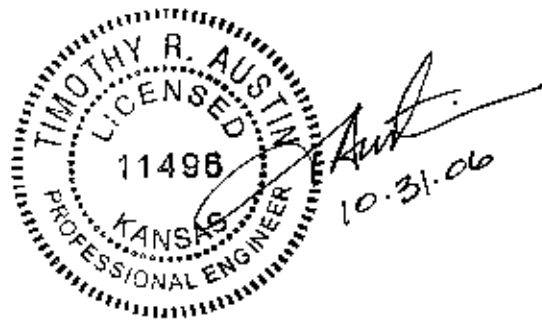


HOLLAND COMMERCIAL ADDITION

DRAINAGE REPORT



OCTOBER 2006

Introduction

The Holland Commercial Addition is an approximate 12-acre tract of land located at the northwest corner of Kellogg and Tyler Road in west Wichita. The site is bounded on the north by Belview, on the east by Tyler Road, on the south by Kellogg Drive, and on the west by Byron. (A copy of the USGS quadrangle map showing the location of the subject property is attached herewith.)

Residential development lies to the west and north of the site. Commercial and industrial uses lie to the east and south. The original, modern land use for the site was a mixture of residential, commercial, and agricultural uses. The property has been rezoned to allow general commercial types of use and is in the process of being re-platted. (A 2003 aerial photograph showing existing land uses is attached herewith.)

Existing Conditions

Presently, the site is a mixture of vacant land, commercial property and some residential property. An un-named tributary of the Cowskin Creek drains north to south through the approximate center of the site. The land has natural slopes ranging from less than 1% to roughly 3%. According to the USGS Soil Survey, the predominant soil type is a Milan loam series material.

The tributary drains through the site and enters an 8'x6' RCB structure under Kellogg. The box conveys the drainage into a storm water channel south of Kellogg and then ultimately to the Cowskin. Box structures under the abandoned RR track that lies south of and parallel to Kellogg and Harry Street are 2-12'x7' and 2-13'x7' respectively.

The upstream drainage basin for the un-named tributary is approximately 120 acres. Land use within the drainage basin is predominantly residential in character. (A 2003 aerial photo showing land use within the drainage basin is attached herewith.) Upstream, storm water is directed to the site via overland flow and through open ditches along Belview, Byron, and Callahan Streets. There are two 36"x60" CMP cross road pipes under Belview that convey storm water onto the subject property. Storm water is presently conveyed through the site in an open ditch from Belview to the RCB under Kellogg.

Proposed Conditions

The site is anticipated on being developed as a multi-lot commercial subdivision. A mixture of retail, restaurant, and other uses are proposed. Typically, commercial developments will increase the impervious area of the property over the existing land use. Such would be true with the Holland tract. (Copies of the proposed plat and Community Unit Plan are attached herewith.)

Developed conditions will take advantage of the natural grades on the site as the site develops. Cross parcel drainage is contemplated as part of the plat. A petition guaranteeing the extension of the 8'x6' RCB through the site to Belview will be provided as a condition of the plat. A drainage easement showing the anticipated location of the box structure is shown on the plat. On-site drainage is will be achieved through localized connections to the proposed RCB structure.

Analysis

The box structure under Kellogg was designed by PEC as part of the overall west Kellogg improvements. Design information from PEC indicated that the box was designed for a drainage basin of 118 acres and a maximum Q_{100} of approximately 405 cfs. (The information obtained from PEC is attached herewith.)

A drainage study of the basin was also conducted by Young & Associates under contract with Austin Miller, PA who originally initiated the platting for the property owner. Young & Associates estimated a larger drainage basin at 164 acres and estimated a larger Q_{100} of 466 cfs. (The drainage study by Young & Associates is attached herewith.)

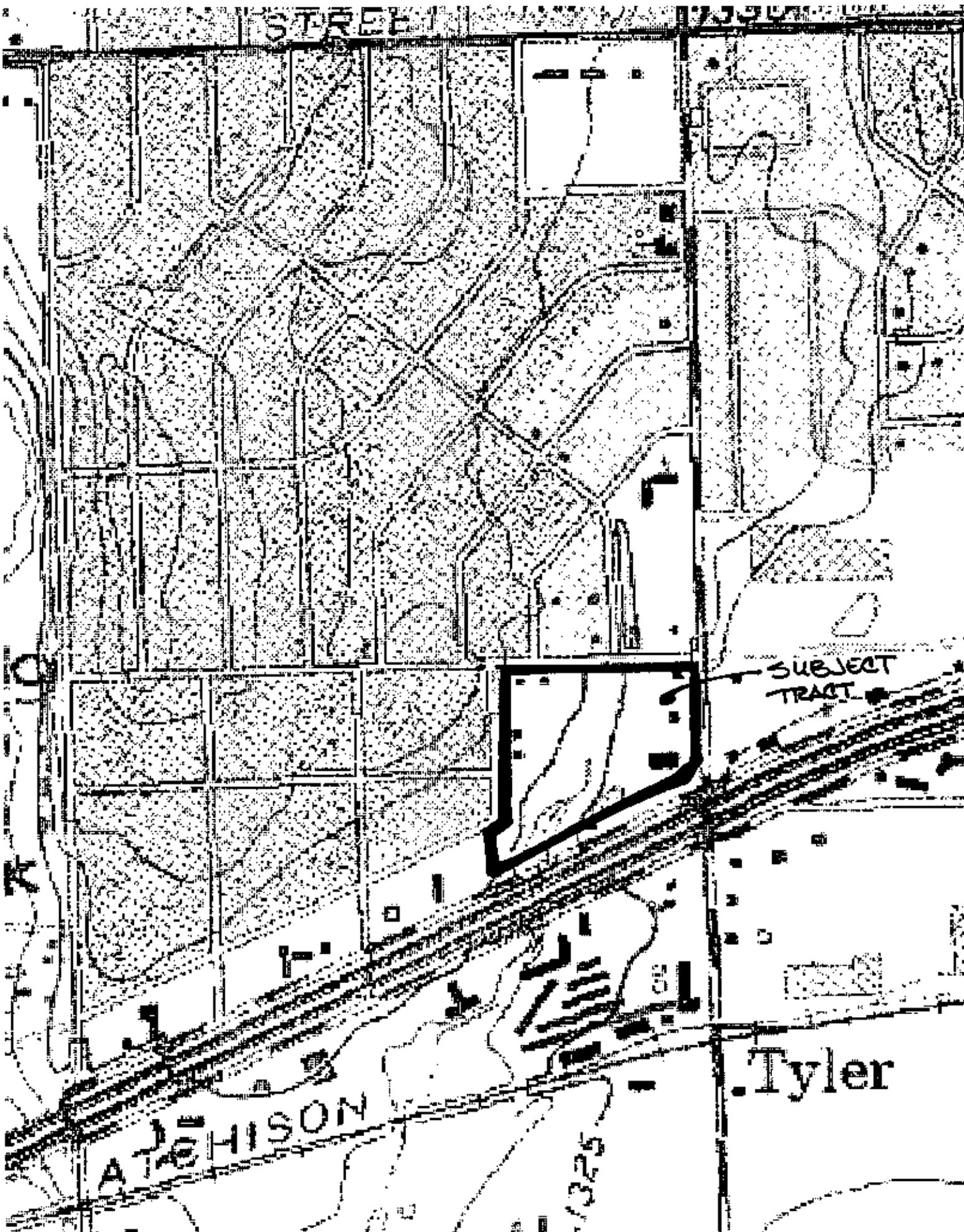
The differences between the two numbers are probably a result of differences in the methodology used for estimating the run-off for the properties and the estimated size of the drainage basin.

