



DRAINAGE PLAN
SOUTHERN SHORES ADDITION
FEBRUARY 2014

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PROJECT NARRATIVE

EXISTING CONDITIONS

The proposed project is located at the northwest corner of 55th Street South and Seneca Street. This site is currently undeveloped and is bounded on the west by the City of Wichita Parks Department land and to the north by a large single family residential lot.

The site sheet flows, currently, to all directions as well as has some ponding areas on site. Primarily, the site discharges to the south and into the 55th Street ROW where it is conveyed to the west and into the Parks Department lake via a storm water sewer system.

This property lies within a FEMA Zone X floodplain. The pond to the west appears to have approximately 10' of freeboard before overtopping onto this property. That pond discharges to the south under 55th Street South via a Triple 10'x4' RCBC. The overtopping elevation at the roadway at this point appears to be at elevation 1271.0.

The drainage patterns as defined above can be seen on the Aerial (Exhibit 2).

PROPOSED CONDITIONS

The property is being platted and zoned as TF-3 and thusly will be developed into a duplex subdivision with corresponding streets, utilities, storm sewer, and water quality treatment unit(s). We expect the structures to be a mixture of slab on grade structures, homes with basements, and view out structures. Storm water will be conveyed onsite via sheet flow to underground storm sewer via backyard and street curb inlets. The storm sewer will tie directly into existing conduit in Seneca and 55th Street South as well as a new system which will drain directly into the offsite City of Wichita Parks Department lake to the west.

For a half-scale copy of the Plat, see Exhibit 3.

OFFSITE CONDITIONS

The site drains primarily to the east and south and ultimately into the west (offsite) City of Wichita lake. This lake is approximately 18 acres and drains to the south under 55th Street via a triple cell 10'x4' RCBC.

There are storm sewer systems in Seneca and 55th Street that help drain this site which also discharge into the offsite pond.

We are not aware of any historical flooding in this area or any concerns with this development. The overall site location can be seen as Exhibit 1.

EXISTING CONDITIONS RUNOFF CALCULATIONS

DRAINAGE METHODS & STANDARDS

The following methods and standards, although not a complete list, were used in calculating the existing conditions runoff values.

- STORM SERIES
 - 24-hour; 2-yr, 5-yr, 10-yr, 25-yr, 100-yr Storm Events
 - 2-yr Rainfall Intensity = 3.83 in
 - 10-yr Rainfall Intensity = 5.22 in
 - 100-yr Rainfall Intensity = 7.37 in

- FLOW DATA
 - Areas per LIDAR data, USGS Quadrangle Sheet, Aerial Photos, and Site Visits
 - Rational Formula Method for onsite flows (C = 0.60)
 - Time of Concentration: Lag Method (minimum 15 min)

SITE CHARACTERISTICS

The site is currently open space pasture that drains primarily to the south and east and into the adjacent street ROWs. The site has some low areas throughout that appear to pond water in the smaller storm events.

The existing site characteristics can be seen from the aerial exhibit (Exhibit 2).

EXISTING CONDITIONS HYDROLOGIC ANALYSIS

The proposed site was analyzed for peak runoff values for the entire storm series based on undeveloped open space in Type B soils. A minimum Time of Concentration was used due to the sites size and runoff lengths. A Rational Runoff Coefficient of 0.60 was used based on open space.

DOWNSTREAM DRAINAGE CAPACITY

The property ultimately drains to the west and into the adjacent Park lake. This lake accepts runoff from approximately 1500+ acres of developed area around southeast Wichita. The lake discharges to the south into a man-made channel south of 55th Street. There appears to be adequate drainage and conveyance at this specific area. The lake is large and features a large outfall section where it is then drained to the channel section via 3 – 10'x4' RCBC.

POST-DEVELOPMENT HYDROLOGIC ANALYSIS

DRAINAGE METHODS & STANDARDS

The following methods and standards, although not a complete list, were used in developing the drainage and grading plans.

- STORM SERIES
 - 24-hour; 2-yr, 5-yr, 10-yr, 25-yr, 50-yr, 100-yr Storm Events Calculated
 - Rational Formula Method used for peak runoff
 - C = 0.72 (Multi-Family Residential - detached)
 - Time of Concentration; Lag Method, minimum Tc = 15min

- GRADING CONSTRAINTS TO BE OBSERVED AT SITE PLAN
 - One foot freeboard between 100-yr WSE and adjacent lot corner
 - Match all existing perimeter grades
 - On-site SWS system to be sized and located based on site plan

DEVELOPED CONDITIONS HYDROLOGIC ANALYSIS

The site is being platted into 38 lots – 37 multi-family residential and 1 limited commercial – with streets, utilities, and storm water sewer. The site was analyzed for peak runoff values based on residential multi-family homes in Type B soils. A Rational Runoff Coefficient of 0.72 was used assuming a 15 minute time of concentration.

DETENTION FACILITIES

There will be no onsite detention facilities located on this property. However, the City of Wichita Parks Department has agreed to accept this increased developed runoff in the adjacent lake in South Lakes Park. This lake, as well as lakes and ponds located upstream, accept runoff from approximately 1500 acres that is then conveyed downstream under 55th Street South via 3 – 10'x4' RCBCs. This pond would be very difficult to calculate a design water surface on since the basin is mostly developed with storm water sewer and varying pond outfalls. For example, the flow to the pond is controlled by the storm sewer serving the surrounding neighborhoods – the design storm likely ponds in the neighborhoods and is not fully conveyed to the pond. Since this basin is large and a simple stage/storage model would not accurately portray the design flows or design water surface, the surrounding house pads will be elevated to at least 1' above 55th Street South. This would allow the pond to overtop the roadway by 1' before any encroachment to the adjacent structures. For comparison, in the subdivision to the west of the lake, Simmons Park Addition, the structures appear to be elevated to an elevation of a 1371.5-72. The adjacent 55th Street is at approximate elevation 1371.0 south of that Addition and at elevation 1370.0 south of this proposed Addition.

DISCHARGE POINTS SUMMARY

Currently, this site discharges to the south and east via sheet flow and into the respective city street ROWs. A small portion sheet flows to the Seneca ROW and into the SWS system. This will continue upon development but only with backyard

drainage and minimal street discharge. A large inlet structure is located just off of the pavement to the south in 55th Street South. This inlet carries the majority of this sites runoff to the Park pond. This development will utilize this system and will incorporate more pipe and inlets internally in the subdivision. This system includes a 5'x3' RCBC which drains into the Park lake. The proposed system in the subdivision has been sized with a full flow backwater in the existing system during the 10 year storm event.

WATER QUALITY

Water quality will be obtained in this subdivision via 2 Hydroguard units. One will be located at the south end of the property along 55th Street in a manhole before the system ties into the existing 55th Street ROW system. The other system will be located at the north west corner of the property in the Reserve. This unit will treat the runoff before entering the Park lake. Both of these units will be sized as such to meet the current City of Wichita 80% TSS removal rate for the 1.2" rainfall event.

DOWNSTREAM CHANNEL PROTECTION

Due to the use of the existing offsite detention facility and the relative size of this site to the overall drainage basin, no downstream channel protection is proposed with this subdivision. The downstream pond has a large outfall – a triple 10'x4' RCBC – and a large manmade channel that is already sized for events larger than the 1 year event.

POTENTIAL UPSTREAM/DOWNSTREAM IMPACTS

Due to the size of the downstream detention pond located on the park property we do not expect any downstream impacts with the development of this site.

FLOODPLAIN SUBMITTAL

SOURCE OF FLOODPLAIN INFORMATION

This site lies within a FEMA Zone X per FEMA FIRM Panel 505 of 700 for Wichita, Sedgwick County, Kansas; effective February 2, 2007.

FEDERAL, STATE, & LOCAL PERMITTING

US ARMY CORPS OF ENGINEERS

There does not appear to be any jurisdictional waters of the US on this site.

KANSAS DEPT OF AGRICULTURE – DWR PERMITTING

There does not appear to be any DWR permitting needed on the proposed site at this time. The areas of discharge do not account for more than 640 acres.

FEMA

No FEMA permitting is expected at this time.

KANSAS DEPT OF TRANSPORTATION

There is no KDOT ROW adjacent or near this property which would require a permit at this time.

SEDGWICK COUNTY PERMITTING

There does not appear to be any Sedgwick County permitting needed at this time.

