เอกสารแนบที่ 8

เอกสารการจัดทำ Soil Profile ของโครงการ

FPT บริษัท ขนส่งน้ำมันทางท่อ จำกัด
FUEL PIPELINE TRANSPORTATION LIMITED

CONSTRUCTION SUPERVISION CONSULTANT

brightstar

CONTRACTOR

TRITON
ENGINEERING AND CONSTRUCTION

REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

โครงการเปลี่ยนแปลงแนวท่อขนส่งน้ำมันในพื้นที่ทับซ้อนโครงการรถไฟความเร็วสูง เชื่อมโยงภูมิภาค กรุงเทพ-หนองคาย (RFPT2)

DOCUMENT NO.:	RFPT2-RPT-D-010-001	REVISION: 0
DOCUMENT TITLE:	TOPOGRAPHIC SURVEY REPORT	

FPT REVIEW STAMP

- [x] E WORK MAY PROCEED
- [ ] F WORK MAY PROCEED SUBMIT FINAL DOCUMENT / DRAWING
- [ ] G REVISE AND RESUBMIT. WORK MAY PROCEED SUBJECT TO INCORPORATION OF CHANGES INDICATED.
- [ ] H REVISE AND RESUBMIT. WORK MAY NOT PROCEED
- [ ] I REVIEW NOT AND REQUIRED. WORK MAY PROCEED.

THIS REVIEW DOES NOT RELIEVE THE CONSTRACTOR OF ITS RESONSIBILITY FOR ERRORS AND FOR ALL ITS OTHER OBLIGATIONS UNDER THE CONTRACT

NAME PR 19 Apr 23
SIGNATURE ..... DATE .....

REV.	DATE	DESCRIPTION	BY	CHK	APPD
0	01 Apr 2023	Issued for Construction	Chaiyakorn	Pisan	Surapong
REVISIONS			TTEC	TTEC	TTEC

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COMMENT RESPONSE SHEET (GRS)

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Contract No.		Owner	Fuel Pipeline Transportation Limited
Project No.		Prepared by	Chaiyakorn Date: 01 Apr 2023
Document Number	RFPT2-RPT-D-010-001	Rev. of the commented	A Sheet: 1 of 1
Document Title	Topographic Survey Report		

No.	Section/Page	Comment	Response	By	Date	Remark
1.	Cover / 1	Return revision A with Code F, minor comment.	Updated to revision 0	Chaiyakorn	01 Apr 23	
2.	Cover / 1	In the next revision, for AutoCAD files (Appendix E), please place all files in the share drive	Incorporated Comment. The Appendix E - AutoCAD files already attached into PDF as follows Attachment Name RFPT2-RPT-D-010-001 Rev.0 Appendix E.dwg	Chaiyakorn	01 Apr 23	

Additional Notes (if any) Attachment:

Distribution:

DOCUMENT CHANGE RECORD

Rev	Date	Prepared/ Revised by	Checked by	Approved by	Description
A	19 Dec 2022	Chaiyakorn	Pisan	Surapong	Issued for Review
0	01 Apr 2023	Chaiyakorn	Pisan	Surapong	Issued for Construction

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1. INTRODUCTION

Fuel Pipeline Transportation Limited (FPT) operates the multi-products pipelines to transport various grades of fuel products with the same pipeline to customers in Thailand. The throughput volume is obtained from 4 sources as follows:

- Oil refinery of Bangchak Petroleum Public Co., Ltd, from Bangchak.
- Oil depot of Oil and Retail Business Public Company Limited. (PTTOR) from Phra Khanong
- Oil depot of The Shell Company of Thailand Ltd. from Chongnonsi
- Oil depot of Chevron (Thailand) Co., Ltd. from Chongnonsi

The throughput from all 4 sources shall be delivered via underground pipelines laid parallel to the railway tracks to main pumping station at Chongnonsi area, then transported by high-pressure distribution pump at Makasan Control Station to deliver to terminals which consist of aviation fuel depots at Donmuang and Suvarnabhumi Airport, and the ground products depots including Bang Pa-In depot at Ayutthaya Province, Pichit depot at Pichit Province, and Lampang Depot at Lampang Province.

According to the State Railway of Thailand (SRT), there is a cooperation project between the government of the Kingdom of Thailand and the government of the People's Republic of China in the development of high-speed railway system to link the region during Bangkok - Nong Khai (Phase 1, Bangkok - Nakhon Ratchasima). A part of this project, in contracts no. 4-2 and 4-3, the fuel pipeline line was found to be interfered with the foundation of elevated high speed railway system. The fuel pipeline shall demolish and reroute to avoid interference in accordance with international standards and requirements of FPT. The reroute pipeline section will be started from KP.24+821 (Foundation no. 1099, DK.36+873.74) to KP.26+674 (Foundation No.1152, DK38+586.44) approximately 1.8 kilometres in length and described in Figure 1: Pipeline reroute section (Pink color)Figure 1.

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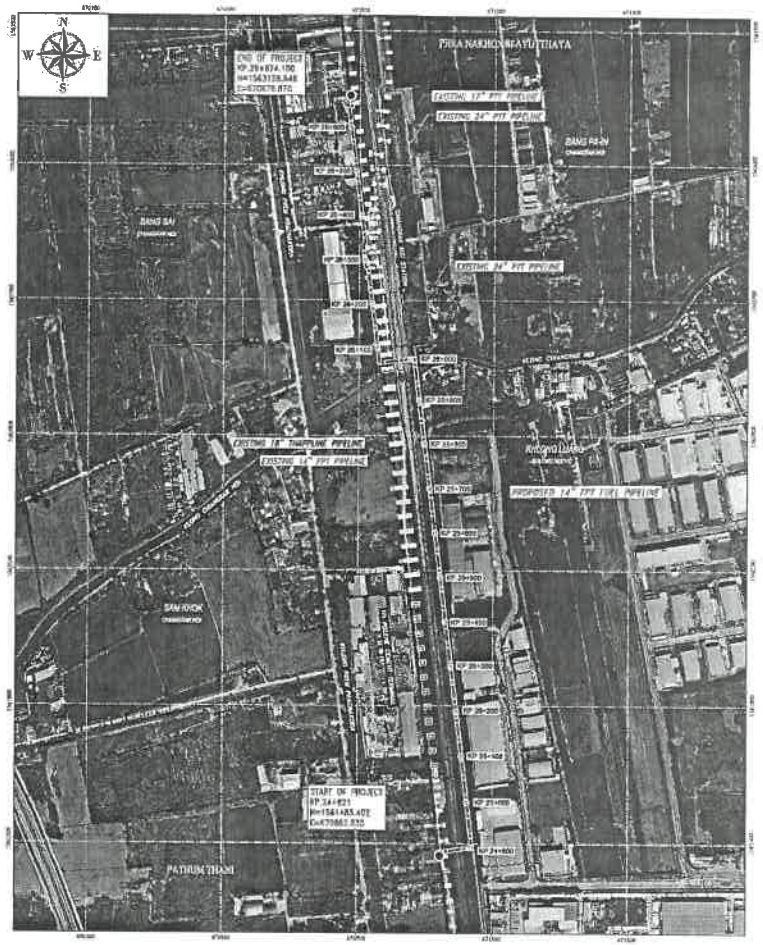


Figure 1: Pipeline reroute section (Pink color)

1.1 Purpose

This report is to describe the survey activities including the establishment of primary control points at site, as well as to identify and map the elevation of the ground and existing features for pipeline re-routes and related pipeline tie-in.

2. DEFINITIONS AND ABBREVIATIONS

2.1 Definitions

Name	Company
OWNER	Fuel Pipeline Transportation Limited (FPT)
Consultant	Brightstar Asia Ltd.
EPC Contractor	Triton Engineering and Construction Public Co., Ltd
Project	Reroute Fuel Pipeline Transportation Project No.2

2.2 Abbreviations

CAN	CAN Joint Venture
EBM	Elevation Benchmarks
GPS	Global Positioning System
GNSS	Global Navigation Satellite System
HSE	Health, Safety and Environmental
HDD	Horizontal Directional Drill
IP	Intersection point
KP	Kilometers Post
MSLD	Mean Sea Level Datum
NLN	National Leveling Network
PTT	PTT Public Company Limited
RFPT 2	Reroute Fuel Pipeline Transportation Project No.2
RID	Royal Irrigation Department
ROW	Right of Way
RTSD	Royal Thai Survey Department
RTK	Real-Time Kinematic
SAO	Subdistrict Administrative Organization
SRT	State Railway of Thailand
UTM	Universal Transverse Mercator
WGS	World Geographical System

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3. STANDARDS

3.1 Project Specification

DOCUMENT NUMBER	TITLE
RFPT2-SP-D-010-001	Specification for Topographical Survey

4. SCOPE OF SURVEY

- Executing the Field Topographical Survey and the Drafting works necessary for the Generation of the site drawings.
- Issuing deliverables in accordance withRFPT2-SP-D-010-001: Specification for Topographical Survey.

5. PRIMARY CONTROL POINT SURVEY

- Horizontal primary control points refer to the existing project control point number CPII-083 and CPII-085 and distributed 4 GPS control points and 8 Secondary control points by GNSS STATIC and RTK the result shown in Apendix A
- Vertical primary control points refer to the existing project control point number CPII-085 and distributed 4 GPS control points and 8 Secondary control points by GNSS STATIC and RTK the result shown in Apendix A

6. SCOPE OF AERIAL SURVEY

The Aerial Survey conducted for approximatively 2 km along pipeline routes.

The Aerial Survey used UAV DJI Matrice 300 and photogrammetry camera Zenmuse P1 with DJI pilot and autopilot flight mission to provide ortho- rectified imagery Tiff file.

- For alignment sheets, photo back-up in a scale of 1:2,000

One autopilot flight was flew and the images were processed by Pix4D mapper. For the pipeline route aerial survey, the area covered a corridor of 200 m along the pipeline center line.

The camera and navigation system are calibrated against surveyed reference points on the ground by GNSS RTK survey method. The rectified aerial images have Easting and Northing position referred to the project control point for information.

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7. APPENDICES

APPENDIX A : TOPOGRAPHIC SURVEY REPORT

APPENDIX B : AERIAL PHOTOGRAMMETRY REPORT

APPENDIX C : INSTRUMENT CALIBRATION & SPECIFICATION

APPENDIX D : PDF DRAWING

APPENDIX E : AUTOCAD DRAWING

APPENDIX A : TOPOGRAPHIC SURVEY REPORT

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Primary network

The Primary network control was created 8 new GPS control points. The survey datum WGS84 Zone47 and MSL Geoid TGM2017 elevation datum refer to the existing project control point number CPII-083 AND CPII-085

The static method is use in the project that require high accuracy of survey work this method, each receiver at each point logs data continuously for pre planed length of time, in this project are not less than 45 min. The slope line of any two antennas is called Baseline Vector and in those 3 antennas, minimum one must be set up at the known point. When the baseline between known point and new point is measured the new point can be used as a known point for other baselines. After we imported the logs data in to the Magnet Tools software the software will ask for the FIX point coordinate and level to calculate and adjust the coordinates and elevation for new point with the loop closures, precision and output all the important result in the GPS static report.

โครงการปรับแนวท่อส่งน้ำมันเชื้อเพลิงอากาศยานอย่างถาวรเพื่อความปลอดภัยในการบินและการขยายสนามบินสุวรรณภูมิ ระยะที่ 2 กรุงเทพฯ-ชลบุรี (RFPT 2)

Station No.	WGS1984 GEO Co-ordinates			WGS1984 UTM Co-ordinates		Indian1975 UTM Co-ordinates		RLMSL (MSL_h)	Combined Ground to Grid Scale Factor	Date
	Latitude (N)	Longitude (E)	Ellipsoid Height	Northing(m)	Eastings(m)	Northing(m)	Eastings(m)			
GPS-05	14°03'34.213353"	100°34'34.932084"	-27.379	1562370.265	670738.063	1562566.849	671072.130	-4.199	0.999963794673	30 November 2022
GPS-06	14°03'23.914541"	100°34'47.698586"	-25.798	1562053.452	670938.624	1562239.036	671072.092	5.785	0.999965022979	30 November 2022
GPS-09	14°03'36.811589"	100°34'59.787697"	-28.986	1561807.201	670912.376	1561803.737	671268.447	2.595	0.999965875750	30 November 2022
GPS-10	14°03'26.154338"	100°34'55.169006"	-27.279	1561986.060	670723.986	1561782.646	671108.057	4.286	0.999964887253	30 November 2022

CONSTRUCTION SUPERVISION CONSULTANT	REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2	CONTRACTOR
brightstar	TOPOGRAPHIC SURVEY REPORT	TRITON ENGINEERING AND CONSTRUCTION

SURVEYED BY :	CLIENT :	STATION :
TRITON ENGINEERING AND CONSTRUCTION	FPT บริษัท ขนส่งน้ำมันทางท่อ จำกัด	GPS-05
		DATE. 30 November 2022

STATION RECORD SHEET : DESCRIPTION FOR CONTROL POINT

PROJECT :	REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2 โครงการเปลี่ยนแปลงแนวท่อขนส่งน้ำมันในพื้นที่ทับซ้อนโครงการรถไฟความเร็วสูง เชื่อมโยงภูมิภาค กรุงเทพ-หนองคาย
LOCATION :	Chiangraknoi

WGS1984 Geodatic Co-ordinates			WGS1984UTM Co-ordinates 47N		Indian1975UTM Co-ordinates 47N		Elevation(m)
Latitude (N)	Longitude (E)	Ellip.ht(m)	Northing(m)	Easting(m)	Northing(m)	Easting(m)	(MSL)
14°07'54.217351"	100°34'54.372094"	-27.379	1562870.265	670738.061	1562566.849	671072.134	4.199

SCALE FACTORS : 0.99996379467

PERMANENT MONUMENT





LOCATION



GENERAL INFORMATION

CONSTRUCTION SUPERVISION CONSULTANT	REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2	CONTRACTOR
brightstar	TOPOGRAPHIC SURVEY REPORT	TRITON ENGINEERING AND CONSTRUCTION

SURVEYED BY :	CLIENT :	STATION :
TRITON ENGINEERING AND CONSTRUCTION	FPT บริษัท ขนส่งน้ำมันทางท่อ จำกัด	GPS-06
		DATE. 30 November 2022

STATION RECORD SHEET : DESCRIPTION FOR CONTROL POINT

PROJECT :	REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2 โครงการเปลี่ยนแปลงแนวท่อขนส่งน้ำมันในพื้นที่ทับซ้อนโครงการรถไฟความเร็วสูง เชื่อมโยงภูมิภาค กรุงเทพ-หนองคาย
LOCATION :	Chiangraknoi

WGS1984 Geodatic Co-ordinates			WGS1984UTM Co-ordinates 47N		Indian1975UTM Co-ordinates 47N		Elevation(m)
Latitude (N)	Longitude (E)	Ellip.ht(m)	Northing(m)	Easting(m)	Northing(m)	Easting(m)	(MSL)
14°07'53.714141"	100°34'47.698586"	-25.798	1562853.452	670538.024	1562550.036	670872.097	5.785

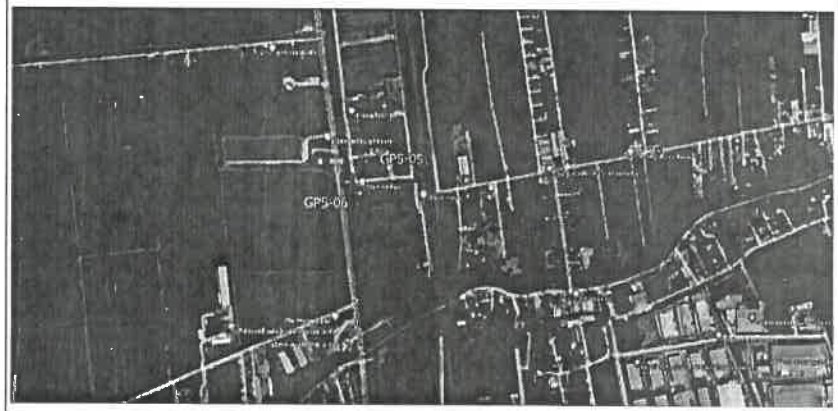
SCALE FACTORS : 0.99996502398

PERMANENT MONUMENT





LOCATION



GENERAL INFORMATION

CONSTRUCTION SUPERVISION CONSULTANT	REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2	CONTRACTOR
brightstar	TOPOGRAPHIC SURVEY REPORT	TRITON ENGINEERING AND CONSTRUCTION

SURVEYED BY :	CLIENT :	STATION :
TRITON ENGINEERING AND CONSTRUCTION	FPT	GPS-09
		DATE. 30 November 2022

STATION RECORD SHEET : DESCRIPTION FOR CONTROL POINT

PROJECT :	REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2 โครงการเปลี่ยนแปลงแนวท่อขนส่งน้ำมันในพื้นที่ทับซ้อนโครงการรถไฟความเร็วสูง เชื่อมโยงภูมิภาค กรุงเทพ-หนองคาย
LOCATION :	Chiangraknoi

WGS1984 Geodatic Co-ordinates			WGS1984UTM Co-ordinates 47N		Indian1975UTM Co-ordinates 47N		Elevation(m)
Latitude (N)	Longitude (E)	Ellipht(m)	Northing(m)	Easting(m)	Northing(m)	Easting(m)	(MSL)
14°06'56.811889"	100°34'59.787697"	-28.966	1561107.201	670912.376	1560803.787	671246.447	2.595

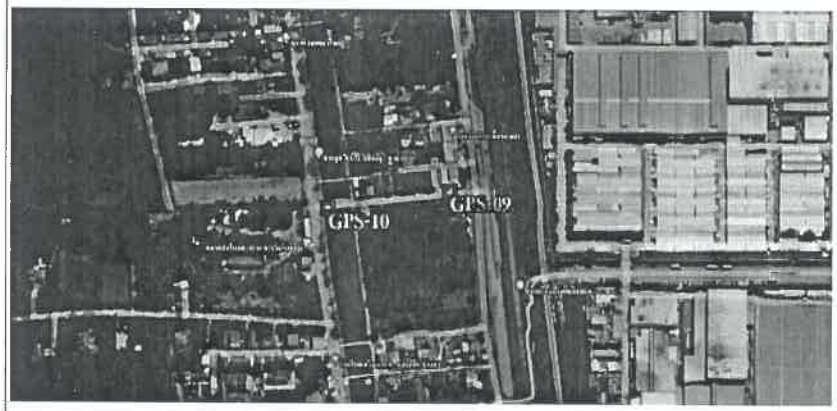
SCALE FACTORS : 0.99996587375

PERMANENT MONUMENT





LOCATION



GENERAL INFORMATION

CONSTRUCTION SUPERVISION CONSULTANT	REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2	CONTRACTOR
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SURVEYED BY :	CLIENT :	STATION :
TRITON ENGINEERING AND CONSTRUCTION	FPT	GPS-10
		DATE. 30 November 2022

STATION RECORD SHEET : DESCRIPTION FOR CONTROL POINT

PROJECT :	REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2 โครงการเปลี่ยนแปลงแนวท่อขนส่งน้ำมันในพื้นที่ทับซ้อนโครงการรถไฟความเร็วสูง เชื่อมโยงภูมิภาค กรุงเทพ-หนองคาย
LOCATION :	Chiangraknoi

WGS1984 Geodatic Co-ordinates			WGS1984UTM Co-ordinates 47N		Indian1975UTM Co-ordinates 47N		Elevation(m)
Latitude (N)	Longitude (E)	Ellipht(m)	Northing(m)	Easting(m)	Northing(m)	Easting(m)	(MSL)
14°06'56.154338"	100°34'55.169006"	-27.279	1561086.060	670773.986	1560782.646	671108.057	4.286

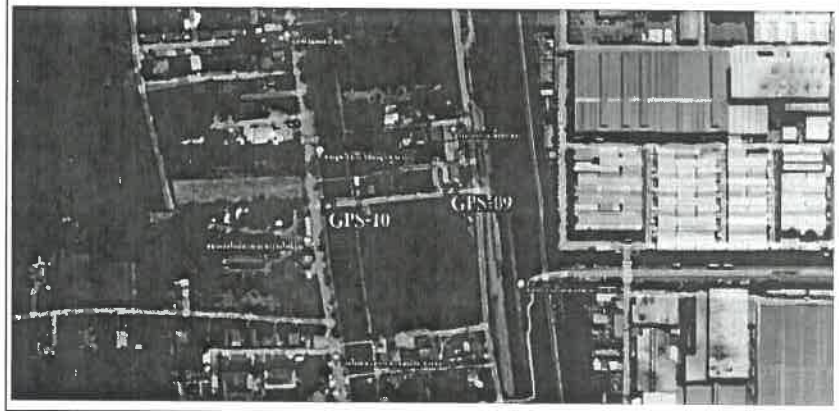
SCALE FACTORS : 0.99996488725

PERMANENT MONUMENT





LOCATION



GENERAL INFORMATION

Secondary control point

The Secondary control point was established 8 benchmarks by GNSS RTK the benchmarks was established by steel bolt drive into the concrete ditch along the project route line.

List of Secondary Control Point			
Point	Northing	Easting	Elevation
SEC901	1561272.530	670954.719	2.765
SEC902	1561434.486	670934.981	1.544
SEC903	1561550.301	670920.524	1.577
SEC904	1561672.337	670905.909	1.530
SEC905	1561788.912	670891.565	1.552
SEC906	1561987.534	670867.208	1.541
SEC907	1562185.899	670843.098	1.540
SEC908	1562338.357	670824.435	1.636

Plan & Contour survey

The 2 Kms of topographic survey was done by 2 survey crews with the modern survey instrument. The GPS RTK and Total Station were used for collecting all the survey details data in to the internal memory and download in to the computer by the Topcon software and transfer to the Civil 3D auto cad in XYZ format.

Survey Report

Submission of survey report consisted of:

- GPS control point coordinates and elevation
- Drawing plan, profile

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Personnel

Personnel engaged in survey:

Name	Position
Mr. Adipong Waiyasoontorn	Survey Engineer
Mr.Narongsak Ubolthong	Surveyor
Mr.Jinda Saksirikosol	Surveyor
Mr.Sakchai Pongpratan	Surveyor
Mr.Sanoh Kluejino	Instrumentman
Mr.Nat Kongsiya	Instrumentman
Mr.Wisoot Phuphu	Instrumentman

Survey Instruments

Topcon GNSS	: 4 sets
DJI UAV Matrice 300	: 1 set
Walkie talkie	: 1 pair
Echo sounder	: 1 set
Notebook computer	: 5 sets
Pickup Car	: 3 unit
Magnet tool software	: 1 set
Civil 3D auto cad software	: 5 sets
Pix4D Mapper software	: 1 set
Pipe Locator	: 1 set

STATIC REPORT

TOPCON

Project Summary

Project name: StaticFTP30_11_2022
Surveyor:
Comment:
Linear unit: Meters
Projection: UTMNorth-Zone_47 : 96E to 102E
Geoid: TGM2017

Adjustment Summary

Adjustment type: Plane + Height, Minimal constraint
Confidence level: 95 %
Number of adjusted points: 6
Number of plane control points: 1
Number of used GPS vectors: 15
A posteriori plane UWE: 0.3063502 , Bounds: (0.6924594 , 1.307096)

Number of height control points: 1
A posteriori height UWE: 0.9179655 , Bounds: (0.5700877 , 1.431083)

Control Points

Name	Grid Northing (m)	Grid Easting (m)	Elevation (m)	Code
CPII-083	1562516.698	670788.015	3.302	CPII-083

GPS Observation Residuals

Name	dN (m)	dE (m)	dHt (m)	Horz RMS	Vert RMS	Duration	Solution Type	Start Time	GPS Satellites	GLONASS Satellites	SBAS Satellites	QZSS Satellites	GAL Satellites	BDS Satellites	PDOP	HDOP	VDOP
CPII-083-CPII-085	680.022	-61.131	-0.024	0.001	0.001	1:44:15	Fixed	30/11/2565 2:56	11	4	5	3	0	20	1.528	0.742	1.336
CPII-083-GPS-05	353.568	-49.954	0.893	0.001	0.001	1:45:30	Fixed	30/11/2565 2:55	11	4	4	3	0	19	1.534	0.744	1.342
CPII-083-GPS-06	338.754	-249.991	2.474	0.001	0.001	1:45:30	Fixed	30/11/2565 2:55	11	4	4	3	0	20	1.514	0.737	1.323
CPII-083-GPS-09	-1409.497	124.361	-0.691	0.001	0.003	1:03:15	Fixed	30/11/2565 3:37	10	4	4	3	0	19	1.584	0.78	1.378
CPII-083-GPS-10	-1430.538	-14.029	0.994	0.001	0.002	1:13:30	Fixed	30/11/2565 3:27	10	4	4	3	0	19	1.449	0.746	1.242
CPII-085-GPS-05	-326.456	11.178	0.919	0.001	0.001	1:46:00	Fixed	30/11/2565 2:56	11	5	4	3	0	19	1.532	0.745	1.338
CPII-085-GPS-06	-343.268	-188.859	2.500	0.001	0.001	1:46:00	Fixed	30/11/2565 2:56	11	5	4	3	0	20	1.527	0.741	1.335
CPII-085-GPS-09	-2089.519	185.492	-0.666	0.001	0.003	1:05:00	Fixed	30/11/2565 3:37	10	5	4	3	0	19	1.593	0.779	1.39
CPII-085-GPS-10	-2110.560	47.102	1.024	0.001	0.002	1:14:30	Fixed	30/11/2565 3:27	10	5	4	3	0	19	1.454	0.745	1.248
GPS-05-GPS-06	-16.813	-200.037	1.563	0.001	0.001	2:17:00	Fixed	30/11/2565 2:35	12	6	4	3	0	19	1.578	0.741	1.393
GPS-05-GPS-09	-1763.065	174.315	-1.581	0.001	0.003	1:05:45	Fixed	30/11/2565 3:37	10	5	4	3	0	18	1.602	0.783	1.397
GPS-05-GPS-10	-1784.205	35.925	0.108	0.001	0.002	1:14:30	Fixed	30/11/2565 3:27	10	5	4	3	0	18	1.458	0.749	1.251
GPS-06-GPS-09	-1746.250	374.352	-3.161	0.001	0.002	1:05:45	Fixed	30/11/2565 3:37	10	6	4	3	0	19	1.56	0.745	1.371
GPS-06-GPS-10	-1767.393	235.962	-1.473	0.001	0.002	1:14:30	Fixed	30/11/2565 3:27	10	5	4	3	0	20	1.454	0.745	1.249
GPS-09-GPS-10	-21.141	-138.389	1.667	0.001	0.001	1:04:15	Fixed	30/11/2565 3:37	10	5	4	4	0	18	1.567	0.768	1.366

Adjusted Points

Name	Grid Northing (m)	Grid Easting (m)	Elevation (m)	Combined Ground to Grid Scale Factor	Geoid Separation (m)	Grid Northing (m)	Grid Easting (m)	Latitude	Longitude	Ell.Height (m)	Convergence	WGS84 Latitude	WGS84 Longitude	WGS84 Ell.Height (m)	Std Dev n (m)	Std Dev e (m)	Std Dev Hz (m)	Std Dev u (m)
CPII-085	1563196.720	670726.884	3.265	0.99996485	-30.738	1563196.72	670726.88	14°08'04.84212"N	100°34'54.67280"E	-27.453	0°23'10.8425"	14°08'04.84212"N	100°34'54.67280"E	-27.453	0	0	0	0.001
GPS-05	1562870.265	670738.061	4.199	0.99996475	-30.734	1562870.27	670738.06	14°07'54.21736"N	100°34'54.57216"E	-26.536	0°23'10.6311"	14°07'54.21735"N	100°34'54.57210"E	-26.536	0	0	0	0.001
GPS-06	1562853.452	670538.024	5.785	0.99996366	-30.739	1562853.45	670538.02	14°07'53.71415"N	100°34'47.69859"E	-24.954	0°23'08.8871"	14°07'53.71415"N	100°34'47.69859"E	-24.954	0	0	0	0.001
GPS-09	1561107.201	670912.375	2.595	0.99996574	-30.712	1561107.2	670912.38	14°06'56.81189"N	100°34'59.78776"E	-28.117	0°23'10.4156"	14°06'56.81189"N	100°34'59.78776"E	-28.117	0	0	0	0.001
GPS-10	1561086.060	670773.985	4.286	0.99996489	-30.716	1561086.06	670773.99	14°06'56.15434"N	100°34'55.16901"E	-26.43	0°23'09.2708"	14°06'56.15434"N	100°34'55.16901"E	-26.43	0	0	0	0.001

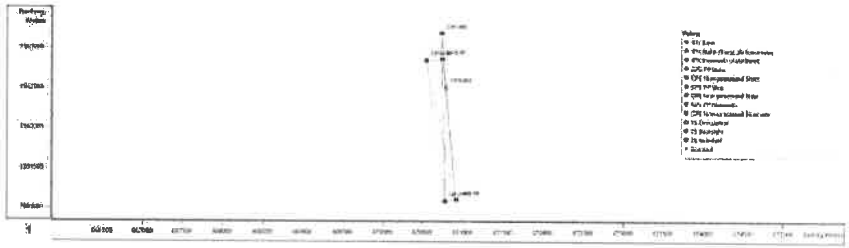
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REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2
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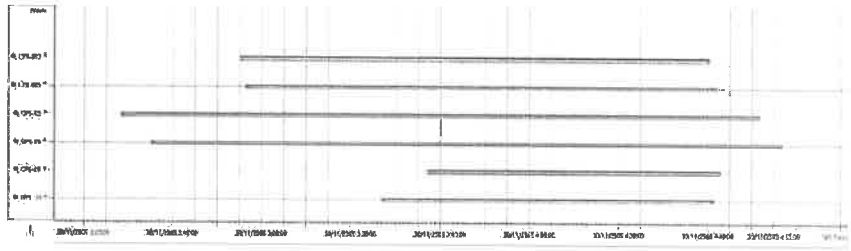
GPS Loop Closure

Loop	dHz (m)	dU (m)	Horz Tolerance (m)	Vert Tolerance (m)	dHz (ppm)	dU (ppm)	Length (m)	dHz relative	dU relative
CPII-083-CPII-085(30/11/2565 2:56:15) CPII-083-GPS-09(30/11/2565 3:37:15) CPII-085-GPS-09(30/11/2565 3:37:15)	0.0004	0.0006	0.051	0.081	0.1	0.15	4195.6195	1:9544643.1	1:6480028.3
CPII-083-CPII-085(30/11/2565 2:56:15) CPII-083-GPS-10(30/11/2565 3:27:00) CPII-085-GPS-10(30/11/2565 3:27:00)	0.0007	0.0062	0.0511	0.0811	0.17	1.46	4224.8055	1:5937925.0	1:686681.3
CPII-083-GPS-05(30/11/2565 2:55:00) CPII-083-GPS-09(30/11/2565 3:37:15) GPS-05-GPS-09(30/11/2565 3:37:15)	0.0003	0.0033	0.0477	0.0777	0.07	0.93	3543.8378	1:13730131.6	1:1077615.1
CPII-083-GPS-05(30/11/2565 2:55:00) CPII-083-GPS-10(30/11/2565 3:27:00) GPS-05-GPS-10(30/11/2565 3:27:00)	0.0002	0.0073	0.0479	0.0779	0.06	2.05	3572.4798	1:15790630.9	1:488393.4
CPII-083-GPS-06(30/11/2565 2:55:00) CPII-083-GPS-09(30/11/2565 3:37:15) GPS-06-GPS-09(30/11/2565 3:37:15)	0.0012	0.0035	0.0481	0.0781	0.33	0.98	3620.4384	1:2995264.2	1:1022418.9
CPII-083-GPS-08(30/11/2565 2:55:00) CPII-083-GPS-10(30/11/2565 3:27:00) GPS-08-GPS-10(30/11/2565 3:27:00)	0.0007	0.0072	0.0482	0.0782	0.2	1.97	3633.3211	1:4954143.2	1:506397.6
CPII-083-GPS-10(30/11/2565 3:27:00) CPII-083-GPS-09(30/11/2565 3:37:15) GPS-09-GPS-10(30/11/2565 3:37:15)	0.001	0.0021	0.0449	0.0749	0.32	0.7	2985.7888	1:3102172.3	1:1433188.8
CPII-085-GPS-05(30/11/2565 2:56:15) CPII-085-GPS-09(30/11/2565 3:37:15) GPS-05-GPS-09(30/11/2565 3:37:15)	0.0011	0.0047	0.051	0.081	0.26	1.13	4196.1921	1:3824395.4	1:887253.3
CPII-085-GPS-05(30/11/2565 2:56:15) CPII-085-GPS-10(30/11/2565 3:27:00) GPS-05-GPS-10(30/11/2565 3:27:00)	0.0011	0.0033	0.0511	0.0811	0.26	0.77	4222.5497	1:3902384.4	1:1299033.7
CPII-085-GPS-05(30/11/2565 2:56:15) CPII-083-CPII-085(30/11/2565 2:56:15) CPII-083-GPS-05(30/11/2565 2:55:00)	0.001	0.0021	0.0368	0.0668	0.75	1.53	1366.5405	1:1337617.4	1:654383.4

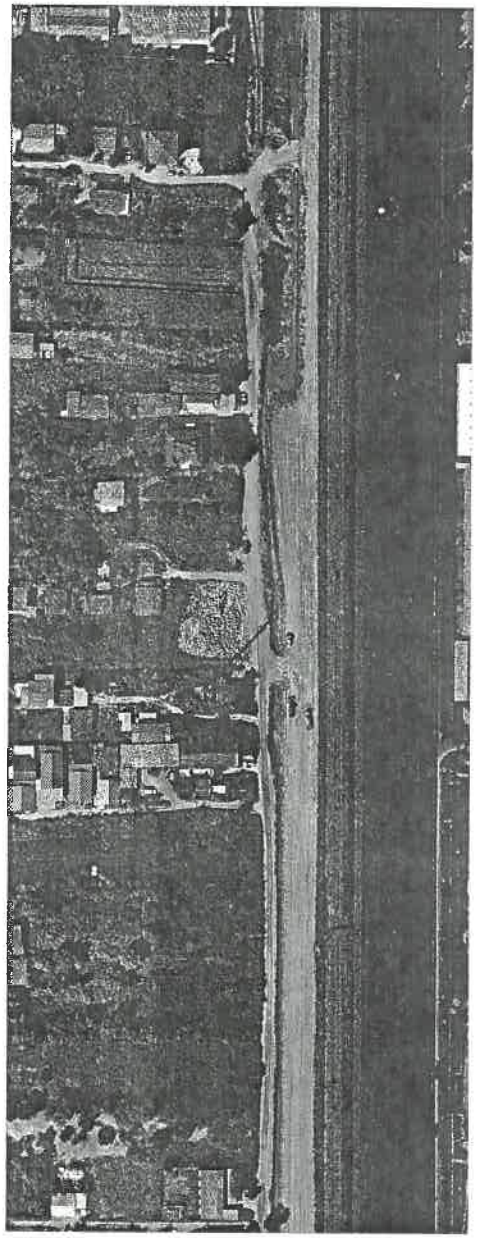
GPS Loop Closure									
Loop	dHz (m)	dU (m)	Horz Tolerance (m)	Vert Tolerance (m)	dHz (ppm)	dU (ppm)	Length (m)	dHz relative	dU relative
CPII-085-GPS-06(30/11/2565 2:56:15)									
CPII-085-GPS-09(30/11/2565 3:37:15)									
GPS-06-GPS-09(30/11/2565 3:37:15)	0.0011	0.0044	0.0514	0.0814	0.26	1.04	4275.6142	1:3800470.7	1:964629.5
CPII-085-GPS-06(30/11/2565 2:56:15)									
CPII-085-GPS-10(30/11/2565 3:27:00)									
GPS-06-GPS-10(30/11/2565 3:27:00)	0.0005	0.0026	0.0514	0.0814	0.11	0.6	4286.2127	1:9437820.9	1:1673571.5
CPII-085-GPS-06(30/11/2565 2:56:15)									
CPII-083-CPII-085(30/11/2565 2:56:15)									
CPII-083-GPS-06(30/11/2565 2:55:00)	0.0002	0.0015	0.0375	0.0575	0.15	1.03	1494.0272	1:6702506.9	1:970895.8
CPII-085-GPS-10(30/11/2565 3:27:00)									
CPII-085-GPS-09(30/11/2565 3:37:15)									
GPS-09-GPS-10(30/11/2565 3:37:15)	0.0012	0.0034	0.0517	0.0817	0.27	0.79	4349.0793	1:3728794.6	1:1270964.5
GPS-05-GPS-06(30/11/2565 2:35:00)									
GPS-05-GPS-09(30/11/2565 3:37:15)									
GPS-06-GPS-09(30/11/2565 3:37:15)	0.0015	0.0028	0.0488	0.0788	0.39	0.73	3758.4699	1:2563826.0	1:1362346.8
GPS-05-GPS-06(30/11/2565 2:35:00)									
GPS-05-GPS-10(30/11/2565 3:27:00)									
GPS-06-GPS-10(30/11/2565 3:27:00)	0.0002	0.0024	0.0488	0.0788	0.05	0.63	3768.5241	1:21726552.0	1:1592486.4
GPS-05-GPS-06(30/11/2565 2:35:00)									
CPII-083-GPS-05(30/11/2565 2:55:00)									
CPII-083-GPS-06(30/11/2565 2:55:00)	0.0005	0.0025	0.0349	0.0649	0.47	2.56	977.2734	1:2125512.4	1:389916.4
GPS-05-GPS-06(30/11/2565 2:35:00)									
CPII-085-GPS-05(30/11/2565 2:56:15)									
CPII-085-GPS-06(30/11/2565 2:56:15)	0.0005	0.0031	0.0346	0.0646	0.57	3.32	919.2288	1:1753658.7	1:300811.6
GPS-05-GPS-10(30/11/2565 3:27:00)									
GPS-05-GPS-09(30/11/2565 3:37:15)									
GPS-09-GPS-10(30/11/2565 3:37:15)	0.001	0.0019	0.0485	0.0785	0.27	0.53	3696.3628	1:3771788.3	1:1902466.7
GPS-06-GPS-10(30/11/2565 3:27:00)									
GPS-06-GPS-09(30/11/2565 3:37:15)									
GPS-09-GPS-10(30/11/2565 3:37:15)	0.002	0.0016	0.0485	0.0785	0.54	0.42	3709.1398	1:1857613.0	1:2391520.4

