



WICHITA

**Public Works, Engineering Division
Final Drainage Plan Submittal Checklist**

Reviewer: _____ Date: _____
 Subdivision Name: Providence Square Addition Location: 13th Street North @ Oliver Avenue
 Total Land Area Of Ownership: _____ Acres.
 Type: _____ Residential Commercial _____ Industrial _____ Recreation _____ Municipal _____ Other _____
 Applicant: H.H. Holding, LLC Contact: George Sherman Phone #: 316-263-9515
 Engineer: Professional Engineering Consultants, P.A. Contact: Joe Hickle Phone # 316-262-2691

Please check the appropriate box:

I = Included; NA = Non-Applicable; R= Required prior to development
 (If "NA" is checked, an explanation must be entered)

Tab 1. Project Narrative	Applicant			Engr	
	I	NA	Explanation / Location in Plan	I	NA
A. Site Location Map, using USGS Map	✓				
B. Discussion of development, existing conditions, and proposed impacts on stormwater, wetland, riparian, and flood plain	✓				
C. Discussion of offsite conditions	✓				
D. Summary of runoff calculations (pre/post development) No increase in peak discharge for all storm series	✓				
E. Narrative description of the type and function of the permanent best management practices that are incorporated into the site design	✓				
F. Copy of the plat	✓				
G. Preliminary grading plan (The final grading plan shall be sealed, signed and dated prior to Engineering receiving the final sanitary sewer plans. One plan sheet and PDF shall be submitted to the Subdivision Engineer.)	✓				
H. Professional Engineer seal, signature and date on cover of report	✓				
I. CD of drainage plan in PDF format (one file) and one paper copy bound with this checklist included behind the cover	✓				

Tab 2. Existing Conditions Runoff Calculations	Applicant			Engr	
	I	NA	Explanation / Location in Plan	I	NA
A. Copy of applicable orthophoto showing proposed project boundaries (preferable in color)	✓				
B. Runoff Method (Rational, Hydrograph Method, or other approved methods by Engineering)	✓				
C. Existing topography (no greater than 2-foot contours, 1-foot recommend)	✓				
D. Total Site Area and Total Impervious Area (acres)	✓				
E. Benchmarks used for site control		✓			
F. Streams, creeks, and waterway labeled		✓			
G. Predominant soils from USDA soil surveys, and/or on site soil borings		✓	No infiltration is applicable		
H. Location and boundaries of natural features such as wetlands, lakes, and ponds with the normal water elevation noted		✓			
I. Location of existing roads, buildings, parking lots and other impervious areas.	✓				



J. Location of existing utilities (e.g., water, sewer, gas, electric) and easements	✓			
K. Location of existing conveyance systems such as storm drains, inlets, catch basins, channels, swales, and areas of overland flow	✓			
L. Flow paths	✓			
M. Location and dimensions of existing channels, bridges or culvert crossings		✓		
N. Existing conditions hydrologic analysis for runoff rates, volumes and velocities showing methodologies used and supporting calculations (2, 5, 10, 25 & 100 year, 24-hour storm events) or Critical Duration	✓			
O. Assumed pre-developed runoff curve numbers	✓			
P. Existing time of concentrations used in calculations	✓			
Q. Evaluate immediate downstream drainage capacity, not to exceed more than 0.25 miles downstream of site	✓			
R. Existing structural elevations (e.g., invert of pipes, manholes, etc.)		✓		
S. Cross-section data for open channels		✓		
T. Ground water elevations, if applicable		✓		