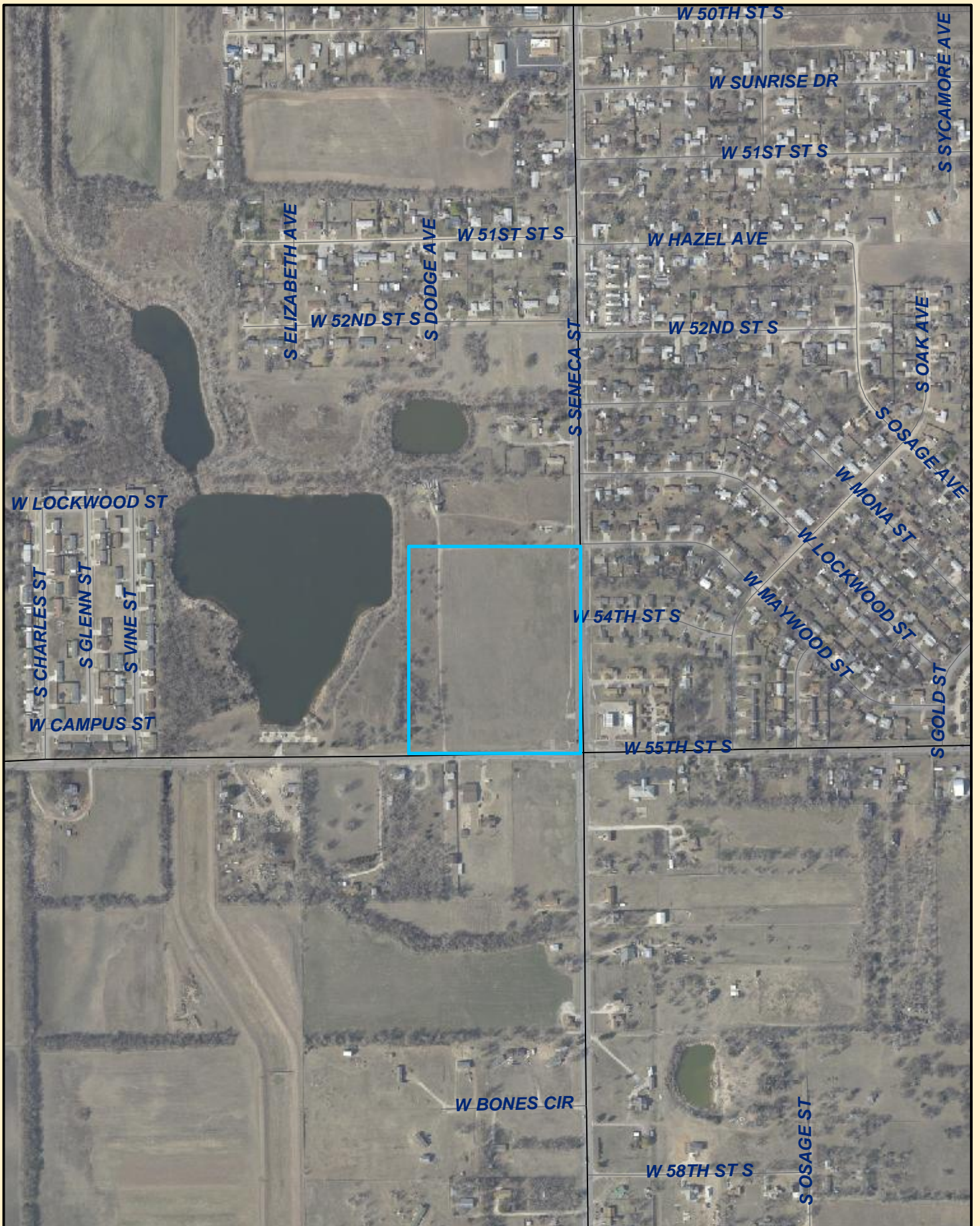
EXHIBIT 1: Site Location Map

EXHIBIT 2: Aerial Photo Exhibit with Lidar Topography

EXHIBIT 3: Plat – Half Scale

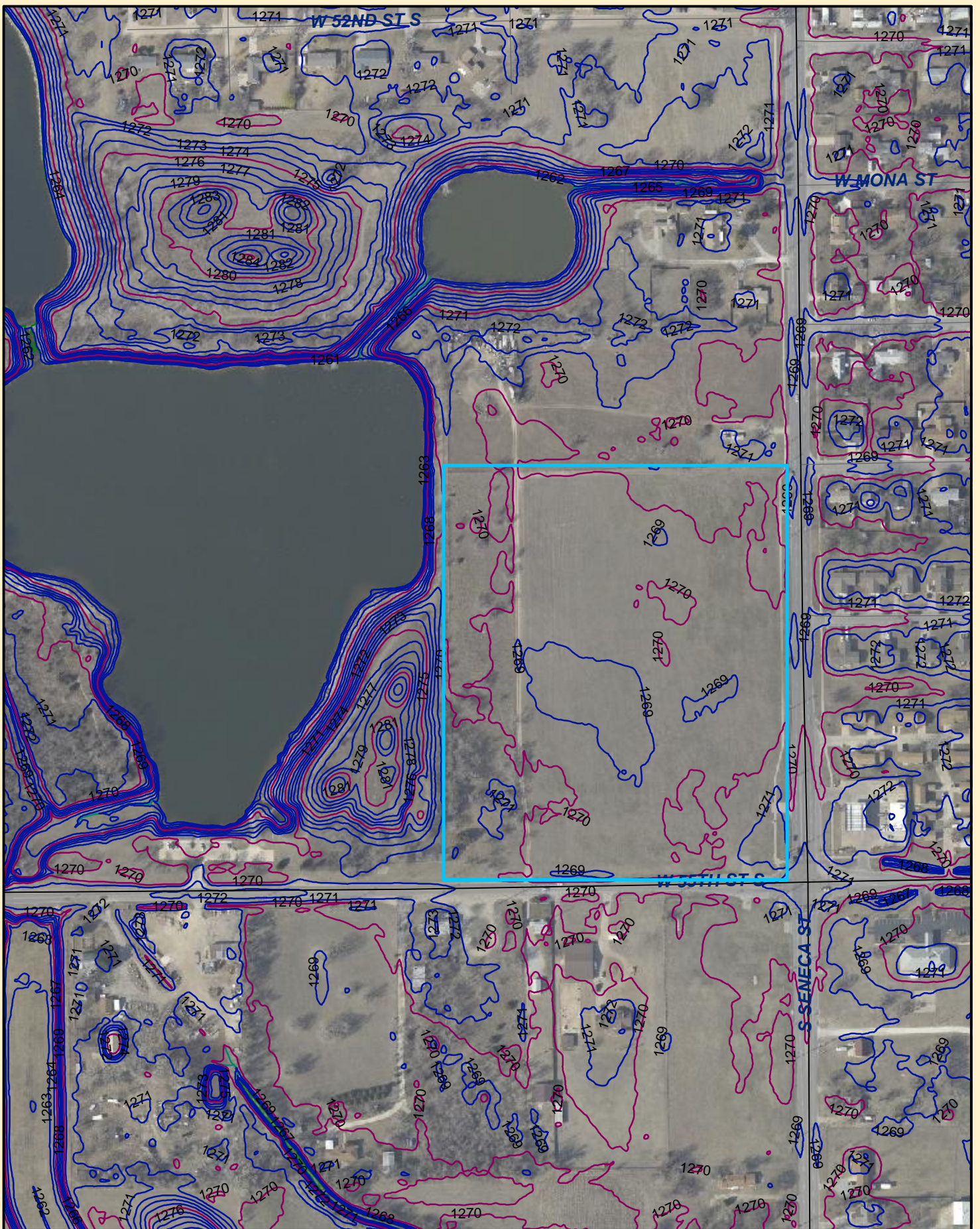
EXHIBIT 4: Drainage Plan – Half Scale

EXHIBIT 5: Floodplain Location (FIRM)