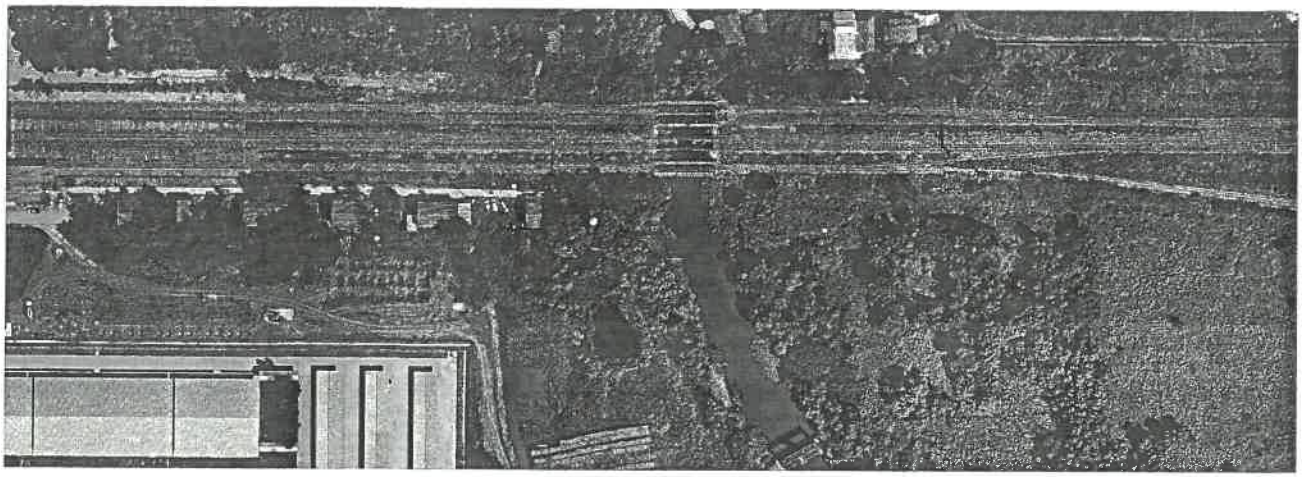
CONSTRUCTION SUPERVISION CONSULTANT
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REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2
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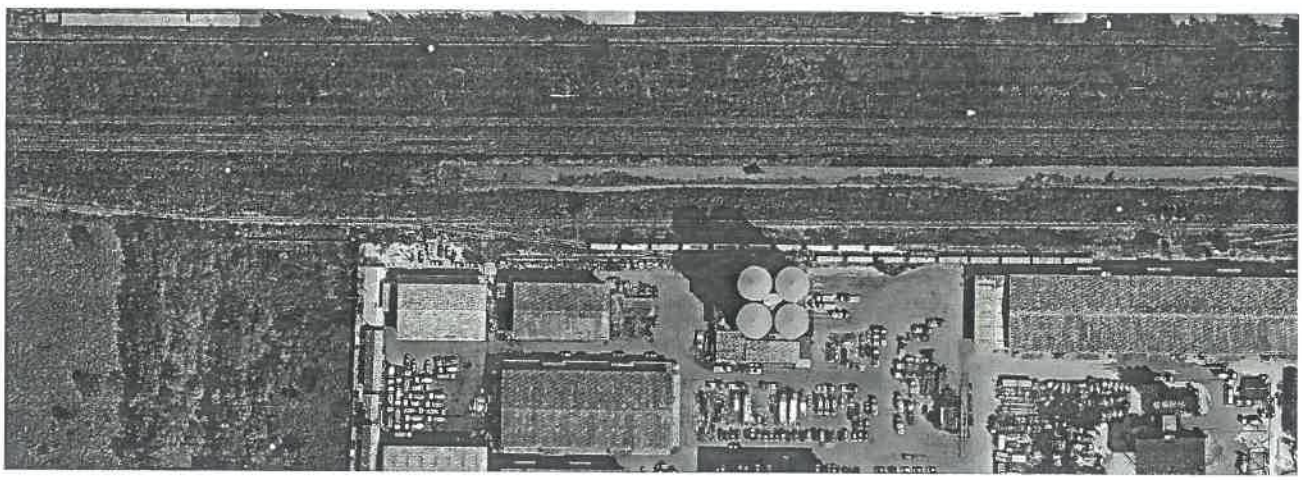


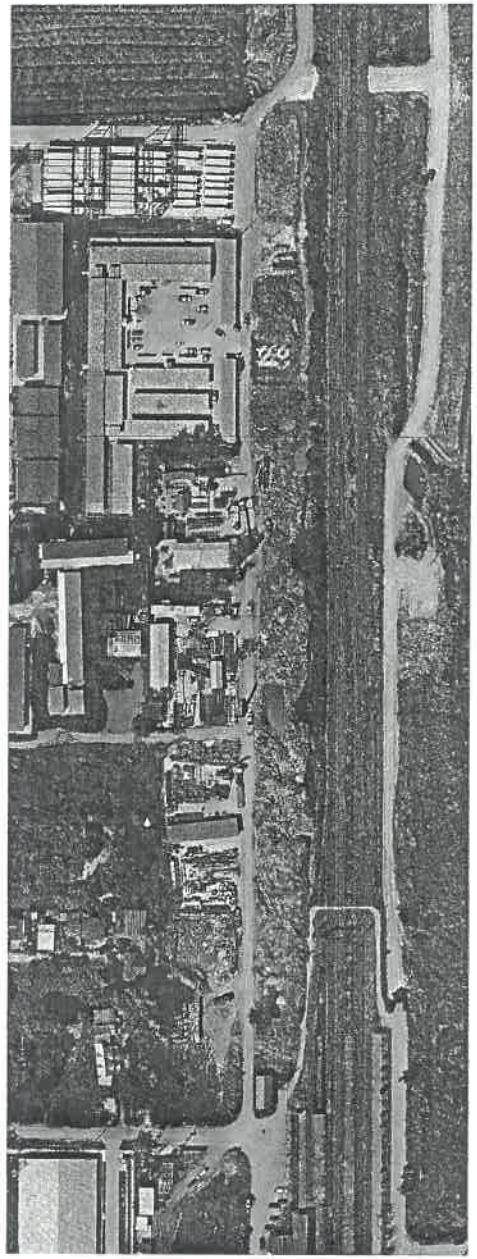


APPENDIX B : AERIAL PHOTOGRAMMETRY REPORT









Quality Report

Generated with PIX4Dmapper version 4.7.5

Important: Click on the different icons for:

Help to analyze the results in the Quality Report

Additional information about the sections

Click here for additional tips to analyze the Quality Report

Summary

Project	8 12 65
Processed	[illegible]
Camera Model Name(s)	ZenmuseP1_35.0_8192x5460 (RGB)
Average Ground Sampling Distance (GSD)	1.86 cm / 0.73 in
Time for Initial Processing (without report)	40m:17s

Quality Check

Images	median of 27090 keypoints per image	✓
Dataset	946 out of 946 images calibrated (100%), all images enabled	✓
Camera Optimization	0.5% relative difference between initial and optimized internal camera parameters	✓
Matching	median of 11448.1 matches per calibrated image	✓
Georeferencing	yes, 6 GCPs (6 3D), mean RMS error = 0.001 m	✓

Calibration Details

Number of Calibrated Images	946 out of 946
Number of Geolocated Images	946 out of 946

Initial Image Positions

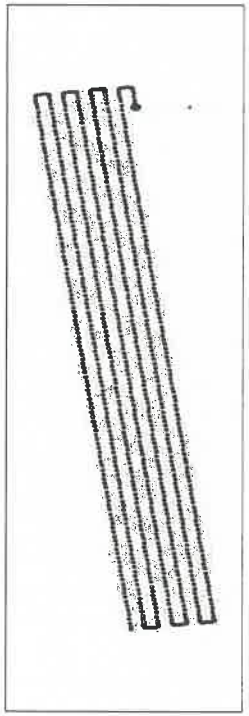
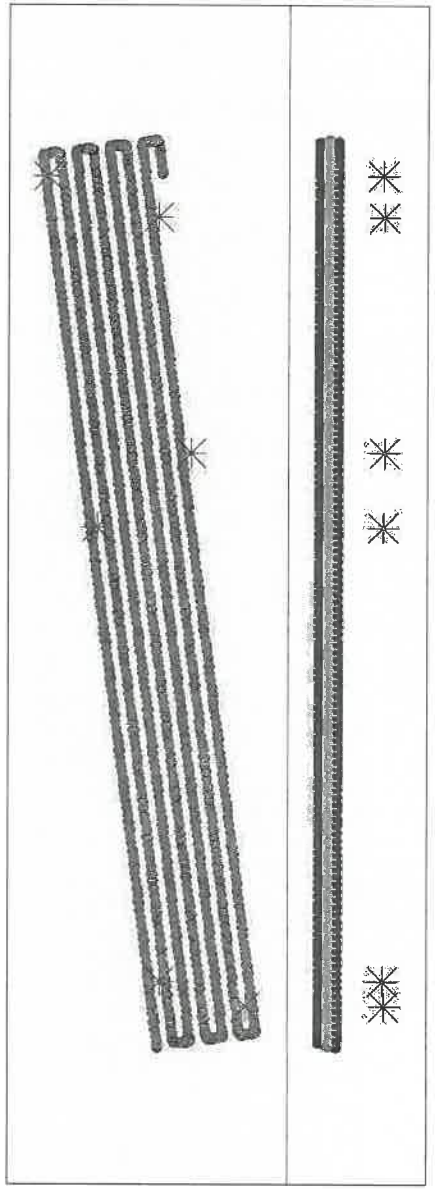
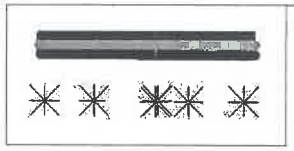


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

Computed Image/GCPs/Manual Tie Points Positions





Uncertainty ellipses 100x magnified

Figure 3: Offset between initial (blue dots) and computed (green dots) image positions as well as the offset between the GCPs initial positions (blue crosses) and their computed positions (green crosses) in the top-view (XY plane), front-view (XZ plane), and side-view (YZ plane). Dark green ellipses indicate the absolute position uncertainty of the bundle block adjustment result.

Absolute camera position and orientation uncertainties

	X [m]	Y [m]	Z [m]	Omega [degree]	Phi [degree]	Kappa [degree]
Mean	0.026	0.034	0.370	0.012	0.009	0.002
Sigma	0.003	0.003	0.001	0.001	0.001	0.000

Bundle Block Adjustment Details

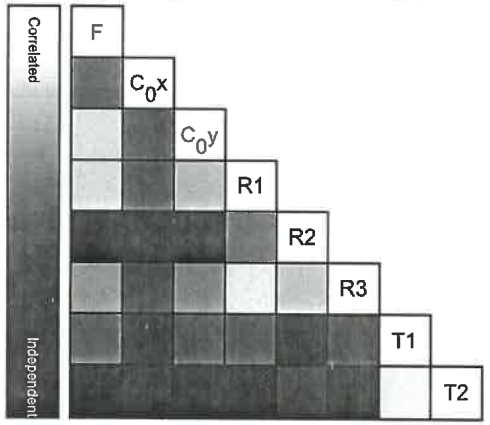
Number of 2D Keypoint Observations for Bundle Block Adjustment	11013927
Number of 3D Points for Bundle Block Adjustment	3094788
Mean Reprojection Error [pixels]	0.141

Internal Camera Parameters

ZenmuseP1_35.0_8192x5460 (RGB). Sensor Dimensions: 35.000 [mm] x 23.328 [mm]

EXIF ID: ZenmuseP1_35.0_8192x5460

	Focal Length	Principal Point x	Principal Point y	R1	R2	R3	T1	T2
Initial Values	8194.340 [pixel] 35.010 [mm]	4096.001 [pixel] 17.500 [mm]	2729.996 [pixel] 11.664 [mm]	-0.048	0.021	-0.097	0.002	-0.001
Optimized Values	8236.033 [pixel] 35.188 [mm]	4092.420 [pixel] 17.485 [mm]	2741.676 [pixel] 11.714 [mm]	-0.052	0.014	-0.099	0.000	-0.001
Uncertainties (Sigma)	19.978 [pixel] 0.085 [mm]	0.272 [pixel] 0.001 [mm]	0.433 [pixel] 0.002 [mm]	0.000	0.001	0.002	0.000	0.000



The correlation between camera internal parameters determined by the bundle adjustment. White indicates a full correlation between the parameters, ie. any change in one can be fully compensated by the other. Black indicates that the parameter is completely independent, and is not affected by other parameters.



The number of Automatic Tie Points (ATPs) per pixel, averaged over all images of the camera model, is color coded between black and white. White indicates that, on average, more than 16 ATPs have been extracted at the pixel location. Black indicates that, on average, 0 ATPs have been extracted at the pixel location. Click on the image to the see the average direction and magnitude of the re-projection error for each pixel. Note that the vectors are scaled for better visualization. The scale bar indicates the magnitude of 1 pixel error.

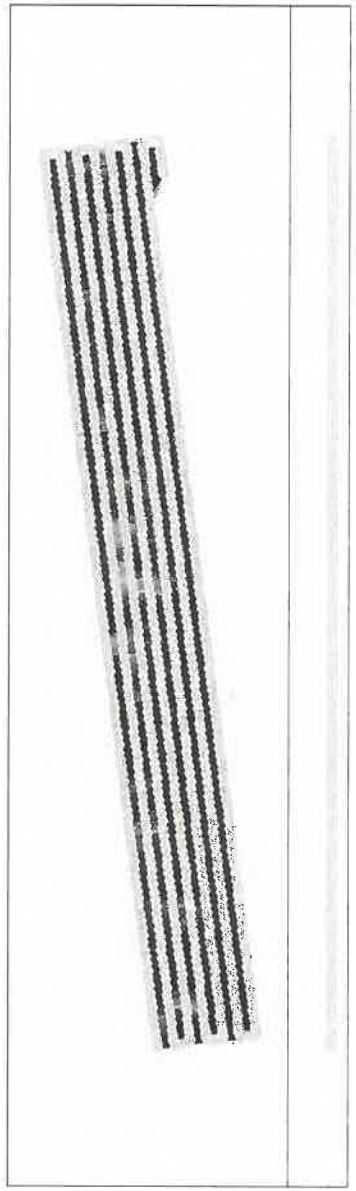
2D Keypoints Table

	Number of 2D Keypoints per Image	Number of Matched 2D Keypoints per Image
Median	27090	11448
Min	13923	4535
Max	49967	27704
Mean	27502	11643

3D Points from 2D Keypoint Matches

	Number of 3D Points Observed
In 2 Images	1608429
In 3 Images	572015
In 4 Images	302380
In 5 Images	201421
In 6 Images	91502
In 7 Images	66693
In 8 Images	52694
In 9 Images	44955
In 10 Images	39691
In 11 Images	21734
In 12 Images	19142
In 13 Images	17603
In 14 Images	16819
In 15 Images	15630
In 16 Images	5598
In 17 Images	4335
In 18 Images	3717
In 19 Images	2998
In 20 Images	2322
In 21 Images	990
In 22 Images	760
In 23 Images	689
In 24 Images	667
In 25 Images	497
In 26 Images	420
In 27 Images	347
In 28 Images	185
In 29 Images	168
In 30 Images	127
In 31 Images	90
In 32 Images	60
In 33 Images	52
In 34 Images	34
In 35 Images	14
In 36 Images	8
In 37 Images	2

2D Keypoint Matches





Number of matches

25 222 444 666 888 1111 1333 1555 1777 2000

Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images.

Geolocation Details

Ground Control Points

GCP Name	Accuracy XY/Z [m]	Error X [m]	Error Y [m]	Error Z [m]	Projection Error [pixel]	Verified/Marked
100 (3D)	0.020/ 0.020	-0.003	0.001	0.001	0.143	10 / 10
101 (3D)	0.020/ 0.020	0.002	0.001	-0.000	0.229	12 / 12
102 (3D)	0.020/ 0.020	0.002	0.001	-0.000	0.234	12 / 12
103 (3D)	0.020/ 0.020	0.002	-0.002	0.001	0.276	13 / 13
104 (3D)	0.020/ 0.020	-0.002	0.001	-0.000	0.327	12 / 12
105 (3D)	0.020/ 0.020	-0.002	-0.002	0.001	0.128	10 / 10
Mean [m]		-0.000097	-0.000003	0.000295		
Sigma [m]		0.002219	0.001219	0.000654		
RMS Error [m]		0.002221	0.001219	0.000718		

Localisation accuracy per GCP and mean errors in the three coordinate directions. The last column counts the number of calibrated images where the GCP has been automatically verified vs. manually marked.

Absolute Geolocation Variance

Min Error [m]	Max Error [m]	Geolocation Error X [%]	Geolocation Error Y [%]	Geolocation Error Z [%]
-	-5.63	0.00	0.00	0.00
-5.63	-4.51	0.00	0.00	0.00
-4.51	-3.38	0.00	0.00	0.00
-3.38	-2.25	0.00	0.00	0.00
-2.25	-1.13	0.00	0.00	0.00
-1.13	0.00	46.62	52.22	52.96
0.00	1.13	53.38	47.78	47.04
1.13	2.25	0.00	0.00	0.00
2.25	3.38	0.00	0.00	0.00
3.38	4.51	0.00	0.00	0.00
4.51	5.63	0.00	0.00	0.00
5.63	-	0.00	0.00	0.00
Mean [m]		0.690262	-1.733948	-23.848505
Sigma [m]		0.128464	0.114103	0.239674
RMS Error [m]		0.702115	1.737698	23.849709

Min Error and Max Error represent geolocation error intervals between -1.5 and 1.5 times the maximum accuracy of all the images. Columns X, Y, Z show the percentage of images with geolocation errors within the predefined error intervals. The geolocation error is the difference between the initial and computed image positions. Note that the image geolocation errors do not correspond to the accuracy of the observed 3D points.

Geolocation Bias	X	Y	Z
Translation [m]	0.691388	-1.732688	-23.849755

Bias between image initial and computed geolocation given in output coordinate system.

Relative Geolocation Variance

Relative Geolocation Error	Images X [%]	Images Y [%]	Images Z [%]
[-1.00, 1.00]	100.00	100.00	100.00
[-2.00, 2.00]	100.00	100.00	100.00
[-3.00, 3.00]	100.00	100.00	100.00
Mean of Geolocation Accuracy [m]	1.136617	1.136617	2.639732
Sigma of Geolocation Accuracy [m]	0.029649	0.029649	0.080685

Images X, Y, Z represent the percentage of images with a relative geolocation error in X, Y, Z.

Geolocation Orientational Variance	RMS [degree]
Omega	0.571
Phi	0.333
Kappa	1.164

Geolocation RMS error of the orientation angles given by the difference between the initial and computed image orientation angles.

Initial Processing Details

System Information

Hardware	CPU: Intel(R) Core(TM) i9-9980HK CPU @ 2.40GHz RAM: 64GB GPU: Intel(R) UHD Graphics 630 (Driver: 25.20.100.6617), NVIDIA GeForce RTX 2080 (Driver: 30.0.15.1278)
Operating System	Windows 10 Home Single Language, 64-bit

Coordinate Systems

Image Coordinate System	WGS 84 (EGM 2008 Geoid)
Ground Control Point (GCP) Coordinate System	WGS 84 / UTM zone 47N (EGM 2008 Geoid)
Output Coordinate System	WGS 84 / UTM zone 47N (EGM 2008 Geoid)

Processing Options

Detected Template	No Template Available
Keypoints Image Scale	Full, Image Scale: 0.5
Advanced: Matching Image Pairs	Aerial Grid or Corridor
Advanced: Matching Strategy	Use Geometrically Verified Matching: yes
Advanced: Keypoint Extraction	Targeted Number of Keypoints: Automatic
Advanced: Calibration	Calibration Method: Standard Internal Parameters Optimization: All External Parameters Optimization: All Rematch: Auto, no

Point Cloud Densification details

Processing Options

Image Scale	multiscale, 1/2 (Half image size, Default)
Point Density	Optimal
Minimum Number of Matches	3
3D Textured Mesh Generation	yes
3D Textured Mesh Settings:	Resolution: Medium Resolution (default) Color Balancing: no
LOD	Generated: no
Advanced: 3D Textured Mesh Settings	Sample Density Divider: 1
Advanced: Image Groups	group1
Advanced: Use Processing Area	yes
Advanced: Use Annotations	yes
Time for Point Cloud Densification	03h:54m:49s
Time for Point Cloud Classification	NA
Time for 3D Textured Mesh Generation	27m:29s

Results

Number of Processed Clusters	2
Number of Generated Tiles	11
Number of 3D Densified Points	315475658
Average Density (per m^3)	311.5

DSM, Orthomosaic and Index Details

Processing Options

DSM and Orthomosaic Resolution	1 x GSD (1.86 [cm/pixel])
DSM Filters	Noise Filtering: yes Surface Smoothing: yes, Type: Sharp
Raster DSM	Generated: yes Method: Inverse Distance Weighting Merge Tiles: yes
Orthomosaic	Generated: yes Merge Tiles: yes GeoTIFF Without Transparency: no Google Maps Tiles and KML: no
Time for DSM Generation	01h:32m:39s
Time for Orthomosaic Generation	01h:59m:11s
Time for DTM Generation	00s
Time for Contour Lines Generation	00s
Time for Reflectance Map Generation	00s
Time for Index Map Generation	00s

APPENDIX C : INSTRUMENT CALIBRATION & SPECIFICATION

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REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2
TOPOGRAPHIC SURVEY REPORT
CONTRACTOR
TRITON ENGINEERING AND CONSTRUCTION

TOPCON

CERTIFICATE OF CALIBRATION

Part A: Equipment Identification

Equipment Description	บริษัท วี เซอร์เวย์อิ้ง จำกัด		
Manufacturer	TOPCON		
Model	GR-5	Serial Number	1118-20513

Part B: Calibration Details

Description	Current
GPS	Yes
GLONASS	Yes
BeiDou	Yes
L1	Yes
L2	Yes
Carrier Phase	Yes
Position Update Rate (Hz)	10
Raw Data Update Rate (Hz)	1
RTK mode (Hz)	1
DGPS mode	Yes
Memory (Mb)	8
Multipath Reduction	Yes
Magnetic Azimuth	Yes
Firmware Version	gr5 4.0
Radio Modem	Internal Pacific Crest
GSM Modem	YES

Part C: Certification

The equipment above has been calibrated according to the calibration method referenced on the Equipment Data Sheet and complies with the equipment acceptance criteria

Name / Signature Topcon Instruments (Thailand) Co., Ltd.

Date: 01-Nov-22

Code: 0003

Remark :

TOPCON

Equipment Data Sheet

Equipment Data Sheet	บริษัท วี เซอร์เวย์อิ้ง จำกัด
Model	GR-5
Serial Number	1118-20513

Scope of Use

All regular survey task

Limitation

Field work Data Collection

Accuracy Parameters

1. Real Time Kinematic	: Horizontal	= 5 mm. + 0.5 ppm
	Vertical	10 mm + 0.5 ppm
2. Static	: Horizontal	= 3.0 mm + 0.1 ppm
	Vertical	: 3.5 mm. + 0.4 ppm

Check required prior and during each use

None

Calibration Method(s)

1. Calibration Method	: follow Topcon Corporation laboratory method
2. Frequency	: every 6 months
3. Auth. to carry out	: trained surveyor

Prepared By : .....

(Name/Sign

Attachment : Certificate of Calibra

Date : 01-Nov-22

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TRITON ENGINEERING AND CONSTRUCTION

TOPCON

CERTIFICATE OF CALIBRATION

Part A: Equipment Identification

Equipment Description	บริษัท วี เซอร์เวย์อิ้ง จำกัด		
Manufacturer	TOPCON		
Model	GR-5	Serial Number	1118-20923

Part B: Calibration Details

Description	Current
GPS	Yes
GLONASS	Yes
BeiDou	Yes
L1	Yes
L2	Yes
Carrier Phase	Yes
Position Update Rate (Hz)	10
Raw Data Update Rate (Hz)	1
RTK mode (Hz)	1
IOIPS mode	Yes
Memory (Mb)	8
Multipath Reduction	Yes
Magnetic Azimuth	Yes
Firmware Version	ar5 4 0
Radio Modem	Internal Pacific Crest
GSM Modem	YES

Part C: Certification

The equipment above has been calibrated according to the calibration method referenced on the Equipment Data Sheet and complies with the [illegible] criteria.

Name / Signature Topcon [illegible]

Date: 01-Nov-22

Code: IK04

Remark :

TOPCON

Equipment Data Sheet

Equipment Data Sheet	บริษัท วี เซอร์เวย์ยิ่ง จำกัด
Model	GR-5
Serial Number	1118-20923

Scope of Use

All regular survey unit

Limitation

Field work Data Collection

Accuracy Parameters

1. Real Time Kinematic	: Horizontal	5 mm. + 0.5 ppm
	: Vertical	10 mm. + 0.8 ppm
2. Static	: Horizontal	3.0 mm.+ 0.1 ppm
	: Vertical	: 3.5 mm. +0.4 ppm

Check required prior and during each use

None

Calibration Method(s)

1. Calibration Method	: follow Topcon Corporation laboratory method
2. Frequency	every 6 months
3. Auth. to carry out	trained surveyor

Prepared By ..... Date : 01-Nov-22

(Name/Signature)

Attachment : Certificate of Calibration No. 0004

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TRITON ENGINEERING AND CONSTRUCTION

TOPCON

CERTIFICATE OF CALIBRATION

Part A: Equipment Identification

Equipment Description	บริษัท วี เซอร์เวย์ยิ่ง จำกัด		
Manufacturer	TOPCON		
Model	GR-5	Serial Number	1118-20939

Part B: Calibration Details

Description	Current
GPS	Yes
GLONASS	Yes
BeiDou	Yes
L1	Yes
L2	Yes
Carrier Phase	Yes
Position Update Rate (Hz)	10
Raw Data Update Rate (Hz)	1
RTK mode (Hz)	1
DGPS mode	Yes
Memory (Mb)	8
Multipath Reduction	Yes
Magnetic Azimuth	YES
Firmware Version	gr5_4_0
Radio Modem	Internal Pacific Crest
GSM Modem	YES

Part C: Certification

The equipment above has been calibrated according to the calibration method referenced on the Equipment Data Sheet and complies with the required acceptance criteria.

Name / Signature Topcon Instruments (Thailand) Co., Ltd. Date: 01-Nov-22

Code: 0005

Remark :

TOPCON

Equipment Data Sheet

Equipment Data Sheet	บริษัท วีเซอร์เวย์อิ้ง จำกัด
Model	GR-5
Serial Number	1118-20939

Scope of Use

All regular survey task

Limitation

Field work Data Collection

Accuracy Parameters

1. Real Time Kinematic	: Horizontal	: 8 mm. + 0.5 ppm
	: Vertical	: 10 mm. + 0.8 ppm
2. Static	: Horizontal	: 3.0 mm + 0.1 ppm
	: Vertical	: 3.5 mm. + 0.4 ppm

Check required prior and during each use

None

Calibration Method(s)

1. Calibration Method	: follow Topcon Corporation laboratory method
2. Frequency	: every 6 months
3. Auth. to carry out	: trained surveyor

Prepared By ..... Date : 01-Nov-22

(Name/Signature)

Attachment : Certificate of Calibration No.0015

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TOPCON

CERTIFICATE OF CALIBRATION

Part A: Equipment Identification

Equipment Description	บริษัท วีเซอร์เวย์อิ้ง จำกัด		
Manufacturer	TOPCON		
Model	GR-5	Serial Number	1118-22761

Part B: Calibration Details

Description	Current
GPS	Yes
GLONASS	Yes
BeiDou	Yes
L1	Yes
L2	Yes
Carrier Phase	Yes
Position Update Rate (Hz)	10
Raw Data Update Rate (Hz)	1
RTK mode (Hz)	1
DGPS mode	Yes
Memory (Mb)	8
Multipath Reduction	Yes
Magnetic Azimuth	Yes
Firmware Version	gr5_4_0
Radio Modem	Internal Pacific Crest
GSM Modem	YES

Part C: Certification

The equipment above has been calibrated according to the calibration method referenced on the Equipment Data Sheet and complies with the required acceptance criteria.

Date: 01-Nov-22

Name / Signature Topcon Instruments (Thailand) Co., Ltd. Code: 0015

Remark :

TOPCON

Equipment Data Sheet

Equipment Data Sheet	บริษัท วี เซอร์เวยิ่ง จำกัด
Model	GR-5
Serial Number	1118-22761

Scope of Use

All regular survey task

Limitation

Field work Data Collection

Accuracy Parameters

1. Real Time Kinematic	: Horizontal	: 5 mm.+ 0.5 ppm
	: Vertical	: 10 mm.+ 0.5 ppm
2. Static	: Horizontal	: 3.0 mm.+ 0.1 ppm
	: Vertical	: 3.5 mm.+ 0.4 ppm

Check required prior and during each use

None

Calibration Method(s)

1. Calibration Method	: follow Topcon Corporation laboratory method
2. Frequency	: every 6 months
3. Auth. to carry out	: trained surveyor

Prepared By: .....

(Name/Signature)

Date : 01-Nov-22

Attachment : Certificate of Calibration No. 0015

14/11/64 15:38 ระบบทะเบียนโดรน / Registration Drone Unmanned Aerial Vehicle (UAV)

หนังสือการขึ้นทะเบียนผู้บังคับหรือปล่อยอากาศยานซึ่งไม่มีนักบิน
(ประเภทอากาศยานที่ควบคุมการบินจากภายนอก)

เลขที่ 016409/2564

หนังสือฉบับนี้ออกให้เพื่อแสดงว่า ชื่อ นาย สุรเดช บางกุล เมย์เยอร์

เลขประจำตัวประชาชน 3100902482878 ที่อยู่ปัจจุบันเลขที่ 59/40 -

ตรอก/ซอย สุเหร่าคลองหนึ่ง 10 ถนน - ตำบล/แขวง บางขัน

อำเภอ/เขต คลองสามวา จังหวัด กทม. รหัสไปรษณีย์ 10510

โทรศัพท์ 081-8331554 โทรสาร - E-MAIL: suradet@jsurveying.com

ได้รับการขึ้นทะเบียนตามประกาศกระทรวงคมนาคม เรื่อง หลักเกณฑ์การขออนุญาตและเงื่อนไขในการบังคับหรือปล่อยอากาศยานซึ่งไม่มีนักบิน ประเภทอากาศยานที่ควบคุมการบินจากภายนอก พ.ศ. 2558 ออกตามมาตรา 24 แห่งพระราชบัญญัติการเดินอากาศ พ.ศ. 2497 โดยมีรายละเอียดดังต่อไปนี้

แบบอากาศยาน/ยี่ห้อ/รุ่น	DJI รุ่น Matrice 300 RTK
น้ำหนัก (weight)	7.300 กิโลกรัม
หมายเลขเครื่อง (Serial No.)	1ZN3J5T005L008
อุปกรณ์ที่ติดตั้ง	8 PROPELLERS, BATTERY, CAMERA AND REMOTE CONTROLLER
วัตถุประสงค์การใช้	1. เพื่อการเล่นเป็นงานอดิเรก ความบันเทิง หรือเพื่อการศึกษา 2. เพื่อการถ่ายภาพ ถ่ายทำหรือการบันทึกลงในภาพยนตร์ หรือรายการโทรทัศน์
ขอบเขต/พื้นที่ทำการบิน	ตามเงื่อนไขการบังคับหรือปล่อยอากาศยาน
รายชื่อผู้บังคับหรือปล่อยอากาศยาน	รายชื่อผู้บังคับหรือปล่อยอากาศยานซึ่งไม่มีนักบิน ตามเอกสารแนบ

โดยให้ปฏิบัติตามเงื่อนไขที่กำหนด มีกำหนด 2 ปี นับแต่วันที่ออกหนังสือฉบับนี้

ออกให้ ณ วันที่ 13 เดือน พฤศจิกายน พ.ศ. 2564

(นายบันเทิง เมธชาย)
ผู้จัดการฝ่ายที่ดีการบิน ปฏิบัติราชการแทน
ผู้อำนวยการสำนักงานการบินพลเรือนแห่งประเทศไทย

(เงื่อนไขการบังคับหรือปล่อยอากาศยานระบุด้านหลังหนังสือฉบับนี้)

หมายเหตุ: ท่านจะต้องประดิษฐ์ป้ายหรือห้อยอยู่ตลอดระยะเวลาที่ใช้งานไม่น้อยกว่า 30 วัน

https://uav.caat.or.th/print_allow.php 1/3

14/11/64 19:38 ขอขึ้นทะเบียนโดรน / Registration Drone Unmanned Aerial Vehicle (UAV)

CAAT
สำนักงานการบินพลเรือนแห่งประเทศไทย
The Civil Aviation Authority of Thailand

รายชื่อผู้บังคับหรือปล่อยอากาศยานซึ่งไม่มีนักบิน (ประเภทอากาศยานที่ควบคุมการบินจากภายนอก) จำนวน 5 คน ตามหนังสือการขึ้นทะเบียนเลขที่ Q16409/2564 สำหรับอากาศยานซึ่งมีหมายเลขเครื่อง (Serial No.) 1ZN3J5T00SL008

ลำดับที่	ชื่อ - นามสกุล
1.	นาย สุวเดช เมย์เยอร์
2.	นาย ธานุภาพ ปรนทรัพย์
3.	นาย ศักดิ์ชัย พงศ์ประทาร
4.	นาย อดิพงษ์ ไวยะสุนทร
5.	นาย คมชัย วัฒนจินดาเลิศ

หมายเหตุ
หากประสงค์จะแก้ไขเพิ่มเติมผู้บังคับหรือปล่อยอากาศยาน ให้มีหนังสือแจ้งขอแก้ไขเพิ่มเติมหรือยกเลิกรายละเอียดหรือบุคคลใด แนบพร้อมหนังสือรับรองสุขภาพ สำเนาใบสำคัญประจำตัวประชาชน สำเนาทะเบียนบ้าน หรือสำเนาหนังสือเดินทาง ยกเว้นกรณีเป็นคนต่างด้าว

https://uav.caat.or.th/print_allow.php 2/3

CONSTRUCTION SUPERVISION CONSULTANT
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FPT บริษัท ขนส่งน้ำมันทางท่อ จำกัด
REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2
TOPOGRAPHIC SURVEY REPORT
CONTRACTOR
TRITON ENGINEERING AND CONSTRUCTION

14/11/64 19:38 ขอขึ้นทะเบียนโดรน / Registration Drone Unmanned Aerial Vehicle (UAV)

CAAT
สำนักงานการบินพลเรือนแห่งประเทศไทย
The Civil Aviation Authority of Thailand

เงื่อนไขการขึ้นทะเบียนและการปล่อยอากาศยานซึ่งไม่มีนักบิน
(ออกตามประกาศกระทรวงคมนาคม เรื่อง หลักเกณฑ์การอนุญาตและเงื่อนไขในการขึ้นทะเบียนหรือปล่อยอากาศยานซึ่งไม่มีนักบิน ประเภทอากาศยานที่ควบคุมการบินจากภายนอก ประกาศ ณ วันที่ 2 กรกฎาคม 2558)

