WASTEWATER TREATMENT DESIGN REPORT AND SUBMITTAL FOR "PATTON'S PLAYGROUND"

Located in the La Paz County, Arizona.

Prepared For:

Patton's Playground
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Job # 0011814
Prepared: MAY 2017

SEPTIC TREATMENT SYSTEM DESIGN REPORT AND SUBMITTAL FOR
"PATTON'S PLAYGROUND"

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1.0 PROJECT SUMMARY AND INTRODUCTION

The Patton's Playground project is a new development. Patton's Playground is the developer of the property and has delegated Westwood Professional Services as their Civil Engineering representative.

Construction plans for the site improvements that include the effluent distribution system shall be prepared by Westwood Professional Services of Scottsdale, Arizona. The construction documents shall be prepared based upon the design report. An Operation and Maintenance Manual (O&M) has been prepared by the manufacturer, Orenco, and is provided in this report and applied at time of construction.

FACILITY DESCRIPTION

The septic treatment facility at final build out will serve up to 92 lots in the Patton's Playground development treating wastewater and will accommodate for flows up to 15,000 gallons per day. Phase 1 will serve 37 units and Phase 2 will serve 55 units.

The final buildout of the WWTF will have a design capacity of 15,000 gpd and consist of:

1. Two 15,000 gal reserve septic tanks – one for each phase.
2. Two 5,000 gpd septic treatment tanks – one for each phase.
3. Subsurface disposal are leach beds.
4. 25 ft setbacks to treatment facility is assumed for all phases. Recorded deeds will insure all future property sales are aware of 25 ft setbacks.

The depth to groundwater at the site has been determined to be at least 240 feet and the direction of groundwater flow is estimated to be to the north-west based on testing conducted by Southwest Groundwater.

2.0 ENGINEERING DESIGN GENERAL

SURFACE AND SUBSURFACE CHARACTERIZATION

General conditions for surface / subsurface characterization have been completed in accordance with ADEQ Rule R18-9-A310.D.

In an assessment conducted by Nelson Digging, completed March 14, 2015, the following was provided as the soil description: *Subsoil conditions at the site comprise predominantly of loamy sands with small pockets of well-graded sands.*

Please see the Percolation Test Results in Appendix A for further detail and support concerning the soil characterization as well as percolation values.

SOIL APPLICATION RATE:

Per Nelson Digging, a Soil Application Rate of 0.80 gal/day/ft^2 was interpolated from R18-9-A312D. The following was derived from the abovementioned Geotechnical Soils Analysis:

Soil Description	Loamy Sand
Soil Application Rate (SAR)	0.80 gpdpsf
Adjusted SAR (SAR_a)	1.446 gpdpsf

A spreadsheet was used to complete calculations for the treatment disposal system.

NITROGEN LOADING & DENITRIFICATION

The area dedicated to the site is approximately 15 acres and there will be 92 units. There are more units than there are acres therefore further analysis of the nitrogen loading is required per A.A.C. R18-9 Article 2, which specifies the following:

- Design loading of 0.0333 lbs of Total Nitrogen per day per person.
- Maximum application rate of 0.088 of Total Nitrogen per day per gross acre.

The project consists of 92 lots that will be seasonally utilized and will not be considered full time residences. Calculation uses 2 persons per space at 50% of the peak flow based on the 5 month average with a total of 15 acres. The application rate is calculated as follows:

Nitrogen Loading w/o treatment = 0.0333*92 / 15 = 0.204 lb of N / AC

Nitrogen Loading w/ treatment = (0.0333*92 / 15)*(72% N reduction) = 0.057 lb of N / AC

This loading calculation clearly exceeds the maximum allowable application rate of 0.0888, thus additional treatment is required and is provided via the Orenco product. This proven treatment system described throughout this report can reduce the influent nitrogen loading values by up to 72%.

This project will be in compliance with ADEQ Permit Nitrogen Maximum Loading requirements of 0.088.

SETBACK REQUIREMENTS

The septic treatment system will be designed for a minimum setback distances as defined by A.A.C. R18-9-A312C.

3.0 WASTEWATER CHARACTERIZATION

DESIGN SEPTIC TREATMENT SYSTEM FLOW

The wastewater flows will be entirely of domestic grade sewage or generated from the three public restrooms. No industrial flows are proposed nor allowed. Calculation uses 100 gpd per space for the lots. Therefore:

Total Flow = 100 gpd peak per space * 92 spaces

= 9,200 gpd

Total flow is well below the 10,000 gpd of the design of the septic treatment system.

