YANCOAL
兖煤澳大利亚有限公司

N

MTW

MTW
Rehabilitation Areas 2019

File:MTW Rehab Areas 2019.wor
MTW Rehab Areas 2019.PDF

Date:	06/03/2020
Produced By:	BB
Map Size:	A4 Portrait
Coordinate System:	MGA94 Zone 56
Revision	01
Data Source	Various

MTW Annual Review Appendix 2 – Rehabilitation Summary

Rehabilitation Site Name	Type	Coordinates (GDA94)	Area (ha)	*Rehabilitation Summary*
CD RL160 Stockpile Area	Woodland	318,885.56 E 6,390,194.33 N	0.7	▪ The landform was constructed from a waste emplacement. ▪ The landform is flat in this area, no aspect. ▪ Area is flat and hence not requiring drainage controls. ▪ Landform surface preparation comprised minor shaping, deep ripping, rock raking, and removal of oversize rock material. ▪ Area was an old topsoil stockpile so there was remaining Clay loam/sandy clay loam topsoil from the floor of the stockpile at a nominal thickness of 100mm. ▪ Soil ameliorants comprising recycled gypsum and Bettergrow Biomulch compost were applied at rates of 5t/ha and 50t/ha respectively. ▪ Growth medium preparation included ameliorant incorporation and aerating as required ▪ The area was sown in December with Diverse Native Woodland at 15.7kg/ha. Non-flowable (grass) seed was spread onto the surface using a direct drill and then the flowable components of the seed mix were spread via an air-seeder mounted on the aerator implement.
CD RL180 Geofluv Topsoil A	Woodland	318,926.55 E 6,389,856.67 N	8.0	▪ The landform was constructed from a waste emplacement. ▪ The landform has been designed using a geomorphological landform approach based on alluvial analogues. Typical slope of the landform is 10 to 14 degrees with limited areas at 16 to 18 degrees. The slope has a primarily easterly aspect. ▪ Drainage is via rock-lined drainage lines, directing run-off to sediment control structures to the east. ▪ Landform surface preparation comprised bulk shaping, deep ripping, rock raking, and removal of oversize rock material. ▪ Clay loam/sandy clay loam topsoil from existing topsoil stockpiles was spread at a nominal thickness of 100mm. ▪ Soil ameliorants comprising recycled gypsum and Bettergrow Biomulch compost were applied at rates of 5t/ha and 50t/ha respectively. ▪ Growth medium preparation included ameliorant incorporation, rock windrowing, rock picking, and aerating as required

Rehabilitation Site Name	Type	Coordinates (GDA94)	Area (ha)	*Rehabilitation Summary*
				▪ The area was sown in September with Diverse Native Woodland at 15.7kg/ha. Non-flowable (grass) seed was spread onto the surface using a direct drill and then the flowable components of the seed mix were spread via an air-seeder mounted on the aerator implement. ▪ Selective weed control of mainly *Galenia pubescens* was undertaken after desirable native species and weed species had started to germinate.
CD RL180 Geofluv Topsoil B	Woodland	319,068.55 E 6,389,506.31 N	0.7	▪ The landform was constructed from a waste emplacement. ▪ The landform has been designed using a geomorphological landform approach based on alluvial analogues. Typical slope of the landform is 10 to 14 degrees with limited areas at 16 to 18 degrees. The slope has a primarily easterly aspect. ▪ Drainage is via rock-lined drainage lines, directing run-off to sediment control structures to the east. ▪ Landform surface preparation comprised bulk shaping, deep ripping, rock raking, and removal of oversize rock material. ▪ Clay loam/sandy clay loam topsoil from existing topsoil stockpiles was spread at a nominal thickness of 100mm. ▪ Soil ameliorants comprising recycled gypsum and Bettergrow Biomulch compost were applied at rates of 5t/ha and 50t/ha respectively. ▪ Growth medium preparation included ameliorant incorporation, rock windrowing, rock picking, and aerating as required ▪ The area was sown in September with Diverse Native Woodland at 15.7kg/ha. Non-flowable (grass) seed was spread onto the surface using a direct drill and then the flowable components of the seed mix were spread via an air-seeder mounted on the aerator implement. ▪ Selective weed control of mainly *Galenia pubescens* was undertaken after desirable native species and weed species had started to germinate.
CD RL180 Topsoil A	Woodland	319,280.83 E 6,389,697.26	4.1	▪ The landform was constructed from a waste emplacement. ▪ Typical slope of the landform is 10 degrees with a primarily northerly aspect. ▪ Drainage is via westerly draining contours reporting to an engineered rock-lined chute. ▪ Landform surface preparation comprised bulk shaping, deep ripping, rock raking, and removal of oversize rock material.

