WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4/9/07	Dave Rentrew	FG
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
104		33.17665	-117.34960
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1504	1508	

FIELD TEAM
FG/JS

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.) wind from the west.
sunny, temp = 70°F

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☒ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☒ OTHER algae clumps
	☐ OBJECTS (DESCRIBE)					
TURBIDI'	☐ HEAVY CLOUDINESS, OPAQUE	☒ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 9.28 TEMPERATURE (°c) 26.36 CONDUCTIVITY (µS/cm) 4237 DO ~~20~~ EC 26.00

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

bottom pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

Depth: 5'
#4ST556

motored and rowed to site. dropped anchor and measured field parameters

TEAM LEADER'S SIGNATURE Beth E Goldstf

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
PVL Sewage	4/9/07	Dave Renfrew	FG
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
105		33.17733	-117.34529
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1517	1519	
FIELD TEAM	FG/JS		

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.) sunny temp ≈ 70°F wind from the west.

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☒ OTHER algae clumps
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☒ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION) visible live fish

FIELD MEASUREMENTS: surface pH 9.16 TEMPERATURE (°C) 23.25 CONDUCTIVITY (µS/cm) 3662 DO 23.98 mg/L

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

bottom pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

Depth = 9 in

MSF 556

motored to site, dropped anchor, took field measurements

TEAM LEADER'S SIGNATURE [signature]

45556

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BUL FISH KILL	4-9-07	D. Rowland	MIKE A.
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
~~10~~ 10A MA		33.16820	117.35600
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
0	0630	0638	0
FIELD TEAM			
LC / MA			

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

100% OVERCAST SLIGHT DRIZZLE — MAY-FLIES - BAD ODOR

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☑ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☑ GREEN	☐ BLUE	☑ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)				None	
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☑ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

ALG FROM CATTAILS

FIELD MEASUREMENTS: surface pH 7.94 TEMPERATURE (°C) 19.54 CONDUCTIVITY (µS/cm) 3218 DO 3.96

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 7.94 TEMP (°C) 19.55 CONDUCTIVITY (µS/cm) 3212 DO 3.99

bottom pH 7.94 TEMP (°C) 19.52 CONDUCTIVITY (µS/cm) 3195 DO 3.85

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

DEPTH- 4' 04"

TEAM LEADER'S SIGNATURE M. Hyde

QA/QC 125

7:56

	pH	Temp	Cond	DO
Surface	7.96	19.41	3194	4.08
Middle	7.93	19.41	3190	3.86
Bottom	7.94	19.40	3192	3.70

✓

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BNL FISH KILL	4-9-07	D. Reinfelder	Mike A.
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10B		33.16779	117.35435
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
0	0640	0644	0
FIELD TEAM			
LC Mike A.			

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

100% clear winds 0-5 NW

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☑ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☑ GREEN	☐ BLUE	☑ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)				— None	
TURBIDI	☑ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY		☐ SOME CLOUDINESS	☐ NONE	

WATER QUALITY APPEARANCE COMMENTS:

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

Grasses 50' from shore

FIELD MEASUREMENTS: surface pH 8.08 TEMPERATURE (°c) 19.34 CONDUCTIVITY (µS/cm) 3102 DO 5.20

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle	pH 8.08	TEMP (°C) 19.33	CONDUCTIVITY (µS/cm) 3104	DO 5.15
bottom	pH 8.07	TEMP (°C) 19.33	CONDUCTIVITY (µS/cm) 3103	DO 5.11

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

Depth 2' 06"

TEAM LEADER'S SIGNATURE M. Ayres

QA/QC 23

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BUL Fish Kill	4-9-07	D. Renfrew	Mike A.
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
01		33 16892	117 35061
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
0	0649	0653	0
FIELD TEAM			
LC / Mike A.			

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

100% overcast WIND: 0-5 kts NW

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☑ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☑ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)					None
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☑ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

Dark Algae 40' From Station

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 8.18 TEMPERATURE (°C) 19.54 CONDUCTIVITY (µS/cm) 3152 DO 5.54

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle	pH 8.18	TEMP (°C) 19.54	CONDUCTIVITY (µS/cm) 3152	DO 5.56
bottom	pH 8.17	TEMP (°C) 19.55	CONDUCTIVITY (µS/cm) 3152	DO 5.42

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

Depth - 3' 0"

TEAM LEADER'S SIGNATURE M. Ryan

04/60 NS

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BUL Fish Kill	4-9-07	D. Renfrew	Mike A.
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10E		33.17059	117.35169
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
0	0656	0659	0
FIELD TEAM			
LC Mike A.			

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

100% Clear
Wind: 0-5 kts NW

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☑ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☑ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)			None		
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☑ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

Cattails 60' from SSA-00

FIELD MEASUREMENTS: surface pH 8.25 TEMPERATURE (°C) 19.57 CONDUCTIVITY (µS/cm) 3157 DO 6.90

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 8.25 TEMP (°C) 19.59 CONDUCTIVITY (µS/cm) 3158 DO 6.79

bottom pH 8.25 TEMP (°C) 19.59 CONDUCTIVITY (µS/cm) 3158 DO 6.64

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

Depth - 3' 03"

TEAM LEADER'S SIGNATURE M. Agnes

04/20.33

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL FHL KILL	4-9-07	D. RENFROW	MIKE A.
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10X 1of		33.17190	117.35277
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
0	0703	0707	0
FIELD TEAM			
LC MIKE A			

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

100% OVERCAST
WIND 0-5 KTS NW

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☑ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☑ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)		— None			
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☑ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

CASTAICS 40' FROM STATION

FIELD MEASUREMENTS: surface pH 8.10 TEMPERATURE (°c) 19.36 CONDUCTIVITY (µS/cm) 3284 DO 6.56

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle	pH 8.11	TEMP (°C) 19.36	CONDUCTIVITY (µS/cm) 3288	DO 6.48	6.48 MM
bottom	pH 8.09	TEMP (°C) 19.29	CONDUCTIVITY (µS/cm) 3264	DO 5.70	

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

DEPTH- 2' 07"

TEAM LEADER'S SIGNATURE Mike A.

04/100.23

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL, Fish Kill	4/30/10	D. Reinfelder	Mike A.
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
106.	—	33.17331	117.35075
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
—	0711	0714	—
FIELD TEAM			
LC Mike A.			

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

Top of overcast Winds 0-5 kts NW

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☑ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☑ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)			— None		
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☑ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

CASTALIS 2-3 from station

FIELD MEASUREMENTS: surface pH 8.06 TEMPERATURE (°C) 19.26 CONDUCTIVITY (µS/cm) 3263 DO 5.24

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle	pH	8.05	TEMP (°C)	19.26	CONDUCTIVITY (µS/cm)	3263	DO 5.19
bottom	pH	8.03	TEMP (°C)	19.29	CONDUCTIVITY (µS/cm)	3251	DO 5.04

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

Depth - 2' 06"

TEAM LEADER'S SIGNATURE [signature]

04/30/10 NS

✓

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4/9/07	Renfrew	NW
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10A		33.16821	-117.35608
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1259	1305	

FIELD TEAM
N Woodward, J Scholler

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)
Sunny, 3-5kts west

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☒ OTHER
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☒ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 8.14 TEMPERATURE (°C) 21.10 CONDUCTIVITY (µS/cm) 3317 DO 7.78 mg/L

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 8.07 TEMP (°C) 20.81 CONDUCTIVITY (µS/cm) 3288 DO 6.83 mg/L

bottom pH 8.04 TEMP (°C) 20.67 CONDUCTIVITY (µS/cm) 3270 DO 6.41 mg/L

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

depth 2/4ft WQ measurements YSI 556

TEAM LEADER'S SIGNATURE

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4/9/07	Refrew	NW
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10 B		33.16779	-117.35485
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1308		

FIELD TEAM
N. Woodward, J Sunollee

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)
partly cloudy, 3-5 kts W

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☑ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☑ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)		algal clumps			
TURBIDI	☒ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:
algal clumps floating on surface. Brn particulates.

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 8.25 TEMPERATURE (°C) 21.02 CONDUCTIVITY (µS/cm) 3113 DO 8.70 mg/L

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 8.28 TEMP (°C) 20.98 CONDUCTIVITY (µS/cm) 3115 DO 8.71 mg/L

bottom pH 8.30 TEMP (°C) 20.88 CONDUCTIVITY (µS/cm) 3115 DO 8.77 mg/L

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)
WQ measurements w/ YSI 556

Depth 2' 7"

TEAM LEADER'S SIGNATURE

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4/9/07	Renfrew	NW
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10 D	—	33.16877	-117.35032
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1315	1320	—
FIELD TEAM	N Woodward, J Scholle		

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

Partly Cloudy, 5-10 kts west

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☒ OTHER
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☒ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

Some bubbles on surface

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

—

FIELD MEASUREMENTS: surface pH 8.38 TEMPERATURE (°C) 21.62°C CONDUCTIVITY (µS/cm) 3146 DO 9.28 mg/L

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle	pH 8.38	TEMP (°C) 21.63°C	CONDUCTIVITY (µS/cm) 3147	DO 9.02 mg/L
bottom	pH 8.38	TEMP (°C) 21.59	CONDUCTIVITY (µS/cm) 3144	DO 9.32 mg/L

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

depth 2'-9" WQ measurements w/ YSI 556

TEAM LEADER'S SIGNATURE

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4/9/07	Renfrew	MW
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10 E		33.17064	-117.35165
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1325		

FIELD TEAM M. Woodward, J. Smolée

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

partly cloudy; 3-5 kts west

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☒ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

Mixing @ surface due to wind

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

✓

FIELD MEASUREMENTS: surface pH 8.5 TEMPERATURE (°C) 21.62 CONDUCTIVITY (µS/cm) 3209 DO 10.36

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle	pH 8.51	TEMP (°C) 21.56	CONDUCTIVITY (µS/cm) 3211	DO 10.25
bottom	pH 8.50	TEMP (°C) 21.52	CONDUCTIVITY (µS/cm) 3211	DO 10.28

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

3M depth 3ft 1inch WQ measurements w/ YSI 556

TEAM LEADER'S SIGNATURE [signature]

✓

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4/9/07	Renfrew	NW
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10P	✓	33.17196	-117.35269
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1335	1340	✓

FIELD TEAM N. Woodward, J. Schulee

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

Partly Cloudy, 3-5kts west, 68°

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☒ OTHER See Comments
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☒ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS: fine particulates, algal clumps

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

✓

FIELD MEASUREMENTS: surface pH 8.28 TEMPERATURE (°C) 21.98 CONDUCTIVITY (µS/cm) 3282 DO 10.47

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 8.27 TEMP (°C) 21.93 CONDUCTIVITY (µS/cm) 3284 DO 10.45

bottom pH 8.27 TEMP (°C) 21.80 CONDUCTIVITY (µS/cm) 3281 DO ~~11.12~~ (M) 10.6 mg/L

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

depth 21.8'11 WQ measurements YSI 556

TEAM LEADER'S SIGNATURE

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4/9/07	Ken Trew	NW
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10 G	—	33.17336	-117.35062
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1345	1350	—

FIELD TEAM
N. Woodward, J Schollée

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)
Partly cloudy, 3-5 kts west, 68°C

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☒ OTHER see Comments
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☒ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:
algal clumps, bubbles, fine algal particulates

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 8.22 TEMPERATURE (°C) 21.55C CONDUCTIVITY (µS/cm) 3249 DO 8.34 mg/L

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle	pH 8.21	TEMP (°C) 21.55	CONDUCTIVITY (µS/cm) 3248	DO 8.09 mg/L
bottom	pH 8.21	TEMP (°C) 21.53	CONDUCTIVITY (µS/cm) 3248	DO 8.17 mg/L

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)
depth 2.24
WQ measurements taken w/ YSI 556

TEAM LEADER'S SIGNATURE _____

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
SW Sewage	4/9/07	Dave Rentrew	EG
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
106		33.17820	-117.34181
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1310		

FIELD TEAM EG / DM

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)
Wind from the west. temp ≈ 70°F, sunny with very few clouds

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☒ SUDS	☒ OTHER bubbles
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☒ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS: few suds from the aerator

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH ~~10.17~~ TEMPERATURE (°C) 21.65 CONDUCTIVITY (µS/cm) 4345 DO _____ see back for data (MS)

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

bottom pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

depth = 2.4 ft

YSI 600XL rental from Ashtead

motored to site, dropped anchor, recorded depth and field measurements

pH probe seems broken.

Site is directly next to an aerator ≈ 3 ft.

TEAM LEADER'S SIGNATURE Erika L Gobat

Paul Hartman from Carlsbad got similar DO readings at this site (≈20) & we stopped taking measurements to recalibrate probe, because DO was reading ≈ 19 mg/L

water quality also done with YSI 556

see other side

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
SM Sewage	4/9/07	Dave Rentrew	EG
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
106		33.17820	-117.34181
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1310		
FIELD TEAM	EG / DM		

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)
Wind from the west. temp ≈ 70°F, sunny with very few clouds

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☒ SUDS	☒ OTHER bubbles
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☒ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS: few suds from the aerator

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 10.17 TEMPERATURE (°C) 21.65 CONDUCTIVITY (µS/cm) 4345 DO _____ see back for data (M)

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

bottom pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

depth = 2.4 ft

YSI 600XL control from Ashtead

Motored to site, dropped anchor, recorded depth and field measurements

pH probe seems broken.

Site is directly next to an aerator ≈ 3 ft.

TEAM LEADER'S SIGNATURE Cathi L Gobat

Pat Hartman from Carlsbad got sonde. DO readings at this site (≈20) + we stopped taking measurements to recalibrate probe, because DO was reading ≈ 19 mg/L

water quality also done with YSI 556

see other side

106 GPS 33.17823, -117.34182 YSI 556

Time 1452 Depth = 2 ft 1 in

Top Temp = 22.89 °C
Cond = 3958 uS
pH = 8.91 pH
DO = 19.42 mg/L

Middle Temp = 22.48 °C
Cond = 3930 uS
pH = ~~16.8~~ 8.77
DO = 16.83 mg/L

Bottom Temp = 22.36 °C
Cond = 3911 uS
pH = 8.71
DO = 16.61 mg/L

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4/9/07	Dave Reatrew	FG
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
107		33.17896	-117.34198
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1300	1307	
FIELD TEAM	FG/DM		

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)
wind from the west. sunny with very few clouds
temp = 70°F

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☒ faint SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☒ OTHER few bubbles and algae clumps
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☒ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 9.80 TEMPERATURE (°C) 20.84 CONDUCTIVITY (µS/cm) 4091 DO 9.38 mg/L

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 9.64 TEMP (°C) 20.33 CONDUCTIVITY (µS/cm) 4037 DO 7.51 mg/L

bottom pH 9.61 TEMP (°C) 20.14 CONDUCTIVITY (µS/cm) 4021 DO 4.37

see back for more data

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

total depth = 5.2 feet
- pH seems to be reading high

returned to site redropped anchor at buoy. Took depth and field measurements

YSI ~~650~~ F rental from Ashtead 600XL

TEAM LEADER'S SIGNATURE Erin Dobbelaar

water quality also done with 451556
see other side

107 GPS 33.17899, -117.34148 YSI 556

Time 1444 Depth = 5ft 3in

Top 21.55°C = Temp

3775 uS = cond

12.56 mg/L = DO

8.48 = pH

Bottom ~~Middle~~ FC 21.95 °C = temp

3776 uS = cond

8.28 = pH

8.37 mg/L = DO

Middle 21.34 °C = Temp

3776 uS = cond

8.41 = pH

11.25 = DO

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Laguna Sewage	4/9/07	Dave Rentrew	EG
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
108		33.17934	-117.3419
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1435	1439	

FIELD TEAM EG/JS

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.) very slight breeze. protected from west wind by vegetation. temp ≈ 70°F sunny with very few clouds

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☒ slight SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☒ few SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☒ CLOUDY		☐ SOME CLOUDINESS	☐ NONE	

WATER QUALITY APPEARANCE COMMENTS:

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 8.55 TEMPERATURE (°C) 21.78 CONDUCTIVITY (µS/cm) 3792 DO 13.81

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 8.55 TEMP (°C) 21.70 CONDUCTIVITY (µS/cm) 3800 DO 13.95

bottom pH 8.41 TEMP (°C) 21.35 CONDUCTIVITY (µS/cm) 3828 DO 11.84

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

Depth = 3 ft 8 in

YE 556

Motored to site. Dropped anchor took depth and field measurements site is ≈ 15 ft from aerator

TEAM LEADER'S SIGNATURE Edith O. Gelcer

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
SVL Sewage	4/9/07	Dave Rentrew	EG
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
109		33.17919	-117.34087
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1251	1259	
FIELD TEAM			
EG/DM			

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)
Wind from the west. temp ~ 70° F
Sunny with very few clouds

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☒ faint SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☒ OTHER none
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☒ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS: no bubbles, definitely less odor than previous week

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 9.86 / 2.5 ft TEMPERATURE (°C) 20.86 CONDUCTIVITY (µS/cm) 4092 DO 9.38 mg/L top

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 9.86 TEMP (°C) 20.87 CONDUCTIVITY (µS/cm) 4090 DO 9.28 mg/L

bottom pH 9.92 TEMP (°C) 20.86 CONDUCTIVITY (µS/cm) 4089 DO 9.19 mg/L

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

total depth = ~~2.5 ft~~ HG 2.9 ft
600 mL
YSI-550 Rentze
EG from Ashtead
motored to site, dropped anchor, took depth and field measurements
pH seemed a little high.
site is directly next to an aerator.

TEAM LEADER'S SIGNATURE Erik O Goebel

water quality also done with YSI 556 see other side over →

EG/SS

Site 109 GPS 33.17920, -117.34087 YSI 556

Time: 1427 Depth = 1ft 5in

Top Temp = 21.53 °C
cond = 3770 uS
DO = 11.43 mg/L
pH = 8.40

Middle Temp = 21.41 °C
cond = 3772 uS
DO = 11.15 mg/L
pH = 8.39

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4/9/07	Renfrew	NW
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10 A		33.16821	117.35608
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1259	1305	

FIELD TEAM
N Woodward, J Schollée

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)
Sunny, 3-5 kts west

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☒ OTHER
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☒ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 8.14 TEMPERATURE (°C) 21.10 CONDUCTIVITY (µS/cm) 3317 DO 7.78 mg/L

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 8.07 TEMP (°C) 20.81 CONDUCTIVITY (µS/cm) 3288 DO 6.83 mg/L

bottom pH 8.04 TEMP (°C) 20.67 CONDUCTIVITY (µS/cm) 3270 DO 6.41 mg/L

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

depth 2 ft WQ measurements YSI 556

TEAM LEADER'S SIGNATURE

04/26/07

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BrL Sewage	4/9/07	Kentrew	MW
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10 B		33.16779	-117.35435
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1308		

FIELD TEAM
N. Woodward, J Sunollee

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)
partly cloudy, 3-5 kts W

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☒ ORGANIC MATERIAL algal clumps	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☒ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY		☐ SOME CLOUDINESS	☐ NONE	

WATER QUALITY APPEARANCE COMMENTS:
algal clumps floating on surface. And particulates.

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 8.25 TEMPERATURE (°C) 21.02 CONDUCTIVITY (µS/cm) 3113 DO 8.70 mg/L

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle	pH 8.28	TEMP (°C) 20.98	CONDUCTIVITY (µS/cm) 3115	DO 8.71 mg/L
bottom	pH 8.30	TEMP (°C) 20.88	CONDUCTIVITY (µS/cm) 3115	DO 8.77 mg/L

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)
WQ measurements w/ YSI 556

depth 2' 7"

TEAM LEADER'S SIGNATURE

04/26/07

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4/9/07	Renfrew	NW
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10 D	—	33.16877	-117.35032
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1315	1320	—

FIELD TEAM
N. Woodward, J Scholle

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)
partly cloudy, 5-10 kts west

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☒ OTHER
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☒ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:
Some bubbles on surface

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)
—

FIELD MEASUREMENTS: surface pH 8.38 TEMPERATURE (°C) 21.62°C CONDUCTIVITY (µS/cm) 3146 DO 9.28 mg/L

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle	pH	8.38	TEMP (°C)	21.63°C	CONDUCTIVITY (µS/cm)	3147	DO 9.02 mg/L
bottom	pH	8.38	TEMP (°C)	21.59	CONDUCTIVITY (µS/cm)	3144	DO 9.32 mg/L

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)
depth 2.9'
WQ measurements w/ YSI 556

TEAM LEADER'S SIGNATURE

4/9/07 ✓

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4/9/07	Renfrew	NW
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10E	—	33.17064	-117.35165
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1325		—

FIELD TEAM N. Woodward, J. Sinoilee

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

partly cloudy; 3-5 kts west

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☒ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

Mixing @ surface due to wind

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

—

FIELD MEASUREMENTS: surface pH 8.51 TEMPERATURE (°C) 21.62 CONDUCTIVITY (µS/cm) 3209 DO 10.36

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle	pH 8.51	TEMP (°C) 21.56	CONDUCTIVITY (µS/cm) 3211	DO 10.25
bottom	pH 8.50	TEMP (°C) 21.52	CONDUCTIVITY (µS/cm) 3211	DO 10.28

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

~~3M~~ depth 3ft 1inch WQ measurements w/ YSI 556

TEAM LEADER'S SIGNATURE

QA/QC NS

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4/9/07	Renfrew	NW
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10P	✓	33.17196	-117.35269
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1335	1340	✓

FIELD TEAM N. Woodward, J. Schulte

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

Partly Cloudy, 3-5kts West, 68°

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☒ OTHER See Comments
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☒ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

fine particulates
algal clumps

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

✓

FIELD MEASUREMENTS: surface pH 8.28 TEMPERATURE (°C) 21.98 CONDUCTIVITY (µS/cm) 3282 DO 10.47

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 8.27 TEMP (°C) 21.93 CONDUCTIVITY (µS/cm) 3284 DO 10.45 (M)

bottom pH 8.27 TEMP (°C) 21.80 CONDUCTIVITY (µS/cm) 3281 DO ~~11.12~~ 10.64 mg/L

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

depth WQ measurements YSI 556

21 ft

TEAM LEADER'S SIGNATURE [signature]

24/12C 25

✓

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4/9/07	Ken Trew	NW
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10 G	—	33.17336	-117.35062
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1345	1350	—
FIELD TEAM			
N. Woodward, J Scholle			

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

Partly cloudy, 3-5 kts west, 68°C

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☒ OTHER see Comments
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☒ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

algal clumps, bubbles, fine algal particulates.

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

—

FIELD MEASUREMENTS: surface pH 8.22 TEMPERATURE (°C) 21.55C CONDUCTIVITY (µS/cm) 3249 DO 8.34 mg/L

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 8.21 TEMP (°C) 21.55 CONDUCTIVITY (µS/cm) 3248 DO 8.09 mg/L

bottom pH 8.21 TEMP (°C) 21.53 CONDUCTIVITY (µS/cm) 3248 DO 8.17 mg/L

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

depth 2'2.4

WQ measurements taken w/ YSI 556

TEAM LEADER'S SIGNATURE _____

Q4/08 NS

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL	10 Apr 07	Renfrew	B Isham
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10A	33.16824	117.35596	
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
4.3' deep	0600	0635	0630

FIELD TEAM
B. Isham L. Campagna

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)
Ptly Cldy, Calm wind ~ 65°F

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☒ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☒ GREEN	☐ BLUE	☑ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☒ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 8.10 TEMPERATURE (°C) 20.19 CONDUCTIVITY (µS/cm) 3278 DO 5.00 mg/l

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 8.08 TEMP (°C) 20.19 CONDUCTIVITY (µS/cm) 3275 DO 4.95 mg/l

bottom pH 8.08 TEMP (°C) 20.19 CONDUCTIVITY (µS/cm) 3277 DO 4.99 mg/l

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)
10A - WQ

TEAM LEADER'S SIGNATURE B Isham

09/80A

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL	10 Apr 07	Renfrew	B. Isham
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10B		33.16776	117.35443
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
2.7" deep	0645	0650	0645

FIELD TEAM
B. Isham L. Campagna

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)
Ptly Cldy, Calm Wind

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)				None	
TURBIDI	☒ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY		☐ SOME CLOUDINESS	☐ NONE	

WATER QUALITY APPEARANCE COMMENTS:
Usual

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)
None

FIELD MEASUREMENTS: surface pH 8.21 TEMPERATURE (°C) 19.95 CONDUCTIVITY (µS/cm) 3122 DO 5.82 mg/l

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 8.12 TEMP (°C) 19.95 CONDUCTIVITY (µS/cm) 3123 DO 5.83 mg/l

bottom pH 8.19 TEMP (°C) 19.99 CONDUCTIVITY (µS/cm) 3115 DO 5.65 mg/l

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)
WQ readings

TEAM LEADER'S SIGNATURE B. Isham

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WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL	10 Apr 07	Renfrew	B. Isham
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
2' 9" deep		33.16898	117.35067
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
10D	0655	0700	0655

FIELD TEAM
B. Isham L. Campagna

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)
Pfly Cldy / No Wind

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)				None	
TURBIDI	☒ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:
Usual

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)
None

FIELD MEASUREMENTS: surface pH 8.10 TEMPERATURE (°C) 20.50 CONDUCTIVITY (µS/cm) 3154 DO 3.95 mg/l

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 8.08 TEMP (°C) 20.50 CONDUCTIVITY (µS/cm) 3154 DO 3.84 mg/l

bottom pH 8.07 TEMP (°C) 20.54 CONDUCTIVITY (µS/cm) 3152 DO 3.75 mg/l

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)
WQ readings

TEAM LEADER'S SIGNATURE B Isham

QA/QC NS

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL	10 Apr 07	Renfrew	B. Ishan
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10E		33.17044	117.35175
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
2' 10" deep	0705	0710	0705

FIELD TEAM
B. Ishan L. Campagna

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)				None	
TURBIDI	☒ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY		☐ SOME CLOUDINESS	☐ NONE	

WATER QUALITY APPEARANCE COMMENTS:
Visual

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)
None

FIELD MEASUREMENTS: surface pH 8.28 TEMPERATURE (°c) 20.46 CONDUCTIVITY (µS/cm) 3162 DO 6.25 mg/l

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 8.28 TEMP (°C) 20.46 CONDUCTIVITY (µS/cm) 3162 DO 6.20 mg/l

bottom pH 8.27 TEMP (°C) 20.49 CONDUCTIVITY (µS/cm) 3161 DO 6.11 mg/l

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)
WQ readings

TEAM LEADER'S SIGNATURE BIsha

QA/QC 23

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL	10 Apr 07	Renfrew	B. Isham
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10F		33.17193	117.35271
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
2'5" deep	0710	0715	0710

FIELD TEAM
B. Isham L. Campagna

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)
Ptly Cldy / No Wind

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)			None		
TURBIDI	☒ HEAVY CLOUDINESS, OPAQUE		☐ CLOUDY	☐ SOME CLOUDINESS	☐ NONE	

WATER QUALITY APPEARANCE COMMENTS:
Usual

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)
None

FIELD MEASUREMENTS: surface pH 8.16 TEMPERATURE (°c) 19.94 CONDUCTIVITY (µS/cm) 3174 DO 5.58 mg/l

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 8.15 TEMP (°C) 19.93 CONDUCTIVITY (µS/cm) 3194 DO 5.65 mg/l

bottom pH 8.14 TEMP (°C) 19.95 CONDUCTIVITY (µS/cm) 3198 DO 5.55 mg/l

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)
WQ readings

TEAM LEADER'S SIGNATURE B Isham

QA/QC 2

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL	10Apr07	Ren Frew	F Ishan
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10G		33.17335	117.35078
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
2' 8"	0718	0722	0718

FIELD TEAM
B. Ishan L. Campagna

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)
Ptly Cldy/No Wind

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN - Green	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)			None		
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:
Usual

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)
None

FIELD MEASUREMENTS: surface pH 8.03 TEMPERATURE (°C) 19.90 CONDUCTIVITY (µS/cm) 3307 DO 5.20 mg/l

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 8.03 TEMP (°C) 19.91 CONDUCTIVITY (µS/cm) 3309 DO 5.24 mg/l

bottom pH 8.02 TEMP (°C) 19.97 CONDUCTIVITY (µS/cm) 3286 DO 5.17 mg/l

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)
WQ readings

TEAM LEADER'S SIGNATURE F Ishan

Q4/QC NS

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4/10/07	Rentraw	NW
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
109	—	33.17917	-117.34103
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	0620	0625	—

FIELD TEAM: N. Woodward, Dan McCay

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

partly cloudy, light breeze 0-3kts W

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☒ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☒ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☒ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

Visibility = 0.2ft

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

—

FIELD MEASUREMENTS: surface pH 8.34 TEMPERATURE (°C) 20.62°C CONDUCTIVITY (µS/cm) 4164 DO 5.23 mg/L

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle	pH	8.48	TEMP (°C)	20.68°C	CONDUCTIVITY (µS/cm)	4187	DO 4.99 mg/L
bottom	pH	8.50	TEMP (°C)	20.68	CONDUCTIVITY (µS/cm)	4186	DO 4.96 mg/L

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

depth => 2.9 ~~2.9~~

WQ measurements w/ YSI 600 XL

TEAM LEADER'S SIGNATURE

RA PK

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4/10/07	Renfrew	NW
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
107	—	33.17896	-117.24153
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	0630	0638	—

FIELD TEAM
N. Woodward, J Scholl ee

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)
partly cloudy, light breeze 0-3kts west

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☒ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☒ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:
Visibility = 0.2 ft fine particulates

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)
fish jumped near by.

