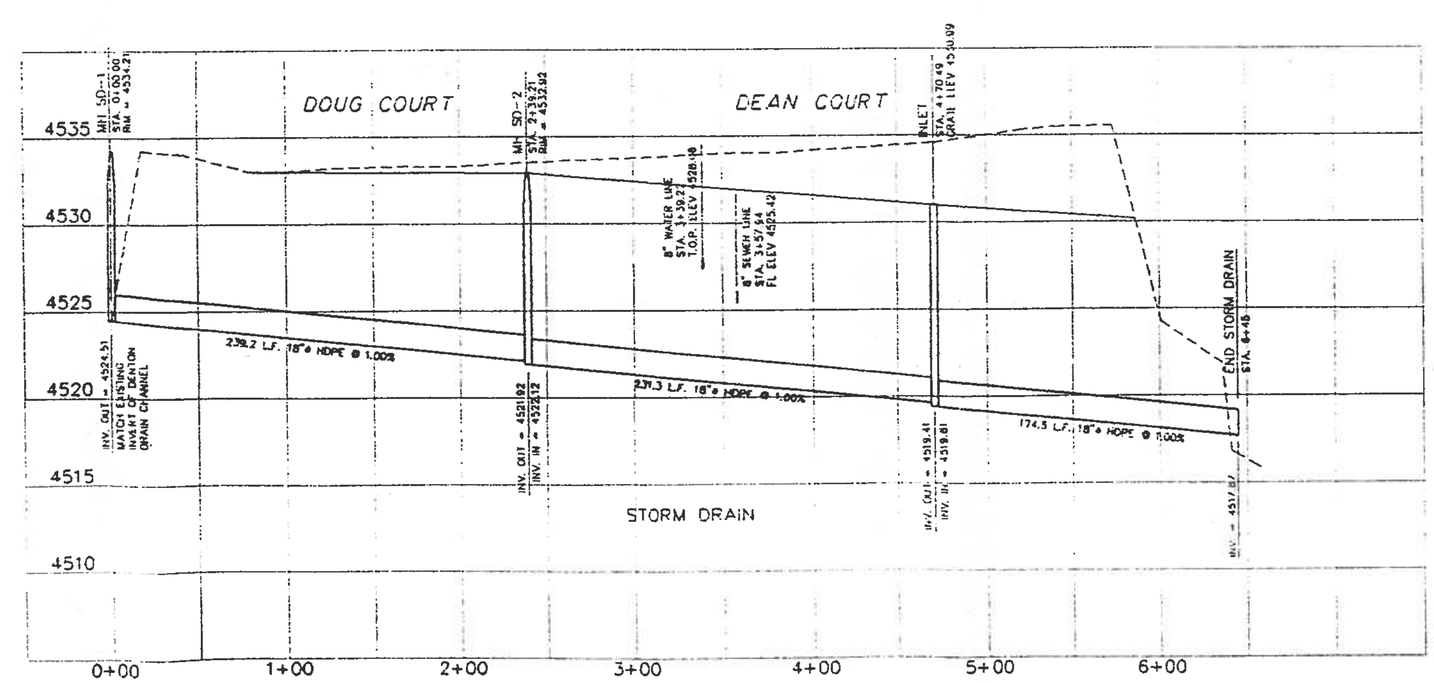
STORM DRAIN PLAN AND PROFILE (HALL STREET)
WILDWOOD ACRES SUBDIVISION, FILING TWO

SCALE: Horiz: 1" = 20, Vert: 1" = 5
Project No: 4010.02-02
DATE: 2-06-04
SHEET NO. 22 of 31









CALL
1-800-922-1987
UTILITY NOTIFICATION
CENTER OF COLORADO

Horizontal Control:
C 1/4 Section 8, T. 1 N., R. 2 W., Ute PM
MCSM No. 888, CPS ID No. 5312

Vista Engineering Corp. Project Control:	SIMS Database:
N = 73,829.960	N = 73,830.015
E = 44,620.163	E = 44,620.139

Vertical Control:
C 1/4 Section 8, T. 1 N., R. 2 W., Ute PM
MCSM No. 888, CPS ID No. 5312

Vista Engineering Corp. Project Control:	SIMS Database:
Elevation = 4524.24 feet	Elevation = 4524.66 feet

The Datum shift going from Vista Engineering Corp. Project Control to the SIMS Database is +0.42 feet.

APPROVED FOR CONSTRUCTION
CITY OF FRUITA DATE
ACCEPTED AS CONSTRUCTED
CITY OF FRUITA DATE

DRAWN BY: F.J.B.	REVIEWED ____ DATE: ____ FOR ____
CHECKED BY: P.M.O.	REVIEWED ____ DATE. ____ FOR VISTA ENGINEERING CORP.

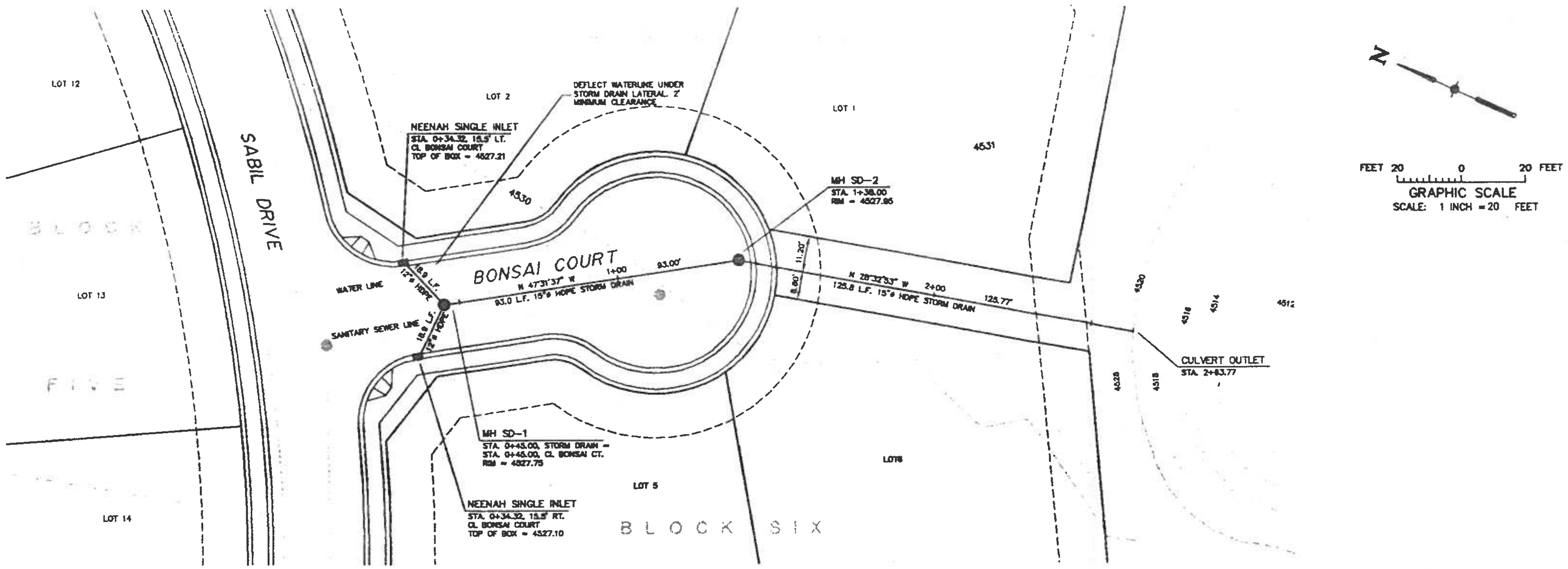
VISTA ENGINEERING CORP.
CONSULTING ENGINEERS AND LAND SURVEYORS
605 28 1/4 ROAD, SUITE B • GRAND JUNCTION, CO 81506 • (970) 243-2242

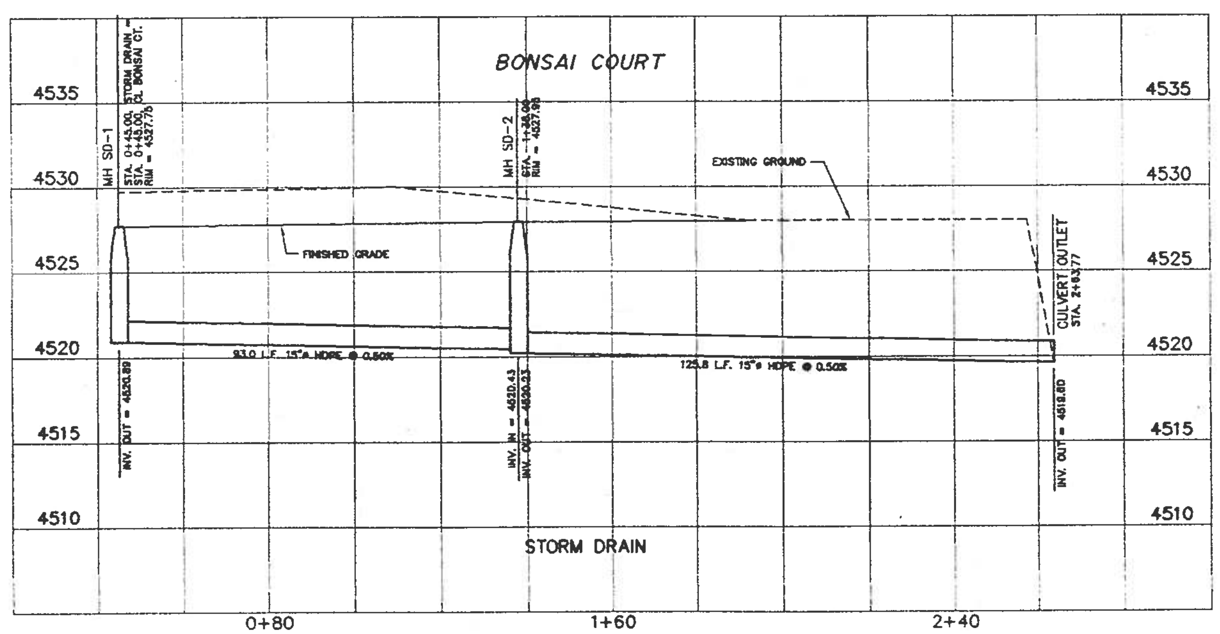
REVISION	DATE	DESCRIPTION	BY	CK'D

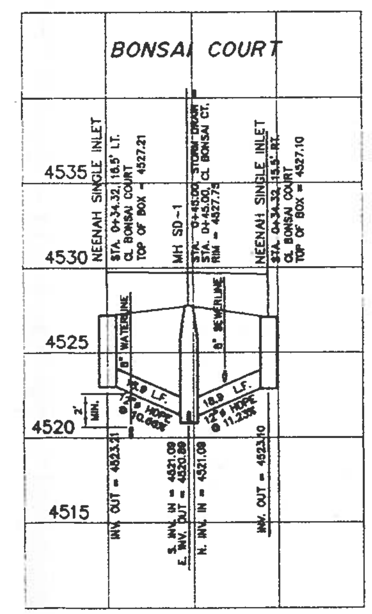
FRUITA WILDWOOD, LLC — GRAND JUNCTION, COLORADO

STORM DRAIN PLAN AND PROFILE
WILDWOOD ACRES SUBDIVISION, FILING TWO

SCALE: Horiz. 1" = 50' Vert. 1" = 5'
Project No: 4010.02-02
DATE: 2-06-04
SHEET NO: 23 of 31







