

# CITY OF ALBUQUERQUE

PLANNING DEPARTMENT – Development Review Services



January 20, 2015

Brian Patterson, PE  
Yolanda Padilla Moyer, PE  
**BOHANNAN-HUSTON, INC.**  
7500 Jefferson Street NE Courtyard I  
Albuquerque, NM 87109

Richard J. Berry, Mayor

**RE: Sevilla @ Andalucia - (File: F11D015C)**  
**Drainage Management Plan, Engineer's Stamp Date 1-19-2015**  
**Grading and Drainage Plans, Engineer's Stamp Date 1-19-2015**

Dear Mr. Patterson, Ms. Moyer:

Based upon the information provided in your submittals received 1-20-14, the above referenced submittals are approved for Preliminary Plat, Site Plan for Subdivision, and Site Plan for Building Permit action by the DRB with the following condition:

1. Open space tract ~~at~~ Basin D-1 should drain to cul-de-sac at far south end via turned blocks or other means.

PO Box 1293

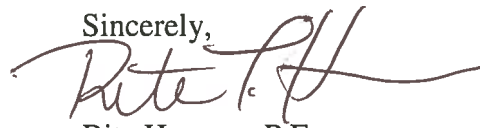
The Grading and Drainage Plans cannot be approved for Grading Permit until DRB approval. A separate letter will be written with any exception or comment after DRB approval.

Albuquerque

If you have any questions, you can contact me at 924-3695.

New Mexico 87103

[www.cabq.gov](http://www.cabq.gov)

Sincerely,  
  
Rita Harmon, P.E.  
Senior Engineer, Planning Dept.  
Development Review Services

Orig: Drainage file  
c.pdf Addressee via Email, Monica Ortiz



# City of Albuquerque

Planning Department

Development & Building Services Division

## DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV 02/2013)

Project Title: \_\_\_\_\_ Building Permit #: \_\_\_\_\_ City Drainage #: \_\_\_\_\_

DRB#: \_\_\_\_\_ EPC#: \_\_\_\_\_ Work Order#: \_\_\_\_\_

Legal Description: \_\_\_\_\_

City Address: \_\_\_\_\_

**Engineering Firm:** \_\_\_\_\_ Contact: \_\_\_\_\_

Address: \_\_\_\_\_

Phone#: \_\_\_\_\_ Fax#: \_\_\_\_\_ E-mail: \_\_\_\_\_

**Owner:** \_\_\_\_\_ Contact: \_\_\_\_\_

Address: \_\_\_\_\_

Phone#: \_\_\_\_\_ Fax#: \_\_\_\_\_ E-mail: \_\_\_\_\_

**Architect:** \_\_\_\_\_ Contact: \_\_\_\_\_

Address: \_\_\_\_\_

Phone#: \_\_\_\_\_ Fax#: \_\_\_\_\_ E-mail: \_\_\_\_\_

**Surveyor:** \_\_\_\_\_ Contact: \_\_\_\_\_

Address: \_\_\_\_\_

Phone#: \_\_\_\_\_ Fax#: \_\_\_\_\_ E-mail: \_\_\_\_\_

**Contractor:** \_\_\_\_\_ Contact: \_\_\_\_\_

Address: \_\_\_\_\_

Phone#: \_\_\_\_\_ Fax#: \_\_\_\_\_ E-mail: \_\_\_\_\_

### TYPE OF SUBMITTAL:

- ☐ DRAINAGE REPORT
- ☐ DRAINAGE PLAN 1st SUBMITTAL
- ☐ DRAINAGE PLAN RESUBMITTAL
- ☐ CONCEPTUAL G & D PLAN
- ☐ GRADING PLAN
- ☐ EROSION & SEDIMENT CONTROL PLAN (ESC)
- ☐ ENGINEER'S CERT (HYDROLOGY)
- ☐ CLOMR/LOMR
- ☐ TRAFFIC CIRCULATION LAYOUT (TCL)
- ☐ ENGINEER'S CERT (TCL)
- ☐ ENGINEER'S CERT (DRB SITE PLAN)
- ☐ ENGINEER'S CERT (ESC)
- ☐ SO-19
- ☐ OTHER (SPECIFY) \_\_\_\_\_

### CHECK TYPE OF APPROVAL/ACCEPTANCE SOUGHT:

- ☐ SIA/FINANCIAL GUARANTEE RELEASE
- ☐ PRELIMINARY PLAT APPROVAL
- ☐ S. DEV. PLAN FOR SUB'D APPROVAL
- ☐ S. DEV. FOR BLDG. PERMIT APPROVAL
- ☐ SECTOR PLAN APPROVAL
- ☐ FINAL PLAT APPROVAL
- ☐ CERTIFICATE OF OCCUPANCY (PERM)
- ☐ CERTIFICATE OF OCCUPANCY (TCL TEMP)
- ☐ FOUNDATION PERMIT APPROVAL
- ☐ BUILDING PERMIT APPROVAL
- ☐ GRADING PERMIT APPROVAL
- ☐ PAVING PERMIT APPROVAL
- ☐ WORK ORDER APPROVAL
- ☐ GRADING CERTIFICATION
- ☐ SO-19 APPROVAL
- ☐ ESC PERMIT APPROVAL
- ☐ ESC CERT. ACCEPTANCE
- ☐ OTHER (SPECIFY) \_\_\_\_\_

WAS A PRE-DESIGN CONFERENCE ATTENDED: \_\_\_\_\_ Yes \_\_\_\_\_ No \_\_\_\_\_ Copy Provided

DATE SUBMITTED: \_\_\_\_\_ By: \_\_\_\_\_

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location, and scope to the proposed development defines the degree of drainage detail. One or more of the following levels of submittal may be required based on the following:

1. **Conceptual Grading and Drainage Plan:** Required for approval of Site Development Plans greater than five (5) acres and Sector Plans
2. **Drainage Plans:** Required for building permits, grading permits, paving permits and site plans less than five (5) acres
3. **Drainage Report:** Required for subdivision containing more than ten (10) lots or constituting five (5) acres or more
4. **Erosion and Sediment Control Plan:** Required for any new development and redevelopment site with 1-acre or more of land disturbing area, including project less than 1-acre that are part of a larger common plan of development

January 15, 2015

Courtyard I  
7500 Jefferson St. NE  
Albuquerque, NM  
87109-4335

[www.bhinc.com](http://www.bhinc.com)

Ms. Rita Harmon, P.E.  
City of Albuquerque  
Planning Department  
600 2<sup>nd</sup> Street NW  
Albuquerque, NM 87103

voice: 505.823.1000  
facsimile: 505.798.7988  
toll free: 800.877.5332

Re: Response to Comments  
Drainage Master Plan for Sevilla @ Andalucia

Dear Ms. Harmon:

Based on the letter we received from you dated January 13, 2015 and the email dated January 14, 2015 which provided comments for the Drainage Management Plan for Sevilla @ Andalucia, below are our responses to each of your comments and how they have been addressed.

Letter dated January 13, 2015:

1. Address the first flush.
  - **Done.** As stated in the report, the required retention of 5771 CF could not be accomplished due to the site restraints. As shown in the report, we maximized all available areas are able to retain a volume of 2311 CF. As stated on the latest EPA MS4 Permit on sheet 10, "Where both the 90th percentile storm event capture requirement and flood control requirements on site cannot be met due to site conditions, the 90<sup>th</sup> percentile storm event capture requirements may be met through a combination of onsite and offsite controls". The existing AMAFCA water harvesting facility just downstream of our site on the San Antonio Arroyo provides an additional water quality feature and thus meets the intent of the MS4 permit.
2. Address offsite flows in the report. Do any flows from Coors enter Sevilla Ave.?
  - **There are no offsite flows that enter the site. This has been addressed in the report.**
3. Grading plan does not show the existing elevations of Sevilla Ave. It seems to show historic contours. Show existing contours and flowline of Sevilla Ave. Is there a water block from Coors into Sevilla Ave?
  - **Yes, there is a water block just east of Coors on Sevilla. The grading plan has been revised to with additional spots confirming the water block.**
4. According to report, portions of Existing Basin 1 are conveyed to separate low points. Therefore, Existing Basin 1 should be divided accordingly to reflect this.
  - **Yes, as indicated in Appendix B, the flows are divided equally to each low point.**
5. Note in the report what portion the  $Q_{100}$  flowrate of Existing Basin 1 contributes to each of the separate lowpoints. Please verify that each portion adds up to the total  $Q_{100}$  for that basin as there seems to be a 0.4 cfs discrepancy
  - **Done.**

Engineering ▲

Spatial Data ▲

Advanced Technologies ▲

6. Adjust basin boundaries so that water blocks in Calle Espana coincide with basin boundaries.
  - **The water blocks in Calle Espana near Sevilla Ave are not true water blocks. There are highpoints located at these locations but during the 100 year storm event, water from Sevilla (Ex. Basin 1) spills over the highpoint where it ultimately collected by the inlets in the sump conditions.**
7. Show an existing basin east of Existing Basin 1? Report and calculations should show that the 36" existing Storm drain has the capacity to convey the developed flows to its discharge location. What offsite basins contribute to flows in the existing 36" Storm Drain?
  - **Previous DMP excepts have been included in the report with this information.**
8. The contours, elevations and line work showing Coors Blvd, the curb and gutter are unclear.
  - **Grading Plan has been revised to more clear show Coors Blvd Line Work. Flowline elevations have also been shown for reference**
9. Do flows on East side of Coors (in meandering sidewalk area) drain to this site? Particularly north of Sevilla Ave? The developed basin map shows flow arrows pointing west, but the contours do not support this. There seems to be some ponding in this area. Where is the R.O.W.? Where is the property line? How does this area drain?
  - **Area west of the wall in Coors Blvd drains towards Coors Blvd. Basin Map and Grading Plan have been updated to show this. ROW has been labeled on Grading Plan.**
10. Is the Retaining wall along Coors existing or proposed? Are both walls shown retaining walls? Site Plan for Subdivision suggests that the wall closer to wall is a decorative wall.
  - **The wall along Coors Blvd south of Sevilla is existing and has a 4' retaining wall built into the wall, where the development site is lower than Coors. On the north side of Sevilla, a portion of the wall is built for approximately 150' to the north and also has a 4' retaining wall built into it similar to the south side. The wall is proposed to continue from the existing terminus of the wall to the north property boundary. Grading Plan notes have been added to reflect this.**
11. How do Open space tracts drain? Particularly the larger ones such as Basins D-1 and H?
  - **They both are conveyed east to the adjacent streets by a swale located just north of the proposed retaining walls.**
12. Show proposed contours.
  - **Grading Plan has been revised to reflect this.**
13. Show top and bottom of wall elevations on Retaining walls on Grading Plan.
  - **Grading Plan has been revised to reflect this.**
14. Legend shows existing storm drain system with hatched pattern, but is actually faded on plan.
  - **This has been updated.**
15. Please provide documentation which indicates which developed basins are allowed to free discharge into the San Antonio Arroyo.
  - **AMAFCA will also be reviewing and approving this report, thus concurring the statement of free discharge into the San Antonio Arroyo which is an AMAFCA facility.**

16. Is there a Master Drainage Plan for this area? If so, please provide relevant excerpts.
- **The report references the Drainage Report for Andalucia at La Luz – Phase 1 and excerpts are provided.**
17. AMAFCA approval is required. The earth lined swales to discharge to San Antonio Arroyo may need an easement. , as well as discharge from any "Turned blocks".
- **We have been in constant contact with AMAFCA on this issue. It is our understanding that an agreement will need to take place for this drainage and maintenance.**
18. Show on the Grading Plan the earth lined swales that Basins B and F and K drain to as indicated in the report.
- **Grading Plan has been revised to reflect this.**
19. Indicate location and opening area of "Turned blocks" on the grading plan.
- **Grading Plan has been revised to reflect this.**
20. Clearly show AMAFCA Floodway and easements as well as the boundary of the SFHA A flood zone.
- **Preliminary Plat is enclosed which shows the AMAFCA Easement. A FEMA Map has also been included in the appendix of the Drainage Report for information.**
21. Show slopes of roadway on Grading.
- **Grading Plan has been revised to reflect this.**
22. Provide Road cross sections.
- **Grading Plan has been revised to reflect this.**
23. Indicate on the Grading plan where standard curb and mountable curb will be used.
- **Note has been added to the grading plan that all curb and gutter is Standard.**
24. Sump in north side (Tract B-2) shows 2 inlets on the Storm Drain Network map, but only 1 inlet on the Grading Plan. The report states that a double grate inlet will be used, but is not indicated elsewhere. Further, the Calculations state that the required capacity is 26.8 cfs, but the Allowable Capacity is for one inlet is 14.5 cfs. Similar comment is for the sump inlet in the south side (Tract A-1-A).
- **The grading plan has been updated to show 2 inlets. The total flow at inlets 1 and 2 is 20.9 cfs and due to there not emergency spill way present, these inlets have been sized to capture two times the 100-year storm event. See Appendix B for additional analysis.**
25. At sump in north side (Tract B-2), flowline elevations indicate that the road is super elevated. Provide street capacity calculations showing the super elevated street has capacity.
- **The analysis provided in Appendix B is for a super elevated roadway.**
26. For the storm drain analysis, provide a graphic representation showing the storm drain, the grade, the HGL and the pipe ID's used in the InRoads program.
- **Plan and profile sheets have been included in the report with the above information.**

Email dated January 14, 2015:

1. Show the Table in Appendix A on the Developed Basin Map
  - **Done**
2. There is a typo on page 1 of report stating site is 38 Acres.
  - **Sheet 1 has been revised.**
3. How do lots 29, 30, 31 drain? Turned blocks on back side of lot? Are drive pads on west side of lots?
  - **These lots drain back through turn blocks. These turn blocks are referenced on the grading plan. These lots front and access from Calle Parasol.**
4. A short retaining wall is needed between lots 39 & 40
  - **Lot 40 has been revised and no retaining wall is needed**
5. Lot 40 seems to be in Basin F
  - **Lot 40 has been revised and drains though the front yard and is within Basin E.**
6. Are the contours between Berm St. and the retaining wall existing contours or historic? Show some spot elevations along Berm St. Is there a curb along Berm St?
  - **Existing elevations are provided at the property line adjacent to Berm St. There retaining walls are proposed. There are currently now walls along the La Luz Subdivision. Elevations that we have are shown. There is no curb and gutter along Berm St only edge of pavement.**
7. There is a 10' difference in elevation between the retaining wall and Sevilla Ave. on South side of Sevilla, near the Arroyo.
  - **Grading Plan has been revised to correct this.**
8. In regards to comment 24 in the letter: I see that the capacity for 1 inlet is 26.11 as opposed to 14.47cfs as stated. However, the calculation for the head is based on there being 2 inlets capturing the flow rather than one. The depth is 0.58' so the capacity is about 20.5 cfs, still less than the required 26.8 cfs for the North Basin. This same comment applies to the South Basin (basin South of Sevilla Ave).
  - **The head for each inlet (100 year event) is approximately 0.37'. As indicated in the report as well as in Appendix B, since there is not an emergency spillway present, 2 x 100 year event is required for these inlets. With this stated, the head for the 2 x 100 year event is approximately 0.57'.**
9. In regards to comment 25: I see that the street capacity calculation does take into account the superelevation; however, it is assuming to separate inlets in both the North and South basins.
  - **The analysis provides the depths for both sides of the inlet in sump as well as the required head to for the total flow at the inlet. The head for each inlet (100 year event) is approximately 0.36'. As indicated in the report as well as in Appendix B, since there is not an emergency spillway present, 2 x 100 year event is required for these inlets. With this stated, the head for the 2 x 100 year event is approximately 0.57'.**

10. I will wait till I get the other comments addressed before I review the SD analysis in more depth.

- **Noted.**

The Drainage Management Plan for Sevilla @ Andalucia 1 is attached. Please feel free to contact me at 823-1000 with questions or comments.

Sincerely,

A handwritten signature in black ink, appearing to read 'B. C. Patterson', with a long horizontal line extending to the right.

Brian C. Patterson, P.E.  
Project Engineer  
Community Development and Planning

BCP/  
Enclosures

cc: Yolanda Moyer, BHI

January 19, 2015

Courtyard I  
7500 Jefferson St. NE  
Albuquerque, NM  
87109-4335

[www.bhinc.com](http://www.bhinc.com)

Ms. Rita Harmon, P.E.  
City of Albuquerque  
Planning Department  
600 2<sup>nd</sup> Street NW  
Albuquerque, NM 87103

voice: 505.823.1000  
facsimile: 505.798.7988  
toll free: 800.877.5332

Re: Response to Comments  
Drainage Master Plan for Sevilla @ Andalucia

Dear Ms. Harmon:

This letter is in response to our meeting with you on January 16, 2015 for the Drainage Management Plan for Sevilla @ Andalucia. In reviewing our responses with you, additional information or clarifications were needed to satisfy your comments, see below as well as the revised Grading and Drainage Report for this information.

1. COA Hydrology suggested that to utilize the front yards for potential water harvesting areas. It was suggested to add a 6" deep ponding area between the back of curb and sidewalk.
  - **The Grading Plan and Drainage report have been revised to incorporate this. A small pond at each lot has a capacity to retain 42 CF. With the ponding areas located in the front and rear yards as indicated in Appendix E. With the front and back yard ponding areas, Pond 2 and Pond 3, a retention volume of 4396 CF is available onsite. Although this subdivision does not meet the full retention volume requirements, this site does maximize all available areas of pond and this meets the intent of the ordinance.**
2. Clearly show AMAFCA Floodways and easement as well as the boundary of SFHA A flood zone.
  - **The grading plan has been revised to show and label AMAFCA's easement. A FEMA Firm has been added and is located in Appendix G which shows the location of the flood zone.**
3. Provide additional information to verify that offsite flows from Coors Blvd do not impact this site.
  - ***Drainage Management Plan – Coors Boulevard Improvements*, prepared by Bohannon Huston, Inc., dated September 2005 was added and referenced in the report. This drainage management plan provides drainage analysis for the Coors Boulevard Improvements, which is located just west of our site. This DMP provides detailed analysis for offsite basins located in Coors Blvd and more importantly provides analysis that flows from Coors Blvd do not enter Sevilla Ave and this project.**

Engineering ▲

Spatial Data ▲

Advanced Technologies ▲

4. Provide additional information for the  $Q_{allowable}$  vs.  $Q_{design}$  for the existing 36" storm drain network in Sevilla Ave.
  - **As shown in the *Andalucia at La Luz – Unit 1* as-built for the above mentioned storm drain, the flow from the previously approved plans discharging to the existing 36" storm drain network is  $Q=34.6$  cfs . As shown in this report, Sevilla @ Andalucia has a  $Q=31.6$  cfs entering the storm drain network, thus there is no adverse effect to the existing storm drain network with this development. The asbuilt plan and profile sheet has been added as Exhibit 5**
5. A short retaining wall is needed between lots 39 & 40.
  - **The grading plan has been revised to show a short retaining wall.**
6. There is a 10' difference in elevation between the retaining wall and Sevilla Ave on South side of Sevilla, near the Arroyo
  - **The grading plan has been revised to show retaining walls, existing bridge wingwalls and contours to show more clarification in this location.**

Comments received from AMAFCA on January 16, 2015:

1. Please make the swales cobble lined instead of earthlined.
  - **Grading Plan and Drainage Report have been revised to reflect a cobble lined swale.**

The Drainage Management Plan for Sevilla @ Andalucia 1 is attached. Please feel free to contact me at 823-1000 with questions or comments.

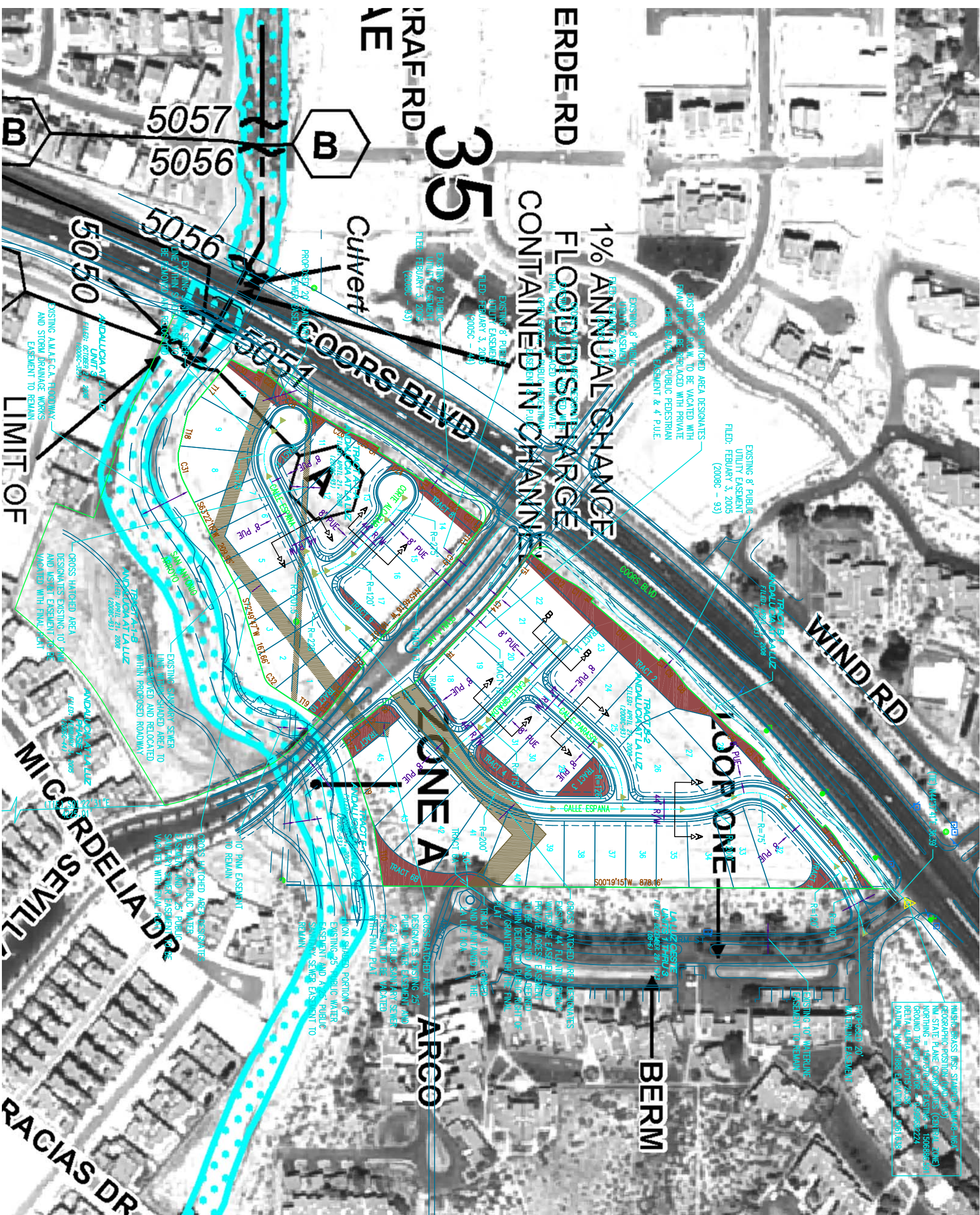
Sincerely,



Brian C. Patterson, P.E.  
Project Engineer  
Community Development and Planning

BCP/  
Enclosures

cc: Yolanda Moyer, BHI



**From:** [Mazur, Lynn](#)  
**To:** [Harmon Rita T.](#); [Cherne, Curtis](#)  
**Cc:** [Yolanda Padilla Moyer](#)  
**Subject:** Andalucia Unit 4  
**Date:** Tuesday, January 20, 2015 1:44:01 PM

---

I approve Preliminary Plat for Andalucia Unit 4. I met with Kevin Patton on Friday to discuss the swale for back lot drainage next to the San Antonio Arroyo. We allowed this for Andalucia Unit 3 on the south side of the arroyo.

