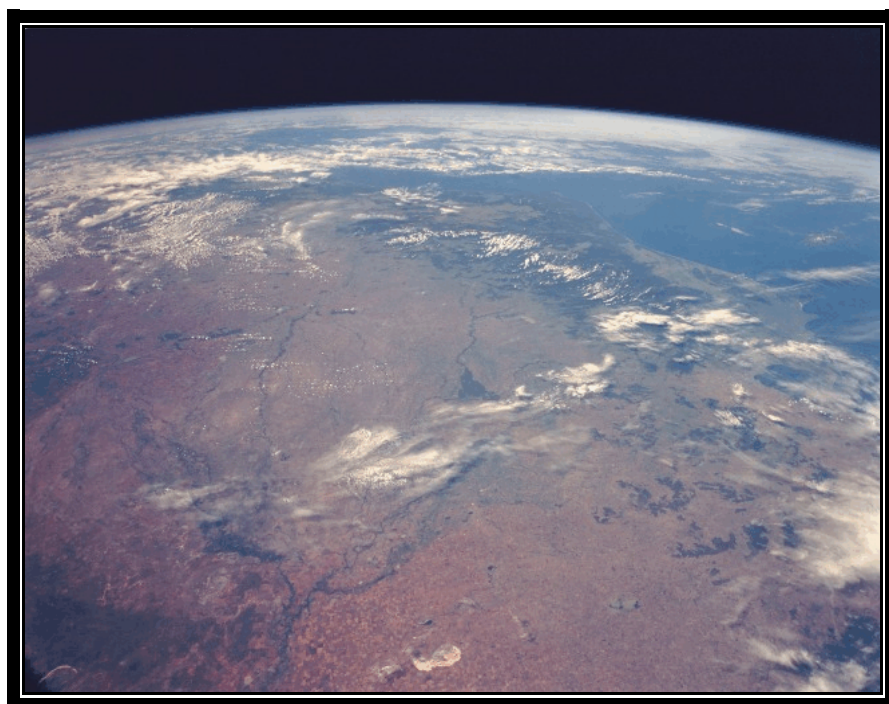


*Final Operations Report
on the
2007
Cobalt 2D Seismic Survey*

for

*Blue Energy Limited
and
Terrex Seismic Pty Ltd*

November 2007



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Dynamic Satellite Surveys Pty Ltd has an externally certified Quality Management System to AS/NZS ISO 9001:2000 standards (Lic# QEC10046), by SAI Global Ltd.

This project was undertaken for Terrex Seismic Pty Ltd and Blue Energy Limited. The sole purpose of the job was to install and survey 2D seismic lines. The use of the data for any other purpose is not authorised.

Any maps or diagrams contained in this report are a visual representation of the associated digital data only.

All data contained in this report and on the attached CD is deemed to be final and overrides any previous data received from DSS, unless otherwise stated.

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1

INTRODUCTION

The following report covers the **2007 Cobalt 2D Seismic Survey** performed by **Dynamic Satellite Surveys Pty Ltd (DSS)** whilst contracted to **Terrex Seismic Pty Ltd** for **Blue Energy Limited**.

The survey operation was located in Central Queensland, east of Injune. It consisted of a total of six (6) 2D seismic lines totalling **84.975 kilometres** and were surveyed at 15 metre station intervals.

All survey operations were completed between the 4th and 16th of November 2007.



2

INSTRUMENTATION AND PERSONNEL

2.1 Personnel and Logistics

DSS personnel involved in the survey were as follows.

- | | |
|------------------------|--|
| Daniel Browning | - Bachelor of Surveying, Queensland University of Technology |
| Brendan Jones | - Surveyor |
| Kirra Minenko | - Trainee Surveyor |
| Joshua McCall | - Survey Assistant |

Personnel and equipment logistics were supported by the DSS Yeppoon office.

Survey operations were based at the Injune Hotel, and from the Kings Motel (Roma) on the last day.

2.2 *Equipment*

Equipment provided by DSS and used on this project.

	Description	Qty
Vehicles	Toyota Landcruiser Trayback	1
GPS receivers	NovAtel GPS receivers with VHF telemetry	3
Computers	Dell Inspiron Laptop	1
	Fujitsu XP tablet	1
Software	Nav05 field software - DSS	Ver 4.12
	MIB for Windows - DSS	Ver 6.42
	MapInfo Professional	Ver 8.5
	GrafNet GPS Processing Software	Ver 7.60
	Transit	Ver 5.5
Printer	Canon i6500 A3	1
Miscellaneous	Necessary standard surveying equipment	
	Sundry office and transport equipment	
	Field and Office Consumables	



3

SURVEY REFERENCE SYSTEMS

3.1 Geodetic Datum

This project was based on the Geocentric Datum of Australia 1994 (GDA94) which is based on the Geodetic Reference System 1980 (GRS80) model defined by the following parameters:

<i>Datum:</i>	GDA94(Geocentric Datum of Australia 1994)
<i>Spheroid:</i>	GRS80
<i>Reference Frame:</i>	ITRF92 (International Terrestrial Reference Frame)
<i>Semi-Major Axis Length:</i>	6 378 137.0
<i>Inverse Flattening:</i>	298.257222101
<i>The Unit of Measure:</i>	International Metre

3.2 Map Projection

Final rectangular coordinates were based on the Map Grid of Australia 1994 (MGA94). Parameters for this projection are as follows:

<i>Projection:</i>	Universal Transverse Mercator (MGA Zone 55)
<i>Latitude of Origin:</i>	0°
<i>Central Meridian (CM):</i>	147° E
<i>Scale Factor at CM:</i>	0.9996
<i>False Easting:</i>	500 000
<i>False Northing:</i>	10 000 000
<i>The Unit of Measure:</i>	International Metre

3.3 Height Datum

All elevations obtained relative to GDA94 have been reduced to the Australian Height Datum (AHD) using the AUSGeoid98 Geoid - Spheroid separation model to determine the geoid-ellipsoid separation (N) for the particular area.

GPS observations are made on the GDA94 datum. The height associated with this datum is an ellipsoidal height (h). The Australian Height Datum (AHD), the height datum associated with MGA94, is an orthometric height which is measured as the height above mean sea level, or the geoid (H).

The function that defines the relationship between the ellipsoid and orthometric heights is:

$$H = h - N$$

Or

$$\text{AHD} = \text{GDA94} - (\text{Geoid / Ellipsoid Separation})$$

The value for the geoid/spheroid separation is interpolated from a national model called AUSGeoid98.

AUSGeoid98 is the third in a series of national geoid models produced for Australia by the Australian Surveying and Land Information Group (AUSLIG). The geoid-ellipsoid data is prepared for the Australian region from:

- EGM96 Global Geopotential Model;
- 1996 Australian Gravity DataBase, from the Australian Geological Survey Organisation (AGSO);
- AUSLIG / AGSO GEODATA nine-second digital elevation model;
- Satellite altimeter - derived free air gravity anomalies offshore;
- Theories, techniques and software developed by Associate Professor Will Featherstone, Curtin University of Technology¹.

AUSGeoid98 N values were interpolated using the GrafNet Version 7.60 software, distributed by Waypoint Consulting Inc.

¹ Johnston, G.M., Featherstone, W.E. (1998) AUSGEOID98: A New Gravimetric Model for Australia



4

SURVEY CONTROL

A Permanent Survey Marks (PSM's) existed in Injune and was used as the datum station for the survey.

The station used was:

Station	Easting	Northing	AHD	Comments
76864	656873.905	7140546.707	392.156	

Coordinates for other PSM's are listed in **Appendix A - Survey Control**.



5

MONUMENTATION

All lines were pegged at a 15-metre station interval. Wooden pegs (every 2nd numbered on both sides) were placed at every station.

No permanent markers, or survey control stations were placed in the prospect, as existing control was sufficient.



6

METHOD OF SURVEY

6.1 Line Pointing

Line pointing operations were completed by MBA Consultants personnel and contractors.

6.2 Surveying and Chaining

The survey was completed using DSS' RT2 real-time kinematic (RTK) surveying technique. This method enabled both position and elevation coordinates to be acquired in real-time and on the appropriate datum.

The survey method utilised phase data received from US Navy NAVSTAR satellites to provide three-dimensional positioning. When RTK surveying, one receiver was set up as a base station at a known location while the other receiver was used as a remote rover. To obtain real-time capabilities, VHF telemetry is required between the base and the remote GPS receiver.

NovAtel real-time kinematic methods can achieve accuracies of better than +/-0.05m in position and elevation, depending on base line length. The expected precision for locating pegged positions is better than 0.3 metres and is generally better than 0.2 metres.

Initialisation of the RT2 rover GPS usually takes as little as 1-2 minutes, although this is greatly dependant on satellite geometry, availability and base line length.

Due to sparse foliage cover on the majority of the prospect, receiving GPS signals was rarely a problem.

6.3 *GPS Processing and Quality Control*

All survey data was immediately recorded internally on the Fujitsu XP Tablets and subsequently downloaded to the office computer each evening.

Quality of the satellite data was monitored by careful examination of the various on-screen quality control statistics produced by the Nav05 software. These checks on data integrity are in the form of standard deviation (or sigma) values for Easting, Northing and Height and are generally better than 0.05 metres.

Any attempt to record positional data where the standard deviation values exceeded 0.1m was highlighted to the surveyor at the time of recording, in which case the GPS was re-initialised in order to obtain a more accurate solution. Any recorded position which fell outside the required tolerances was flagged for further investigation and re-recording if necessary.

Numerous checks on pre-recorded marks were observed during each days survey in order to confirm the integrity of the coordinates of the GPS base receiver and the placed markers.

After data collection, coordinates were checked in the office by determining point to point direction and distance. Profile plots were also examined in detail to identify any height anomalies. Any points showing unusual position or height details were flagged for checking in the field before the delivery of final survey data.



7

DATA PRESENTATION

All line files were checked and finalised before the survey crew demobilised from the prospect.

All final data was in UTM grid coordinate format on the MGA94 datum on the GRS80 reference spheroid. All elevations were on the Australian Height Datum (AHD71).

Files produced were:

07COB-#.uka	Line data in UKOOA format.
07COB-#.seg	Line data in SEGP1 format.
TraceDiagram07COB-#.pdf	Line trace diagrams for each line.
Intersections Directory	Line Intersection Diagrams

All files are backed up on digital disks in the Yeppoon office for future reference.

No hard copy data was provided.



8

SAFETY

DSS personnel are aware of safety conditions concerning all exploration seismic surveys. The DSS “**Quality Policy Statement**” and “**Health, Safety and Environment Policy**” were adhered to at all times.

The vehicle was fitted with a UHF radio, shovel, first-aid kit, bites and stings kit, vehicle recovery equipment and weekly vehicle maintenance check lists.

Comprehensive vehicle checks were carried out weekly to ensure the safety of all surveyors whilst travelling. Oil and water levels were checked daily owing to the hot conditions. Each vehicle carried two spare tyres.

The survey was completed without any safety incidents.



9

OPERATIONAL ASPECTS

The survey was completed in twelve days with an average production of about 7.1 kilometres per day.

