

Appendix D:
Preliminary Geotechnical Report



GLOBAL GEO-ENGINEERING, INC.

September 11, 2018
Project 7862-06

Sondh Venture Inc.
11768 Fotthill Boulevard
Rancho Cucamonga, California 91730

Attention: Mr. Jaswinder Singh Sondh

Subject: Infiltration Rate
Proposed Developments – *Gas Station and Convenience Store*
Northwest Corner of Pennsylvania Avenue and I-10 Freeway
Beaumont, California

Dear Mr. Sondh:

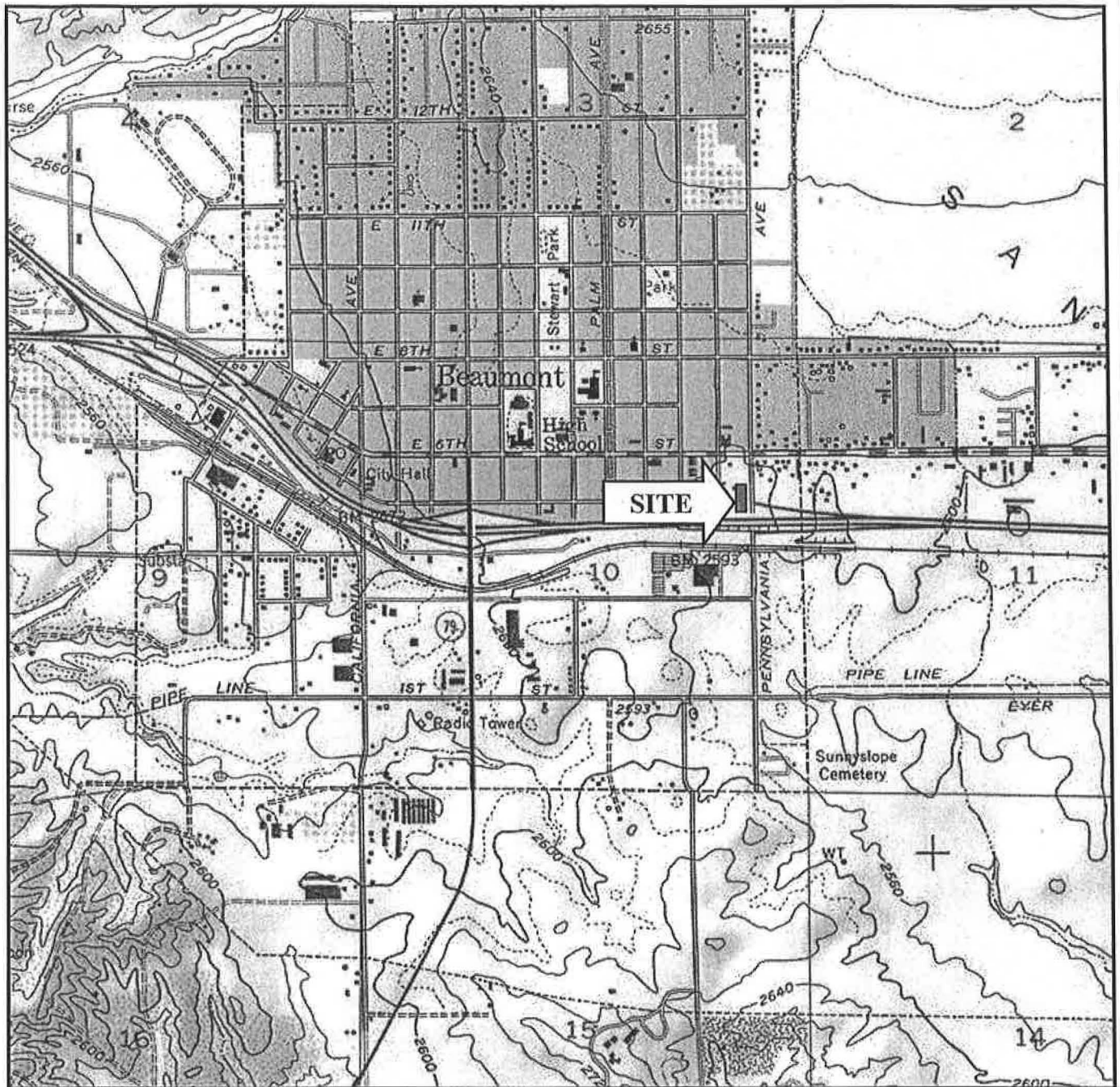
1. INTRODUCTION

- a) As requested, we have conducted an infiltration test for the proposed on-site storm water disposal system to be constructed at the above referenced site located in city of Beaumont, California.
- b) An approximate location is shown on the *Location Map, Figure 1*.
- c) The purpose of our study was to determine the infiltration rate for the proposed on-site storm water disposal system.