FIELD MEASUREMENTS: surface pH 8.51 TEMPERATURE (°C) 20.63 CONDUCTIVITY (µS/cm) 4179 DO ~~8.5~~ 10 5.09 mg/L

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle	pH	8.50	TEMP (°C)	20.65	CONDUCTIVITY (µS/cm)	4181	DO 5.05 mg/L
bottom	pH	8.52	TEMP (°C)	20.64	CONDUCTIVITY (µS/cm)	4180	DO 4.37 mg/L

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)
depth 5.1 WQ measurements w/ YSI 6600 XL

TEAM LEADER'S SIGNATURE

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4/10/07	Pentraw	MW
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
108		33.17934	-117.34199
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	0644	0650	—

FIELD TEAM
N. Woodward, Dan McCoy

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)
partly cloudy, 0-3kts west

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☒ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☒ OTHER See comments
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☒ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:
some bubbles, fine particulates

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)
Visibility = 0.2ft fish jumped nearby

FIELD MEASUREMENTS: surface pH 8.60 TEMPERATURE (°C) 20.504 CONDUCTIVITY (µS/cm) 4166 DO 5.23 mg/L

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle	pH 8.54	TEMP (°C)	20.48°C	CONDUCTIVITY (µS/cm)	4189	DO	5.13 mg/L
bottom	pH 8.57	TEMP (°C)	20.36°C	CONDUCTIVITY (µS/cm)	4212	DO	4.87 mg/L

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)
depth - 2.4 — WQ measurements w/ YSI 6000 XL

— aeration stone ~ 12ft away

TEAM LEADER'S SIGNATURE [signature]

9/486

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4/10/07	Ben Brew	NW
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
106	—	33.17821	-117.34186
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	0652	0655	

FIELD TEAM
N. Woodward, Dan McCoy

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)
Partly Cloudy

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☒ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
FLOATING MATERIAL	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☒ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)					
TURBIDITY	☒ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:
lots of air bubbles on surface due to aeration

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface — pH 8.62 TEMPERATURE (°C) 20.28°C CONDUCTIVITY (µS/cm) 4171 DO 5.51 mg/L

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle	pH 8.59	TEMP (°C) 20.27	CONDUCTIVITY (µS/cm) 4176	DO 5.26 mg/L
bottom	pH 8.58	TEMP (°C) 20.29	CONDUCTIVITY (µS/cm) 4176	DO 5.00 mg/L

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)
depth = 2.3 – WQ measurements w/ YSI 6000 XL
– aeration ~3ft away

TEAM LEADER'S SIGNATURE

176 CT

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4/10/07	Renfrew	NW
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
104		33.17677	-117.34455
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	0700	0705	

FIELD TEAM

N. Woodward, Dan McCoy

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

partly cloudy, 0-3kts west

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☒ OTHER air bubbles
	☐ OBJECTS (DESCRIBE)					
TURBIDI'	☐ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

Visibility = 0.2ft

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 8.49 TEMPERATURE (°C) 18.97 CONDUCTIVITY (µS/cm) 4203 DO 11.38 mg/L

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

bottom pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

depth 0.5ft WQ measurements w/ YSI 6000XL

Very Shallow

TEAM LEADER'S SIGNATURE

9A186

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4/10/07	Renfrew	NW
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
105	—	33.17733	-117.34531
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	0715	0720	—

FIELD TEAM
N. Woodward, Dan McCay

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)
Partly cloudy, 0-3kts west

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☒ OTHER See
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☒ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☐ SOME CLOUDINESS	☒ NONE		

WATER QUALITY APPEARANCE COMMENTS:
Some bubbles, fine particulates

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)
—

FIELD MEASUREMENTS: surface pH 8.59 TEMPERATURE (°C) 18.67 CONDUCTIVITY (µS/cm) 4235 DO 8.86 mg/L

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

bottom pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)
depth 0.9"
WQ measurements w/ YSI 600 XL

TEAM LEADER'S SIGNATURE _____

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4/10/07	Renfrew	NW
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
101		33.17524	-117.34711
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	0740	0750	

FIELD TEAM: N. Woodward, Dan McCoy

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

partly cloudy, 0-3 Kts West

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☒ OTHER none
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☒ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

visibility = 0.2'

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 8.69 TEMPERATURE (°C) 17.43°C CONDUCTIVITY (µS/cm) 2288 DO 6.06 mg/L

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

bottom pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

depth = 0.5' WQ measurements YSI 6000 XL

TEAM LEADER'S SIGNATURE

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4/10/07	Rentrew	NW
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
102	—	33.17575	-117.34804
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	0750	0755	—

FIELD TEAM
N. Woodward, Dan Mclay

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)
partly cloudy, 0-3kts West

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☒ OTHER See Comments
	☐ OBJECTS (DESCRIBE)					
TURBIDI'	☐ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:
a few bubbles, fine particulates

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)
Visibility = 0.2

FIELD MEASUREMENTS: surface pH 8.61 TEMPERATURE (°c) 17.39c CONDUCTIVITY (µS/cm) 39288 DO 5.28mg/L

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

bottom pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)
depth = 0.35

WQ measurements YSI 600XL

TEAM LEADER'S SIGNATURE _____

24 hr

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4/10/17	Renfroe	MW
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
103		33.17622	-117.34811
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	0800	0805	

FIELD TEAM
N. Woodward, Dan McCoy

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)
Partly Cloudy, 0-3 kts West

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☒ OTHER
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☐ SOME CLOUDINESS	☒ NONE		

WATER QUALITY APPEARANCE COMMENTS:
Fine particulates

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 8.01 TEMPERATURE (°C) 17.50 CONDUCTIVITY (µS/cm) 4102 DO 5.54 mg/L

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

bottom pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)
depth = 0.8 WQ measurements YSI 600XL

TEAM LEADER'S SIGNATURE

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4/10/07	Dave Reatrew	EG
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
101		33.17524	-117.34710
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1312	1314	
FIELD TEAM	FG DM		

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.) wind from the west, sunny with very few clouds, temp ≈ 70° F

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☒ OTHER algae clumps
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☒ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 9.65 TEMPERATURE (°c) 27.54 CONDUCTIVITY (µS/cm) 5130 DO FG 19.82

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

bottom pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

Depth = 0.5 ft

YSI 6000XL

measurements taken at edge of turbidity plume that we stirred up. rowed to site took depth and field measurements. longitude was farther than desired because of difficulty rowing and turbidity.

TEAM LEADER'S SIGNATURE Ellen O. Goldstein

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4/10/07	Dave Rentrew	FG
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
102		33.17579	-117.34799
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1324	1325	
FIELD TEAM	FG/DM		

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.) wind from west but slightly protected. sunny with few clouds. temp = 70°F

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☒ YELLOW (slightly orange/yellow)	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☒ OTHER none
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☒ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 10.06 TEMPERATURE (°C) 27.12 CONDUCTIVITY (µS/cm) 4682 DO 18.12

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

bottom pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

Depth = 0.4ft rowed to site. took field measurements outside of sediment plume that we created. took depth

YSI 600XL

TEAM LEADER'S SIGNATURE [signature]

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4/10/07	Dave Renfrew	EG
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
103		33.17622	-117.34802
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1328	1330	

FIELD TEAM
EG/DM

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.) Slight breeze from West. Sunny with few clouds. temp ≈ 70°F

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☒ YELLOW	☐ GREEN	☐ BLUE	☐ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☒ OTHER algae clumps
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☒ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS: Sediment smells like Hydrogen Sulfide after its stirred up ~~you could see~~ The bottom was visible
EG

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 9.47 TEMPERATURE (°C) 25.88 CONDUCTIVITY (µS/cm) 4508 DO 10.16

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

bottom pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

Depth=0.3 ft
YSI 600XL

raced to site. We couldn't get quite to the actual site took field measurements

TEAM LEADER'S SIGNATURE Edith O. Goldstein

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4/10/07	Dave Renfrew	EG
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
104		33.17671	-117.34458
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1346	1348	
FIELD TEAM	EG/DM		

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

slight breeze/wind from west. sunny with few clouds. temp = 70°F

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER	
	☐ SOAP	☐ CHLORINE	☒ NONE				
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER	
	☐ GRAY	☐ WHITE	☐ COLORLESS				
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☒ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☒ OTHER algae clumps	
	☐ OBJECTS (DESCRIBE)						
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE		☒ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS: large sediment plume from large fish and boat

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 10.23 TEMPERATURE (°C) 24.86 CONDUCTIVITY (µS/cm) 4824 DO 28.30

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

bottom pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

Depth = 0.4 ft

YSI 600XL

rowed to site. took depth and field measurements. measurements taken in large sediment plume from boat and fish.

TEAM LEADER'S SIGNATURE Esther O. Goldstein

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4/10/07	Dave Rostren	EC
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
105		33.17725	-117.34528
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1252	1254	
FIELD TEAM	FG/DM		

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.) temp ≈ 70°F. light breeze, but protected from stronger winds. sunny with few clouds.

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☒ OTHER none
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE		☒ CLOUDY	☐ SOME CLOUDINESS	☐ NONE	

WATER QUALITY APPEARANCE COMMENTS: visible live fish

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 9.53 TEMPERATURE (°C) ~~22.56~~ FG 22.06 CONDUCTIVITY (µS/cm) 4509 DO 23.05

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

bottom pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

Depth = 0.8 ft

YSI 600XL

motored and rowed to site. dropped anchor and took depth and field measurements

TEAM LEADER'S SIGNATURE Erin O Goldst

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4/10/07	Dave Renfrow	IG
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
106		33.17822	-117.34184
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1230	~~33.17822~~ FG 1233	~~-117.34184~~ FG
FIELD TEAM	EE/DM		

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.) sunny with few clouds - temp ~ 70°F wind from the west

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☒ SUDS few	☐ OTHER
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☒ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 9.59 TEMPERATURE (°C) 22.48 CONDUCTIVITY (µS/cm) 4520 DO 21.38

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 9.51 TEMP (°C) 22.46 CONDUCTIVITY (µS/cm) 4529 DO 21.83

bottom pH 9.56 TEMP (°C) 22.21 CONDUCTIVITY (µS/cm) 4108 DO 18.88

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

Depth = 2.3 ft

YSI 600XL

site is 3 ft from a large aerator
motored to site, dropped anchor, took depth and field measurements

TEAM LEADER'S SIGNATURE Ian O'Neal

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4/10/07	Dave Renfro	EG
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
107		33.17896	-117.34148
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1217	1220	

FIELD TEAM EG/DM

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.) West. Sunny with few clouds. temp = 70°F Strong wind from the

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☒ SUDS few	☐ OTHER
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE		☒ CLOUDY	☐ SOME CLOUDINESS	☐ NONE	

WATER QUALITY APPEARANCE COMMENTS:

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 9.03 TEMPERATURE (°c) 21.57 CONDUCTIVITY (µS/cm) 4279 DO 11.00 mg/L

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 9.01 TEMP (°C) 21.52 CONDUCTIVITY (µS/cm) 4274 DO 11.01 mg/L

bottom pH 9.03 TEMP (°C) 21.02 CONDUCTIVITY (µS/cm) 4241 DO 8.05 mg/L

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

depth = 5.1 ft

YSI 600XL

motored to site, dropped anchor took depth and field measurements

TEAM LEADER'S SIGNATURE Catherine D. Gibert

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4/10/07	Dave Renfrew	EG
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
108		33.17954	-117.34197
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1223	1226	

FIELD TEAM EG/DM

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.) Slight breeze from the west, but protected from wind. Sunny with few clouds ≈ 70°F

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☒ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☒ SUDS	☒ OTHER Lgpe clumps
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☒ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)
faint odor in this area. maybe because aerator stirs up sediment/water

FIELD MEASUREMENTS: surface pH 9.12 TEMPERATURE (°C) 21.62 CONDUCTIVITY (µS/cm) 4329 DO 12.19

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 9.11 TEMP (°C) 21.69 CONDUCTIVITY (µS/cm) 4335 DO 12.55

bottom pH 9.08 TEMP (°C) 21.48 CONDUCTIVITY (µS/cm) 4360 DO 11.37

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)
Depth = 20 ft
YSI 600XL
Site is ≈ 10 ft from an aerator
Motored to site, anchored took depth and field measurements

TEAM LEADER'S SIGNATURE Erik O. Gedat

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4/10/07	Dave Reatrew	EG
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
109		33.17918	-117.34084
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1209	1212	
FIELD TEAM	EG/DM		

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.) wind from the west sunny with very few clouds. temp ≈ 70°F

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☒ SUDS (few)	☐ OTHER
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE		☒ CLOUDY	☐ SOME CLOUDINESS	☐ NONE	

WATER QUALITY APPEARANCE COMMENTS:

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 8.42 TEMPERATURE (°C) 21.60 CONDUCTIVITY (µS/cm) 4285 DO 14.27

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 8.63 TEMP (°C) 21.48 CONDUCTIVITY (µS/cm) 4275 DO 10.94

bottom pH 8.73 TEMP (°C) 21.53 CONDUCTIVITY (µS/cm) 4277 DO 10.87

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

Depth = 2.9 ft
YSI 600XL

motored to site, dropped anchor, measured discharge DO/field measurements
site is between 2 aerators. ≈ 20ft from one and 30ft from another

TEAM LEADER'S SIGNATURE Dave D. Reatrew

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4-10-07	D. Renfrew	JS
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10A		33.16823°N	-117.35598°W
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1225	1230	

FIELD TEAM L. Campagna, J. Scholler

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)
Sunny, no clouds wind 1-5 from ~~W~~ W

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☒ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)	~~plane~~				
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☒ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:
Some trash collected in tullies. No other debris or floatables. Water cloudy and brown ~~brat~~ JS

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)
R

FIELD MEASUREMENTS: surface pH 8.12 TEMPERATURE (°C) 21.34 CONDUCTIVITY (µS/cm) 3344 DO 6.68

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 8.12 TEMP (°C) 21.34 CONDUCTIVITY (µS/cm) 3353 DO 6.72

bottom pH 8.06 TEMP (°C) 21.03 CONDUCTIVITY (µS/cm) 3281 DO 5.80

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)
4.4 ft
- Motored to site. Note in open water rather than core.
- Depth and then WQ measurements

YSI 556

TEAM LEADER'S SIGNATURE J. Scholler

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4-10-07	D. Penfrew	JS
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10B		33.16785°N	117.35435°W
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1233	1237	

FIELD TEAM
L. Campagna, J. Schollée

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)
Sunny, no clouds 0-5 mph from W

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)	None				
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☒ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:
Murky water, can't see the bottom

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface — pH 8.41 TEMPERATURE (°C) 21.68 CONDUCTIVITY (µS/cm) 3147 DO 8.06

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle — pH 8.40 TEMP (°C) 21.62 CONDUCTIVITY (µS/cm) 3148 DO 8.21

bottom — pH 8.40 TEMP (°C) 21.54 CONDUCTIVITY (µS/cm) 3150 DO 8.31

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)
2'7" depth - Motored to site
- Took depth & WQ measurements (top → mid → bottom)
YSI 556

TEAM LEADER'S SIGNATURE J. Schollée

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4-10-07	D. Renfrew	JS
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10D		33.16893°N	117.35058°W
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1243	1246	

FIELD TEAM: L. Campagna, J. Schollée

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)
Sunny, wind 0-5 mph from west

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☒ OTHER
	☐ OBJECTS (DESCRIBE)	feathers				
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☒ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:
water very murky, can't see bottom.

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 8.35 TEMPERATURE (°C) 22.25 CONDUCTIVITY (µS/cm) 3165 DO 8.22

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 8.34 TEMP (°C) 22.23 CONDUCTIVITY (µS/cm) 3163 DO 8.09

bottom pH 8.34 TEMP (°C) 22.23 CONDUCTIVITY (µS/cm) 3163 DO 8.04

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

219' depth
- Motored to site
- Took depth and WQ measurements
YSI 556

very few swallows as compared to previous days

TEAM LEADER'S SIGNATURE

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4.10.07	D. Renfrew	JS
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10E		33.17060°N	117.35763°W
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1250	1255	

FIELD TEAM L. Campagna, J. Schuller

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)
Sunny, no clouds wind 3-5 from W

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☒ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)	Algae (green not the floriant clumps)				
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE		☒ CLOUDY	☐ SOME CLOUDINESS	☐ NONE	

WATER QUALITY APPEARANCE COMMENTS:

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 8.44 TEMPERATURE (°C) 21.98 CONDUCTIVITY (µS/cm) 3204 DO 8.90

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 8.47 TEMP (°C) 21.86 CONDUCTIVITY (µS/cm) 3205 DO 8.71

bottom pH 8.37 TEMP (°C) 21.62 CONDUCTIVITY (µS/cm) 3229 DO 8.24

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)
3'4" depth - Motored to site
- Took depth and WQ measurements
YSI 556
No swallows

TEAM LEADER'S SIGNATURE JESchuller

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4-10-07	D. Renfrew	JS
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10F		33.17193°N	117.35269°W
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1258	~~1258~~ JS 1301	
FIELD TEAM	L. Campagna, J. Schalke		

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)
Sunny, no clouds Wind 3-5mph west

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☒ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)		small bits of flocculent algae			
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE		☒ CLOUDY	☐ SOME CLOUDINESS	☐ NONE	

WATER QUALITY APPEARANCE COMMENTS:

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 8.47 TEMPERATURE (°C) 22.00 CONDUCTIVITY (µS/cm) 3188 DO 10.44

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 8.47 TEMP (°C) 21.99 CONDUCTIVITY (µS/cm) 3188 DO 10.53

bottom pH 8.37 TEMP (°C) 21.95 CONDUCTIVITY (µS/cm) 3185 DO 10.63

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

2'6" depth
- Motored to site
- Took depth and WQ measurements

YSI 556

Still observed no swallows

TEAM LEADER'S SIGNATURE J. Schalke

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	4-10-07	D. Renfrew	JS
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10G		33.17334° N	117.35075° W
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	1305	1309	
FIELD TEAM	L. Campagna, J. Schaffer		

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)
Sunny, no clouds Wind 1-5 mph from NW

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☒ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☒ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)		floating algae			
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE		☒ CLOUDY	☐ SOME CLOUDINESS	☐ NONE	

WATER QUALITY APPEARANCE COMMENTS:
Water is murky, can't see bottom

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 8.30 TEMPERATURE (°C) 22.00 CONDUCTIVITY (µS/cm) 3301 DO 9.55

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 8.29 TEMP (°C) 21.94 CONDUCTIVITY (µS/cm) 3301 DO 9.44

bottom pH 8.14 TEMP (°C) 21.80 CONDUCTIVITY (µS/cm) 3300 DO 8.74

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)
2'6" depth — Motored to site
- Took depth and WQ YSI 556
Heard bull frog
On rock to site saw bass (~10in) and turtle

TEAM LEADER'S SIGNATURE J E Schaffer

Entered DO. 4.11.07

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
SDC Fish Kill	4-11-07	D. Rainaldo	Mike A.
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10A		33.16819	117.35603
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
~~0~~	0628	0635	~~0~~
FIELD TEAM	C.C. Mike A.		

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

100% Cloud Winds 0-5 kts NE

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ ~~MUSTY~~	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☐ ~~GREEN~~	☐ BLUE	☐ ~~BROWN~~	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)			None		
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY		☐ SOME CLOUDINESS	☐ NONE	

WATER QUALITY APPEARANCE COMMENTS:

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

Cattails 1M From Station

FIELD MEASUREMENTS: surface pH 7.87 TEMPERATURE (°c) 20.94 CONDUCTIVITY (µS/cm) 3368 DO 4.80

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 7.95 TEMP (°C) 20.93 CONDUCTIVITY (µS/cm) 3371 DO 4.56

bottom pH 7.93 TEMP (°C) 20.91 CONDUCTIVITY (µS/cm) 3360 DO 4.50

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

DEPTH - 3' 6"

TEAM LEADER'S SIGNATURE

Entered DO 4-11-07

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BUL Fish Kill	4-7-07	D. Pearrow	Mike A.
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
103		33.16778	117.35431
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
A	0637	0639	0
FIELD TEAM			
C.C. / MA			

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

100% Cover
Wind 0-5 NE

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☑ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☑ GREEN	☐ BLUE	☑ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)			None		
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☑ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

Grasses 10m from Station

FIELD MEASUREMENTS: surface pH 8.07 TEMPERATURE (°C) 20.13 CONDUCTIVITY (µS/cm) 3143 DO 5.78

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle	pH 8.09	TEMP (°C) 20.18	CONDUCTIVITY (µS/cm) 3144	DO 5.50	
bottom	pH 8.07	TEMP (°C) 20.18	CONDUCTIVITY (µS/cm) 3143	DO 7.84	5.36

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

Depth. 2' 0"

TEAM LEADER'S SIGNATURE MA

Entered DO 4.17.07

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL FISH KILL	4-4-07	D. RENSHAW	MIKE A.
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10 D		33.16896	117.35059
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
0	0645	0648	0
FIELD TEAM	C.C. MIKE A.		

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

60's CLOUDY
WIND - 05 NE

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☑ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☑ GREEN	☐ BLUE	☑ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☑ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☑ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

GRASSLANDS 8 M FROM STATION

FIELD MEASUREMENTS: surface — pH 8.06 TEMPERATURE (°C) 20.89 CONDUCTIVITY (µS/cm) 3171 DO 4.50

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle	pH 8.10	TEMP (°C) 20.93	CONDUCTIVITY (µS/cm) 3174	DO 4.41
bottom	pH 8.09	TEMP (°C) 20.93	CONDUCTIVITY (µS/cm) 3171	DO 4.50

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

DEPTH - 2' 6"

TEAM LEADER'S SIGNATURE Mike A.

Entered DO 4.11.07

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVC Fish Kill	4/1/07	D. Tantillo	Mikal.
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10E		33.17063	117.35168
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
0	0653	0656	0
FIELD TEAM	C.C. MA.		

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

70% OVERCAST

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☑ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☑ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)	NONE				
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☑ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

CATTAILS 25M FROM STATION

FIELD MEASUREMENTS: surface pH 8.29 TEMPERATURE (°C) 21.19 CONDUCTIVITY (µS/cm) 3204 DO 6.92

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 8.30 TEMP (°C) 21.20 CONDUCTIVITY (µS/cm) 3205 DO 6.75

bottom pH 8.29 TEMP (°C) 21.19 CONDUCTIVITY (µS/cm) 3204 DO 6.80

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

DEPTH - 2' 8"

TEAM LEADER'S SIGNATURE M. [signature]

Entered DO 4-11-07

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BUC FIELD KILL	4/11/07	D. RENFRO	MIKE A.
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10F		33.17194	117.35270
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
0	0701	~~0710~~ 0708 DC	0
FIELD TEAM			
CC. MA.			

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)
70's OVERCAST

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☒ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☒ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☒ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)
CATTAILS 25M FROM SLOPE

FIELD MEASUREMENTS: surface pH 8.18 TEMPERATURE (°c) 20.43 CONDUCTIVITY (µS/cm) 3234 DO 6.36

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 8.18 TEMP (°C) 20.43 CONDUCTIVITY (µS/cm) 3235 DO 6.45

bottom pH 8.18 TEMP (°C) 20.41 CONDUCTIVITY (µS/cm) 3236 DO 6.46

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)
DRY - 2' 5"

TEAM LEADER'S SIGNATURE

Entered DO 4-11-07

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BUL FISH KILL	4-11-07	D. Redmond	MICAH.
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
06.	0	33.17334	112.35075
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
0	0710	0715	0
FIELD TEAM	C.C. MICAH.		

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

70% Cloud
No wind

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☒ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)				None	
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☒ CLOUDY		☐ SOME CLOUDINESS	☐ NONE	

WATER QUALITY APPEARANCE COMMENTS:

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

GRASSES IN FROM STATION

FIELD MEASUREMENTS: surface pH 7.95 TEMPERATURE (°C) 20.44 CONDUCTIVITY (µS/cm) 3198 DO 4.48

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 7.96 TEMP (°C) 20.45 CONDUCTIVITY (µS/cm) 3298 DO 4.33

bottom pH 7.96 TEMP (°C) 20.44 CONDUCTIVITY (µS/cm) 3296 DO 4.35

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

DRY - 2' 74

BASS ACOUSTICS

TEAM LEADER'S SIGNATURE M. Hall

Enhanced DO 4-11-07

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	11 April 07	D. Rambum	BZ. Ly
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
104	NA	33.17672	117-34466
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
NA	834	838	NA

FIELD TEAM: Damon Owens BZ Ly

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☑ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☑ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE		☑ CLOUDY	☐ SOME CLOUDINESS	☐ NONE	

WATER QUALITY APPEARANCE COMMENTS:

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 9.21 TEMPERATURE (°C) 20.07 °C CONDUCTIVITY (µS/cm) 4,384 µS DO 14.45 mg/L

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

bottom pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

Depth = 0-4 ft
Moderate Fish Activity; No Dead Fish
Some Bird Activity

TEAM LEADER'S SIGNATURE _____

DO Air Check 9.67 mg/L
Saturated Water Bottle = 9.30 mg/L

Entered DO 4.17.07

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	11 April 07	D. Renfrow	BF. Ly
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
101		33.17525	117.34715
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
—	800	804	—

FIELD TEAM: Denver Owen / B. F. Ly

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☑ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☑ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE		☑ CLOUDY	☐ SOME CLOUDINESS	☐ NONE	

WATER QUALITY APPEARANCE COMMENTS:
Brown + Turbid

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 8.96 TEMPERATURE (°C) 17.75 °C CONDUCTIVITY (µS/cm) 4,632 uS DO 6.37 mg/L

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

bottom pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

Depth = 0.4 feet
No fish observed Dead or Alive
Blue heron near site, limited bird activity in general

TEAM LEADER'S SIGNATURE _____

Entered D.O. 4.11.07

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	11 April 2007	Dan Rinkus	Brian Fidler
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
105	NA	33.17733	117.34537
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
—	711	715	NA
FIELD TEAM	Dawson Owen / Brian Fidler		

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

Overcast - slight NW breeze ~1 Knot

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☑ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☑ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☑ SCUM	☐ SUDS	☑ OTHER
	☐ OBJECTS (DESCRIBE)		Some Algal matting			
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

Brown, Turbid

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 8.60 TEMPERATURE (°C) 19.08°C CONDUCTIVITY (µS/cm) 4,389 µS DO 8.41 mg/L

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

bottom pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

Depth = 0.8 ft
Moderate Fish Activity
No dead Fish
Some Swallow Activity
Great Blue Heron Feeding on fish near site.

TEAM LEADER'S SIGNATURE _____

Head Change = 1/4 inch

* Buoy Replaced At 0830 to 33.17735, 117.34536

BVL SEWAGE

Embarked D.O. 9.11.07

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	11 Apr 2007	D. RenFrew	BR
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
109		33.17916	117.34089
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
—	636	642	NA

FIELD TEAM
DO/BR

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)
low clouds, wind NE 3-5kts

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☑ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☑ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☑ OTHER
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE		☑ CLOUDY	☐ SOME CLOUDINESS	☐ NONE	

Low Decomposition Bubble

rel < foam, < previous

WATER QUALITY APPEARANCE COMMENTS:
Visibility less than 6 inches. Water Brown, turbid.

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface Top pH 8.65 TEMPERATURE (°C) 21.19°C CONDUCTIVITY (µS/cm) 4,332 uS DO 5.50 mg/L

Top
~~Top 21.19 °C~~
Top

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle Middle pH 8.65 TEMP (°C) 21.19 CONDUCTIVITY (µS/cm) 4,333 uS DO 5.49 mg/L

bottom Bottom pH 8.68 TEMP (°C) 21.19 CONDUCTIVITY (µS/cm) 4,320 uS DO 5.42 mg/L

Mid
~~Top 21.19 °C~~
~~Cond 4,333 uS~~
~~pH 8.65~~
~~do 5.49 mg/L~~

Bottom

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)
Depth = 5.3 ft

Swallows Active at site - not feeding.
No Live Fish observed - Also - No Dead Fish.

