ENGINEERING•ENVIRONMENTAL• SURVE
DESINGBUILD • CONSTRUCTION MANAGEM

TECHNICAL DRAINAGE STUDY UPDATE

FOR

STARBUCKS BONANZA
(APN: 140-30-411-005)
DS1489

@

N PECOS ROAD AND E BONANZA ROAD

JPL Job No. 22012

Prepared for:

SMITHS FOOD & DRUG CENTERS, INC.
1014 Vine St., 7th Flr.,
Cincinnati, OH 45202

Prepared by:

JPL Engineering, Inc.
6725 South Eastern Ave., Ste. 5
Las Vegas, Nevada 89119
Phone: 702-898-6269
Fax: 877-557-8292

July, 2022

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Starbucks Bonanza Date: 7/26/22

Location of Development: a) Descriptive (Cross Streets) North/South: Pecos Road

East/West: Bonanza Road

b) Section: 30 Township: 22 South Range: 62 East

c) APN : 140-30-411-005

Name of Owner: Smiths Food & Drug Centers, Inc.

Telephone No.: Fax No.: E-Mail Address:

Address: 1014 Vine Street, 7th Flr, Cincinnati, OH 45202

Contact Person-Name: James Lopez **Telephone No.:** (702) 898-6269

* **E-Mail Address:** james@jplengineeringinc.com **Fax No.:**

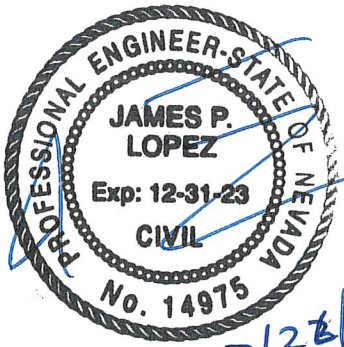
Firm: JPL Engineering, Inc.

Address: 6725 S. Eastern Ave, Ste 5, Las Vegas, NV, 89119

Type of Land Development/Land Disturbance Process:

	Rezoning		Subdivision Map		Clearing and Grading Only
	Parcel Map		Planned Unit Development		Other (Please specify below)
	Large Parcel Map		Building Permit	X	

1. Total Owned Land Area: At Site: 0.91 AC +/- Being Developed/Disturbed: 0.91 AC +/-
2. Is a portion or all of the subject property located in a designated FEMA Flood Hazard Area? ☐ **Yes**** ☒ **No**
3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? ☐ **Yes**** ☒ **No**
4. Proposed type of development (Residential, Commercial, Etc.): Commercial
5. Approximate upstream land area which drains to the subject site: See Plans
6. Has the site drainage been evaluated in the past? ☒ **YES** ☐ **NO** If yes, please identify documentation: DS1489
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site:
8. Briefly describe your proposed schedule for the subject project: ASAP



Engineer's Seal 7/26/22

Local Entity File No.

Submit this form as part of the required drainage study to the local entity which has jurisdiction over the subject property. This form may provide sufficient information to serve as the Conceptual Drainage Study.

*New Required Field

**Review and concurrence of the Clark County Regional Flood Control District is required.

Revision	Date

REFERENCE:

STANDARD FORM 1

Updated 05/01/2008

JPL
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DESINGBUILD • CONSTRUCTION MANAGEM

July 26, 2022

Albert Y. Sung, P.E.
Project Engineer
Public Works Dept./ Flood Control
495 S. Main Street
Las Vegas, Nevada 89101

RE: UPDATE TO TECHNICAL DRAINAGE STUDY FOR STARBUCKS COFFEE COMPANY (DS1489)

Mr. Sung:

The purpose of this letter is to provide a drainage study letter for the proposed Starbucks located at the northeast corner of Pecos Road and Bonanza Road. The improvements are to a section of the approved drainage study Smiths No. 367 (DS1489). The drainage patter for the site remains the same. The onsite flow drains east/southeast onto East Bonanza Road. The previously approved study TDS Smith's 367 (DS1489) was reviewed it was determine that the offsite flow is acceptable for the update analysis. The conservative offsite flow on Bonanza Road is 229/607-cfs (Q10/Q100). A FlowMaster analysis was done on Bonanza Road in order to determine the normal flow depth. The normal flow on Bonanza is determined to be 1.38'. The 100-year water surface elevation on Bonanza is 94.93. The proposed building elevation is 94.95. The analysis and the grading plan are attached with the referenced material from the previously approved study.