4.0 ZONING REQUIREMENTS

Per agreement with La Paz County, The Patton's Playground WWTF has been properly zoned for the permitted use of manufactured home lots and has complied with all La Paz County zoning ordinances in accordance with A.R.S. § 49-243(O) and A.A.C. R18-9-A201(A)(2)(C).

5.0 METHOD OF DISPOSAL

The effluent from the septic treatment system dump station will flow into the subsurface disposal areas; leach fields. The size of the leach beds have been determined by the percolation rate and adjusted SAR as provided previously. It has been found that Patton's Playground will adequately dispose of the total proposed effluent.

6.0 CONTINGENCY AND EMERGENCY OPERATION

Per A.A.C. R-18-9-A204, the permittee is required to provide a contingency plan that shall define the actions that will be taken if the discharge results in any of the following:

- A violation of the Aquifer Water Quality Standard or an AQL
- A violations of a discharge limitation
- A violation of any other permit conditions
- An alert level is exceeded
- An imminent and substantial endangerment to the public health or the environment

Should any of these be violated as defined in the A.A.C., it is the permittee's responsibility to provide any of the following as a remedy:

1) Verification sampling will be the first response
2) Further monitoring that may include increased frequency, additional constituents, or additional monitoring locations
3) Inspection, testing, operation or maintenance of discharge control features at the facility
4) Evaluation of the effectiveness of discharge control technology at the facility that may include technology upgrades
5) Implementing any upgrades and changes to the existing and approved Design Report and treatment facility.

It is imperative that should there be any violations of the proposed and accepted performance of the wastewater facility at Patton's Playground, the permittee or his representative shall provide the proper solution in order to rectify the violation. The permittee, his engineer and/or representative will work hand in hand with the Department to acquire a solution that not only works for the development, but also for ADEQ and adjacent property owners.

It is not anticipated, but should there be an imminent or substantial endangerment to public health or the environment, it shall be the permittee's responsibility to provide a 24 hour emergency response, including notification to the Department. As of this report, the person responsible for such actions will be Oleg Verbenkov or his assignee.

7.0 CONSTRUCTION MANAGEMENT

During the stage of construction and operation, it is understood that communication is critical to the success of any project, especially in the case of a septic treatment facility. It is understood that there are three main components of the construction team which include the Owner, Engineer, and the Facility Operator (FO). Correspondence throughout the construction and development process is the responsibility of each member of the team in order to ensure success of this project.

There may be need for communications or meetings requested by any of the three members should there be any special circumstances or problems that need to be resolved.

All drawings, reports, specifications, instructions, manuals, or any other technical information shall be furnished by the Engineer and/or the Facility Operator as it relates. All required information will be submitted by the Engineer and/or Facility Operator to any and all appropriate authorities and jurisdictions.

All team members will be responsible for the monitoring and quality control assurance over supplies, work conditions, contractors, etc. to ensure that quality is maintained throughout the duration of the construction phase. The Facility Operator will be responsible to verify and inspect all supplies have been provided per the manufacturers specifications. It is the FO's responsibility to ensure that the project has been constructed in the appropriate order and manner that is compliant with the O&M manual as well as to verify that all maintenance protocol is adhered to throughout the duration of the project.

8.0 FACILITY START UP PLAN

A qualified representative from Orenco, who will be involved in the start-up, construction and maintenance, will verify the correct start up for the Orenco product. All materials for the Orenco wastewater facility construction shall be provided by the manufacturer, Orenco, and will be checked and proved that they comply with operation standards. Such materials may include, but is not limited to: tanks, mechanical equipment, electrical equipment, pipes, etc. All materials will be inspected to ensure proper installation, operation, and maintenance. The Orenco representative will responsible to verify the integrity of all equipment and personnel, and will be responsible for overseeing the installation, along with the operation and maintenance. SEE APPENDIX.

