



NC DEPARTMENT OF
**HEALTH AND
HUMAN SERVICES**

ROY COOPER • Governor

KODY H. KINSLEY • Secretary

MARK BENTON • Deputy Secretary for Health

SUSAN KANSAGRA • Assistant Secretary for Public Health

Division of Public Health

Application for Services

This application, in conjunction with the common form established in G.S. 130A-335(a3) and (a5), is optional for local health departments to be used for applications submitted in accordance with G.S. 130A-335(a2), (a3), and (a5).

[hereinafter, G.S. 130A-335(a3) and (a5) permits referred to as (a2) Improvement Permit and (a2) Construction Authorization]

Applying for:

☒ (a2) Improvement Permit ☒ (a2) Construction Authorization ☐ (a2) Repair/Construction Authorization

Please check one of the following:

☒ New Construction ☐ Expansion ☐ System Relocation ☐ Change of Use ☐ Repair

☒ 5 Year Expiration Requested (site plan provided)

☐ Non-Expiring Permit Requested (plat provided, as defined in G.S. 130A-334(7a))

Property Owner Name: Four W's Inc

Property Owner Mailing Address: PO Box 1254 Dunn, NC 28335

Property Owner Phone Number: 910-892-0436

Property Owner Email Address: _____

Applicant Name: Freedom Constructors Inc/Timothy Tart

Applicant Mailing Address: PO Box 608, Dunn, NC 28335

Applicant Phone Number: 910-892-1231

Applicant Email Address: ttart@freedom@outlook.com

Does the property include, or is subject to, any of the following:

- ☐ Yes ☒ No Previously identified jurisdictional wetlands
☐ Yes ☒ No Existing or proposed easements, rights-of-way, encroachments, or other areas subject to legal restrictions
☐ Yes ☒ No Approval by other public agencies

A site plan or plat is required, **OR** the site sketch submitted from the LSS/AOWE, must include the following:

- (A) existing and proposed facilities, structures, appurtenances, and wastewater systems
- (B) proposed wastewater system showing setbacks to property line(s) or other fixed reference point(s)
- (C) existing and proposed vehicular traffic areas
- (D) existing and proposed water supplies, wells, springs, and water lines; and
- (E) surface water, drainage features, and all existing and proposed artificial drainage, as applicable.

Requesting DHHS review: ☐ Yes ☒ No

I understand that the documentation and fees, as required in G.S. 130A-335(a2), (a3), (a5), and (a6), attached to this application are to be used to issue an Improvement Permit and/or Construction Authorization pursuant to G.S. 130A-335(a2), (a3), and (a5). I understand that authorized county and state officials are granted right of entry to the property indicated on this application to conduct necessary inspections to determine compliance with applicable laws and rules. I understand that if the information in the application for an Improvements Permit and/or Construction Authorization is falsified, changed, or the site is altered, then the Improvement Permit and Construction Authorization shall become invalid.

Applicant Signature: [Signature] Date: 10-15-2025

Owner's Signature: [Signature] Date: 10-15-2025

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES • DIVISION OF PUBLIC HEALTH

LOCATION: 5605 Six Forks Road, Building 3, Raleigh, NC 27609

MAILING ADDRESS: 1632 Mail Service Center, Raleigh, NC 27699-1632

www.ncdhhs.gov • TEL: 919-707-5854 • FAX: 919-845-3972

AN EQUAL OPPORTUNITY / AFFIRMATIVE ACTION EMPLOYER



NC DEPARTMENT OF
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HUMAN SERVICES**

ROY COOPER • Governor

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Division of Public Health

Submittal Includes: ☒ (a2) Improvement Permit ☒ (a2) Construction Authorization ☐ Fee \$ _____

IMPROVEMENT PERMIT FOR G.S. 130A-335(a2)

County: Harnett

PIN/Lot Identifier: 0665-30-7131

Issued To: Freedom Constructors Inc, PO Box 608 Dunn, NC 28335

Property Location: 35 Turnberry Court, Fuquay Varina, NC

Subdivision (if applicable) Legacy at Rawls Lot #: 12 Block: _____ Section: _____

LSS Report Provided: Yes ☒ No ☐

If yes, name and license number of LSS: John Kase #1323

New ☒

Expansion ☐

System Relocation ☐

Change of Use ☐

Facility Type: Single Family Residence

Number of bedrooms: 4 Number of Occupants: <8 Other: _____

Design Wastewater Strength: ☒ Domestic ☐ High Strength ☐ Industrial Process Wastewater

Proposed Design Daily Flow: 480 GPD Proposed LTAR (Initial): 0.325 Proposed LTAR (Repair): 0.3

Proposed Wastewater System Type*: Ille-Gravity to PPBPS 50% Reduction (Initial) Pump Required: ☒ Yes ☐ No ☐ May be required

Proposed Wastewater System Type*: Ille-Pump to PPBPS 50% Reduction (Repair) Pump Required: ☒ Yes ☐ No ☐ May be required

**Please include system classification for proposed wastewater system types in accordance with Rule .1301 Table XXXII*

Effluent Standard: ☒ DSE ☐ HSE ☐ NSF/ANSI 40 ☐ TS-I ☐ TS-II ☐ RCW

Saprolite System (Initial): ☐ Yes ☒ No Saprolite System (Repair): ☐ Yes ☒ No

Fill System (Initial): ☐ Yes ☒ No If yes, specify: ☐ New ☐ Existing (when adding more than 6 inches of fill to system area provide a fill plan)

Fill System (Repair): ☐ Yes ☒ No If yes, specify: ☐ New ☐ Existing (when adding more than 6 inches of fill to system area provide a fill plan)

Usable Depth to LC (Initial)*: 34" Usable Depth to LC (Repair)*: 18" (Saprolite) ** Limiting Condition*

Max. Trench Depth (Initial)*: 20" Max. Trench Depth (Repair)*: 18" ** Measured on the downhill side of the trench*

Artificial Drainage Required: ☐ Yes ☒ No If yes, please specify details: _____

Type of Water Supply: ☐ Private well ☐ Public well ☐ Shared well ☒ Municipal Supply ☐ Spring ☐ Other: _____

Drainfield location meets requirements of Rule .0508: Yes ☒ No ☐ Drainfield location meets requirements of Rule .0601: Yes ☒ No ☐

Permit valid for: ☒ Five years [site plan submitted pursuant to GS 130A-334(13a)] ☐ No expiration [plat submitted pursuant to GS 130A-334(7a)]

Permit conditions:

Install as per detail sheet and map. Do not disturb, compact, rut or cut any soil within the septic drainfield area. Ensure 6 inches approved fill cover is maintained over system after installation.

Ensure 6 inches approved fill cover is maintained over system after installation.

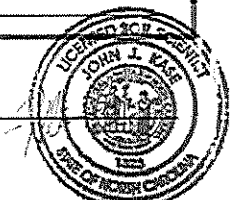
Each trench of initial system must have 12 panels with 4 inch spacing between panels.

Licensed Soil Scientist Print Name: John Kase

Licensed Soil Scientist Signature: _____ Date: 10/14/2025

The LSS evaluation is being submitted pursuant to and meets the requirements of G.S. 130A-335(a2).

See attached site sketch



This Section for Local Health Department Use Only

Initial submittal received: _____ by _____
Date Initials

G.S. 130A-335(a3) states the following:

When an applicant for an Improvement Permit submits to a local health department an Improvement Permit application, the permit fee charged by the local health department, the common form developed by the Department, and a soil evaluation pursuant to subsection (a2) of this section, the local health department shall, within five business days of receiving the application, conduct a completeness review of the submittal. A determination of completeness means that the Improvement Permit includes all of the required components. If the local health department determines that the Improvement Permit is incomplete, the local health department shall notify the applicant of the components needed to complete the Improvement Permit. The applicant may submit additional information to the local health department to cure the deficiencies in the Improvement Permit. The local health department shall make a final determination as to whether the Improvement Permit is complete within five business days after the local health department receives the additional information from the applicant. If the local health department fails to act within any period set out in this subsection, the applicant may treat the failure to act as a determination of completeness. The Department shall develop a common form for use as the Improvement Permit.

The review for completeness of this Improvement Permit was conducted in accordance with G.S. 130A-335(a3). This Improvement Permit is determined to be:

☐ Incomplete (If box is checked, information in this section is required.)

The following items are missing:

Copies of this were sent to the LSS and the Applicant on _____
Date

State Authorized Agent: _____ Date: _____

☐ Complete

State Authorized Agent: _____ Date: _____

This Improvement Permit is issued pursuant to G.S. 130A-335 (a2) and (a3) using the signed and sealed LSS/LG evaluation(s) attached here. The issuance of this permit in no way guarantees the issuance of other permits. The permit holder is responsible for checking with appropriate governing bodies in meeting their requirements. ***This permit is subject to revocation if the site plan, plat, or the intended use changes.*** The Improvement Permit shall not be affected by a change in ownership of the site. This permit is subject to compliance with the provisions of 15A NCAC 18E and to the conditions of this permit.

The Department, the Department's authorized agents, and the local health departments shall be discharged and released from any liabilities, duties, and responsibilities imposed by statute or in common law from any claim arising out of or attributed to evaluations, submittals, or actions from a licensed soil scientist or licensed geologist pursuant to GS 130A-335(a2).

Improvement Permit Expiration Date: _____

See attached site sketch



Re-submittal of Improvement Permit

LHD USE ONLY: This IP resubmittal received: _____ by _____
Date Initials

The following items are being resubmitted pursuant to G.S. 130A-335(a3) for issuance of the Improvement Permit:

I, _____ hereby attest that the information required to be included with this re-submittal
Licensed Soil Scientist (Print Name)
is accurate and complete to the best of my knowledge and that the proposed Improvement Permit meets all applicable federal, State, and local laws, regulations, rules, and ordinances.

Signature of Licensed Soil Scientist

Date

The section below is for Local Health Department use after submittal of items noted as missing above.

LHD Follow-up Completeness Review of Improvement Permit

The review for completeness of this Improvement Permit re-submittal was conducted in accordance with G.S. 130A-335(a3). This Improvement Permit is determined to be:

☐ Incomplete (If box is checked, information in this section is required.)

The following items are missing:

Copies of this were sent to the LSS and the Applicant on _____
Date

State Authorized Agent: _____

Date: _____

☐ Complete

State Authorized Agent: _____

Date: _____



Permit/File #: _____

CONSTRUCTION AUTHORIZATION FOR G.S. 130A-335(a2)County: HarnettPre-Construction Conference Required: Yes ☒ No ☐PIN/Lot Identifier: 0665-30-7131Issued To: Freedom Constructors Inc, PO Box 608 Dunn, NC 28335Property Location: 35 Turnberry Court, Fuquay Varina, NCAOWE/PE Plans/Evaluations Provided: Yes ☒ No ☐ If yes, name and license number of AOWE/PE: John Kase #10060EFacility Type: Single Family ResidenceNumber of bedrooms: 4 Number of Occupants: <8 Other: _____☒ New ☐ Expansion ☐ Repair ☐ System Relocation ☐ Change of UseBasement? ☐ Yes ☒ No Basement Fixtures? ☐ Yes ☒ NoCrawl Space? ☒ Yes ☐ No Slab Foundation? ☒ Yes ☐ NoType of Wastewater System* Ille-Gravity to PPBPS 50% Reduction System (Initial) Illbe-Pump to PPBPS 50% Reduction System (Repair)

*Please include system classification for proposed wastewater system types in accordance with Rule .1301 Table XXXII

Design Daily Flow: 480 GPD Wastewater Strength: ☒ Domestic ☐ High Strength ☐ Industrial Process WWSession Law 2014-120 Section 53, Engineering Design Utilizing Low-flow Fixtures and Low-flow Technologies? ☐ Yes ☒ No
(if yes, please provide engineering documentation)Effluent Standard: ☒ DSE ☐ HSE ☐ NSF/ANSI 40 ☐ TS-I ☐ TS-II ☐ RCWType of Water Supply: ☐ Private well ☐ Public well ☐ Shared well ☒ Municipal Supply ☐ Spring ☐ Other: _____**Installation Requirements/Conditions**Septic Tank Size: 1000 gallons Total Trench/Bed Length: 250 feet Trench/Bed Spacing: 9 feet on centerTrench/Bed Width: 36 inches LTAR: 0.325 gpd/ft² Usable Depth to LC (Initial)*: 33" *Limiting conditionSoil Cover: 6 inches Slope Corrected Maximum Trench/Bed Depth*: 20 inches *Measured on the downhill side of the trenchPump Tank Size (if applicable): NA gallons Requires more than 1 pump? ☐ Yes ☒ No

Pump Requirements: _____ ft. TDH vs. _____ GPM Grease Trap Size (if applicable): _____ gallons

Distribution Method: ☐ Serial ☒ D-Box or Parallel ☐ Pressure Manifold(s) ☐ LPP ☐ Other: _____Artificial Drainage Required: Yes ☐ No ☒ If yes, please specify details: _____**Legal Agreements** (If the answer is "Yes" to any type of legal agreements, please attach a copy of the agreement.)Multi-party Agreement Required [.0204(g)]: ☐ Yes ☒ No Declaration of Restrictive Covenants: ☐ Yes ☒ NoEasement, Right-of-Way, or Encroachment Agreement Required [.0301(b)]: ☐ Yes ☒ NoManagement Entity Required: ☐ Yes ☒ No Minimum O&M Requirements: Owner to maintain wastewater system in accordance with rule .1301**Permit conditions:**

Install as per detail sheet and map. Do not disturb, compact, rut or cut any soil within the septic drainfield area.

