

Kansas Department of Agriculture
Division of Water Resources
PERMIT OF NEW APPLICATION WORKSHEET

1. File Number: <p style="text-align: center;">49,484</p>	2. Status Change Date:	3. Field Office: <p style="text-align: center;">2</p>	4. GMD: <p style="text-align: center;">2</p>
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5. Status: Approved Denied by DWR/GMD Dismiss by Request/Failure to Return

6. Enclosures: Check Valve N of C Form Water Tube Driller Copy Meter

<p>7a. Applicant(s) New to system <input type="checkbox"/></p> <p style="text-align: right;">Person ID <u>64754</u> Add Seq# _____</p> <p>TIER 1 LLC 7926 2 21ST STREET WICHITA KS 67205</p> <p>7b. Landowner(s) New to system <input type="checkbox"/></p> <p style="text-align: right;">Person ID _____ Add Seq# _____</p> <p>7a.</p>	<p>7c. Landowner(s) New to system <input type="checkbox"/></p> <p style="text-align: right;">Person ID _____ Add Seq# _____</p> <p>7d. Misc. New to system <input type="checkbox"/></p> <p style="text-align: right;">Person ID _____ Add Seq# _____</p>
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<p>8. WUR Correspondent New to system <input type="checkbox"/></p> <p style="text-align: right;">Person ID _____ Add Seq# _____</p> <p>Overlap File (s) WUC <input type="checkbox"/></p> <p>Agree <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>7a.</p>	<p>9. Use of Water: Changing? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p style="margin-left: 40px;"><input checked="" type="checkbox"/> Groundwater <input type="checkbox"/> Surface Water</p> <p><input checked="" type="checkbox"/> IRR <input checked="" type="checkbox"/> REC <input type="checkbox"/> DEW <input type="checkbox"/> MUN</p> <p><input type="checkbox"/> \$TK <input type="checkbox"/> SED <input type="checkbox"/> DOM <input type="checkbox"/> CON</p> <p><input type="checkbox"/> HYD DRG <input type="checkbox"/> WTR PWR <input type="checkbox"/> ART RECHRG</p> <p><input type="checkbox"/> IND SIC: _____ <input type="checkbox"/> OTHER: _____</p>
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10. Completion Date: 12/31/2017 11. Perfection Date: 12/31/2021 12. Exp Date: _____

13. Conservation Plan Required? Yes No Date Required: _____ Date Approved: _____ Date to Comply: _____

14. Water Level Measuring Device? Yes No Date to Comply: _____ Date WLMD Installed: _____

Date Prepared: **9/8/2016** By: **EMC**
Date Entered: _____ By: _____

File No. **49,484** 15. Formation Code: **190** Drainage Basin: **ARK RIVER** County: **SG** Special Use: Stream:

16. Points of Diversion	T	MOD	DEL	ENT	PDIV	Qualifier	S	T	R	ID	'N	'W
MOD					84734	SW SE SW	27	26S	1W	9	630	3756

17. Rate and Quantity MOD REC QTY				
Authorized		Additional		
Rate gpm	Quantity af	Rate gpm	Quantity af	Overlap PD Files
800	31.278	800	31.278	(IRR) None
	9.33		9.33	(REC)
Total Quantity is 40.60AF				

18. Storage: Rate _____ NF Quantity _____ ac/ft Additional Rate _____ NF Additional Quantity _____ ac/ft

19. Limitation: _____ af/yr at _____ gpm (_____ cfs) when combined with file number(s) _____
 Limitation: _____ af/yr at _____ gpm (_____ cfs) when combined with file number(s) _____

20. Meter Required? Yes No To be installed by **12/31/2017** Date Acceptable Meter Installed _____

21. Place of Use	NE¼				NW¼				SW¼				SE¼				Total	Owner	Chg? NO	Overlap Files				
	T	MOD	DEL	ENT	PUSE	S	T	R	ID	NE ¼	NW ¼	SW ¼	SE ¼	NE ¼	NW ¼	SW ¼					SE ¼			
MOD 67332 (REC) 27 26S 1W 10																			7a.	No	NONE			
MOD (IRR) 67331 27 26S 1W 9													5.02	1.95	7.21	9.88					24.06	7a.	No	NONE

Comments: **THERE IS A ONE TIME INITIAL FILL FOR THE REC PORTION OF 5.59 AF GW. THERE IS NO STORAGE PORTION WITH THIS PERMIT.**

KANSAS DEPARTMENT OF AGRICULTURE
Division of Water Resources

M E M O R A N D U M

TO: Files

DATE: August 31, 2016

FROM: Erin McGrogan

RE: Application - File No. 49,484

Tier 1, L.L.C and Marvin Shellenberg represented by MKEC of Wichita, Kansas proposes to appropriate 31.278 acre-feet groundwater from one (1) well at a rate of 800 gallons per minute for irrigation use on 24 acres of greenspace and 9.33 acre-feet to authorize evaporative loss in four-small ponds for recreation use. The proposed multi-use project is a subdivision located in the Southwest Quarter of Section 27, Township 26 South, Range 1 West, Sedgwick County. The proposed point of diversion is located within the boundaries of the Groundwater Management District No. 2 and within the Arkansas River basin.

The requested quantity of 31.278 acre-feet is reasonable and based on K.A.R. 5-3-24 for irrigation use in Sedgwick County. The 24.06 acres is located in the Southwest Quarter of Section 27, Township 26 South, Range 1 West, of Sedgwick County. The greenspace is within the subdivision known as Estancia under the development of Marvin Schellenberg and Tier I, L.L.C. The 9.33 acre-feet is to authorize evaporative loss on 5.60 acres of groundwater ponds. The justification is based on 20 inches of NET for Sedgwick County / 12 inches per foot times one year = 9.33 acre-feet. The applicant has requested an initial fill of 5.59 acre-feet of groundwater to fill the four ponds. The ponds are less than 2 acres each with a shallow depth of 1-2 feet. The plans initially proposed six ponds but the plat design decreased this to four ponds with the potential to develop the subdivision adding additional ponds at a later date.

Due to the amount of potential nearby well owners within the area the applicant was required to publish a public notice in the local paper for three consecutive weeks and provide a listing of all property owners within 1,000 feet of the proposed radius of the point of diversion. The applicant published a public notice in The Wichita Eagle for three consecutive weeks from March 7 through March 21, 2016 and provided proof of the publication in an affidavit from the paper received in DWR on March 24, 2016. Four property owners within the 1,000 radius of the proposed point of diversion were notified in a correspondence dated March 24, 2016 of the applicant's intent to appropriate water. No comments were received from the public or the correspondence. According to the WRIS database there are no non-domestic wells or domestic wells located within the required spacing radius of 1,320 feet based on K.A. R. 5-22-2 1 (1) & (2) and 660 feet respectively.

On April 12, 2016 a request for recommendation was sent to the Equus Beds Groundwater Management District No. 2 in Halstead Kansas for a review of the proposed application. Over the course of the initial reviews by the District the proposed point of diversion failed safe yield based on the evaluation. After discussions with the applicant, GMD No, 2, and DWR, the proposed point of diversion was revised to a location within 270 feet of the proposed point of diversion. After the final evaluation the District recommended approval of the application with the proposed point of diversion moved to the revised location in a correspondence dated July 18, 2016. Updated maps and project layouts were submitted to DWR and spacing evaluation was reviewed from the proposed revised point of diversion. Spacing criteria was met based on the revised point of diversion 300 feet radius allowed under K.A.R. 5-5-6.

MEMORANDUM

File No. 49,484 Tier 1, L.L.C Marvin Schellenberg

Page 2

In accordance with K.S.A. 82a-706c, the Chief Engineer retains full authority to require any water user to install meters, gages, or other measuring devices, which devices he or she or his or her agents may read at any time. Water flowmeter requirements are further described in K.A.R. 5-1-4 and K.A.R 5-1-12. If any chemical or foreign substance is injected into the water pumped under this permit, a check valve will also need to be installed. Each use will be required to be metered for this permit. The well will also be required to have a water measurement tube installed based on K.A.R. 5-6-13.

In an e-mail message, dated August 25, 2016, Jeff Lanterman, Water Commissioner of the Stafford Field Office, indicated he had no objection to the approval of the referenced application.

Based on the above discussion, and that no water rights will be effected with the approval, it is recommended that the referenced application be approved.

Erin McGrogan

Erin McGrogan
Environmental Scientist
Permits Unit

McGrogan, Erin

From: Lanterman, Jeff
Sent: Thursday, August 25, 2016 3:11 PM
To: McGrogan, Erin
Cc: Conant, Cameron
Subject: FW: File No. 49,484 Tier 1, L.L.C 27-26 South, Range 1 West, Sedgwick County; Multi-Use Irr and rec; greenspace and ponds; Estancia Subdivision
Attachments: Irrigation Use Supplemental Exhibit.pdf; MEMO 49484 Tier 1, LLC Marvin Schellenberg GMD 2.rtf; Stage Storage Table.pdf; 49484 map.jpg

Erin;

Erin go ahead and approve these. Note that we want to have 2 meters installed to catch the rec use and irrigation use separately. Those become a bear to certify if we don't have that.

There are some senior permits in the circle that are as yet unapproved. I am OK with approving these out of order BUT only if there is safe yield available for both sets of permits.. If approval of 49284 and 49285 in any way affects the approval of this file I would like it held until the other files are approved. I understand that they are figured into safe yield currently so I think we should be OK.

Thanks

Jeff

From: Conant, Cameron
Sent: Thursday, August 25, 2016 3:01 PM
To: Lanterman, Jeff <Jeff.Lanterman@ks.gov>
Subject: FW: File No. 49,484 Tier 1, L.L.C 27-26 South, Range 1 West, Sedgwick County; Multi-Use Irr and rec; greenspace and ponds; Estancia Subdivision

Jeff, you were at the board meeting where this application was reviewed and recommended for approval with some revisions. During the meeting, the board recommended approval of the application after it the proposed location was revised to meet safe-yield.

Spacing is met in all cases. This has not been developed at all yet, as such, nearby domestic wells are outside the property and we have no spacing issues. Very rough map attached.

They requested 1.3AF/acre on the green space in the development totaling 24.06 acres intended to be watered. They also have requested rec use of 9.33AF to cover evap on 4, ponds totaling about 5.6 acres. These are already constructed and lined to be about 1-2 feet deep. They will pump into the ponds with the well. Hopefully they did a good job with the lining...On that note, I we need to make sure there are 2 meters required (1 for irrigation and 1 for rec use).

Below are 2 representative area hydrographs. There are no issues with long term water levels which appear to be very stable. Even during the drought the water level only dropped about 2'.

http://hercules.kgs.ku.edu/geohydro/wizard/wizardwelldetail.cfm?usgs_id=374558097250201

http://hercules.kgs.ku.edu/geohydro/wizard/wizardwelldetail.cfm?usgs_id=374653097242401

I think this application can be recommended for approval with the understanding that 2 meters will be installed to measure the separate uses of water. I want to point out that there are 2 permits ~1 mile away (49284 & 49285

Edgewater) that are senior in priority that are still awaiting a GMD#2 recommendation. What do you want to do with that situation? Should this file be held until Edgewater is resolved? Edgewater was appealed at the August board meeting and it was tabled for additional information from the applicant. The next board meeting is October. I think I'm ok with moving forward with this application since the other 2 applications are currently held up for potentially more than 2 months. I think we can approve this out of order simply because the Edgewater applications were included in the SY analysis for this file. Please pass on to Erin with your opinion of how to proceed with this keeping in mind the senior, pending Edgewater applications. Let me know if you have questions.

Cameron

From: McGrogan, Erin
Sent: Thursday, August 04, 2016 1:50 PM
To: Lanterman, Jeff
Cc: Conant, Cameron
Subject: File No. 49,484 Tier 1, L.L.C 27-26 South, Range 1 West, Sedgwick County; Multi-Use Irr and rec; greenspace and ponds; Estancia Subdivision

Jeff and Cameron, This is a housing subdivision on the west side of Wichita known as Estancia. The plat was revised to have four pond instead of six and the landscape greens total 24 acres. The application initially failed safe yield after a review by the GMD No. 2 but the point of diversion was moved within 300 feet and thereby met safe yield. All notifications for nearby property owners and public notice yielded no responses or comments. Attached is the revised point of diversion and modified pond locations. DWR and the District had a great deal of discussion on this file.

Thank you for your review.

Erin McGrogan

Erin McGrogan, Environmental Scientist
Division of Water Resources
1320 Research Park Drive
Manhattan, Kansas 66502
(785) 564-6640
erin.mcgrogan@ks.gov



1320 Research Park Drive
Manhattan, Kansas 66502
(785) 564-6700

900 SW Jackson, Room 456
Topeka, Kansas 66612
(785) 296-3556

Jackie McClaskey, Secretary

Governor Sam Brownback

TIER 1 LLC
ATTN MARVIN SCHELLENBERG
7926 W 21ST ST
WICHITA KS 67205

October 13, 2016

FILE COPY

Re: Appropriation of Water, File Nos. 49,484

Dear Mr. Schellenberg:

There is enclosed a permit to appropriate water authorizing you to proceed with construction of the proposed diversion works (except those dams and stream obstructions regulated by K.S.A. 82a-301 through 305a), to divert such unappropriated water as may be available from the source and at the location specified in the permit, and to use it for the purpose and at the location described in the permit.

Your attention is directed to the enclosures and to the terms, conditions, and limitations specified in this permit. A water meter is required for each use (recreation and irrigation) and you must install these prior to water being put to beneficial use in order for you to maintain accurate records of water use. Both meters should be used to provide the information required on the annual water use report.

Failure to notify the Chief Engineer of the Division of Water Resources of the completion of the diversion works within the time allowed, or within any authorized extension of time thereof, will result in the dismissal of this permit. Enclosed is a form which may be used to notify the Chief Engineer that the proposed diversion works have been completed.

All requests for extensions of time to complete diversion works, or to perfect appropriations, must be submitted to the Chief Engineer before the expiration of time originally set forth in the permit to complete diversion works or to perfect an appropriation. If for any reason, you require an extension of time, you must request it before the expiration of time set forth in this permit. Failure to comply with this regulation will result in the dismissal of your permit or your water right. Any request for an extension of time shall be accompanied by the required statutory fee, which is currently \$100.00.

There is also enclosed an information sheet setting forth the procedure to obtain a Certificate of Appropriation which will establish the extent of your water right. If you have any questions, please contact our office. If you wish to discuss a specific file, please have the file number ready so that we may help you more efficiently.

Sincerely,

Brent A. Turney, P.G.

Change Application Unit Supervisor
Water Appropriation Program

BAT: emc
Enclosures
pc: Stafford Field Office
GMD No. 2
MKEC Engineering Inc. Attn: Steve Frank, PE

THE STATE OF KANSAS



KANSAS DEPARTMENT OF AGRICULTURE
Jackie McClaskey, Secretary of Agriculture

DIVISION OF WATER RESOURCES
David W. Barfield, Chief Engineer

**APPROVAL OF APPLICATION
and
PERMIT TO PROCEED**
(This Is Not a Certificate of Appropriation)

This is to certify that I have examined Application, **File No. 49,484** of the applicant

**TIER 1 LLC
7926 W 21ST STREET
WICHITA KS 67205**

for a permit to appropriate water for beneficial use, together with the maps, plans and other submitted data, and that the application is hereby approved and the applicant is hereby authorized, subject to vested rights and prior appropriations, to proceed with the construction of the proposed diversion works (except those dams and stream obstructions regulated by K.S.A. 82a-301 through 305a, as amended), and to proceed with all steps necessary for the application of the water to the approved and proposed beneficial use and otherwise perfect the proposed appropriation subject to the following terms, conditions and limitations:

1. That the priority date assigned to such application is **October 12, 2015**.

2. That the water sought to be appropriated shall be used for recreational use in four ponds located in the Southwest Quarter (SW¹/₄) and irrigation use also located in the Southwest Quarter (SW¹/₄) all in Section 27, Township 26 South, Range 1 West, Sedgwick County, Kansas, and shall be used for irrigation use on land described in the application, as follows:

Sec. Twp Range	NE ¹ / ₄				NW ¹ / ₄				SW ¹ / ₄				SE ¹ / ₄				TOTAL
	NE ¹ / ₄	NW ¹ / ₄	SW ¹ / ₄	SE ¹ / ₄	NE ¹ / ₄	NW ¹ / ₄	SW ¹ / ₄	SE ¹ / ₄	NE ¹ / ₄	NW ¹ / ₄	SW ¹ / ₄	SE ¹ / ₄	NE ¹ / ₄	NW ¹ / ₄	SW ¹ / ₄	SE ¹ / ₄	
27 26S 1W									5.02	1.95	7.21	9.88					24.06

3. That the authorized source from which the appropriation shall be made is groundwater from the Equus Beds aquifer, to be withdrawn by means of one (1) well located in the Southwest Quarter of the Southeast Quarter of the Southwest Quarter (SW¹/₄ SE¹/₄ SW¹/₄) of Section 27, more particularly described as being near a point 630 feet North and 3,756 feet West of the Southeast corner of said section, in Township 26 South, Range 1 West, Sedgwick County, Kansas, located substantially as shown on the topographic map accompanying the application.

4. That the appropriation sought shall be limited to a maximum diversion rate not in excess of **800 gallons per minute** (1.78 c.f.s.) and to a total quantity not to exceed **40.60 acre-feet** for any calendar year. This total quantity is further limited not to exceed **31.278 acre-feet** of water per calendar year for irrigation use; and to a quantity not to exceed **9.33 acre-feet** of water per calendar year for recreational use.

5. There will be a one-time initial fill condition of **5.59 acre-feet** of groundwater to fill the four ponds described in paragraph no. 2

6. That installation of works for diversion of water shall be completed on or before **December 31, 2017**, or within any authorized extension thereof. The applicant shall notify the Chief Engineer and pay the statutorily required field inspection fee, which is currently \$400.00, when construction of the works has been completed. Failure to timely submit the notice and the fee will result in revocation of the permit. Any request for an extension of time shall be accompanied by the required statutory fee, which is currently \$100.00.

7. That the proposed appropriation shall be perfected by the actual application of water to the proposed beneficial use on or before **December 31, 2021**, or any authorized extension thereof. Any request for an extension of time shall be submitted prior to the expiration of the deadline and shall be accompanied by the required statutory fee, which is currently \$100.00.

8. That the applicant shall not be deemed to have acquired a water appropriation for a quantity in excess of the amount approved herein nor in excess of the amount found by the Chief Engineer to have been actually used for the approved purpose during one calendar year subsequent to approval of the application and within the time specified for perfection or any authorized extension thereof.

9. That the use of water herein authorized shall not be made so as to impair any use under existing water rights nor prejudicially and unreasonably affect the public interest.

10. That the right of the appropriator shall relate to a specific quantity of water and such right must allow for a reasonable raising or lowering of the static water level and for the reasonable increase or decrease of the streamflow at the appropriator's point of diversion.

11. That this permit does not constitute authority under K.S.A. 82a-301 through 305a to construct any dam or other obstruction; nor does it grant any right-of-way, or authorize entry upon or injury to, public or private property.

12. That all diversion works constructed under the authority of this permit into which any type of chemical or other foreign substance will be injected into the water pumped from the diversion works shall be equipped with an in-line, automatic quick-closing, check valve capable of preventing pollution of the source of the water supply. The type of valve installed shall meet specifications adopted by the Chief Engineer and shall be maintained in an operating condition satisfactory to the Chief Engineer.

13. That all wells with a diversion rate of 100 gallons per minute or more drilled under the authority of this permit shall have a tube or other device installed in a manner acceptable to, and in accordance with specifications adopted by, the Chief Engineer. This tube or device shall be suitable for making water level measurements and shall be maintained in a condition satisfactory to the Chief Engineer.

14. That an acceptable water flow meter shall be installed and maintained on the diversion works authorized by this permit in accordance Kansas Administrative Regulations 5-1-4 through 5-1-12 adopted by the Chief Engineer. This water flow meter shall be used to provide an accurate quantity of water diverted as required for the annual water use report (including the meter reading at the beginning and end of the report year).

15. That the applicant shall maintain accurate and complete records from which the quantity of water diverted during each calendar year may be readily determined and the applicant shall file an annual water use report with the Chief Engineer by March 1 following the end of each calendar year. Failure to file the annual water use report by the due date shall cause the applicant to be subject to a civil penalty.

16. That no water user shall engage in nor allow the waste of any water diverted under the authority of this permit.

CERTIFICATE OF SERVICE

On this 13th day of October, 2016, I hereby certify that the foregoing Approval of Application, File No. 49,484, dated October 12, 2016 was mailed postage prepaid, first class, US mail to the following:

TIER 1 LLC
ATTN MARVIN SCHELLENBERG
7926 W 21ST ST
WICHITA KS 67205

With photocopies to:

MKEC ENGINEERING INC
ATTN STEVE FRANK PE
411 N WEBB RD
WICHITA KS 67206

Stafford Field Office

Groundwater Management District No 2



Division of Water Resources

THE STATE



OF KANSAS

APPLICATION COMPLETE
9/25/2016
Reviewer smc

KANSAS DEPARTMENT OF AGRICULTURE
Jackie McClaskey, Secretary of Agriculture

DIVISION OF WATER RESOURCES
David W. Barfield, Chief Engineer

File Number 49,484
This item to be completed by the Division of Water Resources.