9.0 CLOSURE

As per A.A.C. R-18-9-A209, the permittee shall provide provisions for closure in the case that the property is no longer utilized for the purposes proposed in this Design Report, or the purpose is changed such that the treatment facility as designed is no longer requisite or adequate. The closure process will include contacting ADEQ of the permittee's intent to cease operations of the facility and a site investigation plan that includes the summary of relevant site studies already conducted and a proposed scope of work for any additional site investigation necessary to identify as defined in the abovementioned statutes. Upon completion of the investigation plan, a closure design shall be provided that identifies:

- The method used, if any, to treat any material remaining at the facility
- The method used to control the discharge of pollutants from the facility
- Any limitation on future land or water uses created as a result of the facility's operations or closure activities and a Declaration of Environmental Use Restriction according to A.R.S. 49-152, if necessary
- The methods used to secure the facility.

10.0 GENERAL SPECIFICATIONS

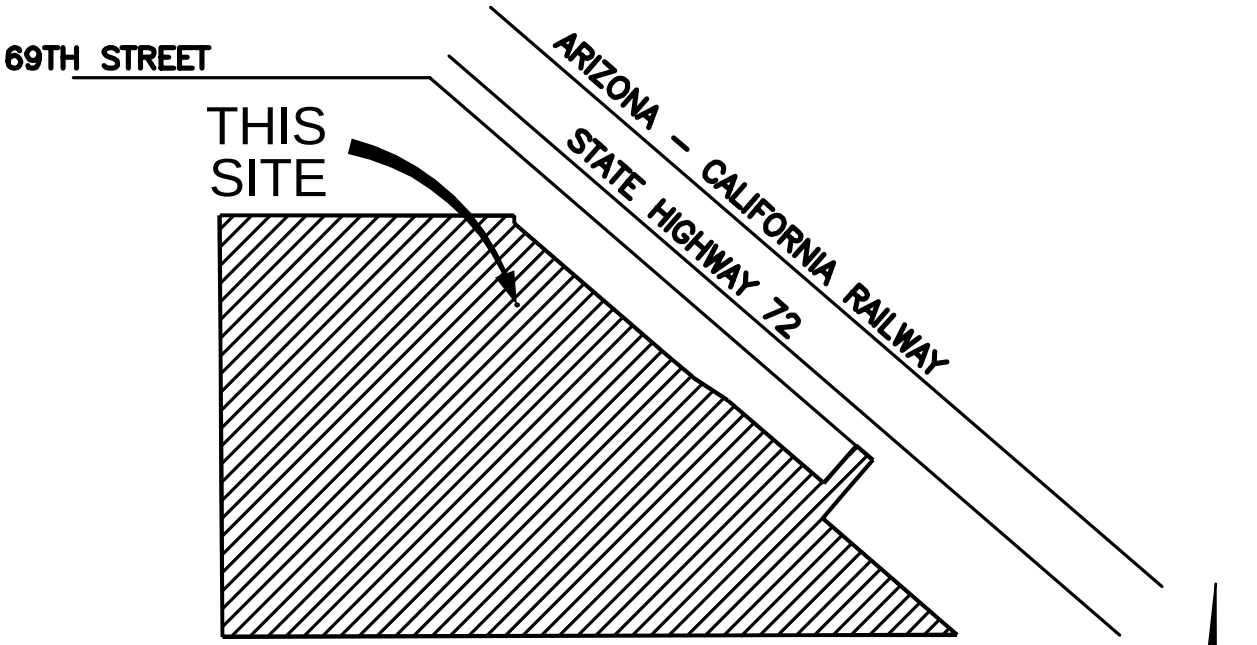
All water and sewer lines will be separated according to all federal, state, and local regulations. All wastewater effluent shall be discharged directly into the dump station holding tanks. The effluent pipe interconnecting the discharge tanks, wastewater treatment systems, and leach fields shall be comply with the minimum standards set for by ADEQ and La Paz County regarding size, vertical and horizontal distances from other utilities, velocity, and capacity calculations. Cleanouts will be constructed and located per ADEQ minimum standards and La County regulations. SEE EXHIBIT C-2, SYSTEM DESIGN FOR DETAILS.

DISCLAIMER

This project was designed based upon the expected flows and waste strengths shown in this report and the associated construction plans. Any changes in usage that would affect flows or waste will require review and design by the engineer of record.