Please contact JPL Engineering Inc. if you should have any further questions.

Sincerely,

Apolonio Roblero, E.I.T
Project Engineer

Flowmaster Calculation

Bonanza Q100
Worksheet for Irregular Channel

Project Description	
Worksheet	Bonanza Q100_
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.8600	%
Discharge	607.00	cfs

Options	
Current Roughness Method	mproved Lotter's Method
Open Channel Weighting Method	mproved Lotter's Method
Closed Channel Weighting Metho	Horton's Method

Results		
Mannings Coefficient	0.015	
Water Surface Elevation	1.38	ft
Elevation Range	0.00 to 1.03	
Flow Area	80.1	ft²
Wetted Perimeter	102.67	ft
Top Width	100.00	ft
Actual Depth	1.38	ft
Critical Elevation	1.62	ft
Critical Slope	0.3554	%
Velocity	7.58	ft/s
Velocity Head	0.89	ft
Specific Energy	2.27	ft
Froude Number	1.49	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.7790612 ft.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+07.00	0.013
0+07.00	0+93.00	0.016
0+93.00	1+00.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+50.00	1.03
0+93.00	0.17

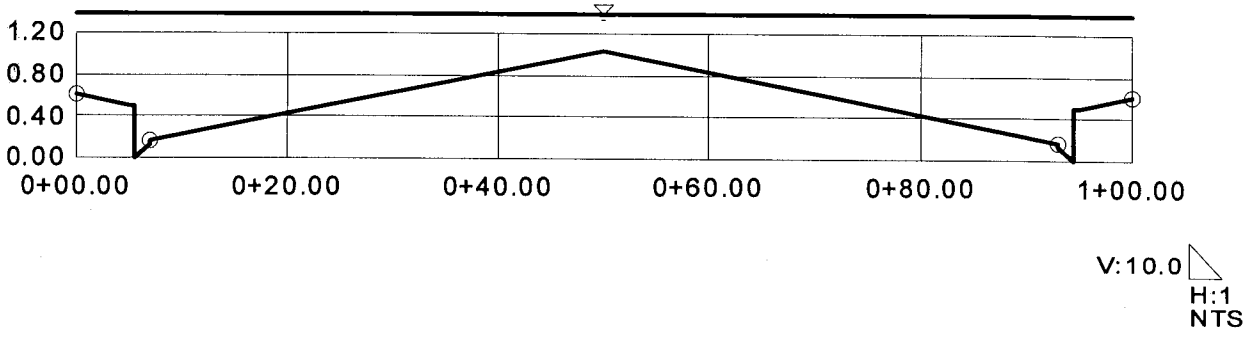
Bonanza Q100
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+93.00	0.13
0+94.50	0.00
0+94.50	0.50
0+95.00	0.50
1+00.00	0.60

Bonanza Q100 Cross Section
Cross Section for Irregular Channel

Project Description	
Worksheet	Bonanza Q100_
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.015	
Channel Slope	0.8600	%
Water Surface Elevation	1.38	ft
Elevation Range	0.00 to 1.03	
Discharge	607.00	cfs



