Boss Energy
Report on Bulk Sample
China Flats
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Boss Energy: Bulk sample extraction, EL 20/2004

Summary
A bulk sample of approximately 1000T of the Tasmanite oil shale was extracted from the China Bush plantation area near Latrobe and stockpiled on a log landing area adjacent to road access. Approximately 26T of shale was crushed to <100mm to provide suitable material for shipping in drums. A 22 Ton excavator with digging bucket and rock breaker was used to extract shale from a 15x30m area averaging 2.2m depth. The sample process was carried out in accordance with requirements of Plantation Managers Timberlands Pacific, and Minerals Resources Tasmania. The resulting pit, roads and stream-ways were re-habilitated in accordance with the Mineral Exploration Code of Practice.

Introduction
In April, 2007, a drilling program undertaken by Boss Energy at China Flats, in the China Bush Plantation area (fig. 1), identified an area where the Tasmanite Oil shale lies less than 10 meters from surface. This provided more detailed information on an area previously drilled on wide spacing by CRA Exploration (fig. 2), and resulted in the identification of a suitable bulk sample site.
A photographic record of activities was kept for operations on each day, and is attached as Appendix 1.

Locality and Access
The site chosen for extraction of the bulk sample is at China Flats, near the 'Big Bend' in the Mersey River between Latrobe and Railton. The bulk sample was obtained from an area located in the south eastern portion of a recently drilled area, where the Tasmanite shale lies between 1 and 10m from surface (fig. 3). At the time of writing the area is a recently harvested pine plantation, managed by Forestry Tasmania and Timberlands Pacific. The site was accessed by gravel access roads and logging tracks requiring the installation of a culvert and screening on a stream crossing. The sample site targeted a locality adjacent to drill hole CF12, where the shale was thought to be less than 5 meters from surface.

Dimension of sample area
The sample area was constrained by the following parameters:

- Sample size < 990t
- Target area < 1 hectare (10, 000 square meters)
- Shale horizon specific gravity of 2.1
- Local thickness of shale horizon 1m

The Tasmanite oil shale horizon is reported to have a specific gravity of 2.1g/cc (Clementson, 1981). Site testing revealed the shale horizon at the sample site to have a thickness of 1m. Assuming that the entire horizon is sampled this gives a sample weight of 2.1 x 1 = 2.1t per square meter of surface sampled.

A target sample of 990t would be obtained by excavating an area of 990/2.1 = 471 square meters. A target area of 15x30m was chosen, theoretically yielding 945T of shale.

Sampling Method
For extraction of the bulk sample, local earthmoving contractors Fieldwick's were engaged. They supplied a 22 ton excavator with rock-breaker, trucks for transport of material to the stockpile, and a crushing facility to reduce a portion of material to a convenient size for handling. Several test holes of 1 bucket width were dug to confirm the presence and thickness of the shale, and the best locality for a larger excavation.

Overburden management
The sample site was prepared by removing and windrowing stumps, stockpiling topsoil, and stripping overburden from the entire sample area. A landing area at the southern end of the pit was cleared to allow access for tip trucks. Topsoil and overburden were kept separate for rehabilitation work (figs. 4-6).

A culvert was installed on the access track to allow adequate drainage, and several loads of screening were placed so that the track could support machinery (fig.7).

Sample extraction
Some areas were free digging where clay development had occurred above the shale, but where overlying siltstones were relatively fresh, a rock-breaker was required.
The shale horizon itself was found to be an extremely durable layer, often drawing sparks from the bucket teeth. With trial and practice the excavator operator found that the shale could be effectively liberated by starting with the rock-breaker, then peeling away the shale in large slabs as is evident in the photographic record attached as Appendix 1.

The most practical extraction method given on site conditions, was to excavate the shale in two long cuts, storing the shale on the pit floor prior to removal by trucking (fig. 8). Water seepage occurred along structures, causing minor ponding overnight in low points on the pit floor. Water was pumped out with a single sludge pump prior to operations each day.

