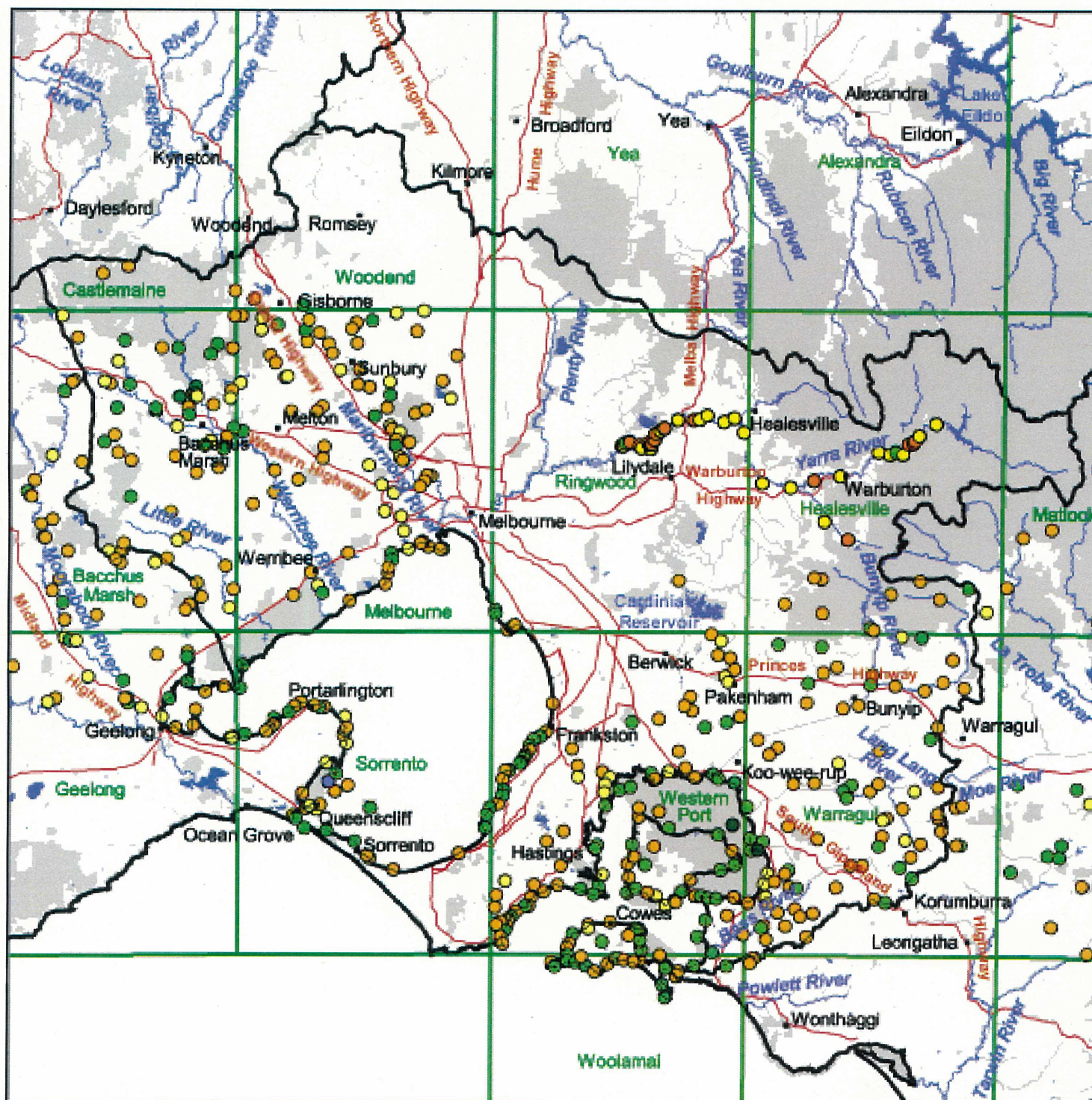


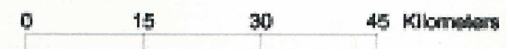
Geological and Geomorphological Sites of Significance

Rosengren (1984,1986,1988),
Rosengren et al (1983),
Rosengren, McRae-Williams
and Kraemers (1981)