AMAFCA  
Lynn Mazur, P.E.  
Development Review Engineer

# DRAINAGE MASTER PLAN FOR SEVILLA @ ANDALUCIA

## (REPLAT OF TRACT A-1-A & B-2 OF ANDALUCIA AT LA LUZ)

**JANUARY 2015**

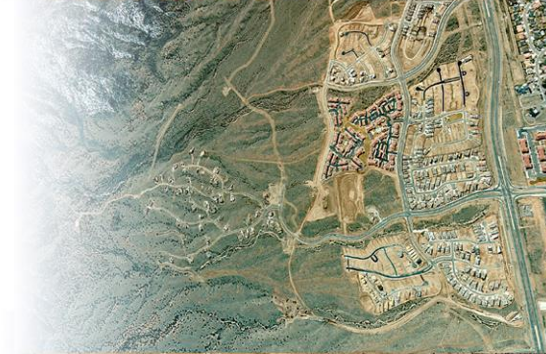
**Prepared for:**

**Pulte Homes of New Mexico  
7601 Jefferson St NE – Suite 320  
Albuquerque, NM 87109**

**Prepared by:**

**Bohannon  Huston**

Engineering  
Spatial Data  
Advanced Technologies



**DRAINAGE MANAGEMENT PLAN  
FOR  
SEVILLA @ ANDALUCIA  
(REPLAT OF TRACT A-1-A & B-2, ANDALUCIA AT LA LUZ)**

**JANUARY 19, 2015**

Prepared for:  
**PULTE HOMES OF NEW MEXICO  
7601 JEFFERSON BLVD. NE, SUITE 320  
ALBUQUERQUE, NM 87109**

Prepared by:  
**BOHANNAN HUSTON, INC.  
COURTYARD I  
7500 JEFFERSON STREET NE  
ALBUQUERQUE, NM 87109**

Prepared by:



Brian C. Patterson, P.E.  
Design Engineer

1-19-15

Date



## TABLE OF CONTENTS

|                                                        |   |
|--------------------------------------------------------|---|
| I. PURPOSE .....                                       | 1 |
| II. CONCEPTS AND METHODOLOGIES .....                   | 1 |
| III. SITE LOCATION AND CHARACTERISTICS .....           | 2 |
| IV. EXISTING HYDRAULIC AND HYDROLOGIC CONDITIONS ..... | 2 |
| V. DEVELOPED HYDRAULIC AND HYDROLOGIC CONDITIONS ..... | 2 |
| VI. CONCLUSION .....                                   | 4 |

## APPENDICES

|                                                              |
|--------------------------------------------------------------|
| APPENDIX A: BASIN CALCULATIONS                               |
| APPENDIX B: STREET HYDRAULICS AND STORM DRAIN INLET ANALYSIS |
| APPENDIX C: INROADS STORM DRAIN OUTPUT FILES                 |
| APPENDIX D: SWALE ANALYSIS                                   |
| APPENDIX E: WATER HARVESTING CALCULATIONS                    |
| APPENDIX F: PREVIOUS DMP'S EXCERPTS                          |
| APPENDIX G: FEMA FIRM                                        |

## EXHIBITS

|           |                              |
|-----------|------------------------------|
| EXHIBIT 1 | PRELIMINARY PLAT             |
| EXHIBIT 2 | EXISTING BASINS MAP          |
| EXHIBIT 3 | PROPOSED BASIN MAP           |
| EXHIBIT 4 | STORM DRAIN NETWORK MAP      |
| EXHIBIT 5 | STORM DRAIN PLAN AND PROFILE |
| EXHIBIT 6 | GRADING PLAN                 |

## **I. PURPOSE**

---

The purpose of this report is to provide a Drainage Management Plan for Sevilla @ Andalucia. Sevilla @ Andalucia encompasses Tract A-1-A and B-2 of the Andalucia at La Luz Subdivision and will consist of 45 single family residential lots on approximately 11.7 acres. This report will provide drainage analysis to support proposed site specific drainage infrastructure in order to obtain approval of the preliminary/final plat and grading plan by the City of Albuquerque.

## **II. CONCEPTS AND METHODOLOGIES**

---

Drainage conditions were analyzed utilizing the 100-year, 6-hour storm event in accordance with the City of Albuquerque Drainage Ordinance and the *Development Process Manual (DPM), Volume 2 Design Criteria, Section 22.2, Hydrology, The City of Albuquerque*, January 2002. The property as described in the "Purpose" section above is approximately 11.7 acres, therefore Part A of the DPM, Section 22.2, which provides a simplified procedure for projects with sub-basins smaller than 40 acres, was used.

Per the City of Albuquerque and EPA requirements, retention of the 90<sup>th</sup> percentile storm event is required and will be utilized by onsite ponds. The infiltration time utilizing these retention ponds, will be 96 hours or less, per City requirements.

The following document was referenced in the preparation of this report:

- *Drainage Report for Andalucia at La Luz – Phase 1*, prepared by Bohannon Huston, Inc., dated September 11, 2003.

This drainage report provides drainage analysis for Phase 1, which is located just east of our site. This report provides detailed analysis for the storm drain network that will be tied to with this development. Excerpts from this report are provided in the appendix.

- *Drainage Management Plan – Coors Boulevard Improvements*, prepared by Bohannon Huston, Inc., dated September 2005.

This drainage management plan provides drainage analysis for the Coors Boulevard Improvements, which is located just west of our site. This DMP provides detailed analysis for offsite basins located in Coors Blvd and more importantly provides analysis that flows from Coors Blvd do not enter Sevilla Ave and this project. Excerpts from this report are provided in the appendix.

Free discharge from the site into the fully improved San Antonio Arroyo located south of the site will be utilized as per discussions with AMAFCA and as stated by the San Antonio Arroyo LOMR prepared by this office dated September 8, 1997 which delineates developed basins which discharge into the arroyo.

### **III. SITE LOCATION AND CHARACTERISTICS**

---

Andalucia is a development located east of Coors Boulevard. The project is located near the San Antonio Arroyo. More specifically, Sevilla @ Andalucia is bordered by Coors Boulevard to the north, San Antonio Arroyo to the west and San Antonio Arroyo and Andalucia at La Luz, Phase 1 to the south. The site will be accessible from Coors Boulevard by Sevilla Ave. The site has been previously rough graded.

### **IV. EXISTING HYDRAULIC AND HYDROLOGIC CONDITIONS**

---

The land comprising of Sevilla @ Andalucia is partially undeveloped. Tracts A-1-A and B-2 have been previously mass graded, while Sevilla Ave which splits these two tracts has been constructed. As demonstrated in Exhibit 2-Existing Basins Map, there are three (3) existing basins that encumber this site. **Basin Tract A-1-A (A=4.2 acres, Q=8.5 cfs)** encompasses all of Tract A-1-A and currently discharges directly into the San Antonio Arroyo by means of sheet flowing. **Ex. Basin 1 (A=0.8 acres, Q=3.2 cfs)** encompasses a portion of Sevilla Ave. and currently discharges east into the existing storm drain system. **Basin Tract B-2 (A=7.5 acres, Q=15.2 cfs)** encompasses all of Tract B-2 and currently discharges directly into the San Antonio Arroyo by means of sheet flowing. As stated in *Drainage Management Plan – Coors Boulevard Improvements* and shown in Appendix F, no offsite flows from Coors Blvd impact this site.

### **V. DEVELOPED HYDRAULIC AND HYDROLOGIC CONDITIONS**

---

As demonstrated in Exhibit 3-Proposed Basins Map, there are thirteen (13) developed basins that are within the site. There are no offsite flows that enter the site. Developed flows were calculated based on du/ac as shown on Table A-5 in Chapter 22, Section 2 of the City of Albuquerque's Development Process Manual. **Basin A (A=2.7 acres, Q=8.2 cfs)**, landscaped **Basin D-1 (A=0.2 acres, Q=0.7 cfs)**, landscaped **Basin D-2 (A=0.02 acres, Q=0.1 cfs)** and a portion of **Ex. Basin 1 (A=0.8 acres, Q=3.2 cfs)** are all conveyed to a low-point in Calle Espana, south of Sevilla, where a double grate, double wing Type "A" inlet (inlet #1) captures all of the flow of Q=10.6 cfs. **Basin E (A=5.9 acres, Q=17.8 cfs)**, landscaped **Basin H (A=0.5 acres, Q=1.3 cfs)** and a portion of **Ex. Basin 1 (A=0.8 acres,**

**Q=3.2 cfs**) are all conveyed to a low-point in Calle Espana, north of Sevilla, where two double grate, double wing Type “A” inlet (inlets #2 and #3) captures all of the flow of **Q=20.9 cfs**. Please note that since inlets #1, #2 and #3 are in a sump condition and there is not an emergency spill way present, thus these inlets have been sized to capture two times the 100-year storm event. Landscaped **Basins D-1 and H** are both conveyed east to the adjacent streets. Landscaped **Basin I (A=0.01 acres, Q=0.1 cfs)** and **Basin J (A=0.2 acres, Q=0.1 cfs)** discharge north to Berm St. Landscaped **Basin C (A=0.06 acres, Q=0.2 cfs)** and landscaped **Basin G (A=0.1 acres, Q=0.3 cfs)** discharge directly into Sevilla Ave where they are collected and conveyed by the existing storm drain infrastructure system.

As shown in the *Andalucia at La Luz – Unit 1* as-builts, located in Exhibit 5, the flow from the previously approved plans impacting the existing 36” storm drain network is **Q=34.6 cfs**. As shown in this report, Sevilla @ Andalucia has a **Q=31.6 cfs** entering the storm drain network, thus there is no adverse effect to the existing storm drain network with this development.

**Basin F (A=0.9 acres, Q=2.7 cfs)** discharges east through the back of the lots via turn blocks where the flows combine with **Basin K (A=0.2 acres, Q=0.5 cfs)**. The combined flow of **Q=3.2 cfs** is conveyed by a cobble-lined swale to ultimately enter the San Antonio Arroyo at a single discharge point. **Basin B (A=1.2 acres, Q=3.7 cfs)** discharges east through the back of the lots via turn blocks and is conveyed by an earth-lined swale to ultimately enter the San Antonio Arroyo at a single discharge point. Please see Appendix D-Swale Analysis as well as Exhibit 6-Grading Plan for additional swale analysis.

The required onsite retention of the 90<sup>th</sup> percentile storm event was calculated to be 5771 CF. Pond 2 has an available retention volume of 605 CF and pond 3 has an available retention volume of 744 CF. Due to lots 1-8 and 41-45 draining through the backyard and out via a turn block that is set 4” above finished ground per the standard detail, each lot has an available retention volume of 74 CF. Additional ponding areas can also be accomplished in the front yards of each lot. A 6” depression will be added between the back of curb and sidewalk of each lot, which in turn can create an available retention volume of 42 CF per lot. With the front and back yard ponding areas, Pond 2 and Pond 3, a retention volume of 4396 CF is available onsite. Although this subdivision does not meet the full retention volume requirements, this site does maximize all available areas of pond and this meets the intent of the ordinance. Please see Appendix E for additional information.

## **VI. CONCLUSION**

---

This report has provided hydrologic and hydraulic considerations of the proposed development of Sevilla @ Andalucia. This Design Analysis Report is in accordance with section 22.2 of the *COA Development Process Manual (DPM)*, where the flows can be safely conveyed by the improvements proposed in this drainage plan to proposed drainage facilities, which have adequate capacity to accept such runoff. Erosion and dust control, consisting of erosion control berms, silt fencing and sedimentation basins, are proposed to mitigate soil washing or blowing into paved streets, storm drains, and existing developed areas. This drainage plan maintains the overall drainage pattern of the area and allows for the safe management of storm runoff in the fully developed condition as well as interim conditions.

## **APPENDICES**

**APPENDIX A: BASIN CALCULATIONS**

**APPENDIX B: STREET HYDRAULICS AND STORM  
DRAIN INLET ANALYSIS**

**APPENDIX C: INROADS STORM DRAIN OUTPUT  
FILES**

**APPENDIX D: SWALE ANALYSIS**

**APPENDIX E: WATER HARVESTING CALCULATIONS**

**APPENDIX F: PREVIOUS DMP'S EXCERPTS**

**APPENDIX F: FEMA FIRM**

# **APPENDIX A**

## **BASIN CALCULATIONS**

| BASIN SUMMARY FOR THE ANDALUCIA                                |              |         |    |  |                  |        |        |       |                 |       |       |
|----------------------------------------------------------------|--------------|---------|----|--|------------------|--------|--------|-------|-----------------|-------|-------|
| HYDROLOGICAL VOLUMETRIC & DISCHARGE DATA                       |              |         |    |  |                  |        |        |       |                 |       |       |
| BASIN<br>I.D.                                                  | AREA<br>(AC) | UNITS   |    |  | % LAND TREATMENT |        |        |       | DISCHARGE (CFS) |       |       |
|                                                                |              |         |    |  | A                | B      | C      | D     | 10 YR           | 100YR |       |
|                                                                |              |         |    |  |                  |        |        |       |                 |       |       |
| HYRDOLOGICAL VOLUMETRIC & DISCHARGE DATA (EXISTING CALCULATED) |              |         |    |  |                  |        |        |       |                 |       |       |
| EX Basin 1                                                     | 0.76         |         |    |  | 0.0%             | 0.0%   | 10.0%  | 90.0% |                 | 2.09  | 3.21  |
| Tract A-1-A                                                    | 4.20         |         |    |  | 0.0%             | 100.0% | 0.0%   | 0.0%  |                 | 3.17  | 8.49  |
| Tract B-2                                                      | 7.50         |         |    |  | 0.0%             | 100.0% | 0.0%   | 0.0%  |                 | 5.65  | 15.16 |
| TOTAL                                                          | 12.46        |         |    |  |                  |        |        |       |                 | 10.91 | 26.85 |
| HYRDOLOGICAL VOLUMETRIC & DISCHARGE DATA (DEVELOPED)           |              |         |    |  |                  |        |        |       |                 |       |       |
| BASINS                                                         |              |         |    |  |                  |        |        |       |                 |       |       |
| Basin A                                                        | 2.70         | 0.00422 | 9  |  | 0.0%             | 56.4%  | 0.0%   | 43.6% |                 | 4.55  | 8.22  |
| Basin B                                                        | 1.21         | 0.00189 | 8  |  | 0.0%             | 56.4%  | 0.0%   | 43.6% |                 | 2.04  | 3.69  |
| Basin C                                                        | 0.06         | 0.00009 | 0  |  | 0.0%             | 0.0%   | 100.0% | 0.0%  |                 | 0.09  | 0.17  |
| Basin D-1                                                      | 0.23         | 0.00036 | 0  |  | 0.0%             | 0.0%   | 100.0% | 0.0%  |                 | 0.34  | 0.66  |
| Basin D-2                                                      | 0.02         | 0.00003 | 0  |  | 0.0%             | 0.0%   | 100.0% | 0.0%  |                 | 0.03  | 0.06  |
| Basin E                                                        | 5.89         | 0.00920 | 23 |  | 0.0%             | 56.4%  | 0.0%   | 43.6% |                 | 9.92  | 17.94 |
| Basin F                                                        | 0.88         | 0.00138 | 5  |  | 0.0%             | 56.4%  | 0.0%   | 43.6% |                 | 1.48  | 2.68  |
| Basin G                                                        | 0.10         | 0.00016 | 0  |  | 0.0%             | 0.0%   | 100.0% | 0.0%  |                 | 0.15  | 0.29  |
| Basin H                                                        | 0.45         | 0.00070 | 0  |  | 0.0%             | 0.0%   | 100.0% | 0.0%  |                 | 0.66  | 1.29  |
| Basin I                                                        | 0.01         | 0.00002 | 0  |  | 0.0%             | 0.0%   | 100.0% | 0.0%  |                 | 0.01  | 0.03  |
| Basin J                                                        | 0.02         | 0.00003 | 0  |  | 0.0%             | 0.0%   | 10.0%  | 90.0% |                 | 0.05  | 0.08  |
| Basin K                                                        | 0.18         | 0.00028 | 0  |  | 0.0%             | 0.0%   | 100.0% | 0.0%  |                 | 0.27  | 0.52  |
| TOTAL                                                          | 11.75        |         | 45 |  |                  |        |        |       |                 | 19.60 | 35.63 |
|                                                                |              |         |    |  |                  |        |        |       |                 |       |       |
| NOTES:                                                         |              |         |    |  |                  |        |        |       |                 |       |       |

**APPENDIX B**  
**STREET HYDRAULICS AND STORM DRAIN**  
**INLET ANALYSIS**

MANNING'S N = 0.017 SLOPE = 0.006

| POINT | DIST | ELEV | POINT | DIST | ELEV | POINT | DIST | ELEV |
|-------|------|------|-------|------|------|-------|------|------|
| 1.0   | 0.0  | 1.4  | 5.0   | 11.5 | 0.6  | 9.0   | 35.2 | 0.7  |
| 2.0   | 8.8  | 1.2  | 6.0   | 32.5 | 0.1  | 10.0  | 44.0 | 0.9  |
| 3.0   | 9.3  | 1.2  | 7.0   | 34.5 | 0.0  |       |      |      |
| 4.0   | 9.5  | 0.6  | 8.0   | 34.7 | 0.7  |       |      |      |

| WSEL  | DEPTH | FLOW   | FLOW   | WETTED | FLOW  | TOPWID       | TOTAL  |
|-------|-------|--------|--------|--------|-------|--------------|--------|
| FT.   | INC   | AREA   | RATE   | PER    | VEL   | PLUS         | ENERGY |
|       |       | SQ.FT. | (CFS)  | (FT)   | (FPS) | OBSTRUCTIONS | (FT)   |
| 0.050 | 0.050 | 0.020  | 0.011  | 0.822  | 0.560 | 3.782        | 0.055  |
| 0.100 | 0.100 | 0.078  | 0.069  | 1.645  | 0.889 | 4.564        | 0.112  |
| 0.150 | 0.150 | 0.183  | 0.185  | 3.159  | 1.013 | 6.038        | 0.166  |
| 0.200 | 0.200 | 0.398  | 0.456  | 5.711  | 1.146 | 8.551        | 0.220  |
| 0.250 | 0.250 | 0.738  | 0.998  | 8.263  | 1.353 | 11.063       | 0.278  |
| 0.300 | 0.300 | 1.204  | 1.886  | 10.815 | 1.567 | 13.576       | 0.338  |
| 0.350 | 0.350 | 1.796  | 3.189  | 13.368 | 1.776 | 16.089       | 0.399  |
| 0.400 | 0.400 | 2.513  | 4.969  | 15.920 | 1.978 | 18.601       | 0.461  |
| 0.450 | 0.450 | 3.356  | 7.288  | 18.472 | 2.172 | 21.114       | 0.523  |
| 0.500 | 0.500 | 4.324  | 10.202 | 21.024 | 2.359 | 23.627       | 0.587  |
| 0.550 | 0.550 | 5.418  | 13.765 | 23.576 | 2.540 | 26.140       | 0.650  |
| 0.600 | 0.600 | 6.676  | 18.413 | 25.679 | 2.758 | 28.165       | 0.718  |
| 0.650 | 0.650 | 7.935  | 24.491 | 25.782 | 3.086 | 26.190       | 0.798  |
| 0.700 | 0.700 | 9.232  | 29.957 | 27.826 | 3.245 | 27.680       | 0.864  |
| 0.750 | 0.750 | 10.653 | 35.904 | 30.331 | 3.370 | 30.145       | 0.927  |
| 0.800 | 0.800 | 12.196 | 42.671 | 32.836 | 3.499 | 32.611       | 0.990  |

NORTH INLET (NORTHSIDE)

67% BASIN E - 12.0 CFS

67% BASIN H - 0.9 CFS

12.9 CFSSTREET CAPACITY

$$\frac{13.8 - 10.2}{0.65 - 0.59} = \frac{13.8 - 12.9}{0.65 - x} \Rightarrow \frac{3.6}{0.06} = \frac{0.9}{0.65 - x} \Rightarrow 0.054 = 2.3 - 3.6x$$

$$x = 0.64' < 0.95' \checkmark$$

ok

WSEL

$$\frac{13.8 - 10.2}{0.55 - 0.50} = \frac{13.8 - 12.9}{0.55 - x} \Rightarrow \frac{3.6}{0.05} = \frac{0.9}{0.55 - x} \Rightarrow 0.045 = 1.98 - 3.6x$$

$$x = 0.54' \checkmark$$

ok

MANNING'S N = 0.017 SLOPE = 0.029

| POINT | DIST | ELEV | POINT | DIST | ELEV | POINT | DIST | ELEV |
|-------|------|------|-------|------|------|-------|------|------|
| 1.0   | 0.0  | 1.4  | 5.0   | 11.5 | 0.6  | 9.0   | 35.2 | 0.7  |
| 2.0   | 8.8  | 1.2  | 6.0   | 32.5 | 0.1  | 10.0  | 44.0 | 0.9  |
| 3.0   | 9.3  | 1.2  | 7.0   | 34.5 | 0.0  |       |      |      |
| 4.0   | 9.5  | 0.6  | 8.0   | 34.7 | 0.7  |       |      |      |

| WSEL<br>FT. | DEPTH<br>INC | FLOW<br>AREA<br>SQ. FT. | FLOW<br>RATE<br>(CFS) | WETTED<br>PER<br>(FT) | FLOW<br>VEL<br>(FPS) | TOPWID<br>PLUS<br>OBSTRUCTIONS | TOTAL<br>ENERGY<br>(FT) |
|-------------|--------------|-------------------------|-----------------------|-----------------------|----------------------|--------------------------------|-------------------------|
| 0.050       | 0.050        | 0.020                   | 0.024                 | 0.822                 | 1.231                | 3.782                          | 0.074                   |
| 0.100       | 0.100        | 0.078                   | 0.153                 | 1.645                 | 1.953                | 4.564                          | 0.159                   |
| 0.150       | 0.150        | 0.183                   | 0.407                 | 3.159                 | 2.227                | 6.038                          | 0.227                   |
| 0.200       | 0.200        | 0.398                   | 1.001                 | 5.711                 | 2.519                | 8.551                          | 0.299                   |
| 0.250       | 0.250        | 0.738                   | 2.195                 | 8.263                 | 2.974                | 11.063                         | 0.388                   |
| 0.300       | 0.300        | 1.204                   | 4.147                 | 10.815                | 3.445                | 13.576                         | 0.485                   |
| 0.350       | 0.350        | 1.796                   | 7.010                 | 13.368                | 3.904                | 16.089                         | 0.587                   |
| 0.400       | 0.400        | 2.513                   | 10.925                | 15.920                | 4.348                | 18.601                         | 0.694                   |
| 0.450       | 0.450        | 3.356                   | 16.023                | 18.472                | 4.775                | 21.114                         | 0.805                   |
| 0.500       | 0.500        | 4.324                   | 22.429                | 21.024                | 5.187                | 23.627                         | 0.918                   |
| 0.550       | 0.550        | 5.418                   | 30.263                | 23.576                | 5.585                | 26.140                         | 1.035                   |
| 0.600       | 0.600        | 6.676                   | 40.480                | 25.679                | 6.064                | 26.165                         | 1.172                   |
| 0.650       | 0.650        | 7.935                   | 53.842                | 25.782                | 6.786                | 26.190                         | 1.366                   |
| 0.700       | 0.700        | 9.232                   | 65.860                | 27.826                | 7.134                | 27.680                         | 1.492                   |
| 0.750       | 0.750        | 10.653                  | 78.935                | 30.331                | 7.410                | 30.145                         | 1.604                   |
| 0.800       | 0.800        | 12.196                  | 93.812                | 32.836                | 7.692                | 32.611                         | 1.720                   |

NORTH INLET (SWTHSIDE)

33% BASIN E - 5.9 CFS

33% BASIN I - 0.1 CFS

50% EX BASIN I - 1.6 CFS

33% BASIN H -  $\frac{0.4 \text{ CFS}}{8.0 \text{ CFS}}$

STREET CAPACITY

$$\frac{10.9-7}{0.69-0.59} = \frac{10.9-8}{0.69-x} \Rightarrow \frac{3.9}{0.1} = \frac{2.9}{0.69-x} \Rightarrow 0.85 = 2.64 - 3.9x$$

$$x = 0.62' < 0.85' \checkmark \text{ok}$$

WSEL

$$\frac{10.9-7}{0.4-0.35} = \frac{10.9-8}{0.4-x} \Rightarrow \frac{3.9}{0.05} = \frac{2.9}{0.4-x} \Rightarrow 0.145 = 1.56 - 3.9x$$

$$x = 0.36'$$

# NORTH INLETS

INLETS #2 & #3

$$Q_{TOTAL} = 20.9 \text{ cfs} / 2 = 10.5 \text{ cfs} / \text{INLET}$$

$$2 \times 10.5 \text{ cfs} = 20.9 \text{ cfs} / \text{INLET}$$

## Double A inlet, in sump condition:

Open Area (for orifice calc in sq. ft.):

Length of Weir (feet):