EACH TRENCH SHALL HAVE 12 PANELS WITH 4 INCHES BETWEEN PANELS

Do not disturb potential future repair line adjacent to initial system.

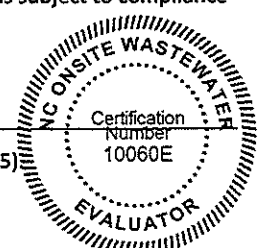
No changes may be made to the septic system design without approval of the AOWE.

GREATER THAN 6" SOIL COVER REQUIRED OVER FIELD AND SLOPED TO SHED SURFACE WATER AND SHALL EXTEND 5' BEYOND EDGE OF TRENCHES.

The requirements of 15A NCAC 18E are incorporated by reference into this permit and shall be met. Systems shall be installed in accordance with the attached site sketch. ***This Construction Authorization is subject to revocation if the site plan, plat, or the intended use changes.*** The Construction Authorization shall not be affected by a change in ownership of the site. This Construction Authorization is subject to compliance with the provisions of 15A NCAC 18E, or 15A NCAC 18A .1900, as applicable, and to the conditions of this permit.

AOWE/PE Print Name: John KaseAOWE/PE Signature: [Signature]Date: 10/14/2025

This AOWE/PE submittal is pursuant to and meets the requirements of G.S. 130A-335(a2) and (a5)

See attached site sketch

This Section for Local Health Department Use Only

Initial submittal received: _____ by _____
Date Initials

G.S. 130A-335(a5) states the following:

When an applicant for a Construction Authorization, or an Improvement Permit and Construction Authorization together, submits a Construction Authorization, or an Improvement Permit and Construction Authorization application together, the permit fee charged by the local health department, the common form developed by the Department, and any necessary signed and sealed plans or evaluations conducted by a person licensed pursuant to Chapter 89C of the General Statutes as a licensed engineer or a person certified pursuant to Article 5 of Chapter 90A of the General Statutes as an Authorized On-Site Wastewater Evaluator, the local health department shall, within five business days of receiving the application, conduct a completeness review of the submittal. A determination of completeness means that the Construction Authorization or Improvement Permit and Construction Authorization includes all of the required components. If the local health department determines that the Construction Authorization or Improvement Permit and Construction Authorization is incomplete, the local health department shall notify the applicant of the components needed to complete the Construction Authorization or Improvement Permit and Construction Authorization. The applicant may submit additional information to the local health department to cure the deficiencies in the Construction Authorization or Improvement Permit and Construction Authorization. The local health department shall make a final determination as to whether the Construction Authorization or Improvement Permit and Construction Authorization is complete within five business days after the local health department receives the additional information from the applicant. If the local health department fails to act within any period set out in this subsection, the applicant may treat the failure to act as a determination of completeness. The applicant may apply for the building permit for the project upon the decision of completeness of the Construction Authorization or Improvement Permit and Construction Authorization by the local health department or if the local health department fails to act within five business days. The Authorized On-Site Wastewater Evaluator or licensed engineer submitting the evaluation pursuant to this subsection may request that the local health department revoke or suspend the Construction Authorization or Improvement Permit and Construction Authorization for cause. Upon written request of the Authorized On-Site Wastewater Evaluator or licensed engineer, the local health department shall suspend or revoke the Construction Authorization or Improvement Permit and Construction Authorization pursuant to G.S. 130A-23. The Department shall develop a common form for use as the Construction Authorization.

The review for completeness of this Construction Authorization was conducted in accordance with G.S. 130A-335(a5). This

Construction Authorization is determined to be:

☐ Incomplete (If box is checked, information in this section is required.)

The following items are missing: _____

Copies of this were sent to the AOWE/PE and the Applicant on _____
Date

State Authorized Agent: _____ Date: _____

☐ Complete

State Authorized Agent: _____ Date of Issuance: _____

This Construction Authorization is issued pursuant to G.S. 130A-335(a2) and (a5) using the signed and sealed plans or evaluations attached here. This Construction Authorization is subject to revocation if the site plan, plat, or the intended use changes. The Construction Authorization shall not be affected by a change in ownership of the site. This Construction Authorization is subject to compliance with the provisions of the Laws and Rules for Sewage Treatment and Disposal and to the conditions of this permit.

The Department, the Department's authorized agents, and the local health departments shall be discharged and released from any liabilities, duties, and responsibilities imposed by statute or in common law from any claim arising out of or attributed to plans, evaluations, preconstruction conference findings, submittals, or actions from a person licensed pursuant to Chapter 89C of the General Statutes as a licensed engineer or a person certified pursuant to Article 5 of Chapter 90A of the General Statutes as an Authorized On-Site Wastewater Evaluator in GS 130A-335(a2), (a5), and (a7). The Department, the Department's authorized agents, and the local health departments shall be responsible and bear liability for their actions and evaluations and other obligations under State law or rule, including the issuance of the operations permit pursuant to GS 130A-337.

Construction Authorization Expiration Date: _____

See attached site sketch



Re-submittal of Construction Authorization

LHD USE ONLY: This CA resubmittal received: _____ by _____
Date Initials

The following items are being resubmitted pursuant to G.S. 130A-335(a5) for issuance of the Construction Authorization:

I, _____ hereby attest that the information required to be included with this re-submittal
Authorized Onsite Wastewater Evaluator (Print Name)
is accurate and complete to the best of my knowledge and that the proposed Construction Authorization meets all applicable federal, State, and local laws, regulations, rules, and ordinances.

Signature of Authorized On-Site Wastewater Evaluator

Date

The section below is for Local Health Department use after submittal of items noted as missing above.

LHD Follow-up Completeness Review of Construction Authorization

The review for completeness of this Construction Authorization re-submittal was conducted in accordance with G.S. 130A-335(a5). This Construction Authorization is determined to be:

☐ Incomplete (If box is checked, information in this section is required.)

The following items are missing:

Copies of this were sent to the AOWE/PE and the Applicant on _____
Date

State Authorized Agent: _____

Date: _____

☐ Complete

State Authorized Agent: _____

Date: _____



ADDENDUM TO G.S. 130A-335(a2) SUBMITTAL

County: Harnett

PIN/Lot Identifier: 0665-30-7131

Issued To: Freedom Constructors Inc, PO Box 608 Dunn, NC 28335

Additional Improvement Permit Conditions:

SEE ATTACHED DETAIL SHEET

Additional Construction Authorization Conditions:

See attached detail sheet.

Southeastern Soil & Environmental Associates, Inc.

P.O. Box 9321
Fayetteville, NC 28311
Phone/Fax (910) 822-4540
Email mike@southeasternsoil.com

October 3, 2025

Mr. Timothy Tart
PO Box 608
Dunn, NC 28335

Re: Soil/site evaluation for subsurface waste disposal [GS 130A-335(a2)], 35 Turnberry Court, Fuquay Varina, NC, PIN 0665-30-7131, Lot 12, Legacy at Rawls Subdivision, Harnett County.

Dear Mr. Tart,

A soil/site evaluation has been conducted on the aforementioned property at your request. The purpose of the investigation was to determine if soils were suitable or provisionally suitable for a subsurface waste disposal system (conventional, accepted and innovative) to serve a proposed single-family residence (4-bedroom home). All ratings and determinations were made in accordance with "Laws and Rules for Wastewater Treatment and Dispersal Systems, 15A NCAC 18E". **This LSS evaluation is being submitted to meet the requirements of GS 130A-335 (a2).**

The soil evaluation was completed on September 28, 2025. Hand auger borings were advanced under moist soil conditions. The site essentially lies on a linear slope landscape (3% slope). Soil borings conducted in most of this area consisted of 18 or more inches of clay loam underlain by clay to 32 or more inches below the soil surface. Soil wetness was not observed shallower than 34 inches below the soil surface (initial system). Soil wetness was not observed shallower than 33 inches below the soil surface (repair area). Parent material (greater than 50%) was not observed in the initial system area and was not observed shallower than 18 inches below the soil surface in the repair system. All other soil characteristics were suitable to at least 48 inches (initial and repair system).

Based on soil borings and site conditions, the site would be designated Suitable for a gravity flow to Prefabricated Permeable Block Panel (PPBPS) 50% reduction subsurface waste disposal drainfield (0.325 gal/day/ft² LTAR; initial system). There is enough suitable soil area to allow for a pump PPBPS trenches (50% reduction) subsurface septic system repair (0.3 gal/day/ft²). A map showing the approximate location of the site and proposed septic layout accompanies this report. **[Note: No grading, rutting or other soil disturbance can occur in or near the proposed septic area. Any grading can alter the findings of this report and render the site unusable. As such, we recommend the builder protect the proposed septic areas with rope, flagging, fencing, etc.]**

Design Summary

- 480 gal/day flow rate (4BR)
- Initial System: Gravity flow to PPBPS 50% reduction horizontal trenches (250', see septic layout)
- 20" maximum trench depth as measured on the downhill side
- 0.325 gpd/ft² LTAR
- 1000-gallon septic tank (**certified watertight**)
- Repair System: Pump to PPBPS 50% reduction trenches (270', see septic layout)
- 18" maximum trench depth as measured on the downhill side
- 0.3 gpd/ft² LTAR
- No grading, rutting or filling in septic areas
- No vertical cuts (greater than 2') within 15' of septic lines/areas
- Keep tanks and drainlines 10' from property lines
- Keep supply line 5 or more feet from property lines
- **Install in dry soil conditions**
- Maintain natural contours when clearing the lots
- Direct gutter water away from septic system

During site construction, it is important not to impact and suitable or provisionally suitable soil areas with activities such as excavation or filling. Only the vegetation should be removed in the areas of the proposed septic drainfields to prevent any disturbance of naturally occurring soil. We recommend all lot clearing activity be delayed until the local health department issues a permit.

To the extent possible, we have identified the soil types that will impact the flow of wastewater on this site and have provided a professional opinion as to the best septic system layout. This report does not guarantee that the proposed septic system will properly function for any specific length of time.