Horizontal Control:
C 1/4 Section 8, T. 1 N., R. 2 W., Ute PM
MCSM No. 888, GPS ID No. S312

Vista Engineering Corp. Project Control: N = 73,829.960 E = 44,620.163
SIMS Database: N = 73,830.015 E = 44,620.139

Vertical Control:
C 1/4 Section 8, T. 1 N., R. 2 W., Ute PM
MCSM No. 888, GPS ID No. S312

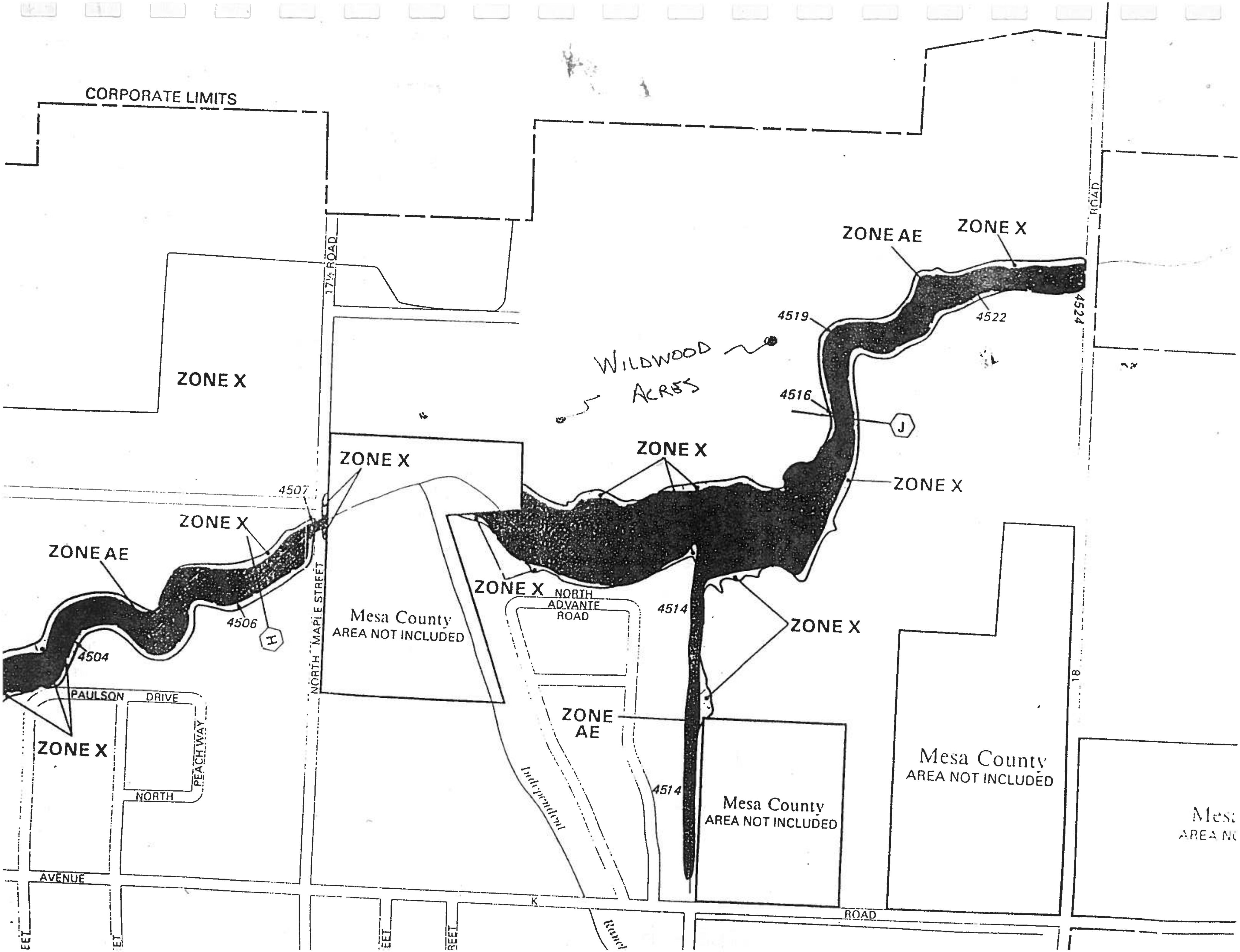
Vista Engineering Corp. Project Control: Elevation = 4524.24 feet
SIMS Database: Elevation = 4524.66 feet

The Datum shift going from Vista Engineering Corp. Project Control to the SIMS Database is +0.42 feet.

CALL 1-800-922-1987 UTILITY NOTIFICATION CENTER OF COLORADO

APPROVED FOR CONSTRUCTION
GRAND JUNCTION DRAINAGE DISTRICT DATE
ACCEPTED AS CONSTRUCTED
GRAND JUNCTION DRAINAGE DISTRICT DATE
APPROVED FOR CONSTRUCTION
CITY OF FRUITA DATE
ACCEPTED AS CONSTRUCTED
CITY OF FRUITA DATE

DRAWN BY: F.J.B.	REVIEWED DATE: FOR	**VISTA ENGINEERING CORP.** CONSULTING ENGINEERS AND LAND SURVEYORS 605 28 1/4 ROAD, SUITE B • GRAND JUNCTION, CO 81506 • (970) 243-2242	REVISION	DATE	DESCRIPTION	BY	CHD	FRUITA WILDWOOD, LLC — GRAND JUNCTION, COLORADO	SCALE: Horiz: 1" = 20' Vert: 1" = 5'	Project No: 4010.03-01
CHECKED BY: F.L.L.	REVIEWED DATE: FOR VISTA ENGINEERING CORP.							BONSAI COURT STORM DRAIN PLAN AND PROFILE WILDWOOD ACRES SUBDIVISION, FILING THREE	DATE: 9-09-04	SHEET NO: 22 of 31


CORPORATE LIMITS
ZONE X
17½ ROAD
ZONE AE
ZONE X
4524
4522
4519
WILDWOOD ACRES
4516
J
ZONE X
ZONE X
4507
ZONE X
ZONE X
ZONE AE
4506
H
4504
NORTH MAPLE STREET
Mesa County
AREA NOT INCLUDED
ZONE X
NORTH ADVANTE ROAD
4514
ZONE X
PAULSON DRIVE
PEACH WAY
NORTH
ZONE X
ZONE AE
4514
Independent
Mesa County
AREA NOT INCLUDED
Mesa County
AREA NOT INCLUDED
18
ROAD
AVENUE
K
ROAD
Ranch

SECTION 2

HYDROLOGY

WILDWOOD ACRES 12/00 BAI # 40010

	HISTORIC	DEVELOPED
2 YR.	0.22	0.33
100 YR.	0.27	0.42

LAND USE OR SURFACE CHARACTERISTICS	SCS HYDROLOGIC SOIL GROUP (SEE APPENDIX "C" FOR DESCRIPTIONS)											
	A			B			C			D		
	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+
UNDEVELOPED AREAS Bare ground	.10 - .20 .14 - .24	.16 - .26 .22 - .32	.25 - .35 .30 - .40	.14 - .22 .20 - .28	.22 - .30 .28 - .36	.30 - .38 .37 - .45	.20 - .28 .26 - .34	.28 - .36 .35 - .43	.36 - .44 .40 - .48	.24 - .32 .30 - .38	.30 - .38 .40 - .48	.40 - .48 .50 - .58
Cultivated/Agricultural	.08 - .18 .14 - .24	.13 - .23 .18 - .28	.16 - .26 .22 - .32	.11 - .19 .16 - .24	.15 - .23 .21 - .29	.21 - .29 .28 - .36	.14 - .22 .20 - .28	.19 - .27 .25 - .33	.26 - .34 .34 - .42	.18 - .26 .24 - .32	.23 - .31 .29 - .37	.31 - .39 .41 - .49
* Pasture	.12 - .22 .15 - .25	.20 - .30 .25 - .35	.30 - .40 .37 - .47	.18 - .26 .23 - .31	.28 - .36 .34 - .42	.37 - .45 .45 - .53	.24 - .32 .30 - .38	.34 - .42 .42 - .50	.44 - .52 .52 - .60	.30 - .38 .37 - .45	.40 - .48 .50 - .58	.50 - .58 .62 - .70
Meadow	.10 - .20 .14 - .24	.16 - .26 .22 - .32	.25 - .35 .30 - .40	.14 - .22 .20 - .28	.22 - .30 .28 - .36	.30 - .38 .37 - .45	.20 - .28 .26 - .34	.28 - .36 .35 - .43	.36 - .44 .44 - .52	.24 - .32 .30 - .38	.30 - .38 .40 - .48	.40 - .48 .50 - .58
Forest	.05 - .15 .08 - .18	.08 - .18 .11 - .21	.11 - .21 .14 - .24	.08 - .16 .10 - .18	.11 - .19 .14 - .22	.14 - .22 .18 - .26	.10 - .18 .12 - .20	.13 - .21 .16 - .24	.16 - .24 .20 - .28	.12 - .20 .15 - .23	.16 - .24 .20 - .28	.20 - .28 .25 - .33
RESIDENTIAL AREAS 1/8 acre per unit	.40 - .50 .48 - .58	.43 - .53 .52 - .62	.46 - .56 .55 - .65	.42 - .50 .50 - .58	.45 - .53 .54 - .62	.50 - .58 .59 - .67	.45 - .53 .53 - .61	.48 - .56 .57 - .65	.53 - .61 .64 - .72	.48 - .56 .56 - .64	.51 - .59 .60 - .68	.57 - .65 .69 - .77
* 1/4 acre per unit	.27 - .37 .35 - .45	.31 - .41 .39 - .49	.34 - .44 .42 - .52	.29 - .37 .38 - .46	.34 - .42 .42 - .50	.38 - .46 .47 - .55	.32 - .40 .41 - .49	.36 - .44 .45 - .53	.41 - .49 .52 - .60	.35 - .43 .43 - .51	.39 - .47 .47 - .55	.45 - .53 .57 - .65
1/3 acre per unit	.22 - .32 .31 - .41	.26 - .36 .35 - .45	.29 - .39 .38 - .48	.25 - .33 .33 - .41	.29 - .37 .38 - .46	.33 - .41 .42 - .50	.28 - .36 .36 - .44	.32 - .40 .41 - .49	.37 - .45 .48 - .56	.31 - .39 .39 - .47	.35 - .43 .43 - .51	.42 - .50 .53 - .61
1/2 acre per unit	.16 - .26 .25 - .35	.20 - .30 .29 - .39	.24 - .34 .32 - .42	.19 - .27 .28 - .36	.23 - .31 .32 - .40	.28 - .36 .36 - .44	.22 - .30 .31 - .39	.27 - .35 .35 - .43	.32 - .40 .42 - .50	.26 - .34 .34 - .42	.30 - .38 .38 - .46	.37 - .45 .48 - .56
1 acre per unit	.14 - .24 .22 - .32	.19 - .29 .26 - .36	.22 - .32 .29 - .39	.17 - .25 .24 - .32	.21 - .29 .28 - .36	.26 - .34 .34 - .42	.20 - .28 .28 - .36	.25 - .33 .32 - .40	.31 - .39 .40 - .48	.24 - .32 .31 - .39	.29 - .37 .35 - .43	.35 - .43 .46 - .54
MISC. SURFACES Pavement and roofs	.93 .95	.94 .96	.95 .97	.93 .95	.94 .96	.95 .97	.93 .95	.94 .96	.95 .97	.93 .95	.94 .96	.95 .97
Traffic areas (soil and gravel)	.55 - .65 .65 - .70	.60 - .70 .70 - .75	.64 - .74 .74 - .79	.60 - .68 .68 - .76	.64 - .72 .72 - .80	.67 - .75 .75 - .83	.64 - .72 .72 - .80	.67 - .75 .75 - .83	.69 - .77 .77 - .85	.72 - .80 .79 - .87	.75 - .83 .82 - .90	.77 - .85 .84 - .92
Green landscaping (lawns, parks)	.10 - .20 .14 - .24	.16 - .26 .22 - .32	.25 - .35 .30 - .40	.14 - .22 .20 - .28	.22 - .30 .28 - .36	.30 - .38 .37 - .45	.20 - .28 .26 - .34	.28 - .36 .35 - .43	.36 - .44 .42 - .52	.24 - .32 .30 - .38	.30 - .38 .40 - .48	.40 - .48 .50 - .58
Non-green and gravel landscaping	.30 - .40 .34 - .44	.36 - .46 .42 - .52	.45 - .55 .50 - .60	.45 - .55 .50 - .60	.42 - .50 .48 - .56	.50 - .58 .57 - .65	.40 - .48 .46 - .54	.48 - .56 .55 - .63	.56 - .64 .64 - .72	.44 - .52 .50 - .58	.50 - .58 .60 - .68	.60 - .68 .70 - .78
Cemeteries, playgrounds	.20 - .30 .24 - .34	.26 - .36 .32 - .42	.35 - .45 .40 - .50	.35 - .45 .40 - .50	.32 - .40 .38 - .46	.40 - .48 .47 - .55	.30 - .38 .36 - .44	.38 - .44 .45 - .53	.46 - .54 .54 - .62	.34 - .42 .40 - .48	.40 - .48 .50 - .58	.50 - .58 .60 - .68