Previously Approved DS1489 Smith's No. 367

1489
N-30

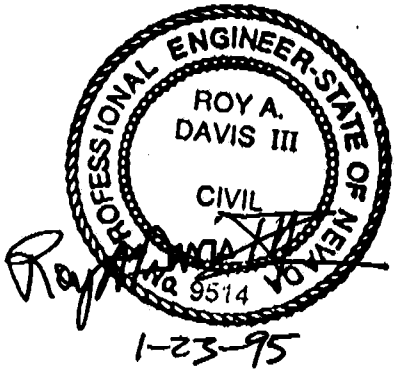
Addendum #1

RESPONSE TO COMMENTS

SMITH'S NO. 367

398.004

JANUARY 1995



CITY OF LAS VEGAS

INTER-OFFICE MEMORANDUM

DATE: February 14, 1995

TO:

Joel Harris
Land Development Services
Department of Public Works

FROM:

Randy Fultz, P.E.
Project Manager
Dept. of Public Works

SUBJECT:

Drainage Study for "Smith's No. 367"
(Price-Rite pad only)

File No. DS1489C
Date of Engineer's Stamp: 02/13/95
Date Received by City: 02/14/95

COPIES TO:

G.C. Wallace
Attn: Roy Davis

John McNellis, P.E.

HISTORY: Review Fees:

1st Submittal	N/C	01/13/95 - Not Acceptable
2nd Submittal	N/C	02/06/95 - Not Acceptable
3rd Submittal	N/C	02/14/95 - (See Comments Below)
	$0	

REMARKS:

The drainage study for the subject project has been reviewed and

__X__ is acceptable in concept subject to conformance to all City standards.

_____ must be resubmitted or supplemented including the following:

NOTE: Any future changes to the proposed design (or design assumptions) as outlined in the approved drainage study and attached preliminary grading plan which affect drainage must be addressed in a drainage study addendum and accepted by CLV Flood Control. Additionally, conditional acceptance of a drainage study is valid for a period of one (1) year from date of issuance. If the proposed construction has not been completed in that time period the City of Las Vegas reserves the right to require additional conditions and/or submission and acceptance of a complete drainage study update prior to further construction.

1. **This drainage study is for the Price Rite building only.** A drainage study update is required for the future shops and pads to set the finished floor elevations.

END OF REMARKS
dbm

S/T/R: 30/20/62
N-30

COMMENT: "1. The Engineer must provide the depth of flow calculations for Pecos Road."

RESPONSE: The original submittal included a very conservative analysis of the Bonanza Road flows because the project will be addressed off Bonanza Road. However, it is reasonable to expect some flows in Pecos Road. Examination of Figure 5 indicates some portion of the Offsite Area OFF6 will probably reach Pecos Road and flow south. It was determined that the Freedom Park area, labeled OFF6A will reach Pecos Road and flow south. The area labeled OFF6 (County Juvenile Court site) will reach Bonanza Road. The offsite HEC-1 model was revised to reflect the above changes.

The model indicates about 82 cfs will reach Pecos Road during a 100-year event. Approximately 607 cfs reaches Point 4 during the 100-year storm when the Pecos Road flows are added to the Bonanza Road flows. A functioning Regional Facility storm sewer leaves approximately 457 cfs in Bonanza Road.

The Pecos Road flow depth is 0.84 feet which results in a 100-year water surface elevation of 94.48 feet when analyzed at the south lip design grade of the western driveway entrance on Pecos Road. The revised Figure 5, revised HEC-1 offsite model, and the Pecos Road flow depth calculations are included.

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FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
****

THIS HEC-1 VERSION CONTAINS ALL OPTIONS EXCEPT ECONOMICS, AND THE NUMBER OF PLANS ARE REDUCED TO 3

HEC-1 INPUT

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

              *DIAGRAM
    1         ID  ************************************
    2         ID  SMITH'S #367
    3         ID  ************************************
    4         ID    6-HOUR RAINFALL, 5MIN TIME INCRMNT 01/18/95
    5         ID  * RAINFALL DISTRIBUTION = SDN3 *
    6         ID  ***********************
    7         ID OFFSITE FLOWS TO SMITH'S #367 REVISED TO REFLECT FLOWS IN PECOS ROAD
    8         ID  ***********************
    9         ID  * SCS UNIT HYDROGRAPH METHOD *
   10         ID  * FILE =     SMREV.H1
   11         ID  *    10-YR. DEPTH = 1.58"
   12         ID  *    100-YR. DEPTH = 2.77"
   13         IT      5       0       0     300
   14         IO      5       0
   15         IN      5       0       0
   16         JR    PREC    0.58    1.00

