

APPENDIX A
REPORT ON PAINT AND SANDBLAST RESULTS
FOR THE REDWOOD BRIDGE REHABILITATION PROJECT

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May 30, 2005

Project Number: 0265 376 00 01

Mr. Bill Ebenspanger
Bridge Design & Project Engineer
Administration/Project Management Branch
City of Winnipeg
2nd Floor 100 Main St Winnipeg, MB R3C 1A4

Dear Mr. Ebenspanger:

Re: Paint and Sandblast Results for the Redwood Bridge Rehabilitation Project

UMA Engineering Ltd. was retained by the City of Winnipeg Public Works Department to provide professional engineering services for the rehabilitative maintenance and related works associated with the Redwood Bridge Project. As part of rehabilitative works the bridge structure will be repainted, including removal, collection and disposal of waste paint and associated sandblast materials generated by cleaning. The following letter provides an overview of sampling methodology, laboratory testing and preliminary characterization of paint and waste materials that may be generated through sandblasting activities.

Sample Collection

On May 12, 2005, paint and paint/silica (sandblast media) material samples were collected from the upper bridge structure for chemical analysis and waste characterization. Visual inspection of the upper bridge structure indicates there are two primary paint types, including a more recently applied silver/grey paint coating the steel up to 2.5 m above the bridge deck; and an older, more weathered silver paint coating the remaining steel above 2.5 m. Visually, paint types were consistent on the north and south sides, spanning the length of the entire bridge structure. A south elevation section detail of the bridge is illustrated on Figure 01, attached. Representative bulk paint or paint/silica samples were collected from each paint type at each designated location illustrated on Figure 01. With the exception of sample BP-3, all samples were collected from the north side of the bridge structure.

Representative bulk paint samples (prefixed with "BP") were collected from three structural members by manually scraping a combination of loose and well adhered paint and placing the paint chips in polyethylene bags. Similarly, paint/silica waste materials (prefixed with "SB") were collected from three different structural members that were test cleaned to "white or near white" by conventional sandblasting methods. Paint/silica materials were placed into pre-cleaned 250 mL glass jars that were subsequently composited into two samples representing conditions below 2.5 m (SB-A) and above 2.5 m (SB-B).

Laboratory Results

Individual bulk samples were submitted for chemical determination of total metals whereas composited paint/silica waste materials were submitted for Toxicity Characteristic Leachate Procedure (TCLP). Testing of paint was done through destructive chemical processes. This method provides for accurate, highly reproducible results for levels of various heavy metals in paint. All samples were submitted to EnviroTest Laboratories in Winnipeg for analysis.

Elevated concentrations of lead were found in all samples collected, with levels ranging between 18,900 and 22,800 mg/kg for samples collected within 2.5 m of the bridge deck and between 90,600 and 132,000 mg/kg in samples collected at heights greater than 2.5 m above the bridge deck. Appreciable chromium concentrations

were also detected in all samples with levels ranging between 180 and 423 mg/kg with no significant difference in concentrations between the upper and lower paint types. Results indicated trace concentrations of cadmium (1.32 – 20.9 mg/kg) and mercury (0.03 – 0.33 mg/kg) in all samples. PCBs were not detected in any samples submitted. A summary of the findings are provided in Table 1, attached.

Leachable lead concentrations were identified in both composite samples submitted for TCLP testing. The sample representing the paint/silica waste generated from sandblasting the lower 2.5 m of the structure indicated a leachate concentration of 4.67 mg/L (SBA), whereas the paint/silica generated from cleaning the structure above 2.5 m indicated a leachate concentration of 12.9 mg/L (SBB).

Applicable Regulations

Under the Federal Hazardous Materials Liquid Coatings Act, paints and coatings may not contain lead at concentrations greater than 5,000 parts per million (ppm) or 0.5% by dry weight. On this basis, the painted surfaces of any facility should be checked for lead concentration prior to rehabilitation or demolition. Flaking and peeling paints in particular, represent a potential exposure source to lead containing dusts and should be removed appropriately. Lead is also regulated under the Canada Labour Code – Part II. Under the Canada Labour Code, the Canadian Occupational Safety and Health Regulations, Part X – Hazardous Substances would be applicable to lead-based paint. This section requires that records of hazardous substances (lead-based paint) be kept, that investigations be undertaken where hazardous materials are present, and that proper warning signs be placed by employers about hazardous materials located in the workplace.