TEAM LEADER'S SIGNATURE _____

Enforced D.O 4.11.06

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BUL Sewage	11 Apr 2007	D. Renfrew	B.R.
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
107		33.17892	117.34148
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
—	646	653	

FIELD TEAM: DO, BR

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

Overcast NW wind ~ 1 Knot

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☑ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☑ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☑ OTHER
	☐ OBJECTS (DESCRIBE)					Decomposition bubbles moderately rising
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☑ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

Turbid, Brown

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 8.74 TEMPERATURE (°C) 21.15 CONDUCTIVITY (µS/cm) 4,332uS DO 5.70 mg/L — Top

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 8.73 TEMP (°C) 21.11 CONDUCTIVITY (µS/cm) 4,326 uS DO 5.66 mg/L — Mid

bottom pH 8.79 TEMP (°C) 21.11 CONDUCTIVITY (µS/cm) 4,327 uS DO 5.47 mg/L — Bottom

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

Depth = 4.7 ft
Decomposition Bubbles rising moderately
some live fish observed
NO Dead Fish

TEAM LEADER'S SIGNATURE _____

Entered DS 4-11-07

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	11 April 07	D. Rinehart	B. Raley
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
108		33.17934	117.34200
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
—	850	855	✓

FIELD TEAM: Denise Owen / Brian Raley

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

Mostly Cloudy NW wind ~ 1-3 Knots

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☑ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☑ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☑ SCUM Some	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☑ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

Brown & Turbid

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface (Top) pH 8.93 TEMPERATURE (°C) 20.99°C CONDUCTIVITY (µS/cm) 4,316 µS DO 6.48 mg/L — Top

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle (Middle) pH 8.94 TEMP (°C) 20.99°C CONDUCTIVITY (µS/cm) 4,317 µS DO 6.43 mg/L — Middle

bottom (Bottom) pH 8.94 TEMP (°C) 20.99°C CONDUCTIVITY (µS/cm) 4,317 µS DO 6.34 mg/L — Bottom

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

Depth = 2.0 feet
No Fish observed - Dead or Alive
Limited Bird Activity

TEAM LEADER'S SIGNATURE _____

site near Aerator (15' from east of site)

Entered DO. 4.11.07

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	11 April 2007	Dave Renfrew	Brian Riley
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
106		33.17819	117.34185
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
—	655	700	—

FIELD TEAM

Danon Owen / Brian Riley

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

Overcast NW wind - 1 Knot

WATER QUALITY APPEARANCE

ODOR: ☐ HYDROGEN SULFIDE ☐ MUSTY ☑ SEWAGE (slight — probably due to proximity of Aerator to station) ☐ AMMONIA ☐ GASOLINE ☑ OTHER Slight organic ☐ SOAP ☐ CHLORINE ☐ NONE

COLOR: ☐ YELLOW ☐ GREEN ☐ BLUE ☑ BROWN ☐ BLACK ☐ OTHER ☐ GRAY ☐ WHITE ☐ COLORLESS

FLOATING MATERIAL: ☐ TRASH OR DEBRIS ☐ OIL AND GREASE ☐ ORGANIC MATERIAL ☐ SCUM ☐ SUDS ☑ OTHER ☐ OBJECTS (DESCRIBE) Limited Algae mats at surface

TURBIDITY: ☐ HEAVY CLOUDINESS, OPAQUE ☐ CLOUDY ☐ SOME CLOUDINESS ☐ NONE

WATER QUALITY APPEARANCE COMMENTS:

Turbid, Brown

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface (Top) pH 8.76 TEMPERATURE (°C) 20.95°C CONDUCTIVITY (µS/cm) 4,321 uS DO 5.20 mg/L — Top

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

	pH	TEMP (°C)	CONDUCTIVITY (µS/cm)	DO	
middle	8.76	20.94°C	4,321 uS	5.17 mg/L	Middle
bottom	8.75	20.92°C	4,322 uS	5.14 mg/L	Bottom

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

Depth 2.0 ft
No Fish - Dead or Alive
Some Swallow Activity

TEAM LEADER'S SIGNATURE ______

Entered 00.19.11.07

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	11 April 2007	D. Rankin	B.Z. Ly
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
102	—	33° 17579	117.34806
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
NA	748	752	NA

FIELD TEAM: D. Owen / B.Z. Ly

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☑ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☑ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE		☑ CLOUDY	☐ SOME CLOUDINESS	☐ NONE	

WATER QUALITY APPEARANCE COMMENTS:
Brown & Turbid

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 8.78 TEMPERATURE (°C) 17.20°C CONDUCTIVITY (µS/cm) 4,215 µS DO 5.73 mg/L

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

bottom pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

No Fish observed Dead or Alive

Depth = 0.4 feet

TEAM LEADER'S SIGNATURE _____

Entered DO 4.11.07

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Sewage	11 April 2007	Dave Rowlen	B. Fuller
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
103		33.17623	117.34811
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
—	739	744	NA

FIELD TEAM: Dave Rowlen / B. Fuller

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☑ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☑ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☑ OTHER Some decomposition bubbles
	☐ OBJECTS (DESCRIBE)					Some Algal mats
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☑ CLOUDY		☐ SOME CLOUDINESS	☐ NONE	

WATER QUALITY APPEARANCE COMMENTS:

Brown + Turbid

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 8.68 TEMPERATURE (°C) 17.50°C CONDUCTIVITY (µS/cm) 4,023 uS DO 3.14 mg/L

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

bottom pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

Depth = 0.4 ft
No live fish observed
Terns & Great egrets foraging & feeding
No Dead Fish observed

TEAM LEADER'S SIGNATURE _____

556 MFS yes used

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Fish Kill	4/2-07	D. ZenFrello	Mike A.
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10 A		33.16820	117.35597
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
0	0615	0623	0

FIELD TEAM: D. ZenFrello, Mike A.

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

75% OVC CAST
WIND 0-5 NE

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☑ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☑ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)		None			
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE		☑ CLOUDY	☐ SOME CLOUDINESS	☐ NONE	

WATER QUALITY APPEARANCE COMMENTS:

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

Veg. IN FROM STATION

FIELD MEASUREMENTS: surface — pH 7.96 TEMPERATURE (°C) 20.37 CONDUCTIVITY (µS/cm) 3365 DO 3.40 MG/L

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle — pH 7.95 TEMP (°C) 20.39 CONDUCTIVITY (µS/cm) 3363 DO 3.30

bottom — pH 7.96 TEMP (°C) 20.39 CONDUCTIVITY (µS/cm) 3364 DO 3.21

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

Z. 3 7.54 → 3304

TEAM LEADER'S SIGNATURE M. Ryan

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
SVL FISH KILL	4/2/07	D. Renfrew	Mike A.
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10 B		33.16781	117.35435
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
0	0627	0633	0
FIELD TEAM	D. Renfrew Mike A.		

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

75% OVERCAST
No WIND

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☑ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☑ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)		- None			
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☑ CLOUDY		☐ SOME CLOUDINESS	☐ NONE	

WATER QUALITY APPEARANCE COMMENTS:

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

Vegetation 50' from STATION

NOSE

FIELD MEASUREMENTS: surface pH 8.15 TEMPERATURE (°C) 20.09 CONDUCTIVITY (µS/cm) 3183 DO 4.73

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

~~middle~~ Bottom pH 8.04 TEMP (°C) 20.06 CONDUCTIVITY (µS/cm) 2980 DO 4.50

~~bottom~~ Middle pH 7.75 TEMP (°C) 20.12 CONDUCTIVITY (µS/cm) 2857 DO 4.42

NOSE

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

2 - 2' 35"

Middle (2) pH - 8.14 Temp - 20.06 Cond. 3046 DO - 4.58

TEAM LEADER'S SIGNATURE M. Hayes

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL FHA Kill	4-12-07	D. Redfern	Mike A.
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10 D		33 16895	117 35060
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
0	0639	0642	0
FIELD TEAM	D. Redfern Mike A.		

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

60's Overcast
Wind 0-5 KTS NE

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☑ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☑ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)	- None				
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☑ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

Vegetation 40' from station

FIELD MEASUREMENTS: surface pH 8.14 TEMPERATURE (°C) 20.22 CONDUCTIVITY (µS/cm) 3203 DO 3.87

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 8.14 TEMP (°C) 20.21 CONDUCTIVITY (µS/cm) 3203 DO 3.85

bottom pH 8.14 TEMP (°C) 20.20 CONDUCTIVITY (µS/cm) 3203 DO 3.94

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

2 - 2' 6"

TEAM LEADER'S SIGNATURE M. Andrews

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BUC Fish Kill	4-12-07	D. Renfrew	Mike A.
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10E		33 17064	117 35169
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
0	0647	0650	0
FIELD TEAM	D. Renfrew Mike A.		

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)
60 to 70 DEGREES

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☑ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☑ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)	- NONE				
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☑ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)
VEGETATION

FIELD MEASUREMENTS: surface pH 8.30 TEMPERATURE (°C) 20.52 CONDUCTIVITY (µS/cm) 3210 DO 5.70

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 8.30 TEMP (°C) 20.52 CONDUCTIVITY (µS/cm) 3210 DO 5.67

bottom pH 7.81 TEMP (°C) 20.68 CONDUCTIVITY (µS/cm) 2913 DO 5.07

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)
2- 3' 1"

TEAM LEADER'S SIGNATURE M. A. [illegible]

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL Fish Kill	4-12-07	D. Renfrew	Mike A.
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10 F		33.17197	117.35269
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
0	0655	0657	0
FIELD TEAM	D. Renfrew Mike A.		

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

Visibility 80' from station
70 % overcast WIND: 05 K/S NW

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☑ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☑ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)	- None				
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☑ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

FIELD MEASUREMENTS: surface pH 8.18 TEMPERATURE (°C) 19.94 CONDUCTIVITY (µS/cm) 3270 DO ~~5.81~~ MM 5.74

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 8.18 TEMP (°C) 19.96 CONDUCTIVITY (µS/cm) 3271 DO 5.74

bottom pH 8.16 TEMP (°C) 19.97 CONDUCTIVITY (µS/cm) 3270 DO ~~5.77~~ MM → 5.70

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

2 - 2' 1"

TEAM LEADER'S SIGNATURE M. Alye

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVC Fish Kill	4/2/07	D. Renfrew	Mike A.
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
10 b.		33 17336	117 3508
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
0	0703		0
FIELD TEAM	D. Renfrew Mike A.		

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

60% OVERCAST
WIND 0-5 KTS NE

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☑ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☐ OTHER
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☑ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)	None				
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☑ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

MUSTY SMELL IN AIR
WATER CLEARER

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

VEGETATION IN FRONT

FIELD MEASUREMENTS: surface pH 7.95 TEMPERATURE (°C) 19.61 CONDUCTIVITY (µS/cm) 3292 DO 2.76

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 7.93 TEMP (°C) 19.62 CONDUCTIVITY (µS/cm) 3294 DO 2.72

bottom pH 7.90 TEMP (°C) 19.62 CONDUCTIVITY (µS/cm) 3295 DO 2.43

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

2. 2' 4"

TEAM LEADER'S SIGNATURE M. Ayers

YSI bloo

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL	4/12/07	D. Renfrew	C. Clark
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
101		33 17.524 ~~33 17 525~~	~~714~~ ~~117 34 715~~ 117 34 715
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	0744	0748	

FIELD TEAM D. owens C. Clark

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

scattered clouds

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☒ OTHER Marshy normal
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☒ OTHER None
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☒ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

normal

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

None

FIELD MEASUREMENTS: surface pH 8.86 TEMPERATURE (°C) 16.64 CONDUCTIVITY (µS/cm) 4488 DO 3.55

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

bottom pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

Depth 0.6ft Vis less than 2 inches
no live fish
no dead fish
1 great blue heron

TEAM LEADER'S SIGNATURE _____

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL	4/12/02	D. Renfrew	C. Clark
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
102		33 17 579	117.34808
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	0733	0740	

FIELD TEAM: D. Owens C. Clark

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)
very light precipitation
scattered clouds

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☒ OTHER marshy normal
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☒ OTHER none
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☐ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:
normal

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)
none

FIELD MEASUREMENTS: surface pH 8.60 TEMPERATURE (°C) 16.84 CONDUCTIVITY (µS/cm) 4123 DO 2.48

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

bottom pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)
Depth 0.4 ft
Same bird activity
C-8 egrets feeding
no dead fish

TEAM LEADER'S SIGNATURE _____

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL	4/12/07	D. Penbrew	C. Clark
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
103		33 17 624	117 34 813
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	0720	0726	

FIELD TEAM D. Owens C. Clark

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☒ OTHER Marshy normal
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☒ OTHER more
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☒ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:
normal

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)
none

FIELD MEASUREMENTS: surface pH 8.70 TEMPERATURE (°C) 16.84 CONDUCTIVITY (µS/cm) 4271 DO 3.04

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

bottom pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)
Depth 0.5 ft less the .3 inches vis

TEAM LEADER'S SIGNATURE _____

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL	4/12/07	D. Renfrew	C. Clerl
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
104		33° 17. 672	117 34 461
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	0803	0810	

FIELD TEAM D Owens, C. Clark

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)
Overcast some dark Clouds

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☒ OTHER marshy
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
FLOATING MATERIAL	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☒ ORGANIC MATERIAL	☒ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)			some bubbles		
TURBIDITY	☒ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:
normal

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)
none

FIELD MEASUREMENTS: surface pH 9.05 TEMPERATURE (°C) 17.77 CONDUCTIVITY (µS/cm) 4261 DO 11.83

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

bottom pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)
Some Carp finning
Depth 0.6 ft
Some bird activity

TEAM LEADER'S SIGNATURE _____

YSI QA 10.09 Air
9.50 sat H_2O B+LE

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL	4/12/07	D Rentaw	C. Clark
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
i05		33 17 732	117 54 535
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	0710	0715	

FIELD TEAM C. Clark D. Owens

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☒ OTHER Marshy normal
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☒ ORGANIC MATERIAL	☒ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☒ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

normal

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

None

FIELD MEASUREMENTS: surface pH 8.68 TEMPERATURE (°C) 17.19 CONDUCTIVITY (µS/cm) 42.16 DO 6.18

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

bottom pH _____ TEMP (°C) _____ CONDUCTIVITY (µS/cm) _____ DO _____

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

Depth 0.7 ft
Multiple carp finning
No dead fish at site
limited bird activity

Vis less the 4in
head change
LEVEL UP 0.25 Inches

TEAM LEADER'S SIGNATURE _____

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL	4/12/07	D. Benbow	C. Clark
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
106		33 17 820	117 34 187
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	0652	0700	

FIELD TEAM

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

low wet clouds

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☒ OTHER Marshy
	☐ SOAP	☐ CHLORINE	☐ NONE			Slight sewage none
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)			very little foam		
TURBIDI	☒ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

normal

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

none

FIELD MEASUREMENTS: surface pH 8.83 TEMPERATURE (°C) 20.32 CONDUCTIVITY (µS/cm) 4303 DO 6.31

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 8.83 TEMP (°C) 20.31 CONDUCTIVITY (µS/cm) 4308 DO 6.98

bottom pH 8.95 TEMP (°C) 20.26 CONDUCTIVITY (µS/cm) 4312 DO 6.27

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

Depth 2.2

bouy. 5 ft from airtube

TEAM LEADER'S SIGNATURE _____

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL	4/12/07	D. Renfrew	C. Clark
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
107		33 17. 895	117 34. 146
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	0635	0642	

FIELD TEAM: D. Owens, C. Clark

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

low wet clouds

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☒ OTHER Marshy normal
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☒ ORGANIC MATERIAL	☒ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)					less than 1 0.9
TURBIDI	☒ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:

normal

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

none

FIELD MEASUREMENTS: surface pH 8.90 TEMPERATURE (°C) 20.79 CONDUCTIVITY (µS/cm) 4307 DO 4.51

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 8.82 TEMP (°C) 20.78 CONDUCTIVITY (µS/cm) 4306 DO 5.00

bottom pH 8.85 TEMP (°C) 20.75 CONDUCTIVITY (µS/cm) 4307 DO 5.10

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

Depth 5.2 ft

2 carp forming

minor decamp bubbles to south shore

TEAM LEADER'S SIGNATURE _____

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL	4/12/07	D. Penlew	C. Clark
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
108		33 17 934	117 34 196
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	0820	0824	

FIELD TEAM
C. Clark D. Owens

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)
Partial cloudy

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☒ OTHER none
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☐ ORGANIC MATERIAL	☐ SCUM	☐ SUDS	☒ OTHER Some bubbles
	☐ OBJECTS (DESCRIBE)					
TURBIDI	☒ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☐ SOME CLOUDINESS	☐ NONE		

WATER QUALITY APPEARANCE COMMENTS:
normal

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)
none

FIELD MEASUREMENTS: surface pH 9.98 TEMPERATURE (°C) 20.70 CONDUCTIVITY (µS/cm) 4301 DO 5.29

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 8.98 TEMP (°C) 20.70 CONDUCTIVITY (µS/cm) 4303 DO 5.15

bottom pH 8.98 TEMP (°C) 20.72 CONDUCTIVITY (µS/cm) 4304 DO 5.05

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)
Depth 7.25 ft
Site is 15-20 ft west of aerator

TEAM LEADER'S SIGNATURE _____

WESTON SOLUTIONS

WATER QUALITY FIELD DATA LOG

PROJECT/SURVEY NAME	DATE	PROJECT MANAGER	RECORDER
BVL	4/12/07	D. Rentsen	CC
STATION NAME	**NAV DATUM**	**LATITUDE**	**LONGITUDE**
109		33° 17.916	117° 34.096
SAMPLE IDENTIFICATION	**TIME STARTED (AT SITE)**	**TIME FINISHED (AT SITE)**	**GRAB SAMPLE TIME**
	0625	0633	

FIELD TEAM D. Owens C. Clark

METEOROLOGICAL CHARACTERISTICS (DESCRIBE RAINFALL, WIND, TEMPERATURE, ETC.)

low wet clouds

WATER QUALITY APPEARANCE

ODOR	☐ HYDROGEN SULFIDE	☐ MUSTY	☐ SEWAGE	☐ AMMONIA	☐ GASOLINE	☒ OTHER Marshy/ Normal
	☐ SOAP	☐ CHLORINE	☐ NONE			
COLOR	☐ YELLOW	☐ GREEN	☐ BLUE	☒ BROWN	☐ BLACK	☐ OTHER
	☐ GRAY	☐ WHITE	☐ COLORLESS			
NG MATERI	☐ TRASH OR DEBRIS	☐ OIL AND GREASE	☒ ORGANIC MATERIAL	☒ SCUM	☐ SUDS	☐ OTHER
	☐ OBJECTS (DESCRIBE)					less than foam
TURBIDI	☒ HEAVY CLOUDINESS, OPAQUE	☐ CLOUDY	☐ SOME CLOUDINESS	☐ NONE	Visibility < 5in	

WATER QUALITY APPEARANCE COMMENTS:

Slight organic scum

EROSION AND VEGETATION (DESCRIBE ANY VISUAL SIGNS OF SLIDE SLOPE EROSION AND/OR CHANGE IN VEGETATION CONDITION)

None

FIELD MEASUREMENTS: surface pH 8.98 TEMPERATURE (°C) 20.79 CONDUCTIVITY (µS/cm) 4301 DO 5.35 mg/L

FIELD MEASUREMENTS CONTINUED (IF DEPTH >2 FT)

middle pH 8.97 TEMP (°C) 20.81 CONDUCTIVITY (µS/cm) 4302 DO 5.34 mg/L

bottom pH 8.95 TEMP (°C) 20.79 CONDUCTIVITY (µS/cm) 4298 DO 5.31 mg/L

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

Depth 5.9
low clouds wind NW 0-2
limited bird activity, limited fish activity
No dead fish at site

TEAM LEADER'S SIGNATURE _____

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DISSOLVED OXYGEN DATA SHEET

PROJECT/SURVEY NAME: Buena Vista Lagoon | DATE: 13APR07

TIME STARTED: 06:30AM | TIME FINISHED: 09:25AM

LATITUDE: | LONGITUDE: | PROJECT MANAGER: KEITH W. MERKEL

MONITORS: ELE MCT

Station ID	Station Type	Time	mg/liter	%SAT	PPT	Cond	H_2O Temp C	NTU	Depth	NOTES
BV01	Shore	7:45	4.28				15.1			
BV02	"	8:10	4.87				18.0			
BV03	"	6:30	5.71				18.8			
BV04	"	8:00	5.43				18.8			
BV05	"	8:55	5.55				17.8			
BV06	"	9:25	5.92				16.6			
BV07	"	8:38	2.36				18.5			
BV08	"	8:28	2.45				18.4			
BV09	"									

Merkel & Associates, Inc.

DISSOLVED OXYGEN DATA SHEET

PROJECT/SURVEY NAME: BUENA VISTA LAGOON | DATE: 4/13/07

TIME STARTED: 0630 | TIME FINISHED: 0900

LATITUDE: | LONGITUDE: | PROJECT MANAGER: KEITH W. MERKEL

MONITORS:

Station ID	Station Type	Time	mg/liter	%SAT	PPT	Cond	Temp	NTU	Depth	NOTES
101	Lagoon	0708	5.29							
102	Lagoon	0712	7.21							
103	Lagoon	0900	1.72							
104	Lagoon	0659	7.25							
105	Lagoon	0720	6.82							
106 Top	Lagoon	0630	6.65							
106 Middle	Lagoon		6.11							
106 Bottom	Lagoon		3.29							
106 Average	Lagoon		5.35							
107 Top	Lagoon	0635	6.56							
107 Middle	Lagoon		5.06							
107 Bottom	Lagoon		3.92							
107 Average	Lagoon		5.21							
108 Top	Lagoon	0645	6.21							
108 Middle	Lagoon		5.79							
108 Bottom	Lagoon		5.39							
108 Average	Lagoon		5.8							
109 Top	Lagoon	0650	6.57							
109 Middle	Lagoon		6.08							
109 Bottom	Lagoon		5.72							
109 Average	Lagoon		6.12							

Merkel & Associates, Inc.

DISSOLVED OXYGEN DATA SHEET

PROJECT/SURVEY NAME: BUENA VISTA LAGOON — DATE: 4/13/07

TIME STARTED: 0808 — TIME FINISHED: 0845

LATITUDE: — LONGITUDE: — PROJECT MANAGER: KEITH W. MERKEL

MONITORS:

Station ID	Station Type	Time	mg/liter	%SAT	PPT	Cond	Temp	NTU	Depth	NOTES
10A Top	Lagoon	0808	5.32							2.5 ft deep
10A Middle	Lagoon		6.29							
10A Bottom	Lagoon		6.15							
10A Average	Lagoon		5.92							
10B Top	Lagoon	0813	6.39							
10B Middle	Lagoon		6.35							
10B Bottom	Lagoon		5.78							
10B Average	Lagoon		6.17							
10C Top	Lagoon	0820	6.63							
10C Middle	Lagoon		5.90							
10C Bottom	Lagoon		5.21							
10C Average	Lagoon		5.91							
10D Top	Lagoon	0830	6.46							
10D Middle	Lagoon		6.05							
10D Bottom	Lagoon		5.60							
10D Average	Lagoon		6.04							
10ETop	Lagoon	0835	6.40							
10E Middle	Lagoon		6.15							
10E Bottom	Lagoon		6.31							
10E Average	Lagoon		6.29							
10F Top	Lagoon	0845	6.47							
10F Middle	Lagoon		5.71							
10F Bottom	Lagoon		5.37							
10F Average	Lagoon		5.85							
10G Top	Lagoon	0840	5.35							
10G Middle	Lagoon		5.25							
10G Bottom	Lagoon		5.02							
10G Average	Lagoon		5.21							

Merkel & Associates, Inc.

DISSOLVED OXYGEN DATA SHEET

PROJECT/SURVEY NAME: Buena Vista Lagoon | DATE: 14APR07

TIME STARTED: 06:00AM | TIME FINISHED: 08:16AM

LATITUDE: | LONGITUDE: | PROJECT MANAGER: KEITH W. MERKEL

MONITORS: MCT

Station ID	Station_Type	Time	mg/liter	%SAT	PPT	Cond	H2O Temp °C	NTU	Depth	NOTES
BV01	Shore	7:05	4.46				15.4			
BV02	"	6:14	5.44				18.0			
BV03	"	6:26	6.21				19.2			
BV04	"	6:05	6.50				19.1			
BV05	"	7:51	5.07				17.7			
BV06	"	8:16	5.34				16.4			
BV07	"	7:35	2.51				18.3			
BV08	"	7:26	2.85				18.6			
BV09	"	8:13								took sample, no DO reading

Merkel & Associates, Inc.

DISSOLVED OXYGEN DATA SHEET

PROJECT/SURVEY NAME: BUENA VISTA LAGOON DATE: 4/14/07

TIME STARTED: 0817 TIME FINISHED: 0845

LATITUDE: LONGITUDE: PROJECT MANAGER: KEITH W. MERKEL

MONITORS:

Station ID	Station_Type	Time	mg/liter	%SAT	PPT	Cond	Temp	NTU	Depth	NOTES
10A Top	Lagoon	0817	5.98							
10A Middle	Lagoon		5.86							
10A Bottom	Lagoon		5.40							
10A Average	Lagoon		5.75							
10B Top	Lagoon	0822	7.36							
10B Middle	Lagoon		7.35							
10B Bottom	Lagoon		6.85							
10B Average	Lagoon		7.19							
10C Top	Lagoon	0825	6.65							
10C Middle	Lagoon		6.08							
10C Bottom	Lagoon		5.91							
10C Average	Lagoon		6.21							
10D Top	Lagoon	0830	7.10							
10D Middle	Lagoon		6.80							
10D Bottom	Lagoon		6.26							
10D Average	Lagoon		6.72							
10ETop	Lagoon	0835	6.98							
10E Middle	Lagoon		6.92							
10E Bottom	Lagoon		6.87							
10E Average	Lagoon		6.92							
10F Top	Lagoon	0840	6.65							7.5 SAT ≈ 65%
10F Middle	Lagoon		5.84							
10F Bottom	Lagoon		5.56							
10F Average	Lagoon		6.02							
10G Top	Lagoon	0845	6.32							
10G Middle	Lagoon		6.15							
10G Bottom	Lagoon		5.77							
10G Average	Lagoon		6.08							

Merkel & Associates, Inc.

DISSOLVED OXYGEN DATA SHEET

PROJECT/SURVEY NAME: BUENA VISTA LAGOON DATE: 4/14/07

TIME STARTED: 0645 TIME FINISHED: 0736

LATITUDE: LONGITUDE: PROJECT MANAGER: KEITH W. MERKEL

MONITORS:

Station ID	Station Type	Time	mg/liter	%SAT	PPT	Cond	Temp	NTU	Depth	NOTES
101	Lagoon	0705	5.28							
102	Lagoon	0716	4.59							
103	Lagoon	0718	5.15							
104	Lagoon	0645	7.56							
105	Lagoon	0655	7.67							
106 Top	Lagoon	0635	5.98							
106 Middle	Lagoon		5.90							
106 Bottom	Lagoon		5.86							
106 Average	Lagoon		5.91							
107 Top	Lagoon	0740	6.27							
107 Middle	Lagoon		6.19							
107 Bottom	Lagoon		6.13							
107 Average	Lagoon		6.2							
108 Top	Lagoon	0730	6.75							
108 Middle	Lagoon		6.43							
108 Bottom	Lagoon		5.90							
108 Average	Lagoon		6.36							
109 Top	Lagoon	0736	6.16							
109 Middle	Lagoon		6.09							
109 Bottom	Lagoon		5.98							
109 Average	Lagoon		6.08							

Merkel & Associates, Inc.

DISSOLVED OXYGEN DATA SHEET

PROJECT/SURVEY NAME: Buena Vista Lagoon | DATE: 15APR07

TIME STARTED: 06:00AM | TIME FINISHED: 07:24AM

LATITUDE: | LONGITUDE: | PROJECT MANAGER: KEITH W. MERKEL

MONITORS: MCT

Station ID	Station_Type	Time	mg/liter	%SAT	PPT	Cond	Temp °C	NTU	Depth	NOTES
BV01	Shore	6:31	4.31				16.3			
BV02	"	6:13	4.15				19.0			
BV03	"	6:23	5.06				18.8			
BV04	"	6:06	4.21				19.6			
BV05	"	7:07	5.02				18.7			
BV06	"	7:24	7.19				17.1			
BV07	"	6:54	3.38				18.5			
BV08	"	6:48	3.46				18.9			
BV09	"									

Merkel & Associates, Inc.

DISSOLVED OXYGEN DATA SHEET

PROJECT/SURVEY NAME: BUENA VISTA LAGOON | DATE: 4/15/07

TIME STARTED: 0818 | TIME FINISHED: 0855

LATITUDE: | LONGITUDE: | PROJECT MANAGER: KEITH W. MERKEL

MONITORS:

Station ID	Station Type	Time	mg/liter	%SAT	PPT	Cond	Temp	NTU	Depth	NOTES
10A Top	Lagoon	0818	4.66	51.2	1.84	3.38	18.26	7.0	0.03	
10A Middle	Lagoon		4.62	50.4	1.89	3.45	18.28	8.9	0.55	
10A Bottom	Lagoon		4.21	46.6	1.88	3.46	18.29	9.1	0.76	
10A Average	Lagoon		4.5							
10B Top	Lagoon	0828	5.35	58.7	1.70	3.10	18.22	13.6	0.04	
10B Middle	Lagoon		5.29	57.6	1.71	3.16	18.19	12.7	0.36	
10B Bottom	Lagoon		5.20	53.7	1.71	3.16	18.21	15.2	0.53	
10B Average	Lagoon		5.28							
10C Top	Lagoon	0823	5.23	57.1	1.66	3.07	18.64	16.7	0.04	
10C Middle	Lagoon		5.65	61.8	1.69	3.10	18.60	18.9	0.18	
10C Bottom	Lagoon		6.24	67.3	1.67	3.09	18.69	22.9	0.40	
10C Average	Lagoon		5.71							
10D Top	Lagoon	0836	6.40	71.2	1.68	3.08	18.52	26.7	0.05	
10D Middle	Lagoon		6.28	68.7	1.66	3.07	18.51	31.5	0.24	
10D Bottom	Lagoon		6.30	68.3	1.69	3.05	18.37	—	0.47	
10D Average	Lagoon		6.33							
10ETop	Lagoon	0843	6.65	73.9	1.65	3.09	19.29	6.24	0.06	
10E Middle	Lagoon		6.59	73.1	1.67	3.08	19.27	6.1.7	0.21	
10E Bottom	Lagoon		6.47	71.9	1.68	3.10	19.26	56.2	0.75	
10E Average	Lagoon		6.57							
10F Top	Lagoon	0849	6.18	68.5	1.71	3.13	18.96	21.2	0.07	
10F Middle	Lagoon		6.00	66.8	1.68	3.07	19.28	42.4	0.23	
10F Bottom	Lagoon		5.99	66.7	1.70	3.10	19.27	86.8	0.04	
10F Average	Lagoon		6.06							
10G Top	Lagoon	0855	6.47	70.7	1.70	3.15	18.64	9.5	0.07	
10G Middle	Lagoon		5.66	62.3	1.71	3.17	18.63	15.0	0.29	
10G Bottom	Lagoon		5.62	61.7	1.70	3.12	18.74	20.1	0.57	
10G Average	Lagoon		5.92							

Merkel & Associates, Inc.

DISSOLVED OXYGEN DATA SHEET

PROJECT/SURVEY NAME: BUENA VISTA LAGOON | DATE: 4/15/07

TIME STARTED: 0619 | TIME FINISHED: 0739

LATITUDE: | LONGITUDE: | PROJECT MANAGER: KEITH W. MERKEL

MONITORS:

Station ID	Station Type	Time	mg/liter	%SAT	PPT	Cond	Temp	NTU	Depth	NOTES
101	Lagoon	0628	3.92	40.8	2.54	4.71	15.82	31.2	0.04	
102	Lagoon	0640	3.20	31.5	2.70	4.94	14.01	51.0	0.03	
103	Lagoon	0645	3.39	35.2	2.51	4.62	16.12	30.1	0.04	
104	Lagoon	0619	4.58	48.5	2.29	4.16	17.71	65.0	0.04	
105	Lagoon	0657	5.73	62.0	2.28	4.13	17.63	92.4	0.03	
106 Top	Lagoon	0739	5.75	46.3	2.20	4.02	19.56	41.8	0.06	
106 Middle	Lagoon		5.72	62.2	2.27	4.10	18.24	48.1	0.28	
106 Bottom	Lagoon		5.85	63.8	2.29	4.17	18.16	50.3	0.55	
106 Average	Lagoon		5.77							
107 Top	Lagoon	0730	4.15	62.4	2.24	4.07	18.67	42.9	0.04	
107 Middle	Lagoon		4.06	45.4	2.22	4.04	19.50	42.7	0.22	
107 Bottom	Lagoon		4.06	45.4	2.19	4.01	19.49	42.0	0.5	
107 Average	Lagoon		4.07							
108 Top	Lagoon	0710	4.21	40.7	2.20	46.3	19.47	44.4	0.04	
108 Middle	Lagoon		4.17	46.8	2.19	4.07	19.44	51.8	0.16	
108 Bottom	Lagoon		4.10	46.1	2.18	4.07	19.49	45.7	0.55	
108 Average	Lagoon		4.16							
109 Top	Lagoon	0719	4.10	46.1	2.19	4.04	19.60	42.2	0.08	
109 Middle	Lagoon		4.22	46.3	2.11	3.87	18.50	67.7	0.25	
109 Bottom	Lagoon		4.16	46.2	2.16	3.98	19.02	43.3	0.33	
109 Average	Lagoon		4.16							

EAST BVL

Merkel & Associates, Inc.