The surveyor was on standby for parts of the 7th, 8th and 10th of November and for a full day on the 11th of November. This standby was due to wet weather conditions that made the roads and job site too muddy and unsafe to travel. There was also a period of standby time on the 9th of November, as permission hadn't been granted to start lines 07COB-05 or 07COB-06. The line pointer was not able to be contacted at this time to receive approval.

The first peg was placed on the 5th of November. Line 07COB-01 was pegged first and was completed in two days. Line 07COB-02 was pegged on the 6th and 7th of November. Lines 07COB-03 and 07COB-04 were completed on the 8th and 9th respectively. The north - south lines 07COB-05 and 07COB-06 were completed from the 10th to the 15th of November.

The survey on line 07COB-05 deviated from the design line in one section, due to a lack of flagged directions, mud maps, or coordinates to help follow the desired route.



10

CONCLUSIONS AND RECOMMENDATIONS

Other than the one partial day of standby waiting for approval and the standby due to weather, the survey was completed efficiently.

There were sections during the survey at which deviations off the initially designed lines were not apparent. The line pointer should possibly have taken GPS coordinates at these locations and given them to the surveyor prior to the start of the particular line.

Signed,

Dynamic Satellite Surveys Pty Ltd

Denis Williams

Survey Manager



11

APPENDICES

Survey Control

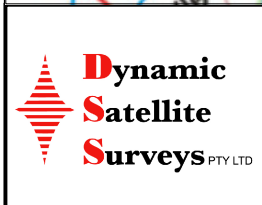
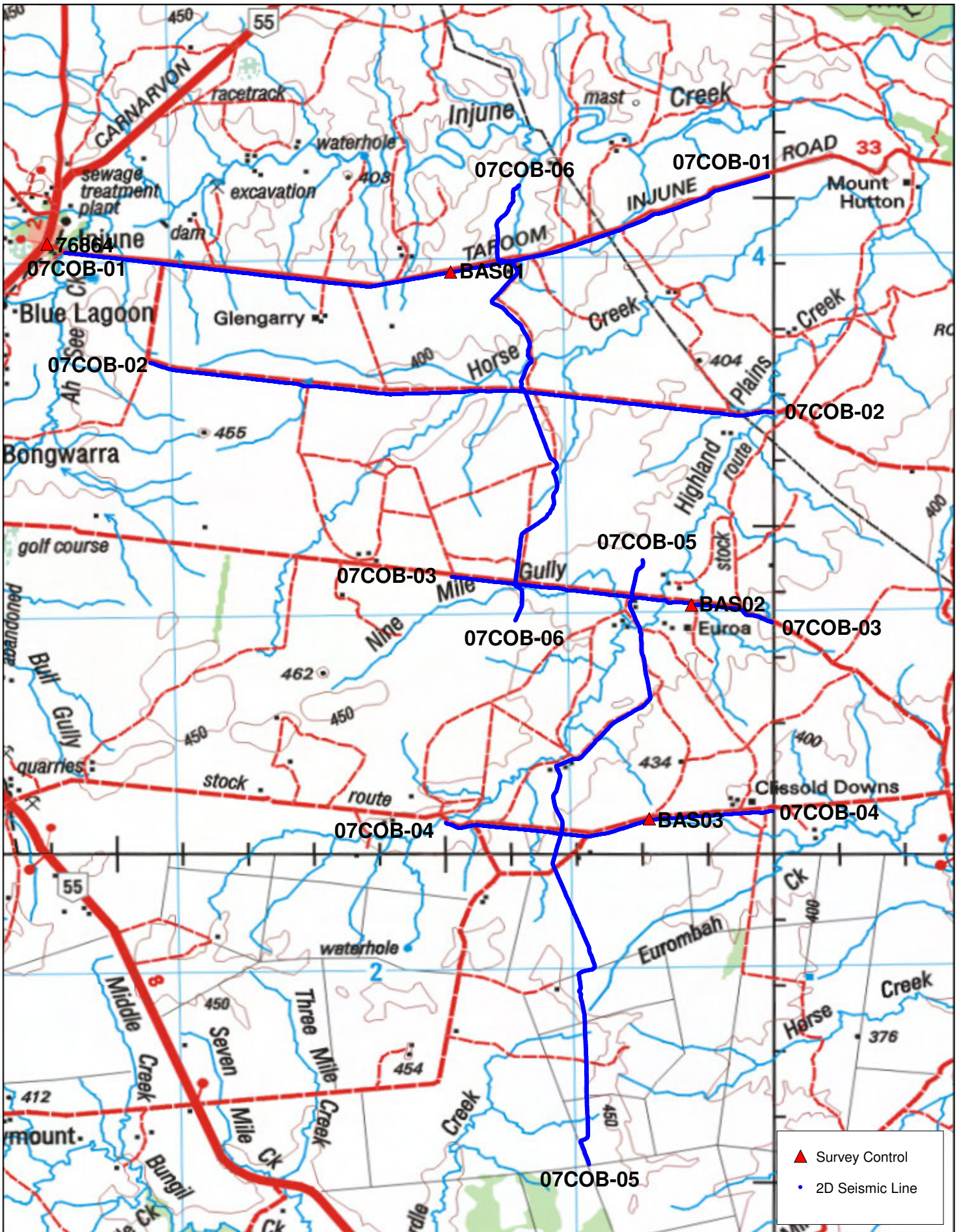
Survey Control

All values are MGA 94 (Zone 55, AHD71)

Base Stations Used

Station	Easting	Northing	Height
76864	656873.905	7140546.707	392.156
BAS01	667136.898	7139637.608	422.563
BAS02	673145.279	7130183.197	390.604
BAS03	671994.703	7124179.425	437.206

Site Diagram



The purpose of this map is to represent the surveyed digital data in a pictorial manner only. The accuracy of the underlying topographic image in no way relates to the accuracy of the surveyed digital data. Features on the topographic map have not necessarily been surveyed by DSS. Any use of this map for reasons other than the purpose for which it was created is not authorised.

Dynamic Satellite Surveys Pty Ltd 1800 060 407

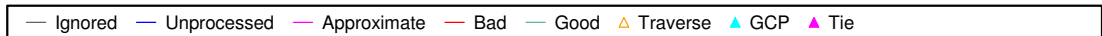
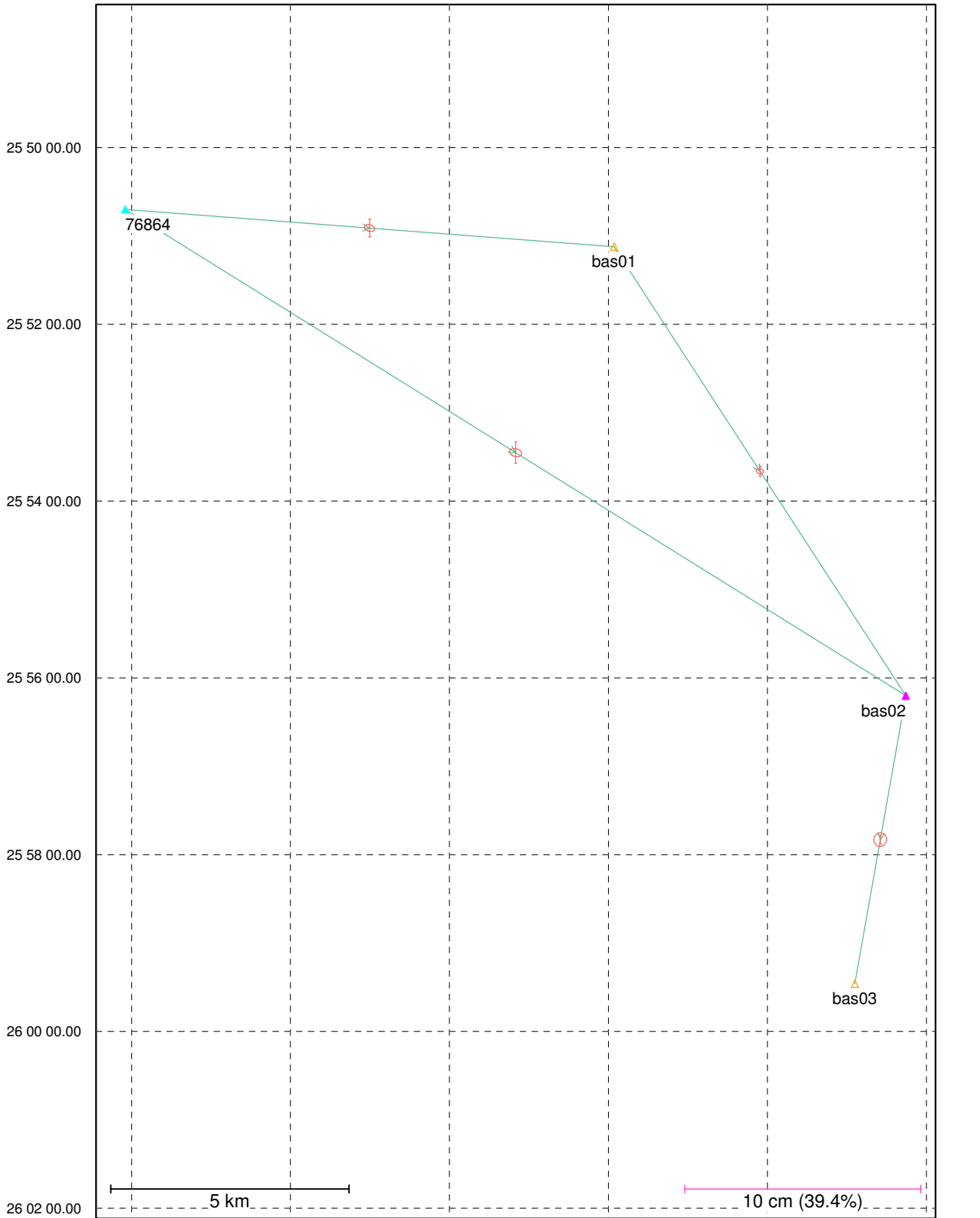
Terrex Seismic Pty Ltd / Blue Energy Limited

Cobalt 2D Seismic Survey

Scale	1:125000 (A4)
Drawn	DW
File	07088 Map
Rev	0.0
Date	19-11-2007

Traverse - Map

Geographic, DMS



Line Length Summary

Line Length Summary

2007 Cobalt 2D Seismic Survey

Station Interval = 15m

Line	SOL Station	EOL Station	Line Km's
07COB-01	266	1500	18.510
07COB-02	233	1300	16.005
07COB-03	242	800	8.370
07COB-04	200	764	8.460
07COB-05	200	1482	19.230
07COB-06	200	1160	14.400
TOTAL =			84.975

Line Intersections

Line Intersections**2007 Cobalt 2D Seismic Survey**

Station Interval = 15m

Coordinates are MGA94, Zone 55.