Sincerely,

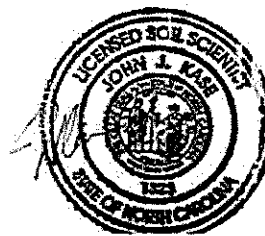


John Kase

NC Licensed Soil Scientist #1323

NC Authorized Wastewater Evaluator #10060E

NC REHS #1785



RIVERWOOD DR
TURNBERRY CT
FOY RD

NOTES:
AREA BY COORDINATES
THIS IS NOT AN ACTUAL SURVEY
PROPERTY SUBJECT TO BOTH ABOVE AND OR BELOW GROUND UTILITIES AND
OR EASEMENT
THIS PROPERTY IS NOT LOCATED IN A FLOOD HAZARD AREA PER F.E.M.A.
MAP # 3720066500L; EFF DATE: 7/19/2022 ZONE X

CURVE RADIUS LENGTH DELTA CHORD CH.BEARING
8.54' 90°00'421" 70.71' N 30°36'02"W

Individual Line Length

50.00

of Panels Needed

12

Spacing Between Panels

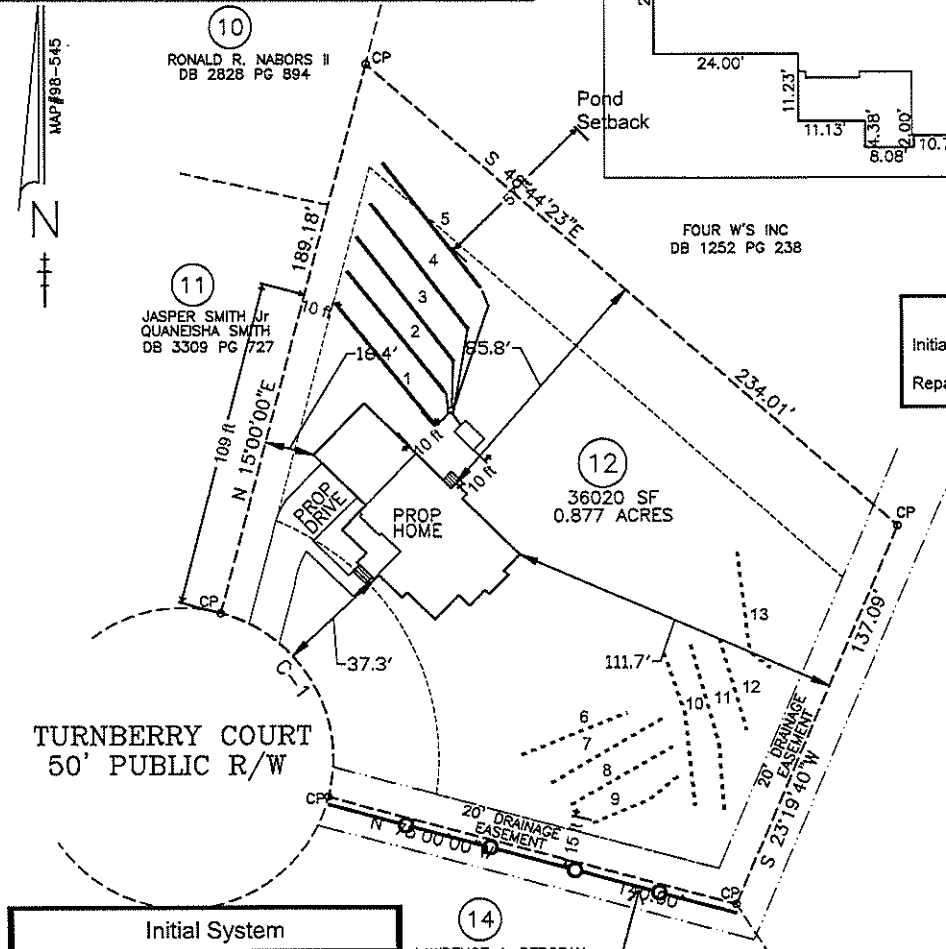
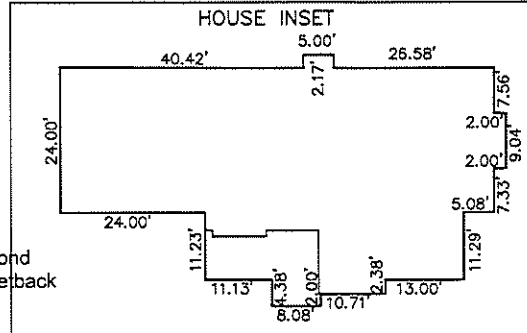
4 Inches

Feet of 1.5 Inch PVC for Horizontals

44 Feet

Feet of 2 Inch PVC for Verticals

22 Feet



Legend
Initial System ———
Repair System - - - - -

Initial System	
System Type:	IIIe
Trench Type:	PPBPS (Horizontal)
Line Numbers:	1-5
Total Trench Length:	250'
Maximum Trench Depth:	20"
(measured on the downhill side)	

I, BENTON W. DEWAR CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION; THAT THE RATIO OF PRECISION IS 1:_____
THAT THE BOUNDARIES NOT SURVEYED ARE SHOWN AS BROKEN LINES PLOTTED FROM INFORMATION FOUND IN BOOK _____
PAGE _____; THAT THIS PLAT DOES NOT MEET SIZE REQUIREMENTS FOR RECORDING IN THE REGISTER OF DEEDS, PER G.S. 47-30 AS AMENDED.
LICENCE NUMBER AND SEAL THIS _____ DAY OF _____ 20____

PROFESSIONAL LAND SURVEYOR L-3040

THIS PLAT MAY NOT BE A CERTIFIED SURVEY AND HAS NOT BEEN REVIEWED BY A LOCAL GOVERNMENT AGENCY FOR COMPLIANCE WITH ANY APPLICABLE LAND DEVELOPMENT REGULATIONS AND HAS NOT BEEN REVIEWED FOR COMPLIANCE WITH RECORDING REQUIREMENTS FOR PLATS.

LAWRENCE & DEBORAH
CONFER
DB 4262 PG 568
MAP # 2003-483

Buried Concrete
Drain Pipe

PROPOSED PLOT PLAN FOR:

FOUR W'S

35 TURNBERRY COURT
FUQUAY-VARINA, NC 27526

LOT 12 LEGACY AT RAWLS
MAP # 98-545A
DEED BOOK 1983 PAGE 117
PIN # 0665-30-7131.000
HECTORS CREEK TOWNSHIP
HARNETT COUNTY - NORTH CAROLINA
SCALE: 1" = 40' SEPTEMBER 8, 2025



BENTON DEWAR & ASSOCIATES
PROFESSIONAL LAND SURVEYOR
5920 HONEYCUTT ROAD
HOLLY SPRINGS, NC 27540
(919)-552-9813
EMAIL: bentondewar@gmail.com

25-173s
12LEGACY\25\700

SOUTHEASTERN SOIL & ENVIRONMENTAL ASSOC., INC.

PROPOSED SUBSURFACE WASTE DISPOSAL SYSTEM DETAIL SHEET

SUBDIVISION: Legacy at Rawls

LOT 12

INITIAL SYSTEM: PPBPS-Horizontal

REPAIR: PPBPS-Horizontal

DISTRIBUTION: Gravity Parallel

DISTRIBUTION Pressure Manifold

BENCHMARK: 100.0

LOCATION CC Pad @ Elect. Box - 2.1

NO. BEDROOMS: 4

LTAR 0.325

SEPTIC TANK SIZE 1000 Gallons

PUMP TANK SIZE N/A

	<u>LINE</u>	<u>FLAG COLOR</u>	<u>ELEVATION(FT)</u>	<u>LENGTH(FT)</u>
Initial	1	Red	99	55 (50)
	2	White	98.7	55 (50)
	3	Blue	98.4	50
	4	Pink	98.1	50
	5	Yellow	97.9	50
				Total-250
Repair	5	Yellow	99.5	35
	6	White	99.4	40
	7	Blue	99.2	36
	6	Green	99	35
	7	Pink	98.9	57
	8	Blue	98.8	57
	9	White	98.1	30
	10	Pink	97.6	45 (not used)
				Total-335

BY John Kase

DATE 9-22-25

TYPICAL PROFILE

THERE SHALL BE NO GRADING,

CUTTING, LOGGING OR OTHER SOIL

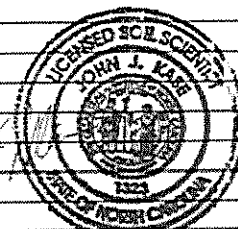
DISTURBANCE IN SEPTIC AREA

HEALTH DEPARTMENT USE ONLY.

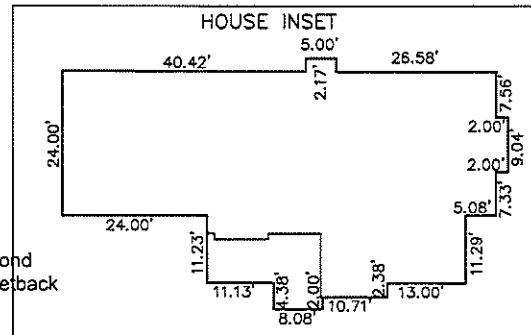
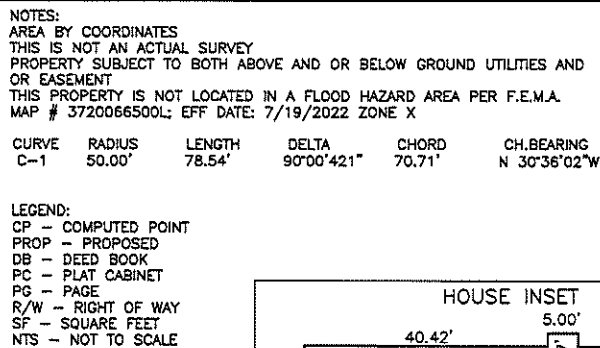
DESIGNS DO NOT GURANTEE FUNCTIONALITY

Initial	0-18	LS GR	VFR/NS/NP
	18-30	C/CL SBK	FR/S/P
	30-44	CL SBK	FR/S/P
	44	10YR7/2 SWC	
Repair	0-20	SiCL SAP	
	20-54	SiL SAP	

SOUTHEASTERN SOIL AND ENVIRONMENTAL ASSOCIATS, INC.			SOIL/SITE EVALUATION SHEET			Sheet #:		1	
OWNER/APP. NAME: Freedom Constructors Inc			SUBDIV./LOT#		Legacy at Rawls Lot 12				
LOCATION OF SITE: 35 Turnberry Court, Fuquay Varina									
COUNTY: Harnett		PROPERTY ID #:		0665-30-7131		DATE EVALUATED:		9/25/2025	
PROPOSED FACILITY: SFR		PROPOSED DESIGN FLOW (.0400):				PROPERTY SIZE:		0.877 acres	
WATER SUPPLY: Public		WATER SUPPLY SETBACK:		10'					
TYPE OF WASTEWATER: Domestic			EVALUATION METHOD:			Auger			
P R O F I L E #	.0502 LANDSCAPE POSITION/ SLOPE %	HORIZON DEPTH (IN.)	SOIL MORPHOLOGY		OTHER PROFILE FACTORS				.0509 PROFILE CLASS & LTAR
			.0503 STRUCTURE/ TEXTURE	.0503 CONSISTENCE/ MINERALOGY	.0504 SOIL WETNESS/ COLOR	.0505 SOIL DEPTH	.0506 SAPRO CLASS	.0507 RESTR HORIZ	
1		0-16	CL - SBK	Fi/S/P		32	S	NOT OBSE RVED	S - 0.3
	L	16-32	C - SBK	Fi/S/P					
	2%	32-48	L SAPROLITE	FR/SS/SP					
	.0502(d) SLOPE CORRECTION			SWC NOT OBSERVED					
	0.7"								
2		0-11	SL - GR	VFR/NS/NP		40	S	NOT OBSE RVED	S - 0.3
	L	11-40	C - SBK	FR/S/P					
	2%	40-48	SiCL - SBK	FR/SS/SP					
	.0502(d) SLOPE CORRECTION			SWC NOT OBSERVED					
	0.7"								
3		0-16	SL - GR	VFR/NS/NP			NOT OBSER VED	NOT OBSE RVED	S - 0.3
	L	16-33	C - SBK	FR/S/P					
	2%	33	C - SBK	FR/S/P	10YR6/1				
	.0502(d) SLOPE CORRECTION								
	0.7"								
4		0-30	CL - SBK	FR/S/P		42	S	NOT OBSE RVED	S - 0.4
	L	30-42	SiL - SBK	FR/SS/SP					
	2%	42-48	SiL SAP	FR/SS/P					
	.0502(d) SLOPE CORRECTION								
	0.7"				SWC NOT OBSERVED				
DESCRIPTION:		INITIAL SYSTEM	REPAIR SYSTEM	SITE CLASSIFICATION (.0509):		Suitable			
Available Space		Suitable	Suitable	EVALUATED BY:		John Kase			
System Type(s):		PPBPS - Hor.	PPBPS - Hor.	OTHER(S) PRESENT:					
Site LTAR:		0.325	0.300						
Maximum Trench		20"	18"						
Saprolite System:		Yes	Yes						
Comments:		Trench bottoms depth measure on downslope side of trench.							