Using the Rational Method, Q_{100} for the Holland tract assuming existing conditions is estimated to be 30 cfs. The Q_{100} for the fully developed commercial site is estimated to be approximately 73 cfs. (A drainage plan for the Holland plat is attached herewith.)

Time of concentration for the entire drainage is estimated to be approximately 58 minutes based upon the Young & Associates study. On-site T_c is estimated to be 15 minutes or less. Accordingly, on-site detention is not recommended for the Holland tract as any detention would possibly add to the upstream peak. The post-developed Q would have the opportunity to clear the RCB prior to the arrival of the upstream peak discharge.

The PEC study assumed inlet control and established 1 foot of head water into the box structure at the south end of the subject tract. Headwater was confirmed using a quick check against FHWA Hydraulic Engineering Circular No. 5. (See chart attached herewith.) The hydraulic grade line was carried through the length of the site to establish the minimum pad elevation for commercial subdivision; however, an in-depth engineering analysis was not performed for the purposes of platting and should be done at the time of the box design. Inlet control and flowline elevation for the new RCB inlet were assumed at the terminus near Callahan and Belview. Site specific design of on-site drainage systems will need to consider potential surcharging of any on-site inlets based upon final design of the RCB.

STREET



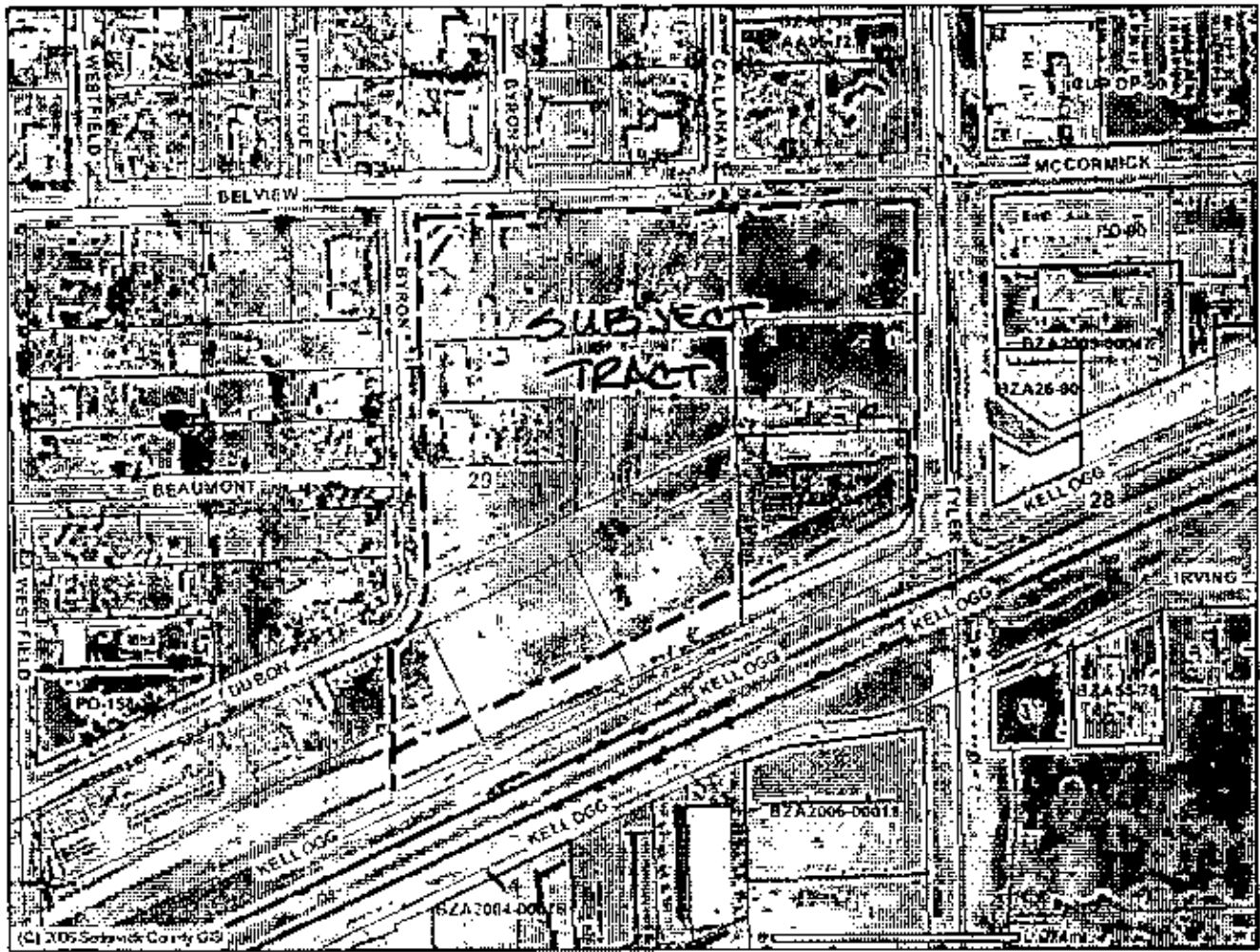
SUBJECT TRACT

ATCHISON

Tyler

1325

Holland Tract



<p>Historic Site Builders</p> <ul style="list-style-type: none"> 1807 Union National Bank Building 1807 National Historic Site Building Other <p>Historic Districts</p> <ul style="list-style-type: none"> National Registered Historic District Locally Re-designated Historic Site <p>County Boundary</p> <p>City Limits</p> <ul style="list-style-type: none"> ANDALE BEAUMONT BENTLEY CHENEY CLEARWATER COLUMBIAN DEWBY EASTBROUGH Other 		<p>Legend</p> <ul style="list-style-type: none"> Arrows State Highway Federal Highway European Other Square Mile (SMBR) - Special Use District Parishes Zoning Districts Unknown 10 Acres 1/4 - 1/2 Acre Family Residential Other CC - Central Commercial CG - General Commercial CO - General Office CS - Single-Family Single-Family CU - General Commercial Other CCP (CC) - 		<ul style="list-style-type: none"> 42 - General Business 43 - Mixed-Use Family Residential 44 - Mixed-Use Family Residential 45 - Manufactured Housing 46 - Professional Office 47 - Non-governmental Office 48 - Other Residential 49 - Other Residential 50 - Single-Family Residential 51 - Single-Family Residential 52 - Single-Family Residential 53 - Single-Family Residential 54 - Single-Family Residential 55 - Single-Family Residential 56 - Single-Family Residential 57 - Single-Family Residential 58 - Single-Family Residential 59 - Single-Family Residential 60 - Single-Family Residential 61 - Single-Family Residential 62 - Single-Family Residential 63 - Single-Family Residential 64 - Single-Family Residential 65 - Single-Family Residential 66 - Single-Family Residential 67 - Single-Family Residential 68 - Single-Family Residential 69 - Single-Family Residential 70 - Single-Family Residential 71 - Single-Family Residential 72 - Single-Family Residential 73 - Single-Family Residential 74 - Single-Family Residential 75 - Single-Family Residential 76 - Single-Family Residential 77 - Single-Family Residential 78 - Single-Family Residential 79 - Single-Family Residential 80 - Single-Family Residential 81 - Single-Family Residential 82 - Single-Family Residential 83 - Single-Family Residential 84 - Single-Family Residential 85 - Single-Family Residential 86 - Single-Family Residential 87 - Single-Family Residential 88 - Single-Family Residential 89 - Single-Family Residential 90 - Single-Family Residential 91 - Single-Family Residential 92 - Single-Family Residential 93 - Single-Family Residential 94 - Single-Family Residential 95 - Single-Family Residential 96 - Single-Family Residential 97 - Single-Family Residential 98 - Single-Family Residential 99 - Single-Family Residential 100 - Single-Family Residential 	
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Geographic Information Services
 Division of Information & Operations
www.sedgwickcounty.org/gis
 525 N. Main, Suite 212, Wichita, KS 67203
 Tel: 316.660.9290 Fax: 316.262.1174

DISCLAIMER: This map is a product of Sedgwick County Geographic Information Services (GIS) and is provided as a public service. It is not intended to be used for legal purposes. The map is based on the best available data and is subject to change without notice. Sedgwick County is not responsible for any errors or omissions in this map. Users should verify the accuracy of the information on this map before using it for any purpose. Sedgwick County is not liable for any damages, including consequential damages, arising from the use of this map. The map is provided on an "as is" basis and Sedgwick County makes no warranty, express or implied, regarding the accuracy, completeness, or reliability of the information contained herein. Sedgwick County is not responsible for any errors or omissions in this map. Users should verify the accuracy of the information on this map before using it for any purpose. Sedgwick County is not liable for any damages, including consequential damages, arising from the use of this map. The map is provided on an "as is" basis and Sedgwick County makes no warranty, express or implied, regarding the accuracy, completeness, or reliability of the information contained herein.

PROFESSIONAL
 ENGINEERING CONSULTANTS, PA
 303 South Topeka
 WICHITA, KANSAS 67202
 (316) 262-2691

LETTER OF TRANSMITTAL

DATE 11/02/00	JOB NO. 32-97362-5-042
ATTENTION Kirk Miller P.E.	
RE: West Kellogg Freeway	

TO Austin Miller P.A.

pick up

WE ARE SENDING YOU Attached Under separate cover via _____ the following items:
 Shop drawings Prints Plans Samples Specifications
 Copy of letter Change order _____

COPIES	DATE	NO.	DESCRIPTION
1		1	Copy of Field Check Drainage map Sta 16+000 to 18+000

THESE ARE TRANSMITTED as checked below:
 For approval Approved as submitted Resubmit _____ copies for approval
 For your use Approved as noted Submit _____ copies for distribution
 As requested Returned for corrections Return _____ corrected prints
 For review and comment _____
 FOR BIDS DUE _____ 19____ PRINTS RETURNED AFTER LOAN TO US

REMARKS This drawing is preliminary and subject to change. Only the final set of plans containing the engineers seal should be considered the working set.

COPY TO _____ SIGNED W. David Hubbard, P.E.
 _____ *wdh*
 If enclosures are not as noted, kindly notify us at once.

DATE: 11/16/00
TIME: 9:00 am



Professional Engineering Consultants, P.A.