Heights are AHD Using AUSGeoid98 N Value Model

Line / Station	Line / Station	Easting	Northing	AHD
07COB-02/875+08	07COB-06/679+15	669000.96	7136234.26	389.67
07COB-03/552+01	07COB-05/1407+0	671665.92	7130422.29	384.05
07COB-03/350+06	07COB-06/276+08	668675.11	7130827.49	402.61
07COB-04/399+03	07COB-05/865+03	669753.01	7123779.71	406.54



Dynamic

Satellite

Surveys

INTERSECTION DIAGRAM

DSS-FF-14

REV 4.0

May 1998

PROJECT / JOB # 07088 CLIENT Blue Energy DATE 11/07

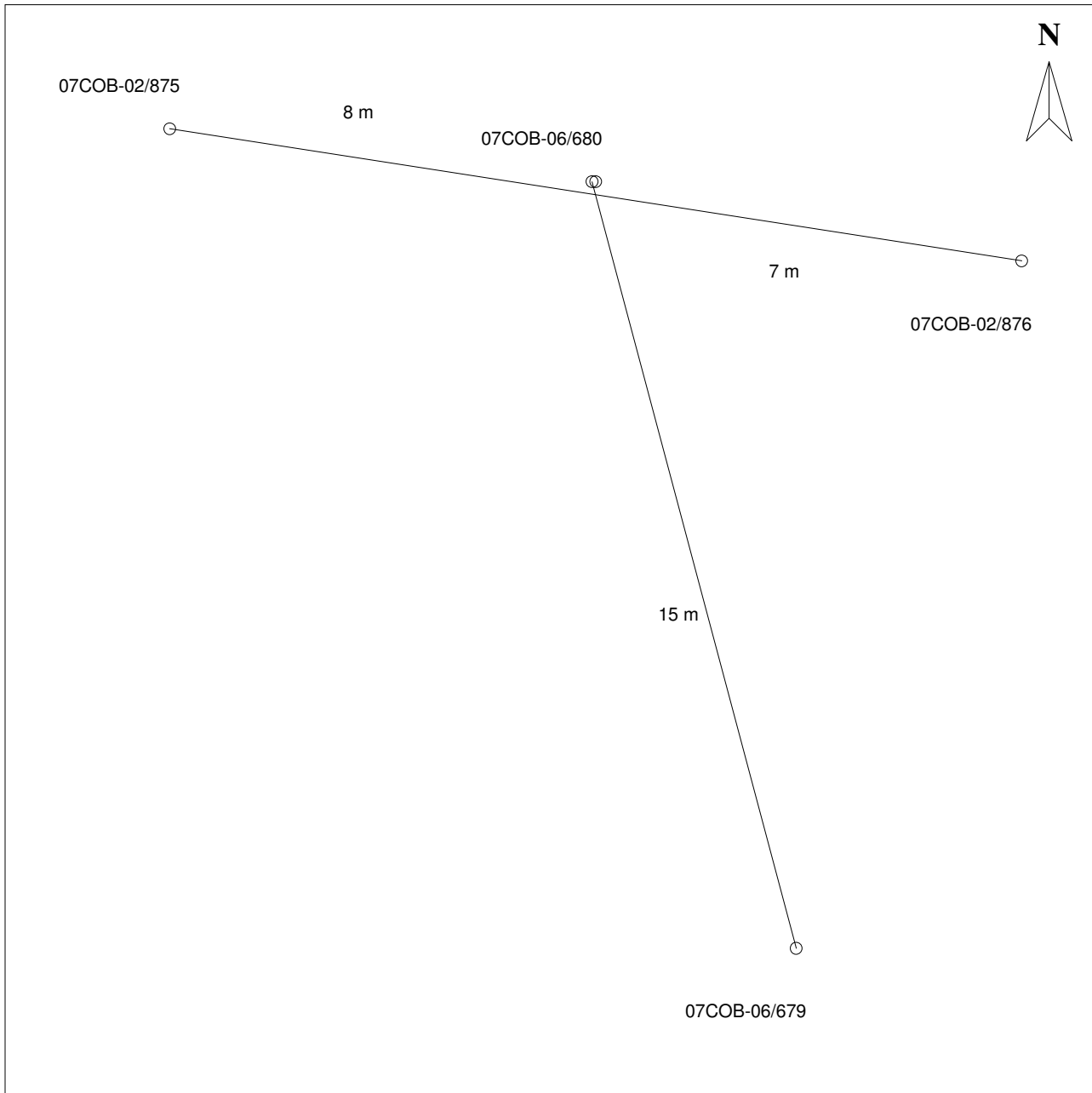
INTERSECTION LINES: 07COB-02 / 07COB-06

AREA: Cobalt

PROJECTION: MGA Zone 55

STATION INTERVAL: 15

DATUM: GDA94 AHD



LINE INTERSECTION: 07COB-02/875+08 = 07COB-06/679+15

Easting	669000.96	RL1 =	389.61
Northing	7136234.26	RL2 =	389.74
RL	389.67	MEAN:	389.67



Dynamic

Satellite

Surveys

INTERSECTION DIAGRAM

DSS-FF-14

REV 4.0

May 1998

PROJECT / JOB # 07088 CLIENT Blue Energy DATE 11/07

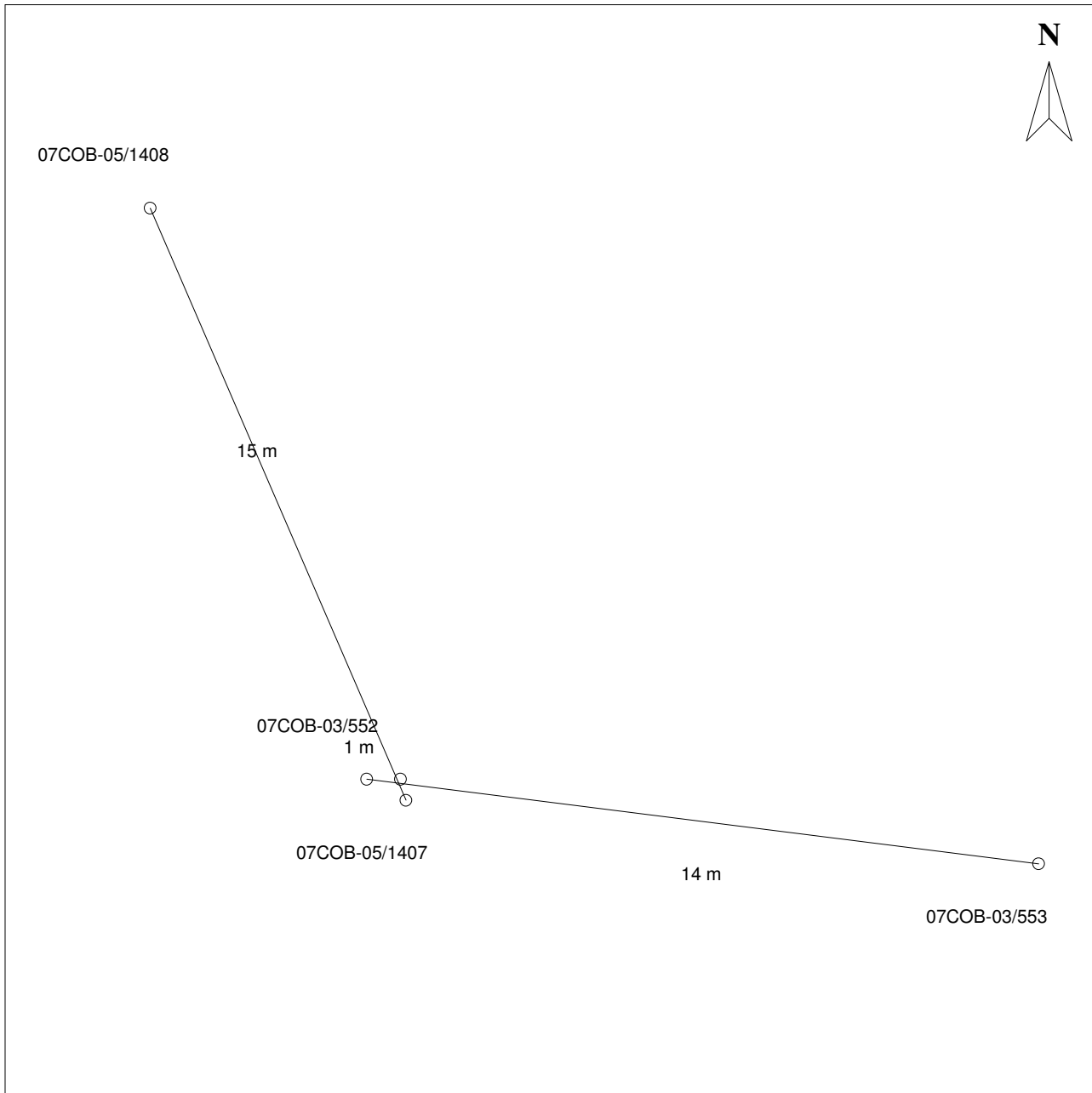
INTERSECTION LINES: 07COB-03 / 07COB-05

AREA: Cobalt

PROJECTION: MGA Zone 55

STATION INTERVAL: 15

DATUM: GDA94 AHD



LINE INTERSECTION: 07COB-03/552+01 = 07COB-05/1407+00

Easting	671665.92	RL1 =	384.09
Northing	7130422.29	RL2 =	384.02
RL	384.05	MEAN:	384.05