NOTES:
1. Values above and below pertain to the 2-year and 100-year storms, respectively.
2. The range of values provided allows for engineering judgement of site conditions such as basic shape, homogeneity of surface type, surface depression storage, and storm duration. In general, during shorter duration storms ($T_c \le 10$ minutes), infiltration capacity is higher, allowing use of a "C" value in the low range. Conversely, for longer duration storms ($T_c > 30$ minutes), use a ""C value in the higher range.
3. For residential development at less than 1/8 acre per unit or greater than 1 acre per unit, and also for commercial and industrial areas, use values under MISC SURFACES to estimate "C" value ranges for use.

RATIONAL METHOD RUNOFF COEFFICIENTS
(Modified from Table 4, UC-Davis, which appears to be a modification of work done by Rawls)

TABLE "B-1"

[illegible]

2/1/04

FIGURE S-4 RUNOFF CURVE NUMBERS FOR HYDROLOGIC SOIL-COVER COMPLEXES
(Antecedent moisture condition II, and I_a - 0.2 S)

Land use	Cover Treatment or practice	Hydrologic condition	Hydrologic soil group A	B	C	D
Fallow	Straight row	----	77	86	91	94
Row crops 3/	"	Poor	72	81	88	91
	"	Good	67	78	85	89
	Contoured	Poor	70	79	84	88
	"	Good	65	75	82	86
	"and terraced	Poor	66	74	80	82
	" " "	Good	62	71	78	81
Small 3/ grain	Straight row	Poor	65	76	84	88
		Good	63	75	83	87
	Contoured	Poor	63	74	82	85
		Good	61	73	81	84
	"and terraced	Poor	61	72	79	82
		Good	59	70	78	81
Close-seeded legumes 1/ or rotation meadow	Straight row	Poor	66	77	85	89
	" "	Good	58	72	81	85
	Contoured	Poor	64	75	83	85
	"	Good	55	69	78	83
	"and terraced	Poor	63	73	80	83
	"and terraced	Good	51	67	76	80
Pasture or range		Poor	68	79	86	89
		Fair	49	69	79	84
		Good	39	61	74	80
	Contoured	Poor	47	67	81	88
	"	Fair	25	59	75	83
	"	Good	6	35	70	79
Meadow		Good	30	58	71	78
Woods (Isolated groves on farms & ranches)		Poor	45	66	77	83
		Fair	36	60	73	79
		Good	25	55	70	77
Farmsteads		----	59	74	82	86
Roads (dirt) 2/		----	72	82	87	89
(hard surface) 2/		----	74	84	90	92

1/ Close-drilled or broadcast
2/ Including right-of-way
3/ Do not use adjustments for contoured or terraced treatments with storm frequencies greater than 10 years.

USE, CN = 75 ±

Quick TR-55 Ver.5.46 S/N:
Executed: 17:48:42 02-02-2004 WLDWD-2.TCT

SUMMARY SHEET FOR Tc or Tt COMPUTATIONS
(Solved for Time using TR-55 Methods)

Wildwood Acres, Filing 2
2/1/04
DEVELOPED BASINS 1a - 7

Subarea descr.	Tc or Tt	Time (hrs)
DEV 1-a	Tc	0.39
DEV 1-b	Tc	0.35
DEV 2-a, 3-a	Tc	0.19
DEV 2-b	Tc	0.31
DEV 3-b	Tc	0.33
DEV 4-a	Tc	0.31
DEV 4-b	Tc	0.34
DEV 5	Tc	0.33
DEV 6	Tc	0.32
DEV 7	Tc	0.25

Quick TR-55 Ver.5.46 S/N:
Executed: 18:07:29 02-02-2004 DENTON.TCT

SUMMARY SHEET FOR Tc or Tt COMPUTATIONS
(Solved for Time using TR-55 Methods)

Wildwood Acres Subdivision, Filing 2
DENTON DRAIN BASIN - OFFSITE
HISTORIC CONDITION
2/1/04

Subarea descr.	Tc or Tt	Time (hrs)
DENTON OFFSITE	Tc	1.06

```
Quick TR-55 Ver.5.46   S/N:
Executed: 18:07:29   02-02-2004    DENTON.TCT

                     Wildwood Acres Subdivision, Filing 2
                        DENTON DRAIN BASIN - OFFSITE
                            HISTORIC CONDITION
                                  2/1/04

                       Tc COMPUTATIONS FOR: DENTON OFFSITE

SHEET FLOW (Applicable to Tc only)
    Segment ID                                      1
    Surface description                        FARM
    Manning's roughness coeff., n                   0.0400
    Flow length, L (total < or = 300)        ft     300.0
    Two-yr 24-hr rainfall, P2                in     0.700
    Land slope, s                          ft/ft    0.0100
                          0.8
         .007 * (n*L)
    T =  --------------                      hrs      0.39              =  0.39
            0.5    0.4
          P2    *   s

SHALLOW CONCENTRATED FLOW
    Segment ID                                     2
    Surface (paved or unpaved)?                    Unpaved
    Flow length, L                           ft    2100.0
    Watercourse slope, s                   ft/ft   0.0143

                            0.5
    Avg.V =  Csf *  (s)                     ft/s   1.9294
    where:   Unpaved Csf = 16.1345
             Paved   Csf = 20.3282

    T = L / (3600*V)                         hrs      0.30              =  0.30


CHANNEL FLOW
    Segment ID                                     2
    Cross Sectional Flow Area, a          sq.ft      2.50
    Wetted perimeter, Pw                     ft     14.50
    Hydraulic radius, r = a/Pw               ft     0.172
    Channel slope, s                       ft/ft   0.0050
    Manning's roughness coeff., n                  0.0160

                      2/3    1/2
         1.49  *  r    *  s
    V =  --------------------               ft/s   2.0399
                  n

    Flow length, L                           ft      2700

    T = L / (3600*V)                         hrs      0.37              =  0.37

   :::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                               TOTAL TIME (hrs)        1.06
```

Quick TR-55 Ver.5.46 S/N:
Executed: 17:48:42 02-02-2004 WLDWD-2.TCT

Wildwood Acres, Filing 2
2/1/04
DEVELOPED BASINS 1a - 7

Tc COMPUTATIONS FOR: DEV 1-a

```
SHEET FLOW (Applicable to Tc only)
    Segment ID                                          1
    Surface description                          YARD
    Manning's roughness coeff., n                      0.0450
    Flow length, L (total < or = 300)     ft          120.0
    Two-yr 24-hr rainfall, P2             in          0.700
    Land slope, s                         ft/ft       0.0100
                        0.8
        .007 * (n*L)
    T = --------------                    hrs         0.20          =  0.20
           0.5    0.4
         P2    *   s

SHALLOW CONCENTRATED FLOW
    Segment ID
    Surface (paved or unpaved)?
    Flow length, L                        ft          0.0
    Watercourse slope, s                  ft/ft       0.0000

                          0.5
    Avg.V =  Csf *  (s)                   ft/s        0.0000
    where:   Unpaved Csf = 16.1345
             Paved   Csf = 20.3282

    T = L / (3600*V)                      hrs         0.00          =  0.00

CHANNEL FLOW
    Segment ID                                        2
    Cross Sectional Flow Area, a          sq.ft       2.50
    Wetted perimeter, Pw                  ft         14.50
    Hydraulic radius, r = a/Pw            ft          0.172
    Channel slope, s                      ft/ft       0.0050
    Manning's roughness coeff., n                     0.0160

                     2/3    1/2
        1.49   *   r    *   s
    V = --------------------              ft/s        2.0399
                 n

    Flow length, L                        ft          1350

    T = L / (3600*V)                      hrs         0.18          =  0.18

    :::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                           TOTAL TIME (hrs)         0.39
```

Quick TR-55 Ver.5.46 S/N:
Executed: 17:48:42 02-02-2004 WLDWD-2.TCT

Wildwood Acres, Filing 2
2/1/04
DEVELOPED BASINS 1a - 7

Tc COMPUTATIONS FOR: DEV 1-b

SHEET FLOW (Applicable to Tc only)

