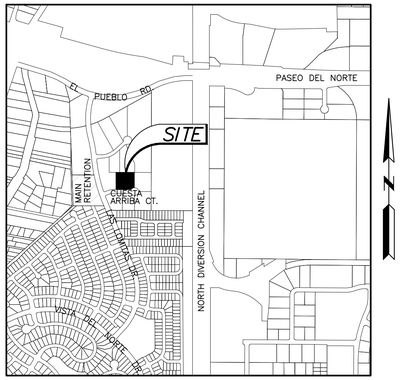


LOCATION MAP

SCALE: 1"=1000'±
ZONE ATLAS MAP D-16-Z

I. EXECUTIVE SUMMARY

THIS PLAN SERVES TO SUPPORT THE DEVELOPMENT OF THE INTERNATIONAL INDOOR SOCCER ASSOCIATION'S (IISA) NEW ARENA. THE SITE IS LOCATED IN THE CITY OF ALBUQUERQUE AND IS KNOWN AS LOT 15 OF THE LAS LOMITAS BUSINESS PARK SUBDIVISION. THIS SUBDIVISION IS LOCATED SOUTH OF PASEO DEL NORTE AND APPROXIMATELY 850 FEET WEST OF THE NORTH DIVERSION CHANNEL. THE SITE ADDRESS IS 1311 CUESTA ARRIBA COURT. THE PROPOSED CONSTRUCTION CONSISTS OF NEW BUILDING, UTILITIES, DRAINAGE STRUCTURES PARKING LOT, WALKWAYS, LANDSCAPE AND OTHER AMENITIES AS REQUIRED FOR A FULLY FUNCTIONAL INDOOR SOCCER ARENA. OFF-SITE CONSTRUCTION WILL INCLUDE SIDEWALK, SIDEWALK CULVERT, DRIVE PADS AND FIRE LINE CONNECTION. THE SITE WILL BE DEVELOPED CONCURRENTLY AND NO PHASING IS PROPOSED. MOST LOTS WITHIN THIS SUBDIVISION ARE NOT DEVELOPED EXCEPT FOR BERMS AT ALL LOT LINES. HOWEVER, THE LOT DIRECTLY TO THE WEST OF THE PROPOSED SITE IS FULLY DEVELOPED. ALSO, STREET PAVEMENT, CURB AND GUTTER, PUBLIC UTILITIES AND DRAINAGE STRUCTURES FOR THE SUBDIVISION ARE IN PLACE. DUE TO THESE DEVELOPMENTS, OFF-SITE STORMWATER SHOULD NOT IMPACT THIS SITE. IT IS PROPOSED THAT STORMWATER GENERATED ON-SITE WILL BE STRATEGICALLY CONTROLLED AND CONVEYED TO THE SUBDIVISION'S MAIN RETENTION BASIN LOCATED APPROXIMATELY 500 FEET WEST OF THE SITE. THE TOTAL RUN-OFF GENERATED ON-SITE DURING A 100 YEAR, 24-HOUR EVENT IS DETERMINED TO BE 4.63 CFS. THIS RUN-OFF WILL BE DIRECTED TOWARD THE RIGHT-OF-WAY THEN TO THE SUBDIVISION'S MAIN RETENTION BASIN. THE RUN-OFF DIRECTED TO THE RIGHT-OF-WAY (4.63 CFS) DOES NOT EXCEED THE ALLOWABLE 4.79 CFS AS ACCORDING TO DRAINAGE REPORT D-16/D002C ON FILE WITH COA.