Dynamic

Satellite

Surveys

INTERSECTION DIAGRAM

DSS-FF-14

REV 4.0

May 1998

PROJECT / JOB # **07088** CLIENT **Blue Energy** DATE **11/07**

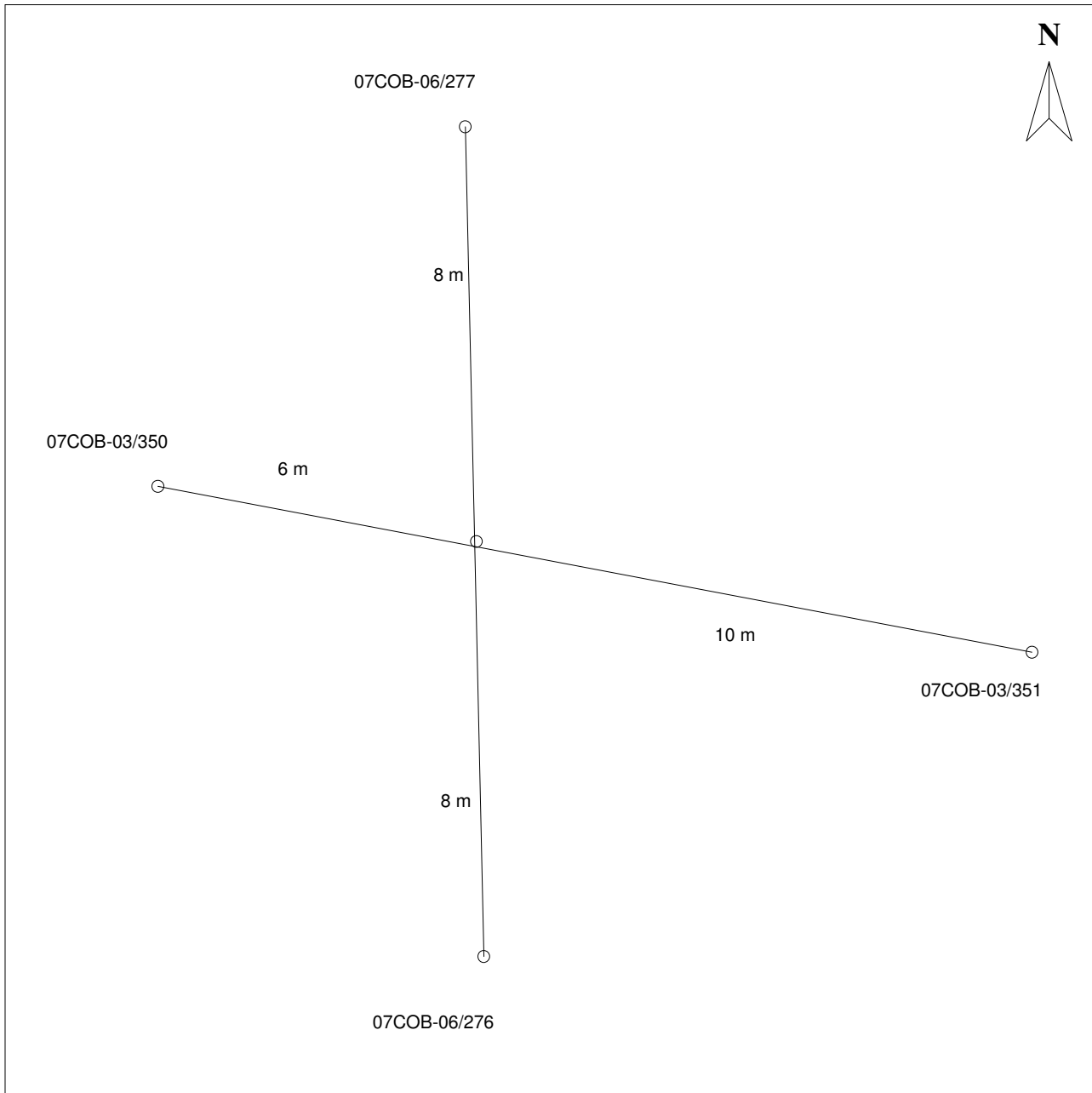
INTERSECTION LINES: **07COB-03 / 07COB-06**

AREA: **Cobalt**

PROJECTION: **MGA Zone 55**

STATION INTERVAL: **15**

DATUM: **GDA94 AHD**



LINE INTERSECTION: **07COB-03/350+06 = 07COB-06/276+08**

Easting	668675.11	RL1 =	402.47
Northing	7130827.49	RL2 =	402.74
RL	402.61	MEAN:	402.61



Dynamic

INTERSECTION DIAGRAM

DSS-FF-14

Satellite

REV 4.0

May 1998

Surveys

PROJECT / JOB # 07088 CLIENT Blue Energy DATE 11/07

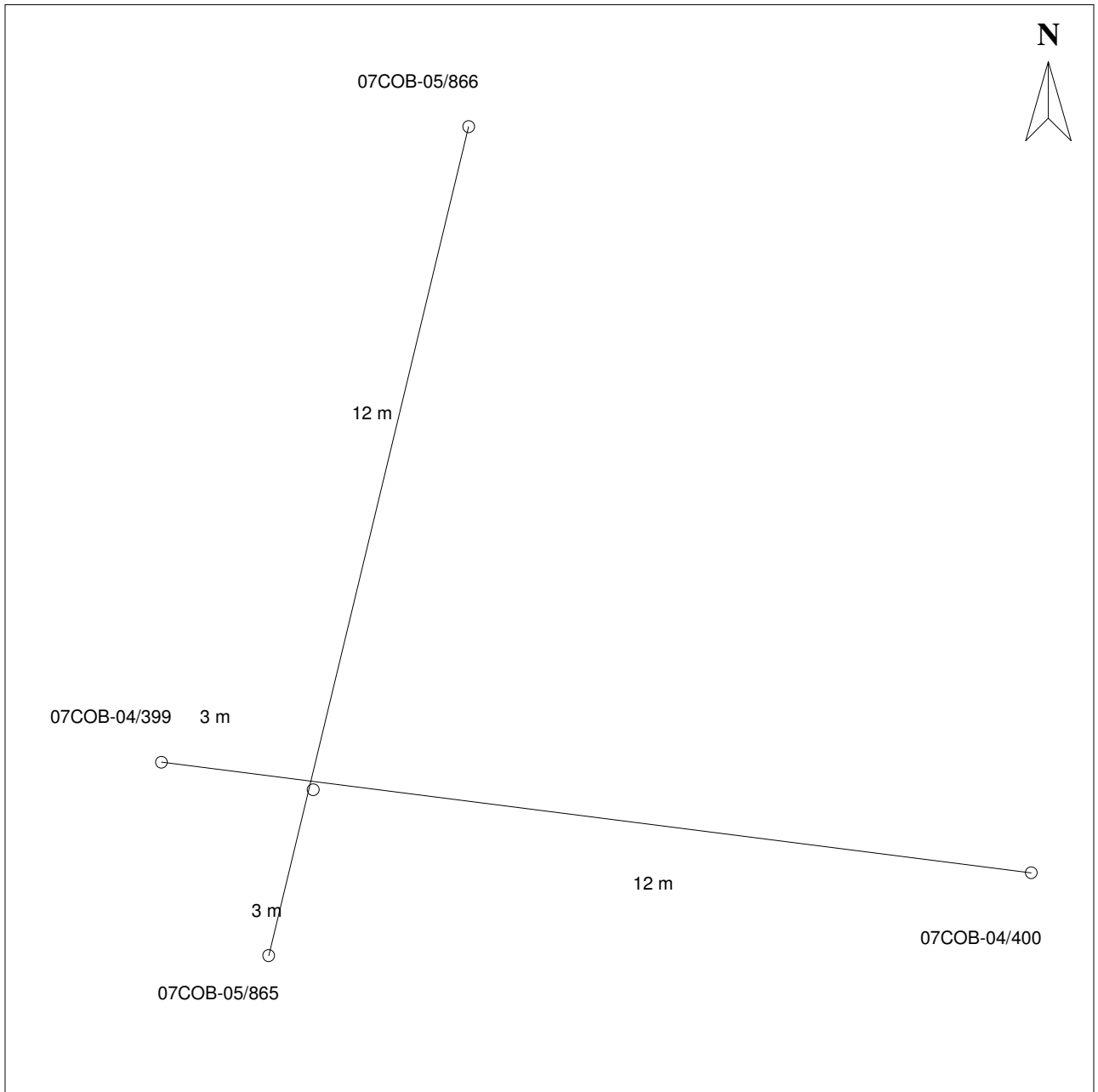
INTERSECTION LINES: 07COB-04 / 07COB-05

AREA: Cobalt

PROJECTION: MGA Zone 55

STATION INTERVAL: 15

DATUM: GDA94 AHD



LINE INTERSECTION: 07COB-04/399+03 = 07COB-05/865+03

Easting	669753.01	RL1 =	406.55
Northing	7123779.71	RL2 =	406.52
RL	406.54	MEAN:	406.54