Rehabilitation Site Name	Type	Coordinates (GDA94)	Area (ha)	*Rehabilitation Summary*
				▪ Clay loam/sandy clay loam topsoil from existing topsoil stockpiles was spread at a nominal thickness of 100mm. ▪ Soil ameliorants comprising recycled gypsum and Bettergrow Biomulch compost were applied at rates of 5t/ha and 50t/ha respectively. ▪ Growth medium preparation included ameliorant incorporation, rock windrowing, rock picking, and aerating as required ▪ The area was sown in September with Diverse Native Woodland at 15.7kg/ha. Non-flowable (grass) seed was spread onto the surface using a direct drill and then the flowable components of the seed mix were spread via an air-seeder mounted on the aerator implement. ▪ Selective weed control of mainly *Galenia pubescens* was undertaken after desirable native species and weed species had started to germinate.
CD RL180 Topsoil B	Woodland	319,221.33 E 6,389,562.33 N	1.3	▪ The landform was constructed from a waste emplacement. ▪ Typical slope of the landform is 10 degrees with a primarily northerly aspect. ▪ Drainage is via westerly draining contours reporting to an engineered rock-lined chute. ▪ Landform surface preparation comprised bulk shaping, deep ripping, rock raking, and removal of oversize rock material. ▪ Clay loam/sandy clay loam topsoil from existing topsoil stockpiles was spread at a nominal thickness of 100mm. ▪ Soil ameliorants comprising recycled gypsum and Bettergrow Biomulch compost were applied at rates of 5t/ha and 50t/ha respectively. ▪ Growth medium preparation included ameliorant incorporation, rock windrowing, rock picking, and aerating as required ▪ The area was sown in September with Diverse Native Woodland at 15.7kg/ha. Non-flowable (grass) seed was spread onto the surface using a direct drill and then the flowable components of the seed mix were spread via an air-seeder mounted on the aerator implement. ▪ Selective weed control of mainly *Galenia pubescens* was undertaken after desirable native species and weed species had started to germinate.
CD RL185	Woodland	320,207.39 E 6,389,707.77 N	8.8	▪ The landform was constructed from a waste emplacement. ▪ Typical slope of the landform is 10 degrees with a primarily southerly aspect. ▪ Drainage is via easterly draining contours reporting to adjacent existing contour drainage and then to an engineered rock-lined chute.

Rehabilitation Site Name	Type	Coordinates (GDA94)	Area (ha)	*Rehabilitation Summary*
				▪ Landform surface preparation comprised bulk shaping, deep ripping, rock raking, and removal of oversize rock material. ▪ Clay loam/sandy clay loam topsoil from existing topsoil stockpiles was spread at a nominal thickness of 100mm. ▪ Soil ameliorants comprising recycled gypsum and Bettergrow Biomulch compost were applied at rates of 5t/ha and 50t/ha respectively. ▪ Growth medium preparation included ameliorant incorporation, rock windrowing, rock picking, and aerating as required ▪ The area was sown in December with Diverse Native Woodland at 15.7kg/ha. Non-flowable (grass) seed was spread onto the surface using a direct drill and then the flowable components of the seed mix were spread via an air-seeder mounted on the aerator implement.
CD RL190 Spoil/Compost	Woodland	319,632.10 E 6,389,688.05 N	5.2	▪ The landform is flat in this area, no aspect. ▪ Area is flat and hence not requiring drainage controls. ▪ Landform surface preparation comprised bulk shaping, deep ripping, rock raking, and removal of oversize rock material. ▪ No topsoil was added, spoil has been used as the growth medium. ▪ Soil ameliorants comprising recycled gypsum and Bettergrow Biomulch compost were applied at rates of 5t/ha and 50t/ha respectively. ▪ Growth medium preparation included ameliorant incorporation, rock windrowing, rock picking, and aerating as required ▪ The area was sown in December with Diverse Native Woodland at 15.7kg/ha. Non-flowable (grass) seed was spread onto the surface using a direct drill and then the flowable components of the seed mix were spread via an air-seeder mounted on the aerator implement.
CD RL190 Topsoil A	Woodland	319,443.37 E 6,389,707.77 N	5.2	▪ The landform was constructed from a waste emplacement. ▪ Typical slope of the landform is 10 degrees with a primarily northerly aspect. ▪ Drainage is via easterly draining contours reporting to an engineered rock-lined chute. ▪ Landform surface preparation comprised bulk shaping, deep ripping, rock raking, and removal of oversize rock material. ▪ Clay loam/sandy clay loam topsoil from existing topsoil stockpiles was spread at a nominal thickness of 100mm.