Orifice Coefficient

Weir Coefficient

7.7977431

7.9791667

0.6

3

| Head<br>(ft) | Head<br>(in) | 1 Wing          |                 | Grate           |                    | Control Q         |                   |
|--------------|--------------|-----------------|-----------------|-----------------|--------------------|-------------------|-------------------|
|              |              | Weir Q<br>(cfs) | Weir Q<br>(cfs) | Weir Q<br>(cfs) | Orifice Q<br>(cfs) | Sgl Wing<br>(cfs) | Dbl Wing<br>(cfs) |
| 0.05         | 0.6          | 0.13            | 0.27            | 0.40            | 8.40               | 0.40              | 0.54              |
| 0.1          | 1.2          | 0.38            | 0.76            | 1.14            | 11.87              | 1.14              | 1.52              |
| 0.15         | 1.8          | 0.70            | 1.39            | 2.09            | 14.54              | 2.09              | 2.78              |
| 0.2          | 2.4          | 1.07            | 2.14            | 3.21            | 16.79              | 3.21              | 4.29              |
| 0.25         | 3            | 1.50            | 2.99            | 4.49            | 18.77              | 4.49              | 5.99              |
| 0.3          | 3.6          | 1.97            | 3.93            | 5.91            | 20.56              | 5.91              | 7.88              |
| 0.35         | 4.2          | 2.48            | 4.96            | 7.44            | 22.21              | 7.44              | 9.93              |
| 0.4          | 4.8          | 3.04            | 6.06            | 9.09            | 23.75              | 9.09              | 12.13             |
| 0.45         | 5.4          | 3.62            | 7.23            | 10.85           | 25.19              | 10.85             | 14.47             |
| 0.5          | 6            | 4.24            | 8.46            | 12.71           | 26.55              | 12.71             | 16.95             |
| 0.55         | 6.6          | 4.89            | 9.76            | 14.66           | 27.84              | 14.66             | 19.55             |
| 0.6          | 7.2          | 5.58            | 11.13           | 16.70           | 29.08              | 16.70             | 22.28             |
| 0.65         | 7.8          | 6.29            | 12.54           | 18.83           | 30.27              | 18.83             | 25.12             |
| 0.667        | 8.0          | 6.54            | 13.04           | 19.58           | 30.66              | 19.58             | 26.11             |
| 0.7          | 8.4          | 7.03            | 14.02           | 21.05           | 31.41              | 21.05             | 28.08             |
| 0.75         | 9            | 7.79            | 15.55           | 23.34           | 32.52              | 23.34             | 31.14             |
| 0.8          | 9.6          | 8.59            | 17.13           | 25.71           | 33.58              | 25.71             | 34.30             |
| 0.85         | 10.2         | 9.40            | 18.76           | 28.16           | 34.62              | 28.16             | 37.57             |
| 0.9          | 10.8         | 10.25           | 20.44           | 30.68           | 35.62              | 30.68             | 40.93             |
| 0.95         | 11.4         | 11.11           | 22.16           | 33.28           | 36.60              | 33.28             | 44.39             |
| 1            | 12           | 12.00           | 23.94           | 35.94           | 37.55              | 35.94             | 47.94             |
| 1.05         | 12.6         | 12.91           | 25.76           | 38.67           | 38.47              | 38.67             | 51.58             |
| 1.1          | 13.2         | 13.84           | 27.62           | 41.46           | 39.38              | 41.46             | 55.31             |
| 1.15         | 13.8         | 14.80           | 29.52           | 44.32           | 40.26              | 44.32             | 59.12             |
| 0.567        | 6.804        | 5.12            | 10.22           | 15.34           | 28.27              | 15.34             | 20.47             |

## Calculation of open area:

|                     |          |           |
|---------------------|----------|-----------|
| Total Grate Area    | 2000     | 13.888889 |
| Cross Bar Area      | -732     | -5.083333 |
| Supports (ends)     | -115.625 | -0.802951 |
| (middle)            | -100     | -0.694444 |
| Areas Counted Twice | 70.5     | 0.4895833 |
|                     | 1122.875 | 7.7977431 |

## Calculation of Length of Weir:

|                          |       |           |
|--------------------------|-------|-----------|
| Total Perimeter of Grate | 130   | 10.833333 |
| Short Cross Bars         | -7    | -0.583333 |
| Bearing Bars             | -13   | -1.083333 |
| End Supports             | -9.25 | -0.770833 |
| Middle Supports          | -5    | -0.416667 |
|                          | 110   | 7.9791667 |

MANNING'S N = 0.017 SLOPE = 0.006

| POINT | DIST | ELEV | POINT | DIST | ELEV | POINT | DIST | ELEV |
|-------|------|------|-------|------|------|-------|------|------|
| 1.0   | 0.0  | 1.4  | 5.0   | 11.5 | 0.6  | 9.0   | 35.2 | 0.7  |
| 2.0   | 8.8  | 1.2  | 6.0   | 32.5 | 0.1  | 10.0  | 44.0 | 0.9  |
| 3.0   | 9.3  | 1.2  | 7.0   | 34.5 | 0.0  |       |      |      |
| 4.0   | 9.5  | 0.6  | 8.0   | 34.7 | 0.7  |       |      |      |

| WSEL<br>FT. | DEPTH<br>INC | FLOW<br>AREA<br>SQ. FT. | FLOW<br>RATE<br>(CFS) | WETTED<br>PER<br>(FT) | FLOW<br>VEL<br>(FPS) | TOPWID<br>PLUS<br>OBSTRUCTIONS | TOTAL<br>ENERGY<br>(FT) |
|-------------|--------------|-------------------------|-----------------------|-----------------------|----------------------|--------------------------------|-------------------------|
| 0.050       | 0.050        | 0.020                   | 0.011                 | 0.822                 | 0.560                | 3.782                          | 0.055                   |
| 0.100       | 0.100        | 0.078                   | 0.069                 | 1.645                 | 0.889                | 4.564                          | 0.112                   |
| 0.150       | 0.150        | 0.183                   | 0.185                 | 3.159                 | 1.013                | 6.038                          | 0.166                   |
| 0.200       | 0.200        | 0.398                   | 0.456                 | 5.711                 | 1.146                | 8.551                          | 0.220                   |
| 0.250       | 0.250        | 0.738                   | 0.998                 | 8.263                 | 1.353                | 11.063                         | 0.278                   |
| 0.300       | 0.300        | 1.204                   | 1.886                 | 10.815                | 1.567                | 13.576                         | 0.338                   |
| 0.350       | 0.350        | 1.796                   | 3.189                 | 13.368                | 1.776                | 16.089                         | 0.399                   |
| 0.400       | 0.400        | 2.513                   | 4.969                 | 15.920                | 1.978                | 18.601                         | 0.461                   |
| 0.450       | 0.450        | 3.356                   | 7.288                 | 18.472                | 2.172                | 21.114                         | 0.523                   |
| 0.500       | 0.500        | 4.324                   | 10.202                | 21.024                | 2.359                | 23.627                         | 0.587                   |
| 0.550       | 0.550        | 5.418                   | 13.765                | 23.576                | 2.540                | 26.140                         | 0.650                   |
| 0.600       | 0.600        | 6.676                   | 18.413                | 25.679                | 2.758                | 28.655                         | 0.718                   |
| 0.650       | 0.650        | 7.935                   | 24.491                | 27.782                | 3.086                | 31.170                         | 0.798                   |
| 0.700       | 0.700        | 9.232                   | 29.957                | 29.826                | 3.245                | 33.680                         | 0.864                   |
| 0.750       | 0.750        | 10.653                  | 35.904                | 30.331                | 3.370                | 36.195                         | 0.927                   |
| 0.800       | 0.800        | 12.196                  | 42.671                | 32.836                | 3.499                | 38.711                         | 0.990                   |

SOUTH INLET (SOUTH SIDE)

57% BASIN A - 4.7 CFS

45% BASIN D-1 - 0.3 CFS

50% EX BASIN 1 - 1.6 CFS

6.6 CFSSTREET CAPACITY

$$\frac{7.3-5.0}{0.52-0.46} = \frac{7.3-6.6}{0.52-x} \Rightarrow \frac{2.3}{0.06} = \frac{0.7}{0.52-x} \Rightarrow 0.042 = 1.196 - 2.3x$$

$$x = 0.50' < 0.85' \checkmark$$

WSEL

$$\frac{7.3-5.0}{0.45-0.4} = \frac{7.3-6.6}{0.45-x} \Rightarrow \frac{2.3}{0.05} = \frac{0.7}{0.45-x} \Rightarrow 0.035 = 1.035 - 2.3x$$

$$x = 0.43'$$

MANNING'S N = 0.017 SLOPE = 0.010

| POINT | DIST | ELEV | POINT | DIST | ELEV | POINT | DIST | ELEV |
|-------|------|------|-------|------|------|-------|------|------|
| 1.0   | 0.0  | 1.4  | 5.0   | 11.5 | 0.6  | 9.0   | 35.2 | 0.7  |
| 2.0   | 8.8  | 1.2  | 6.0   | 32.5 | 0.1  | 10.0  | 44.0 | 0.9  |
| 3.0   | 9.3  | 1.2  | 7.0   | 34.5 | 0.0  |       |      |      |
| 4.0   | 9.5  | 0.6  | 8.0   | 34.7 | 0.7  |       |      |      |

| WSEL<br>FT. | DEPTH<br>INC | FLOW<br>AREA<br>SQ. FT. | FLOW<br>RATE<br>(CFS) | WETTED<br>PER<br>(FT) | FLOW<br>VEL<br>(FPS) | TOPWID<br>PLUS<br>OBSTRUCTIONS | TOTAL<br>ENERGY<br>(FT) |
|-------------|--------------|-------------------------|-----------------------|-----------------------|----------------------|--------------------------------|-------------------------|
| 0.050       | 0.050        | 0.020                   | 0.014                 | 0.822                 | 0.723                | 3.782                          | 0.058                   |
| 0.100       | 0.100        | 0.078                   | 0.090                 | 1.645                 | 1.147                | 4.564                          | 0.120                   |
| 0.150       | 0.150        | 0.183                   | 0.239                 | 3.159                 | 1.308                | 6.038                          | 0.177                   |
| 0.200       | 0.200        | 0.398                   | 0.588                 | 5.711                 | 1.479                | 8.551                          | 0.234                   |
| 0.250       | 0.250        | 0.738                   | 1.289                 | 8.263                 | 1.746                | 11.063                         | 0.297                   |
| 0.300       | 0.300        | 1.204                   | 2.435                 | 10.815                | 2.023                | 13.576                         | 0.364                   |
| 0.350       | 0.350        | 1.796                   | 4.117                 | 13.368                | 2.293                | 16.089                         | 0.432                   |
| 0.400       | 0.400        | 2.513                   | 6.415                 | 15.920                | 2.553                | 18.601                         | 0.501                   |
| 0.450       | 0.450        | 3.356                   | 9.409                 | 18.472                | 2.804                | 21.114                         | 0.572                   |
| 0.500       | 0.500        | 4.324                   | 13.171                | 21.024                | 3.046                | 23.627                         | 0.644                   |
| 0.550       | 0.550        | 5.418                   | 17.771                | 23.576                | 3.280                | 26.140                         | 0.717                   |
| 0.600       | 0.600        | 6.676                   | 23.771                | 25.679                | 3.561                | 26.165                         | 0.797                   |
| 0.650       | 0.650        | 7.935                   | 31.617                | 25.782                | 3.985                | 26.190                         | 0.897                   |
| 0.700       | 0.700        | 9.232                   | 38.674                | 27.826                | 4.189                | 27.680                         | 0.973                   |
| 0.750       | 0.750        | 10.653                  | 46.352                | 30.331                | 4.351                | 30.145                         | 1.044                   |
| 0.800       | 0.800        | 12.196                  | 55.088                | 32.836                | 4.517                | 32.611                         | 1.117                   |

SOUTH INLET - SOUTH S. DE

43% BASIN A - 3.5 CFS  
 55% BASIN D-1 - 0.4 CFS  
 100% BASIN D-2 - 0.1 CFS  


---

 4.0 CFS

STREET CAPACITY
 $d = 0.43' < 0.85' \checkmark \text{ ok}$ 
WSEL
 $x = 0.35'$

SOUTH INLET  
INLET #1

Q<sub>TOTAL</sub> = 10.6 cfs

2x10yr = 21.2 cfs

**Double A inlet, in sump condition:**

Open Area (for orifice calc in sq. ft.):

Length of Weir (feet):

Orifice Coefficient

Weir Coefficient

7.7977431

7.9791667

0.6

3

| Head<br>(ft) | Head<br>(in) | 1 Wing          |                 | Grate           |                    | Control Q         |                   |
|--------------|--------------|-----------------|-----------------|-----------------|--------------------|-------------------|-------------------|
|              |              | Weir Q<br>(cfs) | Weir Q<br>(cfs) | Weir Q<br>(cfs) | Orifice Q<br>(cfs) | Sgl Wing<br>(cfs) | Dbl Wing<br>(cfs) |
| 0.05         | 0.6          | 0.13            | 0.27            | 0.40            | 8.40               | 0.40              | 0.54              |
| 0.1          | 1.2          | 0.38            | 0.76            | 1.14            | 11.87              | 1.14              | 1.52              |
| 0.15         | 1.8          | 0.70            | 1.39            | 2.09            | 14.54              | 2.09              | 2.78              |
| 0.2          | 2.4          | 1.07            | 2.14            | 3.21            | 16.79              | 3.21              | 4.29              |
| 0.25         | 3            | 1.50            | 2.99            | 4.49            | 18.77              | 4.49              | 5.99              |
| 0.3          | 3.6          | 1.97            | 3.93            | 5.91            | 20.56              | 5.91              | 7.88              |
| 0.35         | 4.2          | 2.48            | 4.96            | 7.44            | 22.21              | 7.44              | 9.93              |
| 0.4          | 4.8          | 3.04            | 6.06            | 9.09            | 23.75              | 9.09              | 12.13             |
| 0.45         | 5.4          | 3.62            | 7.23            | 10.85           | 25.19              | 10.85             | 14.47             |
| 0.5          | 6            | 4.24            | 8.46            | 12.71           | 26.55              | 12.71             | 16.95             |
| 0.55         | 6.6          | 4.89            | 9.76            | 14.66           | 27.84              | 14.66             | 19.55             |
| 0.6          | 7.2          | 5.58            | 11.13           | 16.70           | 29.08              | 16.70             | 22.28             |
| 0.65         | 7.8          | 6.29            | 12.54           | 18.83           | 30.27              | 18.83             | 25.12             |
| 0.667        | 8.0          | 6.54            | 13.04           | 19.58           | 30.66              | 19.58             | 26.11             |
| 0.7          | 8.4          | 7.03            | 14.02           | 21.05           | 31.41              | 21.05             | 28.08             |
| 0.75         | 9            | 7.79            | 15.55           | 23.34           | 32.52              | 23.34             | 31.14             |
| 0.8          | 9.6          | 8.59            | 17.13           | 25.71           | 33.58              | 25.71             | 34.30             |
| 0.85         | 10.2         | 9.40            | 18.76           | 28.16           | 34.62              | 28.16             | 37.57             |
| 0.9          | 10.8         | 10.25           | 20.44           | 30.68           | 35.62              | 30.68             | 40.93             |
| 0.95         | 11.4         | 11.11           | 22.16           | 33.28           | 36.60              | 33.28             | 44.39             |
| 1            | 12           | 12.00           | 23.94           | 35.94           | 37.55              | 35.94             | 47.94             |
| 1.05         | 12.6         | 12.91           | 25.76           | 38.67           | 38.47              | 38.67             | 51.58             |
| 1.1          | 13.2         | 13.84           | 27.62           | 41.46           | 39.38              | 41.46             | 55.31             |
| 1.15         | 13.8         | 14.80           | 29.52           | 44.32           | 40.26              | 44.32             | 59.12             |
| 0.567        | 6.804        | 5.12            | 10.22           | 15.34           | 28.27              | 15.34             | 20.47             |

Calculation of open area:

|                     |          |           |
|---------------------|----------|-----------|
| Total Grate Area    | 2000     | 13.888889 |
| Cross Bar Area      | -732     | -5.083333 |
| Supports (ends)     | -115.625 | -0.802951 |
| (middle)            | -100     | -0.694444 |
| Areas Counted Twice | 70.5     | 0.4895833 |
|                     | 1122.875 | 7.7977431 |

Calculation of Length of Weir:

|                          |       |           |
|--------------------------|-------|-----------|
| Total Perimeter of Grate | 130   | 10.833333 |
| Short Cross Bars         | -7    | -0.583333 |
| Bearing Bars             | -13   | -1.083333 |
| End Supports             | -9.25 | -0.770833 |
| Middle Supports          | -5    | -0.416667 |
|                          | 110   | 7.9791667 |

**APPENDIX C**  
**INROADS STORM DRAIN OUTPUT FILES**

## Design Log

=====

InRoads Storm &amp; Sanitary Design Log

Drainage File: P:\20150130\CDP\Control\Data\20150130SD.sdb

Design File: P:\20150130\CDP\DESIGN\20150130UTILITY01.DWG

Display Log: P:\20150130\CDP\DESIGN\design.log

Date: Thursday, January 15, 2015 4:02:38 PM

=====

Designing inlet south inlet

WARNING: Inlet forced to capture all flow, ignoring capacity calculations.

## Results:

|                  |             |                  |                |
|------------------|-------------|------------------|----------------|
| Gutter Flow:     | 10.6000 cfs | Flow From:       | Injected Storm |
| Status:          | Fixed       |                  |                |
| Inlet Length:    | 6.5000 ft   | Inlet Width:     | 2.0000 ft      |
| Flow Downstream: | 10.6000 cfs | Bypass To:       | 0.0000 cfs     |
| Percent Cap:     | 100.0000 %  | Capacity:        | 0.0000 cfs     |
| Spread:          | 2.4117 ft   |                  |                |
| Depth in Gutter: | 0.9647 ft   | Assigned Bypass: | N/A            |

Designing pipe SDP9

WARNING: Full flow velocity is greater than maximum (0.0000)

## Results:

|                 |             |              |              |
|-----------------|-------------|--------------|--------------|
| Total Flow:     | 10.6000 cfs | Flow From:   | Upstream     |
| Status:         | Fixed       | Slope:       | 0.0025 ft/ft |
| Pipe Width:     | 18.0000 in  | Pipe Height: | 18.0000 in   |
| Depth of Flow:  | 1.5000 ft   | Flow Status: | Full         |
| Critical Depth: | 1.5000 ft   | Capacity:    | 5.2522 cfs   |
| Velocity:       | 5.9984 ft/s |              |              |
| Froude Number:  | 0.0000      | Flow Regime: | Subcritical  |

Designing manhole SDMH7

## Results:

|                |             |                 |           |
|----------------|-------------|-----------------|-----------|
| Total Flow:    | 10.6000 cfs | Flow From:      | Upstream  |
| Status:        | Fixed       |                 |           |
| Chamber Width: | 4.0000 ft   | Chamber Length: | 4.0000 ft |

Designing pipe SDP8

WARNING: Full flow velocity is greater than maximum (0.0000)

## Results:

|                 |             |              |              |
|-----------------|-------------|--------------|--------------|
| Total Flow:     | 10.6000 cfs | Flow From:   | Upstream     |
| Status:         | Fixed       | Slope:       | 0.0025 ft/ft |
| Pipe Width:     | 24.0000 in  | Pipe Height: | 24.0000 in   |
| Depth of Flow:  | 1.5360 ft   | Flow Status: | Partial      |
| Critical Depth: | 1.1600 ft   | Capacity:    | 11.3112 cfs  |
| Velocity:       | 4.0916 ft/s |              |              |
| Froude Number:  | 0.5825      | Flow Regime: | Subcritical  |

Designing manhole SDMH6

## Results:

|                |             |                 |           |
|----------------|-------------|-----------------|-----------|
| Total Flow:    | 10.6000 cfs | Flow From:      | Upstream  |
| Status:        | Fixed       |                 |           |
| Chamber Width: | 4.0000 ft   | Chamber Length: | 4.0000 ft |

Designing pipe SDP7

WARNING: Full flow velocity is greater than maximum (0.0000)

## Results:

|                 |             |              |              |
|-----------------|-------------|--------------|--------------|
| Total Flow:     | 10.6000 cfs | Flow From:   | Upstream     |
| Status:         | Fixed       | Slope:       | 0.0025 ft/ft |
| Pipe Width:     | 24.0000 in  | Pipe Height: | 24.0000 in   |
| Depth of Flow:  | 1.5360 ft   | Flow Status: | Partial      |
| Critical Depth: | 1.1600 ft   | Capacity:    | 11.3112 cfs  |
| Velocity:       | 4.0916 ft/s |              |              |
| Froude Number:  | 0.5825      | Flow Regime: | Subcritical  |

Designing manhole SDMH1

## Results:

|                |             |                 |           |
|----------------|-------------|-----------------|-----------|
| Total Flow:    | 10.6000 cfs | Flow From:      | Upstream  |
| Status:        | Fixed       |                 |           |
| Chamber Width: | 4.0000 ft   | Chamber Length: | 4.0000 ft |

Designing pipe exSDP6

WARNING: Full flow velocity is greater than maximum (0.0000)

## Results:

|                 |             |              |              |
|-----------------|-------------|--------------|--------------|
| Total Flow:     | 10.6000 cfs | Flow From:   | Upstream     |
| Status:         | Fixed       | Slope:       | 0.0025 ft/ft |
| Pipe Width:     | 24.0000 in  | Pipe Height: | 24.0000 in   |
| Depth of Flow:  | 1.5360 ft   | Flow Status: | Partial      |
| Critical Depth: | 1.1600 ft   | Capacity:    | 11.3112 cfs  |
| Velocity:       | 4.0916 ft/s |              |              |
| Froude Number:  | 0.5825      | Flow Regime: | Subcritical  |

## Designing inlet north inlet 2

WARNING: Inlet forced to capture all flow, ignoring capacity calculations.

## Results:

|                  |             |                  |                |
|------------------|-------------|------------------|----------------|
| Gutter Flow:     | 10.5000 cfs | Flow From:       | Injected Storm |
| Status:          | Fixed       |                  |                |
| Inlet Length:    | 6.5000 ft   | Inlet Width:     | 2.0000 ft      |
| Flow Downstream: | 10.5000 cfs | Bypass To:       | 0.0000 cfs     |
| Percent Cap:     | 100.0000 %  | Capacity:        | 0.0000 cfs     |
| Spread:          | 0.0000 ft   |                  |                |
| Depth in Gutter: | 0.0000 ft   | Assigned Bypass: | N/A            |

## Designing pipe SDP3

WARNING: Full flow velocity is greater than maximum (0.0000)

## Results:

|                 |             |              |              |
|-----------------|-------------|--------------|--------------|
| Total Flow:     | 10.5000 cfs | Flow From:   | Upstream     |
| Status:         | Fixed       | Slope:       | 0.0060 ft/ft |
| Pipe Width:     | 18.0000 in  | Pipe Height: | 18.0000 in   |
| Depth of Flow:  | 1.5000 ft   | Flow Status: | Full         |
| Critical Depth: | 1.5000 ft   | Capacity:    | 8.1366 cfs   |
| Velocity:       | 5.9418 ft/s |              |              |
| Froude Number:  | 0.0000      | Flow Regime: | Subcritical  |

## Designing inlet NorthInlet 1

WARNING: Inlet forced to capture all flow, ignoring capacity calculations.

WARNING: Pipe Too large for valid connection to inlet.

## Results:

|                  |             |                  |                |
|------------------|-------------|------------------|----------------|
| Gutter Flow:     | 10.5000 cfs | Flow From:       | Injected Storm |
| Status:          | Fixed       |                  |                |
| Inlet Length:    | 6.5000 ft   | Inlet Width:     | 2.0000 ft      |
| Flow Downstream: | 21.0000 cfs | Bypass To:       | 0.0000 cfs     |
| Percent Cap:     | 100.0000 %  | Capacity:        | 0.0000 cfs     |
| Spread:          | 0.0000 ft   |                  |                |
| Depth in Gutter: | 0.0000 ft   | Assigned Bypass: | N/A            |

## Designing pipe SDP4

WARNING: Full flow velocity is greater than maximum (0.0000)

## Results:

|                 |             |              |              |
|-----------------|-------------|--------------|--------------|
| Total Flow:     | 21.0000 cfs | Flow From:   | Upstream     |
| Status:         | Fixed       | Slope:       | 0.0060 ft/ft |
| Pipe Width:     | 24.0000 in  | Pipe Height: | 24.0000 in   |
| Depth of Flow:  | 2.0000 ft   | Flow Status: | Full         |
| Critical Depth: | 2.0000 ft   | Capacity:    | 17.5189 cfs  |
| Velocity:       | 6.6845 ft/s |              |              |
| Froude Number:  | 0.0000      | Flow Regime: | Subcritical  |

WARNING: Pipe Too large for valid connection to inlet.