II. PROJECT DESCRIPTION

AS SHOWN ON THE LOCATION MAP THE SITE (60,984 SF = APPROXIMATELY 1.4 ACRES) IS LOCATED IN THE CITY OF ALBUQUERQUE AT 1311 CUESTA ARRIBA COURT. CURRENTLY THE SITE IS UNDEVELOPED. THE SITE IS PLATTED AS "LAS LOMITAS BUSINESS PARK SUBDIVISION WITHIN THE ELENA GALLEGOS GRANT, PROJECTED SECTIONS 22 & 27, TOWNSHIP 11N, RANGE 3E, NMPM, CITY OF ALBUQUERQUE, BERNALILLO COUNTY NEW MEXICO, MAY 2005," WHICH IS RECORDED IN THE OFFICE OF THE COUNTY CLERK OF BERNALILLO COUNTY, NEW MEXICO ON OCTOBER 27, 2005, IN BOOK 2005C, PAGE 357. FURTHERMORE, THE SITE IS LOCATED IN FLOOD ZONE X AS INDICATED BY FIRM NUMBER 35001C0136G, RECORDED ON SEPTEMBER 26, 2008 BY THE FEMA.

III. BACKGROUND DOCUMENTS

THERE IS A FULL DRAINAGE REPORT AND ASSOCIATED ANALYSIS FOR THIS SUBDIVISION ON FILE WITH THE COA. SAID REPORT IS DETERMINED TO BE FILED AS D-16/D002C AND SEALED BY A N.M. PROFESSIONAL ENGINEER ON 9/06/07. THE PLAT, THE FIRM, THE COA DEVELOPMENT PROCESS MANUAL, THE SITE SURVEY, AND THE PROPOSED GRADING AND DRAINAGE PLAN WERE UTILIZED FOR THE EXECUTION OF THIS HYDROLOGY AND HYDRAULIC ANALYSIS.

IV. EXISTING CONDITIONS

CURRENTLY THE SITE IS UNDEVELOPED EXCEPT FOR EARTHEN BERMS ALONG ALL LOT LINES. IN FACT IT HAS BEEN OBSERVED THAT ALL LOTS WITHIN THIS BUSINESS PARK SUBDIVISION HAVE BEEN CONSTRUCTED WITH BERMS ALONG ADJACENT LOT LINES. THERE IS VERY LITTLE VEGETATION ON THE PROJECT SITE. THE SITE NATURALLY DRAINS SOUTHWESTERLY.

V. DEVELOPED CONDITIONS

THE PROPOSED ON-SITE CONSTRUCTION CONSISTS OF NEW BUILDING, UTILITIES, DRAINAGE STRUCTURES PARKING LOT, WALKWAYS, LANDSCAPE AND OTHER AMENITIES. OFF-SITE CONSTRUCTION WILL INCLUDE SIDEWALK, SIDEWALK CULVERT, DRIVE PADS AND FIRE LINE CONNECTION. IT IS PROPOSED THAT STORMWATER GENERATED ON-SITE WILL BE STRATEGICALLY CONTROLLED AND CONVEYED TO THE SUBDIVISION'S MAIN RETENTION BASIN AS WELL AS THE ON-SITE DETENTION BASINS. SINCE ALL LANDSCAPED AREAS WILL BE DEPRESSED 6-INCHES, STORMWATER THAT FALLS IN THESE AREAS WILL SLOWLY PERCOLATE INTO THE GROUND AND SURROUNDING VEGETATION. STORMWATER GENERATED ON-SITE WILL BE SURFACE ROUTED TOWARDS APPROPRIATE DETENTION BASINS OR OUTFALL POINTS. ROOF RUN-OFF WILL BE CONVEYED UTILIZING ROOF SCUPPERS AND DOWNSPOUTS. DOWNSPOUTS WILL BE PIPED UNDER WALKWAYS AND WILL OUTLET ALONG THE ON-SITE CURBS. ALL DRAINAGE STRUCTURES ARE SIZED TO ACCOMMODATE THE 100-YR 24-HOUR EVENT.

VI. EROSION CONTROL

CURRENTLY NO HARD SURFACES EXIST AT THE SITE. HOWEVER, AFTER DEVELOPMENT APPROXIMATELY 76% OF THE SITE WILL BE MADE-UP OF CONCRETE, ASPHALT AND ROOFTOP. THE PROPOSED CONSTRUCTION WILL INCREASE THE AMOUNT OF IMPERVIOUS AREA. PERMANENT EROSION CONTROL AT PIPE OUTLETS AND SURFACE FLOW CONCENTRATION POINTS WILL CONSIST OF RIP-RAP.