Tab 3. Post-Development Hydrologic Analysis	Applicant			Engr	
	I	NA	Explanation / Location in Plan	I	NA
A. Proposed (post-development) conditions hydrologic and hydraulic analysis for runoff rates, volumes, HGL, and velocities showing the methodologies used and supporting calculations for all applicable design storms (2, 5, 10, 25 & 100 year, 24-hour storm events)	✓				
B. Proposed time of concentrations used in calculations	✓				
C. Assumed post-developed runoff curve numbers	✓				
D. Proposed contours for detention facilities (to equal area used in outlet rating curves)		✓			
E. Preliminary sizing calculations for stormwater controls including contributing drainage area, storage, and outlet configuration		✓			
F. Stage-storage-discharge or outlet rating curves and inflow and outflow hydrographs for storage facilities		✓			
G. Final analysis of potential upstream/downstream impact/effects of project, where necessary		✓			
H. Existing and proposed structural elevations (e.g., invert of pipes, manholes, etc.)		✓			
I. Design water surface elevations and normal pool elevation for ponds.		✓			
J. Typical detail for outlet structures, embankments, spillways, grade control structures, conveyance channels, etc. To include height, width, elevation, and/or diameter.		✓			
K. Proposed limits of clearing and grading		✓			
L. Location of existing and proposed roads, buildings, parking lots and other impervious areas.	✓				
M. Location of existing and proposed utilities (e.g., water, sewer) and easements	✓				
N. Location of existing and proposed conveyance systems such as storm drains, inlets, catch basins, channels, swales, and areas of overland flow		✓			
O. Preliminary location and dimensions of proposed channel modifications, such as bridge or culvert crossings		✓			



P. Preliminary selection and location of stormwater controls	✓		
Q. Emergency overflow structure's flow path	✓		
R. Detention facility provides one-foot of freeboard above the HWL and emergency outfall shown (top of berm elevation shown)	✓		
S. The 100-year 24-hour HWL delineated on the plan for detention pond	✓		
T. Lowest opening elevations table on the plat for structures located adjacent to channels or ponds	✓		
U. Stormwater Management Facilities located within a Reserve	✓		
V. Maintenance responsibility of stormwater management facility shall be specified in the platters text. (e.g. HOA, Lot Owners Association, or lot)	✓		
W. Off-site drainage easements or agreements required, where necessary	✓		

Tab 4. Floodplain Submittal	Applicant		Engr	
	I	NA	I	NA
A. Provide source of flood profile		✓		
B. Nearest base flood elevations		✓		
C. Delineation of pre-developed regulatory floodplain/floodway limits		✓		
D. Delineation of post-developed regulatory floodplain and floodway limits		✓		
E. Floodplain boundary determination per elevation (project limits shown)	✓			
F. Provide source of floodway data table and discharges		✓		
G. Provide all hydrologic and hydraulic study information for site-specific floodplain studies, unnumbered Zone A area elevation determinations and flood plain map revisions or required permits	✓			
H. Provide regulatory floodway and four natural profile models (10,50,100, and 500-yr) for existing and future watershed conditions		✓		
I. Location of floodplain/floodway limits and relationship of site to upstream/downstream properties (floodplain limits to be per elevation and scaled location)	✓			
J. Flood plains and floodways located within a Reserve, where necessary		✓		

Tab 5. Federal, State and Local Permits (to be provided prior to construction unless otherwise specified)	Applicant		Engr	
	I/R	NA	I/R	NA
A. US Army Corps of Engineers - Regulatory program permits (404 water quality certification)		✓		
B. Kansas Department of Agriculture - Division of Water Resources Permits (Stream Obstruction, Channel Change, Flood Plain Fill, Levee, Water Appropriations, Dam safety permit, etc.)		✓		
C. Federal Emergency Management Agency (FEMA) Letter of Map Changes (LOMA, LOMR, LOMR-f, CLOMR, etc.) Shall be included and approved when project modifies the limits of the floodway.		✓		
D. Kansas Department of Transportation		✓		
E. Sedgwick County Right-of-way Permit		✓		

Narrative

PROVIDENCE SQUARE ADDITION RE-PLAT
Wichita, Sedgwick County, Kansas
03/24/09

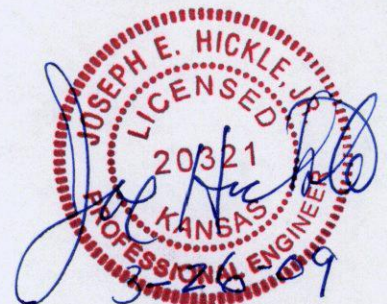
Project Narrative:

The project is a reconfiguration of an existing shopping center. Existing buildings will remain, but portions of the pavement area will be removed to create terminal parking islands with landscaping and trees. The project area is not within the 100-year floodplain.