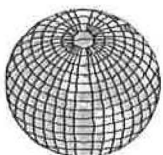
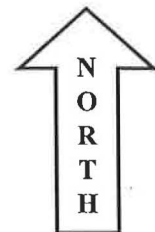
2. FIELD EXPLORATION

- a) During the recent geotechnical investigation, we drilled three borings with depths ranging from 20 feet to 30 feet for purpose of geotechnical investigation along with two 8-inch diameter borings for percolation test to determine infiltration rate. Percolation boring P-1 was drilled in the southeast area of the site where as P-2 was drilled on the east side, along Pennsylvania Avenue.
- b) The borings were drilled using a truck mounted hollow stem auger drill rig. No Seepage or groundwater was noted to exist in any of the boreholes. *Logs of Borings* are enclosed as *Figures 2 through 6*. The locations of the borings are shown on the *Boring Location Plan, Figure 7*.

LOCATION MAP



BASE MAP: USGS 7.5-Minute Topographic Map,
Beaumont Quadrangle, 1996



GLOBAL GEO-ENGINEERING, INC.

GEOLOGIC AND SOILS ENGINEERING IRVINE, CALIFORNIA

Northwest Corner of Pennsylvania Avenue
and I-10 Freeway
Beaumont, California

Date: September 2018

Figure No:

Project No.: 7862-06

1

Global Geo-Engineering, Inc. Irvine, California Geologists and Geotechnical Engineers							LOG OF BORING B-1			Drilling Method : Hollow Stem Sampling Method : California Modified Hammer Weight (lbs) : 140 Hammer Drop (in) : 30	
Northwest Corner of Pennsylvania Avenue and I-10 Freeway Beaumont, California							Date : August 29, 2018 Logged By : KBY Drilling Company : Cal Pac Drilling Rig : Mobile B-53				
Project 7862-06											
Depth in Feet	Sample	Field Moisture % Dry Weight	Dry Density lb./cubic ft.	Blow Count	Relative Compaction	Water Level	USCS	GRAPHIC	Sample Type <div> <div>⊠</div> Ring <div>⊡</div> Bulk <div>■</div> Standard Penetration Testing </div>	Water Levels <div> <div>▼</div> Groundwater Encountered <div>▽</div> Seepage Encountered </div>	DESCRIPTION
0	⊡										Silty SAND: fine grained, orange to dark yellow brown, slightly moist, medium dense, porous with Sandy SILT interbeds
5	⊡	4.9	101.0	26							@5' dark orange brown, slightly porous
10	⊡	9.6	113.6	38							@9' orange to yellow brown
15	⊡	8.4	114.1	38			SM/ML				@14' medium dense to dense, slightly gravelly
20	⊡	9.0	108.7	57							@19' yellow brown, more Silty
25		4.5	107.8	41							ALLUVIAL FAN DEPOSITS
30											Bottom of Boring at 20 feet:
35											Notes: 1. Caving to 13 feet after augers were removed 2. No groundwater or seepage encountered 3. Boring backfilled

Figure 2

Global Geo-Engineering, Inc. Irvine, California Geologists and Geotechnical Engineers							LOG OF BORING B-2			Drilling Method : Hollow Stem Sampling Method : California Modified Hammer Weight (lbs) : 140 Hammer Drop (in) : 30	
Northwest Corner of Pennsylvania Avenue and I-10 Freeway Beaumont, California							Date : August 29, 2018 Logged By : KBY Drilling Company : Cal Pac Drilling Rig : Mobile B-53				
Project 7862-06											
Depth in Feet	Sample	Field Moisture % Dry Weight	Dry Density lb./cubic ft.	Blow Count	Relative Compaction	Water Level	USCS	GRAPHIC	Sample Type <div> <div>⊠</div> Ring <div>▨</div> Bulk <div>■</div> Standard Penetration Testing </div>	Water Levels <div> <div>▼</div> Groundwater Encountered <div>▽</div> Seepage Encountered </div>	DESCRIPTION
0											Silty SAND: fine grained, orange brown to yellow brown, slightly moist, medium dense, slightly porous with Sandy SILT interbeds
5	⊠	8.3	100.2	40							
10	⊠	8.6	112.5	55							
15	⊠	4.7	94.2	29			SM/ML				@9' dark yellow brown
20	⊠	7.4	117.2	78							@14' medium dense to dense, slightly gravelly
25	⊠	5.0	104.4	36							ALLUVIAL FAN DEPOSITS
30											Bottom of Boring at 20 feet:
35											Notes: 1. Caving to 13.5 feet after augers were removed 2. No groundwater or seepage encountered 3. Boring backfilled