DISSOLVED OXYGEN DATA SHEET

PROJECT/SURVEY NAME: Buena Vista Lagoon | DATE: 16 APR 07

TIME STARTED: 06:00AM | TIME FINISHED: 07:34AM

LATITUDE: | LONGITUDE: | PROJECT MANAGER: KEITH W. MERKEL

MONITORS: MCT

Station ID	Station Type	Time	mg/liter	%SAT	PPT	Cond	H_2O Temp °C	NTU	Depth	NOTES
BV01	SHORE	6:33	4.04				16.0			
BV02	"	6:15	3.40				18.8			
BV03	"	6:23	3.43				18.9			
BV04	"	6:08	3.81				19.1			
BV05	"	7:14	4.60				17.8			
BV06	"	7:34	5.10				16.7			
BV07	"	6:54	2.84				18.2			
BV08	"	6:49	2.61				18.3			
BV09	"									

Merkel & Associates, Inc.

DISSOLVED OXYGEN DATA SHEET

PROJECT/SURVEY NAME: BUENA VISTA LAGOON DATE: 4/16/07

TIME STARTED: 0800 TIME FINISHED: 0836

LATITUDE: LONGITUDE: PROJECT MANAGER: KEITH W. MERKEL

MONITORS:

Station ID	Station Type	Time	mg/liter	%SAT	PPT	Cond	Temp	NTU	Depth	NOTES
10A Top	Lagoon	0800	4.78	51.9	2.00	3.68	17.83	—	0.04	
10A Middle	Lagoon	0807	5.08	55.3	2.02	3.71	17.94	—	0.22	
10A Bottom	Lagoon	0810	5.70	62.9	2.42	4.49	18.53	—	0.69	
10A Average	Lagoon		5.19							
10B Top	Lagoon	0817	6.45	70.0	1.69	3.17	18.09	—	0.07	
10B Middle	Lagoon	0818	6.42	69.8	1.71	3.13	18.17	—	0.23	
10B Bottom	Lagoon	0819	6.33	68.8	1.73	3.19	18.20	—	0.45	
10B Average	Lagoon		6.4							
10C Top	Lagoon	0802	3.78	40.8	1.70	3.14	17.82	—	0.04	
10C Middle	Lagoon	0804	3.55	38.4	1.74	3.16	17.86	—	0.22	
10C Bottom	Lagoon	0815	4.09	43.8	1.76	3.22	17.83	—	0.40	
10C Average	Lagoon		3.87							
10D Top	Lagoon	0821	5.13	56.0	1.71	3.15	18.41	—	0.06	
10D Middle	Lagoon	0822	5.04	55.2	1.70	3.13	18.47	—	0.29	
10D Bottom	Lagoon	0823	4.98	54.5	1.69	3.11	18.47	—	0.55	
10D Average	Lagoon		5.05							
10ETop	Lagoon	0825	6.95	76.0	1.68	3.10	18.51	—	0.05	
10E Middle	Lagoon	0826	6.95	76.0	1.70	3.14	18.51	—	0.27	
10E Bottom	Lagoon	0827	6.90	75.5	1.68	3.13	18.51	—	0.55	
10E Average	Lagoon		6.93							
10F Top	Lagoon	0829	6.62	72.6	1.67	3.11	18.60	—	0.09	
10F Middle	Lagoon	0830	6.43	70.4	1.69	3.12	18.58	—	0.32	
10F Bottom	Lagoon	0831	6.24	68.4	1.67	3.09	18.58	—	0.62	
10F Average	Lagoon		6.43							
10G Top	Lagoon	0834	6.29	68.8	1.67	3.07	18.53	—	0.08	
10G Middle	Lagoon	0835	6.13	67.1	1.69	3.13	18.53	—	0.25	
10G Bottom	Lagoon	0836	5.88	64.4	1.69	3.12	18.52	—	0.50	
10G Average	Lagoon		6.1							

BNL CENTRAL

Merkel & Associates, Inc.

DISSOLVED OXYGEN DATA SHEET

PROJECT/SURVEY NAME: BUENA VISTA LAGOON DATE: 4/16/07

TIME STARTED: 0632 TIME FINISHED: 0709

LATITUDE: LONGITUDE: PROJECT MANAGER: KEITH W. MERKEL

MONITORS:

Station ID	Station Type	Time	mg/liter	%SAT	PPT	Cond	Temp	NTU	Depth	NOTES
101	Lagoon	0632	3.35	34.6	2.55	4.67	15.49	42.8	0.06	
102	Lagoon	0638	3.69	38.0	2.60	4.73	15.35	37.8	0.06	
103	Lagoon	0641	3.97	41.1	2.60	4.76	15.50	42.2	0.05	
104	Lagoon	0623	7.58	81.7	2.33	4.32	17.54	47.8	0.05	
105	Lagoon	0649	7.27	76.8	2.37	4.33	16.68	47.2	0.06	
106 Top	Lagoon	0724	4.09	45.2	2.26	4.17	1890	44.4	0.04	
106 Middle	Lagoon	0721	4.19	46.3	2.25	4.16	18.80	48.4	0.25	
106 Bottom	Lagoon	0722	4.00	43.8	2.26	4.15	18.87	45.6	0.40	
106 Average	Lagoon		4.10							
107 Top	Lagoon	0704	4.26	47.3	2.24	4.11	18.99	29.1	0.06	
107 Middle	Lagoon	0712	4.25	47.3	2.25	4.14	19.10	34.2	0.33	
107 Bottom	Lagoon	0715	4.20	46.7	2.25	4.12	19.09	32.1	0.51	
107 Average	Lagoon		4.24							
108 Top	Lagoon	0702	4.20	46.2	2.26	4.15	18.87	35.9	0.06	
108 Middle	Lagoon	0718	4.07	45.0	2.27	4.16	18.88	30.4	0.26	
108 Bottom	Lagoon	0716	4.02	43.9	2.28	4.16	18.82	33.1	0.47	
108 Average	Lagoon		4.10							
109 Top	Lagoon	0706	6.16	66.3	2.24	4.09	18.92	38.0	0.06	
109 Middle	Lagoon	0708	6.09	67.7	2.24	4.09	19.14	37.5	0.16	
109 Bottom	Lagoon	0709	5.25	58.2	2.27	4.11	19.11	37.1	0.37	
109 Average	Lagoon		5.83							

BVL EAST

Merkel & Associates, Inc.

DISSOLVED OXYGEN DATA SHEET

PROJECT/SURVEY NAME: Buena Vista Lagoon | DATE: 17APR07

TIME STARTED: 06:00AM | TIME FINISHED: 07:28AM

LATITUDE: | LONGITUDE: | PROJECT MANAGER: KEITH W. MERKEL

MONITORS: MCT

Station ID	Station Type	Time	mg/liter	%SAT	PPT	Cond	H2O Temp °C	NTU	Depth	NOTES
BV01	Shore	6:34					16.2			pump@ station turned off
BV02	"	6:17					18.8			
BV03	"	6:24					18.9			
BV04	"	6:10					19.2			
BV05	"	7:13					17.8			
BV06	"	7:28					16.4			
BV07	"	6:55					18.9			
BV08	"	6:49					18.4			
BV09	"									

Merkel & Associates, Inc.

DISSOLVED OXYGEN DATA SHEET

PROJECT/SURVEY NAME: BUENA VISTA LAGOON | DATE: 4/17/07

TIME STARTED: 0735 | TIME FINISHED: 0829

LATITUDE: | LONGITUDE: | PROJECT MANAGER: KEITH W. MERKEL

MONITORS:

Station ID	Station Type	Time	mg/liter	%SAT	PPT	Cond	Temp	NTU	Depth	NOTES
10A Top	Lagoon	0735	4.69	51.0	1.88	3.46	18.15	14.4	0.18	
10A Middle	Lagoon	0737	4.40	48.1	2.00	3.61	18.33	14.0	0.50	
10A Bottom	Lagoon	0739	4.54	51.2	2.96	5.38	20.06	12.7	0.89	
10A Average	Lagoon		4.54							
10B Top	Lagoon	0751	5.86	64.5	1.71	3.16	18.68	36.5	0.17	
10B Middle	Lagoon	0752	5.69	62.3	1.72	3.17	18.59	30.7	0.32	
10B Bottom	Lagoon	0753	5.21	56.8	1.72	3.17	18.33	/	0.68	
10B Average	Lagoon		5.59							
10C Top	Lagoon	0746	3.95	43.2	1.97	3.62	18.42	37.3	0.19	
10C Middle	Lagoon	0747	3.85	42.3	2.04	3.74	18.49	25.8	0.29	
10C Bottom	Lagoon	0748	3.70	40.6	2.06	3.78	18.56	23.1	0.65	
10C Average	Lagoon		3.83							
10D Top	Lagoon	0801	5.16	57.1	1.70	3.13	19.06	26.3	0.16	
10D Middle	Lagoon	0802	4.87	53.9	1.70	3.14	19.09	18.7	0.34	
10D Bottom	Lagoon	0803	4.84	53.5	1.70	3.14	19.07	24.3	0.71	
10D Average	Lagoon		4.96							
10ETop	Lagoon	0807	7.69	85.2	1.69	3.13	19.20	15.9	0.17	
10E Middle	Lagoon	0811	7.61	84.5	1.69	3.13	19.23	16.6	0.36	
10E Bottom	Lagoon	0812	7.41	82.2	1.69	3.13	19.19	17.7	0.70	
10E Average	Lagoon		7.57							
10F Top	Lagoon	0817	5.98	66.1	1.70	3.17	18.97	24.8	0.16	
10F Middle	Lagoon	0818	6.02	66.7	1.68	3.12	19.02	22.6	0.31	
10F Bottom	Lagoon	0820	5.92	65.5	1.69	3.11	19.05	22.7	0.74	
10F Average	Lagoon		5.97							
10G Top	Lagoon	0822	5.98	65.8	1.73	3.13	18.77	16.7	0.18	
10G Middle	Lagoon	0823	5.70	62.6	1.73	3.13	18.68	13.1	0.38	
10G Bottom	Lagoon	0829	5.44	59.7	1.71	3.16	18.67	17.1	0.50	
10G Average	Lagoon		5.71							

Merkel & Associates, Inc.

DISSOLVED OXYGEN DATA SHEET

PROJECT/SURVEY NAME: BUENA VISTA LAGOON | DATE: 4/17/07

TIME STARTED: 0624 | TIME FINISHED: 0653

LATITUDE: | LONGITUDE: | PROJECT MANAGER: KEITH W. MERKEL

MONITORS:

Station ID	Station Type	Time	mg/liter	%SAT	PPT	Cond	Temp	NTU	Depth	NOTES
101	Lagoon	0624	3.00	34.0	2.11	4.76	16.03	50.2	0.17	
102	Lagoon	0628	2.56	30.0	2.70	4.92	16.14	33.9	0.17	
103	Lagoon	0630	2.94	30.7	2.67	4.87	16.14	57.0	0.17	
104	Lagoon	0636	4.55	49.4	2.35	4.30	18.06	27.2	0.17	
105	Lagoon	0639	4.35	47.1	2.37	4.33	17.66	64.5	0.18	
106 Top	Lagoon	0703	4.32	48.0	2.20	4.03	19.03	35.2	0.19	
106 Middle	Lagoon	0704	4.28	47.4	2.20	4.04	19.05	38.4	0.31	
106 Bottom	Lagoon	0705	4.18	46.3	2.21	4.04	19.05	50.5	0.60	
106 Average	Lagoon		4.26							
107 Top	Lagoon	0656	4.60	51.0	2.21	4.06	19.13	14.3	0.16	
107 Middle	Lagoon	0657	4.60	51.2	2.21	4.05	19.14	16.9	0.32	
107 Bottom	Lagoon	0659	4.53	50.6	2.21	4.05	19.14	16.2	0.60	
107 Average	Lagoon		4.58							
108 Top	Lagoon	0646	4.76	52.7	2.20	4.03	19.01	16.5	0.17	
108 Middle	Lagoon	0647	4.46	49.5	2.20	4.03	19.08	18.1	0.32	
108 Bottom	Lagoon	0649	4.39	48.7	2.21	4.06	19.01	17.9	0.61	
108 Average	Lagoon		4.54							
109 Top	Lagoon	0652	4.74	51.8	2.04	3.75	18.38	10.5	0.16	
109 Middle	Lagoon	0652	4.72	51.2	1.87	3.36	17.74	15.2	0.26	
109 Bottom	Lagoon	0653	4.66	50.9	1.90	3.45	17.99	4.1	045	
109 Average	Lagoon		4.71							

10mm over the.

Merkel & Associates, Inc.

DISSOLVED OXYGEN DATA SHEET

PROJECT/SURVEY NAME: Buena Vista Lagoon | DATE: 18APR07

TIME STARTED: 06:00AM | TIME FINISHED: 07:38AM

LATITUDE: | LONGITUDE: | PROJECT MANAGER: KEITH W. MERKEL

MONITORS: MCT

Station ID	Station_Type	Time	mg/liter	%SAT	PPT	Cond	H_2O Temp C	NTU	Depth	NOTES
BV01	Shore	6:33					16.2			
BV02	"	6:12					18.4			
BV03	"	6:22					18.8			
BV04	"	6:04					18.8			
BV05	"	7:18					18.2			
BV06	"	7:38					17.1			
BV07	"	6:57					18.4			
BV08	"	6:52					18.6			
BV09										

Merkel & Associates, Inc.

DISSOLVED OXYGEN DATA SHEET

PROJECT/SURVEY NAME: BUENA VISTA LAGOON | DATE: 4/18/07

TIME STARTED: 07:59 | TIME FINISHED: 08:51

LATITUDE: | LONGITUDE: | PROJECT MANAGER: KEITH W. MERKEL

MONITORS:

Station ID	Station Type	Time	mg/liter	%SAT	PPT	Cond	Temp	NTU	Depth	NOTES
10A Top	Lagoon	07:59	3.00	32.2	2.01	3.70	18.25	0.0	0.23	
10A Middle	Lagoon	08:00	3.16	34.0	2.01	3.76	18.21	0.0	0.34	
10A Bottom	Lagoon	08:00	3.07	33.8	2.63	4.79	19.23	2.4	0.77	
10A Average	Lagoon		3.08							
10B Top	Lagoon	8:10	5.10	55.7	1.74	3.22	19.04	27.2	0.18	
10B Middle	Lagoon	8:10	5.10	55.7	1.74	3.21	19.07	205	0.34	
10B Bottom	Lagoon	8:10	5.13	55.9	1.74	3.22	19.05	28.3	0.55	
10B Average	Lagoon		5.11							
10C Top	Lagoon	8:05	3.10	32.4	1.80	3.33	18.59	10.6	0.22	
10C Middle	Lagoon	8:05	3.23	35.0	1.80	3.32	18.57	18.0	0.32	
10C Bottom	Lagoon	8:05	3.52	38.4	1.80	3.32	18.55	13.4	0.4	
10C Average	Lagoon		3.28							
10D Top	Lagoon	08:21	3.83	41.8	1.70	3.16	19.13	12.0	0.19	
10D Middle	Lagoon	08:21	3.43	37.5	1.71	3.15	19.08	5.9	0.31	
10D Bottom	Lagoon	08:21	3.42	37.4	1.71	3.15	19.10	—	0.16	
10D Average	Lagoon		3.41							
10ETop	Lagoon	08:39	6.73	74.1	1.70	3.15	19.44	15.0	0.19	
10E Middle	Lagoon	08:37	6.66	73.3	1.71	3.15	19.60	18.7	0.29	
10E Bottom	Lagoon	08:38	6.63	73.1	1.71	3.15	19.44	15.0	0.19	
10E Average	Lagoon		6.65							
10F Top	Lagoon	08:47	5.81	63.7	1.71	3.16	19.27	8.8	0.18	(cylindrical algae
10F Middle	Lagoon	08:47	5.78	63.5	1.71	3.16	19.31	9.3	0.32	covered buoy)
10F Bottom	Lagoon	08:47	5.75	63.3	1.71	3.16	19.30	8.2	0.64	
10F Average	Lagoon		5.78							
10G Top	Lagoon	08:51	5.17	56.4	1.71	3.16	19.06	4.8	0.19	(disc-shaped
10G Middle	Lagoon	08:51	5.21	56.7	1.71	3.17	18.88	2.2	0.31	buoy)
10G Bottom	Lagoon	08:51	5.12	55.6	1.71	3.16	18.91	1.9	0.46	
10G Average	Lagoon									

Merkel & Associates, Inc.

DISSOLVED OXYGEN DATA SHEET

PROJECT/SURVEY NAME: BUENA VISTA LAGOON | DATE: 4/18/07

TIME STARTED: 6:44 | TIME FINISHED: 7:24

LATITUDE: | LONGITUDE: | PROJECT MANAGER: KEITH W. MERKEL

MONITORS:

Station ID	Station Type	Time	mg/liter	%SAT	PPT	Cond	Temp	NTU	Depth	NOTES
101	Lagoon	06:44	0.82	8.5	2.75	4.87	17.07	36.6	0.14	
102	Lagoon	06:38	1.67	17.1	2.76	5.090	17.63	61.7	0.11	
103	Lagoon									
104	Lagoon	06:18	4.88	53.0	2.30	4.210	18.65	49.1	0.21	
105	Lagoon	06:54	4.10	43.7	2.40	4.40	17.84	50.8	0.14	
106 Top	Lagoon	07:07	4.37	47.3	2.12	3.89	18.55	32.0	0.15	
106 Middle	Lagoon	07:08	4.40	47.5	2.12	3.86	18.57	39.6	0.45	
106 Bottom	Lagoon	07:08	4.43	48.0	2.12	3.88	18.58	46.3	0.63	
106 Average	Lagoon		4.40							
107 Top	Lagoon	07:16	4.66	50.7	2.09	3.84	18.70	6.5	0.19	
107 Middle	Lagoon	07:17	4.70	50.9	2.09	3.84	18.74	7.2	0.41	
107 Bottom	Lagoon	07:17	4.64	50.4	2.10	3.85	18.74	7.4	0.65	
107 Average	Lagoon		4.67							
108 Top	Lagoon	07:21	4.83	52.2	2.09	3.84	18.67	7.8	0.17	
108 Middle	Lagoon	07:21	4.70	51.1	2.09	3.83	18.67	8.1	0.35	
108 Bottom	Lagoon	07:21	4.71	51.2	2.08	3.83	18.70	8.4	0.76	
108 Average	Lagoon		4.75							
109 Top	Lagoon	07:23	4.82	52.3	2.07	3.81	18.59	6.5	0.17	
109 Middle	Lagoon	07:24	5.06	54.7	2.01	3.31	18.09	—	0.33	
109 Bottom	Lagoon	07:24	5.11	53.2	1.64	3.14	16.77	—	0.46	
109 Average	Lagoon		5.00							

Merkel & Associates, Inc.

DISSOLVED OXYGEN DATA SHEET

PROJECT/SURVEY NAME: BV sewage spill — DATE: 19 April 07

TIME STARTED: 0544 — TIME FINISHED: 0750

LATITUDE: — LONGITUDE: — PROJECT MANAGER: KEITH W. MERKEL

MONITORS: Ed Ervin

Station ID	Station Type	Time	mg/liter	%SAT	PPT	Cond	Temp	NTU	Depth	NOTES
BV01	↑	0614	3.78				19.4			
BV02		0642	4.35				16.6			
BV03 (start)	Shore	0603	4.96				17.9			at 0544 I recalibrated YSI55 on site
BV04	shore	0628	5.84				17.8			
BV05		0736	5.12				16.9			
BV06		0747	4.85				15.1			
BV07		0709	2.63				18.1			
BV08	↓	0825	2.78				17.8			
~~BV09~~										

Simultaneous Comparisons

YSI55 (3.5) ECE

Hydrolab R M

Merkel & Associates, Inc.

DISSOLVED OXYGEN DATA SHEET

PROJECT/SURVEY NAME: BUENA VISTA LAGOON DATE: 4/19/07

TIME STARTED: 0632 TIME FINISHED: 0723

LATITUDE: LONGITUDE: PROJECT MANAGER: KEITH W. MERKEL

MONITORS:

Station ID	Station Type	Time	mg/liter	%SAT	PPT	Cond	Temp	NTU	Depth	NOTES
101	Lagoon	0632	4.13	40.2	2.62	4.77	13.65	432	0.06	
102	Lagoon	0641	3.86	37.3	2.62	4.78	13.40	426.0	0.06	
103	Lagoon	0643	3.73	36.5	2.69	4.89	13.66	424.0	0.06	
104	Lagoon	0625	7.05	78.0	2.36	4.32	16.51	(412)	0.06	
105	Lagoon	0651	6.36	63.6	2.38	4.35	15.06	409.0	0.06	
106 Top	Lagoon	0721	6.32	67.5	2.07	3.79	17.79	209	0.14	Started diffuser up
106 Middle	Lagoon	0722	6.44	68.6	2.07	3.82	17.77	37.7	0.33	just before
106 Bottom	Lagoon	0723	6.38	67.7	2.08	3.81	17.22	21.2	0.55	sampling
106 Average	Lagoon		6.38							
107 Top	Lagoon	0718	6.62	76.6	2.07	3.81	17.95	431	0.09	
107 Middle	Lagoon	0719	6.59	70.3	2.07	3.80	17.90	431	0.33	
107 Bottom	Lagoon	0720	6.59	69.8	2.06	3.78	17.90	433	0.52	
107 Average	Lagoon		6.6							
108 Top	Lagoon	0704	6.75	71.8	2.07	3.81	17.69	398	0.06	
108 Middle	Lagoon	0705	6.72	71.6	2.07	3.80	17.86	407	0.26	
108 Bottom	Lagoon	0705	6.48	68.9	2.08	3.83	17.71	402	0.51	
108 Average	Lagoon		6.65							
109 Top	Lagoon	0713	6.42	67.6	1.50	2.77	15.36	414	0.08	
109 Middle	Lagoon	0711	5.89	61.3	1.68	3.20	16.80	417	0.28	
109 Bottom	Lagoon	0710	6.31	67.6	1.97	3.13	17.61	401	0.50	
109 Average	Lagoon		6.21							

Lab @ 102 was probe into mud.

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DISSOLVED OXYGEN DATA SHEET

PROJECT/SURVEY NAME: BUENA VISTA LAGOON | DATE: 4/19/07

TIME STARTED: 0804 | TIME FINISHED: 0850

LATITUDE: | LONGITUDE: | PROJECT MANAGER: KEITH W. MERKEL

MONITORS:

Station ID	Station Type	Time	mg/liter	%SAT	PPT	Cond	Temp	NTU	Depth	NOTES
10A Top	Lagoon	0804	5.50	57.5	1.81	3.34	17.02	391	0.13	
10A Middle	Lagoon	0805	5.33	55.7	1.84	3.39	16.84	396	0.49	
10A Bottom	Lagoon	0806	5.59	60.8	3.59	6.11	18.89	411	0.82	Comparison bt. BCM-LAGOON & ELE-LAGOON
10A Average	Lagoon		5.47							6.13 <TOP>
10B Top	Lagoon	0818	6.37	67.6	1.74	3.21	17.58	448	0.15	
10B Middle	Lagoon	0820	6.82	66.8	1.73	3.20	17.53	456	0.27	
10B Bottom	Lagoon	0822	6.47	68.2	1.73	3.20	17.39	441	0.49	
10B Average	Lagoon		6.55							
10C Top	Lagoon	0812	5.09	53.4	1.94	3.56	17.29	443	0.12	YSI55 4.92 <TOP>
10C Middle	Lagoon	0814	4.95	52.2	1.98	3.64	17.40	560	0.35	
10C Bottom	Lagoon	0815	4.84	51.1	1.97	3.64	17.43	465	0.41	
10C Average	Lagoon		4.96							
10D Top	Lagoon	0828	5.80	61.3	1.74	3.21	17.53	434	0.15	5.44 <TOP>
10D Middle	Lagoon	0829	5.78	61.2	1.73	3.21	17.55	435	0.30	
10D Bottom	Lagoon	0830	5.67	60.0	1.74	3.21	17.53	437	0.49	
10D Average	Lagoon		5.75							
10E Top	Lagoon	0835	7.21	77.0	1.72	3.18	18.83	445	0.16	6.12 <TOP>
10E Middle	Lagoon	0836	7.11	76.0	1.72	3.17	18.04	454	0.34	
10E Bottom	Lagoon	0838	6.97	74.4	1.72	3.17	18.02	469	0.57	
10E Average	Lagoon		7.10							
10F Top	Lagoon	0844	7.06	75.6	1.72	3.17	18.12	440	0.14	5.31 <TOP>
10F Middle	Lagoon	0845	7.05	75.6	1.72	3.17	18.11	443	0.30	
10F Bottom	Lagoon	0846	6.35	67.6	1.74	3.22	17.93	440	0.58	
10F Average	Lagoon		6.82							
10G Top	Lagoon	0848	6.03	63.8	1.77	3.26	17.53	422	0.16	5.06 <TOP>
10G Middle	Lagoon	0849	5.84	61.7	1.77	3.26	17.48	422	0.31	
10G Bottom	Lagoon	0850	5.18	54.5	1.74	3.22	17.28	422	0.47	
10G Average	Lagoon		5.68							

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DISSOLVED OXYGEN DATA SHEET

PROJECT/SURVEY NAME: Buena Vista Lagoon			DATE: 20 APR 07
TIME STARTED: 10:00AM	TIME FINISHED:		
LATITUDE:	LONGITUDE:	PROJECT MANAGER: KEITH W. MERKEL	
MONITORS: MCT			1 of

Station ID	Station Type	Time	mg/liter	%SAT	PPT	Cond	H2O Temp °C	NTU	Depth	NOTES
BV01	Shore	06:35	2.91				15.3		Top	
BV02	"	06:25	5.7				17.8		"	
BV03	"	06:02	5.40				18.3		"	
BV04	"	06:17	7.62				18.4		"	
BV05	"	07:16	3.19				17.3		"	
BV06	"	07:37	4.01				15.5		"	
BV07	"	06:58	2.62				18.1		"	
BV08	"	06:52	2.47				17.7		"	
BV09										

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DISSOLVED OXYGEN DATA SHEET

PROJECT/SURVEY NAME: BUENA VISTA LAGOON — DATE: 4/20/07

TIME STARTED: 0624 — TIME FINISHED: 0735

LATITUDE: — LONGITUDE: — PROJECT MANAGER: KEITH W. MERKEL

MONITORS:

Station ID	Station Type	Time	mg/liter	%SAT	PPT	Cond	Temp	NTU	Depth	NOTES
101	Lagoon	0624	6.23	6.35	2.40	—	16.05	—	0.13	turbidity on the Reitz
102	Lagoon	0628	8.27	33.8	2.68	—	16.21	33.1	0.11	
103	Lagoon	0631	2.90	38.2	2.71	4.89	15.95	~40	0.11	
104	Lagoon	0711	10.06	105.5	2.30	—	16.96	44.0	0.10	
105	Lagoon	0713	9.60	100.6	2.17	—	16.92	31.8	0.10	
106 Top	Lagoon	0742	9.59	103.0	2.05	3.76	18.14	23.5	0,12	
106 Middle	Lagoon	0742	9.62	103.3	2.06	3.77	18.16	22.3	0.29	
106 Bottom	Lagoon	0743	9.48	101.3	2.10	3.86	17.94	27.1	0.55	
106 Average	Lagoon		9.56							
107 Top	Lagoon	0737	8.91	95.6	1.97	3.63	18.16	6.1	0.14	
107 Middle	Lagoon	0738	9.00	96.6	1.97	3.63	18.20	6.0	0,28	
107 Bottom	Lagoon	0739	8.80	94.4	1.98	3.64	18.20	6.7	0.50	
107 Average	Lagoon		8.9							
108 Top	Lagoon	0720	11.16	120.2	2.02	—	18.36	—	0.11	
108 Middle	Lagoon	0726	11.20	118.8	2.01	3.71	18.39	22.2	0.32	
108 Bottom	Lagoon	0727	10.97	118.3	2.01	3.71	1840	19.7	0.55	
108 Average	Lagoon		11.05							
109 Top	Lagoon	0732	7.34	76.4	1.66	3.17	16.83	—	0.12	
109 Middle	Lagoon	0735	7.02	74.2	1.63	3.08	16.48	—	0,34	
109 Bottom	Lagoon	0732	5.34	54.0	1.50	2.77	15.94	—	0.34	
109 Average	Lagoon		6.57							

19 APR 07 - tie was 5cm below waterline on wood post

20 APR 07 - " 6.5cm "

Merkel & Associates, Inc.