Rehabilitation Site Name	Type	Coordinates (GDA94)	Area (ha)	*Rehabilitation Summary*
				▪ Soil ameliorants comprising recycled gypsum and Bettergrow Biomulch compost were applied at rates of 5t/ha and 50t/ha respectively. ▪ Growth medium preparation included ameliorant incorporation, rock windrowing, rock picking, and aerating as required ▪ The area was sown in December with Diverse Native Woodland at 15.7kg/ha. Non-flowable (grass) seed was spread onto the surface using a direct drill and then the flowable components of the seed mix were spread via an air-seeder mounted on the aerator implement.
MTO Geofluv RL130 Topsoil A	Woodland	319,784.64 E 6,387,557.34 N	0.1	▪ The landform was constructed from a waste emplacement. ▪ The landform has been designed using a geomorphological landform approach based on alluvial analogues. This small section of landform has a typical slope of 22 degrees. The slope has a primarily northerly aspect. ▪ Drainage is via rock-lined drainage lines, directing run-off to sediment control structures to the east. ▪ Landform surface preparation comprised bulk shaping, deep ripping, rock raking, and removal of oversize rock material. ▪ Sandy topsoil with a high amount of woody mulch was spread directly from stripping areas at a nominal thickness of 100mm. ▪ Soil ameliorants were not applied due to the slope being too steep for access by spreaders. ▪ The area was sown by hand in December with Diverse Native Woodland at 15.7kg/ha.
MTO Geofluv RL130 Topsoil B	Woodland	319,802.28 E 6,387,509.92 N	4.9	▪ The landform was constructed from a waste emplacement. ▪ The landform has been designed using a geomorphological landform approach based on alluvial analogues. Typical slope of the landform is 10 to 14 degrees. The slope has a primarily north-easterly aspect. ▪ Drainage is via rock-lined drainage lines, directing run-off to sediment control structures to the north. ▪ Landform surface preparation comprised bulk shaping, deep ripping, rock raking, and removal of oversize rock material. ▪ Clay loam/sandy clay loam topsoil from existing topsoil stockpiles was spread at a nominal thickness of 100mm. ▪ Soil ameliorants comprising recycled gypsum and Bettergrow Biomulch compost were applied at rates of 5t/ha and 50t/ha respectively.