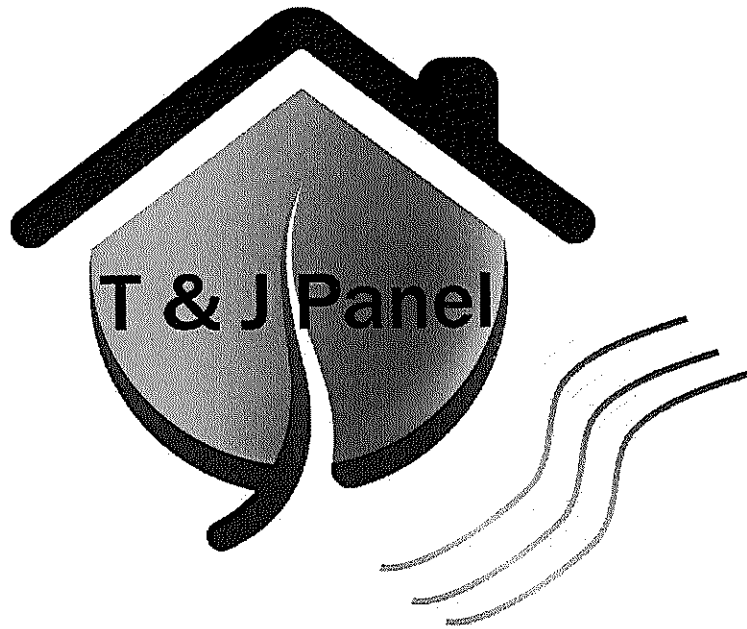
SOUTHEASTERN SOIL & ENVIRONMENTAL CONSULTANTS, INC.			SOIL/SITE EVALUATION SHEET			Project #:		0	
						Sheet #:		2	
OWNER/APP. NAME:		Freedom Constructors Inc			SUBDIV./LOT#		Legacy at Rawls Lot 12		
LOCATION OF SITE :		35 Turnberry Court, Fuquay Varina							
COUNTY:		Harnett		PROPERTY ID #:		0665-30-7131		DATE EVALUATED: 9/18/2025	
PROPOSED FACILITY:		SFR		PROPOSED DESIGN FLOW (.400):		480		PROPERTY SIZE 1.3 AC	
WATER SUPPLY:		Public		WATER SUPPLY SETBACK:					
TYPE OF WASTEWATER:			Domestic		EVALUATION METHOD:			Auger	
P R O F I L E	.502 LANDSCAPE POSITION/ SLOPE %	HORIZON DEPTH (IN.)	SOIL MORPHOLOGY (.503)		OTHER PROFILE FACTORS				PROFILE CLASS & LTAR
			.503 STRUCTURE/ TEXTURE	.503 CONSISTENCE / MINERALOGY	.504 SOIL WETNESS/ COLOR	.505 SOIL DEPTH	.506 SAPRO CLASS	.507 RESTR HORIZ	
5	L	0-18	SICL SAP	FR/SS/P		18	S	NOT OBSE RVED	S - 0.3
		18-56	SIL SAPROLITE	FR/SS/SP					
	3%								
	.0502(d) SLOPE CORRECTION			SWC NOT OBSERVED					
	1.1"								
6	FS	0-18	SL - GR	VFR/NS/NP			NOT OBSER VED	NOT OBSE RVED	S - 0.325
		18-30	CL/C - SBK	FR/S/P					
	3%	30-44	CL - SBK	FR/S/P					
	.0502(d) SLOPE CORRECTION	44	CL - SBK	FR/S/P	10YR6/2				
	1.1"								
7	FS	0-18	SL - GR	VFR/NS/NP			NOT OBSER VED	NOT OBSE RVED	S - 0.325
		18-34	CL - SBK	FR/S/P					
	3%	34	CL - SBK	FR/S/P	10YR6/2				
	.0502(d) SLOPE CORRECTION								
	1.1"								
	.0502(d) SLOPE CORRECTION								
Comments:									



(919)-552-9813 25-173s
EMAIL-bentondewar@gmail.com 12LEGACY\25\700

THIS PLAT MAY NOT BE A CERTIFIED SURVEY AND HAS NOT BEEN REVIEWED BY A LOCAL GOVERNMENT AGENCY FOR COMPLIANCE WITH ANY APPLICABLE LAND DEVELOPMENT REGULATIONS AND HAS NOT BEEN REVIEWED FOR COMPLIANCE WITH RECORDING REQUIREMENTS FOR PLATS.

**Design, Installation and
Maintenance
of the
T & J Panel
Wastewater Treatment System**



A Better Quality Effluent

Environmental Health Specialists
Engineers
Septic Tank Installers

Updated 2023

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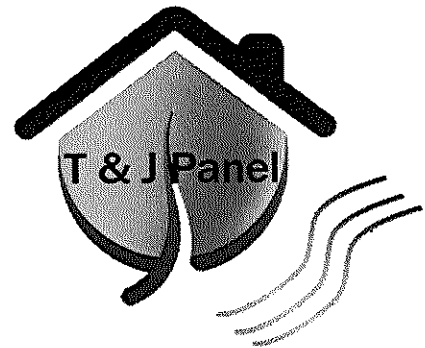
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Introduction

Although this manual is sectioned for specific user groups, we at T&J Panel suggest you familiarize yourself with the complete manual. Please visit our website at www.TJPanel.com for more resources regarding design, installation and maintenance of T&J Panel Systems. All of the resources provided in this manual are available online to print. The most current and up-to-date version of this manual is posted on our website at www.TJPanel.com and supersedes all printed editions. For further discussion of this manual, questions about design, or other inquiries about our product, please reach out to our office at 704-924-8600.

Company Information

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Email: Info@tjpanel.com



New Installers

While T&J Panels does not require a product specific installer certification, it is our goal to ensure installers know how to correctly install a panel block system. If it is your first time installing, inspecting, or designing a system, please do not hesitate to reach out to us. Our company representatives will help you make sure you are prepared for your installation. The installation videos available at www.tjpanel.com provide step-by-step instructions for installing panel blocks.

SYSTEM DESIGN

The primary reason for permitting the panel block system is because of insufficient space for a conventional system. The panel block system should be considered when: a quality effluent may be needed, space is limited, usable soil is limited, or there are indications that at some future time space may be needed for other development. When there is a trend for added development such as additions to homes, pools or other special landscaping development, a T&J Panel System may prevent insufficient space later.

As noted in the regulations, a T&J Panel (Prefabricated, Permeable, Block Panel System) is permitted where soils are suitable, provisionally suitable, or reclassified provisionally suitable, however only one half of the nitrification area required by a conventional system is needed. The minimum soil depth required for vertically installed Panel Systems is 34-inches (minimum depths require 6" of suitable soil cover), whereas the minimum soil depth required for horizontally installed Panel Systems is 26-inches in a traditional trench or 18-inches if utilizing fill. Most of the concepts for laying out a panel block system are the same as for a conventional system; the biggest difference being the nitrification area needed and the quality of effluent being introduced into the ground.

T&J panels can utilize either parallel or serial distribution. Panels can be gravity fed, pumped to a pressure manifold or distribution box and then gravity fed into the lines, or pumped to low-pressure panel lines. When designing a pressure system, the principles of low-pressure distribution are as described in the LPP manual. There is further discussion on pressure systems on page 15 of this manual.

T&J Panel Manufacturer's Specifications for Trench Width and Spacing

T&J Panels recommends horizontal panels be installed in 3-foot wide trenches located 9 foot on-center when suitable area exists. When available space does not allow for 9 foot on-center spacing, 3-foot wide trenches located 8 foot on-center can be used to install horizontal panels. Horizontal panels can **only** be installed in 2-foot wide trenches placed 6 foot on-center when repairing a lot or suitable area does not exist for 3-foot wide trenches placed 8-foot on center. When using horizontal panels in 2-foot wide trenches, **9 inches or more of backfill sand must be installed** underneath the panels. Designing a PPBPS system utilizing 2-foot wide trenches located 6 foot on center is only applicable when using panels as the initial system and the repair system, **or** when repairing a failing lot with limited area. **This practice rules out a larger system being put in place and requiring the repair field to utilize panel blocks with 6 foot on center spacing unnecessarily.** This also eliminates the potential of installing additional repair lines between existing lines if ever needed. If limited by soil conditions, drip dispersal or advanced pretreatment may also be utilized as a repair alternative when using 6 foot on-center spacing for the initial system

T&J Panels recommends Vertical panels be installed in 2-foot wide trenches located 8 foot on-center when suitable area exists. Again, designing a PPBPS system utilizing 2-foot wide trenches located 6 foot on center is only applicable when using panels as the initial system and the repair system, **or** when repairing a failing lot with limited area. This falls in line with our best engineering practice of using 8 foot on center spacing when possible when installing in 2 foot wide trenches.

The following page provides a visual table that helps to illustrate when reduced on-center spacing is applicable.

Manufacturer's Specifications for Using Reduced On-Center Spacing

Vertical Panels

Site Constraints	Design Capabilities
Typical Install	2 ft Wide, 8 ft On-Center
IF Initial and Repair are Panels* AND 2 ft Wide, 8 ft On-Center Will Not Fit	2 ft Wide, 6 ft On Center
IF Repairing Lot AND 2 ft Wide, 8 ft On-Center Will Not Fit	2 ft Wide, 6 ft On Center
* Drip or Advanced Treatment can be substituted for Repair if necessary.	

Horizontal Panels

Site Constraints	Design Capabilities
Typical Install	3 ft Wide, 9 ft On-Center
IF Limited by Space	3 ft Wide, 8 ft On Center
IF Initial and Repair are Panels AND 3 ft Wide, 8 ft On-Center Will Not Fit	2 ft Wide, 6 ft On Center
*Must Install with AT LEAST 9 Inches of Backfill Sand Under the Panels; Advanced Pretreatment may be used as the Repair if Necessary	

Please contact T&J Panels with any questions regarding manufacturer's specifications.

T&J Panel Sizing in Trench Formation

T&J Panel sizing can be calculated by multiplying the nitrification area or linear footage required for a standard conventional system by 0.5. This calculation is used when panels are installed in trenches, beds, fill systems, or sand-lined trenches.

For example:

A three-bedroom house with a 0.4 gpd application rate. (The first three steps are the same as for the conventional system.)

- 1) 120 gallons per bedroom X 3 bedrooms = 360 gallons per day design flow rate.
- 2) 360 gallons' flow rate / 0.4 application rate = 900 sq. ft. of conventional trench bottom.
- 3) 900 sq. ft. / 3 ft. wide trench = 300 linear feet of conventional system.

This conventional layout requires 1,900 sq ft. of area on the lot with another equal area of repair space for a total of 3,800 sq ft. of suitable usable area. To calculate the size of the T&J Panel system, the above calculations must be made with an additional fourth step.

- 4) 300 linear feet of conventional system X 0.5 = 150 linear feet of T&J Panel System.

T&J Panel Bed System Sizing

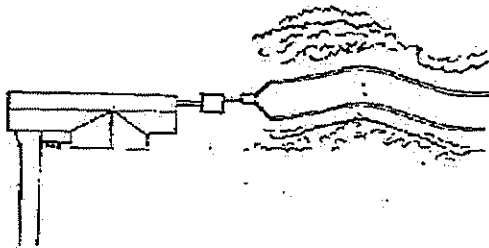
A three-bedroom house with a 0.4 gpd application rate. (The first three steps are the same as for the conventional system.)

- 1) 120 gallons per bedroom X 3 bedrooms = 360 gallons per day design flow rate.
- 2) 360 gallons' flow rate / 0.4 application rate = 900 sq. ft. of conventional trench bottom.
- 3) 900 sq ft x 1.5 = 1,350 sq ft of conventional bed area needed
- 4) 1,350 sq ft x 0.5 = 675 sq ft of T&J Panel bed area needed

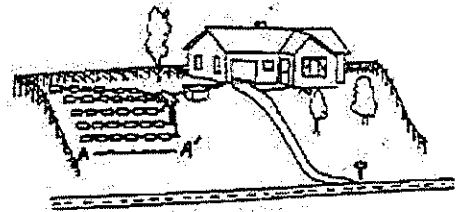
T&J Panel beds are typically excavated in 3-foot increments up to a maximum bed width of 24 feet. Nitrification lines are placed 3 foot on center and 1.5 feet from the bed sidewalls. Bed systems will require a greater number of panels than a typical trench layout, providing added storage and treatment capabilities. Bed systems can be considered when dealing with lots that are limited by space, topography, or other site-planning considerations. For a complete guide to the design, installation, and inspection process for a T&J Panel Bed System, please refer to our T&J Panel Bed Design & Installation Manual found on our website at tjpanel.com.

Window Effect

To prevent hydraulic overload in the soil, aerial space should always be a consideration for any system. This condition is especially notable with panel block systems, as with any system that reduces the size of the aerial area drain field. The following is a simplistic example of this concept:



MOST DESIRABLE



LESS DESIRABLE

While both systems have the same linear footage of trench, the second diagram is a less desirable design. The effluent must pass through the area A-A' which can cause a strain on that area and even a failure because of hydraulic overloading.

Distribution

When aiming to design the most optimal system for a given site, many variables must be taken into consideration. Distribution methods can vary depending on site limitations. The following sections provide various ways to distribute effluent when presented with differing site conditions.