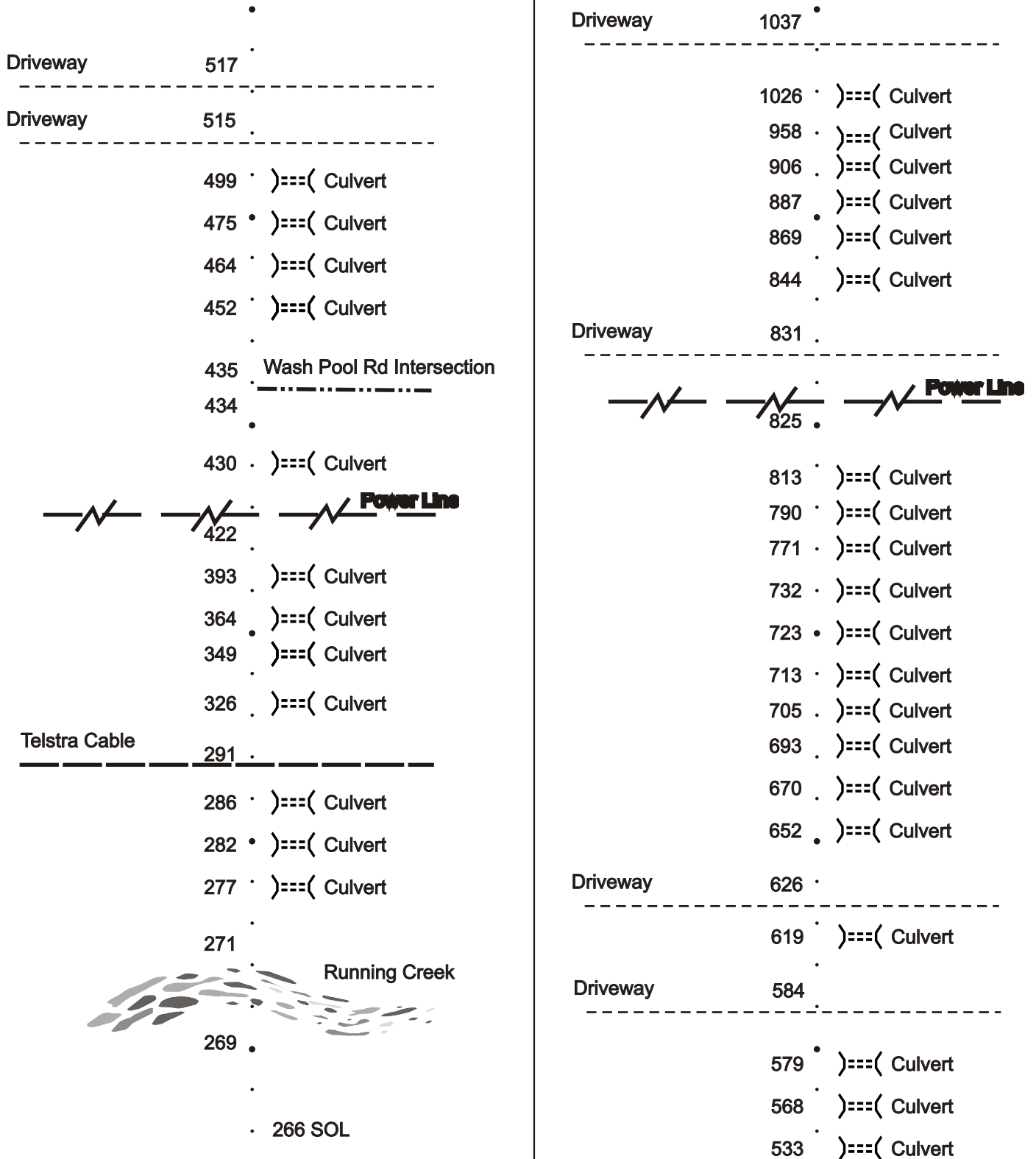
Trace Diagrams

LINE: 07COB-01

PROJECT/JOB # 07088 CLIENT Terrex / Blue Energy

PAGE 1 OF 2 AREA: Injune STN INTERVAL: 15 m SHOT INTERVAL: m

FROM STN 266 TO STN 1050 SHOOTING DIRECTION: West to East BEARING: °

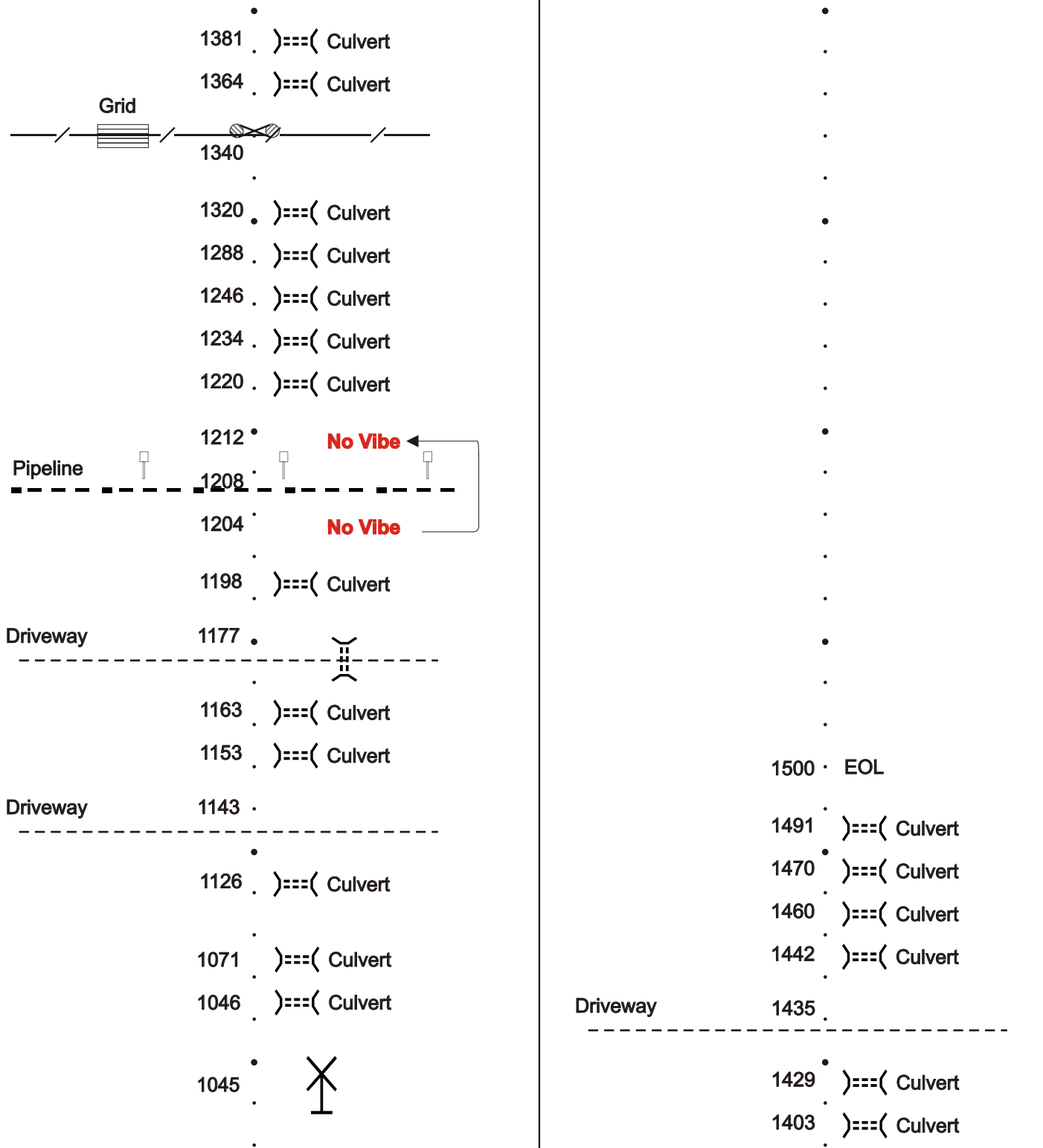


LINE: 07COB-01

PROJECT/JOB # 07088 CLIENT Terrex / Blue Energy

PAGE 2 OF 2 AREA: Injune STN INTERVAL: 15 m SHOT INTERVAL: m

FROM STN 1050 TO STN 1500 SHOOTING DIRECTION: West to East BEARING: °





TRACE DIAGRAM

DSS-FF-07

REV 8.0

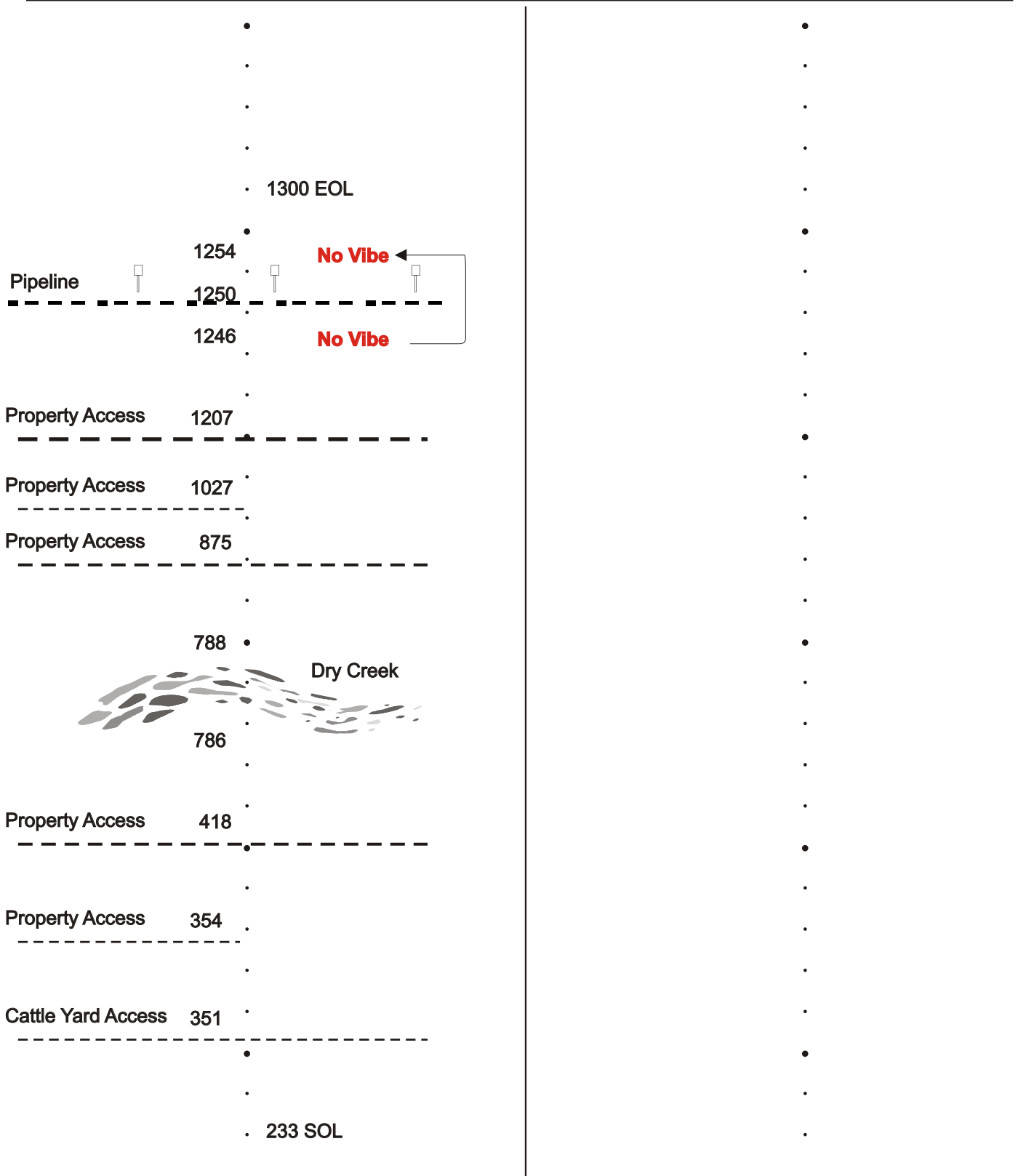
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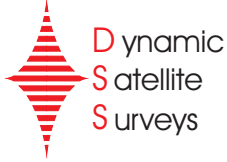
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PROJECT/JOB # 07088 CLIENT Terrex / Blue Energy

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FROM STN 233 TO STN 1300 SHOOTING DIRECTION: West to East BEARING: °