DISSOLVED OXYGEN DATA SHEET

PROJECT/SURVEY NAME: BUENA VISTA LAGOON | DATE: 4/20/07

TIME STARTED: 0827 | TIME FINISHED: 0859

LATITUDE: | LONGITUDE: | PROJECT MANAGER: KEITH W. MERKEL

MONITORS: YSI D.O. Readings

Station ID	Station Type	Time	mg/liter	%SAT	PPT	Cond	Temp	NTU	Depth	NOTES
10A Top	Lagoon	0827	4.91	51.9	1.92	3.51	17.43	1.9	0.16	3.64
10A Middle	Lagoon	0827	4.47	47.1	1.99	3.64	17.29	0.5	0.40	
10A Bottom	Lagoon	0827	4.55	49.5	2.98	5.37	18.50	15.6	0.73	
10A Average	Lagoon		4.64							
10B Top	Lagoon	0834	6.55	70.1	1.75	3.22	18.28	14.9	0.07	4.99
10B Middle	Lagoon	0834	6.38	68.5	1.75	3.23	18.32	15.9	0.29	
10B Bottom	Lagoon	0834	6.37	68.5	1.75	3.23	18.31	16.1	0.61	
10B Average	Lagoon		6.43							
10C Top	Lagoon	0830	5.91	62.9	1.78	3.29	17.88	10.8	0.19	4.66
10C Middle	Lagoon	0831	5.90	62.8	1.78	3.29	17.91	12.8	0.31	
10C Bottom	Lagoon	0831	5.45	58.0	1.79	3.30	17.87	13.1	0.52	
10C Average	Lagoon		5.75							
10D Top	Lagoon	0840	6.01	64.7	1.75	3.23	18.39	14.3	0.11	4.57
10D Middle	Lagoon	0840	6.07	65.4	1.75	3.23	18.39	12.8	0.28	
10D Bottom	Lagoon	0841	6.12	65.9	1.75	3.23	18.38	19.7	0.58	
10D Average	Lagoon		6.07							
10E Top	Lagoon	0847	6.46	69.4	1.75	3.24	18.25	12.4	0.13	4.95
10E Middle	Lagoon	0848	6.59	70.7	1.75	3.24	18.24	11.6	0.38	
10E Bottom	Lagoon	0848	6.62	71.7	1.75	3.23	18.24	13.0	0.52	
10E Average	Lagoon		6.56							
10F Top	Lagoon	0855	5.27	56.3	1.79	3.30	17.99	12.5	0.14	3.89
10F Middle	Lagoon	0855	5.23	55.8	1.79	3.30	18.00	12.7	0.34	
10F Bottom	Lagoon	0856	5.16	55.0	1.80	3.32	17.97	11.1	0.59	
10F Average	Lagoon		5.22							
10G Top	Lagoon	0858	4.51	47.7	1.80	3.31	17.61	0.0	0.16	3.20
10G Middle	Lagoon	0859	4.21	44.6	1.79	3.30	17.58	0.0	0.33	
10G Bottom	Lagoon	0859	4.37	46.3	1.80	3.32	17.61	0.0	0.43	
10G Average	Lagoon		4.36							

Buena Vista Lagoon Restoration Feasibility Analysis

Final Report

Volume 1: Main Report

Prepared for:

Buena Vista Lagoon Foundation
California State Coastal Conservancy
U.S. Fish and Wildlife Service

Prepared by:

Everest International Consultants, Inc.

EVEREST

June 2004

BUENA VISTA LAGOON RESTORATION FEASIBILITY ANALYSIS

Final Report

Volume 1: Main Report

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June 2004

3.5 WATER QUALITY

3.5.1 Buena Vista Lagoon

The water column in the Lagoon was most recently sampled in the period from June 1999 to November 1999 at six locations within the Lagoon for conventional pollutants, nutrients, and other water quality parameters on a monthly or bimonthly basis (Coastal Environments, 2000). The results are summarized in Table 3.7.

Table 3.7 Lagoon Water Quality Sampling Results

CONSTITUENT	UNIT	MEASURED RANGE	BASIN PLAN OBJECTIVE[1]
Turbidity	NTU	0.6 - 14.6	20
Total Nitrogen (N)	mg/L	1.0 - 4.4	0.25[2]
Total Phosphorus (P)	mg/L	ND[3] - 0.4	0.025[2]
Total Coliform	MPN/100 mL	Exceeded objective at least once in each basin during period	230 - 330[4]
Fecal Coliform	MPN/100 mL	Exceeded objective only once in Railroad Basin during period	400[4]
Enterococcus	MPN/100 mL	No exceedance	108[4]
Dissolved Oxygen (DO), Surface	mg/L	4.5 - 6.2	7.0
Dissolved Oxygen (DO), Bottom	mg/L	2.5 - 5.4	7.0
pH	Unit	8.0 - 9.3	7.0 - 9.0[5] 6.5 - 8.5[6]
Salinity, Surface	ppt	1.6 - 2.7	
Salinity, Bottom	ppt	1.6 - 3.0	

Source: Coastal Environments (2000)

(1) RWQCB (1994). Not to be exceeded more than 10% of the time per year (per month for bacteria), except for turbidity.
(2) For lagoons and lakes.
(3) Non-detect.
(4) Single sample.
(5) For bays and estuaries.
(6) For inland waters.

The sampling results indicated that nutrients (N, P) tended to significantly exceed objectives, sometimes by an order of magnitude, which supports the 303(d) listing of nutrients as critical pollutants in the Lagoon. Exceedances of the bacteria objectives were occasional overall, which supports the 303(d) analysis by the Regional Water Quality Control Board (RWQCB) that considered bacteria as of uncertain importance in impairing beneficial uses of the Lagoon. Although total coliforms exceeded objectives more frequently, it is generally considered a less important indicator for bacterial contamination due to its ubiquitous, often naturally occurring sources. The results revealed that DO in the Lagoon tended to be appreciably depressed below objectives, which may be correlated with nutrient excess and algae blooms observed in the Lagoon. Therefore, these results suggest that nutrients, specifically nitrogen (N) and phosphorus (P), are the primary pollutants of concern in the Lagoon.

A reanalysis of the nutrient data from the sampling program was performed to evaluate the potential limiting nutrient in the Lagoon, as summarized in Table 3.8. Since the ratio of N/P is greater than 10, the results indicate that the Lagoon tends to be P-limited, which is typical of a waterbody receiving nutrients predominantly from non-point sources (NPS) (e.g. Thomann and Mueller, 1987). This is consistent with lack of any permitted point source (PS) in the Watershed that discharges into the Buena Vista Creek. Nutrient loadings to the Lagoon are, therefore, expected to primarily originate from NPS such as agricultural, open, and urban lands as suggested in the RWQCB 303(d) fact sheets (RWQCB 1998).

Table 3.8 Lagoon Nutrient Levels and N/P Ratios

ITEM	TOTAL N	TOTAL P	AVERAGE N/P
Minimum	1.0	0.02	48
Maximum	4.4	0.40	
Mean	1.7	0.10	

3.5.2 Buena Vista Creek

The Buena Vista Creek water was most recently sampled three times during the period between May 1998 and June 1998 at Wildwood Park in Vista, South Vista Way in Carlsbad, and a downstream location near the Lagoon. Sampling was conducted for nutrients, total suspended solids, turbidity, and metals, as summarized in Table 3.9. The sampling results indicate that nutrients (N, P) tended to exceed objectives, which supports the 303(d) listing of nutrients as critical pollutants in the Lagoon. Total dissolved solids (TDS), chloride, and

sodium tend to appreciably exceed objectives, suggesting that a source of elevated salt content in Buena Vista Creek water may be discharging into the Lagoon. Although high salt concentrations in Buena Vista Creek may impact certain beneficial uses within the Creek, they are not expected to have discernible effects on the Lagoon water considering the common brackish conditions in the Lagoon (SCC 2002). There was no exceedance of the metals objectives, which suggests that loadings of metals into the Lagoon are not significant. In summary, the results suggest that nutrients (N, P) are the primary pollutants of concern in the Lagoon, consistent with seasonal algal blooms during late spring/early summer and late summer/early fall.

Table 3.9 Creek Water Quality Sampling Results

CONSTITUENT	UNIT	MEASURED RANGE	BASIN PLAN OBJECTIVE[1]
Total Dissolved Solids (TDS)	mg/L	1,133 - 1,378	750
Turbidity	NTU	0.6 - 1.7	20
Total Nitrogen (N)	mg/L	1.9 - 4.1	1.0[2]
Total Phosphorus (P)	mg/L	0.22 - 0.83	0.1[2]
Chromium, Dissolved	µg/L	10	16 (max) 11 (chronicle)
Zinc, Dissolved Total	µg/L	20 40	121
Chloride	mg/L	454	250
Sodium	mg/L	254	60
Sulfate	mg/L	281	250

Source: RWQCB (2002)

(1) RWQCB (1994). All objectives (except for turbidity) not to be exceeded more than 10% of the time per year.

(2) For streams.

3.5.3 Beneficial Use Impairment

The beneficial uses in the Lagoon were determined to be impaired for aquatic life, contact recreation, and noncontact recreation based on a water quality assessment conducted by the RWQCB (1996, 1998). The pollutants determined to be critical for 303(d) listing included

nutrients, sediment, and bacteria. The extents of impairment included 150 acres by nutrients, 350 acres by sediment, and potentially 350 acres by bacteria.

The initial basis for listing nutrients as priority pollutants was largely observational and qualitative. Treated sewage was discharged directly into the Lagoon until 1967. Together with urban runoff, nutrients were historically recycled within the Lagoon. The presence of the original hydraulic control structure at the mouth of the Lagoon, which was installed in 1948 with a crest elevation at 5.8 ft NGVD, permanently isolated the Lagoon from tidal flushing (SCC 2002). The water depth in the Lagoon, which is regulated by the higher of the weir crest and barrier beach berm, varies from 1 ft to 3 ft. Periodic algae blooms and presumed nutrient build-up in the bottom sediments may promote eutrophication in the Lagoon and likely were associated with localized fish kills. Direct observation of water quality conditions in Buena Vista Creek indicated potential eutrophication in the stream water that discharges into the Lagoon (SWRCB 2002).

The basis for listing sediment as a priority pollutant was also largely observational and qualitative. The Lagoon was determined to have received sediment discharge through storm water runoff from various sources in the Watershed that included agricultural land erosion, construction, and channel erosion. The weir and barrier beach berm prevent sediment transport from the Lagoon into the Pacific Ocean. Approximately 122,000 cubic meters (m^3) to 130,000 m^3 of sediment was dredged from the I-5 Basin in 1983, from which two bird nesting islands were created. The islands were graded and capped with sand in 1989. Urbanization of the Watershed that generally increased peak flow discharges during storms and encroachment upon the floodplain that eliminated most of the riparian and marsh land buffer were considered primary factors that contributed to Lagoon sedimentation, particularly during the period of the late 70's and early 80's.

The basis for listing bacteria as a priority pollutant was based on occasional exceedances of bacteria objectives from water quality sampling in the Lagoon. A number of sewage spill incidences occurred during the period of 1991 to 1995 and contributed to elevated bacteria levels in the Lagoon. Storm water runoff that discharges into the Lagoon also contributed to occasional violation of bacteria objectives.

The three priority pollutants were listed on both the 1996 and 2002 303(d) List, with sediment designated higher priority (Medium) compared with nutrients (Low) and bacteria (Low). Since the extent and level of beneficial use impairment by bacteria was determined uncertain by the RWQCB (1998), only sediment and nutrients are considered primary critical pollutants for the present study.

3.6 SEDIMENT QUALITY

Sediments in the Lagoon were most recently sampled during February 24 to March 3, 2003 as part of the present study that is presented in Appendix B. A total of 20 sediment cores were collected throughout the Lagoon with target depths ranging from 9 ft (16 cores) to 20 ft (4 cores). The sample cores were segmented into three strata: top (0-3 ft), mid (3-9 ft), and bottom (9-20 ft), and composited by stratum for each of the four basins. The composite samples were analyzed for physical attributes and chemical constituent levels.

Figure 3.5 presents the grain size distributions within the three sediment strata for each of the four basins (I-5=1-5 Basin, CH=Coastal Highway Basin, RR=Railroad Basin, and W=Weir Basin). Table 3.10 through Table 3.12 provide summaries of the laboratory results of the physical and chemical attributes of the sediments. Various effects levels and benchmark criteria that are commonly used in sediment quality evaluation are also listed for comparison with the constituent concentration levels found in the Lagoon sediments.

Table 3.10 Sediment Physical Characteristics

SAMPLE ID	TOC (% dry wt.)	SPECIFIC CONDUCTIVITY (mS, pore water or extract)	TOTAL DISSOLVED SOLIDS (g/L, pore water or extract)	SALINITY (‰, pore water or extract)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
I-5 Top	1.86	22.3	11.3	13.5	87	28	59
I-5 Mid	0.64	29.8	15.1	18.6	51	24	27
I-5 Bot	0.12	56.6	28.5	37.3	-	NP [1]	-
Coast Hwy-Top	0.91	3.3	1.6	1.7	70	22	48
Coast Hwy-Mid	0.14	9.8	4.9	5.5	-	NP	-
Coast Hwy-Bot	0.14	9.6	4.8	5.3	-	NP	-
RR-Top	0.50	3.6	1.8	1.9	39	19	20
RR-Mid	0.13	3.3	1.6	1.7	-	NP	-
RR-Bot	0.12	2.7	1.3	1.4	-	NP	-
Weir-Top	0.36	4.0	2.0	2.1	-	NP	-
Weir-Mid	0.18	4.5	2.2	2.4	-	NP	-
Weir-Bot	0.04	5.7	2.8	3.0	-	NP	-

1. Non-Plastic

Table 3.11 Metal Concentrations ($\mu g \cdot g^{-1}$)

CONSTITUENT	MINIMUM	MAXIMUM	ER-L[1]	STLC[2]	TTLC[3]
Antimony	ND	ND		15	500
Arsenic	1.2	7.1	8.2	5	500
Barium	15.7	130		100	10,000
Beryllium	ND	ND		0.75	75
Cadmium	ND	ND	1.2	1	100
Chromium	4.9	31	81	5	500
Cobalt	2.4	11.6		80	8,000
Copper	3.9	39.9	34	25	2,500
Lead	30.5	30.5	46.7	5	1,000
Mercury	0.05	0.05	0.15	0.2	20
Molybdenum	2.2	2.6		15	3,500
Nickel	4.4	14.4	20.9	20	2,000
Selenium	ND	ND		1	100
Silver	ND	ND	1	5	500
Thallium	ND	ND		7	700
Vanadium	11.8	71.5		24	2,400
Zinc	7.7	95.7	150	250	5,000

1. *Effects Range – Low*
2. *Soluble Threshold Limit Concentration*
3. *Total Threshold Limit Concentration*

Table 3.12 Organic Constituent Concentrations

CONSTITUENT	MAX ($NG \cdot G^{-1}$)	STLC ($NG \cdot ML^{-1}$)	TTLC ($NG \cdot G^{-1}$)	ER-L ($NG \cdot G^{-1}$)	ER-M[1] ($NG \cdot G^{-1}$)
Aldrin	0.07	140	1,400		
Chlordane	2.60	250	2,500		
DDT, DDE, DDD	5.83	100	1,000	1.58	46.1
2,4-Dichlorophenoxyacetic Acid	ND	10,000	100,000		
Dieldrin	0.11	800	8,000		
Endrin	0.10	20	200		
Heptachlor	0.23	470	4,700		
Methoxychlor	0.09	10,000	100,000		
Mirex	0.13	2,100	21,000		
Pentachlorophenol	ND	1,700	17,000		
Total PCB	3.53	5,000	50,000	22.7	180
2,4,5-Trichlorophenoxypropionic acid	ND	1,000	10,000		
Total PAH	539.41	NA	NA	4,022	44,792

1. Effects Range – Medium

The results of laboratory analysis indicate that the sediments were primarily composed of sand size particles with diameters increasing in the downstream (east to west) direction. Sediments from the top nine feet of the I-5 Basin and the top three feet of the Coast Highway Basin were the only samples with less than 70 percent sand. Total Organic Carbon (TOC) concentrations were low in most samples with only one exceeding 1 percent. Particle size increased and TOC decreased moving downstream to the west, an expected deposition pattern for sediments associated with the inflows from Buena Vista Creek.

There was very minimal evidence of contamination by metals or organic compounds. The sample with the highest levels of constituents above detection limits was the 0-3 ft surface sample from the I-5 Basin. The levels were significantly below the concentrations that are known to cause biological effects. Table 3.13 presents potential sediment management options based on the findings of sediment characterization. However, further sampling and testing may be required to better define the distribution patterns of the physical and chemical characteristics of the sediments across the Lagoon depending on the sediment management options selected.

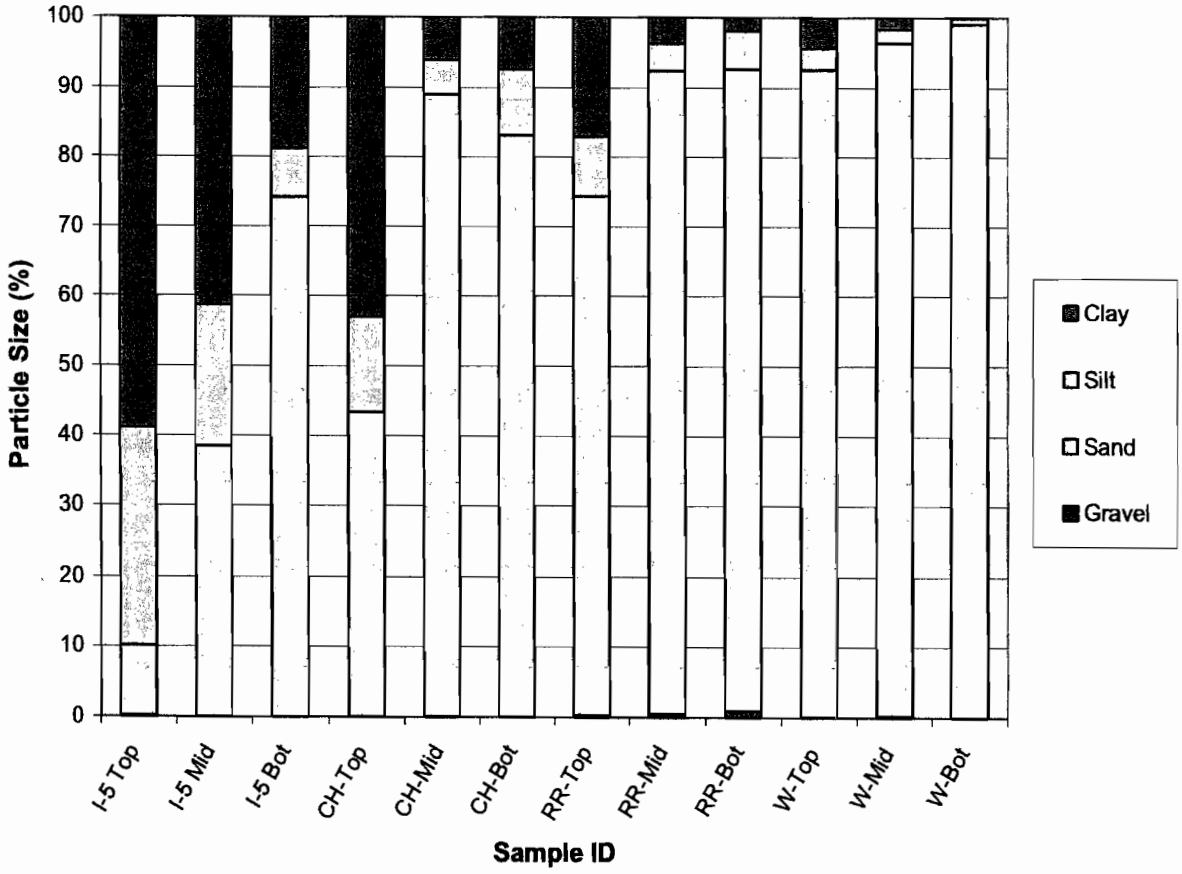

Figure 3.5 Sediment Grain Size Distribution

Table 3.13 Sediment Management Options

Landfill	All sediment samples pass hazardous waste criteria and would be acceptable for disposal at any class of landfill based on chemistry data.	
Construction Fill	Physical attributes of the samples (e.g. plasticity and salinity) may affect the acceptability for site-specific land fills or construction sites.	
Ocean Disposal	All sediment samples would be expected to meet and exceed ocean disposal acceptance criteria.	
Beach Replenishment (based on 80% sand composition)	I-5 Basin Coast Hwy. Basin Railroad Basin Weir Basin	Most sediments below nine feet Sediments below three feet Sediments below three feet All Sediment

3.7 SEDIMENT AND NUTRIENT LOADING AND SOURCES

3.7.1 Sediment

Sediment loading into the Lagoon from the Watershed was evaluated using a regional sediment loading estimator (Chian 2003). Primary sediment source areas were also identified as part of the analysis. The results of the sediment loading analysis are shown in Table 3.14.

Table 3.14 Sediment Loading from Buena Vista Creek

LAND USE	AGRICULTURE	RANGE	BARREN	URBAN/ BUILT-UP	FOREST	OTHER SOURCES/ SINKS	TOTAL
Area (acre)	1,743	1,300	421	6,609	103		10,175
Percent Watershed (%)	15.6	11.6	3.8	59.1	0.9		91
Loading Rate (m^3/acre/year)	1.76	0.28	6.54	0.04	1.75		
Loading (m^3/yr)	3,064	369	2,754	253	180	20,435	27,055

The results indicate that the Watershed discharges an annual total of approximately 27,100 m^3 of sediment to the Lagoon. The majority (75%) of the total loading appears to be contributed by sediment sources other than the five primary upland land uses considered. These sources would include channel erosion among other contributors. Applegate (1985) estimated a total of 27,540 m^3 eroded annually from the main channel and side channels of Buena Vista Creek, which seems to be qualitatively consistent with the present estimate. Among the remaining sources (i.e., other 25%) of the total loading produced by the five upland land uses considered, Agriculture Lands contribute the greatest amount to the Lagoon, followed closely by Barren Lands. Although relatively small in acreage, Barren Lands contribute a loading comparable to Agriculture lands as a result of the appreciably higher loading rate. Contributions from Range and Urban/Built-Up lands are significantly smaller due to lower loading rates from these land uses, especially in the case of Urban/Built-Up lands. The contribution from Forest lands is relatively negligible due to the small acreage of forest present in the Watershed. On this basis, the primary sources of sediment in the Lagoon are, in the order of importance, stream channels, Agriculture lands, and Barren lands.

Sediment yield from the Buena Vista Creek Watershed and loading into the Lagoon were previously estimated by Applegate (1985) and Chang (1986) using different methods. Applegate (1985) estimated the sediment production rate from the Watershed at approximately 58,140 m^3 per year (yr) based on soil conditions, cover, and prior observations. A computer modeling effort performed by Phillip Williams Associates as part of the Applegate (1985) study yielded a loading of approximately 23,000 m^3 per yr from Buena Vista Creek. Chang (1986) estimated the loading rate from Buena Vista Creek at approximately 5,000 m^3 per yr. These estimates appear to bracket the loading rate of 27,100 m^3 per yr estimated as part of the present study.

3.7.2 Nutrients

Nutrient (N and P) loadings into the Lagoon from the Buena Creek Watershed were evaluated using a regional nutrient loading estimator (Chian 2003). Primary nutrient source areas were also identified as part of the analysis. The total annual loadings into the Lagoon are presented in Table 3.15.

Table 3.15 Nutrient Loadings from Buena Vista Creek

LAND USE	AGRICULTURE	RANGE	BARREN	URBAN/ BUILT-UP	FOREST	OTHER SOURCES/ SINKS	TOTAL
Area (acre)	1,743	1,300	421	6,609	103		10,176
%Total Watershed	15.6	11.6	3.8	59.1	0.9		91
Total N Loading (ton/yr)	5.5	2.9	1.1	26.0	0.0	36.1	71.6
Total P Loading (ton/yr)	0.44	0.31	*	3.2	0.0	2.7	6.7

* *Not estimated (see previous discussion). Contribution incorporated in "Other Sources/Sinks"*

The results in Table 3.15 indicate that the Watershed discharges annual totals of approximately 72 tons and 7 tons of total N and total P into the Lagoon, respectively. Significant portions of these loadings appear to be contributed by sources that are unaccounted for by the five land uses considered. These sources are expected to consist primarily of unregulated or unknown discharges among other potential contributors. Among the five land uses analyzed, Urban/Built-Up lands contribute the greatest amounts of nutrients into the Lagoon, followed by Agricultural and Rangeland uses. On this basis, the primary sources of total N and P to the Lagoon are, in the order of importance, Urban/Built-Up lands, unregulated/unknown dischargers, Agriculture lands, and Barren lands.

3.8 NEARSHORE AREA

3.8.1 Bathymetry

The coastal bathymetry offshore of the Lagoon is characterized by the relatively steep cross-shore seabed profiles as a result of the proximity to the Carlsbad Submarine Canyon off Agua Hedionda Lagoon, located just south of the area. The isobaths remain relatively regular and only slightly convergent toward the southeast approaching the Carlsbad Submarine Canyon. On a regional basis, the nearshore bathymetry is continuous from Dana Point to Point La Jolla. Carlsbad Submarine Canyon is relatively less prominent than La Jolla Submarine Canyon farther to the south and its effect on the bathymetry is not significant inshore of the 120-foot Mean Lower Low Water (ft, MLLW) isobath. The coastal bathymetric setting of the study area is shown in Figure 3.6.

Buena Vista Lagoon Restoration Feasibility Analysis

Final Report

Volume 2: Appendices

Prepared for:

Buena Vista Lagoon Foundation
California State Coastal Conservancy
U.S. Fish and Wildlife Service

Prepared by:

Everest International Consultants, Inc.

EVEREST

June 2004

BUENA VISTA LAGOON RESTORATION FEASIBILITY ANALYSIS

Final Report

Volume 2: Appendices

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Buena Vista Lagoon Restoration Feasibility Study

Sediment Characterization

Final Report

October 2003

Prepared for:

Buena Vista Lagoon Foundation
&
U.S. Fish and Wildlife Service

Prepared by:

Everest International Consultants, Inc.
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Battelle

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1.0 INTRODUCTION

1.1 Purpose and Objectives

This report presents sampling, analysis and quality assurance results which characterize chemical and physical properties of sediments and vegetation at Buena Vista Lagoon, California. Information generated from this investigation (Investigation) will be used in the Buena Vista Lagoon Restoration Feasibility Study (Study) to evaluate disposal options and the associated costs of sediment management alternatives. The Investigation portion of the Study was funded by the Buena Vista Lagoon Foundation and the US Fish and Wildlife Service. Everest International Consultants, Inc. (Everest) is responsible for managing the Study; Battelle is responsible for the Investigation. Support was provided by TEG Oceanographic (TEG), Columbia Analytical Services (CAS), and Applied Marine Sciences (AMS). There were two sampling phases. The first survey took place from February 24 to March 2, 2003; the second survey occurred on September 4 and 5, 2003.

1.2 Background

Buena Vista Lagoon is located approximately 35 miles north of San Diego, California, in the cities of Carlsbad and Oceanside (Figure 1-1). The Lagoon is comprised of approximately 225 acres segregated into four basins. The basins are identified (from west to east) as "Weir", "Railroad", "Coast Highway", and "I-5". The Lagoon is shallow in depth, with most areas less than 2 feet deep, ranging from 0 feet in marsh areas to approximately 12 feet in the eastern portion of the I-5 Basin. Flow of water and suspended sediments through each basin is limited by the constrictions defining each basin and the absence of deep channels to direct flow. Construction of a weir at the western terminus in 1940 and 1970 modulates water level and has essentially eliminated tidal flushing. In addition, the beach berm that forms across the Lagoon inlet at the ocean interface controls the maximum water level in the Lagoon.

1.3 Previous Studies

Very little data are available that documents chemical contamination within Buena Vista Lagoon sediments. The most recent sampling and analysis of metals and organic chemicals was performed by the State of California Department of Fish and Game in 1981. The study was conducted to determine the suitability of Lagoon material as fill for a public park. Detailed sampling information was not provided in the Fish and Game memorandum of laboratory results. Interpretation of the data table suggests sediments from five locations were analyzed, with three of the five locations having samples from two depths, for a total of eight samples. Samples were collected from the I-5 Basin only.

Coastal Environments performed the study Buena Vista Lagoon Land Management Plan Elements for the Buena Vista Lagoon Foundation in 1999. This study examined bathymetry, water quality, biology, and soil conditions in the Lagoon. The soil conditions were provided to Coastal Environments in a report titled "Limited Geotechnical Investigation and Input to Buena Vista Lagoon Land Management Plan Elements" prepared by Group Delta Consultants, Inc. (GDC) in November 1999. GDC's report provided

a geologic and geotechnical history of Buena Vista Lagoon, geotechnical characterization of the upper natural sediments in the lagoon basins, and recommendations relating to foundation design for the proposed boardwalk on the east side of Carlsbad Boulevard. Eight power-auger and 13 hand-auger borings were drilled to depths ranging from 2.5 to 31.5 feet. The general description of material found from 2.5 to 20 feet is loose sands, silts and clays of fluvial and estuarine origin. Below 20 feet, sediments are medium dense to very dense sands with abundant shells and shell fragments. Grain size analyses, moisture content, and Atterberg limits tests were performed on selected soil samples.

