PERCOLATION TEST REPORT

PROPOSED ONSITE WASTEWATER TREATMENT SYSTEMS
General Atomics, Desert Horizons II
73 El Mirage Airport Road
Adelanto, CA 92301

Prepared for Parkway Construction
Submitted by Merrell Johnson Geotechnical, Inc.
April 1, 2025

MERRELL JOHNSON

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April 1, 2025

Parkway Construction
18400 Von Karman, Suite 650
Irvine, CA 92612
949-272-3857

Re: Percolation Test Report I General Atomics, Desert Horizons II, Proposed Wastewater Treatment Systems | 73 El Mirage Airport Road, Adelanto, CA 92301 | M.J.G. Project No. 24185P1

Ladies and Gentlemen:

Following your authorization, Merrell Johnson Geotechnical (MJG) has performed percolation testing for the proposed onsite wastewater treatment systems (OWTS) that will be needed for the General Atomics Desert Horizons II project. The enclosed report presents our findings and recommendations based on the results of our field and laboratory tests.

We trust that the enclosed information will be useful for the design and construction phases of this project. If you have any questions, please do not hesitate to contact our firm.

Sincerely,

Brad S. Merrell, P.E., President
Merrell Johnson Geotechnical, Inc.
R.C.E. 49423

CONTENTS

APPENDICES

REFERENCES

A. Complete Project Site Plan, 73 El Mirage Airport Road, Adelanto, CA 92301, Parkway C&A, LP, December 2024

B. Percolation Testing and Reporting Standards for Onsite Wastewater Treatment Systems, San Bernardino County Environmental Health Services, Revised September 2019. http://wp.sbcounty.gov/dph/wp-content/uploads/sites/7/2019/09/PERC-9.26.19-APPROVED.pdf

C. Local Agency Management Program for Onsite Wastewater Treatment Systems, San Bernardino County Environmental Health Services, May 2017

D. How to Size Your Leach Lines, Infiltrators, or Pits, San Bernardino County Division of Environmental Health (DEHS), Not Dated

E. Minimum Setback and Location of Septic System, including distribution box and leach line cross-sections -DEHS Publication, Not Dated

F. Taking Care of Your Septic System, DEHS Publication, Not Dated

INTRODUCTION

The percolation tests described in this report were performed in accordance with San Bernardino County Environmental Health Service's (EHS) Percolation Testing and Reporting Standards for Onsite Wastewater Treatment Systems, Rev. September 2019.

The following table lists the site address, owner, and the contractor for whom this report was prepared.

SITE ADDRESS	PROJECT OWNER	REPORT PREPARED FOR
73 El Mirage Airport Road Adelanto, CA 92301	General Atomics 73 El Mirage Airport Road Adelanto, CA 92301 858-226-0567	Parkway Construction 18400 Von Karman, Suite 650 Irvine, CA 92612 949-272-3857

DESCRIPTION OF SITE

General Atomics El Mirage is located at 73 El Mirage Airport Road in Adelanto, CA, with Hangar 80 located near the east perimeter of the facility. Proposed construction during the Desert Horizons II project will include a new 98,950 SF hangar, 20,000 SF stockroom, 19,500 SF Ground Control Building, six (6) new launch pads, and other ancillary improvements.

The OWTS site is covered with sparce desert vegetation. It appears that no fill has been placed on the natural soils within the proposed disposal field and 100% expansion area. There are no blue-line streams or drainages in the vicinity of the OWTS. Rock outcrops are not visible within the vicinity of the proposed construction and OWTS.

A Site Vicinity Map site is included as Appendix A, Figure 1. The proposed improvements are illustrated on the attached Complete Site Plan as Appendix A, Figure 2.

GROUNDWATER

Review of the California Department of Water Resources website (http://wdl.water.ca.gov/waterdatalibrary/) indicates the nearest water well is located off Bella Vista Drive, east of Sheep Creek Road. This is about 1,900 feet northeast of the proposed disposal field. The well data is listed below:

State Well Number: 06N07W11G001S
Site Code: 346256N1175862W001
Well Surface Elevation: 2852.840
Depth of Historic High Groundwater: 21 ft. (1918)
Elevation of Historic Groundwater Surface: 2831.84
Project Site Elevation: 2855

Based on the above data, the highest historic groundwater level is at least 23 feet below the subject site's existing ground surface.

On February 20, 2025, during the Soils Investigation MJG conducted for this project, a 50-foot-deep exploratory boring was drilled where groundwater was encountered at approximately 43-feet below the existing ground surface. Additionally, the soils between the bottom of the leach lines and groundwater contain more than 15% fines.

EQUIPMENT

The following supplies and equipment were utilized to excavate the test pits and perform the percolation testing:

- CME-75 Drill Rig equipped with Hollow Stem Augers
- Perforated pipe
- Electronic tape measure
- 3/8" pea gravel
- Stopwatch and timer
- 5-gallon plastic water containers
- Potable water from a portable tank

METHODOLOGY AND PROCEDURES

The OWTS will be located south of the Ground Control building, north of the proposed Stockroom building. The approximate location of the OWTS is illustrated on the attached Complete Site Plan, Appendix A, Figure 2.

Four percolation tests holes were excavated to a depth of 48 inches within the area of the proposed disposal field and corresponding 100% expansion area.

SOIL CONDITIONS

The soil conditions exposed in the four percolation test pits (P-1 through P-4) are described in the following table.

The 50-foot exploratory boring, drilled for the soils investigation, in conjunction with the percolation testing, is included in Appendix D of this report.

TEST PIT #	DEPTH (FT)	SOIL DESCRIPTION	LAB SAMPLE
P-1	0-4.0	(SM) Silty Sand Medium Dense, Dry	-
P-2	0-4.0	(SM) Silty Sand Medium Dense, Dry	-
P-3	0-4.0	(SM) Silty Sand Medium Dense, Dry	-
P-4	0-4.0	(SM) Silty Sand Medium Dense, Dry	17.8% Fines

Sieve Analyses

Sieve analyses were performed on a representative bulk sample of the soils obtained in P-4 at a depth of 0 to 4 feet and an undisturbed sample obtained from the exploratory boring at a depth of 10 feet. The sieve analyses results are presented in Appendix B.

PERCOLATION TEST PROCEDURES

Excavation

The 8-inch diameter percolation test holes were excavated to a depth of 48 inches using a CME-75 drill rig equipped with hollow stem augers.

Test Hole

1. Any loose soil was removed from the test hole.
2. Two inches of pea gravel was placed in the bottom of each test hole.
3. A perforated pipe sleeved with filter sock was then inserted into each test hole, on top of the gravel.

Pre-Soak

1. On February 20, 2025, the four test holes were excavated at the site.
2. The holes were filled to the surface with clear water and a full 5-gallon bottle of water was inverted above each hole.

Percolation-Rate Measurement

1. Between 20 and 24 hours after pre-soaking, the water bottle was removed, and the test hole was refilled with 6.0 inches of water above the gravel (bottom of perforated pipe).
2. After 30 minutes, the water level was measured; each hole showed that more than 5 inches of water drained, and “rapid readings” were measured.
3. The hole was again refilled to 6.0 inches above the gravel and the interval of time required to drop not less than 1-inch nor more than 3-inches was measured using a stopwatch.
4. The procedure described in No. 3 above was repeated five (5) more times to obtain a total of six (6) measurements.
5. The final readings were used to calculate the percolation rate.

PERCOLATION TEST RESULTS

The results of the four (4) percolation tests are tabulated below. All test results are tabulated on the Percolation Test Data Sheets presented in Appendix C of this report.

TEST LOCATION	DEPTH (INCHES)	PERC. RATE (MIN./INCH) FINAL READING	SOIL CLASSIFICATION	APPLICATION[1] RATE (FT^2/G/D)
P-1	48	2.78	SM	0.83
P-2	48	6.50	SM	1.25
P-3	48	5.72	SM	1.25
P-4	48	3.70	SM	0.83

[1]Leach line application rate in square feet of absorption area per gallon of effluent per day. From Figure 4.5 San Bernardino County 09/2019 http://wp.sbcounty.gov/dph/wp-content/uploads/sites/7/2019/09/PERC-9.26.19-APPROVED.pdf

DISCUSSION OF RESULTS

The disposal field will be installed in natural soils consisting of silty sand (SM). This material is considered favorable, as defined in Section 3.1 of the County Standard, Reference B.

