

CITY OF ALBUQUERQUE

Hydrology Section Planning Department
David S. Campbell, Director



Timothy M. Keller, Mayor

Sept. 18, 2018

Asa Nilson-Weber, P.E.
Isaacson & Arfman, PA
128 Monroe St NE
Albuquerque, NM 87108

RE: **Juan Tabo Hills Park**
Grading and Drainage Plan for SPBP – Approved
Engineer's Stamp Date: 9/12/2018 (M22D017A)

Dear Ms. Sandoval:

Based upon the information provided in the submittal received on 9/14/2018 the above-referenced plan is approved for Site Plan for Subdivision and Final Plat. However, prior to approval of Building Permit and/or Grading Permit the following comments must be addressed.

1. Remove the label "Not for Construction" under the engineer's stamp and sign the stamp.
2. Verify the Sidewalk Culver Capacity using the weir equation. Grates are now standardized at 24". Use the appropriate number of grates.
3. Add a construction note on the plan stating that an excavation and barricading permit is required for the New Type D inlet on the existing public storm drain and the Sidewalk Culverts.
4. Verify the Gulfstream Ct. inlet calculations using a weir equation at the lip of gutter, which is 0.75' below the property line elevation.
5. Grant Public Drainage easements on the existing 48"- 66" storm drain on the east side of the site (25' min width centered on the pipe) both north and south of Monachos Rd.

If you have any questions, you can contact me at 924-3986 or e-mail at jhughes@cabq.gov.

Sincerely,

James D. Hughes P.E.
Principal Engineer, Planning Dept.
Development Review Services



City of Albuquerque

Planning Department
Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET (REV 6/2018)

Project Title: Juan Tabo Hills Park Phase 1 Building Permit #: _____ Hydrology File #: M22 0017A
DRB#: _____ EPC#: _____ Work Order#: _____
Legal Description: A Portion of Lot IC2, Juan Tabo Hills, Unit 3A
City Address: _____

Applicant: Isaacson & Arfman, PA Contact: Åsa Nilsson-Weber or Bryan J. Bobrick
Address: 128 Monroe Street NE - Albuquerque, NM 87108
Phone#: (505) 268-8828 **Fax#:** _____ **E-mail:** asaw@iacivil.com
bryanb@iacivil.com

Other Contact: MRWM Landscape Architects Contact: _____
Address: 1102 Mountain Road NW, Suite 201 - Albuquerque, NM 87102
Phone#: (505) 268-2266 **Fax#:** _____ **E-mail:** _____

TYPE OF DEVELOPMENT: PLAT RESIDENCE DRB SITE ADMIN SITE

Check all that Apply:

DEPARTMENT:

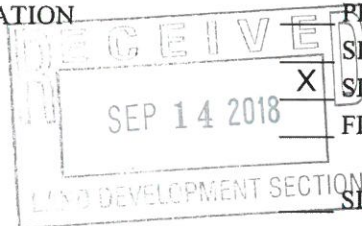
HYDROLOGY/ DRAINAGE
 TRAFFIC/ TRANSPORTATION

TYPE OF APPROVAL/ACCEPTANCE SOUGHT:

BUILDING PERMIT APPROVAL
 CERTIFICATE OF OCCUPANCY

TYPE OF SUBMITTAL:

ENGINEER/ARCHITECT CERTIFICATION
 PAD CERTIFICATION
 CONCEPTUAL G & D PLAN
 GRADING PLAN
 DRAINAGE REPORT
 DRAINAGE MASTER PLAN
 FLOODPLAIN DEVELOPMENT PERMIT APPLIC
 ELEVATION CERTIFICATE
 CLOMR/LOMR
 TRAFFIC CIRCULATION LAYOUT (TCL)
 TRAFFIC IMPACT STUDY (TIS)
 STREET LIGHT LAYOUT
 OTHER (SPECIFY) _____
 PRE-DESIGN MEETING?



PRELIMINARY PLAT APPROVAL
 SITE PLAN FOR SUB'D APPROVAL
 SITE PLAN FOR BLDG. PERMIT APPROVAL
 FINAL PLAT APPROVAL
 SLA/ RELEASE OF FINANCIAL GUARANTEE
 FOUNDATION PERMIT APPROVAL
 GRADING PERMIT APPROVAL
 SO-19 APPROVAL
 PAVING PERMIT APPROVAL
 GRADING/ PAD CERTIFICATION
 WORK ORDER APPROVAL
 CLOMR/LOMR
 FLOODPLAIN DEVELOPMENT PERMIT
 OTHER (SPECIFY) _____

IS THIS A RESUBMITTAL?: Yes No

DATE SUBMITTED: September 14, 2018 By: Åsa Nilsson-Weber

COA STAFF:

ELECTRONIC SUBMITTAL RECEIVED: _____

FEE PAID: _____

City of Albuquerque Planning Department
One Stop Shop – Development and Building Services

09/14/2018 Issued By: E08375 364050

Permit Number: 2018 060 368

Category Code 970

Application Number: 18REV-60368, Review:Drain Plan-Lomr-Traffic Impact

Address:

Location Description: JUAN TABO HILLS PARK PHASE 1

Project Number: null

Applicant

ISAACSON AND ARFMAN PA
JENNY DONART
128 MONROE ST NE
ALBUQUERQUE NM 87108

iamengrs@swcp.com

Agent / Contact

ISAACSON AND ARFMAN PA
JENNY DONART
128 MONROE ST NE
ALBUQUERQUE NM 87108

IAMENGRS@SWCP.COM

Application Fees

REV Actions	\$610.00
TOTAL:	\$610.00

City of Albuquerque Treasury
Date: 9/14/2018 Office: AMNEX
Stat ID: Cashier: E39083
Batch: 9608 Trans #: 30
Permit: 2018060368
Receipt Num: 00519903
Payment Total: \$610.00
0909 REV Actions
Check Tendered : \$610.00



September 14, 2018

James D. Hughes, P.E.
Principal Engineer, Planning Dept.
City of Albuquerque
600 2nd Street NW
Albuquerque, NM 87103



RE: JUAN TABO HILLS PARK (M22D017A)

Dear Mr. Hughes,

Attached with this resubmittal are copies of the revised Grading and Drainage Plan and Supplemental Calculations. Revisions were made in response to your review comments dated August 8, 2018.

The proposed development of the open space is required to demonstrate downstream capacity by reviewing the available reports that designed the downstream infrastructure and providing new capacity calculations.

The Drainage Report for Volterra Village, by Mark Goodwin & Assoc., dated 9-30-09, designed a storm drain and inlet that included a discharge of **21.9 cfs** from the open space into the storm drain system in Monachos Rd. running west to Juan Tabo. Subsequently, a revised grading plan was approved that showed this storm drain inlet eliminated and the open space flows free discharging into Monachos Rd. It does not appear that the discharge of the open space flows was addressed with regards to Monachos street capacity or the capacity of the sump inlets at the intersection of Monachos Rd. and Juan Tabo Blvd. Based on our review, the Volterra Village Drainage Report shows that the sump inlets at the intersection of Monachos Rd. and Juan Tabo Blvd. do not have capacity for additional street flows.

There is an existing cattle guard inlet in Monachos Rd. at the northeast corner of the site discharging to the arroyo north of the site. This storm drain system was designed with the drainage report for Juan Tabo Hills, Unit 3B, by Mark Goodwin & Assoc. dated 3-4-10. Storm drain calculations show that the inlet/storm drain system does not have capacity to accept flows from the open space.

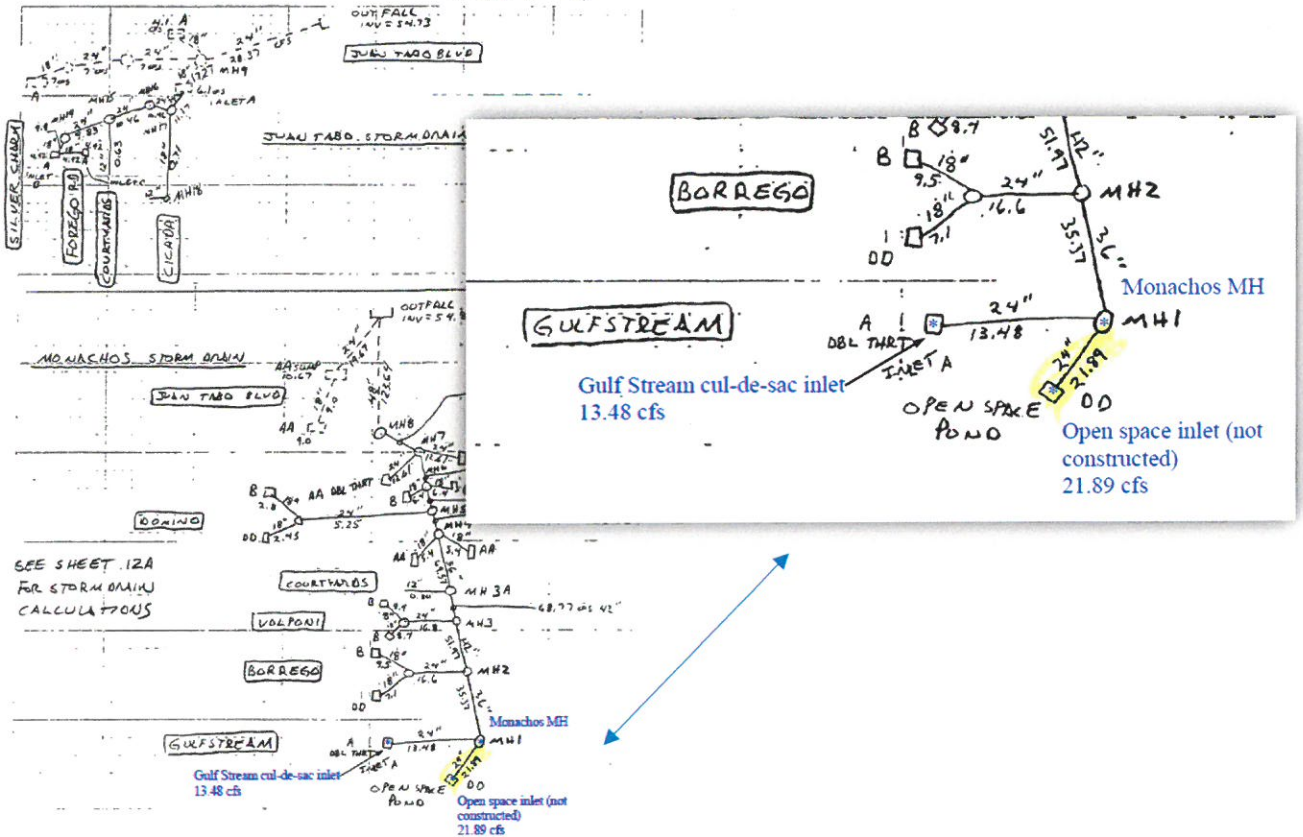
Therefore, all flows from the open space will be required to discharge into the 24" dia. storm drain running from Gulf Stream Ct. cul-de-sac to the Monachos SD as previously approved with the Volterra Village Drainage Report.

Mr. James D. Hughes
 Page 2
 September 14, 2018

dmg D. Mark Goodwin & Associates, P.A.
 Consulting Engineers
 P.O. BOX 90606, ALBUQUERQUE, NM 87199
 (505) 828-2200 FAX 797-9539

PROJECT VOLTERRA
 SUBJECT DRAINAGE CALCS
 BY GJK DATE 3-3-09
 CHECKED _____ DATE _____
 SHEET 12 OF _____

REVISED 8-7-09



Four sidewalk culverts (2-24" culverts and 2-18" culverts) shall direct 11.5 cfs from the open space to an existing sump inlet in Gulf Stream Ct. (in addition to 13.5 cfs existing flows from the subdivision), and another 9.2 cfs from the park shall be discharged via an on-site storm drain system tying to the existing 24-inch storm drain. The total proposed flows from the park of 20.7 cfs is less than allowable of 21.9 cfs per the Volterra Village drainage report.

Please see attached for supplemental calculations and excerpts from the referenced drainage reports.

The following items have been added/adjusted as requested:

- AHYMO drainage calculations.
- Channel capacity calculations. West swale modified to a uniform section. 6' bottom width, 3:1 side slopes. Total 15' width @ 1.5' deep (1' freeboard).
- Erosion protection.

Mr. James D. Hughes
Page 3
September 14, 2018

- Impervious area and first flush pond calculations. All impervious areas are directed to First Flush retention ponds with volumes exceeding required volume.
- Sidewalk culvert capacity calculations.
- Sump inlet capacity calculations.
- Storm drain calculations.
- No off-site grading is shown on this plan. The Parks Department understands that written permission from the owner of the lot to the southwest will be required if off-site grading is necessary.
- All calculations have been stamped and signed.

Please let me know if you have questions.

Thank you.

Sincerely,
Isaacson & Arfman, PA



Åsa Nilsson-Weber, P.E.

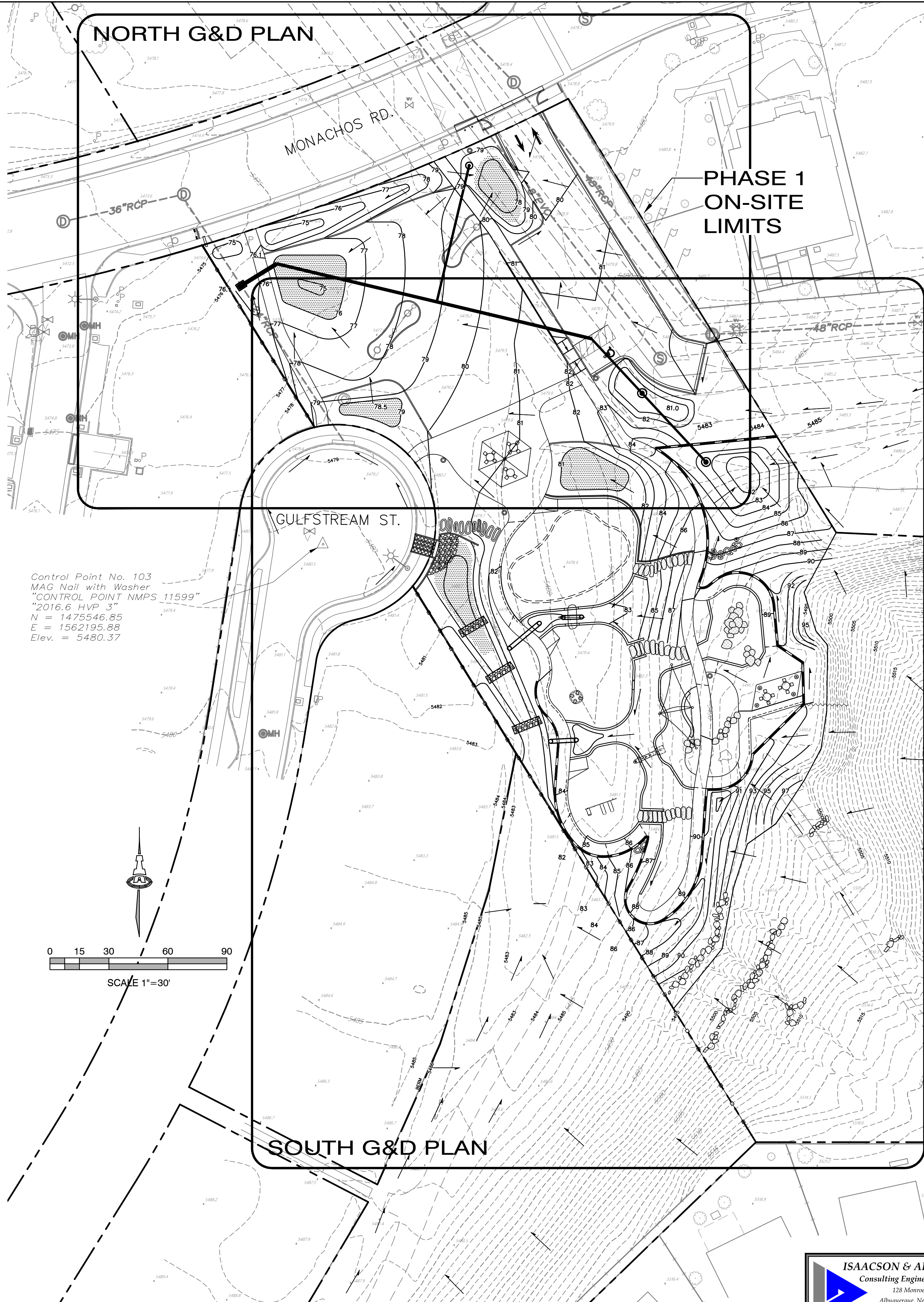
Attachment

AN S.O.19 PERMIT IS REQUIRED FOR PUBLIC STORM DRAIN IMPROVEMENTS AND STORM DRAIN STRUCTURES WITHIN THE CITY R/W. THIS WILL INCLUDE:

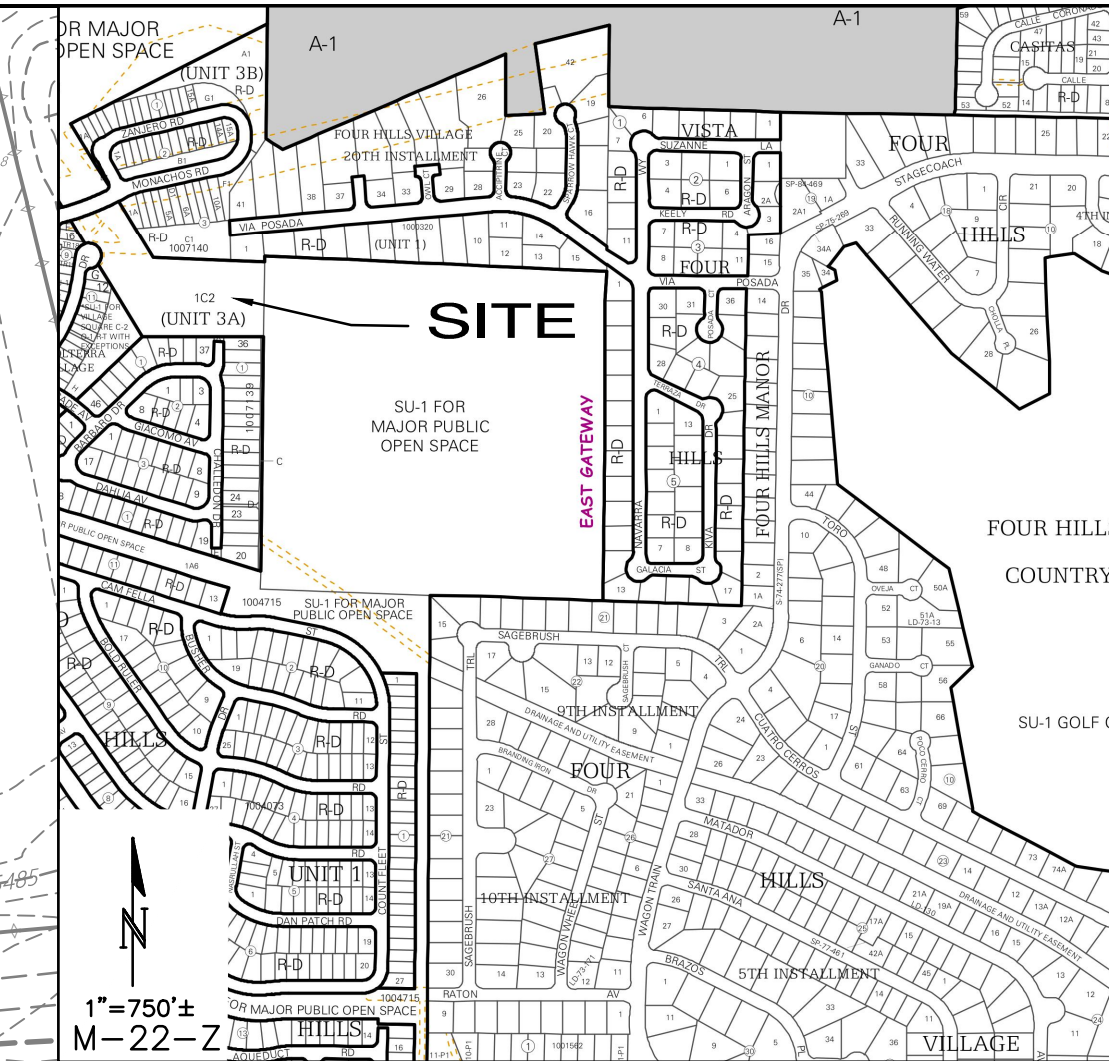
- COVERED SIDEWALK CULVERTS (FOUR) IN GULF STREAM ST. CUL-DE-SAC;
- NEW 4'x MANHOLE WITHIN THE OPEN SPACE EXISTING 24" STORM DRAIN RUNNING FROM GULF STREAM ST. TO MONACHOS ROAD.

S.O.19 : NOTICE TO CONTRACTORS

1	AN EXCAVATION / CONSTRUCTION PERMIT WILL BE REQUIRED BEFORE BEGINNING ANY WORK WITHIN THE CITY RIGHT-OF-WAY.	
2	ALL WORK DETAILED ON THESE PLANS TO BE PERFORMED, EXCEPT AS OTHERWISE STATED OR PROVIDED FOR HEREON, SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CITY OF ALBUQUERQUE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, 1986 EDITION AS REVISED THROUGH UPDATE #9.	
3	TWO WORKING DAYS PRIOR TO ANY EXCAVATION, THE CONTRACTOR MUST CONTACT NEW MEXICO ONE CALL SYSTEM (CALL '811') FOR LOCATION OF EXISTING UTILITIES.	
4	PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL EXCAVATE AND VERIFY THE HORIZONTAL AND VERTICAL LOCATIONS OF ALL CONSTRUCTIONS. SHOULD A CONFLICT EXIST, THE CONTRACTOR SHALL NOTIFY THE ENGINEER SO THAT THE CONFLICT CAN BE RESOLVED WITH A MINIMUM AMOUNT OF DELAY.	
5	BACKFILL COMPACTION SHALL BE ACCORDING TO TRAFFIC / STREET USE.	
6	MAINTENANCE OF THESE FACILITIES SHALL BE THE RESPONSIBILITY OF THE OWNER OF THE PROPERTY SERVED.	
7	WORK ON ARTERIAL STREETS SHALL BE PERFORMED ON A 24-HOUR BASIS.	
8	THE WORK IN THE CITY ROW MUST BE INSPECTED AND ACCEPTED. THE CONTRACTOR MUST CONTACT JASON RODRIGUEZ AT 235-8016 AND CONSTRUCTION COORDINATION AT 924-3416 TO SCHEDULE INSPECTIONS.	
APPROVAL	NAME	DATE
INSPECTOR		



Control Point No. 103
MAG Nail with Washer
"CONTROL POINT NMPS 11599"
"2016.6 HVP 3"
N = 1475546.85
E = 1562195.88
Elev. = 5480.37



PROJECT DATA

PROPERTY: THE SITE IS A FULLY DEVELOPED RESIDENTIAL PROPERTY LOCATED WITHIN C.O.A. VICINITY MAP M-22. THE SITE IS LOCATED OFF MONACHOS RD.

PROPOSED IMPROVEMENTS: THE PROPOSED IMPROVEMENTS INCLUDE ONSITE GRADING, AND LANDSCAPING.

LEGAL: A PORTION OF LOT 1C2 JUAN TABO HILLS UNIT 3A ALBUQUERQUE, NM

BENCHMARK: ELEVATION DATUM IS BASED ON NAVD 1988 FROM CONTROL POINT NO. 103, PUBLISHED ELEVATION (FEET) = 5668.036

OFF-SITE FLOW: OFF-SITE DRAINAGE WILL CONTINUE TO PASS THROUGH THE PROPERTY.

FLOOD HAZARD: PER BERNALILLO COUNTY FIRM MAP PANEL 0367H MAP REVISED AUGUST 16TH, 2012. THE SITE IS LOCATED WITHIN FLOODZONE "X" DESIGNATED AS AREAS DETERMINED TO BE OUTSIDE 500-YEAR FLOODPLAIN.

DRAINAGE PLAN CONCEPT: FIRST FLUSH RETENTION PONDING WILL BE PROVIDED AS REQUIRED. SEDIMENT CONTROL BASINS AND GRADE WALLS WILL BE CONSTRUCTED TO PROTECT THE PROPOSED DEVELOPMENT FROM OFF-SITE FLOW. BASED ON REVIEW OF THE PREVIOUSLY APPROVED PLANS AND SUPPORT CALCULATIONS PROVIDED IN THE SUPPLEMENTAL INFORMATION PACKET, THE ENTIRE OPEN-SPACE PROPERTY (WITH THE EXCEPTION OF MINOR SELF-PONDING PERIMETER LANDSCAPE AREAS NOTED) WILL FREE DISCHARGE TO THE EXISTING PUBLIC STORM DRAIN SYSTEM EXTENDING FROM THE GULF STREAM ST. CUL-DE-SAC INLET TO THE MONACHOS RD. SYSTEM DRAINING WEST TO JUAN TABO BLVD. ON-SITE STORM DRAIN SYSTEM WILL BE CONSTRUCTED TO COLLECT STORMWATER THROUGHOUT THE SITE. THIS SYSTEM WILL RELEASE INTO THE PUBLIC SYSTEM AT A NEW MANHOLE AS SHOWN.

SURVEYOR: STEPHEN J. TOLER: NMPS 11599
SURVEYING CONTROL, INC.
505-266-0935

STORMWATER QUALITY CONTROL

STORMWATER CONTROL MEASURES ARE REQUIRED TO PROVIDE MANAGEMENT OF 'FIRST FLUSH' (FFL: DEFINED AS THE 90TH PERCENTILE STORM EVENT OR 0.34" [0.44" LESS 0.1" FOR INITIAL ABSTRACTION] OF STORMWATER WHICH DISCHARGES DIRECTLY TO A PUBLIC STORM DRAINAGE SYSTEM).

SEE GRADING AND DRAINAGE PLAN - SOUTH FOR IMPERVIOUS AREA AND FIRST FLUSH DESIGN VOLUME CALCULATIONS.

AS-BUILT INFORMATION		BENCH MARKS		SURVEY INFORMATION		ARCHITECTURAL SEAL	
CONTRACTOR	DATE	NO.	DATE	NO.	DATE		
DESIGNED BY:	DATE	DESIGN DEVELOPMENT SUBMITTAL NOT FOR CONSTRUCTION		NO.	DATE		
DRAWN BY:	DATE	REVISIONS	REMARKS	NO.	DATE		
CHECKED BY:	DATE			NO.	DATE		

CITY OF ALBUQUERQUE
STRATEGIC PLANNING AND DESIGN
PARKS AND RECREATION DEPARTMENT

JUAN TABO HILLS PARK - PHASE 1
OVERALL GRADING AND DRAINAGE CONCEPT

Design Review Committee	City Engineer Approval	Mo./Day/Yr.	Mo./Day/Yr.
City Project No.	Zone Map No.	Sheet	
756190	M22		

DESIGN DEVELOPMENT SUBMITTAL DATE: JUNE 23, 2017
 JUAN TABO HILLS PARK - PHASE 1 PROJECT# 756190
 RECORD DRAWINGS DATE: XX/XX/2015

FIRST FLUSH PONDING

POND #1		
Contour	Area	Volume
5479.70	827	
5479.00	340	408 CF
TOTAL VOL. = 408 CF		

POND #2		
Contour	Area	Volume
5481.00	567	
5480.50	350	229 CF
TOTAL VOL. = 229 CF		

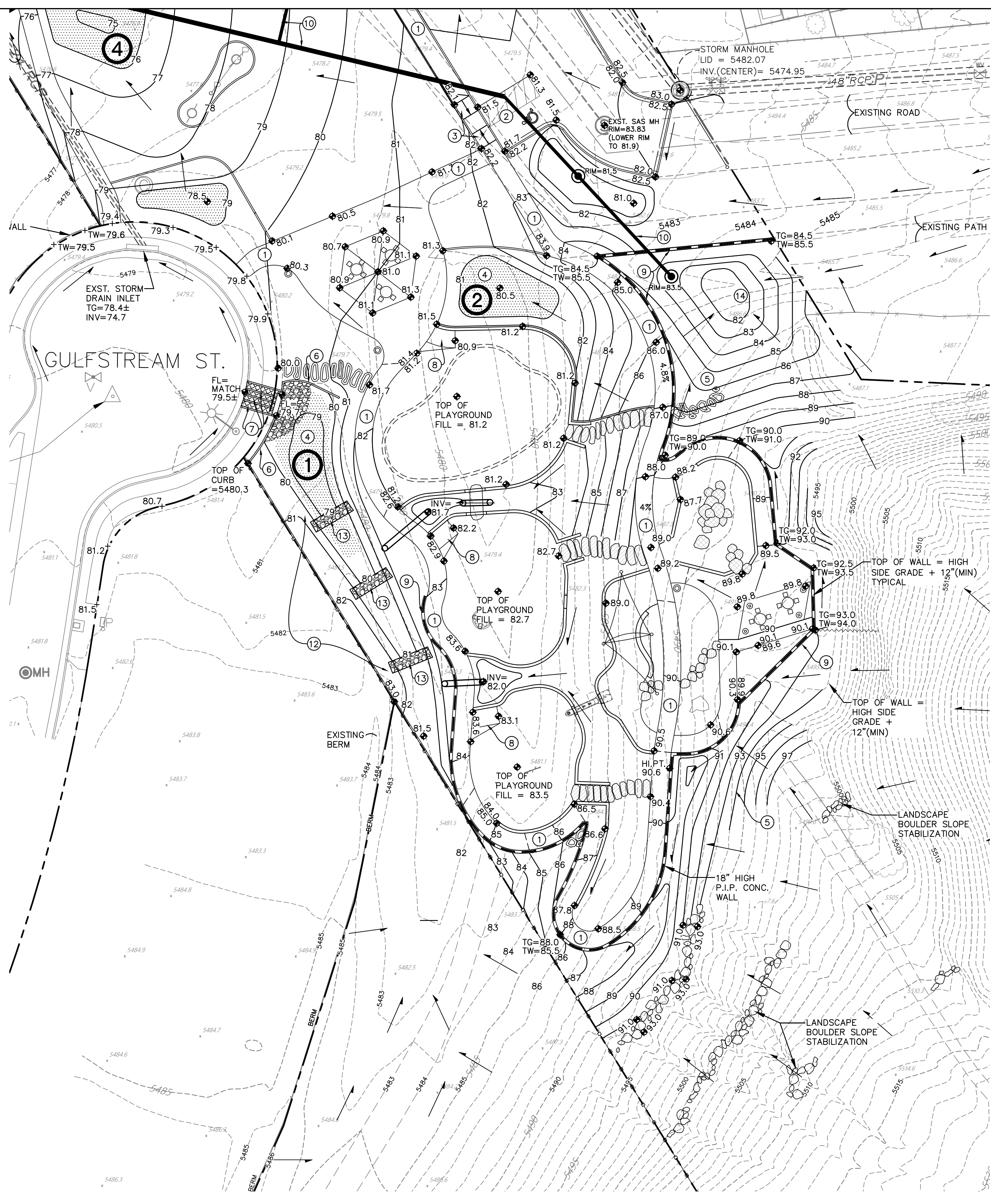
POND #3		
Contour	Area	Volume
5478.50	532	
5478.00	340	218 CF
TOTAL VOL. = 218 CF		

POND #4		
Contour	Area	Volume
5475.50	967	
5475.00	64	258 CF
TOTAL VOL. = 258 CF		

- ①** Pond 1 Basin
Impervious Area: 2520
First Flush Volume Required: 71
- ②** Pond 2 Basin
Impervious Area: 3166
First Flush Volume Required: 90
- ③** Pond 3 Basin
Impervious Area: 5555
First Flush Volume Required: 157
- ④** Pond 5 Basin
Impervious Area: 3577
First Flush Volume Required: 101

ALL RUNOFF FROM IMPERVIOUS AREAS ARE REQUIRED TO PASS THROUGH FIRST FLUSH RETENTION PONDS 1 - 4 AS PROVIDED.