**APPLICATION FOR PERMIT TO
APPROPRIATE WATER FOR BENEFICIAL USE**

Filing Fee Must Accompany the Application
(Please refer to Fee Schedule attached to this application form.)

WATER RESOURCES
RECEIVED

OCT 12 2015

11:58
KS DEPT OF AGRICULTURE

To the Chief Engineer of the Division of Water Resources, Kansas Department of Agriculture,
1320 Research Park Drive, Manhattan, Kansas 66502:

1. Name of Applicant (Please Print): Tier 1, LLC
Address: 7926 W. 21st. Street
City: Wichita State KS Zip Code 67205
Telephone Number: (316) 721-2153

2. The source of water is: surface water in _____ (stream)
OR groundwater in Lower Arkansas River Basin (drainage basin)

Certain streams in Kansas have minimum target flows established by law or may be subject to administration when water is released from storage for use by water assurance district members. If your application is subject to these regulations on the date we receive your application, you will be sent the appropriate form to complete and return to the Division of Water Resources. 35.34 AC-FT for Irrigation Use; 9.33 AC-FT for Recreational Use

3. The maximum quantity of water desired is 44,67 90,00 acre-feet OR _____ gallons per calendar year, to be diverted at a maximum rate of 800 gallons per minute OR _____ cubic feet per second.

Once your application has been assigned a priority, the requested maximum rate of diversion and maximum requested quantity of water under that priority number can **NOT** be increased. Please be certain your requested maximum rate of diversion and maximum quantity of water are appropriate and reasonable for your proposed project and are in agreement with the Division of Water Resources' requirements.

4. The water is intended to be appropriated for (Check use intended):
(a) Artificial Recharge (b) Irrigation (c) Recreational (d) Water Power
(e) Industrial (f) Municipal (g) Stockwatering (h) Sediment Control
(i) Domestic (j) Dewatering (k) Hydraulic Dredging (l) Fire Protection
(m) Thermal Exchange (n) Contamination Remediation

YOU **MUST** COMPLETE AND ATTACH ADDITIONAL DIVISION OF WATER RESOURCES FORM(S) PROVIDING INFORMATION TO SUBSTANTIATE YOUR REQUEST FOR THE AMOUNT OF WATER FOR THE INTENDED USE REFERENCED ABOVE.

For Office Use Only:

F.O. 2 GMD 2 Meets K.A.R. 5-3-1 (YES/NO) Use REG/REG Source (G) S County SG By LI Date 10/12/15
Code REG Fee \$ 200.00 TR # 11010522 Receipt Date 10/12/15 Check # 035866

* DWR 1-100 (Revised 06/16/2014) (D) In steel Pipe; 5.59 AF
(A) 1.3AF plus new (96 cfs) x 24.06 new Ponds .6W = 31.379 AF
3/23/2016 emc/10/15/2015 LCM
SCANNED

5. The location of the proposed wells, pump sites or other works for diversion of water is:

Note: For the application to be accepted, the point of diversion location must be described to at least a 10 acre tract, unless you specifically request a 60 day period of time in which to locate the site within a specifically described, minimal legal quarter section of land.

*Revised
7-13-2016
emc/dwr
see 49,484
summary*

- * (A) One in the ~~SE~~^{SW} quarter of the ~~SW~~^{SE} quarter of the ~~SW~~ quarter of Section ~~27~~, more particularly described as being near a point 361 feet North and 3756 feet West of the Southeast corner of said section, in Township 26 South, Range 1 East/West (circle one), Sedgwick County, Kansas.
- (B) One in the SW quarter of the SE quarter of the SW quarter of Section 27, more particularly described as being near a point 680 feet North and 3756 feet West of the Southeast corner of said section, in Township 26 South, Range 1 East/West (circle one), SB County, Kansas.
- (C) One in the _____ quarter of the _____ quarter of the _____ quarter of Section _____, more particularly described as being near a point _____ feet North and _____ feet West of the Southeast corner of said section, in Township _____ South, Range _____ East/West (circle one), _____ County, Kansas.
- (D) One in the _____ quarter of the _____ quarter of the _____ quarter of Section _____, more particularly described as being near a point _____ feet North and _____ feet West of the Southeast corner of said section, in Township _____ South, Range _____ East/West (circle one), _____ County, Kansas.

If the source of supply is groundwater, a separate application shall be filed for each proposed well or battery of wells, except that a single application may include up to four wells within a circle with a quarter (1/4) mile radius in the same local source of supply which do not exceed a maximum diversion rate of 20 gallons per minute per well.

A battery of wells is defined as two or more wells connected to a common pump by a manifold; or not more than four wells in the same local source of supply within a 300 foot radius circle which are being operated by pumps not to exceed a total maximum diversion rate of 800 gallons per minute and which supply water to a common distribution system.

6. The owner of the point of diversion, if other than the applicant is (please print):

_____ (name, address and telephone number)

_____ (name, address and telephone number)

You must provide evidence of legal access to, or control of, the point of diversion from the landowner or the landowner's authorized representative. Provide a copy of a recorded deed, lease, easement or other document with this application. In lieu thereof, you may sign the following sworn statement:

I have legal access to, or control of, the point of diversion described in this application from the landowner or the landowner's authorized representative. I declare under penalty of perjury that the foregoing is true and correct.

Executed on October 7, 2015. *[Signature]*
Applicant's Signature

The applicant must provide the required information or signature irrespective of whether they are the landowner. Failure to complete this portion of the application will cause it to be unacceptable for filing and the application will be returned to the applicant.

7. The proposed project for diversion of water will consist of 1 water well _____ (number of wells, pumps or dams, etc.) and (was) (will be) completed (by) Spring/Summer (~April 2016) (Month/Day/Year - each was or will be completed)

8. The first actual application of water for the proposed beneficial use was or is estimated to be ~May 2016 (Mo/Day/Year)

WATER RESOURCES RECEIVED

OCT 12 2015

* 3/2/2016 emc/dwr

9. Will pesticide, fertilizer, or other foreign substance be injected into the water pumped from the diversion works?
 Yes No If "yes", a check valve shall be required.

All chemigation safety requirements must be met including a chemigation permit and reporting requirements.

10. If you are planning to impound water, please contact the Division of Water Resources for assistance, prior to submitting the application. Please attach a reservoir area capacity table and inform us of the total acres of surface drainage area above the reservoir. 208 AC

Have you also made an application for a permit for construction of this dam and reservoir with the Division of Water Resources? Yes No

- If yes, show the Water Structures permit number here _____
- If no, explain here why a Water Structures permit is not required The drainage area is less than 640 acres,
and the impounded water will be below the natural grade. Thus, a water structures permit is not required.

11. The application must be supplemented by a U.S.G.S. topographic map, aerial photograph or a detailed plat showing the following information. On the topographic map, aerial photograph, or plat, identify the center of the section, the section lines or the section corners and show the appropriate section, township and range numbers. Also, please show the following information:

- (a) The location of the proposed point(s) of diversion (wells, stream-bank installations, dams, or other diversion works) should be plotted as described in Paragraph No. 5 of the application, showing the North-South distance and the East-West distance from a section line or southeast corner of section.
- (b) If the application is for groundwater, please show the location of any existing water wells of any kind within 1/2 mile of the proposed well or wells. Identify each existing well as to its use and furnish the name and mailing address of the property owner or owners. If there are no wells within 1/2 mile, please advise us.
- (c) If the application is for surface water, the names and addresses of the landowner(s) 1/2 mile downstream and 1/2 mile upstream from your property lines must be shown.
- (d) The location of the proposed place of use should be shown by crosshatching on the topographic map, aerial photograph or plat.
- (e) Show the location of the pipelines, canals, reservoirs or other facilities for conveying water from the point of diversion to the place of use.

A 7.5 minute U.S.G.S. topographic map may be obtained by providing the section, township and range numbers to: Kansas Geological Survey, 1930 Constant, Campus West, University of Kansas, Lawrence, Kansas 66047.

12. List any application, appropriation of water, water right, or vested right file number that covers the same diversion points or any of the same place of use described in this application. Also list any other recent modifications made to existing permits or water rights in conjunction with the filing of this application.

The same point of diversion(well) will be used for irrigation use and recreational use.

**WATER RESOURCES
RECEIVED**

OCT 12 2015

**IRRIGATION USE
SUPPLEMENTAL SHEET**

File No. 49,484

Name of Applicant (Please Print): Tier 1, LLC

1. Please supply the name and address of each landowner, the legal description of the lands to be irrigated, and designate the actual number of acres to be irrigated in each forty acre tract or fractional portion thereof:

Landowner of Record NAME: Tier 1, LLC

ADDRESS: 7926 W 21st St., Wichita, KS 67205

S	T	R	NE¼				NW¼				SW¼				SE¼				TOTAL			
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE				
27	26S	1W											5.02	1.95	7.21	9.88					24.06 acres	

Landowner of Record NAME: _____

ADDRESS: _____

S	T	R	NE¼				NW¼				SW¼				SE¼				TOTAL			
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE				

Landowner of Record NAME: _____

ADDRESS: _____

S	T	R	NE¼				NW¼				SW¼				SE¼				TOTAL			
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE				

* KAR 5-3-24 1.3 AF per acre x 24.06 acres
(Sedgwick County) = 31.278 usable AF

2. Please complete the following information for the description of the operation for the irrigation project. Attach supplemental sheets as needed.

a. Indicate the soils in the field(s) and their intake rates:

Soil Name	Percent of field (%)	Intake Rate (in/hr)	Irrigation Design Group
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
Total:	100 %		

b. Estimate the average land slope in the field(s): _____ %

Estimate the maximum land slope in the field(s): _____ %

c. Type of irrigation system you propose to use (check one):

Center pivot Center pivot - LEPA "Big gun" sprinkler

Gravity system (furrows) Gravity system (borders) Sideroll sprinkler

Other, please describe: Residential irrigation system.

d. System design features:

i. Describe how you will control tailwater:

ii. For sprinkler systems:

(1) Estimate the operating pressure at the distribution system: _____ psi

(2) What is the sprinkler package design rate? _____ gpm

(3) What is the wetted diameter (twice the distance the sprinkler throws water) of a sprinkler on the outer 100 feet of the system? _____ feet

(4) Please include a copy of the sprinkler package design information.

e. Crop(s) you intend to irrigate. Please note any planned crop rotations:

Grass and other landscaping.

f. Please describe how you will determine when to irrigate and how much water to apply (particularly important if you do not plan a full irrigation).

You may attach any additional information you believe will assist in informing the Division of the need for your request.

WATER RESOURCES
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OCT 12 2015

SCANNED

**RECREATIONAL USE
SUPPLEMENTAL SHEET**

File No. 49,484

Name of Applicant (Please Print): Tier 1, LLC

1. Please indicate type of recreational use (boating, fishing, swimming, etc.): _____
Ammenities for a residential subdivision.

2. Please summarize how the water will be used and justify the quantity of water requested: _____
Water will be used to maintain normal pool elevations with a net evaporation rate of 20 inches per year.

* $5.60 \text{ acres} \times 20" \text{ (evap)} \div 12" \text{ per foot} = 9.33 \text{ AF}$
one time initial fill for filling four ponds 5.59 acre-feet

3. Please complete the following table showing estimated future water requirements:

ESTIMATED FUTURE WATER DIVERTED/STORED		
NEXT 5 YEARS	WATER TO BE DIVERTED (ACRE-FEET OR GALLONS)	
	Year 1	9.33 AC-FT
Year 2	9.33 AC-FT	
Year 3	9.33 AC-FT	
Year 4	9.33 AC-FT	
Year 5	9.33 AC-FT	

Please attach any additional information, tables, or curves showing past, present and estimated future water requirements to substantiate the amount of water requested.

4. Please designate the legal description of the location where the water is to be used by providing the fractional part of the Section, Township and Range.

SW 1/4 Sec. 27, T26S, R1W (See Attached Recreational Place of Use Exhibit)

You may attach any additional information you believe will assist in informing the Division of the need for your request.

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9/9/2015 emc/dml

10-7-15

(Date)

Kansas Department of Agriculture
Division of Water Resources
David W. Barfield, Chief Engineer
1320 Research Park Drive
Manhattan, Kansas 66502

Re: Application File No. 49,484

Minimum Desirable Streamflow

Dear Sir:

I understand that a Minimum Desirable Streamflow requirement has been established by the legislature for the source of supply to which the above referenced application applies.

I understand that diversion of water pursuant to this application will be subject to regulation any time Minimum Desirable Streamflow requirements are not being met.

I also understand that if this application is approved, there could be times, as determined by the Division of Water Resources, when I would not be allowed to divert water. I realize that this could affect the economics of my decision to appropriate water.

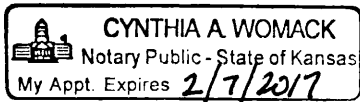
I am aware of the above factors, and with the knowledge thereof, request that the Division of Water Resources proceed with processing and approval, if possible, of the above referenced application.

Marvin Schellenberg
Signature of Applicant

Marvin Schellenberg
(Print Applicant's Name)

State of Kansas)
County of Sedgwick) ss

I hereby certify that the foregoing instrument was signed in my presence and sworn to before me this 7th day of October, 2015.



Cynthia A. Womack
Notary Public

My Commission Expires: February 7, 2017

WATER RESOURCES
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OCT 12 2015

KS DEPT OF AGRICULTURE

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**MINIMUM DESIRABLE STREAMFLOW FORM TO BE USED WHEN
APPLICABLE WHEN FILING AN APPLICATION FOR PERMIT
TO APPROPRIATE WATER FOR BENEFICIAL USE**

The Kansas Legislature has established minimum desirable streamflows for the streams listed below. If your proposed diversion of water is going to be from one of these watercourses or adjacent alluvial aquifers, please complete the back side of this page and submit it along with your application for permit to appropriate water.

Arkansas River
Big Blue River
Chapman Creek
Chikaskia River
Cottonwood River
Delaware River
Little Arkansas River
Little Blue River
Marais des Cygnes River
Medicine Lodge River
Mill Creek (Wabaunsee Co. area)
Neosho River

Ninnescah River
North Fork Ninnescah River
Rattlesnake Creek
Republican River
Saline River
Smoky Hill River
Solomon River
South Fork Ninnescah
Spring River
Walnut River
Whitewater River

WATER RESOURCES
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KS DEPT OF AGRICULTURE

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TIER 1, LLC
 7926 W. 21ST STREET
 WICHITA, KS

SEC 27, T26S, R1W

NET IRRIGATION REQUIREMENT*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Months	No. Days	Average Daily ET	Total ET (Inches)	Total ET (Feet)	Acres Irrigated	Total ET AC-FT	**Usable Precipitation (75% Usable) (AC-FT)	Net Irrigation Requirement (AC-FT)
March-May	92	0.1	9.2	0.77	24.06	18.45	14.81	3.63
June-Sept.	122	0.2	24.4	2.03	24.06	48.92	23.11	25.81
Oct.-Nov.	61	0.1	6.1	0.51	24.06	12.23	6.33	5.90
							TOTAL	35.34

* Net Irrigation Requirement analysis is based on guidance from an article published by Dr. Jack Fry's - How much is a year's worth of water?

Column (2): ET rates for cool season grasses range from 0.1 to 0.3

Column (7):

Only 50%-75% of precipitation is usable by the plant. Small rain events don't supply enough moisture for the plant to use and large rain event produce runoff, which is also unusable.

** Monthly rainfall quantities are (1981-2010 Averages) obtained from *K-State Research and Extension - Weather Data Library (Wichita Mid-Continent Station)*

<u>March-May</u>	<u>June-Sept.</u>	<u>Oct.-Nov.</u>
2.69	5.20	2.78
2.59	3.32	<u>1.43</u>
<u>4.57</u>	3.71	4.21
9.85	<u>3.14</u>	
	15.37	

Column (8): Net Irrigation Requirement = ET - Usable Precipitation

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KS DEPT OF AGRICULTURE

SCANNED

TIER 1, LLC
 7926 W. 21ST STREET
 WICHITA, KS

SEC 27, T26S, R1W

APPROPRIATION QUANTITY CALCULATIONS

Estancia Development Information

Irrigated Areas= 24.06 AC
 Pond System Surface Area at Normal Pool (1328)= 5.60 AC
 Pond System Capacity/Volume at Normal Pool (1328)= 5.59 AC-FT

K.A.R. 5-3-19 Maximum Reasonable Annual Quantity of Water for Irrigation Use

K.A.R. 5-3-24 Exhibit - Reasonable Quantities for Irrigation Use in Kansas by County
 Sedgwick County= 1.3 AC-FT/ AC Irrigated

AC Irrigated x 1.3 AC-FT/AC Irrigated=

31.28 AC-FT

K.A.R. 5-6-7 Determination of Average Annual Potential Net Evaporation Loss

Potential Net Evaporation, in Inches, for Kansas=

20 IN

Indirect Use = Evaporation from Ponds=

9.33 AC-FT

Initial Pond Fill = Pond Volume at Normal Pool=

5.59 AC-FT

TOTAL QUANTITY FOR IRRIGATION AND RECREATIONAL USE (*1)=	44.67 AC-FT
TOTAL QUANTITY FOR IRRIGATION AND RECREATIONAL USE (*2)=	40.61 AC-FT

*1 - Includes alternative irrigation quantity calculation
 *2 - Includes conventional irrigation quantity calculation

TOTAL QUANTITY AVAILABLE IN GMD #2 BOUNDARY=

~~68.64~~ AC-FT

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KS DEPT OF AGRICULTURE

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TIER 1, LLC
 7926 W. 21ST STREET
 WICHITA, KS

SEC 27, T26S, R1W

SEEPAGE CALCULATION

Site Subsurface Information

From GSI Engineering Prepared Geotechnical Exploration Report

Average Groundwater Depth (FT below surface)= 10.88
 0'- 6' of Soil Profile= Clayey Sand (SC) or Sandy Lean Clay (CL)
 6'-25' of Soil Profile= Poorly Graded Sand (SP)

Material	Permeability Range (cm/s)
Clayey Sand and Poorly Graded Sand	0.001 - 0.1
Sandy lean clay	0.00001 - 0.001

Determination of Time Moisture to Reach the Water Table:

Seepage Velocity= $(K (\Delta H/L))n$
 n= soil porosity= From Table Below
 K=Hydraulic Conductivity(permeability)= See calculation below
 ΔH= change in head= 11'
 L= soil profile length= 11' (335.28 cm)

Porosity Values**	
Material	Porosity Range
Clayey Sand (SC)	0.15-0.37
Poorly Graded Sand (SP)	0.23-0.43
Sandy Lean Clay (CL)	0.29-0.41

**Not from GSI Report. Values are from reference books.

Clayey Sand or Sandy Lean Clay= 6' or 182.88 cm
 Poorly Graded Sand = 5' or 152.40 cm

$K = Y / ((Y1/K1) + (Y2/K2))$
 $K = 335.28 / ((182.88/0.001) + (152.40/0.00001)) = 2.17391E-05 \text{ cm/s}$

Compound "n" = $(3'(SC \ n) + (3')(CL \ n) + 5' (SP)) / 11'$
 $n = ((3*0.37) + (3*0.41) + (5*0.43)) / 11 = 0.4082$

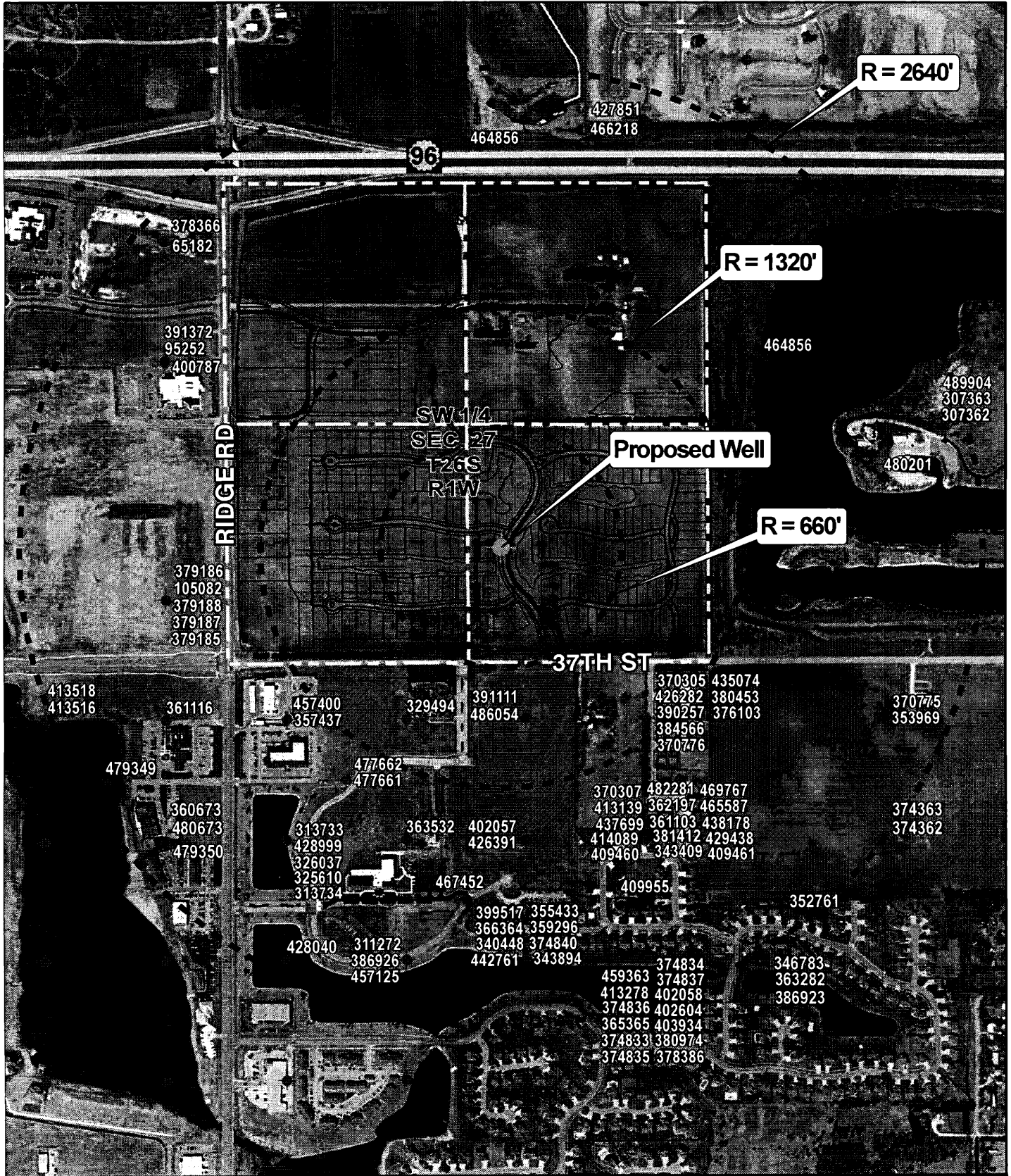
Seepage Velocity= $(K (\Delta H/L))n$
 Seepage Velocity= $2.17E-05 \text{ cm/s} (335.28 \text{ cm} / 335.28 \text{ cm}) / 0.40 = 5.32584E-05 \text{ cm/s}$
 $2.09679E-05 \text{ in/s}$

