

3. REGIONAL OVERVIEW

This section provides a brief description of the general region in which the Happy Valley Proposal is located (principally the Whicher Scarp). More detailed descriptions of the specific bio-physical and social characteristics relevant to the environmental factors are provided in subsequent chapters of this document.

3.1 MINING IN THE SOUTH-WEST

The South-West Region of Western Australia is an important mining, processing, agricultural, manufacturing, timber and tourism area centred on the town of Bunbury. Mining and mineral processing in the south west is a multi-billion dollar industry based largely around the alumina and titanium mineral industries.

The mining of titanium minerals is long-established along the base of the Whicher Scarp and ancient shorelines of the Swan Coastal Plain (Figure 3-1), with Bemax's Gwindinup minesite running parallel and to the north of the Proposal and the Yoganup Extended minesite, operated by Iluka Resources Limited, running parallel and to the south.

Bunbury acts as a service city and port for the industries within the South West Region and is the location of the existing Bemax North Shore secondary minerals separation plant. The Bunbury port provides export opportunities for minerals extracted by companies such as Bemax.

3.2 CLIMATE

The Proposal area experiences a Mediterranean climate with hot, dry summers and cool, wet winters. Average rainfall at the nearest major meteorological station (Donnybrook) is 986 mm and 90% of this is experienced between April and October (BoM 2005).

Strong winds are predominantly from the west. Winter storms bring squally winds from the north-west to south-west and summer afternoon sea-breezes are from the south-west. Hot, dry easterly winds of moderate strength occur at night and early in the day during summer.

3.2.1 Climate change

Rainfall in the south-west of Western Australia has decreased since the mid 1970s. There is evidence of a step change with an altered rainfall regime where there has been a pronounced decrease in autumn and early winter rains (IOCI 2002).

Rainfall in the Whicher area has decreased by up to 10 per cent for 1975–2003 compared to long-term records. There has also been a slight shift in the rainfall distribution during the year with less rain as a percentage of the mean in March and April and more rain in August and September (DoW 2007a).

Through climate modelling the CSIRO (Hennessy et al. 2006) has predicted that from 1990–2030 the south-west may experience a further 5 to 11 per cent decline in average rainfall based on low (0.54 °C by 2030) and high (1.24 °C by 2030) global warming scenarios, respectively.

The reductions in rainfall that have already occurred have reduced the surface water available for use in the Whicher area and the likelihood of further drying through climate change may result in further decreases in the future (DoW 2008a).

3.3 NATURAL AREAS

3.3.1 Bioregions

The Interim Biogeographic Regionalisation for Australia (IBRA) (Thackway and Cresswell 1995, Environment Australia 2000) categorises the Australian continent into regions of like geology, landform, vegetation, fauna and climate. There are 80 such regions throughout Australia, and 26 occur in Western Australia. The bioregions and sub-regions are the reporting units for assessing the status of native ecosystems, their protection in the national reserve system and for use in the monitoring and evaluation framework in the Australian Government's current Natural Resource Management initiatives. The WA IBRA subregions were recently used as the unit for analysis for the 2002 Biodiversity Audit for the State (CALM 2003).

The Happy Valley Proposal is located on the edge of the Swan Coastal Plain 2 subregion of the Swan Coastal Plain (SWA) Bioregion and the Southern Jarrah Forest subregion of the Jarrah Forest (JF) Bioregion (Figure 3-2).

3.3.2 Nature conservation areas

There are a number of proposed or existing conservation reserves within or associated with the Whicher Scarp (Figure 3-2). The most significant of these (size-wise) is the proposed Whicher National Park (6,343 ha), which includes landform-soil subsystems, vegetation complexes and many plant taxa that are also present within the Proposal area, including the Declared Rare Flora *Daviesia elongata* subsp. *elongata* (Section 5).

The 20.6 ha Gwindinup Reserve (Reserves 2307 and 25500) on Lowrie Road is significantly closer to the Proposal and is managed by the Capel Land Conservation District Committee (LCDC). This reserve contains elements of the Swan Coastal Plain Floristic Community Type 21b of Gibson et al. (1994) (Section 5) as does the Proposal area.