Sources of measurement error were kept to a minimum during the percolation testing. The water levels were measured to the nearest 1/8" and a stopwatch was used to start and stop the time intervals between readings. Caving was controlled by inserting a perforated pipe into each test hole.

DESIGN CRITERIA

The percolation rates measured in the four percolation test pits ranged from 2.78 mpi to 6.50 mpi. The most conservative percolation rate of 6.50 mpi measured in P-2 was used for design. This rate corresponds to an application rate of 1.25 ft^2/g/d and was used to develop sizing recommendations for the onsite wastewater treatment system.

The leach line application rate (gallons per day per square foot) was determined using Figure 4.5 of the San Bernardino County Standard, Reference B.

The Hangar, Stockroom and Ground Control building flows will be combined and drain into the same OWTS. MJG understands that the three structures will incorporate the following fixtures: 26 water closets, 6 urinals, 20 lavatories, 7 sinks, 5 water coolers, 20 floor drains, and 2 mop sinks.

Fixture	Quantity	Drainage Fixture Unit (DFU)	Total Fixture Units (FU)
Water Closet	26	6.0	156
Urinal	6	2.0	12
Lavatory	20	2.0	40
Sink	7	2.0	14
Water Cooler	5	0.5	2.5
Floor Drain	20	2.0	40
Mop Sink	2	3.0	6
		TOTAL	**270.5**

The Drainage Fixture Unit Values (DFU) were obtained from Table 702.1 and the estimated septic tank capacity from Table H201.1(1) of the California Plumbing Code.

In accordance with Table H201.1(1), the minimum septic tank capacity for the first 100 fixture unites is 3,500 gallons. For the remaining 170.5 fixture units, over 100, each unit was multiplied by 25 gallons, totaling 4,262.5 gallons. The sum of 3,500 gallons and 4,262.5 gallons is 7,762.5 gallons.

The minimum septic tank capacity required to serve 270.5 fixture units is 7,762.5 gallons. For sizing purposes, we will use a more commonly available **8,000-gallon septic tank.**

Location	Assumed Type of Occupancy	Number of Employees	Estimated Daily Flow Rate (GPD) CPC Table 201.1 (4)	Total Estimated Flow Rate (GPD)
Hangar and Stockroom	Factories – no showers	176	25	4,400
Ground Control Building	Office	65	20	1,300
			TOTAL	**5,700**

Leach Field Size

- Percolation Rate – 6.50 min./in.
- Application Rate – 0.8 g/d/ft^2 ***or*** 1.25 ft^2/g/d (Fig. 4.5, San Bernardino County Standard)
- Total Fixture Units – 270.5
- Gallons of Effluent per Day – 5,700 gallons
- Gallons of Septic Tank Capacity – 8,000 gallons
- Trench Credit, usable area per linear foot of leach line measured starting one foot below inlet pipe – 3' wide x 3' deep = 7 ft^2 trench credit

The total linear feet of 3' wide by 3' deep (4' below the ground surface) leach line recommended was calculated as follows:

- 1.25 ft^2/g/d x 5,700 g/d = 7,125 ft^2
- Total linear feet = 7,125 ft^2 / 7 ft^2 (leach line design area) = 1,018 linear feet (LF)
- The maximum length of a leach line allowed by the County Standard is 100 linear feet
- 1,018 LF of leach line / 11 lines = 93 LF per line
- **Eleven 93 linear foot leach lines**

RECOMMENDATIONS

Based on the results of our percolation tests and the calculations presented above, we recommend the following OWTS for the proposed restroom building:

- Septic Tank Capacity – 8,000-gallons
- Leach Lines – Eleven 93 LF leach lines

Septic Tank

- **Septic Tank Material**
  - The septic tanks shall be constructed of precast concrete or fiberglass.
- **Septic Tank Specifications**
  - Tank Compartments – The septic tank shall have no less than two compartments. Inlet compartments shall be not less than two-thirds of the total capacity of the tank. The liquid depth shall be not less than 2.5 feet nor more than 6 feet. The secondary department shall have a capacity that does not exceed one-third of the total tank capacity.
  - Tank Access – Access to each septic tank shall be provided by not less than two manholes, 20 inches in minimum dimension, or by an equivalent removable cover

slab. One access manhole shall be located over the inlet, and one access manhole shall be located over the outlet. Where a first compartment exceeds 12 feet in length, an additional manhole shall be provided over the baffle hall.
    - Pipe Opening Sizes – The inlet and outlet pipe openings shall not be larger than the connection sewer pipe. The vertical leg of round inlet and outlet fittings shall not be less than the connecting sewer pipe nor less than 4 inches in diameter.
    - Pipe Extension – The inlet and outlet pipe or baffle shall extend 4 inches above and not less than 12 inches below the water surface. The invert of the inlet pipe shall be at a level not less than 2 inches above the inlet of the outlet pipe.
    - Free Vent Area – A free vent area equal to the required cross-sectional area of the sewer to provide free ventilation above the water surface from the disposal field through the septic tank should be provided.
    - Tank Structure Requirements – Tanks should be capable of supporting an earth load of not less than 500 pounds per square foot, where the maximum coverage does not exceed 3 feet.

- **Septic Tank Minimum Separations**
    - Per San Bernardino County's Percolation Test Standards and Report Guide (Reference A), the septic tanks shall be installed no closer than:
        - 5 feet from the disposal field and seepage pits
        - 50 feet from the ephemeral drainage
        - 100 feet from any water supply well
        - 5 feet from domestic water lines (building service lines)
        - 25 feet from domestic water lines (water purveyor lines)
        - 5 feet from the historic high groundwater level
        - 5 feet from building or structure
        - 5 feet from an adjoining property line
        - 50 feet from perennial streams

Distribution Box

In accordance with the 2022 Plumbing Code Appendix H, H601.5, a distribution box of sufficient size to receive the recommended lateral lines shall be installed at the head of the leach field. The invert of the outlets shall be level, and the invert of the inlet shall not be less than 1-inch above the outlets. Distribution boxes shall be designed to ensure equal flow and shall be installed on a level concrete slab in natural or compacted soil.

Dosing Tank (Pump Tank)

Since the anticipated quantity of sewage from the buildings exceeds the amount that is permitted to be disposed in 1,000 lineal feet of leach line, the 2022 California Plumbing Code, Appendix H601.8 specifies that a dosing tank shall be used. The dosing tank shall be installed between the septic tank and distribution box. The tank shall be equipped with an automatic siphon or pump that discharges the tank once every 3 or 4 hours. The tank shall have a capacity equal to 60 to 75 percent of the interior capacity of the pipe to be dosed at one time. Additionally, the tank shall be provided with two siphons or pumps dosing alternatively and each serving one-half of the leach field.

Leach Lines

- **Leach Line Construction Recommendations**
    - We recommended that the eleven leach lines for the proposed modular restroom building will be at least 93 LF.

- The leach line bottoms should be approximately 4 feet below the existing ground surface.
- The leach line bottoms shall be graded essentially level varying no more than 3 inches in 100 feet.
- The trenches were designed for 7 square feet of absorption area per linear foot of leach line trench. This will require the bottom 3 feet of each trench to be filled with ¾-inch to 2 ½-inch filter gravel as measured from the bottom of the leach line pipe invert.
- The leach line pipe shall consist of 4-inch diameter, Schedule 40 or Schedule 80, perforated piping, meeting the requirements of the San Bernardino Standards.
- The leach line pipe shall be covered in the filter gravel, and the gravel shall extend at least 2 inches above the top of the leach line pipe. The filter gravel shall be blanketed with untreated building paper.
- The leach lines trenches should be backfilled above the untreated building paper with the onsite soils. The leach lines shall not be paved over or covered by concrete or material that is capable of reducing or inhibiting evaporation.

- **Leach Line Minimum Separations**
  - Per the San Bernardino County EHS Percolation Testing and Reporting Standards for Onsite Wastewater Treatment Systems (Reference A), the leach lines shall be constructed no closer than:
    - 100 feet from a domestic water well
    - 150 feet from a public water supply well
    - 8 feet from a building or structure
    - 5 feet from an adjoining property line
    - 5 feet from a distribution box or dosing pump
    - 5 feet from a domestic water line (building service line)
    - 25 feet from a domestic water line (water purveyor's line)

The San Bernardino County EHS's document, titled Minimum Setback and Location of Septic System, is included with this report in Appendix E. This document illustrates the setback requirements and provides a typical leach line trench cross-section.