$(335.28 \text{ cm}) / 5.32584E-05 \text{ cm/s} = 6295339.2 \text{ sec}$

$6295339.2 \text{ sec} / 86400 = 72.86 \text{ days}$
 73 days

WATER RESOURCES
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OCT 12 2015



SEC: 27
TWP: T26S
RNG: R1W

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MKEC
Wichita, KS • 316.684.9600

POINT OF DIVERSION EXHIBIT WATER RESOURCES ESTANCIA DEVELOPMENT		
PROJECT NO. 1401010462	DATE: JUL 18 2016	SHEET NO.
DRAWN BY: JGD	DESIGNED BY: JGD	APPROVED BY: SLF
		1 OF 1

Path: J:\Projects\2014\1401010462_Premier_Estancia05-Civil\GIS\Water_Rights_Exhibit.mxd - Date: 7/18/2016

TIER 1, LLC
7926 W. 21ST STREET
WICHITA, KS

SEC 27, T26S, R1W

POND SYSTEM STAGE-STORAGE TABLE				
Stage	Elevation (FT)	Contour Area (SQ FT)	Incremental Storage (AC-FT)	Total Storage (AC-FT)
0	1325	40985	0.00	0.00
1	1326	36293	0.89	0.89
2	1327	64862	1.16	2.05
3	1328	243615	3.54	5.59
4	1329	393,644	7.31	12.90
5	1330	503,048	10.29	23.20
6	1331	631,641	13.02	36.22
7	1332	754,881	15.92	52.14
8	1333	800,000	17.85	69.98



Normal Pool Elevation= 1,328

Drainage Area= 208 Acres

WATER RESOURCES
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AUG 02 2016

KS DEPT OF AGRICULTURE

FRED SEILER, PRESIDENT
VIN KISSICK, VICE PRESIDENT
JEFF WINTER, SECRETARY
MIKE MCGINN, TREASURER
TIM BOESE, MANAGER
THOMAS A. ADRIAN, ATTORNEY



DIRECTORS:
DAVID BOGNER
ALAN BURGHART
JOE PAJOR
BOB SEILER
DAVID STROBERG

EQUUS BEDS GROUNDWATER MANAGEMENT DISTRICT NO. 2

313 SPRUCE STREET • HALSTEAD, KANSAS 67056-1925 • PHONE (316) 835-2224 • FAX (316) 835-2225 • equusbeds@gmd2.org • www.gmd2.org

July 18, 2016

WATER RESOURCES
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Chief Engineer, Division of Water Resources
Attn: Erin McGrogan
1320 Research Park Dr.
Manhattan, KS 66502

JUL 20 2016

KS DEPT OF AGRICULTURE

Re: Appropriation Application No. 49484 – Tier 1 LLC.

Dear Ms. McGrogan:

The Equus Beds Groundwater Management District No. 2 reviewed the referenced application on July 18, 2016, using the District's Revised Management Program (effective May 1, 1995) and Rules and Regulations K.A.R. 5-22-1 through 5-22-17.

Subject to an application modification, the application complies with the Revised Aquifer Management program approved by the Chief Engineer and with the District's Rules and Regulations K.A.R. 5-22-1 through 5-22-17. Therefore, the application is recommended for approval by the Equus Beds Groundwater Management District No. 2, subject to the location of the proposed point of diversion being modified to 630' North & 3756' West of the southeast corner of Section 27-26S-1W, Sedgwick County, as requested by the applicant's consultant.

A District decision may be appealed to the District Board of Directors by submitting a written petition to the District office within 30 days from date of this notification, pursuant to K.A.R. 5-22-12.

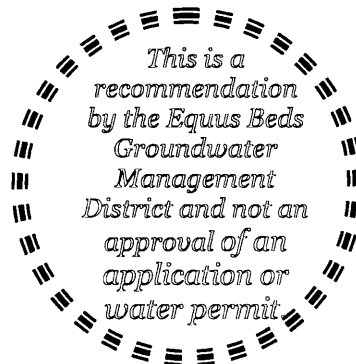
Please contact the District should you have any questions regarding the review or recommendation.

Sincerely,
EQUUS BEDS GROUNDWATER
MANAGEMENT DISTRICT NO. 2

Tim Boese
Manager
TDB/STF

Enclosures

pc: Tier 1 LLC, Applicant and Landowner
Steven Frank, MKEC
Jeff Lanterman, Division of Water Resources, Stafford



SCANNED

SAFEYIELD EVALUATION - #49484 - Tier 1 LLC

LOCATION: SWSESW (630'N & 3756'W) 27-26S-01W, Sedgwick County

SPECIAL USE AREA: None

EVALUATION DATE:- 7/13/2016

Total Areas: 3,993 acres; Area in 3 inch discharge zone: 0 acres; Area in 6 inch discharge zone: 3,993 acres

FILE_ID	WELL_ID	TOWNSHIP	RANGE	SECTION	QUALIFIER	USE	AUTHQUANTITY
A01527300	962	26S	01W	22	39601320	IRR	158
A024018IR	192	26S	01W	32	15751220	IRR	70.05
A024018RE	3328	26S	01W	32	15751220	REC	58.33
A026130D1IN	3736	26S	01W	21	35903885	IND	63.33
A026130D1IR	3735	26S	01W	21	39603921	IRR	41.75
A026130D2	1323	26S	01W	21	39603921	IRR	46.55
A02824500	1166	26S	01W	32	39002550	IRR	165
A04083000	1219	26S	01W	27	14001600	REC	99
A04098100	471	26S	01W	21	12951980	REC	70
A04240000	2581	26S	01W	20	1880375	IND	15
A04365700	2660	26S	01W	23	31893085	REC	97
A04423900	2773	26S	01W	22	35293479	REC	20
A04480800	2898	26S	01W	28	41503800	IND	78.3
A04504300	2975	26S	01W	28	6751595	REC	18.33
A04515600	2958	26S	01W	28	10443946	REC	26
A04571900	3124	26S	01W	29	49511104	REC	0.5
A046003D1	3202	26S	01W	23	13203960	IND	384
A046003D2	4876	26S	01W	23	13203960	IND	216
A04616200	3257	26S	01W	28	21952353	REC	4.33
A04616300	3258	26S	01W	28	18591996	REC	2.48
A046325IR	3314	26S	01W	29	21852085	IRR	0
A046325IR	3296	26S	01W	29	19852085	IRR	44.46
A046325IR	3315	26S	01W	29	20522085	IRR	0
A046325IR	3316	26S	01W	29	19182085	IRR	0
A046325IR	3317	26S	01W	29	17852085	IRR	0
A046325RE	3321	26S	01W	29	21852085	REC	0
A046325RE	3322	26S	01W	29	20522085	REC	0
A046325RE	3323	26S	01W	29	19182085	REC	0
A046325RE	3324	26S	01W	29	17852085	REC	0
A046325RE	3297	26S	01W	29	19852085	REC	13.61
A04640900	3344	26S	01W	20	4800552	IND	14.69
A04645300	3356	26S	01W	28	953228	IRR	7.74
A04645400	3358	26S	01W	28	21905180	IRR	11.17
A04681000	3459	26S	01W	21	16233397	REC	9.4
A047421IR	3623	26S	01W	29	412901	IRR	10.3
A047421RE	3624	26S	01W	29	412901	REC	12.3
A04745600	3636	26S	01W	27	41491564	IRR	0
A04745700	3637	26S	01W	27	46692050	IRR	0
A04761500	3708	26S	01W	27	43301540	IND	19.9
A04883600	4156	26S	01W	22	12201270	IND	150
A04928400P	4869	26S	01W	27	46692050	IRR	28
A04928500P	4870	26S	01W	27	41491564	IRR	0
A04948400P	4874	26S	01W	27	6303756	IRR	31.278
A04948400P	4875	26S	01W	27	6303756	REC	9.33
A20019068	2929	26S	01W	28	41503800	HYD	345
A20109067	3671	26S	01W	21	37003100	HYD	371.2
A20109084	3704	26S	01W	23	13203960	HYD	2386
A20149062	4858	26S	01W	22	12201270	HYD	1066
A20159048	4881	26S	01W	21	35903885	HYD	0
Allowable Appropriations		1,996.50			Total Existing Appropriation		6,164.33
Small User Quantity		0			Non Consumptive Appropriations		4,168.20
Remaining SUQ		45			Consumptive Appropriations		1,996.13
Note- Values are in acre-feet					Available Appropriations		0.37

WATER RESOURCES RECEIVED

JUL 20 2016

KS DEPT OF AGRICULTURE

SCANNED



1320 Research Park Drive
Manhattan, Kansas 66502
(785) 564-6700

900 SW Jackson, Room 456
Topeka, Kansas 66612
(785) 296-3556

Jackie McClaskey, Secretary

Governor Sam Brownback

FILE COPY

May 12, 2016

GROUNDWATER MANAGEMENT
DISTRICT NO 2
313 SPRUCE ST
HALSTEAD KS 67056-1925

Re: Application File No.
49,484

Ladies and Gentlemen:

In response to your e-mail request received in our office on May 12, 2016 for an extension of time to review and submit revised recommendations regarding the referenced application, the Chief Engineer has approved an extension of time of 30 days until June 13, 2016. This extension approval is based on additional information provided to the District in regards to the proposed groundwater ponds and subdivision development.

Please submit your recommendations within the allotted time, or any authorized extension of time thereof. If you wish to discuss the extension of time, please contact this office.

Sincerely,

Erin McGrogan
Environmental Scientist
Water Appropriation Program

EMC
pc: Stafford Field Office

SCANNED

April 2016 review req, 1 emc 1 PUB



1320 Research Park Drive
Manhattan, Kansas 66502
(785) 564-6700

900 SW Jackson, Room 456
Topeka, Kansas 66612
(785) 296-3556

Jackie McClaskey, Secretary

Governor Sam Brownback

FILE COPY

GROUNDWATER MANAGEMENT DISTRICT NO 2
TIM BOESE
313 SPRUCE ST
HALSTEAD KS 67056-1925

April 12, 2016

Re: Pending Application, File No. 49,484

Dear Mr. Boese:

We are enclosing a copy of the application referred to above which appears to be in proper form. Please note this is a multi-use application for irrigation and recreation use in a new subdivision. The proposed overall quantity has been reduced based on the reasonable requirements for the place of use. We also have included a one time intimal fill for the groundwater ponds.

We are delaying any further action for a period of **30 days** from the date of this letter to allow you time to submit your recommendation concerning this application. Please submit your recommendation within the allotted time, or any authorized extension of time thereof.

If you have any questions, please contact me at (785) 564-6640. If you wish to discuss a specific file, please have the file number ready so that I may help you more efficiently.

Sincerely,

Erin McGrogan
Environmental Scientist
Water Appropriation Program

Enclosure
pc: Stafford Field Office

SCANNED

ESTANCIA - TIER 1, LLC

March 2016

DOMESTIC WELL WITHIN 1000' OF FILE NO. 49484 POINT OF DIVERSION

KGS Record Number	Owner/Address	Property Address
329494	Via Christi Property Services, Inc.	6837 W. 37th St N. Wichita, KS 67205
486054	1035 N. Emporia St. Ste. 230 Wichita, KS 67214-2972	
450542	Mid-Kansas Pediatric Associates, P.A. 6837 W. 37th St. N. Wichita, KS 67205	
493238	DEJ Properties, LLC 6943 W. 37th St. N. Wichita, KS 67205	6943 W. 37th St. N. Wichita, KS 67205
Unknown	Catholic Diocese of Wichita 424 N. Broadway Wichita, KS 67202-2310	3782 N Ridge Port Ct. Wichita, KS 67205

1320 Research Park Drive
Manhattan, Kansas 66502
(785) 564-6700



900 SW Jackson, Room 456
Topeka, Kansas 66612
(785) 296-3556

Jackie McClaskey, Secretary

Governor Sam Brownback

March 23, 2016

MID KANSAS PEDIATRIC ASSOC PA
6837 W 37TH ST N
WICHITA KS 67205

Re: Application,
File No. 49,484

Dear Sir or Madam:

This is to advise you that Tier 1, L.L.C. have filed the application referred to above for a permit to appropriate 40.6 acre-feet of groundwater per calendar year for irrigation and recreation use to be diverted at a maximum rate of 800 gallons per minute. The proposed well is located as follows:

One (1) in the Southwest Quarter of the Southeast Quarter of the Southwest Quarter (SW¹/₄ SE¹/₄ SW¹/₄), of Section 27, Township 26 South, Range 1 West, Sedgwick County, Kansas.

A map is enclosed indicating the location of the point of diversion. Records in this office indicate that you may have a well or wells in this vicinity and you are notified of receipt of this application in order that you may be fully informed of the location of the applicant's point of diversion and proposed use of water. Consideration will be given to comments or other information which you desire to submit to this office **within 15 days** from the date of this letter. Please note this is the proposed Estancia subdivision located at Ridge Road and 37th St., Wichita, Kansas. The water will be used in landscape irrigation and provide water for six water features within the subdivision.

If you have any questions or comments, you may also contact me at (785) 564-6640. If you call, please reference the file number so I can help you more efficiently.

Sincerely,

A handwritten signature in cursive script that reads "Erin McGrogan".

Erin McGrogan
Environmental Scientist
Permits Unit

Enclosure

pc: Stafford Field Office
Tier I LLC
MKEC
GMD No 2

FILE COPY

SCANNED

1320 Research Park Drive
Manhattan, Kansas 66502
(785) 564-6700



900 SW Jackson, Room 456
Topeka, Kansas 66612
(785) 296-3556

Jackie McClaskey, Secretary

Governor Sam Brownback

March 23, 2016

CATHOLIC DIOCESE OF WICHITA
424 N BROADWAY
WICHITA KS 67202 2310

Re: Application,
File No. 49,484

Dear Sir or Madam:

This is to advise you that Tier 1, L.L.C. have filed the application referred to above for a permit to appropriate 40.6 acre-feet of groundwater per calendar year for irrigation and recreation use to be diverted at a maximum rate of 800 gallons per minute. The proposed well is located as follows:

One (1) in the Southwest Quarter of the Southeast Quarter of the Southwest Quarter (SW $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$), of Section 27, Township 26 South, Range 1 West, Sedgwick County, Kansas.

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Erin McGrogan
Environmental Scientist
Permits Unit

Enclosure

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Tier I LLC
MKEC
GMD No 2

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1320 Research Park Drive
Manhattan, Kansas 66502
(785) 564-6700



900 SW Jackson, Room 456
Topeka, Kansas 66612
(785) 296-3556

Jackie McClaskey, Secretary

Governor Sam Brownback

March 23, 2016

VIA CHRISTI PROPERTY SERVICES INC
1035 N EMPORIA ST SUITE 230
WICHITA KS 67214 2972

Re: Application,
File No. 49,484

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Sincerely,

Erin McGrogan
Environmental Scientist
Permits Unit

Enclosure

pc: Stafford Field Office
Tier I LLC
MKEC
GMD No 2

FILE COPY



1320 Research Park Drive
Manhattan, Kansas 66502
(785) 564-6700

900 SW Jackson, Room 456
Topeka, Kansas 66612
(785) 296-3556

Jackie McClaskey, Secretary

Governor Sam Brownback

March 23, 2016

DEJ PROPERTIES LLC
6943 W 37TH ST N
WICHITA KS 67205

Re: Application,
File No. 49,484

Dear Sir or Madam:

This is to advise you that Tier 1, L.L.C. have filed the application referred to above for a permit to appropriate 40.6 acre-feet of groundwater per calendar year for irrigation and recreation use to be diverted at a maximum rate of 800 gallons per minute. The proposed well is located as follows:

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Sincerely,

Erin McGrogan
Environmental Scientist
Permits Unit

Enclosure

pc: Stafford Field Office
Tier I LLC
MKEC
GMD No 2

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SCANNED



1320 Research Park Drive
Manhattan, Kansas 66502
(785) 564-6700

900 SW Jackson, Room 456
Topeka, Kansas 66612
(785) 296-3556

Jackie McClaskey, Secretary

Governor Sam Brownback

March 2, 2016

MKEC
ATTN STEVE FRANK PE
411 N WEBB RD
WICHITA KS 67206

FILE COPY

Re: Application File No. 49,484

Dear Mr. Frank:

Upon reviewing the referenced application for permit to appropriate groundwater for irrigation and recreation use, it was determined that notification of potential nearby well owners would be best accomplished by publication of a public notice.

Enclosed is a copy of a notice to be published in a local newspaper once per week for three consecutive weeks at the applicant's expense. Copies of the notice as published are to be submitted within two weeks of the final publication date, or you may arrange for the newspaper to provide an affidavit of publication, which should be forwarded to us.

If the date given in the notice does not allow at least 15 days for public comment following the final publication date, this office should be contacted for permission to revise the date in the notice to allow adequate time for comments.

Should you have any questions regarding your applications, please feel free to contact me at (785) 564-6640.

Sincerely

Erin McGrogan
Environmental Scientist
Water Appropriation Program

Enc: EMC
PC: Tier 1, LLC
Stafford Field Office
GMD No. 2

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This institution is an equal opportunity employer and provider.

Topeka • Kansas City • Manhattan • Garden City • Parsons • Stafford • Stockton

PUBLIC NOTICE

File No. 49,484

Page 2

Tier 1, LLC of Wichita, Kansas has filed with the Division of Water Resources, Kansas Department of Agriculture, one application for a permit to appropriate groundwater for beneficial use, identified as File No. 49,484. The following is a description of the location of the groundwater well:

One (1) well located in the Southwest Quarter of the Southeast Quarter of the Southwest Quarter of Section 27, Township 26 South Range 1 West, Sedgwick County, Kansas.

The water will be used for irrigation on 24 acres of landscaping areas within the Estancia subdivision for the proposed quantity of 35.34 acre-feet per year. The landscaping areas are located in the Southwest Quarter of Section 27, Township 26 South, Range 1 West, Sedgwick County, Kansas. And the water will also be used for recreational use for providing 9.33 acre-feet to cover evaporative loss in six small ground water ponds. The Estancia Development is located between Ridge Road, and 37th St. North in Wichita, Kansas

Any interested party is invited to submit to this office on or before **April 14, 2016** written comments as to whether Application File No. 49,484 should be approved or not approved. Persons submitting comments should specially indicate their interest in the applications in a clear and concise manner.

Application File No. 49,484 are on file and available for public inspection in the office of the Chief Engineer, Division of Water Resources, Kansas Department of Agriculture 1320 Research Park Drive, Manhattan, Kansas 66502.



LEGAL PROOF OF PUBLICATION

Account #	Ad Number	Identification	PO	Amount	Cols	Lines
500353	0002311589	PUBLIC NOTICE File No. 49,484 Page 2 T		\$797.46	1	46

Attention:

MKEC ENGINEERING SUCCESS
411 N. WEBB RD
WICHITA, KS 67206

In The STATE OF KANSAS
In and for the County of Sedgwick
AFFIDAVIT OF PUBLICATION

3 Insertions

Beginning issue of: 03/07/2016

Ending issue of: 03/21/2016

STATE OF KANSAS)
.SS
County of Sedgwick)

PUBLIC NOTICE
File No. 49,484
Page 2

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Application File No. 49,484 are on file and available for public inspection in the office of the Chief Engineer, Division of Water Resources, Kansas Department of Agriculture 1320 Research Park Drive, Manhattan, Kansas 66502.

