



J-U-B ENGINEERS, INC.

J-U-B COMPANIES



THE
LANGDON
GROUP



GATEWAY
MAPPING
INC.

TRANSMITTAL LETTER

To: Washington Department of
Ecology, Eastern Regional Office
Attn: Megan Rounds
4601 N Monroe St
Spokane, WA 99205

Date: July 23, 2019

Project: Warden Hutterian Brethren On-Call
Engineering Services

Project No.: 70-17-041

RECEIVED

JUL 25 2019

Department of Ecology

We are shipping you:

Attached via U.S. Mail , the following items:

COPIES	DATE OR NO.	DESCRIPTION
1	7-23-2019	Application for A State Wastewater Discharge Permit to Discharge Domestic Wastewater to Ground Water by Land Treatment or Application (Warden Hutterian Brethren)

These items are transmitted as checked below:

☒ For Approval

☐ As Requested

☐ Returned for
Corrections

☐ For Your Information

☐ For Review & Comment

☐ _____

REMARKS:

On behalf of Paul Wollman (Warden Hutterian Brethren), please see the attached permit application. Please call if there are questions or clarifications regarding the permit application.

Cc:

Signed: _____

Samuel Mineer, E.I.T.

If enclosures are not as noted, please notify us at 509-458-3727

Accepted
9-10-19 MR



Application for a State Waste Discharge Permit to Discharge Domestic Wastewater to Ground Water by Land Treatment or Application

This application is for a wastewater discharge permit as required by Chapter 90.48 RCW and Chapter 173-216 WAC. It is designed to provide the Department of Ecology with information on pollutants in the waste stream, materials that may enter the waste stream, the flow characteristics of the discharge, and site characteristics at the point of discharge.

Information previously submitted to Ecology that applies to this application should be referenced in the appropriate section. Ecology may request additional information to clarify the conditions of this discharge.

SECTION A. GENERAL INFORMATION

1. Applicant Name: Warden Hutterian Brethren
2. Facility Name: Headquarters Lagoon Wastewater System
(if different from applicant)
3. Applicant Address: 1054 W. Harder Road
Street
Warden, WA 99857
City/State Zip
4. Facility Location Address:
(if different from 3. above) Street
City/State Zip
5. Latitude/longitude of the processing facility as decimal degrees (NAD83/WGS84):
Latitude 47.060010 Longitude -118.940620
6. Latitude/longitude of sprayfield/infiltration site discharge location (approximate center as decimal degrees (NAD83/WGS84):
Latitude 47.059163 Longitude -118.941804
7. Person to contact who is familiar with the information contained in this application:

Paul Wollman
Name

Operator
Title

(509) 760-1808
Telephone Number

(509) 349-8866
Fax Number

pkwollman@gmail.com
Email

FOR OFFICE USE ONLY

Check One

New/Renewal ☒

Modification ☐

Date Application Received

7-25-19

Application/Permit No.

ST 004559

Date Application Accepted

9-10-19

Date Fee Paid

NA

8. Check One:

☐

Permit Renewal (including renewal of temporary permits)

Does this application request a greater amount of wastewater discharge, a greater amount of pollutant discharge, or a discharge of different pollutants than specified in the last permit application for this facility? ☐ YES ☐ NO

For permit renewals, the current permit is an attachment, by reference, to this application.

☐

Permit Modification

☐

Existing Unpermitted Discharge

☒

Proposed Discharge

Anticipated date of discharge: May - September annually, starting September 2019 or May 2020

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and/or imprisonment for knowing violations.

Paul Wollman
Signature*

7-23-19
Date

Operator
Title

Paul Wollman
Printed Name

*Applications must be signed by either a principal executive officer or a ranking elected official. If these titles do not apply within your organization, the application must be signed by the person who makes budget decisions for this facility. For state facilities, this is typically a program manager.

The application signature my delegate signature authority for submittals required by the permit, such as monthly reports, to a suitable employee. You can delegate this authority to a qualified individual or to a position, which you expect to fill with a qualified individual. If you wish to delegate signature authority, please complete the following:

Signature of delegated employee

Date

Title or function at the facility

Printed Name

SECTION B. TREATMENT PLANT INFORMATION

- Identify all industries, large commercial facilities or other communities discharging to this publicly-owned treatment works (POTW) by name, type of industry, address, telephone number and contact name. Attach extra sheet(s) if needed and label as attachment B1.

	INDUSTRY #1	INDUSTRY #2
NAME:	Warden Hutterian Brethren	
INDUSTRY:	Agriculture, Maintenance, and Woodworking	
ADDRESS:	1054 W Harder Road Warden WA	
TELEPHONE:	509-349-8405	
CONTACT NAME:	Paul Wollman	
INDUSTRIAL PRODUCT(S)	Typical Domestic Waste	

- Plant design and operation manuals available for this treatment facility:

Type of Manual	Date	Is there a copy at the POTW?
<input checked="" type="checkbox"/> Engineering Report	2011 & 2018	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
<input checked="" type="checkbox"/> Operation and Maintenance Manual	2012	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
<input type="checkbox"/> Crop Management Plan		<input type="checkbox"/> YES <input type="checkbox"/> NO
<input type="checkbox"/> Sprayfield Management Plan		<input type="checkbox"/> YES <input type="checkbox"/> NO

- Plant Design Data:

a. Average Influent Flow for Maximum Month (MGD):	0.015 MGD
b. Influent BOD Load (lbs/day):	37.5 lbs/day (lagoon only)
c. Influent SS Load (lbs/day):	12.5 lbs/day (lagoon only)
d. Began Operation (year):	2011
e. Last Major Upgrade (year):	N/A
f. Planned Upgrades (year):	2019
g. Design Population:	145
h. Actual Population:	106 as of 2011
i. Sprayfield loading - attach copy of the irrigation schedule if schedule if available	N/A

- Are there plans to modify this facility? If so, briefly describe what and when.

New modifications include installation of irrigation drag tubes on existing irrigation pivot, so that municipal water and wastewater supply can be kept separate. New flow meter and pumping equipment will be installed to facilitate irrigation to field.

5. Attach a simple schematic drawing of POTW. (Label as attachment B.5. Attachments should be 11 x 17" or smaller). The schematic should show all treatment processes (from B.6 below), flow direction and flow quantities in million gallons per day (MGD) or gallons per day (GPD).
6. Identify the type and number of unit processes at this facility.

Treatment	Unit Process	Number of Units
Lift stations	In collection system	None
	At head of plant	None
Preliminary treatment	Manually operated bar screens	None
	Mechanically operated bar screens	None
	Grit removal	One 6,000 gal septic tank
	Pre-aeration	None
	Comminutors/grinders	None
	Other (specify)	
Primary Treatment	Primary Sedimentation Tank/Clarifiers	
	Septic tanks	One 6,000 gallon
	Other (specify)	
Secondary Treatment	Oxidation Ditch	
	Package Plant - Activated Sludge	
	Package Plant - Physical/Chemical	
	Aerated Lagoon	
	Non-aerated Lagoon/Facultative Lagoon	Two cells
	Rotating Biological Contact	
	Secondary Clarifiers	
	Trickling Filter	
	Polishing Ponds	
	Other (specify)	
Additional Treatment	Coagulation	
	Filtration	
	Storage (Lined Lagoon)	Two cells - double lined with leak detection
	Storage (Unlined Lagoon)	
	Other (specify)	Two evaporative lagoons
Land Treatment or Application	Drainfield	
	Rapid Infiltration/Infiltration Lagoon	
	Constructed Wetland	
	Sprinkler Irrigation	One pivot with proposed drag tubes
	Flood Irrigation	
	Ridge and Furrow Irrigation	
	Subsurface Irrigation	
	Other (specify)	
Disinfection	Chlorination	
	Ultraviolet	
	Other	

SECTION C. WASTEWATER INFORMATION

1. The average influent flow to the plant for the maximum month for at least the last 12 months: 15,000 gallons/day
2. The maximum daily flow applied to the land treatment/application site for the last 12 months: N/A gallons/day
N/A inches/acre/month
3. Describe how the influent and effluent flow are measured?