เงื่อนไขก่อนทำการบิน
1. ให้ผ่านการอบรมจากหลักสูตรที่สถานฝึกอบรมการบินได้จัดทำขึ้นและรับรอง ซึ่งรวมถึงหลักสูตรการอบรมออนไลน์ด้วย
2. ต้องได้รับอนุญาตจากเจ้าของพื้นที่ที่จะทำการบิน
3. ให้ทำการศึกษาพื้นที่และสิ่งแวดล้อมโดยรอบก่อนทำการบิน
4. ต้องมีแผนฉุกเฉิน รวมถึงแผนสำหรับการสื่อสารกับหน่วยบริการฉุกเฉิน การประสานงานกับ และการแจ้งเตือนผู้ที่อาจได้รับผลกระทบ
5. ต้องมีการประชาสัมพันธ์ให้ผู้ที่อยู่ในบริเวณทราบล่วงหน้าก่อนทำการบิน
6. ต้องมีความรู้ความเข้าใจในกฎจราจรทางอากาศ
7. ต้องมีความรู้ความเข้าใจในการบำรุงรักษาอากาศยาน และระบบต่างๆ ของอากาศยาน
8. ให้นำหนังสือการขึ้นทะเบียนผู้บังคับหรือปล่อยอากาศยาน (ประเภทที่ควบคุมการบินจากภายนอก) ติดตัวไว้ตลอดเวลาที่ทำการบิน
9. ต้องมีอุปกรณ์ที่แสดงให้ทราบว่าได้ติดตั้งหมายเลขประจำตัวของอากาศยานไว้ที่ตัวอากาศยาน
10. ต้องมีการประกันภัยความเสียหายต่อบุคคลที่สาม ซึ่งครอบคลุมถึงความรับผิดชอบในการเสียชีวิต สูญหาย ทุพพลภาพ หรือบาดเจ็บของบุคคลที่สาม ในวงเงินไม่ต่ำกว่า 1 ล้านบาท/ลูกไม่ครั้ง และการประกันภัยนี้ต้องคุ้มครองไปจนถึงเมื่อการขึ้นทะเบียนผู้บังคับหรือปล่อยอากาศยาน และต้องต่ออายุการประกันก่อนวันสิ้นอายุไม่น้อยกว่า 30 วัน

เงื่อนไขระหว่างทำการบิน
1. ห้ามทำการบินในลักษณะที่อาจก่อให้เกิดอันตรายต่อชีวิต ร่างกาย หรือทรัพย์สิน และรบกวนความสงบสุขของบุคคลอื่น
2. ห้ามทำการบินเข้าใกล้บริเวณสนามบิน เขตกำกับ และขอบเขตข้อมูลข่าวสารการบินของประเทศไทย (Aeronautical Information Publication – Thailand หรือ AIP – Thailand) รวมทั้งสถานที่ราชการ หน่วยงานของรัฐ โรงพยาบาล วัดและโบสถ์ที่มีอยู่ตลอดจนหน่วยงานต่างๆ ตามแต่จะกำหนดขึ้นในภายหลัง
3. ห้ามการบินขึ้นสูงของอากาศยานจะต้องไม่มีสิ่งกีดขวาง
4. ผู้บังคับหรือปล่อยอากาศยานต้องสามารถมองเห็นอากาศยานได้ตลอดเวลาที่ทำการบิน และห้ามทำการบังคับอากาศยานโดยอาศัยอุปกรณ์ช่วยมองหรืออุปกรณ์อื่นที่มีระยะมองไกลยิ่งกว่า
5. ต้องทำการบินในระหว่างช่วงเวลาระหว่างพระอาทิตย์ขึ้นถึงพระอาทิตย์ตก ซึ่งสามารถมองเห็นอากาศยานได้ด้วยตาเปล่า
6. ห้ามทำการบินเหนือโรงงานนิวเคลียร์
7. ห้ามทำการบินเกินกว่าระยะ 9 กิโลเมตร (5 ไมล์ทะเล) จากสนามบินหรือที่ขึ้นลงที่ราชการของสนาม เว้นแต่ได้รับอนุญาตจากเจ้าของหรือผู้ดำเนินการของสนามบินอนุญาตหรือที่ซึ่งได้รับอนุญาต
8. ห้ามทำการบินในแนวดิ่งสูงเกิน 90 เมตร (300 ฟุต) เหนือพื้นดิน
9. ห้ามทำการบินเหนือเมือง หมู่บ้าน ชุมชน หรือพื้นที่ที่มีคนรวมชุมนุมอยู่
10. ห้ามปล่อยอากาศยานเข้าใกล้อากาศยานซึ่งมีนักบิน
11. ห้ามทำการบินประมาทเลินเล่อหรือส่วนบุคคลจนเกินไป
12. ห้ามทำการบินในลักษณะให้เกิดความเสี่ยงต่อชีวิต ทรัพย์สิน หรือความปลอดภัยของผู้อื่น
13. ห้ามทำการบินเพื่อวัตถุประสงค์ในการขนส่งอุปกรณ์หรือสิ่งของที่เป็นอันตราย
14. ห้ามทำการบินในลักษณะที่ก่อให้เกิดรบกวนต่อบุคคล ยานพาหนะ สิ่งก่อสร้าง อาคาร ที่อยู่ใกล้เคียงหรือการปฏิบัติหน้าที่ของเจ้าหน้าที่ของรัฐ
15. กรณีมีข้อสงสัยหรือต้องการข้อมูลเพิ่มเติมให้ติดต่อกับกรมการบินพลเรือน กรุงเทพมหานคร โทร.02 568 8800 ต่อ 1603 หรือ Email : uav@caat.or.th

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พระราชบัญญัติการเดินอากาศ พ.ศ. 2497
มาตรา 24 "ห้ามมิให้ผู้ใดบังคับหรือปล่อยอากาศยานซึ่งไม่มีนักบิน หรือที่เป็นอากาศยานซึ่งไม่ได้รับอนุญาตเป็นการฝ่าฝืนข้อกำหนดในกฎกระทรวง"
มาตรา 67/20 "ผู้ใดรับอนุญาตตามมาตรา 24 ฝ่าฝืนหรือไม่ปฏิบัติตามหน้าที่การควบคุมหรือเงื่อนไขที่กำหนดในการอนุญาต ต้องระวางโทษปรับไม่เกินห้าพันบาท"
มาตรา 78 "ผู้ใดบังคับหรือปล่อยอากาศยานซึ่งไม่มีนักบินหรือที่ไม่ได้รับอนุญาต เป็นเหตุให้เกิดอุบัติภัยแก่อากาศยานลำอื่น ต้องระวางโทษจำคุกไม่เกินหนึ่งปี หรือปรับไม่เกินสี่หมื่นบาท หรือทั้งจำทั้งปรับ"

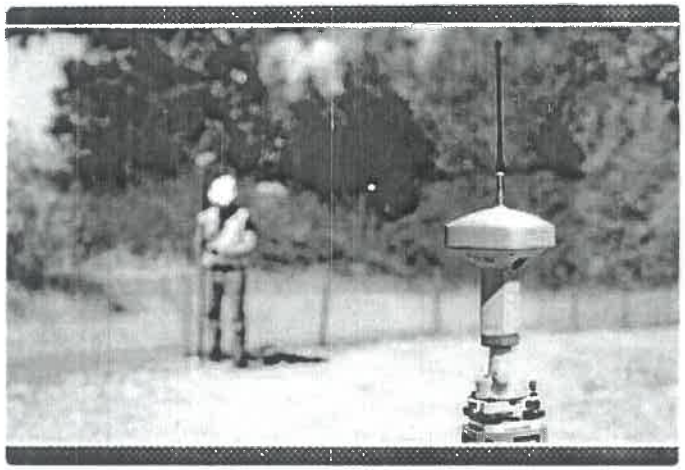
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GR-5

TOPCON

Advanced GNSS Receiver





- 216 Universal Tracking Channels
- G3 Tracking Technology (GPS/GLONASS/Galileo)
- Advanced Fence Antenna™ Technology
- High accuracy RTK with updates up to 100Hz
- Integrated dual radio and cellular combinations
- 32GB SDHC storage support
- Dual hot-swappable batteries

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GR-5 Advanced GNSS Receiver

The GR-5 is the most advanced RTK GPS system from Topcon. This exciting system incorporates G3 tracking technology to track all three satellite positioning systems as well as new design features not found in any other system.

Topcon's G3 technology was the first to combine all three of the original positioning systems – GPS, GLONASS, and Galileo. Although commercial use of Galileo continues to be years away, Topcon continues its commitment to develop technology to utilize ALL signals from ALL satellites. Not only is Topcon committed to the GPS, GLONASS and Galileo satellite systems, but also to all precision signals from the developing Chinese COMPASS system, Japan's Quasi-Zenith Satellite System (QZSS), and India's IRNSS system. If there is any operational advantage of combining new systems and signals, you can count on Topcon to continue to lead the industry.

Building from the tremendous success of the world's first G3 RTK receiver, the Topcon GR-3, the new GR-5 provides the latest technological advancements with the same powerful performance our customers have grown to demand.

One look at the new GR-5, and you notice the new, advanced antenna design. This patented Fence Antenna™ technology provides industry-leading tracking sensitivity and multipath rejection in a compact and lightweight package. By combining this antenna with the latest innovations in tracking algorithms, Topcon has given the GR-5 our most highly advanced tracking performance ever! The GR-5's tracking capabilities are not only state-of-the-art, but also delivers unmatched value to our customers by providing accuracy levels superior to other RTK systems in difficult environments. While other systems sacrifice accuracy for tracking performance, the GR-5 gives you the best of both!

The new GR-5 design didn't stop simply with new antenna and tracking technologies, the GR-5 also boasts numerous advancements such as: an increased number of channels, extended battery life, expanded internal memory options, new internal modem design, internet compatible firmware, and much, much more.

Combine the GR-5 with a Topcon Field Controller

- Topcon's FC Series field controllers
- Full color touch screen
- Graphical Windows® interface
- Operates the full suite of Topcon field controller software packages
- Wireless operation via Bluetooth® connection



216 Universal Tracking Channels
Topcon's unique channel tracking technology manages satellite signals on universal channels. Each of the 216 channels available can track any of the existing signals. Other receivers dedicate channels to single signals, thus needing more channels. With Topcon, channels can be assigned as needed.



Rugged Design
The GR-5 is guaranteed rugged by design. The frame of the GR-5 and the robust internal components are guaranteed to resist a 2m pole drop. Sure, you may scratch the housing, but the receiver keeps on working strong.



Dual Cellular and Radio
Each receiver has both cellular and radio communication available. So when in the convenience of network and cellular coverage, the GR-5 can be a network rover. When long range base to rover radios are needed, choose either UHF or digital UHF.



Long Range UHF Radio
The antenna design of the GR-5 places the radio antenna on top of the receiver, right in the middle of the GPS antenna. This unique advantage for Topcon receivers produces longer range results because the radio antenna is aiming up and is the tallest point of the receiver.



TOPCON

PRIMARY FEATURES



MAGNET™ Field

Experience the advantage of MAGNET Field with the GR-5 RTK system. Whether connecting to a network or setting up a Base/Rover system, MAGNET Field makes you more productive. Collect field data with smart coding, stakeout in five reading, or simply measure the volume of a stock pile. All this and the ability to share data to cloud storage is all built into MAGNET Field.



KIT COMPONENTS

Dual Receiver Package

- Two GR-5 Receivers
- Batteries (4) and Charger
- PC Data Cables
- Radio Antennas
- Manuals and Utility Software
- Carry Case
- Fixed Height Tripod



GR-5

TOPCON

SPECIFICATIONS

GNSS	
GPS+GLONASS Antenna	GPS + GLONASS + Galileo*
Number of Channels	216 Universal Channels
WAAS/EGNOS	Yes
Antenna Type	Integrated Micro Center Fence Antenna™ with Ground Plane
Accuracy	
RTK	H: 10mm + 1ppm V: 15mm + 1ppm
Static	H: 3mm + 0.1ppm V: 3.5mm + 0.4ppm
Communication	
Internal Radio Type	Integrated UHF TX/RX, or (1 Watt or Spread Spectrum in [illegible])
Base Radio Output	1W - 4W, user selectable
Cell, Internet, Satellite Communication	Integrated GSM/GPRS or CDMA**
Personal Communication	Bluetooth®
Data and Memory	
Memory	Internal, Removable SD/SDHC Memory Card
Data Update Output Rate	1Hz - 100Hz Selectable
Real Time Data Output	TPS, RTCA, RTCM, CMR, CMR+, NMEA (1 simultaneous port for RTK)
ASCII Output	NMEA (1 simultaneous port for RTK)
Environmental	
Enclosure	Magnesium Alloy Housing
Operating Temperature	-40 to +70°C
Dust/Water Protection	IP67
Shock Rating	2m pole drop to concrete (GR-5 meets MIL-STD-810F, Method 516.5, Procedure IV and IEC 60068-2-27, Test Ea)
Vibration Rating	(GR-5 meets MIL-STD-810F, Method 514.5, Procedure I and IEC 60068-2-6, Test Fc)

* Future upgrade. GALILEO is known as interoperable with Open Service™ technology

** CDMA, GPRS and satellite are available for optional expansion slot PCMCIA card.

*** Base + rover RTK simultaneous between

For more GNSS specifications visit: topconpositioning.com/gps

TOPCON TECHNOLOGY

Topcon's Patented Fence Antenna™ Technology

The Topcon GR-5 represents the next generation [illegible]

Technology Leadership

Once again, Topcon has set a new industry standard with our state-of-the-art Fence Antenna™ Technology. This revolutionary new antenna design provides signal-tracking capabilities not found in any other RTK receiver.



Enhanced Sensitivity

The most significant advancement comes with the Fence Antenna's™ performance tracking low elevation satellites. This patented* Fence Antenna™ technology provides unsurpassed sensitivity while simultaneously improving accuracy.

Advanced Multipath Suppression

Not only does the new Topcon Fence Antenna™ outperform other RTK receivers with enhanced sensitivity, but also provides multipath rejection characteristics that gives the GR-5 a level of tracking performance in difficult environments beyond any other RTK GNSS receiver.

Side-by-Side Tests

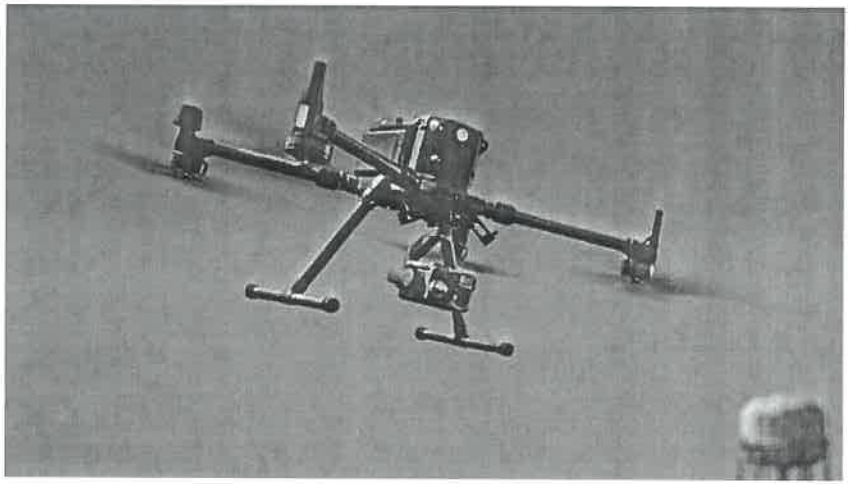
In side-by-side tests with other RTK GNSS receivers the Topcon GR-5 outperformed the competition in tracking behavior and overall RTK performance, and continues to lead the industry in RTK radio range.



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topcompositioning.com
7400 National Drive • Livermore • CA 94550
(925) 245 8300

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Imaging Above Everything| The new flagship drone DJI Mavic 3 is available now. Learn More

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Specs

Aircraft

Dimensions	Unfolded, propellers excluded, 810×670×430 mm (L×W×H) Folded, propellers included, 430×420×430 mm (L×W×H)
Diagonal Wheelbase	895 mm
Weight (with single downward gimbal)	Approx. 3.6 kg (without batteries) Approx. 6.3 kg (with two TB60 batteries)
Single Gimbal Dampers Max. Payload	930g
Max Takeoff Weight	9 kg
Operating Frequency	2.4000-2.4835 GHz 5.725-5.850 GHz
EIRP	2.4000-2.4835 GHz: 29.5 dBm (FCC); 18.5dBm (CE) 18.5 dBm (SRRC); 18.5dBm (MIC) 5.725-5.850 GHz: 28.5 dBm (FCC); 12.5dBm (CE) 28.5 dBm (SRRC)
Hovering Accuracy (P-mode with GPS)	Vertical: ±0.1 m (Vision System enabled) ±0.5 m (GPS enabled) ±0.1 m (RTK enabled) Horizontal: ±0.3 m (Vision System enabled) ±1.5 m (GPS enabled) ±0.1 m (RTK enabled)
RTK Positioning Accuracy	When RTK enabled and fixed: 1 cm+1 ppm (Horizontal) 1.5 cm + 1 ppm (Vertical)
Max Angular Velocity	Pitch: 300°/s, Yaw: 100°/s
Max Pitch Angle	30° (P-mode, Forward Vision System enabled: 25°)
Max Ascent Speed	S mode: 6 m/s P mode: 5 m/s
Max Descent Speed (vertical)	S mode: 5 m/s P mode: 4 m/s

Max Descent Speed (tilt)	S Mode: 7 m/s
Max Speed	S mode: 23 m/s P mode: 17 m/s
Service Ceiling Above Sea Level	5000 m (with 2110 propellers, takeoff weight ≤ 7 kg) / 7000 m (with 2195 propellers, takeoff weight ≤ 7 kg)
Max Wind Resistance	15 m/s
Max Flight Time	55 min
Supported DJI Gimbals	Zenmuse XT2/XT S/Z30/H20/H20T/P1/	P1/Gl L1
Supported Gimbal Configurations	Single Downward Gimbal, Dual Downward Gimbals, Single Upward Gimbal, Upward and Downward Gim Gimbals
Ingress Protection Rating	IP45
GNSS	GPS+GLONASS+BeiDou+Galileo
Operating Temperature	-20°C to 50°C (-4°F to 122° F)

Remote Controller

Operating Frequency	2.4000-2.4835 GHz 5.725-5.850 GHz
Max Transmitting Distance (unobstructed, free of interference)	NCC/FCC: 15 km CE/MIC: 8 km SRRC: 8 km
EIRP	2.4000-2.4835 GHz: 29.5 dBm (FCC) 18.5dBm (CE) 18.5 dBm (SRRC) 18.5dBm (MIC) 5.725-5.850 GHz: 28.5 dBm (FCC); 12.5dBm (CE) 20.5 dBm (SRRC)
External battery	Name: WB37 Intelligent Battery Capacity: 4920 mAh Voltage: 7.6V Type: LiPo Energy: 37.39Wh Charging time (using BS60 Intelligent Battery Station): 70 minutes (35°C to 45°C); 130 minutes (0°C to 15°
Built-in battery	Type: 18650 lithium-ion battery (5000 mAh @ 7.2 V) Charging: Use a USB charger with specification of 12V / 2A Rated power: 17 W Charging time: 2 hours and 15 minutes (Using a USB charger with specification of 12V / 2A)
Battery Life	Built-in battery: Approx. 2.5h Built-in battery+External battery: Approx. 4.5h
USB Power Supply	5V / 1.5A
Operating Temperature	-20°C to 40°C (-4 °F to 104 °F)

Vision System

Obstacle Sensing Range	Forward/Backward/Left/Right: 0.7-40m

	Upward/Downward: 0.6-30m
FOV	Forward/Backward/Downward: 65° (H), 50° (V) Left/Right/Upward: 75°(H), 60°(V)
Operating Environment	Surfaces with clear patterns and adequate lighting (> 15 lux)

Infrared ToF Sensing System

Obstacle Sensing Range	0.1-8m
FOV	30° (±15°)
Operating Environment	Large, diffuse and reflective obstacles (reflectivity >10%)

Top and bottom auxiliary light

Effective lighting distance	5m

FPV Camera

Resolution	960p
FOV	145°
Frame rate	30 fps

Intelligent Flight Battery

Name	TB60
Capacity	5935 mAh
Voltage	52.8 V
Battery Type	LiPo 12S
Energy	274 Wh
Net Weight	Approx. 1.35 kg
Operating Temperature	-4°F to 122°F (-20°C to 50°C)
Ideal storage temperature	71.6°F to 86°F (22°C to 30°C)
Charging Temperature	-4°F to 104°F (-20°C to 40°C) (When the temperature is lower than 5°C, the self-heating function will be automatically enabled. Charge temperature may shorten the lifetime of the battery)
Charging time	Using BS60 Intelligent Battery Station: 220V input: 60 minutes (fully charging two TB60 batteries), 30 minutes (charging two TB60 batteries from 110V input: 70 minutes (fully charging two TB60 batteries), 40 minutes (charging two TB60 batteries from

BS60 Intelligent Battery Station

Dimensions	501*403*252mm

Net Weight	6.37kg
Maximum Capacity	TB60 Intelligent Flight Battery x 6 WB37 Intelligent Battery x 4
Input	100-120 VAC, 50-60 Hz / 220-240 VAC, 50-60 Hz
Max. Input Power	1070W
Output Power	100-120 V: 750 W 220-240 V: 992 W
Operating Temperature	-4°F to 104°F (-20°C to 40°C)

Consumer
Professional
Enterprise
Compliance
DJI Care
Shield AI
DJI Care Refresh
DJI Online Store
Flight Hub
DJI Fleet Tips
Predict Support
Help Center
After-Sales Service Notice
Drone Law Centre
Newsroom
Events
Buying Guides
STEM Education
Mini Drones
DJI Camera Drones
Support
DJI Forum
Reviewer
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Your email a
DJI Authorized Dealer
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Specs

ZENMUSE P1

General

Product Name	ZENMUSE P1
Dimensions	198×166×129 mm
Weight	Approx. 800 g
Power	20W
IP Rating	IP4X
Supported Aircraft	Matrice 300 RTK
Operating Temperature Range	-20° to 50°C (-4° to 122°F)
Storage Temperature Range	-20° to 60°C (-4° to 140°F)
Absolute Accuracy	Horizontal: 3 cm, Vertical: 5 cm * * Using Mapping Mission at a GSD of 3 cm and flight speed of 15 m/s, with an 75% front overlap rate and a 55% side overlap rate.

Camera

Sensor	Sensor size (Still): 35.9×24 mm (Full frame) Sensor size (Max video recording area): 34×19 mm Effective Pixels: 45MP Pixel size: 4.4 µm
Supported Lenses	DJI DL 24mm F2.8 LS ASPH (with lens hood and balancing ring/filter), FOV 84° DJI DL 35mm F2.8 LS ASPH (with lens hood and balancing ring/filter), FOV 63.5° DJI DL 50mm F2.8 LS ASPH (with lens hood and balancing ring/filter), FOV 46.8°
Supported SD Cards	SD UHS-I rating or above. Max capacity: 512 GB
Storage Files	Photo / GHSS Raw Observation Data / Image Log File
Photo Size	3:2 (8192×5460)
Operation Modes	Photo, Video, Playback
Minimum photo interval	0.7 s
Shutter Speed	Mechanical Shutter Speed: 1/2000-1 s Electronic Shutter Speed: 1/8000-1 s *Aperture value no larger than f/5.6
Aperture Range	f/2.8-f/16
ISO Range	Photo: 100-25600 Video: 100-25600

Video

16:9 (3840×2160)*
*Only 35mm lens supported

Frame Rate 60fps

Gimbal

Stabilized System 3-axis (tilt, roll, pan)

Angular Vibration Range ±0.01°

Mount Detachable DJI SKYPORT

Mechanical Range Tilt: +130° to -40°;
Roll: -55° to +55°;
Pan: ±320°

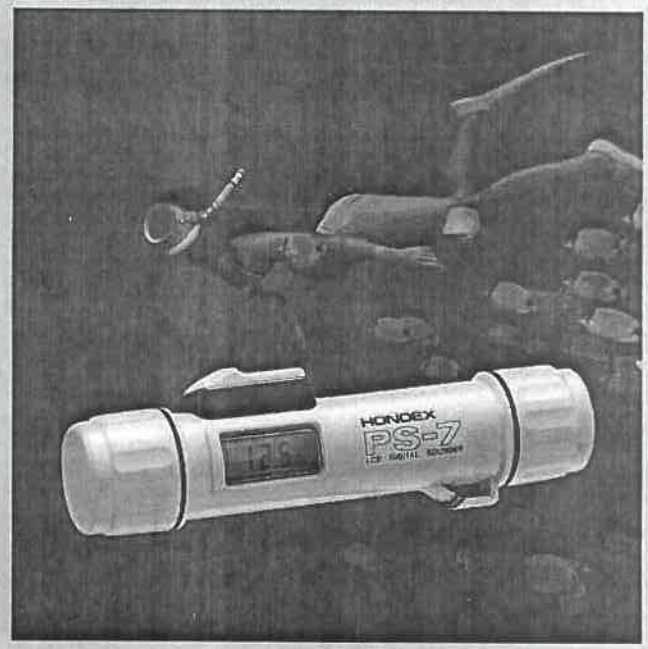
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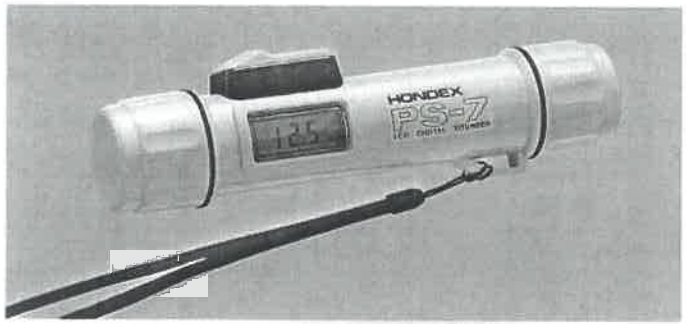
PS-7 & PS-7FL

PORTABLE DEPTH SOUNDERS

HONDEX
by HONDA ELECTRONICS



50m Waterproof for Divers



MODEL PS-7

Portable Sounder with Float Sensor



MODEL PS-7FL

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FEATURES

PS-7

•50m WATERPROOF

Unique portable sounder contains a dry cell and a transducer. It is used for marine diving, fishing on the small boat or measurement of depth for river works becase of 50m waterproof and anti-impactness.





For Diving



For Fishing

•EASY OPERATION

Distance can be mensured by pointing the sensor toward the object and sliding the switch on only. Display can be backlighted for night time operation.

PS-7FL

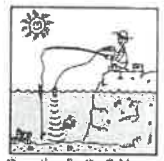
•SIMPLE OPERATION

With float sensor, you can operate PS-7 on the boat and yacht which is too large to use standard PS-7. And it is effective for the fishing on the shore and break water as well as on the boat.





Operation on the boat



Operation for the fishing on the shore and break water

•FLOAT SENSOR

New float sensor with anti-impactness enables you to operate the unit stably. (Length of cable:10m.)

COMMON FEATURES OF PS-7 & PS-7FL

•OPERATION BY DRY CELL BATTERY

You can operate with dry cell battery 006P.
Auto power off function works to shut the power off automatically about 10 seconds after you release the switch.



•INNER LIGHT

During sliding the switch on, the display is lighted up by built-in light. So you can operate at night time.

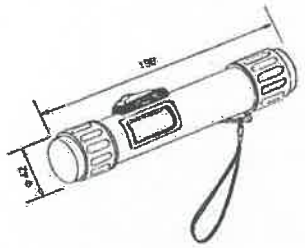


SPECIFICATIONS

	PS-7	PS-7FL
DISPLAY	LCD(7 segments)	
FREQUENCY	200KHz(Beam Angle : 24°)	
DEPTH SCALE	0.6~80m(1.5~260feet)	
BACK LIGHT	Filament Light	
WATERPROOF	30m (150feet) depth	----
POWER OFF	Automatical (for about 10 seconds)	
LENGTH OF FLOAT SENSOR'S CABLE	----	10m
OPERATING VOLTAGE	DC9V (Dry Cell 006P)	
BATTERY LIFE	Approximately 500 activations with battery	
WEIGHT	Approx.190g with battery	Approx.170g (Display) Approx.440g (Sensor)
DIMENSIONS	42(ø)X198(L)mm	42(ø)X198(L)mm (Display) 50(ø)X155(L)mm (Sensor)

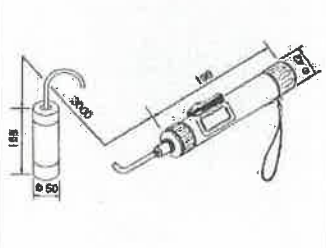
DIMENSIONS

PS-7



(mm)

PS-7FL



(mm)

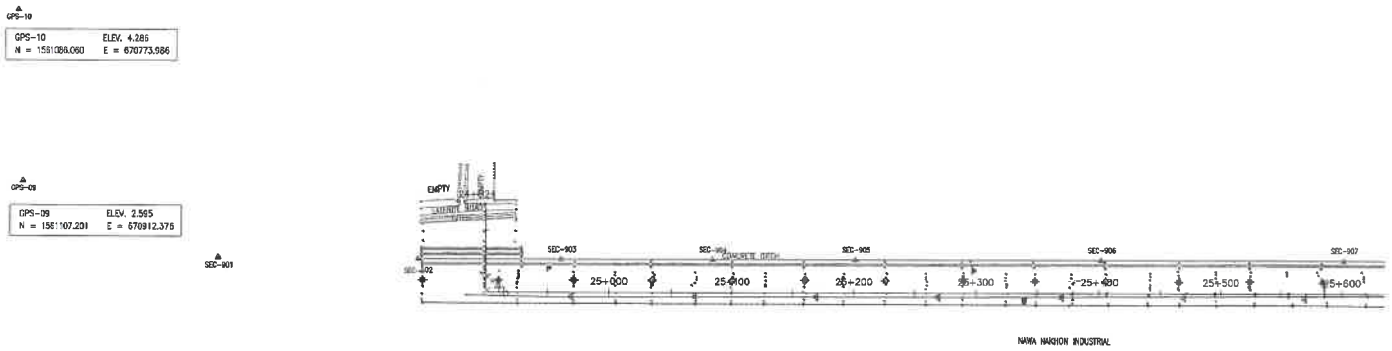
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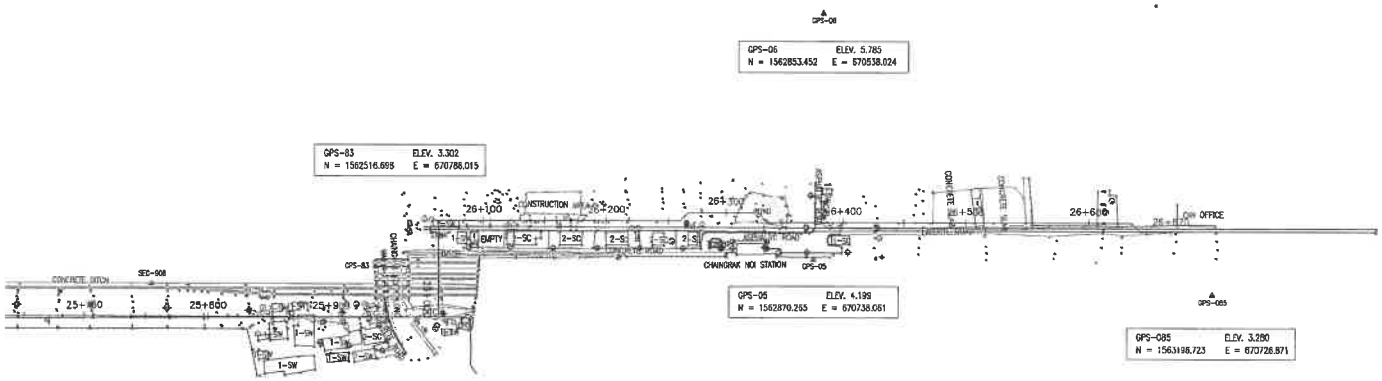
HONDEX is trade name of
HONDA ELECTRONICS CO.,LTD.
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Toyohashi, Aichi, Japan 441-3193
TEL: 81-532-41-2514
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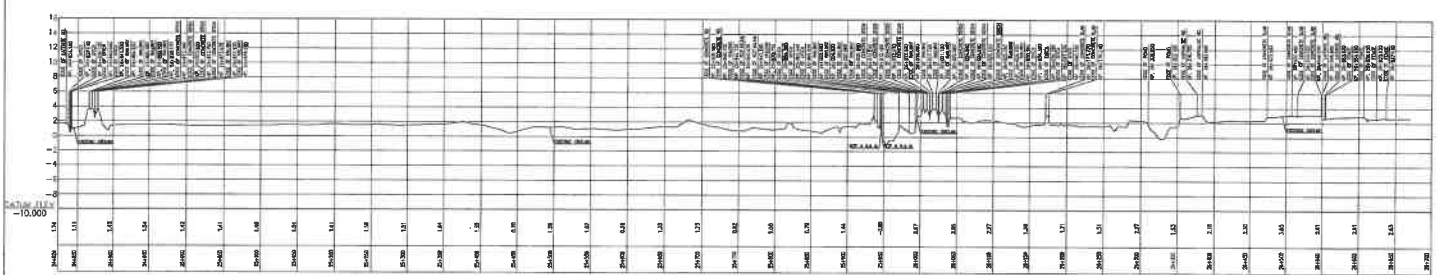
Dealer

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APPENDIX D : PDF DRAWING


GPS-10
GPS-10 ELEV. 4.285
N = 1591086.060 E = 670773.986
GPS-09
GPS-09 ELEV. 2.565
N = 1561107.201 E = 670912.375
SEC-901
EMPTY
SEC-903
SEC-904
SEC-905
SEC-906
SEC-907
SEC-902
25+000
25+100
25+200
25+300
25+400
25+500
25+600
NAWA NAGKON INDUSTRIAL


GPS-06
GPS-06 ELEV. 5.785
N = 1562853.452 E = 670538.024
GPS-83
GPS-83 ELEV. 3.302
N = 1562516.698 E = 670788.015
26+100
INSTRUCTION
26+200
25+700
26+400
26+500
26+600
CON OFFICE
EMPTY
1-SC
2-SC
2-S
1-SW
CHAINGRAK NOI STATION
GPS-05
GPS-05 ELEV. 4.199
N = 1562870.255 E = 670738.061
GPS-085
GPS-085 ELEV. 3.280
N = 1563198.723 E = 670726.871
SEC-908
CONCRETE DITCH
25+800
25+900
25+950


DATUM ELEV.
-10.000

APPENDIX E : AUTOCAD DRAWING

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FUEL PIPELINE TRANSPORTATION LIMITED

CONSTRUCTION SUPERVISION CONSULTANT: brightstar

CONTRACTOR: TRITON ENGINEERING AND CONSTRUCTION

REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

โครงการเปลี่ยนแปลงแนวท่อขนส่งน้ำมันในพื้นที่ทับซ้อนโครงการรถไฟความเร็วสูง เชื่อมโยงภูมิภาค กรุงเทพ-หนองคาย (RFPT2)

DOCUMENT NO.:	RFPT2-RPT-D-010-002	REVISION: 0
DOCUMENT TITLE:	GEOTECHNICAL SURVEY REPORT	

FPT REVIEW STAMP

- [x] E WORK MAY PROCEED
- [ ] F WORK MAY PROCEED SUBMIT FINAL DOCUMENT / DRAWING
- [ ] G REVISE AND RESUBMIT. WORK MAY PROCEED SUBJECT TO INCORPORATION OF CHANGES INDICATED.
- [ ] H REVISE AND RESUBMIT. WORK MAY NOT PROCEED
- [ ] I REVIEW NOT AND REQUIRED. WORK MAY PROCEED.

THIS REVIEW DOES NOT RELIEVE THE CONSTRACTOR OF ITS RESONSIBILITY FOR ERRORS AND FOR ALL ITS OTHER OBLIGATIONS UNDER THE CONTRACT

NAME PR DATE 19 Apr 23
SIGNATURE DATE

REV.	DATE	DESCRIPTION	BY	CHK	APPD
0	01 Apr 2023	Issued for Construction	Chaiyakorn	Pisan	Surapong
REVISIONS			TTEC	TTEC	TTEC

DOCUMENT CHANGE RECORD

Rev	Date	Prepared/ Revised by	Checked by	Approved by	Description
A	23 Dec 2022	Chaiyakorn	Pisan	Surapong	Issued for Review
0	01 Apr 2023	Chaiyakorn	Pisan	Surapong	Issued for Construction

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1. INTRODUCTION

Fuel Pipeline Transportation Limited (FPT) operates the multi-products pipelines to transport various grades of fuel products with the same pipeline to customers in Thailand. The throughput volume is obtained from 4 sources as follows:

- Oil refinery of Bangchak Petroleum Public Co., Ltd, from Bangchak.
- Oil depot of Oil and Retail Business Public Company Limited. (PTTOR) from Phra Khanong
- Oil depot of The Shell Company of Thailand Ltd. from Chongnonsi
- Oil depot of Chevron (Thailand) Co., Ltd. from Chongnonsi

The throughput from all 4 sources shall be delivered via underground pipelines laid parallel to the railway tracks to main pumping station at Chongnonsi area, then transported by high-pressure distribution pump at Makasan Control Station to deliver to terminals which consist of aviation fuel depots at Donmuang and Suvarnabhumi Airport, and the ground products depots including Bang Pa-In depot at Ayutthaya Province, Pichit depot at Pichit Province, and Lampang Depot at Lampang Province.

According to the State Railway of Thailand (SRT), there is a cooperation project between the government of the Kingdom of Thailand and the government of the People's Republic of China in the development of high-speed railway system to link the region during Bangkok - Nong Khai (Phase 1, Bangkok - Nakhon Ratchasima). A part of this project, in contracts no. 4-2 and 4-3, the fuel pipeline line was found to be interfered with the foundation of elevated high speed railway system. The fuel pipeline shall demolish and reroute to avoid interference in accordance with international standards and requirements of FPT. The reroute pipeline section will be started from KP.24+821 (Foundation no. 1099, DK.36+873.74) to KP.26+674 (Foundation No.1152, DK38+586.44) approximately 1.8 kilometres in length and described in Figure 1-1: Pipeline reroute section (Pink color) Figure 1-1.