Lead is defined as a designated material by the Manitoba Workplace Health Hazard Regulation (MR 53/88, Section 18(2)). This regulation requires that employers keep exposures to hazardous chemicals below their occupational exposure limits (OEL). The OEL for airborne lead is 50 micrograms/cubic metre ($\mu\text{g}/\text{m}^3$). This number is a time-weighted average for an eight-hour workday and a forty-hour workweek. When concentrations of airborne lead are above an action level of 25 $\mu\text{g}/\text{m}^3$, an employer is required to implement a monitoring program and to ensure that concentrations do not exceed 50 $\mu\text{g}/\text{m}^3$.

The document A Guideline for Working with Lead, published by Manitoba Department of Labour and Immigration, Workplace Safety and Health Branch documents abatement and monitoring procedures for lead impacted materials. Airborne exposure criteria, respirator requirements and mandatory worker medical testing requirements are outlined under this regulation. As with all other designated substances all personnel working around or with such materials must be made aware of their existence and supplied with training in the potential health effects and means of avoiding exposures. Lead is a cumulative toxin and thus, any exposure should be avoided.

The leachate quality criteria for lead, as defined in Manitoba Regulation 282/87 under the Dangerous Goods Handling and Transportation Act is 5.0 mg/L. Therefore, the paint is considered to be a leachable toxic substance, and would be classified as a Class 9 hazardous waste. As a hazardous substance, transportation and disposal of lead (leachable concentrations exceeding 5 mg/L) must be in compliance with the Federal Transport of Dangerous Goods (TDG) Regulations and the Manitoba Dangerous Goods Handling and Transportation Act and Regulations.

Recommendations

Lead concentrations well in excess of the 5,000 mg/kg guideline were found in all paint samples collected. Appropriate human health and environmental protection measures should be taken during all phases of rehabilitative works associated with existing painted structures.

The leachate analyses of paint/silica waste materials collected as part of this study were found to be 4.67 mg/L and 12.9 mg/L. Although the sample collected from the lower 2.5 m of the bridge structure was marginally below the TDG leachate quality criteria, all paint waste materials associated with rehabilitation works should be considered as hazardous waste and must be transported by a licensed carrier and disposed of or treated at a licensed facility. Furthermore, appropriate containment measures should be implemented to prevent discharge of waste materials into the environment (i.e. Red River).

If you have questions or require further information please contact the undersigned at 284-0580.

Sincerely,

UMA Engineering Ltd.



Andrew Passalis, E.I.T.
Earth & Environmental Division
ANP/anp

cc: B. Biswanger, UMA
L. Bielus, UMA
E. Yee, UMA

Attach.

**TABLE 1: PAINT and SANDBLAST RESULTS
REDWOOD BRIDGE, WINNIPEG, MB**

Location	Material Sampled	Sample Description	Suspected DSS	Comment	RESULTS					
					Cadmium	Chromium	Lead	Mercury	PCB	Lead Leachate (mg/L)
Method Detection Limit					0.02	0.1	0	0.02	1	0.001
BP-1A	Paint	scraping	Lead	Silver/grey	1.99	318	22,800	0.03	<1	-
BP-1B	Paint	scraping	Lead	Silver	20.2	290	90,600	0.08	<1	-
BP-2A	Paint	scraping	Lead	Silver/grey	8.68	281	19,100	0.10	<1	-
BP-2B	Paint	scraping	Lead	Silver	15.8	180	108,000	0.09	<1	-
BP-3A	Paint	scraping	Lead	Silver/grey	1.32	381	18,900	0.03	<1	-
BP-3B	Paint	scraping	Lead	Silver	33.4	432	132,000	0.33	<1	-
SBA	Paint/Silica	Sandblasted	Lead	Silver/grey	-	-	-	-	-	4.67
SBB	Paint/Silica	Sandblasted	Lead	Silver	-	-	-	-	-	12.9
FHMLC Act Guideline							5,000			
TDGA Leachate Criteria										5

Notes:

All concentrations reported in milligrams per kilogram (mg/kg) based on a dry weight basis unless otherwise noted.

"-" indicates parameter not tested.

FHMLC Act - Federal Hazardous Materials Liquid Coatings Act

BOLD - indicated result is greater than applicable guideline or criteria

All samples collected on May 12, 2005

ENVIRO-TEST FAXED ANALYSIS REPORT

PROJECT INFORMATION:

COMPANY:	UMA ENGINEERING
ATTENTION:	EDWIN YEE
LAB WORK ORDER #:	L267073
PROJECT REFERENCE:	D265
PROJECT P.O.#:	
SAMPLED BY:	A. PASSALIS
DATE RECEIVED:	12-MAY-05
FAX NUMBER:	204-475-3646
TECHNICAL QUESTIONS:	GAIL HILL
# of PAGES:	6

MESSAGE: Preliminary Results

If you require results couriered immediately, check and return by fax.