Influent flow is measured with a trapezoidal flume and flow meter.
Effluent will be measured with flow meter in vault before water is pumped to irrigation pivot.
4. Attach flow records for the last year. (*Label as attachment C.4.*)
5. Describe the collection method for the samples analyzed below (i.e., grab, 24-hour composite). Applicants must collect grab samples (not composites) for analysis of pH, temperature, cyanide, total phenols, residual chlorine, oil and grease, fecal coliform (including *E. coli*), and Enterococci (previously known as fecal streptococcus at § 122.26 (d)(2)(iii)(A)(3)), or volatile organics.

No sampling has been conducted of the effluent.
Influent and pond samples were collected in 2018 by grab sample.
6. Provide measurement values or range of measurements for treated wastewater prior to land treatment/application for the parameters with an "X" in the left column of the table below. If you obtain the application from the Internet, contact Ecology's regional office to see if testing for a subset of these parameters is permissible. All analyses (except pH) must be conducted by a laboratory registered or accredited by Ecology (WAC 173-216-125). If this is an application for permit renewal, provide data for the last year for parameters that are routinely measured. For parameters measured only for this application, place the values under "Maximum." Report the values with units as specified in the parameter name or in the detection level.

The Permittee must use the specified analytical methods, detection limits (DLs) and quantitation levels (QLs) in the following table unless Ecology approves an alternate method or the method used produces measurable results in the sample and EPA has listed it as an EPA approved method in 40 CFR Part 136. If the Permittee uses an alternative method as allowed above, it must report the test method, DL, and QL on the discharge monitoring report or in the required report.

X	Parameter	Concentration Measured			Number of Analyses	Analytical Method Std. Methods 19 th , 20 th edition or EPA	Detection Limit/Quantitation Level
		Minimum	Maximum	Average			
X	BOD (5 day)					SM 5210 B	/2 mg/l
	COD					SM 5220 D	/10 mg/l
	Total suspended solids					SM 2540 D	/5 mg/l
X	Total dissolved solids					SM 2540 C	
	Conductivity (micromhos/cm)					SM 2510 B	
	Ammonia-N as N					SM 4500-NH ₃ C	/0.3 mg/L
X	pH					SM 4500-H	0.1 standard units
	Total Residual Chlorine					SM4500-Cl G	50/ µg/L L
	Fecal coliform (organisms/100 mL)					SM 9221 E or 9222 D	
	Total coliform (organisms/100 mL)					SM 9221 B or 9222 B	
	Dissolved oxygen					SM 4500-O C/G	
X	Nitrate + nitrite-N as N					SM 4500-NO ₃ E	100 µg/L
X	Total kjeldahl N as N					SM 4500-N _{org} C/E/FG	300 µg/l
	Ortho-phosphate-P as P					SM 4500-P E/F	10 µg/l
	Total-phosphorous-P as P					SM 4500-P E/P/F	10 µg/l
	Total Oil & grease					EPA 1664A	1.4/5 mg/l
	NWTPH - Dx					Ecology NWTPH Dx	250/250 µg/l
	NWTPH - Gx					Ecology NWTPH Gx	250/250 µg/l
	Calcium					EPA 200.7	10 µg/l
X	Chloride					SM 4500-Cl C	0.15 µg/l
	Fluoride					SM 4500-F E	.025/0.1 mg/l
	Magnesium					EPA 200.7	10/50 µg/l
	Potassium					EPA 200.7	700/ µg/l
	Sodium					EPA 200.7	29/ µg/l
	Sulfate					SM 4500-SO ₄ C/D	/200 µg/l
	Alkalinity mg/L as CaCO ₃					SM 2320 B	/5 mg/L as CaCO ₃
	Arsenic(total)					EPA 200.8	0.1/0.5 µg/l

X	Parameter	Concentration Measured			Number of Analyses	Analytical Method Std. Methods 19 th , 20 th edition or EPA	Detection Limit/Quantitation Level
		Minimum	Maximum	Average			
	Barium (total)					EPA 200.8	0.5/2 µg/l
	Cadmium (total)					EPA 200.8	.05/.25 µg/l
	Chromium (total)					EPA 200.8	0.2/1 µg/l
	Copper (total)					EPA 200.8	0.4/2 µg/l
	Iron (total)					EPA 200.7	12.5/50 µg/l
	Lead (total)					EPA 200.8	0.1/0.5 µg/l
	Manganese (total)					EPA 200.8	0.1/0.5 µg/l
	Mercury (total) pg/L					EPA 1631E	0.2/.5 pg/l
	Molybdenum(total)					EPA 200.8	0.1/0.5 µg/l
	Nickel(total)					EPA 200.8	0.1/0.5 µg/l
	Selenium (total)					EPA 200.8	1/1 µg/l
	Silver (total)					EPA 200.8	.04/.2 µg/l
	Zinc (total)					EPA 200.8	0.5/2.5 µg/l

Detection level (DL) or detection limit means the minimum concentration of an analyte (substance) that can be measured and reported with a 99% confidence that the analyte concentration is greater than zero as determined by the procedure given in 40 CFR part 136, Appendix B.

Quantitation Level (QL) also known as Minimum Level of Quantitation (ML) – The lowest level at which the entire analytical system must give a recognizable signal and acceptable calibration point for the analyte. It is equivalent to the concentration of the lowest calibration standard, assuming that the lab has used all method-specified sample weights, volumes, and cleanup procedures. The QL is calculated by multiplying the MDL by 3.18 and rounding the result to the number nearest to (1, 2, or 5) x 10n, where n is an integer. (64 FR 30417).

ALSO GIVEN AS:

The smallest detectable concentration of analyte greater than the Detection Limit (DL) where the accuracy (precision & bias) achieves the objectives of the intended purpose. (Report of the Federal Advisory Committee on Detection and Quantitation Approaches and Uses in Clean Water Act Programs Submitted to the US Environmental Protection Agency December 2007).

7. Has the effluent been analyzed for any other parameters than those identified in question C.6, or are there other pollutants that you know of or believe to be present?

☐ YES ☒ NO

No other pollutants believed to be present.

If yes, specify the pollutants and their concentration if known (attach laboratory analyses if available). (*Note: Ecology may require additional testing.*)

SECTION D. GROUNDWATER INFORMATION

Provide available data measurements or range of measurements from monitoring wells or supply wells in the area of discharge. Provide the analytical method and detection limit, if known. Provide the location of each well on the map required in E.3 below. Attach well logs when available (*label as Attachment D*). Copy this page as necessary for each well (*label as Attachment D*). Provide the latitude and longitude in decimal format.