## Designing manhole SDMH2

## Results:

|                |             |                 |           |
|----------------|-------------|-----------------|-----------|
| Total Flow:    | 21.0000 cfs | Flow From:      | Upstream  |
| Status:        | Fixed       |                 |           |
| Chamber Width: | 4.0000 ft   | Chamber Length: | 4.0000 ft |

## Designing pipe SDP2

WARNING: Full flow velocity is greater than maximum (0.0000)

## Results:

|                 |             |              |              |
|-----------------|-------------|--------------|--------------|
| Total Flow:     | 21.0000 cfs | Flow From:   | Upstream     |
| Status:         | Fixed       | Slope:       | 0.0015 ft/ft |
| Pipe Width:     | 36.0000 in  | Pipe Height: | 36.0000 in   |
| Depth of Flow:  | 2.0530 ft   | Flow Status: | Partial      |
| Critical Depth: | 1.4700 ft   | Capacity:    | 25.8322 cfs  |
| Velocity:       | 4.0716 ft/s |              |              |
| Froude Number:  | 0.5280      | Flow Regime: | Subcritical  |

## Designing pipe exSDP1

WARNING: Full flow velocity is greater than maximum (0.0000)

## Results:

|                 |             |              |              |
|-----------------|-------------|--------------|--------------|
| Total Flow:     | 21.0000 cfs | Flow From:   | Upstream     |
| Status:         | Fixed       | Slope:       | 0.0015 ft/ft |
| Pipe Width:     | 36.0000 in  | Pipe Height: | 36.0000 in   |
| Depth of Flow:  | 2.0530 ft   | Flow Status: | Partial      |
| Critical Depth: | 1.4700 ft   | Capacity:    | 25.8322 cfs  |
| Velocity:       | 4.0716 ft/s |              |              |
| Froude Number:  | 0.5280      | Flow Regime: | Subcritical  |

## Designing manhole exSDMH1

## Results:

|                |             |                 |           |
|----------------|-------------|-----------------|-----------|
| Total Flow:    | 31.6000 cfs | Flow From:      | Upstream  |
| Status:        | Fixed       |                 |           |
| Chamber Width: | 6.0000 ft   | Chamber Length: | 6.0000 ft |

## Designing pipe exSDP10

WARNING: Full flow velocity is greater than maximum (0.0000)

## Results:

|             |             |              |              |
|-------------|-------------|--------------|--------------|
| Total Flow: | 31.6000 cfs | Flow From:   | Upstream     |
| Status:     | Fixed       | Slope:       | 0.0019 ft/ft |
| Pipe Width: | 36.0000 in  | Pipe Height: | 36.0000 in   |

InRoads output file.txt  
 Depth of Flow: 3.0000 ft Flow Status: Full  
 Critical Depth: 3.0000 ft Capacity: 29.1175 cfs  
 Velocity: 4.4705 ft/s  
 Froude Number: 0.0000 Flow Regime: Subcritical

Designing pipe SDP12

WARNING: Full flow velocity is greater than maximum (0.0000)

Results:

Total Flow: 1.7000 cfs Flow From: Injected Storm  
 Status: Fixed Slope: 32.1700 ft/ft  
 Pipe Width: 18.0000 in Pipe Height: 18.0000 in  
 Depth of Flow: 0.0580 ft Flow Status: Partial  
 Critical Depth: 0.4900 ft Capacity: 595.7914 cfs  
 Velocity: 73.5155 ft/s  
 Froude Number: 65.6490 Flow Regime: SuperCritical

Designing pipe SDP13

WARNING: Full flow velocity is greater than maximum (0.0000)

Results:

Total Flow: 1.7000 cfs Flow From: Injected Storm  
 Status: Fixed Slope: 0.0938 ft/ft  
 Pipe Width: 18.0000 in Pipe Height: 18.0000 in  
 Depth of Flow: 0.2340 ft Flow Status: Partial  
 Critical Depth: 0.4900 ft Capacity: 32.1714 cfs  
 Velocity: 9.6031 ft/s  
 Froude Number: 4.2112 Flow Regime: SuperCritical

Designing manhole SDMH9

Results:

Total Flow: 35.0000 cfs Flow From: Upstream  
 Status: Fixed  
 Chamber Width: 4.0000 ft Chamber Length: 4.0000 ft

Designing pipe SDP11

WARNING: Full flow velocity is greater than maximum (0.0000)

Results:

Total Flow: 35.0000 cfs Flow From: Upstream  
 Status: Fixed Slope: 0.0014 ft/ft  
 Pipe Width: 36.0000 in Pipe Height: 36.0000 in  
 Depth of Flow: 3.0000 ft Flow Status: Full  
 Critical Depth: 3.0000 ft Capacity: 24.9563 cfs  
 Velocity: 4.9515 ft/s  
 Froude Number: 0.0000 Flow Regime: Subcritical

HGL/EGL Computations:

Table A:

| Struct_ID<br>Rim_Elev.<br>(ft) | D<br>(in) | Q<br>(cfs) | L<br>(ft) | V<br>(ft/s) | d<br>(ft) | dc<br>(ft) | V^2/2g<br>(ft) | Sf<br>(ft/ft) | Dn_Soffit<br>(ft) | EGLdn<br>(ft) | HGLdn<br>(ft) | Tot_Loss<br>(ft) | EGLup<br>(ft) | HGLup<br>(ft) |
|--------------------------------|-----------|------------|-----------|-------------|-----------|------------|----------------|---------------|-------------------|---------------|---------------|------------------|---------------|---------------|
| Outfall                        | -         | -          | -         | -           | -         | -          | -              | -             | -                 | -             | -             | -                | -             | 5038.85       |
| (Alternate HGL and EGL Used)   |           |            |           |             |           |            |                |               |                   |               |               |                  |               |               |
| SDP11                          | 36        | 35.00      | 64.00     | 4.95        | -         | -          | 0.38           | 0.0028        | 5038.85           | 5039.23       | 5038.85       | 0.18             | 5039.41       | 5039.03       |
| SDMH9                          | -         | -          | -         | -           | -         | -          | -              | -             | -                 | 5039.41       | 5039.03       | 0.06             | 5039.47       | 5039.09       |
| 5046.21<br>exSDP10             | 36        | 31.60      | 87.95     | 4.47        | -         | -          | 0.31           | 0.0022        | 5039.04           | 5039.47       | 5039.09       | 0.20             | 5039.67       | 5039.36       |
| exSDMH1                        | -         | -          | -         | -           | -         | -          | -              | -             | -                 | 5039.67       | 5039.36       | 0.14             | 5039.81       | 5039.50       |
| 5047.11<br>exSDP1              | 36        | 21.00      | 26.07     | 2.97        | -         | -          | 0.14           | 0.0010        | 5039.30           | 5039.81       | 5039.50       | 0.03             | 5039.83       | 5039.70       |
| Junction                       | -         | -          | -         | -           | -         | -          | -              | -             | -                 | 5039.83       | 5039.70       | 0.00             | 5039.83       | 5039.70       |
| SDP2                           | 36        | 21.00      | 215.55    | 2.97        | -         | -          | 0.14           | 0.0010        | 5039.34           | 5039.83       | 5039.70       | 0.21             | 5040.05       | 5039.91       |
| SDMH2                          | -         | -          | -         | -           | -         | -          | -              | -             | -                 | 5040.05       | 5039.91       | 0.09             | 5040.14       | 5040.00       |
| 5042.43<br>SDP4                | 24        | 21.00      | 25.55     | 6.68        | -         | -          | 0.69           | 0.0086        | 5038.76           | 5040.14       | 5040.00       | 0.22             | 5040.36       | 5039.66       |
| NorthInlet 1                   | -         | -          | -         | -           | -         | -          | -              | -             | -                 | 5040.36       | 5039.66       | 0.47             | 5040.82       | 5040.13       |
| 5041.95<br>SDP3                | 18        | 10.50      | 20.63     | 5.94        | -         | -          | 0.55           | 0.0100        | 5038.48           | 5040.82       | 5040.13       | 0.21             | 5041.03       | 5040.48       |
| north inlet 2                  | -         | -          | -         | -           | -         | -          | -              | -             | -                 | 5041.03       | 5040.48       | -                | 5041.03       | 5040.48       |
| 5041.78                        |           |            |           |             |           |            |                |               |                   |               |               |                  |               |               |
| New Branch                     | -         | -          | -         | -           | -         | -          | -              | -             | -                 | -             | -             | -                | 5039.41       | 5039.03       |
| SDMH9                          | -         | -          | -         | -           | -         | -          | -              | -             | -                 | 5039.41       | 5039.03       | 0.10             | 5039.51       | 5039.13       |
| 5046.21<br>SDP12               | 18        | 1.70       | 318.90    | 73.52       | -         | -          | 83.99          | 0.0003        | 5037.44           | 5039.51       | 5039.13       | -                | 5374.40       | 5290.41       |
| New Branch                     | -         | -          | -         | -           | -         | -          | -              | -             | -                 | -             | -             | -                | 5039.41       | 5039.03       |
| SDMH9                          | -         | -          | -         | -           | -         | -          | -              | -             | -                 | 5039.41       | 5039.03       | 0.02             | 5039.43       | 5039.05       |
| 5046.21<br>SDP13               | 18        | 1.70       | 37.28     | 9.60        | -         | -          | 1.43           | 0.0003        | 5037.54           | 5039.43       | 5039.05       | -                | 5041.00       | 5039.57       |

| InRoads output file.txt |    |       |        |      |   |   |      |        |         |         |         |      |                 |
|-------------------------|----|-------|--------|------|---|---|------|--------|---------|---------|---------|------|-----------------|
| New Branch              | -  | -     | -      | -    | - | - | -    | -      | -       | -       | -       | -    | 5039.67 5039.36 |
| - exSDMH1               | -  | -     | -      | -    | - | - | -    | -      | -       | 5039.67 | 5039.36 | 0.07 | 5039.74 5039.42 |
| 5047.11 exSDP6          | 24 | 10.60 | 80.15  | 3.37 | - | - | 0.18 | 0.0022 | 5039.19 | 5039.74 | 5039.42 | 0.18 | 5039.91 5039.73 |
| - SDMH1                 | -  | -     | -      | -    | - | - | -    | -      | -       | 5039.91 | 5039.73 | 0.02 | 5039.93 5039.75 |
| 5048.13 SDP7            | 24 | 10.60 | 101.63 | 3.37 | - | - | 0.18 | 0.0022 | 5039.39 | 5039.93 | 5039.75 | 0.22 | 5040.15 5039.98 |
| - SDMH6                 | -  | -     | -      | -    | - | - | -    | -      | -       | 5040.15 | 5039.98 | 0.05 | 5040.20 5040.03 |
| 5047.04 SDP8            | 24 | 10.60 | 127.46 | 3.37 | - | - | 0.18 | 0.0022 | 5039.68 | 5040.20 | 5040.03 | 0.28 | 5040.48 5040.31 |
| - SDMH7                 | -  | -     | -      | -    | - | - | -    | -      | -       | 5040.48 | 5040.31 | 0.11 | 5040.59 5040.41 |
| 5043.17 SDP9            | 18 | 10.60 | 19.67  | 6.00 | - | - | 0.56 | 0.0102 | 5039.54 | 5040.59 | 5040.41 | 0.20 | 5040.79 5040.23 |
| - south inlet           | -  | -     | -      | -    | - | - | -    | -      | -       | 5040.79 | 5040.23 | -    | 5040.79 5040.23 |
| 5042.47                 |    |       |        |      |   |   |      |        |         |         |         |      |                 |

Table B:

| LOSSES |                 |      |      |      |    |    |    |       | - LOSS_COEFFICIENTS |       |       |       |       |       |
|--------|-----------------|------|------|------|----|----|----|-------|---------------------|-------|-------|-------|-------|-------|
| Cb     | Str_ID<br>K     | Hf   | Hb   | Hstr | Hc | He | Hj | Total | Dstr                | Ko    | CD    | Cd    | Cq    | Cp    |
| -      | Outfall         | -    | -    | -    | -  | -  | -  | -     | -                   | -     | -     | -     | -     | -     |
| -      | - SDP11         | 0.18 | -    | -    | -  | -  | -  | 0.18  | -                   | -     | -     | -     | -     | -     |
| -      | - SDMH9         | -    | -    | 0.06 | -  | -  | -  | 0.06  | 3.09                | 0.281 | 1.000 | 0.509 | 1.135 | 1.000 |
| 1.000  | 0.162 exSDP10   | 0.20 | -    | -    | -  | -  | -  | 0.20  | -                   | -     | -     | -     | -     | -     |
| -      | - exSDMH1       | -    | -    | 0.14 | -  | -  | -  | 0.14  | 3.16                | 1.553 | 1.000 | 0.516 | 0.559 | 1.000 |
| 1.000  | 0.448 exSDP1    | 0.03 | -    | -    | -  | -  | -  | 0.03  | -                   | -     | -     | -     | -     | -     |
| -      | - Junction      | -    | 0.00 | -    | -  | -  | -  | 0.00  | -                   | -     | -     | -     | -     | -     |
| -      | - SDP2          | 0.21 | -    | -    | -  | -  | -  | 0.21  | -                   | -     | -     | -     | -     | -     |
| -      | - SDMH2         | -    | -    | 0.09 | -  | -  | -  | 0.09  | 3.25                | 1.232 | 1.000 | 0.525 | 1.000 | 1.000 |
| 1.000  | 0.647 SDP4      | 0.22 | -    | -    | -  | -  | -  | 0.22  | -                   | -     | -     | -     | -     | -     |
| -      | - NorthInlet 1  | -    | -    | 0.47 | -  | -  | -  | 0.47  | 2.78                | 1.100 | 1.000 | 0.609 | 1.000 | 1.000 |
| 1.000  | 0.670 SDP3      | 0.21 | -    | -    | -  | -  | -  | 0.21  | -                   | -     | -     | -     | -     | -     |
| -      | - north inlet 2 | -    | -    | -    | -  | -  | -  | -     | 3.41                | -     | -     | -     | -     | -     |
| -      | -               |      |      |      |    |    |    |       |                     |       |       |       |       |       |
| -      | New Branch      | -    | -    | -    | -  | -  | -  | -     | -                   | -     | -     | -     | -     | -     |
| -      | - SDMH9         | -    | -    | 0.10 | -  | -  | -  | 0.10  | 3.09                | 1.175 | 1.000 | 0.509 | 0.453 | 1.000 |
| 1.000  | 0.271 SDP12     | 0.08 | -    | -    | -  | -  | -  | 0.08  | -                   | -     | -     | -     | -     | -     |
| -      | -               |      |      |      |    |    |    |       |                     |       |       |       |       |       |
| -      | New Branch      | -    | -    | -    | -  | -  | -  | -     | -                   | -     | -     | -     | -     | -     |
| -      | - SDMH9         | -    | -    | 0.02 | -  | -  | -  | 0.02  | 3.09                | 1.443 | 1.000 | 0.509 | 0.063 | 1.000 |
| 1.000  | 0.046 SDP13     | 0.01 | -    | -    | -  | -  | -  | 0.01  | -                   | -     | -     | -     | -     | -     |
| -      | -               |      |      |      |    |    |    |       |                     |       |       |       |       |       |
| -      | New Branch      | -    | -    | -    | -  | -  | -  | -     | -                   | -     | -     | -     | -     | -     |
| -      | - exSDMH1       | -    | -    | 0.07 | -  | -  | -  | 0.07  | 3.16                | 1.553 | 1.000 | 0.516 | 0.264 | 1.000 |
| 1.000  | 0.212 exSDP6    | 0.18 | -    | -    | -  | -  | -  | 0.18  | -                   | -     | -     | -     | -     | -     |
| -      | - SDMH1         | -    | -    | 0.02 | -  | -  | -  | 0.02  | 2.36                | 0.200 | 1.000 | 0.552 | 1.000 | 1.000 |
| 1.000  | 0.110 SDP7      | 0.22 | -    | -    | -  | -  | -  | 0.22  | -                   | -     | -     | -     | -     | -     |
| -      | - SDMH6         | -    | -    | 0.05 | -  | -  | -  | 0.05  | 2.34                | 0.495 | 1.000 | 0.549 | 1.000 | 1.000 |
| 1.000  | 0.272 SDP8      | 0.28 | -    | -    | -  | -  | -  | 0.28  | -                   | -     | -     | -     | -     | -     |
| -      | - SDMH7         | -    | -    | 0.11 | -  | -  | -  | 0.11  | 2.31                | 1.125 | 1.000 | 0.546 | 1.000 | 1.000 |
| 1.000  | 0.614 SDP9      | 0.20 | -    | -    | -  | -  | -  | 0.20  | -                   | -     | -     | -     | -     | -     |
| -      | - south inlet   | -    | -    | -    | -  | -  | -  | -     | 2.15                | -     | -     | -     | -     | -     |
| -      | -               |      |      |      |    |    |    |       |                     |       |       |       |       |       |

# **APPENDIX D**

## **SWALE ANALYSIS**

MANNING'S N = 0.045 SLOPE = 0.006

| POINT<br>1.0 | DIST<br>0.0  | ELEV<br>2.0             | POINT<br>2.0          | DIST<br>6.0           | ELEV<br>0.0          | POINT<br>3.0                   | DIST<br>12.0            | ELEV<br>2.0 |
|--------------|--------------|-------------------------|-----------------------|-----------------------|----------------------|--------------------------------|-------------------------|-------------|
| WSEL<br>FT.  | DEPTH<br>INC | FLOW<br>AREA<br>SQ. FT. | FLOW<br>RATE<br>(CFS) | WETTED<br>PER<br>(FT) | FLOW<br>VEL<br>(FPS) | TOPWID<br>PLUS<br>OBSTRUCTIONS | TOTAL<br>ENERGY<br>(FT) |             |
| 0.100        | 0.100        | 0.030                   | 0.010                 | 0.632                 | 0.335                | 0.600                          | 0.102                   |             |
| 0.200        | 0.200        | 0.120                   | 0.064                 | 1.265                 | 0.532                | 1.200                          | 0.204                   |             |
| 0.300        | 0.300        | 0.270                   | 0.188                 | 1.897                 | 0.697                | 1.800                          | 0.308                   |             |
| 0.400        | 0.400        | 0.480                   | 0.405                 | 2.530                 | 0.845                | 2.400                          | 0.411                   |             |
| 0.500        | 0.500        | 0.750                   | 0.735                 | 3.162                 | 0.980                | 3.000                          | 0.515                   |             |
| 0.600        | 0.600        | 1.080                   | 1.195                 | 3.795                 | 1.107                | 3.600                          | 0.619                   |             |
| 0.700        | 0.700        | 1.470                   | 1.803                 | 4.427                 | 1.227                | 4.200                          | 0.723                   |             |
| 0.800        | 0.800        | 1.920                   | 2.574                 | 5.060                 | 1.341                | 4.800                          | 0.828                   |             |
| 0.900        | 0.900        | 2.430                   | 3.524                 | 5.692                 | 1.450                | 5.400                          | 0.933                   |             |
| 1.000        | 1.000        | 3.000                   | 4.667                 | 6.325                 | 1.556                | 6.000                          | 1.038                   |             |
| 1.100        | 1.100        | 3.630                   | 6.018                 | 6.957                 | 1.658                | 6.600                          | 1.143                   |             |
| 1.200        | 1.200        | 4.320                   | 7.590                 | 7.589                 | 1.757                | 7.200                          | 1.248                   |             |
| 1.300        | 1.300        | 5.070                   | 9.395                 | 8.222                 | 1.853                | 7.800                          | 1.353                   |             |
| 1.400        | 1.400        | 5.880                   | 11.448                | 8.854                 | 1.947                | 8.400                          | 1.459                   |             |
| 1.500        | 1.500        | 6.750                   | 13.761                | 9.487                 | 2.039                | 9.000                          | 1.565                   |             |
| 1.600        | 1.600        | 7.680                   | 16.345                | 10.119                | 2.128                | 9.600                          | 1.670                   |             |
| 1.700        | 1.700        | 8.670                   | 19.213                | 10.752                | 2.216                | 10.200                         | 1.776                   |             |
| 1.800        | 1.800        | 9.720                   | 22.376                | 11.384                | 2.302                | 10.800                         | 1.882                   |             |
| 1.900        | 1.900        | 10.830                  | 25.847                | 12.017                | 2.387                | 11.400                         | 1.989                   |             |

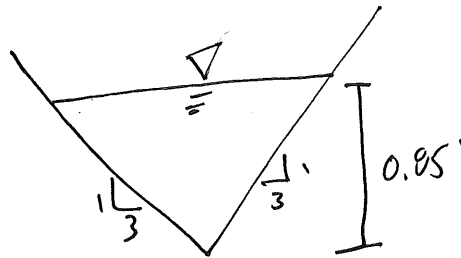
NORTH SWALE

BASIN F - 2.7 CFS

BASIN K - 0.5 CFS

3.2 CFSWSEL

d = 0.85'



MANNING'S N = 0.045 SLOPE = 0.010

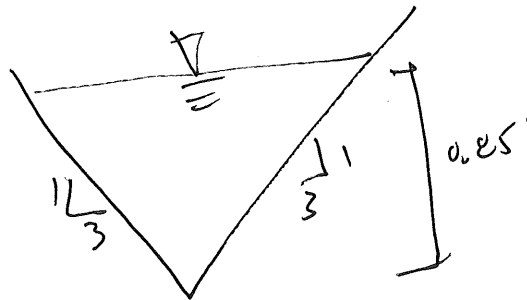
| POINT<br>1.0 | DIST<br>0.0  | ELEV<br>2.0             | POINT<br>2.0          | DIST<br>6.0           | ELEV<br>0.0          | POINT<br>3.0                   | DIST<br>12.0            | ELEV<br>2.0 |
|--------------|--------------|-------------------------|-----------------------|-----------------------|----------------------|--------------------------------|-------------------------|-------------|
| WSEL<br>FT.  | DEPTH<br>INC | FLOW<br>AREA<br>SQ. FT. | FLOW<br>RATE<br>(CFS) | WETTED<br>PER<br>(FT) | FLOW<br>VEL<br>(FPS) | TOPWID<br>PLUS<br>OBSTRUCTIONS | TOTAL<br>ENERGY<br>(FT) |             |
| 0.100        | 0.100        | 0.030                   | 0.013                 | 0.632                 | 0.433                | 0.600                          | 0.103                   |             |
| 0.200        | 0.200        | 0.120                   | 0.082                 | 1.265                 | 0.687                | 1.200                          | 0.207                   |             |
| 0.300        | 0.300        | 0.270                   | 0.243                 | 1.897                 | 0.900                | 1.800                          | 0.313                   |             |
| 0.400        | 0.400        | 0.480                   | 0.523                 | 2.530                 | 1.090                | 2.400                          | 0.418                   |             |
| 0.500        | 0.500        | 0.750                   | 0.949                 | 3.162                 | 1.265                | 3.000                          | 0.525                   |             |
| 0.600        | 0.600        | 1.080                   | 1.543                 | 3.795                 | 1.429                | 3.600                          | 0.632                   |             |
| 0.700        | 0.700        | 1.470                   | 2.328                 | 4.427                 | 1.583                | 4.200                          | 0.739                   |             |
| 0.800        | 0.800        | 1.920                   | 3.323                 | 5.060                 | 1.731                | 4.800                          | 0.847                   |             |
| 0.900        | 0.900        | 2.430                   | 4.550                 | 5.692                 | 1.872                | 5.400                          | 0.955                   |             |
| 1.000        | 1.000        | 3.000                   | 6.025                 | 6.325                 | 2.008                | 6.000                          | 1.063                   |             |
| 1.100        | 1.100        | 3.630                   | 7.769                 | 6.957                 | 2.140                | 6.600                          | 1.171                   |             |
| 1.200        | 1.200        | 4.320                   | 9.798                 | 7.589                 | 2.268                | 7.200                          | 1.280                   |             |
| 1.300        | 1.300        | 5.070                   | 12.129                | 8.222                 | 2.392                | 7.800                          | 1.389                   |             |
| 1.400        | 1.400        | 5.880                   | 14.780                | 8.854                 | 2.514                | 8.400                          | 1.498                   |             |
| 1.500        | 1.500        | 6.750                   | 17.765                | 9.487                 | 2.632                | 9.000                          | 1.608                   |             |
| 1.600        | 1.600        | 7.680                   | 21.101                | 10.119                | 2.748                | 9.600                          | 1.717                   |             |
| 1.700        | 1.700        | 8.670                   | 24.804                | 10.752                | 2.861                | 10.200                         | 1.827                   |             |
| 1.800        | 1.800        | 9.720                   | 28.888                | 11.384                | 2.972                | 10.800                         | 1.937                   |             |
| 1.900        | 1.900        | 10.830                  | 33.368                | 12.017                | 3.081                | 11.400                         | 2.048                   |             |

SOUTH SWALE

BASIN B - 3.7 CFS

WSEL

d = 0.25'