REQUIRED VOLUMES AND DESIGN VOLUMES FOR EACH POND ARE PROVIDED IN THE CHART ABOVE.



KEYED NOTES

- PEDESTRIAN WALKS TO BE ADA ACCESSIBLE (5% MAX. SLOPE, 2% MAX. CROSS-SLOPE) UNLESS NOTED.
 - SLOPES WITHIN HANDICAP PARKING AREA TO MEET ADA REQUIREMENTS. MAX. SLOPE = 2% IN ANY DIRECTION.
 - CONSTRUCT ADA COMPLIANT RAMP. MAX. 1:12 SLOPE, 2% MAX. CROSS-SLOPE.
 - CONSTRUCT FIRST FLUSH (STORMWATER QUALITY) RETENTION, PONDS TO ELEVATIONS AND AREAS SHOWN. INSTALL ROCK EDGE PROTECTION.
 - TRANSITION SLOPES TO ACHIEVE GRADE DIFFERENCES SHOWN. TYPICAL = 5:1, MAXIMUM = 3:1.
 - CONSTRUCT RAISED CURB THIS AREA TO DIRECT DISCHARGE TO COVERED SIDEWALK CULVERTS. TOP OF CURB = 80.3 TYP.
 - CONSTRUCT TWO (2) 2' WIDE AND TWO (2) 1.5' WIDE COVERED SIDEWALK CULVERTS PER C.O.A. STD. DWG. 2236.
 - CONSTRUCT RAMP TO PLAY AREA. SEE SITE DETAILS BY LANDSCAPE ARCHITECT.
 - CONSTRUCT PERIMETER GRADE TRANSITION CURB/WALL TO DIVERT OFF-SITE FLOW AROUND PARK.
 - CONSTRUCT PRIVATE ON-SITE STORM DRAIN SYSTEM. SEE STORM DRAIN DETAIL SHEET.
 - CONSTRUCT TYPE 'D' STORM DRAIN INLET WITH ALBUQUERQUE GRATE AT EXISTING PUBLIC 24" Ø MAIN PER C.O.A. STD. DWGS. 2206 AND 2220. SEE STORM DRAIN DETAILS FOR RIM / INVERT ELEVATIONS.
 - CONSTRUCT 15' WIDE UNIFORM GRADED CHANNEL (6' BOTTOM WIDTH, 3:1 SIDE SLOPES. TOTAL DEPTH = 1.5' AT ELEVATIONS SHOWN.
 - CONSTRUCT 15' WIDE X 2' LONG X 2' DEEP FRACTURED FACE ROCK CHANNEL CONTROL.
 - GRADE DESILTATION BASIN TO ELEVATIONS SHOWN.
- SEE LANDSCAPE PLANS FOR PAVEMENT DETAILS INCLUDING PAVEMENT SECTIONS, CURB AND GUTTER DETAILS.

LEGEND

- 5105.65' EXISTING SPOT ELEVATION
- 5110 --- EXISTING CONTOUR
- - - 12 --- PROPOSED CONTOUR (1' INCREMENT)
- - - 10 --- PROPOSED CONTOUR (0.5' INCREMENT)
- 08.9 PROPOSED SPOT ELEVATION
- FLOW ARROW
- [Hatched Box] PROPOSED FIRST FLUSH RETENTION POND
- GRADE TRANSITION WALL
- [Rock Pattern Box] 6" AVG. DIA. FRACTURED FACE ROCK EROSION PROTECTION.
- ①** FIRST FLUSH RETENTION POND. SEE 'GRADING AND DRAINAGE PLAN - SOUTH' FOR REQUIRED VOLUMES.

AS-BUILT INFORMATION		BENCH MARKS		SURVEY INFORMATION		ARCHITECTURAL SEAL	
CONTRACTOR	DATE	NO.	DATE	NO.	DATE	NO.	DATE

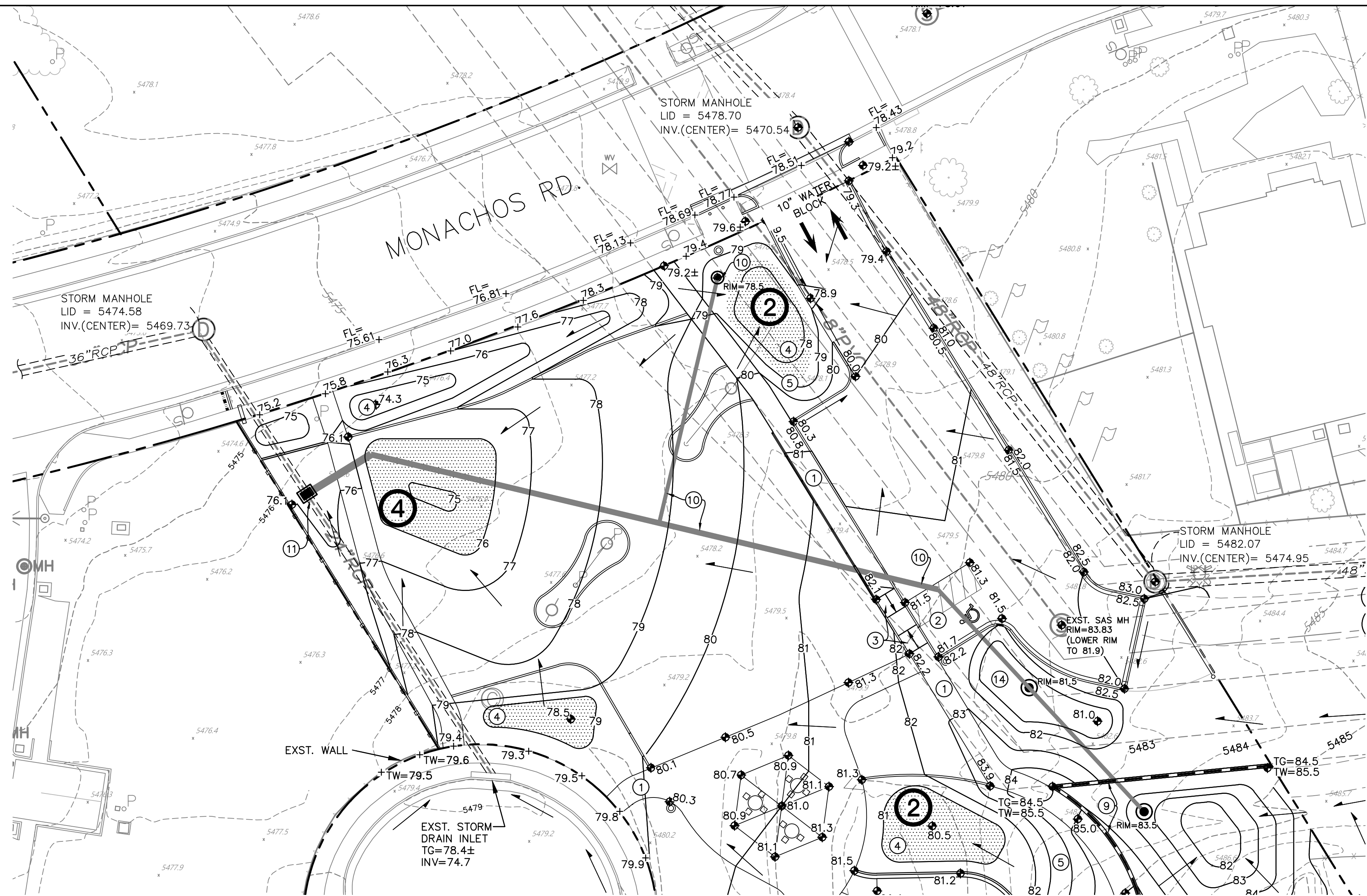
REVISIONS	REMARKS	NO.	DATE	BY

DESIGNED BY:	DATE:	CHECKED BY:	DATE:
ANW / BJB	9/12/18	ANW	9/12/18

CITY OF ALBUQUERQUE STRATEGIC PLANNING AND DESIGN PARKS AND RECREATION DEPARTMENT	
JUAN TABO HILLS PARK - PHASE 1 GRADING AND DRAINAGE PLAN - SOUTH	
Design Review Committee	City Engineer Approval

City Project No.	Zone Map No.	Sheet
756190	M22	





- ### KEYED NOTES
- PEDESTRIAN WALKS TO BE ADA ACCESSIBLE (5% MAX. SLOPE, 2% MAX. CROSS-SLOPE) UNLESS NOTED.
 - SLOPES WITHIN HANDICAP PARKING AREA TO MEET ADA REQUIREMENTS. MAX. SLOPE = 2% IN ANY DIRECTION.
 - CONSTRUCT ADA COMPLIANT RAMP. MAX. 1:12 SLOPE, 2% MAX. CROSS-SLOPE.
 - CONSTRUCT FIRST FLUSH (STORMWATER QUALITY) RETENTION PONDS TO ELEVATIONS AND AREAS SHOWN. INSTALL ROCK EDGE PROTECTION.
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- - - 5110 - - - EXISTING CONTOUR
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- FLOW ARROW
- [Hatched Box] PROPOSED FIRST FLUSH RETENTION POND
- [Solid Line] GRADE TRANSITION WALL
- [Rock Pattern Box] 6" AVG. DIA. FRACTURED FACE ROCK EROSION PROTECTION.
- ① FIRST FLUSH RETENTION POND. SEE 'GRADING AND DRAINAGE PLAN - SOUTH' FOR REQUIRED VOLUMES.

AS-BUILT INFORMATION		BENCH MARKS		SURVEY INFORMATION		ARCHITECTURAL SEAL	
CONTRACTOR	DATE	NO.	DATE	NO.	DATE		
DRAWN BY	DATE	NO.	DATE	NO.	DATE	DESIGN DEVELOPMENT SUBMITTAL NOT FOR CONSTRUCTION	
DESIGNED BY	DATE	NO.	DATE	NO.	DATE	REVISIONS	
CHECKED BY	DATE	NO.	DATE	NO.	DATE	REMARKS	
NO.	DATE	NO.	DATE	NO.	DATE	NO. DATE REMARKS BY	

MRWM
LANDSCAPE ARCHITECTS
mwmna.com 505 268 2266

CITY OF ALBUQUERQUE
STRATEGIC PLANNING AND DESIGN
PARKS AND RECREATION DEPARTMENT

JUAN TABO HILLS PARK - PHASE 1
GRADING AND DRAINAGE PLAN - NORTH

Design Review Committee	City Engineer Approval	Mo./Day/Yr.	Mo./Day/Yr.
City Project No.	Zone Map No.	Sheet	
756190	M22		

ISAACSON & ARFMAN, P.A.
Consulting Engineering Associates
128 Monroe Street N.E.
Albuquerque, New Mexico 87108
Ph. 505-268-8828 www.isaact.com
2238 00-101.dwg Sep 14, 2018

PROJECT# 756190
 JUAN TABO HILLS PARK - PHASE 1
 DESIGN DEVELOPMENT SUBMITTAL
 DATE: JUNE 23, 2017
 RECORD DRAWINGS
 DATE: XX/XX/2015