Segment ID		1	
Surface description		YARD	
Manning's roughness coeff., n		0.0450	
Flow length, L (total < or = 300)	ft	100.0	
Two-yr 24-hr rainfall, P2	in	0.700	
Land slope, s	ft/ft	0.0100	
$T = \dfrac{.007 * (n*L)^{0.8}}{P2^{0.5} * s^{0.4}}$	hrs	0.18	= 0.18

SHALLOW CONCENTRATED FLOW

Segment ID			
Surface (paved or unpaved)?			
Flow length, L	ft	0.0	
Watercourse slope, s	ft/ft	0.0000	
$Avg.V = Csf * (s)^{0.5}$	ft/s	0.0000	
where: Unpaved Csf = 16.1345			
Paved Csf = 20.3282			
T = L / (3600*V)	hrs	0.00	= 0.00

CHANNEL FLOW

Segment ID		2	
Cross Sectional Flow Area, a	sq.ft	2.50	
Wetted perimeter, Pw	ft	14.50	
Hydraulic radius, r = a/Pw	ft	0.172	
Channel slope, s	ft/ft	0.0050	
Manning's roughness coeff., n		0.0160	
$V = \dfrac{1.49 * r^{2/3} * s^{1/2}}{n}$	ft/s	2.0399	
Flow length, L	ft	1250	
T = L / (3600*V)	hrs	0.17	= 0.17

::

TOTAL TIME (hrs) 0.35

```
Quick TR-55 Ver.5.46    S/N:
Executed: 17:48:42    02-02-2004    WLDWD-2.TCT

                         Wildwood Acres, Filing 2
                                 2/1/04
                         DEVELOPED BASINS 1a - 7


                     Tc COMPUTATIONS FOR: DEV 2-a, 3-a

 SHEET FLOW (Applicable to Tc only)
     Segment ID                                         1
     Surface description                          YARD
     Manning's roughness coeff., n                       0.0450
     Flow length, L (total < or = 300)         ft      100.0
     Two-yr 24-hr rainfall, P2                 in      0.700
     Land slope, s                          ft/ft      0.0100
                              0.8
          .007 * (n*L)
     T =  --------------                       hrs      0.18          =  0.18
              0.5     0.4
            P2    *   s

 SHALLOW CONCENTRATED FLOW
     Segment ID
     Surface (paved or unpaved)?
     Flow length, L                             ft       0.0
     Watercourse slope, s                    ft/ft    0.0000

                                0.5
     Avg.V =   Csf *   (s)                   ft/s     0.0000
     where:    Unpaved Csf = 16.1345
               Paved   Csf = 20.3282

     T = L / (3600*V)                          hrs      0.00          =  0.00


 CHANNEL FLOW
     Segment ID                                        2
     Cross Sectional Flow Area, a          sq.ft       2.50
     Wetted perimeter, Pw                     ft      14.50
     Hydraulic radius, r = a/Pw               ft      0.172
     Channel slope, s                      ft/ft     0.0050
     Manning's roughness coeff., n                   0.0160

                          2/3     1/2
           1.49   *   r    *   s
     V =  --------------------                ft/s     2.0399
                         n

     Flow length, L                             ft       100

     T = L / (3600*V)                          hrs      0.01          =  0.01
   ::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                         TOTAL TIME (hrs)          0.19
```

Quick TR-55 Ver.5.46   S/N:
Executed: 17:48:42   02-02-2004   WLDWD-2.TCT

Wildwood Acres, Filing 2
2/1/04
DEVELOPED BASINS 1a - 7

Tc COMPUTATIONS FOR: DEV 2-b

```
SHEET FLOW (Applicable to Tc only)
    Segment ID                                            1
    Surface description                               YARD
    Manning's roughness coeff., n                          0.0450
    Flow length, L (total < or = 300)            ft        100.0
    Two-yr 24-hr rainfall, P2                    in        0.700
    Land slope, s                               ft/ft      0.0100
                       0.8
         .007 * (n*L)
    T = --------------                          hrs        0.18         =  0.18
            0.5    0.4
          P2   *   s

SHALLOW CONCENTRATED FLOW
    Segment ID
    Surface (paved or unpaved)?
    Flow length, L                               ft        0.0
    Watercourse slope, s                        ft/ft      0.0000

                            0.5
    Avg.V =  Csf *  (s)                         ft/s       0.0000
    where:   Unpaved Csf = 16.1345
             Paved   Csf = 20.3282

    T = L / (3600*V)                            hrs        0.00         =  0.00

CHANNEL FLOW
    Segment ID                                            2
    Cross Sectional Flow Area, a                sq.ft      2.50
    Wetted perimeter, Pw                         ft        14.50
    Hydraulic radius, r = a/Pw                   ft        0.172
    Channel slope, s                            ft/ft      0.0050
    Manning's roughness coeff., n                          0.0160

                     2/3    1/2
         1.49   *  r   *  s
    V = --------------------                    ft/s       2.0399
                   n

    Flow length, L                               ft        1000

    T = L / (3600*V)                            hrs        0.14         =  0.14
  :::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                                TOTAL TIME (hrs)      0.31
```

```
Quick TR-55 Ver.5.46    S/N:
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                              Wildwood Acres, Filing 2
                                       2/1/04
                              DEVELOPED BASINS 1a - 7


                         Tc COMPUTATIONS FOR: DEV 3-b

 SHEET FLOW (Applicable to Tc only)
     Segment ID                                        1
     Surface description                          YARD
     Manning's roughness coeff., n                      0.0450
     Flow length, L (total < or = 300)          ft     120.0
     Two-yr 24-hr rainfall, P2                  in     0.700
     Land slope, s                           ft/ft    0.0100
                                0.8
           .007 * (n*L)
     T =   --------------                      hrs      0.20                 =  0.20
              0.5     0.4
            P2    *    s

 SHALLOW CONCENTRATED FLOW
     Segment ID
     Surface (paved or unpaved)?
     Flow length, L                              ft       0.0
     Watercourse slope, s                     ft/ft    0.0000

                                  0.5
     Avg.V =   Csf *   (s)                     ft/s    0.0000
     where:    Unpaved Csf = 16.1345
               Paved   Csf = 20.3282

     T = L / (3600*V)                           hrs      0.00                 =  0.00


 CHANNEL FLOW
     Segment ID                                        2
     Cross Sectional Flow Area, a             sq.ft      2.50
     Wetted perimeter, Pw                        ft     14.50
     Hydraulic radius, r = a/Pw                  ft     0.172
     Channel slope, s                         ft/ft    0.0050
     Manning's roughness coeff., n                     0.0160

                        2/3     1/2
          1.49   *   r    *   s
     V =  --------------------                 ft/s    2.0399
                       n

     Flow length, L                              ft       950

     T = L / (3600*V)                           hrs      0.13                 =  0.13

    :::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                               TOTAL TIME (hrs)               0.33
```

```
Quick TR-55 Ver.5.46   S/N:
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                         Wildwood Acres, Filing 2
                                 2/1/04
                         DEVELOPED BASINS 1a - 7

                    Tc COMPUTATIONS FOR: DEV 4-a

SHEET FLOW (Applicable to Tc only)
    Segment ID                                           1
    Surface description                           YARD
    Manning's roughness coeff., n                        0.0450
    Flow length, L (total < or = 300)        ft     130.0
    Two-yr 24-hr rainfall, P2                 in      0.700
    Land slope, s                           ft/ft    0.0100
                               0.8
         .007 * (n*L)
    T =  -------------                      hrs       0.22          =  0.22
              0.5    0.4
           P2    *  s

SHALLOW CONCENTRATED FLOW
    Segment ID
    Surface (paved or unpaved)?
    Flow length, L                            ft       0.0
    Watercourse slope, s                    ft/ft    0.0000

                              0.5
    Avg.V =  Csf *  (s)                     ft/s     0.0000
    where:   Unpaved Csf = 16.1345
             Paved   Csf = 20.3282

    T = L / (3600*V)                        hrs       0.00          =  0.00

CHANNEL FLOW
    Segment ID                                          2
    Cross Sectional Flow Area, a           sq.ft      2.50
    Wetted perimeter, Pw                      ft     14.50
    Hydraulic radius, r = a/Pw                ft     0.172
    Channel slope, s                        ft/ft    0.0050
    Manning's roughness coeff., n                    0.0160

                      2/3    1/2
          1.49  *  r    *  s
    V =  --------------------               ft/s     2.0399
                   n

    Flow length, L                            ft       700

    T = L / (3600*V)                        hrs       0.10          =  0.10
  ::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                            TOTAL TIME (hrs)        0.31
```

Quick TR-55 Ver.5.46 S/N:
Executed: 17:48:42 02-02-2004 WLDWD-2.TCT

Wildwood Acres, Filing 2
2/1/04
DEVELOPED BASINS 1a - 7

Tc COMPUTATIONS FOR: DEV 4-b

SHEET FLOW (Applicable to Tc only)

Segment ID		1	
Surface description		YARD	
Manning's roughness coeff., n		0.0450	
Flow length, L (total < or = 300)	ft	100.0	
Two-yr 24-hr rainfall, P2	in	0.700	
Land slope, s	ft/ft	0.0100	
$T = \frac{.007 * (n*L)^{0.8}}{P2^{0.5} * s^{0.4}}$	hrs	0.18	= 0.18

SHALLOW CONCENTRATED FLOW

Segment ID			
Surface (paved or unpaved)?			
Flow length, L	ft	0.0	
Watercourse slope, s	ft/ft	0.0000	
$Avg.V = Csf * (s)^{0.5}$	ft/s	0.0000	
where: Unpaved Csf = 16.1345			
Paved Csf = 20.3282			
T = L / (3600*V)	hrs	0.00	= 0.00

CHANNEL FLOW

Segment ID		2	
Cross Sectional Flow Area, a	sq.ft	2.50	
Wetted perimeter, Pw	ft	14.50	
Hydraulic radius, r = a/Pw	ft	0.172	
Channel slope, s	ft/ft	0.0050	
Manning's roughness coeff., n		0.0160	
$V = \frac{1.49 * r^{2/3} * s^{1/2}}{n}$	ft/s	2.0399	
Flow length, L	ft	1200	
T = L / (3600*V)	hrs	0.16	= 0.16

::