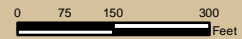


SOUTHERN SHORES ADDITION
Site Location



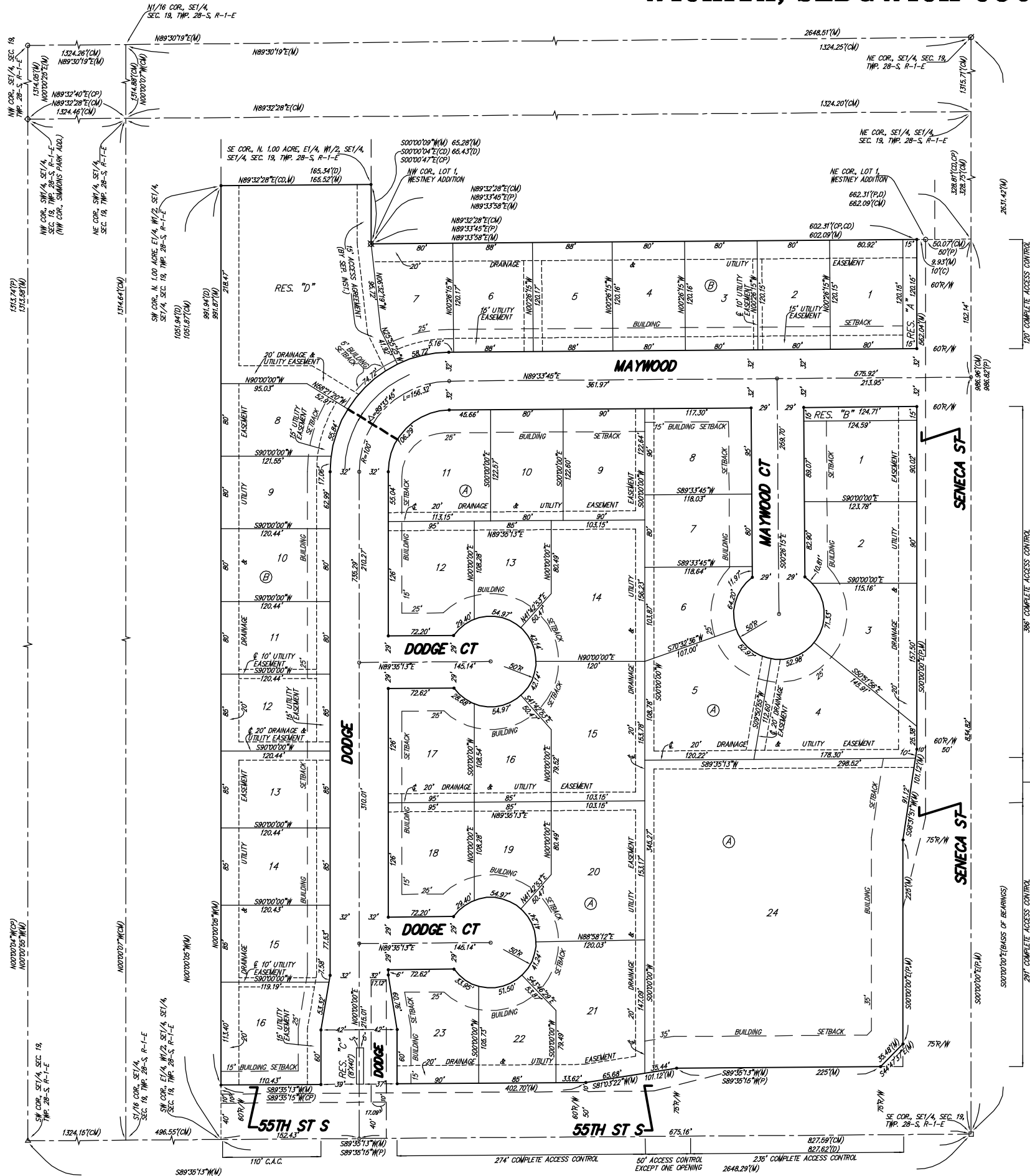


SOUTHERN SHORES ADDITION
Aerial Photo with LIDAR



SOUTHERN SHORES ADDITION

WICHITA, SEDGWICK COUNTY, KANSAS



State of Kansas) SS We, Baughman Company, P.A., Surveyors in Sedgwick County) do hereby certify that we have surveyed and platted "SOUTHERN SHORES ADDITION", Wichita, Sedgwick County, Kansas and that the accompanying plat is a true and correct exhibit of the property surveyed, described as follows: All of Lots 1, 2, 3, and 4, Westney Addition, Wichita, Sedgwick County, Kansas, together with a portion of the Southeast Quarter of the Southeast Quarter of Section 19, Township 28 South, Range 1 East of the Sixth Principal Meridian, Sedgwick County, Kansas, all of the above lying within and being coincident with the following described tract of land: Beginning at the southeast corner of said Southeast Quarter; thence westerly along the south line of said Southeast Quarter, 827.62 feet to the southwest corner of the East One-Fourth of the West Half of the Southeast Quarter of said Southeast Quarter; thence northerly along the west line of the East One-Fourth of the West Half of the Southeast Quarter of said Southeast Quarter, 1051.94 feet to the southwest corner of the north 1.00 acre of the East One-Fourth of the West Half of the Southeast Quarter of said Southeast Quarter; thence easterly along the south line of the north 1.00 acre of the East One-Fourth of the West Half of the Southeast Quarter of said Southeast Quarter, 165.34 feet to the southeast corner of the north 1.00 acre of the East One-Fourth of the West Half of the Southeast Quarter of said Southeast Quarter, said southeast corner also being on the northerly extension of the west line of said Westney Addition; thence southerly along the east line of the West Half of the Southeast Quarter of said Southeast Quarter, (and along the northerly extension of the west line of said Westney Addition), 65.43 feet to the northwest corner of said Westney Addition; thence easterly along the north line of said Westney Addition, and as extended easterly, 662.31 feet to a point on the east line of said Southeast Quarter; thence southerly along the east line of said Southeast Quarter, 986.82 feet to the point of beginning.

Existing public easements, dedications, building setbacks, and access controls, if any, being vacated by virtue of K.S.A. 12-512b, as amended.

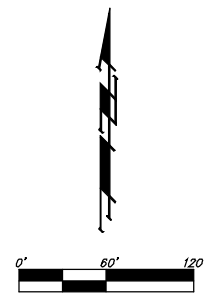
All being situated in the Southeast Quarter of Section 19, Township 28 South, Range 1 East of the Sixth Principal Meridian, Sedgwick County, Kansas.
Baughman Company, P.A.

Michael G. Conrey, Surveyor

Know all men by these presents that we, the undersigned, have caused the land in the surveyors certificate to be platted into Lots, Blocks, Streets, and Reserves to be known as "SOUTHERN SHORES ADDITION", Wichita, Sedgwick County, Kansas. The utility easements are hereby granted as indicated for the construction and maintenance of all public utilities. The drainage easement is hereby granted as indicated for drainage purposes. The drainage and utility easements are hereby granted as indicated for drainage purposes and for the construction and maintenance of all public utilities. The streets are hereby dedicated to and for the use of the public. Reserves "A" and "B" are hereby reserved for open space, landscaping, entry monuments, berms, drainage purposes, and utilities as confined to easement. Reserve "C" is hereby reserved for entry monuments, streets, landscaping, open space, drainage purposes, and utilities. Reserve "D" is hereby reserved for open space, landscaping, pedestrian access to the public park, a clubhouse, swimming pools and related appurtenances, an access drive as confined to easement, drainage purposes, and utilities as confined to easements. All abutters rights of access are hereby granted to the City of Wichita, Kansas.

Angel Fire, LLC, a Kansas limited liability company

Michael J. Brand, Managing Member



- = #4 REBAR W/ "BAUGHMAN" CAP (SET)
 - ⊗ = 3/4" IRON IN THIMBLE (FOUND)
 - ⊙ = 5/4" IRON (FOUND)
 - = 1/2" IRON IN THIMBLE (FOUND)
 - △ = #4 REBAR (FOUND)
 - = 1/2" IRON PIPE (FOUND) (ORIGIN UNKNOWN)
 - ◇ = 5/4" IRON PIPE W/ "TEC" CAP (FOUND)
- (M) = MEASURED
(D) = DESCRIBED
(P) = PLATTED
(CM) = CALCULATED PER MEASURED INFO.
(CD) = CALCULATED PER DESCRIBED INFO.
(CP) = CALCULATED PER PLATTED INFO.

NOTE: A master grading plan for drainage has been developed for this subdivision and is on file with the City of Wichita, Kansas. All drainage easements, right-of-ways, or reserves shall remain at established grades or as modified with the approval of the City Engineer of the City of Wichita, Kansas. No obstructions which impede the flow of this drainage system shall be allowed.

This plat of "SOUTHERN SHORES ADDITION, Wichita, Sedgwick County, Kansas has been submitted to and approved by the Wichita-Sedgwick County Metropolitan Area Planning Commission, Wichita, Kansas.

Dated this _____ day of _____, 2014.
Wichita-Sedgwick County Metropolitan Area Planning Commission

Don Klausmeyer, Chair

John L. Schlegel, Secretary

This plat approved and all dedications shown hereon accepted by the City Council of the City of Wichita, Kansas, this _____ day of _____, 2014.

Carl Brewer, Mayor

Karen Sublett, City Clerk

Reviewed in accordance with K.S.A. 58-2005 on this _____ day of _____, 2014.

Tricia L. Robello, L.S. #1246
Deputy County Surveyor
Sedgwick County, Kansas

Entered on transfer record this _____ day of _____, 2014.

Kelly B. Arnold, County Clerk

State of Kansas) SS This is to certify that this plat has been filed for record in the office of the Register of Deeds, this _____ day of _____, 2014 at _____ o'clock _____ M.; and is duly recorded.

Bill Meek, Register of Deeds

Tonya Buckingham, Deputy

State of Kansas) SS The foregoing instrument acknowledged before me, this _____ day of _____, 2014, by Michael J. Brand, Managing Member of Angel Fire, LLC, a Kansas limited liability company, on behalf of the limited liability company;