Rehabilitation Site Name	Type	Coordinates (GDA94)	Area (ha)	*Rehabilitation Summary*
				▪ Growth medium preparation included ameliorant incorporation, rock windrowing, rock picking, and aerating as required ▪ The area was sown in October with Diverse Native Woodland at 15.7kg/ha. Non-flowable (grass) seed was spread onto the surface using a direct drill and then the flowable components of the seed mix were spread via an air-seeder mounted on the aerator implement.
MTO RL154 Geofluv Topsoil A	Woodland	319,845.67 E 6,386,872.08 N	1.6	▪ The landform was constructed from a waste emplacement. ▪ The landform has been designed using a geomorphological landform approach based on alluvial analogues. This section of the landform is flat and therefore without any aspect. ▪ Area is flat and hence not requiring drainage controls. ▪ Landform surface preparation comprised bulk shaping, deep ripping, rock raking, and removal of oversize rock material. ▪ Clay loam/sandy clay loam topsoil from existing topsoil stockpiles was spread at a nominal thickness of 100mm. ▪ Soil ameliorants comprising recycled gypsum and Bettergrow Biomulch compost were applied at rates of 5t/ha and 50t/ha respectively. ▪ Growth medium preparation included ameliorant incorporation, rock windrowing, rock picking, and aerating as required ▪ The area was sown in October with Diverse Native Woodland at 15.7kg/ha. Non-flowable (grass) seed was spread onto the surface using a direct drill and then the flowable components of the seed mix were spread via an air-seeder mounted on the aerator implement.
MTO RL154 Geofluv Topsoil B	Woodland	320,012.22 E 6,387,049.56 N	12.2	▪ The landform was constructed from a waste emplacement. ▪ The landform has been designed using a geomorphological landform approach based on alluvial analogues. Typical slope of the landform is 10 to 14 degrees. The slope section has a primarily northerly aspect. There is also a flat section of landform above the slope. ▪ Drainage is via rock-lined drainage lines, directing run-off to sediment control structures to the north. ▪ Landform surface preparation comprised bulk shaping, deep ripping, rock raking, and removal of oversize rock material. ▪ Clay loam/sandy clay loam topsoil from existing topsoil stockpiles was spread at a nominal thickness of 100mm.

Rehabilitation Site Name	Type	Coordinates (GDA94)	Area (ha)	*Rehabilitation Summary*
				▪ Soil ameliorants comprising recycled gypsum and Bettergrow Biomulch compost were applied at rates of 5t/ha and 50t/ha respectively. ▪ Growth medium preparation included ameliorant incorporation, rock windrowing, rock picking, and aerating as required ▪ The area was sown in October with Diverse Native Woodland at 15.7kg/ha. Non-flowable (grass) seed was spread onto the surface using a direct drill and then the flowable components of the seed mix were spread via an air-seeder mounted on the aerator implement.
MTO RL154 Geofluv Topsoil C	Woodland	320,093.04 E 6,387,041.13 N	1.9	▪ The landform was constructed from a waste emplacement. ▪ The landform has been designed using a geomorphological landform approach based on alluvial analogues. This section of the landform is flat and therefore without any aspect. ▪ Area is flat and hence not requiring drainage controls. ▪ Landform surface preparation comprised bulk shaping, deep ripping, rock raking, and removal of oversize rock material. ▪ Clay loam topsoil from stripping areas in West Pit South was spread directly at a nominal thickness of 100mm. ▪ Soil ameliorants comprising recycled gypsum and Bettergrow Biomulch compost were applied at rates of 5t/ha and 50t/ha respectively. ▪ Growth medium preparation included ameliorant incorporation, rock windrowing, rock picking, and aerating as required ▪ The area was sown in October with Diverse Native Woodland at 15.7kg/ha. Non-flowable (grass) seed was spread onto the surface using a direct drill and then the flowable components of the seed mix were spread via an air-seeder mounted on the aerator implement.
MTO RL154 Spoil/Compost	Woodland	320,311.38 E 6,385,990.70 N	5.1	▪ The landform was constructed from a waste emplacement. ▪ Typical slope of the landform is 10 degrees with a primarily southerly aspect. ▪ Drainage is via westerly draining contours reporting to an engineered rock-lined chute. ▪ Landform surface preparation comprised bulk shaping, deep ripping, rock raking, and removal of oversize rock material. ▪ No topsoil was added, spoil has been used as the growth medium. ▪ Soil ameliorants comprising recycled gypsum and Bettergrow Biomulch compost were applied at rates of 5t/ha and 50t/ha respectively.