- Significance Rating
- International
 - National
 - State
 - Regional
 - Local

- Port Phillip 1: 100 000 Maps
- Public Land





Sites of Geological and Geomorphological Significance in the Western Region of Melbourne, on the coast of Port Phillip Bay and along the Merri Creek

based on Rosengren (1986 1988, 1993)

● National Significance

Me3. Toolern Creek, Exford - Pillow Lava

● State Significance

AB1. Altona, Koorngal Golf Club - Sand Ridges

AB2. Altona Meadows - Sand Spits and Ridges

K1. Bulla - Kaolinised Granodiorite

K3. Organ Pipes National Park

K12. Taylors Creek - Silcrete Cave

Ko3. Emu Creek and Jackson Creek

M1. Williamstown - Lava Blister

Me2. Djerriwarrh Creek Cutting

Sb2. Deverall Hill - Eruption Point

TV4. Mt Gisborne - Eruption Point

W4. Werribee River - Delta Sediments

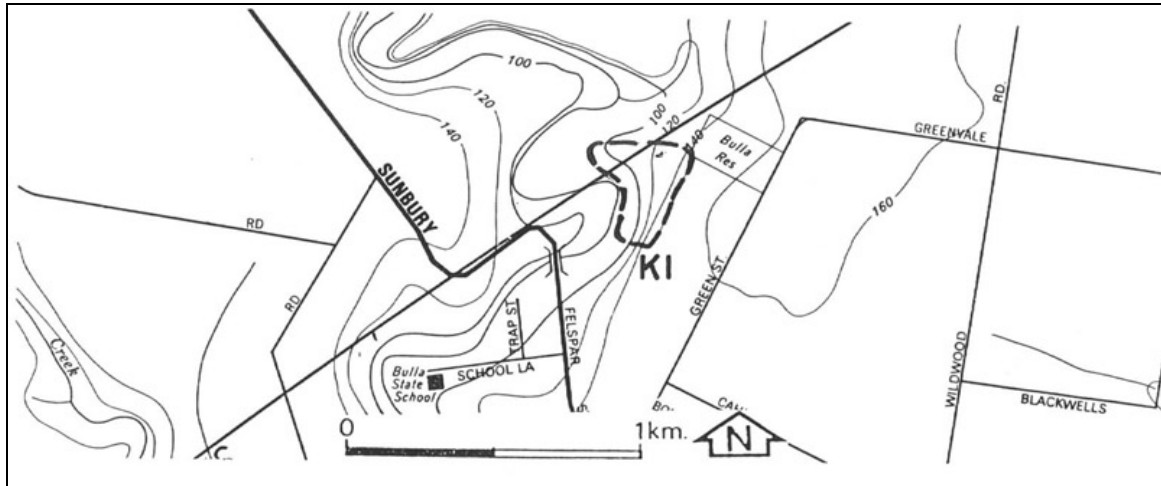
1. Studley Park/Dight Falls - Melbourne Formation

26. Barry Road Gorge, Campbellfield - Unconformity

27. O'Hearns Road, Campbellfield - Intra basaltic sediments



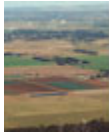
0 2 4 6 8 Kilometers



Location Map of Site of Significance K1 (from dpi website)

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Werribee Plains



K1 Bulla - Kaolinized Granodiorite

Location Keilor - 061327. Shire of Bulla. Eastern side of Deep Creek upstream of the Sunbury Road bridge.



K1 - Newer Volcanics lava flows overlying weathered granite, Bulla.

Access Track along river from Felspar Street.

Ownership Some Crown land, some private land

Site Description Abandoned quarries into the steep hillslope east of Deep Creek expose Bulla Granodiorite beneath Newer Volcanics lava flows. The granite is generally deeply weathered and the feldspars have decomposed to kaolinite - a grey-white aluminium rich clay which has a number of industrial uses. In places there are concentrations of remnant quartz in the kaolin. At the lower levels in the quarry, along the track above Deep Creek, less weathered strongly jointed granodiorite is intruded by a number of aplite dykes up to 25 cm wide. In the quarry at the end of the track, there is a clear section exposing the base of the lava flows overlying the kaolinite.