STORM DRAIN GENERAL NOTES

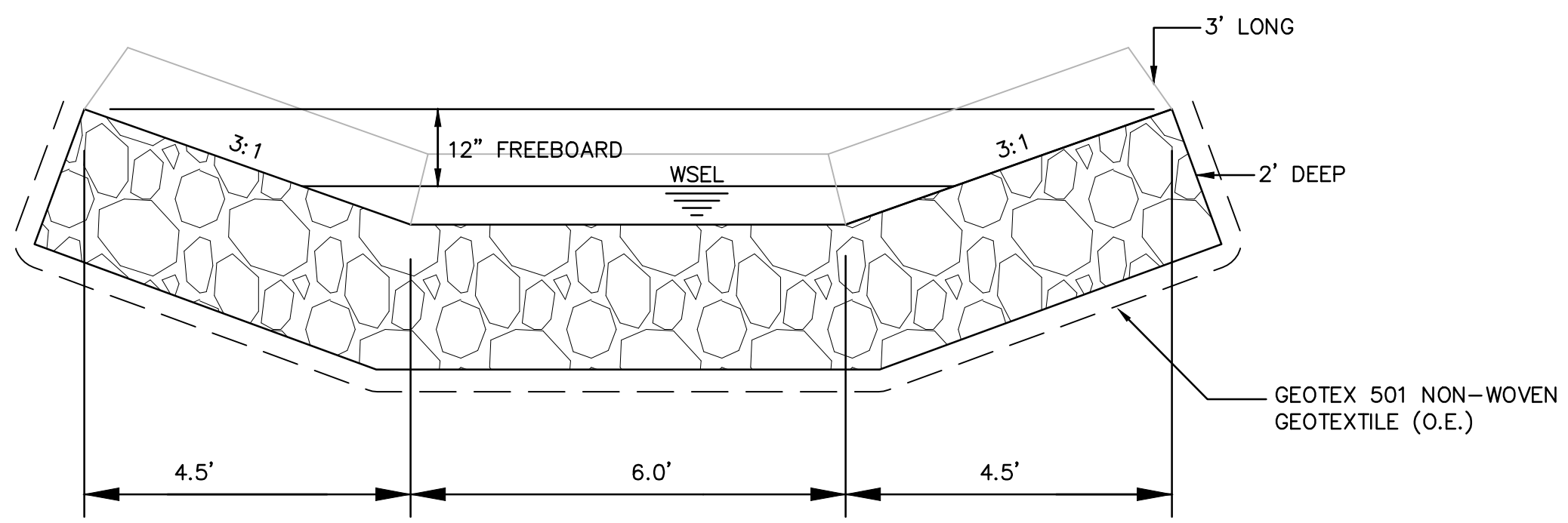
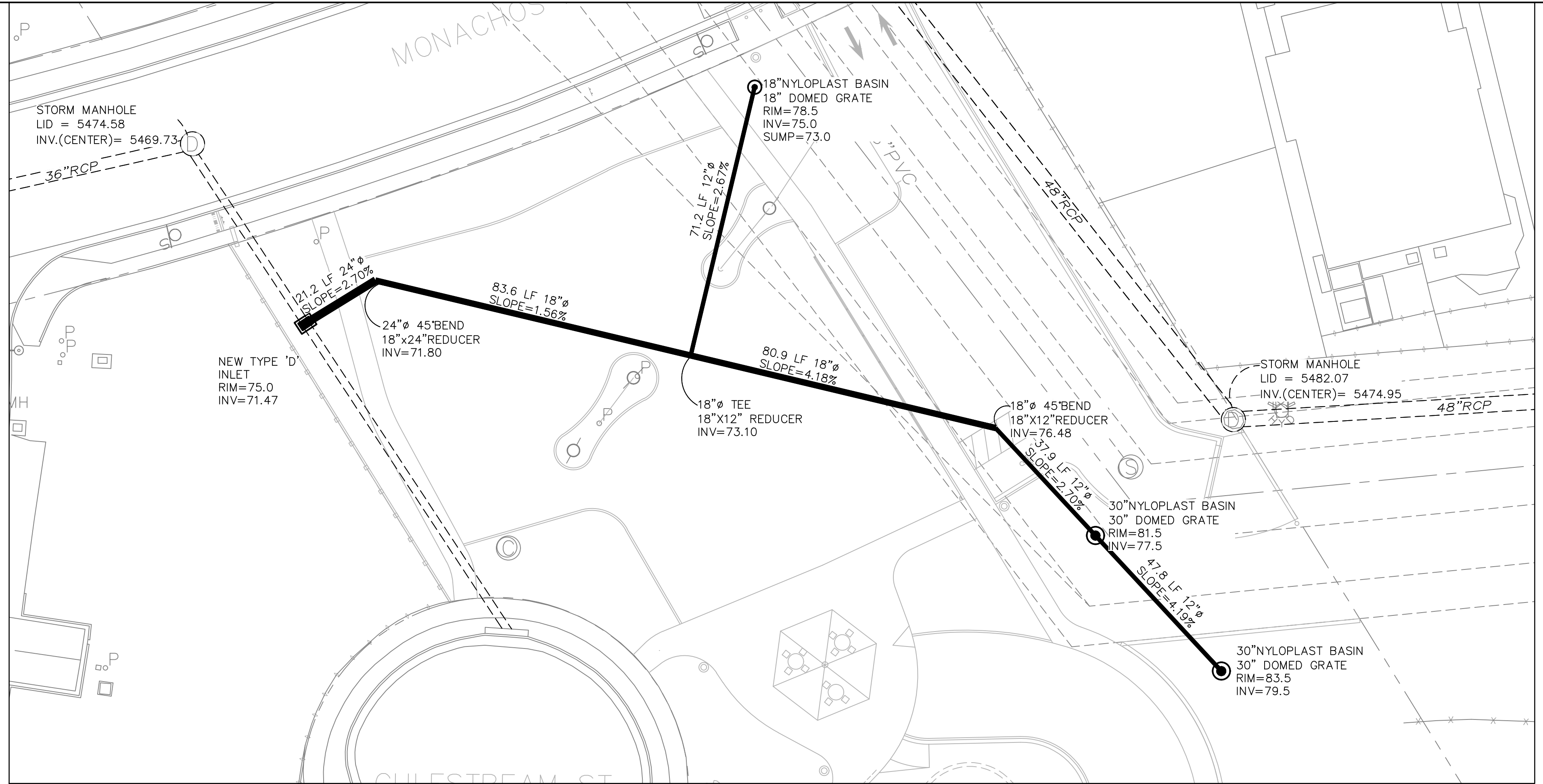
- A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COMPLETE INSTALLATION OF ALL WORK RELATED TO PROPOSED STORM DRAINS SHOWN ON THIS PLAN INCLUDING: TRENCHING, BACKFILL, SUPPORTS, INLET AND MANHOLE COLLARS, MANHOLES, WATER QUALITY FEATURES, EROSION CONTROL FEATURES, TESTING AND CLEANING. ANY WORK NOT ACCEPTED BY THE ARCHITECT OR ENGINEER DUE TO IMPROPER WORKMANSHIP OR LACK OF PROPER COORDINATION SHALL BE REMOVED AND CORRECTLY INSTALLED AT THE CONTRACTOR'S EXPENSE, AS DIRECTED.
- B. MINIMUM COVER FOR STORM DRAIN PIPES SHALL BE 12", UNLESS OTHERWISE NOTED.
- C. TRENCHING, BORING, AND JACKING SHALL BE CONSTRUCTED IN ACCORDANCE WITH COA SPEC. SECT. 700. ALL BACKFILL SHALL BE COMPACTED TO A MINIMUM 95% DENSITY PER ASTM D-1557.
- D. ALL INLET AND AREA DRAIN LIDS & GRATES, MANHOLE RINGS & COVERS, AND OTHER SURFACE ITEMS FOR THE STORM DRAINS SHALL BE ADJUSTED TO FINISHED GRADE, UNLESS OTHERWISE NOTED ON THE PLANS.
- E. ALL STORM DRAIN CROSSINGS OF WATER AND SEWER LINES SHALL HAVE 18" MIN CLEARANCE. IF 18" CLEARANCE IS NOT POSSIBLE, CONTACT THE ENGINEER IMMEDIATELY.
- F. RCP PIPES, PP PIPES, CONCRETE INLETS, MANHOLES, AND CLEANOUTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH COA SPEC. SECT. 900.
- G. HDPE PIPE SHALL BE ADS N-12 (WATERTIGHT). HDPE PIPE SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.
- H. STORM DRAINS SHALL BE INSTALLED AT INVERTS AND SLOPES SPECIFIED ON THE PLANS. THE PIPE SHALL DRAIN AT A CONSTANT SLOPE BETWEEN FITTINGS AND MANHOLES. THE PIPE SHALL DRAIN TOWARD THE OUTLET AT ALL LOCATIONS.

CIVIL GENERAL NOTES

- A. THE CONTRACTOR SHALL ABIDE BY ALL STATE, LOCAL, AND FEDERAL LAWS, CODES, RULES AND REGULATIONS WHICH APPLY TO THE CONSTRUCTION OF THESE IMPROVEMENTS, INCLUDING EPA AND ADA REQUIREMENTS.
- B. ALL WORK DETAILED ON THESE PLANS TO BE PERFORMED UNDER CONTRACT SHALL, EXCEPT AS OTHERWISE STATED ON OR PROVIDED FOR HEREON, BE CONSTRUCTED IN ACCORDANCE WITH THE CURRENT EDITION OF THE CITY OF ALBUQUERQUE STANDARD SPECIFICATIONS FOR PUBLIC WORKS (COA SPEC.)
- C. NO WORK SHALL BE PERFORMED WITHOUT THE APPROPRIATE PERMITS. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR OBTAINING ALL REQUIRED PERMITS FOR THE PROJECT PRIOR TO COMMENCING CONSTRUCTION, OR PRIOR TO OCCUPANCY, AS APPROPRIATE. IF PERMITS ARE DELAYED OR ISSUED WITH CONDITIONS, THE CONTRACTOR SHALL NOTIFY THE OWNER AND ARCHITECT IMMEDIATELY.
- D. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY HORIZONTAL AND VERTICAL LOCATIONS OF ALL EXISTING OBSTRUCTIONS, AND CONDITION OF ALL EXISTING INFRASTRUCTURE PRIOR TO CONSTRUCTION. REPORT ALL DISCREPANCIES TO THE ARCHITECT AND VERIFY THE ARCHITECT'S INTENT BEFORE PROCEEDING.
- E. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR SITE SAFETY.
- F. THE CONTRACTOR SHALL MAINTAIN RECORD DRAWINGS ON SITE AT ALL TIMES.
- G. CONTRACTOR SHALL OBTAIN ALL REQUIRED INSPECTIONS OF THE WORK.
- H. CONSTRUCTION ACTIVITY SHALL BE LIMITED TO THE PROPERTY AND/OR PROJECT LIMITS. ANY DAMAGE TO ADJACENT STRUCTURES RESULTING FROM THE CONSTRUCTION PROCESS SHALL BE REPAIRED OR REPLACED AT THE CONTRACTOR'S EXPENSE. CONTRACTOR SHALL BE RESPONSIBLE FOR DOCUMENTING EXISTING CONDITIONS PRIOR TO CONSTRUCTION.
- I. EXISTING UTILITY LINES ARE SHOWN IN AN APPROXIMATE MANNER ONLY AND MAY BE INCOMPLETE OR OBSOLETE. SUCH LINES MAY OR MAY NOT EXIST WHERE SHOWN OR NOT SHOWN. CONTRACTOR SHALL CONTACT NM-811 FOR UTILITY LINE SPOTS FIVE WORKING DAYS PRIOR TO CONDUCTING SITE FIELD WORK. CONTRACTOR SHALL FIELD VERIFY AND LOCATE ALL UTILITIES PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION. CONTRACTOR IS FULLY RESPONSIBLE FOR ANY AND ALL DAMAGE CAUSED BY ITS FAILURE TO LOCATE, IDENTIFY AND PRESERVE ANY AND ALL EXISTING UTILITIES, PIPELINES, AND UNDERGROUND UTILITY LINES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF NECESSARY DRY UTILITY ADJUSTMENTS.
- J. FIVE WORKING DAYS PRIOR TO ANY EXCAVATION, THE CONTRACTOR MUST CONTACT NM811 (811) FOR LOCATION OF EXISTING UTILITIES.
- K. ALL SITE PREPARATION, GRADING OPERATIONS, FOUNDATION CONSTRUCTION, AND PAVEMENT INSTALLATION WORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE GEOTECHNICAL REPORT, WHICH WILL BE PROVIDED BY THE OWNER OR ARCHITECT.
- L. ALL TRASH, DEBRIS, & SURFACE VEGETATION SHALL BE CLEARED AND LEGALLY DISPOSED OF OFFSITE.
- M. VIBRATORY COMPACTION SHALL NOT BE USED OVER IN-PLACE UTILITIES.
- N. ADJUST ANY RIMS OF EXISTING UTILITY FEATURES AS NECESSARY TO MATCH NEW GRADES. UTILITIES IN PAVED AREAS SHALL BE HS-25 TRAFFIC RATED.
- O. CONTRACTOR SHALL COMPLY WITH LOCAL REGULATIONS FOR RESEEDING OF DISTURBED AREAS.

GRADING GENERAL NOTES

- A. GRADING SHALL BE PERFORMED AT THE ELEVATIONS AND IN ACCORDANCE WITH THE DETAILS SHOWN ON THIS PLAN.
- B. PROPOSED SPOT AND CONTOUR ELEVATIONS SHOWN REPRESENT TOP OF FINISH MATERIAL (I.E. TOP OF CONCRETE, TOP OF CONCRETE BUILDING PAD, TOP OF PAVEMENT MATERIAL, TOP OF LANDSCAPING MATERIAL, ETC.). CONTRACTOR SHALL GRADE, COMPACT SUBGRADE AND DETERMINE EARTHWORK ESTIMATES BASED ON ELEVATIONS SHOWN MINUS FINISH MATERIAL THICKNESSES.
- C. IF FIELD GRADE ADJUSTMENTS ARE REQUIRED, THE CONTRACTOR SHALL NOTIFY THE LANDSCAPE ARCHITECT.
- D. THE ENVIRONMENTAL PROTECTION AGENCY (EPA) AND THE CITY OF ALBUQUERQUE REQUIRE A STORM WATER POLLUTION PREVENTION PLAN (SWPPP), AN NPDES PERMIT, AND AN EROSION AND SEDIMENT CONTROL (ESC) PERMIT FOR PROJECTS WHERE CONSTRUCTION ACTIVITIES MEET THE EPA THRESHOLD (SWPPP, NPDES PERMIT, AND ESC PLAN BY OTHERS.) A CURRENT CITY-APPROVED ESC PERMIT MUST BE INCLUDED WITH THE CONTRACTOR'S SUBMITTAL FOR A ROUGH GRADING, GRADING, PAVING, BUILDING, OR WORK ORDER PERMIT. CONTRACTOR SHALL COORDINATE WITH OWNER TO DETERMINE WHO WILL PREPARE SWPPP AND INSPECT REQUIRED ELEMENTS..
- E. MEASURES REQUIRED FOR EROSION AND SEDIMENT CONTROL SHALL BE INCIDENTAL TO THE PROJECT COST.
- F. ALL NEW PAVEMENT SURFACES SHALL BE CONSTRUCTED WITH POSITIVE SLOPE TOWARD PROPOSED DRAINAGE PATHS. PAVING AND ROADWAY GRADES SHALL BE ±0.1' FROM PLAN ELEVATIONS.
- G. WHERE GRADES BETWEEN NEW AND EXISTING ARE SHOWN AS 'MATCH' OR '±', TRANSITIONS SHALL BE SMOOTH.
- H. PAVEMENT GRADES IN MARKED HANDICAPPED PARKING AREAS SHALL NOT EXCEED 2.0% IN ANY DIRECTION. FOR ALL ACCESSIBLE ROUTES, MAXIMUM ALLOWABLE CROSS SLOPE IS 2.0% AND MAXIMUM LONGITUDINAL SLOPE WITHOUT RAMP IS 5.0%. FOLLOW ALL ADA ACCESSIBILITY GUIDELINES OR CITY CODES, WHICHEVER IS MORE STRINGENT.
- I. ALL EROSION PROTECTION TO BE INSTALLED AS 6" AVG. DIA. ANGULAR FACED ROCK (F.F. ROCK) PLACED OVER GEOTEX 501 NON-WOVEN GEOTEXTILE (O.E.).
- J. SIDESLOPES STEEPER THAN 3:1 BUT LESS THAN 2:1 MUST HAVE PERMANENT EROSION PROTECTION INSTALLED, TYPICAL. NO SLOPE SHALL BE STEEPER THAN 2:1.
- K. POND DESIGN PARAMETERS AND STORMWATER CONTROL MEASURES SHOWN ON THIS PLAN (TOP OF POND, BOTTOM OF POND, SIZE OF ORIFICE, AREA OF POND, ETC.) TO BE STRICTLY ADHERED TO FOR CERTIFICATION PURPOSES.
- L. POST-CONSTRUCTION MAINTENANCE FOR PRIVATE STORMWATER FACILITIES WILL BE THE RESPONSIBILITY OF THE FACILITIES OWNER. PERIODIC INSPECTION AND CERTIFICATIONS OF THE FACILITIES MAY BE REQUIRED BY THE CITY ENGINEER. ENGINEER RECOMMENDS THAT OWNER INSPECT SITE YEARLY AND AFTER EACH RAINFALL TO IDENTIFY NEW AREAS OF EROSION AND INSTALL ADDITIONAL EROSION PROTECTION AS NEEDED BASED ON ACTUAL OCCURRENCES.
- P. GRADING OF FIRST FLUSH BASINS WILL BE INSPECTED AS PART OF ENGINEER'S CERTIFICATION FOR CERTIFICATE OF OCCUPANCY. DURING LANDSCAPING, FIRST FLUSH BASINS WILL BE SMOOTHLY INTEGRATED INTO LANDSCAPING WHILE MAINTAINING REQUIRED TOP AND BOTTOM ELEVATION, VOLUME AND INLET / OVERFLOW ELEVATIONS.
- W. SITE CONSTRUCTION LAYOUT / STAKING SHALL BE COORDINATED WITH THE ARCHITECT USING THE ARCHITECT PROVIDED SITE PLAN.