Mark Fletchall, of lawful age, being first duly sworn, deposeth and saith: That he is Record Clerk of The Wichita Eagle, a daily newspaper published in the City of Wichita, County of Sedgwick, State of Kansas, and having a general paid circulation on a daily basis in said County, which said newspaper has been continuously and uninterruptedly published in said County for more than one year prior to the first publication of the notice hereinafter mentioned, and which said newspaper has been entered as second class mail matter at the United States Post Office in Wichita, Kansas, and which said newspaper is not a trade, religious or fraternal publication and that a notice of a true copy is hereto attached was published in the regular and entire Morning issue of said The Wichita Eagle from 3/7/2016 to 03/21/2016.

I certify (or declare) under the penalty of perjury that the foregoing is true and correct.

Mark Fletchall
(Signature of Principal Clerk)

DATED: 3/21/2016

Rachel M. Wilson

Notary Public Sedgwick County, Kansas

WATER RESOURCES
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MAR 24 2016

KS DEPT OF AGRICULTURE



How much is a year's worth of water?

Estimating annual water usage on the golf course may not only placate the water police — it could also save money.

Jack Fry, Ph.D.

As water becomes a more costly resource, golf course superintendents find that they must furnish estimates of annual usage to those who provide the water. These estimates are used to develop a water budget specific to a particular golf course. Although this request comes most often when golf courses are in the planning stage or under construction, existing golf courses also may be required to provide estimated annual water requirements to water companies.

Measuring irrigation

Turfgrass irrigation requirements depend on water losses through evapotranspiration (ET) and gains from usable precipitation. Evapotranspiration is the sum of water lost by evaporation from the soil surface and by transpiration through small pores (*stomata*) on leaves. Although water is typically measured in units of volume, such as fluid ounces, pints or gallons, water requirements for large areas of agricultural land, including turf areas, are more easily expressed in units of measure, such as inches or feet. For example, if ET is reported as 1 inch, the amount of water lost is equivalent to water covering the entire surface of the turf area at a depth of 1 inch.

To take this a step further, engineers have determined the volume of water required to cover an acre of ground with 1 foot of water: 325,851.43 gallons or 1 acre-foot of water. Applying 1 foot of water to 3 acres would require 977,554.29 gallons of water (325,851.43 gallons × 3 acres). One acre-inch of water equals 27,154.29 gallons (325,851.43/12). Golf course irrigation requirements are commonly expressed in terms of acre-feet, primarily because this terminology is easier than using "hundreds of thousands" or "tens of millions" of gallons.

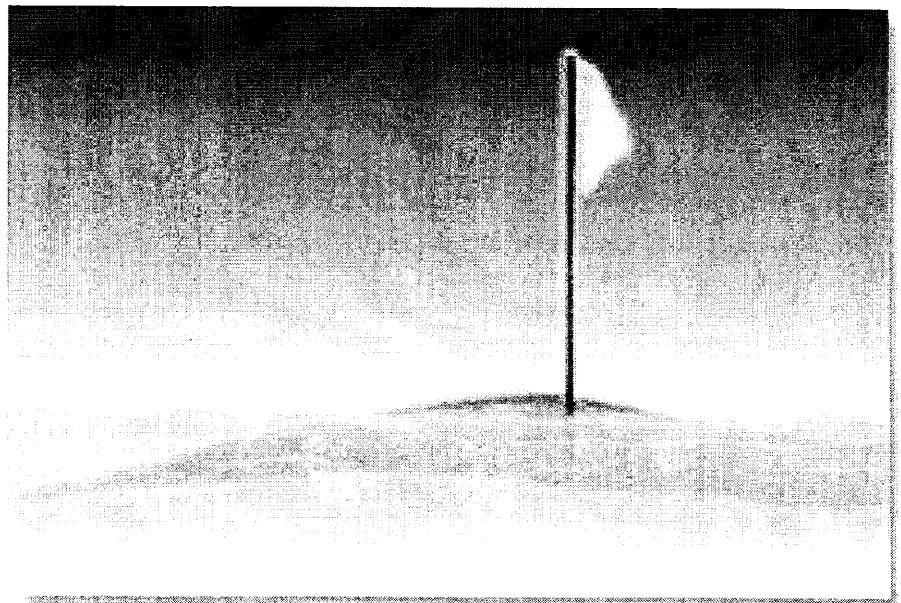


Illustration by Kelly Neis

Irrigation is commonly measured in acre-feet. One acre-foot, the amount of water needed to cover an acre of ground with 1 foot of water, is 325,851.43 gallons.

KEY points

More Info: www.gcsaa.org

Water is becoming an increasingly expensive commodity for golf courses.

Municipalities and water companies often want to know the estimated water use of a golf course before granting construction permits or in times of drought or water restrictions.

To determine estimated water use, it is necessary to know the acreage of irrigated areas and an estimate of average turfgrass ET rates.

Once the basic information has been gathered, simple mathematical formulas can be used to estimate annual water use.

This information can also be used to determine how many gallons of water have been lost through ET. For example, if 0.25 inch of ET occurred in one day from 40 acres of fairways, the total gallons of water lost can be calculated as follows:

Gallons lost through ET in 1 acre
 = ET rate (inches per day) × 27,154.29 gallons
 = 0.25 inch × 27,154.29
 = 6,788.57 gallons ET per acre

Gallons of ET lost over the entire area
 = number of acres of turf × gallons ET per acre
 = 40 acres × 6,788.57 gallons ET per acre
 = 271,542.8 gallons ET across 40 acres

Case Study: Colbert Hills Golf Course

Given background information on calculating water usage, it is possible to determine annual water requirements for a golf course.

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OCT 12 2015

RESEARCH

The golf course used in the examples presented here is Colbert Hills Golf Course, an 18-hole championship course located in Manhattan, Kan., the home of Kansas State University (KSU).

Irrigated acreage at the course is 5 acres of L-93 creeping bentgrass (*Agrostis stolonifera*) greens mowed at 0.130 inch; 45 acres of Meyer zoysiagrass (*Zoysia japonica*) fairways and tees mowed at 0.5 inch; and 100 acres of turf-type tall fescue (*Festuca arundinacea*) mowed at 2.5 inches. Turf ET values for June to September were based on turfgrass research data conducted at KSU since 1993. Weather-based estimates were used to determine values for March-May and October-November.

1. Measure the acreage of irrigated areas on the golf course.

The acreage of irrigated areas on the golf course may already be on file at the course. If not, the superintendent or a member of the staff should be prepared to spend a few days with a measuring wheel to determine areas for greens, tees, fairways and rough. It is important to determine areas separately, because ET of turf on putting greens is different from ET of fairways, and fairway turf ET may be different from ET in roughs. For more information on determining area, see "The Mathematics of Turfgrass Maintenance" (1).

2. Get an estimate of average turfgrass ET rates.

Turfgrass ET rates can be obtained from numerous sources, including historical weather data, mathematical-based models that employ weather data, evaporation pan data and university turfgrass researchers. Researchers at land-grant universities in several states have measured ET rates of turfgrasses during the growing season.

Turfgrass ET values are almost always reported as water loss under conditions in which soil water was not limiting for plant growth. This is important, because ET declines as soil dries. Evapotranspiration data obtained from weather-based estimates may have to be adjusted for the specific golf course conditions, because some mathematical models provide data appropriate for stands of cool-season grass maintained at a 3- to 6-inch height, considerably higher than turf on most golf courses. Therefore, although the illustration in this article provides a reasonable estimate of annual turfgrass water requirements, many interacting factors may increase or decrease the total amount of water required.

In some cases, interacting factors can be accounted for by using a multiplier, or crop coefficient, to adjust an ET estimate. For example, a crop coefficient may be used to adjust ET for effects of mowing height, irri-

gation frequency, nitrogen fertility level or soil type. In such a case, university Extension personnel may be able to provide more accurate numbers. (A list of Web sites that provide ET calculators is shown below.)

Typical average ET rates during active growth, and under well-watered conditions, range from 0.1 to 0.3 inch per day for cool-season grasses and 0.05 to 0.2 inch per day for warm-season grasses. However, ET can be quite variable, and values can be higher or lower than the ranges provided because many environmental and cultural factors influence ET. (See the table, "Environmental and cultural factors vs. ET.")

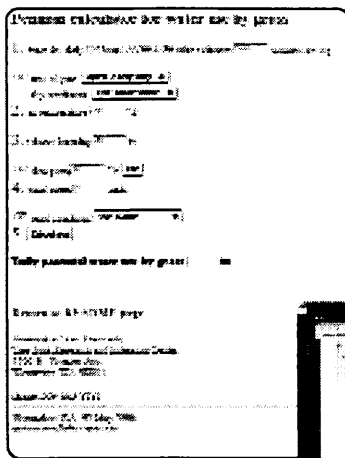
ET estimates for each area of the golf course are best broken out by month or by groups of months. In the case study below for a golf course in Manhattan, average ET estimates are provided for March-May, June-September and October-November. Months or groups of months may be divided differently depending on geographic location. For example, superintendents in the southern United States may have significant ET values every month of the year.

3. Determine annual ET rates for the golf course, and then convert to acre-feet.

An example of determining annual ET rates is illustrated by using the average ET loss from 5 acres of creeping bentgrass turf (0.2

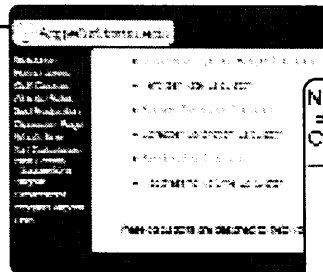
HELPdesk

Web sites for ET calculators



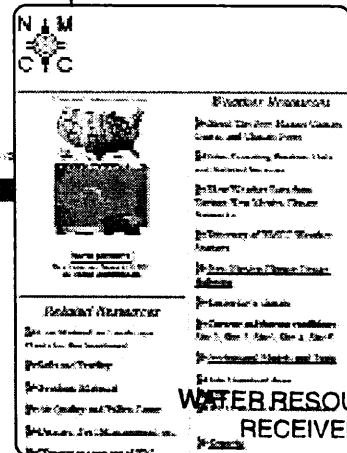
<http://www.tfrec.wsu.edu/Orchard/pET/pETCalc.html>

<http://aggierturf.tamu.edu/tools.html>



http://www.springirrigation.com/management/penman_calculator_for_water_use.htm

<http://weather.nmsu.edu/nmcrops/grasses/index.htm>



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inch per day) over the 122-day period from June through September:

Step 1.

Total ET for the time period in inches
 = average daily ET in inches
 × number of days in the period
 = 0.2 inch × 122 days
 = 24.4 inches ET

Step 2.

Total ET for the time period in feet
 = inches ÷ 12 (12 inches = 1 foot)
 = 24.4 inches ÷ 12
 = 2.03 feet ET

Step 3.

Acre-feet of ET over the time period
 = feet of ET × number of acres of turf
 = 2.03 feet ET × 5 acres
 = 10.15 acre-feet ET

The total acre-feet of water required for each time period can then be added together to determine the total water requirement for the creeping bentgrass putting greens. (See the

ENVIRONMENTAL AND CULTURAL FACTORS VS. ET

Environmental factor	Influence on ET
Air and soil temperature	Increases with temperature
Sunshine	Increases with intensity and day length
Wind speed	Increases with wind speed
Relative humidity	Decreases with increasing humidity
Cultural factor	
Mowing height	Increases with mowing height
Nitrogen	Increases with nitrogen

table, "Estimating irrigation at Colbert Hills.")

4. Subtract usable precipitation to determine net acre-feet of water required.

Not all precipitation that falls is used by

the plant. Usable rainfall varies depending on many factors, including precipitation rate, soil type, soil water content and turfgrass rooting characteristics. An accurate measure of precipitation at several locations across the

ESTIMATING IRRIGATION AT COLBERT HILLS

Months	(1) Average daily ET (inches)	(2) No. days	(3) Total ET (inches) (col. 1 × col.2)	(4) Acre- feet/acre (col.3 ÷ 12)	(5) Acres	(6) Total acre-feet (col. 4 × col.5)	(7) Usable precip. (acre-feet over the area given)	(8) Net acre-feet (col.6 - col.7)
CREEPING BENTGRASS GREENS								
March-May	0.10	92	9.2	0.77	5	3.85	2.06	1.79
June-Sept.	0.20	122	24.4	2.03	5	10.15	3.39	6.76
Oct.-Nov.	0.10	61	6.1	0.51	5	2.55	1.01	1.54
Total								10.09
ZOYSIAGRASS FAIRWAYS AND TEES								
March-May	0.08	92	7.36	0.61	45	27	18.5	8.5
June-Sept.	0.17	122	20.74	1.73	45	77.78	30.5	47.28
Oct.-Nov.	0.08	61	4.88	0.41	45	18.45	9.09	9.36
Total								65.14
TALL FESCUE ROUGHS								
March-May	0.12	92	11.04	0.92	100	92	41.13	50.87
June-Sept.	0.27	122	32.94	2.75	100	275	67.8	207.2
Oct.-Nov.	0.12	61	7.32	0.61	100	61	20.2	40.8
Total								298.87
						WATER RESOURCES RECEIVED		
Estimates of acre-feet requirements at Colbert Hills Golf Course in Manhattan, Kan.								

OCT 12 2015

RESEARCH

course will better document irrigation needs. Less than 0.10 inch of rainfall generally does not provide irrigation usable to the turf. When precipitation is heavy, amounts greater than 1.5 inch are likely to run off. Some water will also move beyond the root zone.

For this example, the bentgrass greens at Colbert Hills GC assume that 50 percent of precipitation is available for turfgrass use. This estimate is conservative because in some years turf in the Midwest may be able to use more than 75 percent of precipitation and irrigation. The greens at Colbert Hills can serve as an example of how usable precipitation is deducted from the total turf water requirements.

Step 1.

Usable precipitation for the period

- = normal precipitation ÷ 2 (assuming 50 percent of precipitation is usable)
- = 16.28 inches of precipitation ÷ 2
- = 8.14 inches of usable precipitation

Step 2.

Total acre-inches of precipitation

- = usable precipitation × number of acres
- = 8.14 inches of usable precipitation × 5 acres
- = 40.7 acre-inches of usable precipitation

Step 3.

Total acre-feet of usable precipitation

- = acre-inches of usable precipitation ÷ 12
- = 40.7 acre-inches of usable precipitation ÷ 12
- = 3.39 acre-feet of usable precipitation

Following the steps outlined above, seasonal water requirements for greens, tees

and fairways and rough have been determined for Colbert Hills. (See the table, "Total estimated irrigation for Colbert Hills.")

Based on this process, the annual irrigation requirement for Colbert Hills is 374.10 acre-feet, or 121,901,019 gallons. Of the total water applied, greens receive 2.7 percent, fairways 17.4 percent and rough 79.8 percent.

The Colbert Hills illustration demonstrates how reducing irrigation of the rough could result in significant water savings. This may be accomplished by zoning rough irrigation separately from fairways or using drought-resistant turfgrasses that require only minimal irrigation (e.g., buffalograss in Kansas).

Estimated vs. actual water use

In all likelihood, the water requirement calculated for Colbert Hills represents an amount that will be required during a dry year, such as 2002, but overestimates water requirements in a wet year. Nevertheless, it is better to err on the high side than to submit a request that will not allow for sufficient water. Actual water use may also be less because ET values assumed that turf was growing under well-watered conditions. As mentioned above, ET declines as the soil dries between irrigation or rain. Actual turf ET values will be lower than the calculated values depending on irrigation frequency and other factors. Usable rainfall also may be greater than 50 percent, further reducing the amount of water required.

Once an irrigation budget is determined,

the superintendent should strive to stay within the targeted allotment. In fact, some water providers penalize golf courses that exceed the identified goal. For example, the city of Wichita, Kan., currently charges \$518.10 per acre-foot of water for golf courses inside the city limits. However, once a course has exceeded its targeted limit, the cost increases to \$785.30 per acre-foot.

Irrigation efficiency

The steps outlined above for determining annual irrigation requirements do not take into account the inefficiency of the irrigation system. Poor water distribution will increase the amount of water required to maintain turf quality (2). In the Colbert Hills example, if the system is assumed to be 80 percent efficient, the new water requirement would be 467.63 acre-feet, which is 20 percent higher than originally calculated (374.1 acre-feet ÷ 0.80 = 467.63 acre-feet). Once again, a higher, rather than lower, estimate of irrigation need may help to account for minor problems with distribution uniformity.

Keep in mind, however, that water providers have little empathy for superintendents managing water on courses with inefficient delivery systems. If such problems exist, efforts should be made to correct them, because the money saved on water will more than cover the cost of correcting irrigation system woes.

Acknowledgments

Thanks to Dale Bremer, Ph.D.; Paul Davids, CGCS; Kay Drennan; David Gourlay, CGCS; Steve Keeley, Ph.D.; and Cathie Lavis for reviewing this article.

Literature cited

1. Christians, N., and M. Agnew. 1997. The mathematics of turfgrass maintenance. Ann Arbor Press, Chelsea, Mich.
2. Kopec, D. 1994. Adjusting irrigation systems for greater efficiency. *Golf Course Management* 62(8):74-82.

TOTAL ESTIMATED IRRIGATION FOR COLBERT HILLS

Area	Acre-feet
L-93 creeping bentgrass greens	10.09
Meyer zoysiagrass fairways and tees	65.14
Turf-type tall fescue rough	298.87
Total	374.10

Jack Fry, Ph.D. (jfry@oznet.ksu.edu) is a professor in the department of horticulture, forestry and recreation resources at Kansas State University, Manhattan, Kan.

WATER RESOURCES
RECEIVED

OCT 12 2015

SCANNED

June 23, 2015

Mr. Jesse Schellenberg
Tier One
7926 W. 21st Street North
Wichita, Kansas 67205

SUBJECT: Geotechnical Exploration
Nicholson Family Development
Wichita, Kansas
GSI Job No. 157268

Dear Mr. Schellenberg:

This letter presents the results of our geotechnical exploration for the Nicholson Family Development. The proposed project will be located on the northeast corner of 37th Street North and North Ridge Road in Wichita, Kansas. We understand the development will consist primarily of residential construction with some commercial properties along Ridge Road. The detention ponds associated with the development will be designed to discharge runoff through percolation into the sandy soils typical of this area. We also understand this exploration will be used to assess groundwater levels and the suitability of on-site materials as sand bedding for pipes in accordance with City of Wichita Specification 801.

Field Exploration

We drilled 5 borings for this geotechnical exploration on June 8, 2015 with a CME 55 track-mounted drilling rig using 3.25-inch inside diameter hollow stem augers. We drilled the borings to a depth of approximately 25 feet below the site grade at the time of our exploration. The boring locations are shown on the attached boring location plan.

Laboratory Testing

Our engineering staff reviewed the field boring logs to outline the depth, thickness and extent of the soil strata. The samples taken from the borings were examined in our laboratory and visually classified in general accordance with ASTM D2488, "*Description and Identification of Soils (Visual-Manual Procedure)*." We established a testing program to evaluate the engineering properties of the recovered samples. A GSI technician performed laboratory testing in general accordance with the following current ASTM test methods:

- Moisture Content (ASTM D2216, "*Laboratory Determination of Water (Moisture) Content of Soil and Rock*")
- Atterberg Limits (ASTM D4318, "*Liquid Limit, Plastic Limit, and Plasticity Index of Soils*")
- Minus No. 200 Sieve Wash (ASTM D1140, "*Amount of Material in Soils Finer Than the No. 200 (75- μ m) Sieve*")
- Sieve Analysis (ASTM D422, "*Particle Size Analysis of Soils*")

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Laboratory test results are presented on the boring logs as well as on summary tables included with this letter.

Site Conditions

At the time of our exploration, the site comprised a relatively flat agricultural field with wheat and watermelon plants.

We developed a general soil profile based on our exploration, although we observed some variability in subsurface conditions. The soil we encountered within the depths of exploration generally comprised sandy lean clay overlying clayey sand and poorly graded sand.

We encountered sandy lean clay in B-1, B-4 and B-5 underlying a 6-inch topsoil layer and extending to depths between 2.5 and 5 feet. We also encountered a sandy lean clay seam in B-3 from approximately 18.5 feet to 23.5 feet. This material was generally described as light brown, dark brown, very dark brown or grayish brown and moist. We measured Standard Penetration Test (SPT) N-values between 2 and 10 blows per foot (bpf), indicating the sandy lean clay is in a soft to stiff condition.

We encountered clayey sand and poorly graded sand in all of our borings underlying the topsoil or sandy lean clay materials and extending to the termination depth of the borings at approximately 25 feet below site grade. This material was generally described as light brown, dark brown, yellowish brown or grayish brown and slightly moist to wet. We measured SPT N-values between 3 and 24 bpf, indicating the sandy soils are in a very loose to medium dense condition.

Our drill crew made water level observations during drilling and after completion of the borings to evaluate groundwater conditions. We observed groundwater at the depths indicated on the boring logs and in the following table.