TRACE DIAGRAM

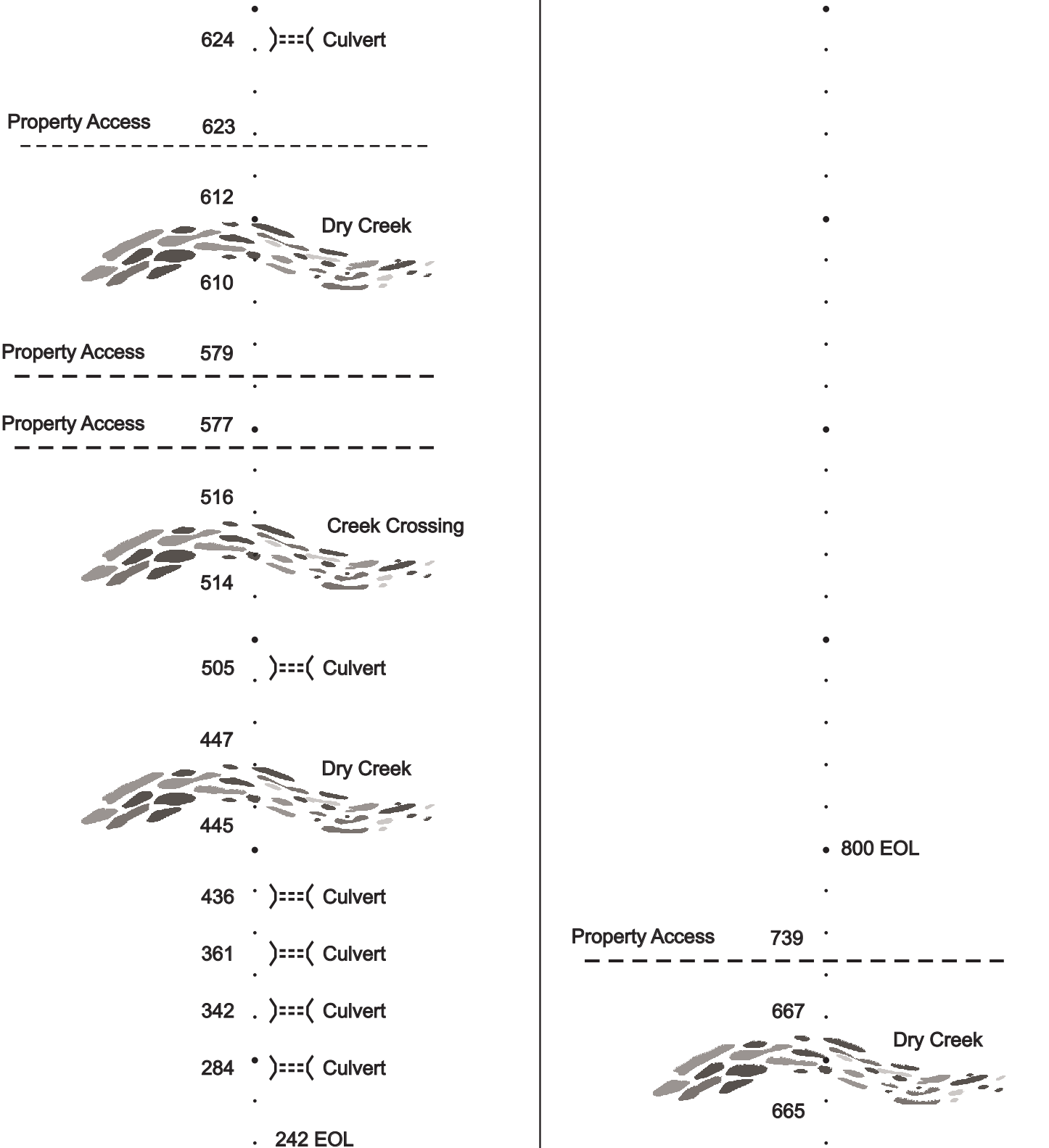
DSS-FF-07
REV 8.0
August 2004

LINE: 07COB-03

PROJECT/JOB # 07088 CLIENT Terrex / Blue Energy

PAGE 1 OF 1 AREA: Injune STN INTERVAL: 15 m SHOT INTERVAL: m

FROM STN 242 TO STN 800 SHOOTING DIRECTION: West to East BEARING: °

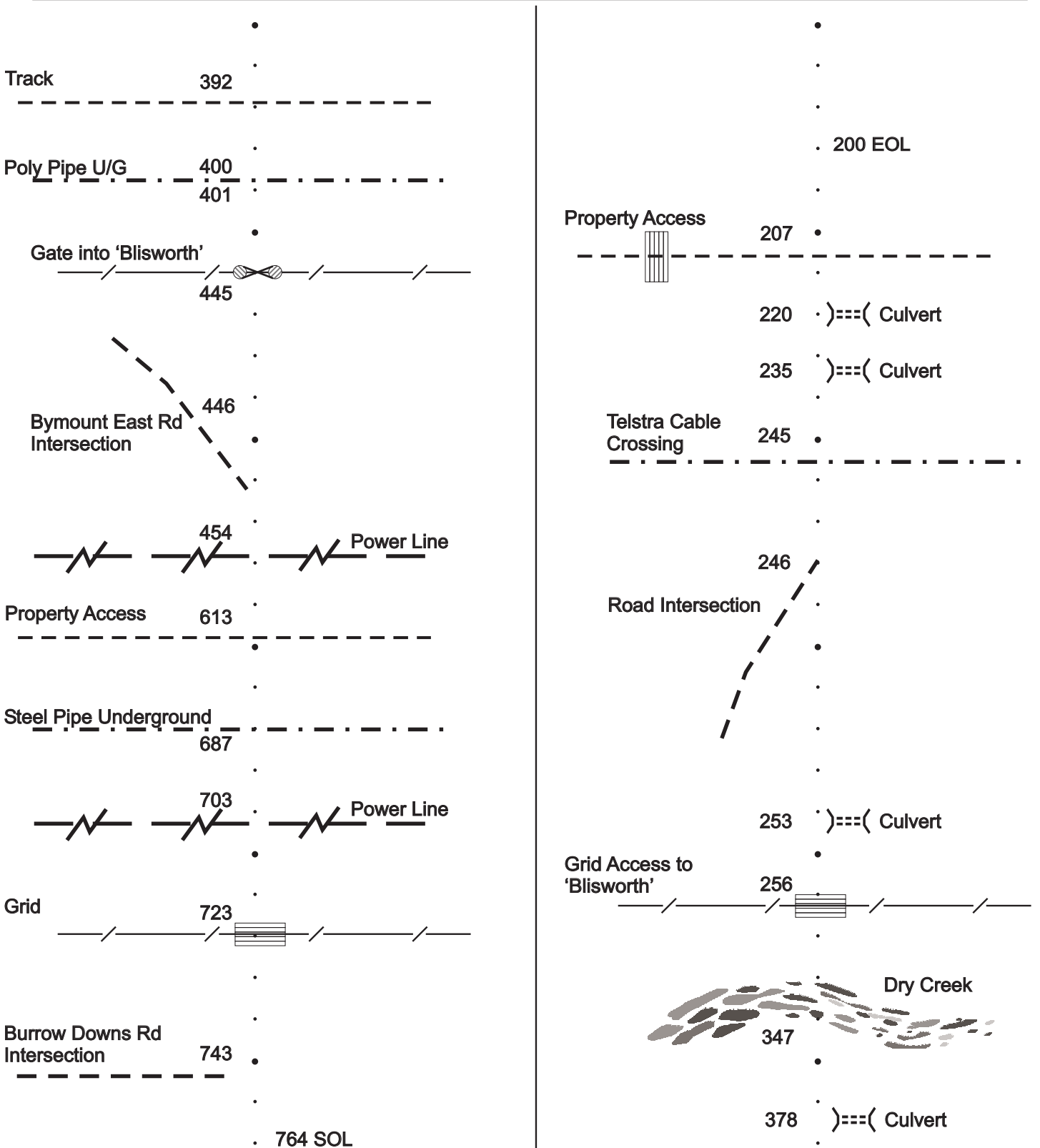


LINE: 07COB-04

PROJECT/JOB # 07088 CLIENT Terrex / Blue Energy

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FROM STN 200 TO STN 764 SHOOTING DIRECTION: East to West BEARING: °

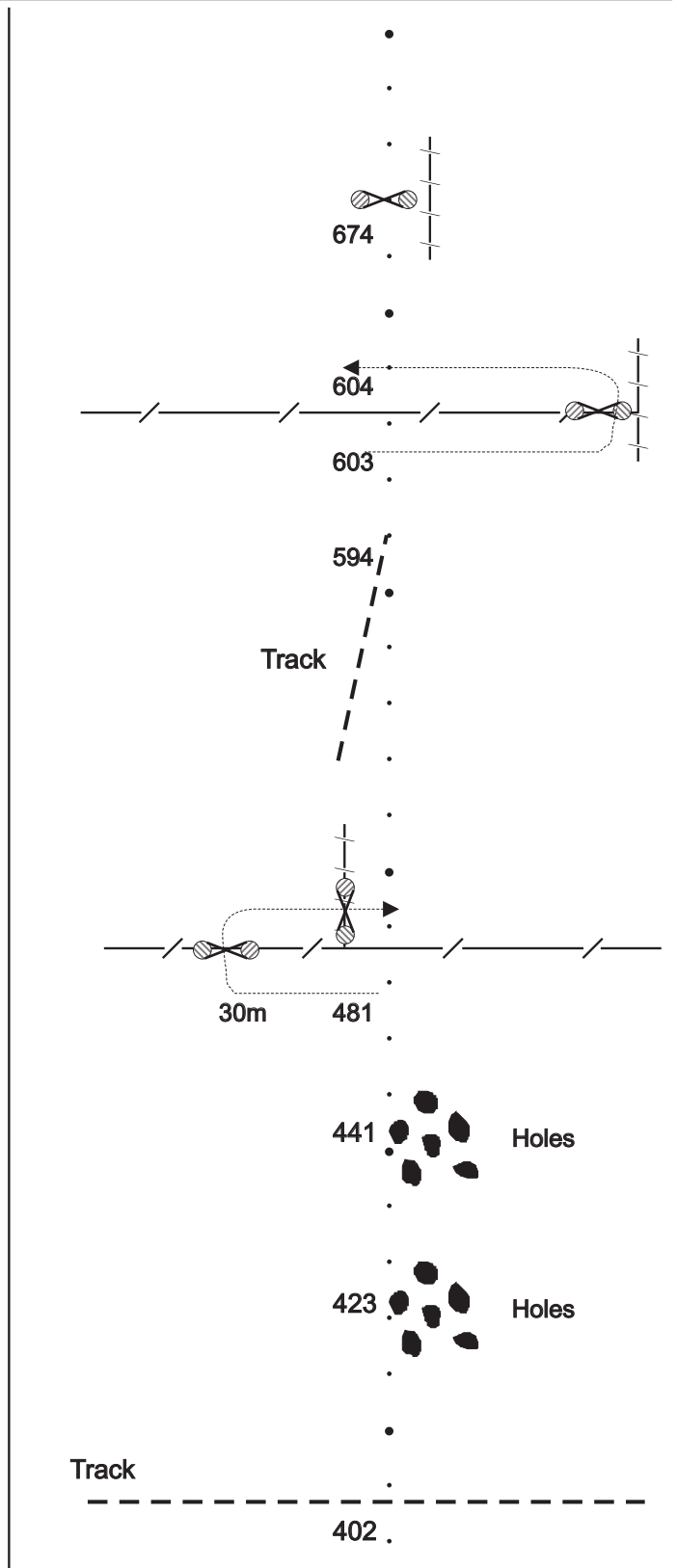
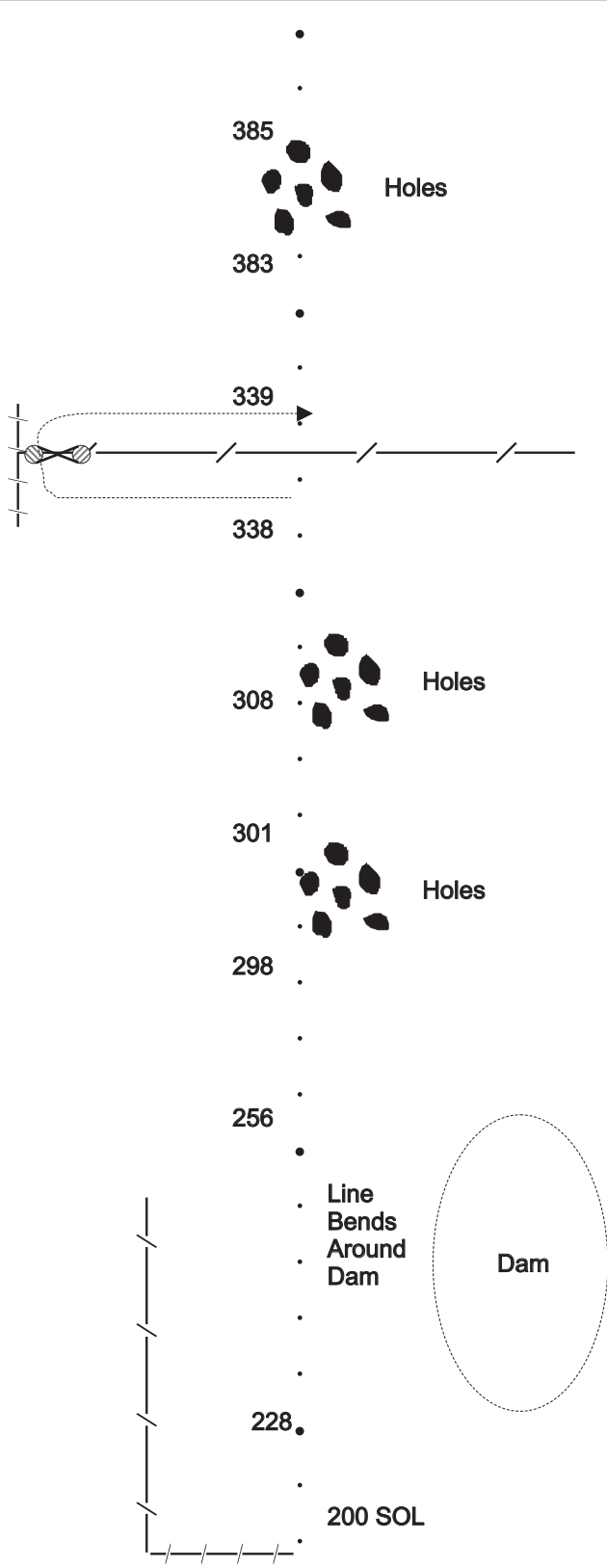