303 S. TOPEKA • WICHITA, KANSAS 67202 • 316-262-2691 • FAX 316-262-3003 • www.pecl.com • designers@pecl.com

RECORD OF TELEPHONE CALL

CLIENT OR ORGANIZATION: Austin Miller PROJECT NO. 32-97362-5-042
PROJECT: West Kellogg Freeway
Road PS&E
PERSONS TALKED TO: Pat Baer
TITLE(S): _____ FILE THRU: _____
SUBJECT: Tyler Drainage NW of intersection COPIES TO: Austin Miller, Carl Gipson

CONVERSATION NOTES: Pat was wondering if they could connect storm sewer to the proposed 3.4 X 2.4 m RCB at approx. Sta. 17+160 Lt. I told him this box was not designed to handle drainage from the west of Tyler except for what was draining to it through the existing SWS in Tyler road (60" RCP). All other drainage west of Tyler (specifically including the Holland Property (orchard) was designed to drain to the new 2.4 X 1.8 m RCB at Sta. 17+090. The plan he had was incorrect in that it showed an existing RCB in the drainage easement between Blue Water and Carpet Mill. I told him that RCB does not exist. I told him the following RCB info. Q100 = 405cfs, HW = 402.7 m, C = 0.61

FL of upstream end = 1314.3 with a 2' soil saver, D.A. = 66.4 ha. 1321^2

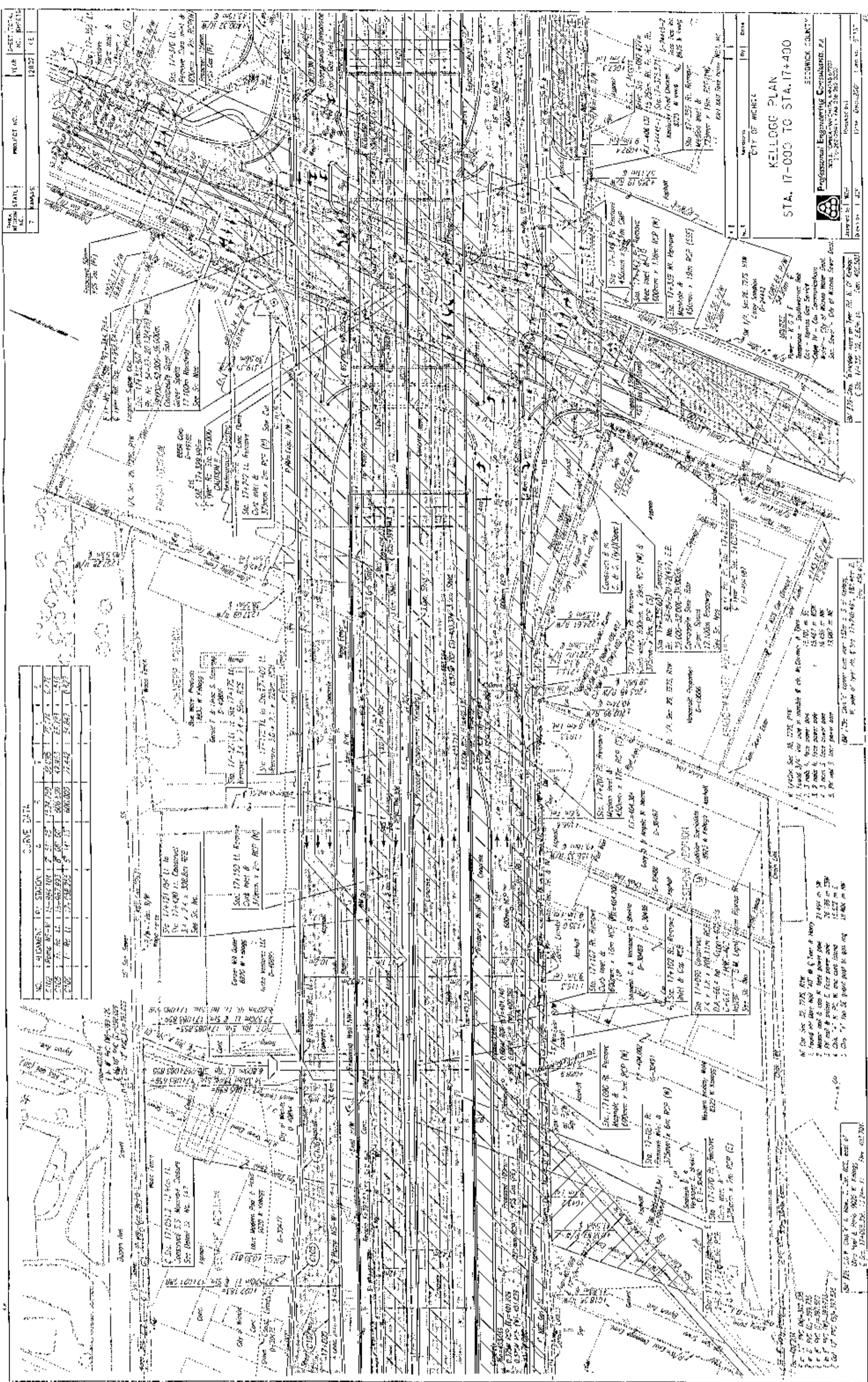
DECISION OR ACTION REQUIRED: None at this time. Further coordination if requested by COW and or Austin.

RECORDED BY: Dave Hubbard *WBH*

SHEET NO. 17
 PROJECT NO. 17-000
 YEAR 1999
 DATE 12/02/99

CURVE DATA

NO.	STATION	1	2
1	17+00.00	17+00.00	17+00.00
2	17+00.00	17+00.00	17+00.00
3	17+00.00	17+00.00	17+00.00
4	17+00.00	17+00.00	17+00.00
5	17+00.00	17+00.00	17+00.00
6	17+00.00	17+00.00	17+00.00
7	17+00.00	17+00.00	17+00.00
8	17+00.00	17+00.00	17+00.00
9	17+00.00	17+00.00	17+00.00
10	17+00.00	17+00.00	17+00.00