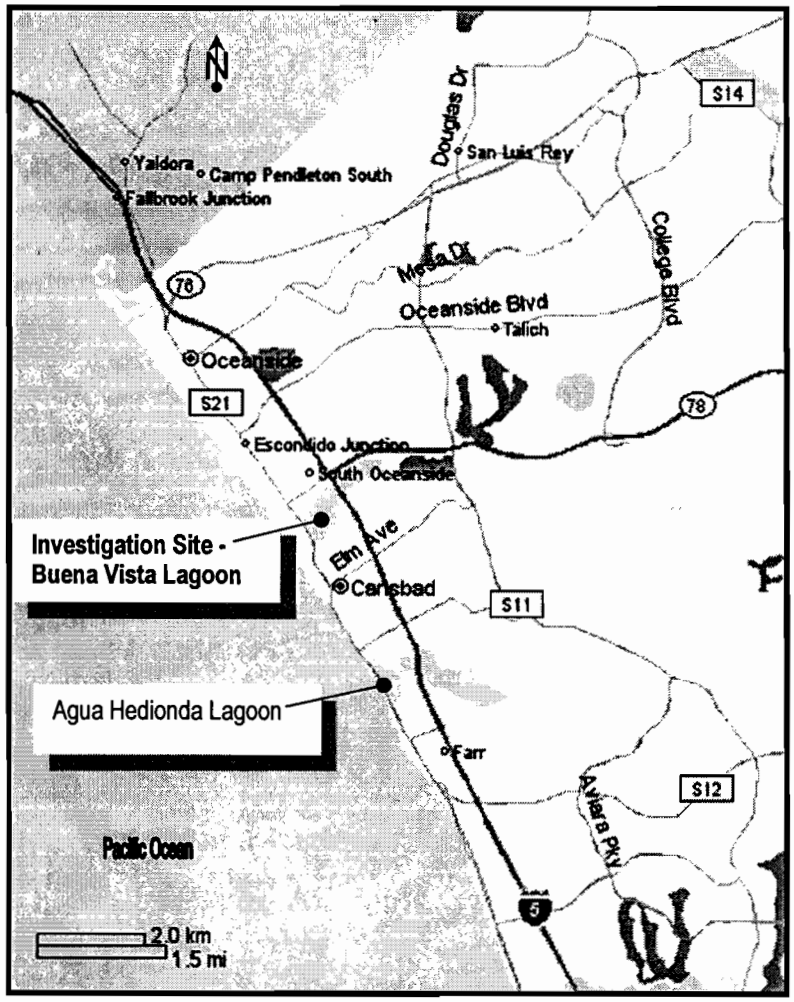

Figure 1-1. Location of Buena Vista Lagoon

1.4 Team Roles and Contact Information

An overview of the project team for the Investigation is presented in Table 1-1.

Table 1-1. Team Roles and Contact Information.

Team Member	Responsibilities	Contact
Everest	Buena Vista Lagoon Restoration Feasibility Study Prime Consultant	Mr. David Cannon 444 West Ocean Boulevard Suite 1104 Long Beach, CA 90802 Ph: (562) 435-9309 Fax: (562) 435-9310
Battelle	Sediment Characterization Investigation management; PAH, PCB, and pesticide analyses, QA/QC, and reporting	Mr. John Hardin 2382 Faraday Ave., Suite 120 Carlsbad, CA 92008 Ph: 1-760-476-1415 Fax: 1-760-476-1416
TEG	Vessel, core sampling equipment and field staff support	Mr. Mark Mertz 216 Florence Dr. Aptos, CA 95003 Ph: (831) 684-2749
CAS	Trace metal and herbicide analyses, and Title 22 testing	Ms. Lynda Huckestein Columbia Analytical Services 1317 South 13th Ave. Kelso, WA 98626 Ph: 1-360-577-7222 Fax: 1-360-636-1068
AMS	TOC, grain size, Atterberg Limit, and conductivity analyses	Dr. Kenneth Davis Applied Marine Sciences, Inc. 502 N. Highway 3, Suite B League City, TX 77573 Ph: (281)-554-7272 Fax: (281)-554-6356

2.0 STUDY DESIGN AND METHODS

The primary objective of this Investigation is to further characterize the chemical and physical properties of the lagoon sediments and vegetation to assist in the assessment of the cost and feasibility of various restoration design alternatives. In particular, data presented in this report describe the general physical and chemical conditions of sediments and vegetation in the lagoon and will be used, along with the 1999 Coastal Environments study and other available resources, to evaluate sediment management alternatives for moving and dispensing lagoon sediments. A second phase of the study was undertaken to assess if any concentration of contaminants occurred within sediments trapped within aquatic vegetation, or the vegetation itself. Also measured in the second phase was the density of reed material that may be removed as part of the remediation effort.

Since a restoration plan has not been completed, it is not completely certain what data requirements will be needed to satisfy the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA). Therefore, additional data may be needed to complete the CEQA/NEPA process and obtain permits for the selected restoration alternative in the future.

2.1 Phase 1 Sampling

Phase 1 objectives are summarized as follows:

- Analyze results and characterize the contamination, if any, of sediments within Buena Vista Lagoon.
- Document current chemical and physical conditions of sediments within each basin and at several depth ranges within each basin.
- Archive samples from several depth ranges from each core sample to allow further delineation of contamination in the event such contamination restricts disposal or relocation options.

A total of 20 sediment cores were collected from Buena Vista Lagoon using a 4–in. outside diameter (OD) vibracore sampler. The target depth of 16 cores was 9 feet, and the target depth of one core within each of the four basins was 20 feet. Sediment from the 20 cores was sectioned vertically and archived in the following groups:

- 9-ft Core Sections (ft): 0-3; 3-6; 6-9
- 20-ft Core Sections (ft): 0-3; 3-6; 6-9; 9-15; 15-20

Segments were composited into 12 samples by basin as detailed in Section 2.2. Bulk sediment samples were analyzed for 17 elements, polycyclic aromatic hydrocarbons (PAH), pesticides, PCBs, herbicides, Total Organic Carbon (TOC), particle size, and Atterberg Limits. The 12 composite samples also were proposed for analysis of California Title 22 Soluble Threshold Limit Concentration (STLC) levels for 17 metals. However, initial results indicated very low concentrations of metals; therefore, the Title 22 testing was deemed unnecessary and was not performed.

Complete details of the sampling plan and laboratory analytical methods, including detection limits, are provided in the document Buena Vista Lagoon Restoration Feasibility Study Sediment Characterization Sampling and Analysis Plan dated January 2003.

2.2 Phase 2 Sampling

Phase 1 data analysis indicated sediments were at background or relatively low levels of contamination. Contamination levels in sediments were lower than expected, elevating the significance of questions regarding potential sequestering (physical and biological) of contaminants in reed and island areas. If reeds are sequestering contaminants, then their function needs to be maintained if the reeds are removed. If they are not, then the contaminant remediation aspect of the reeds does not need to be considered in restoration alternative development. Phase 2 objectives are summarized as follows:

- Provide physical and chemical data for plant and sediments underlying the plants for use to determine if material from reeds, their underlying sediment, and within surface sediments on the islands is clean enough for uses such as mulch, beach replenishment, and other open contact uses.
- Determine if reeds are sequestering contaminants.

2.3 Field Sample Collection

Field activities including pertinent observations (e.g., wildlife, debris or visible contamination), weather conditions, station and sample information (e.g., sample identification, date and time of collection, station arrival and departure times) were recorded in bound, pre-formatted field notebooks.

Figure 2-1 is a map of the sampling locations and Table 2-1 provides a listing of stations, locations, and core splits.

2.3.1 Phase 1 Field Sampling

Battelle and TEG performed the Phase 1 field survey during the period February 24 to March 3, 2003. Poor weather postponed sampling on February 25 and fieldwork resumed on February 26. Operations were conducted on a 10-h per day basis using a field team of four persons.

Samples were taken from a shallow-draft barge equipped with a hydraulic/electronic winch, gantry, and electric vibracore (Figure 2-2). The vessel was positioned at each station (±5 m) using a Leica MK-20 Wide Area Augmentation System (WAAS) differential global positioning system (DGPS). The field team was comprised of Mr. John Hardin from Battelle and three TEG Staff, Mr. Mark Mertz, Ms. Annick Tardif, and Mr. John Carr.

Sediment samples were collected using an electric vibracore sampler. The core tube is a 4-in. OD aluminum tube. The core tube is outfitted with a stainless steel cutting head/catcher tip. To assure no cross-contamination during sampling, the vibracore sampler was decontaminated prior to each deployment as follows:

- Rinse equipment with site water to remove visible sediment
- Scrub the aluminum tubing with a brush using Alconox in site water
- Rinse aluminum tubing with site water
- Air dry

Immediately upon returning to the deck of the survey vessel, the cutting head of the corer was removed. The quality of each core sample was determined by visual inspection prior to sub-sampling. The core was inspected for acceptable recovery and levels of disturbance. Some compaction or liquefaction occurred as is typical in soft sediments. The following criteria were used to determine an acceptable core sample:

- Recovery core length is $\geq$ 80 percent of penetration length.
- Sample appears to be contiguous and undisturbed.
- Overlying water is present, unless core is full or near full.
- Sediment has not been lost through top of core tube due to over-penetration.

All cores collected met the above criteria and were accepted. Cores were processed in the field by the following method, which was modified from the original sampling plan. Instead of sectioning the core tube, sediment was extruded onto clean plastic lined trays. The sediment from the center of the core was subsampled into clean food grade plastic bags. Pre-printed plastic labels were affixed to the bag and the bag was sealed with a plastic cable tie. Samples from core segments of 0-3; 3-6; 6-9; 9-15; and 15-20 ft were segregated in the field and will be archived up to one year. Archived samples have sufficient material for a full complementary analytical suite.

Notes on each core were entered into the field notebook and each core section was photographed with a digital camera. Field notes and core photos are provided in Appendix A and B, respectively. As mentioned previously, GDC also obtained soil samples during its investigation. Samples of material from those 21 borings were collected by split-spoon samplers in conjunction with standard penetration testing.

2.3.2 Phase 2 Sampling

Battelle staff performed the Phase 2 field survey on 4 and 5 September 2003. Following is a summary of the Phase 2 sampling effort:

- Collect vegetation consisting of leaves and stems (above water and sediment) and the root area (below water/sediment horizon) from two areas:
    - Near the input of Buena Vista Creek along the shore and on the upstream ends of the islands
    - Along the shore near the I-5 bridge.
- Collect six foot cores from three areas.
    - Near the input of Buena Vista Creek along the shore and on the upstream ends of the islands.

  - Dry land on the islands near Buena Vista Creek.
  - Within reeds near the I-5 Bridge.

- Prepare six composite soil samples from the borings. Analyze composites from the 0-3 foot sections. Archive composites from the 3-6 foot sections.
- Prepare four composite plant samples. Analyze two samples from vegetation above the water/soil level. Analyze two samples from vegetation underwater/within the soil.
- Retrieve sediment archived from the 0-3 foot section of the core at BV-01 collected in March 2003.
- Analyze sediments and plant tissues for contaminants of concern.
- Measure volume and density of reeds for use in estimating disposal costs.

Sediment and vegetation samples for chemical and physical analyses were obtained using a small inflatable vessel. Core samples were collected with a hand-driven Geo-probe sampler with a 2-inch outside diameter barrel and a 1.75 inch polycarbonate tube liner. Reed samples were collected by hand with a stainless steel knife. For calculating disposal volume and density:

1. The average height of reeds estimated.
2. Reeds were removed from a measured area
3. The volume consumed in disposal transportation vehicle was measured
4. The net weight of reed material was determined.

Sampling locations were recorded at each station (±5 m) with a Garmin GPS V Wide Area Augmentation System (WAAS) differential global positioning system (DGPS). The field team was comprised of Mr. John Hardin and Mr. Frederick Newton from Battelle.

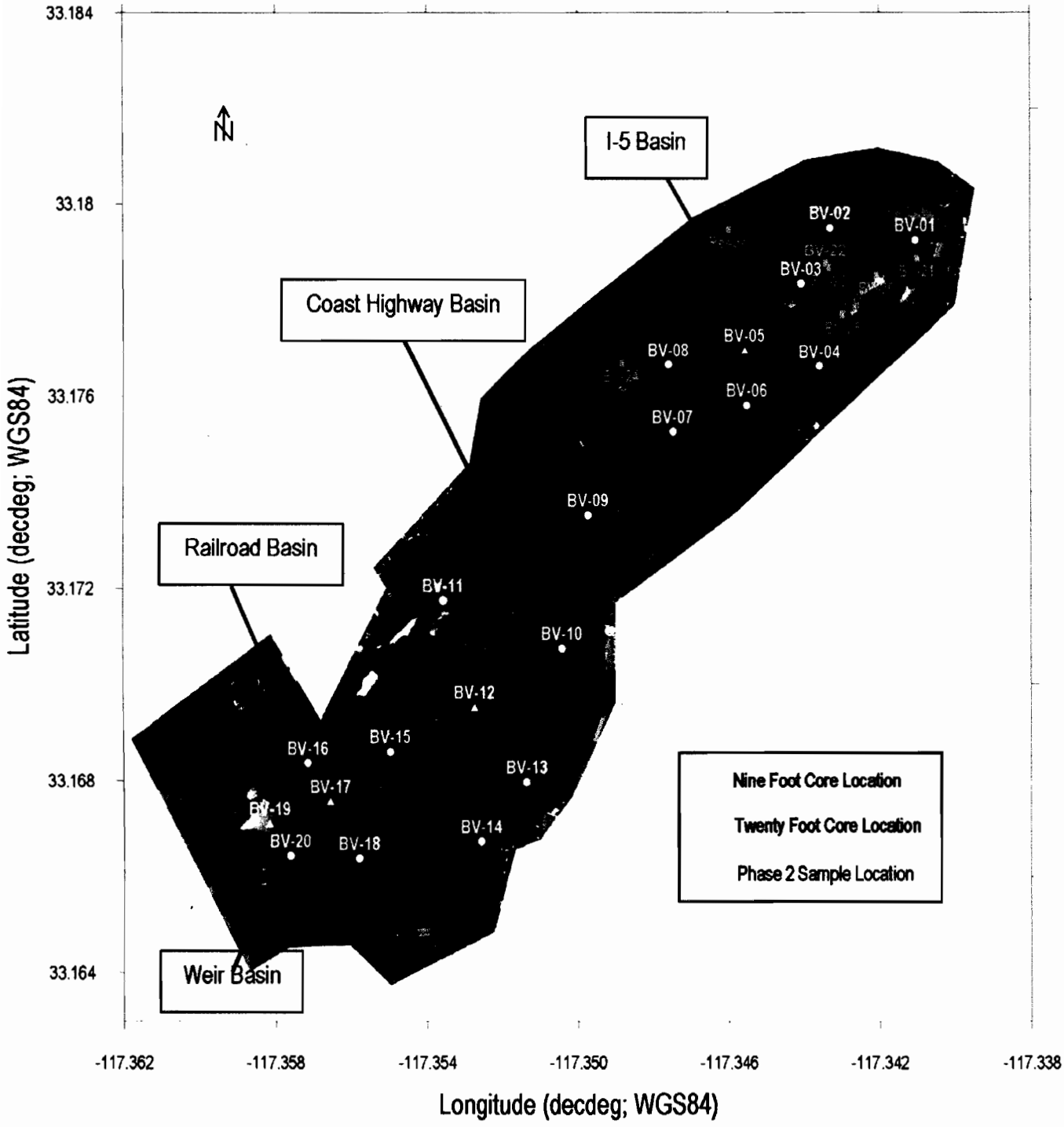

Figure 2-1. Sample Collection Location Map

Table 2-1. Phase 1 Station Locations and Core Splits.

Station[1] Name	Basin	Date Sampled	Core Depth (ft)	Station Coordinates[1]		Depth range split (ft)
				Latitude	Longitude	
BV-01	I-5	Feb 24, 2003	9	33.17925	117.34105	0-3; 3-6; 6-9
BV-02	I-5	Feb 24, 2003	9	33.17950	117.34330	0-3; 3-6; 6-9
BV-03	I-5	Feb 26, 2003	9	33.17833	117.34407	0-3; 3-6; 6-7.5[2]
BV-04	I-5	Feb 26, 2003	9	33.17662	117.34358	0-3; 3-6; 6-9
BV-05	I-5	Feb 26, 2003	19	33.17695	117.34557	0-3; 3-6; 6-9, 9-15; 15-19[3]
BV-06	I-5	Feb 26, 2003	9	33.17580	117.34552	0-3; 3-6; 6-9
BV-07	I-5	Feb 26, 2003	9	33.17525	117.34747	0-3; 3-6; 6-9
BV-08	I-5	Feb 26, 2003	9	33.17665	117.34758	0-3; 3-6; 6-9
BV-09	Coast Hwy.	Feb 28, 2003	9	33.17352	117.34973	0-3; 3-6; 6-9
BV-10	Coast Hwy.	Feb 28, 2003	9	33.17075	117.35043	0-3; 3-6; 6-8[2]
BV-11	Coast Hwy.	Feb 28, 2003	9	33.17175	117.35358	0-3; 3-6; 6-9
BV-12	Coast Hwy.	Feb 28, 2003	16	33.16952	117.35275	0-3; 3-6; 6-9, 9-15; 15-16[3]
	Coast Hwy.	Feb 28, 2003	9	33.16797	117.35137	0-3; 3-6; 6-8[2]
BV-13						
BV-14	Coast Hwy.	Feb 28, 2003	9	33.16673	117.35257	0-3; 3-6; 6-9
BV-15	Coast Hwy.	Feb 28, 2003	9	33.16860	117.35498	0-3; 3-6; 6-9
BV-16	Railroad	Mar 2, 2003	9	33.16837	117.35717	0-3; 3-6; 6-9
BV-17	Railroad	Mar 2, 2003	17	33.16757	117.35657	0-3; 3-6; 6-9; 9-15; 15-17[3]
BV-18	Railroad	Mar 2, 2003	9	33.16640	117.35567	0-3; 3-6; 6-9
BV-19	Weir	Mar 2, 2003	18	33.16710	117.35817	0-3; 3-6; 6-9, 9-15; 15-18[3]
BV-20	Weir	Mar 2, 2003	9	33.16643	117.35762	0-3; 3-6; 6-9
TOTALS 20 Cores						**68 Sections**

[1]Decimal Degrees; WGS84 Datum.

[2] Some compaction observed, incomplete recovery

[3] Refusal before 20 ft

Table 2-2. Phase 2 Station Locations in I-5 Basin and Core Splits.

Station[1] Name	Date Sampled	Core Depth (ft)	Station Coordinates[1]		Depth range split (ft)	Reed Sample for Chemistry
			Latitude	Longitude		
BV-01	Feb 24, 2003	9	33.17925	117.34105	0-3, 3-6, 6-9	
BV-21	Sep 5, 2003	3	33.17901	117.34103	0-3	X
BV-22	Sep 5, 2003	6	33.17892	117.34341	0-3, 3-6	
BV-23	Sep 5, 2003	6	33.17882	117.34333	0-3, 3-6	X
BV-24	Sep 5, 2003	3	33.17698	117.34878	0-3	X
BV-25	Sep 5, 2003	6	33.17792	117.34297	0-3, 3-6	
BV-26	Sep 5, 2003	3	33.17868	117.34208	0-3	X
Reed Density	Sep 4, 2003	NA	33.17956	117.34597	NA	
TOTALS						**12 Sections**

[1]Decimal Degrees; WGS84 Datum.

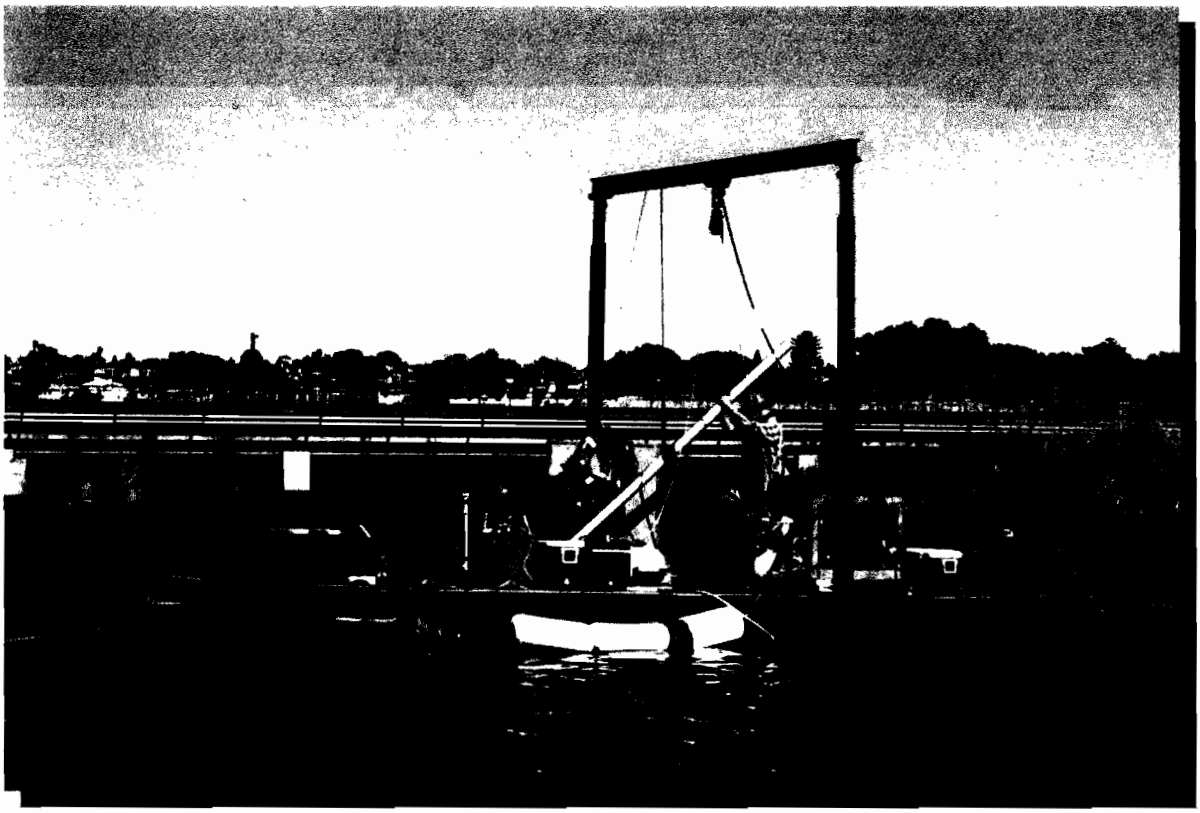

Figure 2-2. Sampling Vessel and Equipment in Weir Basin

2.4 Sample Compositing, Storage, and Shipment

Core sections for both surveys were composited at the Battelle office in Carlsbad prior to shipment. Samples were stored at 4°C. The compositing strategy is detailed in Table 2-3. Sediment was removed from the bag or core tube and placed into a clean stainless steel mixing bowl. Samples were mixed with a clean stainless steel mixing spoon until they were of a uniform color and texture. After thoroughly mixed, samples were placed into the appropriate pre-labeled containers for shipment to the laboratories.

Reed samples were placed into clean zip closure polyethylene bags prior to shipment.

Samples were shipped via overnight service to the three laboratories while being stored at 4°C. For Phase 1 samples, FedEx misdirected the shipments to Battelle and AMS; however, adequate ice was packed and they were received in good condition at both laboratories on the second day after being shipped. All samples for Phase 2 were delivered on time in good condition.

Table 2-3. Sample Composites.

Basin	Depth Strata (ft)	Sample ID	Core Sections in Composite
Phase 1			
I-5	0 – 3	EV02-101	BV-01, 02, 03, 04, 05, 06, 07, 08
I-5	3 – 9	EV02-102	BV-01, 02, 03, 04, 05, 06, 07, 08
I-5	9 – 19	EV02-103	BV-05
Coast Highway	0 – 3	EV02-104	BV-09, 10, 11, 12, 13, 14, 15
Coast Highway	3 – 9	EV02-105	BV-09, 10, 11, 12, 13, 14, 15
Coast Highway	9 – 16	EV02-106	BV-12
Railroad	0 – 3	EV02-107	BV-16, 17, 18
Railroad	3 – 9	EV02-108	BV 16, 17, 18
Railroad	9 – 17	EV02-109	BV-17
Weir	0 – 3	EV02-110	BV-19, 20
Weir	3 – 9	EV02-111	BV-19, 20
Weir	9 – 18	EV02-112	BV-19
Phase 2 (sediment)			
I-5	0-3	EV02-001	BV-01
I-5	0-3	EV02-080	BV-21, 23, 26
I-5	0-3	EV02-081	BV-24
I-5	0-3	EV02-082	BV-22, 25
Phase 2 (reeds)			*Reed Material in Composite*
I-5	Above water	EV02-090	BV-21, 23, 26
I-5	Underwater	EV02-091	BV-21, 23, 26
I-5	Above water	EV02-092	BV-24
I-5	Underwater	EV02-093	BV-24

3.0 LABORATORY METHODS AND RESULTS

Summary results for sediment measurements of physical properties, metals and organic chemicals (PAHs, PCBs, pesticides, herbicides, and semi-volatile compounds) are presented in this section. Complete descriptions of the methods are provided in the Buena Vista Lagoon Restoration Feasibility Study Sediment Characterization Sampling and Analysis Plan.

3.1 Methods

All samples were analyzed using standard, certified laboratory methods. Laboratory quality control samples consisted of calibration standards, duplicate samples, standard reference materials, surrogates, and laboratory blanks where appropriate. Quality control samples were analyzed at the same time as test samples. All samples were archived under proper storage conditions and are available for future reference.

3.1.1 *Physical Laboratory Methods*

Sediment grain size was analyzed using a sieve and pipette method (Plumb 1981). Results are reported for four grain size classes (i.e., gravel, sand, silt and clay). Sediments were analyzed for total organic carbon using a DC-190 high temperature total organic carbon analyzer with an infra-red detector for purposes of quality control.

3.1.2 *Elemental and Organic Laboratory Methods*

Hydrocarbon analyses consisting of PAHs were performed using gas chromatography/mass spectrometry (GC/MS), PCBs and pesticides by GC/electron capture detection (ECD). Metals were analyzed using a combination of atomic absorption and inductively coupled plasma techniques. Herbicides and semivolatile organics are analyzed by GC/MS.

3.2 Laboratory Results

Twelve samples were analyzed for physical and chemical parameters. Results for physical attributes are presented in Section 3.2.1. Results for metals are presented in Section 3.2.2 and organic constituents are presented in Section 3.2.3. Complete tabular results for elemental and organic chemistry testing are provided in Appendix C.

3.2.1 Physical Attributes

A graphical presentation of particle size data is presented in Figure 3-1 and grain size distribution curves are presented in Appendix D. It is important to note that these curves represent results for composite

samples, not for specific coring locations or depths. Table 3-1 summarizes TOC, conductivity, and Atterberg Limit data.

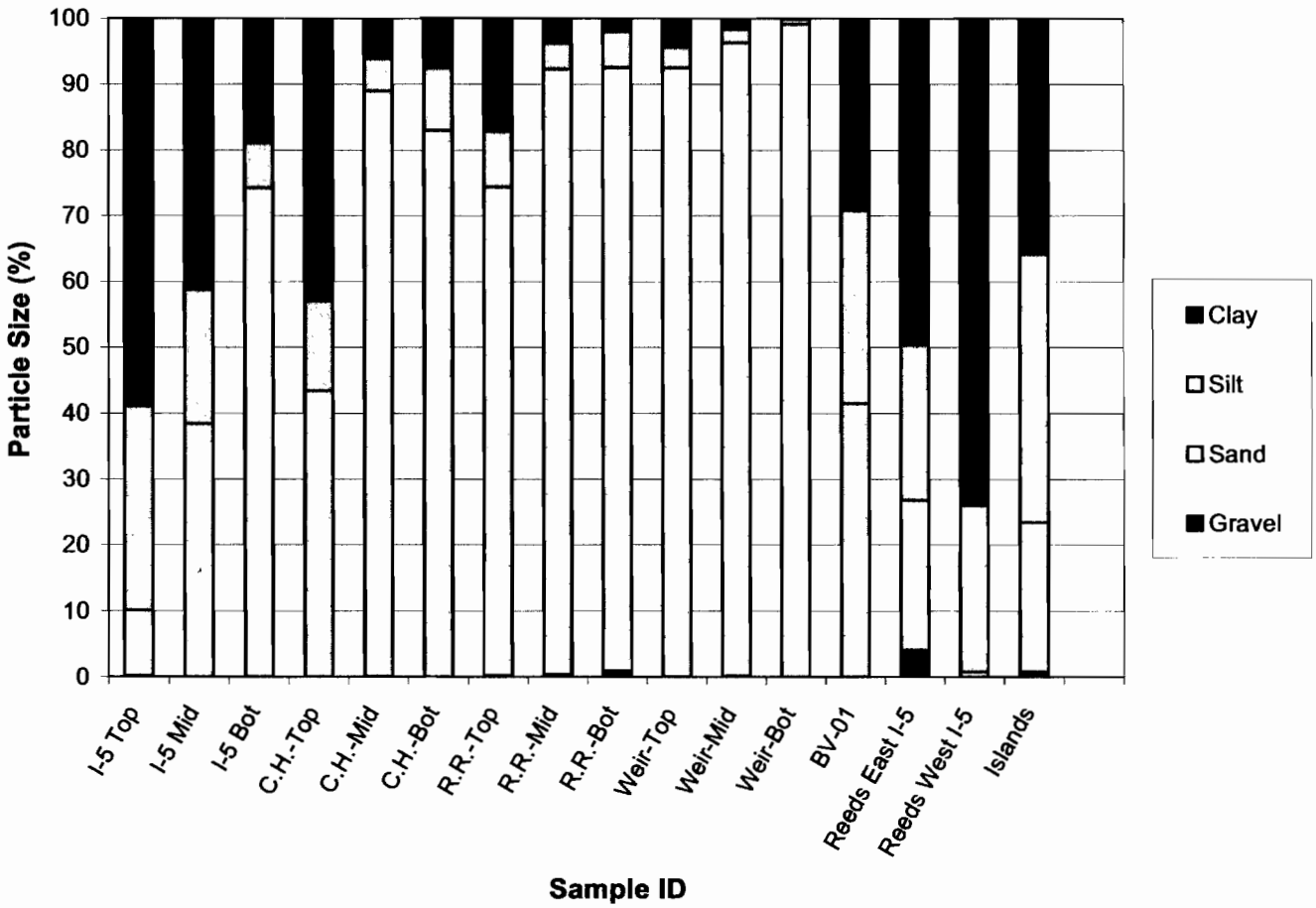

Figure 3-1. Particle Size Distribution

Material from the surface samples contained the highest percentage of fine grained particles (silts and clays). Sand composition increased moving downstream across the basins toward the ocean. Sediment from 7 of the 12 samples exceeded 80% sand composition and 2 other samples exceeded 70% sand. Small percentages of gravel sized particles (shell material) were measured in the Railroad Basin.

Total organic carbon levels were low as is characteristic of high sand content samples. The only sample exceeding 1% TOC was one from the top three feet I-5 Basin. Conductivity and salinity of the sediments varied greatly, highest levels were within I-5 Basin sediments (37.3‰) and lowest in the Weir Basin (<2‰).