Figure 3

Global Geo-Engineering, Inc. Irvine, California Geologists and Geotechnical Engineers							LOG OF BORING B-3			Drilling Method : Hollow Stem Sampling Method : California Modified Hammer Weight (lbs) : 140 Hammer Drop (in) : 30		
Northwest Corner of Pennsylvania Avenue and I-10 Freeway Beaumont, California							Date : August 29, 2018 Logged By : KBY Drilling Company : Cal Pac Drilling Rig : Mobile B-53					
Project 7862-06												
Depth in Feet	Sample	Field Moisture % Dry Weight	Dry Density lb./cubic ft.	Blow Count	Relative Compaction	Water Level	USCS	GRAPHIC	Sample Type <div> <div>⊠</div> Ring </div> <div> <div>⊠</div> Bulk </div> <div> <div>■</div> Standard Penetration Testing </div>	Water Levels <div> <div>▼</div> Groundwater Encountered </div> <div> <div>▽</div> Seepage Encountered </div>		
DESCRIPTION												
0	⊠	12.5	114.0	27						Silty SAND: fine grained, orange brown, moist, medium dense, slightly porous with Sandy SILT interbeds, slight CLAY content		
5	⊠	9.6	112.6	27								
10	⊠	13.1	116.4	24						@9' orange brown		
15	⊠	9.4	113.5	27			SM/ML			@14' slightly gravelly		
20	⊠	13.9	111.7	21								
25	⊠	15.7	115.3	24						@24' more Silty, dark orange brown		
30	⊠	12.4	113.9	30						@29' less Silty, fine to medium grained, yellow brown ALLUVIAL FAN DEPOSITS		
Bottom of Boring at 30 feet:												
Notes:												
1. Caving to 24 feet after augers were removed												
2. No groundwater or seepage encountered												
3. Boring backfilled												
35												

Figure 4

Figure 6

- c) All the borings encountered Silty SAND alluvium soils.

3. **PERCOLATION STUDY**

- a) The percolation study was conducted in both the borings.
- b) The borings were thoroughly pre-soaked for a period of 24 hours. The percolation testing was conducted on the next day following the pre-soak. From a fixed reference point, the drop in the water level was measured in 60-minute intervals for a period of just over, six hours for all the borings, refilling after every reading. The results of the field percolation tests are provided in *Figure 8 and 9*. Before the testing started the Boring P-1 had 30 inches of water left from the pre-soak and the Boring P-2 had 10 inches of water left from the pre-soak.
- c) The drops in the water during the last reading period of 60 minutes and the corresponding percolation rates were:

Boring No.	Date	Drop (Inches)	Percolation Rate (min/inch)
P-1	August 30, 2018	1.75	34.3
P-2	August 30, 2018	7	8.6

- d) In accordance with *Riverside County – Low Impact Development BMP Design Handbook*, Page 20 (see attached), we used *Porchet* method to calculate the infiltration rate. The rates are shown below:

Boring No.	Percolation Rate (inch/hour)
P-1	0.05
P-2	0.24

- e) These rates are calculated using a factor of safety of 1.0. Appropriate factor of safety should be utilized while designing the basin.

Field Percolation Test

Test Hole No:	P-1
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Depth of Test Hole (D_T):	66 inches
Diameter of Test Hole:	8 inches
Presoak Date:	8/29/2018
Water Level after Presoak:	30 inches
Test Date:	8/30/2018
Tested by:	ERV

Trial No.	ΔT	D_o	D_f	ΔD	Percolation Rate (min/in.)
	Time Interval (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	
1	60	0	3	3	20
2	60	0	2.5	2.5	24
3	60	0	2	2	30
4	60	0	2	2	30
5	60	0	1.75	1.75	34.29
6	60	0	1.75	1.75	34.29

***Note** = D_o and D_f measured from the top of the ground surface

Northwest Corner of Pennsylvania Avenue and I-10 Freeway Beaumont, California	
Date: September 2018	Figure No: 8
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Field Percolation Test

Test Hole No:	P-2
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Depth of Test Hole (D_T):	60 inches
Diameter of Test Hole:	8 inches
Presoak Date:	8/29/2018
Water Level after Presoak:	10 inches
Test Date:	8/30/2018
Tested by:	ERV