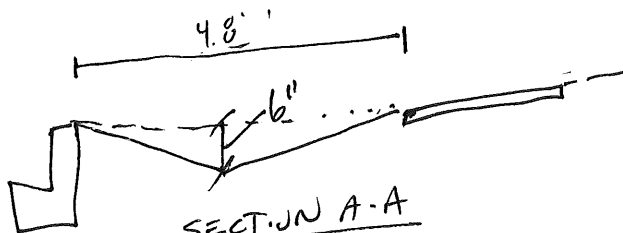
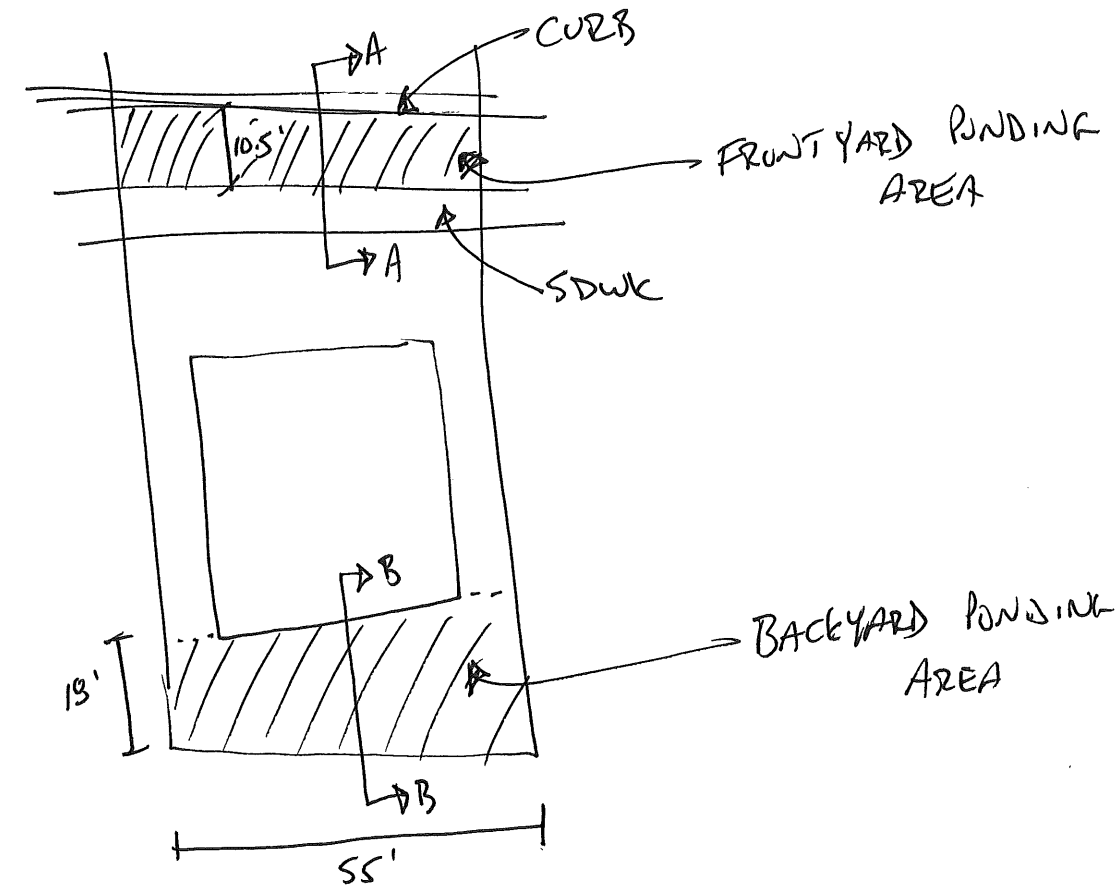


# **APPENDIX E**

## **WATER HARVESTING CALCULATIONS**

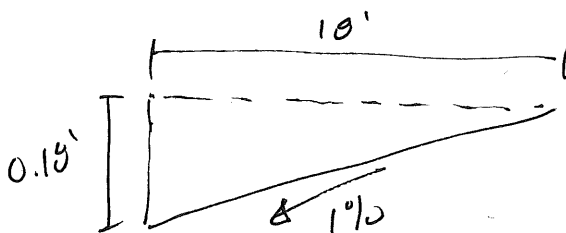
| BASIN SUMMARY FOR THE ANDALUCIA                      |              |            |                  |      |       |        |                           |  |      |
|------------------------------------------------------|--------------|------------|------------------|------|-------|--------|---------------------------|--|------|
| HYDROLOGICAL VOLUMETRIC & DISCHARGE DATA             |              |            |                  |      |       |        |                           |  |      |
| BASIN<br>I.D.                                        | AREA<br>(AC) | UNITS<br># | % LAND TREATMENT |      |       |        | 90TH PERCENTILE<br>VOLUME |  |      |
|                                                      |              |            | A                | B    | C     | D      | (CF)                      |  |      |
| HYRDOLOGICAL VOLUMETRIC & DISCHARGE DATA (DEVELOPED) |              |            |                  |      |       |        |                           |  |      |
| BASINS                                               |              |            |                  |      |       |        |                           |  |      |
| Basin A                                              | 2.70         | 9          |                  | 0.0% | 56.4% | 0.0%   | 43.6%                     |  | 1453 |
| Basin B                                              | 1.21         | 8          |                  | 0.0% | 56.4% | 0.0%   | 43.6%                     |  | 651  |
| Basin C                                              | 0.06         | 0          |                  | 0.0% | 0.0%  | 100.0% | 0.0%                      |  | 0    |
| Basin D-1                                            | 0.23         | 0          |                  | 0.0% | 0.0%  | 100.0% | 0.0%                      |  | 0    |
| Basin D-2                                            | 0.02         | 0          |                  | 0.0% | 0.0%  | 100.0% | 0.0%                      |  | 0    |
| Basin E                                              | 5.89         | 23         |                  | 0.0% | 56.4% | 0.0%   | 43.6%                     |  | 3171 |
| Basin F                                              | 0.88         | 5          |                  | 0.0% | 56.4% | 0.0%   | 43.6%                     |  | 474  |
| Basin G                                              | 0.10         | 0          |                  | 0.0% | 0.0%  | 100.0% | 0.0%                      |  | 0    |
| Basin H                                              | 0.45         | 0          |                  | 0.0% | 0.0%  | 100.0% | 0.0%                      |  | 0    |
| Basin I                                              | 0.01         | 0          |                  | 0.0% | 0.0%  | 100.0% | 0.0%                      |  | 0    |
| Basin J                                              | 0.02         | 0          |                  | 0.0% | 0.0%  | 10.0%  | 90.0%                     |  | 22   |
| Basin K                                              | 0.18         | 0          |                  | 0.0% | 0.0%  | 100.0% | 0.0%                      |  | 0    |
| TOTAL                                                | 11.75        | 45         |                  |      |       |        |                           |  | 5771 |
|                                                      |              |            |                  |      |       |        |                           |  |      |

# TYPICAL LOT - PONDING AREAS



$$A = \frac{(4.8)(0.5)}{2} = 1.2 \text{ SF} \Rightarrow V = 1.2 \text{ SF} \times (55 \text{ FT} - 20 \text{ FT})$$

$$V_{\text{FRONT}} = 42 \text{ CF}$$



SECTION B-B

$$A = \frac{1}{2}bh = \frac{1}{2}(10)(0.10) = 1.62 \text{ SF} \Rightarrow V = 1.62 \text{ SF} \cdot 55 \text{ FT}$$

$$V_{\text{BACK}} = 89 \text{ CF}$$

| Elevation | Incremental Volume | Cumulative Volume | pond2 volumes.txt<br>Acre-Feet | Surface Area |
|-----------|--------------------|-------------------|--------------------------------|--------------|
|           | cu ft              | cu ft             |                                | sq ft        |
| 5042.6000 | 605.4049           | 605.4049          | 0.0139                         | 1125.8623    |

POND 2

$$V_{\text{available}} = 605 \text{ CF}$$

| Elevation | Incremental Volume | Cumulative Volume | pond3 volumes.txt |              |
|-----------|--------------------|-------------------|-------------------|--------------|
|           |                    |                   | Acre-Feet         | Surface Area |
|           | cu ft              | cu ft             |                   | sq ft        |
| 5030.1000 | 5.6658             | 5.6658            | 0.0001            | 63.7732      |
| 5030.2000 | 7.1343             | 12.8000           | 0.0003            | 79.1396      |
| 5030.3000 | 8.7393             | 21.5393           | 0.0005            | 95.8716      |
| 5030.4000 | 10.4809            | 32.0202           | 0.0007            | 113.9709     |
| 5030.5000 | 12.3589            | 44.3792           | 0.0010            | 133.4351     |
| 5030.6000 | 14.3735            | 58.7527           | 0.0013            | 154.2649     |
| 5030.7000 | 16.5247            | 75.2774           | 0.0017            | 176.4568     |
| 5030.8000 | 18.8123            | 94.0897           | 0.0022            | 200.0161     |
| 5030.9000 | 21.2365            | 115.3261          | 0.0026            | 224.9390     |
| 5031.0000 | 23.7971            | 139.1233          | 0.0032            | 251.2307     |
| 5031.1000 | 32.0477            | 171.1710          | 0.0039            | 349.1394     |
| 5031.2000 | 37.5774            | 208.7483          | 0.0048            | 402.5547     |
| 5031.3000 | 43.0625            | 251.8109          | 0.0058            | 459.4431     |
| 5031.4000 | 48.9768            | 300.7877          | 0.0069            | 520.8245     |
| 5031.5000 | 55.3342            | 356.1219          | 0.0082            | 586.5920     |
| 5031.6000 | 62.1304            | 418.2523          | 0.0096            | 656.7458     |
| 5031.7000 | 69.3652            | 487.6175          | 0.0112            | 731.2893     |
| 5031.8000 | 77.0388            | 564.6562          | 0.0130            | 810.2190     |
| 5031.9000 | 85.1510            | 649.8072          | 0.0149            | 893.5356     |
| 5032.0000 | 93.7020            | 743.5092          | 0.0171            | 981.2434     |

POND 3

$$V_{\text{available}} = 744 \text{ CF}$$

**APPENDIX F**  
**PREVIOUS DMP'S EXCERPTS**



P:\030187\cdp\design\030187bas1ns.dgn  
1/14/2015

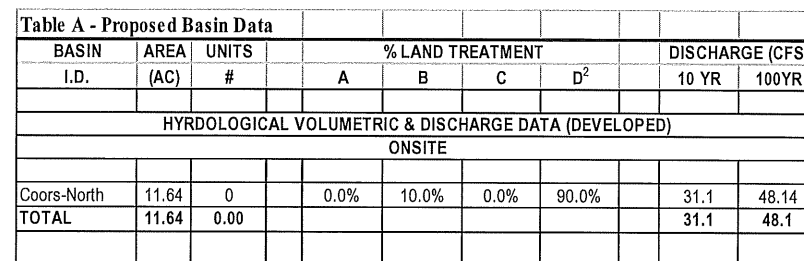
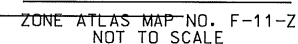
2101210 PM  
j0001110

BHI JOB NO. 03 0187

COPYRIGHT BOHANNAN HUSTON, INC. 2003

ANDALUCIA AT LA LUZ – PHASE 1  
PROPOSED BASIN MAP  
ALBUQUERQUE, NEW MEXICO  
JUNE, 2003

**Bohannon** **Huston**  
Courtyard I 7500 Jefferson St. NE Albuquerque, NM 87109-4335  
ENGINEERING • SPATIAL DATA • ADVANCED TECHNOLOGIES

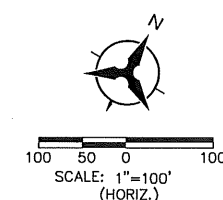
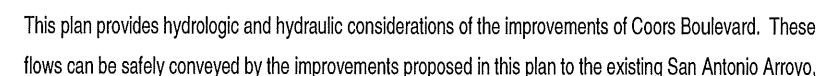


| Roadway Grade (%) | Roadway Cross-slope (%) | Q (100 YR) in roadway (cfs) | Q (10 YR) in roadway (cfs) | Curb Type | Depth of water in roadway-10yr (ft.) | Velocity of storm water in roadway (ft/s) | V <sup>2</sup> /2g | EGL  | Comments |
|-------------------|-------------------------|-----------------------------|----------------------------|-----------|--------------------------------------|-------------------------------------------|--------------------|------|----------|
| 4.89              | 2.00                    | 16.54                       | 10.70                      | STD       | 0.37                                 | 5.32                                      | 0.44               | 0.81 | OK       |
| 2.03              | 2.00                    | 30.40                       | 19.66                      | STD       | 0.50                                 | 4.41                                      | 0.30               | 0.81 | OK       |
| -1.43             | 2.00                    | 17.70                       | 11.45                      | STD       | 0.46                                 | 3.42                                      | 0.18               | 0.64 | OK       |
| -1.60             | 2.00                    | 6.75                        | 4.37                       | STD       | 0.34                                 | 2.84                                      | 0.13               | 0.47 | OK       |

1). Designed in accordance to DPM Chpt. 22 Sec. 3-E

| Table C - Storm Drain Analysis |              |           |                          |                             |
|--------------------------------|--------------|-----------|--------------------------|-----------------------------|
| SIZE/TYPE                      | LENGTH (ft.) | SLOPE (%) | PROPOSED Q (100-YR, cfs) | PIPE CAPACITY (100-YR, CFS) |
| 36" RCP                        | 240.00       | 0.60      | 48.10                    | 52.00                       |

ALBUQUERQUE, NEW MEXICO  
SEPTEMBER, 2005

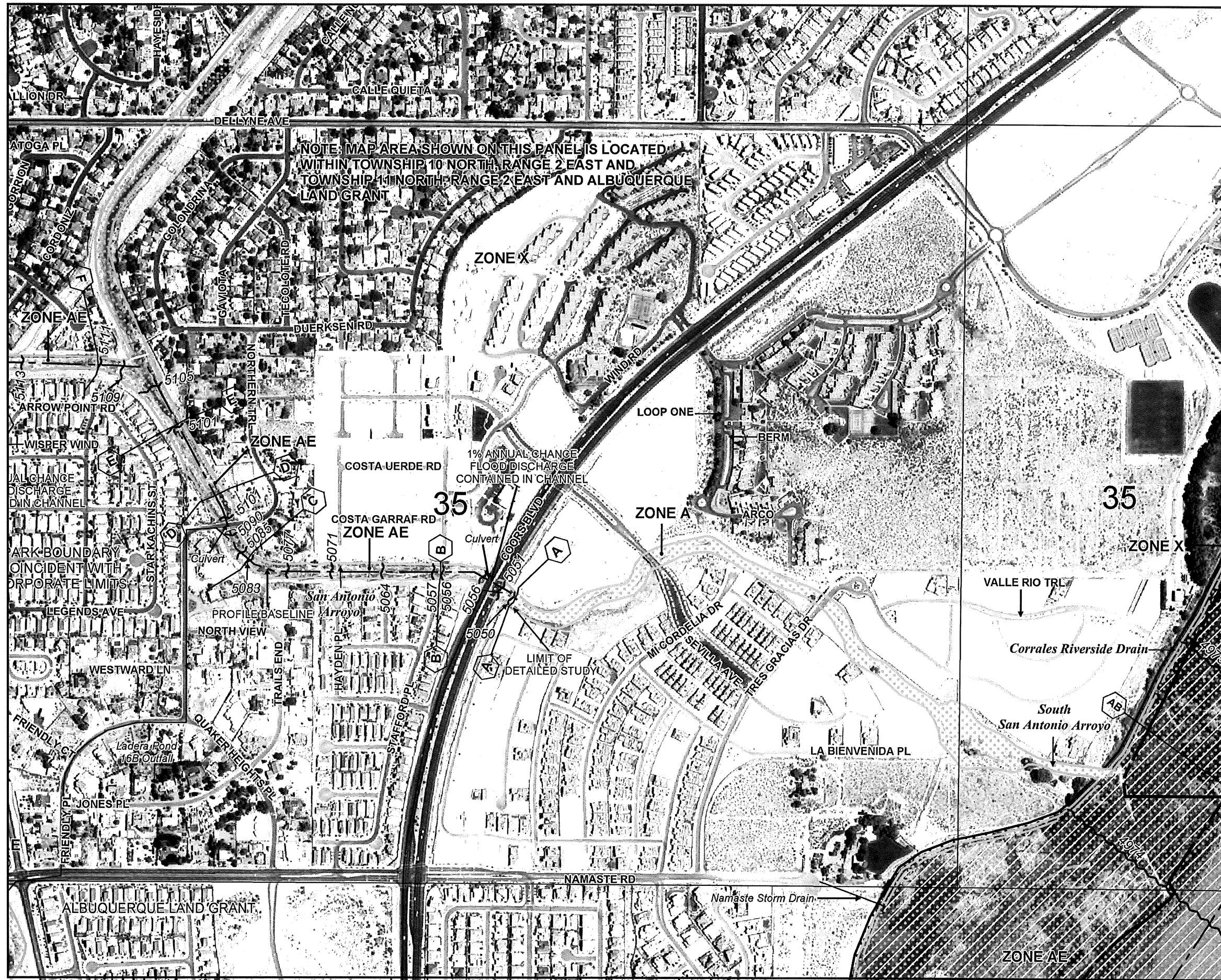


# Bohannon Huston

Courtyard I 7500 Jefferson St. NE Albuquerque, NM 87109-4335  
**ENGINEERING**  **SPATIAL DATA**  **ADVANCED TECHNOLOGIES**

## **APPENDIX G**

### **FEMA FIRM**



MAP SCALE 1" = 500'

0 500 1000 FEET

**NFIP**

**NATIONAL FLOOD INSURANCE PROGRAM**

PANEL 0114H

**FIRM**

FLOOD INSURANCE RATE MAP

BERNALILLO COUNTY, NEW MEXICO

AND INCORPORATED AREAS

PANEL 114 OF 825

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

| COMMUNITY                              | NUMBER | PANEL | SUFFIX |
|----------------------------------------|--------|-------|--------|
| ALBUQUERQUE, CITY OF                   | 350002 | 0114  | H      |
| BERNALILLO COUNTY UNINCORPORATED AREAS | 350001 | 0114  | H      |

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

 **MAP NUMBER**  
35001C0114H

**MAP REVISED**  
AUGUST 16, 2012

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)

## **EXHIBITS**

**EXHIBIT 1: PRELIMINARY PLAT**

**EXHIBIT 2: EXISTING BASINS MAP**

**EXHIBIT 3: DEVELOPED BASINS MAP**

**EXHIBIT 4: STORM DRAIN NETWORK MAP**

**EXHIBIT 5: STORM DRAIN PLAN AND PROFILE**

**EXHIBIT 6: GRADING PLAN**

**EXHIBIT 1**  
**PRELIMINARY PLAT**

ALBUQUERQUE, NEW MEXICO  
DECEMBER, 2014

| Tangent Data |             |          |
|--------------|-------------|----------|
| ID           | BEARING     | DISTANCE |
| T1           | N41°06'49"W | 7.19     |
| T2           | N44°03'56"W | 7.19     |
| T3           | N47°41'20"W | 6.86     |
| T4           | N50°08'07"W | 7.19     |
| T5           | N52°49'40"W | 63.29    |
| T6           | N54°45'16"W | 164.79   |
| T7           | N29°25'19"W | 44.66    |
| T8           | N40°14'36"W | 49.34    |
| T9           | S72°03'36"W | 127.68   |
| T10          | S81°24'13"W | 107.79   |
| T11          | S11°12'02"W | 59.26    |
| T12          | S50°44'27"W | 12.03    |
| T13          | N52°49'40"W | 51.01    |
| T14          | N55°56'32"W | 7.05     |
| T15          | N57°19'00"W | 7.00     |
| T16          | N60°03'26"W | 6.81     |
| T17          | N50°48'29"W | 122.20   |
| T18          | N76°50'35"W | 73.84    |
| T19          | S33°33'08"W | 107.06   |

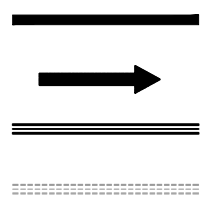
| Curve Data |           |         |         |          |         |            |
|------------|-----------|---------|---------|----------|---------|------------|
| ID         | DELTA     | TANGENT | ARC     | RADIUS   | CHORD   | CHORD BRG  |
| C1         | 01°04'35" | 34.89'  | 69.79'  | 3714.20' | 69.78'  | S50°29'35" |
| C2         | 12°20'17" | 5.40'   | 10.77'  | 50.00'   | 10.75'  | S56°07'26" |
| C3         | 14°54'36" | 31.52'  | 62.68'  | 240.85'  | 62.50'  | S54°50'16" |
| C4         | 02°28'16" | 80.10'  | 160.18' | 3714.20' | 160.17' | S47°35'45" |
| C5         | 12°04'35" | 25.48'  | 50.76'  | 240.85'  | 50.67'  | S41°47'43" |
| C6         | 09°13'34" | 19.51'  | 38.94'  | 241.85'  | 38.90'  | S40°22'13" |
| C7         | 01°31'01" | 49.17'  | 98.33'  | 3714.20' | 98.33'  | S44°13'29" |
| C8         | 12°02'55" | 5.28'   | 10.51'  | 50.00'   | 10.50'  | S49°29'27" |
| C9         | 14°30'27" | 30.66'  | 60.98'  | 240.85'  | 60.82'  | S48°15'41" |
| C10        | 02°28'36" | 80.29'  | 160.55' | 3714.20' | 160.54' | S41°08'03" |
| C11        | 14°50'03" | 31.35'  | 62.36'  | 240.85'  | 62.18'  | S33°54'24" |
| C12        | 12°17'18" | 5.38'   | 10.77'  | 50.00'   | 10.70'  | S32°38'01" |
| C13        | 01°00'46" | 32.83'  | 65.66'  | 3714.20' | 65.66'  | S38°16'17" |
| C14        | 07°03'24" | 43.16'  | 86.21'  | 700.00'  | 86.16'  | S49°17'58" |
| C15        | 03°54'29" | 10.58'  | 21.14'  | 390.00'  | 21.14'  | S38°17'22" |
| C16        | 09°26'09" | 23.93'  | 47.76'  | 290.00'  | 47.70'  | S41°03'12" |
| C17        | 03°53'22" | 20.07'  | 39.81'  | 127.50'  | 39.65'  | N63°06'55" |
| C18        | 03°50'19" | 10.39'  | 20.77'  | 310.00'  | 20.76'  | N53°07'11" |
| C19        | 07°03'24" | 37.00'  | 73.90'  | 600.00'  | 73.85'  | N49°17'58" |
| C20        | 05°55'40" | 1.55'   | 3.10'   | 30.00'   | 3.10'   | N55°47'30" |
| C21        | 00°41'45" | 22.50'  | 45.00'  | 3705.45' | 45.00'  | S35°52'11" |
| C22        | 07°57'53" | 13.92'  | 27.80'  | 200.00'  | 27.78'  | S39°30'15" |
| C23        | 07°56'03" | 29.57'  | 59.04'  | 426.36'  | 58.99'  | S39°31'10" |
| C24        | 01°30'37" | 48.84'  | 97.68'  | 3705.45' | 97.67'  | S33°25'51" |
| C25        | 11°45'19" | 21.79'  | 43.42'  | 240.85'  | 49.33'  | S28°15'49" |
| C26        | 08°52'28" | 24.34'  | 42.59'  | 275.00'  | 42.55'  | S26°49'24" |
| C27        | 00°50'02" | 28.04'  | 56.09'  | 3705.45' | 56.08'  | S30°49'37" |
| C28        | 16°40'59" | 29.33'  | 58.24'  | 200.00'  | 58.03'  | S38°44'05" |
| C29        | 21°27'18" | 27.22'  | 53.81'  | 143.70'  | 53.50'  | S36°20'56" |
| C30        | 00°47'33" | 25.68'  | 51.37'  | 3714.20' | 51.37'  | S28°17'28" |
| C31        | 31°02'43" | 29.02'  | 56.62'  | 104.50'  | 55.93'  | N78°53'38" |
| C32        | 37°41'51" | 9.56'   | 18.42'  | 28.00'   | 18.09'  | N52°24'03" |
| C33        | 09°27'25" | 23.99'  | 47.87'  | 290.00'  | 47.81'  | N50°18'38" |

USC & GS BRASS DISC STAMPED "JOSEPH 1969"  
GEOGRAPHIC POSITION (NAD 1983)  
NM STATE PLANE COORDINATES (CENTRAL ZONE)  
NORTHING = 1502309.280 EASTING = 1506932.687  
GROUND TO GRID FACTOR = 0.999679588  
DELTA ALPHA = -0015°24.78"  
DATUM: NAVD 1988