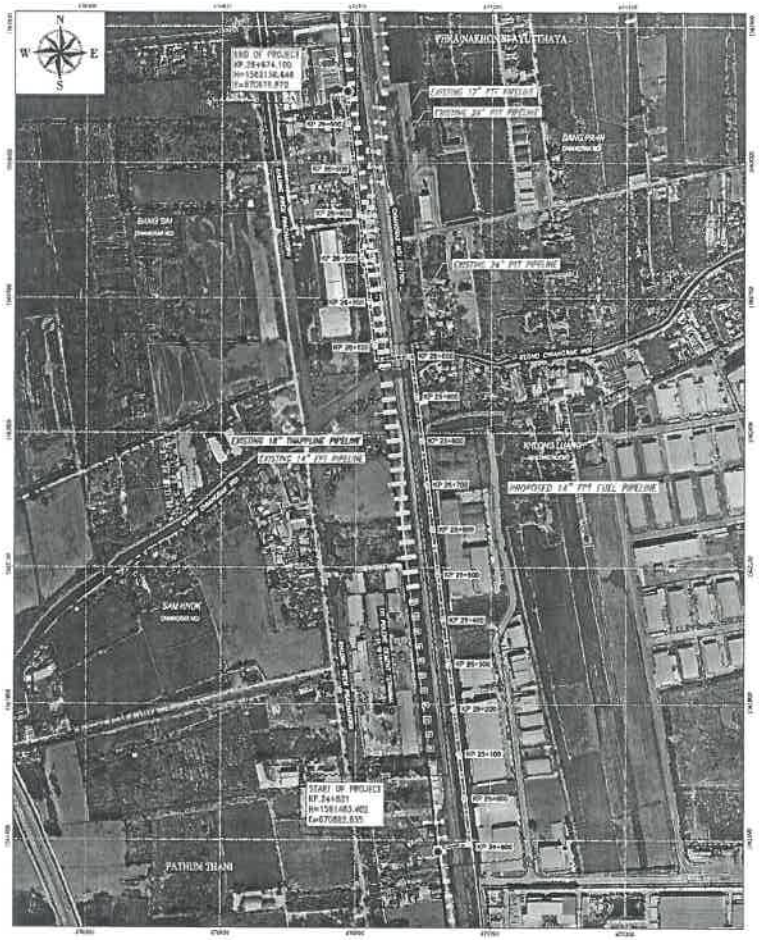


Figure 1-1: Pipeline reroute section (Pink color)

1.1 Purpose

The purpose of this investigation is to provide geotechnical information regarding soil for detailed engineering design of Reroute Fuel Pipeline Transportation Project No.2.

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2. DEFINITIONS AND ABBREVIATIONS

2.1 Definitions

Name	Company
OWNER	Fuel Pipeline Transportation Limited (FPT)
Consultant	Brightstar Asia Ltd.
EPC Contractor	Triton Engineering and Construction Public Co., Ltd
Project	Reroute Fuel Pipeline Transportation Project No.2

2.2 Abbreviations

BH	Borehole
CAN	CAN Joint Venture
HDD	Horizontal Directional Drill
ID	Inside Diameter
MSL	Mean Sea Level
OD	Outside Diameter
RFPT 2	Reroute Fuel Pipeline Transportation Project No.2
RID	Royal Irrigation Department
ROW	Right of Way
SPT	Standard Penetration Test
UCS	Unconfined Compressive Strength
USCS	The Unified Soil Classification System

3. STANDARDS

3.1 General

EPC Contractor shall meet or exceed the requirements of the following codes, regulations, and specifications herein. In case where more than one code, regulation or standard apply to the same condition, the most stringent shall be followed. All specifications and publications shall be the latest version.

3.2 International Standards

3.2.1 Field Investigations

Perform field work in accordance with common international practices for such works and the latest edition of the following standards:

CODES AND STANDARDS	TITLE
ASTM D420	Standard Guide for Site Characterization for Engineering Design and Construction Purposes
ASTM D1452	Standard Practice for Soil Exploration and Sampling by Auger Borings
ASTM D1586	Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils
ASTM D1587	Standard Practice for Thin-Walled Tube Sampling of Fine-Grained Soils for Geotechnical Purposes
ASTM D4220	Standard Practices for Preserving and Transporting Soil Samples

3.2.2 Laboratory Test

Perform laboratory tests in accordance with common international practices for such works and the latest edition of the following standards:

CODES AND STANDARDS	TITLE
ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM D422	Standard Test Method for Particle-Size Analysis of Soils
ASTM D854	Standard Test Method for Specific Gravity of Soil Solids
ASTM D2166	Standard Test Method for Unconfined Compressive Strength of Cohesive Soil
ASTM D2216	Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
ASTM D2435	Standard Test Methods for One-Dimensional Consolidation

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CODES AND STANDARDS	TITLE
	Properties of Soils Using Incremental Loading
ASTM D2487	Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D2938	Standard Test Method for Unconfined Compressive Strength of Intact Rock Core Specimens
ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

3.3 Project Specification

DOCUMENT NUMBER	TITLE
RFPT2-SP-D-010-002	Specification for Soil Investigation
RFPT2-PR-D-010-002	Geotechnical Survey Procedure

4. GEOTECHNICAL SURVEY

4.1 Site Description

The bore location is located along the pipeline alignment in Chiang Rak Noi Sub-district, Bang Pa-in District, Phra Nakhon Si Ayutthaya, which starts from BH1 to BH6 is next to 2.2 km. the area is alluvial plain and flat plain, which is shown in Figure 4-1.

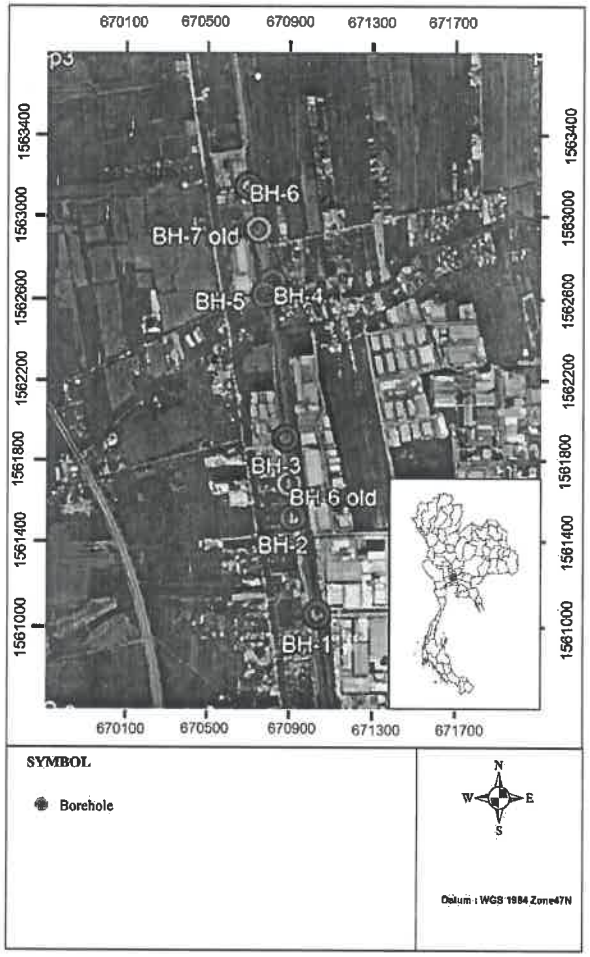


Figure 4-1: Overview Map Showing the Project Location

4.2 General Geology

The general geology in the project area as presented in Figure 4-2 is based on the provincial geological map of Thailand (Geological Survey Division, Department of Mineral Resources (DMR); Bangkok, Thailand: 2015). The geology was identified over the borehole location. It is Qmc unit: Coastal tide-dominated deposits: clay, silt, and fine-grained sand of tidal flat, marsh, mangrove swamp and estuary.

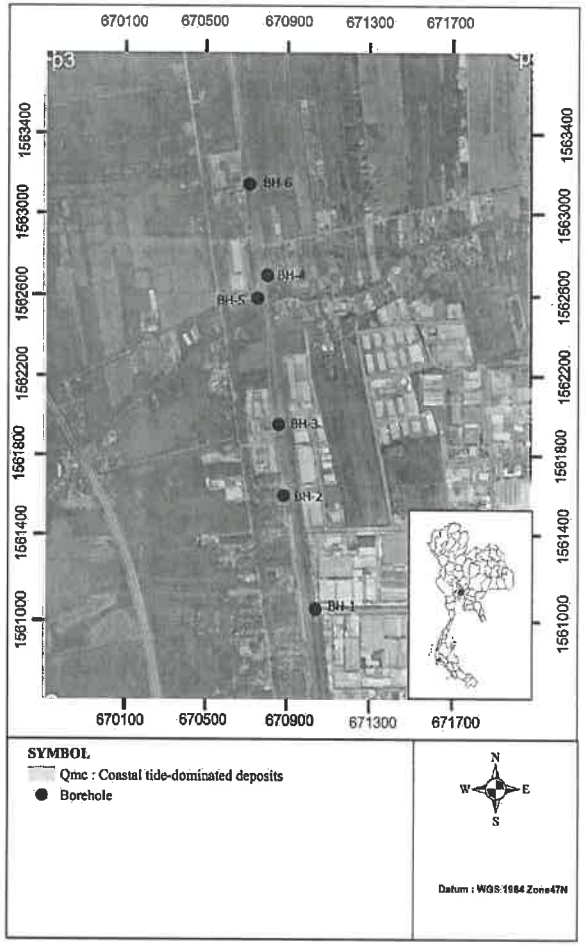


Figure 4-2: General Geological Map at Borehole, Project Area (Refer to DMR 2015)

4.3 Geotechnical Investigation

4.3.1 Field Reconnaissance

The location of borehole that has been selected is based on the engineering design and field reconnaissance taken on 30th November 2022 by the Geologist and Driller together with the project client personnel that made a site visit to locate the boring location. The proposed borehole location was specified by client and the exacted location was marked and surveyed at site between Client representative and Subcontractor-Syntera representative. The exacted borehole location map and detail of borehole is shown in Figure 4-1 and Table 4-1, respectively

Table 4-1: List of Exacted Borehole Location

No.	Item	Depth (m)	Coordinates UTM WGS84		
			Zone	North	East
1	BH-1	30.00	47P	1561016	671006
2	BH-2	30.00	47P	1561483	670891
3	BH-3	30.00	47P	1561874	670860
4	BH-4	30.00	47P	1562645	670804
5	BH-5	30.00	47P	1562584	670763
6	BH-6	30.00	47P	1563119	670688

4.3.2 Drilling and Sampling

The borehole was carried out by percussion drilling machine. Conceptually, boring was drilled into soil formation from original ground surface. The casing and bentonite slurry were used for stabilizing the hole in medium clay and sandy material.

The percussion drilling machine was engaged in soil drilling program, as demonstrated in Figure 4-3.

Standard Penetration Test (SPT), split barrel sampler (2 inches O.D.) was driven into soil layer. The number of blow in the last 30cm of penetration was taken as the standard penetration resistance SPT N Value. The test was executed in accordance with ASMT D1586. The soil property based on SPT for sand and clay are shown in Table 4-2 and Table 4-3.

Disturbed soil samples were obtained in the generally "granular" soil and sand layers encountered from split barrel tube. The samplings were obtained using the Standard Penetration Test, SPT ASTM D 1586 shown in Figure 4-4

Undisturbed samples were from thin wall Shelby tube for taking medium to soft clay and some of the "cohesive" silty clay materials which were found at selected depths. The sampling method was following ASTM D 1587 shown in Figure 4-5.

The soil samples were taken at 1.5,3.0,4.5 meter and at 1.5 meter of depths interval until the end of borehole.

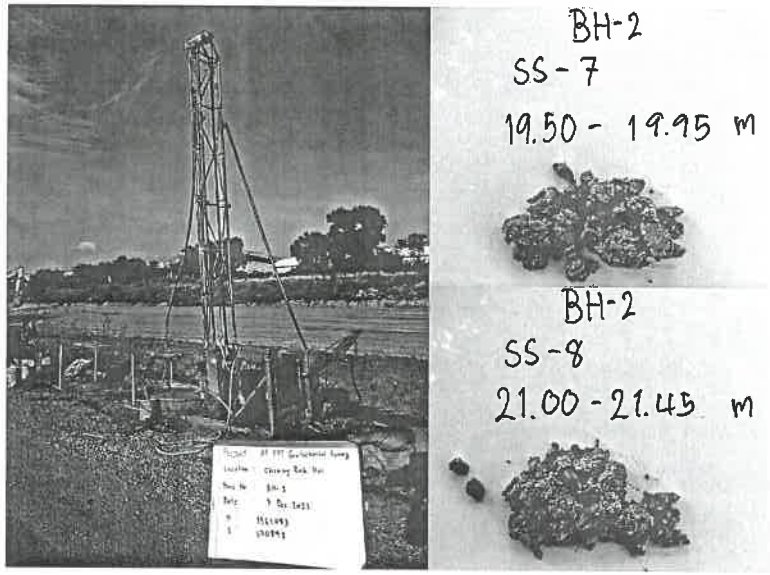


Figure 4-3: Percussion Drilling Machine in Operation and Sample

Table 4-2: Penetration Resistance and Soil Properties Based on the SPT for Sand (Peck, Hanson and Thornburn, 1974)

N-Value (Blows/ft)	Compactness	Relative Density (%)	Friction Angle (Ø degree)
0-4	Very Loose	0-15	<28°
4-10	Loose	15-35	28°-30°
10-30	Medium	35-65	30°-36°
30-50	Dense	65-85	36°-41°
Over 50	Very Dense	85-100	>41°

Table 4-3: Penetration Resistance and Soil Properties Based on the SPT for Clay (Peck, Hanson and Thornburn, 1974)

N-Value (Blows/ft)	Consistency	Unconfined Compressive Strength, q_u (ksc)
0-2	Very Soft	0-0.25
2-4	Soft	0.25-0.50
4-8	Medium	0.50-1.00
8-15	Stiff	1.00-2.00
15-30	Very Stiff	2.00-4.00
Over 30	Hard	Over 4.00



Figure 4-4: Split Spoon Sampler Tube for Disturbed Soil Sample

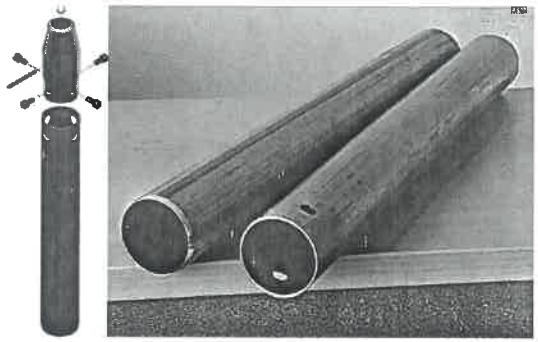


Figure 4-5: Thin-Walled Shelby Sampler Tube for Undisturbed Soil Sample

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4.3.3 Ground Water Measurement

Subsurface water conditions and the potential for groundwater seepage are fundamental factors in virtually all geotechnical analyses and design studies. Accordingly, the evaluation of groundwater conditions is a basic element of almost all geotechnical investigation.

Determination of groundwater levels and pressures includes measurements of elevation of the groundwater surface or water table and its variation with the season of the year; the location of perched water tables; the location of aquifers (geological units which yield economically significant amounts of water to a well); and the presence of artesian pressures.

The water level in open borings were measured after any prolonged interrupt ion in drilling, at the completion of each boring, and at least 12 hours (preferably 24 hours) after completion of drilling. Additional water level measurement was obtained at the complete ion of the field exploration and at other times designated by the engineer. The date and time of each observation should be recorded.

4.3.4 Laboratory Testing

Laboratory testing has been performed according to ASTM procedures. The geotechnical testing includes Index Property, Consolidation and Direct shear. The soil samples were selected at every significant change of strata or to cover the required laboratory tests. Sample cares also were taken in handling and transporting from the site to testing laboratory.

4.3.5 Classification of soil

Standard soil classification chart was used to identify soil types on both field and laboratory aspects. The description of the grain size distribution for soil particles are specified in accordance to sieve analysis, includes Gravel (>2mm), Sand (0.1-2mm), Silt (0.01-0.1mm), Clay (<0.1mm); as specified and demonstrated in Figure 4-6.

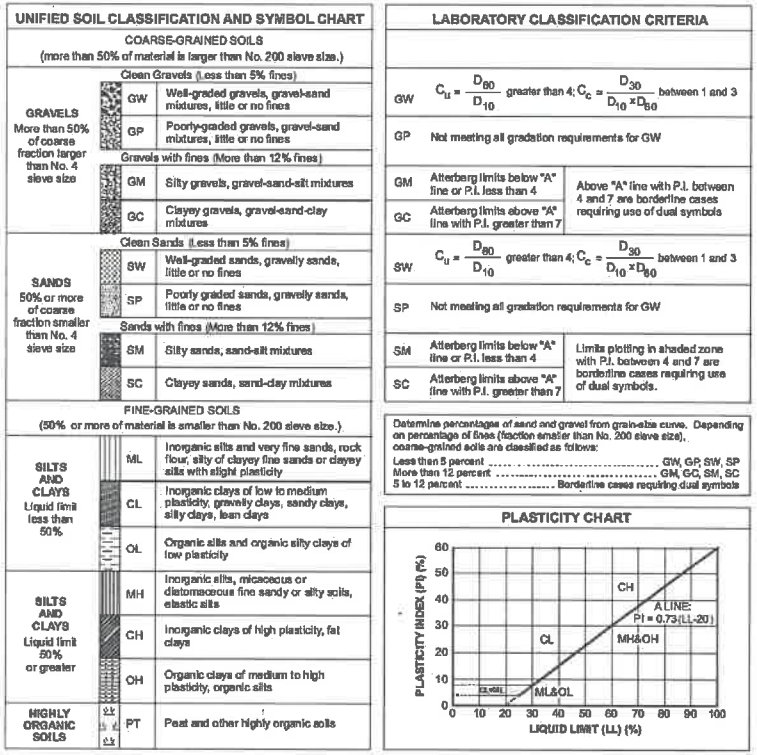


Figure 4-6: Unified Soil Classification System (USCS)

4.4 Investigation Results

4.4.1 Summary of Actual Work Quantities

Soil boring conditions in bore was investigated by washed drilling with SPT method and laboratory testing for geotechnical design. All information on the material as to their color, consistency, classification, and physical description were recorded for every test depth in borehole. Soil sample description obtained from drilling information and sieve analysis. Photographs show the existing site conditions during the time of field investigation and soil sample characters is for reference. A total of six (6) bore are performed for soil geotechnical investigation in this project. The detail of bores is illustrated in Table 4.4.

Table 4-4: Executed Soil Boreholes for Geotechnical Investigation and Engineering Design

No.	Bore no.	Actual Depth (m)	Start Date	Finished Date
1	BH-1	30.45	10/12/2022	11/12/2022
2	BH-2	30.45	7/12/2022	8/12/2022
3	BH-3	30.45	8/12/2022	9/12/2022
4	BH-4	30.45	5/12/2022	6/12/2022
5	BH-5	30.45	3/12/2022	4/12/2022
6	BH-6	30.45	2/12/2022	3/12/2022

4.4.2 Bore Information

The list of six (6) bore is tabulated in Table 4-5. The SPT, Unified Soil Classification System (USCS), Ground Water Level (G.W.L), ground surface elevation and borehole location were also recorded and indicated on the boring logs presented in Appendix A: Boring Logs. Laboratory investigation was carried out on representative soil samples obtained from drilling to determine the index and engineering properties required for analysis and design. The laboratory testing was performed are Index properties in Appendix B: Summary Testing Result.

Table 4-5: Borehole information

Bore No.	UTM WGS84		Elevation (m)	Depth (m)	G.W.L (m)	Test index
	North	East				
BH-1	1561016	671006	4	30.00	1.12	✓
BH-2	1561483	670891	4	30.00	0.86	✓
BH-3	1561874	670860	5	30.00	0.46	✓
BH-4	1562645	670804	5	30.00	0.34	✓
BH-5	1562584	670763	6	30.00	1.14	✓
BH-6	1563119	670688	5	30.00	0.62	✓

Remark: ✓: Tested

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4.4.3 Soil Stratification

Six (6) bores was carried out to identify of soil types, which is based on Unified Soil Classification System (USCS), are from both drilling and laboratory information. The description of the grain size distribution for soil particles is specified in accordance to sieve analysis, including Gravel (> 2 mm), Sand (0.1-2 mm), Silt (0.01-0.1 mm), Clay (< 0.1 mm). Soil stratification are summarized in the following;

Boring No. BH-1

Depth (m.)	Thickness (m)	Description
0.00-1.00	1.00	Fill material
1.00-11.00	10.00	CLAY (CH), Gray, High plasticity, Soft to medium.
11.00-15.00	4.00	CLAY (CH), Gray and brown, High plasticity, Very stiff.
15.00-19.00	4.00	CLAY (CL), Brown and gray, Low plasticity, very stiff.
19.00-22.00	3.00	Silty SAND (SM), Brown, fine to coarse grained, very dense.
22.00-27.00	5.00	Poorly graded SAND (SP), Brown, fine to coarse grained, Dense to very dense.
27.00-30.00	3.00	Silty SAND (SM), Brown, fine to coarse grained, Dense to very dense.

Boring No. BH-2

Depth (m.)	Thickness (m)	Description
0.00-1.00	1.00	Fill material
1.00-10.00	9.00	CLAY (CH), Gray, High plasticity, Soft.
10.00-13.00	3.00	CLAY (CH), Gray, High plasticity, Very Stiff.
13.00-24.00	11.00	Silty SAND (SM), Yellow, fine grained, Dense.
24.00-25.50	1.50	CLAY (CL), Gray, Low plasticity, Very Stiff.
25.50-30.00	4.50	Silty SAND (SM), Brown, fine to medium grained, very dense.

Boring No. BH-3

Depth (m.)	Thickness (m)	Description
0.00-1.00	1.00	Fill material
1.00-11.00	10.00	CLAY (CH), Gray, High plasticity, Soft.
11.00-16.00	5.00	CLAY (CH), Gray and brown, High plasticity, Very Stiff.
16.00-19.00	3.00	CLAY (CL), Gray and brown, Low plasticity, Hard.
19.00-25.00	6.00	Silty SAND (SM), Yellow and gray, fine- medium grained, Dense.
25.00-30.00	5.00	CLAY (CL), Gray, Low plasticity, Very Stiff.
30.00-30.45	0.45	Silty SAND (SM), Yellow and gray, fine- medium grained, Dense.

Boring No. BH-4

Depth (m.)	Thickness (m)	Description
0.00-1.00	1.00	Fill material
1.00-12.00	11.00	CLAY (CH), Gray, High plasticity, Soft.
12.00-15.00	3.00	CLAY (CH), Gray and brown, High plasticity, Very Stiff.
15.00-16.00	1.00	CLAY (CL), Gray and brown, Low plasticity, Very Stiff.
16.00-22.00	6.00	Silty SAND (SM), Brown and gray, fine- medium grained, very dense.
22.00-30.00	8.00	CLAY (CL), Gray, Low plasticity, Very Stiff.

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Boring No. BH-5

Depth (m.)	Thickness (m)	Description
0.00-2.00	2.00	Fill material
2.00-4.00	2.00	CLAY (CH), Brown, High plasticity, very stiff.
4.00-12.00	8.00	CLAY (CH), Gray, High plasticity, Soft.
12.00-19.00	7.00	CLAY (CH), Gray and brown, High plasticity, Very Stiff.
19.00-21.00	2.00	CLAY (CL), Gray and brown, Low plasticity, Hard.
21.00-24.00	3.00	Silty SAND (SM), Light gray, fine grained, very dense.
24.00-27.00	3.00	Sandy CLAY (CL), Dark Gray and brown, Low plasticity, stiff to Very Stiff.
27.00-29.00	2.00	Clayey SAND (SC), Gray, fine grained, Medium dense.
29.00-30.00	1.00	Sandy CLAY (CL), Gray, Low plasticity, Very Stiff.

Boring No. BH-6

Depth (m.)	Thickness (m)	Description
0.00-1.00	1.00	Fill material
1.00-12.00	11.00	CLAY (CH), Gray, High plasticity, Soft.
12.00-16.00	4.00	CLAY (CH), Brown, High plasticity, Very Stiff.
16.00-18.00	2.00	Clayey SAND (SC), Brown, fine grained, Medium dense
18.00-21.00	3.00	Silty SAND (SM), Gray to light gray, fine grained, very dense.
21.00-22.00	1.00	Silty SAND (SP-SM), Brown, fine to coarse grained, very dense
22.00-25.00	3.00	Silty SAND (SM), Brown, fine grained, Dense to very dense
25.00-30.00	5.00	CLAY (CL), Light gray, Low plasticity, very stiff to Hard

4.4.4 Soil Profiles

The identifications of soil types are from both field work and laboratory information, which are based on Unified Soil Classification System (USCS) as specified. The soil profiles at pipeline are created from section 4.4.3 "Soil Stratification" the "Boring Logs" (Appendix A) and the "Summary Test Results" (Appendix B). The soil profile can be described as shown in the Figure 4-7 following;

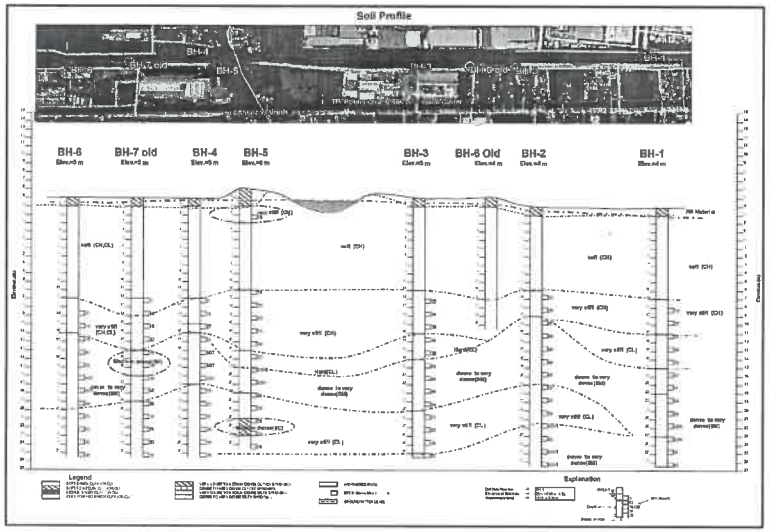


Figure 4-7: Sectional Soil Profile

4.4.5 Subsurface Water Conditions

The water table below ground surface can be identified and demonstrated from boring information. The water level was measured after 24 hours boring completion. Subsurface water is measured and revealed vary from place to place in range of 0.34-1.14 m below the ground surface due to the rainy season. However, the ground water should decrease when dry season.

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5. APPENDICES

APPENDIX A: BORING LOGS AND SOIL PROFILE

APPENDIX B: UNCONFINED COMPRESSIVE STRENGTH

APPENDIX C: SUMMARY TESTING RESULTS

APPENDIX D: BORE HOLE SAMPLE

APPENDIX E: DAILY REPORT

APPENDIX A : BORING LOGS AND SOIL PROFILE

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SOIL BORING LOG

PROJECT : REROUTE FULL PIPELINE TRANSPORTATION PROJECT NO.2
OWNER : Fuel Pipeline Transportation Limited (FPT)

BORING NO : BH-1
DEPTH (m) : 30.00
COORD. N : 1551016
E : 611900

ELEV. (m) : 4.00
GWL. (m) : 1.12
DATE STARTED : 10/12/2022
DATE FINISHED : 11/12/2022

SOIL DESCRIPTION	DEPTH (m)	GRAPHIC LOG	METHOD	SAMPLE NO.	RECOVERY (cm)	SPT-N VALUE (blows/ft) 10 20 30 40	Wn LL PL (%) 20 40 60 80	Su UC PP (tsf, m) 5 10 15 20	TOTAL UNIT WEIGHT (t/cu.m) 1.6 1.8 2.0
0.00-1.00 m. **Fill material**	1.00								
1.00-11.00m. **CLAY (CH)** Gray , High plasticity , Soft to medium .	2		ST	1	35				
	3								
	4		ST	2	35				
	5		ST	3	40				
	6								
	7		ST	4	40				
	8		ST	5	35				
	9								
	10		ST	6	40				
	11.00 11		ST	7	35				
11.00-15.00m. **CLAY (CH)** Gray and brown , High plasticity , Very stiff.	12		SS	1	30				
	13								
	14		SS	2	20				
	15.00 15								
15.00-19.00m. **CLAY (CL)** Gray and brown , Low plasticity , very stiff.	16		SS	3	25				
	17		SS	4	20				
	18								
	19.00 19		SS	5	25				
19.00-22.00m Silty SAND (SM) Brown , fine to coarse grained , Very Dense.	20		SS	6	15				
	21								
	22.00 22		SS	7	15				
22.00-27.00m Poorly graded SAND (SP) Brown , fine to coarse grained Dense to very dense.	23		SS	8	15				
	24								
	25		SS	9	25				
	26		SS	10	25				
	27.00 27								
27.00-30.00m Silty SAND (SM) Brown , fine to coarse grained , Dense to very dense.	28		SS	11	20				
	29		SS	12	20				
	30								
End of Bore Hole	30.45		SS	13	15				
	31								

PA = POWER AUGERING | HA = HAND AUGERING | WO = WASH OUT | ST = SHELBY TUBE | SS = SPLIT SPOON

PARTY CHIEF: | MADE BY: | ENGINEER: | FILE : | DISK:

FPT brightstar REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2 TRITON

SOIL BORING LOG

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2
OWNER : Fuel Pipeline Transportation Limited (FPT)

BORING NO : BH-1
DEPTH (m) : 30.00
COORD. N : 1561483
E : 670891
ELEV. (m) : 4.00
GWL. (m) : 0.86
DATE STARTED : 7/12/2023
DATE FINISHED : 8/12/2023

SOIL DESCRIPTION	DEPTH (m)	GRAPHIC LOG	METHOD	SAMPLE NO.	RECOVERY (cm)	SPT-N VALUE (blows/ft) 10 20 30 40	Wn LL PL (%) 20 40 60 80	Su UC PP (t/sq.m) 5 10 15 20	TOTAL UNIT WEIGHT (t/cu.m) 1.6 1.8 2.0
0.00-1.00 m Fill material	1.00								
1.00-10.00 m CLAY (CH) Gray , High plasticity , Soft.	2		ST	1	35				
	3								
	4		ST	2	40				
	5		ST	3	35				
	6								
	7		ST	4	40				
	8		ST	5	35				
	9								
	10.00 10		ST	6	40				
10.00-13.00m. CLAY (CH) Gray , High plasticity , Very stiff.	11		SS	1	20	20			
	12								
	13.00 13		SS	2	25				
13.00-24.00m Silty SAND (SM) Yellow , fine grained , Dense.	14		SS	3	20				
	15								
	16		SS	4	25	48			
	17		SS	5	20	49			
	18								
	19		SS	6	25	44			
	20		SS	7	15	42			
	21								
	22		SS	8	15	32			
	23		SS	9	15	32			
	24.00 24								
24.00-25.50m. CLAY (CL) Gray , Low plasticity , Very stiff.	25.50		SS	10	25	29			
25.50-30.00m. Silty SAND (SM) Brown , fine to medium grained , Very dense.	26		SS	11	25	50/11			
	27								
	28		SS	12	0				
	29		SS	13	20	50/11			
End of Bore Hole	30		SS	14	25	50/1			
	31								

PA = POWER AUGERING	HA = HAND AUGERING	WO = WASH OUT	ST = SHELBY TUBE	SS = SPLIT SPOON
PARTY CHIEF:	MADE BY:	ENGINEER:	FILE :	DISK:

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SOIL BORING LOG

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2
OWNER : Fuel Pipeline Transportation Limited (FPT)

BORING NO : BH-3
DEPTH (m) : 30.00
COORD. N : 1561974
E : 670899
ELEV. (m) : 5.00
GWL. (m) : 0.46
DATE STARTED : 9/12/2023
DATE FINISHED : 9/12/2023

SOIL DESCRIPTION	DEPTH (m)	GRAPHIC LOG	METHOD	SAMPLE NO.	RECOVERY (cm)	SPT-N VALUE (blows/ft) 10 20 30 40	Wn LL PL (%) 20 40 60 80	Su UC PP (t/sq.m) 5 10 15 20	TOTAL UNIT WEIGHT (t/cu.m) 1.6 1.8 2.0
0.00-1.00 m Fill material	1.00								
1.00-11.00 m CLAY (CH) Gray , High plasticity , Soft.	2		ST	1	35				
	3								
	4		ST	2	35				
	5		ST	3	35				
	6								
	7		ST	4	40				
	8		ST	5	35				
	9								
	10		ST	6	40				
	11.00 11		ST	7	35				
11.00-16.00m. CLAY (CH) Gray and brown, High plasticity ,Very stiff.	12								
	13		SS	1	30				
	14		SS	2	20				
	15								
	16.00 16		SS	3	25				
16.00-19.00m. CLAY (CL) Gray and brown , Low plasticity , Hard.	17		SS	4	20				
	18								
	19.00 19		SS	5	25				
19.00-25.00m Silty SAND (SM) Yellow and gray , fine- medium grained , Dense	20		SS	6	15				
	21								
	22		SS	7	15				
	23		SS	8	15				
	24								
	25.00 25		SS	9	25				
25.00-30.00m. CLAY (CL) Gray , Low plasticity , very stiff.	26		SS	10	25				
	27								
	28		SS	11	25				
	29		SS	12	20				
	30.00 30								
30.00-30.45 m Silty SAND (SM) Yellow and gray , fine- medium grained , Dense	31		SS	13	25				

PA = POWER AUGERING	HA = HAND AUGERING	WO = WASH OUT	ST = SHELBY TUBE	SS = SPLIT SPOON
PARTY CHIEF:	MADE BY:	ENGINEER:	FILE :	DISK:

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SOIL BORING LOG

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2
OWNER : Fuel Pipeline Transportation Limited (FPT)

BORING NO : BH-4
DEPTH (m) : 30.00
COORD. N : 1562645
E : 670864
ELEV. (m) : 5.00
GWL. (m) : 0.34
DATE STARTED : 5/12/2022
DATE FINISHED : 6/12/2022

SOIL DESCRIPTION	DEPTH (m)	GRAPHIC LOG	METHOD	SAMPLE NO.	RECOVERY (cm)	SPT-N VALUE (blows/ft) 10 20 30 40	Wn ■ LL □ PL (%) 20 40 60 80	Su ○ UC ● PP (t/sq.m) 5 10 15 20	TOTAL UNIT WEIGHT (t/cu.m) 1.6 1.8 2.0
0.00-1.00 m Fill material	1.00								
1.00-12.00 m CLAY (CH) Gray , High plasticity , Soft.	2		ST	1	35				
	3								
	4		ST	2	35				
	5		ST	3	35				
	6								
	7		ST	4	40				
	8		ST	5	35				
	9								
	10		ST	6	40				
	11		ST	7	40				
	12.00	12							
12.00-15.00m CLAY (CH) Gray and brown , High plasticity , Very stiff.	13		SS	1	30				
	14		SS	2	20				
15.00-16.00m CLAY (CL) Gray and brown, Low plasticity , Very stiff.	15.00	15	SS	3	25				
16.00-22.00m Silty SAND (SM) Gray and brown , fine to medium grained , Very dense.	16.00	16	SS	4	20				
	17								
	18		SS	5	25				
	19								
	20		SS	6	15				
	21								
	22.00	22	SS	7	15				
22.00-30.00m CLAY (CL) Gray , Low plasticity , very stiff.	23		SS	8	15				
	24								
	25		SS	9	25				
	26		SS	10	25				
	27								
	28		SS	11	20				
	29		SS	12	20				
	30								
End of Bore Hole		31	SS	13	25				

PA = POWER AUGERING	HA = HAND AUGERING	WO = WASH OUT	ST = SHELBY TUBE	SS = SPLIT SPOON
PARTY CHIEF:	MADE BY:	ENGINEER:	FILE :	DISK:

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SOIL BORING LOG

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2
OWNER : Fuel Pipeline Transportation Limited (FPT)

BORING NO : BH-5
DEPTH (m) : 30.00
COORD. N : 1562584
E : 670763
ELEV. (m) : 4.86
GWL. (m) : 1.74
DATE STARTED : 3/12/2022
DATE FINISHED : 4/12/2022

SOIL DESCRIPTION	DEPTH (m)	GRAPHIC LOG	METHOD	SAMPLE NO.	RECOVERY (cm)	SPT-N VALUE (blows/ft) 10 20 30 40	Wn ■ LL □ PL (%) 20 40 60 80	Su ○ UC ● PP (t/sq.m) 5 10 15 20	TOTAL UNIT WEIGHT (t/cu.m) 1.6 1.8 2.0
0.00-2.00 m Fill material	2.00								
2.00-4.00 m CLAY (CH) Brown, High plasticity , very stiff	4.00		SS	1	35				
4.00-12.00 m CLAY (CH) Gray , High plasticity , Soft.	5		ST	1	40				
	6								
	7		ST	2	40				
	8		ST	3	35				
	9								
	10		ST	4	40				
	11		ST	5	25				
	12.00	12							
12.00-19.00 m CLAY (CH) Gray and brown, High plasticity, very stiff	13		SS	2	20				
	14		SS	3	20				
	15								
	16		SS	4	20				
	17		SS	5	20				
	18								
	19.00	19	SS	6	25				
19.00-21.00 m CLAY (CL) Gray and brown , Low plasticity , Hard.	21.00	20	SS	7	25				
21.00-24.00 m Silty SAND (SM) Light gray , fine grained , Very dense.	22	21	SS	8	15				
	23		SS	9	15				
	24.00	24							
24.00-30.00 m Sandy CLAY (CL) Dark gray and brown, Low plasticity , Stiff to very stiff	25		SS	10	20				
	26		SS	11	25				
	27.00	27							
27.00-29.00 m Clayey SAND(SC) Gray , fine grained , Medium dense.	28		SS	12	0				
	29		SS	13	25				
29.00-30.00 m Sandy CLAY (CL) Gray , low plasticity , very stiff	30								
End of Bore Hole		31	SS	14	20				