Coordinates of the pit corners were recorded by GPS in AGD66 and are shown below.
North West: 5425714N, 452841E
North East: 5425730N, 452855E
South West: 5425702N, 452865E
South East: 5425721N, 452877E

Geology
In the vicinity of the sample pit the shale was found to dip gently to the North West at around 5 degrees, and is intersected by cross cutting, steeply dipping North westerly and north easterly striking faults. Most structures observed were normal faults with minimal displacement. One vertical fault striking 300 AMG causes a 30cm offset in the shale horizon (figs. 2-3). Structural measurements are shown below.

Type	Strike (AMG)	Dip
Fault	300	90
Fault	035	90
Fault	020	78W
Fault	120	78S

Stockpile location

Shale recovered from the bulk sample excavation was stored on site at China Flats on an adjacent log landing area that had been burned, leveled, and re-planted with radiata pine seedlings (fig. 9). Approximately 26T of shale was removed to a nearby crushing facility and was reduced to 20-100mm for easy handling. It is intended that shale samples will be accessed from this location for further processing and transfer into drums or containers for shipping. Potentially, shale may directly retorted on site using a closed circuit process, should suitable equipment be available.

Runoff from pit and stockpile

Runoff from the stockpile was channeled into the nearby natural drainage. The oil shale is reported to be environmentally benign and resistant to weathering, and is not expected to present any water contamination issues.

Rehabilitation

The entire site has been re-habilitated according to the minerals exploration code of practice. Overburden capped with topsoil has been returned to the pit area and the site was re-contoured to blend with the natural landform (figs. 10-11). It is expected that Boss Energy will need to compensate Timberlands Pacific for re-planting of the disturbed area with pine seedlings.

Safety

During the sampling process appropriate signage was placed on access roads, and all excavated areas were fenced with barrier mesh. All personnel on site wore appropriate safety equipment and observed standard procedures for working with heavy machinery.

References

Clementson, I.M., 1981, Railton E.L. 4/74 Interim report on 1081 Drilling, CRA Exploration PTY LTD.