To the north is the Dardanup Conservation Park, which is the largest and northern-most area of Whicher Scarp vegetation remaining and contains elements of both the Whicher Scarp and Darling Scarp (Keighery et al. 2008).

3.3.3 Conservation recommendations

Formal recommendations

The EPA considers natural areas that are subject to formal conservation recommendations⁸ as having a conservation significance equivalent to the existing Conservation Estate (EPA 2006c) and these areas have been included in the preceding section.

⁸ For example, System 6, System 1 recommendation areas and Forest Conservation areas where these supersede System 6 and System 1.

Informal recommendations

Regional Forest Agreement

The State Forest areas that will be affected by the Proposal come under the Regional Forest Agreement (Government of Western Australia and Commonwealth of Australia 1999) and their management and conservation is subject to the requirements and recommendations of the Forest Management Plan (CCWA 2004), which are discussed below.

Forest Management Plan

The Forest Management Plan 2004 – 2013 (FMP) gives effect to the legislation and policies of the Western Australian government in relation to ecologically sustainable forest management (CCWA 2004). It contains management actions relevant to a number of criteria considered relevant to sustainability, to be implemented by the Conservation Commission of Western Australia (CCWA), the Department of Conservation and Land Management (now Department of Environment and Conservation, DEC) and the Forest Products Commission (FPC). Some of these actions may be relevant to the Proposal, where it relates to the State Forest. Note that there are no formal conservation reserves (see below), forest conservation areas, informal reserves or fauna habitat zones within the Happy Valley mining tenements, although there are both informal reserves (areas exempt from logging under the FMP) and indicative fauna habitat zones⁹ immediately to the south.

South West Regional Strategy for Natural Resource Management

The South West Regional Strategy for Natural Resource Management (NRM) was developed by the South West Catchments Council (SWCC) with the aim of integrating and coordinating natural resource management in the southwest. The Strategy follows an assets-based approach, with the southwest region's assets being identified as water, biodiversity, land, marine and coasts, air, climate and people. The values placed on these assets are described in the Strategy and threats to them identified. Management actions and targets are provided and prioritised, including the role of the mining sector. The majority of these actions are covered in other NRM policy documents and none are specific to the Proposal, either as a result of land-use or the area in which it is situated.

A Floristic Survey of the Whicher Scarp, Keighery et al. (2008)

Recently, Keighery et al. (2008) presented a number of conservation recommendations based on natural values described in their report. These recommendations are informal only and the report has not been formally considered by the EPA or the CCWA. Key recommendations of Keighery et al. (2008) relevant to the Proposal area are:

- the boundaries of the Whicher National Park should be expanded to include the full extent of the Whicher Scarp slopes on public lands, in line with the original conservation recommendations of CTRC 1974
- the boundaries of the Dardanup Conservation Park should be expanded to include the full extent of the Dardanup Forest Block and consideration should be given to making the area a National Park

⁹ Indicative fauna habitat zones are those that still require final consideration by DEC, FPC and CCWA.

Environmental Review

- the Gwindinup Reserve ecological linkage opportunities west and south to the Argyle Forest Block should be investigated
- three conservation areas should be established in each of the Treeton, Abba and Argyle Forest Blocks to protect specific Whicher Scarp values, including populations of protected and/or significant plant taxa, restricted and/or diverse plant communities and ecological linkages.

River Action Plan for Gynudup Brook and Tren Creek

The River Action Plan for Gynudup Brook and Tren Creek (GeoCatch 2004) was developed between the Capel Land Conservation District Committee (LCDC) and the Geographe Catchment Council (GeoCatch). It includes within its scope the creeklines that cross the two Happy Valley deposits (Figure 7-1). Management recommendations in the River Action Plan relevant to these creeks are:

- fence the creeklines in Location 215 and on Location 4965 to prevent stock access
- undertake feral animal control, especially of rabbits, as they can be a significant cause of bushland degradation
- ensure continued protection of State Forest and high quality vegetation in Location 215 and Location 4965
- in consultation with CALM, undertake a comprehensive vegetation survey of State Forest 27.