Significance State. The site is an outstanding example of deep weathering of granodiorite to produce an *in situ* deposit of kaolinite. It shows clearly the uneven nature of subsurface weathering as fresh sections of granodiorite lie adjacent to deeply weathered ones. It is therefore an important site to demonstrate stages in the origin of boulders (tors). It also clearly displays the unconformity between the lava flows and the weathered granodiorite. It is readily accessible and is used extensively by schools and tertiary institutions as a teaching site.

Management Class 2. The unused quarry sections should be retained as teaching sites. No reclamation or filling should be permitted and they should not be used as refuse pits. In the longer term, access to the site could be improved by providing a parking bay or widening the intersection near the bridge to increase the safety for vehicles entering or leaving the site.

References
James, A.V.C. (1920). The Physiography and Geology of the Bulla/Sydenham Area. *Proc. R. Soc. Vict.* 32:323-349.
Gaskin, A.J. (1944). Kaolinized Granodiorite in the Bulla/Broadmeadows area. *Proc. R. Soc. Vict.* 56:1-18.



This information has been developed from the publications:

- **Sites of Geological and Geomorphological Significance in the Western Region of Melbourne** (1986) by Neville Rosengren
- **Sites of Geological and Geomorphological Significance on the Coast of Port Phillip Bay** (1988) by Neville Rosengren.
- **Sites of Geological and Geomorphological Significance in the Shire of Otway** (1984) by Neville Rosengren.