LINE: 07COB-05

PROJECT/JOB # 07088 CLIENT Terrex / Blue Energy

PAGE 1 OF 2 AREA: Injune STN INTERVAL: 15 m SHOT INTERVAL: m

FROM STN 200 TO STN 650 SHOOTING DIRECTION: South to North BEARING: °

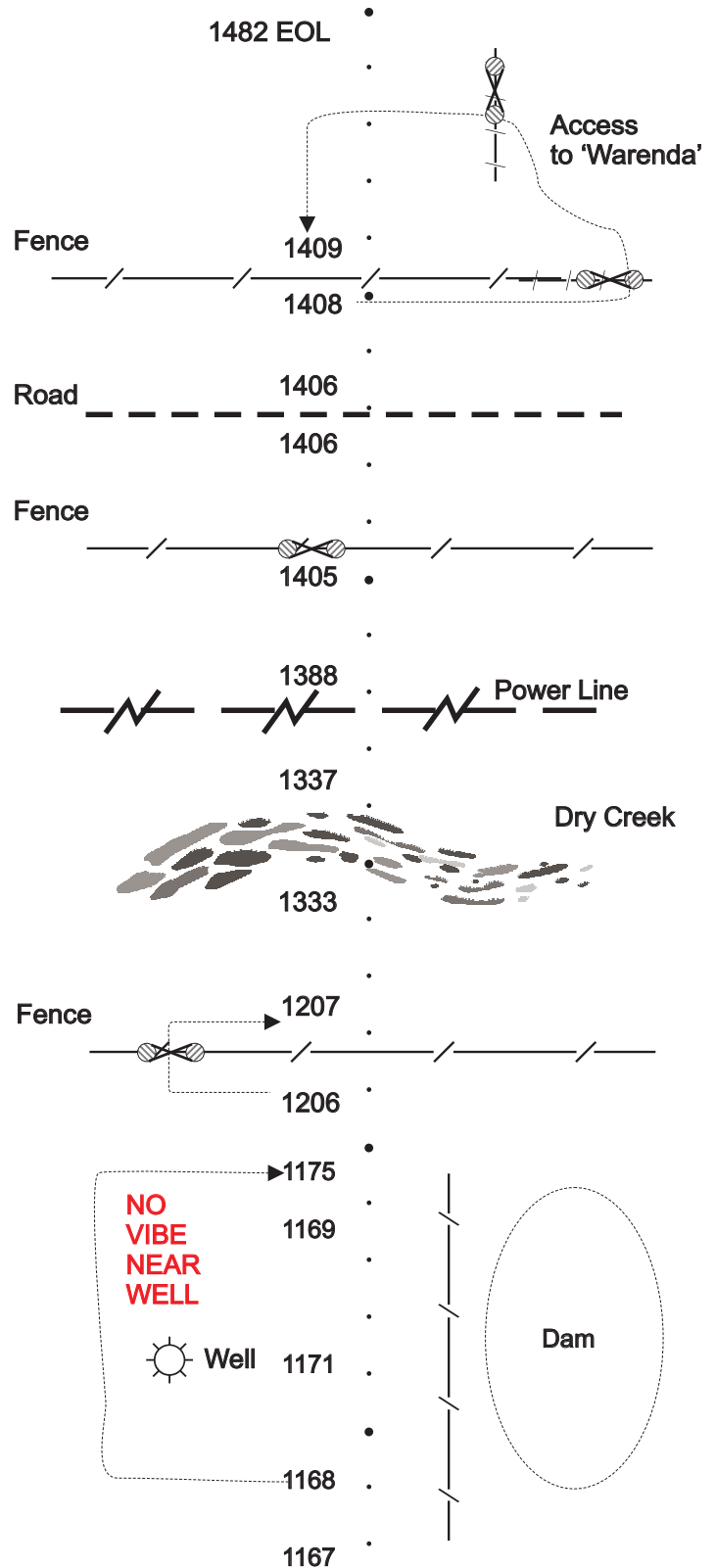
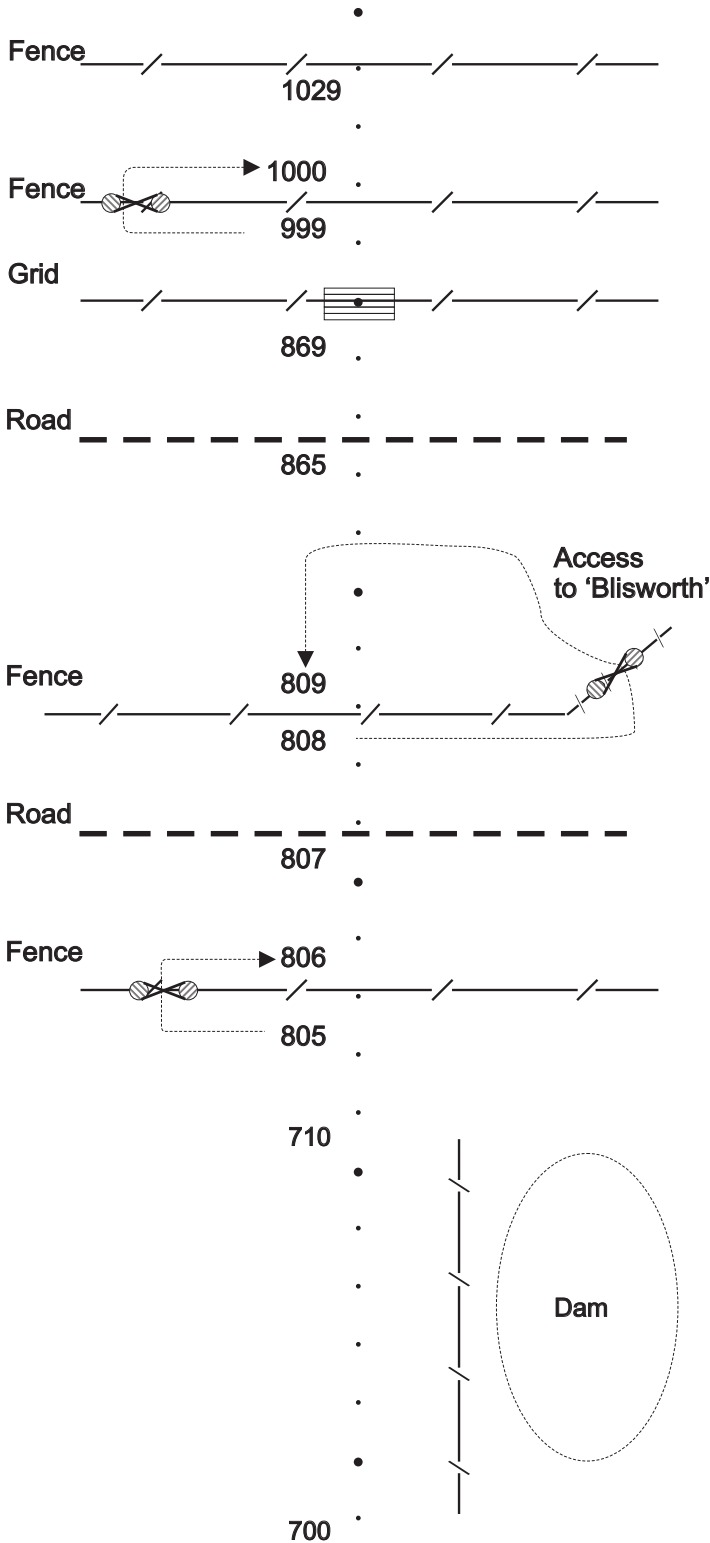