Eight of the 12 samples were found to be non-plastic. For the four samples with measurable amounts of plasticity, the liquid limit ranged from 39 – 87, and the plasticity index ranged from 20 to 59.

Sediment salinity (porewater or extract) ranged from 37.3 ‰ (I-5 Basin, bottom section) to 1.4 ‰ (Railroad Bain, top section). Conductivity and Total Dissolved Solids values were similarly high in the I-5 Basin samples. Samples were re-run to confirm the result. Both sets of data indicate higher than expected ionic concentrations in the I-5 basin. The source of the salts is not certain, neither are the

concentrations of individual ions. Levels increasing by depth in the eastern most lagoon suggest that the environment may have been intermittently flooded in the past, causing evaporation and concentration of ions. The source of salts is most likely seawater, but could also be from agriculture activities. Lower levels near the surface imply that the depositional environment has changed or they are slowly being diluted. Within the region, there are hard siltstone and sandstone layers that could be trapping salts in subsurface sediments by reducing their diffusion. The individual core section BV02-101, taken from archive and individually analyzed, measured at a similar level of salinity as the composite from the lagoon. This indicates continuity in salinity of I-5 Basin one-three foot deep open water sediments. Sediment collected within reeds were from shoaled areas (shallower) with more recently deposited material and contained lower salinity concentrations.

Table 3-1. TOC, Conductivity, Total Dissolved Solids, Salinity, Atterberg Limits

Sample ID	TOC (% dry wt.)	Specific Conductivity (mS, pore water or extract)	Total Dissolved Solids (g/L, pore water or extract)	Salinity (‰, pore water or extract)	Liquid Limit	Plastic Limit	Plasticity Index
I-5 Top	1.86	22.3	11.3	13.5	87	28	59
I-5 Mid	0.64	29.8	15.1	18.6	51	24	27
I-5 Bot	0.12	56.6	28.5	37.3	-	NP	-
Coast Hwy-Top	0.91	3.3	1.6	1.7	70	22	48
Coast Hwy-Mid	0.14	9.8	4.9	5.5	-	NP	-
Coast Hwy-Bot	0.14	9.6	4.8	5.3	-	NP	-
RR-Top	0.50	3.6	1.8	1.9	39	19	20
RR-Mid	0.13	3.3	1.6	1.7	-	NP	-
RR-Bot	0.12	2.7	1.3	1.4	-	NP	-
Weir-Top	0.36	4.0	2.0	2.1	-	NP	-
Weir-Mid	0.18	4.5	2.2	2.4	-	NP	-
Weir-Bot	0.04	5.7	2.8	3.0	-	NP	-
I-5 (BV02-101)	0.43			14.1	57	21	36
Reeds East (I-5)	0.87			5.0	58	21	37
Reeds West (I-5)	0.62			4.8	49	17	32
Islands	1.98			2.0	-	-	-

NP - Non-Plastic

- Atterberg Test method is not applicable to high sand content non-plastic samples

3.2.2 Elemental and Organic Laboratory Results

Concentrations of all elements and organic compounds were well below levels that cause environmental concern.

Figure 3-2 presents the minimum and maximum concentrations of elemental data along with average earth crustal concentrations from Krauskoph (1967); the environmental effects range-low (ER-L; Long et. al.,1995); and, soluble threshold limit concentrations (STLC) for the State of California. ER-L values

represent concentrations where biological impacts are observed $\leqslant$10% of the time. STLC values are presented instead of total threshold limit concentration (TTLC) to show how bulk sediment results were below the leachate criteria even prior to the weak extraction/dilution which produce much lower concentrations.

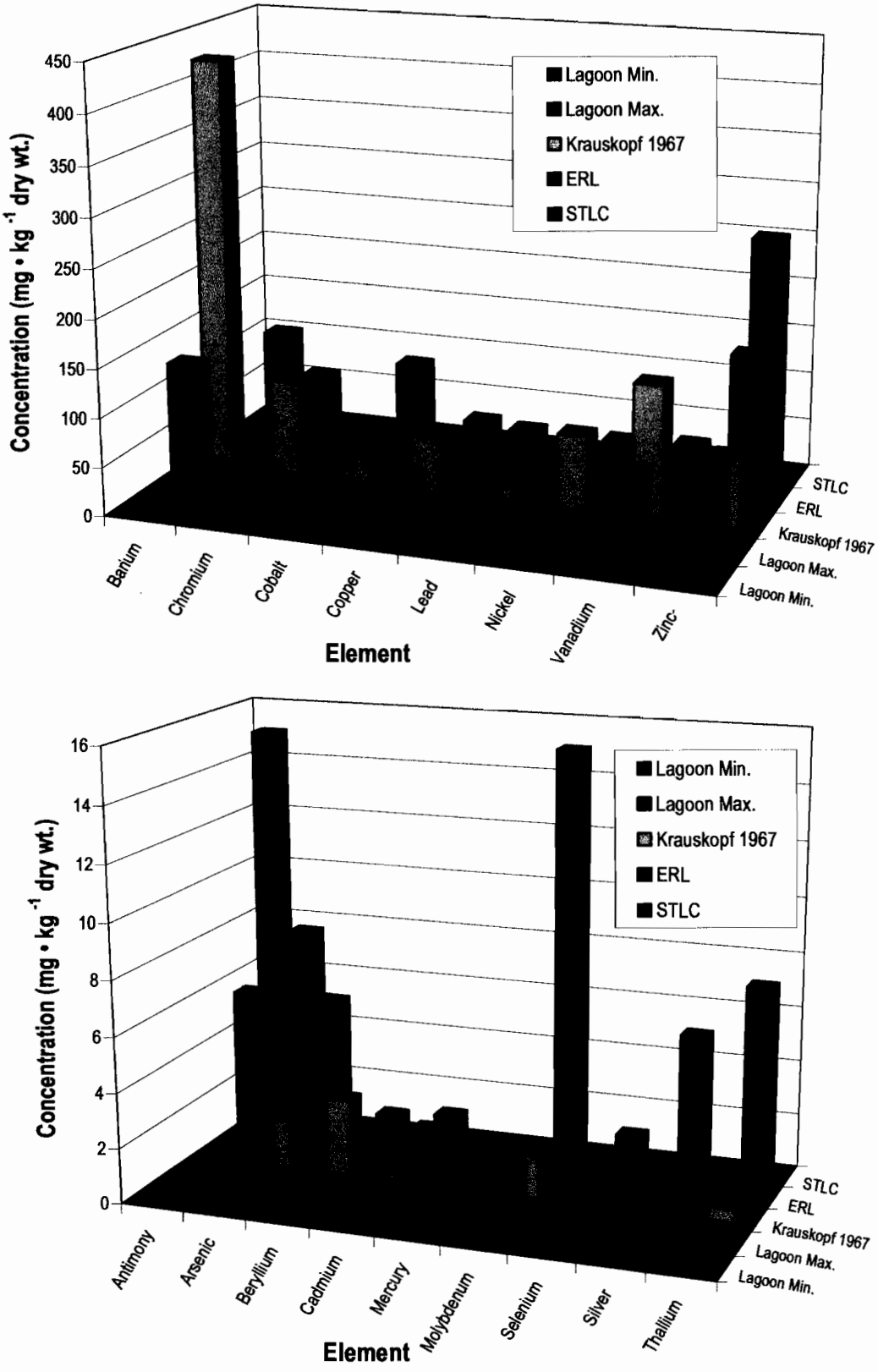

Figure 3-2. Minimum and Maximum Concentrations of Elements with Benchmarks

Table 3-2 presents a summary of the minimum and maximum values of element concentrations compared to average values for the earth's crust, ER-L, STLC and TTLC benchmarks. STLC benchmarks are provided to illustrate that bulk sediments were near or below STLC criteria for elements prior to leaching and dilution from STLC methods. Arsenic and Vanadium were the only elements reported slightly above STLC values, and it is not reasonable to believe they would exceed STLC limits after the method extraction. All elements were well below TTLC values. Copper was the only element measured at a concentration slightly above the ER-L. Sediments with concentrations at or below the ER-L rarely cause environmental effects (Long et. al 1995).

Concentrations of elements in sediments underlying reeds and reed tissue were similar to open water sediment values. Some elements were measured at slightly higher values (primarily in the island sediments). Values remained below levels of environmental concern such as the ER-L. There was no evidence of increased concentrations in underlying sediments or sequestering of elements in plant tissues.

Table 3-2. Elemental Minimum and Maximum Values with Various Benchmarks ($\mu g \cdot g^{-1}$)

Element	Minimum	Maximum	Earth Crust1	ER-L	STLC	TTLC
Antimony	ND	ND	0.2		15	500
Arsenic	1.2	7.1	1.8	8.2	5	500
Barium	15.7	147	425		100	10,000
Beryllium	ND	ND	2.8		0.75	75
Cadmium	ND	ND	0.2	1.2	1	100
Chromium	4.9	42.9	100	81	5	500
Cobalt	2.4	13.9	25		80	8,000
Copper	3.9	50.4	55	34	25	2,500
Lead	30.5	52.7	12.5	46.7	5	1,000
Mercury	0.05	0.05	0.08	0.15	0.2	20
Molybdenum	2.2	3	1.5		15	3,500
Nickel	4.4	18.5	75	20.9	20	2,000
Selenium	ND	ND	0.05		1	100
Silver	ND	ND	0.07	1	5	500
Thallium	ND	ND	0.45		7	700
Vanadium	11.8	101	135		24	2,400
Zinc	7.7	99.3	70	150	250	5,000

Concentrations of organic compounds of concern were below environmental effects guidelines (ER-L and ER-M) and Title 22 STLC/TTLC criteria. Table 3-3 summarizes the various groups and individual compounds. The majority of compounds evaluated for PAH, PCBs and pesticides were not detected, and when detected they were present at low levels. There were no herbicides detected.

Concentrations of organic compounds in sediments underlying reeds and reed tissue were similar to open water sediment values with the exception of phenol and phenol compounds (Appendix C). Phenol

compounds naturally occur in the breakdown of lignins from plant material. Lignin breakdown products are included in waste products from plant eating animals (e.g. waterfowl). Not surprisingly, the highest levels of phenol (658 µg/kg), occurred within island sediments which include decaying plant material and guano from waterfowl. The Washington Department of Ecology's Toxicity Reference Value (TRV) for phenol is 420 µg/kg. The one island sample exceeds this value, but all other samples are well below it. There is no reason to believe that phenol concentrations are anthropogenic. Phenol is a constituent of coal tar, and is formed during the natural decomposition of organic materials. Phenol is also a product or byproduct of phenolic resins and caprolactam (plastics manufacturing), exhaust gases, residential wood burning, and cigarette smoke. Another potential source is the atmospheric degradation of benzene under the influence of light. There are no known coal tar or resin sources in the area. The other main sources are atmospheric, and should create elevated levels in open water sediment samples. Rather, the increased levels are found in areas of high plant and guano concentrations which suggests that the source is natural.

Overall, organic chemical concentrations remained near or below levels of environmental concern (e.g. ER-L, WDOE 1995). With the exception of phenols, there was no evidence of increased concentrations in underlying sediments or sequestering of elements in plant tissues.

Complete tabular results are provided in Appendix C.

Table 3-3. Organic Compound Maximum Values with Various Benchmarks

Substance	Max ($ng \cdot g^{-1}$)	STLC ($ng \cdot ml^{-1}$)	TTLC ($ng \cdot g^{-1}$)	ER-L ($ng \cdot g^{-1}$)	ER-M ($ng \cdot g^{-1}$)
Aldrin	0.07	140	1400		
Chlordane	2.60	250	2500		
DDT, DDE, DDD	26.69	100	1000	1.58	46.1
2,4-Dichlorophenoxyacetic Acid	ND	10,000	100,000		
Dieldrin	0.11	800	8000		
Endrin	0.10	20	200		
Heptachlor	0.23	470	4700		
Methoxychlor	0.09	10,000	100,000		
Mirex	0.13	2100	21,000		
Pentachlorophenol	ND	1700	17,000		
Total PCB	4.29	5000	50,000	22.7	180
2,4,5-Trichlorophenoxypropionic acid	ND	1000	10,000		
Total PAH	298	Na	na	4022	44,792

3.2.3 Reed Disposal Area, Volume and Weight Measurements

Uncompressed volume and density of reeds along the Northwest shore of the I-5 basin (Figure 2-1) was measured to provide a basis for assessing the cost for reed disposal. A small patch of reeds occupying a surface 3.7 square meters was removed by hand. Prior to harvesting, the average reed height was estimated. Approximately half of the plants broke off at the sediment interface during the removal process and the associated root material was not recovered. The balance of the harvested reeds possessed reasonably intact root structures and some lagoon sediment. Removal of all the root material with the above ground reed mass and washing away all the lagoon sediment was not possible using the trial harvesting method. Additionally, it would have been very difficult to remove only the above sediment/below water reed tops, thus the values reported represent a mix of intact and broken reeds. Harvested material was loaded into a small trailer (4' x 6'). No additional compaction of the plant material (e.g., jumping on the plant mass) was attempted. The loaded trailer and tow vehicle were weighed at the El Corazon disposal site in Oceanside and, after disposing of the reeds and sediment, the trailer and tow vehicle were re-weighed. The net weight of the reeds was 500 lbs with a scale resolution of ± 40 lbs.

Using the estimated in-field reed height and areal coverage and the harvested volume in the trailer, the volume of reed material was "naturally compacted" by a factor of 7.2. Harvested reeds measured 61.1 kg/m^2, with a density of 24 kg/m^3. Table 3-4 details the reed harvesting results. The ultimate method of reed removal is presently unknown; however, if non-mechanical "hand harvesting" is chosen these results can be used to provide assist in predicting disposal volume, weight and cost.

Table 3-4. Reed Disposal Area, Volume and Weight Data

Measurement	Units	Result
Area of reeds harvested	m2	3.7
	yd^2	4.4
Volume of reeds harvested (average height =2.5 m)	m^3	9.3
	yd^3	12.1
Volume of reeds in disposal vehicle	m^3	1.3
	yd^3	1.7
Weight of harvested reeds	kg	227
	lb	500
Mass per unit area of harvested reeds	kg/m^2	61
	lb/yd^2	112
Density of reeds harvested	kg/m^3	24
	lb/yd^3	41
Density of reeds in disposal vehicle	kg/m^3	173
	lb/yd^3	292

4.0 DATA SUMMARY AND DISCUSSION

Sediments were primarily comprised of sand size particles, with particle diameter increasing in the downstream (east to west) direction. Sediments from the top nine feet of the I-5 Basin and the top three feet of the Coast Highway Basin were the only samples with <70 percent sand composition. TOC concentrations were low in most samples with only one exceeding 1 percent. Particle size increased and TOC decreased moving downstream to the west, a conventional aquatic sediment relationship.

There was very minimal evidence of contamination of elemental or organic compounds. Samples with the highest level of constituents above detection limits were from 0-3 foot surface samples from the I-5 Basin, followed by surface samples from the other three basins moving east to west. Levels of contamination within the I-5 surface samples were still very low, and do not come close to concentrations that are known to cause biological effects.

Based on particle size and chemistry data, potential sediment management options are presented below.

Landfill	All sediment and plant samples pass hazardous waste criteria and would be acceptable for disposal at any class of landfill based on chemistry data.	
Construction Fill	Physical attributes of the sediment samples (e.g. plasticity and salinity) may affect the acceptability for site specific land fills or construction sites.	
Ocean Disposal	All sediment samples would be expected to meet and exceed ocean disposal acceptance criteria.	
Beach Replenishment (based on 80% sand composition)	• I-5 Basin	Most sediments below nine feet
	• Coast Hwy. Basin	Sediments below three feet
	• Railroad Basin	Sediments below three feet
	• Weir Basin	All Sediment

After the restoration plan has been finalized and approved, further testing may be required to better define patterns of the particle size distribution depending on the sediment management plan that is developed.

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BUENA VISTA LAGOON RESTORATION FEASIBILITY ANALYSIS

Pollutant Source and Sedimentation Analyses

December 2002

1. INTRODUCTION

1.1 Purpose and Objectives

This report summarizes Task 1.3(b) Pollutant Source Analysis and Task 1.3(c) Sedimentation Analysis of the data collection program for the Buena Vista Lagoon Restoration Feasibility Study. The objectives of the analyses are to identify critical pollutants in the Buena Vista Lagoon, develop loading estimates for the identified critical pollutants from Buena Vista Creek and local runoff, and determine potential sources of critical pollutants in the Buena Vista Creek Watershed based on existing data.

1.2 Background

Buena Vista Lagoon (Lagoon) receives wet and dry weather input from the Buena Vista Creek Watershed (Watershed). Typical sources of discharges from Buena Vista Creek (Creek) include stormwater runoff and subsurface runoff under wet weather conditions during storms, and runoff from wastewater, nuisance water, and irrigation return water under dry weather conditions. The inflows carry pollutants in aqueous and particulate phases into the Lagoon. The aqueous phase of a constituent tends to remain in the water column within the Lagoon where it is subject to mixing across the Lagoon and over the water column while undergoing physical, chemical, and biological interactions. The particulate phase of the constituent tends to settle to the Lagoon bottom with the solids it is sorbed to and is possibly redistributed by currents within the Lagoon during high flow or inlet breach events. Interactions between constituents in the sediment bed and those in the water column can take place across the sediment-water interface.

The water quality and sediment quality conditions within the Lagoon need be characterized to determine the potential impact to the beneficial uses of the Lagoon as designated in the San Diego Basin Plan (SDWQCB, 1994), which include the following:

- Contact Water Recreation (fishing from boat or shore)
- Non-Contact Water Recreation
- Biological Habitats of Special Significance
- Wildlife Habitat
- Rare, Threatened, or Endangered Species
- Marine Habitat
- Warm Freshwater Habitat

- Estuarine Habitat (potential)

Evaluation of a full range of constituents in both water column and bottom sediments is needed to identify critical pollutants that are present within the Lagoon at elevated levels that could potentially impact the beneficial uses of the Lagoon. Upon identification of the critical pollutants, the potential source areas within the watershed can be through correlation with land uses.

The Lagoon historically experienced sedimentation as a result of sediment input from the Creek. The existing conditions of sedimentation in the Lagoon are a common concern such that sediment has been on the 303(d) list since 1996 as a critical pollutant of Medium Priority for TMDL. Prior studies on sediment discharges from the Creek include those by Applegate (1985) and Chang (1986). These studies yielded divergent results as to the level of sediment loading from the Watershed, through the Creek, and into the Lagoon. One major reason for the uncertainty in sediment loading estimates is the nearly total lack of data for calibrating the analyses. The Watershed is essentially ungauged. The Lagoon's bathymetry has not been surveyed in a manner that permits calculation of the amount of historical sediment deposition in the Lagoon that would provide a basis for estimating sediment loading from the Creek. Therefore, reexamination of the existing knowledge on sedimentation into the Lagoon based on an independent loading analysis is necessary to provide adequate characterization of the sedimentation conditions in the Lagoon.

1.3 Approach

The analysis approach described below was designed to achieve the stated objectives of the study.

Existing data on the water quality in the Lagoon and Creek were reviewed to identify pollutants at elevated concentrations. The measured concentrations were compared with water quality objectives as set forth in the San Diego Basin Plan and California Toxics Rule to identify critical pollutants.

The loadings of the identified critical pollutants into the Lagoon were determined for non-point sources (NPS) and point sources (PS) based on existing data. The NPS loadings from the Watershed were analyzed based on a regional analysis of loadings of the critical pollutants. A regional analysis provides pertinent estimates of pollutant loadings for an ungauged watershed based on data from neighboring watersheds with similar hydrological and geological characteristics. Data from the neighboring watersheds were reviewed and correlated with land uses. Land use-specific loading rates of the critical pollutants were then determined on a regional basis. These rates were applied to the Watershed to determine land use-specific loadings and total loadings of the critical pollutants into the Lagoon. The land use-specific loadings were ranked to identify the primary contributing land uses and source areas within the Watershed.

The EPA Permit Compliance System (PCS) and information from the San Diego Regional Water Quality Control Board (RWQCB) were surveyed for major dischargers in the Watershed, which indicated no permitted dischargers in the Watershed. Therefore, PS loadings were eliminated as pollutant sources.

Since sediment was determined to be a critical pollutant identified as a result of water quality data review, a sedimentation analysis was conducted in addition to the Pollutant Source Analysis. The Sedimentation Analysis was focused on discussion of the sediment loading results from the Pollutant Source Analysis by comparing them with those from prior studies in terms of both loading magnitude and basis of calculation to provide a perspective on the updated loading estimate. The effects of BMPs are discussed below based on information provided by the local agencies.

2. CRITICAL POLLUTANT IDENTIFICATION

This section discusses the results of the data review conducted to identify critical pollutants in the Lagoon that might adversely affect the beneficial uses of the Lagoon based on existing water quality information provided by local agencies. The primary basis for critical pollutant identification included information that supported the 303(d) listing by the RWQCB (1996,1998) and short-term water quality sampling programs conducted in the Lagoon by Coastal Environments (Coastal Environments, 2000) and in the Creek by the RWQCB (2002). Earlier studies addressing water quality conditions in the Lagoon include City of Oceanside (1995), MEC (1994), Peters et al. (1985), LaPre (1980), and Carpelan (1969).

2.1 RWQCB 303(d) Listing

The beneficial uses in the Lagoon were determined to be impaired for aquatic life, contact recreation and noncontact recreation based on a water quality assessment conducted by the RWQCB (1996, 1998). The pollutants determined to be critical for 303(d) listing included nutrients, sediment, and bacteria. The extents of impairment included 150 acres by nutrients, 350 acres by sediment, and potentially 350 acres threatened by bacteria.

The basis for listing nutrients as pollutants of priority was largely observational and qualitative. Treated sewage was discharged directly into the Lagoon until 1967. Together with urban runoff, nutrients were historically recycled within the Lagoon. The presence of the original weir at the mouth of the Lagoon, which was installed in 1948 with a crest elevation at 5.8 feet (ft) above NGVD, isolated the Lagoon from tidal flushing (Coastal Conservancy, 2002). The water depth in the Lagoon, which is regulated by the higher of the weir crest and barrier beach seaward of the weir, varies between 1~3 ft. Periodic algae blooms were observed to cause localized fish kills. Nutrient build-up in the bottom sediments may have promoted eutrophication in the Lagoon. Direct

observation of water quality conditions in the Creek also indicated potential eutrophication in the stream water that discharges into the Lagoon (SWRCB, 2002).

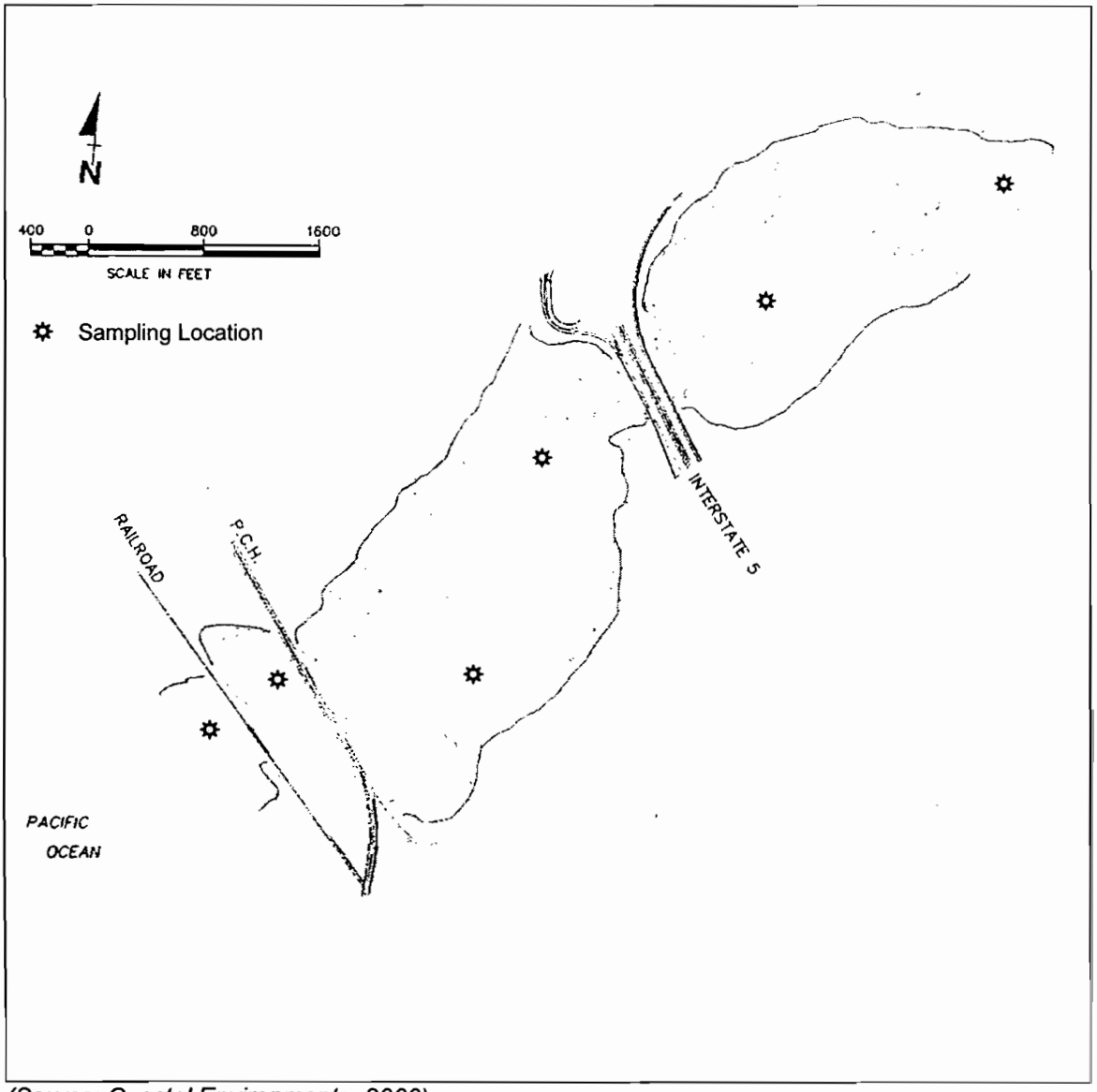
The basis for listing sediment as a priority pollutant was also largely observational and qualitative. The Lagoon was determined to receive sediment discharge through stormwater runoff from various sources in the Watershed that included agricultural land erosion, construction, and channel erosion. The weir and barrier beach at the mouth of the Lagoon reduced sediment transport across the Lagoon and into the Pacific Ocean. Approximately 122,000-130,000 cubic meters of sediment were dredged from the I5 Basin in 1983, from which two least-tern nesting islands were created. The islands were graded and capped with sand in 1989. Urbanization of the watershed that generally increased peak flow discharges during storms and encroachment upon the floodplain that eliminated most of the riparian and marsh land buffer were considered primary factors that contributed to Lagoon sedimentation, particularly during the period of the late 70's and early 80's.

The basis for listing bacteria as a priority pollutant was based on occasional exceedances of bacteria objectives from water quality sampling in the Lagoon. A number of sewage spill incidences occurred during the period of 1991-1995 that contributed to elevated bacteria levels in the Lagoon. Stormwater runoff that discharges into the Lagoon also contributed to the occasional violation of bacteria objectives.

The three priority pollutants were listed on both the 1996 and 2002 303(d) List, with sediment designated higher priority (Medium) compared with nutrients and bacteria (Low). Since the extent and level of beneficial use impairment by bacteria was determined uncertain by the RWQCB (1998), only sediment and nutrients are considered primary critical pollutants for this study based on the 303(d) process.

2.2 Lagoon Sampling

The water column in the Lagoon was most recently sampled in June-November of 1999, at six locations within the Lagoon for conventional pollutants, nutrients, and other water quality parameters on a monthly or bimonthly basis (Coastal Environments, 2000). Figure 1 shows the sampling locations, which included 2 in the I5 Basin, 2 in the PCH Basin, 1 in the Railroad Basin, and 1 in the Weir Basin. Table 1 summarizes the sampling results.



(Source: Coastal Environments, 2000)

Figure 1 Lagoon Sampling Locations

Table 1 Lagoon Water Quality Sampling Results

CONSTITUENT	UNIT	MEASURED RANGE[7]	BASIN PLAN OBJECTIVE[1]
Turbidity	NTU	0.6-14.6	20
Total Nitrogen (N)	mg/L	1.0-4.4	0.25[6]
Total Phosphorus (P)	mg/L	ND[3]-0.4	0.025[6]
Total Coliform	MPN/100 mL	Exceeded objective at least once in each basin during period	230-330[2]
Fecal Coliform	MPN/100 mL	Exceeded objective only once in Railroad Basin during period	400[2]
Enterococcus	MPN/100 mL	No exceedance	108[2]
Dissolved Oxygen (DO), Surface	mg/L	4.5-6.2	7.0
Dissolved Oxygen (DO), Bottom	mg/L	2.5-5.4	7.0
pH	unit	8.0-9.3	7.0-9.0[4] 6.5-8.5[5]
Salinity, Surface	ppt	1.6-2.7	
Salinity, Bottom	ppt	1.6-3.0	

Source: Coastal Environments (2000)

(1) RWQCB (1994). All objectives (except for turbidity) not to be exceeded more than 10% of the time per year (per month for bacteria)
(2) Single sample.
(3) Non-detect.
(4) For bays and estuaries.
(5) For inland waters.
(6) For lagoons and lakes.
(7) Total data range. Local ranges vary.

The sampling results most notably indicate the following:

- Nutrients (N, P) tended to significantly exceed objectives, sometimes by an order of magnitude, which supports the 303(d) listing of nutrients as critical pollutants in the Lagoon.

- Exceedances of the bacteria objectives were occasional overall, which supports the 303(d) analysis by the RWQCB that considered bacteria as of uncertain importance in impairing beneficial uses of the Lagoon. Although total coliforms exceeded objectives more frequently, it is

generally considered a less important indicator for bacterial contamination due to its ubiquitous, often naturally occurring sources.