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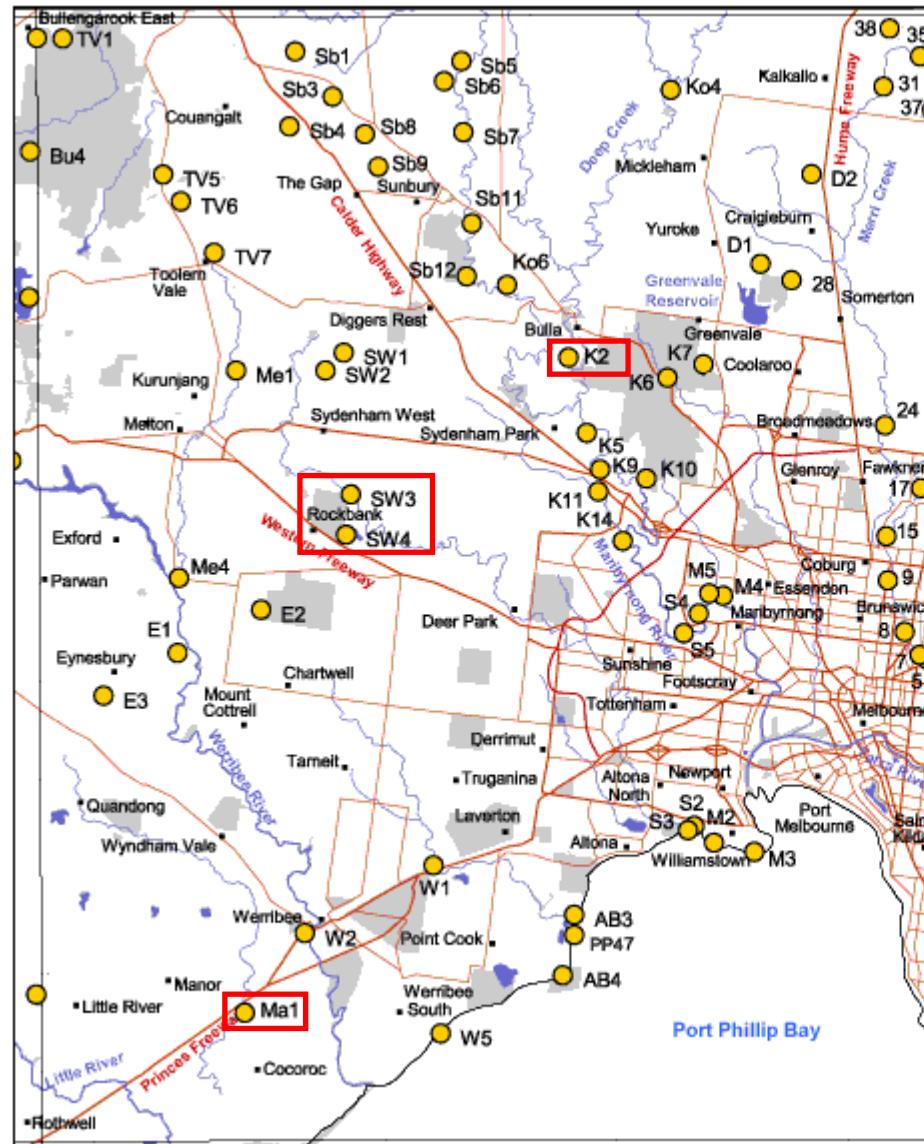
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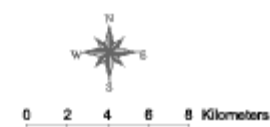
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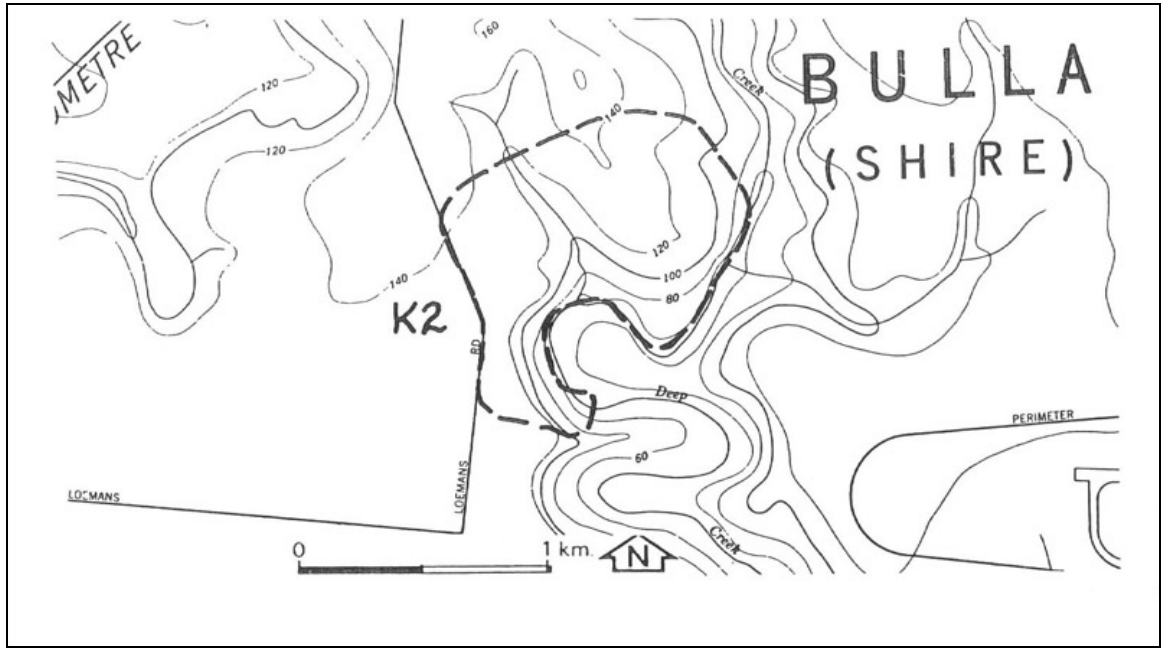
based on Rosengren (1986, 1988, 1993)