Groundwater Levels

<i>Boring Number</i>	<i>Depth Below Grade After Drilling (ft.)</i>	<i>Hours after Drilling</i>
B-1	10.1	3
B-2	10.8	--
B-3	12.9	1.5
B-4	9.9	4.5
B-5	10.7	6

Recommendations

The sandy lean clay soils we encountered in the test borings generally classify as a type "B" soil while the clayey sand and poorly graded sand generally classify as a type "C" soil according to OSHA's Construction Standards for Excavations. In general, the maximum allowable slope for shallow excavations of less than 20 feet in a type "B" soil is 1.0H:1V and in a type "C" soil is 1.5H:1V, although other provisions and restrictions may apply. If different soil types are encountered, the maximum allowable slope may be different.

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Vertical cuts and excavations may stand for short periods of time, but should not be considered stable in any case. All excavations should be sloped back, shored, or shielded for the protection of workers. As a minimum, trenching and excavation activities should conform to federal and local regulations. The information presented above is solely for our client's reference. GSI assumes no responsibility for site safety or the implementation of proper excavation techniques.


We recommend structural fill material have sufficient cohesion to form a compactable, uniform and stable subgrade. Granular material exhibiting a PI less than 10 may be used within confined areas such as within foundation stem walls. The sandy lean clay and clayey sand materials we encountered in the upper 2.5 to 5 feet of the site generally exhibit sufficient cohesion for use as structural fill material while the poorly graded sand is suitable only in confined areas.

We performed Minus No. 200 Sieve Wash tests and Sieve Analysis tests on the on-site poorly graded sand to determine the suitability of these materials for use as pipe bedding according to the City of Wichita, Section 801 specification. Section 801.2 specifies that for sand bedding, 100 percent of the material must pass the 3/4-inch sieve, not more than 25 percent be retained on the No. 4 sieve and not more than 10 percent pass the No. 200 sieve. According to these criteria, the poorly graded sand materials we encountered in our exploration are suitable for use as sand bedding. Particle size distribution reports are attached to this letter for your reference.


We estimate the on-site clayey sand and poorly graded sand materials will exhibit permeability ranging from 1×10^{-3} to 1×10^{-1} centimeters per second while the permeability of the sandy lean clay materials will range from 1×10^{-5} to 1×10^{-3} centimeters per second. Additional field and laboratory testing may help further determine the permeability characteristics of the on-site soils.

We appreciate this opportunity to be of service in the geotechnical exploration phase of this project and are prepared to assist you as the project progresses. Please contact us if you have any questions concerning this report or any of our other consulting or testing services.

Respectfully submitted,
GSI Engineering, LLC



Matthew N. Tye, I.E.
Staff Engineer



Thomas C. Kettler, Jr., P.E.
Senior Engineer



MNT/TCK

Enclosures: Boring Location Plan (1), Boring Logs (5), Key to Symbols (1), Legend and Nomenclature (1) Unified Soil Classification System (USCS) (1), Particle Size Distribution Reports (6), Test Summary (2)

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BORING LOG No. B-1

BORING NO. B-1	LOCATION OF BORING See Boring Location Plan	ELEVATION	DATUM	DRILLER A. Thornburg	LOGGER A. Noll
WATER LEVEL OBSERVATIONS			TYPE OF SURFACE Wheat Field		DRILL RIG CME 55 Track
WHILE DRILLING 13.5 ft.	END OF DRILLING 10.5 ft.	24 HOURS AFTER DRILLING	3 HOURS AFTER DRILLING 10.1 ft.	DRILLING METHOD 3.25-inch Hollow Stem Augers	
				TOTAL DEPTH 25.0 ft.	

DEP. FT.	SAMPLE DATA			SOIL DESCRIPTION			LABORATORY DATA			ELEV. FT.
	SAMPLE NO. & TYPE	"N" BLOWS (FT)	% REC.	COLOR, CONSISTENCY, MOISTURE	USCS CLASS.	MC %	Dry Dens. pcf	q _u ksf		
				GEOLOGIC DESCRIPTION & OTHER REMARKS						
				6" TOPSOIL						
	S-1	4		SANDY LEAN CLAY- very dark brown, moist, medium stiff, iron, rust stains, roots LL=35; PL=19; PI=16		16.4				
	S-2	10		- grayish brown, stiff, calcium nodules, else as above	CL	17.5				
5				- light brown, else as above						
	S-3	9		CLAYEY SAND- light brown, moist, loose, fine grained % Pass #200: 43.3	SC	15.7				
	S-4	18		POORLY GRADED SAND- yellowish brown, slightly moist, medium dense, fine grained						
10										
	S-5	8		- grayish brown, wet, loose, medium t coarse grained, else as above						
15										
	S-6	7		- medium grained, else as above	SP					
20										
	S-7	11		- medium dense, medium to coarse grained, else as above						
25										
				Bottom of Boring @ 25'						
30										
35										
40										

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PROJECT: Nicholson Family Development

LOCATION: Wichita, Kansas

JOB NO.: 157268

DATE: June 8, 2015

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BORING LOG No. B-2

BORING NO.	LOCATION OF BORING	ELEVATION	DATUM	DRILLER	LOGGER
B-2	See Boring Location Plan			A. Thornburg	A. Noll
WATER LEVEL OBSERVATIONS			TYPE OF SURFACE		DRILL RIG
WHILE DRILLING	END OF DRILLING	24 HOURS AFTER DRILLING	AFTER DRILLING	Wheat Field	CME 55 Track
13.5 ft.	10.8 ft.			DRILLING METHOD	TOTAL DEPTH
				3.25-inch Hollow Stem Augers	25.0 ft.

DEP. FT.	SAMPLE DATA			SOIL DESCRIPTION			LABORATORY DATA			ELEV. FT.
	SAMPLE NO. & TYPE	"N" BLOWS (FT)	% REC.	COLOR, CONSISTENCY, MOISTURE		USCS CLASS.	MC %	Dry Dens. pcf	q _u ksf	
				GEOLOGIC DESCRIPTION & OTHER REMARKS						
				6" TOPSOIL	0.5'					
	S-1	3		CLAYEY SAND- dark brown, slightly moist, very loose, fine grained, roots		SC	10.2			
				% Pass #200: 37.5						
	S-2	6		POORLY GRADED SAND- yellowish brown, slightly moist, loose, fine to medium grained	2.5'		2.4			
5				- brown, medium dense, else as above			4.7			
	S-3	16								
				- fine grained, else as above						
10	S-4	19								
				- grayish brown, loose, wet, medium grained, else as above		SP				
15	S-5	4								
				- medium dense, medium to coarse grained, else as above						
20	S-6	10								
				- coarse grained, else as above						
25	S-7	13								
				Bottom of Boring @ 25'	25.0'					
30										
35										
40										

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BORING LOG No. B-3

BORING NO.	LOCATION OF BORING	ELEVATION	DATUM	DRILLER	LOGGER
B-3	See Boring Location Plan			A. Thornburg	A. Noll
WATER LEVEL OBSERVATIONS			TYPE OF SURFACE		DRILL RIG
WHILE DRILLING	END OF DRILLING	24 HOURS AFTER DRILLING	1.5 HOURS AFTER DRILLING	Wheat Field	CME 55 Track
10.0 ft.	13.3 ft.		12.9 FT.	3.25-inch Hollow Stem Augers	TOTAL DEPTH 25.0 ft.

DEP. FT.	SAMPLE DATA			SOIL DESCRIPTION		LABORATORY DATA			ELEV. FT.	
	SAMPLE NO. & TYPE	"N" BLOWS (FT)	% REC.	COLOR, CONSISTENCY, MOISTURE		USCS CLASS.	MC %	Dry Dens. pcf		qu ksf
				GEOLOGIC DESCRIPTION & OTHER REMARKS						
				6" TOPSOIL	0.5'					
	S-1	5		CLAYEY SAND- dark brown, moist, loose, iron, rust stains, fine grained			13.2			
	S-2	3		- very loose, else as above		SC	14.5			
5	S-3	4		- as above % Pass #200: 17.3			10.6			
	S-4	14		POORLY GRADED SAND- brown, very moist, medium dense, fine to medium grained	8.5'	SP				
10										
	S-5	17		- yellowish brown, wet, else as above		SP				
15										
	S-6	3		SANDY LEAN CLAY- gray to very dark brown, wet, soft	18.5'	CL				
20										
	S-7	N.R.		POORLY GRADED SAND- grayish brown, wet, coarse grained with trace gravel	23.5'	SP				
25				Bottom of Boring @ 25'	25.0'					
30										
35										
40										

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BORING LOG No. B-4

BORING NO.	LOCATION OF BORING	ELEVATION	DATUM	DRILLER	LOGGER
B-4	See Boring Location Plan			A. Thornburg	A. Noll
WATER LEVEL OBSERVATIONS				TYPE OF SURFACE	DRILL RIG
WHILE DRILLING	END OF DRILLING	24 HOURS AFTER DRILLING	4.5 HOURS AFTER DRILLING	Wheat Field	CME 55 Track
13.5 ft.	9.5 ft.		9.9 ft.	DRILLING METHOD	TOTAL DEPTH
				3.25-inch Hollow Stem Augers	25.0 ft.

DEP. FT.	SAMPLE DATA			SOIL DESCRIPTION		LABORATORY DATA			ELEV. FT.	
	SAMPLE NO. & TYPE	"N" BLOWS (FT)	% REC.	COLOR, CONSISTENCY, MOISTURE		USCS CLASS.	MC %	Dry Dens. pcf		Qu ksf
				GEOLOGIC DESCRIPTION & OTHER REMARKS						
				6" TOPSOIL	0.5'					
	S-1	2		LEAN CLAY WITH SAND- dark brown, moist, soft, iron, rust stains, roots, calcium			18.9			
	S-2	9		- grayish brown, stiff, else as above % Pass #200: 78.6		CL	28.9			
5										
	S-3	10		POORLY GRADED SAND- grayish brown to yellowish brown, moist, medium dense, fine grained	5.0'					
10	S-4	18		- yellowish brown, fine to medium grained, else as above						
15	S-5	5		- grayish brown, wet, loose, medium to coarse grained, else as above		SP				
20	S-6	6		- coarse grained, else as above						
25	S-7	15		- medium dense, else as above						
				Bottom of Boring @ 25'	25.0'					
30										
35										
40										

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BORING LOG No. B-5

BORING NO.	LOCATION OF BORING	ELEVATION	DATUM	DRILLER	LOGGER
B-5	See Boring Location Plan			A. Thornburg	A. Noll
WATER LEVEL OBSERVATIONS			TYPE OF SURFACE		DRILL RIG
WHILE DRILLING	END OF DRILLING	24 HOURS AFTER DRILLING	6 HOURS AFTER DRILLING	Wheat Field	CME 55 Track
13.0 ft.	11.0 ft.		10.7 ft.	3.25-inch Hollow Stem Augers	TOTAL DEPTH 25.0 ft.

DEP. FT.	SAMPLE DATA			SOIL DESCRIPTION		LABORATORY DATA			ELEV. FT.	
	SAMPLE NO. & TYPE	"N" BLOWS (FT)	% REC.	COLOR, CONSISTENCY, MOISTURE		USCS CLASS.	MC %	Dry Dens. pcf		q _u ksf
				GEOLOGIC DESCRIPTION & OTHER REMARKS						
				6" TOPSOIL	0.5'					
	S-1	7		SANDY LEAN CLAY- dark brown, moist, medium stiff, iron, rust stains, roots	0.5'	CL	7.4			
	S-2	10		CLAYEY SAND- brown, slightly moist, medium dense, iron, rust stains, roots % Pass #200: 12.3	2.5'	SC	24.7			
5										
	S-3	19		POORLY GRADED SAND- brown, slightly moist, medium dense, fine to medium grained	5.0'					
10	S-4	20		- yellowish brown, fine grained, else as above						
15	S-5	24		- light brown, wet, fine to medium grained, else as above		SP				
20	S-6	4		- grayish brown, loose, else as above						
25	S-7	6		- as above						
				Bottom of Boring @ 25'	25.0'					
30										
35										
40										

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Topsoil



Lean clay w/sand or sandy lean clay



Clayey sand/
Low plasticity clay



Poorly graded sand

Misc. Symbols



Water table during drilling



Water table at the conclusion of drilling

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Notes:

1. The exploratory borings were drilled on June 8, 2015 using 3.25-inch diameter hollow stem augers.
2. These logs are subject to the limitations, conclusions, and recommendations in this report.
3. Results of tests conducted on samples recovered are reported on the logs.

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Boring Log Legend and Nomenclature

Items shown on boring logs refer to the following:

1. **Depth** - Depth below ground surface or drilling platform
2. **Sample** -Types designated by letter:
 - A - Disturbed sample, obtained from auger cuttings or wash water.
 - S - Split barrel sample, obtained by driving a 2-inch split-barrel sampler unless otherwise noted.
 - C - California liner sample, obtained using a thick-walled liner sampler containing 2-inch-diameter liner tubes.
 - U - Undisturbed sample, obtained using a thin-walled tube, 3-inch-diameter, or as noted, and open sampling head.

Recovery - Recovery is expressed as a percentage of the length recovered to the total length pushed, driven or cored.

Resistance - Resistance is designated as follows:

 - P - Sample pushed in one continuous movement by hydraulic rig action.
 - 12 - The Standard Penetration Resistance is the number of blows for the last 12 inches of penetration of split spoon sampler, driven by a 140-pound hammer falling 30 inches.
 - 50/4" - Number of blows to drive sampler distance shown.
3. **Soil Description** - Description of material according to the Unified Soil Classification: word description giving soil constituents, consistency or density, and other appropriate classification characteristics. Geologic name or type of deposit and other pertinent information, where appropriate, is shown under Geologic Description or other Remarks. A solid line indicates the approximate location of stratigraphic change.
4. **Lab Data** - Laboratory test data.
5. **Legend**

A.D. — After drilling	N.A. — Not Applicable
A.T.D. — At time of drilling	N.D. — Not detectable due to drilling method
C.F.A. — Continuous flight auger	N.E. — None encountered
D.W.L. — Drill water loss	N.R. — Not recorded
D.W.R. — Drill water return	R.Q.D. — Rock quality designation
E.D. — End of drilling	R.W.B. — Rotary wash boring
H.B. — Hole backfilled	
6. **Limitations** - The lines between materials shown on the boring logs represent approximate boundaries between material types and the changes may be gradual. Water level readings shown on the logs were made at the time and under the conditions indicated. Fluctuations in the water levels may occur with time. The boring logs in this report are subject to the limitations, explanations and conclusions of this report.

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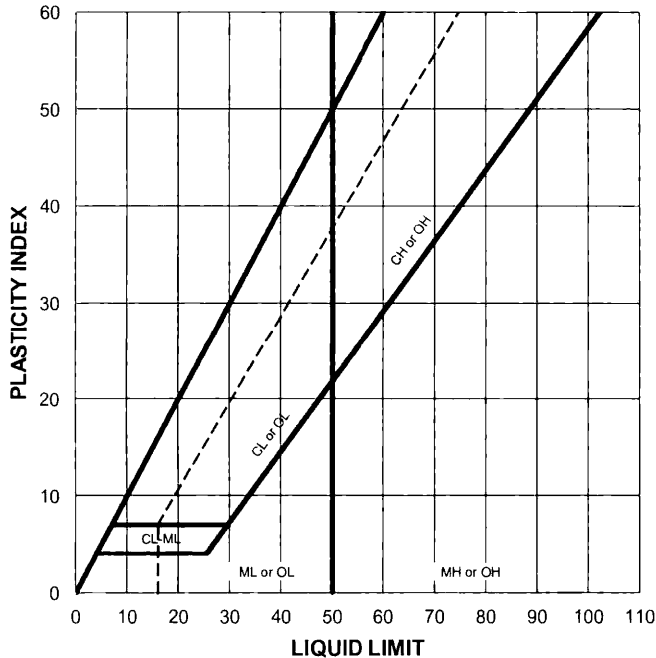
UNIFIED SOIL CLASSIFICATION SYSTEM

GROUP NAME	GROUP SYMBOL	SOIL DESCRIPTION	COMMENTS
Peat	Pt	Highly Organic Soils	50% or More Is Smaller than No. 200 Sieve
Fat Clay	CH	Clay - Liquid Limit => 50*	
Elastic Silt	MH	Silt - Liquid Limit => 50*	
Lean Clay	CL	Clay - Liquid Limit < 50*	
Silt	ML	Silt - Liquid Limit < 50*	
Silty Clay	CL-ML	Silty Clay*	
Clayey Sand	SC	Sands with 12 to 50% Smaller than No. 200 Sieve	More than 50% Is Larger than No. 200 Sieve and % Sand > % Gravel
Silty Sand	SM	Sands with 5 to 12% Smaller than No. 200 Sieve	
Poorly-Graded Sand with Clay	SP-SC		
Poorly-Graded Sand with Silt	SP-SM		
Well-Graded Sand with Clay**	SW-SC		
Well-Graded Sand with Silt**	SW-SM		
Poorly-Graded Sand	SP	Sands with Less than 5% Smaller than No. 200 Sieve	
Well-Graded Sand**	SW		
Clayey Gravel	GC	Gravels with 12 to 50% Smaller than No. 200 Sieve	More than 50% Is Larger than No. 200 Sieve and % Gravel > % Sand
Silty Gravel	GM	Gravels with 5 to 12% Smaller than No. 200 Sieve	
Poorly-Graded Gravel with Clay	GP-GC		
Poorly-Graded Gravel with Silt	GP-GM		
Well-Graded Gravel with Clay**	GW-GC		
Well-Graded Gravel with Silt**	GW-GP		
Poorly-Graded Gravel	GP	Gravels with Less than 5% Smaller than No. 200 Sieve	
Well-Graded Gravel**	GW		

*See Plasticity Chart for definition of silts and clays. If organic, use OL or OH.

**See definition of well-graded

PLASTICITY CHART



LEGEND OF TERMS

MOISTURE CONDITIONS

Dry, Slightly Moist, Moist, Very Moist, Wet (Saturated)

SOIL CONSISTENCY

Fine-Grained Soils

Description	SPT (N)	UCS (q _u , tsf)
Very Soft	0-2	0-0.25
Soft	2-4	0.25-0.50
Medium Stiff	4-8	0.50-1.0
Stiff	8-16	1.0-2.0
Very Stiff	16-32	2.0-4.0
Hard	>32	>4.0

Coarse-Grained Soils

Description	SPT (N)
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	>50

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CLASSIFICATION OF SANDS & GRAVELS

Boulders	Cobbles	Coarse Gravel	Fine Gravel	Coarse Sand	Medium Sand	Fine Sand	Fines (Silt or Clay)
	10"	3"	3/4"	#4	#10	#40	#200

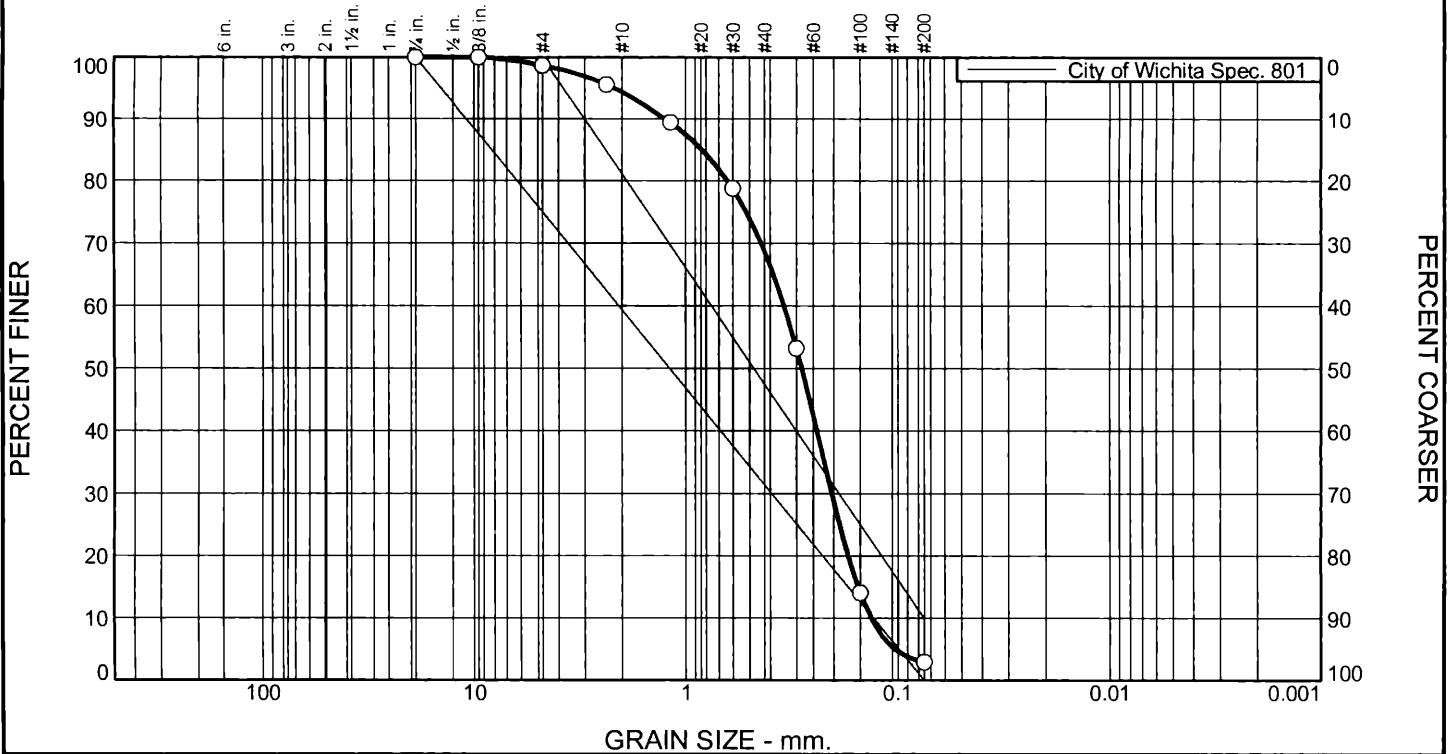
Well-Graded Sands (SW): $C_u \geq 6$ and $1 \leq C_c \leq 3$