**EXHIBIT 2**  
**EXISTING BASINS MAP**

LEGEND

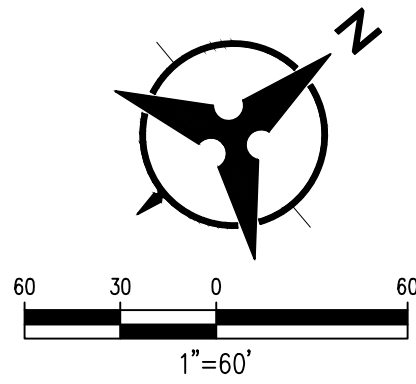
BASIN BOUNDARY  
FLOW ARROW  
PROPOSED STORM DRAIN  
EXISTING STORM DRAIN



SEVILLA AT ANDALUCIA  
EXISTING BASINS MAP  
01/2015



| BASIN SUMMARY FOR THE ANDALUCIA                                |              |            |                  |        |       |       |                 |       |  |
|----------------------------------------------------------------|--------------|------------|------------------|--------|-------|-------|-----------------|-------|--|
| HYDROLOGICAL VOLUMETRIC & DISCHARGE DATA                       |              |            |                  |        |       |       |                 |       |  |
| BASIN<br>I.D.                                                  | AREA<br>(AC) | UNITS<br># | % LAND TREATMENT |        |       |       | DISCHARGE (CFS) |       |  |
|                                                                |              |            | A                | B      | C     | D     | 10 YR           | 100YR |  |
| HYDROLOGICAL VOLUMETRIC & DISCHARGE DATA (EXISTING CALCULATED) |              |            |                  |        |       |       |                 |       |  |
| EX Basin 1                                                     | 0.76         |            | 0.0%             | 0.0%   | 10.0% | 90.0% | 2.09            | 3.21  |  |
| Tract A-1-A                                                    | 4.20         |            | 0.0%             | 100.0% | 0.0%  | 0.0%  | 3.17            | 8.49  |  |
| Tract B-2                                                      | 7.50         |            | 0.0%             | 100.0% | 0.0%  | 0.0%  | 5.65            | 15.16 |  |
| TOTAL                                                          | 12.46        |            |                  |        |       |       | 10.91           | 26.85 |  |



**EXHIBIT 3**  
**DEVELOPED BASINS MAP**

LEGEND

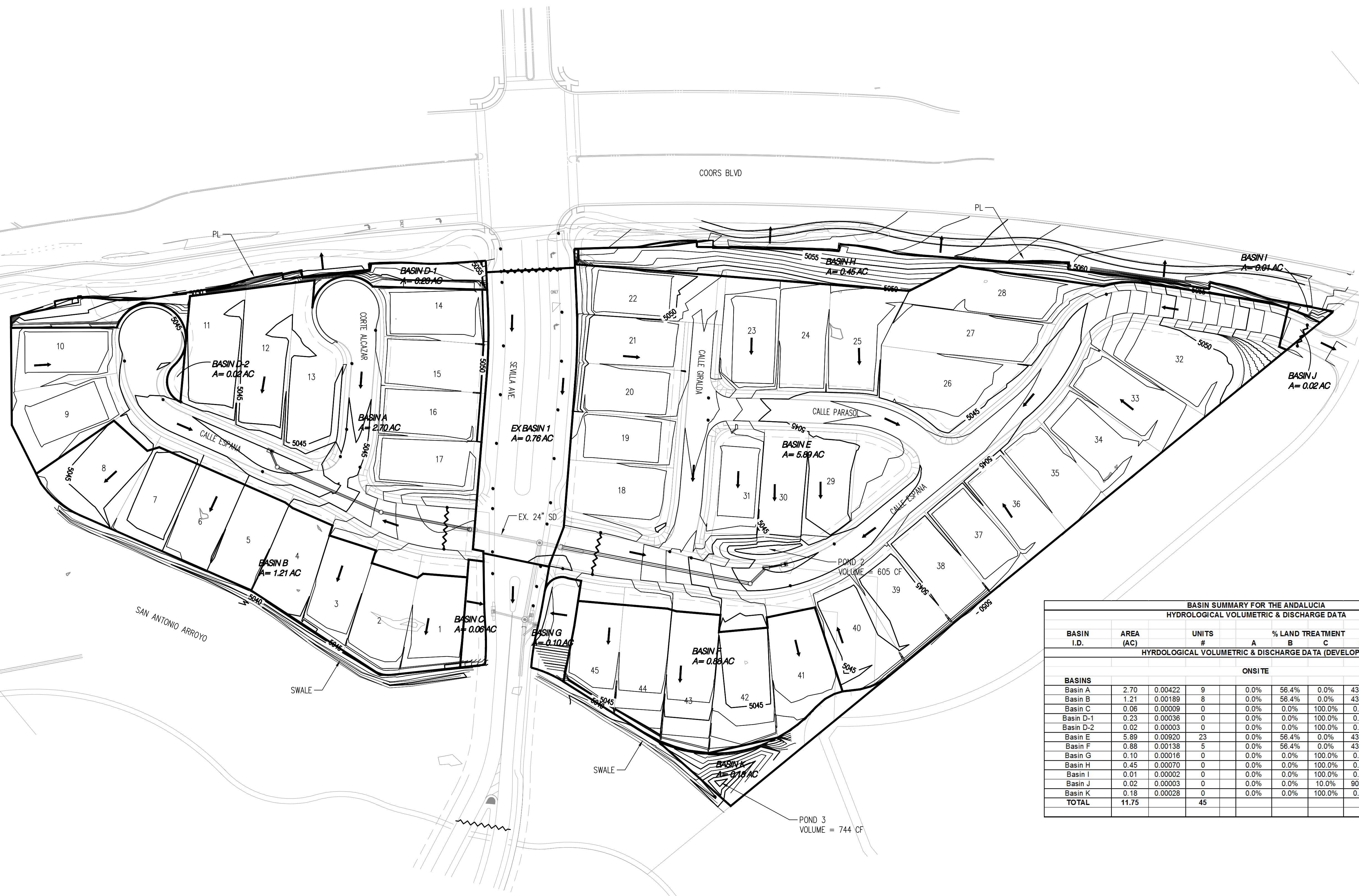
BASIN BOUNDARY

FLOW ARROW

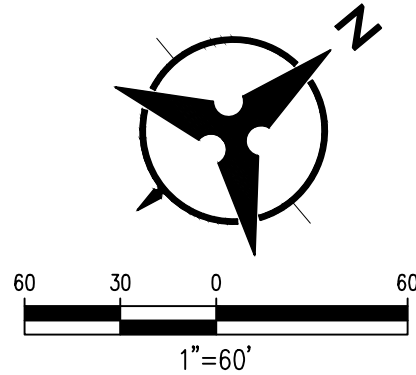
PROPOSED STORM DRAIN

EXISTING STORM DRAIN

SEVILLA AT ANDALUCIA  
DEVELOPED BASINS MAP  
01/2015



| BASIN SUMMARY FOR THE ANDALUCIA                      |           |         |                  |      |       |        |                 |       |       |
|------------------------------------------------------|-----------|---------|------------------|------|-------|--------|-----------------|-------|-------|
| HYDROLOGICAL VOLUMETRIC & DISCHARGE DATA             |           |         |                  |      |       |        |                 |       |       |
| BASIN I.D.                                           | AREA (AC) | UNITS # | % LAND TREATMENT |      |       |        | DISCHARGE (CFS) |       |       |
|                                                      |           |         | A                | B    | C     | D      | 10 YR           | 100YR |       |
| HYDROLOGICAL VOLUMETRIC & DISCHARGE DATA (DEVELOPED) |           |         |                  |      |       |        |                 |       |       |
| ONSITE                                               |           |         |                  |      |       |        |                 |       |       |
| BASINS                                               |           |         |                  |      |       |        |                 |       |       |
| Basin A                                              | 2.70      | 0.00422 | 9                | 0.0% | 56.4% | 0.0%   | 43.6%           | 4.55  | 8.22  |
| Basin B                                              | 1.21      | 0.00189 | 8                | 0.0% | 56.4% | 0.0%   | 43.6%           | 2.04  | 3.69  |
| Basin C                                              | 0.06      | 0.00009 | 0                | 0.0% | 0.0%  | 100.0% | 0.0%            | 0.09  | 0.17  |
| Basin D-1                                            | 0.23      | 0.00036 | 0                | 0.0% | 0.0%  | 100.0% | 0.0%            | 0.34  | 0.66  |
| Basin D-2                                            | 0.02      | 0.00003 | 0                | 0.0% | 0.0%  | 100.0% | 0.0%            | 0.03  | 0.06  |
| Basin E                                              | 5.89      | 0.00920 | 23               | 0.0% | 56.4% | 0.0%   | 43.6%           | 9.92  | 17.94 |
| Basin F                                              | 0.88      | 0.00138 | 5                | 0.0% | 56.4% | 0.0%   | 43.6%           | 1.48  | 2.68  |
| Basin G                                              | 0.10      | 0.00016 | 0                | 0.0% | 0.0%  | 100.0% | 0.0%            | 0.15  | 0.29  |
| Basin H                                              | 0.45      | 0.00070 | 0                | 0.0% | 0.0%  | 100.0% | 0.0%            | 0.66  | 1.29  |
| Basin I                                              | 0.01      | 0.00002 | 0                | 0.0% | 0.0%  | 100.0% | 0.0%            | 0.01  | 0.03  |
| Basin J                                              | 0.02      | 0.00003 | 0                | 0.0% | 0.0%  | 10.0%  | 90.0%           | 0.05  | 0.08  |
| Basin K                                              | 0.18      | 0.00028 | 0                | 0.0% | 0.0%  | 100.0% | 0.0%            | 0.27  | 0.52  |
| TOTAL                                                | 11.75     |         | 45               |      |       |        |                 | 19.60 | 35.63 |



**EXHIBIT 4**  
**STORM DRAIN NETWORK MAP**

SEVILLA AT ANDALUCIA  
STORM DRAIN NETWORK  
1/2015

LEGEND

|                              |  |
|------------------------------|--|
| PROPOSED STORM DRAIN PIPE    |  |
| PROPOSED STORM DRAIN MANHOLE |  |
| PROPOSED STORM DRAIN INLET   |  |
| EXISTING STORM DRAIN         |  |



SUMMARY OF INLET FLOWS

| ID  | STREET SLOPE | STREET FLOW DEPTH (ft) | STREET FLOW UPSTREAM OF INLET (cfs) | FLOW CAPTURED BY INLET (cfs) | STREET FLOW BYPASSING INLET (cfs) |
|-----|--------------|------------------------|-------------------------------------|------------------------------|-----------------------------------|
| IN1 | SUMP         | 0.43                   | 10.6                                | 10.6                         | N/A                               |
| IN2 | SUMP         | 0.54                   | 10.5                                | 10.5                         | N/A                               |
| IN3 | SUMP         | 0.46                   | 10.5                                | 10.5                         | N/A                               |

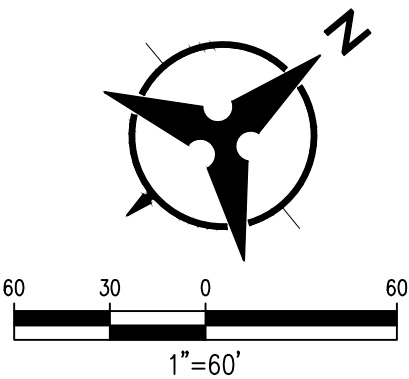
SUMMARY OF MANHOLES FLOWS

| ID  | STORM DRAIN FLOWRATE (cfs) |
|-----|----------------------------|
| MH1 | 10.6                       |
| MH2 | 10.6                       |
| MH3 | 21.0                       |

ALL INLETS SHALL BE DOUBLE GRATE, DOUBLE WING TYPE 'A' INLETS

SUMMARY OF PIPE FLOWS

| ID   | SIZE | SLOPE (%) | Q (cfs) ALLOWABLE | Q (cfs) ACTUAL |
|------|------|-----------|-------------------|----------------|
| SDP1 | 18"  | 0.25      | 5.3               | 10.6           |
| SDP2 | 24"  | 0.25      | 11.3              | 10.6           |
| SDP3 | 24"  | 0.25      | 11.3              | 10.6           |
| SDP4 | 36"  | 0.15      | 25.8              | 21.0           |
| SDP5 | 24"  | 0.60      | 17.5              | 21.0           |
| SDP6 | 18"  | 0.60      | 8.1               | 10.5           |



**EXHIBIT 5**

**STORM DRAIN PLAN AND PROFILE**

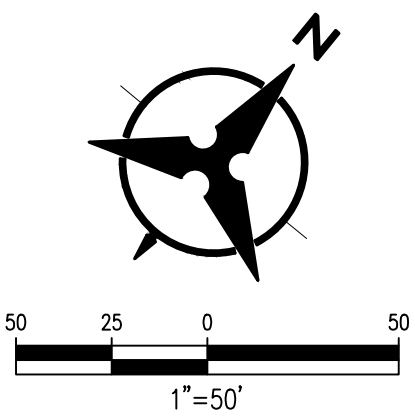
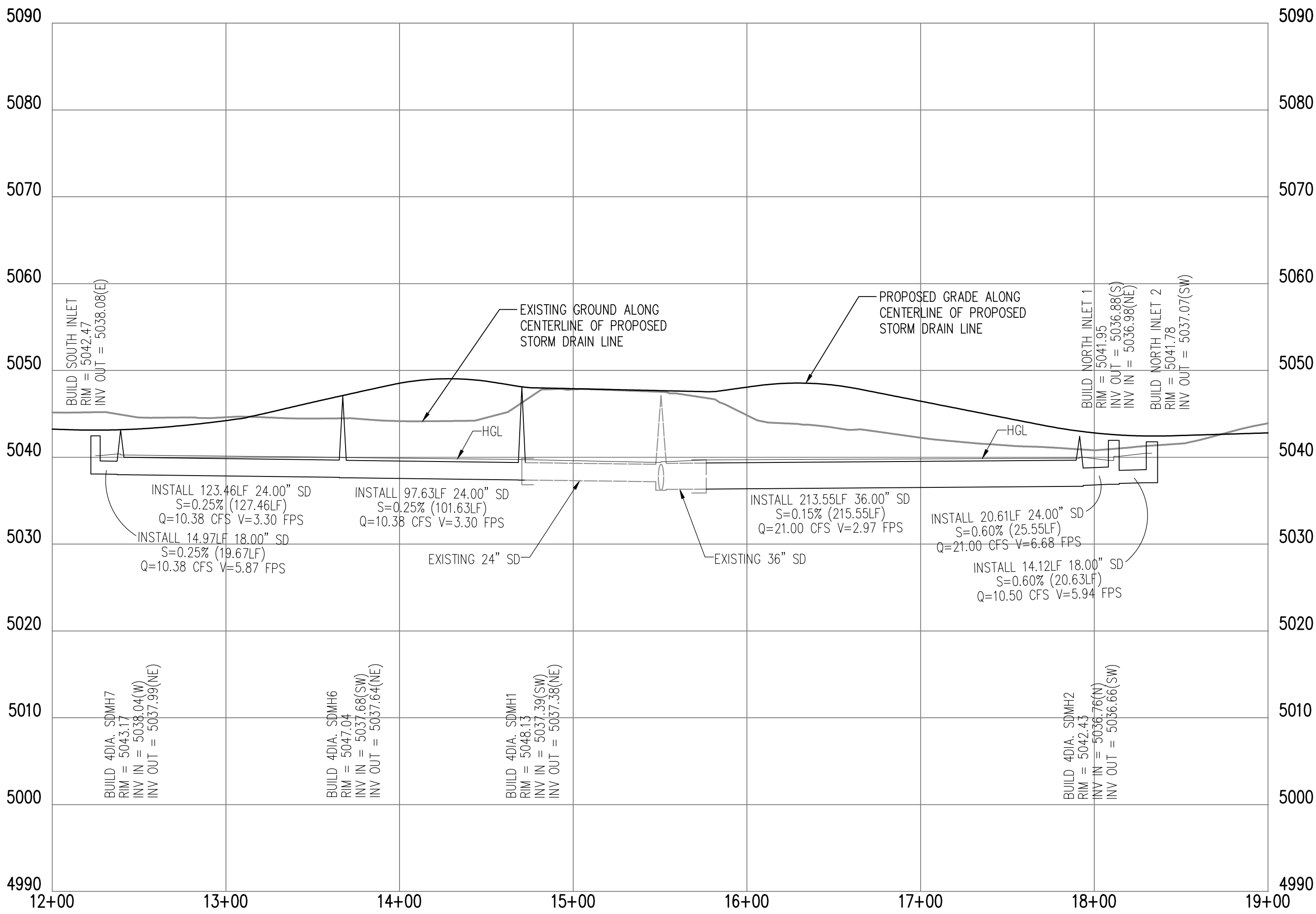
SEVILLA AT ANDALUCIA  
STORM DRAIN NETWORK  
PLAN & PROFILE

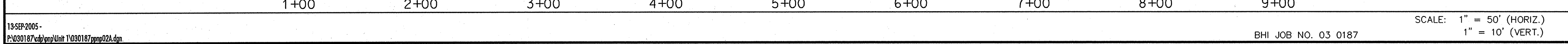
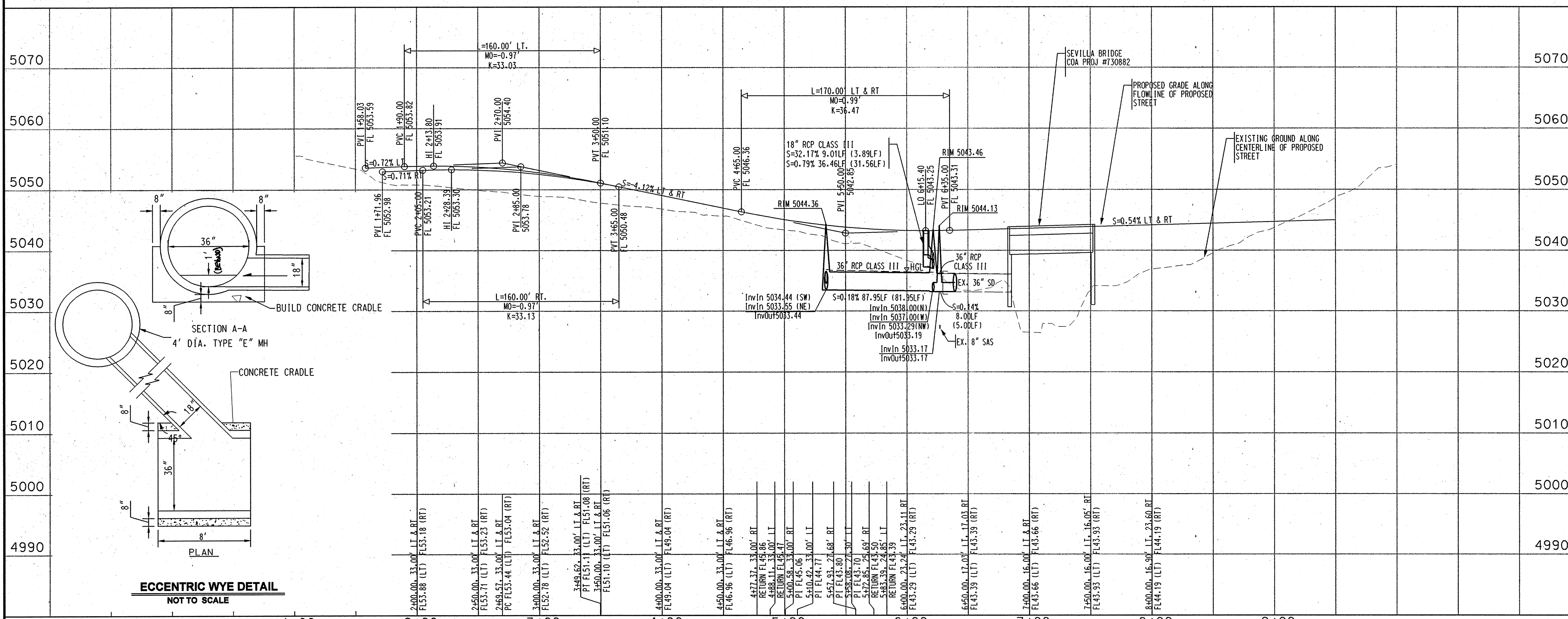
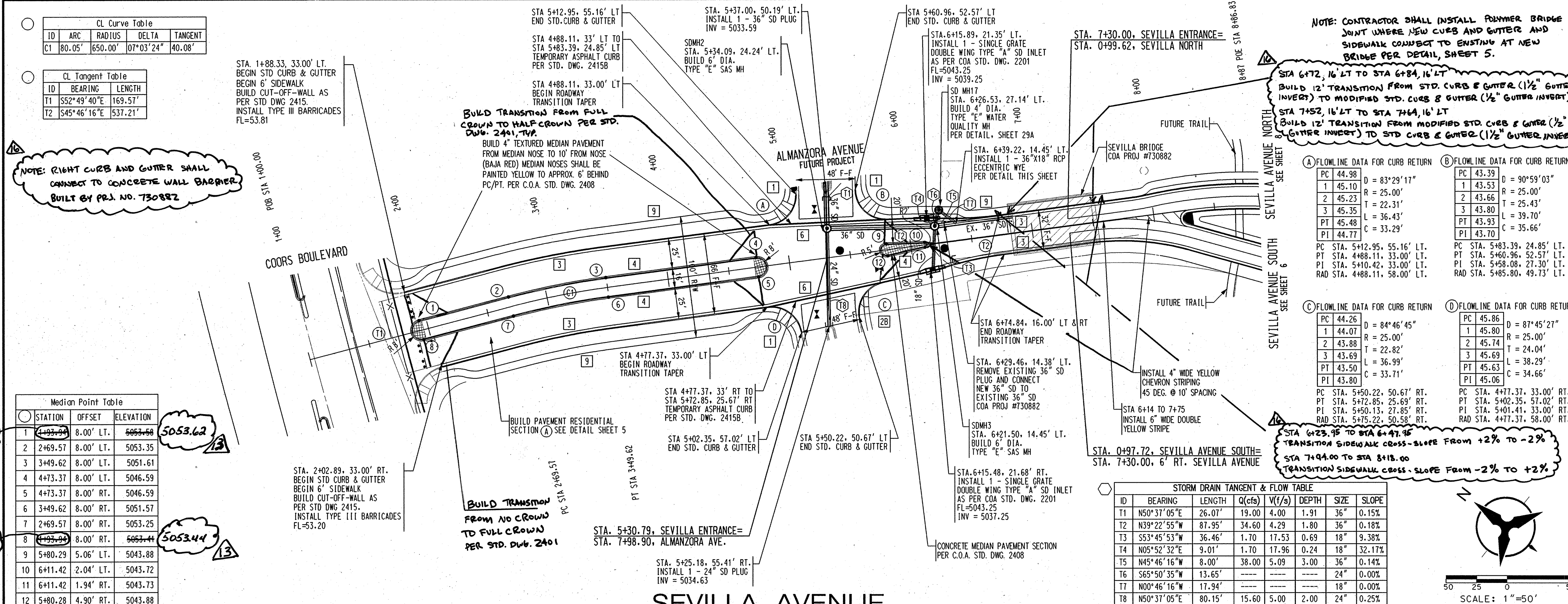
01/2015

LEGEND

- PROPOSED STORM DRAIN PIPE  
PROPOSED STORM DRAIN MANHOLE  
PROPOSED STORM DRAIN INLET  
EXISTING STORM DRAIN

| SD Tangent Table |             |         |
|------------------|-------------|---------|
| ID               | BEARING     | LENGTH  |
| SDP9             | N73°42'51"W | 19.67'  |
| SDP8             | S63°11'26"W | 127.46' |
| SDP7             | S50°37'06"W | 101.63' |
| SDP2             | N50°37'06"E | 215.55' |
| SDP4             | N05°12'18"W | 25.55'  |
| SDP3             | N29°55'56"E | 20.63'  |





NOTES

- THE CONTRACTOR SHALL FIELD VERIFY THE EXISTING UTILITY LOCATIONS AND NOTIFY THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.
- ALL CURB RETURN RADIUS SHALL BE 25' UNLESS OTHERWISE SPECIFIED.
- ALL CURVE DATA AND DIMENSIONS REFER TO FACE OF CURB UNLESS OTHERWISE SPECIFIED.
- GRADE ELEVATIONS, WHERE NOTED, ARE ALONG FLOWLINE OF STANDARD CURB UNLESS OTHERWISE SPECIFIED.
- CONTRACTOR IS TO INSTALL A 4" X 4" X 5' POST AND END AT THE END OF EACH SANITARY SEWER SERVICE.
- CONTRACTOR IS RESPONSIBLE FOR REPAIR AND/OR REPLACEMENT OF ALL UTILITY CONDUITS AND EXISTING LINES.
- ANY ADDITIONAL GRADING REQUIRED TO MATCH PROPOSED STREET GRADES SHALL BE INCIDENTAL TO PAVING ITEMS.
- CONTRACTOR SHALL PROVIDE THE INSPECTORS (CITY AND PRIVATE) WITH THE PROPOSED HYDROSTATIC TESTING PLAN. THE PLAN MUST BE APPROVED BEFORE TESTING OPERATIONS BEGIN.
- CONTRACTOR SHALL PARK EQUIPMENT AND VEHICLES AS NOT TO INTERFERE WITH NORMAL ACTIVITIES OF RESIDENTS OR OTHER CONTRACTORS ON SITE.
- ANY DAMAGE TO THE EXISTING FACILITIES (CURB & GUTTER), PAVEMENT, CONDUITS, LANDSCAPING, UTILITY LINES, ETC., DURING CONSTRUCTION SHALL BE REPLACED AT THE CONTRACTORS' EXPENSE.
- REMOVAL OF THE EXISTING CURB AND GUTTER SHALL BE AS PER COA STD. DWG. 2415 (SAWCUT ONLY).
- WHEELCHAIR RAMP SHALL BE CONSTRUCTED PRIOR TO ACCEPTANCE OF CURB & GUTTER.
- ALL EXCAVATION, TRENCHING AND SHORING ACTIVITIES MUST BE CARRIED-OUT IN ACCORDANCE WITH OSHA 29 CFR 1926.650 SUBPART P.