● Regional Significance



- | | |
|--|--|
| AB3. Pt Cook - Relict Spits | Sb11. Jacksons Ck - Valley Forms |
| AB4. Pt Cook - Parallel Sand Ridges | Sb12. Jacksons Ck - Ordovician/ Newer Volcanics |
| D1. Aitken Hill - Eruption Point | SW1. Diggers Rest - Dry Lake |
| D2. Mt Ridley - Twin Eruption Point | SW2. Mt Kororoit - Eruption Point |
| E1. Werribee River - Gorge | SW3. Rockbank - Floodplain |
| E2. Mt Cottrell - Eruption Point | SW4. Deans Marsh - Intermittent Lakes |
| E3. Green Hill - Eruption Point | TV1. Little Bullengarook - Eruption Point |
| K2. Bulla - Metamorphic Aureole | TV5. Breakneck Hill - Ordovician/ Newer Volcanics |
| K5. Kellor N - Intra-Basaltic Sediments | TV6. Toolern Ck - Silcrete |
| K6. Moonee Ponds Ck - Older Volcanics | TV7. Flagstaff Hill - Gully Reclamation |
| K7. Gellibrand Hill - Granite Slopes | W1. Skeleton Ck - Consequent Stream |
| K9. Kellor N - Silcrete | W2. Werribee - Nick Point |
| K10. Kellor - Confluence | W5. Werribee S - Delta |
| K11. Taylors Ck - Lava Flow Section | PP47. Skeleton Creek - Relict Spits |
| K14. Green Gully - Terraces | 4. Quarries Park - Ropy lava |
| Ko4. Deep/Koragaderra Cks - Outcrops | 5. Northcote Park - Basalt columns |
| Ko6. Jacksons Ck - High Level Cutoff | 6. Creek Parade, - Basalt columns and lava |
| M2. Merrett Rifle Range - Mangroves | 7. Rushall Station - Basalt structures |
| M3. Williamstown - Shore Platforms | 8. Summer Park - Silurian/basalt unconformity |
| M4. Essendon W - Tertiary Sediments | 9. Capp Reserve - Melbourne Formation |
| M5. Steele Ck - Terraces, Floodplains | 15. Edgars Creek - Waterfall & geological structure |
| Ma1. Werribee - Prior Stream | 17. Edgars Creek - Dolomite nodules |
| Me1. Toolern Ck - Sediment Deposits | 25. Retarding Basin - Dolomite |
| Me4. Exford Cutting - Volcanics | 28. Craigieburn East - Stony rises, gilgai (soil mounds) |
| S2. Kororoit Ck Mouth | 31. Donnybrook - Mineral spring |
| S3. Altona E - Sand Bars | 35. Merri Creek Park - Incised channel |
| S4. Tea Gardens - Newer Volcanics | 37. Hayes Hill - Eruption Point |
| S5. Avondale Heights - River Terraces | 38. Bald Hill - Eruption Point |
| Sb1. Red Rock - Eruption Point | |
| Sb3. Fitzgerald Hill - Eruption Point | |
| Sb4. Mt Aitken - Eruption Point | |
| Sb5. Jacksons Ck - Slope Forms | |
| Sb6. Evans Ck - Basalt Outlier | |
| Sb7. Sunbury - Avulsion Channel | |
| Sb8. Sunbury Tip - Volcanic/ Sedimentary Contact | |
| Sb9. Mt Holden - Eruption Point | |





Location Map of Site of Significance K2 (from dpi website)



Victorian Resources Online
Werribee Plains



K2 Bulla - Metamorphic Aureole

Location Keilor - 05605. Shire of Bulla. Western side of Deep Creek 1.5 km south of Bulla.

Access Loemans Road off Bulla-Diggers Rest Road

Ownership Private land



[K2](#)

Site Description The site illustrates thermal metamorphism of Silurian sedimentary rocks by the intrusion of the Bulla Granodiorite. A traverse beginning of Loemans Road first crosses the level surface of the Newer Volcanics lava flows, while on the steeper slopes of Deep Creek and a tributary which forms a hanging valley on the west, are outcrops of Silurian mudstones and sandstones which have been baked by the heat of the intrusion to form hornfels and quartzite. Several dykes of granitic composition intrude the sediments near the hanging valley. The Bulla Granodiorite outcrops on the ridge north of the hanging valley, while beneath the lava and overlying the Silurian rocks to the south are thin Tertiary sands.

Significance Regional. The site is a clear display of the changes introduced in sedimentary rocks by contact metamorphism, and includes clear exposures of sedimentary, intrusive, volcanic and metamorphic rocks in close proximity. It is one of the best localities in the study area to examine these varied rock types.

Management Class 2. Continuation of present rural land use is compatible with maintaining the features of the site and permitting access to authorized group or individuals.

References James, A.V.C. (1920). The Physiography & Geology of the Bulla/Sydenham Area. *Proc. R. Soc. Vict.* 32:323-349.