Well-Graded Gravels (GW): $C_u \geq 4$ and $1 \leq C_c \leq 3$



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Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.4	4.3	25.5	66.0	2.8	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4	100.0	100.0	
3/8	100.0		
#4	98.6	75.0 - 100.0	
#8	95.5		
#16	89.3		
#30	78.8		
#50	53.2		
#100	14.0		
#200	2.8	0.0 - 10.0	

Material Description

POORLY GRADED SAND- yellowish brown to grayish brown, slightly moist to wet

Atterberg Limits (ASTM D 4318)

PL= _____ LL= _____ PI= _____

Classification

USCS (D 2487)= SP AASHTO (M 145)= _____

Coefficients

D₉₀= 1.2565 D₈₅= 0.8394 D₆₀= 0.3430
 D₅₀= 0.2831 D₃₀= 0.2041 D₁₅= 0.1538
 D₁₀= 0.1336 C_u= 2.57 C_c= 0.91

Remarks

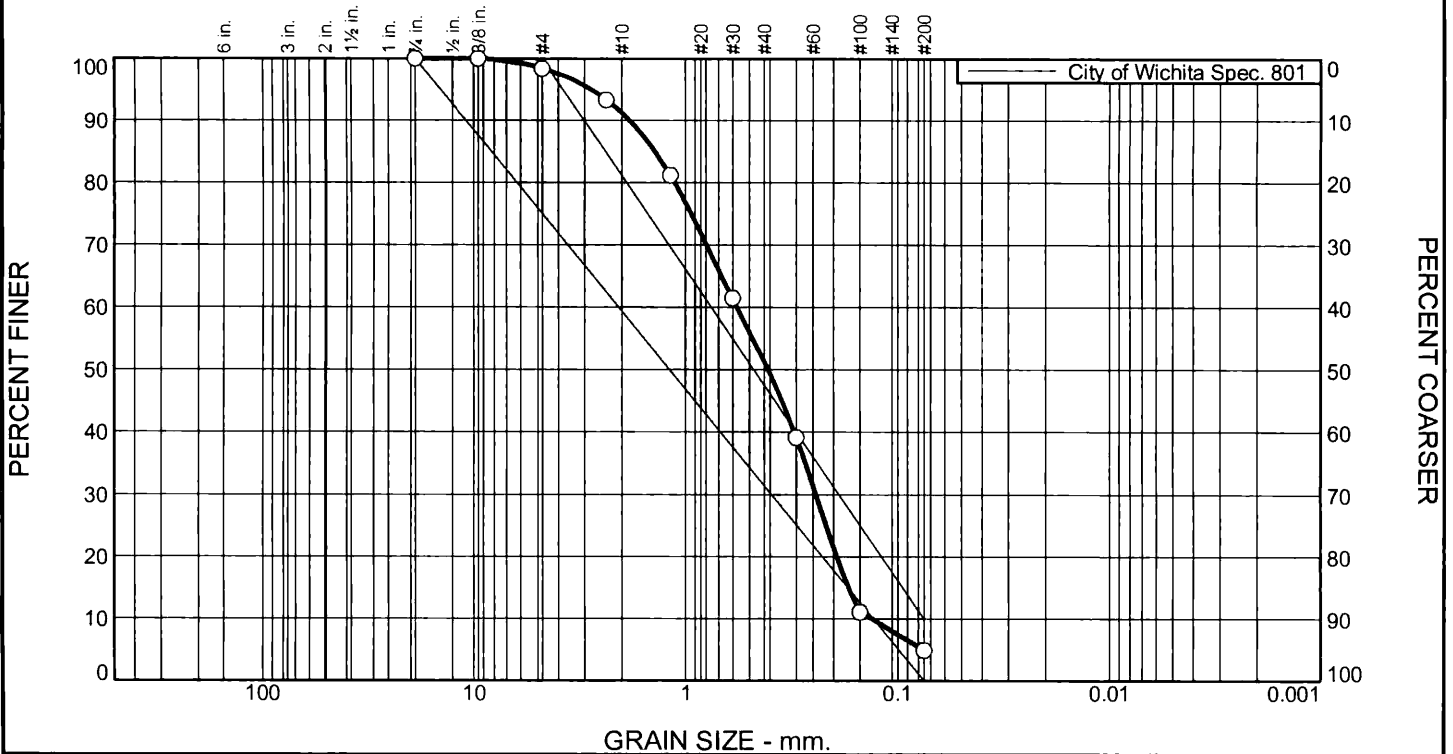
Date Received: June 8, 2015 Date Tested: June 12, 2015
 Tested By: VBD
 Checked By: MNT
 Title: Staff Engineer

* City of Wichita Spec. 801

Location: B-1 Sample Number: Combined S-4 & S-5 Depth: 8.5 ft. to 15.0 ft. Date Sampled: June 8, 2015

<p>GSI Engineering</p>	4503 East 47 th Street South Wichita, KS 67210 316-554-0725	Client: Tier One Project: Nicholson Family Development Project No: 157268	WATER RESOURCES RECEIVED OCT 12 2015 Figure
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Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.7	7.1	39.9	46.4	4.9	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4	100.0	100.0	
3/8	100.0		
#4	98.3	75.0 - 100.0	
#8	93.3		
#16	81.2		
#30	61.5		
#50	39.2		
#100	11.1		
#200	4.9	0.0 - 10.0	

Material Description

POORLY GRADED SAND- yellowish brown, slightly moist, loose

Atterberg Limits (ASTM D 4318)

PL= _____ LL= _____ PI= _____

Classification

USCS (D 2487)= SP AASHTO (M 145)= _____

Coefficients

D ₉₀ = 1.8427	D ₈₅ = 1.3968	D ₆₀ = 0.5710
D ₅₀ = 0.4077	D ₃₀ = 0.2428	D ₁₅ = 0.1700
D ₁₀ = 0.1333	C _u = 4.28	C _c = 0.77

Remarks

Date Received: June 8, 2015 Date Tested: 6/12/15

Tested By: VBD

Checked By: MNT

Title: Staff Engineer

* City of Wichita Spec. 801

Source of Sample: B-2
Sample Number: S-2

Depth: 2.5

Date Sampled: June 8, 2015



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Project: Nicholson Family Development

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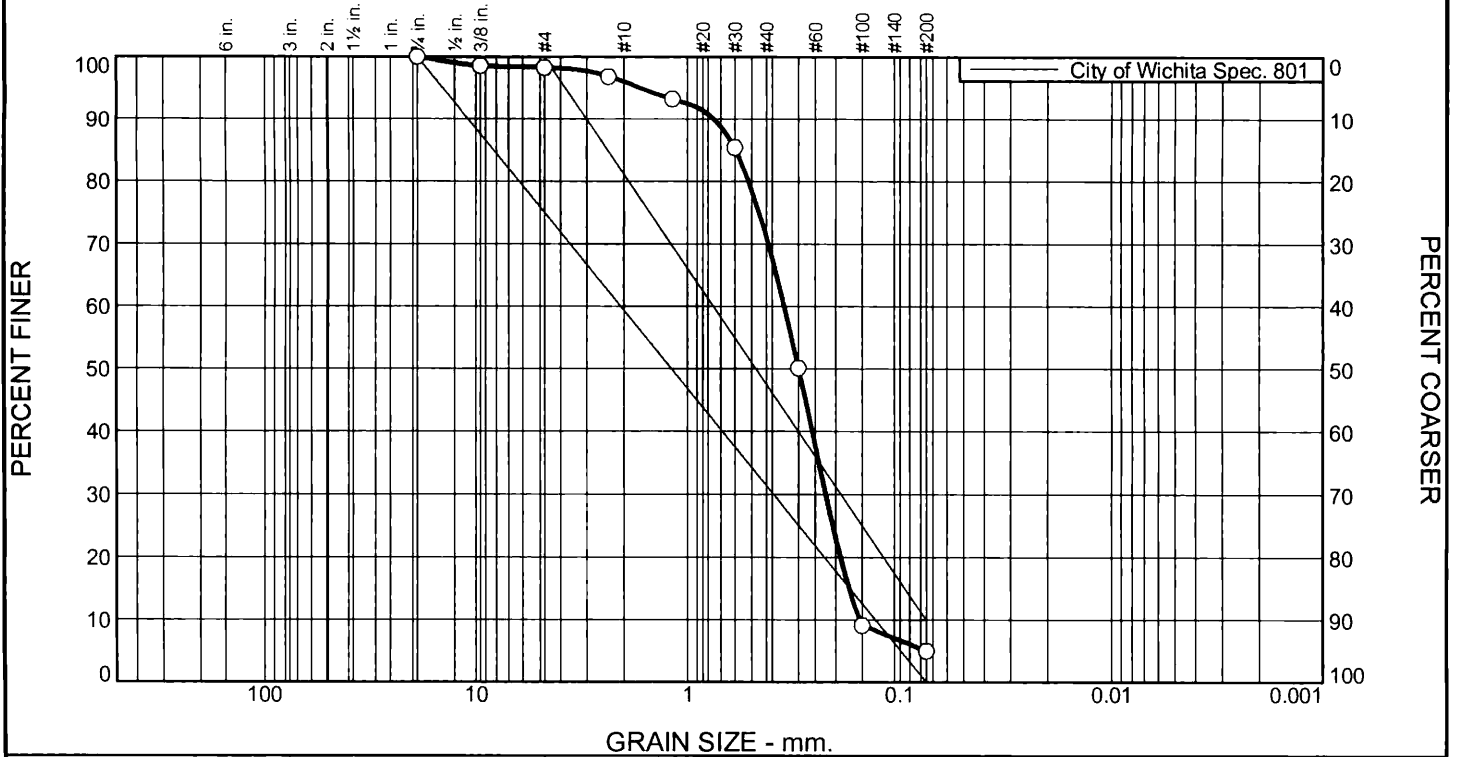
OCT 12 2015
Figure

Project No: 157268

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Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.8	2.2	24.9	66.1	5.0	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4	100.0	100.0	
3/8	98.5		
#4	98.2	75.0 - 100.0	
#8	96.8		
#16	93.1		
#30	85.3		
#50	50.1		
#100	9.1		
#200	5.0	0.0 - 10.0	

Material Description

POORLY GRADED SAND- brown, very moist, medium dense

Atterberg Limits (ASTM D 4318)

PL= _____ LL= _____ PI= _____

Classification

USCS (D 2487)= SP AASHTO (M 145)= _____

Coefficients

D₉₀= 0.7506 D₈₅= 0.5932 D₆₀= 0.3498
 D₅₀= 0.2994 D₃₀= 0.2230 D₁₅= 0.1727
 D₁₀= 0.1540 C_u= 2.27 C_c= 0.92

Remarks

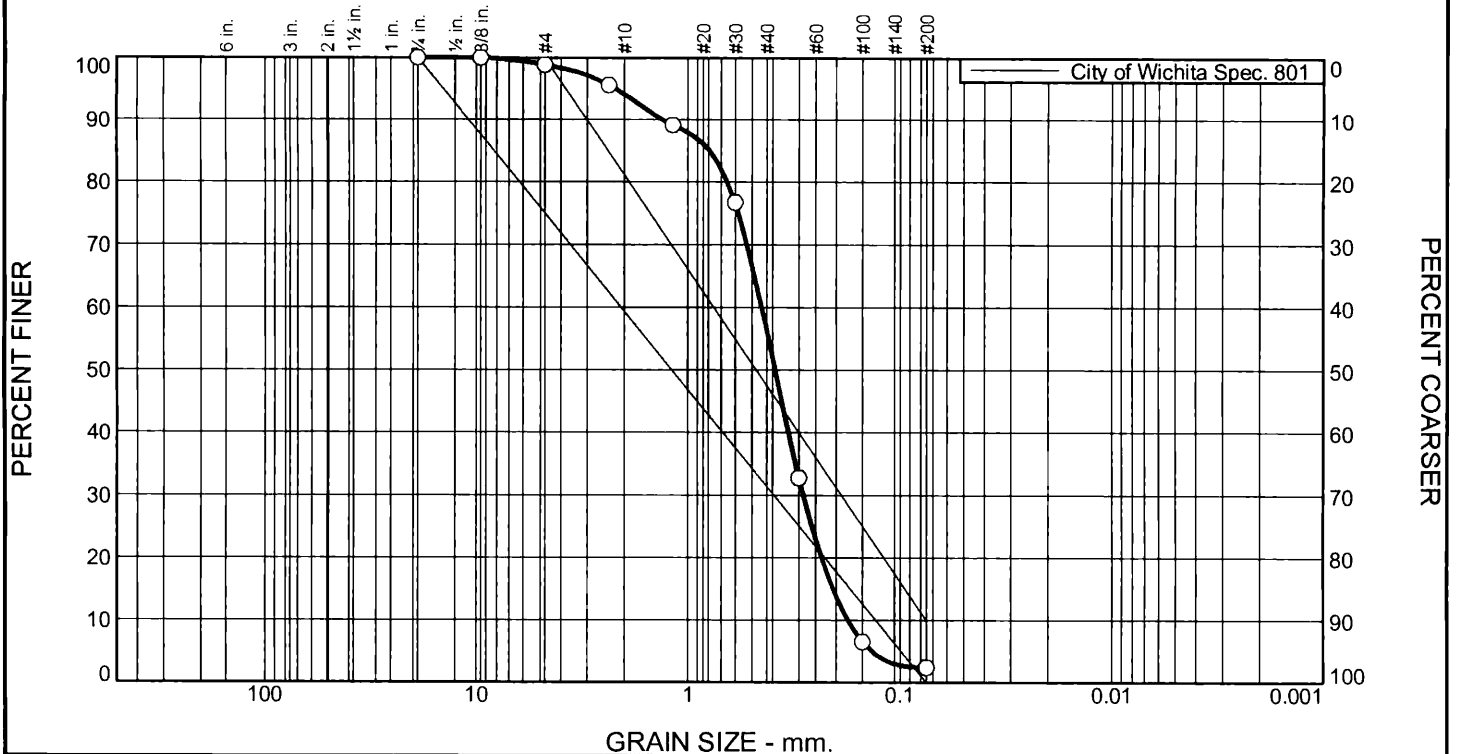
Date Received: June 8, 2015 **Date Tested:** _____
Tested By: VBD
Checked By: MNT
Title: Staff Engineer

* City of Wichita Spec. 801

Source of Sample: B-3 **Depth:** 8.5 **Date Sampled:** June 8, 2015
Sample Number: S-4

4503 East 47 th Street South Wichita, KS 67210 316-554-0725	Client: Tier One Project: Nicholson Family Development Project No: 157268	WATER RESOURCES RECEIVED OCT 2 2015
--	--	---

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.2	4.8	37.7	53.9	2.4	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4	100.0	100.0	
3/8	100.0		
#4	98.8	75.0 - 100.0	
#8	95.5		
#16	89.0		
#30	76.7		
#50	32.8		
#100	6.5		
#200	2.4	0.0 - 10.0	

Material Description
POORLY GRADED SAND- yellowish brown, wet, medium dense

Atterberg Limits (ASTM D 4318)
PL= LL= PI=

Classification
USCS (D 2487)= SP AASHTO (M 145)=

Coefficients
D₉₀= 1.3281 D₈₅= 0.7934 D₆₀= 0.4485
D₅₀= 0.3881 D₃₀= 0.2863 D₁₅= 0.2069
D₁₀= 0.1761 C_u= 2.55 C_c= 1.04

Remarks

Date Received: June 8, 2015 Date Tested: June 12, 2015
Tested By: VBD
Checked By: MNT
Title: Staff Engineer

* City of Wichita Spec. 801

Source of Sample: B-3
Sample Number: S-5

Depth: 13.5

Date Sampled: June 8, 2015



4503 East 47th Street South
Wichita, KS 67210
316-554-0725

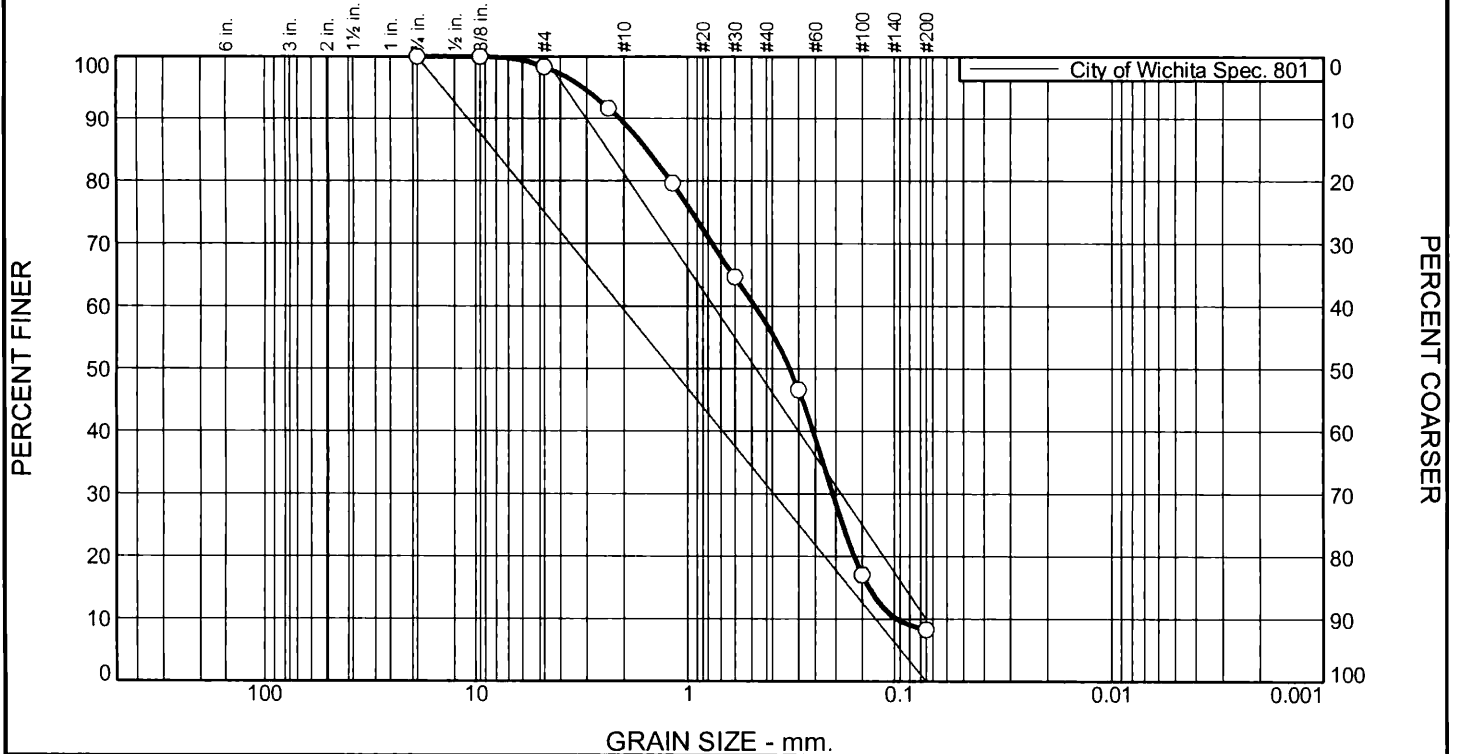
Client: Tier One
Project: Nicholson Family Development

WATER RESOURCES
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Project No: 157268

OCT 12 2015

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.7	9.1	32.0	49.0	8.2	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4	100.0	100.0	
3/8	100.0		
#4	98.3	75.0 - 100.0	
#8	91.6		
#16	79.5		
#30	64.6		
#50	46.6		
#100	17.0		
#200	8.2	0.0 - 10.0	

Material Description
 POORLY GRADED SAND- yellowish brown to grayish brown, moist to wet

Atterberg Limits (ASTM D 4318)
 PL= _____ LL= _____ PI= _____

Classification
 USCS (D 2487)= SP AASHTO (M 145)= _____

Coefficients
 D₉₀= 2.1092 D₈₅= 1.5599 D₆₀= 0.4814
 D₅₀= 0.3295 D₃₀= 0.2068 D₁₅= 0.1397
 D₁₀= 0.1036 C_u= 4.65 C_c= 0.86

Remarks _____

Date Received: June 8, 2015 Date Tested: June 12, 2015
 Tested By: VBD
 Checked By: MNT
 Title: Staff Engineer

* City of Wichita Spec. 801

Location: B-4 Date Sampled: June 8, 2015
 Sample Number: Combined S-3 to S-5 Depth: 5.0 ft. to 15.0 ft.