VII. WATER QUALITY ENHANCEMENTS

NO WATER QUALITY ENHANCEMENTS ARE PROPOSED.

VIII. GRADING PLAN

THE GRADING PLAN ON SHEET C-101 SHOWS:
1. EXISTING GRADE SPOT ELEVATION AS TAKEN FROM RECENT TOPOGRAPHY
2. PROPOSED GRADES INDICATED BY SPOT ELEVATIONS AND CONTOUR LINES
3. THE LIMITS AND CHARACTER OF THE EXISTING FEATURES
4. THE LIMITS AND CHARACTER OF THE PROPOSED IMPROVEMENTS
5. CONTINUITY BETWEEN EXISTING AND PROPOSED GRADES

IX. CALCULATIONS

THE CALCULATIONS HEREON ANALYZE THE HYDROLOGY FOR BOTH THE EXISTING AND DEVELOPED CONDITIONS UPON A 100 YEAR, 24-HOUR RAINFALL EVENT. BOTH THE PROCEDURE FOR 40 ACRES AND SMALLER BASINS, AS SET FORTH IN CHAPTER 22 OF THE DEVELOPMENT PROCESS MANUAL (DPM), VOLUME 1, 1997 REVISIONS, AND AHYMO ARE USED TO QUANTIFY THE PEAK RATE OF DISCHARGE (Q) AND VOLUME (V) OF ON-SITE STORMWATER RUN-OFF. ALL DATA UTILIZED FOR EACH PROCEDURE CAN BE FOUND IN TABLES 1 AND 2. RESULTS OF CALCULATIONS FOR HYDROLOGY AND HYDRAULIC CALCULATIONS ARE PRESENTED BELOW.

HYDROLOGY ANALYSIS FOR PEAK RATE OF DISCHARGE (Q) AND PEAK VOLUME (V):

SITE CHARACTERISTICS:
DRAINAGE AREA = (SEE PRE AND POST-DEVELOPMENT MAP)
LAND TREATMENT (DPM CH. 22, TABLE A-4)
IMPERVIOUS = D
PERVIOUS = C
PRECIPITATION ZONE = 2 (DPM CH. 22, TABLE A-1)
FOR ADDITIONAL DATA USED, SEE TABLE 1 ON THIS SHEET.

DRAINAGE AREA - PRE-DEVELOPMENT
60,984 sf = 100% PERVIOUS
ANALYSIS RESULTS
Q = 4.4 cfs
V = 5,743 cf

DRAINAGE AREA "A" - POST DEVELOPMENT
30,853 sf = 82% IMPERVIOUS
6,932 sf = 18% PERVIOUS
ANALYSIS RESULTS
Q = 3.83 cfs
V = 7,132 cf

DRAINAGE AREA "B" - POST-DEVELOPMENT
13,061 sf = 74% IMPERVIOUS
6,433 sf = 26% PERVIOUS
ANALYSIS RESULTS
Q = 0.50 cfs (SEE AHYMO RESULTS)
V = 3,006 cf (SEE AHYMO RESULTS)

DRAINAGE AREA "C" - POST-DEVELOPMENT
974 sf = 26% IMPERVIOUS
2,731 sf = 74% PERVIOUS
ANALYSIS RESULTS
Q = 0.30 cfs
V = 560 cf

HYDRAULIC ANALYSIS FOR CAPACITY (Q) OF SITE DRAINAGE AMENITIES:

OFF-SITE CULVERT CAPACITY (Q):
INLET OPEN AREA (A) = 1.00 sf
SUBMERGED HEAD (h) = 0.04 ft

$Q = (0.67A)[(2gh)^{0.5}] = 1.08$ cfs

SIX-INCH ROOF DRAIN CAPACITY (Q):
PIPE ROUGHNESS (n) = 0.012
PIPE FLOW AREA (A) = 0.196 sf
HYDRAULIC RADIUS (R) = 0.125
PIPE SLOPE (S) = .0208 ft/ft