Rehabilitation Site Name	Type	Coordinates (GDA94)	Area (ha)	*Rehabilitation Summary*
				▪ Growth medium preparation included ameliorant incorporation, rock windrowing, rock picking, and aerating as required ▪ The area was sown in November with Diverse Native Woodland at 15.7kg/ha. Non-flowable (grass) seed was spread onto the surface using a direct drill and then the flowable components of the seed mix were spread via an air-seeder mounted on the aerator implement.
MTO RL154 Topsoil A	Woodland	319,611.14 E 6,386,649.08 N	2.3	▪ The landform was constructed from a waste emplacement. ▪ The landform is flat in this area, no aspect. ▪ Area is flat and hence not requiring drainage controls. ▪ Landform surface preparation comprised minor shaping, deep ripping, rock raking, and removal of oversize rock material. ▪ Clay loam topsoil from stripping areas in West Pit South was spread directly at a nominal thickness of 100mm. ▪ Soil ameliorants comprising recycled gypsum and Bettergrow Biomulch compost were applied at rates of 5t/ha and 50t/ha respectively. ▪ Growth medium preparation included ameliorant incorporation and aerating as required ▪ The area was sown in October with Diverse Native Woodland at 15.7kg/ha. Non-flowable (grass) seed was spread onto the surface using a direct drill and then the flowable components of the seed mix were spread via an air-seeder mounted on the aerator implement.
MTO RL154 Topsoil B	Woodland	319,538.68 E 6,386,642.15 N	2.1	▪ The landform was constructed from a waste emplacement. ▪ The landform is flat in this area, no aspect. ▪ Area is flat and hence not requiring drainage controls. ▪ Landform surface preparation comprised minor shaping, deep ripping, rock raking, and removal of oversize rock material. ▪ Clay loam/sandy clay loam topsoil from existing topsoil stockpiles (sourced from rehabilitation disturbance) was spread at a nominal thickness of 100mm. ▪ Soil ameliorants comprising recycled gypsum and Bettergrow Biomulch compost were applied at rates of 5t/ha and 50t/ha respectively. ▪ Growth medium preparation included ameliorant incorporation and aerating as required

Rehabilitation Site Name	Type	Coordinates (GDA94)	Area (ha)	*Rehabilitation Summary*
				▪ The area was sown in October with Diverse Native Woodland at 15.7kg/ha. Non-flowable (grass) seed was spread onto the surface using a direct drill and then the flowable components of the seed mix were spread via an air-seeder mounted on the aerator implement.
MTO RL154 Topsoil C	Woodland	319,613.39 E 6,386,416.30 N	0.8	▪ The landform was constructed from a waste emplacement. ▪ The landform is flat in this area, no aspect. ▪ Area is flat and hence not requiring drainage controls. ▪ Landform surface preparation comprised minor shaping, deep ripping, rock raking, and removal of oversize rock material. ▪ Clay loam topsoil from stripping areas in West Pit South was spread directly at a nominal thickness of 100mm. ▪ Soil ameliorants comprising recycled gypsum and Bettergrow Biomulch compost were applied at rates of 5t/ha and 50t/ha respectively. ▪ Growth medium preparation included ameliorant incorporation and aerating as required ▪ The area was sown in November with Diverse Native Woodland at 15.7kg/ha. Non-flowable (grass) seed was spread onto the surface using a direct drill and then the flowable components of the seed mix were spread via an air-seeder mounted on the aerator implement.
MTO RL154 Topsoil D	Woodland	319,747.84 E 6,386,141.08 N	1.4	▪ The landform was constructed from a waste emplacement. ▪ The landform is flat in this area, no aspect. ▪ Area is flat and hence not requiring drainage controls. ▪ Landform surface preparation comprised minor shaping, deep ripping, rock raking, and removal of oversize rock material. ▪ Clay loam/sandy clay loam topsoil from existing topsoil stockpiles (sourced from rehabilitation disturbance) was spread at a nominal thickness of 100mm. ▪ Soil ameliorants comprising recycled gypsum and Bettergrow Biomulch compost were applied at rates of 5t/ha and 50t/ha respectively. ▪ Growth medium preparation included ameliorant incorporation and aerating as required ▪ The area was sown in November with Diverse Native Woodland at 15.7kg/ha. Non-flowable (grass) seed was spread onto the surface using a