4503 East 47th Street South
 Wichita, KS 67210
 316-554-0725

Client: Tier One
 Project: Nicholson Family Development
 Project No: 157268

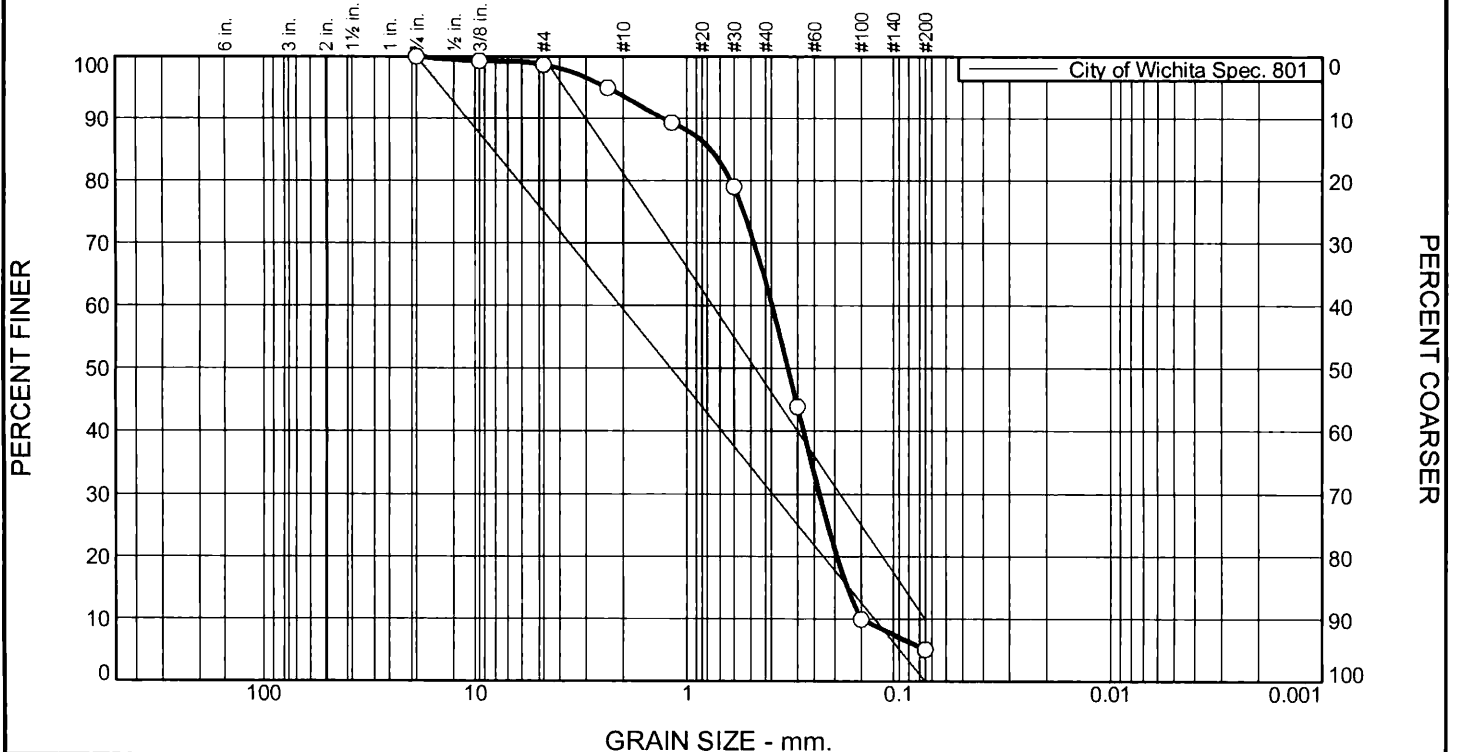
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OCT 12 2015
 Figure

KS DEPT OF AGRICULTURE

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Particle Size Distribution Report



GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.4	5.0	29.7	58.9	5.0	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4	100.0	100.0	
3/8	99.3		
#4	98.6	75.0 - 100.0	
#8	94.9		
#16	89.2		
#30	79.0		
#50	43.9		
#100	9.9		
#200	5.0	0.0 - 10.0	

* City of Wichita Spec. 801

Material Description

POORLY GRADED SAND- yellowish brown to light brown, slightly moist to wet

Atterberg Limits (ASTM D 4318)

PL= _____ LL= _____ PI= _____

Classification

USCS (D 2487)= SP AASHTO (M 145)= _____

Coefficients

D₉₀= 1.3031 D₈₅= 0.7727 D₆₀= 0.3954
D₅₀= 0.3324 D₃₀= 0.2364 D₁₅= 0.1740
D₁₀= 0.1505 C_u= 2.63 C_c= 0.94

Remarks

Date Received: June 8, 2015 Date Tested: June 12, 2015
Tested By: VBD
Checked By: MNT
Title: Staff Engineer

Location: B-5 Sample Number: Combined S-3 to S-5 Depth: 5.0 ft. to 15.0 ft. Date Sampled: June 8, 2015



4503 East 47th Street South
Wichita, KS 67210
316-554-0725

Client: Tier One
Project: Nicholson Family Development
Project No: 157268

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Boring No.	Sample No.	Sample Depth (ft)	Sample Type	Sample Diameter (in)	Sample Length (in)	Moisture Content (%)	Wet Unit Weight (lb/ft ³)	Dry Unit Weight (lb/ft ³)	Unconfined Compressive Strength (kips/ft ²)	Atterberg Limits			Percent Passing No. 200 Sieve	Blow Counts SPT 'N' (blows/ft)	USCS Soil Classification
										Liquid Limit	Plastic Limit	Plasticity Index			
B-1	S-1	0.5-2.0	Split Spoon			16.4				35	19	16		4	SANDY CL
	S-2	2.5-4.0	Split Spoon			17.5								10	SANDY CL
	S-3	5.0-6.5	Split Spoon			15.7							43.3	9	SC
	S-4	8.5-10.0	Split Spoon											18	SP
	S-5	13.5-15.0	Split Spoon											8	SP
	S-6	18.5-20.0	Split Spoon											7	SP
	S-7	23.5-25.0	Split Spoon											11	SP
B-2	S-1	0.5-2.0	Split Spoon			10.2							37.5	3	SC
	S-2	2.5-4.0	Split Spoon			2.4								6	SP
	S-3	5.0-6.5	Split Spoon			4.7								16	SP
	S-4	8.5-10.0	Split Spoon											19	SP
	S-5	13.5-15.0	Split Spoon											4	SP
	S-6	18.5-20.0	Split Spoon											10	SP
	S-7	23.5-25.0	Split Spoon											13	SP
B-3	S-1	0.5-2.0	Split Spoon			13.2								5	SC
	S-2	2.5-4.0	Split Spoon			14.5								3	SC
	S-3	5.0-6.5	Split Spoon			10.6							17.3	4	SC
	S-4	8.5-10.0	Split Spoon											14	SP
	S-5	13.5-15.0	Split Spoon											17	SP
	S-6	18.5-20.0	Split Spoon											3	SANDY CL
	S-7	23.5-25.0	Split Spoon											N.R.	SP

WATER RESOURCES RECEIVED
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 KS DEPT OF AGRICULTURE

GSI
GSI Engineering, LLC
 4503 E. 47th Street South
 Wichita, KS 67210
 (316) 554-0725
 www.gsinetwork.com

**SUMMARY OF FIELD AND
 LABORATORY TEST
 RESULTS**

Project:	Nicholson Family Development	
Location:	Wichita, Kansas	
Job Number:	157268	Date: 6/22/2015

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Boring No.	Sample No.	Sample Depth (ft)	Sample Type	Sample Diameter (in)	Sample Length (in)	Moisture Content (%)	Wet Unit Weight (lb/ft ³)	Dry Unit Weight (lb/ft ³)	Unconfined Compressive Strength (kips/ft ²)	Atterberg Limits			Percent Passing No. 200 Sieve	Blow Counts SPT 'N' (blows/ft)	USCS Soil Class.
										Liquid Limit	Plastic Limit	Plasticity Index			
B-4	S-1	0.5-2.0	Split Spoon			18.9								2	CL W/ SAND
	S-2	2.5-4.0	Split Spoon			28.9						78.6		9	CL W/ SAND
	S-3	5.0-6.5	Split Spoon											10	SP
	S-4	8.5-10.0	Split Spoon											18	SP
	S-5	13.5-15.0	Split Spoon											5	SP
	S-6	18.5-20.0	Split Spoon											6	SP
	S-7	23.5-25.0	Split Spoon											15	SP
B-5	S-1	0.5-2.0	Split Spoon			7.4								7	SANDY CL
	S-2	2.5-4.0	Split Spoon			24.7						12.3		10	SC
	S-3	5.0-6.5	Split Spoon											19	SP
	S-4	8.5-10.0	Split Spoon											20	SP
	S-5	13.5-15.0	Split Spoon											24	SP
	S-6	18.5-20.0	Split Spoon											4	SP
	S-7	23.5-25.0	Split Spoon											6	SP

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 KS DEPT OF AGRICULTURE



GSI Engineering, LLC
 4503 E. 47th Street South
 Wichita, KS 67210
 (316) 554-0725
 www.gsinetwork.com

**SUMMARY OF FIELD AND
 LABORATORY TEST
 RESULTS**

Project:	Nicholson Family Development	
Location:	Wichita, Kansas	
Job Number:	157268	Date: 6/22/2015

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SCANNED



October 9, 2015

FILE NO. 49,484

Chief Engineer
Division of Water Resources
Kansas Department of Agriculture
1320 Research Park Drive
Manhattan, KS 66502

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KS DEPT OF AGRICULTURE

Dear Chief Engineer,

Tier 1, LLC is constructing a new residential development (Estancia Addition) in the SW 1/4 of Section 27, Township 26 South, Range 1 W, in Sedgwick County, Kansas. Phase 1 construction should be complete in Spring/Summer of 2016. This new development will need to appropriate water for irrigation and recreational use. Specifically, water will be used to irrigate the fescue grass within the reserve areas and fill the pond system to counteract evaporation. In hot years with limited rain and runoff, pumping water into the pond will be the only way to maintain normal pool elevations. After the point of diversion is established, a one time term permit will be submitted for the initial fill of the pond system.

In recent years, over pumping has been a reoccurring issue with our clients, particularly as it pertains to irrigating fescue grass (specialty crop) in reserves of residential developments. Previous applications have been prepared using K.A.R. 5-3-19, K.A.R. 5-3-20, and K.A.R. 5-3-24 for the determination on the maximum reasonable annual quantity of water for irrigation use.

In an effort to eliminate the over pumping problem, MKEC utilized an alternative method of determining the reasonable annual quantity of water for irrigation use. In general, this method is a water budget focused on determining the irrigation requirement from the difference between the evapotranspiration (ET) and precipitation of the irrigated area. Dr. Jack Fry, a professor in the department of horticulture, forestry and recreation resources at Kansas State University published an article, *How much is a year's worth of water?*, illustrating a process to more accurately estimate annual water usage as it pertained to golf courses. Within the article, he stepped through the calculations using Colbert Hills Golf Course as an example.

The additional allotment of water requested using this method is reasonable and conservative for this crop type. This alternative method yields 0.44 inches/week of irrigation water, which still may not be enough water for this crop type. K-State Research and Extension literature states that fescue may need 1-1.5 inches/week during dry periods. The subsurface conditions of this area are also unique. The water table under this property is only 10-15 feet below the surface. The first 2-6 feet of the soil profile is sandy clay that turns to poorly graded sand that extends through the depth of the water table. The additional allotment of water requested with this method will be beneficial in maintaining the grass; however, if water percolates below the root zone it will not be wasted as it will infiltrate back into the water table. Based on the hydraulic conductivity of the soils listed in the geotechnical report, a seepage velocity calculation was completed to see how long it would take for moisture to reach the water table. Using conservative values for the hydraulic conductivity and porosity, the maximum time it would take for moisture to reach the water table is 73 days.

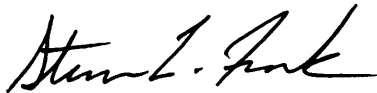
FILE NO. 49,484

Additionally, the location of this new development is also regulated by Equus Beds Groundwater Management District No.2. MKEC has had communication with GMD #2 and a preliminary safe yield evaluation was conducted.

Please do not hesitate to contact MKEC if you have any question or if any additional information is required during the application review process.

Sincerely,

MKEC ENGINEERING, INC.



Steven L. Frank, P.E.

**WATER RESOURCES
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OCT 12 2015

KS DEPT OF AGRICULTURE

FRED SEILER, PRESIDENT
VIN KISSICK, VICE PRESIDENT
JEFF WINTER, SECRETARY
MIKE MCGINN, TREASURER
TIM BOESE, MANAGER
THOMAS A. ADRIAN, ATTORNEY



DIRECTORS:
DAVID BOGNER
ALAN BURGHART
JOE PAJOR
BOB SEILER
DAVID STROBERG

EQUUS BEDS GROUNDWATER MANAGEMENT DISTRICT NO. 2

313 SPRUCE STREET • HALSTEAD, KANSAS 67056-1925 • PHONE (316) 835-2224 • FAX (316) 835-2225 • equusbeds@gmd2.org • www.gmd2.org

July 21, 2015

Brian Lindebak
411 N. Webb Rd.
Wichita, KS 67206

RE: Preliminary Safe Yield Evaluation - 361.113

Dear Mr. Lindebak:

A preliminary safe yield evaluation was run in the Southwest Quarter of Section 27 Township 26 South Range 1 West. The results of the safe yield indicated a quantity that, at 1390 ft North and 3900 ft West of the Southeast Corner of the said section, may be sufficient for a groundwater pit.

The results of the preliminary evaluation indicate that the aquifer in the area of consideration (2-mile radius circle) has a minimum quantity of unappropriated groundwater which *might* be able to be appropriated. The quantity may not satisfy the total amount of water requested for an application.

Before the District can make an official determination of the available groundwater appropriation, you must file a water permit application with the Chief Engineer, Division of Water Resources. This preliminary evaluation does **NOT** guarantee that water is, or will be, available for appropriation at the time an application is filed.

The Equus Beds Groundwater Management District office or the Division of Water Resources office in Stafford can assist you in filing the application.

Please note that the preliminary evaluation is not an indication of the physical characteristics of the aquifer at the proposed location. The District recommends test drilling to determine the aquifer's yield capability and water quality at the proposed location.

If you have any questions, please feel free to contact our office.

Sincerely,
EQUUS BEDS GROUNDWATER
MANAGEMENT DISTRICT NO. 2

Steve Flaherty
Hydrogeologist
STF

Enclosure

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KS DEPT OF AGRICULTURE

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PRELIMINARY SAFEYIELD EVALUATION for MKEC
LOCATION: NCSW (1390'N & 3900'W) 27-265-01W, Sedgwick County

SPECIAL USE AREA: None

EVALUATION DATE:- 7/21/2015

Total Areas: 4,309 acres; Area in 3 inch discharge zone: 0 acres; Area in 6 inch discharge zone: 4,309 acres

FILE_ID	WELL_ID	TOWNSHIP	RANGE	SECTION	QUALIFIER	USE	AUTHQUANTITY
A01527300	962	265	01W	22	39601320	IRR	158
A024018IR	192	265	01W	32	15751220	IRR	70.05
A024018RE	3328	265	01W	32	15751220	REC	58.33
A026130D1IN	3736	265	01W	21	37003100	IRR	46.67
A026130D1IR	3735	265	01W	21	39603921	IRR	69.82
A026130D2	1323	265	01W	21	39603921	IRR	46.55
A02824500	1166	265	01W	32	39002550	IRR	165
A04083000	1219	265	01W	27	14001600	REC	99
A04098100	471	265	01W	21	12951980	REC	70
A04240000	2581	265	01W	20	1880375	IND	15
A04365700	2660	265	01W	23	31893085	REC	97
A04423900	2773	265	01W	22	35293479	REC	20
A04480800	2898	265	01W	28	41503800	IND	78.3
A04504300	2975	265	01W	28	6751595	REC	18.33
A04515600	2958	265	01W	28	9503850	REC	36.5
A04571900	3124	265	01W	29	50701063	REC	0.5
A04600300	3202	265	01W	23	13203960	IND	600
A04616200	3257	265	01W	28	21952353	REC	4.33
A04616300	3258	265	01W	28	18591996	REC	2.48
A046325IR	3314	265	01W	29	21852085	IRR	0
A046325IR	3296	265	01W	29	19852085	IRR	44.46
A046325IR	3315	265	01W	29	20522085	IRR	0
A046325IR	3316	265	01W	29	19182085	IRR	0
A046325IR	3317	265	01W	29	17852085	IRR	0
A046325RE	3321	265	01W	29	21852085	REC	0
A046325RE	3322	265	01W	29	20522085	REC	0
A046325RE	3323	265	01W	29	19182085	REC	0
A046325RE	3324	265	01W	29	17852085	REC	0
A046325RE	3297	265	01W	29	19852085	REC	13.61
A046348IR	3312	265	01W	29	8983823	IRR	3.9
A046348RE	3313	265	01W	29	8983823	REC	5.53
A04640900	3344	265	01W	20	4800552	IND	29.69
A04645300	3356	265	01W	28	953228	IRR	7.74
A04645400	3358	265	01W	28	21905180	IRR	11.17
A04681000	3459	265	01W	21	16233397	REC	9.4
A047421IR	3623	265	01W	29	412901	IRR	10.3
A047421RE	3624	265	01W	29	412901	REC	12.3
A04745600	3636	265	01W	27	41491564	IRR	7.54
A04745700	3637	265	01W	27	46692050	IRR	4.16
A047518IR	3656	265	01W	23	43002640	IRR	13
A047518RE	3657	265	01W	23	43002640	REC	70
A04761500	3708	265	01W	22	3701745	IND	32.2
A04883600	4156	265	01W	22	12201270	IND	155
A20019068	2929	265	01W	28	41503800	HYD	345
A20109067	3671	265	01W	21	37003100	HYD	371.2
A20109084	3704	265	01W	23	13203960	HYD	2386

Allowable Appropriations	2,154.50	Total Existing Appropriation	5,188.06
Small User Quantity	9.43	Non Consumptive Appropriations	3,102.20
Remaining SUQ	35.57	Consumptive Appropriations	2,085.86
Note- Values are in acre-feet		Available Appropriations	68.64

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FEE SCHEDULE

1. The fee for an application for a permit to appropriate water for beneficial use, except for domestic use, shall be (see paragraph No. 2 below if requesting storage):

ACRE-FEET	FEE
0-100	\$200.00
101-320	\$300.00
More than 320	\$300.00 plus \$20.00 for each additional 100 acre-feet or any part thereof.

2. The fee for an application in which storage is requested, except for domestic use, shall be:

ACRE-FEET	FEE
0-250	\$200.00
More than 250	\$200.00 plus \$20.00 for each additional 250 acre-feet of storage or any part thereof.

Note: If an application requests both direct use *and* storage, the fee charged shall be as determined under No. 1 or No. 2 above, whichever is greater, but not both fees.

3. The fee for an application for a permit to appropriate water for water power or dewatering purposes shall be \$100.00 plus \$200.00 for each 100 cubic feet per second, or part thereof, of the diversion rate requested.

Note: The applicant shall notify the Chief Engineer and pay the statutorily required field inspection fee of \$400.00 when construction of the works for diversion has been completed, except that for applications filed on or after July 1, 2009, for works constructed for sediment control use and for evaporation from a groundwater pit for industrial use shall be accompanied by a field inspection fee of \$200.00.

MAKE CHECKS PAYABLE TO THE KANSAS DEPARTMENT OF AGRICULTURE

ATTENTION

A Water Conservation Plan may be required per K.S.A. 82a-733. A statement that your application for permit to appropriate water may be subject to the minimum desirable streamflow requirements per K.S.A. 82a-703a, b, and c may also be required from you. After the Division of Water Resources has had the opportunity to review your application, you will be notified whether or not you will need to submit a Water Conservation Plan. You also may be required to install a water flow meter or water stage measuring device on your diversion works prior to diverting water. There may be other special conditions or Groundwater Management District regulations that you will need to comply with if this application is approved.

CONVERSION FACTORS

1 acre-foot equals 325,851 gallons

1 million gallons equal 3.07 acre-feet

WATER RESOURCES
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OCT 12 2015

KS DEPT OF AGRICULTURE

SCANNED



1320 Research Park Drive
Manhattan, Kansas 66502
Jackie McClaskey, Secretary

Phone: (785) 564-6700
Fax: (785) 564-6777
Email: ksag@kda.ks.gov
www.agriculture.ks.gov
Sam Brownback, Governor

October 13, 2015

MARVIN SCHELLENBERG
TIER 1 LLC
7926 W 21ST STREET
WICHITA KS 67205

RE: Application
File No. 49484

Dear Sir or Madam:

Your application for permit to appropriate water in 27-26-1W in Sedgwick County, was received and has been assigned the file number noted above.

As a matter of record, the Division of Water Resources has on hand a large number of applications awaiting processing. Therefore to be fair to all concerned, and so that we can process those applications on hand in the order they were received, we intend to concentrate on the backlog of applications until the issue is resolved. Once review of your application has begun, we will contact you, if additional information is required.

In accordance with the provisions of the Kansas Water Appropriation Act, a portion of which is included below, the use of water as proposed prior to approval of the application is unlawful. Once approved, compliance with the terms, conditions and limitations of the permit is necessary. Conservation of the water resources of Kansas is required.