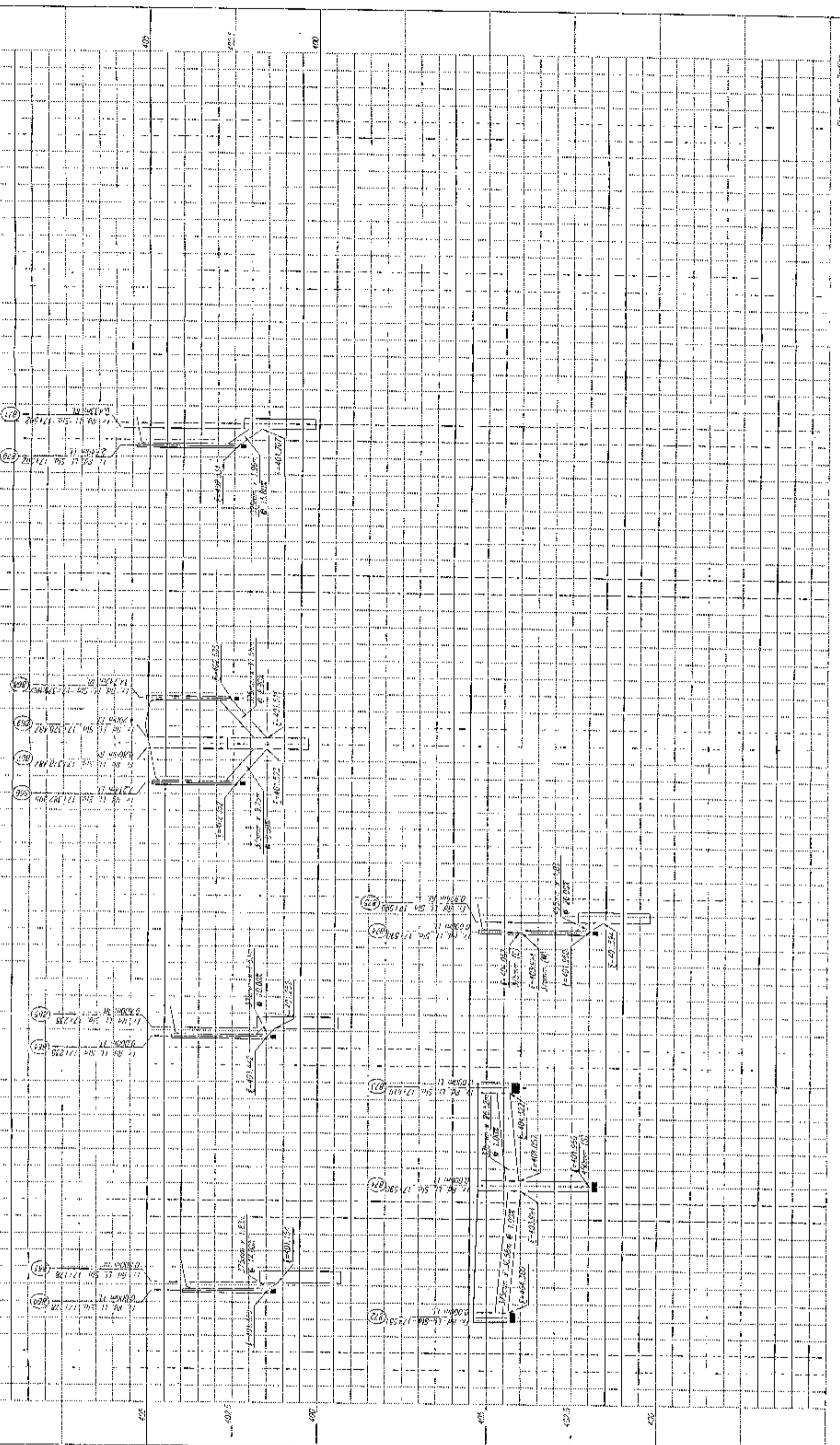
KELLOGG PLAN
STA. 17-000 TO STA. 17+400
 CITY OF WICHITA
 SEDGWICK COUNTY
 Professional Engineering Consultants, P.C.
 1111 S. WILSON ST., SUITE 200
 WICHITA, KS 67202
 316-261-1111

BY: [Signature]
 TITLE: [Title]
 DATE: 12/02/99

17-000 STA. 17+00.00 TO STA. 17+400.00
 02/16/02 03:46:15 PM

SHEET TOTAL: 155
 PROJECT NO.: 2882
 YEAR: 1982
 DATE: 11-11-2002

STATE: MISSISSIPPI
 COUNTY: HARRIS
 PROJECT: STORM SEWER IMPROVEMENTS
 SHEET NO.: 155



DATE	BY	REVISION

DESIGNER: [Name]
 CHECKER: [Name]
 DATE: 11-11-2002

SCALE: AS SHOWN
 PROJECT: STORM SEWER IMPROVEMENTS
 SHEET NO.: 155

(A) → (B)

Worksheet 4: Graphical Peak Discharge method

Project Holland Addition By Cox Date 3-11-04
 Location NE Cor. Tyler & US 54 Checked _____ Date _____

Circle one: Percent Developed _____

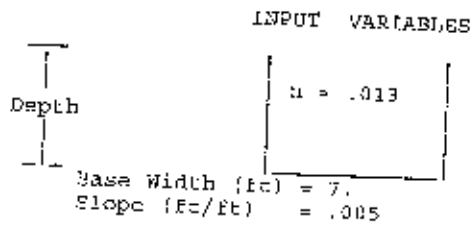
1. Data:

Drainage area $A_d = \underline{0.1841}$ mi² (acres/640) 117.8
 Runoff curve number $CN = \underline{81}$ (From worksheet 2), Figure 2-6
 Time of concentration .. $T_c = \underline{0.97}$ hr (From worksheet 3), Figure 3-2
 Rainfall distribution type = II (I, IA, II, III)
 Pond and swamp areas spread throughout watershed = 0 percent of A_d (_____ acres or mi² covered)

	Storm #1	Storm #2	Storm #3
2. Frequency yr	5	10	100
3. Rainfall, P (24-hour) in	4.6	5.2	7.8
4. Initial abstraction, I_a in (Use CN with table 4-1.)	0.469	0.469	0.469
5. Compute I_a/P	0.104	0.090	0.060
6. Unit peak discharge, q_u cfs/in (Use T_c and I_a/P with exhibit 4-II)	400	425	460
7. Runoff, Q in (From worksheet 2), Figure 2-6	2.3	3.1	5.5
8. Pond and swamp adjustment factor, F_p (Use percent pond and swamp area with table 4-2. Factor is 1.0 for zero percent pond and swamp area.)	1.0	—	—
9. Peak discharge, q_p cfs (Where $q_p = q_u A_d Q F_p$)	169	242	466

Figure 4-2.—Worksheet 4 for example 4-1.