None of these recommendations are Priority Actions, under the River Action Plan.

3.4 SURROUNDING LAND-USE

3.4.1 State Forest

Argyle forest block

The Argyle State Forest block (State Forest No. 27) is managed by the DEC for the purposes of logging, quarrying and wildlife conservation. The Argyle block occupies the area of the Whicher Scarp and Blackwood Plateau between the Preston and Capel Rivers. It is part of the North Whicher Scarp, as identified by Keighery et al. (2008), who also ascribed the following environmental values to the block:

- supports diversity of the flora of the North Whicher Scarp and a large number of significant taxa including at least nine taxa at the end of their range and a series of rare taxa including *Daviesia elongata* subsp. *elongata* (DRF), *Logania wendyae* (P1), *Stenanthemum sublineare* (P2) and the newly recognised taxa, *Lomandra whicherensis* and *Platytheca* sp. *Argyle* (G.J. and B.J. Keighery 2008)
- ecological linkage with contiguous Blackwood Plateau vegetation within State Forest
- ecological linkage with contiguous Swan Coastal Plain vegetation in a series of small areas of Cartis vegetation complex (mostly on private land)
- a very high degree of intactness of native vegetation (least disturbed area of the Whicher Scarp observed by Keighery et al. 2008).

The Capel Land Conservation District Committee (LCDC), which manages the Gwindinup Nature Reserve on Lowrie Rd, reports that the Argyle block is home to the brush wallaby (*Macropus irma*) and all three species of Black Cockatoo (see Section 6).

Webb et al. (2006) identify two main vegetation-soil associations within the Argyle block, namely:

- *Eucalyptus haematoxylon*, *Banksia attenuata* woodland on grey sand over laterite rock (synonymous to SCP Floristic Community Type 21b of Gibson et al 1994)
- *Eucalyptus haematoxylon*, *Banksia attenuata*, *Eucalyptus marginata* woodland on yellow/orange sands over sandy clay soils and/or laterite rock at some depth (synonymous with SCP Floristic Community Type 1a of Gibson et al. 1994).

There are numerous historical gravel quarries and old access tracks within the Argyle block and the area is subject to dieback controls.

Recreation and public access

The DEC is responsible for the management of the State Forest. This responsibility includes the maintenance or enhancement of recreation values. The broad recreation objective for State Forest, as defined by the Forest Management Plan (CCWA 2004) is to seek to sustain and enhance socio-economic benefits obtained from the forest to meet community needs.

Public access to the State Forest within the Happy Valley North and part of the Happy Valley South tenements is restricted by DEC for the purposes of dieback disease control. The tenements are not authorised areas for firewood collection, horse-riding or for the use of off-road vehicles, as defined by the *Control of Vehicles (Off-Road Areas) Act 1978*.

3.4.2 Freehold land

Within and surrounding the Proposal area, the predominant land-uses on private land are agriculture-related, such as cropping, grazing and silviculture. A number of smaller holdings are 'lifestyle properties' that may contain a dwelling. To the east of the Proposal area, on the other side of the Argyle block, special rural areas have been established, consisting of numerous small blocks (1 – 5 ha) with private dwellings.

Near neighbours

The location of all neighbouring residences within 2 km of the Proposal is described in Section 9. Of the six residences within that distance, two are located on property owned by the Proponent. All residences are on land zoned Rural on which a variety of domestic and agricultural uses are conducted.