Fig. 1: Locality map

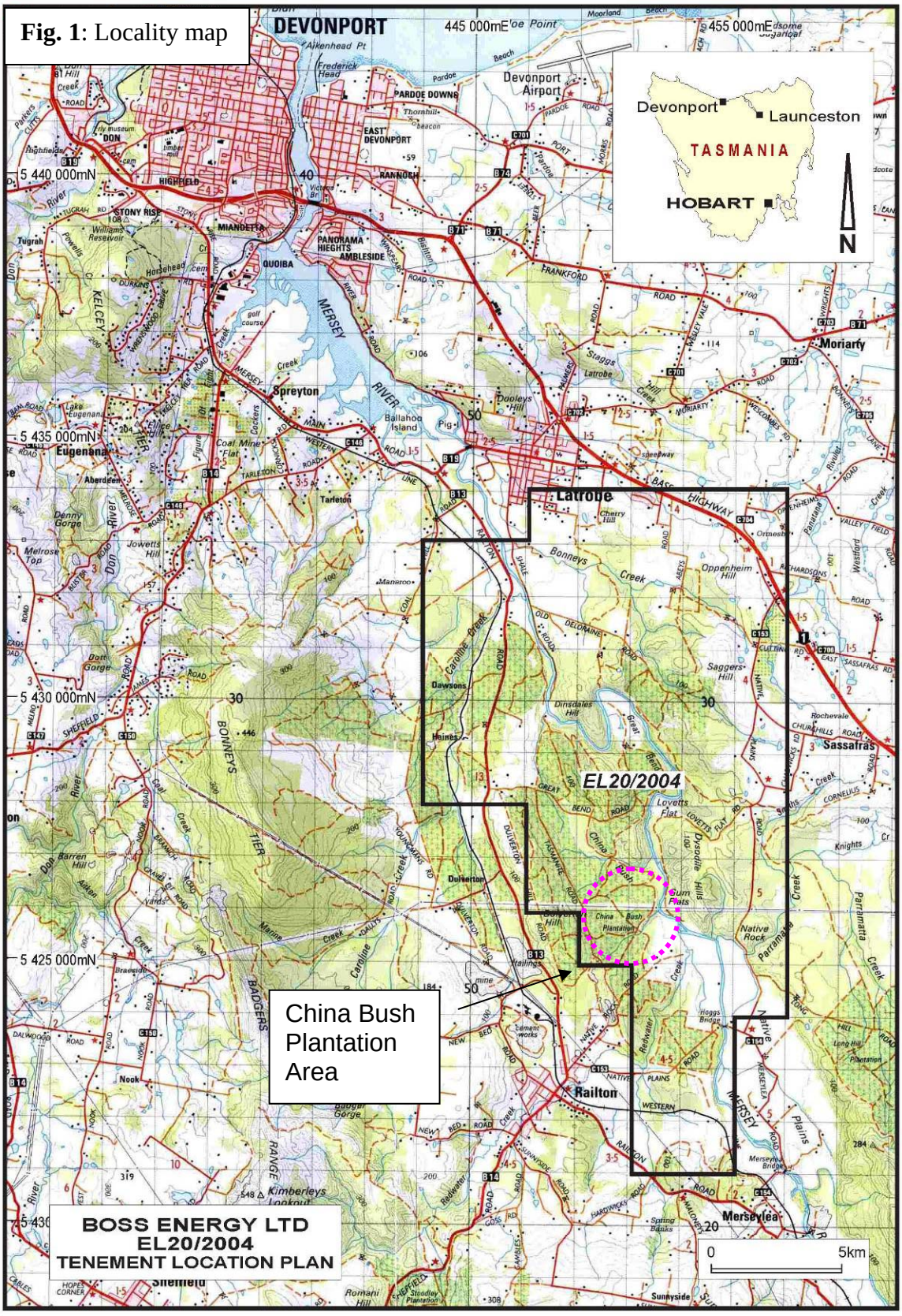

Fig. 2

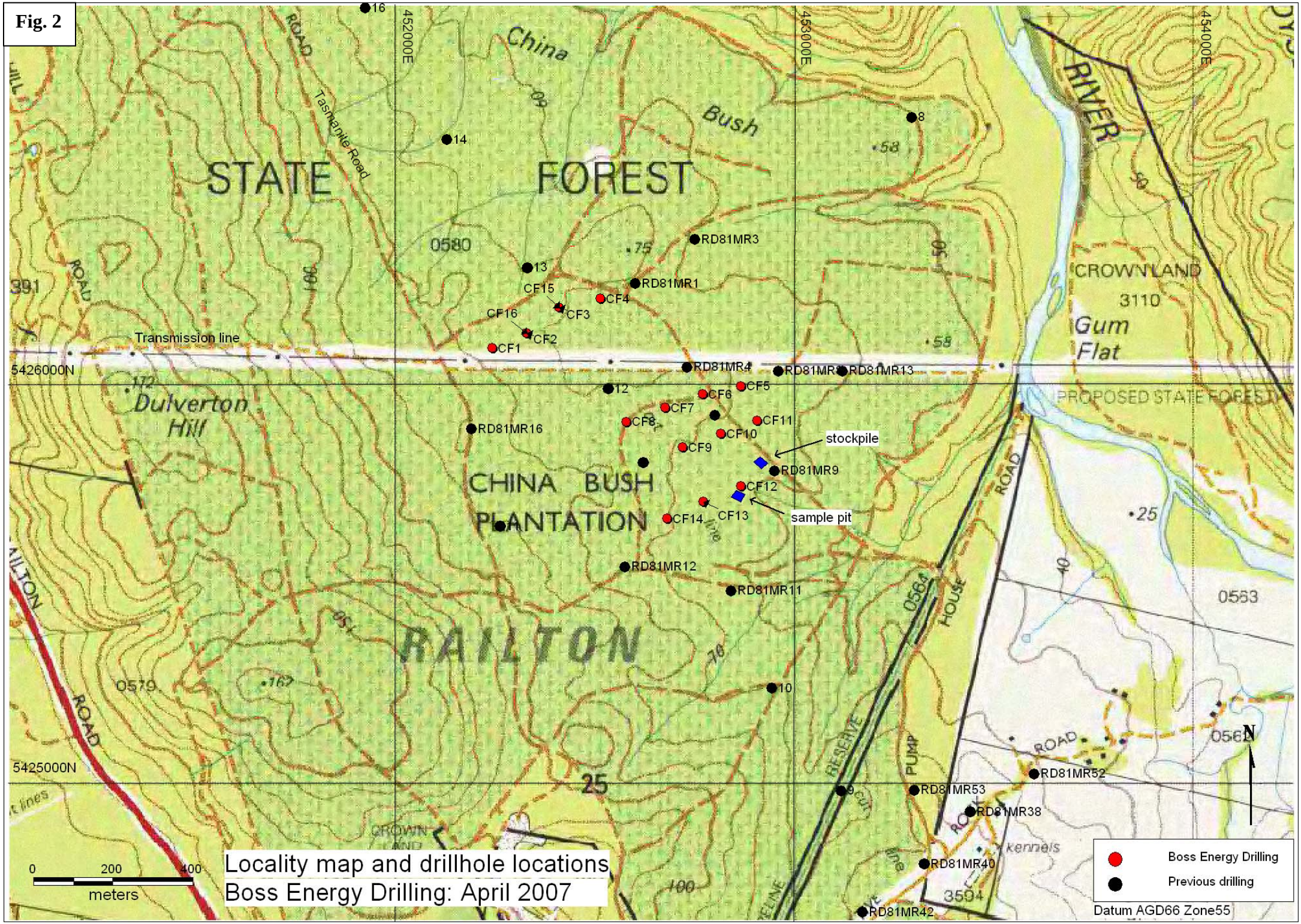
452000E
453000E
454000E
5426000N
5425000N
STATE FOREST
CHINA BUSH PLANTATION
RAILTON
China Bush
Tasmanike Road
Transmission line
Dulverton Hill
Gum Flat
CROWNLAND 3110
PROPOSED STATE FOREST
RIVER
RD81MR3
RD81MR1
RD81MR4
RD81MR5
RD81MR13
RD81MR16
RD81MR9
RD81MR12
RD81MR11
RD81MR52
RD81MR53
RD81MR38
RD81MR40
RD81MR42
CF1
CF2
CF3
CF4
CF5
CF6
CF7
CF8
CF9
CF10
CF11
CF12
CF13
CF14
CF15
CF16
stockpile
sample pit
0580
0579
0564
0563
0561
3594
ROAD
HOUSE
PUMP
RESERVE
kennels
0 200 400
meters
N
Locality map and drillhole locations
Boss Energy Drilling: April 2007
Boss Energy Drilling
Previous drilling
Datum AGD66 Zone55