FRACTURED FACE ROCK CHANNEL CONTROL STRUCTURE

ALL PERMANENT EROSION CONTROL SHALL BE 6" AVG. DIA., FRACTURED FACE ROCK OVER PERMANENT GEOTECH MATERIAL. DEPTH OF ROCK IS 1' FOR SLOPE PROTECTION; 1' FOR LINED SWALES; 2' FOR GRADE STRUCTURES.

AS-BUILT INFORMATION	
CONTRACTOR	DATE
STAKED BY	DATE
INSPECTOR'S ACCEPTANCE BY	DATE
VERIFICATION BY	DATE
DRAWINGS BY	DATE
MICRO-FILM INFORMATION	
RECORDED BY	DATE
NO.	

BENCH MARKS	

SURVEY INFORMATION	
FIELD NOTES	DATE
	BY
NO.	

ARCHITECTURAL SEAL

DESIGN DEVELOPMENT SUBMITTAL NOT FOR CONSTRUCTION

REVISIONS	NO.	DATE	BY

REMARKS	NO.	DATE	BY

MRWM
LANDSCAPE ARCHITECTS
mrwma.com 505 268 2266

CITY OF ALBUQUERQUE
STRATEGIC PLANNING AND DESIGN
PARKS AND RECREATION DEPARTMENT
JUAN TABO HILLS PARK - PHASE 1
STORM DRAIN AND DRAINAGE DETAILS

Design Review Committee	City Engineer Approval	Mo./Day/Yr.	Mo./Day/Yr.
City Project No. 756190	Zone Map No. M22	Sheet	

ISAACSON & ARFMAN, P.A.
Consulting Engineering Associates
128 Monroe Street N.E.
Albuquerque, New Mexico 87108
Ph. 505-268-8828 www.isaact.com
2238 00-101.dwg Sep 14, 2018

DESIGN DEVELOPMENT SUBMITTAL DATE: JUNE 23, 2017
JUAN TABO HILLS PARK - PHASE 1 PROJECT# 756190
RECORD DRAWINGS DATE: XX/XX/2015

SEPTEMBER 14, 2018

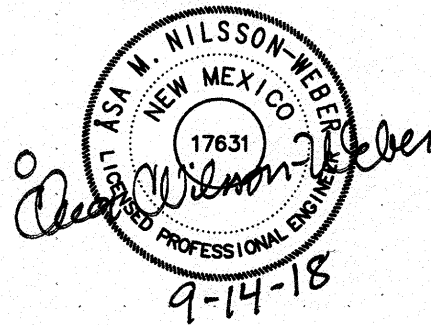
SUPPLEMENTAL CALCULATIONS

FOR

JUAN TABO HILLS PARK

ALBUQUERQUE, NEW MEXICO

BY



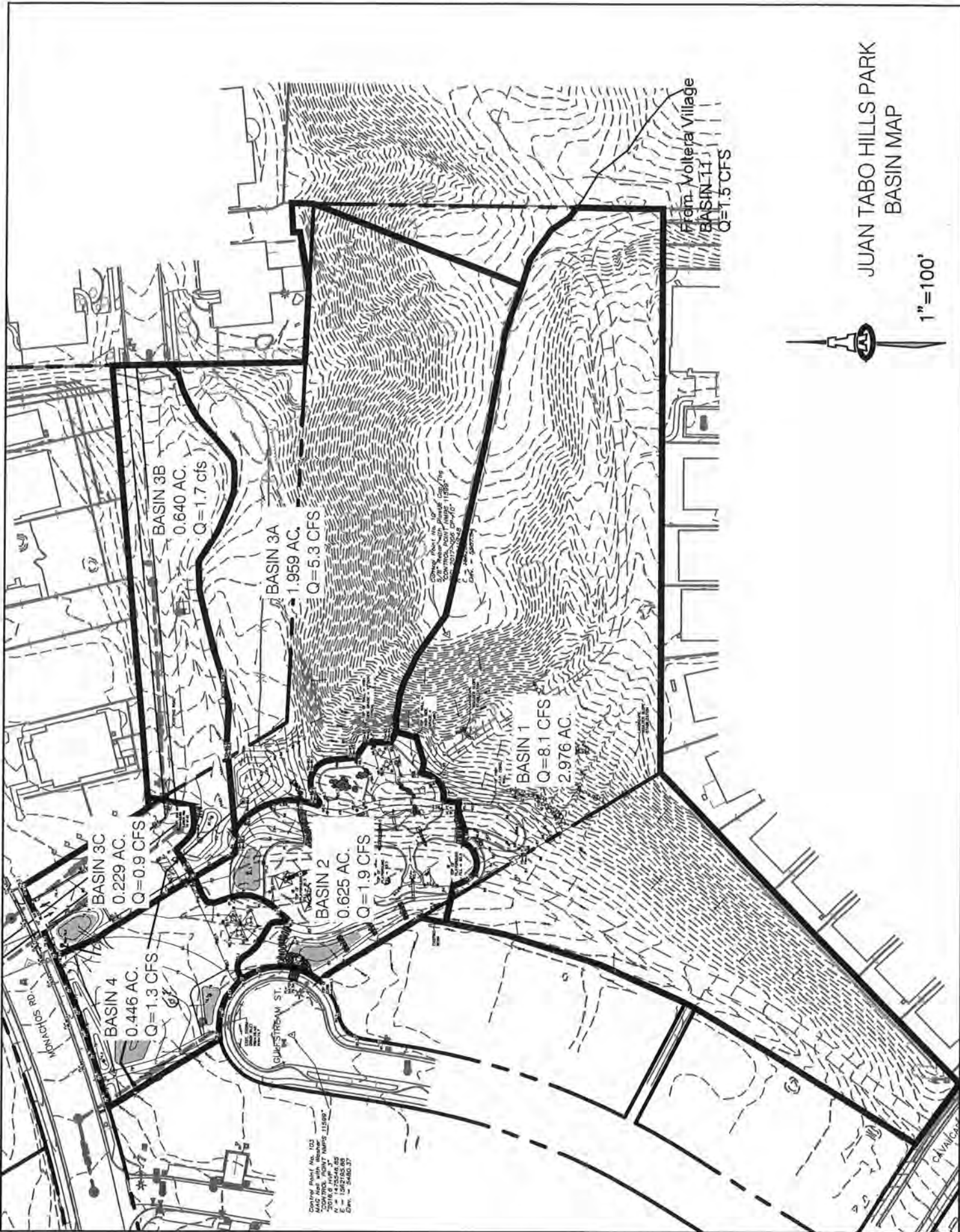
ISAACSON & ARFMAN, P.A.
Consulting Engineering Associates

Thomas O. Isaacson, PE & LS
Fred C. Arfman, PE
Asa Nilsson-Weber, PE

I&A Project No. 2236

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- **Sidewalk Culvert Calculations**
- **Sump Inlet Calculations**
- **Channel Calculations**
- **Storm Drain Calculations**
- **Excerpts from Volterra Village and Juan Tabo Hills Unit 3B Drainage Reports**



JUAN TABO HILLS PARK
BASIN MAP

1"=100'

JUAN TABO HILLS PARK

BASIN AREA AND LAND TREATMENT TABLE-- PROPOSED CONDITIONS

BASIN	AREA			LAND TREATMENT (%)				Q _{100yr-6hr}
	SF	AC.	SQ.MI.	A	B	C	D	cfs
1	129,620	2.976	0.00465	15	40	45	0	8.1
2	27,242	0.625	0.00098	20	30	30	20	1.9
3A	85,352	1.959	0.00306	20	35	45	0	5.3
3B	27,891	0.640	0.00100	20	50	30	0	1.7
3C	9,978	0.229	0.00036	0	22	22	56	0.9
4	19,423	0.446	0.00070	0	70	25	5	1.3
TOTAL	299,506	6.876						19.2



NOAA Atlas 14, Volume 1, Version 5
Location name: Albuquerque, New Mexico, USA*
Latitude: 35.0539°, Longitude: -106.5127°
Elevation: 5491.79 ft**
 * source: ESRI Maps
 ** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps & aeriels](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.183 (0.157-0.213)	0.237 (0.202-0.276)	0.316 (0.270-0.370)	0.378 (0.321-0.440)	0.463 (0.391-0.538)	0.528 (0.445-0.614)	0.596 (0.499-0.693)	0.668 (0.556-0.775)	0.765 (0.630-0.890)	0.842 (0.690-0.980)
10-min	0.278 (0.239-0.324)	0.360 (0.307-0.420)	0.482 (0.410-0.563)	0.576 (0.489-0.670)	0.704 (0.596-0.819)	0.803 (0.677-0.934)	0.907 (0.759-1.06)	1.02 (0.845-1.18)	1.16 (0.959-1.35)	1.28 (1.05-1.49)
15-min	0.345 (0.296-0.402)	0.446 (0.381-0.521)	0.597 (0.509-0.698)	0.714 (0.606-0.831)	0.872 (0.739-1.01)	0.995 (0.839-1.16)	1.12 (0.941-1.31)	1.26 (1.05-1.46)	1.44 (1.19-1.68)	1.59 (1.30-1.85)
30-min	0.464 (0.398-0.541)	0.601 (0.513-0.702)	0.804 (0.685-0.939)	0.961 (0.817-1.12)	1.18 (0.995-1.37)	1.34 (1.13-1.56)	1.52 (1.27-1.76)	1.70 (1.41-1.97)	1.94 (1.60-2.26)	2.14 (1.75-2.49)
60-min	0.574 (0.493-0.670)	0.743 (0.635-0.868)	0.995 (0.848-1.16)	1.19 (1.01-1.38)	1.45 (1.23-1.69)	1.66 (1.40-1.93)	1.87 (1.57-2.18)	2.10 (1.75-2.44)	2.40 (1.98-2.80)	2.65 (2.17-3.08)
2-hr	0.673 (0.570-0.808)	0.862 (0.730-1.04)	1.14 (0.962-1.37)	1.36 (1.14-1.62)	1.66 (1.39-1.98)	1.91 (1.59-2.27)	2.17 (1.79-2.58)	2.44 (2.00-2.89)	2.82 (2.28-3.34)	3.12 (2.51-3.70)
3-hr	0.718 (0.613-0.857)	0.912 (0.776-1.09)	1.19 (1.02-1.42)	1.41 (1.20-1.68)	1.73 (1.45-2.05)	1.97 (1.65-2.34)	2.24 (1.86-2.64)	2.51 (2.07-2.97)	2.90 (2.37-3.42)	3.21 (2.60-3.80)
6-hr	0.833 (0.717-0.989)	1.05 (0.904-1.25)	1.35 (1.16-1.60)	1.59 (1.36-1.87)	1.91 (1.63-2.25)	2.16 (1.83-2.55)	2.43 (2.04-2.86)	2.70 (2.26-3.18)	3.08 (2.55-3.62)	3.38 (2.78-3.98)
12-hr	0.936 (0.816-1.08)	1.18 (1.03-1.36)	1.49 (1.30-1.72)	1.74 (1.51-2.00)	2.08 (1.79-2.38)	2.33 (2.00-2.68)	2.60 (2.22-2.99)	2.88 (2.44-3.30)	3.25 (2.73-3.74)	3.55 (2.96-4.09)
24-hr	1.09 (0.969-1.24)	1.37 (1.21-1.56)	1.71 (1.52-1.95)	1.99 (1.76-2.26)	2.36 (2.08-2.68)	2.65 (2.32-3.00)	2.95 (2.58-3.34)	3.25 (2.83-3.68)	3.66 (3.16-4.14)	3.98 (3.42-4.51)
2-day	1.17 (1.04-1.32)	1.47 (1.31-1.65)	1.84 (1.63-2.07)	2.13 (1.89-2.40)	2.53 (2.24-2.84)	2.84 (2.50-3.19)	3.16 (2.77-3.55)	3.48 (3.04-3.92)	3.92 (3.41-4.42)	4.27 (3.68-4.81)
3-day	1.28 (1.15-1.41)	1.59 (1.44-1.77)	1.98 (1.79-2.19)	2.29 (2.06-2.53)	2.70 (2.43-2.99)	3.02 (2.71-3.34)	3.35 (2.99-3.70)	3.68 (3.27-4.07)	4.12 (3.65-4.57)	4.47 (3.93-4.96)
4-day	1.38 (1.27-1.51)	1.72 (1.58-1.88)	2.12 (1.95-2.32)	2.44 (2.24-2.66)	2.87 (2.62-3.13)	3.20 (2.92-3.49)	3.54 (3.21-3.86)	3.88 (3.51-4.22)	4.33 (3.89-4.72)	4.67 (4.18-5.10)
7-day	1.60 (1.47-1.74)	1.99 (1.83-2.17)	2.44 (2.24-2.66)	2.80 (2.56-3.04)	3.27 (2.99-3.55)	3.62 (3.30-3.93)	3.97 (3.62-4.32)	4.32 (3.93-4.70)	4.79 (4.33-5.21)	5.13 (4.62-5.60)
10-day	1.78 (1.64-1.94)	2.22 (2.04-2.41)	2.73 (2.52-2.96)	3.13 (2.89-3.40)	3.67 (3.37-3.98)	4.08 (3.73-4.42)	4.49 (4.10-4.86)	4.90 (4.46-5.31)	5.45 (4.93-5.91)	5.85 (5.27-6.36)
20-day	2.30 (2.12-2.50)	2.87 (2.64-3.11)	3.50 (3.22-3.79)	3.98 (3.66-4.31)	4.59 (4.21-4.97)	5.04 (4.61-5.46)	5.48 (5.01-5.93)	5.91 (5.38-6.39)	6.45 (5.85-6.98)	6.84 (6.19-7.42)
30-day	2.77 (2.55-2.99)	3.44 (3.17-3.72)	4.17 (3.84-4.50)	4.71 (4.33-5.08)	5.39 (4.95-5.81)	5.88 (5.39-6.34)	6.35 (5.81-6.85)	6.80 (6.21-7.34)	7.36 (6.70-7.95)	7.76 (7.05-8.39)
45-day	3.37 (3.12-3.64)	4.19 (3.88-4.52)	5.01 (4.64-5.41)	5.61 (5.18-6.05)	6.35 (5.86-6.84)	6.87 (6.33-7.41)	7.35 (6.77-7.93)	7.80 (7.16-8.41)	8.34 (7.64-9.01)	8.71 (7.96-9.41)
60-day	3.89 (3.60-4.20)	4.83 (4.47-5.22)	5.79 (5.36-6.24)	6.48 (5.99-6.99)	7.31 (6.76-7.89)	7.89 (7.29-8.52)	8.44 (7.79-9.12)	8.94 (8.24-9.67)	9.54 (8.78-10.3)	9.95 (9.15-10.8)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