   17         KK    OFF1
   18         KM   OFF-SITE AREA OFF1 AT POINT 1
   19         BA   .0067
   20         PB    2.77
   21         PC       0     .02    .057     .07    .087    .108    .124     .13     .13     .13
   22         PC     .13     .13     .13    .133     .14    .142    .148    .158    .172    .181
   23         PC     .19    .197    .199     .20    .201    .204    .214    .229    .241    .249
   24         PC    .251    .256     .27    .278    .281    .283    .295    .322    .352    .409
   25         PC    .499     .59     .71    .744    .781    .812    .819    .835    .851    .856
   26         PC     .86    .868    .876    .888     .91    .926    .937     .95     .97    .976
   27         PC    .982    .985    .987    .989     .99    .993    .993    .994    .995    .998
   28         PC    .998    .999    1.00
   29         LS       0      80
   30         UD   0.085

   31         KK    OFF2
   32         KM   OFF-SITE AREA OFF2 AT POINT 1
   33         BA    .056
   34         LS       0      80
   35         UD   0.167

   36         KK       1
   37         KM    COMBINE OFF1 & OFF2 AT POINT 1
```

```
38          HC      2

39          KK      2
40          KM   ROUTE COMBINED OFF1 & OFF2 TO POINT 2
41          RK    750    .027    .017       0    TRAP     100       2
42          RK   1900    .012    .017       0    TRAP     100       2

43          KK    OFF3
44          KM   OFFSITE AREA OFF3 AT POINT 2
45          BA    .099
46          LS       0      80
47          UD   0.322
```



```
LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

48          KK    OFF4
49          KM   OFFSITE AREA OFF4 AT POINT 2
50          BA   0.202
51          LS       0      86
52          UD   0.478

53          KK      2
54          KM   COMBINE OFF3 & OFF4 WITH OFF1 & OFF2 AT POINT 2
55          HC      3

56          KK      3
57          KM   ROUTE HYDROGRAPHS TO POINT 3
58          RK   3000   0.012    .017       0    TRAP     100       2

59          KK    OFF5
60          KM   OFFSITE AREA OFF5 AT POINT 3
61          PB    2.74
62          BA    .273
63          LS       0      88
64          UD   0.524

65          KK      3
66          KM   COMBINE HYDROGRAPHS AT POINT 3
67          HC      2

68          KK      4
69          KM   ROUTE COMBINED HYDROGRAPHS TO POINT 4 NEAR SITE
70          KM   AT INTERSECTION OF BONANZA AND PECOS
71          RK   2200   .0074   0.017       0    TRAP     100       2

72          KK    OFF6
73          KM   OFFSITE AREA OFF6 (COMMERCIAL-COUNTY COURT ONLY)
74          PB    2.76
75          BA   0.111
76          LS       0      94
77          UD   0.309

78          KK      4
79          KM   COMBINE OFF6 RUNOFF WITH OTHER HYDROGRAPHS REACHING POINT 4
80          HC      2

81          KK   OFF6A
82          KM   FREEDOM PARK AREA EXPECTED TO REACH PECOS
```

```
          83          BA   0.116
          84          LS      0      79
          85          UD   0.254

          86          KK      4
          87          KM  COMBINE OFF6A(FREEDOM PARK) WITH OTHER FLOWS REACHING POINT 4
          88          HC      2
          89          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
 INPUT
 LINE     (V) ROUTING          (--->) DIVERSION OR PUMP FLOW
  NO.     (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   17       OFF1
               .
               .
   31          .       OFF2
               .          .
               .          .
   36          1.............
               V
               V
   39          2
               .
               .
   43          .       OFF3
               .          .
               .          .
   48          .          .       OFF4
               .          .          .
               .          .          .
   53          2.........................
               V
               V
   56          3
               .
               .
   59          .       OFF5
               .          .
               .          .
   65          3.............
               V
               V
   68          4
               .
               .
   72          .       OFF6
               .          .
               .          .
   78          4.............
               .
               .
   81          .       OFF6A
               .          .
               .          .
   86          4.............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