I. Gravity Flow

A. Parallel Distribution

If adequate fall to the proposed drainfield location is present and line lengths are equal or have a variance less than 20 percent, parallel distribution utilizing a distribution box may be desirable. Parallel distribution might also be an option when long lines can be multi-fied to produce smaller lines that achieve less than a 20 percent variance with respect to other lines. If shorter lines can be serial linked together (connected end to end) to form a longer line that achieves a similar low variance, parallel distribution might still be an applicable design.

B. Serial Distribution

When variance in line lengths exceeds 20 percent and adequate fall to the drainfield exists, gravity-fed serial distribution can be utilized, especially if pump tanks are not desired for cost efficiency or lack of available space. On sites where installing separate supply lines to each nitrification line would prove problematic, serial distribution might also be a better option. Serial distribution may be designed in two different ways.

1. **Drop Boxes** – Placing drop boxes at each line (except the last line) is one form of serial distribution. Drop boxes are helpful when obstacles between lines exist that prevent connecting them end to end. They are also beneficial when connecting ends of lines are far apart and would require lengthy supply lines. Drop boxes are also useful on steep slopes in order to combat the effects of gravity on effluent. We recommend the use of drop boxes rather than true serial on slopes of 30% or greater if possible.
2. **True Serial (End to End)** – Connecting lines end to end in a snake-like fashion is another form of serial distribution. When connecting lines together, no turnup or dam should be used. The pipe (2 Inch SCH 40) exiting the last panel in the upslope line should be level and then turned using a proper fitting towards the next nitrification line. After making the necessary turn, the supply line should have adequate fall to the next nitrification line. True serial distribution can be a beneficial system design in that effluent will move downline before panels are completely filled with effluent, allowing freeboard in the top portion of the panels for oxygen content.

II. Pressure Dosing

Pressure dosing (i.e., utilizing a pump tank) can be incorporated into designs when any of the following criteria exist on a given site:

- Adequate fall cannot be achieved from the septic tank to the drainfield
- Variance in line lengths exceeds 10 percent and serial distribution is not desired
- Line lengths in parallel distribution exceed 67 feet from the point of introduction and are unable to be center-fed or multi-fed

Pressure dosing can involve several different distribution devices and methods such as pumping to a pressure manifold, pumping to a distribution box, or using low pressure pipe distribution.

A. Pressure Manifold

Pumping to a pressure manifold is a common method of distribution when pump tanks are needed. Pressure manifolds allow for more control when trying to achieve a desired flow to individual nitrification lines. Using different tap sizes for varying line lengths can help to minimize flow variance and may help to avoid the use of low-pressure distribution. As with gravity flow, lines can be linked together via serial feed to essentially form longer lines. In some instances, this can provide more desirable line lengths and help limit flow variance. Using multiple taps to feed a long single line can also be advantageous in creating a more efficient overall design.

B. Distribution Box

When nearly equal line lengths can be designed, pumping to a distribution box may be a useful option. T&J Panels recommends that a second distribution box be placed in series with the first distribution box. The first distribution box would act as a splash box, helping to deplete some of the energy of the pumped effluent. This allows the effluent to then be more equally fed to the nitrification lines from the second distribution box. Effluent can then be fed via parallel distribution (when variance in line lengths is low) or serial fed.

C. Low-Pressure Distribution

Low-pressure distribution may be desirable when long line lengths (over 85 feet) can only be fed from one end due to limiting site conditions or a multitude of differing line lengths exist that are difficult to overcome using varying size taps.

Any questions regarding the optimal distribution method for your system design, please contact our office.

Calculating Panels per Line

To calculate the number of panels needed for a given nitrification line length, the formula is **Number of Panels = Line Length(feet) x 12/52**. If the result is a decimal of .4 or lower, round down to the nearest panel. Rounding down may result in a foot or two of the trench that only has sand. If the result is a decimal of .5 or higher, round up. Panels may have to be spaced closer than 6 inches to fit the line length. To calculate the number of panels needed for a 50-foot line, multiply 50' X 12" = 600", then divide by 52" which is 46 inches for the panel and 6 inches for the space between the panels in the trench. $600" / 52" = 11.5$ panels; therefore, the 50-foot line would call for 12 panels.

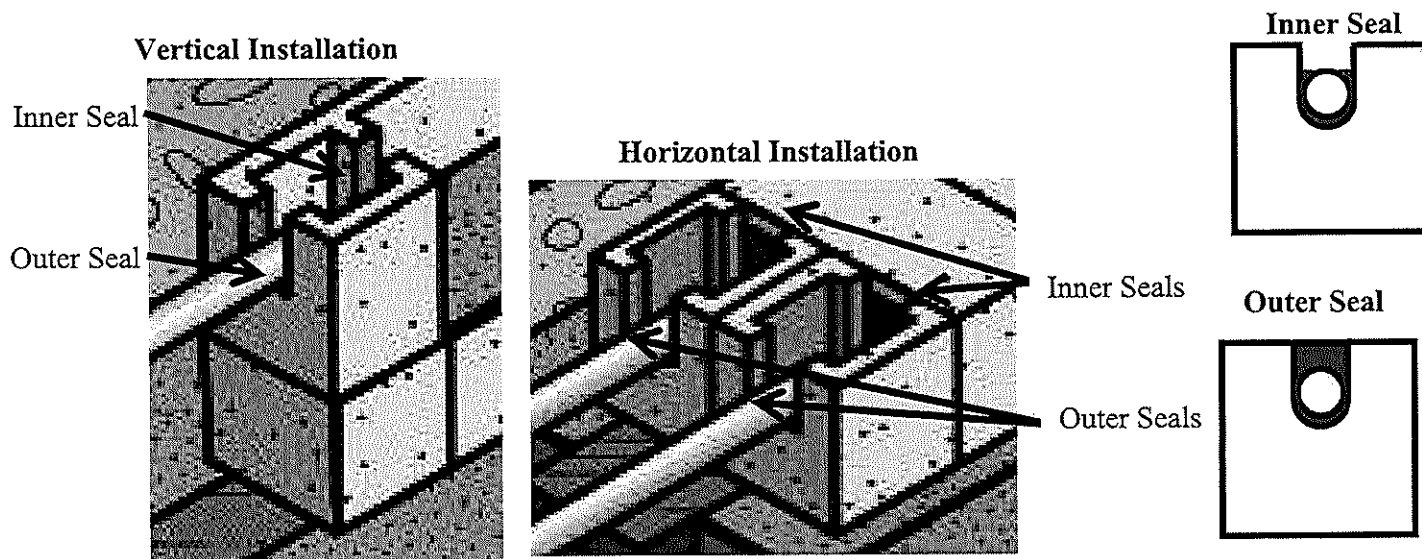
Backfill

Backfill sand shall be a clean, screened, medium-grade sand that is naturally-occurring. Acceptable sands are those suitable for the production of ready-mix concrete and clean of organic debris and stone. In true Group I soils, panels can be installed directly on the trench bottom (when soil depth is limited). Backfill sand used during installation should meet grade and specs listed below. Sands dredged from rivers and creeks can be used if gradation is sufficient to be blended into ready-mix concrete production. Product description includes, but is not limited to: Concrete Sand, NC-2S Sand, ASTM C-33 Sand, FA-10 Sand and Grade "A" Sand. Product suitability is important and T&J Panel, Inc. will help answer any questions. Man-made sands such as crushed aggregate should never be used with T&J Panel systems.

S.A.P. Sand Alternative Product: is the geotextile fabric inside each panel for quality control and downline and horizontal distribution. (this takes the place of medium blasting sand)

Foam Sealant / Tar Seals

The drawings below illustrate the outer and inner seal. Note that while the outer seal is a complete seal, the inner seal is only up to the top of the connecting pipe. This is to allow for overflow of the effluent into the sand at peak use. If sealed off completely, the foam sealer will restrict the overflow reservoir. These seals can be inspected by lifting the caps at the ends of the panels while inspecting the system installation. T&J approved foam sealer or tar seal rope must be used to construct these seals. Caps should not be "glued down" using the foam sealer, as this could impede inspection of the system.



Preparation for Installation

The Panel Block System

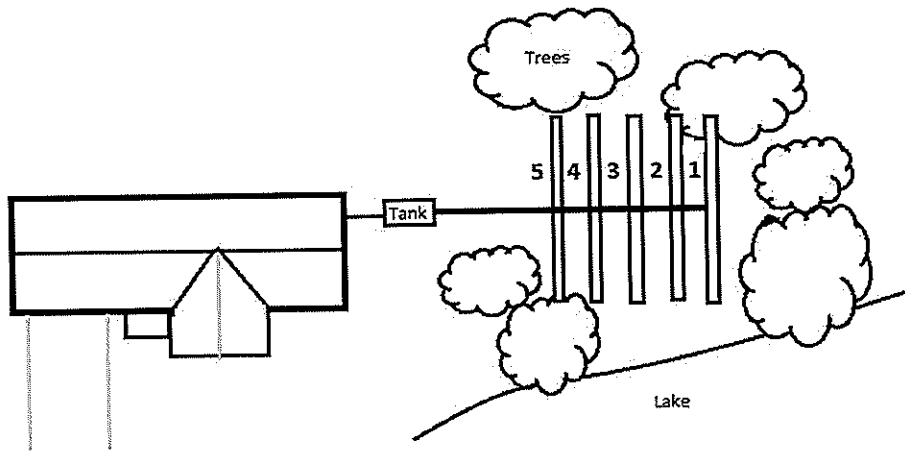
Generally, on level open land, a panel block system can be installed in about the same amount of time as a conventional system; however, traditionally, panel block systems have been installed where space and topography have restricted the use of a conventional system. For this reason, panel block system installations typically require more time. Many installers enjoy the change of working with panels, not handling gravel, and the satisfaction of knowing a better quality, long-lasting system has been installed.

Ordering Materials

T&J Panel partners with suppliers to ensure panel block systems are available statewide. Please be sure to let your supplier know what installation method you are utilizing, as this will affect the amount of materials needed for the system. For information on the distributor located closest to you, call 704-924-8600 or email info@tjpanel.com.

Installation Tips

Installation for multiple line systems should begin in the most confining area and be worked to the more open areas.

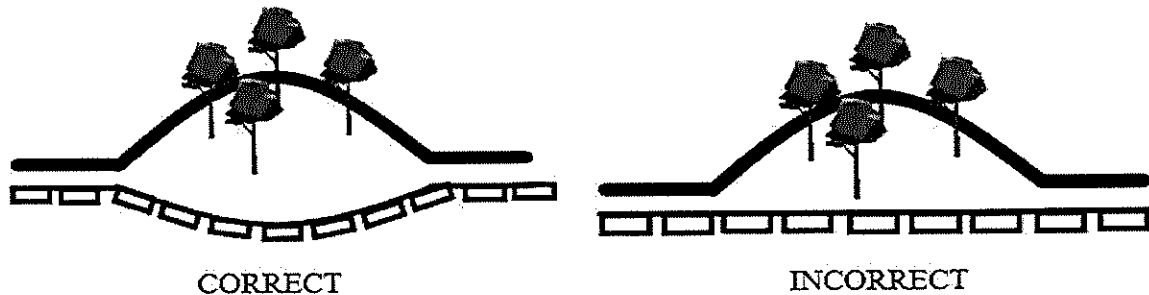


Above is an example of a multiple line installation. As you can see, the installation should begin with the line marked 1 and proceed to 2, 3 then 4. This procedure will greatly ease material handling and backfilling.

Most Panel Systems are currently used due to space considerations and caution should be taken to preserve suitable soil structure and site conditions.

Staying on Contour

Below are two examples of drain lines on sloping lots. The second drawing shows the drain line going through a slope making the center of the line deeper in the ground, resulting in an undesirable situation. The first drawing shows the drain line going around the slope, (on contour) keeping the trench depth and cover uniform for the entire length of the line. On slopes, care should be given to avoid cutting away valuable topsoil in an effort to make straight lines. The panel line should be installed on grade with the contour of the natural slope. Panel lines can be curved to almost any degree.



Trench Preparation

Trench grade should be established so that backfill cover will be four to six inches over the tops of the panels. (Note, on severe slopes, system depth should be adjusted to protect against breakout of effluent.) In shallow soil conditions, panel blocks may be installed at grade and require 6 inches of topsoil suited for vegetative growth be brought in. In soils containing clay as the key mineralogy, the trench side walls should be raked to bring slicked over areas back as near to original structure as possible. A light dusting of pulverized lime on the sidewalls will help restore the soils back to their original structure.