KEYED GENERAL NOTES

- INSTALL WHEELCHAIR RAMP AS PER MODIFIED STD. DWG. 2441 CASE II AS PER DETAIL SHEET 5.
- INSTALL WHEELCHAIR RAMP AS PER DETAIL SHEET 5.
- STD. CURB & GUTTER AS PER STD. DWG. 2415A
- MOUNTABLE CURB ROLL TYPE AS PER STD. DWG. 2415A
- INSTALL 6" CONCRETE VALLEY GUTTER AS PER STD. DWG. 2420
- DEFERRED 4' SIDEWALK
- BUILD 4' SIDEWALK AS PER STD. DWG. 2430
- BUILD 6' SIDEWALK AS PER STD. DWG. 2430
- DEFERRED 8' SIDEWALK
- 2' ALLEY GUTTER AS PER STD. DWG. 2415A
- 6' ASPHALT TRAIL TO BE BUILT BY OTHERS WITH LANDSCAPE PLANS SEE DETAIL SHEET 5.
- INSTALL 10' CONCRETE VALLEY GUTTER PER STD. DWG. 2422
- DEPRESSED CURB AND GUTTER AS PER STD. DWG. 2415B

AS-BUILT INFORMATION

CONTRACTOR: BOHANNAN & HUSTON

DATE: 10/20/2003

BY: CJS

NO. DATE

REVISIONS

DESIGN

DATE 10/20/2003

DATE 10/20/2003

CITY OF ALBUQUERQUE

PUBLIC WORKS DEPARTMENT

ENGINEERING DEVELOPMENT GROUP

ANDALUCIA AT LA LUZ - UNIT 1

PAVING PLAN & PROFILE

SEVILLA AVENUE STA. 0+00.00 - 9+84.47

DESIGN REVIEW COMMITTEE: CITY ENGINEER APPROVAL

APPROVED

OCT 27 2005

CITY ENGINEER

LAST DESIGN UPDATE

MO./DAY/YR.

MO./DAY/YR.

Bohannan & Huston

Courtyard 1 7500 Jefferson St NE Albuquerque, NM 87109-4335

ENGINEERING • SPATIAL DATA • ADVANCED TECHNOLOGIES

12-1-05 DESIGNED BY: CJS

10-18-05 MEDIAN P.S. 1 & 2 REUSED

8-05 DESIGN REVISION #10: ADDED THIS SHEET

NO. DATE

REMARKS

DESIGN

DATE 10/20/2003

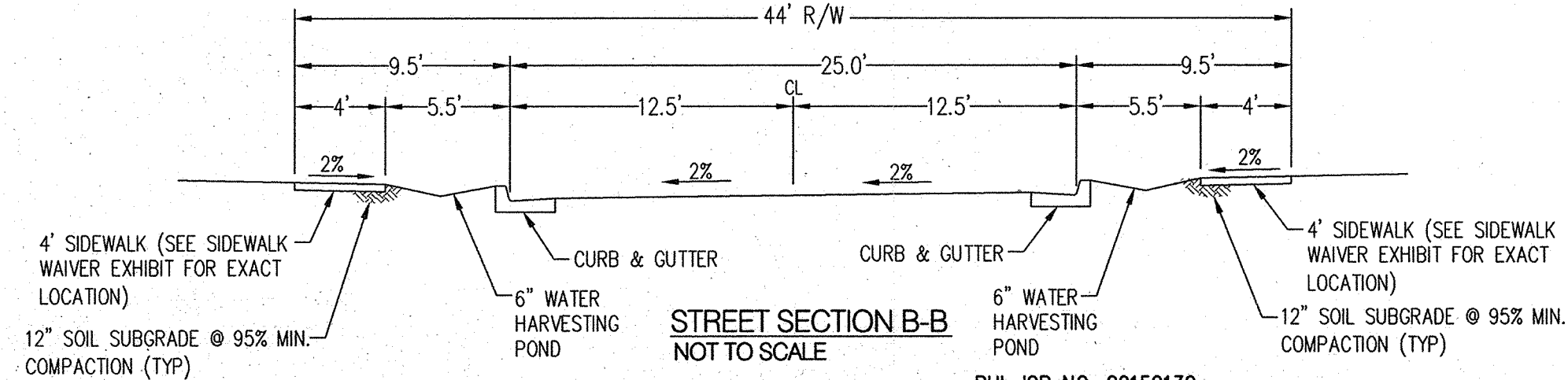
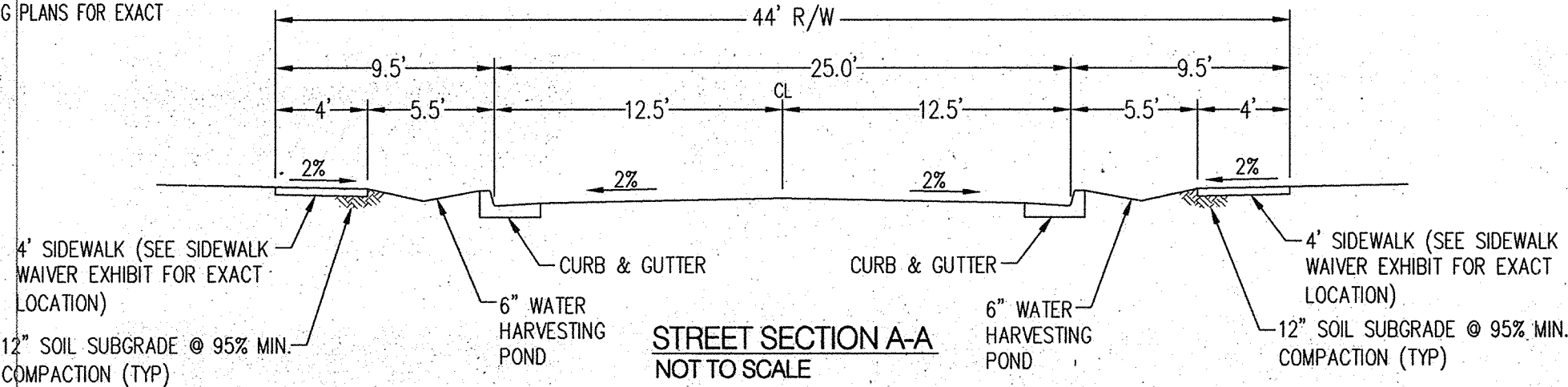
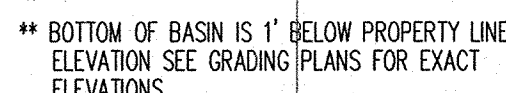
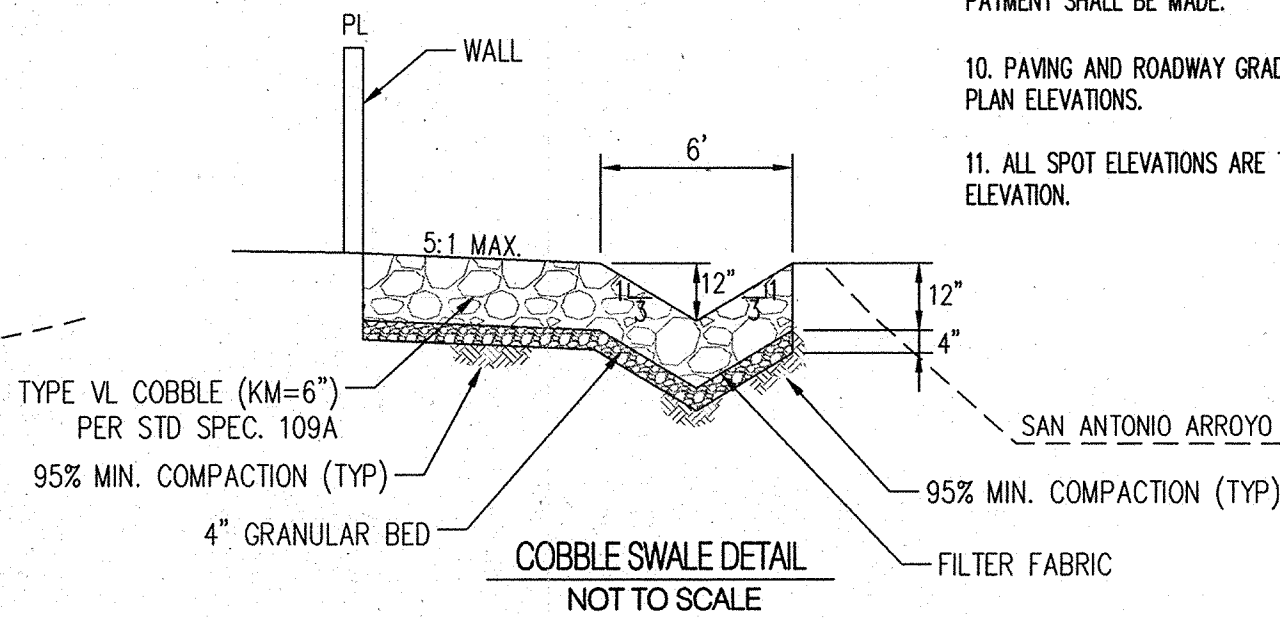
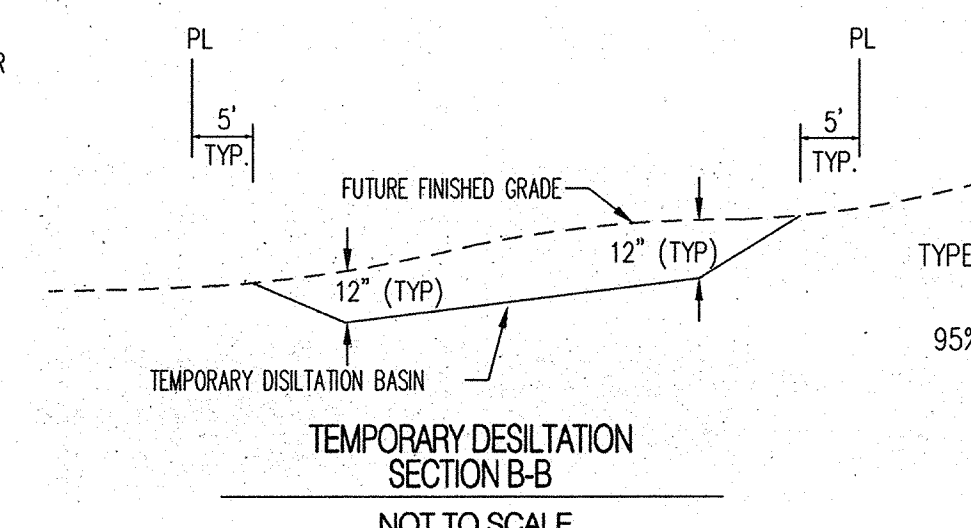
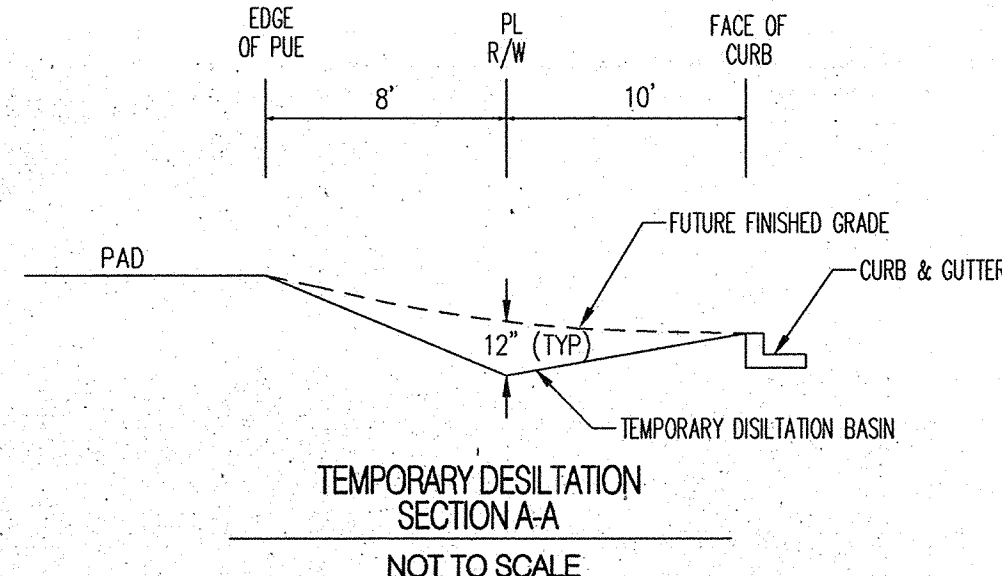
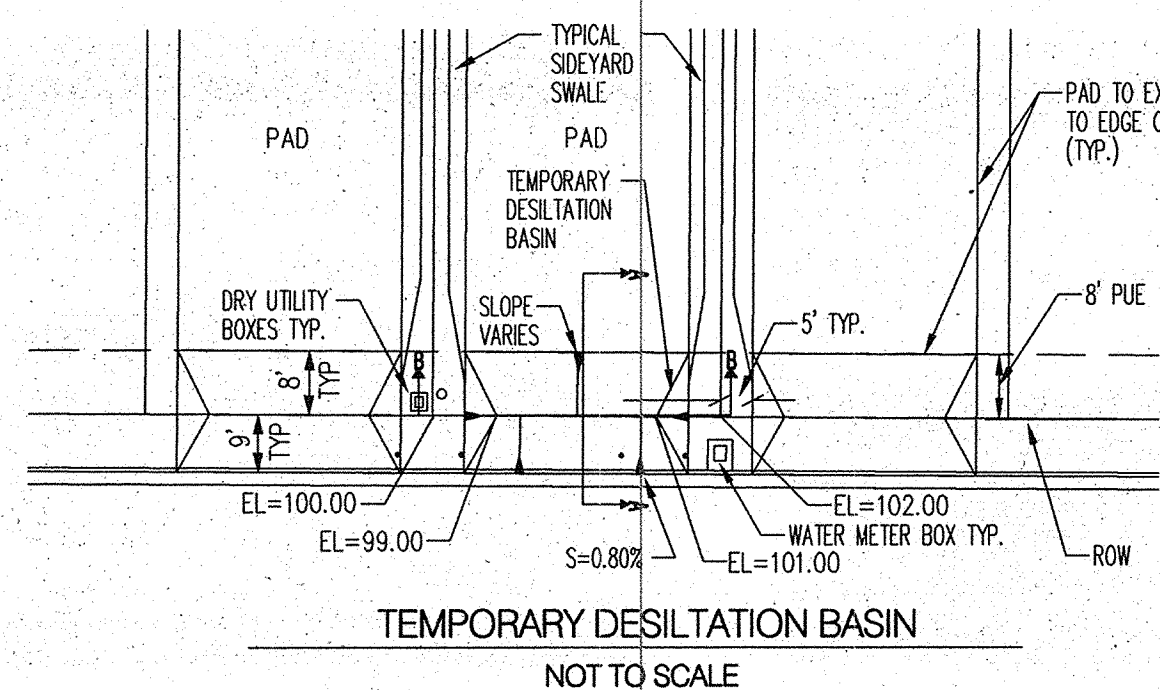
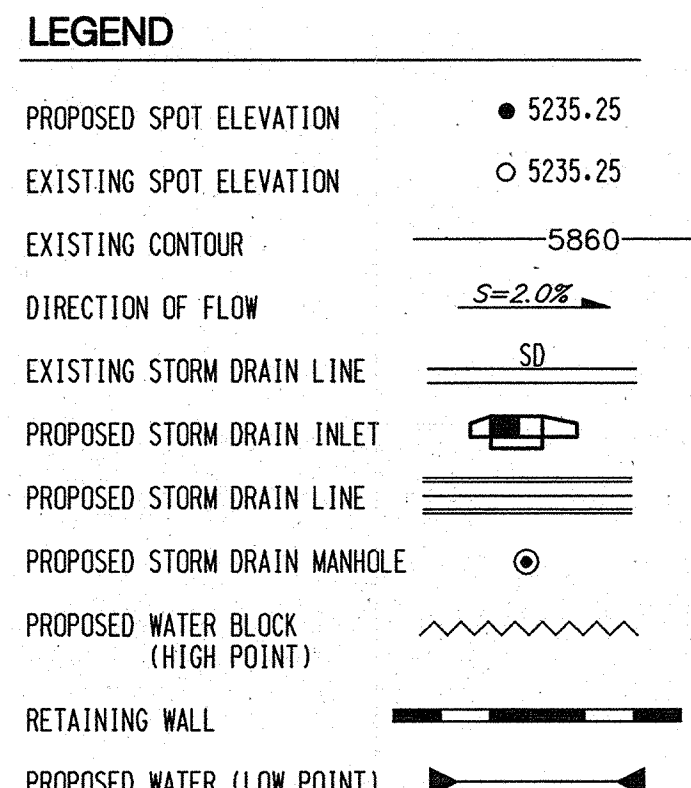
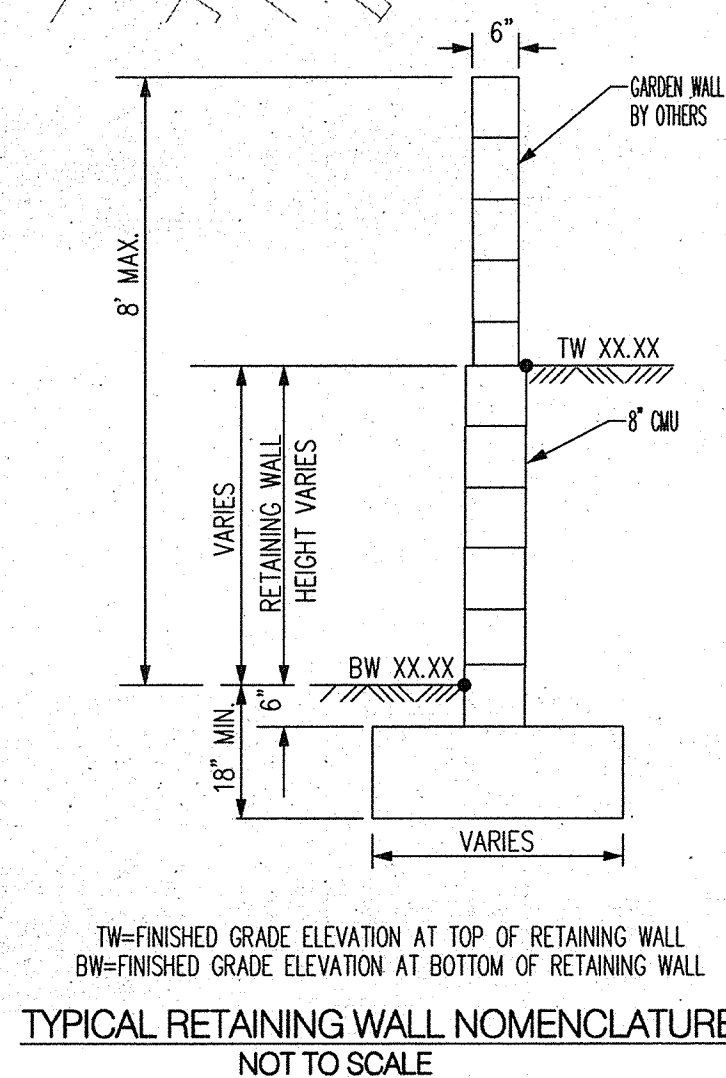
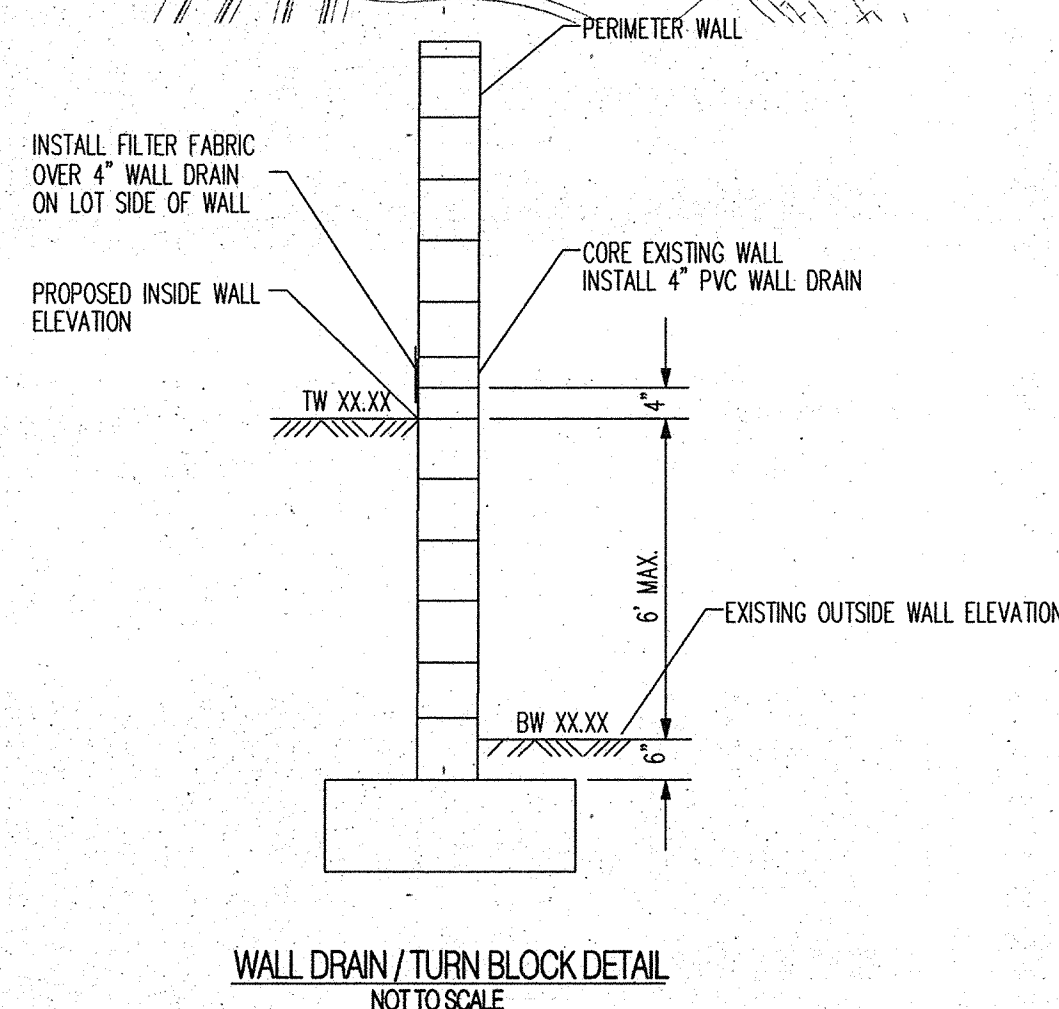
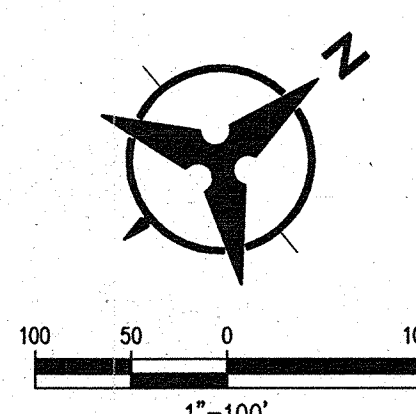
DATE 10/20/2003