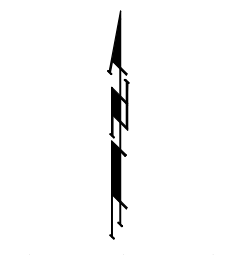
_____, Notary Public

My App't. Exp. _____

DRAINAGE PLAN

SOUTHERN SHORES ADDITION

WICHITA, SEDGWICK COUNTY, KANSAS



DATE OF PREPARATION: 9 DECEMBER 2013
 DATE OF TOPOGRAPHY: 1 AUGUST 2012
 CONTOUR INTERVALS - 1 FOOT

OWNER:
 ANGEL FIRE, LLC
 ATTN: MIKE BRAND
 2418 S HOOVER
 WICHITA, KS 67215
 943-2306

LEGAL DESCRIPTION:
 ALL OF LOTS 1, 2, 3, AND 4, WESTNEY ADDITION, WICHITA, SEDGWICK COUNTY, KANSAS, TOGETHER WITH A PORTION OF THE SOUTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 19, TOWNSHIP 28 SOUTH, RANGE 1 EAST OF THE SIXTH PRINCIPAL MERIDIAN, SEDGWICK COUNTY, KANSAS, ALL OF THE ABOVE LYING WITHIN AND BEING CONSIDERED WITH THE FOLLOWING DESCRIBED TRACT OF LAND: BEGINNING AT THE SOUTHWEST CORNER OF SAID SOUTHWEST QUARTER; THENCE WESTERLY ALONG THE SOUTH LINE OF SAID SOUTHWEST QUARTER, 827.62 FEET TO THE SOUTHWEST CORNER OF THE EAST ONE-FOURTH OF THE WEST HALF OF THE SOUTHWEST QUARTER OF SAID SOUTHWEST QUARTER; THENCE NORTHERLY ALONG THE WEST LINE OF THE EAST ONE-FOURTH OF THE WEST HALF OF THE SOUTHWEST QUARTER OF SAID SOUTHWEST QUARTER, 1051.94 FEET TO THE SOUTHWEST CORNER OF THE NORTH 1.00 ACRE OF THE EAST ONE-FOURTH OF THE WEST HALF OF THE SOUTHWEST QUARTER OF SAID SOUTHWEST QUARTER; THENCE EASTERLY ALONG THE SOUTH LINE OF THE NORTH 1.00 ACRE OF THE EAST ONE-FOURTH OF THE WEST HALF OF THE SOUTHWEST QUARTER OF SAID SOUTHWEST QUARTER, 1051.94 FEET TO THE SOUTHWEST CORNER OF THE NORTH 1.00 ACRE OF THE EAST ONE-FOURTH OF THE WEST HALF OF THE SOUTHWEST QUARTER OF SAID SOUTHWEST QUARTER; THENCE SOUTHERLY ALONG THE EAST LINE OF THE WEST HALF OF THE SOUTHWEST QUARTER OF SAID SOUTHWEST QUARTER, (AND ALONG THE NORTHERLY EXTENSION OF THE WEST LINE OF SAID WESTNEY ADDITION), 65.43 FEET TO THE NORTHWEST CORNER OF SAID WESTNEY ADDITION; THENCE EASTERLY ALONG THE NORTH LINE OF SAID WESTNEY ADDITION, AND AS EXTENDED EASTERLY, 662.31 FEET TO A POINT ON THE EAST LINE OF SAID SOUTHWEST QUARTER; THENCE SOUTHERLY ALONG THE EAST LINE OF SAID SOUTHWEST QUARTER, 986.82 FEET TO THE POINT OF BEGINNING.

BENCHMARK:
 "C1" CUT BACK OF WALK AT THE NORTHERLY DEFLECTION IN WALK 83' S. SOUTH OF THE CORNER OF LOT 17. ELEV. = 1270.20 NAVD83

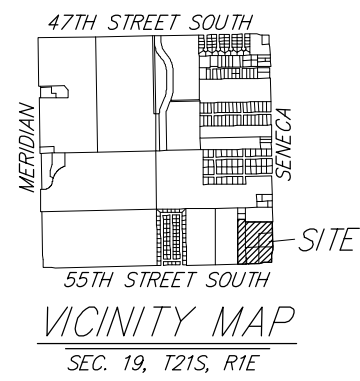
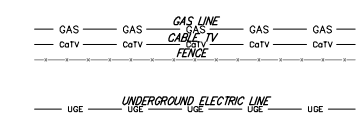
LEGEND

- Proposed SWS
- Drainage Basin Boundary
- Proposed Flow Direction
- Proposed Drainage Basin

Developed Intensity	2yr			10yr			100yr		
	Intensity	3.8	5.2	7.3	7.3	7.3	7.3	7.3	7.3
Rational C	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72

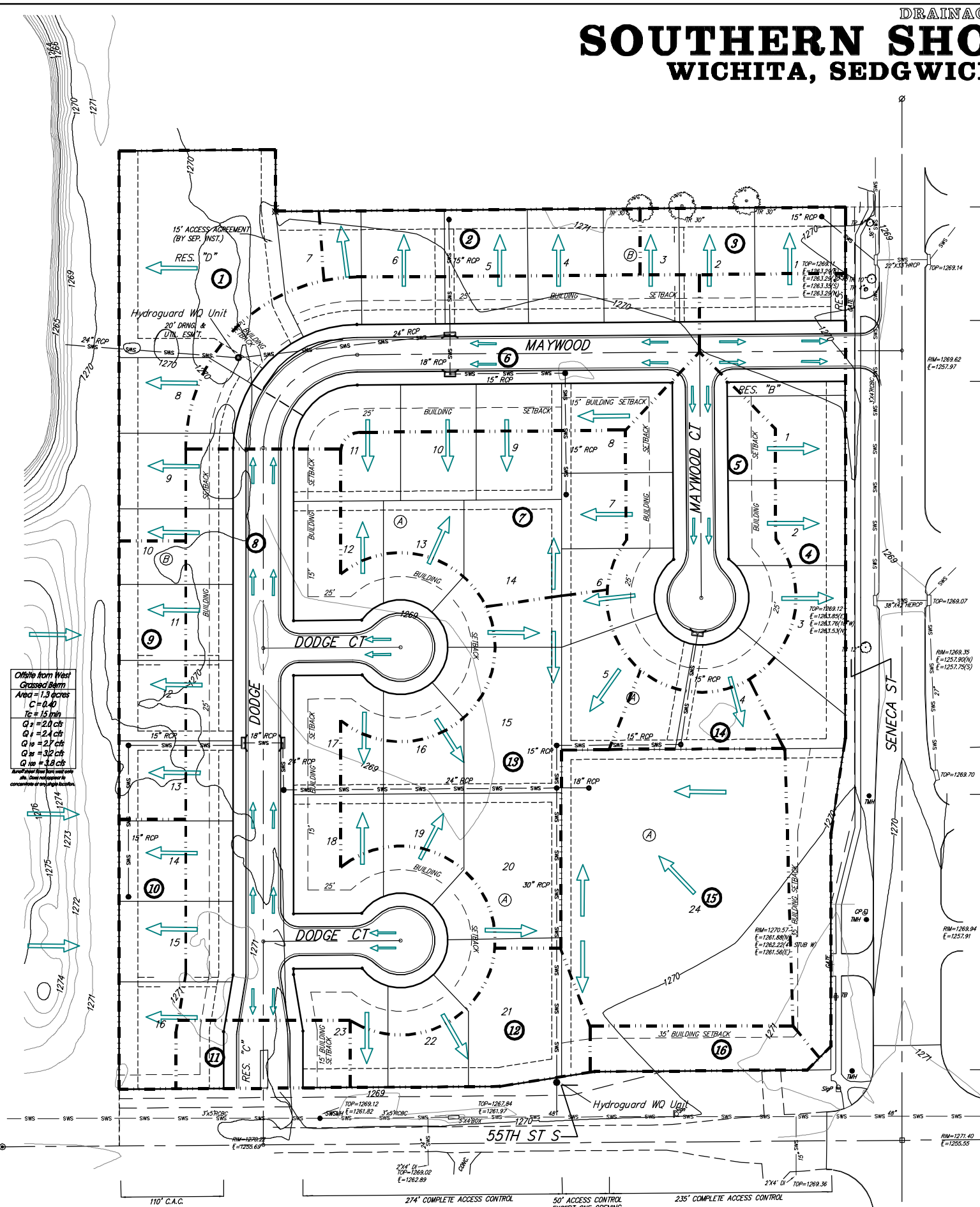
Basin ID	Area acres	Developed Flowrates		
		2-yr cfs	10-yr cfs	100-yr cfs
1	1.20	3.3	4.5	6.4
2	0.50	1.4	1.9	2.6
3	0.30	0.8	1.1	1.6
4	1.30	3.6	4.9	6.9
5	1.20	3.3	4.5	6.4
6	1.90	5.2	7.1	10.1
7	1.00	2.7	3.7	5.3
8	3.50	9.6	13	19
9	0.50	1.4	1.9	2.6
10	0.40	1.1	1.5	2.1
11	0.30	0.8	1.1	1.6
12	0.50	1.4	1.9	2.6
13	1.30	3.6	4.9	6.9
14	0.20	0.5	0.7	1.1
15	1.60	4.4	6.0	8.5
16	0.20	0.5	0.7	1.1
TOTAL	16	44	60	84

- OP = Catch Basin
- OP = Cable TV Pedestal
- DI = Drop Inlet
- ⊙ = #4 REBAR (FOUND)
- ⊙ = #4 REBAR W/ "BAUGHMAN" CAP (SET)
- ⊙ = 3/4" IRON IN THIMBLE (FOUND)
- ⊙ = 3/4" IRON (FOUND)
- ⊙ = 1/2" IRON IN THIMBLE (FOUND)
- SP = Signal Pole
- SM = Sign
- SSM = Stormwater Sewer Manhole
- TR = Tree
- TR = Traffic Box
- TM = Traffic Manhole



NOTE: Detention will be provided in the west offsite City of Wichita Parks Department Lake. Offsite runoff will be treated by mechanical devices prior to discharging into the lake or adjacent SWS system. Hydroguard Unit to be sized at time of site development. Size and location are subject to change based on SWS routing and pipe location.