PA = POWER AUGERING	HA = HAND AUGERING	WO = WASH OUT	ST = SHELBY TUBE	SS = SPLIT SPOON
PARTY CHIEF:	MADE BY:	ENGINEER:	FILE :	DISK:

FPT brightstar — REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2 — TRITON ENGINEERING AND CONSTRUCTION

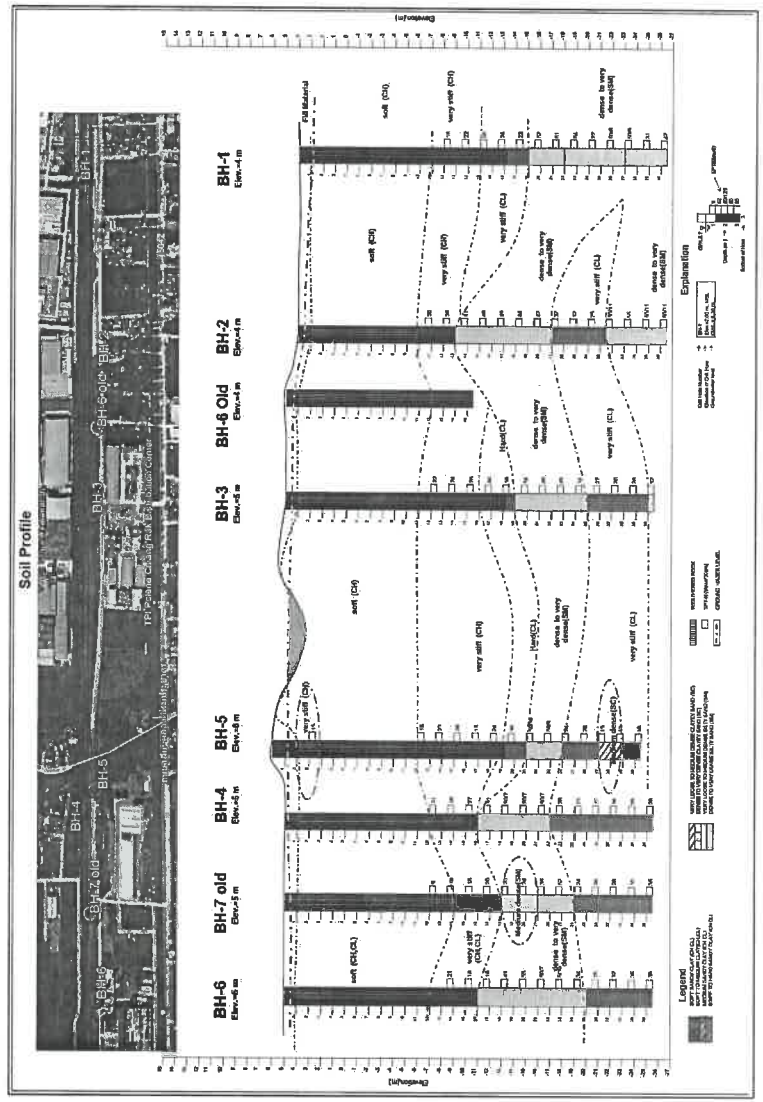
SOIL BORING LOG

PROJECT	: REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2	BORING NO	: BH-5	ELEV. (m)	: 0.00
OWNER	: Fuel Pipeline Transportation Limited (FPT)	DEPTH (m)	: 30.00	GWL. (m)	: 0.62
		COORD. N	: 1663119	DATE STARTED	: 1/12/2022
		E	: 670688	DATE FINISHED	: 2/12/2022

SOIL DESCRIPTION	DEPTH (m)	GRAPHIC LOG	METHOD	SAMPLE NO.	RECOVERY (cm)	SPT-N VALUE (blows/ft) 15 30 45 60	Wn / LL / PL (%) 20 40 60 80	Su UC / FP (t/sq.m) 5 10 15 20	TOTAL UNIT WEIGHT (t/cu.m) 1.6 1.8 2.0
0.00-1.00 m Fill material	1.00								
1.00-12.00 m CLAY (CH) Gray , High plasticity , Soft.	12.00		ST	1	35				
			ST	2	35				
			ST	3	40				
			ST	4	35				
			ST	5	35				
			ST	6	40				
			ST	7	25				
12.00-16.00 m CLAY (CH) Brown , High plasticity , Very stiff.	16.00		ST	8	30				
			SS	1	20				
			SS	2	20				
16.00-18.00 m Clayey SAND (SC) Brown , fine grained , Medium dense.	18.00		SS	3	15				
18.00-21.00 m Silty SAND (SM) Gray to light gray , fine grained , Very dense.	21.00		SS	4	20				
			SS	5	15				
21.00-22.00 m Silty SAND (SP-SM) Brown , fine to coarse grained , Very dense.	22.00		SS	6	15				
22.00-25.00 m Silty SAND (SM) Brown , fine grained ,Dense to very dense.	25.00		SS	7	15				
			SS	8	0				
25.00-30.00 m CLAY (CL) Light gray , Low plasticity , very stiff to hard.			SS	9	25				
			SS	10	25				
			SS	11	20				
End of Bore Hole	30.00		SS	12	20				

PA = POWER AUGERING	HA = HAND AUGERING	WO = WASH OUT	ST = SHELBY TUBE	SS = SPLIT SPOON
PARTY CHIEF:	MADE BY:	ENGINEER:	FILE :	DISK:

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APPENDIX B: UNCONFINED COMPRESSIVE STRENGTH

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท ขนส่งน้ำมันทางท่อ จำกัด brightstar TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. :	BH-1
SAMPLE NO.:	ST-1
DEPTH (m) :	1.50-2.0
SOIL TYPE :	CH

Test Summary

Water Content, w_n	62.3	%
Total Unit Weight, g_t	1.50	t/m^3
Unconfined Compressive Strength, q_u	39.86	kPa
	4.06	t/m^2
Undrained Shear Strength, c_u	2.03	t/m^2
Strain at Failure, e_f	10.76	%
Strain at 50% Stress Level, e_{50}	5.38	%
Modulus at 50% Stress Level, E_{50}	37.76	t/m^2

Soil specimen measurement

Height	11.80	cm.
Diameter	7.11	cm.
Area	39.70	sq.cm.
Volume	468.5	cu.cm.
Weigth of soil	701.21	gm.
Total Unit Weigth	1.50	

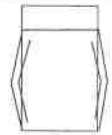
Proving Ring No. : 560924

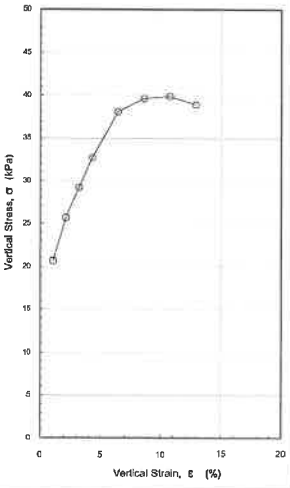
Equation for Calibration : Y = 0.5242 X + 3.056

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050	10	1.08	40.14	8.30	20.7
0.075					
0.100	14	2.15	40.58	10.39	25.6
0.125					
0.150	17	3.23	41.03	11.97	29.2
0.175					
0.200	20	4.31	41.49	13.54	32.6
0.225					
0.250					
0.300	25	6.46	42.44	16.16	38.1
0.350					
0.400	27	8.61	43.44	17.21	39.6
0.450					
0.500	28	10.76	44.49	17.73	39.9
0.550					
0.600	28	12.92	45.59	17.73	38.9
0.650					
0.700					
0.750					
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท พนส่งน้ำมันปิโตรเลียม จำกัด (มหาชน) brightstar TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-1
SAMPLE NO.: ST-2
DEPTH (m) : 3.00-3.50
SOIL TYPE : CH

Test Summary

Water Content, w_n	66.6	%
Total Unit Weight, g_t	1.56	t/m^3
Unconfined Compressive Strength, q_u	42.33	kPa
	4.32	t/m^2
Undrained Shear Strength, c_u	2.16	t/m^2
Strain at Failure, e_f	10.76	%
Strain at 50% Stress Level, e_{50}	5.38	%
Modulus at 50% Stress Level, E_{50}	40.11	t/m^2

Soil specimen measurement

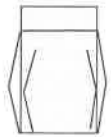
Height	11.80	cm.
Diameter	7.10	cm.
Area	39.59	sq.cm.
Volume	467.2	cu.cm.
Weigth of soil	729.50	gm.
Total Unit Weigth	1.56	

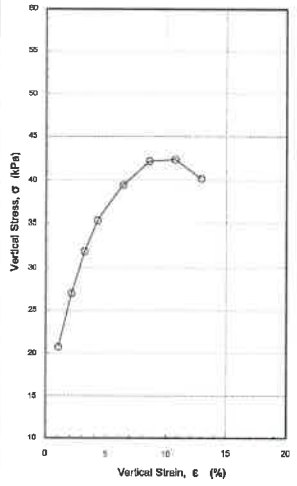
Proving Ring No. : 560924
Equation for Calibration Load : Y = 0.5242 X + 3.056

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050	10	1.08	40.02	8.30	20.7
0.075					
0.100	15	2.15	40.46	10.92	27.0
0.125					
0.150	19	3.23	40.91	13.02	31.8
0.175					
0.200	22	4.31	41.37	14.59	35.3
0.225					
0.250					
0.300	28	6.46	42.33	16.69	39.4
0.350					
0.400	29	8.61	43.32	18.26	42.1
0.450					
0.500	30	10.76	44.37	18.78	42.3
0.550					
0.600	29	12.92	45.46	18.26	40.2
0.650					
0.700					
0.750					
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท พนส่งน้ำมันปิโตรเลียม จำกัด (มหาชน) brightstar TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-1
SAMPLE NO.: ST-3
DEPTH (m) : 4.50-5.00
SOIL TYPE : CH

Test Summary

Water Content, w_n	84.3	%
Total Unit Weight, g_t	1.46	t/m^3
Unconfined Compressive Strength, q_u	33.28	kPa
	3.39	t/m^2
Undrained Shear Strength, c_u	1.70	t/m^2
Strain at Failure, e_f	11.84	%
Strain at 50% Stress Level, e_{50}	5.92	%
Modulus at 50% Stress Level, E_{50}	28.65	t/m^2

Soil specimen measurement

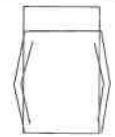
Height	11.80	cm.
Diameter	7.14	cm.
Area	40.04	sq.cm.
Volume	472.5	cu.cm.
Weigth of soil	690.40	gm.
Total Unit Weigth	1.46	

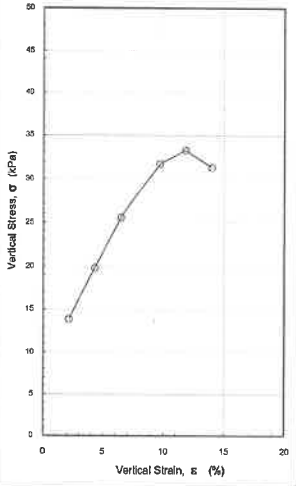
Proving Ring No. : 560924
Equation for Calibration : Y = 0.5242 X + 3.056

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050					
0.075					
0.100	5	2.15	40.92	5.68	13.9
0.125					
0.150					
0.175					
0.200	10	4.31	41.84	8.30	19.8
0.225					
0.250					
0.300	15	6.46	42.80	10.92	25.5
0.350					
0.400					
0.450	21	9.69	44.33	14.06	31.7
0.500					
0.550	23	11.84	45.42	15.11	33.3
0.600					
0.650	22	13.99	46.55	14.59	31.3
0.700					
0.750					
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท ขนส่งน้ำมันทางท่อ จำกัด | brightstar | TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-1
SAMPLE NO.: ST-4
DEPTH (m) : 6.00-6.50
SOIL TYPE : CH

Test Summary

Water Content, w_n	79.3	%
Total Unit Weight, g_t	1.51	t/m^3
Unconfined Compressive Strength, q_u	38.84	kPa
	3.96	t/m^2
Undrained Shear Strength, c_u	1.98	t/m^2
Strain at Failure, e_f	15.07	%
Strain at 50% Stress Level, e_{50}	7.54	%
Modulus at 50% Stress Level, E_{50}	26.27	t/m^2

Soil specimen measurement

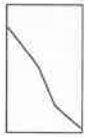
Height	11.80	cm.
Diameter	7.13	cm.
Area	39.93	sq.cm.
Volume	471.1	cu.cm.
Weigth of soil	712.00	gm.
Total Unit Weigth	1.51	

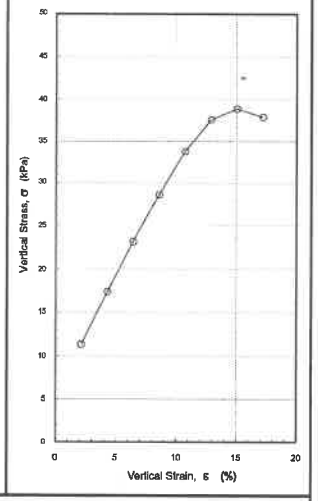
Proving Ring No. : 560924
Equation for Calibration : Y = 0.5242 X + 3.056

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050					
0.075					
0.100	3	2.15	40.81	4.63	11.3
0.125					
0.150					
0.175					
0.200	8	4.31	41.72	7.25	17.4
0.225					
0.250					
0.300	13	6.46	42.68	9.87	23.1
0.350					
0.400	18	8.61	43.69	12.49	28.6
0.450					
0.500	23	10.76	44.74	15.11	33.8
0.550					
0.600	27	12.92	45.85	17.21	37.5
0.650					
0.700	29	15.07	47.01	18.26	38.8
0.750					
0.800	29	17.22	48.23	18.26	37.9
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท ขนส่งน้ำมันทางท่อ จำกัด | brightstar | TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-1
SAMPLE NO.: ST-5
DEPTH (m) : 7.50-8.00
SOIL TYPE : CH

Test Summary

Water Content, w_n	81.4	%
Total Unit Weight, g_t	1.51	t/m^3
Unconfined Compressive Strength, q_u	36.91	kPa
	3.76	t/m^2
Undrained Shear Strength, c_u	1.88	t/m^2
Strain at Failure, e_f	12.92	%
Strain at 50% Stress Level, e_{50}	6.46	%
Modulus at 50% Stress Level, E_{50}	29.12	t/m^2

Soil specimen measurement

Height	11.80	cm.
Diameter	7.08	cm.
Area	39.37	sq.cm.
Volume	464.6	cu.cm.
Weigth of soil	699.80	gm.
Total Unit Weigth	1.51	

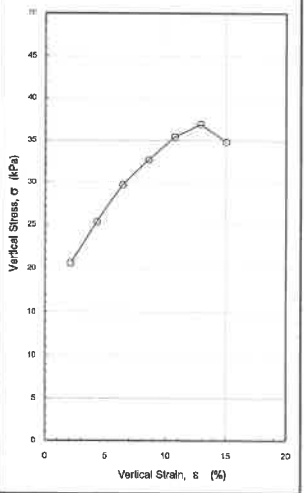
Proving Ring No. : 560924
Equation for Calibration Load : Y = 0.5242 X + 3.056

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050					
0.075					
0.100	10	2.15	40.24	8.30	20.6
0.125					
0.150					
0.175					
0.200	14	4.31	41.14	10.39	25.3
0.225					
0.250					
0.300	18	6.46	42.09	12.49	29.7
0.350					
0.400	21	8.61	43.08	14.06	32.6
0.450					
0.500	24	10.76	44.12	15.64	35.4
0.550					
0.600	26	12.92	45.21	16.69	36.9
0.650					
0.700	25	15.07	46.35	16.16	34.9
0.750					
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท พนส่งน้ำมันทางท่อ จำกัด (มหาชน) brightstar TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-1
SAMPLE NO.: ST-6
DEPTH (m) : 9.00-9.50
SOIL TYPE : CH

Test Summary

Water Content, w_n	21.4	%
Total Unit Weight, g_t	1.95	t/m^3
Unconfined Compressive Strength, q_u	190.74	kPa
	19.44	t/m^2
Undrained Shear Strength, c_u	9.72	t/m^2
Strain at Failure, e_f	12.90	%
Strain at 50% Stress Level, e_{50}	6.45	%
Modulus at 50% Stress Level, E_{50}	150.72	t/m^2

Soil specimen measurement

Height	11.80	cm.
Diameter	7.13	cm.
Area	39.93	sq.cm.
Volume	471.1	cu.cm.
Weigth of soil	917.50	gm.
Total Unit Weigth	1.95	

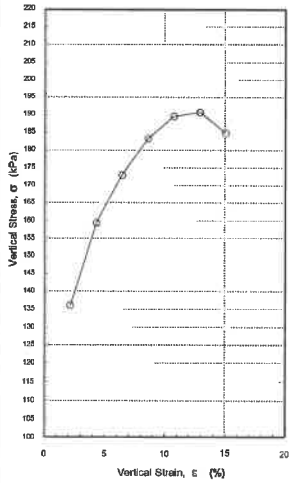
Proving Ring No. : 560924
Equation for Calibration Load : Y = 0.5242 X + 3.056

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050					
0.075					
0.100	100	2.15	40.81	55.48	136.0
0.125					
0.150					
0.175					
0.200	121	4.31	41.72	66.48	159.3
0.225					
0.250					
0.300	135	6.46	42.68	73.82	173.0
0.350					
0.400	147	8.61	43.69	80.11	183.4
0.450					
0.500	156	10.76	44.74	84.83	189.6
0.550					
0.600	161	12.92	45.85	87.45	190.7
0.650					
0.700	160	15.07	47.01	86.93	184.9
0.750					
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท พนส่งน้ำมันทางท่อ จำกัด (มหาชน) brightstar TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-1
SAMPLE NO.: ST-7
DEPTH (m) : 10.50=11.00
SOIL TYPE : CH

Test Summary

Water Content, w_n	19.8	%
Total Unit Weight, g_t	2.02	t/m^3
Unconfined Compressive Strength, q_u	226.98	kPa
	23.14	t/m^2
Undrained Shear Strength, c_u	11.57	t/m^2
Strain at Failure, e_f	10.76	%
Strain at 50% Stress Level, e_{50}	5.38	%
Modulus at 50% Stress Level, E_{50}	215.04	t/m^2

Soil specimen measurement

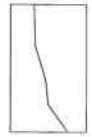
Height	11.80	cm.
Diameter	7.15	cm.
Area	40.15	sq.cm.
Volume	473.8	cu.cm.
Weigth of soil	955.30	gm.
Total Unit Weigth	2.02	

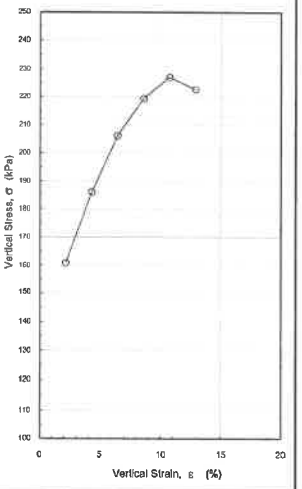
Proving Ring No. : 560924
Equation for Calibration : Y = 0.5242 X + 3.056

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050					
0.075					
0.100	120	2.15	41.03	65.96	160.7
0.125					
0.150					
0.175					
0.200	143	4.31	41.96	78.02	185.9
0.225					
0.250					
0.300	163	6.46	42.92	88.50	206.2
0.350					
0.400	178	8.61	43.93	96.36	219.3
0.450					
0.500	189	10.76	44.99	102.13	227.0
0.550					
0.600	190	12.92	46.11	102.65	222.6
0.650					
0.700					
0.750					
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท เอฟพีที อินดัสทรี จำกัด (มหาชน) | brightstar | TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-2
SAMPLE NO.: ST-1
DEPTH (m) : 1.50-2.0
SOIL TYPE : CH

Test Summary

Water Content, w_n	61.5	%
Total Unit Weight, g_t	1.46	t/m^3
Unconfined Compressive Strength, q_u	33.05	kPa
	3.37	t/m^2
Undrained Shear Strength, c_u	1.68	t/m^2
Strain at Failure, e_f	12.92	%
Strain at 50% Stress Level, e_{50}	6.46	%
Modulus at 50% Stress Level, E_{50}	26.08	t/m^2

Soil specimen measurement

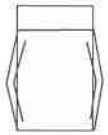
Height	11.80	cm.
Diameter	7.12	cm.
Area	39.82	sq.cm.
Volume	469.8	cu.cm.
Weigth of soil	685.60	gm.
Total Unit Weigth	1.46	

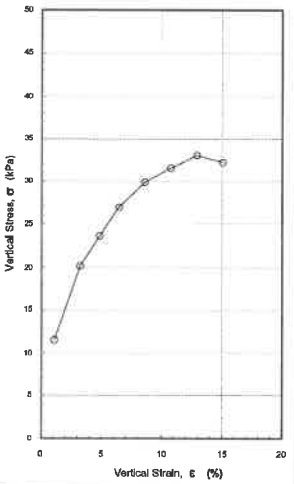
Proving Ring No. : 560924
Equation for Calibration Load : Y = 0.5242 X + 3.056

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050	3	1.08	40.25	4.63	11.5
0.075					
0.100					
0.125					
0.150	10	3.23	41.14	8.30	20.2
0.175					
0.200					
0.225	13	4.84	41.84	9.87	23.6
0.250					
0.300	16	6.46	42.56	11.44	26.9
0.350					
0.400	19	8.61	43.57	13.02	29.9
0.450					
0.500	21	10.76	44.62	14.06	31.5
0.550					
0.600	23	12.92	45.72	15.11	33.1
0.650					
0.700	23	15.07	46.88	15.11	32.2
0.750					
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท เอฟพีที อินดัสทรี จำกัด (มหาชน) | brightstar | TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-2
SAMPLE NO.: ST-2
DEPTH (m) : 3.00-3.50
SOIL TYPE : CH

Test Summary

Water Content, w_n	82.5	%
Total Unit Weight, g_t	1.47	t/m^3
Unconfined Compressive Strength, q_u	34.88	kPa
	3.56	t/m^2
Undrained Shear Strength, c_u	1.78	t/m^2
Strain at Failure, e_f	8.61	%
Strain at 50% Stress Level, e_{50}	4.31	%
Modulus at 50% Stress Level, E_{50}	41.30	t/m^2

Soil specimen measurement

Height	11.80	cm.
Diameter	7.10	cm.
Area	39.59	sq.cm.
Volume	467.2	cu.cm.
Weigth of soil	688.80	gm.
Total Unit Weigth	1.47	

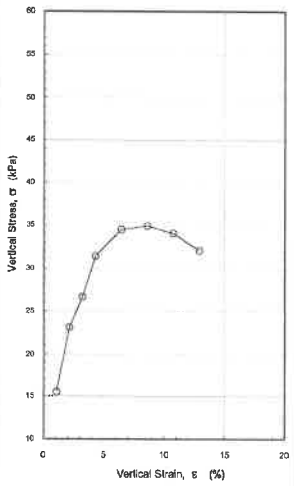
Proving Ring No. : 560924
Equation for Calibration Load : Y = 0.5242 X + 3.056

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050	6	1.08	40.02	6.20	15.5
0.075					
0.100	12	2.15	40.46	9.35	23.1
0.125					
0.150	15	3.23	40.91	10.92	26.7
0.175					
0.200	19	4.31	41.37	13.02	31.5
0.225					
0.250					
0.300	22	6.46	42.33	14.59	34.5
0.350					
0.400	23	8.61	43.32	15.11	34.9
0.450					
0.500	23	10.76	44.37	15.11	34.1
0.550					
0.600	22	12.92	45.46	14.59	32.1
0.650					
0.700					
0.750					
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท พนส์ไพบูลย์ จำกัด (มหาชน) | brightstar | TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-2
SAMPLE NO.: ST-3
DEPTH (m) : 4.50-5.00
SOIL TYPE : CH

Test Summary

Water Content, w_n	85.0	%
Total Unit Weight, g_t	1.45	t/m^3
Unconfined Compressive Strength, q_u	32.06	kPa
	3.27	t/m^2
Undrained Shear Strength, c_u	1.63	t/m^2
Strain at Failure, e_f	15.07	%
Strain at 50% Stress Level, e_{50}	7.54	%
Modulus at 50% Stress Level, E_{50}	21.68	t/m^2

Soil specimen measurement

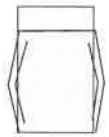
Height	11.80	cm.
Diameter	7.14	cm.
Area	40.04	sq.cm.
Volume	472.5	cu.cm.
Weigth of soil	685.40	gm.
Total Unit Weigth	1.45	

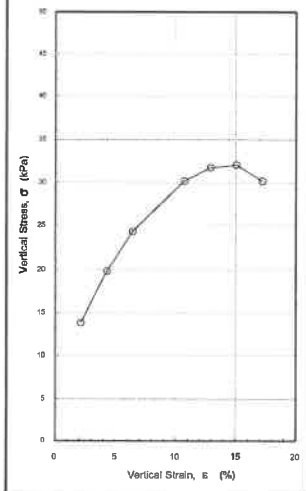
Proving Ring No. : 560924
Equation for Calibration : Y = 0.5242 X + 3.056

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050					
0.075					
0.100	5	2.15	40.92	5.68	13.9
0.125					
0.150					
0.175					
0.200	10	4.31	41.84	8.30	19.8
0.225					
0.250					
0.300	14	6.46	42.80	10.39	24.3
0.350					
0.400					
0.450					
0.500	20	10.76	44.87	13.54	30.2
0.550					
0.600	22	12.92	45.98	14.59	31.7
0.650					
0.700	23	15.07	47.14	15.11	32.1
0.750					
0.800	22	17.22	48.37	14.59	30.2
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท พนส์ไพบูลย์ จำกัด (มหาชน) | brightstar | TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-2
SAMPLE NO.: ST-4
DEPTH (m) : 6.00-6.50
SOIL TYPE : CH

Test Summary

Water Content, w_n	79.3	%
Total Unit Weight, g_t	1.46	t/m^3
Unconfined Compressive Strength, q_u	31.82	kPa
	3.24	t/m^2
Undrained Shear Strength, c_u	1.62	t/m^2
Strain at Failure, e_f	12.92	%
Strain at 50% Stress Level, e_{50}	6.46	%
Modulus at 50% Stress Level, E_{50}	25.10	t/m^2

Soil specimen measurement

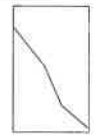
Height	11.80	cm.
Diameter	7.13	cm.
Area	39.93	sq.cm.
Volume	471.1	cu.cm.
Weigth of soil	690.20	gm.
Total Unit Weigth	1.46	

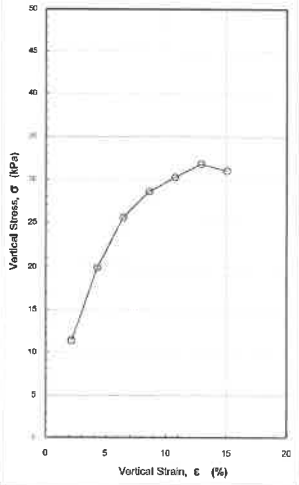
Proving Ring No. : 560924
Equation for Calibration : Y = 0.5242 X + 3.056

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050					
0.075					
0.100	3	2.15	40.81	4.63	11.3
0.125					
0.150					
0.175					
0.200	10	4.31	41.72	8.30	19.9
0.225					
0.250					
0.300	15	6.46	42.68	10.92	25.6
0.350					
0.400	18	8.61	43.69	12.49	28.6
0.450					
0.500	20	10.76	44.74	13.54	30.3
0.550					
0.600	22	12.92	45.85	14.59	31.8
0.650					
0.700	22	15.07	47.01	14.59	31.0
0.750					
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท ขนส่งน้ำมันทางท่อ จำกัด (มหาชน) brightstar TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-2
SAMPLE NO.: ST-5
DEPTH (m) : 7.50-8.00
SOIL TYPE : CH

Test Summary

Water Content, w_n	80.4	%
Total Unit Weight, g_t	1.45	t/m^3
Unconfined Compressive Strength, q_u	32.27	kPa
	3.29	t/m^2
Undrained Shear Strength, c_u	1.64	t/m^2
Strain at Failure, e_f	12.92	%
Strain at 50% Stress Level, e_{50}	6.46	%
Modulus at 50% Stress Level, E_{50}	25.46	t/m^2

Soil specimen measurement

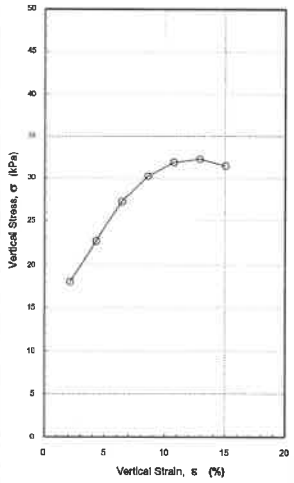
Height	11.80	cm.
Diameter	7.06	cm.
Area	39.37	sq.cm.
Volume	464.6	cu.cm.
Weigth of soil	672.50	gm.
Total Unit Weigth	1.45	
Proving Ring No. :	560924	
Equation for Calibration Load	Y = 0.5242 X + 3.056	

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050					
0.075					
0.100	8	2.15	40.24	7.25	18.0
0.125					
0.150					
0.175					
0.200	12	4.31	41.14	9.35	22.7
0.225					
0.250					
0.300	16	6.46	42.09	11.44	27.2
0.350					
0.400	19	8.61	43.08	13.02	30.2
0.450					
0.500	21	10.76	44.12	14.06	31.9
0.550					
0.600	22	12.92	45.21	14.59	32.3
0.650					
0.700	22	15.07	46.35	14.59	31.5
0.750					
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท ขนส่งน้ำมันทางท่อ จำกัด (มหาชน) brightstar TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-2
SAMPLE NO.: ST-6
DEPTH (m) : 9.00-9.50
SOIL TYPE : CH

Test Summary

Water Content, w_n	81.1	%
Total Unit Weight, g_t	1.50	t/m^3
Unconfined Compressive Strength, q_u	36.99	kPa
	3.77	t/m^2
Undrained Shear Strength, c_u	1.89	t/m^2
Strain at Failure, e_f	8.61	%
Strain at 50% Stress Level, e_{50}	4.31	%
Modulus at 50% Stress Level, E_{50}	43.80	kPa

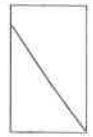
Soil specimen measurement

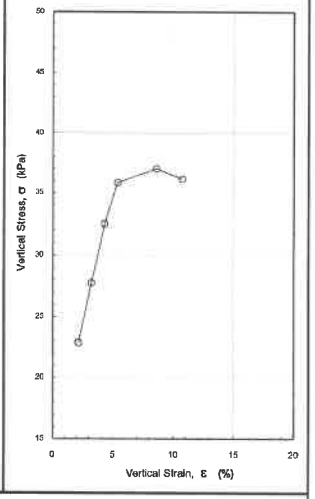
Height	11.80	cm.
Diameter	7.13	cm.
Area	39.93	sq.cm.
Volume	471.1	cu.cm.
Weigth of soil	708.60	gm.
Total Unit Weigth	1.50	
Proving Ring No. :	560924	
Equation for Calibration Load	Y = 0.5242 X + 3.056	

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050					
0.075					
0.100	12	2.15	40.61	9.35	22.9
0.125					
0.150	16	3.23	41.26	11.44	27.7
0.175					
0.200	20	4.31	41.72	13.54	32.5
0.225					
0.250	23	5.38	42.20	15.11	35.8
0.300					
0.350					
0.400	25	8.61	43.69	16.16	37.0
0.450					
0.500	25	10.76	44.74	16.16	36.1
0.550					
0.600					
0.650					
0.700					
0.750					
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท ทบส่งน้ำมันทางท่อ จำกัด | brightstar | TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-3
SAMPLE NO.: ST-1
DEPTH (m) : 1.50-2.0
SOIL TYPE : CH

Test Summary

Water Content, w_n	84.9	%
Total Unit Weight, g_t	1.46	t/m^2
Unconfined Compressive Strength, q_u	32.97	kPa
	3.36	t/m^2
Undrained Shear Strength, c_u	1.68	t/m^2
Strain at Failure, e_f	15.07	%
Strain at 50% Stress Level, e_{50}	7.54	%
Modulus at 50% Stress Level, E_{50}	22.30	t/m^2

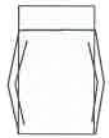
Soil specimen measurement

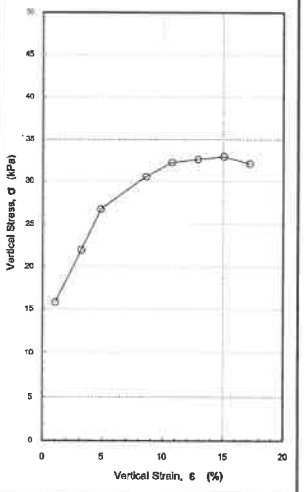
Height	11.80	cm.
Diameter	7.04	cm.
Area	38.93	sq.cm.
Volume	459.3	cu.cm.
Weigth of soil	670.40	gm.
Total Unit Weigth	1.46	
Proving Ring No. :	560924	
Equation for Calibratior	Y = 0.5242 X + 3.056	

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050	6	1.08	39.35	6.20	15.8
0.075					
0.100					
0.125					
0.150	11	3.23	40.22	8.82	21.9
0.175					
0.200					
0.225	15	4.84	40.91	10.92	26.7
0.250					
0.300					
0.350					
0.400	19	8.61	42.59	13.02	30.6
0.450					
0.500	21	10.76	43.62	14.08	32.2
0.550					
0.600	22	12.92	44.70	14.59	32.6
0.650					
0.700	23	15.07	45.83	15.11	33.0
0.750					
0.800	23	17.22	47.02	15.11	32.1
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท ทบส่งน้ำมันทางท่อ จำกัด | brightstar | TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-3
SAMPLE NO.: ST-2
DEPTH (m) : 3.00-3.50
SOIL TYPE : CH

Test Summary

Water Content, w_n	83.2	%
Total Unit Weight, g_t	1.47	t/m^2
Unconfined Compressive Strength, q_u	35.15	kPa
	3.58	t/m^2
Undrained Shear Strength, c_u	1.79	t/m^2
Strain at Failure, e_f	10.76	%
Strain at 50% Stress Level, e_{50}	5.38	%
Modulus at 50% Stress Level, E_{50}	33.30	t/m^2

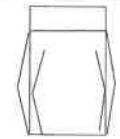
Soil specimen measurement

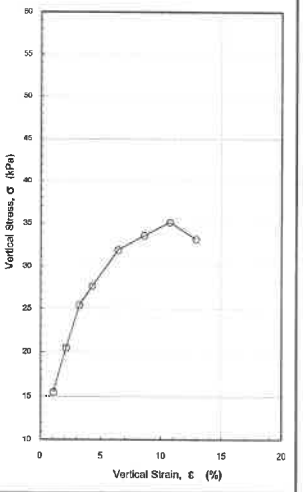
Height	11.80	cm.
Diameter	7.11	cm.
Area	39.70	sq.cm.
Volume	468.5	cu.cm.
Weigth of soil	688.80	gm.
Total Unit Weigth	1.47	
Proving Ring No. :	560924	
Equation for Calibration Load	Y = 0.5242 X + 3.056	

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050	6	1.08	40.14	6.20	15.5
0.075					
0.100	10	2.15	40.58	8.30	20.5
0.125					
0.150	14	3.23	41.03	10.39	25.3
0.175					
0.200	16	4.31	41.49	11.44	27.6
0.225					
0.250					
0.300	20	6.46	42.44	13.54	31.9
0.350					
0.400	22	8.61	43.44	14.59	33.6
0.450					
0.500	24	10.76	44.49	15.64	35.1
0.550					
0.600	23	12.92	45.59	15.11	33.1
0.650					
0.700					
0.750					
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท พนส์ทีเอ็นทาวเวอร์ จำกัด (มหาชน) brightstar TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-3
SAMPLE NO.: ST-3
DEPTH (m) : 4.50-5.00
SOIL TYPE : CH

Test Summary

Water Content, w_n	84.9	%
Total Unit Weight, g_t	1.44	t/m^2
Unconfined Compressive Strength, q_u	31.78	kPa
	3.24	t/m^2
Undrained Shear Strength, c_u	1.62	t/m^2
Strain at Failure, e_f	13.99	%
Strain at 50% Stress Level, e_{50}	7.00	%
Modulus at 50% Stress Level, E_{50}	23.16	t/m^2