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PF graphical

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*S*****
*S      JUAN TABO HILLS PARK
*S      DEVELOPED CONDITIONS
*S      100-YR, 6-HR STORM
*S      2236P.DAT
*S      SEPTEMBER 2018
*S      BY ASA NILSSON-WEBER
*S      ISAACSON & ARFMAN, P.A.
*S*****
START          RAINFALL BEGINS AT 0.0 HRS
RAINFALL      TYPE=1 RAIN QUARTER=0 RAIN ONE=1.87
              RAIN SIX=2.43 RAIN DAY=2.95 DT=0.01HR
*
*S  BASIN 1
COMPUTE NM HYD      ID=1 HYD NO=101 AREA=0.00465 SQ MI
                   PER A=15 PER B=40 PER C=45 PER D=0
                   TP=-0.1333 HR   MASS RAIN=-1
PRINT HYD          ID=1   CODE=1
*S  BASIN 2
COMPUTE NM HYD      ID=2 HYD NO=102 AREA=0.00098 SQ MI
                   PER A=20 PER B=30 PER C=30 PER D=20
                   TP=-0.1333 HR   MASS RAIN=-1
PRINT HYD          ID=2   CODE=1
*S  BASIN 3A
COMPUTE NM HYD      ID=3 HYD NO=103 AREA=0.00306 SQ MI
                   PER A=20 PER B=35 PER C=45 PER D=0
                   TP=-0.1333 HR   MASS RAIN=-1
PRINT HYD          ID=3   CODE=1
*S  BASIN 3B
COMPUTE NM HYD      ID=4 HYD NO=104 AREA=0.00100 SQ MI
                   PER A=20 PER B=50 PER C=30 PER D=0
                   TP=-0.1333 HR   MASS RAIN=-1
PRINT HYD          ID=4   CODE=1
*S  BASIN 3C
COMPUTE NM HYD      ID=5 HYD NO=105 AREA=0.00036 SQ MI
                   PER A=0 PER B=22 PER C=22 PER D=56
                   TP=-0.1333 HR   MASS RAIN=-1
PRINT HYD          ID=5   CODE=1
*S  BASIN 4
COMPUTE NM HYD      ID=6 HYD NO=106 AREA=0.00070 SQ MI
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                   TP=-0.1333 HR   MASS RAIN=-1
PRINT HYD          ID=6   CODE=1
FINISH

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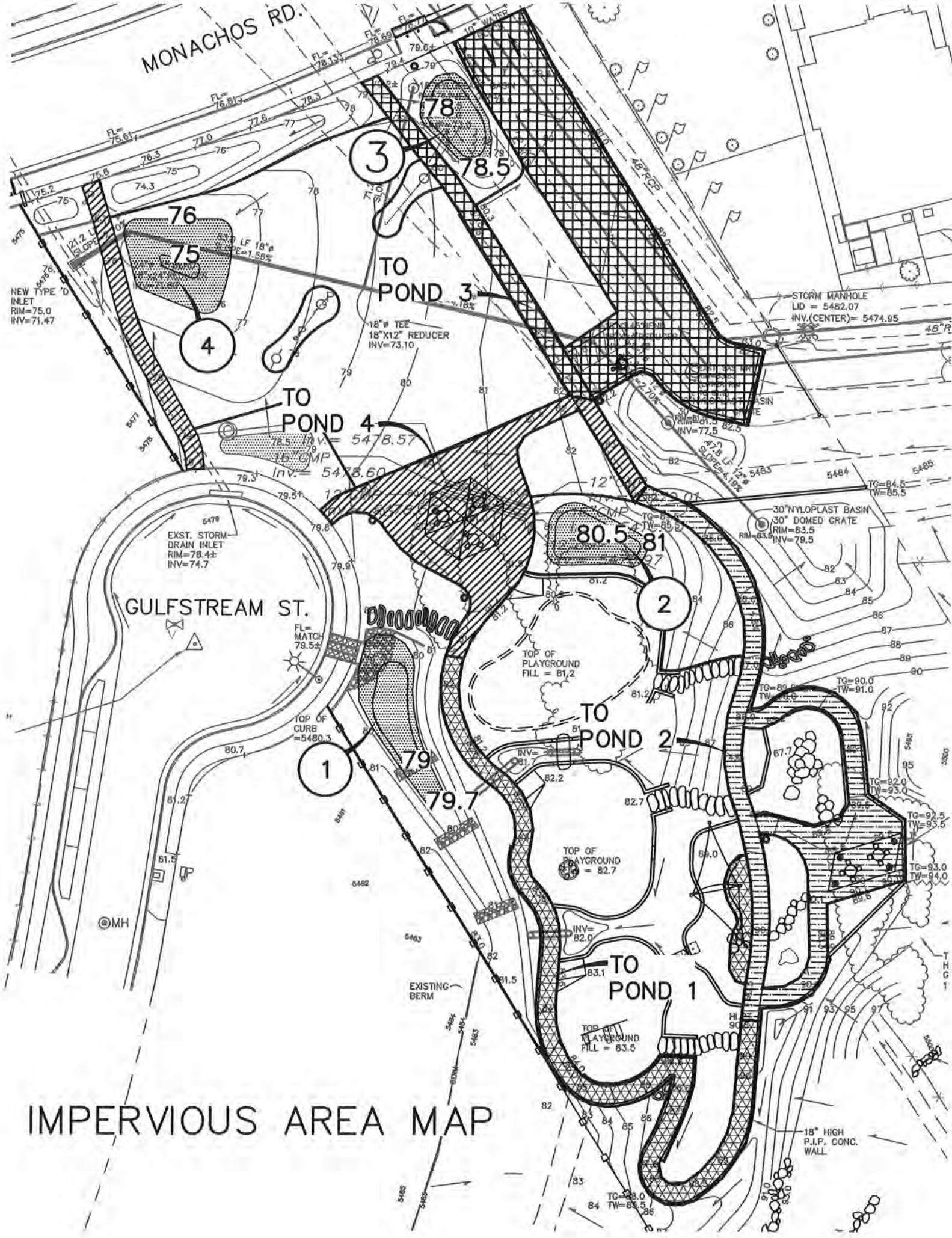

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- Ver. S4.01a, Rel: 01a

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 USER NO. = AHYMO_Temp_User:20122010

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE =	NOTATION
S	JUAN TABO HILLS PARK									1	
S	DEVELOPED CONDITIONS										
S	100-YR, 6-HR STORM										
S	2236P.DAT										
S	SEPTEMBER 2018										
S	BY ASA NILSSON-WEBER										
S	ISAACSON & ARFMAN, P.A.										
S	*****										
START											
RAINFALL	TYPE= 1 NOAA 14										
S	BASIN 1										
COMPUTE NM HYD	101.00	-	1	0.00465	8.12	0.233	0.93913	1.540	2.729 PER IMP=	0.00	
S	BASIN 2										
COMPUTE NM HYD	102.00	-	2	0.00098	1.89	0.060	1.15508	1.530	3.019 PER IMP=	20.00	
S	BASIN 3A										
COMPUTE NM HYD	103.00	-	3	0.00306	5.28	0.151	0.92775	1.540	2.694 PER IMP=	0.00	
S	BASIN 3B										
COMPUTE NM HYD	104.00	-	4	0.00100	1.67	0.048	0.89481	1.540	2.609 PER IMP=	0.00	
S	BASIN 3C										
COMPUTE NM HYD	105.00	-	5	0.00036	0.90	0.032	1.65232	1.530	3.896 PER IMP=	56.00	
S	BASIN 4										
COMPUTE NM HYD	106.00	-	6	0.00070	1.28	0.037	0.99293	1.540	2.846 PER IMP=	5.00	
FINISH											

TIME= 0.00
 RAIN6= 2.430



IMPERVIOUS AREA MAP

First Flush Pond Volume and Design Volume Calculations

POND #1		
Contour	Area	Volume
5479.70	827	
5479.00	340	408 CF
TOTAL VOL.		408 CF

Pond 1 Basin	
Impervious Area	2520
First Flush Volume Required	71

POND #2		
Contour	Area	Volume
5481.00	567	
5480.50	350	229 CF
TOTAL VOL.		229 CF

Pond 2 Basin	
Impervious Area	3166
First Flush Volume Required	90

POND #3		
Contour	Area	Volume
5478.50	532	
5478.00	340	218 CF
TOTAL VOL.		218 CF

Pond 3 Basin	
Impervious Area	5555
First Flush Volume Required	157

POND #4		
Contour	Area	Volume
5475.50	967	
5475.00	64	258 CF
TOTAL VOL.		258 CF

Pond 5 Basin	
Impervious Area	3577
First Flush Volume Required	101

JUAN TABO HILLS PARK

ORIFICE EQUATION - SIDEWALK CULVERTS TO GULF STREAM CT. 1-24" CULVERT

The Orifice Equation is used to calculate the Flow at the opening of a Channel

$$Q = C * A * (2 * g * h)^{0.5}$$

Where	Q	=	3.32	cfs
	C	=	0.6	
	A	=	1.24	sq.ft.
	g	=	32.2	ft/sec ²
	h	=	0.31	ft depth of flow at opening from the center of culvert

ORIFICE EQUATION - SIDEWALK CULVERTS TO GULF STREAM CT. 1-18" CULVERT

The Orifice Equation is used to calculate the Flow at the opening of a Channel

$$Q = C * A * (2 * g * h)^{0.5}$$

Where	Q	=	2.49	cfs
	C	=	0.6	
	A	=	0.93	sq.ft.
	g	=	32.2	ft/sec ²
	h	=	0.31	ft depth of flow at opening from the center of culvert

USE 2-24" CULVERTS AND 2-18" CULVERTS

$$2 * 3.32 + 2 * 2.49 = 11.63 \text{ CFS}$$

JUAN TABO HILLS PARK SUMP INLET CALCULATIONS

GRATE OPEN AREA:

(per COA std dwg #2220, single grate)

GROSS AREA FOR ONE GRATE = (25 in/12)(40 in/12) =	6.94 SF
LESS BEARING BARS = (0.5 in/12)(3.33 ft)(13) =	1.80 SF
LESS CROSS BARS = (0.5 in/12)(7)[(25 in/12)-(13)(0.5 in/12)] =	0.45 SF

4.69 SF

NET GRATE OPEN AREA = 4.69 SF

ORIFICE EQUATION:

$$Q = CA(2gh)^{1/2}$$

Where:

- C = 0.67
- A = 4.69 ft²
- g = 32.2 ft/sec²
- h = height of the water surface above the grate

CAPACITY CALCULATIONS:

INLET	
LOCATION: Sump Inlet at Gulf Stream	
h = <input style="width: 80px;" type="text" value="1"/> ft Q _(capacity) = 25.22244 cfs	REQUIRED Q = <input style="width: 80px;" type="text" value="25"/> cfs
NUMBER OF GRATES REQUIRED = <u style="text-decoration: underline double;">1</u>	
Actual # of grates = 1 - OK	

Channel Report

Trapezoidal Channel in Basin 2

Trapezoidal

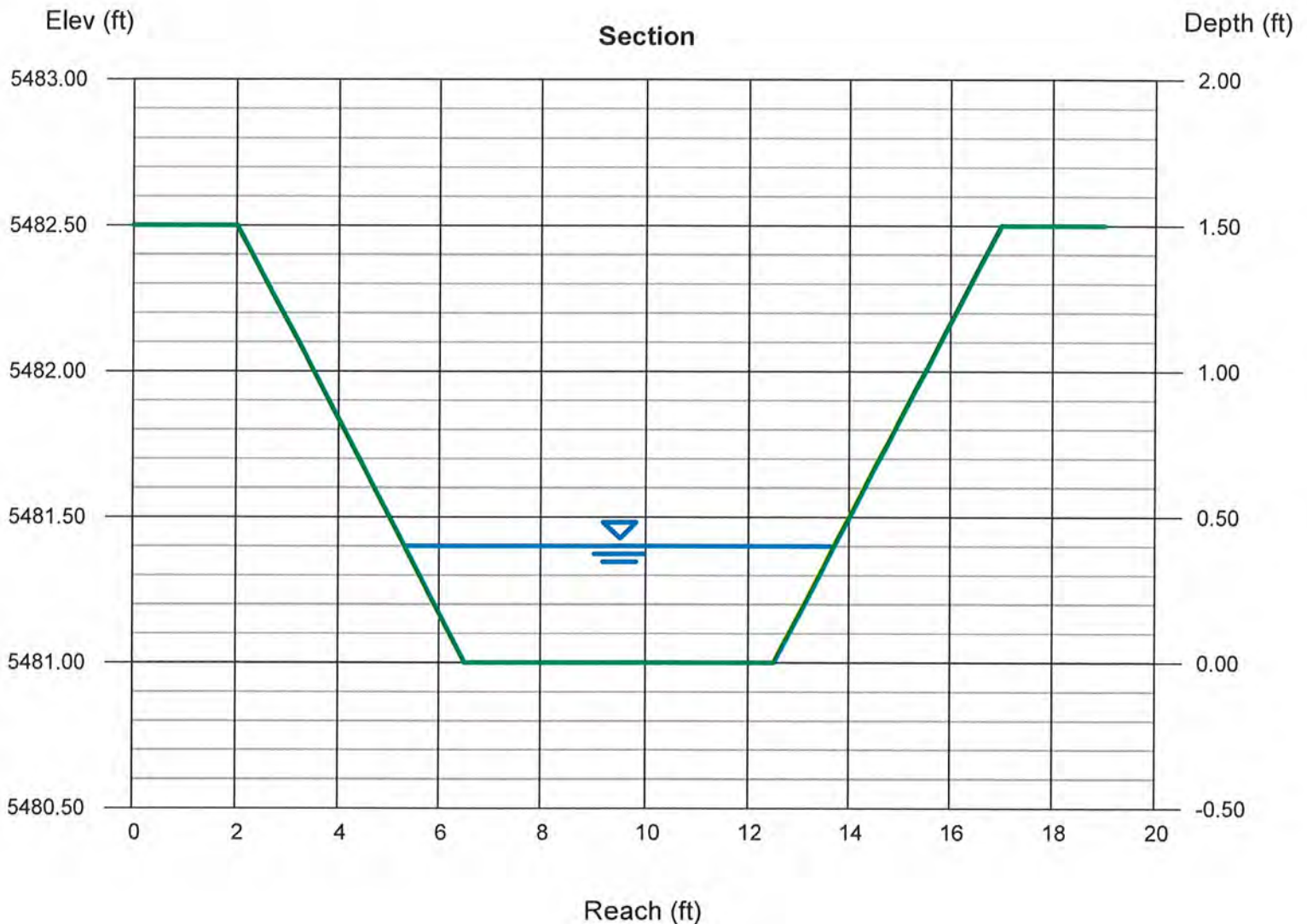
Bottom Width (ft) = 6.00
Side Slopes (z:1) = 3.00, 3.00
Total Depth (ft) = 1.50
Invert Elev (ft) = 5481.00
Slope (%) = 3.00
N-Value = 0.035

Calculations

Compute by: Known Q
Known Q (cfs) = 10.00

Highlighted

Depth (ft) = 0.40
Q (cfs) = 10.00
Area (sqft) = 2.88
Velocity (ft/s) = 3.47
Wetted Perim (ft) = 8.53
Crit Depth, Y_c (ft) = 0.42
Top Width (ft) = 8.40
EGL (ft) = 0.59