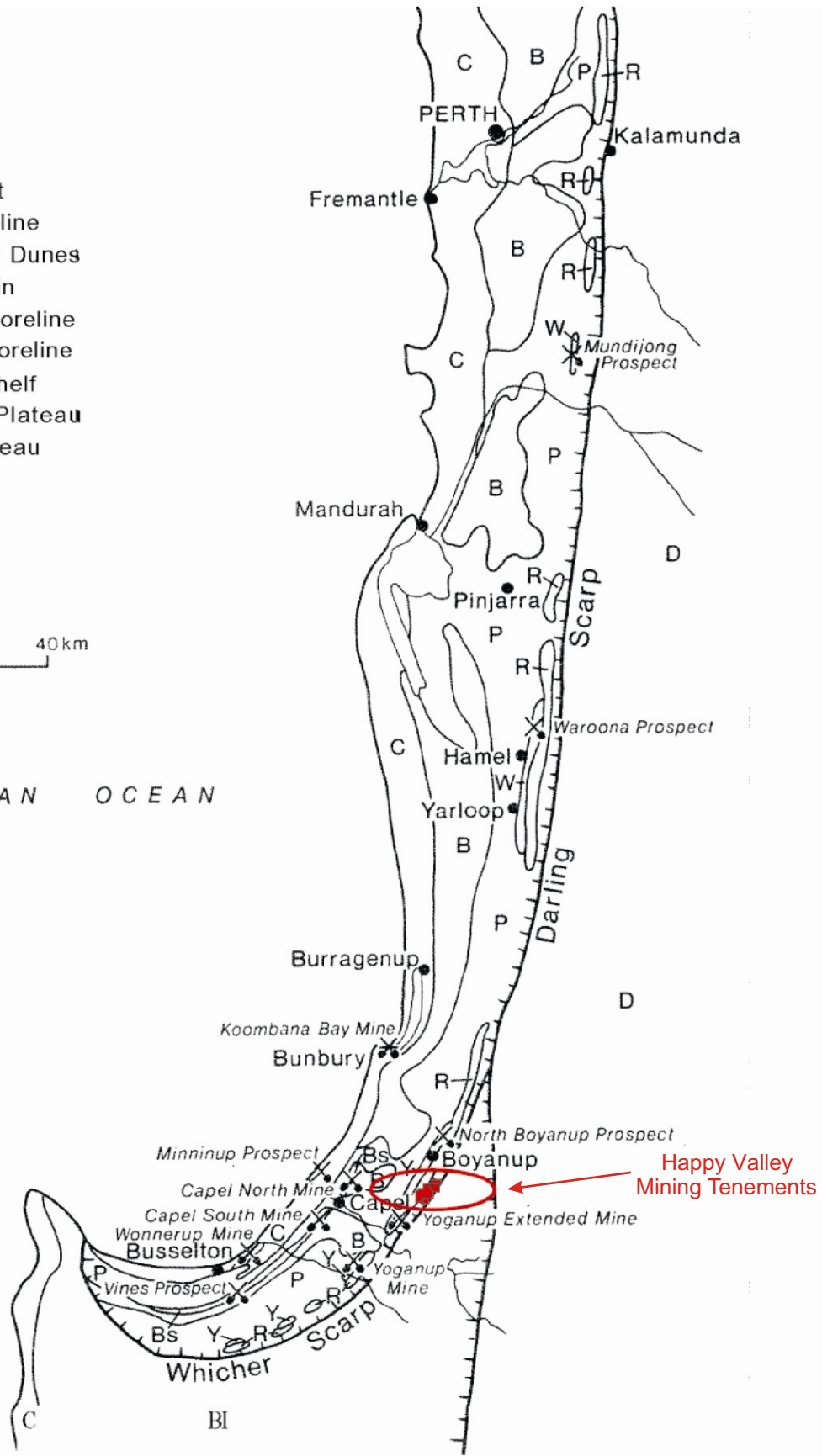
REFERENCE

- C Coastal Belt
- a Capel Shoreline
- Bs Bassendean Dunes
- P Pinjarra Plain
- W Waroona Shoreline
- Y Yoganup Shoreline
- R Ridge Hill Shelf Plateau
- D Darling Plateau