CLOSURE

Variations in the soil conditions could exist between the areas explored and tested. Therefore, if any soil conditions are encountered at the site that is different from those assumed in the preparation of this report, our firm should be notified so that we may review the situation that exists and make supplementary recommendations or perform additional tests if needed.

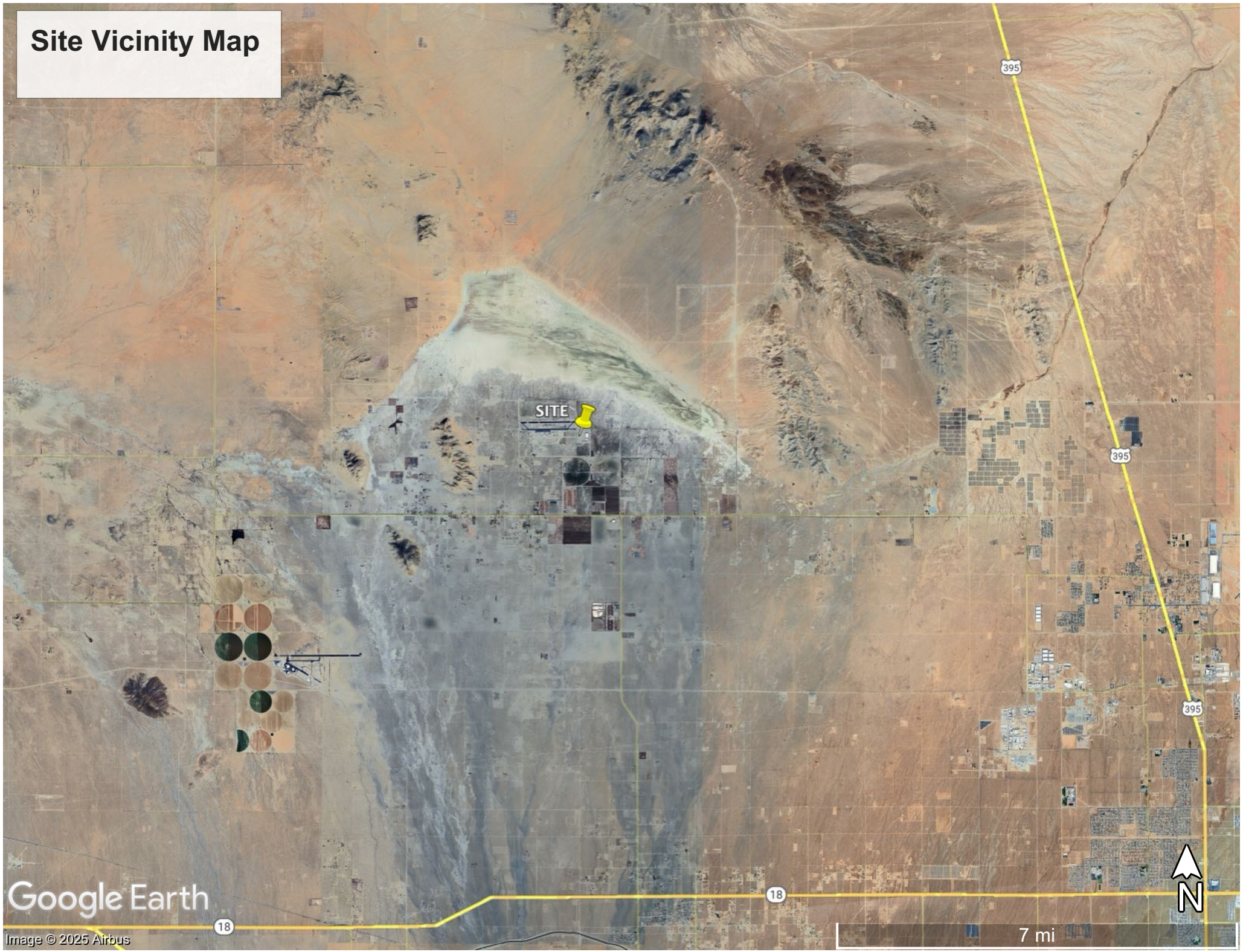
For your reference, a copy of the E.H.S publication, "Taking Care of Your Septic System," has been included as an attachment to this report (Appendix F).

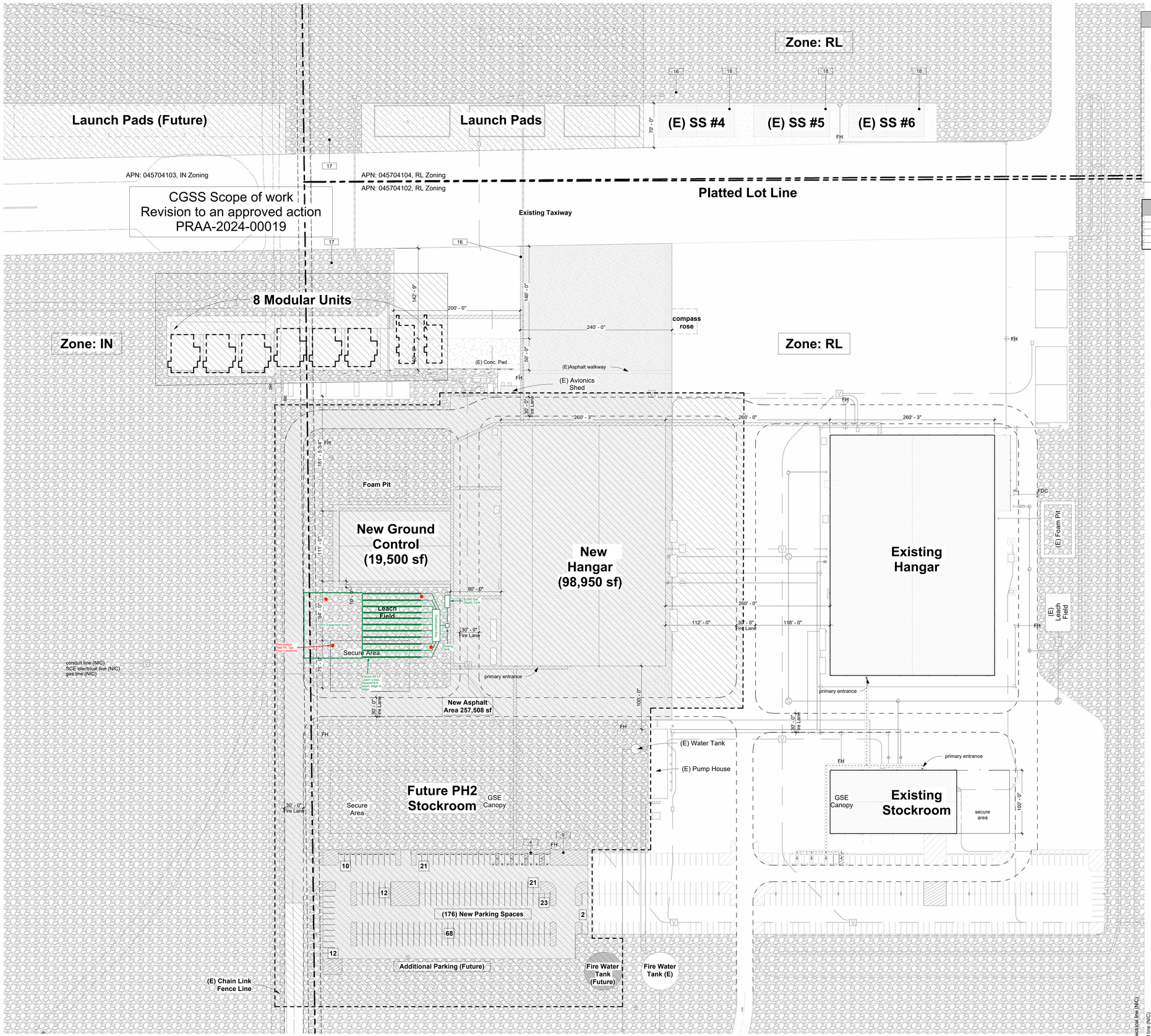
We appreciate the opportunity to be of service to you. Should you have any questions or need further assistance, please do not hesitate to contact this office.