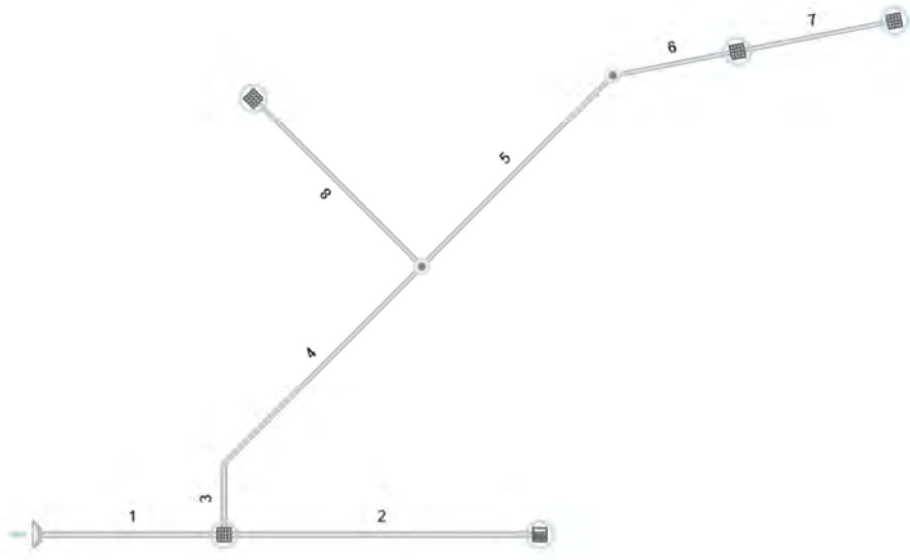


Plan View

Stormwater Studio 2017 v 1.0.0.0

Project Name: JUAN TABO HILLS PARK

09-14-2018

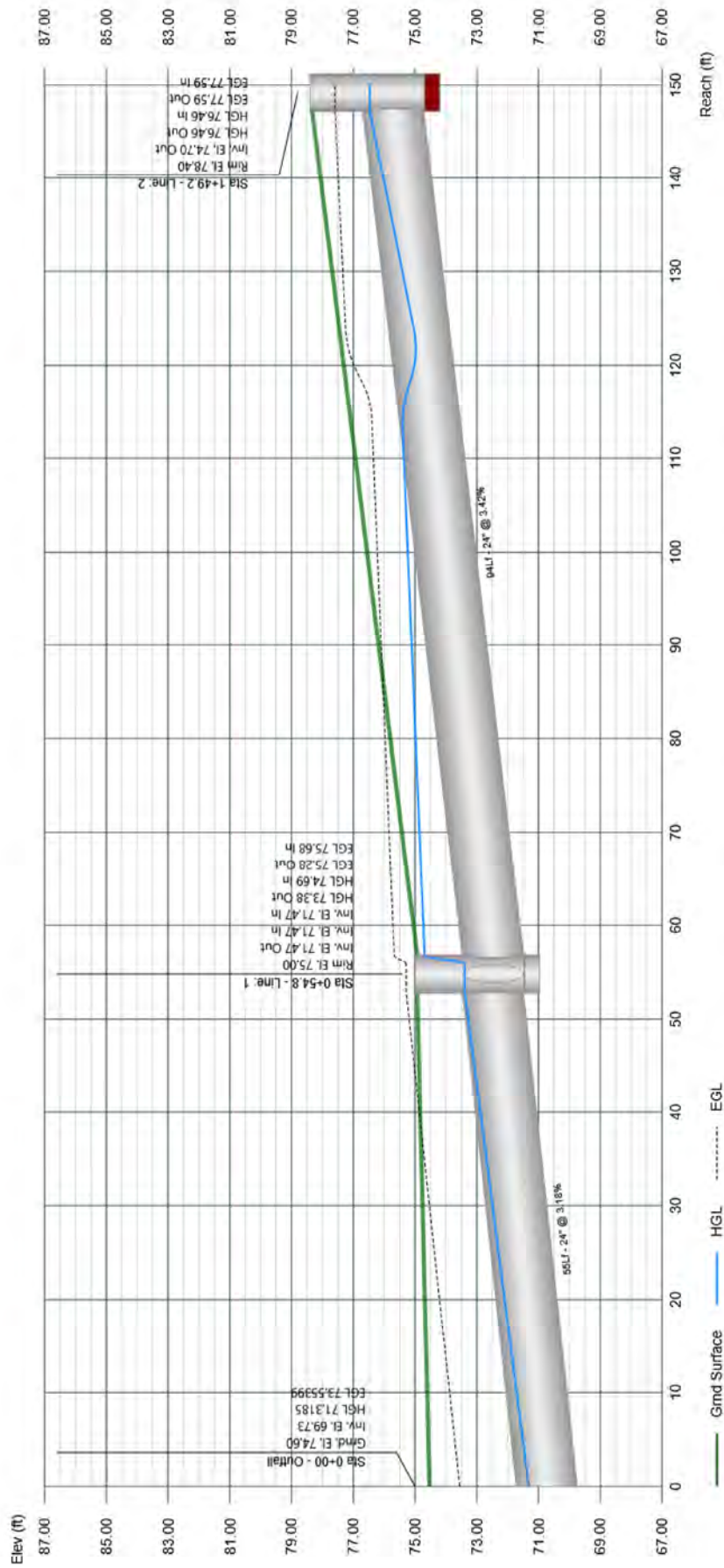


Profile View

Stormwater Studio 2017 v 1.0.0.0

Project Name: JUAN TABO HILLS PARK

09-14-2018

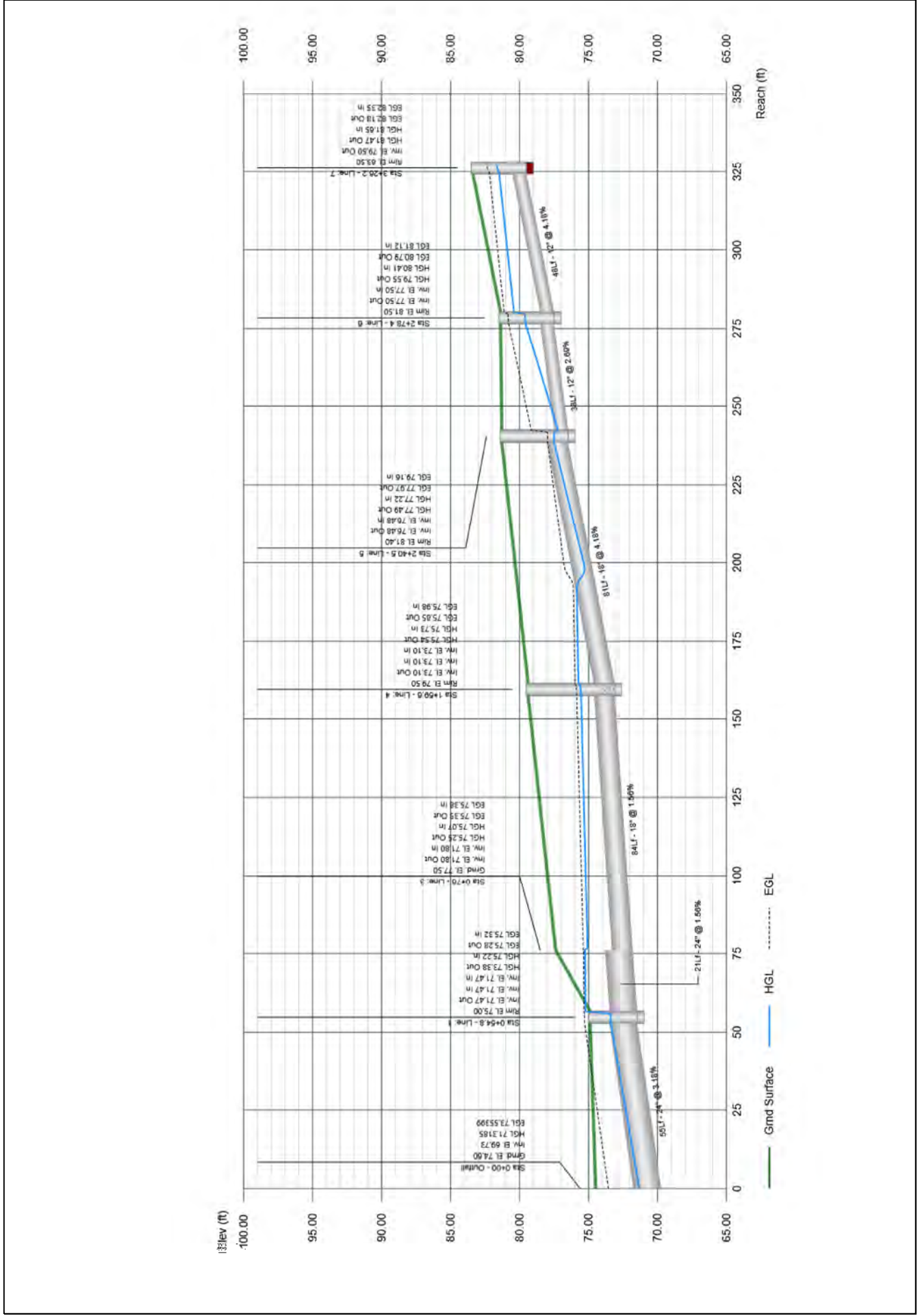


Profile View

Stormwater Studio 2017 v 1.0.0.0

Project Name: JUAN TABO HILLS PARK

09-14-2018

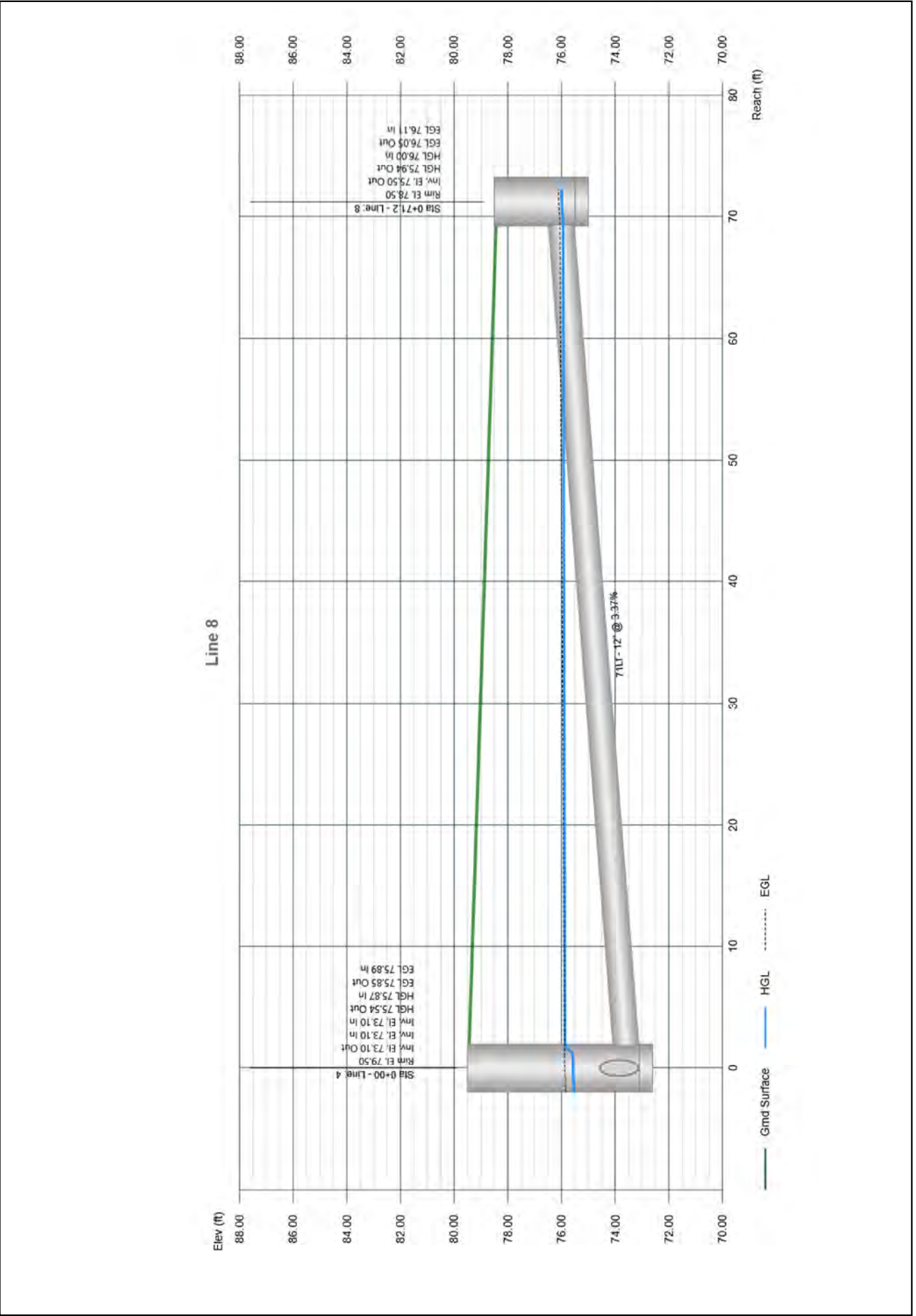


Profile View

Stormwater Studio 2017 v 1.0.0.0

Project Name: JUAN TABO HILLS PARK

09-14-2018



Energy Grade Line Calculations

Project Name: JUAN TABO HILLS PARK
09-14-2018

Stormwater Studio 2017 v 1.0.0.0

Line No	Line Size (in)	Q (cfs)	Downstream							Length (ft)	Upstream							Pipe		Junction		
			Invert Elev (ft)	Depth (ft)	Area (sqft)	HGL Elev (ft)	Vel (ft/s)	Vel Head (ft)	EGL Elev (ft)		Invert Elev (ft)	Depth (ft)	Area (sqft)	HGL Elev (ft)	Vel (ft/s)	Vel Head (ft)	EGL Elev (ft)	n Value	Energy Loss (ft)	HGLa Elev (ft)	EGLa Elev (ft)	Energy Loss (ft)
1	24	34.20	69.73	1.59†	2.68	71.32	12.78	2.54	73.55	54.80	1.91 ²	3.10	73.38	11.05	1.90	75.28	0.013	1.113	73.38	75.28	0.00	
2	24	25.00	71.47	2.00	2.93	74.69	7.96	0.98	75.68	94.40	1.76 ²	2.93	76.46	8.52	1.13	77.59	0.013	1.095	76.46	77.59	0.00	
3	24	7.90	71.47	2.00	3.14	75.22	2.52	0.10	75.32	21.20	2.00	3.14	75.25	2.51	0.10	75.35	0.013	0.026	75.28	75.38	0.03	
4	18	7.90	71.80	1.50	1.77	75.07	4.47	0.31	75.38	83.60	1.50	1.77	75.54	4.47	0.31	75.85	0.013	0.473	75.57	75.88	0.03	
5	18	7.00	73.10	1.50	1.77	75.73	3.96	0.24	75.98	80.90	1.01 ²	1.27	77.49	5.53	0.48	77.97	0.013	0.464	77.49	77.97	0.00	
6	12	7.00	76.48	0.74†	0.63	77.22	11.16	1.94	79.16	37.90	1.00	0.79	79.55	8.91	1.24	80.79	0.013	1.628	79.60	80.83	0.05	
7	12	5.30	77.50	1.00	0.79	80.41	6.75	0.71	81.12	47.80	1.00	0.79	81.47	6.75	0.71	82.18	0.013	1.059	81.65	82.35	0.18	
8	12	0.90	73.10	1.00	0.79	75.87	1.15	0.02	75.89	71.20	0.44	0.33	75.94	2.71	0.11	76.05	0.013	0.165	76.00	76.11	0.06	

Notes: Return Period = 2-yrs. ² Critical depth. † Supercritical.