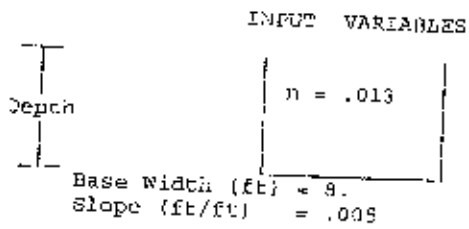
Cross Section: 1 Type: * Rectangular Channel



OUTPUT VARIABLES

Depth (ft)	5.
Crit Depth (ft)	5.1
Discharge (cfs)	458.
Velocity (ft/s)	13.09
Top Width (ft)	7.
Froude No.	1.03
Flow Type	Near-Critical

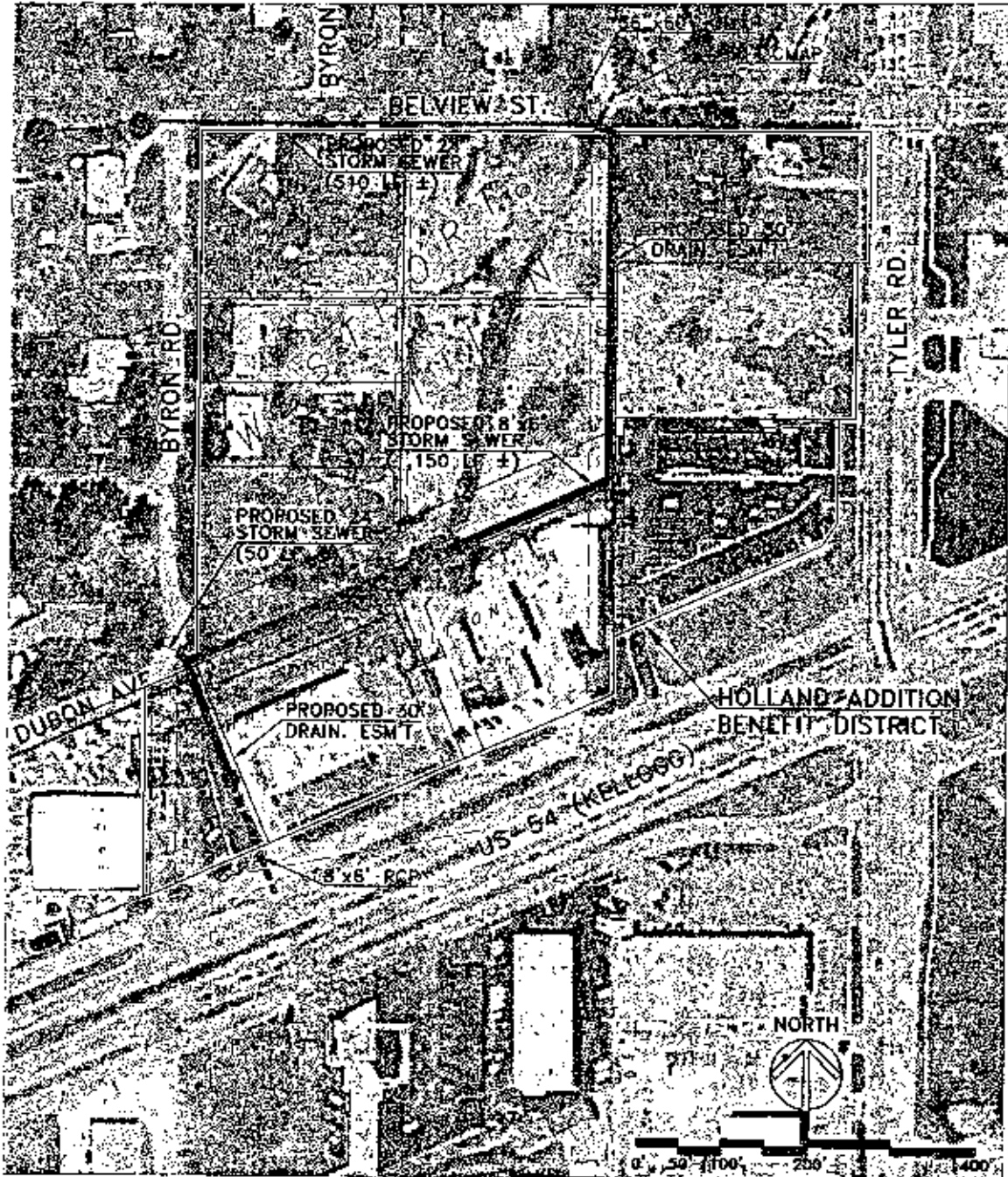
Cross Section: 2 Type: * Rectangular Channel



OUTPUT VARIABLES

Depth (ft)	6.
Crit Depth (ft)	6.17
Discharge (cfs)	696.
Velocity (ft/s)	14.49
Top Width (ft)	9.
Froude No.	1.04
Flow Type	Near-Critical

Proposed Storm Sewer Improvements, to serve
HOLLAND ADDITION
City of Wichita, Sedgwick County, Kansas



Vicinity Map prepared by:

YOUNG & ASSOCIATES, P.A.
Civil and Environmental Engineers

STORM SEWER IMPROVEMENTS					
				Estimated Probable Const. Costs, Budget Estimate	
Item No.	Description	Quantity	Units	Unit Price	Extension
1.	8'x6' RCB	1,150	LF	\$ 330	\$ 379,500
2.	8'x6' RC Transition Structures	5	EA	8,000	40,000
3.	24" Storm Sewer	560	LF	60	33,600
4.	24" End Section, w/Rock Rip-Rap	1	EA	3,000	3,000
5.	Std. Sngl Curb Inlet	2	EA	2,500	5,000
6.	Compacted Fill (exist. drainage channel)	950	LF	20	19,000
7.	BMP's	1	LS	5,000	5,000
8.	Site Clearing and Restoration	1	LS	5,000	5,000
9.	5% Contingency	1	LS	24,505	24,505

Sub-Total Construction	\$ 514,605
Estimated Project Costs, 35%	<u>180,112</u>
Total Petition Amount	\$ 694,717

STORM SEWER PETITION

To the Mayor and City Council
Wichita, Kansas

Dear Council Members:

I. We, the undersigned owners of record as below designated, of Lots, Parcels, and Tracts of real property described as follows:

IMPROVEMENT DISTRICT:

Holland Addition, Wichita, Sedgwick County, Kansas

do hereby petition pursuant to the provisions of K.S.A. 12-6a01 et seq., as follows:

- (a) That there be constructed a storm sewer extension to serve the area described above, according to plans and specifications to be furnished by the City Engineer of the City of Wichita, Kansas.
- (b) That the estimated and probable cost of the foregoing improvements being Six Hundred Ninety-five Thousand Dollars and 00/100, (\$695,000), exclusive of the cost of interest on borrowed money, with 100 percent payable by the improvement district. Said estimated cost as above set forth is hereby increased at the pro rata rate of 1 percent per month from and after _____.
- (c) That the land or area above described be constituted as an improvement district against which shall be assessed 100 percent of the total actual cost of the improvement for which the improvement district is liable.