Soil specimen measurement

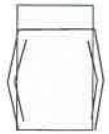
Height	11.80	cm.
Diameter	7.09	cm.
Area	39.48	sq.cm.
Volume	465.9	cu.cm.
Weigth of soil	671.40	gm.
Total Unit Weigth	1.44	

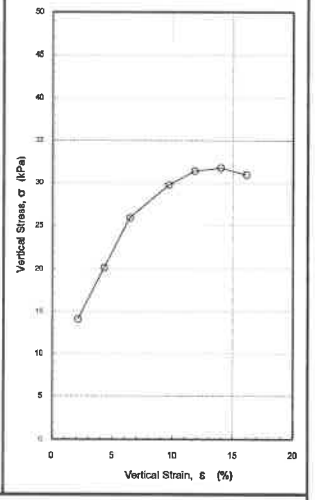
Proving Ring No. : 560924
Equation for Calibration : Y = 0.5242 X + 3.056

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050					
0.075					
0.100	5	2.15	40.35	5.68	14.1
0.125					
0.150					
0.175					
0.200	10	4.31	41.26	8.30	20.1
0.225					
0.250					
0.300	15	6.46	42.21	10.92	25.9
0.350					
0.400					
0.450	19	9.69	43.71	13.02	29.8
0.500					
0.550	21	11.84	44.78	14.06	31.4
0.600					
0.650	22	13.99	45.90	14.59	31.8
0.700					
0.750	22	16.14	47.08	14.59	31.0
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท พนส์ทีเอ็นทาวเวอร์ จำกัด (มหาชน) brightstar TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-3
SAMPLE NO.: ST-4
DEPTH (m) : 6.00-6.50
SOIL TYPE : CH

Test Summary

Water Content, w_n	84.2	%
Total Unit Weight, g_t	1.51	t/m^2
Unconfined Compressive Strength, q_u	36.74	kPa
	3.75	t/m^2
Undrained Shear Strength, c_u	1.87	t/m^2
Strain at Failure, e_f	11.84	%
Strain at 50% Stress Level, e_{50}	5.92	%
Modulus at 50% Stress Level, E_{50}	31.63	t/m^2

Soil specimen measurement

Height	11.80	cm.
Diameter	7.14	cm.
Area	40.04	sq.cm.
Volume	472.5	cu.cm.
Weigth of soil	714.20	gm.
Total Unit Weigth	1.51	

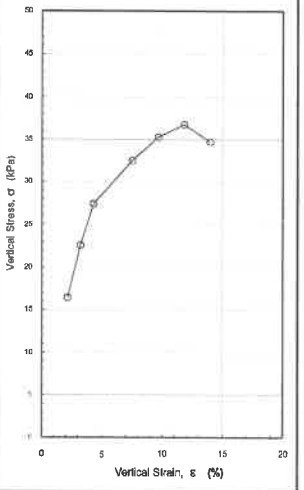
Proving Ring No. : 560924
Equation for Calibration : Y = 0.5242 X + 3.056

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050					
0.075					
0.100	7	2.15	40.92	6.73	16.4
0.125					
0.150	12	3.23	41.38	9.35	22.6
0.175					
0.200	16	4.31	41.84	11.44	27.3
0.225					
0.250					
0.300					
0.350	21	7.53	43.30	14.06	32.5
0.400					
0.450	24	9.69	44.33	15.64	35.3
0.500					
0.550	26	11.84	45.42	16.69	36.7
0.600					
0.650	25	13.99	46.55	16.16	34.7
0.700					
0.750					
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท พนส์ปิโตรเลียมทางท่อ จำกัด | brightstar | TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-3
SAMPLE NO.: ST-5
DEPTH (m) : 7.50-8.00
SOIL TYPE : CH

Test Summary

Water Content, w_n	84.8	%
Total Unit Weight, g_t	1.49	t/m^2
Unconfined Compressive Strength, q_u	36.70	kPa
	3.74	t/m^2
Undrained Shear Strength, c_u	1.87	t/m^2
Strain at Failure, e_f	12.92	%
Strain at 50% Stress Level, e_{50}	6.46	%
Modulus at 50% Stress Level, E_{50}	28.96	t/m^2

Soil specimen measurement

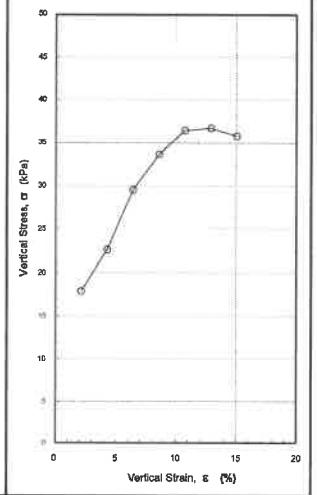
Height	11.80	cm.
Diameter	7.10	cm.
Area	39.59	sq.cm.
Volume	467.2	cu.cm.
Weigth of soil	695.40	gm.
Total Unit Weigth	1.49	
Proving Ring No. :	560924	
Equation for Calibration Load	Y = 0.5242 X + 3.056	

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050					
0.075					
0.100	8	2.15	40.46	7.25	17.9
0.125					
0.150					
0.175					
0.200	12	4.31	41.37	9.35	22.6
0.225					
0.250					
0.300	18	6.46	42.33	12.49	29.5
0.350					
0.400	22	8.61	43.32	14.59	33.7
0.450					
0.500	25	10.76	44.37	16.16	36.4
0.550					
0.600	26	12.92	45.46	16.69	36.7
0.650					
0.700	26	15.07	46.62	16.69	35.8
0.750					
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท พนส์ปิโตรเลียมทางท่อ จำกัด | brightstar | TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-3
SAMPLE NO.: ST-6
DEPTH (m) : 9.00-9.50
SOIL TYPE : CH

Test Summary

Water Content, w_n	80.6	%
Total Unit Weight, g_t	1.52	t/m^2
Unconfined Compressive Strength, q_u	38.14	kPa
	3.89	t/m^2
Undrained Shear Strength, c_u	1.94	t/m^2
Strain at Failure, e_f	10.76	%
Strain at 50% Stress Level, e_{50}	5.38	%
Modulus at 50% Stress Level, E_{50}	36.13	t/m^2

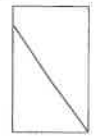
Soil specimen measurement

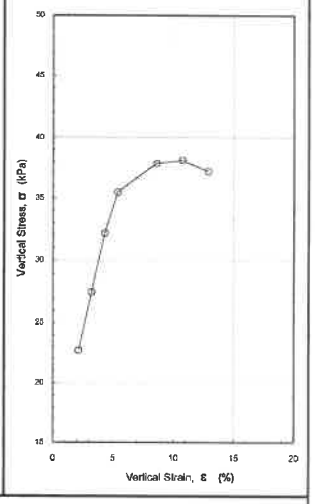
Height	11.80	cm.
Diameter	7.16	cm.
Area	40.26	sq.cm.
Volume	475.1	cu.cm.
Weigth of soil	720.20	gm.
Total Unit Weigth	1.52	
Proving Ring No. :	560924	
Equation for Calibration Load	Y = 0.5242 X + 3.056	

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050					
0.075					
0.100	12	2.15	41.15	9.35	22.7
0.125					
0.150	16	3.23	41.61	11.44	27.5
0.175					
0.200	20	4.31	42.08	13.54	32.2
0.225					
0.250	23	5.38	42.55	15.11	35.5
0.300					
0.350					
0.400	26	8.61	44.06	16.69	37.9
0.450					
0.500	27	10.76	45.12	17.21	38.1
0.550					
0.600	27	12.92	46.24	17.21	37.2
0.650					
0.700					
0.750					
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท พนส.เป็นมหาชน จำกัด | brightstar | TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-3
SAMPLE NO.: ST-7
DEPTH (m) : 10.5-11.00
SOIL TYPE : CH

Test Summary

Water Content, w_n	81.3	%
Total Unit Weight, g_t	1.49	t/m^2
Unconfined Compressive Strength, q_u	36.53	kPa
	3.72	t/m^2
Undrained Shear Strength, c_u	1.86	t/m^2
Strain at Failure, e_f	10.76	%
Strain at 50% Stress Level, e_{50}	5.38	%
Modulus at 50% Stress Level, E_{50}	34.61	t/m^2

Soil specimen measurement

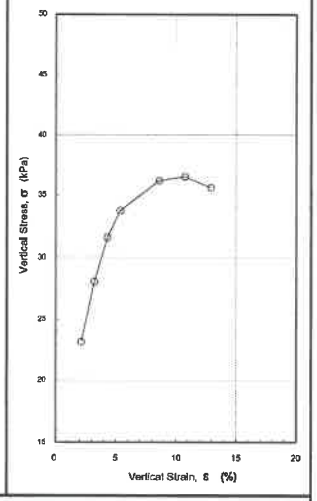
Height	11.80	cm.
Diameter	7.09	cm.
Area	39.48	sq.cm.
Volume	465.9	cu.cm.
Weigth of soil	696.30	gm.
Total Unit Weigth	1.49	
Proving Ring No. :	560924	
Equation for Calibration Load	Y = 0.5242 X + 3.056	

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050					
0.075					
0.100	12	2.15	40.35	9.35	23.2
0.125					
0.150	16	3.23	40.80	11.44	28.0
0.175					
0.200	19	4.31	41.26	13.02	31.5
0.225					
0.250	21	5.38	41.73	14.06	33.7
0.300					
0.350					
0.400	24	8.61	43.20	15.64	36.2
0.450					
0.500	25	10.76	44.24	16.16	36.5
0.550					
0.600	25	12.92	45.34	16.16	35.6
0.650					
0.700					
0.750					
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท พนส.เป็นมหาชน จำกัด | brightstar | TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-4
SAMPLE NO.: ST-1
DEPTH (m) : 1.50-2.0
SOIL TYPE : CH

Test Summary

Water Content, w_n	79.6	%
Total Unit Weight, g_t	1.46	t/m^3
Unconfined Compressive Strength, q_u	33.05	kPa
	3.37	t/m^2
Undrained Shear Strength, c_u	1.68	t/m^2
Strain at Failure, e_f	12.92	%
Strain at 50% Stress Level, e_{50}	6.46	%
Modulus at 50% Stress Level, E_{50}	26.08	t/m^2

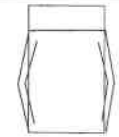
Soil specimen measurement

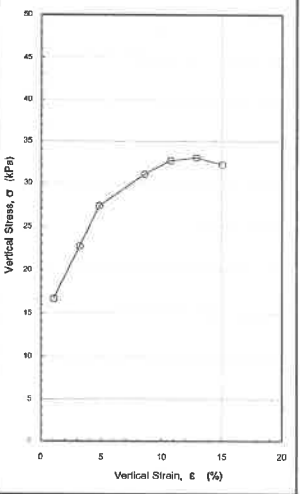
Height	11.80	cm.
Diameter	7.12	cm.
Area	39.82	sq.cm.
Volume	469.8	cu.cm.
Weigth of soil	685.60	gm.
Total Unit Weigth	1.46	
Proving Ring No. :	560924	
Equation for Calibration	Y = 0.5242 X + 3.056	

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050	7	1.08	40.25	6.73	16.7
0.075					
0.100					
0.125					
0.150	12	3.23	41.14	9.35	22.7
0.175					
0.200					
0.225	16	4.84	41.84	11.44	27.3
0.250					
0.300					
0.350					
0.400	20	8.61	43.57	13.54	31.1
0.450					
0.500	22	10.76	44.62	14.59	32.7
0.550					
0.600	23	12.92	45.72	15.11	33.1
0.650					
0.700	23	15.07	46.88	15.11	32.2
0.750					
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท พนส์เข็มกรุงเทพ จำกัด (มหาชน) brightstar TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-4
SAMPLE NO.: ST-2
DEPTH (m) : 3.00-3.50
SOIL TYPE : CH

Test Summary

Water Content, w_n	84.2	%
Total Unit Weight, g_t	1.49	t/m^3
Unconfined Compressive Strength, q_u	33.16	kPa
	3.38	t/m^2
Undrained Shear Strength, c_u	1.69	t/m^2
Strain at Failure, e_f	10.76	%
Strain at 50% Stress Level, e_{50}	5.38	%
Modulus at 50% Stress Level, E_{50}	31.42	t/m^2

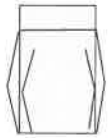
Soil specimen measurement

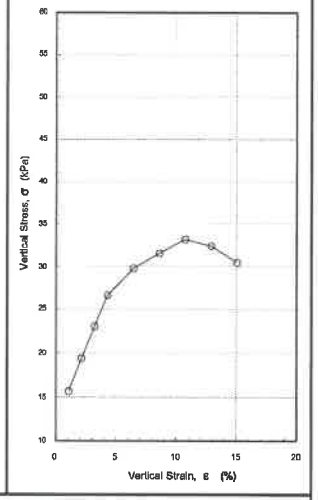
Height	11.80	cm.
Diameter	7.07	cm.
Area	39.26	sq.cm.
Volume	463.2	cu.cm.
Weigth of soil	688.80	gm.
Total Unit Weigth	1.49	
Proving Ring No. :	560924	
Equation for Calibration Load	Y = 0.5242 X + 3.056	

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050	6	1.08	39.69	6.20	15.6
0.075					
0.100	9	2.15	40.12	7.77	19.4
0.125					
0.150	12	3.23	40.57	9.35	23.0
0.175					
0.200	15	4.31	41.02	10.92	26.6
0.225					
0.250					
0.300	18	6.46	41.97	12.49	29.8
0.350					
0.400	20	8.61	42.96	13.54	31.5
0.450					
0.500	22	10.76	43.99	14.59	33.2
0.550					
0.600	22	12.92	45.08	14.59	32.4
0.650					
0.700	21	15.07	46.22	14.06	30.4
0.750					
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท พนส์เข็มกรุงเทพ จำกัด (มหาชน) brightstar TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-4
SAMPLE NO.: ST-3
DEPTH (m) : 4.50-5.00
SOIL TYPE : CH

Test Summary

Water Content, w_n	85.4	%
Total Unit Weight, g_t	1.44	t/m^3
Unconfined Compressive Strength, q_u	31.51	kPa
	3.21	t/m^2
Undrained Shear Strength, c_u	1.61	t/m^2
Strain at Failure, e_f	13.99	%
Strain at 50% Stress Level, e_{50}	7.00	%
Modulus at 50% Stress Level, E_{50}	22.96	t/m^2

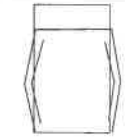
Soil specimen measurement

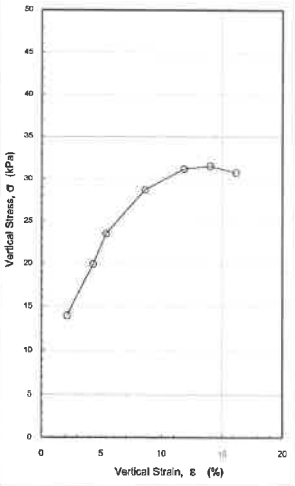
Height	11.80	cm.
Diameter	7.12	cm.
Area	39.82	sq.cm.
Volume	469.8	cu.cm.
Weigth of soil	675.30	gm.
Total Unit Weigth	1.44	
Proving Ring No. :	560924	
Equation for Calibratior	Y = 0.5242 X + 3.056	

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050					
0.075					
0.100	5	2.15	40.69	5.68	14.0
0.125					
0.150					
0.175					
0.200	10	4.31	41.61	8.30	19.9
0.225					
0.250	13	5.38	42.08	9.87	23.5
0.300					
0.350					
0.400	18	8.61	43.57	12.49	28.7
0.450					
0.500					
0.550	21	11.84	45.16	14.06	31.1
0.600					
0.650	22	13.99	46.29	14.59	31.5
0.700					
0.750	22	16.14	47.48	14.59	30.7
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท พนส์สมบัติบริหารงานก่อ จำกัด (มหาชน) brightstar TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-4
SAMPLE NO.: ST-4
DEPTH (m) : 6.00-6.50
SOIL TYPE : CH

Test Summary

Water Content, w_n	82.2	%
Total Unit Weight, g_t	1.49	t/m^3
Unconfined Compressive Strength, q_u	36.35	kPa
	3.71	t/m^2
Undrained Shear Strength, c_u	1.85	t/m^2
Strain at Failure, e_f	13.99	%
Strain at 50% Stress Level, e_{50}	7.00	%
Modulus at 50% Stress Level, E_{50}	26.49	t/m^2

Soil specimen measurement

Height	11.80	cm.
Diameter	7.09	cm.
Area	39.48	sq.cm.
Volume	465.9	cu.cm.
Weigth of soil	695.60	gm.
Total Unit Weigth	1.49	

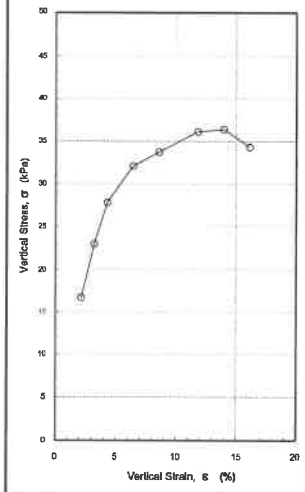
Proving Ring No. : 560924
Equation for Calibration Load : Y = 0.5242 X + 3.056

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050					
0.075					
0.100	7	2.15	40.35	6.73	16.7
0.125					
0.150	12	3.23	40.80	9.35	22.9
0.175					
0.200	16	4.31	41.26	11.44	27.7
0.225					
0.250					
0.300	20	6.46	42.21	13.54	32.1
0.350					
0.400	22	8.61	43.20	14.59	33.8
0.450					
0.500					
0.550	25	11.84	44.78	16.16	36.1
0.600					
0.650	26	13.99	45.90	16.69	36.3
0.700					
0.750	25	16.14	47.08	16.16	34.3
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท พนส์สมบัติบริหารงานก่อ จำกัด (มหาชน) brightstar TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-4
SAMPLE NO.: ST-5
DEPTH (m) : 7.50-8.00
SOIL TYPE : CH

Test Summary

Water Content, w_n	81.4	%
Total Unit Weight, g_t	1.50	t/m^3
Unconfined Compressive Strength, q_u	37.15	kPa
	3.79	t/m^2
Undrained Shear Strength, c_u	1.89	t/m^2
Strain at Failure, e_f	11.84	%
Strain at 50% Stress Level, e_{50}	5.92	%
Modulus at 50% Stress Level, E_{50}	31.99	t/m^2

Soil specimen measurement

Height	11.80	cm.
Diameter	7.10	cm.
Area	39.59	sq.cm.
Volume	467.2	cu.cm.
Weigth of soil	702.10	gm.
Total Unit Weigth	1.50	

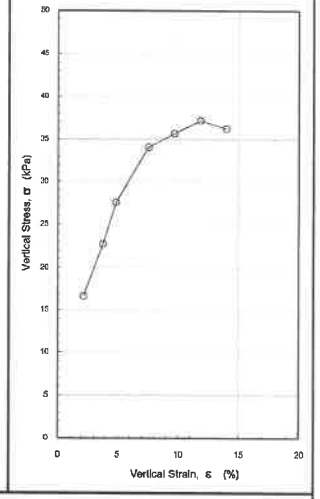
Proving Ring No. : 560924
Equation for Calibration Load : Y = 0.5242 X + 3.056

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050					
0.075					
0.100	7	2.15	40.46	6.73	16.6
0.125					
0.150					
0.175	12	3.77	41.14	9.35	22.7
0.200					
0.225	16	4.84	41.61	11.44	27.5
0.250					
0.300					
0.350	22	7.53	42.82	14.59	34.1
0.400					
0.450	24	9.69	43.84	15.64	35.7
0.500					
0.550	26	11.84	44.91	16.69	37.2
0.600					
0.650	26	13.99	46.03	16.69	36.2
0.700					
0.750					
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท ทบส่งน้ำมันทางท่อ จำกัด (มหาชน) | brightstar | TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-4
SAMPLE NO.: ST-6
DEPTH (m) : 9.00-9.50
SOIL TYPE : CH

Test Summary

Water Content, w_n	79.7	%
Total Unit Weight, g_t	1.53	t/m^3
Unconfined Compressive Strength, q_u	39.04	kPa
	3.98	t/m^2
Undrained Shear Strength, c_u	1.99	t/m^2
Strain at Failure, e_f	9.69	%
Strain at 50% Stress Level, e_{50}	4.85	%
Modulus at 50% Stress Level, E_{50}	41.07	t/m^2

Soil specimen measurement

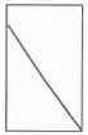
Height	11.80	cm.
Diameter	7.12	cm.
Area	39.82	sq.cm.
Volume	469.8	cu.cm.
Weigth of soil	720.10	gm.
Total Unit Weigth	1.53	

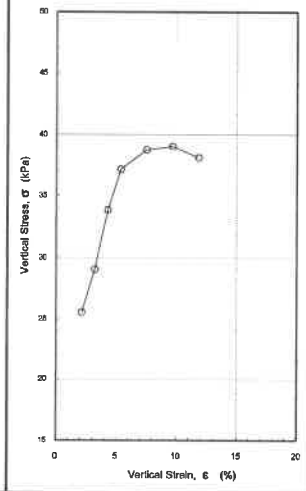
Proving Ring No. : 560924
Equation for Calibration Load : Y = 0.5242 X + 3.056

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050					
0.075					
0.100	14	2.15	40.69	10.39	25.5
0.125					
0.150	17	3.23	41.14	11.97	29.1
0.175					
0.200	21	4.31	41.61	14.06	33.8
0.225					
0.250	24	5.38	42.08	15.64	37.2
0.300					
0.350	28	7.53	43.06	16.69	38.7
0.400					
0.450	27	9.69	44.09	17.21	39.0
0.500					
0.550	27	11.84	45.16	17.21	38.1
0.600					
0.650					
0.700					
0.750					
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท ทบส่งน้ำมันทางท่อ จำกัด (มหาชน) | brightstar | TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-4
SAMPLE NO.: ST-7
DEPTH (m) : 10.5-11.00
SOIL TYPE : CH

Test Summary

Water Content, w_n	82.9	%
Total Unit Weight, g_t	1.47	t/m^3
Unconfined Compressive Strength, q_u	33.78	kPa
	3.44	t/m^2
Undrained Shear Strength, c_u	1.72	t/m^2
Strain at Failure, e_f	10.76	%
Strain at 50% Stress Level, e_{50}	5.38	%
Modulus at 50% Stress Level, E_{50}	32.00	t/m^2

Soil specimen measurement

Height	11.80	cm.
Diameter	7.13	cm.
Area	39.93	sq.cm.
Volume	471.1	cu.cm.
Weigth of soil	690.30	gm.
Total Unit Weigth	1.47	

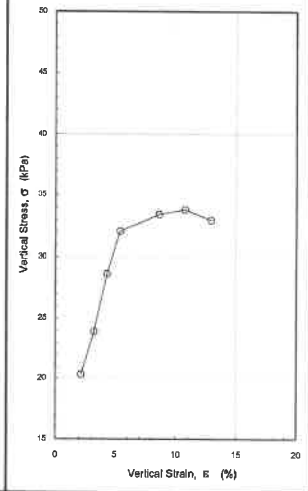
Proving Ring No. : 560924
Equation for Calibration Load : Y = 0.5242 X + 3.056

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050					
0.075					
0.100	10	2.15	40.81	8.30	20.3
0.125					
0.150	13	3.23	41.26	9.87	23.9
0.175					
0.200	17	4.31	41.72	11.97	28.7
0.225					
0.250	20	5.38	42.20	13.54	32.1
0.300					
0.350					
0.400	22	8.61	43.69	14.59	33.4
0.450					
0.500	23	10.76	44.74	15.11	33.8
0.550					
0.600	23	12.92	45.85	15.11	33.0
0.650					
0.700					
0.750					
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท ทรัสต์ไบโอเทคโนโลยี จำกัด (มหาชน) brightstar TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-5
SAMPLE NO.: ST-1
DEPTH (m) : 4.50-5.00
SOIL TYPE : CH

Test Summary

Water Content, w_n	21.1	%
Total Unit Weight, g_t	2.00	t/m^3
Unconfined Compressive Strength, q_u	31.61	kPa
	3.22	t/m^2
Undrained Shear Strength, c_u	1.61	t/m^2
Strain at Failure, e_f	10.76	%
Strain at 50% Stress Level, e_{50}	5.38	%
Modulus at 50% Stress Level, E_{50}	29.95	t/m^2

Soil specimen measurement

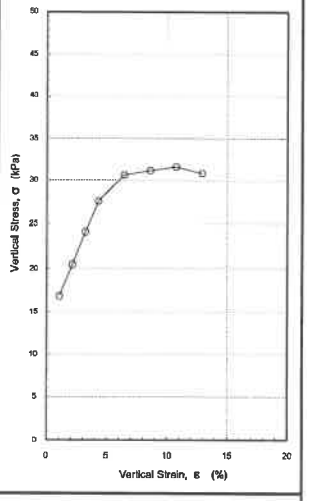
Height	11.80	cm.
Diameter	7.11	cm.
Area	39.70	sq.cm.
Volume	468.5	cu.cm.
Weigth of soil	938.50	gm.
Total Unit Weigth	2.00	
Proving Ring No. :	560924	
Equation for Calibration Load	Y = 0.5242 X + 3.056	

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050	7	1.08	40.14	6.73	16.8
0.075					
0.100	10	2.15	40.58	8.30	20.5
0.125					
0.150	13	3.23	41.03	9.87	24.1
0.175					
0.200	16	4.31	41.49	11.44	27.6
0.225					
0.250					
0.300	19	6.46	42.44	13.02	30.7
0.350					
0.400	20	8.61	43.44	13.54	31.2
0.450					
0.500	21	10.76	44.49	14.06	31.6
0.550					
0.600	21	12.92	45.59	14.06	30.8
0.650					
0.700					
0.750					
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท ทรัสต์ไบโอเทคโนโลยี จำกัด (มหาชน) brightstar TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-5
SAMPLE NO.: ST-2
DEPTH (m) : 6.00-6.50
SOIL TYPE : CH

Test Summary

Water Content, w_n	81.3	%
Total Unit Weight, g_t	1.50	t/m^3
Unconfined Compressive Strength, q_u	36.32	kPa
	3.70	t/m^2
Undrained Shear Strength, c_u	1.85	t/m^2
Strain at Failure, e_f	10.76	%
Strain at 50% Stress Level, e_{50}	5.38	%
Modulus at 50% Stress Level, E_{50}	34.41	t/m^2

Soil specimen measurement

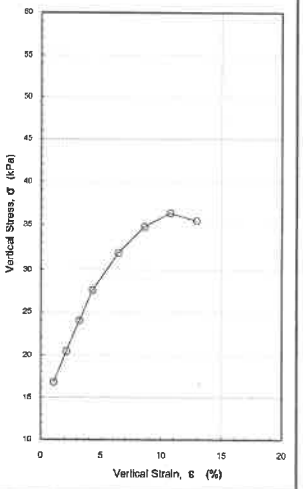
Height	11.80	cm.
Diameter	7.11	cm.
Area	39.70	sq.cm.
Volume	468.5	cu.cm.
Weigth of soil	704.20	gm.
Total Unit Weigth	1.50	
Proving Ring No. :	560924	
Equation for Calibration Load	Y = 0.5242 X + 3.056	

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050	7	1.08	40.14	6.73	16.8
0.075					
0.100	10	2.15	40.58	8.30	20.5
0.125					
0.150	13	3.23	41.03	9.87	24.1
0.175					
0.200	16	4.31	41.49	11.44	27.6
0.225					
0.250					
0.300	20	6.46	42.44	13.54	31.9
0.350					
0.400	23	8.61	43.44	15.11	34.8
0.450					
0.500	25	10.76	44.49	16.16	36.3
0.550					
0.600	25	12.92	45.59	16.16	35.4
0.650					
0.700					
0.750					
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท ทบส่งน้ำมันทางท่อ จำกัด | brightstar | TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-5
SAMPLE NO.: ST-3
DEPTH (m) : 7.50-8.00
SOIL TYPE : CH

Test Summary

Water Content, w_n	80.3	%
Total Unit Weight, g_t	1.51	t/m^3
Unconfined Compressive Strength, q_u	37.02	kPa
	3.77	t/m^2
Undrained Shear Strength, c_u	1.89	t/m^2
Strain at Failure, e_f	15.07	%
Strain at 50% Stress Level, e_{50}	7.54	%
Modulus at 50% Stress Level, E_{50}	25.04	t/m^2

Soil specimen measurement

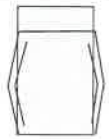
Height	11.80	cm.
Diameter	7.09	cm.
Area	39.48	sq.cm.
Volume	465.9	cu.cm.
Weigth of soil	703.10	gm.
Total Unit Weigth	1.51	

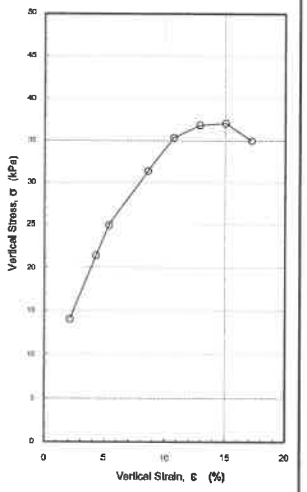
Proving Ring No. : 560924
Equation for Calibratior Y = 0.5242 X + 3.056

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050					
0.075					
0.100	5	2.15	40.35	5.68	14.1
0.125					
0.150					
0.175					
0.200	11	4.31	41.26	8.82	21.4
0.225					
0.250	14	5.38	41.73	10.39	24.9
0.300					
0.350					
0.400	20	8.61	43.20	13.54	31.3
0.450					
0.500	24	10.76	44.24	15.64	35.3
0.550					
0.600	26	12.92	45.34	16.69	36.8
0.650					
0.700	27	15.07	46.48	17.21	37.0
0.750					
0.800	26	17.22	47.69	16.69	35.0
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท ทบส่งน้ำมันทางท่อ จำกัด | brightstar | TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-5
SAMPLE NO.: ST-4
DEPTH (m) : 9.00-9.50
SOIL TYPE : CH

Test Summary

Water Content, w_n	68.1	%
Total Unit Weight, g_t	1.54	t/m^3
Unconfined Compressive Strength, q_u	38.96	kPa
	3.97	t/m^2
Undrained Shear Strength, c_u	1.99	t/m^2
Strain at Failure, e_f	13.99	%
Strain at 50% Stress Level, e_{50}	7.00	%
Modulus at 50% Stress Level, E_{50}	28.39	t/m^2

Soil specimen measurement

Height	11.80	cm.
Diameter	7.06	cm.
Area	39.15	sq.cm.
Volume	461.9	cu.cm.
Weigth of soil	709.30	gm.
Total Unit Weigth	1.54	

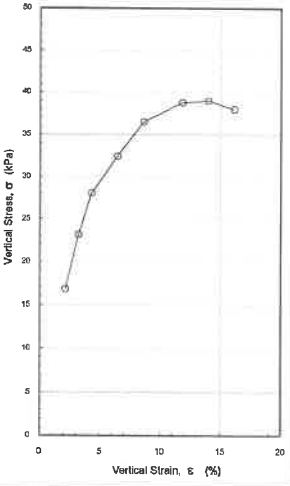
Proving Ring No. : 560924
Equation for Calibratior Y = 0.5242 X + 3.056

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050					
0.075					
0.100	7	2.15	40.01	6.73	16.8
0.125					
0.150	12	3.23	40.45	9.35	23.1
0.175					
0.200	16	4.31	40.91	11.44	28.0
0.225					
0.250					
0.300	20	6.46	41.85	13.54	32.4
0.350					
0.400	24	8.61	42.84	15.64	36.5
0.450					
0.500					
0.550	27	11.84	44.40	17.21	38.8
0.600					
0.650	28	13.99	45.52	17.73	39.0
0.700					
0.750	28	16.14	46.68	17.73	38.0
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท ทรัสต์น้ำมันทางท่อ จำกัด | brightstar | TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-4
SAMPLE NO.: ST-5
DEPTH (m) : 10.5-11.00
SOIL TYPE : CH

Test Summary

Water Content, w_n	20.2	%
Total Unit Weight, g_t	2.07	t/m^3
Unconfined Compressive Strength, q_u	33.78	kPa
	3.44	t/m^2
Undrained Shear Strength, c_u	1.72	t/m^2
Strain at Failure, e_f	13.90	%
Strain at 50% Stress Level, e_{50}	6.95	%
Modulus at 50% Stress Level, E_{50}	24.77	t/m^2

Soil specimen measurement

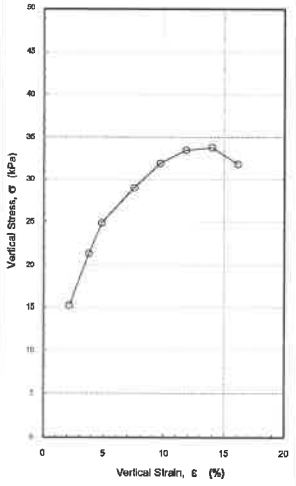
Height	11.80	cm.
Diameter	7.12	cm.
Area	39.82	sq.cm.
Volume	469.8	cu.cm.
Weigth of soil	970.30	gm.
Total Unit Weigth	2.07	
Proving Ring No. :	560924	
Equation for Calibration Load	Y = 0.5242 X + 3.056	

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050					
0.075					
0.100	6	2.15	40.69	6.20	15.2
0.125					
0.150					
0.175	11	3.77	41.37	8.82	21.3
0.200					
0.225	14	4.84	41.84	10.39	24.8
0.250					
0.300					
0.350	18	7.53	43.06	12.49	29.0
0.400					
0.450	21	9.69	44.09	14.06	31.9
0.500					
0.550	23	11.84	45.16	15.11	33.5
0.600					
0.650	24	13.99	46.29	15.64	33.8
0.700					
0.750	23	16.14	47.48	15.11	31.8
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท ทรัสต์น้ำมันทางท่อ จำกัด | brightstar | TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-6
SAMPLE NO.: ST-1
DEPTH (m) : 1.50-2.0
SOIL TYPE : CH

Test Summary

Water Content, w_n	65.4	%
Total Unit Weight, g_t	1.46	t/m^3
Unconfined Compressive Strength, q_u	32.88	kPa
	3.35	t/m^2
Undrained Shear Strength, c_u	1.68	t/m^2
Strain at Failure, e_f	10.76	%
Strain at 50% Stress Level, e_{50}	5.38	%
Modulus at 50% Stress Level, E_{50}	31.15	t/m^2

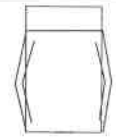
Soil specimen measurement

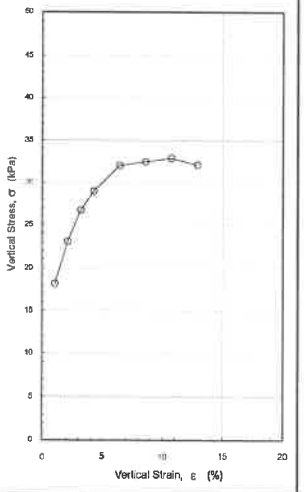
Height	11.80	cm.
Diameter	7.10	cm.
Area	39.59	sq.cm.
Volume	467.2	cu.cm.
Weigth of soil	684.20	gm.
Total Unit Weigth	1.46	
Proving Ring No. :	560924	
Equation for Calibratior	Y = 0.5242 X + 3.056	

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050	8	1.08	40.02	7.25	18.1
0.075					
0.100	12	2.15	40.46	9.35	23.1
0.125					
0.150	15	3.23	40.91	10.92	26.7
0.175					
0.200	17	4.31	41.37	11.97	28.9
0.225					
0.250					
0.300	20	6.46	42.33	13.54	32.0
0.350					
0.400	21	8.61	43.32	14.06	32.5
0.450					
0.500	22	10.76	44.37	14.59	32.9
0.550					
0.600	22	12.92	45.46	14.59	32.1
0.650					
0.700					
0.750					
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท พนส์เว็นบิทรางท่อ จำกัด (มหาชน) | brightstar | TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-6
SAMPLE NO.: ST-2
DEPTH (m) : 3.00-3.50
SOIL TYPE : CH

Test Summary

Water Content, w_n	82.4	%
Total Unit Weight, g_t	1.47	t/m^3
Unconfined Compressive Strength, q_u	34.98	kPa
	3.57	t/m^2
Undrained Shear Strength, c_u	1.78	t/m^2
Strain at Failure, e_f	12.92	%
Strain at 50% Stress Level, e_{50}	6.46	%
Modulus at 50% Stress Level, E_{50}	27.60	t/m^2

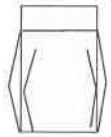
Soil specimen measurement

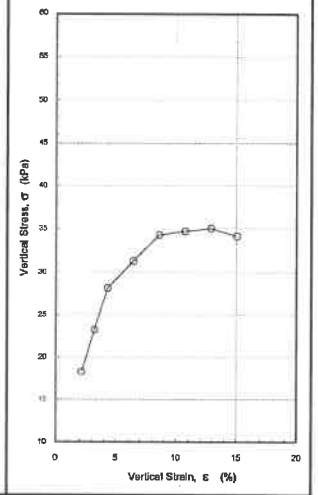
Height	11.80	cm.
Diameter	7.04	cm.
Area	38.93	sq.cm.
Volume	459.3	cu.cm.
Weigth of soil	675.60	gm.
Total Unit Weigth	1.47	
Proving Ring No. :	560924	
Equation for Calibration Load	Y = 0.5242 X + 3.056	