Upon facility construction and implementation based upon the Operation and Maintenance Manual, the effluent integrity will be monitored. (Regulation may not require that the influent be monitored, but may do so should evidence of excessive flows or waste strength be demonstrated.) Should flows or effluent potency exceed what has been proposed in this design report, it is the owner's responsibility to reduce those parameters to meet what has been provided in the report and plan set. Additional treatment capacity and treatment expansion may be required.

It is understood by both the engineer and the operator of the treatment facility that the operation of the collection system and treatment will not receive discharge of toxic or foreign chemicals such as industrial waste, restaurant greasers, etc.



VICINITY MAP

N.T.S.

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VICINITY MAP

"PATTON'S PLAYGROUND"
53344 HWY 72
LA PAZ COUNTY, ARIZONA
JOB #: 0011814.00

EXHIBIT
A

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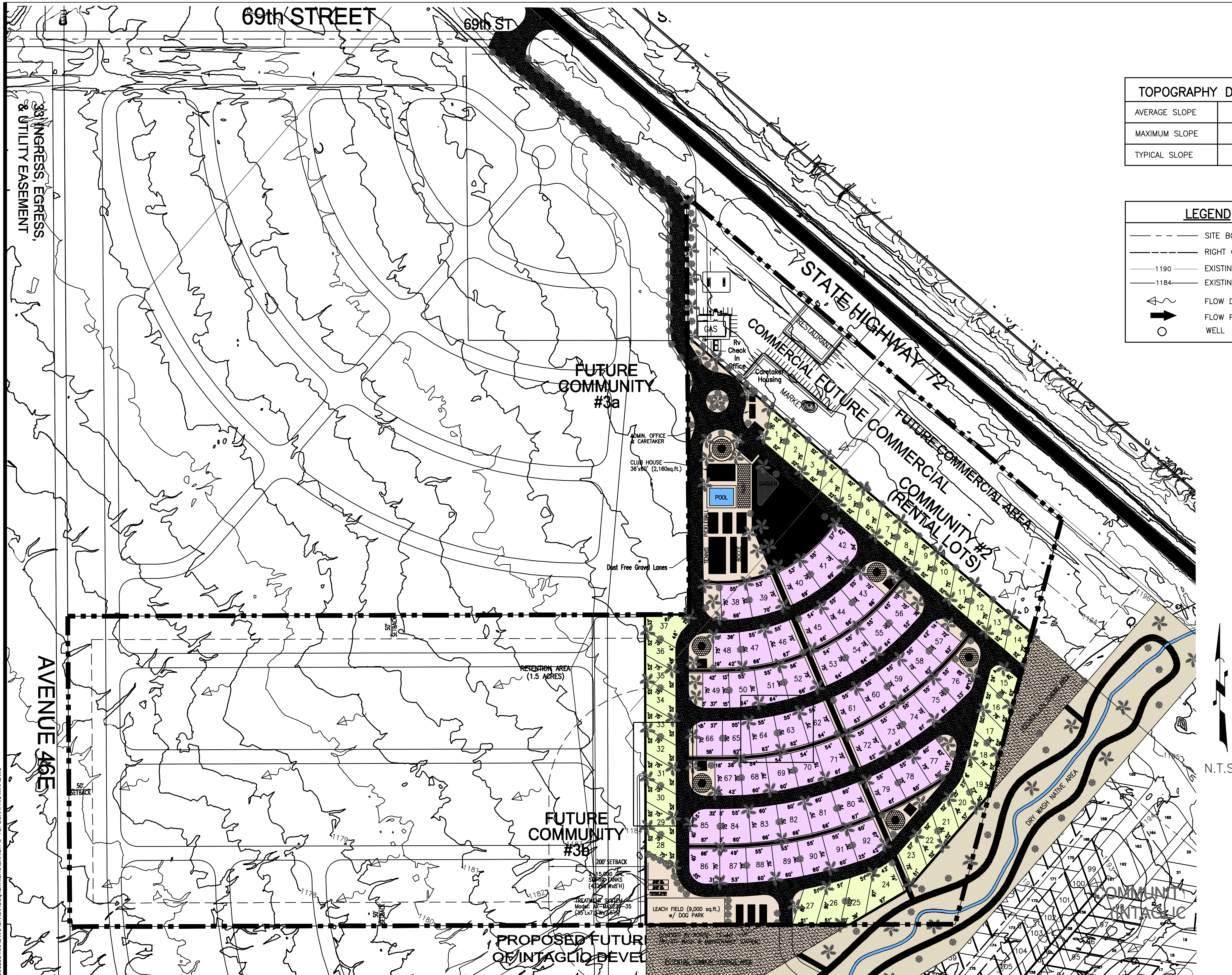