APPENDIX A

Figure 1: Site Vicinity Map
Figure 2: Complete Project Site Plan / Plot Plan

Site Vicinity Map





1 **Site Plan - GCS**
1" = 60'-0"

Site Plan Legend

- Property Line
- Property Setback Line
- Scope of Work
- Landscape Area - Reference landscape drawings
- French Drain/ Riprap stone
- Accessible Path of Travel
- Accessible Parking (NIC)
- Keynote Tag
- New Asphalt Paving
- Existing Chainlink Fence
- FH — Fire Hydrant
- E — Existing Building / Equipment

Site Plan Keynotes

4	Unloading zone
9	Paint stripe for accessible pedestrian walk
16	
17	
18	

Parking Tabulation

Parking Spaces (Existing)

Total Parking Spaces Required (Hangar):	193 spaces
Total Parking Spaces Required (Stockroom):	25 spaces
Total Parking Spaces Required:	218 spaces
Total Parking Spaces Existing:	299 spaces

Parking Spaces (New)

Total Parking Spaces Required (Hangar):	74 spaces
Total Parking Spaces Required (Ground Control):	+ 80 spaces
Total Parking Spaces Required (Modular):	+ 49 spaces
Total Parking Spaces Required (Stockroom): Future	+ 20 spaces
Total Parking Spaces Required:	223 spaces
Total Spaces Existing (extra from previous project):	-81 spaces
Total Parking Spaces Provided (new):	**142 spaces**

(San Bernardino County Development Code - Table 83-15 - Parking Ratios)

Accessible Space Requirements (2022 CBC - Table 11B-208.2)

Total Parking Spaces Provided:	142 spaces
Minimum Accessible Parking Spaces Required:	5 spaces
Total Accessible Parking Spaces Provided:	**Min. 7 spaces** -including 2 Van spaces (2022 CBC - 11B-208.2.4)

Designated Parking for Clean Air Vehicles (2022 CGBSC - A5.106.5.1)

Total Parking Spaces Provided:	142 spaces
Minimum Spaces Required (8% of total):	12 spaces

Designated Parking for EV Charging (2022 CGBSC - Table A5.106.5.3.1 Tier1)

Total Parking Spaces Provided:	142 spaces
Minimum # of EV Capable Spaces Required: (Future Ready)	12 spaces

Clean Air Vehicle Parking

Total spaces designated for Clean Air:	0 spaces
Total spaces designated for Car / Van Pool:	12 spaces
Total Spaces Provided (Clean Air/ Van Pool/ EV):	**12 spaces**

CONSTRUCTION • ARCHITECTURE

PARKWAY
Parkway C&A, LP
1000 Civic Circle Lewisville, TX 75067
pkwycon.com (972) 221-1979

Project Manager: Contact: Raymond A. Morgan 214-111-1111

Architect: Contact: Matt Hodeaux (469) 933-8852

GENERAL ATOMICS

GA - Desert Horizons II

73 El Mirage Airport Road.
Adelanto, CA 92301

Owner:
General Atomics & Affiliated Co.
73 El Mirage Airport Road
Adelanto, CA 92301
Contact: Loren Kagan
Phone: 858.226.0567

Architect:
Parkway C&A
1000 Civic Circle
Lewisville, TX 75057

MEP Engineer:
CESO, Inc.
6550 Sprint Parkway, Suite 200
Overland Park, KS 66211
Contact: Joe Hillebrenner, PE.
Phone: 937.435.8584

Structural Engineer:
Wright Engineers
2 Venture, Suite 200
Irvine, CA 2618
Contact: Scott Jones
Phone: 949.477.4001

Fire Protection Engineer

Civil Engineer

NOT FOR REGULATORY APPROVAL, PERMITTING OR CONSTRUCTION.
Architect: Matt Hodeaux

No.	Description	Date
SD	Schematic Design	02/28/25
C	Model / Programing Dsgn. Review	01/10/25
B	Programing Review	12/17/24
A	Pre-Development Review	11/14/24

Drawn by: RAM
Checked by: MBH
Project Number: 04-240134

Complete Project Site Plan

SD1.01

APPENDIX B

Laboratory Testing

Particle-Size Analysis of Soil

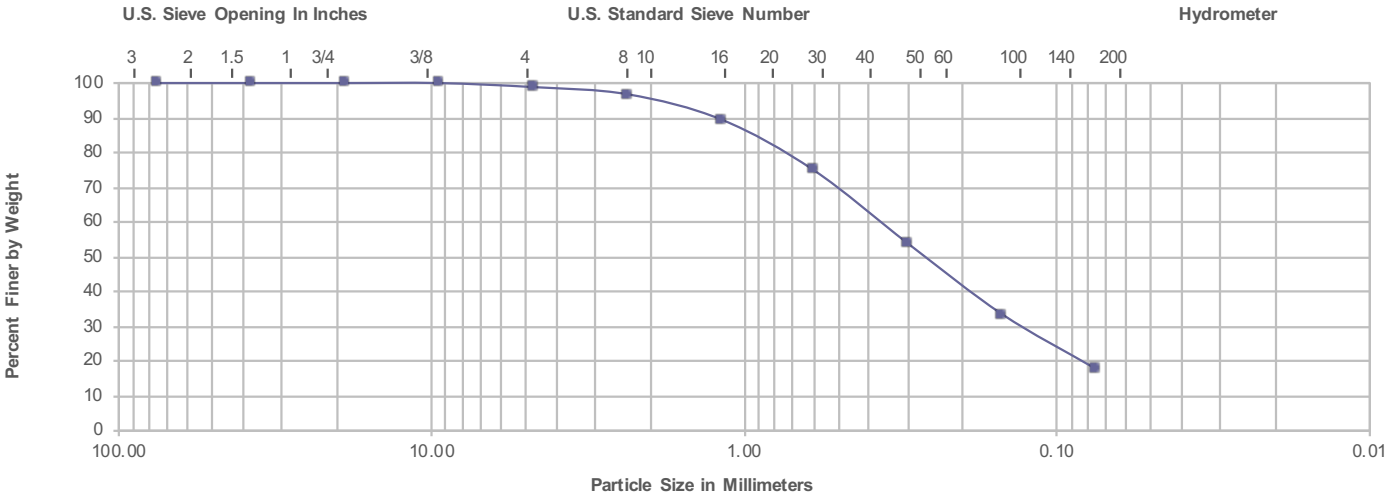
D422, D1140, D2487

Project Number:	24185P1
Project Title:	Desert Horizons II, General Atomics
Project Location:	El Mirage, CA
Client:	Parkway Construction

Report Date:	
Sheet:	1 of 1
Appendix:	
Permit No:	
Client Project No:	
Other:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Sample ID: JDA02202535 **Gravel** (%): 1.2% **Sand** (%): 81.1% **Fines** (%): 17.8%

Classification, ASTM D2487: (SM) Silty sand
Sample Origin: Perc Test Hole 4 at 0' to 4'
Laboratory Remarks:



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	SE
NA	NA	1.1%	5.382	0.373	0.128	0.000	ND	ND	ND	ND	ND	ND

Method / Procudure Used: D422, D1140
Size of Initial Dry Mass (g): 303.4
Determination of Dry Mass: D2216
Particles; Shape, Hardness: ND
Dispersion Device/Period: Manual/2 hr
Type & Amount of Agent: Defloc. & 1.0
Laboratory Comments:

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.

cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

MerrellJohnson. engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Particle-Size Analysis of Soil