All results will be mailed unless otherwise notified.

All couriered results will be billed directly at cost.

If you did not receive all pages, Please notify 1-800-668-9878 as soon as possible

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19-MAY-05 04:39 PM

ENVIRO-TEST ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L267073-1 BP-1A Sample Date: 12-MAY-05 Matrix: BULK PAINT								
Cadmium (Cd)-Total	1.99		0.02	mg/kg	17-MAY-05	18-MAY-05	DAG	R285193
Chromium (Cr)-Total	318		0.1	mg/kg	17-MAY-05	18-MAY-05	DAG	R285193
Lead (Pb)-Total	22800	RAMB	0.05	mg/kg	17-MAY-05	18-MAY-05	DAG	R285193
Mercury (Hg)-Total	0.03		0.02	mg/kg	16-MAY-05	17-MAY-05	TEP	R284733
PCB								
Aroclor 1016	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1221	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1232	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1242	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1248	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1254	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1260	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1262	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1268	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Total PCBs	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
L267073-2 BP-1B Sample Date: 12-MAY-05 Matrix: BULK PAINT								
Cadmium (Cd)-Total	20.2		0.02	mg/kg	17-MAY-05	18-MAY-05	DAG	R285193
Chromium (Cr)-Total	290		0.1	mg/kg	17-MAY-05	18-MAY-05	DAG	R285193
Lead (Pb)-Total	90600	RAMB	0.05	mg/kg	17-MAY-05	18-MAY-05	DAG	R285193
Mercury (Hg)-Total	0.08		0.02	mg/kg	16-MAY-05	17-MAY-05	TEP	R284733
PCB								
Aroclor 1016	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1221	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1232	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1242	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1248	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1254	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1260	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1262	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1268	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Total PCBs	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
L267073-3 BP-2A Sample Date: 12-MAY-05 Matrix: BULK PAINT								
Cadmium (Cd)-Total	8.68		0.02	mg/kg	17-MAY-05	18-MAY-05	DAG	R285193
Chromium (Cr)-Total	281		0.1	mg/kg	17-MAY-05	18-MAY-05	DAG	R285193
Lead (Pb)-Total	19100	RAMB	0.05	mg/kg	17-MAY-05	18-MAY-05	DAG	R285193
Mercury (Hg)-Total	0.10		0.02	mg/kg	16-MAY-05	17-MAY-05	TEP	R284733
PCB								
Aroclor 1016	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1221	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1232	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1242	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1248	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1254	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307

ENVIRO-TEST ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L267073-3 BP-2A Sample Date: 12-MAY-05 Matrix: BULK PAINT								
PCB								
Aroclor 1260	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1262	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1268	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Total PCBs	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
L267073-4 BP-2B Sample Date: 12-MAY-05 Matrix: BULK PAINT								
Cadmium (Cd)-Total	15.8		0.02	mg/kg	17-MAY-05	18-MAY-05	DAG	R285193
Chromium (Cr)-Total	180		0.1	mg/kg	17-MAY-05	18-MAY-05	DAG	R285193
Lead (Pb)-Total	108000	RAMB	0.05	mg/kg	17-MAY-05	18-MAY-05	DAG	R285193
Mercury (Hg)-Total	0.09		0.02	mg/kg	16-MAY-05	17-MAY-05	TEP	R284733
PCB								
Aroclor 1016	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1221	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1232	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1242	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1248	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1254	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1260	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1262	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1268	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Total PCBs	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
L267073-5 BP-3A Sample Date: 12-MAY-05 Matrix: BULK PAINT								
Cadmium (Cd)-Total	1.32		0.02	mg/kg	17-MAY-05	18-MAY-05	DAG	R285193
Chromium (Cr)-Total	381		0.1	mg/kg	17-MAY-05	18-MAY-05	DAG	R285193
Lead (Pb)-Total	18900	RAMB	0.05	mg/kg	17-MAY-05	18-MAY-05	DAG	R285193
Mercury (Hg)-Total	0.03		0.02	mg/kg	16-MAY-05	17-MAY-05	TEP	R284733
PCB								
Aroclor 1016	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1221	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1232	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1242	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1248	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1254	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1260	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1262	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Aroclor 1268	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
Total PCBs	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
L267073-6 BP-3B Sample Date: 12-MAY-05 Matrix: BULK PAINT								
Cadmium (Cd)-Total	33.4		0.02	mg/kg	17-MAY-05	18-MAY-05	DAG	R285193
Chromium (Cr)-Total	432		0.1	mg/kg	17-MAY-05	18-MAY-05	DAG	R285193