$Q = (1.49/n)(A)(R^{0.667})(S^{0.5}) = 0.88$ cfs

ON-SITE CULVERT CAPACITY (Q):
INLET OPEN AREA (A) = 0.5 sf
SUBMERGED HEAD (h) = 0.04 ft

$Q = (0.67A)[(2gh)^{0.5}] = 0.53$ cfs

DETENTION BASIN DESCRIPTION AND VOLUME (V) CALCULATIONS:

NOTE: STORMWATER WILL BE DETAINED IN DRAINAGE ARE "B" ONLY.

DETENTION BASIN CONSIST OF TWO BASINS CONNECTED BY A 10" PIPE WITH A CONSTANT INVERT OF ELEVATION 5036.1. ONE PORTION OF THE BASIN IS RECTANGULAR AND DESIGNED WITH RETAINING WALLS ALONG ALL FOUR SIDES. THE OTHER PORTION IS A POLYGON DESIGNED WITH SIDES SLOPES OF 3' HORIZONTAL TO EVERY 1' VERTICAL.
THE TOTAL VOLUME IS CALCULATED AS FOLLOWS;

RECTANGULAR CHARACTERISTICS:
LENGTH = 128.0 FT
WIDTH = 7.3 FT
DEPTH = 1.17 FT
POLYGONAL CHARACTERISTICS:
BOTTOM PERIMETER AREA = 1,786 SF
TOP PERIMETER AREA = 2,481 SF
DEPTH = 1.17 FT

V = (128.0 FT)*(7.3 FT)*(1.17 FT) +
(1/2)*[(2,481 SF + 1,786 SF)*(1.17 FT)] = 3,589 CF

X. CONCLUSION

THIS PLAN SUPPORTS THE PROPOSED IMPROVEMENTS TO THE IISA's NEW ARENA. THE PROPOSED STORM DRAINAGE FACILITIES WILL ADEQUATELY CONVEY STORMWATER GENERATED ON-SITE BY A 100 YEAR, 24-HOUR STORM EVENT. ALSO, IF CONSTRUCTED IN ACCORDANCE WITH THE ASSOCIATED GRADING AND DRAINAGE PLAN, THE SITE HYDRAULICS WILL ALLOW 4.63 CFS OF STORMWATER TO RUN OFF INTO THE RIGHT-OF-WAY, AND WILL PROVIDE 3,006 CF OF STORMWATER DETENTION ON-SITE. MORE SPECIFICALLY, RUN-OFF FROM; DRAINAGE AREA "A" WILL SHEET FLOW TO THE RIGHT-OF-WAY, DRAINAGE AREA "B" WILL BE DETAINED ON-SITE, DRAINAGE AREA "C" WILL FLOW TO THE RIGHT-OF-WAY VIA THE OFF-SITE CULVERT. FURTHERMORE, THE RUN-OFF DIRECTED TO THE RIGHT-OF-WAY (4.63 CFS) DOES NOT EXCEED THE ALLOWABLE 4.79 CFS AS ACCORDING TO DRAINAGE REPORT D-16/D002C ON FILE WITH COA. ALL ON-SITE STORM DRAINAGE FACILITIES WILL BE PRIVATELY OWNED, OPERATED AND MAINTAINED.

TABLE 1: DATA USED FOR CALCULATIONS (DPM):

(TAKEN FROM CHAPTER 22 OF THE DEVELOPMENT PROCESS MANUAL, VOLUME 1, 1997 REVISIONS.)