LINE: 07COB-05

PROJECT/JOB # 07088 CLIENT Terrex / Blue Energy

PAGE 2 OF 2 AREA: Injune STN INTERVAL: 15 m SHOT INTERVAL: m

FROM STN 650 TO STN 1482 SHOOTING DIRECTION: South to North BEARING: °

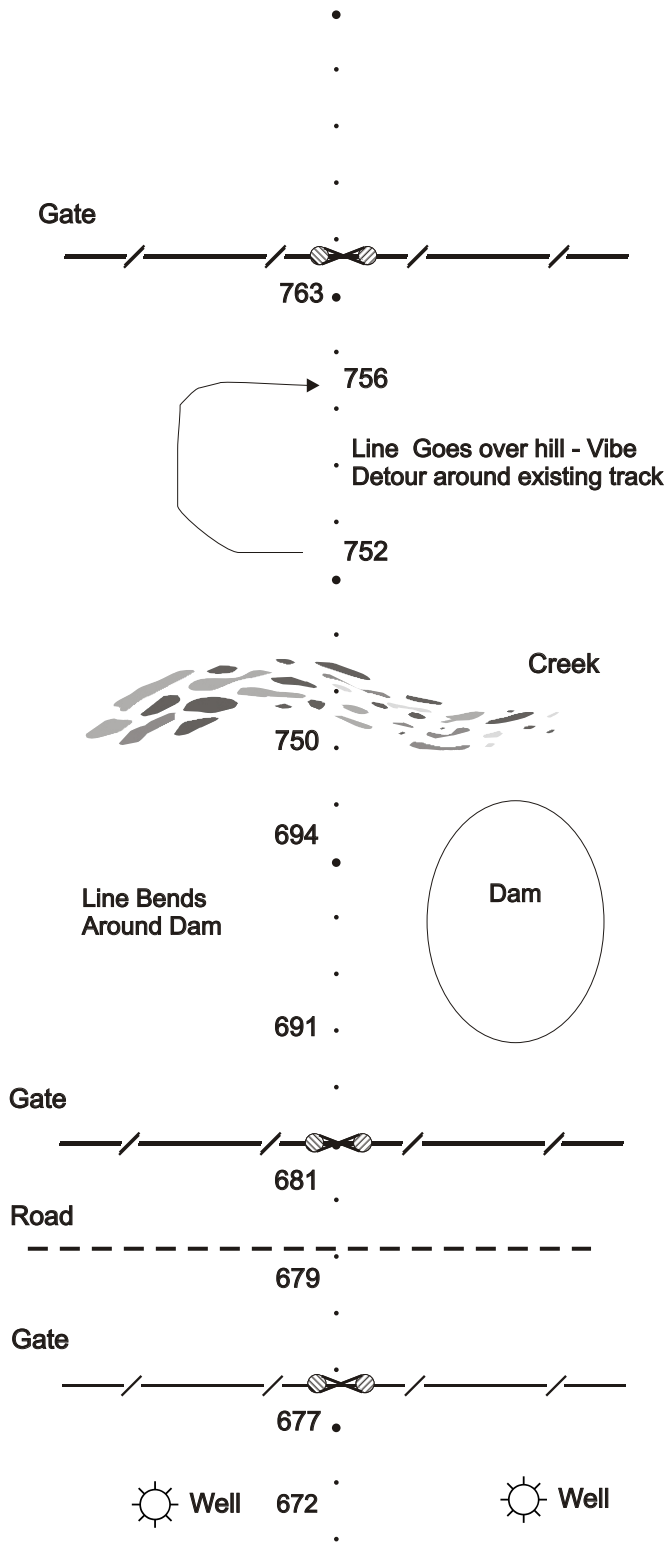
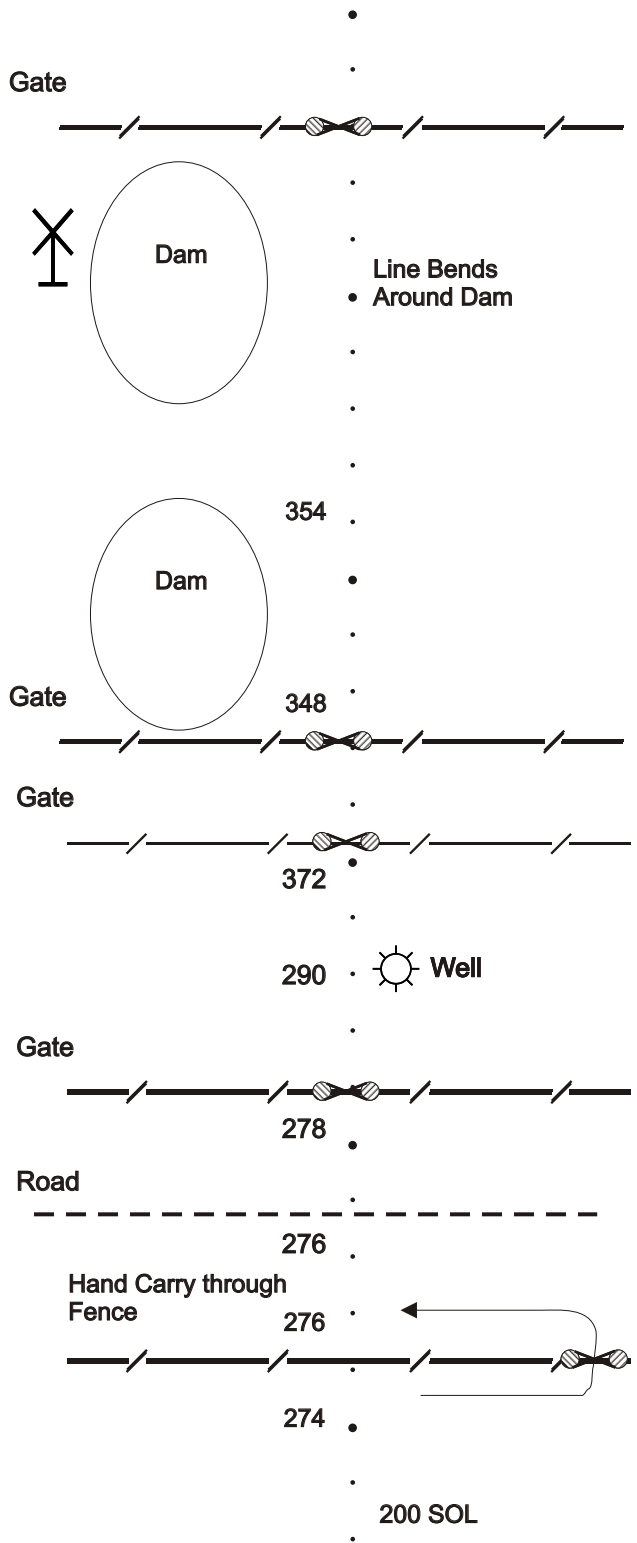


LINE: 07COB-06

PROJECT/JOB # 07088 CLIENT Terrex / Blue Energy

PAGE 1 OF 2 AREA: Injune STN INTERVAL: 15 m SHOT INTERVAL: m

FROM STN 200 TO STN 800 SHOOTING DIRECTION: South to North BEARING: °

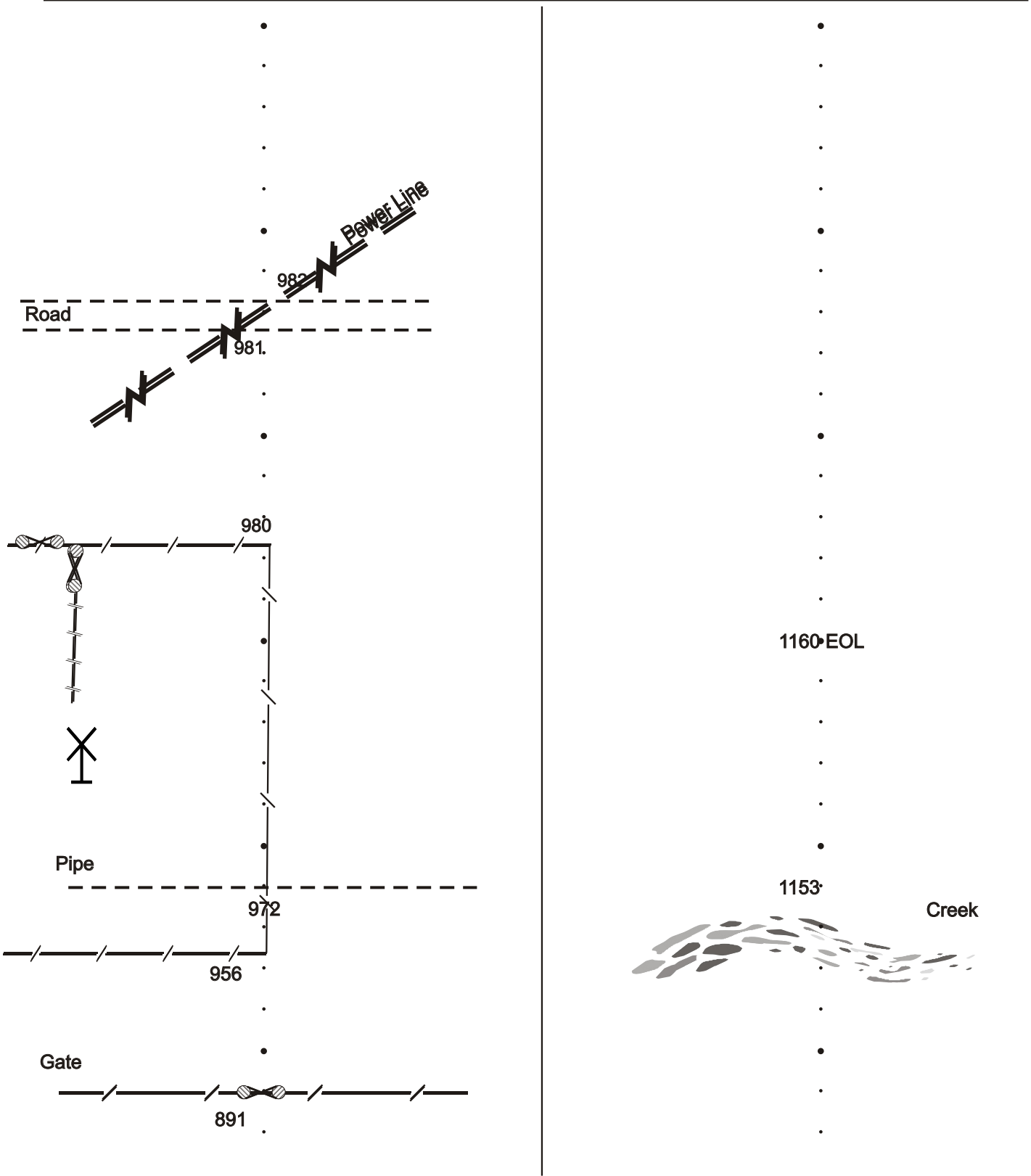


LINE: 07COB-06

PROJECT/JOB # 07088 CLIENT Terrex / Blue Energy

PAGE 2 OF 2 AREA: Injune STN INTERVAL: 15 m SHOT INTERVAL: m

FROM STN 800 TO STN 1160 SHOOTING DIRECTION: South to North BEARING: °



Chronological Summary

Chronological Summary

DATE	OPERATIONS	
4 th November	Dan - Mobilise from Emerald. Established GPS control for prospect. Brendan - mobilise from Yeppoon.	
		SURVEY PRODUCTION 07COB-01: 15.000kms
		SURVEY CUMULATIVE PRODUCTION: 15.000kms
5 th November	Dan and Brendan start pegging.	
6 th November	Continue on line 07COB-01, started line 07COB-02.	
		SURVEY PRODUCTION 07COB-01: 3.510kms
		SURVEY PRODUCTION 07COB-02: 9.000kms
		SURVEY CUMULATIVE PRODUCTION: 27.510kms
7 th November	Set up to peg on line 07COB-02 but road was too muddy. Investigated line 07COB-03 but was also too muddy. Returned to Injune and washed vehicle. Resumed pegging on line 07COB-02 at 11am. Joshua mobilised from Yeppoon.	
		SURVEY PRODUCTION 07COB-02: 7.005kms
		SURVEY CUMULATIVE PRODUCTION: 34.515kms
8 th November	Brendan and Joshua on standby due to weather conditions. Pegging on line 07COB-03 started at 8am.	
		SURVEY PRODUCTION 07COB-03: 8.370kms
		SURVEY CUMULATIVE PRODUCTION: 42.885kms
9 th November	Pegging on line 07COB-04. Crew on standby in afternoon due to pending access approval.	
		SURVEY PRODUCTION 07COB-04: 8.460kms
		SURVEY CUMULATIVE PRODUCTION: 51.345kms

Chronological Summary

DATE	OPERATIONS
10 th November	Crew on standby due to very muddy access to job site. Pegging on line 07COB-05. SURVEY PRODUCTION 07COB-05: 6.000kms SURVEY CUMULATIVE PRODUCTION: 57.345kms
11 th November	Crew on standby due to very muddy access to job site.
12 th November	Crew checked access to site and considered it too muddy. Joshua departed Injune on crew change. Kirra mobilised into Roma late morning. Pegging on line 07COB-05. SURVEY PRODUCTION 07COB-05: 2.010kms SURVEY CUMULATIVE PRODUCTION: 59.355kms
13 th November	Pegging on line 07COB-05. SURVEY PRODUCTION 07COB-05: 11.220kms SURVEY CUMULATIVE PRODUCTION: 70.575kms
14 th November	Pegging on line 07COB-06. SURVEY PRODUCTION 07COB-06: 9.000kms SURVEY CUMULATIVE PRODUCTION: 79.575kms
15 th November	Pegging on line 07COB-06. Prospect completed. Demobilised to Goondiwindi. SURVEY PRODUCTION 07COB-06: 5.400kms SURVEY CUMULATIVE PRODUCTION: 84.975kms