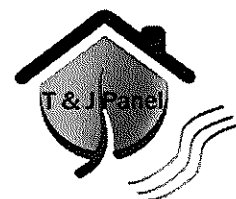
Materials Needed for Vertical Installation

- One can of Foam Sealer per five panels
- Two feet of 2-inch SCH 40 pipe per panel (unless low pressure distribution is used). For low pressure systems, use the same linear feet as line layout of 1 ¼ or 1 ½ inch pipe. Additional pipe is needed for all supply lines.
- Same linear feet of 1x6 boards as total line length of system to be installed
- Bag of powder lime when in clay soil

Materials Needed for Horizontal Installation

- Two cans of Foam Sealer per five panels
- Two pieces of two foot long 1 ½ inch SCH 40 pipe per panel (unless low pressure distribution is used). For low pressure systems, use the same linear feet as line layout of 1 ¼ or 1 ½ inch pipe. Additional pipe is needed for all supply lines.
- Same linear feet of 1x6 boards as total line length of system to be installed
- Bag of powder lime when in clay soil

T&J Panels Jobsite Worksheet



Homeowner/Job Name: _____

County: _____

Address: _____

System Description (Distribution type, total lines, line lengths, etc.):

_____ Vertical T&J Panels (Caps included)	AVAILABLE FOR PURCHASE FROM T&J PANEL.
_____ Horizontal T&J Panels (Caps included)	
_____ Foam Sealer (amount varies based on installation method)	
_____ Powdered Lime	
_____ Entry Tees (Horizontal Installation ONLY)	

MATERIALS CHECKLIST:

_____ 2" Pipe

_____ 1 ½" Pipe

_____ 1 ¼" Pipe

_____ Fittings for Pipe

_____ Backfill Sand (Clean, Screened, Naturally-Occurring, Concrete Sand, or ASTM-C33, NC-2S, FA-10 and Grade "A" Sands)

↳ Be sure to use the correct backfill sand material. Contact our offices for backfill sand sources or with any questions regarding backfill sand material.

_____ 1x4 or 1x6 Board (Does not need to be treated)

ADDITIONAL PRODUCTS THAT MAY BE NEEDED FOR COMPLETION:

_____ Septic Tank _____ Gallon

_____ Pump Tank _____ Gallon

_____ 4" Pipe

_____ Distribution Box

_____ Manifold _____ Taps _____ Size

Installation Process

Vertical Trench Installation

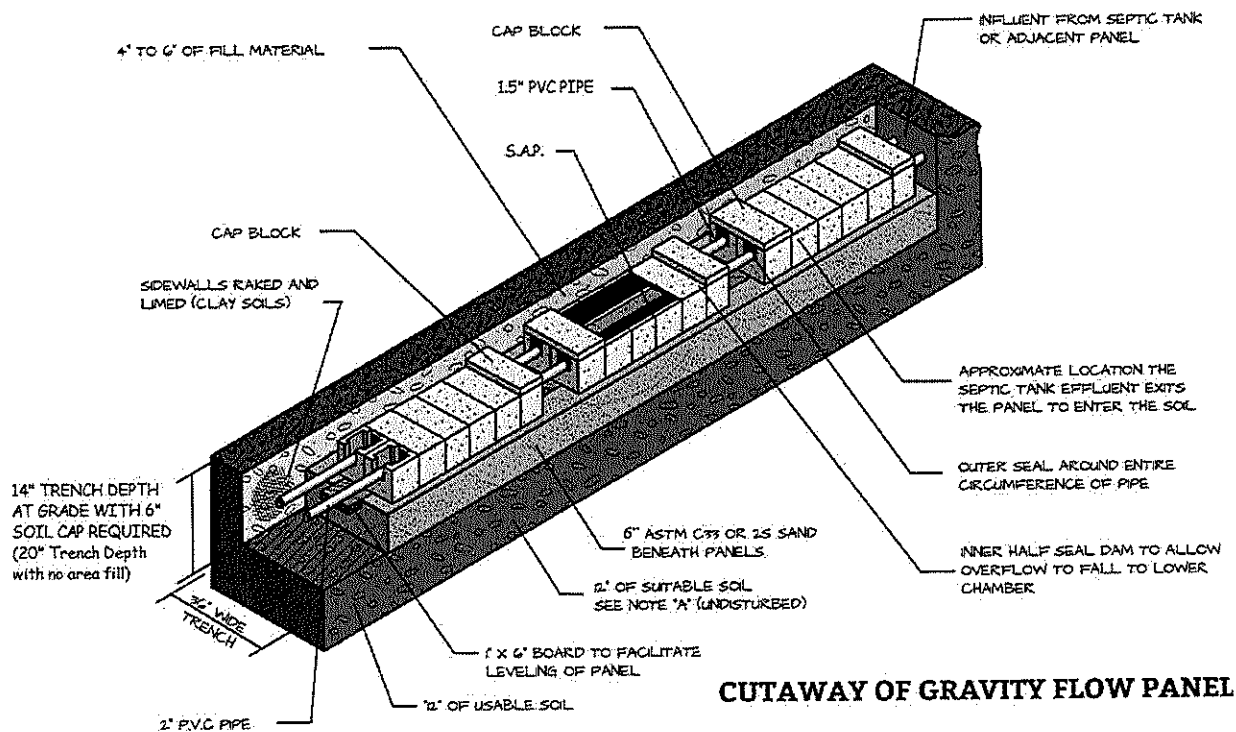
1. Start by shooting grade and marking contour of the lot
2. Based on the permit, figure your trench depth and set transit system properly
3. Dig the trench to the proper depth and width specified on the permit (2-foot wide for Vertical Panels)
4. Use trench spacing listed on your permit
5. If smearing of the side walls is present (as is the case in most clay dominant mineralogy), side walls effected should be raked and lightly dusted with pulverized lime to bring them back to original structure
6. Place at least a 6-inch layer of appropriate backfill sand (natural, clean, screened) in the trench and level to grade
7. Place 1x6 inch boards flat down the middle of the trench.
8. Check the grade of the tops of the boards to ensure they are level or less than 1/4-inch of fall per 10 feet from the supply direction
9. Once all boards have been set, panels may be set into the trench on top of the boards
10. Panels can be placed about 6 inches apart. Panels can be placed closer together to ensure the correct number of panels can be placed into each nitrification line
11. Place foam sealer in the bottom of the cutouts to form seals around the pipe as shown in diagrams on page 8
12. Place a 24-inch section of 2 inch PVC into the cutouts, ensuring the pipe extends into both panels at least 8 inches. **If using pressure dispersal, please see page 15 for proper instructions**
13. Using foam sealer or tar seal rope, form a complete seal on all outer cutouts. Ensure that inner seals are partial seals that do not extend over top of the PVC pipe.
14. After completing the inner and outer seals, place a cap block on each end of the panel to cover all openings
15. Use the appropriate backfill sand(natural, clean, screened) to backfill up to the top of the panel block, leaving cap blocks exposed for inspection
16. The system is now ready for final inspection
17. After final inspection, a minimum of 4-6 inches soil cover is to be added over top of the panel block system

Horizontal Trench Installation

1. Start by shooting grade and marking contour of the lot
2. Based on the permit, figure your trench depth and set transit system properly
3. Dig the trench to the proper depth and width specified on the permit (Typically 3-foot wide for Horizontal Panels)
4. If smearing of the side walls is present (as is the case in most clay dominant mineralogy), side walls effected should be raked and lightly dusted with pulverized lime to bring them back to original structure
5. Place at least a 6-inch layer of appropriate backfill sand (natural, clean, screened) in the trench and level to grade. If installing in Group I soil, this 6-inch layer of sand beneath the panel is optional
6. Place 1x6 inch boards flat down the middle of the trench.
7. Check the grade of the tops of the boards to ensure they are level or less than 1/4-inch of fall per 10 feet from the supply direction
8. Once grade boards have been set, panels may be set into the trench on top of the boards
9. Panels can be placed about 6 inches apart. Panels can be placed closer together to ensure the correct number of panels can be placed into each nitrification line
10. Place two pieces of 1.5-inch PVC that are 24 inches long to connect the panels together. **If using pressure dispersal, see page 15-16 of Installation Manual at tjpanel.com**
11. The pipes must extend into each panel at least 8 inches
12. Lift each pipe up and hold in place
13. Spray a small amount of foam sealer in bottom of inner and outer cutouts
14. Set pipe down and fill outer cutouts to top with foam sealer. Inner seals should be open over top of the pipe
15. After completing the inner and outer seals, place a cap block on each end of the panel to cover all openings
16. Use the appropriate backfill sand(natural, clean, screened) to backfill up to the top of the panel block, leaving cap blocks exposed for inspection
17. The system is now ready for final inspection
18. After final inspection, a minimum of 4-6 inches soil cover is to be added over top of the panel block system

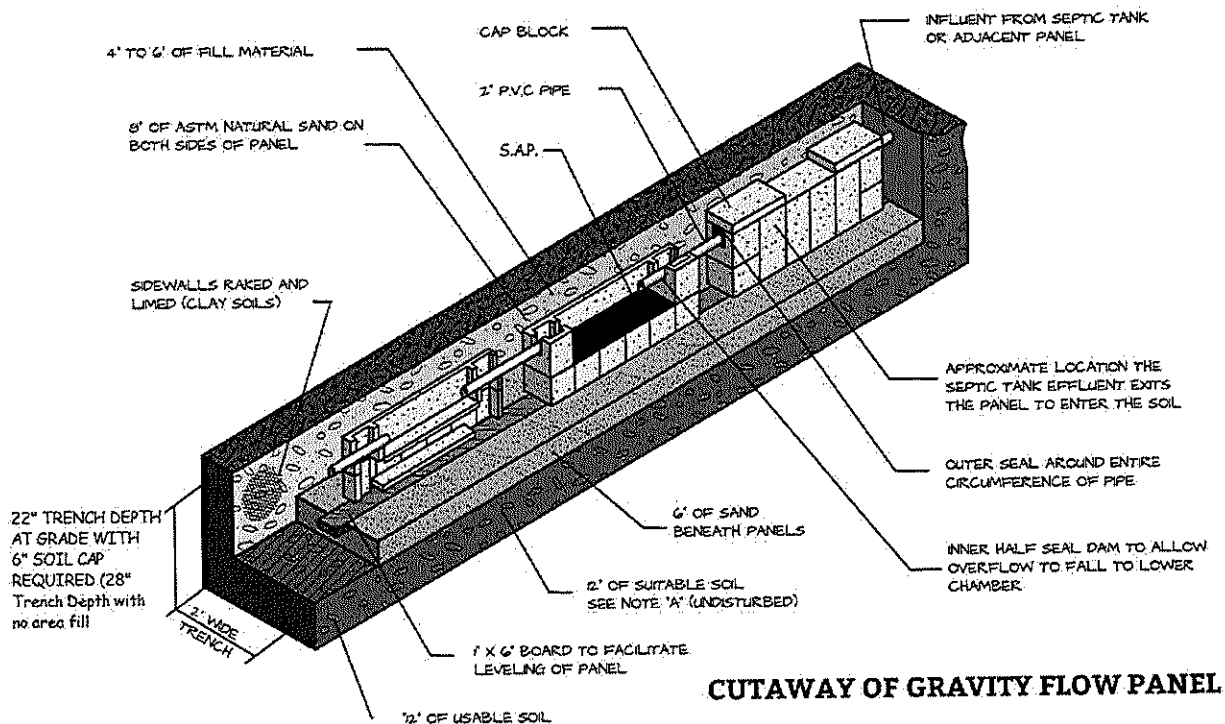
The following page provides illustrations of proper installation of Vertical and Horizontal panels along with all necessary components.

Isometric Drawing of a Segment of T & J Panel Horizontal Installation



CUTAWAY OF GRAVITY FLOW PANEL

Isometric Drawing of a Segment of T & J Panel Vertical Installation



CUTAWAY OF GRAVITY FLOW PANEL

Pump to Pressure Manifold Gravity Feed

When pumping to gravity feed, the Vertical Panel should be dosed at about 3.6 gal per Panel and the Horizontal Panel should be dosed between 3.6 gal to 7.2 gal per Panel. For most instances, dosing Horizontal Panels at 3.6 to 5.0 gallons will provide an adequate dose volume.