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Victorian Resources Online Werribee Plains



Ma1 Werribee - Prior Stream of Werribee Delta

Location Manor - 903978. Former Shire of Werribee. Section of channel of Lollypop creek, south of the Princes Highway one kilometre west of the Maltby By-Pass Road.

Access Old Boundary Road.

Ownership Crown land (MMBW Farm).

Site Description The site is a shallow meandering section of the channel of Lollypop Creek. This stream is an abandoned distributary channel or prior stream of the system that fed from the Werribee River to deposit the sediments of the Werribee River Delta. These channels were active during a higher sea level episode in the [Pleistocene](#). Lollypop Creek no longer links with the Werribee River as the main channel of the river is now incised deeply into the delta sediments and the creek has been abandoned as an ephemeral channel.



Ma1 - Shallow channel of Lollypop Creek, a distributary stream of the Werribee delta.

Significance Regional. Lollypop Creek is one of the last unmodified examples of the formerly extensive distributary channel system of the Werribee River. Most other channel systems lie within the pond system of the MMBW farm, or are on private land and have been considerably modified by agricultural activities. The channel is an example of the processes that produced the extensive sedimentary body of the Werribee River Delta. It is evidence that the delta was built as a subaerial feature by terrestrial streams and is not a true subaqueous delta.

Management Class 1. The channel system should be retained in its present form and not be filled, drained or submerged. Changes in land use should be planned to maintain this form.

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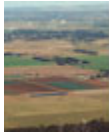


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SW3 Rockbank - Kororoit Creek Floodplain

Location Sydenham West - 950235. Shire of Melton. Valley of Kororoit Creek 2 km northeast of Rockbank.

Access Beattys Road.

Ownership Crown land and private land.

Site Description The valley of Kororoit Creek upstream of Beattys Road bridge is a wide floodplain with abandoned stream channels. Below the bridge, the valley narrows and is incised into enclosing lava flows. A small quarry exposes a section in basalt lava flows showing strong platey jointing.



SW3 - Alluvial floodplain sector of Kororoit Creek, Rockbank.

Significance Regional. The site illustrates the influence of lava flows on drainage patterns and show the hydrological complexity of the Kororoit Creek.

Management Class 2. The stream channels in the site should not be artificially modified. The area should be reserved from intensive residential subdivision and retained for open space use.

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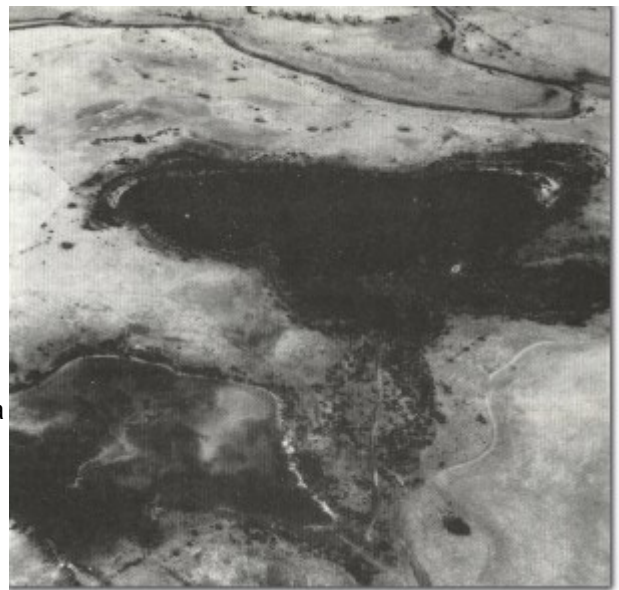
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Werribee Plains



SW4 Deans Marsh, Rockbank - Intermittent Lakes

- Location** Sydenham West - 948215. Shire of Melton. North of Western Highway at Rockbank.
- Access** Western Highway.
- Ownership** Commonwealth land (Defence Department, Rockbank Signal Station) and private land.
- Site Description** Between Kororoit Creek and the Western Highway are several enclosed depressions on the surface of the lava plain. The depressions appear to be due to the original configuration of the contours of the lava and are an integral part of the original basalt terrain.