730881

F-11

SHEET 6A OF 47

**EXHIBIT 6**  
**GRADING PLAN**



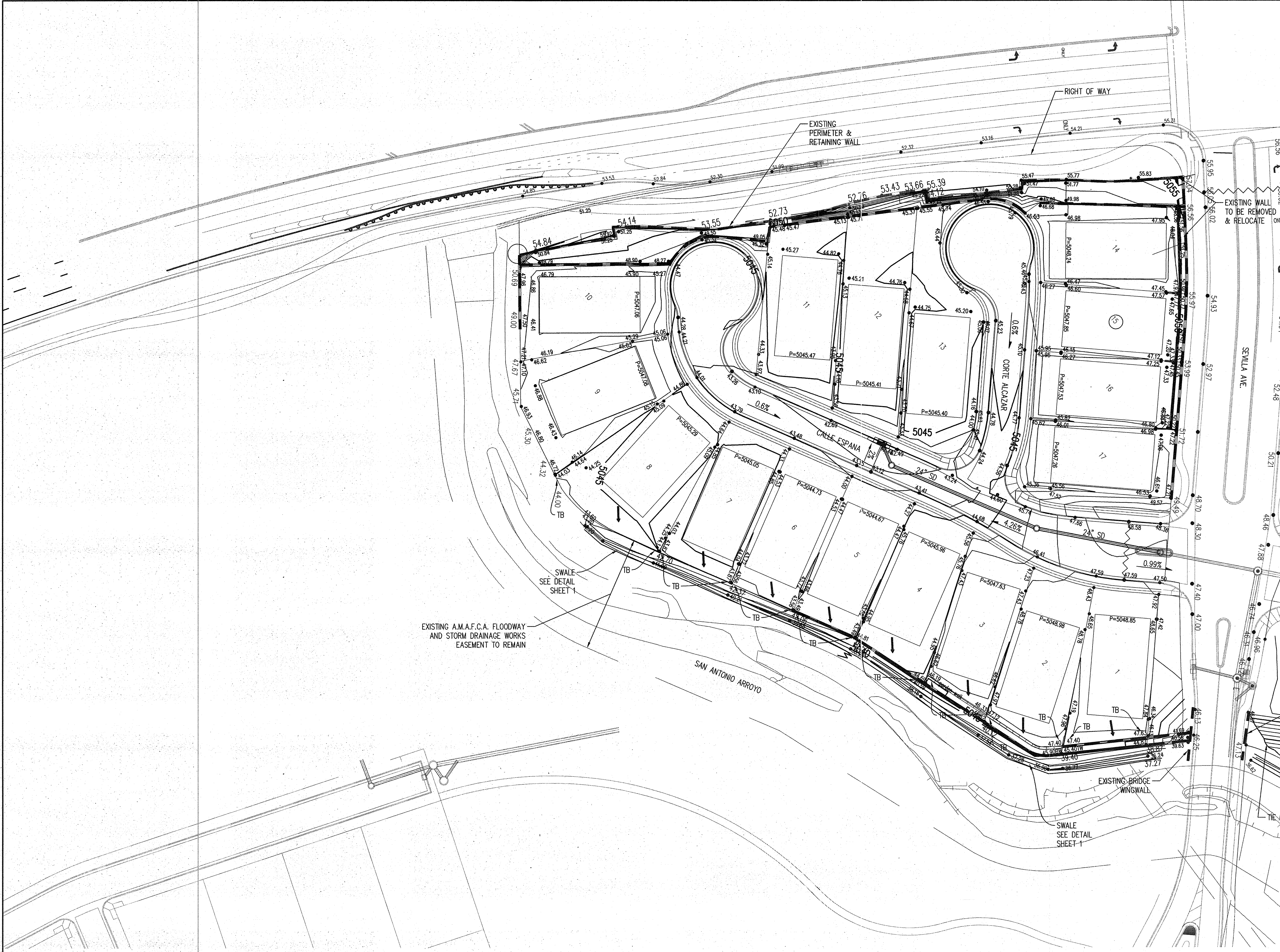
1. ALL WORK DETAILED ON THESE PLANS AND PERFORMED UNDER THIS CONTRACT SHALL BE IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS AND THE PROJECT GEOTECHNICAL REPORT. WHERE APPLICABLE, CITY OF ALBUQUERQUE PUBLIC WORKS STANDARDS SHALL APPLY.
2. THE CONTRACTOR SHALL ABIDE BY ALL LOCAL, STATE, AND FEDERAL LAWS, RULES AND REGULATIONS WHICH APPLY TO THE CONSTRUCTION OF THESE IMPROVEMENTS, INCLUDING EPA REQUIREMENTS WITH RESPECT TO STORM WATER DISCHARGE.
3. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL FIELD VERIFY THE HORIZONTAL AND VERTICAL LOCATIONS OF ALL POTENTIAL OBSTRUCTIONS INCLUDING ALL UNDERGROUND UTILITIES. SHOULD A CONFLICT EXIST, THE CONTRACTOR SHALL NOTIFY THE CONSTRUCTION OBSERVER OR ENGINEER SO THAT THE CONFLICT CAN BE RESOLVED WITH A MINIMUM AMOUNT OF DELAY.
4. TWO (2) WORKING DAYS PRIOR TO ANY EXCAVATION, THE CONTRACTOR SHALL CONTACT LINE LOCATING SERVICE FOR LOCATION OF EXISTING UTILITIES.
5. ALL ELECTRICAL, TELEPHONE, CABLE TV, GAS AND OTHER UTILITY LINES, CABLES, AND APPURTENANCES ENCOUNTERED DURING CONSTRUCTION THAT REQUIRE RELOCATION, SHALL BE COORDINATED WITH THAT UTILITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF ALL NECESSARY UTILITY ADJUSTMENTS. NO ADDITIONAL COMPENSATION WILL BE ALLOWED FOR DELAYS OR INCONVENIENCES CAUSED BY UTILITY COMPANY WORK CREWS. THE CONTRACTOR MAY BE REQUIRED TO RESCHEDULE HIS ACTIVITIES TO ALLOW UTILITY CREWS TO PERFORM THEIR REQUIRED WORK.
6. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTING ALL EXISTING UTILITY LINES WITHIN THE CONSTRUCTION AREA. ANY DAMAGE TO EXISTING FACILITIES CAUSED BY CONSTRUCTION ACTIVITY SHALL BE REPAIRED OR REPLACED AT THE CONTRACTOR'S EXPENSE AND APPROVED BY THE CONSTRUCTION OBSERVER.
7. CONSTRUCTION ACTIVITY SHALL BE LIMITED TO THE PROPERTY AND/OR PROJECT LIMITS. ANY DAMAGE TO ADJACENT PROPERTIES RESULTING FROM THE CONSTRUCTION PROCESS SHALL BE REPAIRED OR REPLACED AT THE CONTRACTOR'S EXPENSE.
8. OVERNIGHT PARKING OF CONSTRUCTION EQUIPMENT SHALL NOT OBSTRUCT DRIVEWAYS OR DESIGNATED TRAFFIC LANES. THE CONTRACTOR SHALL NOT STORE ANY EQUIPMENT OR MATERIAL WITHIN THE PUBLIC RIGHT-OF-WAY.
9. THE CONTRACTOR SHALL OBTAIN ALL THE NECESSARY PERMITS FOR THE PROJECT PRIOR TO COMMENCING CONSTRUCTION (I.E., BARRICADEING, TOPSOIL DISTURBANCE, EXCAVATION PERMITS, EPA STORM WATER PERMITS, ETC.).
10. ALL PROPERTY CORNERS DESTROYED DURING CONSTRUCTION SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE. ALL PROPERTY CORNERS MUST BE RESET BY A REGISTERED LAND SURVEYOR.
11. THE CONTRACTOR SHALL PREPARE A CONSTRUCTION TRAFFIC CONTROL AND SIGNING PLAN AND OBTAIN APPROVAL OF SUCH PLAN FROM THE CITY OF ALBUQUERQUE, TRAFFIC ENGINEERING DEPARTMENT, PRIOR TO BEGINNING ANY CONSTRUCTION WORK ON OR ADJACENT TO EXISTING STREETS.
12. ALL BARRICADES AND CONSTRUCTION SIGNING SHALL CONFORM TO APPLICABLE SECTIONS OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD), US DEPARTMENT OF TRANSPORTATION, LATEST EDITION.
13. THE CONTRACTOR SHALL MAINTAIN ALL CONSTRUCTION BARRICADES AND SIGNING AT ALL TIMES. THE CONTRACTOR SHALL VERIFY THE PROPER LOCATION OF ALL BARRICADEING AT THE END AND BEGINNING OF EACH DAY.
14. THE CONTRACTOR SHALL TAKE ALL STEPS NECESSARY TO CONFORM WITH EPA REQUIREMENTS, INCLUDING COMPLIANCE WITH NPDES PHASE 2 REQUIREMENTS.

1. EXISTING AS PROVIDED HEREIN, GRADING SHALL BE PERFORMED AT THE ELEVATIONS AND IN ACCORDANCE WITH THE DETAILS SHOWN ON THIS PLAN.
2. CONTRACTOR SHALL OBTAIN AND ABIDE BY A TOPSOIL DISTURBANCE PERMIT FROM THE CITY OF ALBUQUERQUE ENVIRONMENTAL HEALTH DIVISION, PRIOR TO CONSTRUCTION. THE COST FOR REQUIRED CONSTRUCTION DUST AND EROSION CONTROL MEASURES SHALL BE INCIDENTAL TO THE PROJECT COST. THE CONTRACTOR SHALL COMPLY TO ALL CITY, COUNTY, STATE, AND FEDERAL SOIL CONTROL MEASURES AND REQUIREMENTS AND WILL BE RESPONSIBLE FOR PREPARING AND OBTAINING ALL NECESSARY APPLICATIONS AND APPROVALS.
3. ALL WORK RELATIVE TO FOUNDATION CONSTRUCTION, SITE PREPARATION, AND PAVEMENT INSTALLATION, AS SHOWN ON THIS PLAN, SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SOILS REPORT PREPARED BY XELVINYARD DATED JULY 22, 2013. ALL OTHER WORK, UNLESS OTHERWISE STATED OR PROVIDED FOR HEREON, SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS (FIRST PRIORITY), AND/OR THE CITY OF ALBUQUERQUE (COA) STANDARD SPECIFICATIONS FOR PUBLIC WORKS (SECOND PRIORITY).
4. TWO WORKING DAYS PRIOR TO EXCAVATION, CONTRACTOR MUST CONTACT LINE LOCATING SERVICE (765-1264) FOR LOCATION OF EXISTING UTILITIES.
5. PRIOR TO GRADING, ALL VEGETATION DEBRIS, AND NEAR SURFACE ORGANICALLY CONTAMINATED SOIL SHALL BE STRIPPED FROM ALL AREAS TO BE GRADED. VEGETATION AND DEBRIS SHALL BE DISPOSED OF OFF-SITE OR STOCK-PILED FOR USE IN PLANTERS AND NON-STRUCTURAL FILLS.
6. EARTH SLOPES SHALL NOT EXCEED 4 HORIZONTAL TO 1 VERTICAL UNLESS SHOWN OTHERWISE.
7. IT IS THE INTENT OF THESE PLANS THAT THIS CONTRACTOR SHALL NOT PERFORM ANY WORK OUTSIDE OF THE PROPERTY BOUNDARIES EXCEPT AS REQUIRED BY THIS PLAN.
8. THE CONTRACTOR IS TO ENSURE THAT NO SOIL ERODES FROM THE SITE ONTO ADJACENT PROPERTY OR PUBLIC RIGHT-OF-WAY. THIS SHOULD BE ACHIEVED BY CONSTRUCTING TEMPORARY BERMS AT THE PROPERTY LINES NETTING THE SOIL TO PROTECT IT FROM WIND EROSION.
9. A DISPOSAL SITE FOR ALL EXCESS EXCAVATION AND UNSUITABLE MATERIAL SHALL BE OBTAINED BY THE CONTRACTOR IN COMPLIANCE WITH APPLICABLE ENVIRONMENTAL REGULATIONS AND APPROVED BY THE OBSERVER. ALL COSTS INCURRED IN OBTAINING A DISPOSAL SITE AND HAUL THERE TO SHALL BE CONSIDERED INCIDENTAL TO THE PROJECT, AND NO SEPARATE MEASUREMENT OR PAYMENT SHALL BE MADE.
10. PAVING AND ROADWAY GRADES SHALL BE  $\pm 0.1'$  FROM PLAN ELEVATIONS. PAD ELEVATION SHALL BE  $\pm 0.05'$  FROM BUILDING PLAN ELEVATIONS.
11. ALL SPOT ELEVATIONS ARE TO FLOWLINE UNLESS OTHERWISE NOTED. VALLEY GUTTER ELEVATIONS ARE SHOWN AT FLOWLINE ELEVATION.

[illegible]

**Bohannon  Huston**  
www.bhinc.com 800.877.5332

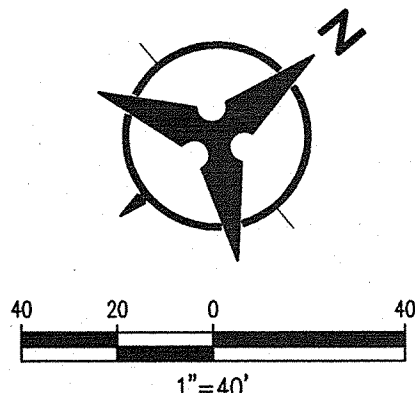
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>CITY OF ALBUQUERQUE</b><br><b>DEPARTMENT OF</b><br><b>MUNICIPAL DEVELOPMENT</b> |              |             |  |  |  |  |  |  |  |  |  |  |  |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------|-------------|--|--|--|--|--|--|--|--|--|--|--|--|
| <b>SEVILLA AT ANDALUCIA</b><br><b>OVERALL GRADING PLAN</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                    |              |             |  |  |  |  |  |  |  |  |  |  |  |  |
| CITY REVIEW COMMITTEE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CITY ENGINEER APPROVAL                                                             |              |             |  |  |  |  |  |  |  |  |  |  |  |  |
| <div style="display: flex; align-items: center; justify-content: center;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); border: 1px solid black; padding: 5px;">LAST DESIGN UPDATE</div> <table border="1" style="margin-left: 10px;"> <tr> <th style="width: 50%;">MO./DAY/YR.</th> <th style="width: 50%;">MO./DAY/YR.</th> </tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table> </div> |                                                                                    | MO./DAY/YR.  | MO./DAY/YR. |  |  |  |  |  |  |  |  |  |  |  |  |
| MO./DAY/YR.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | MO./DAY/YR.                                                                        |              |             |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                    |              |             |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                    |              |             |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                    |              |             |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                    |              |             |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                    |              |             |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                    |              |             |  |  |  |  |  |  |  |  |  |  |  |  |
| CITY PROJECT NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ZONE MAP NO.                                                                       | SHEET 1 OF 3 |             |  |  |  |  |  |  |  |  |  |  |  |  |



**LEGEND**

PROPOSED SPOT ELEVATION      ● 5235.25  
EXISTING SPOT ELEVATION      ○ 5235.25  
EXISTING CONTOUR      — 5860  
DIRECTION OF FLOW      S=2.0% →  
EXISTING STORM DRAIN LINE      SD  
PROPOSED STORM DRAIN INLET      [Symbol]  
PROPOSED STORM DRAIN LINE      [Symbol]  
PROPOSED STORM DRAIN MANHOLE      [Symbol]  
PROPOSED WATER BLOCK (HIGH POINT)      [Symbol]  
RETAINING WALL      [Symbol]  
PROPOSED WATER (LOW POINT)      [Symbol]  
TURNED BLOCK SEE DETAIL SHEET 1      TB

**NOTE :**  
ALL CURB IS STANDARD CURB & GUTTER

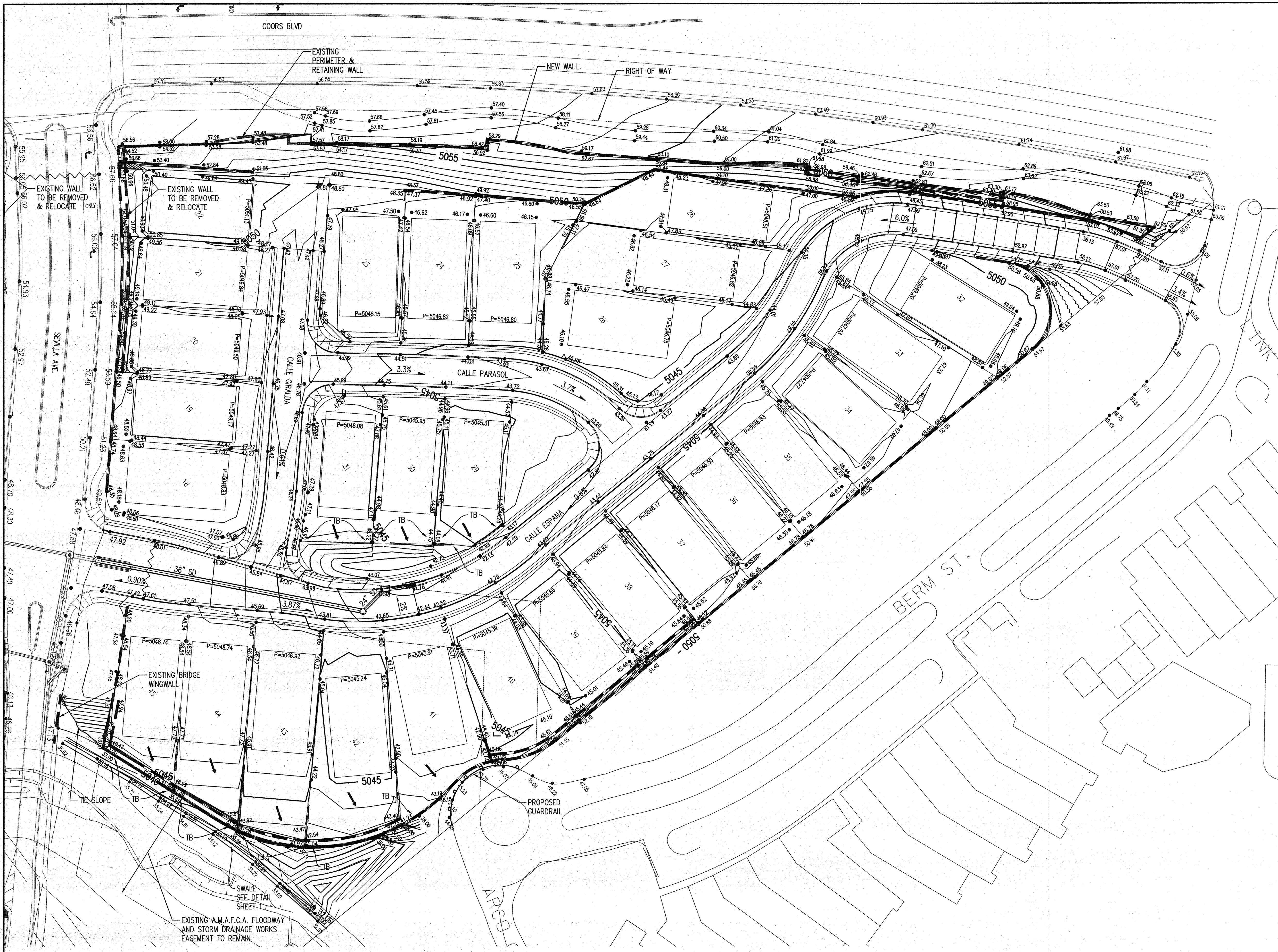


**Bohannon & Huston**  
www.bhinc.com      800.877.5332

|                                      |                        |                                                                      |    |
|--------------------------------------|------------------------|----------------------------------------------------------------------|----|
|                                      |                        | <b>CITY OF ALBUQUERQUE</b><br>DEPARTMENT OF<br>MUNICIPAL DEVELOPMENT |    |
| SEVILLA AT ANDALUCIA<br>GRADING PLAN |                        |                                                                      |    |
| DESIGN REVIEW COMMITTEE              | CITY ENGINEER APPROVAL | MO./DAY/YR.      MO./DAY/YR.                                         |    |
|                                      |                        | LAST DESIGN UPDATE                                                   |    |
|                                      |                        |                                                                      |    |
|                                      |                        |                                                                      |    |
| CITY PROJECT NO.                     | ZONE MAP NO.           | SHEET                                                                | OF |
|                                      |                        | 2                                                                    | 3  |

| AS-BUILT INFORMATION      |  |      |  | BENCH MARKS                            |  | SURVEY INFORMATION             |  | ENGINEER'S SEAL                                                                      |  |  |  |  |  |
|---------------------------|--|------|--|----------------------------------------|--|--------------------------------|--|--------------------------------------------------------------------------------------|--|--|--|--|--|
| CONTRACTOR                |  | DATE |  | US&GS BRASS DISC STAMPED "REWARD 1969" |  | FIELD NOTES                    |  |  |  |  |  |  |  |
| WORK ORDERED BY           |  | DATE |  | GEOGRAPHIC POSITION (NAD 83)           |  | BY                             |  |                                                                                      |  |  |  |  |  |
| INSPECTOR'S ACCEPTANCE BY |  | DATE |  | N.M. STATE PLANE COORDINATES           |  |                                |  |                                                                                      |  |  |  |  |  |
| FIELD LOCATION BY         |  | DATE |  | (CENTRAL ZONE)                         |  |                                |  |                                                                                      |  |  |  |  |  |
| DRAWINGS CORRECTED BY     |  | DATE |  | N=1487364.063 E=1491190.819            |  |                                |  |                                                                                      |  |  |  |  |  |
| MICRO-FILM INFORMATION    |  |      |  | GROUND TO GRID = 0.999675005           |  |                                |  |                                                                                      |  |  |  |  |  |
| RECORDED BY               |  |      |  | DATE                                   |  | DELTA ALPHA = -0.01712.26"     |  |                                                                                      |  |  |  |  |  |
| NO.                       |  |      |  | DATE                                   |  | NAVD 1988 ELEVATION = 5319.688 |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |
|                           |  |      |  |                                        |  |                                |  |                                                                                      |  |  |  |  |  |

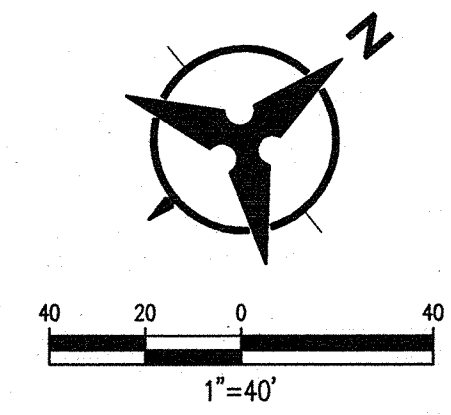




**LEGEND**

PROPOSED SPOT ELEVATION      ● 5235.25  
EXISTING SPOT ELEVATION      ○ 5235.25  
EXISTING CONTOUR      — 5860—  
DIRECTION OF FLOW      S=2.0%  
EXISTING STORM DRAIN LINE      SD  
PROPOSED STORM DRAIN INLET      [Symbol]  
PROPOSED STORM DRAIN LINE      [Symbol]  
PROPOSED STORM DRAIN MANHOLE      [Symbol]  
PROPOSED WATER BLOCK (HIGH POINT)      [Symbol]  
RETAINING WALL      [Symbol]  
PROPOSED WATER (LOW POINT)      [Symbol]  
TURNED BLOCK SEE DETAIL SHEET 1      TB

NOTE :  
ALL CURB IS STANDARD CURB & GUTTER



**Bohannon & Huston**  
www.bhinc.com 800.877.5332

|                                                                                       |                        |                                                                      |    |
|---------------------------------------------------------------------------------------|------------------------|----------------------------------------------------------------------|----|
|  |                        | <b>CITY OF ALBUQUERQUE</b><br>DEPARTMENT OF<br>MUNICIPAL DEVELOPMENT |    |
| SEVILLA AT ANDALUCIA<br>GRADING PLAN                                                  |                        |                                                                      |    |
| DESIGN REVIEW COMMITTEE                                                               | CITY ENGINEER APPROVAL | MO./DAY/YR. 1 MO./DAY/YR.                                            |    |
|                                                                                       |                        | LAST DESIGN UPDATE                                                   |    |
|                                                                                       |                        |                                                                      |    |
| CITY PROJECT NO.                                                                      | ZONE MAP NO.           | SHEET                                                                | OF |
|                                                                                       |                        | 3                                                                    | 3  |

| ENGINEER'S SEAL                                                                      |  | SURVEY INFORMATION |    | BENCH MARKS |  | AS-BUILT INFORMATION |  |
|--------------------------------------------------------------------------------------|--|--------------------|----|-------------|--|----------------------|--|
|  |  | FIELD NOTES        |    |             |  |                      |  |
|                                                                                      |  | NO.                | BY | DATE        |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
| REMARKS                                                                              |  | BY                 |    |             |  |                      |  |
| DESIGN                                                                               |  |                    |    |             |  |                      |  |
| DESIGNED BY YPM                                                                      |  | DATE 01/2015       |    |             |  |                      |  |
| DRAWN BY ARR                                                                         |  | DATE 01/2015       |    |             |  |                      |  |
| CHECKED BY YPM                                                                       |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |
|                                                                                      |  |                    |    |             |  |                      |  |