ENVIRO-TEST ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L267073-6	BP-3B								
Sample Date: 12-MAY-05									
Matrix: BULK PAINT									
	Lead (Pb)-Total	132000	RAMB	0.05	mg/kg	17-MAY-05	18-MAY-05	DAG	R285193
	Mercury (Hg)-Total	0.33		0.02	mg/kg	16-MAY-05	17-MAY-05	TEP	R284733
PCB									
	Aroclor 1016	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
	Aroclor 1221	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
	Aroclor 1232	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
	Aroclor 1242	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
	Aroclor 1248	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
	Aroclor 1254	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
	Aroclor 1260	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
	Aroclor 1262	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
	Aroclor 1268	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
	Total PCBs	<1	DLM	1	ug	17-MAY-05	18-MAY-05	THT	R285307
L267073-7	SBA								
Sample Date: 12-MAY-05									
Matrix: BULK PAINT									
Leachate metals by TCLP									
Leachate prep TCLP									
Leachate metals by TCLP									
	Silver (Ag)-Total	<0.001		0.001	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
	Arsenic (As)-Total	0.0010		0.0005	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
	Boron (B)-Total	<0.03	RAMB	0.03	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
	Barium (Ba)-Total	0.0140	RAMB	0.0003	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
	Beryllium (Be)-Total	<0.001		0.001	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
	Cadmium (Cd)-Total	0.0035		0.0002	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
	Cobalt (Co)-Total	0.0090	RAMB	0.0002	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
	Chromium (Cr)-Total	0.009	RAMB	0.001	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
	Copper (Cu)-Total	0.044	RAMB	0.001	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
	Iron (Fe)-Total	3.53	RAMB	0.05	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
	Mercury (Hg)-Total	<0.0004		0.0004	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
	Nickel (Ni)-Total	<0.002	RAMB	0.002	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
	Lead (Pb)-Total	4.67	RAMB	0.0005	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
	Antimony (Sb)-Total	<0.001		0.001	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
	Selenium (Se)-Total	<0.001		0.001	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
	Thallium (Tl)-Total	<0.0001		0.0001	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
	Uranium (U)-Total	0.0005		0.0001	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
	Vanadium (V)-Total	<0.001	RAMB	0.001	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
	Zinc (Zn)-Total	7.41	RAMB	0.01	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
	Zirconium (Zr)-Total	0.0008		0.0004	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
L267073-8	SBB								
Sample Date: 12-MAY-05									
Matrix: SILICA & PAINT									
Leachate metals by TCLP									
Leachate prep TCLP									
Leachate metals by TCLP									
	Silver (Ag)-Total	<0.001		0.001	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
	Arsenic (As)-Total	0.0029		0.0005	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
	Boron (B)-Total	<0.03	RAMB	0.03	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
	Barium (Ba)-Total	0.123	RAMB	0.0003	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
	Beryllium (Be)-Total	<0.001		0.001	mg/L	17-MAY-05	17-MAY-05	DAG	R284770

ENVIRO-TEST ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L267073-8								
SBB								
Sample Date: 12-MAY-05								
Matrix: SILICA & PAINT								
Leachate metals by TCLP								
Leachate metals by TCLP								
Cadmium (Cd)-Total	0.0126		0.0002	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
Cobalt (Co)-Total	0.0051	RAMB	0.0002	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
Chromium (Cr)-Total	0.001	RAMB	0.001	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
Copper (Cu)-Total	0.039	RAMB	0.001	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
Iron (Fe)-Total	2.25	RAMB	0.05	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
Mercury (Hg)-Total	<0.0004		0.0004	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
Nickel (Ni)-Total	<0.002	RAMB	0.002	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
Lead (Pb)-Total	12.9	RAMB	0.0005	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
Antimony (Sb)-Total	<0.001		0.001	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
Selenium (Se)-Total	<0.001		0.001	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
Thallium (Tl)-Total	<0.0001		0.0001	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
Uranium (U)-Total	0.0004		0.0001	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
Vanadium (V)-Total	<0.001	RAMB	0.001	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
Zinc (Zn)-Total	14.0	RAMB	0.01	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
Zirconium (Zr)-Total	0.0006		0.0004	mg/L	17-MAY-05	17-MAY-05	DAG	R284770
Refer to Referenced Information for Qualifiers (if any) and Methodology.								