SW4 - Intermittent Lakes, Deans Marsh, Rockbank

The two westernmost depressions, that comprise this site, are generally marshy, indicating they are fed from groundwater springs; they are intermittent rather than ephemeral lakes. The lake water is slightly brackish and alkaline, and there is a concentration of the sulphate ion. There is no surface water exchange between the lakes but the northern lake is partly artificially drained to Kororoit Creek. It is likely that there is a complex hydrological regime of these lakes related to water levels of Kororoit Creek.

- Significance** Regional. Although there are many enclosed depressions on the Werribee Plains, most have been severely disturbed by draining, grazing, reclamation or other processes. The two wetlands at this site are therefore important remnants to illustrate the formerly complex drainage and surface water distribution of the plains. They should be retained to allow studies of water quality and hydrological regime. The shorelines of the lakes are low and rocky and illustrate the weathering of basalt boulders in a saline wetting and drying environment.
- Management** Class 1. The lakes need to be excluded from disturbance associated with adjacent land use. As most of the surrounding area is being subdivided, it is important that planning controls prevent the draining, filling, or reclamation of these two remaining wetlands, and ensure that street drainage or other urban runoff is not diverted into them. The drain from the northern lake should be closed. The lakes should be seen as a positive factor providing important terrain variation in an otherwise uniform landscape.
- References** Shugg, A. (1980). Disturbed Drainage and an Ephemeral Lake on the Basalt Plains, Rockbank (Kororoit Creek). *Unpub. Reports Geol. Survey Vic.* 108.

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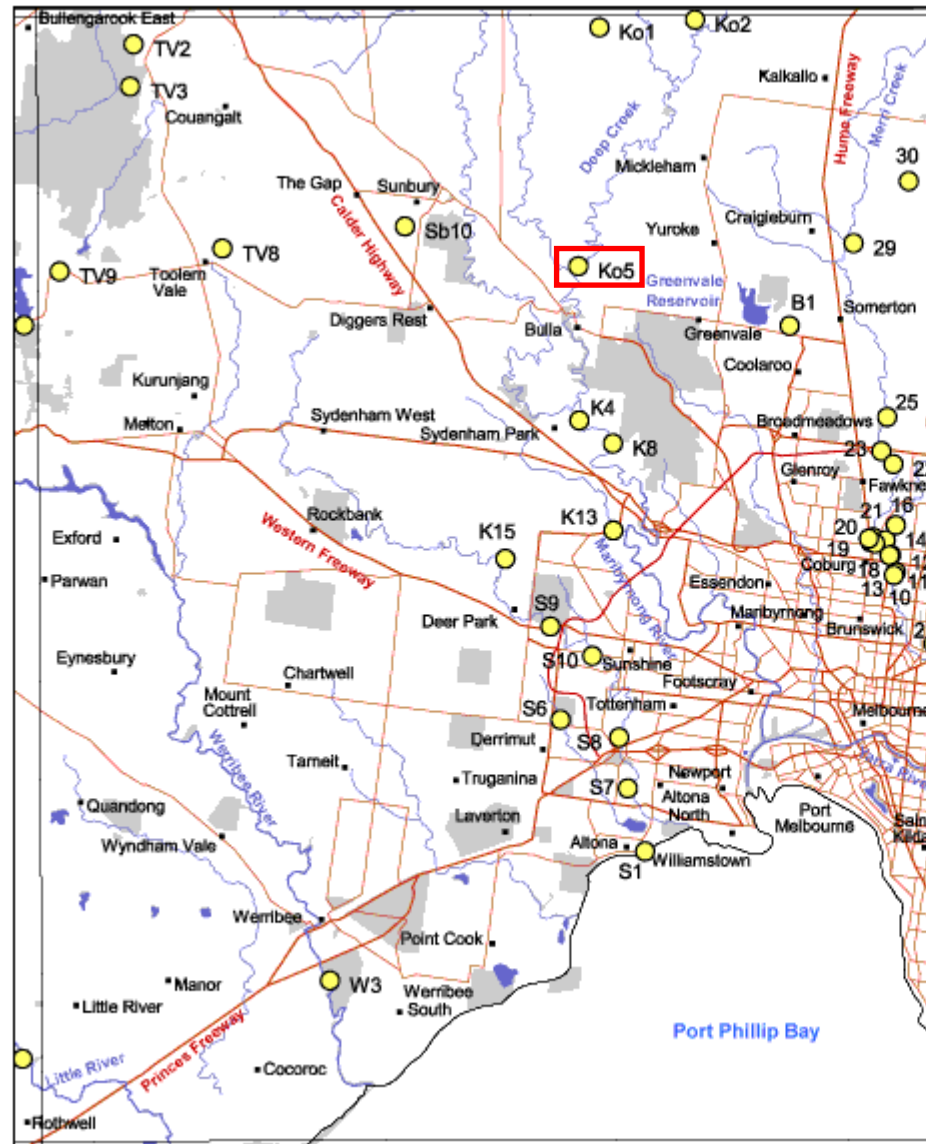