SCALE



INDIAN OCEAN



Happy Valley Mining Tenements



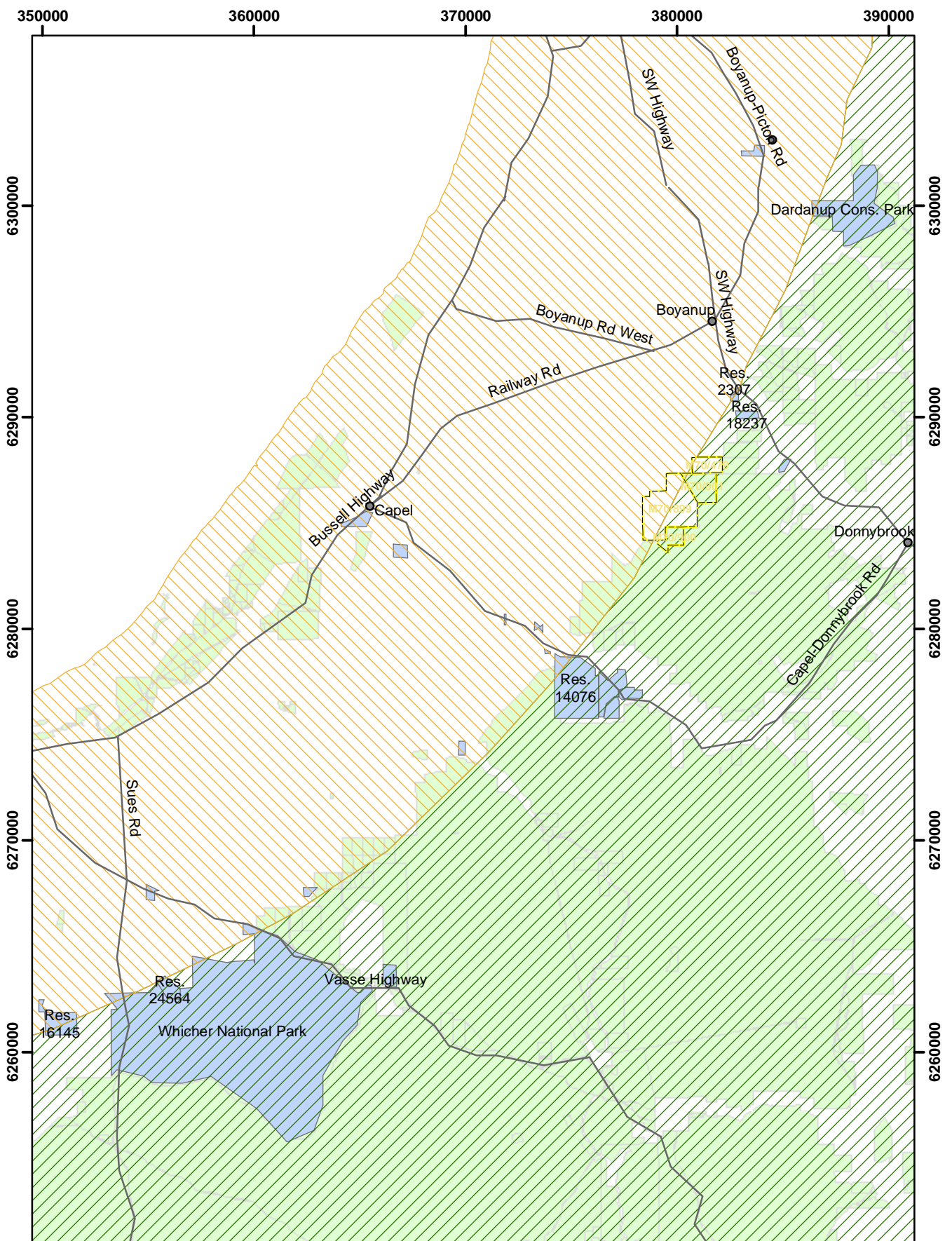






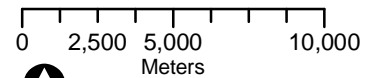


Figure 3-2:
Bioregion map of the proposal area.
Also showing State Forest areas, including Argyle State Forest,
and nature conservation areas.

Legend

- | | |
|---|--|
|  Tenement Boundaries |  Jarrah Forest |
|  State Forest |  Swan Coastal Plain |
|  Whicher Reserves |  Main Roads |



Datum: GDA 1994 MGA Zone 50
Drawn: DH
Date: 19/05/09