TOTAL TIME (hrs) 0.34

```
Quick TR-55 Ver.5.46   S/N:
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                         Wildwood Acres, Filing 2
                                 2/1/04
                         DEVELOPED BASINS 1a - 7


                      Tc COMPUTATIONS FOR: DEV 5

SHEET FLOW (Applicable to Tc only)
    Segment ID                                        1
    Surface description                           YARD
    Manning's roughness coeff., n                      0.0450
    Flow length, L (total < or = 300)       ft      120.0
    Two-yr 24-hr rainfall, P2               in      0.700
    Land slope, s                        ft/ft      0.0100
                            0.8
             .007 * (n*L)
    T =     --------------                  hrs      0.20          =  0.20
                0.5     0.4
              P2    *   s

SHALLOW CONCENTRATED FLOW
    Segment ID
    Surface (paved or unpaved)?
    Flow length, L                           ft        0.0
    Watercourse slope, s                  ft/ft     0.0000

                              0.5
    Avg.V =  Csf *  (s)                    ft/s     0.0000
    where:   Unpaved Csf = 16.1345
             Paved   Csf = 20.3282

    T = L / (3600*V)                        hrs       0.00          =  0.00


CHANNEL FLOW
    Segment ID                                        2
    Cross Sectional Flow Area, a         sq.ft       2.50
    Wetted perimeter, Pw                    ft      14.50
    Hydraulic radius, r = a/Pw              ft      0.172
    Channel slope, s                     ft/ft     0.0050
    Manning's roughness coeff., n                  0.0160

                         2/3     1/2
             1.49   *  r    *   s
    V =     --------------------           ft/s     2.0399
                        n

    Flow length, L                          ft        930

    T = L / (3600*V)                       hrs       0.13          =  0.13

::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                          TOTAL TIME (hrs)         0.33
```

Quick TR-55 Ver.5.46 S/N:
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Wildwood Acres, Filing 2
2/1/04
DEVELOPED BASINS 1a - 7

Tc COMPUTATIONS FOR: DEV 6

SHEET FLOW (Applicable to Tc only)

Segment ID		1	
Surface description		YARD	
Manning's roughness coeff., n		0.0450	
Flow length, L (total < or = 300)	ft	150.0	
Two-yr 24-hr rainfall, P2	in	0.700	
Land slope, s	ft/ft	0.0100	
$T = \frac{.007 * (n*L)^{0.8}}{P2^{0.5} * s^{0.4}}$	hrs	0.24	= 0.24

SHALLOW CONCENTRATED FLOW

Segment ID			
Surface (paved or unpaved)?			
Flow length, L	ft	0.0	
Watercourse slope, s	ft/ft	0.0000	
Avg.V = Csf * $(s)^{0.5}$	ft/s	0.0000	
where: Unpaved Csf = 16.1345			
Paved Csf = 20.3282			
T = L / (3600*V)	hrs	0.00	= 0.00

CHANNEL FLOW

Segment ID		2	
Cross Sectional Flow Area, a	sq.ft	2.50	
Wetted perimeter, Pw	ft	14.50	
Hydraulic radius, r = a/Pw	ft	0.172	
Channel slope, s	ft/ft	0.0050	
Manning's roughness coeff., n		0.0160	
$V = \frac{1.49 * r^{2/3} * s^{1/2}}{n}$	ft/s	2.0399	
Flow length, L	ft	530	
T = L / (3600*V)	hrs	0.07	= 0.07

::

TOTAL TIME (hrs) 0.32

```
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Executed: 17:48:42   02-02-2004    WLDWD-2.TCT

                              Wildwood Acres, Filing 2
                                      2/1/04
                              DEVELOPED BASINS 1a - 7


                          Tc COMPUTATIONS FOR: DEV 7

 SHEET FLOW (Applicable to Tc only)
     Segment ID                                    1
     Surface description                        YARD
     Manning's roughness coeff., n                   0.0450
     Flow length, L (total < or = 300)       ft     100.0
     Two-yr 24-hr rainfall, P2                in     0.700
     Land slope, s                          ft/ft    0.0100
                           0.8
          .007 * (n*L)
     T =  --------------                     hrs      0.18                   =  0.18
             0.5    0.4
           P2    *   s

 SHALLOW CONCENTRATED FLOW
     Segment ID
     Surface (paved or unpaved)?
     Flow length, L                           ft       0.0
     Watercourse slope, s                   ft/ft    0.0000

                             0.5
     Avg.V =  Csf *  (s)                    ft/s     0.0000
     where:   Unpaved Csf = 16.1345
              Paved   Csf = 20.3282

     T = L / (3600*V)                        hrs      0.00                   =  0.00


 CHANNEL FLOW
     Segment ID                                    2
     Cross Sectional Flow Area, a          sq.ft      2.50
     Wetted perimeter, Pw                     ft     14.50
     Hydraulic radius, r = a/Pw               ft     0.172
     Channel slope, s                       ft/ft    0.0050
     Manning's roughness coeff., n                   0.0160

                         2/3    1/2
          1.49  *  r   *  s
     V =  --------------------              ft/s     2.0399
                   n

     Flow length, L                           ft       520

     T = L / (3600*V)                        hrs      0.07                   =  0.07

    ::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                                 TOTAL TIME (hrs)       0.25
```

Quick TR-55 Ver.5.46 S/N:
Executed: 09:53:08 02-02-2004

WILDWOOD ACRES, FILING 2
DEVELOPED BASIN 1-A
2/1/04

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A

Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

					RETURN FREQUENCY = 2 years 'C' adjustment, k = 1 Adj. 'C' = Wtd.'C' x 1			
Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
1-A	0.330	3.92						
			23.00	0.330	0.330	0.640	3.92	0.83

Quick TR-55 Ver.5.46 S/N:
Executed: 09:53:08 02-02-2004

WILDWOOD ACRES, FILING 2
DEVELOPED BASIN 1-A
2/1/04

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 100 years
'C' adjustment, k = 1.2727
Adj. 'C' = Wtd.'C' x 1.2727

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
1-A	0.330	3.92						
			23.00	0.330	0.420	2.510	3.92	4.13

Quick TR-55 Ver.5.46 S/N:
Executed: 09:54:00 02-02-2004

WILDWOOD ACRES, FILING 2
DEVELOPED BASIN 1-B
2/1/04

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 2 years
'C' adjustment, k = 1
Adj. 'C' = Wtd.'C' x 1

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
1-B	0.330	7.94						
			21.00	0.330	0.330	0.670	7.94	1.76

Quick TR-55 Ver.5.46 S/N:
Executed: 09:54:00 02-02-2004

WILDWOOD ACRES, FILING 2
DEVELOPED BASIN 1-B
2/1/04

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 100 years
'C' adjustment, k = 1.2727
Adj. 'C' = Wtd.'C' x 1.2727

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
1-B	0.330	7.94						
			21.00	0.330	0.420	2.630	7.94	8.77

Quick TR-55 Ver.5.46 S/N:
Executed: 09:54:38 02-02-2004

WILDWOOD ACRES, FILING 2
DEVELOPED BASIN 2-A
2/1/04

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 2 years
'C' adjustment, k = 1
Adj. 'C' = Wtd.'C' x 1

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
2-A	0.330	0.36						
			11.00	0.330	0.330	0.890	0.36	0.11

Quick TR-55 Ver.5.46 S/N:
Executed: 09:54:38 02-02-2004

WILDWOOD ACRES, FILING 2
DEVELOPED BASIN 2-A
2/1/04

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 100 years
'C' adjustment, k = 1.2727
Adj. 'C' = Wtd.'C' x 1.2727

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
2-A	0.330	0.36						
			11.00	0.330	0.420	3.520	0.36	0.53

Quick TR-55 Ver.5.46 S/N:
Executed: 09:56:14 02-02-2004

WILDWOOD ACRES, FILING 2
DEVELOPED BASIN 2-B
2/1/04

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 2 years
'C' adjustment, k = 1
Adj. 'C' = Wtd.'C' x 1

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
2-B	0.330	2.08						
			19.00	0.330	0.330	0.700	2.08	0.48

Quick TR-55 Ver.5.46 S/N:
Executed: 09:56:14 02-02-2004

WILDWOOD ACRES, FILING 2
DEVELOPED BASIN 2-B
2/1/04

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 100 years
'C' adjustment, k = 1.2727
Adj. 'C' = Wtd.'C' x 1.2727

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
2-B	0.330	2.08						
			19.00	0.330	0.420	2.770	2.08	2.42

Quick TR-55 Ver.5.46 S/N:
Executed: 09:56:45 02-02-2004

WILDWOOD ACRES, FILING 2
DEVELOPED BASIN 3-A
2/1/04

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 2 years
'C' adjustment, k = 1
Adj. 'C' = Wtd.'C' x 1

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
3-A	0.330	0.24						
			11.00	0.330	0.330	0.890	0.24	0.07

Quick TR-55 Ver.5.46 S/N:
Executed: 09:56:45 02-02-2004

WILDWOOD ACRES, FILING 2
DEVELOPED BASIN 3-A
2/1/04

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 100 years
'C' adjustment, k = 1.2727
Adj. 'C' = Wtd.'C' x 1.2727

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
3-A	0.330	0.24						
			11.00	0.330	0.420	3.520	0.24	0.35

Quick TR-55 Ver.5.46 S/N:
Executed: 09:57:08 02-02-2004

WILDWOOD ACRES, FILING 2
DEVELOPED BASIN 3-B
2/1/04

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A

Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 2 years
'C' adjustment, k = 1
Adj. 'C' = Wtd.'C' x 1

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
3-B	0.330	3.01						
			20.00	0.330	0.330	0.680	3.01	0.68

Quick TR-55 Ver.5.46 S/N:
Executed: 09:57:08 02-02-2004

WILDWOOD ACRES, FILING 2
DEVELOPED BASIN 3-B
2/1/04

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 100 years
'C' adjustment, k = 1.2727
Adj. 'C' = Wtd.'C' x 1.2727

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
3-B	0.330	3.01						
			20.00	0.330	0.420	2.700	3.01	3.41

Quick TR-55 Ver.5.46 S/N:
Executed: 10:00:03 02-02-2004

WILDWOOD ACRES, FILING 2
DEVELOPED BASIN 4-A
2/1/04

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

$$Q = adj * C * I * A$$

Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 2 years
'C' adjustment, k = 1
Adj. 'C' = Wtd.'C' x 1

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
4-A	0.330	2.47						
			19.00	0.330	0.330	0.700	2.47	0.57

Quick TR-55 Ver.5.46 S/N:
Executed: 10:00:03 02-02-2004

WILDWOOD ACRES, FILING 2
DEVELOPED BASIN 4-A
2/1/04

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 100 years
'C' adjustment, k = 1.2727
Adj. 'C' = Wtd.'C' x 1.2727

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
4-A	0.330	2.47						
			19.00	0.330	0.420	2.770	2.47	2.87

Quick TR-55 Ver.5.46 S/N:
Executed: 10:00:33 02-02-2004

WILDWOOD ACRES, FILING 2
DEVELOPED BASIN 4-B
2/1/04

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 2 years
'C' adjustment, k = 1
Adj. 'C' = Wtd.'C' x 1

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
4-B	0.330	3.19						
			20.00	0.330	0.330	0.680	3.19	0.72

Quick TR-55 Ver.5.46 S/N:
Executed: 10:00:33 02-02-2004

WILDWOOD ACRES, FILING 2
DEVELOPED BASIN 4-B
2/1/04

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 100 years
'C' adjustment, k = 1.2727
Adj. 'C' = Wtd.'C' x 1.2727