Ecology Well Tag ID # ALF246
(*example AAB123*)

Well ID # Well #1

Latitude: 47.058308 Longitude: -118.950494

Well Elevation (to the nearest 0.01 feet) 1356 Check the appropriate box; the elevation measurement is relative to: the NAVD88 standard ☒ mean sea level ☐

Parameter	Units	Range of Measurements	Number of Analyses	Analytical Method	Detection Limit
BOD (5 day)	mg/L				
COD	mg/L				
Total organic carbon	mg/L				
Dissolved Fixed Solids	mg/L				
Total dissolved solids	mg/L				
pH	Standard units				
Conductivity	(micromhos/cm)	379	1		70
Alkalinity	mg/L as CaCO ₃				
Total hardness	mg/L	55.6	1		10
Fecal coliform	organisms/100 mL				
Total coliform	organisms/100 mL				
Dissolved oxygen	mg/L				
Ammonia-N as N	mg/L				
Nitrate + nitrite-N, as N	mg/L	0.04-0.26	15		0.20
Total kjeldahl N as N	mg/L				
Ortho-phosphate-P as P	mg/L				
Total-phosphorus-P as P	mg/L				
Total Oil & Grease	mg/L				
Total petroleum hydrocarbon	<input type="checkbox"/> mg/L <input type="checkbox"/> µg/l				
Calcium	<input type="checkbox"/> mg/L <input type="checkbox"/> µg/l				
Chloride	<input type="checkbox"/> mg/L <input type="checkbox"/> µg/l	8.3	1		2.0
Fluoride	<input type="checkbox"/> mg/L <input type="checkbox"/> µg/l	1.01	1		0.2
Magnesium	<input type="checkbox"/> mg/L <input type="checkbox"/> µg/l				
Potassium	<input type="checkbox"/> mg/L <input type="checkbox"/> µg/l				
Sodium	<input checked="" type="checkbox"/> mg/L <input type="checkbox"/> µg/l	51.9	1		5
Sulfate	<input type="checkbox"/> mg/L <input type="checkbox"/> µg/l	53	1		50
Barium	<input checked="" type="checkbox"/> mg/L <input type="checkbox"/> µg/l	0.019	1		0.4
Cadmium	<input checked="" type="checkbox"/> mg/L <input type="checkbox"/> µg/l	0.002	1		0.002
Chromium	<input checked="" type="checkbox"/> mg/L <input type="checkbox"/> µg/l	0.02	1		0.02
Copper	<input checked="" type="checkbox"/> mg/L <input type="checkbox"/> µg/l	0.02	1		0.02
Iron	<input checked="" type="checkbox"/> mg/L <input type="checkbox"/> µg/l	0.1	1		0.1
Lead	<input checked="" type="checkbox"/> mg/L <input type="checkbox"/> µg/l	0.001	1		0.001
Manganese	<input checked="" type="checkbox"/> mg/L <input type="checkbox"/> µg/l	0.005	1		0.01
Mercury	<input checked="" type="checkbox"/> mg/L <input type="checkbox"/> µg/l	0.0004	1		0.0004
Selenium	<input checked="" type="checkbox"/> mg/L <input type="checkbox"/> µg/l	0.01	1		0.01
Silver	<input checked="" type="checkbox"/> mg/L <input type="checkbox"/> µg/l	0.1	1		0.1
Zinc	<input type="checkbox"/> mg/L <input type="checkbox"/> µg/l	0.2	1		0.2
Depth to water level (to the nearest .01 feet)					

SECTION E. SITE ASSESSMENT

Note: The Department of Ecology Water Resources Section can be consulted for identifying wells within one mile of your site. The local library and local city or county planning offices may be helpful in providing the information required in this section.

1. Give the legal description of the land treatment site(s) by section/township/range and latitude/longitude. Indicate owner for each site. Give the acreage of each land treatment site(s). Attach a copy of the contract(s) authorizing use of land for treatment. *(Label as attachment E.1)*

SE 1/4 Section 8 Township 18N Range 31N WM.
Lat 47.060033 Long -118.940620
Owner: Warden Huterian Brethren (self).
Acres: ~18.5
2. If this is a new discharge, list all environmental control permits or approvals needed for this project; for example, SEPA review, engineering reports, hydrogeologic reports, , biosolids permits, or air emissions permits.

SEPA Checklist (dated 7-23-2019)
Biosolids Permit (pending)
3. Attach an original United States Geological Survey (USGS) 7.5 minute topographic map or aerial photograph that shows the POTW and the land treatment/application site(s).
USGS topographical maps are available from the Department of Natural Resources (360-902-1234), Metsker Maps (206-588-5222), and some local bookstores and internet sites.
Show the following on this map: *(Label as attachment E.3.)*
 - a. Location and name of internal and adjacent streets.
 - b. Surface water drainage systems within ¼ mile of the site.
 - c. All wells within 1 mile of the site.
 - d. Wastewater discharge points.
 - e. Land uses and zoning adjacent to the wastewater application site.
 - f. Ground water gradient.
4. Describe soils on the site using information from local soil survey reports. **Soils information is available from your county conservation district or from information contained in the sites hydrogeologic report.**
(Label as attachment E.4.) 2010 STRATA Report (File: JUBE03 S10059A)
5. Describe the local geology and hydrogeology within one mile of the site. Include any ground water quality data. **The local library, the site's hydrogeologic report, or soil conservation service may have this information.**
(Label as attachment E.5.)
The site is primarily agricultural, with Shano silt loam, with a maximum slope of 5% for the area. Annual precipitation in the region is 11.34 inches. The depth to ground water is several hundred feet. The WHB Headquarters is located with Water Resource Inventory Area 41, Lower Crab watershed.
6. List the names and addresses of contractors or consultants who provided information, and cite sources of information by title and author.

Doug Ensor, J-U-B Engineers, Inc. "2011 Engineering Report"
Layne Merritt, J-U-B Engineers, Inc. "2018 Engineering Report"

SECTION F. SLUDGE/BIOSOLIDS MANAGEMENT AND DISPOSAL

1. If your wastewater treatment is by lagoon:

Has the depth of the sludge been measured in the last five years?

☐ YES ☒ NO (IF yes, include the measurements and a map that shows the approximate measurement sites)

Will sludge be removed in the next five years? If so, describe sludge generation, stabilization, utilization, and disposal. Attach extra sheets as necessary.

Sludge in the wastewater is typically captured in the 6,000 gallon septic tank prior to entering the lagoon system. Sludge is removed from the septic tank twice a year and the lagoons are inspected annually for sludge accumulation.

2. If your wastewater treatment is by methods other than lagoon: N/A

Do you have a Sludge Management Plan? ☒ YES ☐ NO

Is the Plan approved by:

☐ Local health district? Date approved:

☐ Department of Ecology? Date approved:

3. Does your facility have a biosolids permit issued by Ecology? If so, please provide the permit's number and expiration date. Pending Application

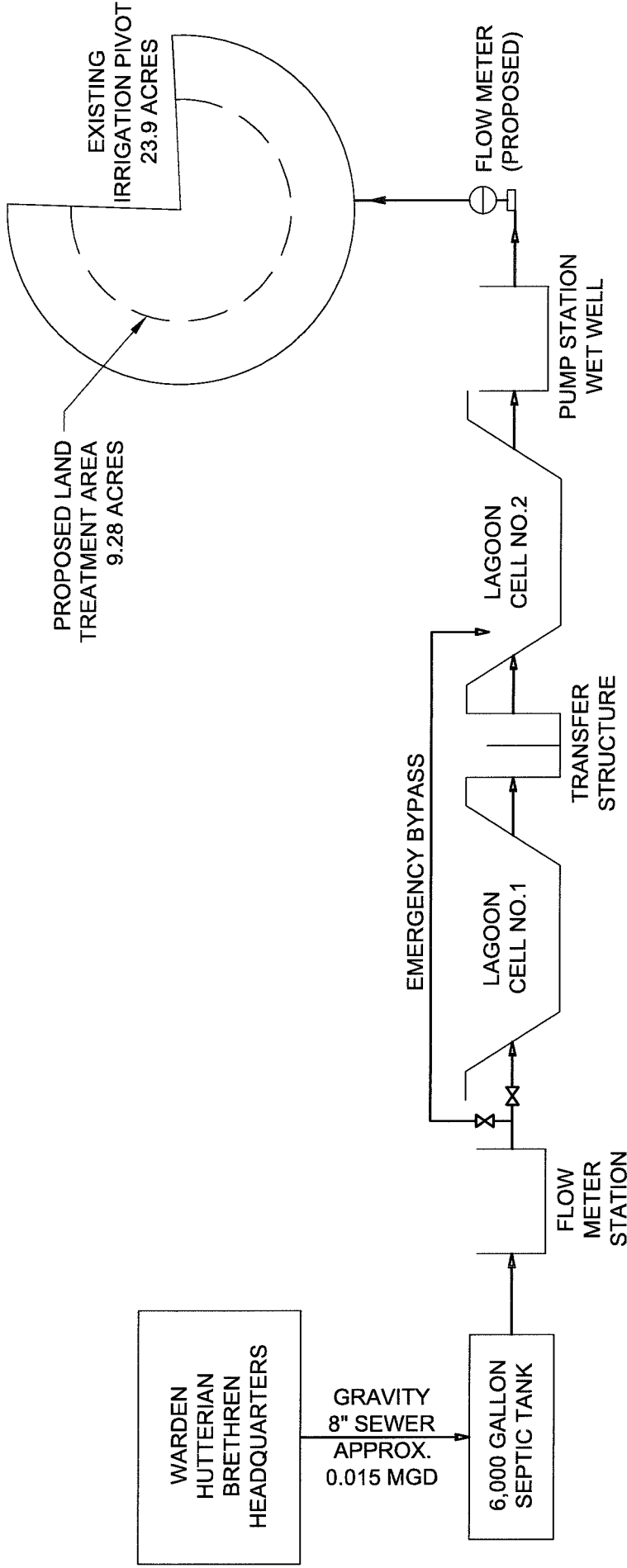
Biosolids Permit number Pending Application Permit expiration Date Pending Application