If this improvement is abandoned, altered and/or constructed privately in part or whole that precludes building this improvement under the authority of this petition, any costs that the City of Wichita incurs shall be assessed to the property described above in accordance with the terms of the petition. In addition, if the improvement is abandoned at any state during the design and/or construction of the improvement or if it is necessary for the City of Wichita to redesign, repair or reconstruct the improvement after its initial design and/or construction because the design or construction does not meet the requirements of the City, then such costs associated with the redesign, repair or reconstruction of said improvement shall be assessed to the property described above in accordance with the terms of this petition.

- (d) That the method of assessment of all costs of the improvement for which the improvement district shall be liable shall be on a square foot basis:

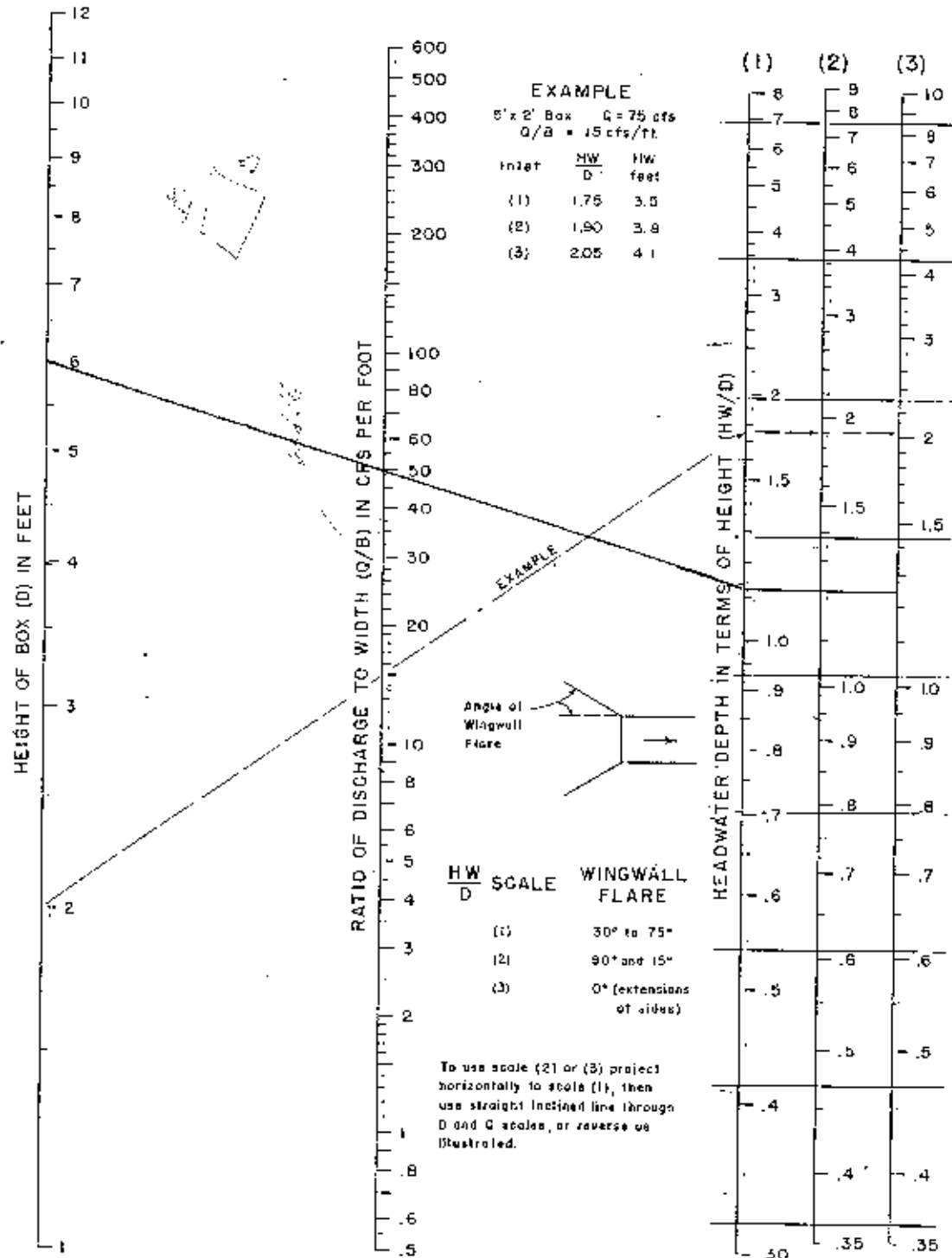
Where the ownership of a single lot is or may be divided into two or more parcels, the assessment to the lot so divided shall be assessed to each ownership or parcel on a square foot basis:

2. (a) It is requested that the improvement hereby petitioned be made without notice and hearing, which, but for this request, would be required by K.S.A. 12-6a04. This petition may be combined with other petitions of similar nature to form one public improvement project.
- (b) Signatures on this petition are made with full knowledge and understanding that said signatures constitute a waiver of the limitations contained in K.S.A. 13-1013, which appear to limit the assessment for a storm sewer to not more than one storm sewer.
3. That names may not be withdrawn from this petition by the signers thereof after the Governing Body commences consideration of the petition or later that seven (7) days after filing, whichever occurs first.
4. That when this petition has been filed with the City Clerk and it has been certified that the signatures thereon are according to the records of the Register of Deeds of Sedgwick County, Kansas, the petition may be found sufficient if signed by either (1) a majority of the resident owners of record of property liable for assessment under the proposal, or (2) the resident owners of record or more than one-half of the area liable for assessment under the proposal, or (3) the owners of record (whether resident or not) of more than one-half of the area liable for assessment under the proposal. The Governing Body is requested to proceed in the manner provided by statute to the end that the petitioned improvements may be expeditiously completed and placed in use if and when such improvements are necessary to serve any building that may be constructed on the real property after the date on this petition.