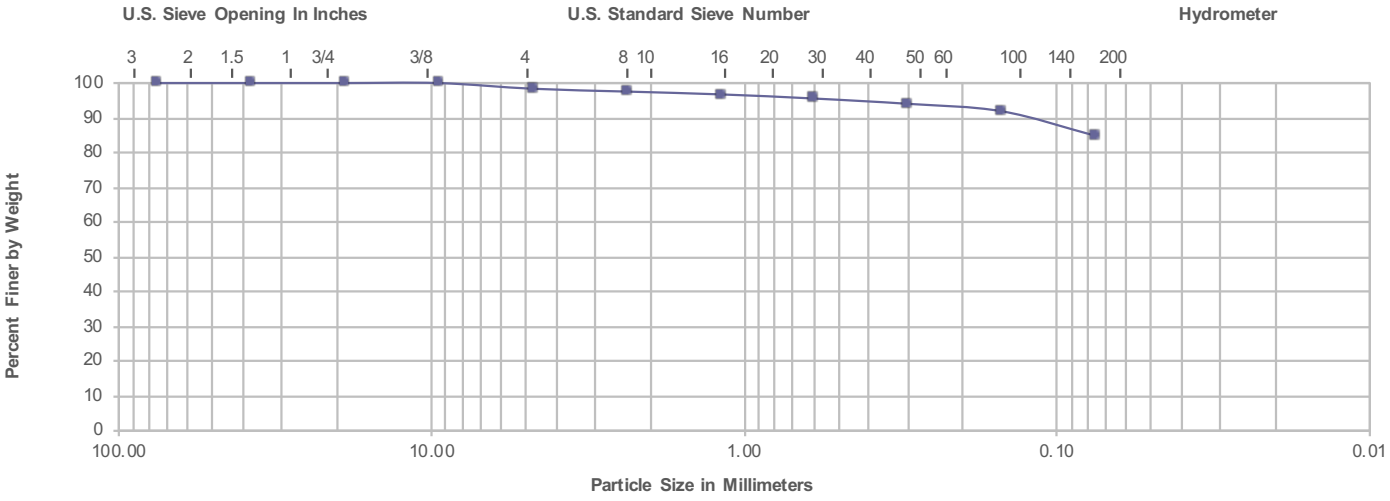
D422, D1140, D2487

Report Date:
Sheet: 1 of 1
Appendix:
Permit No:
Client Project No:
Other:
DSA File No:
DSA Application No:
DSA LEA No:

Project Number: 24185P1
Project Title: Desert Horizons II, General Atomics
Project Location: El Mirage, CA
Client: Parkway Construction

Sample ID: JDA02202505 **Gravel** (%): 1.6% **Sand** (%): 13.6% **Fines** (%): 84.8%

Classification, ASTM D2487: (CLML) Silty clay
Sample Origin: Boring One at 10'
Laboratory Remarks:



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	SE
NA	NA	13.6%	14.250	0.000	0.000	0.000	ND	ND	ND	ND	ND	ND

Method / Procudure Used: D422, D1140
Size of Initial Dry Mass (g): 366.6
Determination of Dry Mass: D2216
Particles; Shape, Hardness: ND
Dispersion Device/Period: Manual/2 hr
Type & Amount of Agent: Defloc. & 1.0
Laboratory Comments:

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.
cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

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APPENDIX C

Percolation Test Results

Percolation Test Data Sheet

Report Date:	2/21/25
Sheet:	1 of 2
Appendix:	C
Permit No.:	
Client Project No.:	
Other:	
USA Ticket No.:	

Project Number:	24185P1
Project Title:	Desert Horizons II, General Atomics
Project Location:	El Mirage, CA
Client:	Park Way Construction

Tested By:	James Albornoz
Test Hole No:	P-1
Diameter:	8"
Depth of Test Hole:	48"
USCS Classification:	SM
Comments:	

☑ Rapid Reading ☐ Slow Readings

Trial No.	Start Time	Stop Time	Time Interval (Min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 5"? (Y/N)
1	8:10	8:40	30	30.6	48	17.40	Y
2							

☐ Continuous Pre-Soak

Start Time	Stop Time	Time Interval (Min.)	Volume of Water

Trial No.	Start Time	Stop Time	Time Interval (min./sec.)		Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Percolation Rate (min./in.)
1	8:55	9:00	4	4	6.00	7.00	1.00	4.07
2	9:01	9:03	2	6	6.00	7.00	1.00	2.10
3	9:05	9:10	5	8	6.00	9.00	3.00	1.71
4	9:11	9:17	6	33	6.00	9.00	3.00	2.18
5	9:18	9:21	2	40	6.00	7.00	1.00	2.67
6	9:22	9:30	8	21	6.00	9.00	3.00	2.78
7								
8								

Tested By:	James Albornoz
Test Hole No:	P-2
Diameter:	8"
Depth of Test Hole:	48"
USCS Classification:	SM
Comments:	

☑ Rapid Reading ☐ Slow Readings

Trial No.	Start Time	Stop Time	Time Interval (Min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 5"? (Y/N)
1	8:15	8:45	30	37.8	48	10.20	Y
2							

☐ Continuous Pre-Soak

Start Time	Stop Time	Time Interval (Min.)	Volume of Water

Trial No.	Start Time	Stop Time	Time Interval (min./sec.)		Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Percolation Rate (min./in.)
1	9:35	9:40	5	5	6.00	9.00	3.00	1.69
2	9:40	9:45	4	52	6.00	7.00	1.00	4.87
3	9:46	9:51	5	27	6.00	7.00	1.00	5.45
4	9:51	10:02	11	38	6.00	8.00	2.00	5.82
5	10:02	10:08	6	23	6.00	7.00	1.00	6.38
6	10:08	10:15	6	30	6.00	7.00	1.00	6.50
7								
8								

Percolation Test Data Sheet

Report Date:	2/21/25
Sheet:	2 of 2
Apendix:	C
Permit No.:	
Client Project No.:	
Other:	
USA Ticket No.:	

Project Number:	24185P1
Project Title:	Desert Horizons II, General Atomics
Project Location:	El Mirage, CA
Client:	Parkway Construction

Tested By:	James Albornoz
Test Hole No:	P-3
Diameter:	8"
Depth of Test Hole:	48"
USCS Classification:	SM

Comments:

☑ Rapid Reading ☐ Slow Readings

Trial No.	Start Time	Stop Time	Time Interval (Min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 5"? (Y/N)
1	10:15	10:45	30	35.4	48	12.60	Y
2							

☐ Continuous Pre-Soak

Start Time	Stop Time	Time Interval (Min.)	Volume of Water

Trial No.	Start Time	Stop Time	Time Interval (min./sec.)		Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Percolation Rate (min./in.)
1	10:50	10:56	5	43	6.00	7.00	1.00	5.72
2	10:56	10:59	2	36	6.00	7.00	1.00	2.60
3	10:59	11:02	2	48	6.00	7.00	1.00	2.80
4	11:02	11:04	3	3	6.00	7.00	1.00	3.05
5	11:04	11:08	3	37	6.00	7.00	1.00	3.62
6	11:09	11:12	3	48	6.00	7.00	1.00	3.80
7								
8								

Tested By:	James Albornoz
Test Hole No:	P-4
Diameter:	8"
Depth of Test Hole:	48"
USCS Classification:	SM

Comments:

☑ Rapid Reading ☐ Slow Readings

Trial No.	Start Time	Stop Time	Time Interval (Min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 5"? (Y/N)
1	10:20	10:50	30	36	48	12.00	Y
2							

☐ Continuous Pre-Soak

Start Time	Stop Time	Time Interval (Min.)	Volume of Water

Trial No.	Start Time	Stop Time	Time Interval (min./sec.)		Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Percolation Rate (min./in.)
1	11:15	11:17	2	3	6.00	7.00	1.00	2.05
2	11:17	11:19	2	18	6.00	7.00	1.00	2.30
3	11:20	11:23	2	24	6.00	7.00	1.00	2.40
4	11:23	11:26	2	45	6.00	7.00	1.00	2.75
5	11:28	11:31	3	6	6.00	7.00	1.00	3.10
6	11:32	11:36	3	42	6.00	7.00	1.00	3.70
7								
8								

APPENDIX D

Exploratory Log, 50-foot boring

Exploratory Log

ASTM D5434, D1452, D1586, D1587, D2488 (USCS), D3550

Report Date:	02/20/25
Sheet:	1 of 2
Appendix:	B
Permit No:	
Client Project No:	
USA Ticket No:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Project Number:	24185P1
Project Title:	Desert Horizons II, General Atomics
Project Location:	El Mirage, CA
Client:	Parkway Construction

Location No:	B1 (Hangar)	**Start Date/Time:**	02/21/25 0750	**End Date/Time:**	2/21/25 0915