Summary of Attachments That May be Required for This Application:

(Please check attachments that are included)

- ☒ B.5 Schematic drawing of POTW
- ☒ C.4 Flow records
- ☐ C.6 Additional effluent analysis
- ☐ D. Additional ground water data
- ☐ E.1 Copies of contracts authorizing use of land for treatment
- ☒ E.3 USGS topographic map
- ☒ E.4 Soil information
- ☐ E.5 Local geology and hydrogeology

If you need this document in a format for the visually impaired, call the Water Quality Program at 360-407-6600. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.



FLOW DIAGRAM

Attachment C.4
Warden Hutterian Brethren

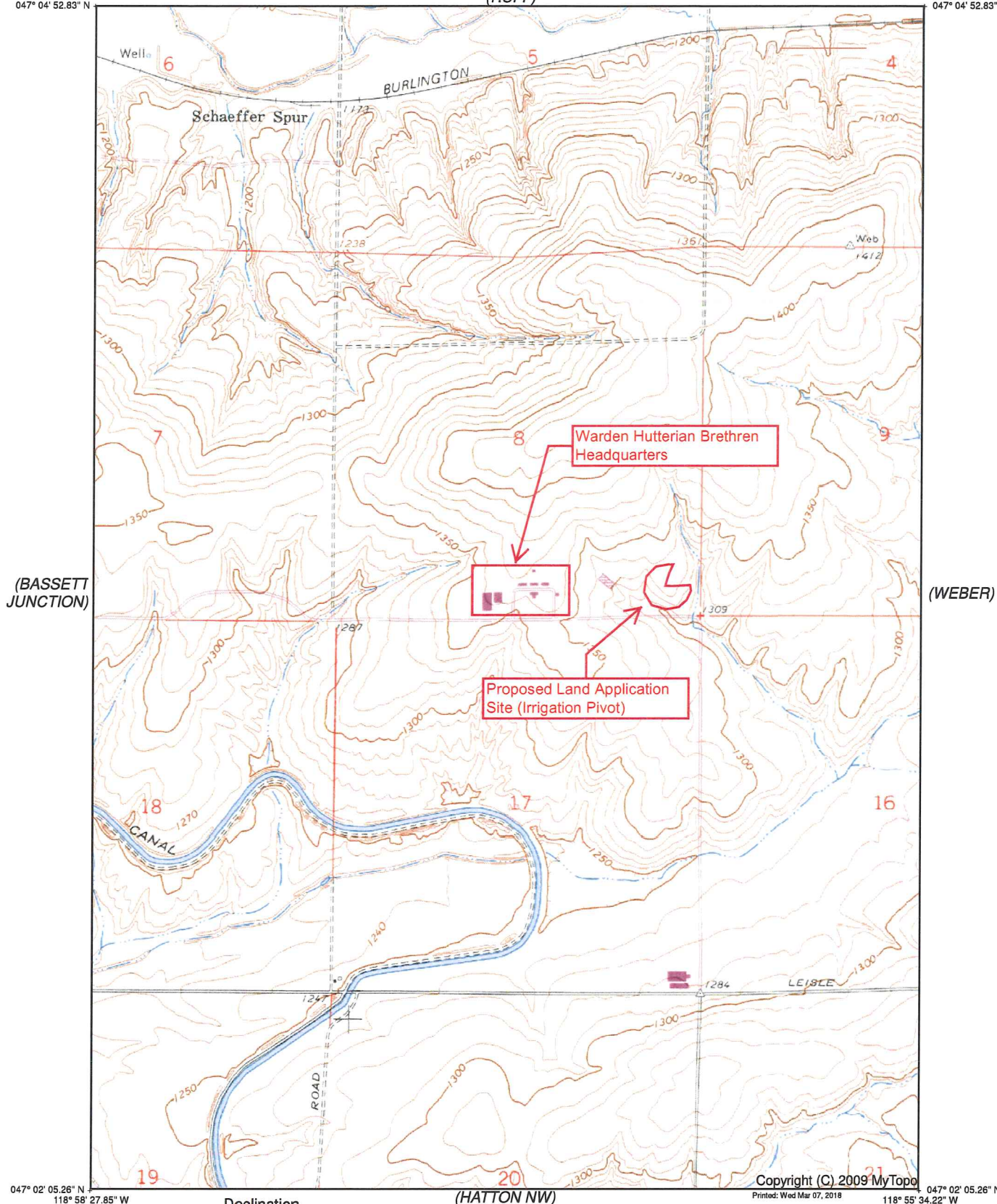
Lagoon Meter Readings

	Date	Gallons (meter reading)	Difference (Gallons)	Days between meter readings	Gallons/day (calculated)
2012	January 1, 2013	4,272,960			
2013	January 1, 2014	3,767,000	3,767,000	365	10,321
2015	December 31, 2015	3,261,043	3,261,043	729	4,473
	January 30, 2016	363,668	363,668	30	12,122
	April 28, 2016	1,505,682	1,142,014	89	12,832
	May 24, 2016	1,819,474	313,792	26	12,069
	June 15, 2016	2,192,476	373,002	22	16,955
	July 23, 2016	2,537,895	345,419	38	9,090
	November 4, 2016	3,297,929	760,034	104	7,308
2016	December 3, 2016	3,935,205	637,276	29	21,975
	February 22, 2017	843,717	843,717	81	10,416
	April 7, 2017	1,306,850	463,133	44	10,526
	May 8, 2017	1,622,975	316,125	31	10,198
	August 1, 2017	2,719,053	1,096,078	85	12,895
	August 26, 2017	3,188,515	469,462	25	18,778
	October 5, 2017	3,948,465	759,950	40	18,999
	October 28, 2017	4,375,591	427,126	23	18,571
	November 30, 2017	4,896,846	521,255	33	15,796
2017	January 2, 2018	5,412,204	515,358	33	15,617

118° 58' 27.85" W
047° 04' 52.83" N

(RUFF)

118° 55' 34.22" W
047° 04' 52.83" N



(WARDEN)

Produced by MyTopo Terrain Navigator
Topography based on USGS 1:24,000
Maps

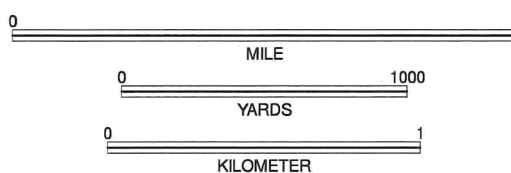
North American 1983 Datum (NAD83)
Polyconic Projection

To place on the predicted North American
1927 move the projection lines 15M S and
85M W