Section 82a-728 of the Kansas Water Appropriation Act, provides (a) except for the appropriation of water for the purpose of domestic use, . . . it shall be unlawful for any person to appropriate or threaten to appropriate water from any source without first applying for and obtaining a permit to appropriate water in accordance with the provisions of the Water Appropriation Act or for any person to violate any condition of a vested right, appropriation right or an approved application for a permit to appropriate water for beneficial use.

(b) (1) The violation of any provision of this section by any person is a class C misdemeanor . . .

A class C misdemeanor is punishable by a fine not to exceed \$500 and/or a term of confinement not to exceed one month in the county jail. Each day that the violation occurs constitutes a separate offense.

If you have any questions, please contact me at (785) 564-6634. If you wish to discuss a specific file, please have the file number ready so that we may help you more efficiently.

Sincerely,

A handwritten signature in black ink, appearing to read "K. Kopp", written over a white background.

Kenneth A. Kopp, P.G.
New Application Unit Supervisor
Water Appropriation Program

BAT: dwl
pc: STAFFORD Field Office
GMD 2

96

NW 1/4, SW 1/4
Irrigated Area: 1.95 AC.

NE 1/4, SW 1/4
Irrigated Area: 5.02 AC.

SW 1/4
SEC. 27
T26S
R1W

SW 1/4, SW 1/4
Irrigated Area: 7.21 AC.











SE 1/4, SW 1/4
Irrigated Area: 9.88 AC.

RIDGE RD

37TH ST

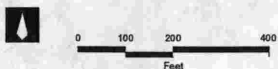
RIDGEPORT ST

Irrigation Areas

	5.83 Acres		0.42 Acres
	1.46 Acres		1.89 Acres
	3.65 Acres		0.30 Acres
	3.52 Acres		0.94 Acres
	1.97 Acres		4.08 Acres

Note:
Total Irrigated Area
24.06 Acres

SEC: 27
TWP: T26S
RNG: R1W



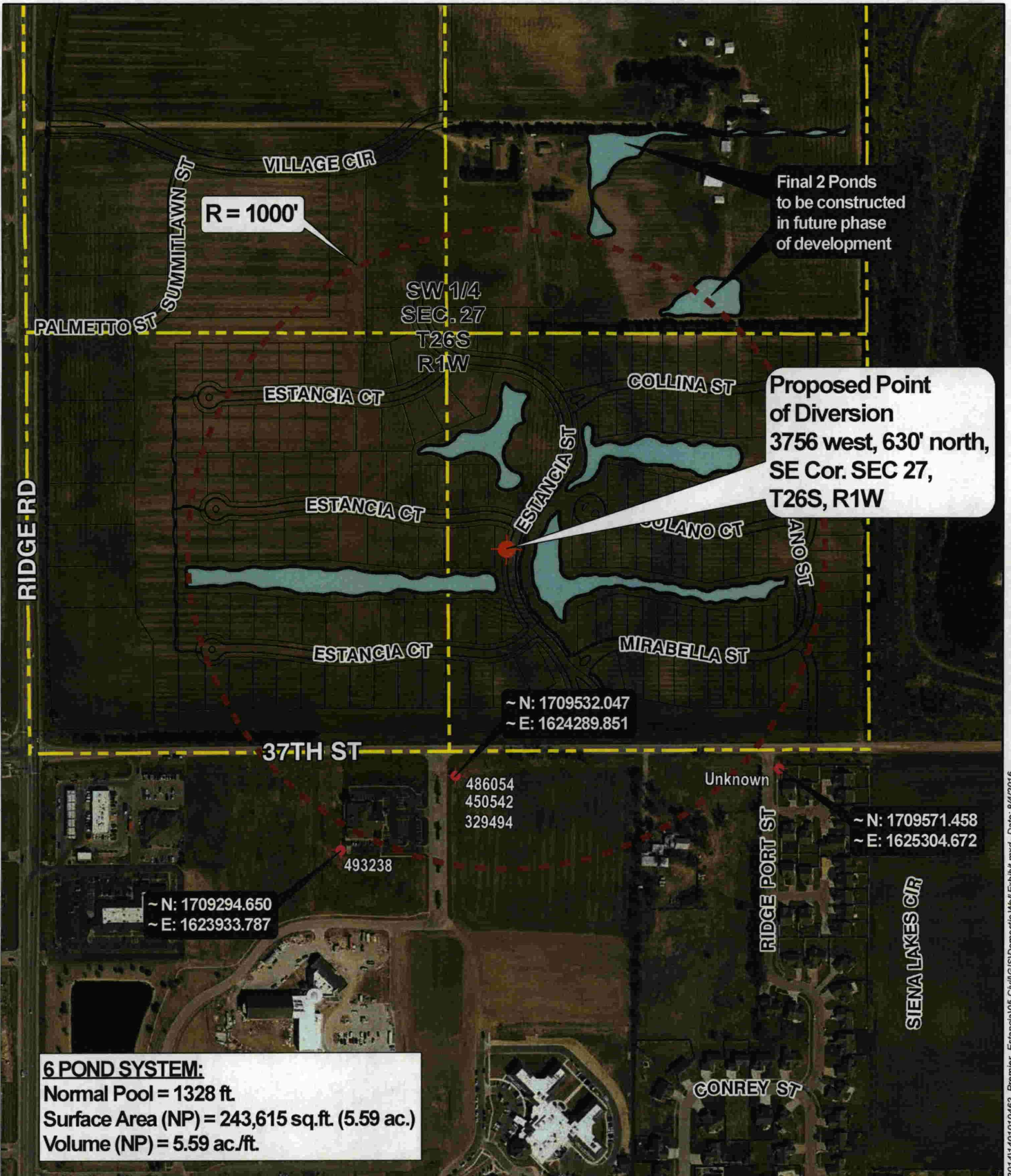
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WATER RESOURCES
RECEIVING IRRIGATION PLACE OF USE EXHIBIT
ESTANCIA DEVELOPMENT

OCT 12 2015

PROJECT NO. 1401010462	DATE: 10/5/2015	SHEET NO.
DESIGNED BY: JGD	APPROVED BY: SLF	1 OF 1



Final 2 Ponds to be constructed in future phase of development

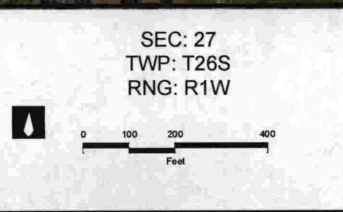
Proposed Point of Diversion
3756 west, 630' north,
SE Cor. SEC 27,
T26S, R1W

~ N: 1709294.650
~ E: 1623933.787

~ N: 1709532.047
~ E: 1624289.851

~ N: 1709571.458
~ E: 1625304.672

6 POND SYSTEM:
Normal Pool = 1328 ft
Surface Area (NP) = 243,615 sq.ft. (5.59 ac.)
Volume (NP) = 5.59 ac./ft.

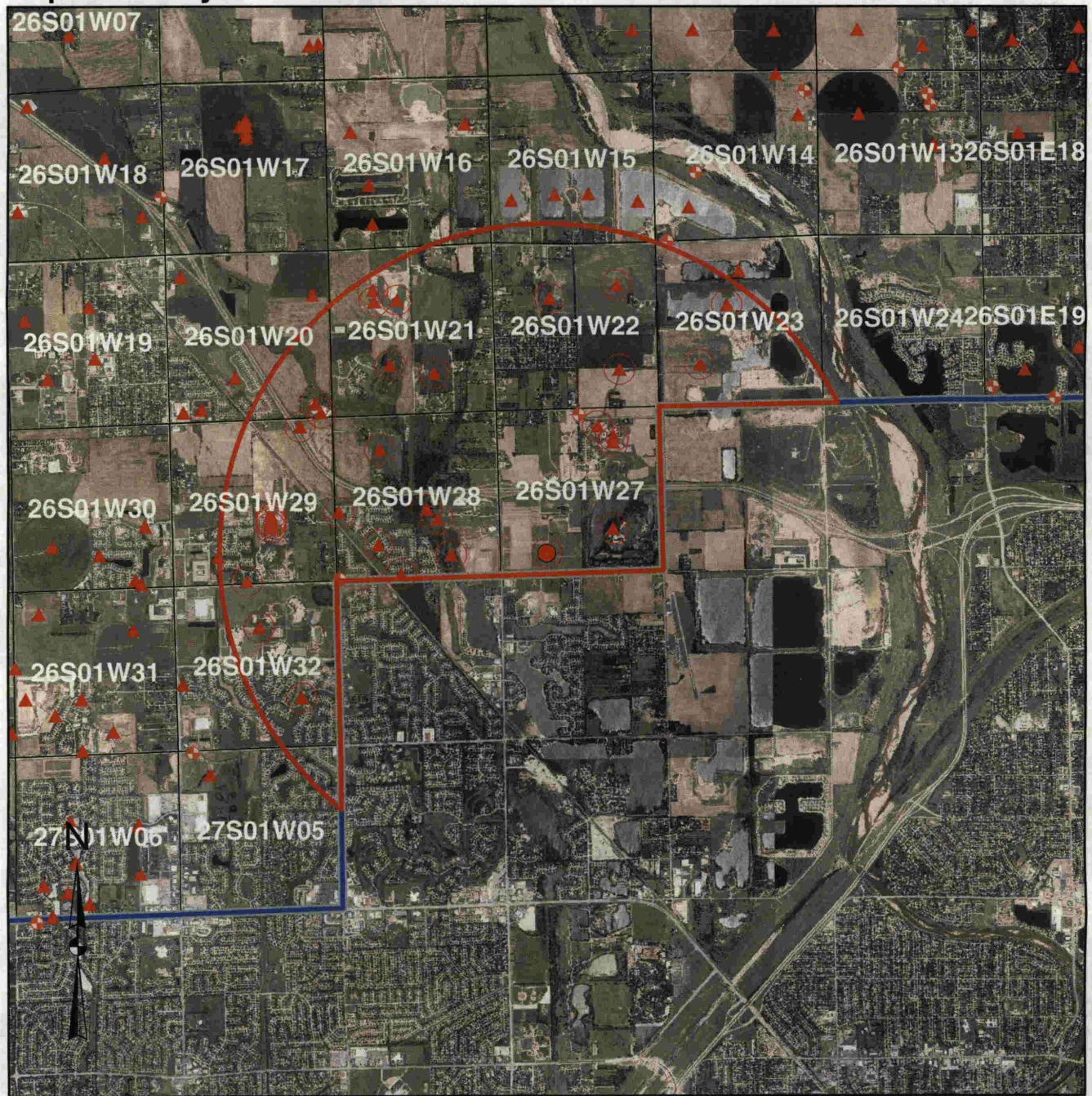


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IRRIGATION USE SUPPLEMENTAL EXHIBIT ESTANCIA DEVELOPMENT			
PROJECT NO. 1401010462	DATE: 8/4/2016	SHEET NO.	
DRAWN BY: JGD	DESIGNED BY: JGD	APPROVED BY: SLF	1 OF 1

Equus Beds Groundwater Management District No. 2 Safe Yield Evaluation - #49484- Tier 1 LLC SWSESW (630'N & 3756'W) 27-26S-01W, Sedgwick County Prepared By: T. Boese Date: 7/13/2016



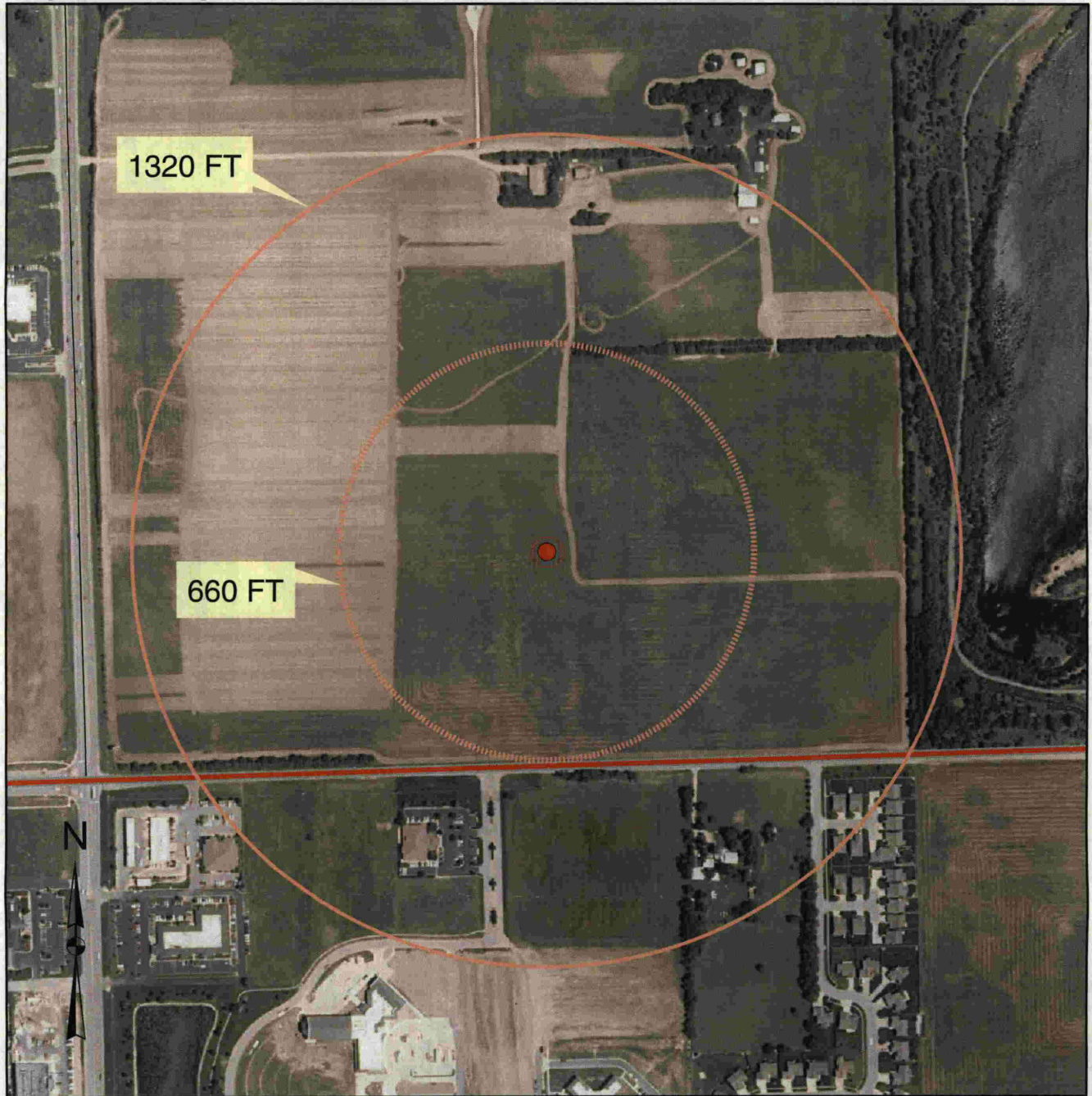
	Proposed Point of Diversion		Map Legend		Burrton IGUCA
	Area of Consideration Boundary		Major Highway		Hollow Nickel SWQUA
	Monitoring Wells		Other Roadway		McPherson IGUCA
	Points of Diversion		Major Stream		Enhanced Well Spacing Area
	District Boundary		Other Water Feature		Permian Surface Bedrock
	County Boundary		City Boundary		

0.75 0.375 0 0.75 Miles

WATER RESOURCES RECEIVED JUL 20 2016 KS DEPT OF AGRICULTURE SCANNED

Equus Beds Groundwater Management District No. 2
 313 Spruce Street, Halstead, KS 67056
 316-835-2224, equusbeds@gmd2.org

Equus Beds Groundwater Management District No. 2
 Spacing Evaluation - #49484- Tier 1 LLC
 SWSESW (630'N & 3756'W) 27-26S-01W, Sedgwick County
 Prepared By: T. Boese Date: 7/13/2016



WATER RESOURCES RECEIVED

JUL 20 2016

KS DEPT OF AGRICULTURE

SCANNED

● Proposed Point of Diversion	Map Legend	Burrton IGUCA
Area of Consideration Boundary	Major Highway	Hollow Nikkel SWQUA
● Monitoring Wells	Other Roadway	McPherson IGUCA
▲ Points of Diversion	Major Stream	Enhanced Well Spacing Area
District Boundary	Other Water Feature	Permian Surface Bedrock
0.07 0.035 0 0.07 Miles	County Boundary	
	City Boundary	

Boring Location Plan



4000

1

feet
km

Google earth

WATER RESOURCES
RECEIVED

ACT 12 2015

KS DEPT OF AGRICULTURE

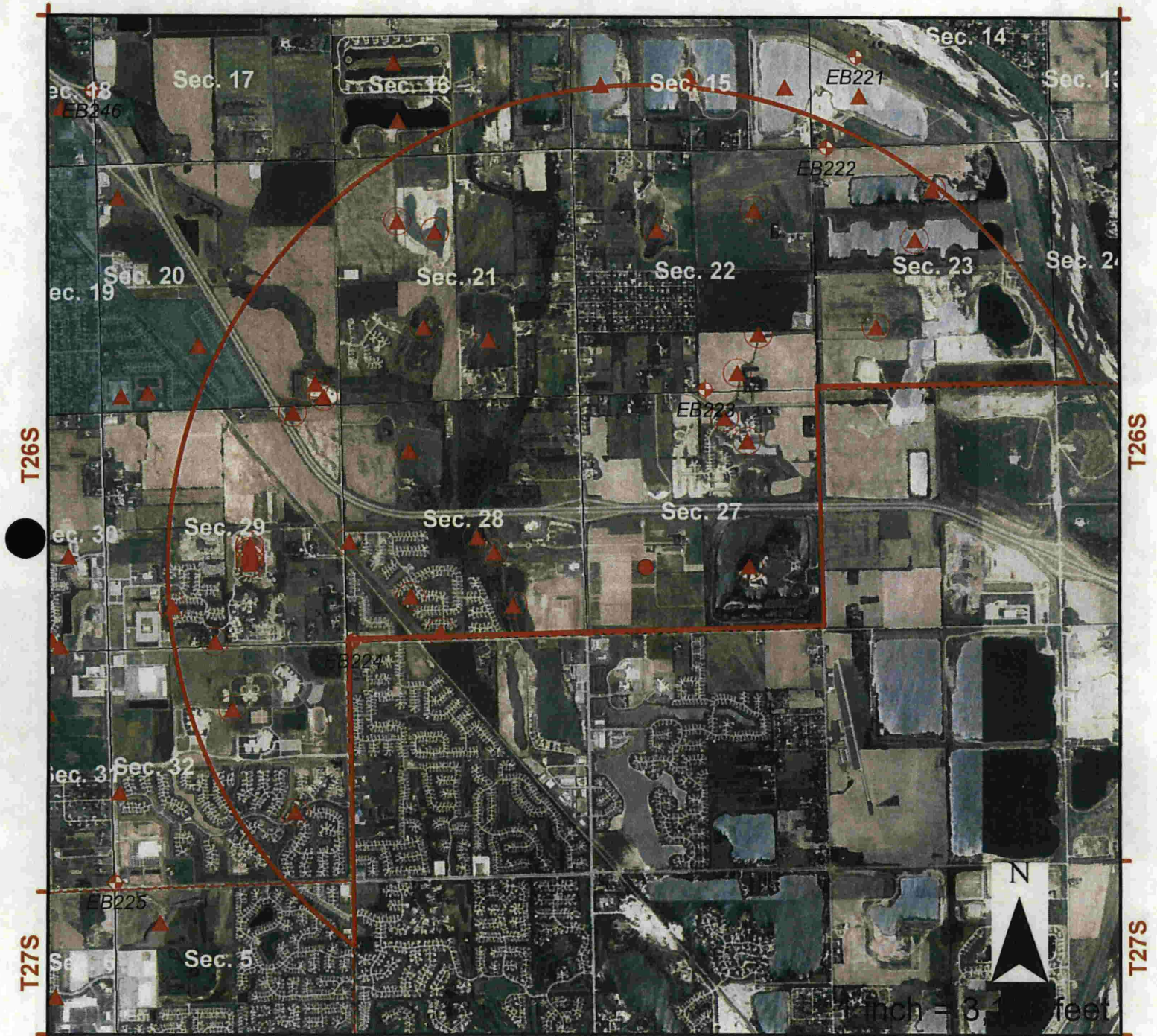
SCANNED

Equus Beds Groundwater Management District No. 2

Preliminary Safe Yield Evaluation for MKEC

● NCSW (1390'N & 3900'W) 27-26S-01W, Sedgwick County

Prepared By: S. Flaherty Date: 7/21/2015



Map Legend

- Monitoring Wells**
- P_Wells
 - AN_Wells
 - ◆ EB_Wells
 - IW_Wells

- Proposed Point of Diversion
- ▭ District Boundary
- ▲ Points of Diversion

WATER RESOURCES RECEIVED

OCT 12 2015 Burrton IGUCA
 Hollow Nickel SWQUA
 McPherson IGUCA
 Enhanced Well Spacing Area



Equus Beds Groundwater Management District No. 2
 313 Spruce Street, Halstead, KS 67056
 316-835-2224, equusbeds@gmd2.org

SCANNED



GRADING PLANS FOR
ESTANCIA ADDITION
PHASE 1

WATER RESOURCES
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OVERALL
GRADING PLAN