Conducted By:	J. Albornoz	**Excavation Type:**	Auger Hole	**Elevation:**	2855
Operator:	C. Hartman	**Dimensions:**	8" x 50'	**Groundwater:**	43'
Equipment Type:	CME-75-HSA	**Advance Assist:**	None	**Recent Weather:**	Clear
Drive Weight (lb)**:**	140	**Field Tests:**	D3550	**Sampler Insertion:**	Driven
Drive Drop (in)**:**	30	**Shoring Type:**	None	**Preservation:**	D4220

Depth (ft)	'N' Value	Sample (1)	Moisture (%)	Density (pcf)	Class (USCS)	Graphic	Description / Comments	Lab Tests (2)
0					SM		Light Brown, Dry, Medium Dense, Silty Sand	
	10, 14, 15		1.5	103.2			Bulk Sample at 0' to 5' - JDA02202501	SA, MD, EI, CR
							Tube at 1' - JDA02202502	TD
	6,9,14		1.0	89.3			Tube at 3' - JDA02202503	TD
							Grayish Brown, Dry, Medium Dense, Poorly Graded Sand with Silt	
5	11,14, 32		7.9	107.7	CLML		Tube at 5' - JDA02202504 Grayish Brown, Moist, Hard, Silty Clay with Sand	TD, SA
10	14,22, 26		12.9	100.2			Tube at 10' - JDA02202505 Grayish Brown, Moist, Hard, Silty Clay	SA
15	15,17, 17						Tube at 15' - JDA02202506	CN, TD
20	10,16, 19						Tube at 20' - JDA02202507	
25	3,6,6						SPT at 25' - JDA02202508 Stiff	SA

Comments: "N" Value based on 2.5" diameter modified California Tube Sampler (ASTM D3550) or SPT (ASTM D1586) as noted on log. Some boulder/rock encountered during drilling operations. Partial caving of hole observed.

(1) =Bulk, =Driven

(2) **DS** =Direct Shear, **EI** =Expansion Index, **SA** =Sieve Analysis, **CR** =Corrosion, **MD** =Max Density, **RV** =R-Value, **AL** =Atterberg Limits, **SE** =Sand Equivalent, **CN** =Consolidation, **TD** =Tube Density

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Exploratory Log

ASTM D5434, D1452, D1586, D1587, D2488 (USCS), D3550

Report Date:	02/20/25
Sheet:	2 of 2
Appendix:	B
Permit No:	
Client Project No:	
USA Ticket No:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Project Number:	24185P1
Project Title:	Desert Horizons II, General Atomics
Project Location:	El Mirage, CA
Client:	Parkway Construction

Location No:	B1 (Cont.)	**Start Date/Time:**	2/21/25 0750	**End Date/Time:**	2/21/25 0915

Conducted By:	J. Albornoz	**Excavation Type:**	Auger Hole	**Elevation:**	2855
Operator:	C. Hartman	**Dimensions:**	8" x 50'	**Groundwater:**	43'
Equipment Type:	CME-75-HSA	**Advance Assist:**	None	**Recent Weather:**	Clear
Drive Weight (lb)**:**	140	**Field Tests:**	D3550	**Sampler Insertion:**	Driven
Drive Drop (in)**:**	30	**Shoring Type:**	None	**Preservation:**	D4220

Depth (ft)	'N' Value	Sample (1)	Moisture (%)	Density (pcf)	Class (USCS)	Graphic	Description / Comments	Lab Tests (2)
30	4,8,8				CLML		SPT at 30' Dark Brown, Moist, Very Stiff, Silty Clay with Sand	
35	3,4,7						SPT at 35' Stiff	
40	4,7,11	■			CH		SPT at 40' - JDA02202509 Dark Brown, Moist, Very Stiff, Fat Clay Groundwater encountered at 43'	SA, PI
45	6,11, 13						SPT at 45'	
50	3,4,7						SPT at 50' Stiff *Drilling Terminated at Approximately 50'*	

Comments: "N" Value based on 2.5" diameter modified California Tube Sampler (ASTM D3550) or SPT (ASTM D1586) as noted on log. Some boulder/rock encountered during drilling operations. Partial caving of hole observed.

(1) ▒ =Bulk ■ =Driven

(2) **DS** =Direct Shear **EI** =Expansion Index **SA** =Sieve Analysis **CR** =Corrosion **MD** =Max Density **RV** =R-Value **AL** =Atterberg Limits **SE** =Sand Equivalent **CN** =Consolidation **TD** =Tube Density

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APPENDIX E

Minimum Setbacks and Location of Septic System, including distribution box, and leach line cross sections

Department of Public Health
Division of Environmental Health Services

www.SBCounty.gov
www.sbcounty.gov/dph/dehs
800-442-2283

Minimum Setback and Location of Septic System

LOCATION OF SEWAGE DISPOSAL SYSTEM

Minimum Horizontal Distance in Clear Required From:	Bldg. Sewer	Septic Tank	Disposal Field	Seepage Pit or Cesspool
Buildings or Structures	2 ft.	5 ft.	8 ft.	8 ft.
Property line adjoining private property	Clear	5 ft.	5 ft.	8 ft.
Water supply wells	50 ft.	100 ft.	100 ft.	150 ft.
Streams and lakes	50 ft.			to 200 ft.
Large trees	-	10 ft.	-	10 ft.
Seepage pits or cesspools	-	5 ft.	5 ft.	12 ft.
Disposal field	-	5 ft.	4 ft.	5 ft.
Domestic water line	1 ft.	5 ft.	5 ft.	5 ft.
Distribution box	-	-	5 ft.	5 ft.

* By Ordinance 2521

NOTES: When disposal fields and/or seepage pits are installed in sloping ground, the minimum horizontal distance between any part of the leaching system and ground surface shall be fifteen (15) feet.

1. Including porches and steps whether covered or uncovered, breezeways, roofed porte-cocheres, roofed patios, car ports, covered walks, covered driveways and similar structures or appurtenances.
2. All non-metallic drainage piping shall clear domestic water supply wells by at least fifty (50) feet. This distance may be reduced to not less than twenty-five (25) feet when approved type metallic piping is installed. Where special hazards are involved, the distance required shall be increased, as may be directed by the Health Officer or the Administrative Authority.

GENERAL INFORMATION ON SEPTIC TANKS

Septic tanks should be cleaned before too much sludge or scum is allowed to accumulate. If either the sludge or scum approaches too closely to the bottom of the outlet device, particles will be scoured into the disposal field and will clog the system. Eventually, when this happens, liquid may break through to the ground surface, and the sewage may back up in the plumbing fixtures. When a disposal field is clogged in this manner, it is not only necessary to clean the tank, but it also may be necessary to construct a new disposal field.

There are no formulas which determine how often septic tanks should be cleaned. Many have gone as long as ten years without requiring cleaning, even when servicing a garbage disposal. Others have had to cleaned within a year. As a general rule, tanks should be inspected yearly to determine whether or not cleaning is required. There are firms which specialize in cleaning septic tanks.

The life of an absorption field will be drastically shortened if the septic tank is not operating properly. Every time that sewage which has not been properly treated in the septic tank is discharged into the field, it causes the layer of impervious material to build up with alarming rapidity. This over-all condition can be caused by an undersized tank, a one in need of cleaning.

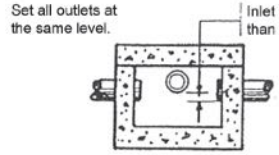
According to the U. S. Public Health Service, there are more than 1,200 additives on the market, which are claimed to aid the function of a septic system in one manner or another. As far as is known, none has proved an advantage in properly controlled tests.

Normal household waste, including that from the laundry, bath, and kitchen, should pass into a single system.

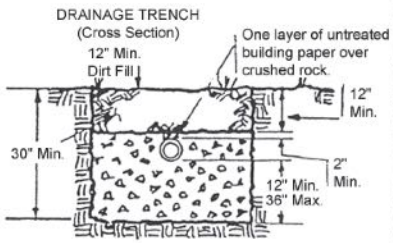
Toilet-paper substitutes should not be flushed into a septic tank. Paper towels, newspaper, wrapping paper, rags, and sticks may not decompose in the tank, and are likely to lead to clogging of the plumbing and disposal system.

Soil conditions in some areas are unsuitable for septic tank system, particularly in the mountain areas. Percolation tests determine the acceptability of the soil and the size and design of the subsurface disposal system.