Declination

GN MN
GN 1.42° W
MN 16.01° E

(HATTON NW)
SCALE 1:24000



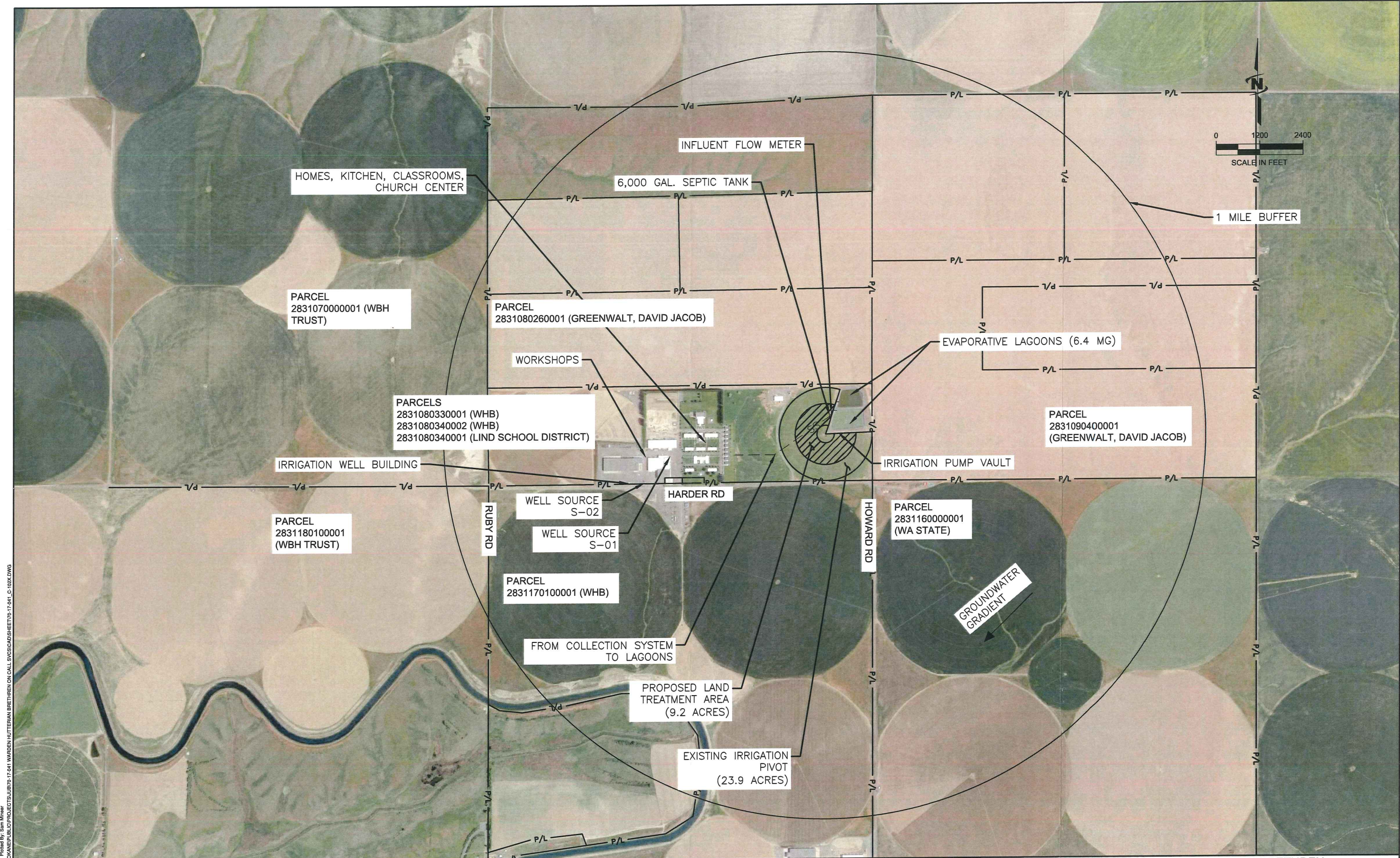
CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM 1929

Copyright (C) 2009 MyTopo
Printed: Wed Mar 07, 2018

047° 02' 05.26" N
118° 55' 34.22" W

(HATTON NW)

WEBER, WA
1967



Plot Date: 7/24/2019 8:29 AM Plotted By: Sam Miner Data Created: 7/22/2019 10:50 AM Project: JUB70-17-041 WARDEN HUTTERIAN BRETHREN ON CALL SVC CAD SHEET 70-17-041 C-102X DWG



NOTE: PROPERTY LINES SHOWN FOR ILLUSTRATIVE PURPOSES AND DO NOT REFLECT A LEGAL SURVEY OF PARCEL BOUNDARIES. INFORMATION GATHERED FROM ADAMS COUNTY MAPSIFTER.

ATTACHMENT E.3B

WARDEN HUTTERIAN BRETHREN
HEADQUARTERS WASTEWATER FACILITY
BUFFER EXHIBIT
JULY 2019

PARCEL
2831070000001
(WBH TRUST)

PARCEL
2831080260001 (GREENWALT,
DAVID JACOB)

PARCEL
2831090400001
(GREENWALT, DAVID
JACOB)

HOMES, KITCHEN, CLASSROOMS,
CHURCH CENTER

INFLUENT FLOW METER

6,000 GAL. SEPTIC TANK

EVAPORATIVE LAGOONS
(6.4 MG)

PARCELS
2831080330001 (WHB)
2831080340002 (WHB)
2831080340001 (LIND SCHOOL DISTRICT)

IRRIGATION PUMP VAULT

WORKSHOPS

IRRIGATION WELL BUILDING

HARDER RD

FROM COLLECTION SYSTEM
TO LAGOONS

WELL SOURCE
S-02

WELL SOURCE
S-01

PROPOSED LAND
TREATMENT AREA
(9.2 ACRES)

EXISTING
IRRIGATION PIVOT
(23.9 ACRES)

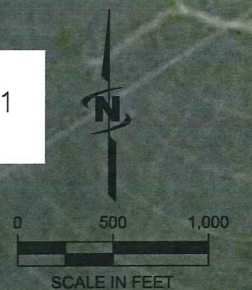
RUBY RD

HOWARD RD

PARCEL
2831180100001
(WBH TRUST)

PARCEL
2831170100001 (WHB)

PARCEL
2831160000001
(WA STATE)



NOTE: PROPERTY LINES SHOWN FOR
ILLUSTRATIVE PURPOSES AND DO NOT
REFLECT A LEGAL SURVEY OF PARCEL
BOUNDARIES. INFORMATION GATHERED
FROM ADAMS COUNTY MAPSIFTER.

ATTACHMENT E.3C

WARDEN HUTTERIAN BRETHREN
HEADQUARTERS WASTEWATER FACILITY

FACILITY EXTENTS EXHIBIT
JULY 2019





June 30, 2010
File: JUBE03 S10059A

Mr. Douglas Ensor, P.E.
J-U-B Engineers, Inc.
422 West Riverside Avenue
Spokane, WA 99201-5116

RE: **Geotechnical Site Characterization**
Warden Hutterian Brethren
Headquarters Wastewater System Project
Warden, Grant County, Washington

Dear Mr. Ensor:

Strata, A Professional Services Corporation, (STRATA) is pleased to present this letter report to help support project planning, design and construction of the proposed Warden Hutterian Brethren (WHB) Headquarters Wastewater System Project to be located north of the intersection of N. Howard Road and W. Harder Road in Grant County near Warden, Washington. The purpose of our services was to explore the project site, briefly summarize the site conditions encountered and discuss pertinent geotechnical considerations to support civil design by J-U-B Engineers, Inc. (J-U-B). We provided our services referencing our authorized proposal dated June 15, 2010. The following paragraphs summarize our scope of service, site exploration results, laboratory test results and briefly present geotechnical considerations to assist project planning, design and construction.