69th STREET
69th ST
33' INGRESS, EGRESS, & UTILITY EASEMENT
STATE HIGHWAY 72
COMMERCIAL FUTURE
COMMERCIAL
FUTURE COMMERCIAL AREA
COMMUNITY #2 (RENTAL LOTS)
RESTAURANT
GAS
Rv Check In Office
Caretaker Housing
MARKET
FUTURE COMMUNITY #3a
ADMIN. OFFICE & CARETAKER
CLUB HOUSE 36'x60' (2,160sq.ft.)
POOL
Dust Free Gravel Lanes
RETENTION AREA (1.5 ACRES)
AVENUE 46E
50' SETBACK
FUTURE COMMUNITY #3b
200' SETBACK
LEACH FIELD (9,000 sq.ft.) w/ DOG PARK
PROPOSED FUTUR
OF INTAGLIO DEVEL
DRY WASH NATIVE AREA
COMMUNIT
INTAGLIO
N.T.S.

TOPOGRAPHY DESCRIPTION

AVERAGE SLOPE	0.85%
MAXIMUM SLOPE	2%
TYPICAL SLOPE	0.94%

LEGEND

- SITE BOUNDARY
- RIGHT OF WAY
- 1190 — EXISTING MAJOR CONTOUR
- 1184 — EXISTING MINOR CONTOUR
- FLOW DIRECTION
- FLOW PATH
- WELL

INITIAL ISSUE: ####
REV: ####
REV: ####
REV: ####
REV: ####

DESIGNED: ####
CHECKED: ####
DRAWN: ####
FIELD CREW:
FIELD WORK DATE:
SCALE: 1" = HORIZONTAL
SCALE: 1" = VERTICAL

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SITE PLAN WITH TOPOGRAPHY

Patton's Playground
53344 Hwy 72
La Paz County, Arizona

SHEET NUMBER:
EXHIBIT B

DATE: 05/16/2017
PROJ: 0011814.00

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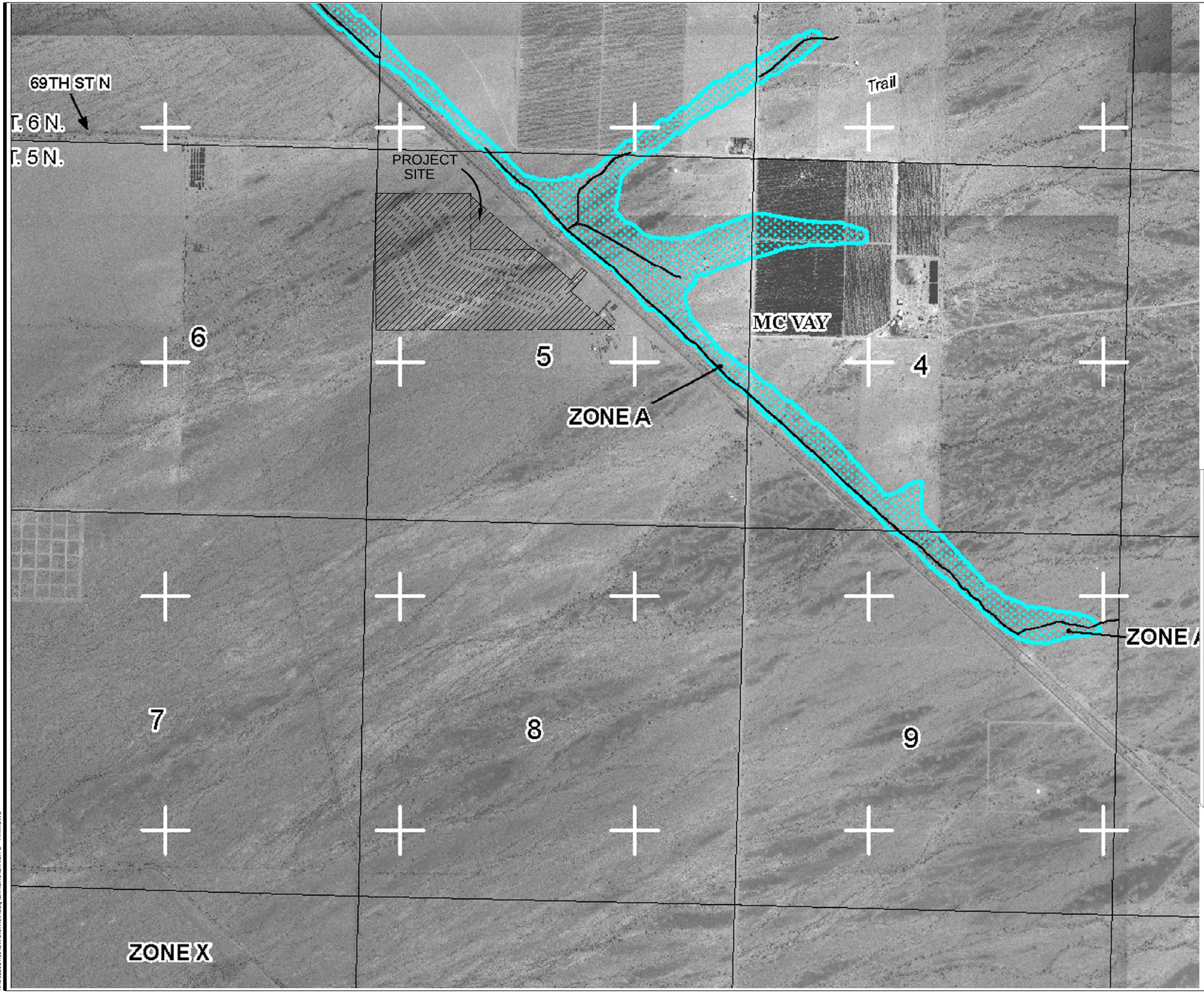