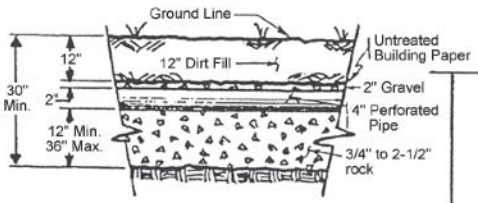
DISTRIBUTION BOX



DRAINAGE TRENCH (Cross Section)



DRAINAGE TRENCH (Longitudinal Section)



NOTE A:
Add two (2) feet to this dimension for each additional foot of gravel below the twelve (12) inch gravel bed in trench.

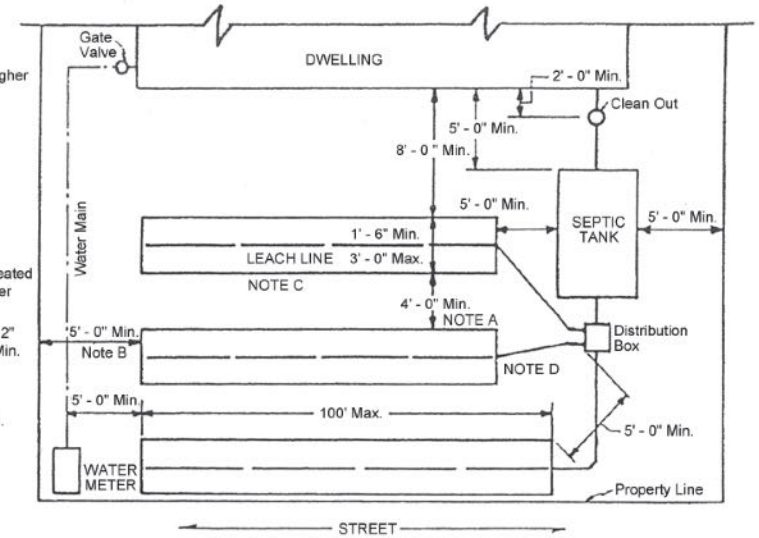
NOTE B:
Where no water main exists, the leach line or seepage pit may be located a minimum of five (5) feet from side property line.

NOTE C:
Leach line must contain at least one hundred and fifty (150) square feet of trench bottom. There must be sufficient yard space to increase the leach line by one hundred (100) percent.

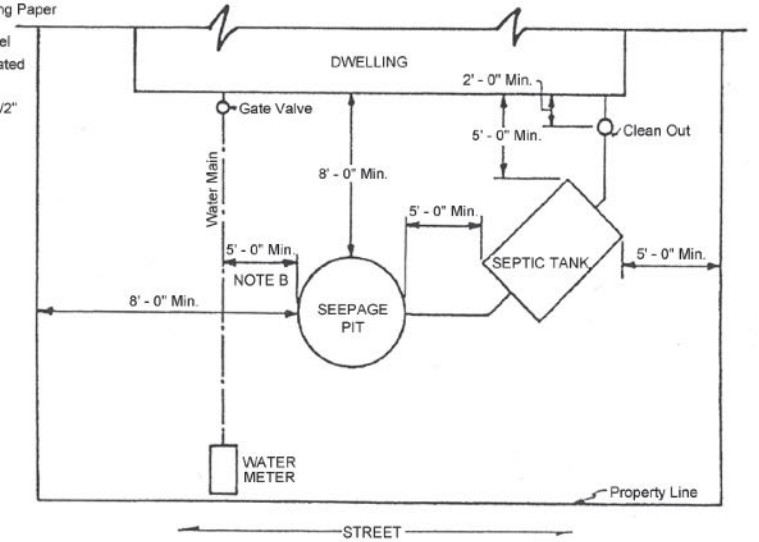
NOTE D:
These lines from the distribution box to the leach line area shall be water - tight lines.

SEPTIC TANK SIZE	
BEDROOMS	GALLONS
1 or 2	750
3	1,000
4	1,200
5 or 6	1,500

LEACH LINE SYSTEM



SEEPAGE PIT SYSTEM



APPENDIX F

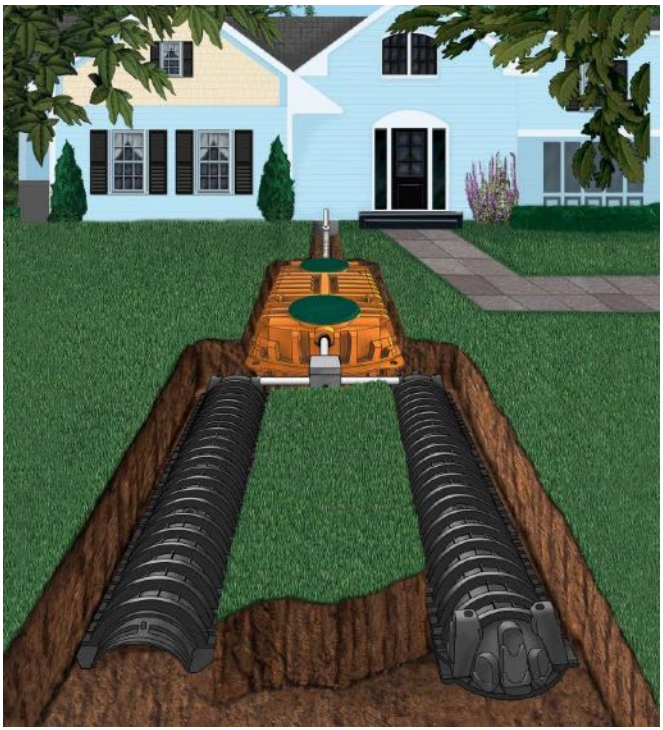
Taking Care of Your Septic System

SAN BERNARDINO COUNTY

www.SBCounty.gov

TAKING CARE OF YOUR SEPTIC SYSTEM

WHAT YOU NEED TO KNOW



DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH SERVICES

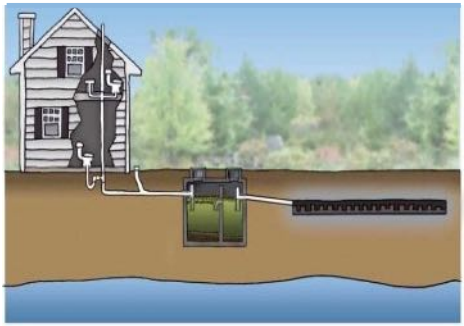
385 N Arrowhead Ave., 2nd Floor
San Bernardino, CA 92415
1-800-442-2283

TABLE OF CONTENTS

Reading this brochure could save you a lot of money, time, and trouble. By learning how to take care of your septic system, you can protect your family's health and the value of your home. You can also protect the environment, including your drinking water, from contamination caused by your septic system.

What Is A Septic System?

A septic system is made up of a septic tank and a leachline or seepage pit (dispersal soil absorption area) buried in the ground near your home. This system treats wastewater and sewage from your toilets, showers, washing machines, garbage disposals, kitchens, etc., where public sewer systems are not available.



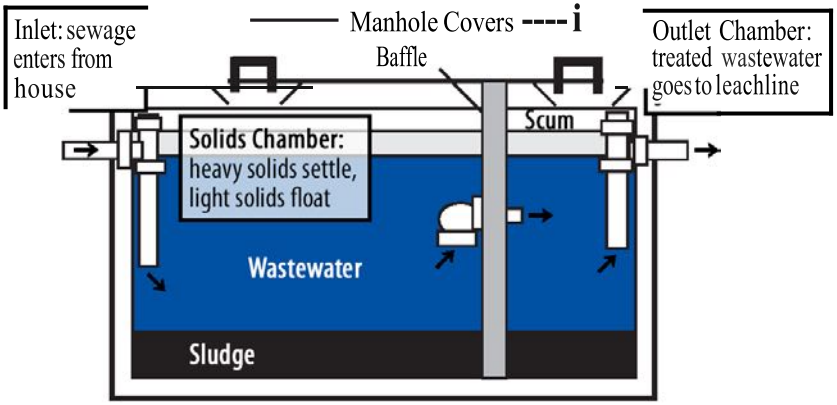
The septic tank is a concrete, fiberglass, Polyethylene or steel box about nine feet long and five feet deep and wide. The tank is usually buried about five feet from the house under one to three feet of soil. The leachline is a gravel-filled underground trench, whereas a seepage pit is a vertical hole in the ground with a concrete block lid and walls that are covered with soil. The pit measures 4-6 feet in diameter and 15-40 feet deep.