(Q) = CiA = 100-YR. PEAK DISCHARGE FOR ZONE 2;

PERVIOUS;
C = 0.61 (DPM CH. 22, TABLE A-11)
i = 5.05 ((DPM CH. 22, TABLE A-10)

IMPERVIOUS;
C = 0.93 (DPM CH. 22, TABLE A-11)
i = 5.05 (DPM CH. 22, TABLE A-10)

100-YR., 24-HOUR VOLUME (V) =
$\frac{[6\text{ HOUR VOL. + IMPERVIOUS AREA}]*[24\text{-HOUR PRECIP. - 6 HOUR PRECIP.}]}{12\text{in/ft}}$

FOR ZONE 2;

6 HOUR VOL. = (WEIGHTED EXCESS PRECIPITATION)*(LAND TREATMENT)
EXCESS PRECIPITATION FOR THE 100-YR. 6-HOUR STORM CAN BE FOUND IN TABLE A-8 OF DPM, CH. 22.

24-HOUR PRECIPITATION = 2.75 (DPM CH. 22, TABLE A-2)
6-HOUR PRECIPITATION = 2.35 (DPM CH. 22, TABLE A-2)

A SPREADSHEET WAS USED TO FACILITATE THESE CALCULATIONS. RESULTS CAN BE FOUND IN "IX. CALCULATIONS" SHOWN ON THIS SHEET.

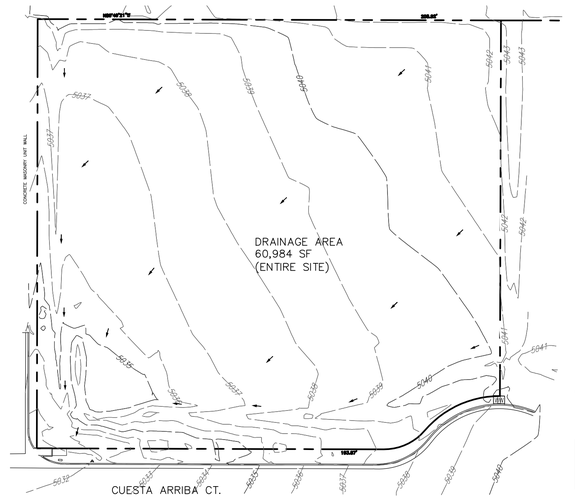
TABLE 2: CALCULATIONS (AHYMO):

INPUT DATA:

```
* FILENAME: (AHYMO PC VERSION)
*   100-YEAR STORM
*         ASSUMPTIONS:
*         1. 100 YR 24 HR RAINFALL = 2.75 INCHES.
**********************************************************************
START                 RAINFALL BEGINS AT 0.0 HOURS
RAINFALL              TYPE=2  RAIN QUARTER=0.00
                      RAIN ONE=2.01     RAIN SIX=2.35
                      RAIN DAY=2.75     DT=0.033333 HRS
*S*  ***************************************************************
*S*  HYDROGRAPH FOR BASIN
COMPUTE NM HYD        ID=1  HYD=100.00  DA=.0007
                      PER A=0  PER B=0  PER C=26  PER D=74
                      TP=-.10  MASS RNFL=-1
PRINT HYD             ID=1  CODE=10
*S*  ***************************************************************
*S*  ROUTE FLOWS THROUGH PROPOSED POND
ROUTE RESERVOIR       ID=5  HYD=100.05  INFLOW ID=1  CODE=10
                      OUTFLOW  STORAGE  ELEVATION
                      (CFS)    (AC-FT)  (FT)
                       0.001    0.000    36.10
                       0.002    0.016    36.35
                       0.003    0.033    36.60
                       0.196    0.043    36.75
                       0.640    0.056    36.93
                       1.193    0.069    36.10
                       1.851    0.082    37.27
*S*  ***************************************************************
PRINT HYD             ID=5  CODE=10
FINISH
```