SCOPE OF SERVICE

To provide this letter report, we accomplished the following:

1. STRATA coordinated with J-U-B to identify an appropriate exploration schedule and to help facilitate communication with WHB. Prior to exploration, STRATA prepared a sketch using project plans to present proposed exploration locations to J-U-B. J-U-B helped coordinate and facilitate the exploration equipment and private utility locating with WHB personnel. STRATA contacted a public utility notification service to help identify utilities at the project site.
2. STRATA observed 4 exploratory test pit excavations advanced using equipment provided by WHB. STRATA described and classified the soil encountered referencing the *Unified Soil Classification System* (USCS). We obtained select soil samples for laboratory testing and to assist soil classification. Each test pit was backfilled by the Owner-provided operator and was not landscaped or compacted.
3. STRATA performed limited laboratory testing to assist soil classification and to establish

a moisture-density relationship curve (Proctor). We performed laboratory testing referencing applicable *ASTM International* (ASTM) test standards. Our laboratory testing program included the following.

- Atterberg Limits
 - Percent passing the No. 200 sieve
 - In-place moisture and unit weight
 - Moisture-density relationship curve
4. STRATA reviewed laboratory test results, exploration findings and summarized the following considerations via this letter report:
- Exploration summary
 - Laboratory test result summary
 - Subsurface conditions description
 - Geotechnical site characterization including:
 - Site soil reusability
 - Soil earthwork characteristics
 - Soil erodibility
 - Soil shrinkage considerations

SITE EVALUATION

To assist J-U-B's design and accomplish site characterization, we performed fieldwork on Tuesday June 22, 2010 and performed subsequent laboratory testing. The following sections describe fieldwork, laboratory testing we performed and geotechnical site characteristics.

Field Exploration

STRATA evaluated the subsurface conditions at the site by observing 4 exploratory test pits using a CASE Extend-a-hoe backhoe equipped with standard soil excavation teeth. Prior to exploration, STRATA provided J-U-B a site schematic showing proposed test pit locations with a focus on establishing exploration outside cultivated areas. Based on our interaction with Mr. Paul Wollman with WHB, test pits were slightly modified in the field to help reduce crop impact. We established test pit locations in the field by taping and pacing from known site features. STRATA also documented approximate exploratory test pit locations using a global positioning system (GPS) unit. Plate 1, *Site Plan*, presents approximate test pit locations, latitude and longitude established through GPS measurement, and depth to excavation refusal. WHB provided an operator and exploration equipment, and test pits were advanced to depths between 4.5 and 14.0 feet below the existing ground surface.



A professional engineer from our Spokane, Washington office observed exploration and logged the subsurface conditions encountered referencing ASTM D 2487 and ASTM D 2488, USCS. STRATA obtained select soil samples for laboratory testing and to assist visual-manual soil classification. Exploratory test pits were loosely backfilled following their completion and were not landscaped or compacted. Of the 4 exploratory test pits, 3 were located in proposed "cut" areas and may not require remediation prior to construction. Test pit TP-3 located in the southeast lagoon corner, was advanced immediately outside of the embankment footprint and also may not require remediation. However, if loose test pit backfill is located below any planned embankment or structure, we recommend the loose test pit backfill be completely removed to undisturbed native soil and replaced with structural fill in accordance with project specifications.

Subsurface Conditions

STRATA encountered native silt with sand in each test pit at the ground surface. Silt was generally tan, firm, moist and extended to depths between 2.7 and greater than 14.0 feet below the ground surface. Below silt, we encountered cemented silt (caliche) or basalt bedrock in TP-2, TP-3 and TP-4. Silt generally became cemented at depths between 8.0 and 12.0 feet below the ground surface. We encountered basalt bedrock in TP-3 at approximately 2.5 feet below the existing ground surface. Basalt bedrock was grey, slightly to moderately weathered, moderately fractured and dense. Excavation refusal occurred on caliche or bedrock in TP-2, TP-3 and TP-4 at 8.5, 4.5 and 12.5 feet below the ground surface, respectively. TP-1 was terminated in silt at 14.0 feet below the ground surface due to equipment depth limitations.

Based on our experience and after researching available *Washington State Department of Ecology* (Ecology) water well logs, we expect basalt bedrock to be present below soil at the project site to significant depths. We did not encounter groundwater during exploration. From our Ecology well log research, we do not expect groundwater will be encountered during construction, although groundwater can become temporarily perched above cemented zones or above basalt bedrock at any time of the year.

Laboratory Testing

STRATA performed laboratory testing referencing applicable ASTM test standards. Laboratory testing included the following:



- Atterberg limits
- Percent passing the No. 200 sieve
- In-place unit weight and moisture content
- Moisture density relationships (Proctor)

Index laboratory test results are presented on test pit logs in Appendix A. Plate 2 presents the moisture density relationship curve (ASTM D 1557, Modified Proctor). STRATA will retain soil samples in our laboratory for a 90-day period, unless we receive written notification to retain the samples for a longer time period.

GEOTECHNICAL SITE CHARACTERIZATION

The following paragraphs briefly discuss soil-related considerations to assist J-U-B's design and to help characterize the site from a geotechnical standpoint. From our conversations with you, we understand J-U-B does not require a comprehensive, detailed geotechnical evaluation to assist site design. However, J-U-B requested STRATA provide general site characteristics and notable considerations specific to the soil conditions encountered. Accordingly, we present the following geotechnical concepts.

Site Soil Reusability

The silt soil encountered during exploration has little to no plasticity and is moderately moisture-sensitive. Although STRATA is not aware of the required soil engineering properties to support the lagoon project, our opinion is the soil is generally suitable for reuse as structural fill. From our experience and limited laboratory testing, we are not aware of notable soil difficulties, hazards or issues other than explicitly discussed herein. We observe that the soil was readily excavated using conventional soil excavation equipment and was moist with moisture contents varying between 6.2 and 12.3 percent. Optimum moisture content for compaction is on the order of 14.5 percent. This indicates the soil will require some moisture-conditioning and processing to achieve compaction, depending upon project compaction requirements.

Soil Earthwork Characteristics

Silt soil encountered at the project site may require moderate soil processing, depending upon the time of year construction occurs. When this soil is wetter than the optimum moisture content, the soil is prone to substantial pumping, rutting and subgrade instability. However, under wind and warm weather conditions, the soil dries relatively quickly based on our experience.



Soil Erodibility

From our experience and the lack of soil plasticity, our opinion is the soil has a strong potential to be eroded by wind and water. During construction, this soil can be easily transported by wind and may require substantial applied moisture to reduce the potential for wind erosion. Further, channelized and sheet erosion is common with this soil until vegetation can be established. We strongly recommend J-U-B consider an aggressive stormwater pollution prevention plan (SWPPP) during construction and an aggressive re-vegetation program following construction.

Soil Shrinkage Considerations

From our experience and research, silt soil typically shrinks on the order of 10 to 20 percent when the soil is excavated and compacted to a higher density as structural fill. We recommend J-U-B reference Table 1 below to review in-place dry unit weight and the maximum theoretical dry unit weight for compaction to estimate soil shrinkage factors. Soil shrinkage factors will vary depending upon the specified relative compaction and on the actual degree of compaction achieved in the field versus the specified compaction requirement.

Table 1. Soil Unit-Weight and Moisture Considerations

Location ¹	Measurement Condition ²	Unit Weight ³	Moisture Content
TP-1 – 3.5 to 4.0	In-place	87.0	10.6 percent
TP-2 – 4.0 to 4.5	In-place	77.0	8.7 percent
TP-4 – 2.5 to 3.0	In-place	80.3	12.3 percent
TP-4 – 4.5 to 5.0	In-place	88.2	9.9 percent
TP-4 – 5.0 to 6.0	ASTM D 1557 (Proctor)	110.5 ⁴	14.5 percent ⁵

1. Measured in feet below the existing ground surface in the location explored.
2. In-place unit weight taken from ring samples. Proctor tested in laboratory from bulk soil sample.
3. Measured in pounds per cubic foot (pcf).
4. Theoretical maximum dry density for compaction.
5. Optimum moisture content for compaction.