What Does A Septic System Do?

A septic tank has three main functions: 1) to remove and treat greases and solids in the wastewater; 2) to store greases and solids until they are removed by a professional septic tank pumper; and 3) to slowly release wastewater to a dispersal system so it can be absorbed by the soil.

Wastewater from your home flows into a two-chamber septic tank. In the first solids chamber, greases and light solids in the water rise to the surface of the liquid, forming a scum layer, while heavier materials sink to the bottom and form a sludge layer. Anaerobic bacteria digest (break down) solids in the sludge layer to reduce sludge buildup. The third layer is the clarified wastewater which flows to the second liquids chamber where further settling occurs.

Typical Concrete Septic Tank



The treated wastewater flows from the liquid chamber to the dispersal soil absorption area, where it seeps down into the soil. Bacteria trapped in the soils continue treating the wastewater. Every time raw sewage flows into the tank, an equal amount of treated wastewater flows out.

What Could *Go* Wrong?

Septic Tank Failure

Ignoring your septic system could cost you thousands of dollars for repair or replacement. If your tank is not pumped regularly, scum and sludge will fill up the tank, overflow into the dispersal

area and plug up the soil. This causes the leachline to fail and the wastewater to rise to the surface of the ground. Failure of a leachline means a new leachline or seepage pit must be constructed with a permit from the County or City Building and Safety Department.

Other factors can also cause septic system failure. Wasting water, or even too many people living in the house, can cause a septic system to fail. Your septic system was designed according to the number of bedrooms in the home with an average of two people per bedroom. Because the soil can only absorb a limited amount of water, conserving water can help you stay under the daily limit.

This chart shows how much wastewater your tank can process in a 24-hour period:

Bedrooms	Estimated Gallons of Wastewater per Day	Septic Tank Capacity in Gallons
1-2	500	750
3	670	1000
4	800	1200
5-6	1000	1500

Water draining into the leachline from gutters, or even heavy rains, can overload the system and cause it to fail.

Health Hazard

Failure of a septic system is a serious health hazard and could threaten the health of your family and neighbors. Children and adults could come in contact with raw (untreated) sewage. Pets, insects, rodents, and birds could pick up and carry disease causing organisms to you and your family. Furthermore, it usually stinks.

Water Contamination

The first sign of failure is sewage where you don't want it, such as:

- Sewage running into the tub when you flush the toilet
- Sewage rising to the surface of the ground above the leachline, especially after storms
- Slow draining toilets/drains or toilets that won't flush
- Gurgling sounds in pipes and drains
- Mushy ground or lush, green grass near septic system area
- Strong sewage odors and possible complaints from your neighbors

What Can I Do? Important Ways to Keep Your Septic System Running Well

Do **have your tank pumped by a County-licensed septic tank pumper every two to four years.** Have both compartments pumped. To see if your tank needs to be pumped, remove the manhole cover at the inlet end (the end closest to the house). Use a shovel to push the scum layer away from the side of the tank to estimate its thickness. If the scum layer is more than one foot thick, have your tank pumped immediately! Replace the manhole cover and wash your hands and shovel. Yearly inspection of the septic tank is strongly recommended. Check your phone book yellow pages for a licensed Septic Tank Pumper. If your tank does not have risers to grade, install them over both chambers.

Do **keep a record of all pumpings, inspections, installations and other maintenance.** Keep this brochure and use the back page to record this information. This record should remain in the

house, even if you move. If you buy a house with a septic system, make sure you get a record and layout from the owner. They are responsible for keeping the records.

Do **call your City or County Building and Safety Department if your system fails within five years of the installation date.** This could mean your system was not designed, constructed or installed properly. DEHS does not have final plans on what was installed.

Do **find out where your septic tank and leachline are.** Your licensed pumper can help you draw a sketch of the septic system layout, including the location of the manholes, tank, piping and leachline. Remember, pumping your tank or installing a new leachline will cost more if the pumpers or contractors have to dig and search for the tank or leachline. Also, install an effluent filter on the outlet line to prevent solids from plugging the soil.

Do **conserve water.** Repair dripping faucets and leaking toilets. Avoid taking long showers and use water saving toilets, shower heads and faucets. Don't leave faucets running for long periods of time. Use your dishwasher or clothes washer only when the machine has a full load. Using your garbage disposal will also fill up your septic tank much faster.

Do **use bleach, disinfectants, and drain/toilet bowl cleaners sparingly and according to labels.** Take your leftover household hazardous chemicals to a Household Hazardous Waste Collection Center. For more information on household hazardous waste disposal call (909) 382-5401.

Do **reserve additional land equal to or larger than your present septic system area for future use.** This is needed when the original system fails. Do not build over the existing system or expansion area.

Tips to Avoid Trouble

Do Not **wait until your septic system fails to have your tank pumped.** It is cheaper and easier to prevent system failure than to correct a failed system or to install a new system. Remember, once the leachline is clogged, cleaning the tank will do little good. You will need a new leaching area.

Do Not **waste money on chemical, yeast, bacteria or enzyme additives.** These products have been evaluated by the EPA and it has been determined that they usually don't prevent problems. These products could hurt your system in the long run, or even contaminate groundwater. Only regular tank pumpings by professional licensed septic tank pumpers can help.

Do Not **destroy an old, failed leachline.** It may be used again by letting the old leachline dry out, or rest, for three to five years. DEHS recommends installing a diversion valve when your new leachline is built to change the flow of wastewater from the new line to the old line. After the three to five year waiting period, you can release the wastewater to the new line on even-numbered years and to the old line on odd-numbered years. If you let a leaching area rest every other year and have your septic tank pumped regularly, the leachline(s) should last the life of your home or building.

Do Not **allow anyone to drive, park or pave over any part of the system.** Traffic vibration or heavy weight could damage pipes and your seepage pits. The area over the leachline should be left undisturbed with only a mowed grass cover. Keep trees and shrubs away from your septic system area. Their roots could clog or damage your leachline(s).

Do Not **use your toilet and sink as a trash can to dump non- degradable (things that do not dissolve).** Keep things like vegetable trimmings, cooking oils, greases, coffee grounds, cigarette butts, Kleenex, paper towels, disposable diapers, and sanitary pads out of your septic tank. Use good quality white toilet paper that breaks up easily when wet. Dyes from colored toilet paper can hurt the bacteria.

Do Not **contaminate the groundwater or harm your septic system by pouring harmful chemicals down the drain or toilet.** Large amounts of cleaning products can kill the good bacteria in your septic tank that treat wastewater. Read the instructions on the labels and use only as directed.

KEEP THESE MATERIALS OUT OF YOUR SEPTIC SYSTEMS!

Non-degradable: grease, paper towels, plastics, coffee grounds, cigarette butts, disposable diapers, etc.

Hazardous Waste: paints and paint thinners, used motor oil, pesticides, antifreeze, weed killers, etc.

WHERE IS MY SEPTIC SYSTEM?

One method to locate a septic tank is by probing with a metal rod or by listening to the noise a plumber's snake makes when it contacts the tank inlet. Care must be utilized during the probing as it may damage the inlet fitting or piping.

Another method is by making a water probe with *W"* X 6' galvanized water pipe or PVC, threaded on one end. Purchase a pipe-to-hose fitting or use duct tape as a temporary fitting. Turn the water on and sink the probe into the ground. The water will do the digging. Set up a grid pattern and probe every 1 to 2 feet until the tank is found. The top of the septic tank is usually 2 to 4 feet beneath the surface. Legally, septic tanks can be no closer than 5 feet from the house so begin probing 6 to 7 feet from the house. Typically, the septic tank is in the front yard but the system might be in the rear yard or even under a patio slab.

SAVE THESE IMPORTANT SEPTIC SYSTEM RECORDS!

SEPTIC TANK ADDRESS:

SEPTIC TANK
Installation Date/Size (gallons)

CONTRACTOR
Name/Phone Number

SEPTIC TANK/SEEPAGE PIT PUMPING

LEACHLINES/SEEPAGE PIT
Installation Dates/Length, Width, Depth of Rock

Department of Public Health | Division of Environmental Health Services | 800-442-2283 | www.SBCounty.gov/dph/dehs

MERRELL JOHNSON

12277 Apple Valley Rd. #291, Apple Valley, CA 92308
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