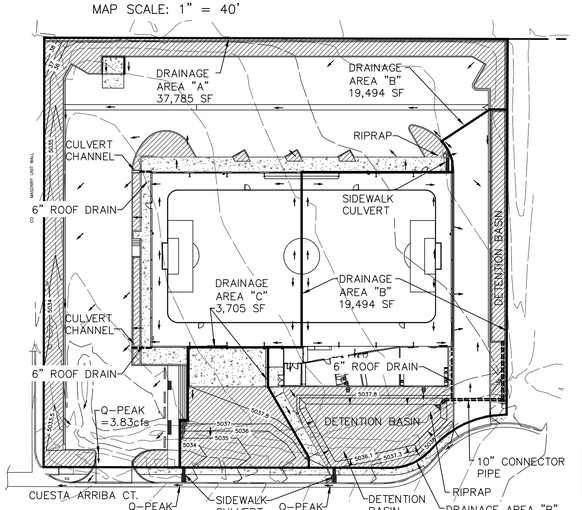
OUTPUT DATA:

```
AHYMO PROGRAM (AHYMO-S4)          - Version: S4.01a - Rel: 01a
            RUN DATE (MON/DAY/YR) = 09/26/2011
            START TIME (HR:MIN:SEC) = 14:24:46     USER NO.=
AHYMO_Temp_User:LarkinAb
            INPUT FILE = K:\Joe\Pond.HYM

  * FILENAME: (AHYMO PC VERSION)
  *   100-YEAR STORM
  *         ASSUMPTIONS:
  *         1. 100 YR 24 HR RAINFALL = 2.75 INCHES.
**********************************************************************
  START                 RAINFALL BEGINS AT 0.0 HOURS
  RAINFALL              TYPE=2  RAIN QUARTER=0.00
                        RAIN ONE=2.01     RAIN SIX=2.35
                        RAIN DAY=2.75     DT=0.033333 HRS

  24-HOUR RAINFALL DIST. - BASED ON NOAA ATLAS 14 FOR
  CONVECTIVE AREAS (NM & AZ) - D1
    DT =   0.033333 HOURS        END TIME =    23.999763 HOURS
*S*  ***************************************************************
*S*  HYDROGRAPH FOR BASIN
COMPUTE NM HYD          ID=1  HYD=100.00  DA=.0007
                        PER A=0  PER B=0  PER C=26  PER D=74
                        TP=-.10  MASS RNFL=-1
                        ID=1  CODE=10

        RUNOFF VOLUME = 2.16695      INCHES = 0.0809 ACRE-FEET
        PEAK DISCHARGE RATE = 2.26 CFS  AT 1.467 HOURS
        BASIN AREA =  0.0007 SQ. MI.

*S*  ***************************************************************
*S*  ROUTE FLOWS THROUGH PROPOSED POND

PEAK DISCHARGE = 0.489 CFS - PEAK OCCURS AT HOUR 1.80
    MAXIMUM WATER SURFACE ELEVATION = 36.869
    MAXIMUM STORAGE = 0.0516 AC-FT INCREMENTAL TIME= 0.033333HRS

*S*  ***************************************************************

PRINT HYD             ID=5  CODE=10

PARTIAL HYDROGRAPH    100.05
RUNOFF VOLUME = 1.84487   INCHES = 0.0689 ACRE-FEET
        PEAK DISCHARGE RATE = 0.49 CFS AT 1.800 HOURS
        BASIN AREA =  0.0007 SQ. MI.

    FINISH
```



DRAINAGE AREA PRE-DEVELOPMENT

MAP SCALE: 1" = 40'



DRAINAGE AREA POST-DEVELOPMENT

MAP SCALE: 1" = 40'

= PERVIOUS AREA

BENCHMARK INFORMATION
CP-13, #5 REBAR WITH PLASTIC CAP STAMPED "LARKIN GROUP CONTROL POINT",
N=1755477.38, E=1723118.79
ELEV.=6337.27, NAVD 1988

JOSEPH C. CASARES, JR. NEW MEXICO 19014 REGISTERED PROFESSIONAL ENGINEER

SEPTEMBER 26, 2011

IISA - INDOOR SOCCER ARENA
ALBUQUERQUE, NEW MEXICO

HYDROLOGIC ANALYSIS

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PROJECT NO.:	DRAWN:	CHECKED:	DATE:	SHEET:
2011-0007	KW	JC	SEPT. 2011	C-100