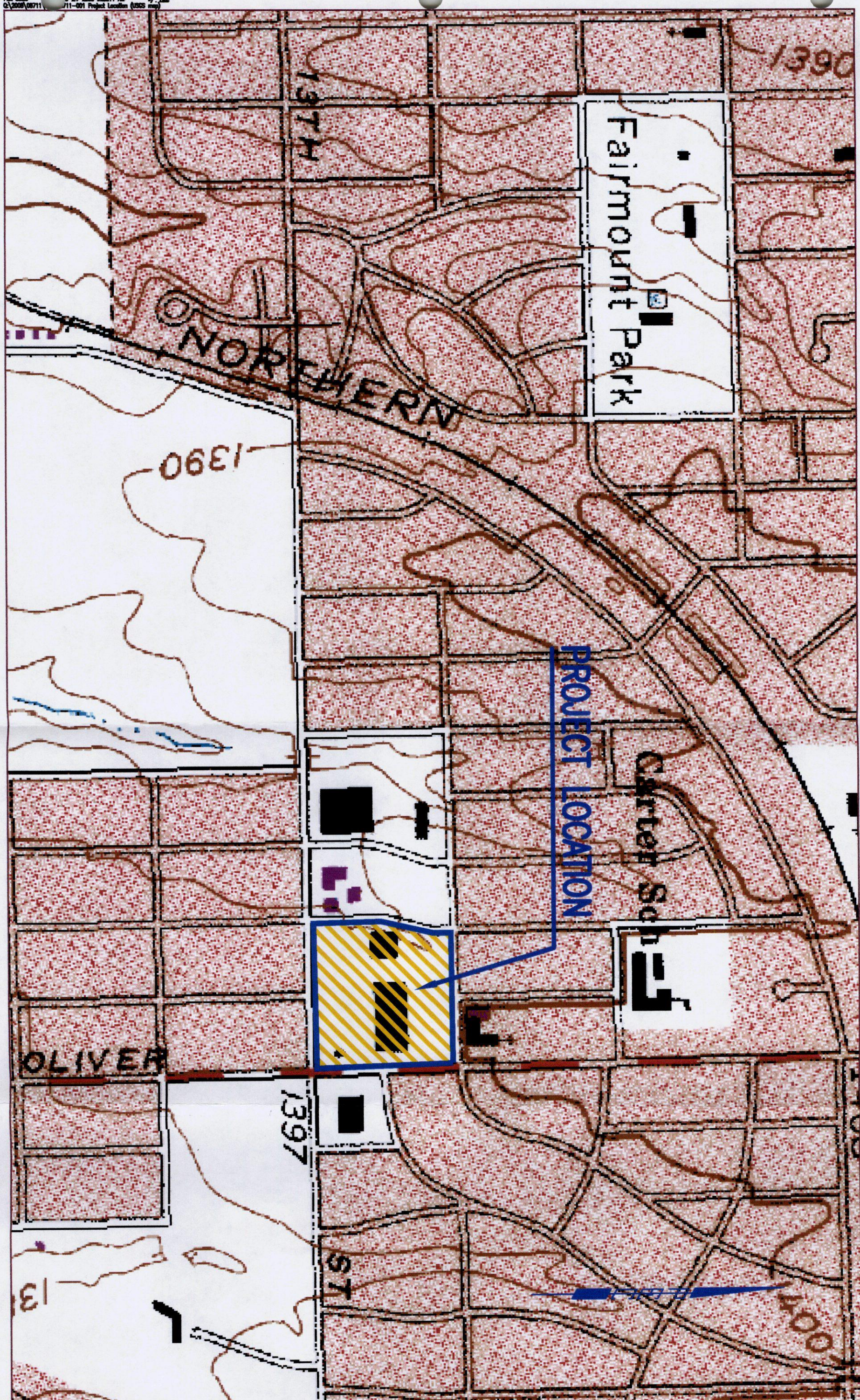
All site runoff is to the southeast into the local streets of 13th Street North and North Pershing Avenue. Neither street has an existing urban stormsewer system. Runoff continues in the street gutters to existing stormsewers further away from the project site. No offsite drainage runoff enters the project site.

The existing condition of the site contains no pervious surface and 7.68 acres of impervious surface. The proposed condition of the site contains 0.54 acres of pervious surface and 6.99 acres of impervious surface over the 7.53 acre site. The right of way of 13th Street North is being widening causing the project site area to be reduced by 0.15 acres. This translates to a net reduction of impervious surface over the entire property.