Project File: 2236 SD CALCS.sws

DRAINAGE REPORT
for
VOLTERRA VILLAGE

Prepared by

Mark Goodwin & Associates, PA
P.O. Box 90606
Albuquerque, NM 87199
(505) 828-2200

Prepared for

JTH, LLC
P.O. Box 1443
Corrales, NM 87048
(505) 892-5533



47-09
9-30-09



D. Mark Goodwin & Associates, P.A.
Consulting Engineers

P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 828-2200 FAX 797-9539

PROJECT VOLTERRA

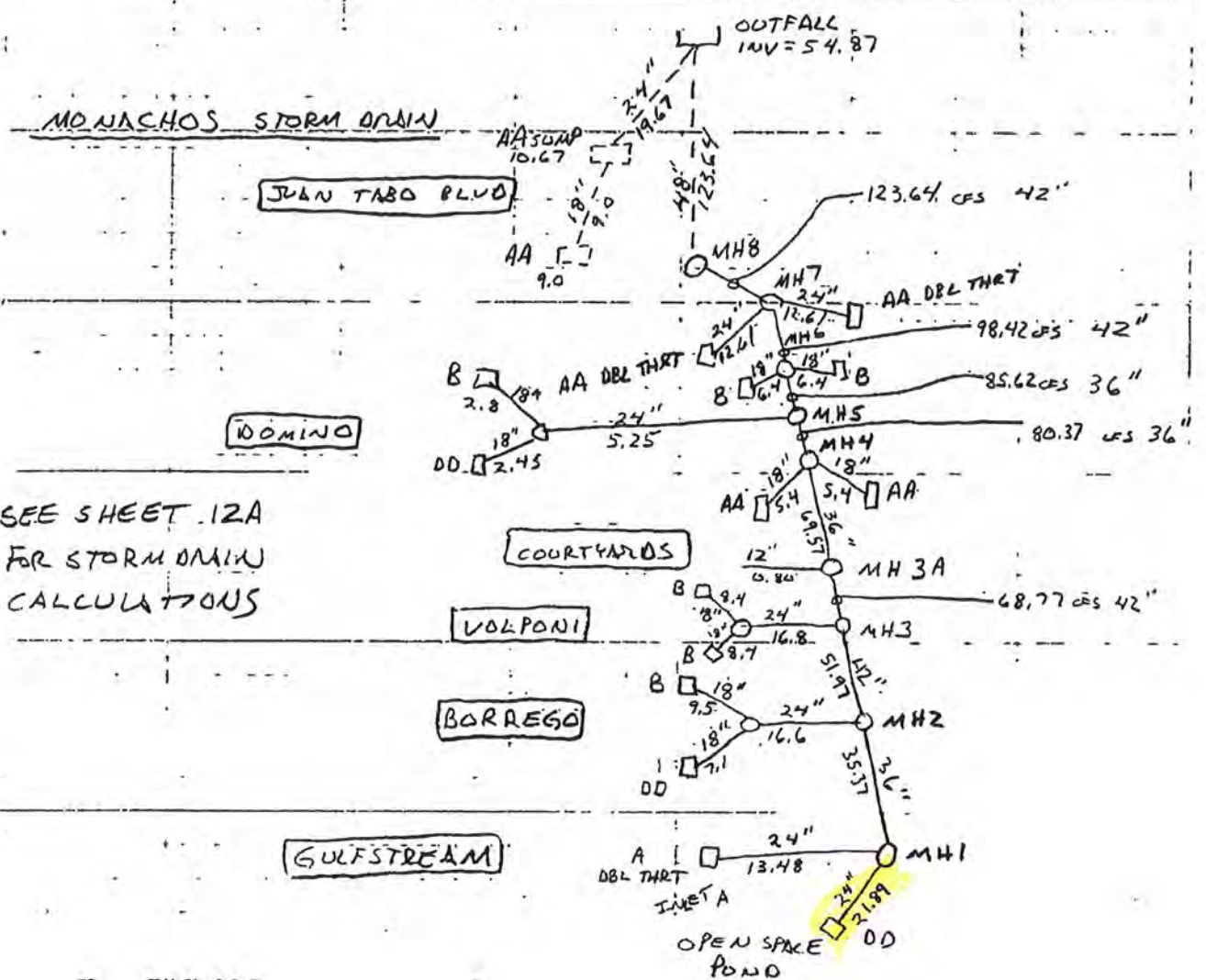
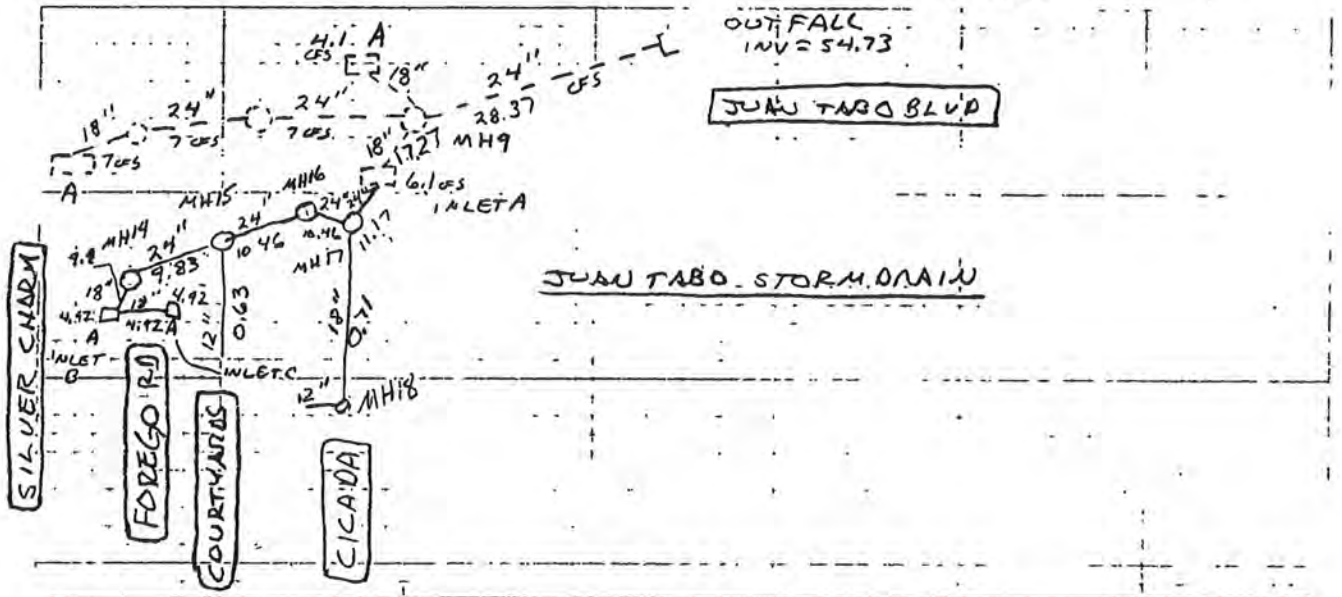
SUBJECT DRAINAGE CALCS

BY GJK DATE 3-3-09

CHECKED _____ DATE _____

SHEET 12 OF _____

REVISED 8-4-09



AHYMO PROGRAM (AHYMO 97) - Version: 1997.02d
 RUN DATE (MON/DAY/YR) = 03/06/2009
 START TIME (HR:MIN:SEC) = 13:09:49 USER NO.= AHYMO-I-
 9702dGoodwinM-AH
 INPUT FILE = volopend.dat

START TIME=0.0
 ***** HYDROGRAPH FOR VOLTERRA OPEN SPACE
 RAINFALL TYPE=1 RAIN QUARTER=0.0 IN
 RAIN ONE=2.05 IN RAIN SIX=2.60 IN
 RAIN DAY=3.20 IN DT=0.03333 HR

COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 -
 PEAK AT 1.40 HR.

DT = .033330 HOURS		END TIME = 5.999400 HOURS				
.0000	.0040	.0081	.0123	.0166	.0210	.0255
.0300	.0347	.0395	.0444	.0494	.0546	.0599
.0653	.0709	.0767	.0826	.0887	.0951	.1016
.1084	.1154	.1227	.1302	.1381	.1464	.1550
.1641	.1736	.1837	.1893	.1954	.2019	.2158
.2469	.2947	.3635	.4573	.5807	.7380	.9338
1.1728	1.3946	1.4873	1.5655	1.6351	1.6984	1.7566
1.8107	1.8613	1.9087	1.9533	1.9953	2.0351	2.0727
2.1083	2.1421	2.1742	2.2046	2.2335	2.2411	2.2482
2.2550	2.2615	2.2678	2.2738	2.2797	2.2854	2.2909
2.2962	2.3015	2.3065	2.3115	2.3163	2.3210	2.3257
2.3302	2.3346	2.3389	2.3432	2.3474	2.3515	2.3555
2.3595	2.3634	2.3672	2.3710	2.3747	2.3783	2.3819
2.3855	2.3890	2.3925	2.3959	2.3992	2.4026	2.4058
2.4091	2.4123	2.4154	2.4186	2.4217	2.4247	2.4277
2.4307	2.4337	2.4366	2.4395	2.4424	2.4453	2.4481
2.4509	2.4536	2.4564	2.4591	2.4618	2.4644	2.4671
2.4697	2.4723	2.4749	2.4774	2.4800	2.4825	2.4850
2.4874	2.4899	2.4923	2.4948	2.4972	2.4995	2.5019
2.5043	2.5066	2.5089	2.5112	2.5135	2.5158	2.5180
2.5202	2.5225	2.5247	2.5269	2.5291	2.5312	2.5334
2.5355	2.5377	2.5398	2.5419	2.5440	2.5460	2.5481
2.5502	2.5522	2.5542	2.5563	2.5583	2.5603	2.5623
2.5642	2.5662	2.5682	2.5701	2.5720	2.5740	2.5759
2.5778	2.5797	2.5816	2.5835	2.5853	2.5872	2.5890
2.5909	2.5927	2.5945	2.5964	2.5982	2.6000	

***** OPEN SPACE AREA SB 11
 COMPUTE NM HYD ID=1 HYD NO=101 AREA=0.001289 SQ MI
 PER A=100 B=0 C=0 D=0
 TP=0.1333 HR MASS RAINFALL=-1

K = .159146HR TP = .133300HR K/TP RATIO = 1.193894 SHAPE
 CONSTANT, N = 2.975114
 UNIT PEAK = 2.7055 CFS UNIT VOLUME = .9946 B = 279.79
 P60 = 2.0500
 AREA = .001289 SQ MI IA = .65000 INCHES INF = 1.67000
 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =
 .033330

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 101.00

RUNOFF VOLUME = .63017 INCHES = .0433 ACRE-FEET
 PEAK DISCHARGE RATE = 1.49 CFS AT 1.500 HOURS BASIN AREA =
 .0013 SQ. MI.

LEGEND

- NEW ALIGN LINE
- EXISTING LINE
- NEW TIE
- NEW LOT AND
- NEW ROAD AND



ENGINEER'S SEAL 		CHECKED BY: <i>DWJ</i> DATE: 04/09 DRAWN BY: <i>ACM</i> DATE: 04/09 DESIGNED BY: <i>GM</i> DATE: 04/09 DESIGN:	
SURVEY INFORMATION FIELD NOTES NO. _____ BY _____ DATE _____ STATION 3+00 TO 3+100 IS LOCATED AT THE SE CORNER OF LOT 10, BLOCK 10, SUBDIVISION 10, TOWNSHIP 10 NORTH, RANGE 10 WEST, COUNTY OF MIDDLESEX, STATE OF NEW JERSEY.		NO. DATE REMARKS DESIGN:	
AS BUILT INFORMATION BENCH MARKS STATION 3+00 TO 3+100 IS LOCATED AT THE SE CORNER OF LOT 10, BLOCK 10, SUBDIVISION 10, TOWNSHIP 10 NORTH, RANGE 10 WEST, COUNTY OF MIDDLESEX, STATE OF NEW JERSEY.		CITY OF ALBUQUERQUE PUBLIC WORKS DEPARTMENT POLTERRA VILLAGE DRAINAGE BASINS DESIGN REVIEW COMMITTEE CITY ENGINEER APPROVAL: _____ DATE: _____	

dhwg
 JAMES GORMAN & ASSOCIATES, P.A.
 1000 WEST 10TH AVENUE, SUITE 1000
 DENVER, COLORADO 80202, TEL: (303) 733-4333

SCALE: 1" = 100'
 100' 0" 100' 100' 200'

CITY PROJECT NO. 756188
 SHEET 8 OF 55

**DRAINAGE REPORT
FOR
Juan Tabo Hills Unit 3B**

*Prepared for
Juan Tabo Hills, LLC
P.O. Box 1443
Corrales, NM 87048*

*Prepared by
Mark Goodwin & Associates, PA
P.O. Box 90606
Albuquerque, NM 87199
(505) 828-2200*

December 2009



*2-16-10
3-4-10*



D. Mark Goodwin & Associates, P.A.
Consulting Engineers

P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 828-2200 FAX 797-9539

PROJECT JUDY TAGG HILLS 3B
SUBJECT DRAINAGE CALCS
BY GJK DATE 12-10-09
CHECKED _____ DATE _____
SHEET 3 OF _____
REVISED 1-21-10

- VERIFY CAPACITY OF ZANUSO AT MONACHOS

$$S = 0.59\% \quad n = 0.017 \quad 32' \text{ F-F STD C\&G}$$

$$\begin{aligned} d &= 0.45 \\ WP &= 32.90 \\ A &= 6.73 \\ V &= 2.15 \text{ F/S} \\ Q &= 14.47 \text{ CFS} \approx 14.23 \text{ OK} \\ d + V^2/2g &= 0.52 < 0.67 \text{ OK} \end{aligned}$$

- INSTALL CATTLE GUARD / TRENCH DRAIN INLET AT LOW POINT OF MONACHOS IN SUMP CONDITION.

$$\begin{aligned} Q &= 14.23 + 11.86 \\ &= 26.09 \text{ CFS} \end{aligned}$$

$$\begin{aligned} P &= (40' \times 2) + (2' \times 2) \\ &= 84' \end{aligned}$$

$$Q/P = 3.0 H^{1.5}$$

$$H = 0.22' \ll 0.67 \text{ OK}$$

- SIZE "56L D" INLET IN BASIN 14 IN SUMP CONDITION

$$\begin{aligned} Q &= 4.13 \text{ CFS} \\ P &= 11' \end{aligned}$$

$$Q/P = 3.0 H^{1.5}$$

$$H = 0.25' < 0.5' \text{ OK}$$

- SEE SHEETS 15-22 FOR C/TORM DRAIN DESIGN