LIMITATIONS

We prepared the above considerations to assist J-U-B's project planning, design, and ultimately, construction. As presented in our June 15, 2010 proposal, STRATA is not providing a comprehensive geotechnical evaluation with detailed geotechnical recommendations. Our services were specifically limited by you to providing site characterization and a reconnaissance-level evaluation only. A more comprehensive geotechnical evaluation can be



provided upon request. In authorizing STRATA to provide our services you understand and agree to the extent, nature and limitations of our involvement.

STRATA provided this letter report given the limitations described above and referencing geotechnical engineering principles and practices as they exist at the time of this report and in central Washington. We strongly recommend an adequate level of construction observation, monitoring and testing during construction to verify the project is constructed as designed. STRATA is available to provide such construction observation services on J-U-B or the owner's behalf. This acknowledgement is in lieu of any expressed or implied warranties.

We sincerely appreciate the opportunity to continue our working relationship with J-U-B and look forward to successful project initiation and construction. If you have any questions or require additional services, please do not hesitate to contact us.



Sincerely,
STRATA, Inc.

Chris M. Comstock, P.E.
Project Manager

Angela K. Lemmerman, P.E.
Project Reviewer

CMC/cl

Attachments:	Plate 1:	Site Plan
	Plate 2:	Moisture Density Relationship Curve
	Appendix A:	Exploratory Test Pit Logs
		USCS Explanation



MOISTURE-DENSITY RELATIONSHIP CURVE

ASTM D 1557
Method A

Project: Warden Hutterian Brethren Wastewater System
Client: J-U-B Engineers
File Name: JUBE03 S10059A
Date Tested: June 29, 2010
Tested By: J. Cardin
Sample Number: SL052210-2h
Sample Location: Test Pit TP-4 at 5.0 to 6.0 feet BGS
Sample Description: Light Brown SILT

GRADING ANALYSIS

SCREEN SIZE	% PASSING	AS TESTED
6 inch		
4 inch		
2 inch		
3/4 inch	100	100
3/8 inch		
#4 screen		
#200 screen		

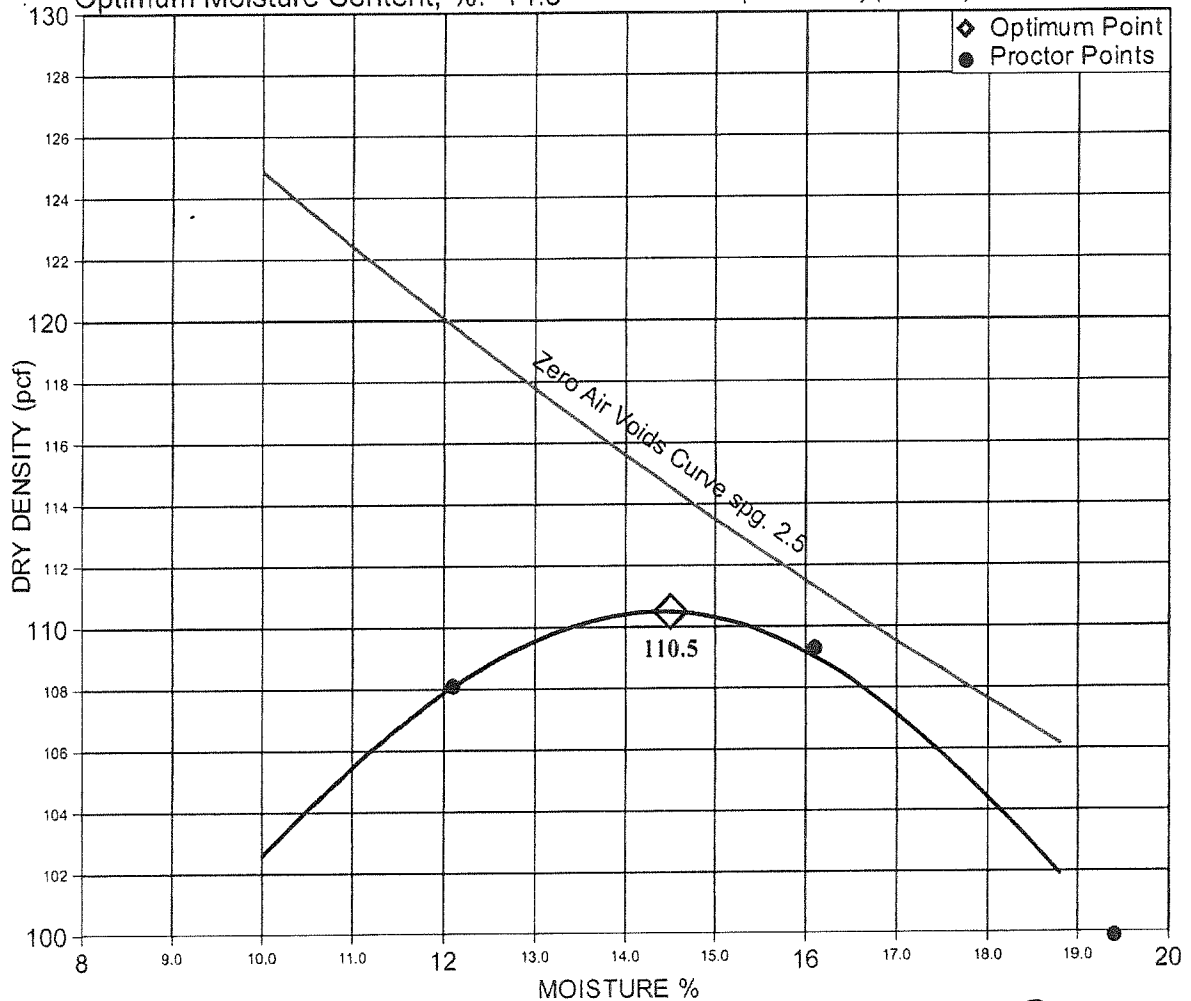
Corrected Dry Density, pcf: N/A

Corrected Moisture Content, %: N/A

Coarse Aggregate Correction, %: N/A

Bulk Specific Gravity (assumed): N/A

Maximum Dry Density, pcf: 110.5
Optimum Moisture Content, %: 14.5



Reviewed By

Col W. Wilf




APPENDIX A


Exploratory Logs and
Unified Soil Classification System (USCS)




STRATA BH / TP / WELL - STRATA GPJ - 6/30/10 15:37 - P:\GINT\PROJECTS\JUBE03 S10059A TP-1 THRU TP-4.GPJ

USCS Description	DEPTH (ft)	U.S.C.S. CLASS	SYMBOL	Sample Type	USDA SOIL Textural Classification	% Passing No. 200 Sieve	Dry Density (pcf)	Moisture Content (%)	Pocket Pen. (tsf)	REMARKS Note: BGS = Below Ground Surface
(ML) SILT with Sand (Native). Tan, firm, moist	0.0	ML								Trace vegetation and organics observed to 5 inches BGS
	2.5		BG		78.0		6.2	Silt is non-plastic, pocket penetrometer readings not obtained		
			RG		82.0	87.0	10.6			
	5.0									
	7.5							Weak cementation observed from 7.5 feet to 14 feet BGS		
	10.0		BK		86.5					
	12.5		BG		66.2		9.2			
Test Pit Terminated at 14.0 Feet.										
Client: JUBE03		Test Pit Number: TP-1			 STRATA <small>A PROFESSIONAL SERVICES CORPORATION</small> <i>Integrity from the Ground Up</i>			EXPLORATORY TEST PIT LOG Sheet 1 Of 1		
Project: S10059A		Date Excavated: 06-22-2010								
Backhoe: CASE		Bucket Width: 24 inches								
Depth to Groundwater: N.E.		Logged By: CMC								