Low-Pressure Distribution

The LP Panel uses technology similar to that of Low Pressure Pipe (LPP) Systems, with the orifices discharging into the panels. The tables and distribution design described in the LPP manual, in most regards, is applicable to the pressure Panel System. The system should be used with two to four feet of head. In *both* horizontally and vertically installed pressure dosed panel systems, valves should be banked in a valve box and turn-ups should be neatly capped, covered and labeled for future service. Foam sealer is only needed in the outer cutout. Pump tanks should be constructed as shown in the drawing on page 21 to allow for service and repairs.

Vertical Panels with Pressure Distribution

When using low pressure distribution, our recommended dosing is 3.6 gallons per panel. By dosing each panel at 3.6 gallons, the top chamber will have the optimal ratio of both effluent and freeboard, allowing for storage capacity and high oxygen content. By drilling one hole per panel in the distribution line, the total dose volume can easily be calculated by multiplying the number of panels by 3.6. As an example, for a system with 34 panels and identical orifice sizes, the total dose volume would be 122 gallons ($34 \times 3.6 = 122$). Special care should be taken to ensure that only one hole is drilled per panel. The first and last hole of each line should be drilled at 6 o'clock (facing trench bottom) to act as weep holes, helping any residual effluent to escape the line. All holes in between should be drilled alternating from the 10 o'clock and the 2 o'clock positions on the distribution pipe, with only one hole per panel. If the hole sizing changes in the system, the pump cycle is set by the hole that is discharging the fastest.

Horizontal Panels with Pressure Distribution

When dosing a horizontal panel with low pressure distribution, the same ideas apply. Panels will have one orifice each. For cost effectiveness, it is allowable to run a single distribution pipe per line rather than having to install two for each line (one in each chamber). We recommend the distribution line be installed in the chamber that is most uphill. The chamber without the distribution still serves its purpose of storage capacity as the panel block matrix allows for effluent permeability. The chambers without a distribution line must have a full seal of foam sealer on the outer cutout. Additional materials may be used to give structure to the foam sealer to prevent unstable seals during the curing process. As with Vertical Panels, calculating total dose volume for a low-pressure horizontal panel system can be achieved by multiplying total number of panels by 3.6 gallons. If a system has 34 panels and all holes are the same size, you would multiply 34×3.6 to get 122 gallons per dose cycle. that the effluent is pumped into the inner chambers of the panel. If the hole sizing changes in the system, the pump cycle is set by the hole that is discharging the fastest. The first and last hole of each line should be drilled at 6 o'clock (facing trench bottom) to act as weep holes, helping any residual effluent to escape the line. All holes in between should be drilled alternating from the 10 o'clock and the 2 o'clock positions on the distribution pipe, with only one hole per panel. If the hole sizing changes in the system, the pump cycle is set by the hole that is discharging the fastest.

Proper Hole Placement in a Low-Pressure Panel Block System

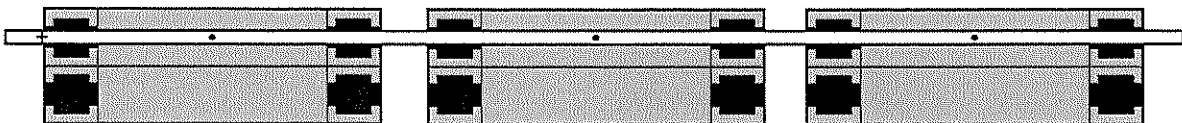
The following diagram shows how to easily drill orifices in the distribution line for a T&J Panel system utilizing low-pressure distribution.



In the picture above, we see that the distribution line has been run through the full number of panel blocks for a given trench length. The goal is to drill the orifices close to the middle of the panel (23 inches from the end of the panel). The red circles indicate the ideal location for the distribution orifices. By marking a cross where the distribution line enters the first panel in the line, it is easy to keep track of orientation for drilling holes at the appropriate angles. This mark will also help give a reference point as to where the distribution pipe should be reset to after all holes are drilled.

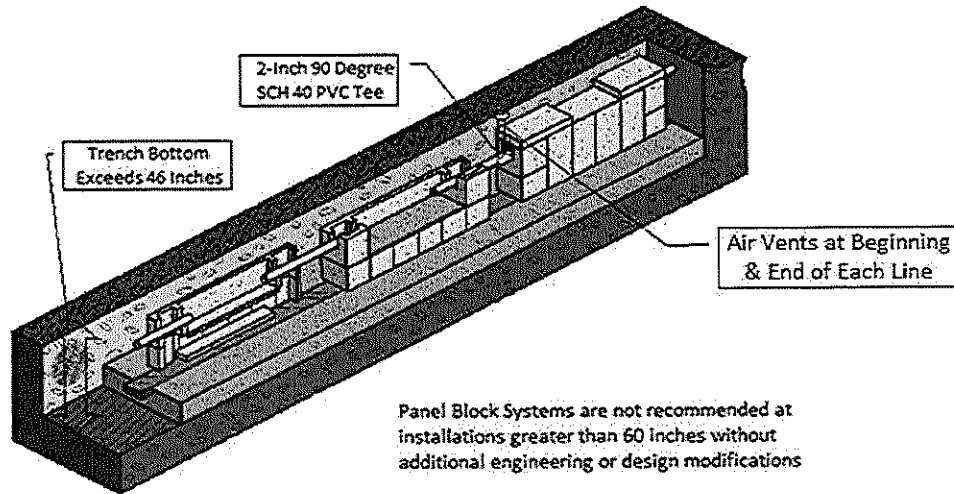


Once the orientation mark has been made, the distribution pipe can be pulled outward just over 23 inches. This allows for each orifice to be drilled just in front of the corresponding panel. After drilling all holes at the proper angles as mentioned in the previous section, the distribution pipe can be returned to its proper location by aligning the blue cross with the front side of the first panel block. The same process applies for a horizontal installation, with only one side of panel receiving the distribution line as shown below.



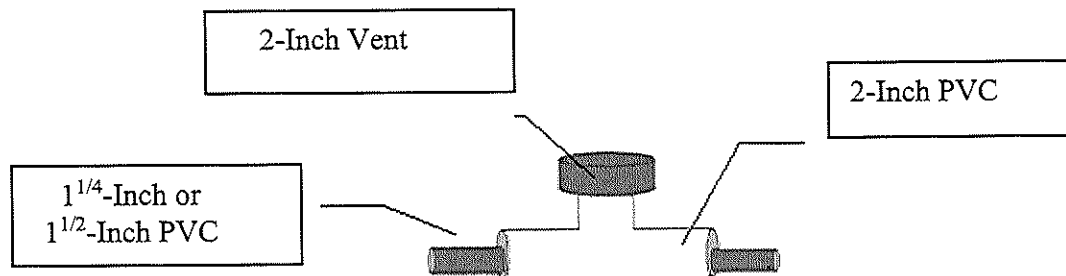
Deep Installation of Panel Block Systems

Utilize these specifications for ventilation when Trench Bottom *exceeds* 46-inches. In certain situations, there are more desirable soil conditions deeper in the soil profile. On these sites, Panel Systems can still be utilized with proper ventilation to the system. Air vents are used with Panel Systems to allow the chambers within the Panel to receive the air needed for treatment. Air vents should be installed as designed. When venting Panel Systems, vents should be placed at the beginning and end of each line.



Gravity Flow Installation: Air vents should be placed at the beginning and end of each line to provide adequate oxygen content. For vertical panels, cut the 24-inch long, 2-inch PVC pipe in half, then reconnect with a 2-inch 90-Degree SCH 40 Tee. Extend the 2-inch Tee up to ground surface to allow ventilation. For horizontal panels, follow the same procedure on one side of the panel block and utilize 1 ½-inch PVC. Air vents should come to or just below finish grade and housed neatly in something such as an irrigation box/cover for protection.

Vertical Panel Deep LP Installation (Low Pressure Pipe): Insert your 1 ¼-inch or 1 ½-inch into a 2-inch PVC "sleeve" that spans from one inner chamber of a panel to the next for each panel. At the beginning and end of each line, connect a 2-inch 90 Degree SCH 40 Tee to the "sleeve" halfway between one panel and the next. Extend the 2-inch Tee up to ground surface to allow ventilation. Air vents should come to or just below finish grade and be housed neatly in something such as an irrigation box/cover for protection.



Horizontal Panel Deep LP Installation

For deep horizontal installations, venting can be supplied to the side of the panels not being utilized by the distribution line. 2-foot sections of 1 ½-inch SCH 40 PVC can be used to connect the panels from inner chamber to inner chamber. At the beginning and end of each line of panels, connect a 1 ½-inch SCH 40 ninety and extend the vent lines to ground surface to allow for ventilation. Air vents should come to or just below finish grade and housed neatly in something such as an irrigation box/cover for protection. The diagram below illustrates this configuration.



Installing Panels in Deep Trenches Using Additional Backfill Sand

When more permeable underlying horizons are present below more restrictive upper horizons in the soil profile, installing panels with additional backfill sand is applicable **in lieu of utilizing vents**. The backfill sand used shall be a medium grade naturally occurring sand that extends into the permeable underlying horizon. Panels can then be installed closer to the surface, allowing for greater oxygen availability, and negating the need for vents. The presence of added backfill sand offers even greater storage capacity and treatment for the system.

Final Inspection

The following list are key points that an inspector should look for when issuing a completion permit:

- 1) Were panels installed horizontally or vertically, according to the permit?
- 2) Are the proper number of panels for each line installed?
- 3) Is the depth of the panels within guidelines?
- 4) Are drain lines level or less than ¼ inch fall in ten feet?
- 5) Have seals been properly constructed?
- 6) Was the proper foam sealer (GE) or tar seal rope used to construct the seals?
- 7) Was the proper sand used in the trench backfill?

Is the sand clean? (i.e. free of debris, large organics, leaves, etc.)

Has the sand been screened? (to a medium grade, not too fine, free of large rocks)

Is the sand naturally occurring? (i.e. from a river, creek, sand pit, etc., not manufactured)

- 8) If in soils where clay is present, were the sidewalls raked and limed?

For Pumped Systems

- 9) Have pump size, head pressure and dose cycle been properly sized and set?
Set dose cycle for 3.6 gallons per panel with pressure distribution
Set dose cycle at 3.6 gallons per vertical panel and 3.6 to 7.2 gallons per horizontal panel when pumping to pressure manifold and gravity feeding.
- 10) Record field data on operations permit.

Design Resources

Please feel free to contact a member of T&J Panel with any design, installation or maintenance questions related to an LP Panel or Pressure Manifold system

Here you will find a pressure head table to help in flow design of your LP Panel system. These numbers are a guide to help you in selecting the right flow for your system. We have found that in most systems the 5/32" and 3/16" hole at 2 to 4 feet of head pressure works the best in giving a pump cycle of more than 5 minutes and keeps the same maximum top chamber flow load as sited on the previous page.

Flow Chart of Various Orifices and Pressure Heads

FLOW CHART OF VARIOUS ORIFICES AND HEAD PRESSURES

Head Pressure Ft.	Orifice Size									
	3/32" .094"	1/8" .125"	5/32" .156"	3/16" .188"	7/32" .219"	1/4" .250"	9/32" .281"	5/16" .313"	11/32" .344"	3/8" .375"
2.0	.15	.26	.41	.59	.80	1.04	1.32	1.63	1.97	2.34
2.1	.15	.27	.42	.60	.82	1.07	1.35	1.67	2.02	2.40
2.2	.15	.27	.43	.61	.84	1.09	1.38	1.71	2.07	2.46
2.3	.16	.28	.44	.63	.86	1.12	1.41	1.75	2.11	2.51
2.4	.16	.29	.46	.64	.87	1.14	1.44	1.78	2.16	2.57
2.5	.16	.29	.46	.66	.89	1.17	1.47	1.82	2.20	2.62
2.6	.17	.30	.46	.67	.91	1.19	1.5	1.86	2.25	2.67
2.7	.17	.30	.47	.68	.93	1.21	1.53	1.89	2.29	2.72
2.8	.17	.31	.48	.69	.94	1.23	1.56	1.93	2.33	2.77
2.9	.18	.31	.49	.71	.96	1.25	1.59	1.96	2.37	2.82
3.0	.18	.32	.50	.72	.98	1.28	1.62	1.99	2.41	2.87
3.1	.18	.32	.51	.73	.99	1.3	1.64	2.03	2.45	2.92
3.2	.19	.33	.51	.74	1.01	1.32	1.67	2.06	2.49	2.97
3.3	.19	.33	.52	.75	1.02	1.34	1.69	2.09	2.53	3.01
3.4	.19	.34	.53	.76	1.04	1.36	1.72	2.12	2.57	3.06
3.5	.19	.34	.54	.78	1.06	1.38	1.74	2.15	2.61	3.10
3.6	.20	.35	.55	.79	1.07	1.40	1.77	2.18	2.64	3.15
3.7	.20	.35	.55	.80	1.09	1.42	1.79	2.21	2.68	3.19
3.8	.20	.36	.56	.81	1.10	1.44	1.82	2.24	2.72	3.23
3.9	.20	.36	.57	.82	1.11	1.46	1.84	2.27	2.75	3.27
4.0	.21	.37	.58	.83	1.13	1.47	1.87	2.30	2.79	3.32