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
4-B	0.330	3.19						
			20.00	0.330	0.420	2.700	3.19	3.62

Quick TR-55 Ver.5.46 S/N:
Executed: 10:02:16 02-02-2004

WILDWOOD ACRES, FILING 2
DEVELOPED BASIN 5
2/1/04

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 2 years
'C' adjustment, k = 1
Adj. 'C' = Wtd.'C' x 1

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
5	0.330	4.33						
			20.00	0.330	0.330	0.680	4.33	0.97

Quick TR-55 Ver.5.46 S/N:
Executed: 10:02:16 02-02-2004

WILDWOOD ACRES, FILING 2
DEVELOPED BASIN 5
2/1/04

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A

Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 100 years
'C' adjustment, k = 1.2727
Adj. 'C' = Wtd.'C' x 1.2727

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
5	0.330	4.33						
			20.00	0.330	0.420	2.700	4.33	4.91

Quick TR-55 Ver.5.46 S/N:
Executed: 10:02:36 02-02-2004

WILDWOOD ACRES, FILING 2
DEVELOPED BASIN 6
2/1/04

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 2 years
'C' adjustment, k = 1
Adj. 'C' = Wtd.'C' x 1

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
6	0.330	8.24						
			19.00	0.330	0.330	0.700	8.24	1.90

Quick TR-55 Ver.5.46 S/N:
Executed: 10:02:36 02-02-2004

WILDWOOD ACRES, FILING 2
DEVELOPED BASIN 6
2/1/04

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 100 years
'C' adjustment, k = 1.2727
Adj. 'C' = Wtd.'C' x 1.2727

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
6	0.330	8.24						
			19.00	0.330	0.420	2.770	8.24	9.59

Quick TR-55 Ver.5.46 S/N:
Executed: 10:02:59 02-02-2004

WILDWOOD ACRES, FILING 2
DEVELOPED BASIN 7
2/1/04

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 2 years
'C' adjustment, k = 1
Adj. 'C' = Wtd.'C' x 1

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
7	0.330	4.71						
			15.00	0.330	0.330	0.790	4.71	1.23

Quick TR-55 Ver.5.46 S/N:
Executed: 10:02:59 02-02-2004

WILDWOOD ACRES, FILING 2
DEVELOPED BASIN 7
2/1/04

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 100 years
'C' adjustment, k = 1.2727
Adj. 'C' = Wtd.'C' x 1.2727

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
7	0.330	4.71						
			15.00	0.330	0.420	3.110	4.71	6.15

Quick TR-55 Ver.5.46 S/N:
Executed: 11:15:27 02-03-2004

WILDWOOD ACRES, FILING 2
DEVELOPED BASIN A (COMBINED BASINS 1-A THRU 4-B)
2/2/04

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 2 years
'C' adjustment, k = 1
Adj. 'C' = Wtd.'C' x 1

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
A (COMB.)	0.330	23.21						
			25.00	0.330	0.330	0.610	23.21	4.67

Quick TR-55 Ver.5.46 S/N:
Executed: 11:15:27 02-03-2004

WILDWOOD ACRES, FILING 2
DEVELOPED BASIN A (COMBINED BASINS 1-A THRU 4-B)
2/2/04

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 100 years
'C' adjustment, k = 1.2727
Adj. 'C' = Wtd.'C' x 1.2727

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
A (COMB.)	0.330	23.21						
			25.00	0.330	0.420	2.390	23.21	23.30

Quick TR-55 Version: 5.46 S/N:

>>>>> GRAPHICAL PEAK DISCHARGE METHOD <<<<<

DENTON DRAIN - OFFSITE
WILDWOOD ACRES, FILING 2
2/01//04
EXCLUDING ONSITE BASINS

CALCULATED
DISK FILE: DENTON .GPD

Drainage Area	(acres)	124	--->	0.1938 sq.mi.
Runoff Curve Number	(CN)	75		
Time of Concentration,Tc	(hrs)	1.06		
Rainfall Distribution	(Type)	II		
Pond and Swamp Areas	(%)	0	--->	0.0 acres

	Storm #1	Storm #2	Storm #3
Frequency (years)	2	100	
Rainfall, P, 24-hr (in)	0.7	2.01	
Initial Abstraction, Ia (in)	0.667	0.667	0.667
Ia/p Ratio	0.952	0.332	0.000
Unit Discharge, * qu (csm/in)	155	264	0
Runoff, Q (in)	0.00	0.39	0.00
Pond & Swamp Adjustment Factor	1.00	1.00	1.00
PEAK DISCHARGE, qp (cfs)	0	20	0

Summary of Computations for qu

Ia/p	#1	0.500	0.300	0.000
C0	#1	2.203	2.465	0.000
C1	#1	-0.516	-0.623	0.000
C2	#1	-0.013	-0.117	0.000
qu (csm)	#1	154.794	281.508	0.000
Ia/p	#2	0.500	0.350	0.000
C0	#2	2.203	2.419	0.000
C1	#2	-0.516	-0.616	0.000
C2	#2	-0.013	-0.088	0.000
qu (csm)	#2	154.794	253.114	0.000
* qu (csm)		155	264	0

* Interpolated for computed Ia/p ratio (between Ia/p #1 & Ia/p #2)
If computed Ia/p exceeds Ia/p limits, bounding limit for Ia/p is used.

$$\log(qu) = C0 + (C1 * \log(Tc)) + (C2 * (\log(Tc))^2)$$

$$qp\ (cfs) = qu(csm) * Area(sq.mi.) * Q(in.) * (Pond\ \&\ Swamp\ Adj.)$$

Quick TR-55 Version: 5.46 S/N:

>>>>> GRAPHICAL PEAK DISCHARGE METHOD <<<<<

DENTON DRAIN - OFFSITE
WILDWOOD ACRES, FILING 2
2/01//04
INCLUDING ONSITE BASIN 7

CALCULATED
DISK FILE: DENTON .GPD

Drainage Area	(acres)	128.71--->	0.2011 sq.mi.
Runoff Curve Number	(CN)	75	
Time of Concentration,Tc	(hrs)	1.06	
Rainfall Distribution	(Type)	II	
Pond and Swamp Areas	(%)	0 --->	0.0 acres

	Storm #1	Storm #2	Storm #3
Frequency (years)	2	100	
Rainfall, P, 24-hr (in)	0.7	2.01	
Initial Abstraction, Ia (in)	0.667	0.667	0.667
Ia/p Ratio	0.952	0.332	0.000
Unit Discharge, * qu (csm/in)	155	264	0
Runoff, Q (in)	0.00	0.39	0.00
Pond & Swamp Adjustment Factor	1.00	1.00	1.00
PEAK DISCHARGE, qp (cfs)	0	20	0

Summary of Computations for qu

		Storm #1	Storm #2	Storm #3
Ia/p	#1	0.500	0.300	0.000
C0	#1	2.203	2.465	0.000
C1	#1	-0.516	-0.623	0.000
C2	#1	-0.013	-0.117	0.000
qu (csm)	#1	154.794	281.508	0.000
Ia/p	#2	0.500	0.350	0.000
C0	#2	2.203	2.419	0.000
C1	#2	-0.516	-0.616	0.000
C2	#2	-0.013	-0.088	0.000
qu (csm)	#2	154.794	253.114	0.000
* qu (csm)		155	264	0

* Interpolated for computed Ia/p ratio (between Ia/p #1 & Ia/p #2)
If computed Ia/p exceeds Ia/p limits, bounding limit for Ia/p is used.

$$\log(qu) = C0 + (C1 * \log(Tc)) + (C2 * (\log(Tc))^2)$$

qp (cfs) = qu(csm) * Area(sq.mi.) * Q(in.) * (Pond & Swamp Adj.)

Quick TR-55 Version: 5.46 S/N:

>>>>> GRAPHICAL PEAK DISCHARGE METHOD <<<<<

DENTON DRAIN - OFFSITE
WILDWOOD ACRES, FILING 2
2/01//04
INCLUDING ONSITE BASINS 6 AND 7

CALCULATED
DISK FILE: DENTON .GPD

Drainage Area	(acres)	136.95--->	0.2140 sq.mi.
Runoff Curve Number	(CN)	75	
Time of Concentration,Tc	(hrs)	1.06	
Rainfall Distribution	(Type)	II	
Pond and Swamp Areas	(%)	0 --->	0.0 acres

	Storm #1	Storm #2	Storm #3
Frequency (years)	2	100	
Rainfall, P, 24-hr (in)	0.7	2.01	
Initial Abstraction, Ia (in)	0.667	0.667	0.667
Ia/p Ratio	0.952	0.332	0.000
Unit Discharge, * qu (csm/in)	155	264	0
Runoff, Q (in)	0.00	0.39	0.00
Pond & Swamp Adjustment Factor	1.00	1.00	1.00
PEAK DISCHARGE, qp (cfs)	0	22	0

Summary of Computations for qu

		Storm #1	Storm #2	Storm #3
Ia/p	#1	0.500	0.300	0.000
C0	#1	2.203	2.465	0.000
C1	#1	-0.516	-0.623	0.000
C2	#1	-0.013	-0.117	0.000
qu (csm)	#1	154.794	281.508	0.000
Ia/p	#2	0.500	0.350	0.000
C0	#2	2.203	2.419	0.000
C1	#2	-0.516	-0.616	0.000
C2	#2	-0.013	-0.088	0.000
qu (csm)	#2	154.794	253.114	0.000
* qu (csm)		155	264	0