STRATA BH / TP / WELL - STRATA.GPJ - 6/30/10 15:37 - P:\GINT\PROJECTS\SUBE03 S10059A TP-1 THRU TP-4.GPJ

USCS Description	DEPTH (ft)	U.S.C.S. CLASS	SYMBOL	Sample Type	USDA SOIL Textural Classification	% Passing No. 200 Sieve	Dry Density (pcf)	Moisture Content (%)	Pocket Pen. (tsf)	REMARKS Note: BGS = Below Ground Surface
(ML) SILT with Sand (Native). Tan, firm, moist	0.0									Silt is non-plastic, pocket penetrometer readings not obtained Trace vegetation and organics observed to 8 inches BGS
	2.5									
		ML		RG		81.4	77.0	8.7		
	5.0									
	7.5									
(ML) Cemented SILT with Sand (Caliche). Light tan to white, very hard, moist		ML								Excavation extremely difficult Trace basalt gravel observed at 8.0 feet BGS Test pit terminated at 8.5 feet BGS due to refusal on caliche
Test Pit Terminated at 8.5 Feet.										
Client: JUBE03		Test Pit Number: TP-2				 A PROFESSIONAL SERVICES CORPORATION Integrity From the Ground Up		EXPLORATORY TEST PIT LOG Sheet 1 Of 1		
Project: S10059A		Date Excavated: 06-22-2010								
Backhoe: CASE		Bucket Width: 24 inches								
Depth to Groundwater: N.E.		Logged By: CMC								

STRATA BH / TP / WELL - STRATA.GPJ - 6/30/10 15:37 - P:\GINT\PROJECTS\JUBE03 S10059A TP-1 THRU TP-4.GPJ

USCS Description	DEPTH (ft)	U.S.C.S. CLASS	SYMBOL	Sample Type	USDA SOIL Textural Classification	% Passing No. 200 Sieve	Dry Density (pcf)	Moisture Content (%)	Pocket Pen. (tsf)	REMARKS Note: BGS = Below Ground Surface
(ML) SILT with Sand (Native). Tan, firm, moist	0									Silt is non-plastic, pocket penetrometer readings not obtained
	1	ML								Trace vegetation and organics observed to 10 inches BGS
	2									
(RX) Basalt Bedrock. Dark grey, moderately fractured, slightly to moderately weathered, dense	3									Trace cobbles observed from 2.0 to 2.7 feet BGS
	4	RX								Test pit terminated at 4.5 feet BGS due to refusal on bedrock
Test Pit Terminated at 4.5 Feet.										
Client: JUBE03		Test Pit Number: TP-3		 STRATA <small>A PROFESSIONAL SERVICES CORPORATION</small> <i>Integrity from the Ground Up</i>				EXPLORATORY TEST PIT LOG Sheet 1 Of 1		
Project: S10059A		Date Excavated: 06-22-2010								
Backhoe: CASE		Bucket Width: 24 inches								
Depth to Groundwater: N.E.		Logged By: CMC								

STRATA BH / TP / WELL - STRATA GPJ - 6/30/10 15:37 - P:\GINT\PROJECTS\JUBE03 S10059A TP-1 THRU TP-4.GPJ

USCS Description	DEPTH (ft)	U.S.C.S. CLASS	SYMBOL	Sample Type	USDA SOIL Textural Classification	% Passing No. 200 Sieve	Dry Density (pcf)	Moisture Content (%)	Pocket Pen. (tsf)	REMARKS Note: BGS = Below Ground Surface
(ML) SILT with Sand (Native). Tan, firm, moist	0.0									Trace vegetation and organics observed to 10 inches BGS
	2.5			RG		84.2	80.3	12.3		Silt is non-plastic, pocket penetrometer readings not obtained
	5.0			RG BK		75.1	88.2	9.9		
	7.5	ML								Weak cementation observed from 7.5 feet to 8.0 feet BGS
	10.0			BG						Moderate cementation observed from 11.0 feet to 12.0 feet BGS
(ML) Cemented SILT with Sand (Caliche). Light tan to white, very hard, moist	12.5	ML								Strong cementation observed from 12.0 feet to 12.5 feet BGS Test pit terminated at 12.5 feet BGS due to refusal on caliche
Test Pit Terminated at 12.5 Feet.										
Client: JUBE03		Test Pit Number: TP-4			 STRATA A PROFESSIONAL SERVICES CORPORATION Integrity From the Ground Up		EXPLORATORY TEST PIT LOG			
Project: S10059A		Date Excavated: 06-22-2010								
Backhoe: CASE		Bucket Width: 24 inches								
Depth to Groundwater: N.E.		Logged By: CMC					Sheet 1 Of 1			

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GRAPH SYMBOL	LETTER SYMBOL	TYPICAL NAMES
COARSE GRAINED SOILS	GRAVELS	CLEAN GRAVELS		GW	Well-Graded Gravel, Gravel-Sand Mixtures.
				GP	Poorly-Graded Gravel, Gravel-Sand Mixtures.
		GRAVELS WITH FINES		GM	Silty Gravel, Gravel-Sand-Silt Mixtures.
				GC	Clayey Gravel, Gravel-Sand-Clay Mixtures.
	SANDS	CLEAN SANDS		SW	Well-Graded Sand, Gravelly Sand.
				SP	Poorly-Graded Sand, Gravelly Sand.
		SANDS WITH FINES		SM	Silty Sand, Sand-Silt Mixtures.
				SC	Clayey Sand, Sand-Clay Mixtures.
FINE GRAINED SOILS	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50%			ML	Inorganic Silt, Sandy or Clayey Silt.
				CL	Inorganic Clay of Low to Medium Plasticity, Sandy or Silty Clay.
				OL	Organic Silt and Clay of Low Plasticity.
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%			MH	Inorganic Silt, Mica-ceous Silt, Plastic Silt.
				CH	Inorganic Clay of High Plasticity, Fat Clay.
				OH	Organic Clay of Medium to High Plasticity.
				PT	Peat, Muck and Other Highly Organic Soils.

BORING LOG SYMBOLS

	Standard 2-Inch OD Split-Spoon Sample
	California Modified 3-Inch OD Split-Spoon Sample
	Rock Core
	Shelby Tube 3-Inch OD Undisturbed Sample

GROUNDWATER SYMBOLS

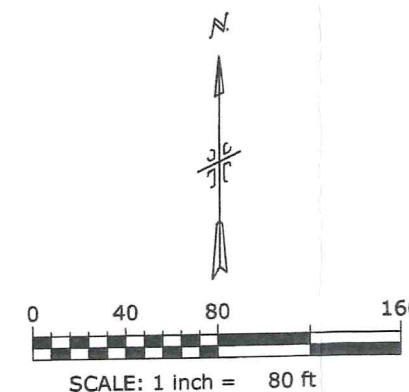
	Groundwater After 24 Hours
(7-3-07)	Indicates Date of Reading
	Groundwater at Time of Drilling

TEST PIT LOG SYMBOLS

BG	Baggie Sample
BK	Bulk Sample
RG	Ring Sample

Shorthand Notation:

BGS = Below Existing Ground Surface
N.E. = None Encountered



THIS PLAN COMPRISES A PORTION OF STRATA'S REPORT AND THE TEXT OF THE REPORT CONTAINS ESSENTIAL INFORMATION: BEFORE UTILIZING THIS PLAN FOR ANY PURPOSE WHATSOEVER, THE REPORT SHOULD BE READ COMPLETELY. THIS PLAN IS INTENDED TO HELP VISUALIZE THE INFORMATION PROVIDED IN THE REPORT. THESE LOCATIONS AND INFORMATION WERE ADDED TO EXISTING PLANS OF THE SITE PREVIOUSLY PREPARED BY OTHERS AND NO CHECK OF ACCURACY, CURRENCY, APPROPRIATENESS, ETC., OF INFORMATION PROVIDED BY OTHERS WAS PERFORMED, SINCE SUCH CHECKS WERE NOT PART OF STRATA'S SCOPE OF SERVICES.

REFERENCE: Site Plan from JUB Engineers Dated: 3-23-2009.