

## MEMO

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TO:	Neil Dixon	COMPANY:	BCI MINERALS
FROM:	Sam Collins	PROJECT TITLE:	FLOODWAYS ASS SURVEY
DATE:	25 February 2020	PROJECT & DOCUMENT NO:	BCI-002-1-5 005
SUBJECT:	Results of ASS screen testing carried out on floodway samples		

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Neil,

This memo summarises the results of Acid Sulfate Soil (ASS) screen testing carried out on a total of 55 soil samples collected from Floodway's 4 and 5 at the Mardie Project. Sampling was carried out according to the recommendations provided in the Department of Environment Regulation, (now Department of Water and Environment Regulation) guidelines – Identification and investigation of acid sulfate soils and acidic landscapes (DER, 2015). It was considered that the disturbance involved with the proposed floodway's constituted Major Linear Disturbance, defined as roads, railways, canals, deep sewers, wide / deep drains and dredging projects which exceeded 1m depth below ground level.

Sampling was therefore carried out at the 50m intervals recommended by the guideline for Major Linear Disturbances along the length of the two proposed floodway's. Depth of sampling varied between 1.5 and 2.0m, with samples collected at 0.25m vertical intervals. The sampling was conducted using a hand held soil auger (Plate 1) with the soil profile logged and each sample then placed in sealable plastic bags for transport to a laboratory.

A total of 9 locations were sampled along the two floodway lengths (Figure 1) with the details of each of the sampling locations provided in Table 1.

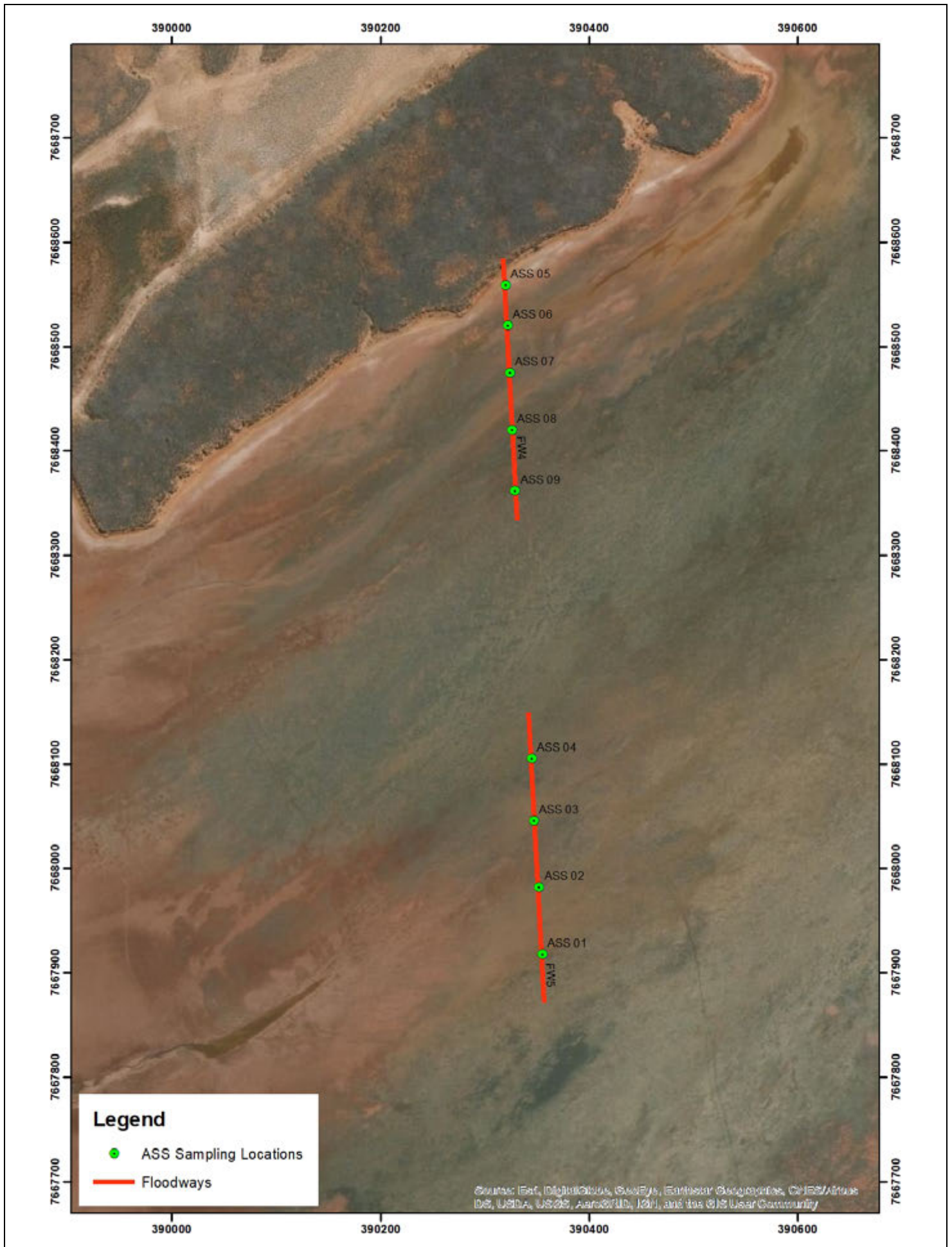
Sampling at each of the 9 locations showed a generally consistent profile across the length of sampling, with a 30 to 40 cm thick layer of very fine reddish brown silty clay overlying sub-rounded gravels varying in size from 1 – 5 cm. The gravels were loosely set in a matrix of reddish brown to grey silty loam to silty clay. The gravel lenses were generally greater than 1m in thickness with the gravel becoming finer with increasing depth. The entire profile was saturated, with the encountered water table generally occurring approximately 10cm below the ground level, varying with the exact position of the sampling site relative to the tidal channel centre line.