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● Local Significance

- B1. Somerton Rd - Granodiorite
- K4. Sydenham Park - Silurian, Tertiary
- K8. Kellor North - River Terraces
- K13. Taylors Creek - Newport Formation
- K15. Kororoit Creek - Valley Form
- Ko1. Fenton Hill - Eruption Point
- Ko2. Deep Creek - Springs
- Ko5. Deep Creek - Outcrops
- S1. Altona - Shore Platform
- S6. Ardeer - Andersons Swamp
- S7. Kororoit Creek - Valley Profile
- S8. Kororoit Creek - Incised Valley
- S9. Kororoit Creek - Waterhole
- S10. Kororoit Creek - Escarpments
- Sb10. Sunbury - Hanging Valley
- TV2. Sclobes Corner - Gravel
- TV3. Murray Spur - Lava Ridge
- TV8. Flagstaff Hill - Colluvial Gravels
- TV9. Djerniwarh Creek - Unconformity
- W3. Werribee - River Terraces
- 2. Yarra Bend Park - Merri Creek/Yarra River digitate delta
- 10. Tate Reserve, Coburg - Former creek course
- 11. Kendall & Harding St - Melbourne Formation and terrace
- 12. Connolly Ave, Coburg - Tessellated pavement
- 13. De Chene Reserve - Lava flow structure
- 14. Coburg - Edgar Creek terrace and meander
- 16. Kodak, Coburg - Cliff of Melbourne Formation
- 18. Coburg Lake - Basalt structures and unconformity
- 19. Coburg Lake - Basalt flows
- 20. Coburg Lake - Alluvial terrace
- 21. Carr St, Coburg - Weathered Silurian
- 22. Moomba Park Reserve - Basalt escarpment
- 23. Mahoneys Rd - Alluvial terrace
- 25. Retarding Basin, Thomastown - Alluvial basin
- 29. Craigieburn East - Alluvial terrace
- 30. Summerhill Road - Rockfall



0 2 4 6 8 Kilometers





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Werribee Plains



Ko5 Deep Creek Wildwood - Outcrops

Location	Konagaderra - 060350. Shire of Bulla. 3 km north of Bulla near the confluence of Emu Creek and Deep Creek.
Access	Wildwood Road.
Ownership	Mostly private land, part Crown land.
Site Description	Deep Creek and Emu Creek have incised into Newer Volcanics basalt to expose the underlying Bullengarook Gravel resting unconformably on Silurian and Ordovician sedimentary bedrock.



Ko5 - Alternative sediments horizons, Deep Creek, Wildwood.

The rocks are exposed on the steep valley side slopes and in the channel of Deep Creek. Alluvium and terrace deposits including sand, silt and gravel are exposed in channel side sections upstream from the Wildwood Road bridge. The small conical hill on the valley floor just north of the bridge on the western side of the road is an inlier of Silurian in the core of an abandoned high level meander of Deep Creek surrounded by alluvial and terrace deposits.

Ordovician sediments are well exposed in the bed of Emu Creek in the western part of the site.

Significance	Local. The site encloses the characteristic landforms and geology of Deep Creek valley. The meander core is the most obvious example of such features in the study area.
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Management	The features of the site are adequately preserved under current land use, although the extent of private land makes access for detailed inspection very difficult. Further building construction on the meander core and in the abandoned higher level valley floor would obscure the significant features of this part of the site. Excavation or construction activity that would obscure outcrops and features of the valley floor should not be permitted.
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