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
DLM	Detection Limit Adjustment For Sample Matrix Effects
RAMB	Result Adjusted For Method Blank

Methods Listed (if applicable):

ETL Test Code	Matrix	Test Description	Preparation Method Reference(Based On)	Analytical Method Reference(Based On)
CD-LOW-WP	Soil	Cadmium (Cd)-Total		EPA 200.8 Rev 5.4 May 1994
CR-LOW-WP	Soil	Chromium (Cr)-Total		EPA 200.8 Rev 5.4 May 1994
HG-TOT-CV-WP	Soil	Mercury Total		EPA 7470A Rev 1,1994
A hydrochloric acid/nitric acid and potassium persulphate block digestion is employed to oxidize the organomercury to inorganic mercury. After digestion, samples are analyzed using cold vapour techniques.				
METAL-TCLP-LOW-WP	Water	Leachate metals by TCLP		EPA 200.8 Rev 5.4 May 1994
PB-LOW-WP	Soil	Lead (Pb)-Total		EPA 200.8 Rev 5.4 May 1994
PCB-WP	Misc.	PCB		EPA SW-846, 3550A, Sep 1994

** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.

Chain of Custody numbers:

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WP	Enviro-Test Laboratories - Winnipeg, Manitoba, Canada		

Samples Requiring Regular Turnaround

Sample #	Client sample ID	Sample #	Client sample ID
L267073-1	BP-1A		
L267073-2	BP-1B		
L267073-3	BP-2A		
L267073-4	BP-2B		
L267073-5	BP-3A		
L267073-6	BP-3B		
L267073-7	SBA		
L267073-8	SBB		

GLOSSARY OF REPORT TERMS

Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in environmental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds. The reported surrogate recovery value provides a measure of method efficiency. The Laboratory warning units are determined under column heading D.L.

mg/kg (units) - unit of concentration based on mass, parts per million

mg/L (units) - unit of concentration based on volume, parts per million

< - Less than

D.L. - Detection Limit

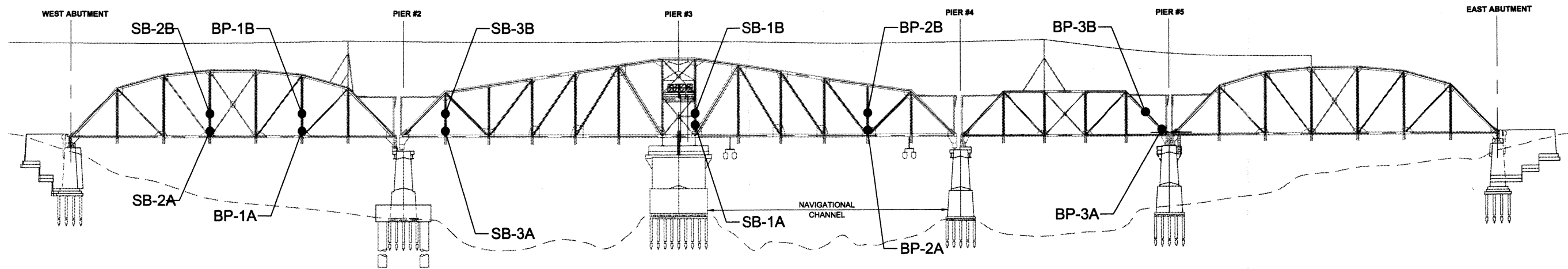
N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
UNLESS OTHERWISE STATED, SAMPLES ARE NOT CORRECTED FOR CLIENT FIELD BLANKS.

Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

Enviro-Test Laboratories has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, Enviro-Test Laboratories assumes no liability for the use or interpretation of the results.



BP = BULK PAINT SAMPLE LOCATION
SB = PAINT/SILICA (SANDBLAST) SAMPLE LOCATION
ALL SAMPLES WITH EXCEPTION OF BP-3 COLLECTED
ON NORTH SIDE OF BRIDGE STRUCTURE

City of Winnipeg
Redwood Bridge Rehabilitation
Paint and Sandblast Sample Locations

South Elevation