****

FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
****

****
SMITH'S #367
****
6-HOUR RAINFALL, 5MIN TIME INCRMNT 01/18/95
* RAINFALL DISTRIBUTION = SDN3 *
****
OFFSITE FLOWS TO SMITH'S #367 REVISED TO REFLECT FLOWS IN PECOS ROAD
****
* SCS UNIT HYDROGRAPH METHOD *
* FILE = SMREV.H1
* 10-YR. DEPTH = 1.58"
* 100-YR. DEPTH = 2.77"

14 IO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA

NMIN		5	MINUTES IN COMPUTATION INTERVAL
IDATE	1	0	STARTING DATE
ITIME		0000	STARTING TIME
NQ		300	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	2	0	ENDING DATE
NDTIME		0055	ENDING TIME

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 24.92 HOURS

ENGLISH UNITS

JP MULTI-PLAN OPTION

NPLAN	1	NUMBER OF PLANS

JR MULTI-RATIO OPTION
RATIOS OF PRECIPITATION
.58 1.00

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

1

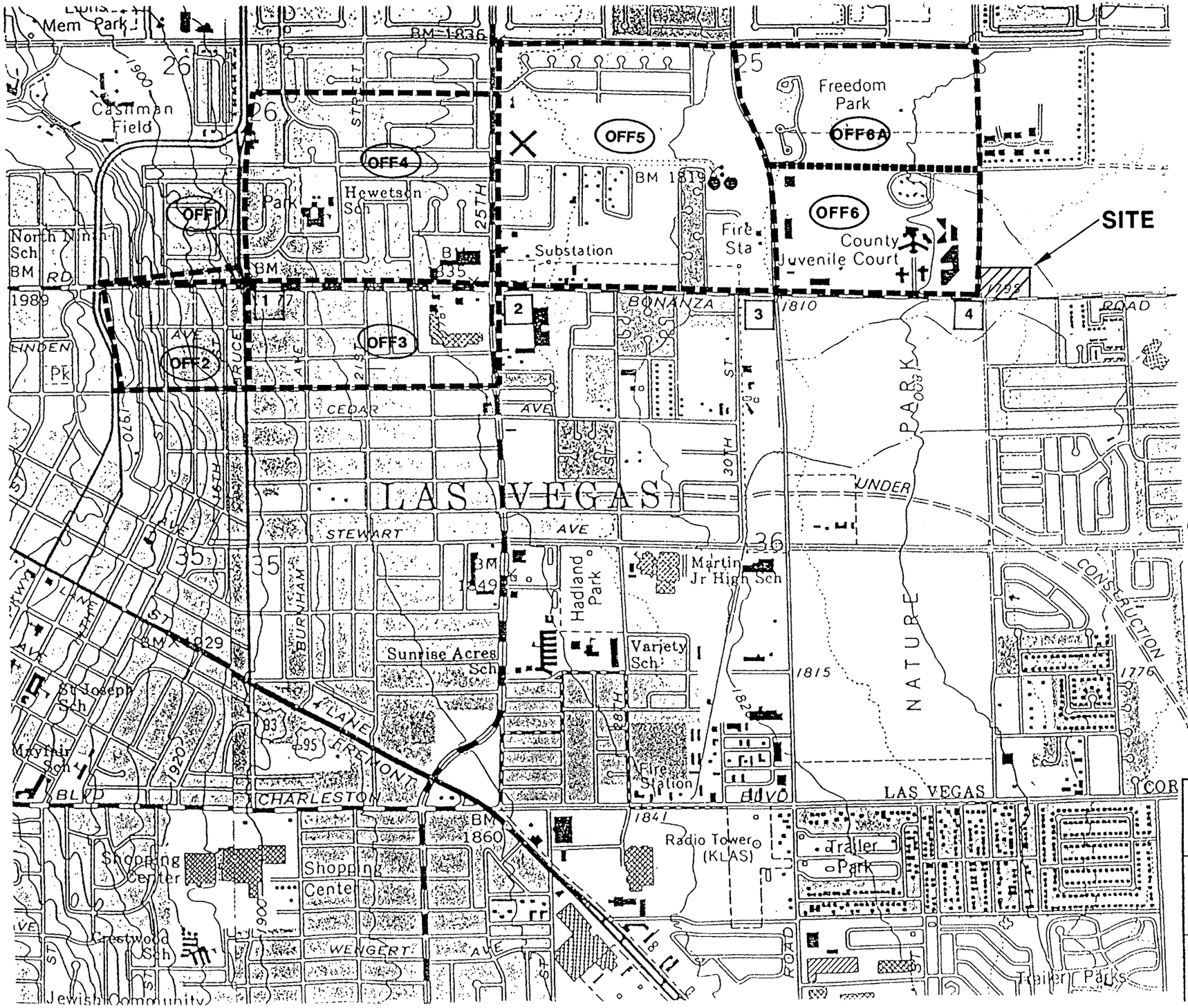
PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