Runoff from the 2, 5, 10, 25 and 100-year precipitation events were calculated using the Rational Method for both the pre and post development conditions. Tables 1 through 10 display these calculations. Peak runoff rates of 29, 36, 42, 49 and 60 cfs in the pre development condition were determined respectively. Peak runoff rates of 27, 34, 39, 46 and 58 cfs in the post development condition were determined respectively. All storms will produce a lower peak runoff rate in the post development condition than the pre development condition. No stormwater detention will be required. Appropriate erosion control and best management practices will be employed during the construction of the project.



USGS



Flood Plain

MAP SCALE 1" = 500'



PANEL 0358E

FIRM
FLOOD INSURANCE RATE MAP
SEDGWICK COUNTY,
KANSAS
AND INCORPORATED AREAS

PANEL 358 OF 700

SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:
 COMMUNITY NUMBER 200828
 CITY OF WICHITA, CITY OF
 PANEL SUFFIX 0358 E

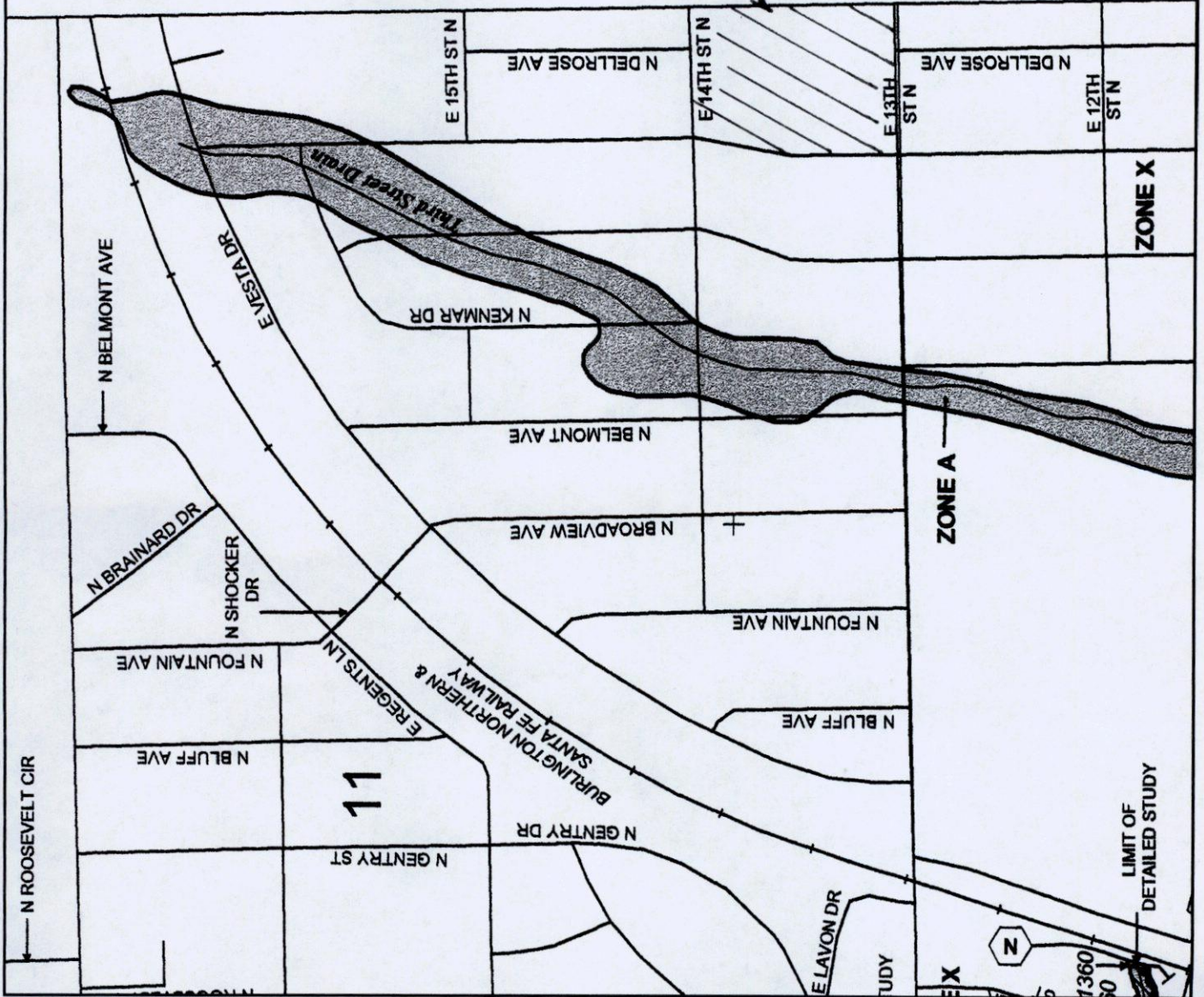
Project Location

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
20173C0358E
EFFECTIVE DATE
FEBRUARY 2, 2007
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



Aerial Map



Existing
Hydrology

Runoff Curve Numbers and Runoff Worksheet

TABLE 1

Project : Ken Mar
 Project No. : # 08711
 By : JEH
 Date : 3/24/2009

Existing Conditions

Tc = 10 min

Cover Description, Cover Type, Treatment, Hydrologic Condition	C	Area (acres)	Product of C x area
Lawn	0.3	0.00	0.00
Paved	0.835	7.68	6.41
Total		7.68	6.41
C (weighted) = total product/total area		Use C =	0.84

Frequency (years) 2
 Intensity, i (in/hour) 4.5
 Runoff, $Q=C*i*A$ (cfs) 28.86

Reference: Urban Hydrology for Small Watersheds
 Technical Release 55, Soil Conservation Service
 U.S. Department of Agriculture, June 1986

Runoff Curve Numbers and Runoff Worksheet

TABLE 2

Project : Ken Mar
 Project No. : # 08711
 By : JEH
 Date : 3/24/2009

Existing Conditions

Tc = 10 min