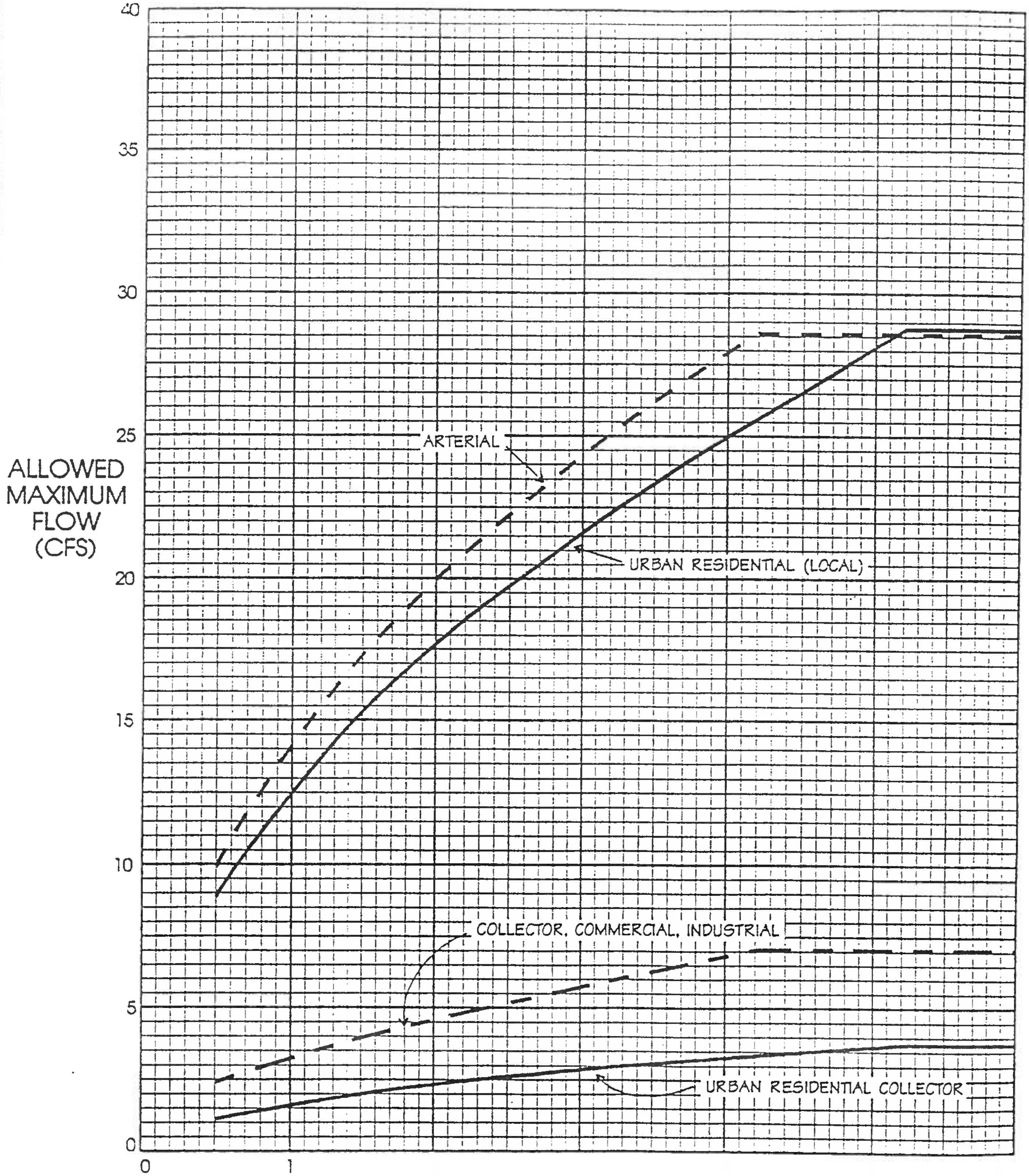
* Interpolated for computed Ia/p ratio (between Ia/p #1 & Ia/p #2)
If computed Ia/p exceeds Ia/p limits, bounding limit for Ia/p is used.

$$\log(qu) = C0 + (C1 * \log(Tc)) + (C2 * (\log(Tc))^2)$$

qp (cfs) = qu(csm) * Area(sq.mi.) * Q(in.) * (Pond & Swamp Adj.)

SECTION 3

HYDRAULICS



MAXIMUM HALF STREET FLOWS (Sx=2%, n=0.016)
(Based upon Figures G-3 and G-4)

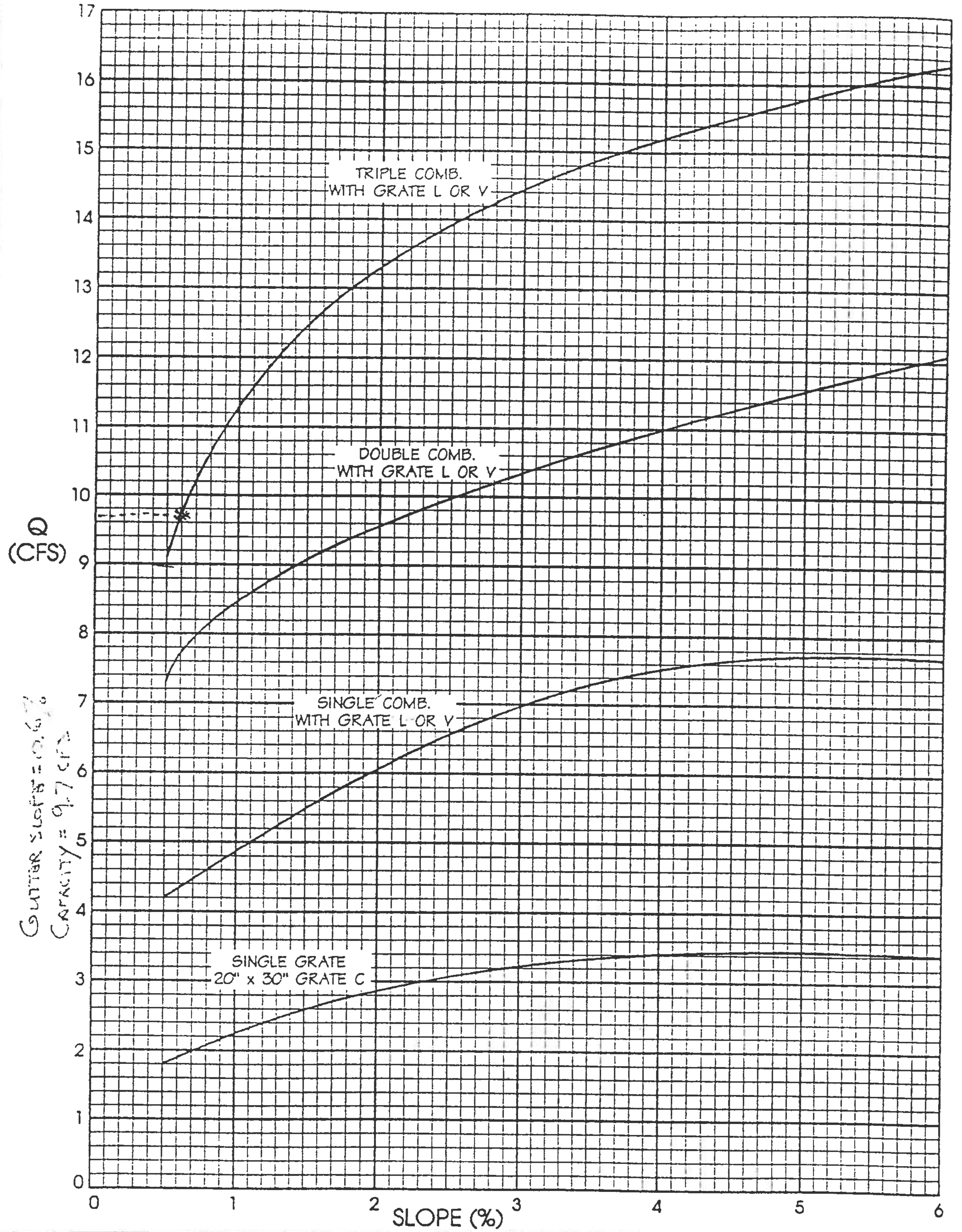
FIGURE "G-5"

ROAD TYPE	COMBINATION INLET CAPACITY (CFS)					
	SINGLE		DOUBLE		TRIPLE	
	2-YR	100-YR	2-YR	100-YR	2-YR	100-YR
Urban Residential (local)	6.4	13	9.5	22	12.7	31
Residential Collector, Commercial and Industrial Streets	3.2	13	4.9	22	6.5	31
Collector Streets (3000 - 8000 ADT)	2.7	13	4.0	22	5.3	31
Principal and Minor Arterials	6.0	13	9.0	22	12.0	31

Inlet capacities shown above are based upon: 1) use of non-curved vane grates (similar to HEC-12 P-1⅞-4 grates; 2) HEC-12 procedures; 3) clogging factors per Section VI; and 4) City/County standard inlets with 2-inch radius on curb face and type C grates. Capacities shown for 2-year storms are based upon depths allowed by maximum street inundation per Figure "G-3". The 100-year capacities are based upon a ponded depth of 1.0 foot. Note that only combination inlets are allowed in sag or sump conditions.

MAXIMUM INLET CAPACITIES: SUMP OR SAG CONDITION — **TABLE "G-1"**

INLET CAPACITIES PROVIDED ARE BASED UPON FIGURE "G-4", MAXIMUM ALLOWED FLOW CONDITIONS, SMF ENGINEERING CORP.'S HEC-12 SOFTWARE, CLOGGING FACTORS PRESENTED IN SECTION [illegible], AND CITY/COUNTY STANDARD INLETS.



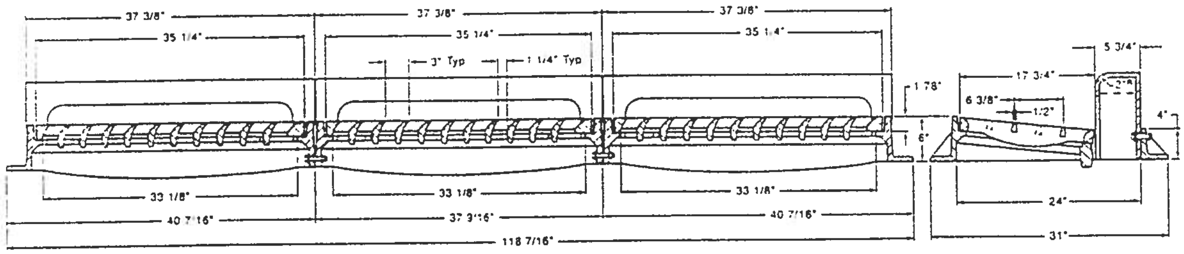
MAXIMUM INLET CAPACITIES: ON-GRADE
URBAN RESIDENTIAL (LOCAL)

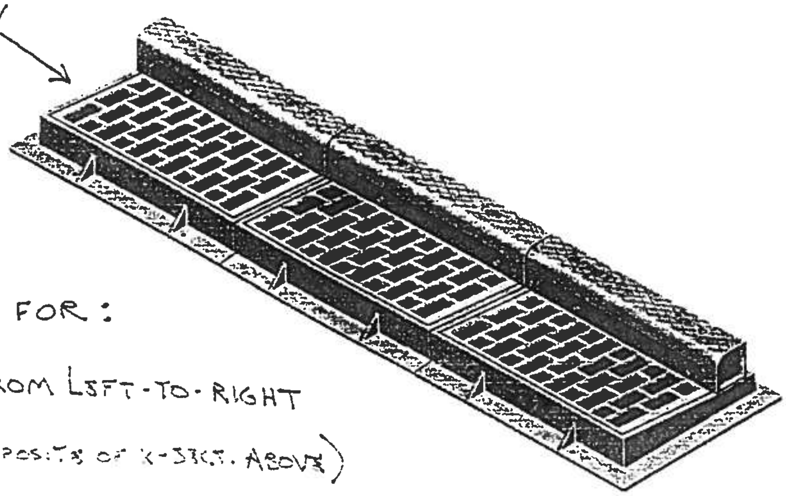
FIGURE "G-7a"

NOTE: When specifying or ordering grates–
Please refer to "CHOOSING THE PROPER INLET GRATE" on pages 108 and 109.