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050					
0.075					
0.100	8	2.15	39.78	7.25	16.2
0.125					
0.150	12	3.23	40.22	9.35	23.2
0.175					
0.200	16	4.31	40.68	11.44	28.1
0.225					
0.250					
0.300	19	6.46	41.61	13.02	31.3
0.350					
0.400	22	8.61	42.59	14.59	34.3
0.450					
0.500	23	10.76	43.62	15.11	34.6
0.550					
0.600	24	12.92	44.70	15.64	35.0
0.650					
0.700	24	15.07	45.83	15.64	34.1
0.750					
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท พนส์เว็นบิทรางท่อ จำกัด (มหาชน) | brightstar | TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-6
SAMPLE NO.: ST-3
DEPTH (m) : 4.50-5.00
SOIL TYPE : CH

Test Summary

Water Content, w_n	84.8	%
Total Unit Weight, g_t	1.45	t/m^3
Unconfined Compressive Strength, q_u	33.02	kPa
	3.37	t/m^2
Undrained Shear Strength, c_u	1.68	t/m^2
Strain at Failure, e_f	13.99	%
Strain at 50% Stress Level, e_{50}	7.00	%
Modulus at 50% Stress Level, E_{50}	24.06	t/m^2

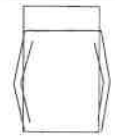
Soil specimen measurement

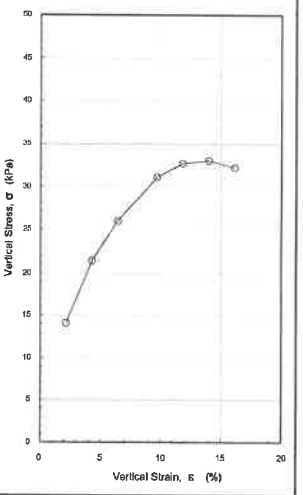
Height	11.80	cm.
Diameter	7.08	cm.
Area	39.37	sq.cm.
Volume	464.6	cu.cm.
Weigth of soil	672.40	gm.
Total Unit Weigth	1.45	
Proving Ring No. :	560924	
Equation for Calibration	Y = 0.5242 X + 3.056	

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050					
0.075					
0.100	5	2.15	40.24	5.68	14.1
0.125					
0.150					
0.175					
0.200	11	4.31	41.14	8.82	21.4
0.225					
0.250					
0.300	15	6.46	42.09	10.92	25.9
0.350					
0.400					
0.450	20	9.69	43.59	13.54	31.1
0.500					
0.550	22	11.84	44.66	14.59	32.7
0.600					
0.650	23	13.99	45.77	15.11	33.0
0.700					
0.750	23	16.14	46.95	15.11	32.2
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท ทบส่งน้ำมันกรมท่อ จำกัด (มหาชน) brightstar TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-6
SAMPLE NO.: ST-4
DEPTH (m) : 6.00-6.50
SOIL TYPE : CH

Test Summary

Water Content, w_n	82.4	%
Total Unit Weight, g_t	1.49	t/m^3
Unconfined Compressive Strength, q_u	35.69	kPa
	3.64	t/m^2
Undrained Shear Strength, c_u	1.82	t/m^2
Strain at Failure, e_f	15.07	%
Strain at 50% Stress Level, e_{50}	7.54	%
Modulus at 50% Stress Level, E_{50}	24.14	t/m^2

Soil specimen measurement

Height	11.80	cm.
Diameter	7.11	cm.
Area	39.70	sq.cm.
Volume	468.5	cu.cm.
Weigth of soil	698.90	gm.
Total Unit Weigth	1.49	

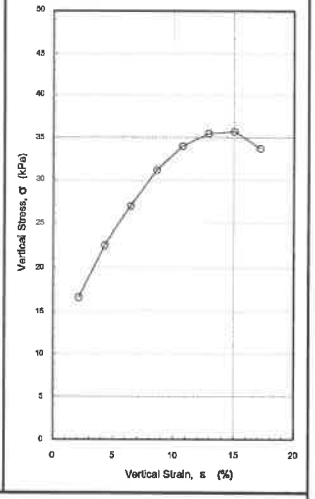
Proving Ring No. : 560924
Equation for Calibration : Y = 0.5242 X + 3.056

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050					
0.075					
0.100	7	2.15	40.58	6.73	16.6
0.125					
0.150					
0.175					
0.200	12	4.31	41.49	9.35	22.5
0.225					
0.250					
0.300	16	6.46	42.44	11.44	27.0
0.350					
0.400	20	8.61	43.44	13.54	31.2
0.450					
0.500	23	10.76	44.49	15.11	34.0
0.550					
0.600	25	12.92	45.59	16.16	35.4
0.650					
0.700	26	15.07	46.75	16.69	35.7
0.750					
0.800	25	17.22	47.96	16.16	33.7
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท ทบส่งน้ำมันกรมท่อ จำกัด (มหาชน) brightstar TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-6
SAMPLE NO.: ST-5
DEPTH (m) : 7.50-8.00
SOIL TYPE : CH

Test Summary

Water Content, w_n	81.6	%
Total Unit Weight, g_t	1.54	t/m^3
Unconfined Compressive Strength, q_u	33.24	kPa
	3.39	t/m^2
Undrained Shear Strength, c_u	1.69	t/m^2
Strain at Failure, e_f	12.92	%
Strain at 50% Stress Level, e_{50}	6.46	%
Modulus at 50% Stress Level, E_{50}	26.23	t/m^2

Soil specimen measurement

Height	11.80	cm.
Diameter	7.10	cm.
Area	39.59	sq.cm.
Volume	467.2	cu.cm.
Weigth of soil	720.30	gm.
Total Unit Weigth	1.54	

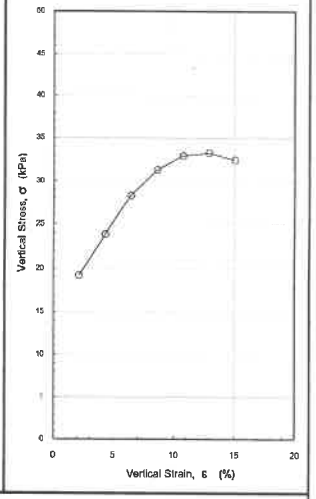
Proving Ring No. : 560924
Equation for Calibration Load : Y = 0.5242 X + 3.056

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050					
0.075					
0.100	9	2.15	40.46	7.77	19.2
0.125					
0.150					
0.175					
0.200	13	4.31	41.37	9.87	23.9
0.225					
0.250					
0.300	17	6.46	42.33	11.97	28.3
0.350					
0.400	20	8.61	43.32	13.54	31.3
0.450					
0.500	22	10.76	44.37	14.59	32.9
0.550					
0.600	23	12.92	45.46	15.11	33.2
0.650					
0.700	23	15.07	46.62	15.11	32.4
0.750					
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท ทบส่งน้ำมันทางท่อ จำกัด (มหาชน) brightstar TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-6
SAMPLE NO.: ST-6
DEPTH (m) : 9.00-9.50
SOIL TYPE : CH

Test Summary

Water Content, w_n	85.1	%
Total Unit Weight, g_t	1.47	t/m^3
Unconfined Compressive Strength, q_u	34.49	kPa
	3.52	t/m^2
Undrained Shear Strength, c_u	1.76	t/m^2
Strain at Failure, e_f	12.92	%
Strain at 50% Stress Level, e_{50}	6.46	%
Modulus at 50% Stress Level, E_{50}	27.21	t/m^2

Soil specimen measurement

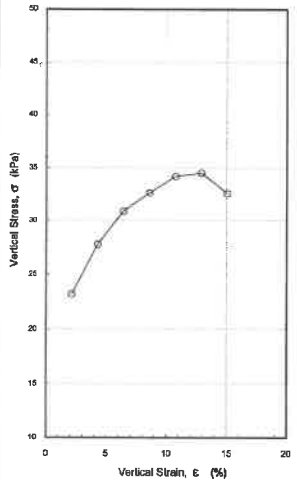
Height	11.80	cm.
Diameter	7.09	cm.
Area	39.48	sq.cm.
Volume	465.9	cu.cm.
Weigth of soil	686.30	gm.
Total Unit Weigth	1.47	
Proving Ring No. :	560924	
Equation for Calibration Load	Y = 0.5242 X + 3.056	

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050					
0.075					
0.100	12	2.15	40.35	9.35	23.2
0.125					
0.150					
0.175					
0.200	16	4.31	41.26	11.44	27.7
0.225					
0.250					
0.300	19	6.46	42.21	13.02	30.8
0.350					
0.400	21	8.61	43.20	14.06	32.6
0.450					
0.500	23	10.76	44.24	15.11	34.2
0.550					
0.600	24	12.92	45.34	15.64	34.5
0.650					
0.700	23	15.07	46.48	15.11	32.5
0.750					
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท ทบส่งน้ำมันทางท่อ จำกัด (มหาชน) brightstar TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. : BH-6
SAMPLE NO.: ST-7
DEPTH (m) : 10.50-11.00
SOIL TYPE : CH

Test Summary

Water Content, w_n	85.0	%
Total Unit Weight, g_t	1.46	t/m^3
Unconfined Compressive Strength, q_u	33.59	kPa
	3.42	t/m^2
Undrained Shear Strength, c_u	1.71	t/m^2
Strain at Failure, e_f	10.76	%
Strain at 50% Stress Level, e_{50}	5.38	%
Modulus at 50% Stress Level, E_{50}	31.82	t/m^2

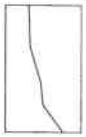
Soil specimen measurement

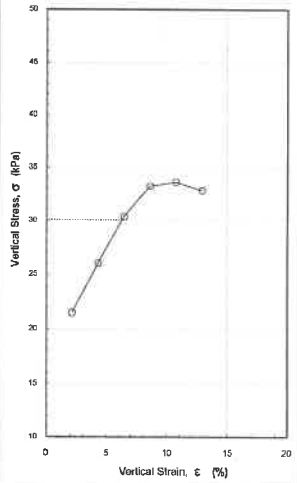
Height	11.80	cm.
Diameter	7.15	cm.
Area	40.15	sq.cm.
Volume	473.8	cu.cm.
Weigth of soil	692.70	gm.
Total Unit Weigth	1.46	
Proving Ring No. :	560924	
Equation for Calibratior	Y = 0.5242 X + 3.056	

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050					
0.075					
0.100	11	2.15	41.03	8.82	21.5
0.125					
0.150					
0.175					
0.200	15	4.31	41.96	10.92	26.0
0.225					
0.250					
0.300	19	6.46	42.92	13.02	30.3
0.350					
0.400	22	8.61	43.93	14.59	33.2
0.450					
0.500	23	10.76	44.99	15.11	33.6
0.550					
0.600	23	12.92	46.11	15.11	32.8
0.650					
0.700					
0.750					
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

ASTM D 2166-00

UNCONFINED COMPRESSION TEST

FPT บริษัท ทบส่งน้ำมันทางท่อ จำกัด | brightstar | TRITON ENGINEERING AND CONSTRUCTION

PROJECT : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

LOCATION: CHIANG RAK NOI

BH NO. :	BH-6
SAMPLE NO.:	ST-8
DEPTH (m) :	12.00-12.50
SOIL TYPE :	CH

Test Summary

Water Content, w_n	20.6	%
Total Unit Weight, g_t	1.80	t/m^3
Unconfined Compressive Strength, q_u	218.89	kPa
	22.31	t/m^2
Undrained Shear Strength, c_u	11.16	t/m^2
Strain at Failure, e_f	10.76	%
Strain at 50% Stress Level, e_{50}	5.38	%
Modulus at 50% Stress Level, E_{50}	207.37	t/m^2

Soil specimen measurement

Height	11.80	cm.
Diameter	7.13	cm.
Area	39.93	sq.cm.
Volume	471.1	cu.cm.
Weigth of soil	850.10	gm.
Total Unit Weigth	1.80	

Proving Ring No. : 560924

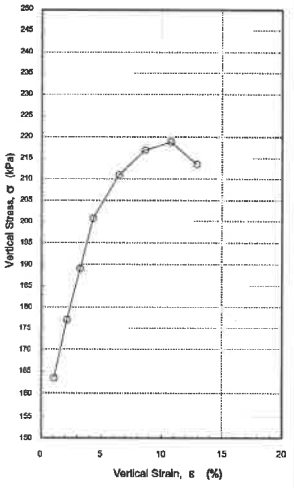
Equation for Calibration Load Y = 0.5242 X + 3.056

Test Result

Deform. reading (in)	Proving ring reading (div.)	Axial stain,%	Corected area (sq.cm)	Axial load (kg.)	Axial stress (kN/sq.m)
0.000					
0.025					
0.050	120	1.08	40.36	85.96	183.4
0.075					
0.100	132	2.15	40.81	72.25	177.1
0.125					
0.150	143	3.23	41.26	78.02	189.1
0.175					
0.200	154	4.31	41.72	83.78	200.8
0.225					
0.250					
0.300	166	6.46	42.68	90.07	211.0
0.350					
0.400	175	8.61	43.69	94.79	217.0
0.450					
0.500	181	10.76	44.74	97.94	218.9
0.550					
0.600	181	12.92	45.85	97.94	213.6
0.650					
0.700					
0.750					
0.800					
0.850					
0.900					
0.950					
1.000					
1.050					
1.100					

Failure Mode





Remark :

APPENDIX C : SUMMARY TESTING RESULTS

SUMMARY OF TEST RESULTS

Project : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2 | Date of Boring : 10/12/2022 | Ground Water Level (m): 1.12

Location : CHIANG RAK NOI | Boring No : BH-1 | North : 1561016 | East : 671008

Sample	Depth ,m		Wn	Atterberg Limits (%)			Grain Size Analysis						USCS	γ_t	S_U	SPT-N ,(blows/inch)			N value
No.	From	To	(%)	LL	PL	PI	3/8"	#4	#10	#40	#100	#200	Group	(t/m^3)	(t/m^2)	1st	2nd	3rd	
ST-1	1.50	2.00	62.30	65.80	31.50	34.30		100.00	100.00	98.70	98.50	98.20	CH	1.50	2.03	-	-	-	-
ST-2	3.00	3.50	66.60	66.80	30.50	36.30		100.00	100.00	98.70	98.30	98.00	CH	1.56	2.16	-	-	-	-
ST-3	4.50	5.00	84.30	78.00	32.70	45.30		100.00	100.00	100.00	99.40	99.30	CH	1.46	1.70	-	-	-	-
ST-4	6.00	6.50	79.30	74.80	30.50	44.30		100.00	100.00	99.70	99.30	99.10	CH	1.51	1.98	-	-	-	-
ST-5	7.50	8.00	81.40	75.90	31.50	44.40		100.00	100.00	99.60	99.00	99.20	CH	1.50	1.88	-	-	-	-
ST-6	9.00	9.50	21.40	61.80	29.80	32.00		100.00	100.00	99.00	98.50	98.10	CH	1.95	9.72	-	-	-	-
ST-7	10.50	11.00	19.80	57.90	28.30	29.60		100.00	100.00	99.20	98.30	97.80	CH	2.02	11.57	-	-	-	-
SS-1	12.00	12.45	17.80	57.80	29.00	28.80		110.00	100.00	98.60	98.10	97.80	CH			8	8	10	18
SS-2	13.50	13.95	17.50	57.80	29.10	28.70		100.00	100.00	98.90	98.20	97.70	CH	2.11		9	9	13	22
SS-3	15.00	15.45	17.30	48.90	24.30	24.60		100.00	99.40	93.90	90.70	87.90	CL	2.12		8	11	14	25
SS-4	16.50	16.95	17.40	48.50	24.20	24.30		100.00	99.40	93.70	90.50	87.60	CL	2.12		8	9	15	24
SS-5	18.00	18.45	17.50	39.80	22.80	17.00		100.00	98.90	88.20	82.80	79.30	CL	2.12		7	9	14	23
SS-6	19.50	19.95	6.90	NP	NP	NP	100.00	95.00	84.60	49.30	29.50	12.70	SM			14	23	29	52
SS-7	21.00	21.45	6.60	NP	NP	NP	100.00	95.30	84.80	49.80	28.70	12.50	SM			18	22	29	51
SS-8	22.50	22.95	5.80	NP	NP	NP	100.00	91.80	75.80	40.90	22.10	8.90	SP			20	24	30	54
SS-9	24.00	24.45	5.60	NP	NP	NP	100.00	91.40	75.60	40.60	22.00	8.60	SP			10	10	12	22
SS-10	25.50	25.95	5.70	NP	NP	NP	100.00	91.70	75.70	40.50	21.80	8.60	SP			12	29	21/2	50/8
SS-11	27.00	27.45	6.70	NP	NP	NP	100.00	95.30	84.90	49.50	28.80	12.80	SM			12	30	20/3	50/9
SS-12	28.50	28.95	6.80	NP	NP	NP	100.00	95.30	84.80	49.70	29.20	12.90	SM			12	15	16	31
SS-13	30.00	30.45	6.60	NP	NP	NP	100.00	95.50	84.90	49.60	28.90	12.50	SM			14	17	25	42

SUMMARY OF TEST RESULTS

Project : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2 | Date of Boring : 7/12/2022 | Ground Water Level (m): 0.86

Location : CHIANG RAK NOI | Boring No : BH-2 | North : 1561483 | East : 670891

Sample	Depth ,m		Wn	Atterberg Limits (%)			Grain Size Analysis						USCS	γ_t	S_U	SPT-N ,(blows/inch)			N value
No.	From	To	(%)	LL	PL	PI	3/8"	#4	#10	#40	#100	#200	Group	(t/m^3)	(t/m^2)	1st	2nd	3rd	
ST-1	1.50	2.00	61.50	60.50	31.50	29.00			100.00	98.70	98.50	98.20	CH	1.48	1.68	-	-	-	-
ST-2	3.00	3.50	82.50	77.10	32.10	45.00			100.00	99.50	99.40	99.20	CH	1.47	1.78	-	-	-	-
ST-3	4.50	5.00	85.00	78.60	33.20	45.40				100.00	99.50	99.40	CH	1.45	1.63	-	-	-	-
ST-4	6.00	6.50	79.30	73.50	30.50	43.00			100.00	99.80	99.30	99.00	CH	1.48	1.62	-	-	-	-
ST-5	7.50	8.00	80.40	74.80	31.50	43.30			100.00	99.70	99.00	99.10	CH	1.45	1.64	-	-	-	-
ST-6	9.00	9.50	81.10	75.70	31.20	44.50			100.00	99.60	99.40	99.20	CH	1.50	1.89	-	-	-	-
SS-1	10.50	10.95	17.80	57.80	29.00	28.80			100.00	98.80	98.10	97.80	CH	2.11		8	10	10	20
SS-2	12.00	12.45	17.50	57.70	29.10	28.60			100.00	98.90	98.20	97.70	CH	2.12		13	13	13	26
SS-3	13.50	13.95	7.20	NP	NP	NP		100.00	99.20	69.30	37.90	14.40	SM	2.11		18	18	23	41
SS-4	15.00	15.45	7.00	NP	NP	NP		100.00	99.30	69.90	37.80	13.80	SM	2.12		19	22	26	48
SS-5	16.50	16.95	7.10	NP	NP	NP		100.00	99.50	69.70	38.20	14.10	SM	2.12		26	26	23	49
SS-6	18.00	18.45	7.00	NP	NP	NP	100.00	95.40	85.00	49.80	29.70	13.20	SM	2.12		18	18	26	44
SS-7	19.50	19.95	6.80	NP	NP	NP	100.00	95.30	84.90	49.80	28.80	12.90	SM			17	19	23	42
SS-8	21.00	21.45	6.70	NP	NP	NP	100.00	95.20	84.80	49.60	28.50	12.80	SM			12	16	16	32
SS-9	22.50	22.95	6.60	NP	NP	NP	100.00	95.40	85.10	49.90	28.70	12.60	SM			13	14	18	32
SS-10	24.00	24.45	18.60	39.6	22.6	17.00		100.00	98.90	88.30	82.50	78.50	CL			13	11	14	25
SS-11	25.50	25.95	6.70	NP	NP	NP	100.00	95.30	84.90	49.40	28.80	12.80	SM			15	30	20/5	50/11
SS-12	27.00	27.45	NO RECOVERY										(SM)			20	26	29	55
SS-13	28.50	28.95	6.70	NP	NP	NP	100.00	95.10	84.70	49.30	28.60	12.60	SM			20	25	25/5	50/11
SS-14	30.00	30.45	6.60	NP	NP	NP	100.00	95.30	84.80	49.80	28.70	12.50	SM			21	27	23/5	50/11

SUMMARY OF TEST RESULTS

Project : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2 Date of Boring : 8/12/2022 Ground Water Level (m): 0.46

Location : CHIANG RAK NOI Boring No : BH-3 North : 1561874 East : 670860

Sample	Depth ,m		Wn	Atterberg Limits (%)			Grain Size Analysis						USCS	γ_t	S_u	SPT-N ,(blows/inch)			N value
No.	From	To	(%)	LL	PL	PI	3/8"	#4	#10	#40	#100	#200	Group	(t/m^3)	(t/m^2)	1st	2nd	3rd	
ST-1	1.50	2.00	79.80	75.40	31.50	43.90			100.00	99.50	98.50	98.20	CH	1.48	1.68	-	-	-	-
ST-2	3.00	3.50	83.20	77.40	32.20	45.20			100.00	99.5	99.40	99.20	CH	1.47	1.79	-	-	-	-
ST-3	4.50	5.00	84.90	78.20	32.80	45.40				100.00	99.50	99.40	CH	1.44	1.62	-	-	-	-
ST-4	6.00	6.50	81.20	75.80	31.30	44.50			100.00	99.60	99.40	99.20	CH	1.51	1.87	-	-	-	-
ST-5	7.50	8.00	81.80	75.90	31.40	44.50			100.00	99.60	99.40	99.20	CH	1.49	1.87	-	-	-	-
ST-6	9.00	9.50	80.60	75.20	30.80	44.40			100.00	99.70	99.40	99.10	CH	1.52	1.94	-	-	-	-
ST-7	10.50	11.00	81.30	75.40	30.90	44.50			100.00	99.60	99.40	99.20	CH	1.49	1.86	-	-	-	-
SS-1	12.00	12.45	17.60	57.90	29.10	28.80			100.00	98.90	98.30	97.80	CH	2.12		8	10	12	22
SS-2	13.50	13.95	17.30	57.80	29.10	28.70			100.00	98.90	98.20	97.70	CH	2.12		7	10	14	24
SS-3	15.00	15.45	17.20	57.70	29.10	28.60			100.00	98.00	98.30	97.70	CH	2.12		8	12	26	38
SS-4	16.50	16.95	16.30	48.90	24.30	24.60			99.40	93.90	90.70	87.90	CL	2.14		12	19	25	44
SS-5	18.00	18.45	16.60	36.70	21.70	15.00	100.00	98.80	88.10	68.00	61.00	57.80	CL	2.14		14	16	22	38
SS-6	19.50	19.95	6.90	NP	NP	NP	100.00	95.20	84.90	49.80	28.80	12.90	SM			20	28	26	54
SS-7	21.00	21.45	7.10	NP	NP	NP	100.00	95.30	84.90	49.80	29.50	13.10	SM			20	23	23	46
SS-8	22.50	22.95	6.90	NP	NP	NP	100.00	95.50	85.10	49.90	28.80	12.70	SM			22	24	25	49
SS-9	24.00	24.45	6.80	NP	NP	NP	100.00	95.20	84.80	49.60	28.60	12.50	SM			21	19	15	34
SS-10	25.50	25.95	16.60	36.8	21.7	15.10	100.00	98.90	88.20	68.20	62.10	57.90	CL	2.13		11	13	14	27
SS-11	27.00	27.45	16.50	39.7	22.7	17.00		100.00	99.00	88.20	82.20	78.50	CL	2.12		7	8	12	20
SS-12	28.60	28.95	6.90	36.7	21.7	15.00	100.00	98.80	88.10	67.90	61.30	56.80	CL	2.13		11	12	14	26
SS-13	30.00	30.45	6.60	NP	NP	NP		100.00	99.30	69.80	37.90	13.90	SM			13	15	17	32

SUMMARY OF TEST RESULTS

Project : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2 Date of Boring : 5/12/2022 Ground Water Level (m): 0.34

Location : CHIANG RAK NOI Boring No : BH-4 North : 1562645 East : 670804

Sample	Depth ,m		Wn	Atterberg Limits (%)			Grain Size Analysis						USCS	γ_t	S_u	SPT-N ,(blows/inch)			N value
No.	From	To	(%)	LL	PL	PI	3/8"	#4	#10	#40	#100	#200	Group	(t/m^3)	(t/m^2)	1st	2nd	3rd	
ST-1	1.50	2.00	79.60	74.00	33.50	40.50				100.00	99.40	99.30	CH	1.48	1.68	-	-	-	-
ST-2	3.00	3.50	84.20	76.10	32.80	45.30				100.00	99.40	99.30	CH	1.46	1.68	-	-	-	-
ST-3	4.50	5.00	85.40	78.70	33.20	45.50				100.00	99.50	99.40	CH	1.44	1.61	-	-	-	-
ST-4	6.00	6.50	82.20	76.10	31.40	44.70			100.00	99.60	99.40	99.20	CH	1.49	1.85	-	-	-	-
ST-5	7.50	8.00	81.40	75.90	31.40	44.50			100.00	99.60	99.40	99.20	CH	1.50	1.89	-	-	-	-
ST-6	9.00	9.50	79.70	75.00	30.60	44.40			100.00	99.70	99.40	99.10	CH	1.53	1.99	-	-	-	-
ST-7	10.50	11.00	82.90	77.80	32.60	45.20			100.00	99.40	99.30	99.20	CH	1.47	1.72	-	-	-	-
SS-1	12.00	12.45	18.20	57.80	29.00	28.80			100.00	98.90	98.20	97.70	CH	2.10		8	10	11	21
SS-2	13.50	13.95	17.70	58.00	28.80	29.20			100.00	98.80	98.20	97.80	CH	2.12		7	7	9	16
SS-3	15.00	15.45	17.20	48.90	24.30	24.60		100.00	99.40	93.80	90.60	87.90	CL	2.12		10	11	16	27
SS-4	16.50	16.95	6.90	NP	NP	NP	100.00	95.20	84.90	48.70	28.50	12.80	SM			19	24	27	51
SS-5	18.00	18.45	6.70	NP	NP	NP	100.00	95.10	84.70	48.50	28.30	12.50	SM			28	43	10/1	50/7
SS-6	19.50	19.95	6.80	NP	NP	NP	100.00	95.80	85.40	48.80	29.50	13.10	SM			29	30	20/1	50/7
SS-7	21.00	21.45	6.80	NP	NP	NP	100.00	95.30	84.90	48.80	28.60	12.80	SM			28	29	21/1	50/7
SS-8	22.50	22.95	16.60	48.8	24.3	24.50		100.00	99.30	93.70	90.50	87.70	CL	2.13		11	13	15	28
SS-9	24.00	24.45	16.50	39.8	22.8	17.00		100.00	98.90	88.30	82.80	79.30	CL	2.12		10	11	12	23
SS-10	25.50	25.95	16.30	39.6	22.5	17.10		100.00	98.80	88.10	82.30	78.70	CL	2.13		10	11	16	27
SS-11	27.00	27.45	16.70	36.8	21.8	15.00		100.00	98.90	88.20	82.60	58.80	CL	2.13		7	14	14	14
SS-12	28.50	28.95	16.50	36.6	21.5	15.10		100.00	98.70	88.00	61.80	57.60	CL	2.13		12	14	15	29
SS-13	30.00	30.45	16.30	35.7	21.5	14.20	100.00	99.10	88.70	66.50	61.20	55.90	CL	2.13		13	12	14	26

SUMMARY OF TEST RESULTS

Project : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2 | Date of Boring : 3/12/2022 | Ground Water Level (m): 1.14

Location : CHIANG RAK NOI | Boring No : BH-5 | North : 1562584 | East : 670763

Sample	Depth ,m		Wn	Atterberg Limits (%)			Grain Size Analysis						USCS	γ_t	S_u	SPT-N ,(blows/inch)			N value
No.	From	To	(%)	LL	PL	PI	3/8"	#4	#10	#40	#100	#200	Group	(t/m^3)	(t/m^2)	1st	2nd	3rd	
SS-1	3.00	3.50	18.60	58.00	28.90	29.10			100.00	99.00	98.30	97.80	CH	1.50		5	7	8	15
ST-1	4.50	5.00	21.10	58.20	28.40	29.80			100.00	98.80	98.30	97.80	CH	2.00	1.61	-	-	-	-
ST-2	6.00	6.50	81.30	75.90	31.40	44.50			100.00	99.60	99.40	97.90	CH	1.50	1.85	-	-	-	-
ST-3	7.50	8.00	80.30	75.10	30.60	44.50			100.00	99.60	99.40	99.20	CH	1.51	1.89	-	-	-	-
ST-4	9.00	9.50	68.10	68.90	31.30	37.60			100.00	99.70	99.20	99.20	CH	1.54	1.99	-	-	-	-
ST-5	10.50	11.00	20.2	57.90	28.20	29.70			100.00	98.90	98.20	98.90	CH	2.06	1.72	-	-	-	-
SS-2	12.00	12.45	17.60	57.90	28.80	29.10			100.00	99.00	98.30	97.80	CH	2.10		6	7	9	16
SS-3	13.50	13.95	17.30	57.80	29.10	28.70			100.00	99.00	98.20	97.80	CH	2.11		10	11	12	23
SS-4	15.00	15.45	17.50	57.70	29.00	28.70			100.00	98.80	98.10	97.70	CH	2.1		10	9	11	20
SS-5	16.50	16.95	17.20	57.8	28.8	29.00			100.00	98.90	98.30	97.80	CH	2.12		6	7	9	16
SS-6	18.00	18.45	17.30	57.6	29	28.60			100.00	99.10	98.30	97.70	CH	2.12		10	11	13	24
SS-7	19.50	19.95	16.90	48.9	24.3	24.60		100.00	99.40	93.80	90.60	87.90	CL	2.13		12	13	17	30
SS-8	21.00	21.45	6.90	NP	NP	NP	100.00	95.20	84.70	49.80	29.50	13.10	SM			36	31	20/2	50/10
SS-9	22.50	22.95	6.70	NP	NP	NP	100.00	95.30	84.80	49.50	28.90	12.70	SM			23	33	17/3	50/9
SS-10	24.00	24.45	16.80	48.8	24.3	24.50	100.00	100.00	99.40	93.80	90.50	87.70	CL	2.12		8	10	14	24
SS-11	25.50	25.95	16.50	39.8	22.7	17.10		100.00	98.50	87.80	80.70	78.80	CL	2.13		10	14	14	28
SS-12	27.00	27.45	NO RECOVERY										(SC)			6	6	7	13
SS-13	28.50	28.95	17.30	33.5	20.5	13.00	100.00	98.90	88.20	68.40	55.10	43.50	SC	2.13		4	6	7	13
SS-14	30.00	30.45	17.10	35.6	21.5	14.10	100.00	98.90	88.30	68.40	60.90	55.70	CL	2.13		7	8	8	16

SUMMARY OF TEST RESULTS

Project : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2 | Date of Boring : 1/12/2022 | Ground Water Level (m): 0.62

Location : CHIANG RAK NOI | Boring No : BH-6 | North : 1563119 | East : 670688

Sample	Depth ,m		Wn	Atterberg Limits (%)			Grain Size Analysis						USCS	γ_t	S_u	SPT-N ,(blows/inch)			N value
No.	From	To	(%)	LL	PL	PI	3/8"	#4	#10	#40	#100	#200	Group	(t/m^3)	(t/m^2)	1st	2nd	3rd	
ST-1	1.50	2.00	65.40	66.70	34.50	32.20			100.00	99.80	99.50	99.20	CH	1.46	1.68	-	-	-	-
ST-2	3.00	3.50	82.40	77.10	32.10	45.00			100.00	99.50	99.40	99.20	CH	1.47	1.78	-	-	-	-
ST-3	4.50	5.00	84.80	78.20	32.90	45.30				100.00	99.40	99.30	CH	1.45	1.68	-	-	-	-
ST-4	6.00	6.50	82.40	77.20	32.30	44.90			100.00	99.60	99.40	99.20	CH	1.49	1.82	-	-	-	-
ST-5	7.50	8.00	81.60	78.40	33.50	44.90			100.00	99.80	99.40	99.10	CH	1.54	1.69	-	-	-	-
ST-6	9.00	9.50	85.10	78.70	33.10	45.60			100.00	99.50	99.40	99.20	CH	1.47	1.76	-	-	-	-
ST-7	10.50	11.00	85.00	78.50	33.30	45.20			100.00	99.40	99.30	99.20	CH	1.48	1.71	-	-	-	-
ST-8	12.00	12.45	20.60	58.10	27.80	30.30			100.00	98.80	98.30	97.90	CH	2.03	11.16	-	-	-	-
SS-1	13.50	13.95	18.10	57.80	29.00	28.80			100.00	98.90	98.20	97.70	CH	2.10		10	9	12	21
SS-2	15.00	15.45	17.70	58.00	28.80	29.20			100.00	98.80	98.20	97.80	CH			6	7	9	16
SS-3	16.50	16.95	17.30	32.10	20.30	11.80	100.00	98.70	87.90	67.20	53.80	42.10	SC			10	8	8	16
SS-4	18.00	18.45	7.40	NP	NP	NP		100.00	99.30	69.80	37.70	14.30	SM			13	17	24	41
SS-5	19.50	19.95	6.8	NP	NP	NP	100.00	95.30	84.80	49.80	29.50	13.10	SM			15	21	34	55
SS-6	21.00	21.45	5.90	NP	NP	NP	100.00	91.80	75.80	40.90	21.80	8.90	SP-SM			17	39	11/1	50/7
SS-7	22.50	22.95	7.00	NP	NP	NP	100.00	95.10	84.60	49.50	28.70	12.80	SM			25	29	20/4	50/10
SS-8	24.00	24.45	NO RECOVERY										(SM)			14	14	20	34
SS-9	25.50	25.95	18.40	48.50	24.20	24.30		100.00	99.40	93.60	90.40	87.60	CL	2.12		11	12	13	25
SS-10	27.00	27.45	18.60	39.70	22.70	17.00		100.00	98.90	88.30	82.60	78.70	CL	2.13		12	13	19	32
SS-11	28.50	28.95	18.30	36.80	21.80	15.00	100.00	99.10	88.60	69.40	62.90	59.30	CL	2.13		14	15	20	35

APPENDIX D: BORE HOLE SAMPLE

CONSTRUCTION SUPERVISION CONSULTANT
brightstar
FPT บริษัท พบส่งน้ำมันทางท่อ จำกัด
REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2
GEOTECHNICAL SURVEY REPORT
CONTRACTOR
TRITON ENGINEERING AND CONSTRUCTION

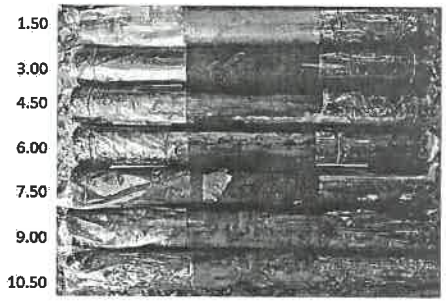
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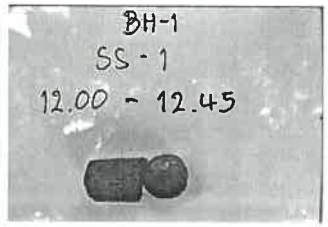
Project : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

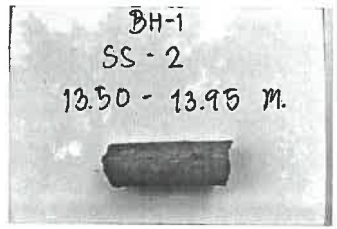
Location: Chiang Rak Noi
Boring No. : BH-1

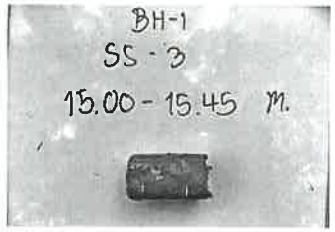
BORE HOLE SAMPLE

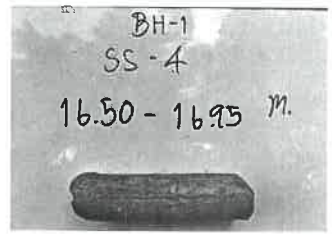
Date of boring : 10/12/2022 **Ground Water Level (m) :** 1.12
Depth (m) : 30.00 North: 1561016 East: 671006











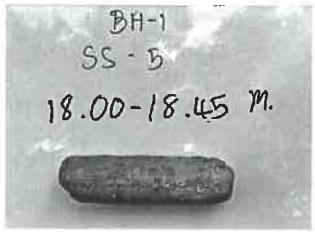
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Project : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

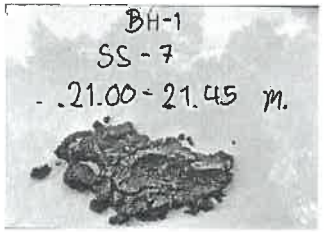
Location: Chiang Rak Noi
Boring No. : BH-1