Cover Description, Cover Type, Treatment, Hydrologic Condition	C	Area (acres)	Product of C x area
Lawn	0.35	0.00	0.00
Paved	0.86	7.68	6.60
Total		7.68	6.60
C (weighted) = total product/total area		Use C =	0.86

Frequency (years) 5
 Intensity, i (in/hour) 5.42
 Runoff, $Q=C*i*A$ (cfs) 35.80

Reference: Urban Hydrology for Small Watersheds
 Technical Release 55, Soil Conservation Service
 U.S. Department of Agriculture, June 1986

Runoff Curve Numbers and Runoff Worksheet

TABLE 3

Project : Ken Mar
 Project No. : # 08711
 By : JEH
 Date : 3/24/2009

Existing Conditions

Tc = 10 min

Cover Description, Cover Type, Treatment, Hydrologic Condition	C	Area (acres)	Product of C x area
Lawn	0.45	0.00	0.00
Paved	0.89	7.68	6.84
Total		7.68	6.84
C (weighted) = total product/total area		Use C =	0.89

Frequency (years) 10
 Intensity, i (in/hour) 6.08
 Runoff, $Q=C*i*A$ (cfs) 41.56

Reference: Urban Hydrology for Small Watersheds
 Technical Release 55, Soil Conservation Service
 U.S. Department of Agriculture, June 1986

Runoff Curve Numbers and Runoff Worksheet

TABLE 4

Project : Ken Mar
 Project No. : # 08711
 By : JEH
 Date : 3/24/2009

Existing Conditions

Tc = 10 min

Cover Description, Cover Type, Treatment, Hydrologic Condition	C	Area (acres)	Product of C x area
Lawn	0.52	0.00	0.00
Paved	0.9	7.68	6.91
Total		7.68	6.91
C (weighted) = total product/total area		Use C =	0.90

Frequency (years) 25
 Intensity, i (in/hour) 7.06
 Runoff, $Q=C*i*A$ (cfs) 48.80

Reference: Urban Hydrology for Small Watersheds
 Technical Release 55, Soil Conservation Service
 U.S. Department of Agriculture, June 1986

Runoff Curve Numbers and Runoff Worksheet

TABLE 5

Project : Ken Mar
 Project No. : # 08711
 By : JEH
 Date : 3/24/2009

Existing Conditions

Tc = 10 min

Cover Description, Cover Type, Treatment, Hydrologic Condition	C	Area (acres)	Product of C x area
Lawn	0.65	0.00	0.00
Paved	0.91	7.68	6.99
Total		7.68	6.99
C (weighted) = total product/total area		Use C =	0.91