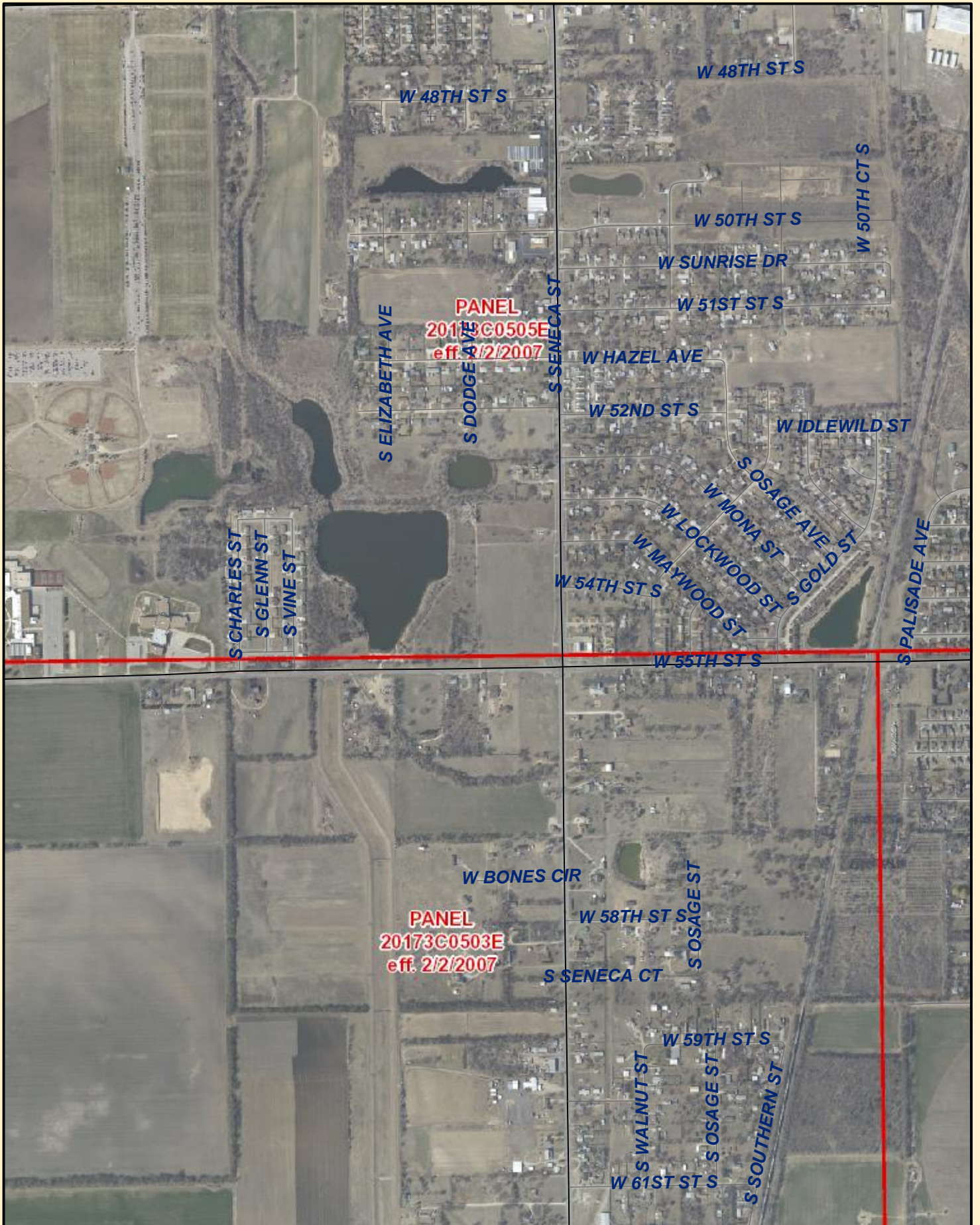
NOTES: There is no FEMA SFHA located on this property as of this date per FEMA FIRM Panel 505 of 700, for Wichita, Sedgwick County, Kansas; effective February 2, 2007.



Offsite from West Grassed Farm
 Area = 1.3 acres
 C = 0.40
 Tc = 15 min
 Qi = 2.0 cfs
 Qi = 2.4 cfs
 Qi = 2.7 cfs
 Qi = 3.2 cfs
 Qi = 3.8 cfs

DRAINAGE PLAN

SOUTHERN SHORES ADDITION



PANEL
20173C0505E
eff. 2/2/2007

S ELIZABETH AVE

S DODGE AVE

S SENECA ST

S CHARLES ST

S GLENN ST

S VINE ST

W 48TH ST S

W 50TH ST S

W SUNRISE DR

W 51ST ST S

W HAZEL AVE

W 52ND ST S

W IDLEWILD ST

S OSAGE AVE ST

W MONA ST

W LOCKWOOD ST

W MAYWOOD ST

S GOLD ST

W 54TH ST S

W 55TH ST S

S PALISADE AVE

W BONES CIR

PANEL
20173C0503E
eff. 2/2/2007

W 58TH ST S

S SENECA CT

W 59TH ST S

S WALNUT ST

S OSAGE ST

S SOUTHERN ST

W 61ST ST S



SOUTHERN SHORES ADDITION
FIRM Panel



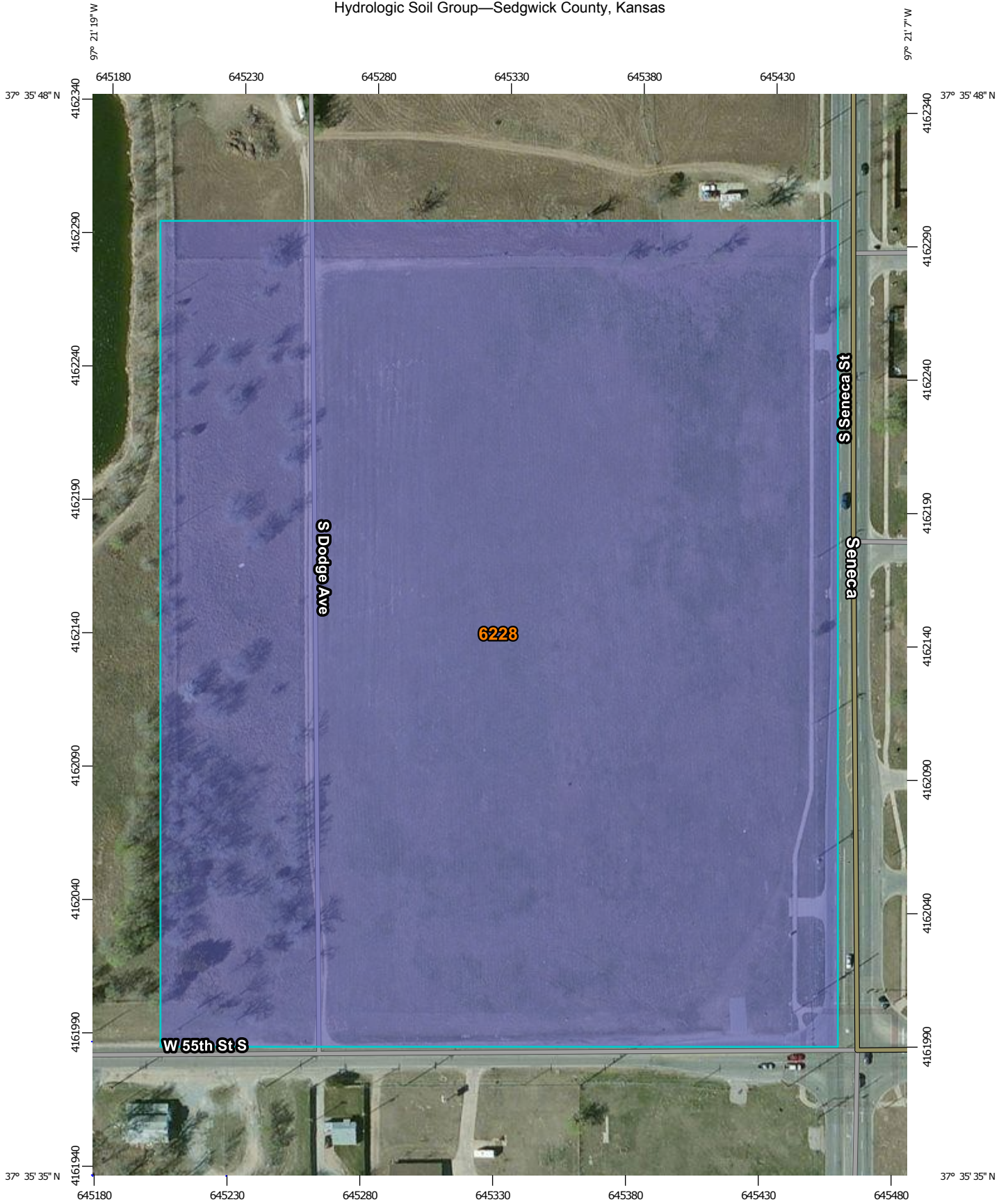
SUPPORTING CALCULATIONS

APPENDIX A: USGS Soils Survey

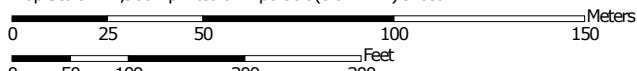
APPENDIX B : HydraFlow SWS
Proposed Onsite SWS

USGS Soils Survey

Hydrologic Soil Group—Sedgwick County, Kansas



Map Scale: 1:1,980 if printed on A portrait (8.5" x 11") sheet.




Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84



MAP LEGEND

Area of Interest (AOI)









 Area of Interest (AOI)

Soils

Soil Rating Polygons





-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

Soil Rating Lines


-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

Soil Rating Points






-  A
-  A/D
-  B
-  B/D

-  C
-  C/D
-  D
-  Not rated or not available


Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Sedgwick County, Kansas
 Survey Area Data: Version 8, Sep 20, 2012

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 18, 2010—Sep 27, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Sedgwick County, Kansas (KS173)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
6228	Canadian-Waldeck fine sandy loams, rarely flooded	B	19.6	100.0%
Totals for Area of Interest			19.6	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie. The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

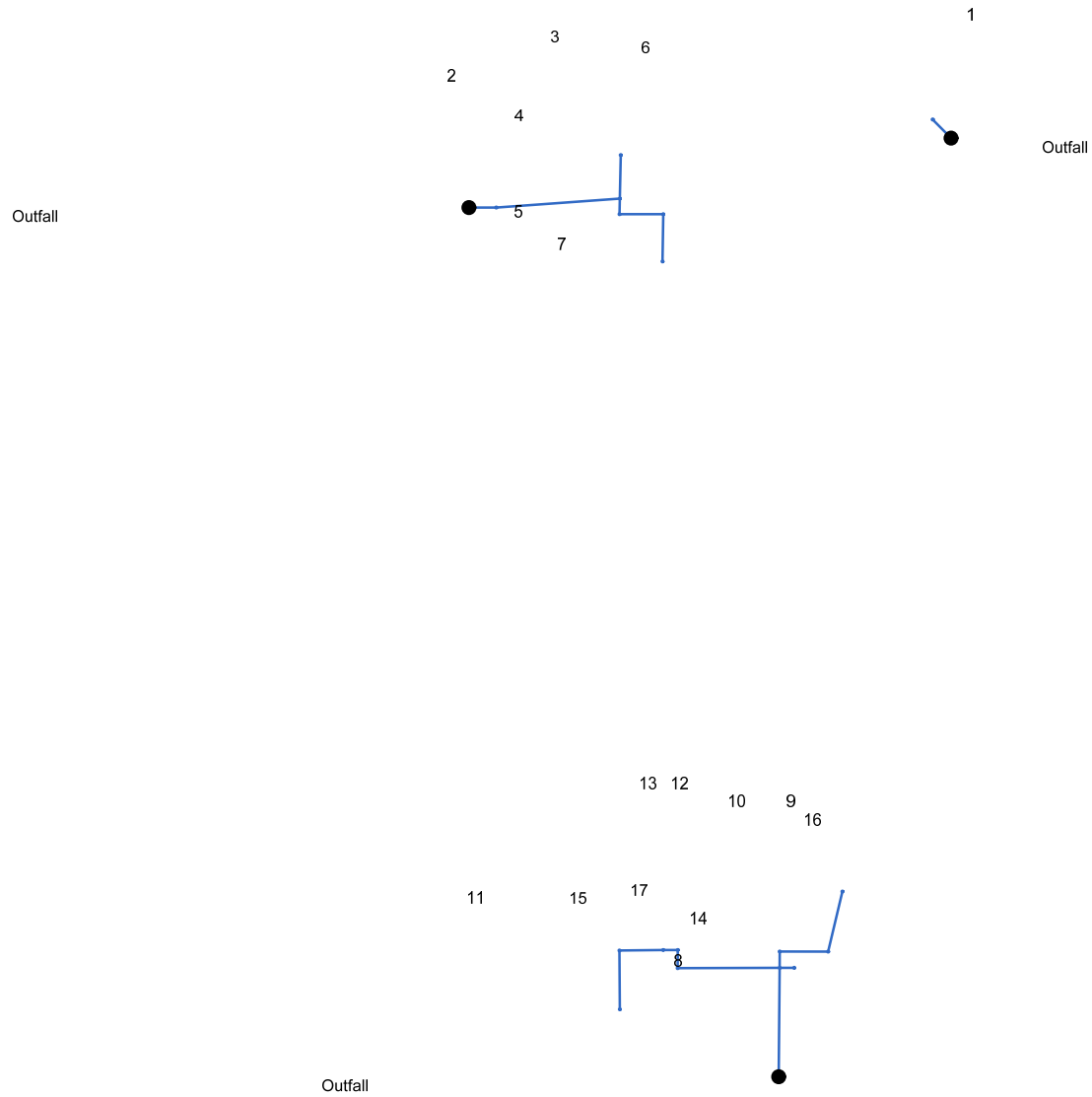
Tie-break Rule: Higher

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

HydraFlow SWS

Onsite SWS Systems

Hydraflow Storm Sewers Extension for AutoCAD® Civil 3D® 2013 Plan



Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	72.000	-134.556	DrGrt	0.00	0.30	0.72	15.0	1263.90	0.33	1264.13	15	Cir	0.013	1.00	1268.90	
2	End	75.000	0.000	DrGrt	0.00	1.00	0.72	15.0	1263.00	0.20	1263.15	24	Cir	0.013	0.50	1268.90	
3	2	340.000	-4.153	Curb	0.00	1.00	0.72	15.0	1263.15	0.20	1263.83	24	Cir	0.013	1.50	1271.00	
4	3	120.000	-84.691	DrGrt	0.00	0.50	0.72	15.0	1264.58	0.44	1265.11	15	Cir	0.013	1.00	1269.10	
5	3	43.000	95.466	Curb	0.00	0.90	0.72	15.0	1264.33	0.25	1264.44	18	Cir	0.013	1.50	1271.00	
6	5	120.000	-91.314	MH	0.00	0.00	0.72	15.0	1264.69	0.44	1265.22	15	Cir	0.013	1.00	1272.20	
7	6	130.000	90.903	DrGrt	0.00	1.00	0.72	15.0	1265.22	0.37	1265.70	15	Cir	0.012	1.00	1270.40	
8	End	300.000	-89.489	DrGrt	0.00	1.00	0.72	15.0	1263.00	0.20	1263.60	30	Cir	0.013	1.50	1269.40	
9	8	40.000	89.351	DrGrt	0.00	1.60	0.72	15.0	1264.60	0.33	1264.73	18	Cir	0.013	1.00	1269.00	
10	8	280.000	-90.688	MH	0.00	0.00	0.72	15.0	1264.10	0.20	1264.66	24	Cir	0.013	1.00	1269.40	
11	10	50.000	90.624	Curb	0.00	2.00	0.72	15.0	1264.66	0.20	1264.76	24	Cir	0.013	1.50	1271.50	
12	11	40.000	-90.448	Curb	0.00	1.50	0.72	15.0	1265.26	0.25	1265.36	18	Cir	0.013	0.50	1270.70	
13	12	120.000	-0.639	DrGrt	0.00	0.50	0.72	15.0	1265.61	0.44	1266.14	15	Cir	0.013	1.50	1269.00	
14	13	162.000	-89.761	DrGrt	0.00	0.40	0.72	15.0	1266.14	0.33	1266.66	15	Cir	0.013	1.00	1269.80	
15	8	45.000	-0.448	DrGrt	0.00	0.30	0.72	15.0	1264.85	0.32	1265.00	15	Cir	0.013	1.50	1269.90	
16	15	133.000	90.067	DrGrt	0.00	0.20	0.72	15.0	1265.00	0.33	1265.43	15	Cir	0.013	1.47	1269.20	
17	16	170.000	-76.865	Curb	0.00	1.20	0.72	15.0	1265.43	0.44	1266.17	15	Cir	0.013	1.00	1270.70	

Project File: onsite SWS.stm

Number of lines: 17

Date: 2/10/2014

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
1		DropGrate	1268.90	Cir	4.00	4.00	15	Cir	1264.13			
2		DropGrate	1268.90	Cir	4.00	4.00	24	Cir	1263.15	24	Cir	1263.15
3		Curb-	1271.00	Cir	4.00	4.00	24	Cir	1263.83	15 18	Cir Cir	1264.58 1264.33
4		DropGrate	1269.10	Cir	4.00	4.00	15	Cir	1265.11			
5		Curb-	1271.00	Cir	4.00	4.00	18	Cir	1264.44	15	Cir	1264.69
6		Manhole	1272.20	Cir	4.00	4.00	15	Cir	1265.22	15	Cir	1265.22
7		DropGrate	1270.40	Cir	4.00	4.00	15	Cir	1265.70			
8		DropGrate	1269.40	Cir	4.00	4.00	30	Cir	1263.60	18 24 15	Cir Cir Cir	1264.60 1264.10 1264.85
9		DropGrate	1269.00	Cir	4.00	4.00	18	Cir	1264.73			
10		Manhole	1269.40	Cir	4.00	4.00	24	Cir	1264.66	24	Cir	1264.66
11		Curb-	1271.50	Cir	4.00	4.00	24	Cir	1264.76	18	Cir	1265.26
12		Curb-	1270.70	Cir	4.00	4.00	18	Cir	1265.36	15	Cir	1265.61
13		DropGrate	1269.00	Cir	4.00	4.00	15	Cir	1266.14	15	Cir	1266.14
14		DropGrate	1269.80	Cir	4.00	4.00	15	Cir	1266.66			
15		DropGrate	1269.90	Cir	4.00	4.00	15	Cir	1265.00	15	Cir	1265.00
16		DropGrate	1269.20	Cir	4.00	4.00	15	Cir	1265.43	15	Cir	1265.43
17		Curb-	1270.70	Cir	4.00	4.00	15	Cir	1266.17			