WITNESS our signatures attached with respect to each of which is indicated the property owned and the date of signing.

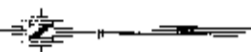
LEGAL DESCRIPTION	SIGNATURE	DATE
Holland Addition, Wichita, Sedgwick County, Kansas	_____	_____

CHART 1



HEADWATER DEPTH FOR BOX CULVERTS WITH INLET CONTROL

DRAINAGE PLAN FOR HOLLAND ADDITION WICHITA SEDGWICK COUNTY KANSAS



LEGEND

- △ = Section Corner
- = 3/4" Iron Pipe (found)
- = 5/8" Rubber AMINC OLS #104 (set)
- (C) = Calculated
- (M) = Measured
- - - = Assumed Drainage Break Line



Area #	Area	I ₁₀₀	Q ₁₀₀	Undeveloped C=0.35		Developed C=0.85	
				Q ₁₀₀	Q ₅₀	Q ₅₀	Q ₂₅
1	11.59	4.56	7.37	18.5	29.9	44.9	72.6
TOTAL	11.59			18.5	29.9	44.9	72.6

NOTES:

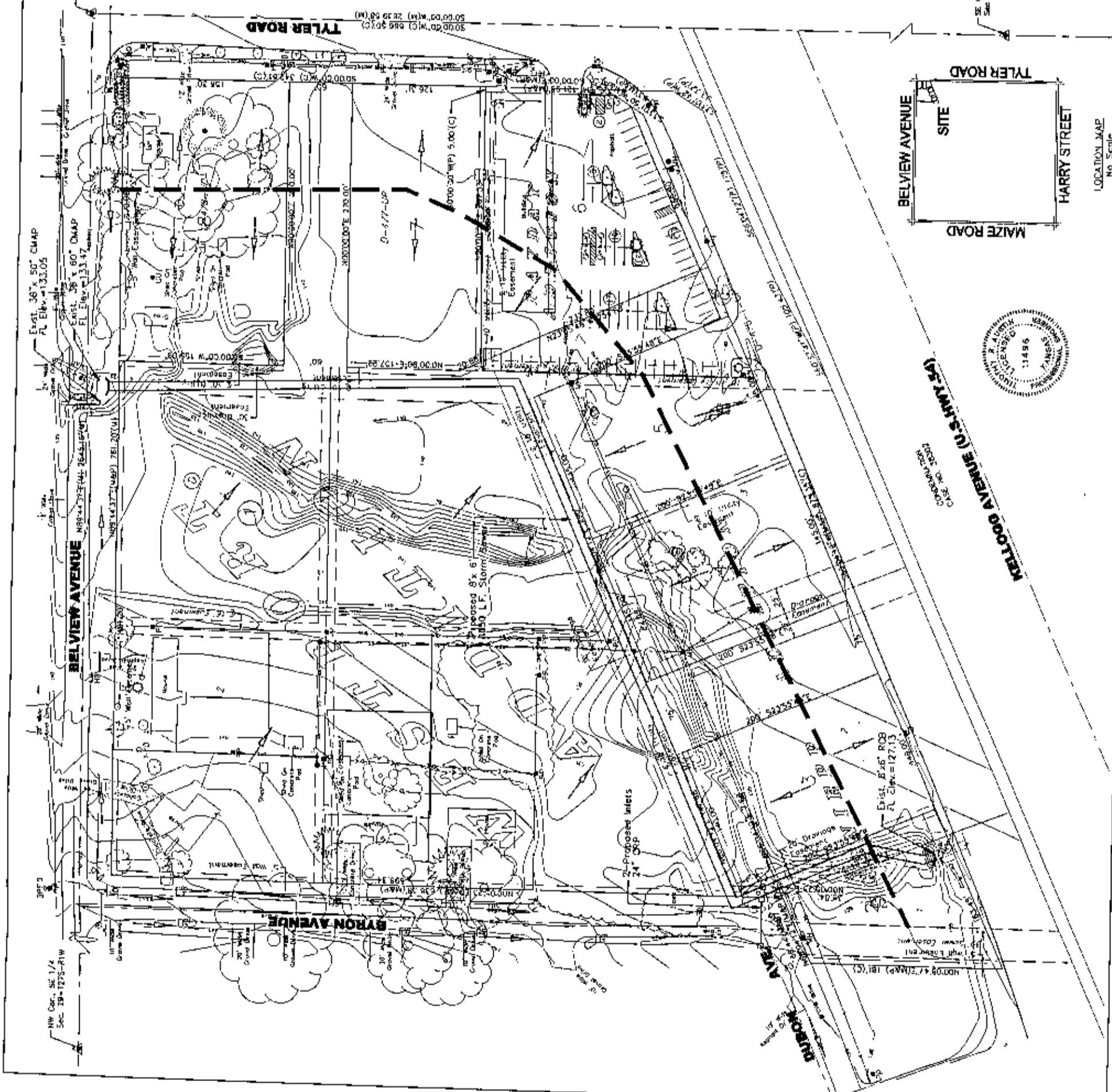
1. Cross-drainage agreement required for subsequent sub-divisions.
2. See drainage study by Young & Associates dated 3-15-04
3. Site grading and drainage plans to be designed by a licensed professional engineer.
4. The drainage plan will need to be updated and filed with city engineering at the time of building permit(s).
5. Min. Pad Elev.=137.0(City Datum);
1324.40 (MSL)

BENCHMARK

West 51' and 47th St. South
C.O.W. Benchmark NE corner of intersection.
Elev. 1282.29 MSL, 94.69 City Datum



POE & ASSOCIATES, INC.
CONSULTING ENGINEERS
2940 E. Central Ave. Suite 200 • Wichita, KS 67209-0000
Phone: 316-865-1114 • Fax: 316-865-1444



LOCATION MAP
No Scale