Frequency	(years)	100
Intensity, i	(in/hour)	8.58
Runoff, $Q=C*i*A$	(cfs)	59.96

Reference: Urban Hydrology for Small Watersheds
 Technical Release 55, Soil Conservation Service
 U.S. Department of Agriculture, June 1986

Post
Hydrology

Runoff Curve Numbers and Runoff Worksheet

TABLE 6

Project : Ken Mar
 Project No. : # 08711
 By : JEH
 Date : 3/24/2009

Post Conditions
 Tc = 10 min

Cover Description, Cover Type, Treatment, Hydrologic Condition	C	Area (acres)	Product of C x area
Lawn	0.3	0.54	0.16
Paved	0.835	6.99	5.84
Total		7.53	6.00
C (weighted) = total product/total area		Use C =	0.80

Frequency (years) 2
 Intensity, i (in/hour) 4.5
 Runoff, $Q=C*i*A$ (cfs) 27.00

Reference: Urban Hydrology for Small Watersheds
 Technical Release 55, Soil Conservation Service
 U.S. Department of Agriculture, June 1986

Runoff Curve Numbers and Runoff Worksheet

TABLE 7

Project : Ken Mar
 Project No. : # 08711
 By : JEH
 Date : 3/24/2009

Post Conditions
 Tc = 10 min

Cover Description, Cover Type, Treatment, Hydrologic Condition	C	Area (acres)	Product of C x area
Lawn	0.35	0.54	0.19
Paved	0.86	6.99	6.01
Total		7.53	6.20
C (weighted) = total product/total area		Use C =	0.82

Frequency	(years)	5
Intensity, i	(in/hour)	5.42
Runoff, $Q=C*i*A$	(cfs)	33.61

Reference: Urban Hydrology for Small Watersheds
 Technical Release 55, Soil Conservation Service
 U.S. Department of Agriculture, June 1986

Runoff Curve Numbers and Runoff Worksheet

TABLE 8

Project : Ken Mar
 Project No. : # 08711
 By : JEH
 Date : 3/24/2009

Post Conditions

Tc = 10 min

Cover Description, Cover Type, Treatment, Hydrologic Condition	C	Area (acres)	Product of C x area
Lawn	0.45	0.54	0.24
Paved	0.89	6.99	6.22
Total		7.53	6.47
C (weighted) = total product/total area		Use C =	0.86

Frequency (years) 10
 Intensity, i (in/hour) 6.08
 Runoff, $Q=C*i*A$ (cfs) 39.31

Reference: Urban Hydrology for Small Watersheds
 Technical Release 55, Soil Conservation Service
 U.S. Department of Agriculture, June 1986

Runoff Curve Numbers and Runoff Worksheet

TABLE 9

Project : Ken Mar
 Project No. : # 08711
 By : JEH
 Date : 3/24/2009

Post Conditions

Tc = 10 min

Cover Description, Cover Type, Treatment, Hydrologic Condition	C	Area (acres)	Product of C x area
Lawn	0.52	0.54	0.28
Paved	0.9	6.99	6.29
Total		7.53	6.57
C (weighted) = total product/total area		Use C =	0.87

Frequency	(years)	25
Intensity, i	(in/hour)	7.06
Runoff, $Q=C*i*A$	(cfs)	46.41

Reference: Urban Hydrology for Small Watersheds
 Technical Release 55, Soil Conservation Service
 U.S. Department of Agriculture, June 1986

Runoff Curve Numbers and Runoff Worksheet

TABLE 10

Project : Ken Mar
 Project No. : # 08711
 By : JEH
 Date : 3/24/2009

Post Conditions
 Tc = 10 min

Cover Description, Cover Type, Treatment, Hydrologic Condition	C	Area (acres)	Product of C x area
Lawn	0.65	0.54	0.35
Paved	0.91	6.99	6.36
Total		7.53	6.71
C (weighted) = total product/total area		Use C =	0.89

Frequency (years) 100
 Intensity, i (in/hour) 8.58
 Runoff, $Q=C*i*A$ (cfs) 57.60

Reference: Urban Hydrology for Small Watersheds
 Technical Release 55, Soil Conservation Service
 U.S. Department of Agriculture, June 1986