Rehabilitation Site Name	Type	Coordinates (GDA94)	Area (ha)	*Rehabilitation Summary*
				direct drill and then the flowable components of the seed mix were spread via an air-seeder mounted on the aerator implement.
MTO RL154 Topsoil E	Woodland	319,821.58 E 6,386,085.74 N	6.5	▪ The landform was constructed from a waste emplacement. ▪ Typical slope of the landform is 10 degrees with a primarily southerly aspect. ▪ Drainage is via westerly draining contours reporting to an engineered rock-lined chute. ▪ Landform surface preparation comprised bulk shaping, deep ripping, rock raking, and removal of oversize rock material. ▪ Clay loam topsoil from stripping areas in West Pit South was spread directly at a nominal thickness of 100mm. ▪ Soil ameliorants comprising recycled gypsum and Bettergrow Biomulch compost were applied at rates of 5t/ha and 50t/ha respectively. ▪ Growth medium preparation included ameliorant incorporation, rock windrowing, rock picking, and aerating as required ▪ The area was sown in November with Diverse Native Woodland at 15.7kg/ha. Non-flowable (grass) seed was spread onto the surface using a direct drill and then the flowable components of the seed mix were spread via an air-seeder mounted on the aerator implement.
NPN RL175 Geofluv	Woodland	317,038.19 E 6,392,473.36 N	3.4	▪ The landform was constructed from a waste emplacement. ▪ The landform has been designed using a geomorphological landform approach based on alluvial analogues. Typical slope of the landform is 10 to 14 degrees with limited areas at 16 to 22 degrees. The slope has a primarily northerly aspect. ▪ Drainage is via rock-lined drainage lines, directing run-off to sediment control structures to the north west. ▪ Landform surface preparation comprised bulk shaping, deep ripping, rock raking, and removal of oversize rock material. ▪ Sandy topsoil with a high amount of woody mulch was spread directly from stripping areas at a nominal thickness of 100mm. High amount of mulch was used for erosion protection on slopes. ▪ Soil ameliorant comprising recycled gypsum compost was applied at a rate of 5t/ha. No compost was used due to high organic component in topsoil. ▪ Growth medium preparation included ameliorant incorporation, and aerating as required

Rehabilitation Site Name	Type	Coordinates (GDA94)	Area (ha)	*Rehabilitation Summary*
				▪ The area was sown in September with Diverse Native Woodland at 15.7kg/ha. Non-flowable (grass) seed was spread onto the surface using a direct drill and then the flowable components of the seed mix were spread via an air-seeder mounted on the aerator implement. A small area was hand sown due to the steep slope.
Tailings Dam 2	Woodland	319,043.07 E 6,392,347.22	2.2	▪ The landform was constructed from spoil placed as an inert cap over a tailings dam. This section of the tailings dam had a layer of Redbank ash deposited on top of the tailings surface. ▪ Typical slope of the landform is 10 degrees with a primarily northerly aspect. ▪ Drainage from the slope reports to an engineered rock-lined chute. ▪ Landform surface preparation comprised bulk shaping, deep ripping, rock raking, and removal of oversize rock material. ▪ No topsoil was added, capping spoil has been used as the growth medium. ▪ Soil ameliorants comprising recycled gypsum and Bettergrow Biomulch compost were applied at rates of 5t/ha and 50t/ha respectively. ▪ Growth medium preparation included ameliorant incorporation, rock windrowing, rock picking, and aerating as required ▪ The area was sown in September with Diverse Native Woodland at 15.7kg/ha. Non-flowable (grass) seed was spread onto the surface using a direct drill and then the flowable components of the seed mix were spread via an air-seeder mounted on the aerator implement.
Woodlands RL155	Woodland	319,634.08 E 6,388,797.99 N	4.1	▪ The landform was constructed from a waste emplacement. ▪ The landform has been designed using a geomorphological landform approach based on alluvial analogues. Typical slope of the landform is 6 to 14 degrees. The slope has a primarily north-easterly aspect. ▪ Drainage is via rock-lined drainage lines, directing run-off to sediment control structures to the north east. ▪ Landform surface preparation comprised bulk shaping, deep ripping, rock raking, and removal of oversize rock material. ▪ Clay loam/sandy clay loam topsoil from existing topsoil stockpiles was spread at a nominal thickness of 100mm. ▪ Soil ameliorants comprising recycled gypsum and Bettergrow Biomulch compost were applied at rates of 5t/ha and 50t/ha respectively.

Rehabilitation Site Name	Type	Coordinates (GDA94)	Area (ha)	*Rehabilitation Summary*
				▪ Growth medium preparation included ameliorant incorporation, rock windrowing, rock picking, and aerating as required ▪ The area was sown in October with Diverse Native Woodland at 15.7kg/ha. Non-flowable (grass) seed was spread onto the surface using a direct drill and then the flowable components of the seed mix were spread via an air-seeder mounted on the aerator implement.