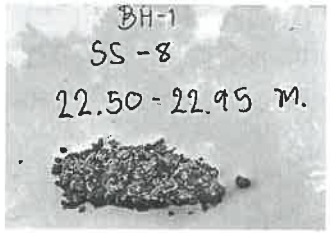
BORE HOLE SAMPLE

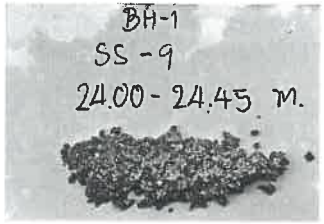
Date of boring : 10/12/2022 **Ground Water Level (m) :** 1.12
Depth (m) : 30.00 North: 1561016 East: 671006

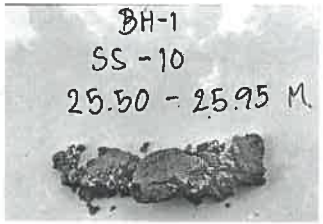












CONSTRUCTION SUPERVISION CONSULTANT
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REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2
GEOTECHNICAL SURVEY REPORT
CONTRACTOR
TRITON ENGINEERING AND CONSTRUCTION

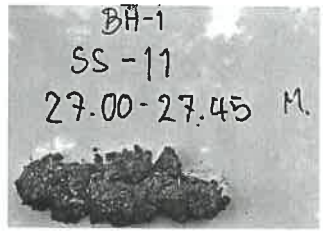
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Project : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

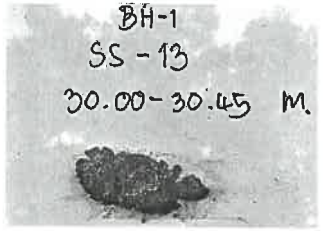
Location: Chiang Rak Noi
Boring No. : BH-1

BORE HOLE SAMPLE

Date of boring : 10/12/2022 **Ground Water Level (m) :** 1.12
Depth (m) : 30.00 North: 1561016 East: 671006







SYNTERRA

Project : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

Location: Chiang Rak Noi
Boring No. : BH-1

BORE HOLE SAMPLE

Date of boring : 10/12/2022 **Ground Water Level (m) :** 1.12
Depth (m) : 30.00 North: 1561016 East: 671006





SYNTERRA

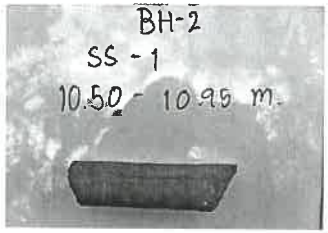
Project : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

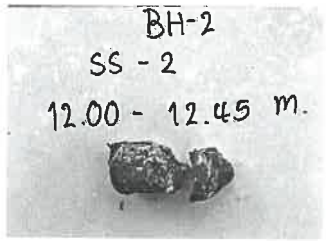
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Boring No. : BH-2

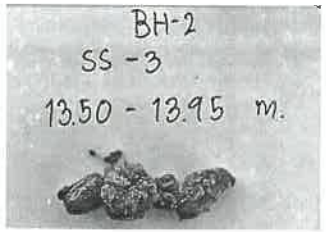
BORE HOLE SAMPLE

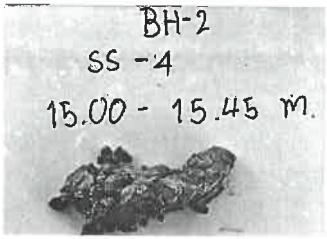
Date of boring : 7/12/2022 **Ground Water Level (m) :** 0.86
Depth (m) : 30.00 North:1561483 East: 670891











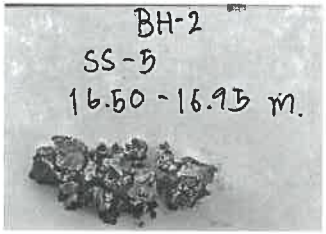
SYNTERRA

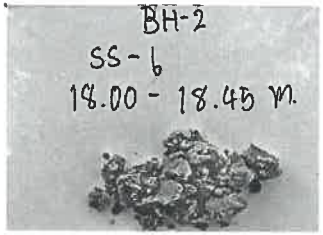
Project : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

Location: Chiang Rak Noi
Boring No. : BH-2

BORE HOLE SAMPLE

Date of boring : 7/12/2022 **Ground Water Level (m) :** 0.86
Depth (m) : 30.00 North:1561483 East; 670891

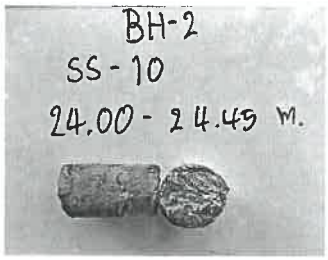












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CONTRACTOR
TRITON ENGINEERING AND CONSTRUCTION

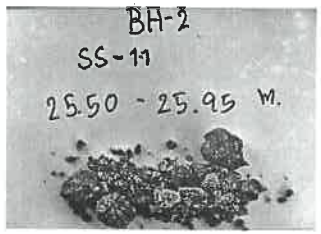
SYNTERRA

Project : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

Location: Chiang Rak Noi
Boring No. : BH-2

BORE HOLE SAMPLE

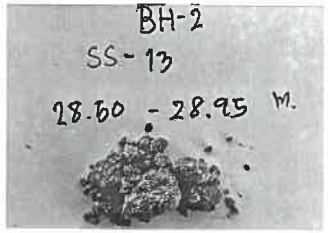
Date of boring : 7/12/2022 **Ground Water Level (m) :** 0.86
Depth (m) : 30.00 North:1561483 East; 670891

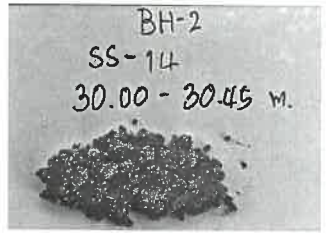


BH-2

SS-12
27.00 - 27.45 m.

NO RECOVERY





SYNTERRA

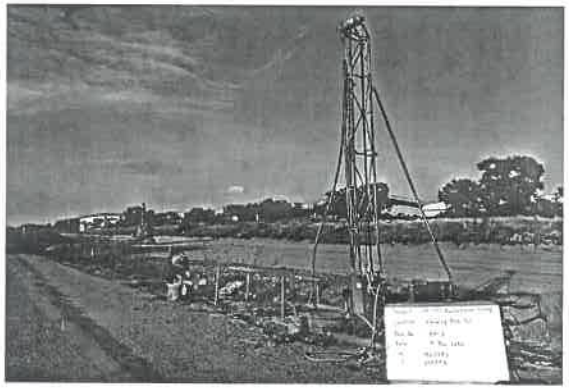
Project : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

Location: Chiang Rak Noi
Boring No. : BH-2

BORE HOLE SAMPLE

Date of boring : 7/12/2022 **Ground Water Level (m) :** 0.86
Depth (m) : 30.00 North:1561483 East: 670891





SYNTERRA

Project : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

Location: Chiang Rak Noi
Boring No. : BH-3

BORE HOLE SAMPLE

Date of boring : 8/12/2022 **Ground Water Level (m) :** 0.46
Depth (m) : 30.00 North: 1561874 East: 670860

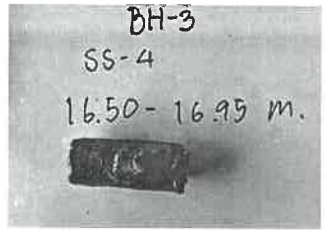
1.50 2.00
3.00 3.50
4.50 5.00
6.00 6.50
7.50 8.00
9.00 9.50
10.50 11.00











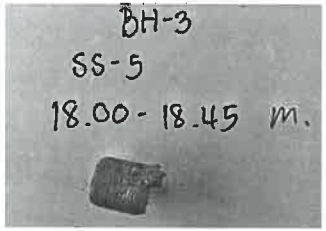
SYNTERRA

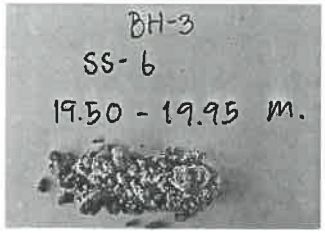
Project : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

Location: Chiang Rak Noi
Boring No. : BH-3

BORE HOLE SAMPLE

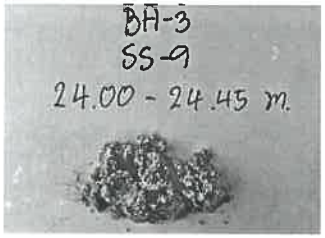
Date of boring : 8/12/2022 **Ground Water Level (m) :** 0.46
Depth (m) : 30.00 North: 1561874 East: 670860

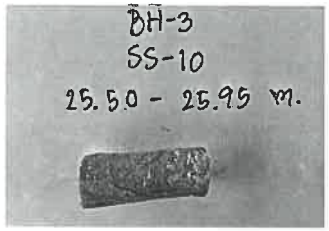












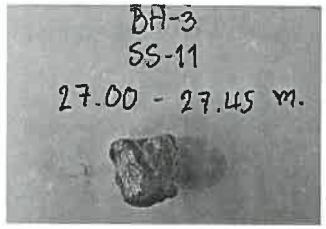
SYNTERRA

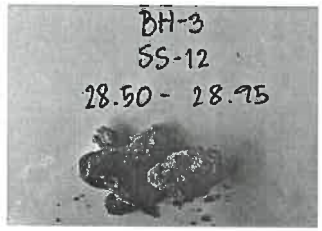
Project : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

Location: Chiang Rak Noi
Boring No. : BH-3

BORE HOLE SAMPLE

Date of boring : 8/12/2022 **Ground Water Level (m) :** 0.46
Depth (m) : 30.00 North: 1561874 East: 670860







SYNTERRA

Project : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

Location: Chiang Rak Noi
Boring No. : BH-3

BORE HOLE INVESTIGATION

Date of boring : 8/12/2022 **Ground Water Level (m) :** 0.46
Depth (m) : 30.00 North: 1561874 East: 670860





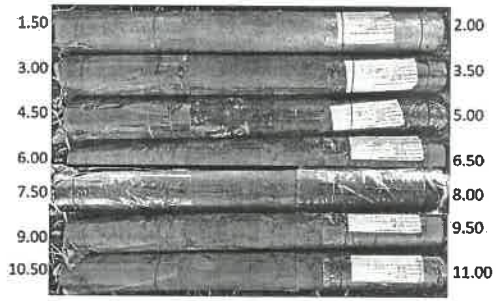
SYNTERRA

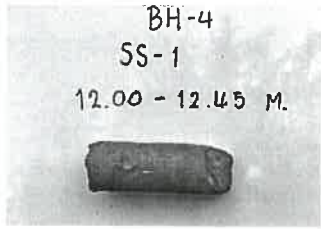
Project : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

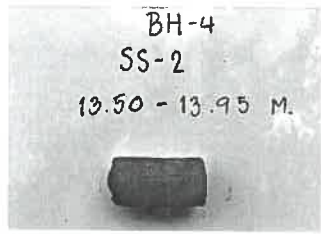
Location: Chiang Rak Noi
Boring No. : BH-4

BORE HOLE SAMPLE

Date of boring : 5/12/2022 **Ground Water Level (m) :** 0.34
Depth (m) : 30.00 North: 1562645 East: 670804











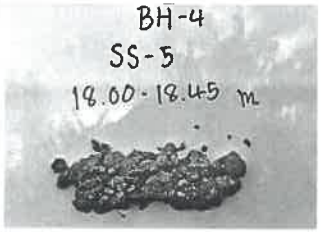
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Project : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

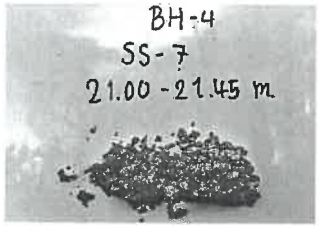
Location: Chiang Rak Noi
Boring No. : BH-4

BORE HOLE SAMPLE

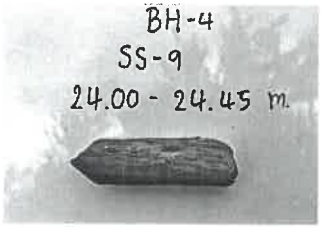
Date of boring : 5/12/2022 **Ground Water Level (m) :** 1.14
Depth (m) : 30.00 North: 1562645 East: 670804

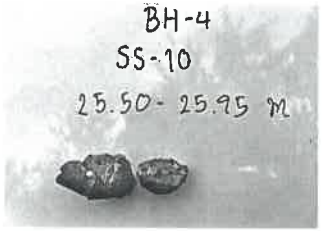












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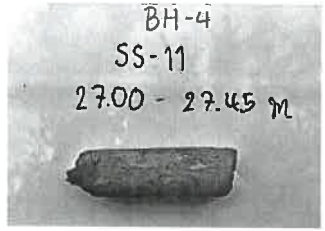
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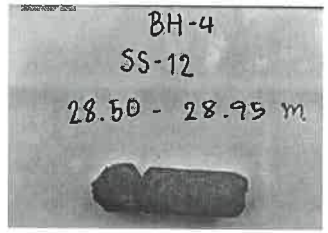
Project : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

Location: Chiang Rak Noi
Boring No. : BH-4

BORE HOLE SAMPLE

Date of boring : 5/12/2022 **Ground Water Level (m) :** 1.14
Depth (m) : 30.00 North: 1562645 East: 670804







SYNTERRA

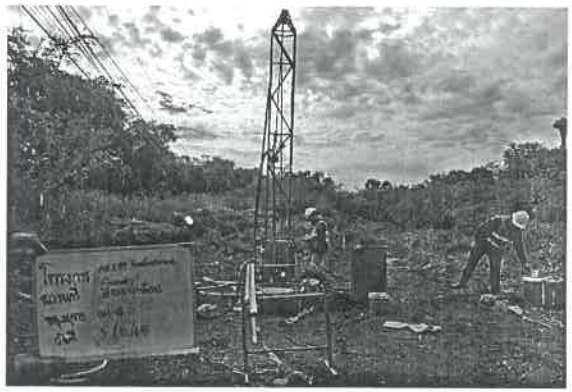
Project : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

Location: Chiang Rak Noi
Boring No. : BH-4

BORE HOLE INVESTIGATION

Date of boring : 5/12/2022 **Ground Water Level (m) :** 1.14
Depth (m) : 30.00 North: 1562645 East: 670804





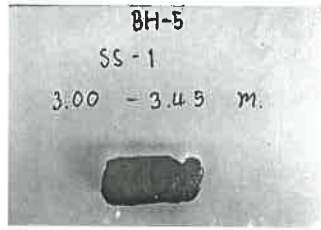
SYNTERRA

Project : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

Location: Chiang Rak Noi
Boring No. : BH-5

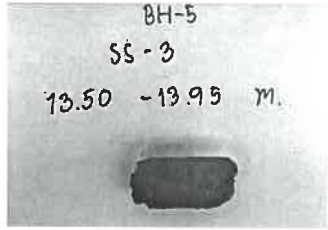
BORE HOLE SAMPLE

Date of boring : 3/12/2022 **Ground Water Level (m) :** 1.14
Depth (m) : 30.00 North: 1562584 East: 670763









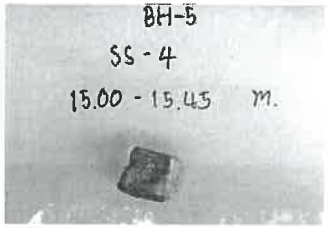
SYNTERRA

Project : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

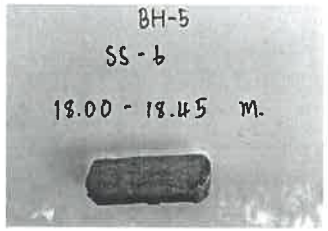
Location: Chiang Rak Noi
Boring No. : BH-5

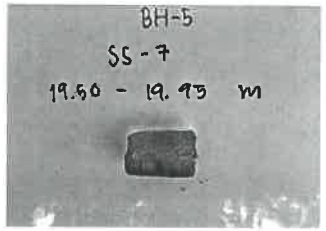
BORE HOLE SAMPLE

Date of boring : 3/12/2022 **Ground Water Level (m) :** 1.14
Depth (m) : 30.00 North: 1562584 East: 670763

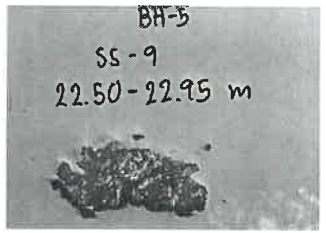












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CONTRACTOR
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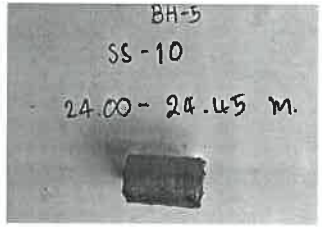
SYNTERRA

Project : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

Location: Chiang Rak Noi
Boring No. : BH-5

BORE HOLE SAMPLE

Date of boring : 3/12/2022 **Ground Water Level (m) :** 1.14
Depth (m) : 30.00 North: 1562584 East: 670763



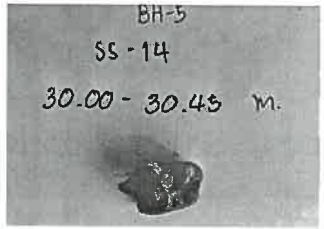


BH-5
SS-12

27.00 - 27.45 m.

NO RECOVERY





SYNTERRA

Project : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

Location: Chiang Rak Noi
Boring No. : BH-5

BORE HOLE INVESTIGATION

Date of boring : 3/12/2022 **Ground Water Level (m) :** 1.14
Depth (m) : 30.00 North: 1562584 East: 670763





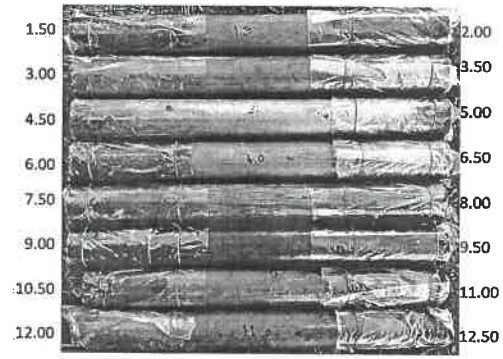
SYNTERRA

Project : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

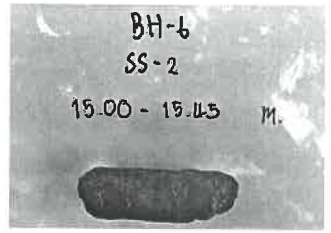
Location: Chiang Rak Noi
Boring No. : BH-6

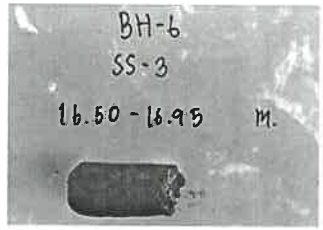
BORE HOLE SAMPLE

Date of boring : 2/12/2022 **Ground Water Level (m) :** 0.62
Depth (m) : 30.00 North: 156319 East: 670688











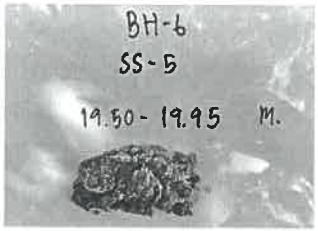
SYNTERRA

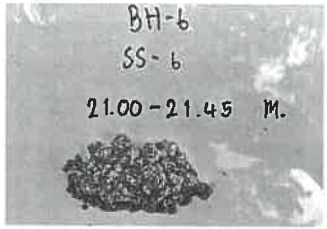
Project : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

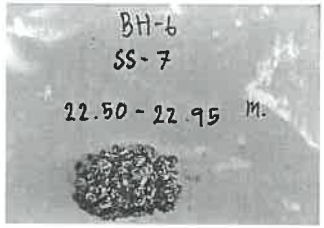
Location: Chiang Rak Noi
Boring No. : BH-6

BORE HOLE SAMPLE

Date of boring : 2/12/2022 **Ground Water Level (m) :** 0.62
Depth (m) : 30.00 North: 156319 East: 670688



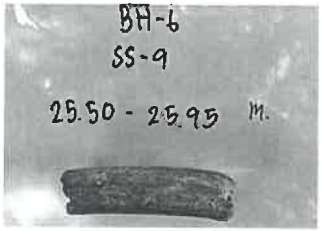


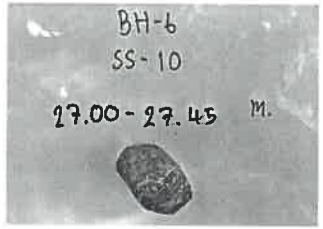


BH-6
SS-8

24.0-24.45 m.

NO RECOVERY





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CONTRACTOR
TRITON ENGINEERING AND CONSTRUCTION

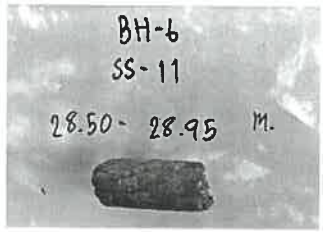
SYNTERRA

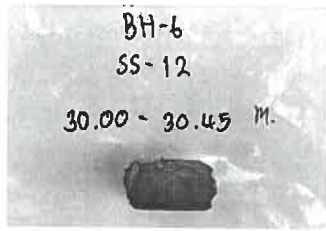
Project : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

Location: Chiang Rak Noi
Boring No. : BH-6

BORE HOLE SAMPLE

Date of boring : 2/12/2022 **Ground Water Level (m) :** 0.62
Depth (m) : 30.00 North: 156319 East: 670688





SYNTERRA

Project : REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2

Location: Chiang Rak Noi
Boring No. : BH-6

BORE HOLE SAMPLE

Date of boring : 2/12/2022 **Ground Water Level (m) :** 0.62
Depth (m) : 30.00 North: 156319 East: 670688





CONSTRUCTION SUPERVISION CONSULTANT
brightstar
FPT บริษัท ขนส่งน้ำมันทางท่อ จำกัด
REROUTE FUEL PIPELINE TRANSPORTATION PROJECT NO.2
GEOTECHNICAL SURVEY REPORT
CONTRACTOR
TRITON ENGINEERING AND CONSTRUCTION

APPENDIX E : DAILY REPORT

FPT brightstar **Daily Progress Report** TRITON

Project : AP FPT Geotechnical Survey	No.of Report : 1
Location : Chiang Rak Noi Station	Date : 01-Dec-22
	Start Time: 8:30
Weather : Sunny	End Time: 11:00
Rig No. : 1	

1.Rig Machine :

Description	Yes.	No.	Description	Yes.	No.
Three-legged frame	/		Sump	/	
Rods	/		Head spin	/	
Handle	/		Piling Pipe	/	
Swivel	/		Hammer	/	
Hose & Joint pipe	/		Kiddy oil	/	

Remark :

2.PPE

Description	Yes.	No.
Helmet	/	
Glasses	/	
Gloves	/	
Safety shoes	/	
Mask	/	

Remark :

3.Colleagues in Field :

Position	Company	Quota
Site Engineer	Synterra	1
Driller	Synterra	1
Driller assistance	Synterra	3
Inspection		
Visitor		
Diver		
Total		5

4. Activities

1. Set up the rig.
2. The soil boring equipment has failured. The equipment is under refurbished and will continue on 2 Dec 22.

5.Sketch location map



6. Drill hole photo location

BH-6





Reported By: Sarawut Thinkoksung Position : Site Engineer

Verified By : Pornpong Asavadomdeja Position : PM

FPT brightstar **Daily Progress Report** TRITON

Project : AP FPT Geotechnical Survey	No.of Report : 2
Location : Chiang Rak Noi Station	Date : 02-Dec-22
	Start Time: 8:30
Weather : Sunny	End Time: 17:00
Rig No. : 1	

1.Rig Machine :

Description	Yes.	No.	Description	Yes.	No.
Three-legged frame	/		Sump	/	
Rods	/		Head spin	/	
Handle	/		Piling Pipe	/	
Swivel	/		Hammer	/	
Hose & Joint pipe	/		Kiddy oil	/	

Remark :

2.PPE

Description	Yes.	No.
Helmet	/	
Glasses	/	
Gloves	/	
Safety shoes	/	
Mask	/	

Remark :

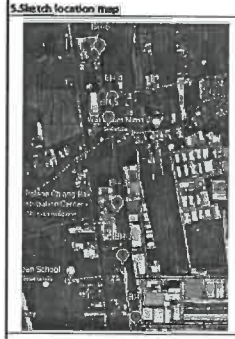
3.Colleagues in Field :

Position	Company	Quota
Site Engineer	Synterra	1
Driller	Synterra	1
Driller assistance	Synterra	2
Inspection		
Visitor		
Diver		
Total		4

4. Activities

1.BH-6 Finished at 30.00 m.
0.0-16.00 m. is Clay.
16.00-25.00 m. is Sand .
16.00-30.00 m. is Clay
2 .Tomorrow will move to BH-5

5.Sketch location map



6. Drill hole photo location

BH-6





Reported By: Sarawut Thinkoksung Position : Site Engineer

Verified By : Pornpong Asavadomdeja Position : PM

FPT บริษัท ขนส่งน้ำมันทางท่อ จำกัด brightstar **Daily Progress Report** TRITON

Project : AP FPT Geotechnical Survey	No.of Report : 3
Location : Chiang Rak Noi Station	Date : 03-Dec-22
	Start Time: 8:30
Weather : Sunny	End Time: 17:00
Rig No. : 1	

1.Rig Machine :

Description	Yes.	No.	Description	Yes.	No.
Three-legged frame	/		Sump	/	
Rods	/		Head spin	/	
Handle	/		Piling Pipe	/	
Swivel	/		Hammer	/	
Hose & joint pipe	/		Kiddy oil	/	

Remark :

2.PPE

Description	Yes.	No.
Helmet	/	
Glasses	/	
Gloves	/	
Safety shoes	/	
Mask	/	

Remark :

3.Colleagues in Field :

Position	Company	Quota
Site Engineer	Synterra	1
Driller	Synterra	1
Driller assistance	Synterra	2
Inspection		
Visitor		
Diver		
Total		4

4. Activities

1. Set up the rig.
2. Soil drill with SPT from 0.00m to 7.00m

5.Sketch location map



6. Drill hole photo location

BH-5





Reported By: Serawut Thinkoksung Position : Site Engineer

Verified By : Pornpong Asavadomdeja Position : PM

FPT บริษัท ขนส่งน้ำมันทางท่อ จำกัด brightstar **Daily Progress Report** TRITON

Project : AP FPT Geotechnical Survey	No.of Report : 4
Location : Chiang Rak Noi Station	Date : 04-Dec-22
	Start Time: 8:30
Weather : Sunny	End Time: 17:00
Rig No. : 1	

1.Rig Machine :

Description	Yes.	No.	Description	Yes.	No.
Three-legged frame	/		Sump	/	
Rods	/		Head spin	/	
Handle	/		Piling Pipe	/	
Swivel	/		Hammer	/	
Hose & joint pipe	/		Kiddy oil	/	

Remark :

2.PPE

Description	Yes.	No.
Helmet	/	
Glasses	/	
Gloves	/	
Safety shoes	/	
Mask	/	

Remark :

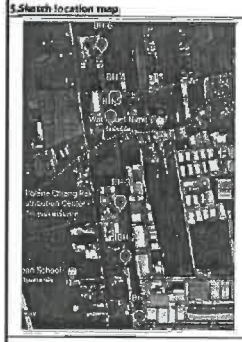
3.Colleagues in Field :

Position	Company	Quota
Site Engineer	Synterra	1
Driller	Synterra	1
Driller assistance	Synterra	2
safety officer	YJ	1
Visitor		
Diver		
Total		5

4. Activities

1.BH-5 finishd at 30.0 m.
0.0-20.0 m. is clay.
20.0 - 24.0 m. is sand.
24.0-30.0 m . is clay.
2. Move to BH-4 on 5 Dec 2022.

5.Sketch location map



6. Drill hole photo location

BH-5





Reported By: Serawut Thinkoksung Position : Site Engineer

Verified By : Pornpong Asavadomdeja Position : PM

FPT brightstar **Daily Progress Report** TRITON

Project : AP FPT Geotechnical Survey	No.of Report : 5
Location : Chiang Rak Noi Station	Date : 05-Dec-22
	Start Time: 8:30
Weather : Sunny	End Time: 17:00
Rig No. : 1	

1.Rig Machine :

Description	Yes.	No.	Description	Yes.	No.
Three-legged frame	/		Sump	/	
Rods	/		Head spin	/	
Handle	/		Piling Pipe	/	
Swivel	/		Hammer	/	
Hose & Joint pipe	/		Kiddy oil	/	

Remark :

2.PPE

Description	Yes.	No.
Helmet	/	
Glasses	/	
Gloves	/	
Safety shoes	/	
Mask	/	

Remark :

3.Colleagues in Field :

Position	Company	Quota
Site Engineer	Systerra	1
Driller	Systerra	1
Driller assistance	Systerra	2
safety officer		1
Visitor		
Diver		
Total		5

4. Activities

1.Move from BH-5 to BH-4
2.Soil drill with SPT from 0.00 - 18.00 m

5.Sketch location map



6. Drill hole photo location

BH-4





Reported By: Sarawut Thinkoksung Position : Site Engineer

Verified By : Pornpong Asavadornderja Position : PM

FPT brightstar **Daily Progress Report** TRITON

Project : AP FPT Geotechnical Survey	No.of Report : 6
Location : Chiang Rak Noi Station	Date : 06-Dec-22
	Start Time: 8:30
Weather : Sunny	End Time: 17:00
Rig No. : 1	

1.Rig Machine :

Description	Yes.	No.	Description	Yes.	No.
Three-legged frame	/		Sump	/	
Rods	/		Head spin	/	
Handle	/		Piling Pipe	/	
Swivel	/		Hammer	/	
Hose & Joint pipe	/		Kiddy oil	/	

Remark :

2.PPE

Description	Yes.	No.
Helmet	/	
Glasses	/	
Gloves	/	
Safety shoes	/	
Mask	/	

Remark :

3.Colleagues in Field :

Position	Company	Quota
Site Engineer	Systerra	1
Driller	Systerra	1
Driller assistance	Systerra	2
safety officer		1
Visitor		
Diver		
Total		5

4. Activities

1.BH-4 finished at 30.0 m
0.00 -16.00 m. is clay.
16.00-22.00 m. is sand.
22.00-30.00 m. is clay.
2.Move to BH-2.

5.Sketch location map



6. Drill hole photo location

BH-4



BH-2



Reported By: Sarawut Thinkoksung Position : Site Engineer

Verified By : Pornpong Asavadornderja Position : PM

FPT บริษัท ขนส่งน้ำมันทางท่อ จำกัด brightstar **Daily Progress Report** TRITON

Project : AP FPT Geotechnical Survey	No.of Report : 7
Location : Chiang Rak Noi Station	Date : 12-07-22
	Start Time: 8:30
Weather : Sunny	End Time: 17:00
Rig No. : 1	

1.Rig Machine :

Description	Yes.	No.	Description	Yes.	No.
Three-legged frame	/		Sump	/	
Rods	/		Head spin	/	
Handle	/		Piling Pipe	/	
Swivel	/		Hammer	/	
Hose & Joint pipe	/		Kiddy oil	/	

Remark :

2.PPE

Description	Yes.	No.
Helmet	/	
Glasses	/	
Gloves	/	
Safety shoes	/	
Mask	/	

Remark :

3.Colleagues in Field :

Position	Company	Quota
Site Engineer	Synterra	1
Driller	Synterra	1
Driller assistance	Synterra	2
safet y officer		1
Visitor		
Diver		
Total		5

4. Activities

1. Soil drill with SPT from 00.0m - 10.5 m.
2.Some parts of the drill machine are damaged. Buy and change new parts takes hours.

5.Sketch location map



6. Drill hole photo location

BH-2





Reported By: Sarawut Thinkoksung Position : Site Engineer

Verified By : Pornpong Asavadomdeja Position : PM

FPT บริษัท ขนส่งน้ำมันทางท่อ จำกัด brightstar **Daily Progress Report** TRITON

Project : AP FPT Geotechnical Survey	No.of Report : 8
Location : Chiang Rak Noi Station	Date : 12-08-22
	Start Time: 8:30
Weather : Sunny	End Time: 17:00
Rig No. : 1	

1.Rig Machine :

Description	Yes.	No.	Description	Yes.	No.
Three-legged frame	/		Sump	/	
Rods	/		Head spin	/	
Handle	/		Piling Pipe	/	
Swivel	/		Hammer	/	
Hose & Joint pipe	/		Kiddy oil	/	

Remark :

2.PPE

Description	Yes.	No.
Helmet	/	
Glasses	/	
Gloves	/	
Safety shoes	/	
Mask	/	

Remark :

3.Colleagues in Field :

Position	Company	Quota
Site Engineer	Synterra	1
Driller	Synterra	1
Driller assistance	Synterra	2
safet y officer		1
Visitor		
Diver		
Total		5

4. Activities

1. BH-2 finished at 30.0 m.
0.00-13.00 m. is cla
13.00-23.00m. is sand.
23.00-25.00m. is clay.
25.00-30.00m. is sand.
3. Move to BH-3 and Soil drill with SPT from 00.0m - 13.0 m.

5.Sketch location map



6. Drill hole photo location

BH-2



BH-3



Reported By: Sarawut Thinkoksung Position : Site Engineer

Verified By : Pornpong Asavadomdeja Position : PM

FPT บริษัท ขนส่งน้ำมันทางท่อ จำกัด brightstar **Daily Progress Report** TRITON

Project : AP FPT Geotechnical Survey	No.of Report : 9
Location : Chiang Rak Noi Station	Date : 12-09-22
	Start Time: 8:30
Weather : Sunny	End Time: 17:00
Rig No. : 1	

1.Rig Machine :

Description	Yes.	No.	Description	Yes.	No.
Three-legged frame	/		Sump	/	
Rods	/		Head spin	/	
Handle	/		Piling Pipe	/	
Swivel	/		Hammer	/	
Hose & Joint pipe	/		Kiddy oil	/	

Remark :

2.PPE

Description	Yes.	No.
Helmet	/	
Glasses	/	
Gloves	/	
Safety shoes	/	
Mask	/	

Remark :

3.Colleagues in Field :

Position	Company	Quota
Site Engineer	Synterra	1
Driller	Synterra	1
Driller assistance	Synterra	2
safety officer		1
Visitor		
Diver		
Total		5

4. Activities

1. BH-3 finished at 30.0 m.
   0.00-19.00 m. is cla
   19.00-25.00m. is sand.
   25.00-28.00m. is clay.
   28.00-30.00m. is sand.

5.Sketch location map



6. Drill hole photo location

BH-3



Reported By: Serawut Thinkoksung Position : Site Engineer

Verified By : Pornpong Asavadomdeja Position : PM

FPT บริษัท ขนส่งน้ำมันทางท่อ จำกัด brightstar **Daily Progress Report** TRITON

Project : AP FPT Geotechnical Survey	No.of Report : 10
Location : Chiang Rak Noi Station	Date : 12-10-22
	Start Time: 8:30
Weather : Sunny	End Time: 17:00
Rig No. : 1	

1.Rig Machine :

Description	Yes.	No.	Description	Yes.	No.
Three-legged frame	/		Sump	/	
Rods	/		Head spin	/	
Handle	/		Piling Pipe	/	
Swivel	/		Hammer	/	
Hose & Joint pipe	/		Kiddy oil	/	

Remark :

2.PPE

Description	Yes.	No.
Helmet	/	
Glasses	/	
Gloves	/	
Safety shoes	/	
Mask	/	

Remark :

3.Colleagues in Field :

Position	Company	Quota
Site Engineer	Synterra	1
Driller	Synterra	1
Driller assistance	Synterra	2
safety officer		1
Visitor		
Diver		
Total		5

4. Activities

1. Move from BH-3
2. Soil dril with SPT form 0.00 - 25.00 m

5.Sketch location map



6. Drill hole photo location

BH-1



Reported By: Serawut Thinkoksung Position : Site Engineer

Verified By : Pornpong Asavadomdeja Position : PM

FPT บริษัท ขนส่งน้ำมันทางท่อ จำกัด brightstar

Daily Progress Report

TRITON

Project : AP FPT Geotechnical Survey	No.of Report : 11
Location : Chiang Rak Noi Station	Date : 12-11-22
	Start Time: 8:30
Weather : Sunny	End Time: 17:00
Rig No. : 1	

1.Rig Machine :

Description	Yes.	No.	Description	Yes.	No.
Three-legged frame	/		Sump	/	
Rods	/		Head spin	/	
Handle	/		Piling Pipe	/	
Swivel	/		Hammer	/	
Hose & Joint pipe	/		Kiddy oil	/	

Remark :

2.PPE

Description	Yes.	No.
Helmet	/	
Glasses	/	
Gloves	/	
Safety shoes	/	
Mask	/	

Remark :

3.Colleagues in Field :

Position	Company	Quota
Site Engineer	Synterra	1
Driller	Synterra	1
Driller assistance	Synterra	2
safet y officer		1
Visitor		
Diver		
Total		5

4. Activities

1. BH-1 finished at 30.0m
   - 0.00-19.0m. is clay.
   - 19.0- 30.0 m. is sand.

5.Sketch location map



6. Drillhole photo location

BH-1





Reported By: Sarawut Thinkoksung Position : Site Engineer

Verified By : Pornpong Asawidomdeja Position : PM