Trial No.	ΔT	D_o	D_f	ΔD	Percolation Rate (min/in.)
	Time Interval (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	
1	60	0	8	8	7.5
2	60	0	8	8	7.5
3	60	0	7.5	7.5	8
4	60	0	7.25	7.25	8.28
5	60	0	7	7	8.57
6	60	0	7	7	8.57

***Note** = D_o and D_f measured from the top of the ground surface

Northwest Corner of Pennsylvania Avenue and I-10 Freeway Beaumont, California	
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2.3 - Percolation Tests

The **percolation test** is widely used for assessing the suitability of a soil for onsite wastewater disposal. Depending on the required depth of testing, there are two versions of the percolation test. For shallow depth testing (less than 10 feet), the procedure would be as shown in Figure 8 (Photo 6). For deep testing (10 feet to 40 feet), the procedure is as shown in Figure 9. For deep testing, special care must be taken to ensure that caving of the sidewalls does not occur.

This test measures the length of time required for a quantity of water to infiltrate into the soil and is often called a “percolation rate”. It should be noted that the percolation rate is related to, but not equal to, the infiltration rate. While an infiltration rate is a measure of the speed at which water progresses downward into the soil, the percolation rate measures not only the downward progression but the lateral progression through the soil as well. This reflects the fact that the surface area for infiltration testing would include only the horizontal surface while the percolation test includes both the bottom surface area and the sidewalls of the test hole. However, there is a relationship between the values obtained by a percolation test and infiltration rate. Based on the ¹“Porchet Method”, the following equation may be used to convert percolation rates to the tested infiltration rate, I_t :

$$I_t = \frac{\Delta H \pi r^2 60}{\Delta t (\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H 60 r}{\Delta t (r + 2H_{avg})}$$

Where:

- I_t = tested infiltration rate, inches/hour
- ΔH = change in head over the time interval, inches
- Δt = time interval, minutes
- r = effective radius of test hole
- H_{avg} = average head over the time interval, inches

An example of this procedure is provided on Page 26 based data form Table 5, *Sample Percolation Test Data*. Figure 11 provides a plot of the converted percolation test data.

*Where a rectangular test hole is used, an equivalent radius should be determined based on the actual area of the rectangular test hole. (i.e., $r = (A/\pi)^{0.5}$)

Note to the designer: The values obtained using this method may vary from those obtained from methods considered to be more accurate. The designer is encouraged to explore the derivation of these equations (Ritzema; Smedema)

Final Report - Ultimately, as discussed in Section 1.7, a final report shall be provided and, based on the test results, an infiltration rate shall be recommended.

¹H.P. Ritzema, “Drainage Principles and Applications,” International Institute for Land Reclamation and Improvement (ILRI), Publication 16, 2nd revised edition, 1994, Wageningen, The Netherlands.

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The opportunity to be of service is sincerely appreciated. If you have any questions or if we can be of further assistance, please call.

Very truly yours,

GLOBAL GEO-ENGINEERING, INC.



Mohan B. Upasani
Principal Geotechnical Engineer
RGE 2301
(Exp. March 31, 2019)



Enclosures:

Location Map	- Figure 1
Logs of Borings	- Figures 2 through 6
Boring Location Plan	- Figure 7
Field Percolation Test Data	- Figures 8 and 9
Riverside County – Low Impact Development BMP Design Handbook, Page 20	
Terms and Conditions	

TERMS AND CONDITIONS OF AUTHORIZATION

Consultant shall serve Client by providing professional counsel and technical advice regarding subsurface conditions consistent with the scope of services agreed-to between the parties. Consultant will use his professional judgment and will perform his services using that degree of care and skill ordinarily exercised under similar circumstances, by reputable foundation engineers and/or engineering geologists practicing in this or similar localities.