				RATIOS APPLIED TO PRECIPITATION	
OPERATION	STATION	AREA	PLAN	RATIO 1	RATIO 2

					.58	1.00
HYDROGRAPH AT						
+	OFF1	.01	1	FLOW	2.	7.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	OFF2	.06	1	FLOW	15.	50.
				TIME	3.58	3.58
2 COMBINED AT						
+	1	.06	1	FLOW	17.	57.
				TIME	3.58	3.58
ROUTED TO						
	2	.06	1	FLOW	16.	52.
				TIME	3.75	3.75
HYDROGRAPH AT						
	OFF3	.10	1	FLOW	20.	67.
				TIME	3.83	3.75
HYDROGRAPH AT						
	OFF4	.20	1	FLOW	58.	150.
				TIME	3.92	3.92
3 COMBINED AT						
+	2	.36	1	FLOW	88.	255.
				TIME	3.83	3.83
ROUTED TO						
+	3	.36	1	FLOW	88.	251.
				TIME	4.00	3.92
HYDROGRAPH AT						
+	OFF5	.27	1	FLOW	85.	206.
				TIME	4.00	4.00
2 COMBINED AT						
+	3	.64	1	FLOW	174.	456.
				TIME	4.00	3.92
ROUTED TO						
+	4	.64	1	FLOW	171.	455.
				TIME	4.08	4.00
HYDROGRAPH AT						
+	OFF6	.11	1	FLOW	71.	140.
				TIME	3.75	3.75
2 COMBINED AT						
+	4	.75	1	FLOW	213.	548.
				TIME	4.00	3.92
HYDROGRAPH AT						
+	OFF6A	.12	1	FLOW	23.	82.
				TIME	3.75	3.67
2 COMBINED AT						
+	4	.86	1	FLOW	229.	607.

TIME 4.00 3.92

*** NORMAL END OF HEC-1 ***



LEGEND

OFF5 SUBAREA DESIGNATION

4 FLOW CONCENTRATION POIN

DRAINAGE BOUNDARY

REVISED

SMITH'S NO. 367

FIGURE 5

OFFSITE DRAINAGE MAP

G.C. WALLACE, INC.
Engineering/Architecture
1555 SOUTH RAINBOW BLVD. LAS VEGAS, NEVADA 89102