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1		1.02	15	Cir	72.000	1263.90	1264.13	0.325	1265.00	1265.01	0.02	1265.03	End	DropGrate
2		13.69	24	Cir	75.000	1263.00	1263.15	0.200	1264.31	1264.95	n/a	1265.11	End	DropGrate
3		11.01	24	Cir	340.000	1263.15	1263.83	0.200	1265.15*	1265.96*	n/a	1266.24	2	Curb-
4		1.70	15	Cir	120.000	1264.58	1265.11	0.438	1266.24	1266.32	n/a	1266.35	3	DropGrate
5		6.19	18	Cir	43.000	1264.33	1264.44	0.255	1266.24*	1266.39*	n/a	1266.68	3	Curb-
6		3.32	15	Cir	120.000	1264.69	1265.22	0.438	1266.68*	1267.00*	n/a	1267.11	5	Manhole
7		3.39	15	Cir	130.000	1265.22	1265.70	0.373	1267.11*	1267.42*	n/a	1267.53	6	DropGrate
8		26.23	30	Cir	300.000	1263.00	1263.60	0.200	1264.73*	1266.62*	n/a	1267.28	End	DropGrate
9		5.43	18	Cir	40.000	1264.60	1264.73	0.325	1267.28*	1267.39*	n/a	1267.54	8	DropGrate
10		13.60	24	Cir	280.000	1264.10	1264.66	0.200	1267.28*	1268.30*	n/a	1268.59	8	Manhole
11		13.66	24	Cir	50.000	1264.66	1264.76	0.200	1268.59*	1268.77*	n/a	1269.21	10	Curb-
12		7.48	18	Cir	40.000	1265.26	1265.36	0.255	1269.21*	1269.41*	n/a	1269.55	11	Curb-
13		2.86	15	Cir	120.000	1265.61	1266.14	0.438	1269.55*	1269.79*	n/a	1269.91	12	DropGrate
14		1.36	15	Cir	162.000	1266.14	1266.66	0.325	1269.91*	1269.99*	n/a	1270.01	13	DropGrate
15		5.55	15	Cir	45.000	1264.85	1265.00	0.325	1267.28*	1267.62*	n/a	1268.09	8	DropGrate
16		4.64	15	Cir	133.000	1265.00	1265.43	0.325	1268.09*	1268.78*	n/a	1269.11	15	DropGrate
17		4.07	15	Cir	170.000	1265.43	1266.17	0.438	1269.11*	1269.78*	n/a	1269.95	16	Curb-

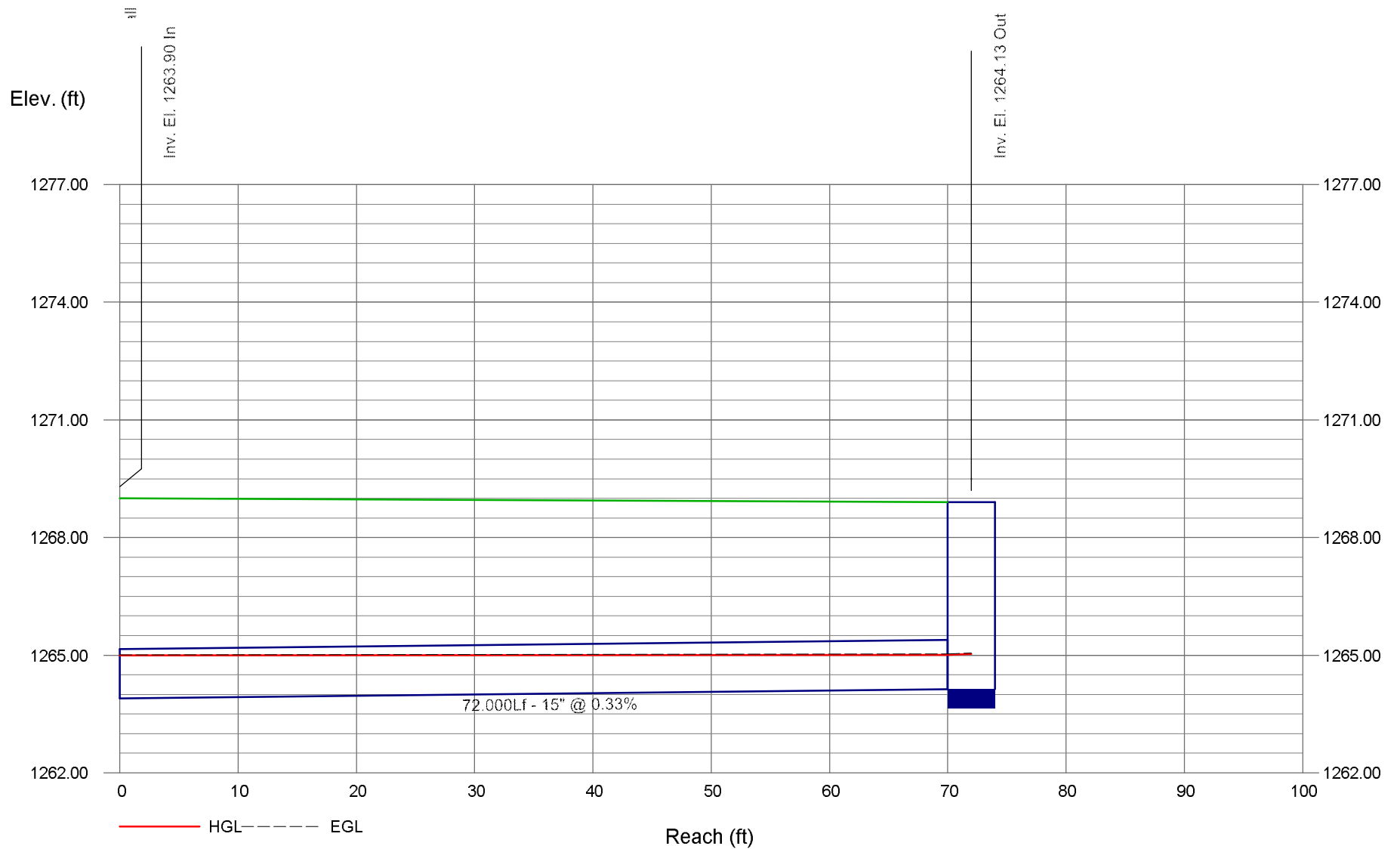
Project File: onsite SWS.stm

Number of lines: 17

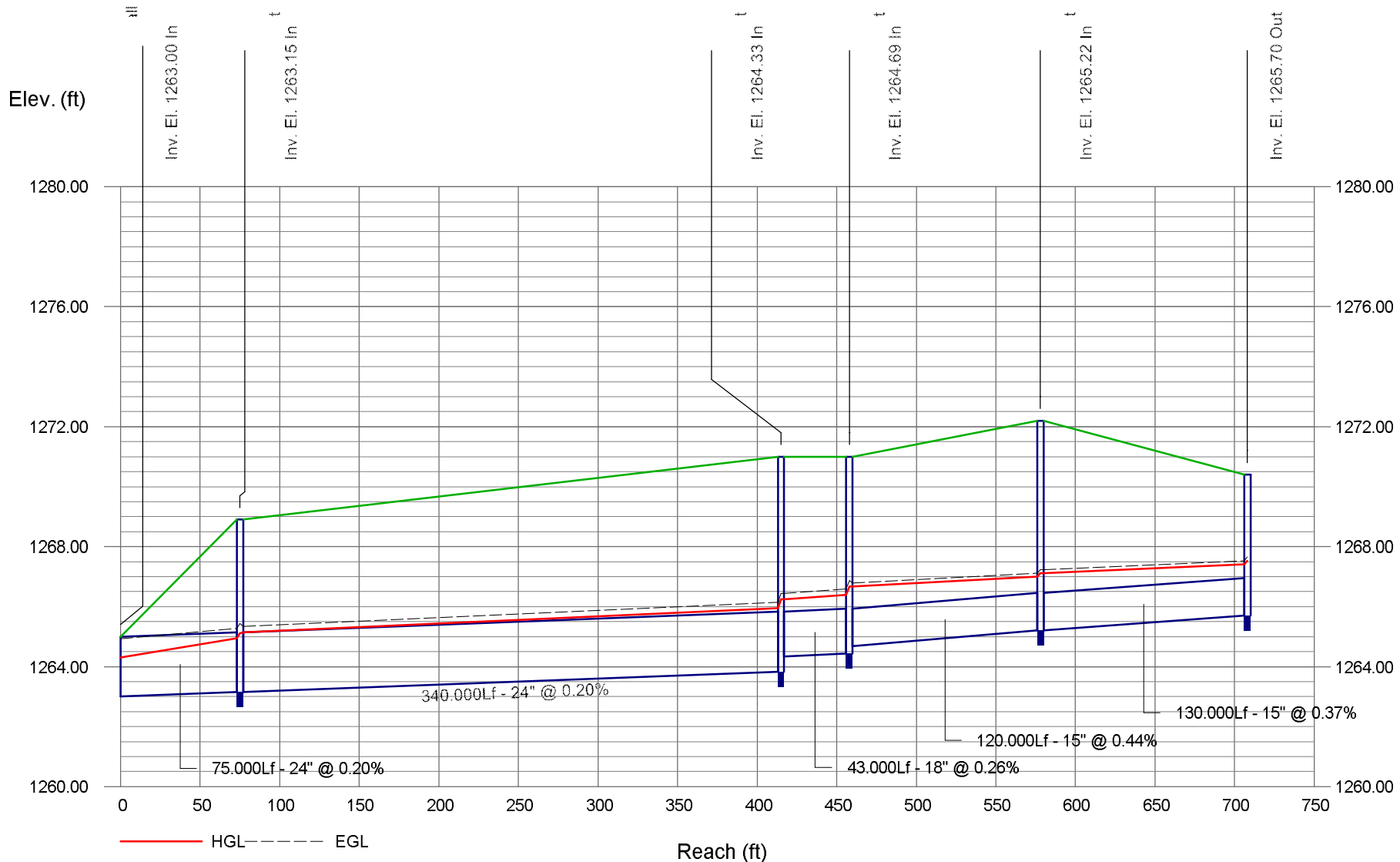
Run Date: 2/10/2014

NOTES: Return period = 10 Yrs. ; *Surcharged (HGL above crown).