R-3295-3
Triple Unit Frame, Grate, Curb Box

Heavy Duty





SPECIFY FOR:

FLOW FROM LEFT-TO-RIGHT

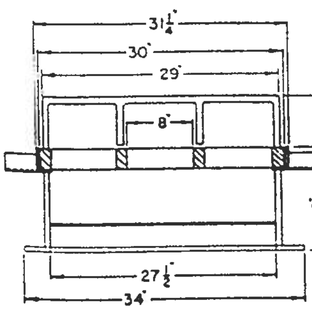
(VANES OPPOSITE OF R-3295-3 ABOVE)

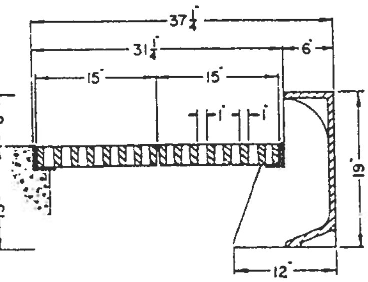
R-3297-1
Curb Inlet Frame, Grate, Curb Box

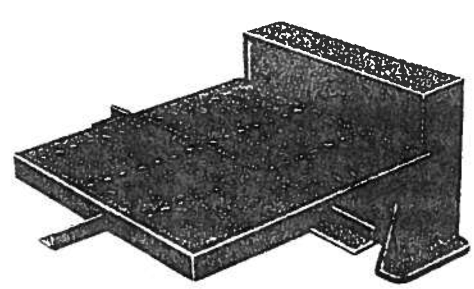
Heavy Duty

Fabricated steel frame. Gray iron grates and curb box.

Available with Type "L" grate.







culvert in question, the minimum size is satisfactory for the full 100-year design discharged in inlet control. If the headwater is too high, a larger size must be selected corresponding to the maximum permissible headwater. Now check for possible outlet control, as follows.

Outlet Control. Using the size selected for inlet control enter Fig. 4-22, 4-23, 4-24 or 4-25 to determine the headwater depth in outlet control. If the depth here is greater than that for inlet control, the culvert is assumed to be in outlet control and the higher depth applies.

Wall roughness factors used are stated on the flow charts. For other values of "n," use an adjusted value for length, L', calculated by the formula

$$L' = L\left(\frac{n'}{n}\right)^2 \quad \text{(14)}$$

where L = Actual length
n' = Actual value of Manning's n
n = Value of Manning's n shown on chart.

Using L' on the length scales in the charts, adjust the result for the Manning's n desired.

The appropriate k_e curve is selected for the entrance condition desired. Typical values of k_e are found in Table 4-9, page 156.

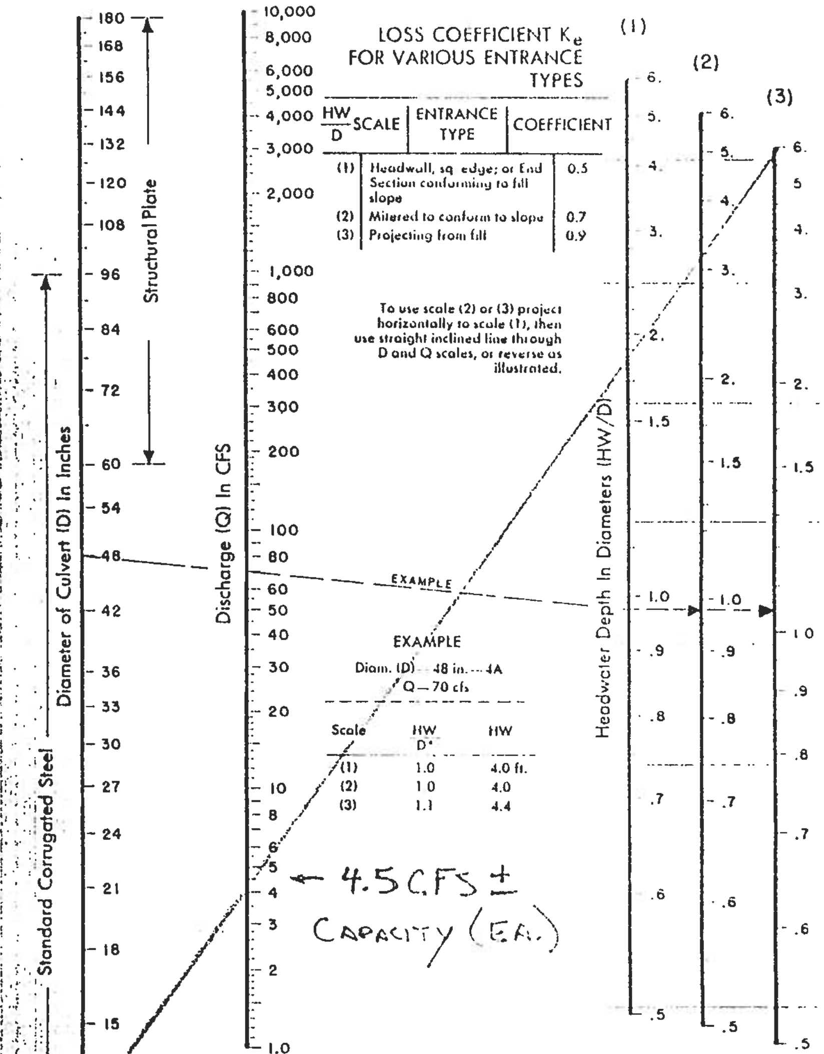
If the culvert is in outlet control and the headwater exceeds the allowable, a larger size can be selected corresponding to acceptable headwater depth. In such a case, alternate solutions should be considered for corrugated steel structures with lower roughness coefficients. See Table 4-10. A smaller size of paved pipe or helical pipe may be satisfactory.

Entrance conditions should also be considered. It may be economical to use a more efficient entrance than planned if a size difference results. Check the lowest k_e curve results.

Structural Plate Factors. Values of Manning's n for Structural Plate Pipe determined in the 1968 full-scale field measurements reported in Table 4-11 are shown for convenience on Figs. 4-24 and 4-25 together with the corresponding adjusted L value to be used. This data was not a part of the Federal Highway Administration charts, which were published in 1963.

OTHER CLASSES OF CULVERTS

This design procedure utilizes 10-year and 100-year flood discharge. Obviously there are culvert requirements of less importance which do not warrant these frequencies. Maximum, or design discharges for less critical culverts may be based on 25 or even 10-year floods. This is a matter of hydrology and is discussed briefly in Section A of this chapter. But, whatever the flood frequency is chosen for the design discharge, the rationale presented here is still usable. The culvert design may be balanced by requiring no static head at entrance for a lower frequency flood discharge than the design discharge frequency.



HEADWATER DEPTH FOR CORRUGATED STEEL PIPE CULVERTS WITH INLET CONTROL

Fig. 4-18. ***Inlet control*** **nomograph for corrugated steel *pipe* culverts. The manufacturers recommend keeping *HW/D* to a maximum of 1.5 and preferably to no more than 1.0.**

18" HALL STREET STORM SEWERS
Rating Table for Circular Channel

Project Description	
Project File	c:\haestad\fmw\wildwood.fm2
Worksheet	STORM SEWER - INTERCEPTOR (GJDD)
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Discharge

Constant Data		
Mannings Coefficient	0.010	
Depth	1.50	ft
Diameter	18.00	in

Input Data	Minimum	Maximum	Increment
Channel Slope	0.005000	0.050000	0.005000 ft/ft

Rating Table

Channel Slope (ft/ft)	Discharge (cfs)
0.005000	9.66
0.010000	13.65
0.015000	16.72
0.020000	19.31
0.025000	21.59
0.030000	23.65
0.035000	25.55
0.040000	27.31
0.045000	28.97
0.050000	30.53

18" HALL STREET STORM SEWER
Rating Table for Circular Channel

Project Description	
Project File	c:\haestad\fmw\wildwood.fm2
Worksheet	STORM SEWER - INTERCEPTOR (GJDD)
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Discharge

Constant Data		
Mannings Coefficient	0.010	
Depth	1.50	ft
Diameter	18.00	in

Input Data	Minimum	Maximum	Increment
Channel Slope	0.005000	0.050000	0.005000 ft/ft

Rating Table

Channel Slope (ft/ft)	Discharge (cfs)
0.005000	9.66
0.010000	13.65
0.015000	16.72
0.020000	19.31
0.025000	21.59
0.030000	23.65
0.035000	25.55
0.040000	27.31
0.045000	28.97
0.050000	30.53

24" HDPE STORM SEWER - INTERCEPTOR - HALL STREET (EXISTING)

Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\wildwood.fm2
Worksheet	STORM SEWER - INTERCEPTOR (GJDD)
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Discharge

Input Data		
Mannings Coefficient	0.010	
Channel Slope	0.005000	ft/ft
Depth	2.00	ft
Diameter	24.00	in

Results		
Discharge	20.79	cfs
Flow Area	3.14	ft²
Wetted Perimeter	6.28	ft
Top Width	0.6e-7	ft
Critical Depth	1.63	ft
Percent Full	100.00	
Critical Slope	0.005025	ft/ft
Velocity	6.62	ft/s
Velocity Head	0.68	ft
Specific Energy	2.68	ft
Froude Number	0.16e-3	
Maximum Discharge	22.37	cfs
Full Flow Capacity	20.79	cfs
Full Flow Slope	0.005000	ft/ft
Flow is subcritical.		

Table
Rating Table for Circular Channel

Project Description	
Project File	c:\haestad\fmw\wildwood.fm2
Worksheet	STORM SEWER - INTERCEPTOR (GJDD)
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Discharge

Constant Data		
Mannings Coefficient	0.010	
Depth	2.00	ft
Diameter	24.00	in

Input Data	Minimum	Maximum	Increment
Channel Slope	0.005000	0.050000	0.005000 ft/ft

Rating Table

Channel Slope (ft/ft)	Discharge (cfs)
0.005000	20.79
0.010000	29.41
0.015000	36.02
0.020000	41.59
0.025000	46.50
0.030000	50.94
0.035000	55.02
0.040000	58.82
0.045000	62.38
0.050000	65.76

12" HALL STREET STORM SEWERS - LATERALS FROM INLETS TO MAIN LINE IN HALL ST.
Rating Table for Circular Channel

Project Description	
Project File	c:\haestad\fmw\wildwood.fm2
Worksheet	STORM SEWER - INTERCEPTOR (GJDD)
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Discharge

Constant Data		
Mannings Coefficient	0.010	
Depth	1.00	ft
Diameter	12.00	in

Input Data	Minimum	Maximum	Increment
Channel Slope	0.005000	0.050000	0.005000 ft/ft

Rating Table

Channel Slope (ft/ft)	Discharge (cfs)
0.005000	3.27
0.010000	4.63
0.015000	5.67
0.020000	6.55
0.025000	7.32
0.030000	8.02
0.035000	8.66
0.040000	9.26
0.045000	9.82
0.050000	10.36