Fig. 3

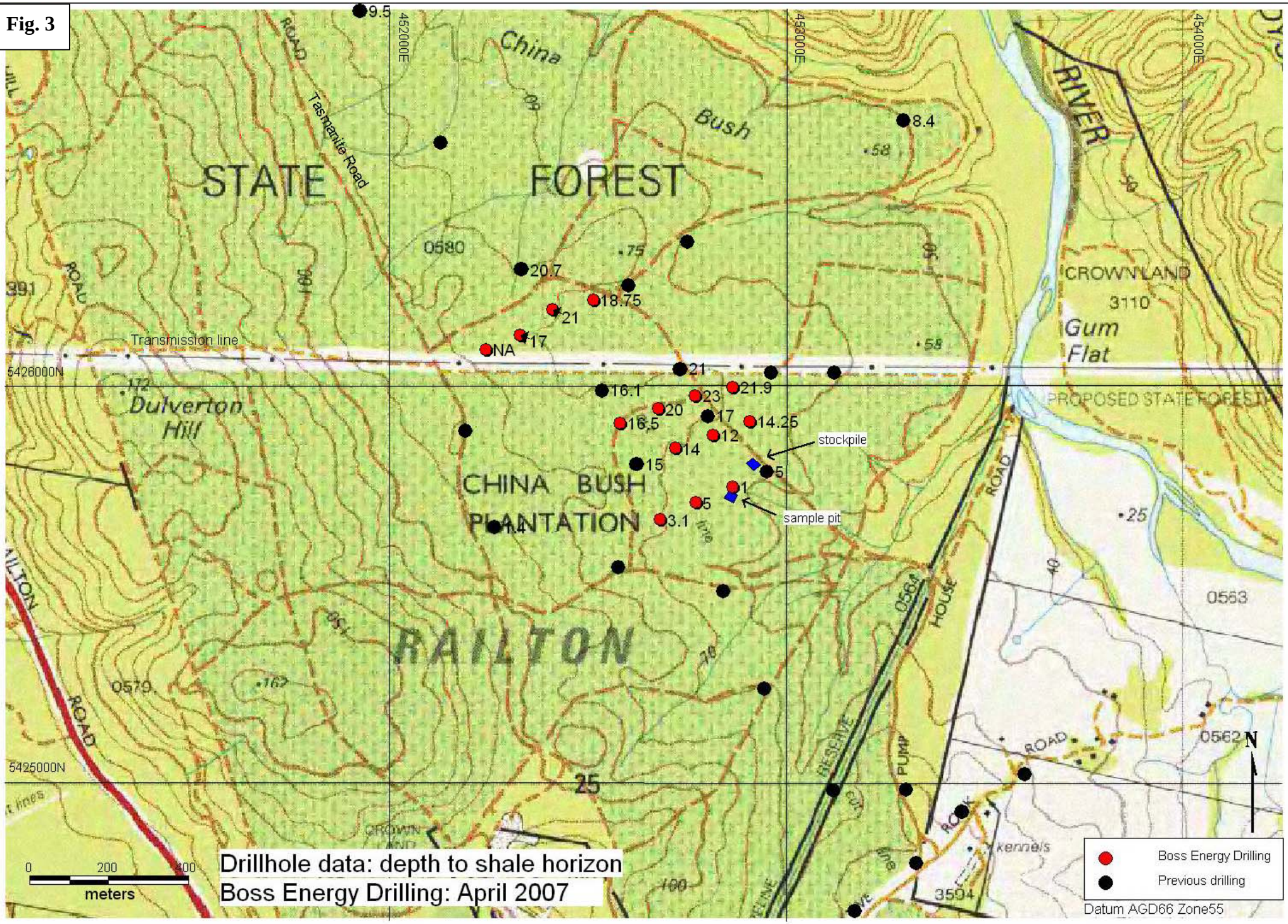
9.5
452000E
453000E
454000E
China
Bush
RIVER
8.4
STATE FOREST
Tasmanite Road
ROAD
0580
20.7
18.75
21
17
NA
Transmission line
5426000N
CROWNLAND
3110
Gum Flat
PROPOSED STATE FOREST
Dulverton Hill
21
16.1
23
21.9
20
17
14.25
16.5
12
14
stockpile
15
5
CHINA BUSH PLANTATION
1
5
3.1
sample pit
RAILTON
0579
0563
0564
HOUSE
ROAD
0562
N
5425000N
25
RESERVE
PUMP
kennels
3594
0
200
400
meters
Drillhole data: depth to shale horizon
Boss Energy Drilling: April 2007
Boss Energy Drilling
Previous drilling
Datum AGD66 Zone55

Fig 4. Site cleared and stumps windrowed.

Fig 5. Overburden cleared from sample area.

Fig 6. Fault visible in pit floor.

Fig 7. Culvert installed on streamway.

Fig 8. Slabs of shale excavated in two cuts.

Fig 9. Stockpile with crushed material in foreground

Fig 10. rehabilitation of sample pit site. Area contoured, topsoil and mulch replaced.

Fig 11. Track rehabilitation looking north east towards stockpile.