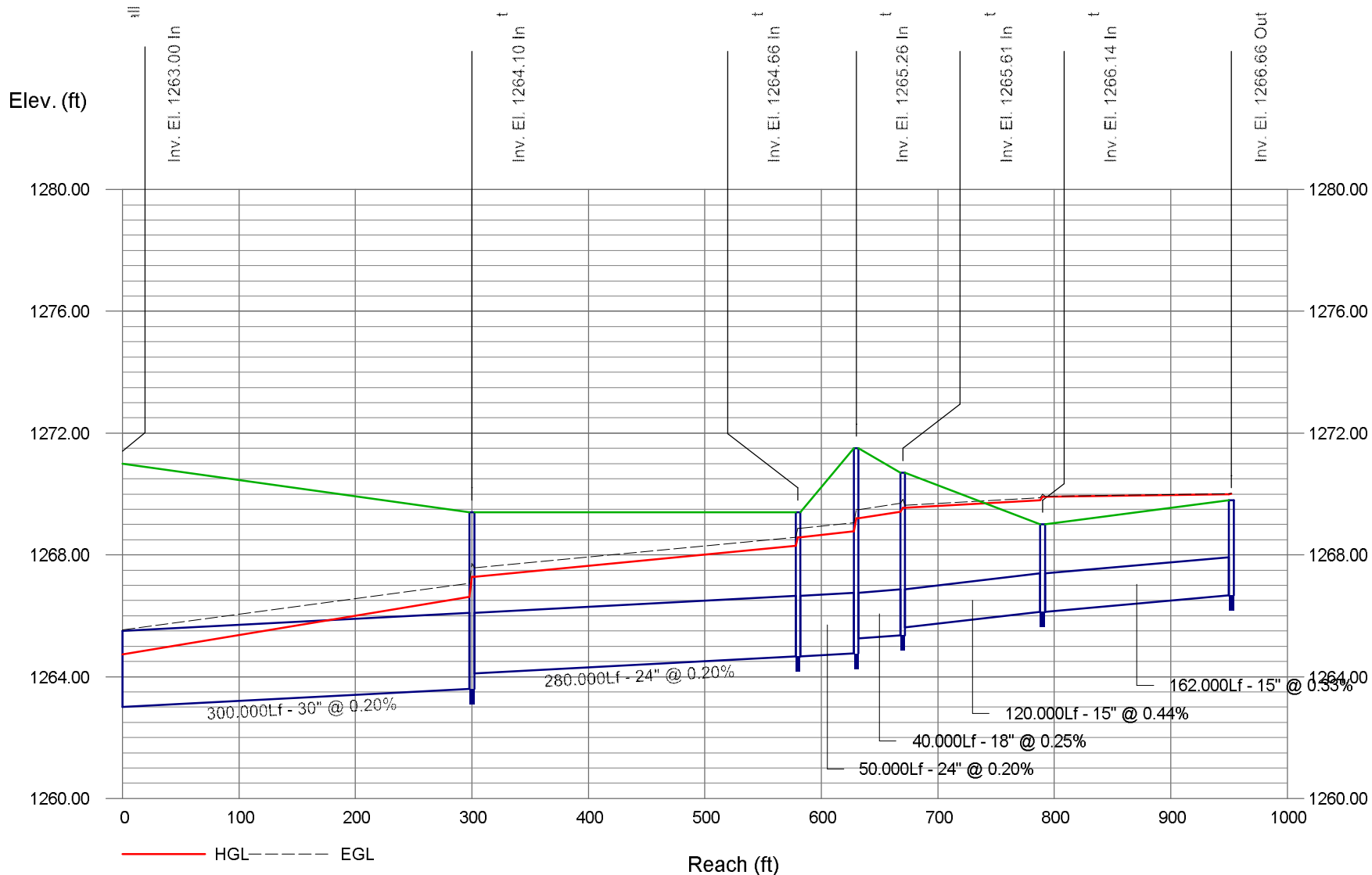
Storm Sewer Profile



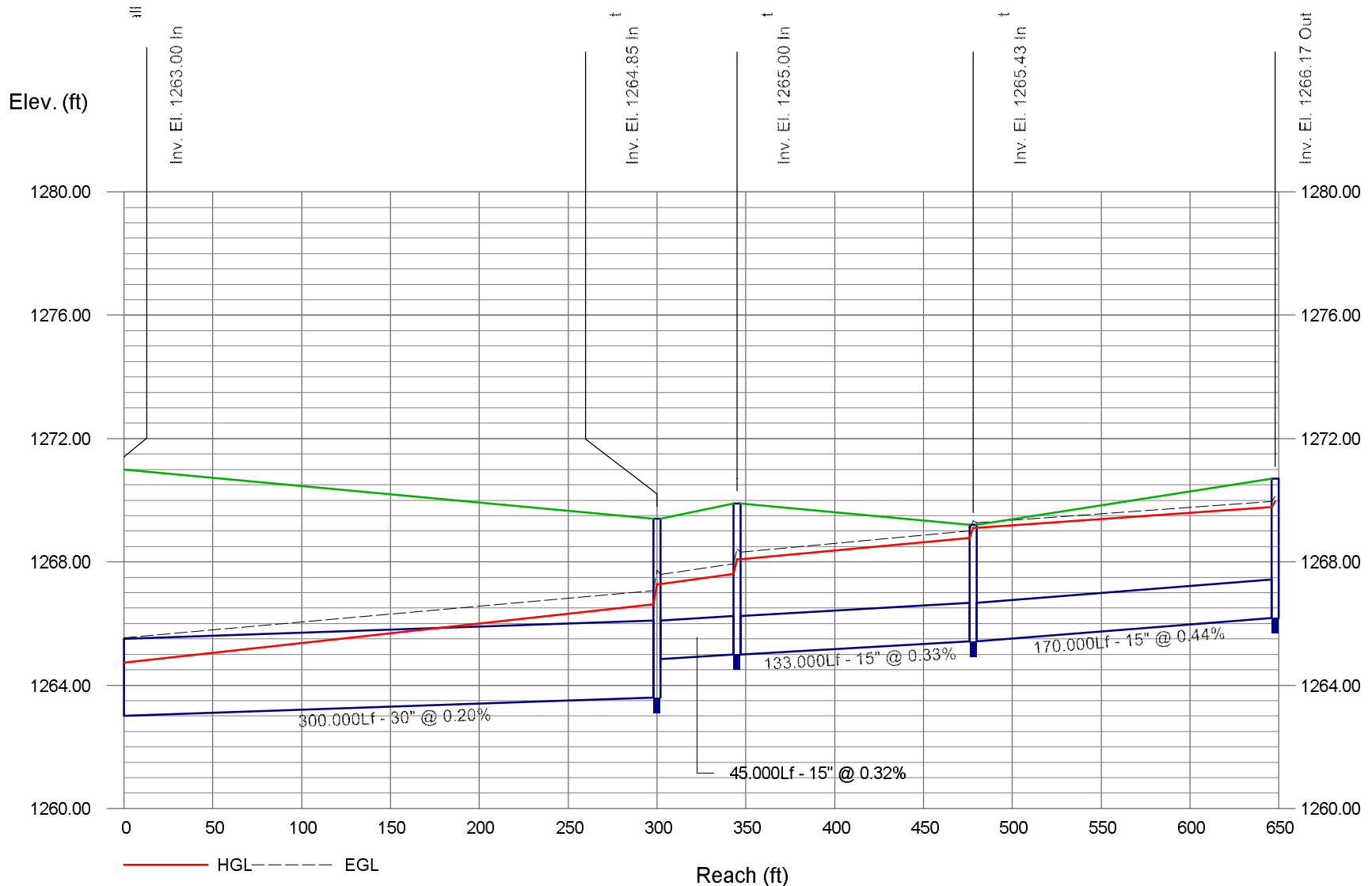
Storm Sewer Profile



Storm Sewer Profile



Storm Sewer Profile



Drainage Plan
1:100 Scale