Plate 1: Collection of soil samples using a hand-held soil auger



Table 1: Details of sampling locations

Sample Location ID	Coordinates GDA 94 Zone 50		Depth (cm)
	Easting	Northing	
ASS 01	390,355	7,667,918	150
ASS 02	390,352	7,667,982	75 (refusal)
ASS 03	390,347	7,668,046	200
ASS 04	390,345	7,668,105	150
ASS 05	390,320	7,668,559	150
ASS 06	390,322	7,668,520	150
ASS 07	390,324	7,668,475	200
ASS 08	390,326	7,668,420	150
ASS 09	390,329	7,668,362	150



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Figure 1: ASS Sampling Locations



Screen testing was carried out on all of the samples collected in the field. This consisted of testing the pH of each sample, then forcing oxidation of potential sulfides within the samples through the addition of 30% hydrogen peroxide solution, with a follow-up test of pH (termed pHfox) to determine if acid production occurred.

Basis statistics which summarise the results of the ASS screen testing are provided in Table 2, with all results also provided as simplified logs in the appendix.

Table 2: Statistical summary of screen testing of ASS samples

	pH	pHfox	$\Delta$ pH
Maximum	8.85	8.83	-0.88
Minimum	8.15	7.36	+0.39
Average	8.44	8.26	-0.18
Median	8.42	8.27	-0.12
Standard Deviation	0.16	0.28	-

The results show that both in-situ pH and the pH following forced oxidation of all samples collected from Floodway's 4 and 5 remained above 7, indicating the presence of sulfides or ASS within these soil profiles is unlikely.

Should you have any queries regarding this report, please do not hesitate to contact us.

Yours sincerely,



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## APPENDIX A

Site ID	Depth (cm)	pH	pHfox	ΔpH
1	25	8.39	8.36	-0.03
1	50	8.45	8.07	-0.38
1	75	8.79	8.09	-0.70
1	100	8.72	8.35	-0.37
1	125	8.28	7.78	-0.50
1	150	8.42	8.68	0.26
2	25	8.32	8.13	-0.19
2	50	8.24	8.34	0.10
2	75	8.25	8.37	0.12
3	25	8.17	8.08	-0.09
3	50	8.40	8.39	-0.01
3	75	8.62	8.30	-0.32
3	100	8.37	8.55	0.18
3	125	8.78	7.92	-0.86
3	150	8.41	7.87	-0.54
3	175	8.40	7.88	-0.52
3	200	8.28	8.24	-0.04
4	25	8.42	8.29	-0.13
4	50	8.42	8.42	0.00
4	75	8.57	8.25	-0.32
4	100	8.53	8.39	-0.14
4	125	8.45	8.19	-0.26
4	150	8.41	7.95	-0.46
5	25	8.32	8.26	-0.06
5	50	8.46	8.23	-0.23
5	75	8.26	8.22	-0.04
5	100	8.74	8.67	-0.07
5	125	8.85	8.83	-0.02
5	150	8.54	7.86	-0.68
6	25	8.50	8.16	-0.34
6	50	8.21	8.27	0.06
6	75	8.51	8.13	-0.38
6	100	8.36	8.03	-0.33
6	125	8.49	8.29	-0.20
6	150	8.35	8.33	-0.02
7	25	8.31	8.63	0.32
7	50	8.49	8.37	-0.12
7	75	8.63	8.44	-0.19
7	100	8.47	8.54	0.07
7	125	8.49	8.45	-0.04
7	150	8.43	8.60	0.17

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Site ID	Depth (cm)	pH	pHfox	$\Delta$ pH
7	175	8.25	8.17	-0.08
7	200	8.41	8.36	-0.05
8	25	8.33	8.35	0.02
8	50	8.22	8.61	0.39
8	75	8.35	8.57	0.22
8	100	8.66	8.62	-0.04
8	125	8.63	8.57	-0.06
8	150	8.50	8.27	-0.23
9	25	8.49	8.22	-0.27
9	50	8.35	8.26	-0.09
9	75	8.15	7.36	-0.79
9	100	8.44	8.11	-0.33
9	125	8.70	8.16	-0.54
9	150	8.38	7.50	-0.88

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