GPM

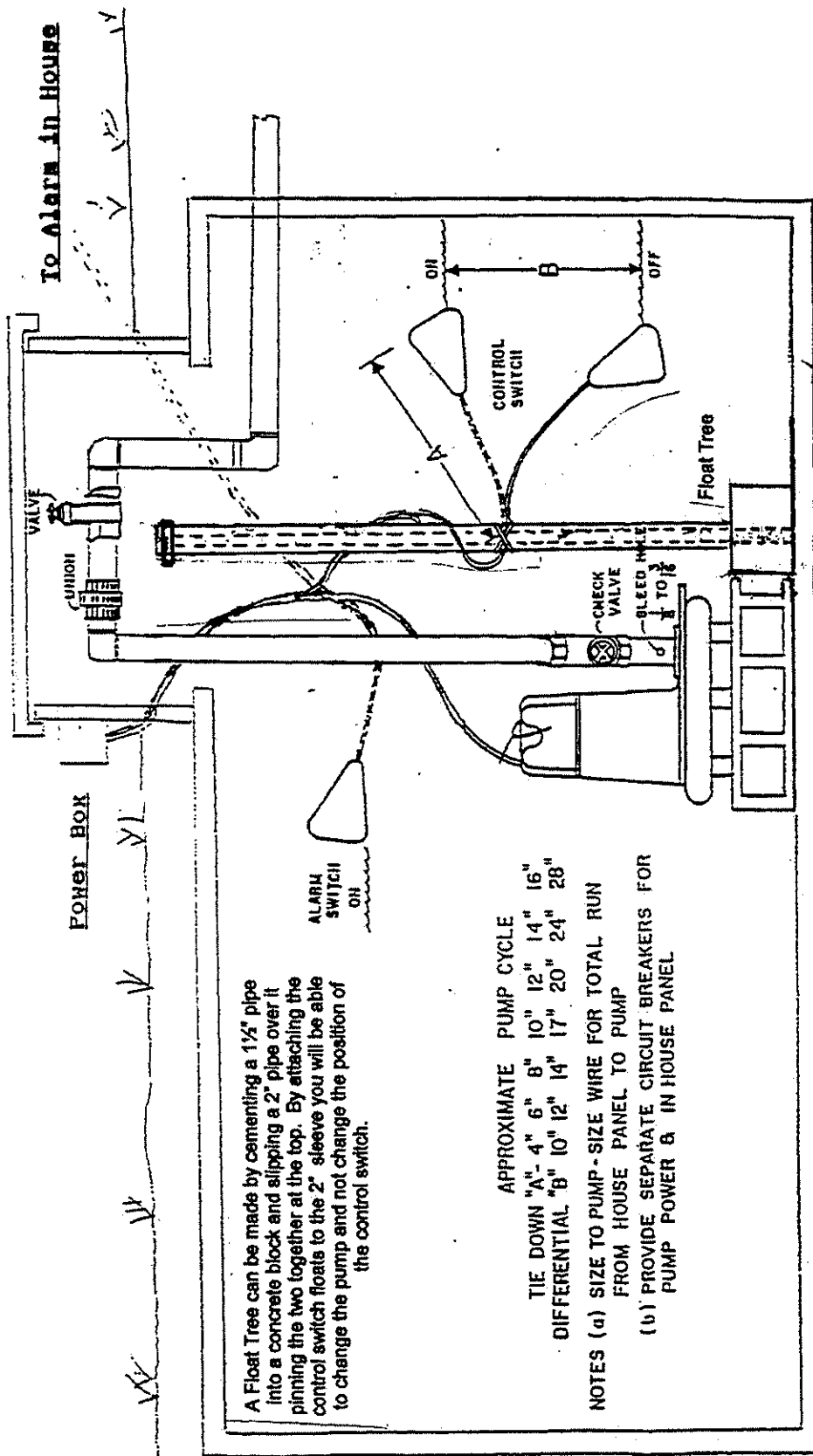
This chart will assist you in determining the proper tap sizes when you have to pump to a pressure manifold in a gravity system.

PRESSURE MANIFOLD TAP FLOW

Head Pressure ft.	SCH 40		Tap Diameter	SCH 80	
	1/2" 0.622	3/4" 0.824		1/2" 0.546	3/4" 0.742
2.0	7.11	12.50		5.48	10.10
2.1	7.29	12.80		5.62	10.40
2.2	7.46	13.10		5.75	10.60
2.3	7.63	13.40		5.88	10.90
2.4	7.79	13.70		6.00	11.10
2.5	7.95	14.00		6.13	11.30
2.6	8.11	14.20		6.25	11.50
2.7	8.26	14.50		6.37	11.80
2.8	8.62	14.80	Gallons	6.48	12.00
2.9	8.36	15.00	per minute	6.60	12.20
3.0	8.71	15.30		6.71	12.40
3.1	8.86	15.50		6.82	12.60
3.2	9.00	15.80		6.93	12.80
3.3	9.14	16.00		7.04	13.00
3.4	9.27	16.30		7.15	13.20
3.5	9.41	16.50		7.25	13.40
3.6	9.54	16.70		7.35	13.60
3.7	9.67	17.00		7.45	13.80
3.8	9.80	17.20		7.55	14.00
3.9	9.93	17.40		7.65	14.10
4.0	10.10	17.70		7.75	14.30

Below is a chart to aid in head selection due to friction loss in PVC pipe. In calculating friction, be sure to add 20% for loss in fittings. In the chart below, friction loss is per 100 feet of pipe. The head created by friction loss is added to the elevation head of lift from the bottom of the pump tank to the top of the highest turn-up.

Flow GPM	Pipe Diameter					
	1"	1 1/4"	1 1/2"	2"	3"	4"
	Friction Loss (100ft)					
1	.07					
2	.28	.07				
3	.60	.16	.07			
4	1.01	.25	.12			
5	1.52	.39	.18			
6	2.14	.55	.25	.07		
7	2.89	.76	.36	.10		
8	3.63	.97	.46	.14		
9	4.57	1.21	.58	.17		
10	5.5	1.46	.70	.21		
11		1.77	.84	.25		
12		2.09	1.01	.30	.07	
13		2.42	1.17	.35	.08	
14		2.74	1.33	.39	.09	
15		3.06	1.45	.44	.10	
16		3.49	1.65	.50	.11	
17		3.93	1.86	.56	.12	
18		4.37	2.07	.62	.16	
19		4.81	2.28	.68	.23	
20		5.23	2.46	.74	.30	
25			3.75	1.10	.39	
30			5.22	1.54	.48	
35				2.05	.58	.07
40				2.62	.81	.09
45				3.27	1.08	.12
50				3.98	1.38	.16
60					1.73	.21
70					2.09	.28
80						.37
90						.46
100						.55



Frequently Asked Questions

Q: Can I Use Vertical and Horizontal Panels in the same system to overcome certain site or soil conditions?

A: YES. Both styles are interchangeable can be used in combination.

Q: How do I calculate the amount of backfill sand for my drainfield?

A: To calculate the amount of backfill sand needed, use the equation: $LF \times .17 = \text{Tons Needed}$; where LF is total linear feet of nitrification line.

Q: When designing a T&J Panel System, do lines need to be designed to certain lengths in order to make panels fit properly with 6-inch spacing between them?

A: NO, panels can be utilized in whatever line lengths are necessary for the design of a system. Spacing between the panels can be adjusted in order to make them fit into any given line length, so long as the proper number of panels are installed in that line.

Q: Does the Horizontal Panel system use more sand due to its 3-foot trench?

A: No, the cubic volume remains the same as Vertical Panel systems even though it is a 2-foot trench due to the lower trench profile.

Q: Should I consider a wider trench when installing a Vertical Panel System?

A: No, a 2-foot trench is vital in the distribution of effluent to the side walls and is key to keeping the aerobic treatment needed for breakdown.

Q: Why do Panel Block Systems have the longest lifespan on average of any system on the market:

A: The successful longevity of our system is primarily due to the fact that the storage capacity is 3X that of a conventional system all while pretreating effluent and preserving the soil itself. This hydraulically allows the soil to accept effluent longer and in a much smaller footprint.

Q: What type of boards are used for installation and that are their purpose?

A: Any 1x4 or 1x6 board will work. Boards do not have to be treated because it will actually fossilize in the trench over time. The purpose of this board is for maintaining the level at time of installation.

Q: Do I need a certification from T&J Panels to be able to install the system?

A: No, you do not need a certification from T&J Panels to be able to install the system, but we recommend an install training from one of our company representatives for your first-time installation.

Q: Why should I consider a Panel System?

A: You may consider using a panel system if you want a system with longevity, if you have future site needs (ex. pools, additional bedrooms, landscaping needs), to maximize your development potential, or if you value having a more environmentally friendly option.

T & J Panel Wastewater Treatment System

**269 Marble Road
Statesville, NC 28625**

Office: 704-924-8600

Fax: 704-924-8681

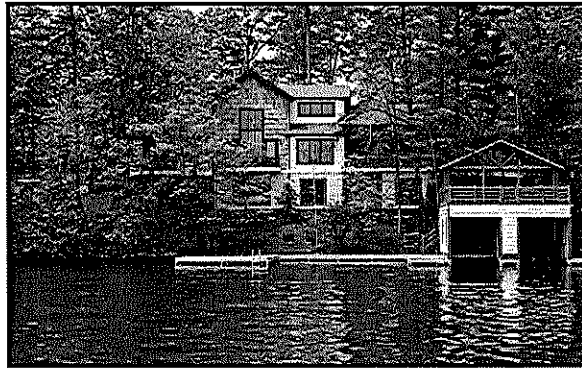
Website: www.tjpanel.com

Email: info@tjpanel.com

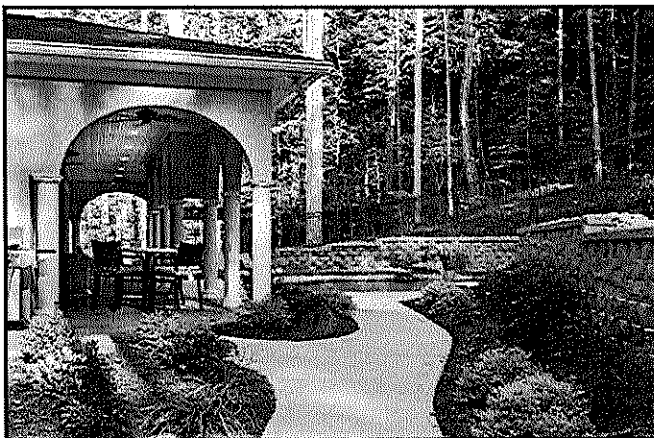
Limited Warranty:

The structural integrity of each T&J Panel, when installed in accordance with manufacturer's instructions, is warranted against defective materials and workmanship for one year from date of manufacture. Should a defect appear within the warranty period, purchaser must inform T&J Panel System of the defect before the warranty expires. T&J Panel System will supply a replacement unit. T&J Panel System's liability specifically excludes the cost of removal and/or installation of the panels. There are no other warranties with respect to the units, including no warranties of merchantability or of fitness for a particular purpose. The warranty does not extend to incidental, consequential, special or indirect damages. The company shall not be liable for penalties or liquidated damages, including loss of production and profits, labor and materials, overhead costs, or other loss or expense incurred by buyer. Specifically excluded from warranty coverage are: Damage to the panels due to ordinary wear and tear; alteration, accident, misuse, abuse or neglect of the panels; the panels being subjected to stresses greater than those prescribed in the installation instructions; the placement by buyer of improper materials into buyer's system; or any other event, not caused by the company. Furthermore, in no event shall the company be responsible for any loss or damage to the buyer, the panels or any third party resulting from its installation or shipment. Buyer shall be solely responsible for ensuring that installation of the system is completed in accordance with all applicable laws, codes, rules and regulations. Any alteration of this warranty must be noted as "Warranty" in writing by the company.

When Your Problem In On-site Is:



Topography and Vegetation



Special Landscaping Needs



Future Site Needs



Limited Suitable Area

Then consider a better quality effluent with T & J Panel