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

LA PAZ COUNTY, ARIZONA AND INCORPORATED AREAS

PANEL 1100 OF 2350

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LA PAZ COUNTY, UNINCORPORATED AREAS	040122	1100	C

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
04012C1100C

EFFECTIVE DATE
AUGUST 28, 2008

Federal Emergency Management Agency

N.T.S.

INITIAL ISSUE: #####
REV ##### REV ##### REV ##### REV #####

DESIGNED: ####
CHECKED: ####
DRAWN: ####
FIELD CREW:
FIELD WORK DATE:
SCALE 1" = HORIZONTAL
SCALE 1" = VERTICAL

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FIRM MAP
Patton's Playground
53344 Hwy 72
La Paz County, Arizona

SHEET NUMBER:
EXHIBIT D
DATE: 05/16/2017
PROJ: 00118140

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APPENDIX

APPENDIX 'A' - "PATTON'S PLAYGROUND"
LEACH DISPOSAL SIZING CALCULATIONS

PROJECT NAME : PATTON'S PLAYGROUND RV PARK
LOCATION : LA PAZ, AZ
DATE : 3-May-17
PREPARED BY : GSM
REVIEWED BY : DB

Total number of Lots			92
Design Flow Rate from Lots		*gpd*	9200
Design Flow Rate from Restrooms		*gpd*	0
Total Design Flow Rate		*gpd*	9200
DESIGN AVERAGE EFFLUENT BOD_5	BOD_EFF	*ppm*	30
DESIGN AVERAGE EFFLUENT TSS:	TSS_EFF	*ppm*	30
PERCOLATION SUMMARY			
		UNITS	VALUE
Percolation Rate		*mpi*	14
[1]SAR		*gpd/ s.f.*	0.8
[2]SAR_a		*gpd/ s.f.*	1.446
Required Absorbtion Area		*square feet*	6,361
Absorbtion Area Provided		*square feet*	7,000
*LEACH BED CALCULATION**			
Length of the Bed		*feet*	100
Width of the Bed		*feet*	1
Depth of the Bed		*feet*	3.0
Effective Depth of the Bed		*feet*	4.0
Length of the Pipe		*feet*	100
Diameter of Pipe		*inches*	4
Area of the Pipe		*inches*	12.56
		s.f	0.09
Percolation Area per bed		*s.f*	908
Total number Beds		*no.*	8
Total number Pipes		*no.*	15

* Bed Calculations = Per AAC Section R18-9-E302 General Permit.
1 & 2 Per AAC Section R18-9-A312 (D) Facility Design.