- In assisting Client, the Consultant may include or rely on information and drawings prepared by others for the purpose of clarification, reference or bidding; however, by including the same, the Consultant assumes no responsibility for the information shown thereon and Client agrees that Consultant is not responsible for any defects in its services that result from reliance on the information and drawings prepared by others. Consultant shall not be liable for any incorrect advice; judgment or decision based on any inaccurate information furnished by the Client or any third party, and Client will indemnify Consultant against claims, demands, or liability arising out of, or contribute to, by such information.
- Unless otherwise negotiated in writing, Client agrees to limit any and all liability, claim for damages, cost of defense, or expenses to be levied against Consultant on account of design defect, error, omission, or professional negligence to a sum **not to exceed ten thousand dollars or charged fees whichever is less**. Further, Client agrees to notify any construction contractor or subcontractor who may perform work in connection with any design, report, or study prepared by Consultant of such limitation of liability for design defects, errors, omissions, or professional negligence, and require as a condition precedent to their performing the work a like limitation of liability on their part as against the Consultant. In the event the Client fails to obtain a like limitation of liability provision as to design defects, errors, omissions or professional negligence, any liability of the Client and Consultant to such contractor or subcontractor arising out of a negligence shall be allocated between Client and Consultant in such a manner that the aggregate liability of Consultant for such design defects to all parties, including the Client shall **not exceed ten thousand dollars or charged fees whichever is less**. No warranty, expressed or implied of merchantability or fitness, is made or intended in connection with the work to be performed by Consultant or by the proposal for consulting or other services or by the furnishing of oral or written reports or findings made by Consultant.
- The Client agrees, to the fullest extent permitted by law, to indemnify, defend and hold harmless the Consultant, its officers, directors, employees, agents and subconsultants from and against all claims, damages, liabilities or costs, including reasonable attorney's fees and defense costs, of any nature whatsoever arising from or in connection with the Project to the extent that said claims, damages, liabilities or costs arise out of the work, services, or conduct of Client or Client's contractors, subconsultants, or other third party not under Consultant's control. Client further agrees that the duty to defend set forth herein arises immediately and is not contingent on a finding of fault against Client or Client's contractors, subconsultants, or other third parties. Client shall not be obligated under this provision to indemnify Consultant for Consultant's sole negligence or willful misconduct.
- Client shall grant free access to the site for all necessary equipment and personnel and Client shall notify any and all possessors of the project site that Client has granted Consultant free access to the project site at no charge to Consultant unless expressly agreed to otherwise in writing.
- If Client is not the property owner for the subject Project, Client agrees that it will notify the property owner of the terms of this agreement and obtain said property owner's approval to the terms and conditions herein. Should Client fail to obtain the property owner's agreement as required herein, Client agrees to be solely responsible to Consultant for all damages, liabilities, costs, including litigation fees and costs, arising from such failure that exceed that limitation of Consultant's liability herein.
- Client shall locate for Consultant and shall assume responsibility for the accuracy of his representations as to the locations of all underground utilities and installations. Consultant will not be responsible for damage to any such utilities or installation not so located.
- Client and Consultant agree to waive claims against each other for consequential damages arising out of or relating to this agreement. Neither party to this agreement shall assign the contract without the express, written consent of the other party.
- Consultant agrees to cover all open test holes and place a cover to carry a 200-pound load on each hole prior to leaving project site unattended. Consultant agrees that all test holes will be backfilled upon completion of the job. However, Client may request test holes to remain open after completion of Consultants work. In the event Client agrees to pay for all costs associated with covering and backfilling said test holes at a later date, and Client shall indemnify, defend and hold harmless Consultant for all claims, demands and liabilities arising from his request, except for the sole negligence of the Consultant, to the extent permitted by law.
- Consultant shall not be responsible for the general safety on the job or for the work of Client, other contractors and third parties.
- Consultant shall be excused for any delay in completion of the contract caused by acts of God, acts of the Client or Client's agent and/or contractors, inclement weather, labor trouble, acts of public utilities, public bodies, or inspectors, extra work, failure of Client to make payments promptly, or other contingencies unforeseen by Consultant and beyond reasonable control of the Consultant.
- In the event that either party desires to terminate this contract prior to completion of the project, written notification of such intention to terminate must be tendered to the other party. In the event Client notifies Consultant of such intention to terminate Consultant's services prior to completion of the contract, Consultant reserves the right to complete such analysis and records as are necessary to place files in order, to dispose of samples, put equipment in order, and (where considered necessary to protect his professional reputation) to complete a report on the work performed to date. In the event that Consultant incurs cost in Client's termination of this Agreement, a termination charge to cover such cost shall be paid by Client.
- If the Client is a corporation, the individual or individuals who sign or initial this Contract, on behalf of the Client, guarantee that Client will perform its duties under this Contract. The individual or individuals so signing or initialing this Contract warrant that they are duly authorized agents of the Client.
- Any notice required or permitted under this Contract may be given by ordinary mail at the address contained in this Contract, but such address may be changed by written notice given by one party to the other from time to time. Notice shall be deemed received in the ordinary course of the mail. This agreement shall be deemed to have been entered into the County of Orange, State of California.

LIMITATIONS

Our findings, interpretations, analyses, and recommendations are professional opinions, prepared and presented in accordance with generally accepted professional practices and are based on observation, laboratory data and our professional experience. Consultant does not assume responsibility for the proper execution of the work by others by undertaking the services being provided to Client under this agreement and shall in no way be responsible for the deficiencies or defects in the work performed by others not under Consultant's direct control. No other warranty herein is expressed or implied.