- Dissolved oxygen (DO) in the Lagoon tended to be appreciably depressed below objectives, which may be correlated with nutrient excess and algae blooms observed in the Lagoon.

The results suggest that nutrients (N, P) are the primary pollutants of concern in the Lagoon.

A reanalysis of the nutrient data from the sampling program was performed to evaluate the potential limiting nutrient in the Lagoon. The nutrient concentrations were tabulated to calculate total N, total P, and N/P ratio by sample, which were then summarized as shown in Table 2.

Table 2 Lagoon Nutrient Levels and N/P Ratios

ITEM	TOTAL N	TOTAL P	AVERAGE N/P
Minimum	1.0	0.02	48
Maximum	4.4	0.40	
Mean	1.7	0.10	

Since the ratio of N/P is greater than 10, the results indicate that the Lagoon tends to be P-limited, which is typical of a waterbody receiving nutrients predominantly from non-point sources (e.g. Thomann and Mueller, 1987). This is consistent with the fact that there is no permitted point source in the Watershed that discharges into the Creek. Nutrient loadings to the Lagoon are, therefore, expected to primarily originate from non-point sources such as agricultural, open, and urban lands as suggested in the RWQCB 303(d) fact sheets (RWQCB, 1998).

2.3 Creek Sampling

The Creek water was most recently sampled three times during May-June, 1998 at Wildwood Park in Vista, South Vista way (Carlsbad) and a downstream location near the Lagoon, respectively, for nutrients, total suspended solids, turbidity, and metals. The results are summarized in Table 3.

Table 3 Creek Water Quality Sampling Results

CONSTITUENT	UNIT	MEASURED RANGE	BASIN PLAN OBJECTIVE[1]
Total Dissolved Solids (TDS)	mg/L	1,133 - 1,378	750
Turbidity	NTU	0.6 - 1.7	20
Total Nitrogen (N)	mg/L	1.9 - 4.1	1.0[2]
Total Phosphorus (P)	mg/L	0.22 - 0.83	0.1[2]
Chromium, Dissolved	µg/L	10	16 (max) 11 (chronicle)
Zinc, Dissolved Total	µg/L	20 40	121
Other Metal		ND	
Chloride	mg/L	454	250
Sodium	mg/L	254	60
Sulfate	mg/L	281	250

Source: RWQCB (2002)

(1) RWQCB (1994). All objectives (except for turbidity) not to be exceeded more than 10% of the time per year.
(2) For streams.
(3) Non-detect.

The sampling results most notably indicate the following:

- Nutrients (N, P) tended to exceed objectives, which supports the 303(d) listing of nutrients as critical pollutants in the Lagoon.

- TDS, chloride, and sodium tend to appreciably exceed objectives, which indicates elevated salt content in the Creek water discharging into the Lagoon. Although high salt concentrations in the Creek may impact certain beneficial uses of the Creek, they are not expected to have discernible effects on the Lagoon water considering the often brackish conditions in the Lagoon (Coastal Conservancy, 2002).

- There were no exceedances of the metals objectives, which suggest loadings of metals into the Lagoon are not significant.

The results suggest that nutrients (N, P) are the primary pollutants of concern in the Lagoon.

2.4 Summary

Based on the information from the 303(d) process and analysis of sampling data from the Lagoon and Creek presented above, sediment and nutrients (N, P) were identified as critical pollutants in the Lagoon.

3. POLLUTANT SOURCE ANALYSIS

This section discusses the methods, procedures, and results of the pollutant source analysis for the identified critical pollutants (i.e., sediment and nutrients).

3.1 Sediment

Method

Sediment loadings into the Lagoon and potential sources in the Watershed were analyzed based on a regional watershed sedimentation analysis. The regional watershed sedimentation analysis was performed based on data of stream flows, sediment loadings and land uses from a group of watersheds in the general coastal region centering around the study area. The sediment loadings from the selected watersheds were determined based on prior studies and correlated with land uses by a regression analysis. The analysis yielded a regional loading estimator that is capable of providing total and land use-specific loadings from any typical watershed in the region on an average basis. The loading estimator was then applied to the Watershed to determine sediment loading through the Creek and land use-specific loadings in the Watershed.

Analysis

A total of nine coastal streams in the general geological province of the Peninsular Ranges that encompasses the study area and extends approximately from just north of Santa Ana River to the Mexican border were selected to represent sedimentation characteristics of the region. Selection of the component streams for the regional analysis was based on availability of sediment loading data either in the streams or watersheds. Table 4 shows the selected component streams, stations in the streams where the loading analysis was performed, watershed drainage areas above the stations, and levels of upstream regulation (*e.g.* damming). The composition of the levels of upstream regulation of the component streams roughly reflects the characteristics of watershed development in the region.

Table 4 Component Streams for Regional Sediment Loading Analysis

STREAM	STATION	USGS STATION	DRAINAGE (SQ. MILE)	REGULATION[1]
San Dieguito River	Del Mar	11030500	338	Extensive
San Diego River	Santee	11022500	377	Extensive
San Diego Creek	Culver	11048500	42	Extensive
San Diego Creek	Campus	11048555	306	Extensive
San Juan Creek	San Juan Capistrano	11046500	106	Moderate
San Luis Rey River	Oceanside	11042000	557	Moderate
Santa Margarita River	Ysidora	11046000	723	Moderate
Sweetwater River	Descanso	11015000	45	Natural
Santa Ana River	Santa Ana	11078000	1,700	Extensive

(1) Inman and Jenkins (1999)

Sediment loads from the component streams were obtained based on the data from Taylor (1983), Inman and Jenkins (1999), and the USGS stream loading measurement database. Taylor (1983) analyzed 23 coastal basins in Southern California and provided upland sediment yields from the watersheds based on debris basin siltation data. The estimated sediment yields represent the amounts of upland sediment production in the watershed. Inman and Jenkins (1999) analyzed 20 coastal streams in California and calculated in-stream sediment loads based on USGS stream flow and suspended sediment measurements.

The data from Taylor (1983), Inman and Jenkins (1999), and the USGS database (USGS, 2002) were processed to provide in-stream sediment loads for the nine component streams selected for analysis. The in-stream loads for all streams except San Diego River at Culver and San Dieguito River were provided by Inman and Jenkins (1999). The load for San Diego River at Culver was calculated separately based on the USGS measurements at the location. Since only upland yield was available for San Dieguito River, it was necessary to estimate the in-stream load based on the upland yield provided by Taylor (1983).

It has been well established that the actual amount of sediment delivered through the streams to downstream locations (known as coastal delivery) is often appreciably less than the amounts produced upland, primarily due to the presence of various interceptors

(*e.g.*, dams and debris basins) as well as the variable carrying capacities of runoff flows overland and in stream along the paths of sediment delivery. A delivery ratio, defined as the ratio of sediment load measured in-stream at a downstream location to the upland sediment yield, needs be developed and applied to the upland sediment yield to obtain the in-stream sediment load at a downstream location.

To develop delivery ratio estimates, the sediment loads provided by Inman and Jenkins (1999) were divided by upland yields by Taylor (1983) for streams that were analyzed by both to provide data points of delivery ratios. These data were then correlated with watershed drainage areas by a regression analysis to provide a regional delivery ratio curve as show in Figure 2. The results indicate that the delivery ratio decreases (smaller fraction delivered to downstream) as watershed size increases, which is consistent with the well-known fact that sediment delivery becomes inefficient as the size of a storm system becomes smaller relative to that of the watershed. For San Dieguito River with a drainage area of 338 square miles (mi^2), the delivery ratio was determined to be approximately 0.42. Applying this delivery ratio to the upland yield estimate by Taylor (1983), the corresponding in-stream load was determined. As a verification of the regional delivery ratio curve, the in-stream load of 102,885 cubic meters/year (m^3/yr) measured in San Diego Creek at Campus Drive was applied with a predicted delivery ratio of 0.43 to give an upland yield of approximately 239,300 m^3/yr. This agrees well with the site-specific estimates of approximately 250,000 m^3/yr (County of Orange, 1998).

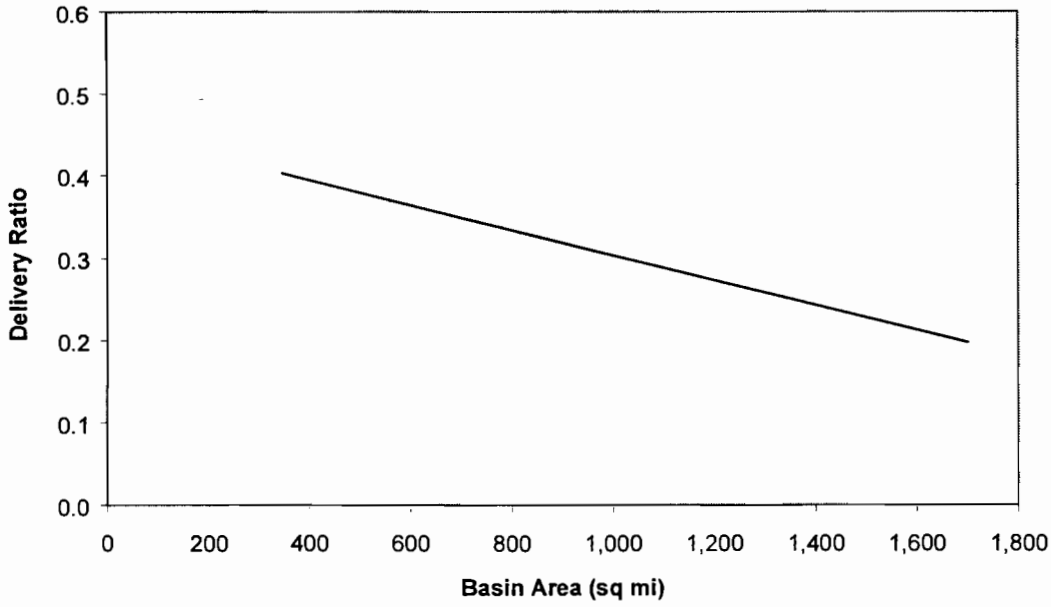


Figure 2 Regional Sediment Delivery Ratio

Table 5 shows the sediment loads for the nine streams together with four types of primary erosional land use acreages in the respective watersheds. Largely paved impervious areas were not included in the analysis due to the limited erosional area associated with this land use. The acreages of the erosional land uses above the measuring stations were obtained from the EPA BASINS land use database (EPA, 2001a).

Table 5 Sediment Loads and Land Use Acreages

STREAM	LAND USE (ACRE)				LOAD[1] (M^3/YR)
	AGRICULTURAL	RANGE	BARREN	FOREST	
San Dieguito River at Del Mar	42,212	108,670	1,677	44,341	100,170
San Diego River at Santee	8,198	174,197	3,939	32,204	9,615
San Diego Creek at Culver	8,016	10,690	1,455	335	124,200
San Diego Creek at Campus	9,826	18,896	3,023	335	102,885
San Juan Creek at San Juan Capistrano	9,737	56,825	1,568	5,724	49,038
San Luis Rey River at Oceanside	72,844	200,890	3,509	67,089	409,615
Santa Margarita River at Ysidora	90,260	346,237	8,340	32,091	91,346
Sweetwater River at Descanso	1,970	18,631	0	7,958	4,135
Santa Ana River at Santa Ana	194,763	431,967	25,481	203,003	475,962

(1) Based on bulk sediment aggregate density of 1.04 tons/m^3 (Taylor, 1983).

Table 6 shows the sediment loads per acre of drainage areas for the nine streams together with the four types of erosional land use areas as percentages of total drainage areas in the respective watersheds. These values were obtained by normalizing the values in Table 5 by total drainage areas in the respective watersheds.

Table 6 Sediment Loads and Land Use Acreages

STREAM	LAND USE (% TOTAL DRAINAGE)				LOAD (M^3/ACRE/YR)
	AGRICULTURAL	RANGE	BARREN	FOREST	
San Dieguito River at Del Mar	20.0	51.4	0.8	21.0	0.47
San Diego River at Santee	3.2	69.9	1.6	12.9	0.04
San Diego Creek at Culver	30.4	40.6	5.5	1.3	4.72
San Diego Creek at Campus	13.0	25.0	4.0	0.0	1.36
San Juan Creek at San Juan Capistrano	13.0	75.7	2.1	7.6	0.65
San Luis Rey River at Oceanside	20.0	55.3	1.0	18.5	1.13
Santa Margarita River at Ysidora	18.3	70.3	1.7	6.5	0.19
Sweetwater River at Descanso	6.8	64.1	0.0	27.4	0.14
Santa Ana River at Santa Ana	17.9	39.7	2.3	18.7	0.43

The normalized (per-acre) sediment loads in the last column of Table 6 were correlated with the four types of normalized (percent) land uses in Columns 2~5 using multiple linear regression in the following form (Seber, 1977):

$$L = \sum l_i A_i + l_0 + \varepsilon$$

where L is the normalized total in-stream load, l_i the land use-specific load for land use i, A_i the normalized area of land use i, l_0 the intercept, and ε a random regression residual with zero mean and constant variance. The regression provides l_i as estimates of regional loading rates from the four types of primary erosional land uses. Table 7 shows the loading rates.

As a verification of the estimates, site-specific loading rates from prior local studies in the region were extracted and compared with the present rates. Results are shown in Table 8.

Table 7 Sediment Loading Rates by Land Uses

LAND USE	LOADING RATE (M^3/ACRE/YR)
Agricultural	6.4
Range	2.3
Barren	106.4
Forest	8.4

Table 8 Sediment Loading Rate Comparison

LAND USE	LOADING RATE (M^3/ACRE/YR)		
	PRESENT STUDY	SAN DIEGO CREEK WATERSHED (OCPFRD, 2000)	BUENA VISTA CREEK WATERSHED (APPLEGATE, 1985)
Agricultural	6.4	7.5	10.4
Range	2.3	2.7[1]	1~2[3]
Barren	106.4	32.7[2]	19.1[2]
Forest	8.4	---	---

(1) "Open" land use; assumed to approximate Range.
(2) "Construction" land use; assumed to approximate disturbed/transitional Barren.
(3) "Natural" land use; assumed to approximate Range.

Comparison of the rates indicates that the loading rates by the present study based on a regional regression procedure agree well with site-specific estimates for the San Diego Creek watershed for Agricultural and Range land uses. The rate for Barren land uses was estimated to be considerably higher than those of other land uses, which is consistent with the pattern in the local estimates. Quantitatively, however, the present estimate for Barren land uses exceeds the local estimates by a factor of 3~5. One possible reason for this discrepancy is the sensitivity of Barren land uses, which include disturbed, transitional lands such as construction sites, to sediment control and land management measures implemented. Loading from Barren land uses can vary significantly depending on the extent of disturbed lands within a watershed, the length of time disturbed lands are present, and the level of sediment control measures implemented. On this basis, loading rates from Barren land uses are probably best estimated based on site-specific estimates. For sites where local estimates are not

available, such as in the case of the present study, the rates presented in Table 8 can be used to bracket the range of potential loadings.

Results

Sediment loading rates developed from the analysis presented above were applied to the land uses in the Watershed to provide total sediment loading and identify primary source areas. The existing land use distribution within the Watershed was obtained from the EPA BASINS database (EPA, 2001a) as shown in Figure 3. Table 9 summarizes the results of sediment loadings from the Watershed into the Lagoon by erosional land uses.

Table 9 Lagoon Sediment Loading

LAND USE	AGRICULTURAL	RANGE	BARREN	FOREST	TOTAL
Area (acre)	1,743	1,300	421	103	3,567
%Total Watershed	15.6	11.6	3.8	0.9	32
Loading (m^3/yr)	11,155	2,990	13,893[1]	865	28,903

(1) Based on estimate from San Diego Creek Watershed (OCPFRD, 2000)

The results in Table 9 indicate that the Watershed discharges an annual total of approximately 28,900 m^3 of sediment into the Lagoon. Barren land uses contribute the greatest amount of sediment into the Lagoon, followed closely by Agricultural land uses. Contributions from Range and Forest land us es appear to be relatively small due, respectively, to the relatively low loading rate from range lands and small acreage of forest present in the Watershed. The primary Source Areas for sediment in the Lagoon are, therefore, areas designated as Barren and Agricultural land uses in Figure 3.

It should be noted that, although urban land uses were not considered as erosional land uses in the present study, the runoff associated with urban land uses can contain small amounts of fine-grained sediment that can add to the total sediment loading that reaches the Lagoon. This potential additional sediment load was considered negligible for the present study.

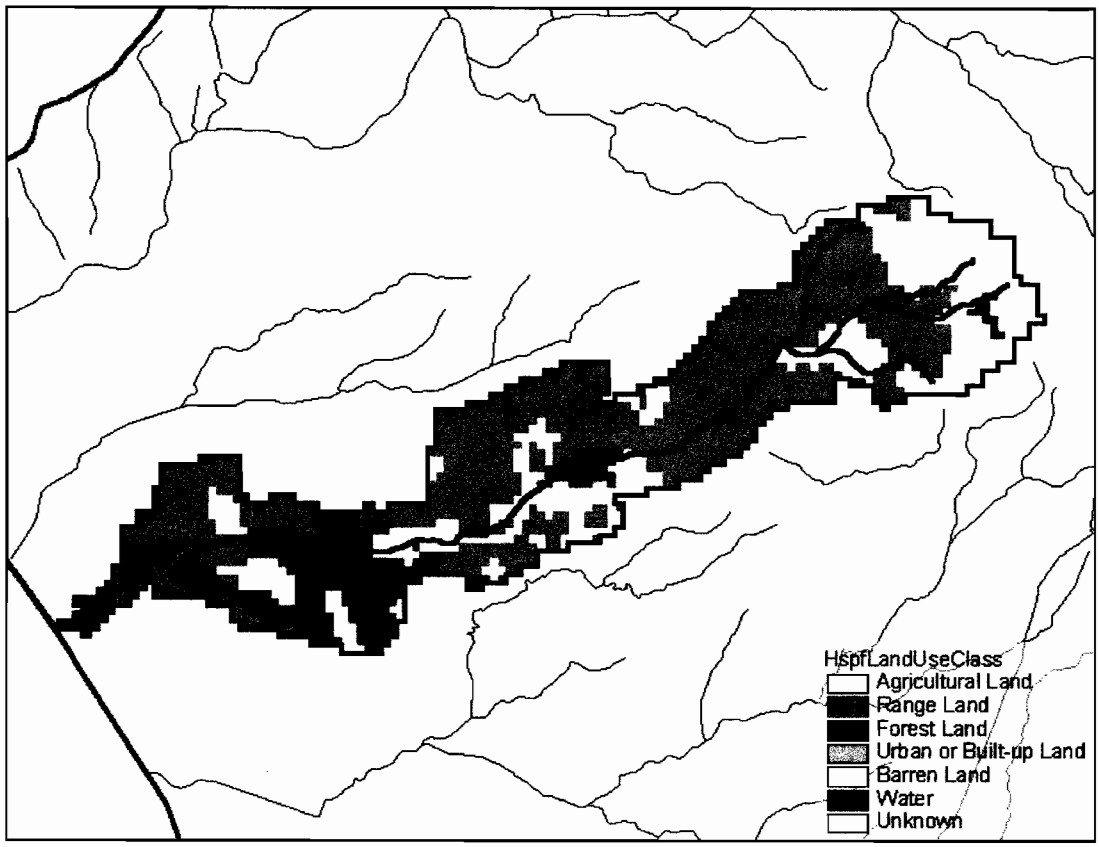


Figure 3 Buena Vista Watershed Land Use Distribution

Comparison with Prior Studies

Sediment loading from the Watershed through the Creek into the Lagoon was previously estimated by Applegate (1985) and Chang (1986) using different methods. The studies provided divergent results of sediment loading into the Lagoon, with approximately 58,140 m^3/yr predicted by Applegate (1985) versus approximately 5,000 m^3/yr provided by Chang (1986). The order-of-magnitude difference in loading estimates resulted in uncertainty as to the actual sedimentation conditions in the Creek-Lagoon system. One major reason for the uncertainty in sediment loading estimates is the nearly total lack of data for calibrating the analyses. The Watershed is essentially ungauged. The bathymetry of the Lagoon has not been surveyed in a manner that permits calculation of the amount of historical sediment deposition in the Lagoon that would provide a basis for estimating sediment loading from the Creek.

Although there is no reliable basis for determining the actual sediment loading, the Applegate (1985) estimate is probably on the high side based on observation of sediment accumulation indicators (e.g., shoals) in the I5 Basin. On the other hand, the Chang (1986) estimate implies relatively insignificant Lagoon sedimentation compared

with other streams in the region and this seems inconsistent with the view of the RWQCB. The RWQCB has determined that there is a sedimentation problem in the Lagoon and that the sediment originates from upland sources in the Watershed (RWQCB, 1998). On this basis, the sediment loading of developed under the present study represents an estimate somewhere between the prior sediment loading estimates.

The sediment loading estimates in the present study are based on a relatively limited data set (*i.e.,* component streams/watersheds). Refinement of the regression model through inclusion of more regional data points would assist in providing more accurate estimates for land use-specific loadings. Local land use-based mass loading monitoring analogous to the NPDES stormwater monitoring program conducted under RWQCB for the City of San Diego, San Diego County, San Diego Unified Port District, and 17 other cities as co-permittees would allow further improvement on loading estimates.

Creek Erosion

Creek erosion (channel down-cutting) has been one of the historical concerns in the Watershed. One of the reasons for the concern is that it represents a source of sediment that would be carried downstream and discharged into the Lagoon.

The most significant reported erosion events occurred during the period of late 70's and early 80's. Severe down-cutting along portions of the channel was observed during the period. Since then, stormwater detention facilities were constructed in the Watershed to reduce the peak flows. No significant erosion event was subsequently reported based on available record

Although severe erosion was reported during the earlier period, there was no evidence that the eroded sediment was transported all the way into the Lagoon rather than deposited along the downstream portions of the Creek. The delivery ratio of eroded material is rarely unity as discussed previously. In a stream, the actual amount of material delivered downstream largely depends on the carrying capacity of the stream flow, which varies along the stream.

Chang (1986) analyzed erosion in the Creek using the Fluvial model (Chang, 1984). It was determined that the Creek erodes at 33, 222, and 1,377 m^3/yr for 10, 25, and 100 year floods, respectively. Since Fluvial is a bed-load model that predicts transport of the sand fraction of the bed material only, the corresponding total load of erosion is estimated to be approximately 330, 2,220, and 10,377 m^3/yr for 10, 25, and 100 year floods based on a 10% sand composition. Given the fact that an average annual discharge approximately corresponds to a 2~3-year event, discharge of sediment due to erosion in the Creek is not expected to be significant based on these estimates. In other words, the sediment loads that discharge into the Lagoon is expected to be predominantly derived from source areas in the Watershed as opposed to creek ersosion.

3.2 Nutrients

Method

Nutrient loadings into the Lagoon and potential sources in the Watershed were analyzed based on a regional watershed nutrient loading analysis. The regional watershed nutrient loading analysis was performed based on data of stream flows, nutrient loadings and land uses from a group of watersheds in the general coastal region centering around the study area. The nutrient loadings from the selected watersheds were determined based on data from stream nutrient and flow monitoring programs conducted by the USGS (USGS, 2002a, b) and correlated with land uses by a regression analysis. The analysis yielded a regional loading estimator that is capable of providing total and land use-specific loadings from any typical watershed in the region on an average basis. The loading estimator was then applied to the Watershed to determine nutrient loading through the Creek and land use-specific loadings in the Watershed.

Analysis

A total of eight coastal streams in the general geological province of the Peninsular Ranges that encompasses the study area and extends approximately from just north of Santa Ana River to the Mexican border were selected to represent nutrient export characteristics of the region. The component streams for the regional analysis were selected based on availability of long-term continuous flow data and consistency with those used in the sediment loading analysis. Table 10 shows the selected component streams, stations in the streams where loading analysis was performed, watershed drainage areas above the stations, and the levels of upstream regulation (*e.g.*, dams).

Table 10 Component Streams for Regional Nutrient Loading Analysis

STREAM	STATION	USGS STATION	DRAINAGE (SQ. MILE)	REGULATION[1]
San Dieguito River	Del Mar	11030500	338	Extensive
San Diego River	Santee	11022500	377	Extensive
San Diego Creek	Culver	11048500	42	Extensive
San Juan Creek	San Juan Capistrano	11046500	106	Moderate
San Luis Rey River	Oceanside	11042000	557	Moderate
Santa Margarita River	Ysidora	11046000	723	Moderate
Sweetwater River	Descanso	11015000	45	Natural
Santa Ana River	Santa Ana	11078000	1,700	Extensive

(1) Inman and Jenkins (1999)

The composition of the levels of upstream regulation of the component streams roughly reflects the characteristics of watershed development in the region. Unlike the sediment analysis presented previously, in-stream nutrient loads are not available from either existing studies or the USGS database for the streams considered for analysis. Therefore, it was necessary to first develop nutrient loads for each of the streams before applying the method of regional regression. Nutrient loads from the component streams were determined by developing the regional nutrient rating curves for total N and total P and applying the rating curves to long-term flow records in each of the component streams.

Nutrient monitoring data for a number of streams in the region are available from the USGS database (USGS, 2002a). The measurements were conducted over different periods in the last few decades with simultaneous flow measurements. Although various agencies have conducted nutrient sampling in the regional streams, no simultaneous flow data were collected. This is also the case with the STORET database maintained by EPA (which no longer stores historical data from the USGS). The lack of simultaneous flow measurements essentially renders the nutrient data useless for loading calculations. On this basis, only the USGS data were used for the determination of regional nutrient rating curves. Table 11 lists the streams and stations where simultaneous nutrient and flow measurements are available.

Table 11 Streams for Regional Rating Curve Development

STREAM	STATION	USGS STATION
Santa Margarita River	Ysidora	11046000
Santa Margarita River	Fallbrook	11044500
San Luis Rey River	Oceanside	11042000
San Luis Rey River	Bonsall	11041000
San Luis Rey River	Monserate Narrows	11040000
San Diego River	Old Mission Dam	11022490
Bubble-Up Creek	Pala	11039600
Sweetwater River	Descanso	11015000
Tecolote Creek	San Diego	11078000

The simultaneous nutrient and flow measurements from these stations were extracted from the USGS database. Total N and P in each of the samples were calculated from component compounds when the totals are not provided. Since not all samples contain the complete suite of component compounds to permit calculation of the totals, samples with the majority of the component compounds measured were included to provide approximate totals so as to increase the number of data points. For example, the sum of dissolved nitrite-N, dissolved nitrate-N, total ammonia-N, and total organic-N was used as total N for the Santa Margarita River at Ysidora.

It has been widely established that an approximately linear relation exists between the logarithm of nutrient concentration and logarithm of flow discharge (*e.g.* Cohn et al., 1989). This permits the development of a simple rating curve that correlates constituent concentration with flow discharge. Since constituents in streams are generally much less frequently measured than flows, a rating curve can be used to provide continuous estimates of concentrations given continuous flow measurements. The usefulness of a rating curve is especially apparent in the case of ungauged or infrequently gauged streams when estimates of constituent loadings are required.

The logarithms of total N and total P data processed from the USGS data were regressed with the logarithm of daily mean stream flows. The bias inherent in the retransformation of the logarithm regression (Cohn, 1995; Koch and Smillie, 1986) was corrected using the method of Furguson (Furguson, 1986). Figures 4 and 5 present the rating curves for total N and total P for the region.

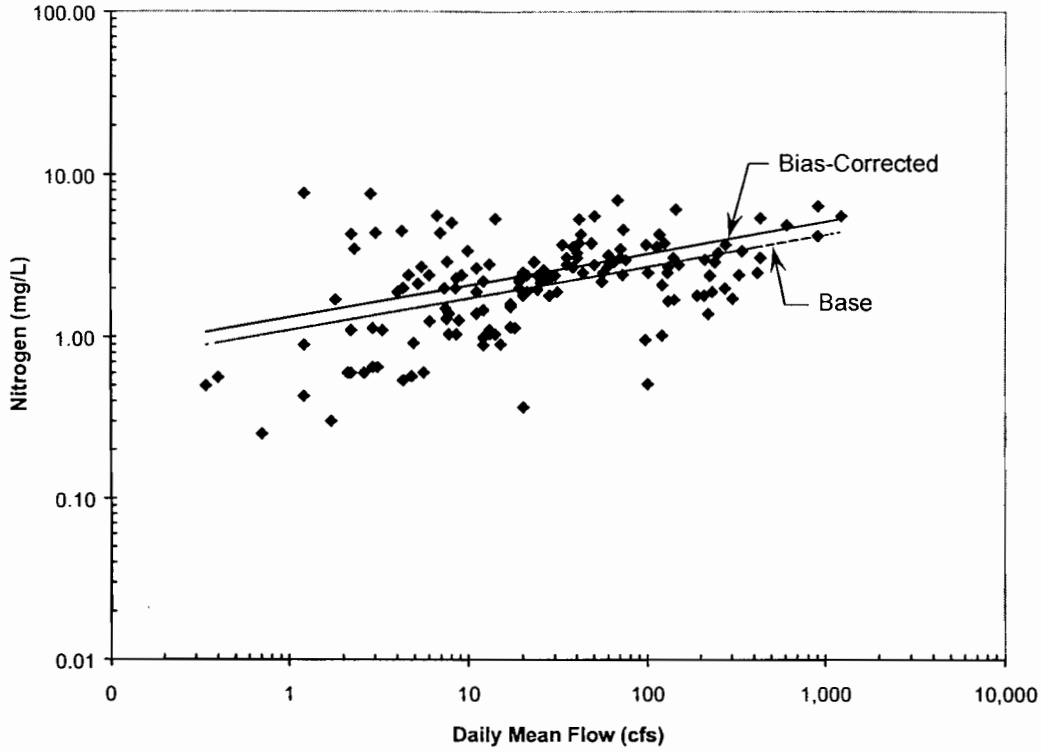


Figure 4 Regional Total Nitrogen Rating Curve

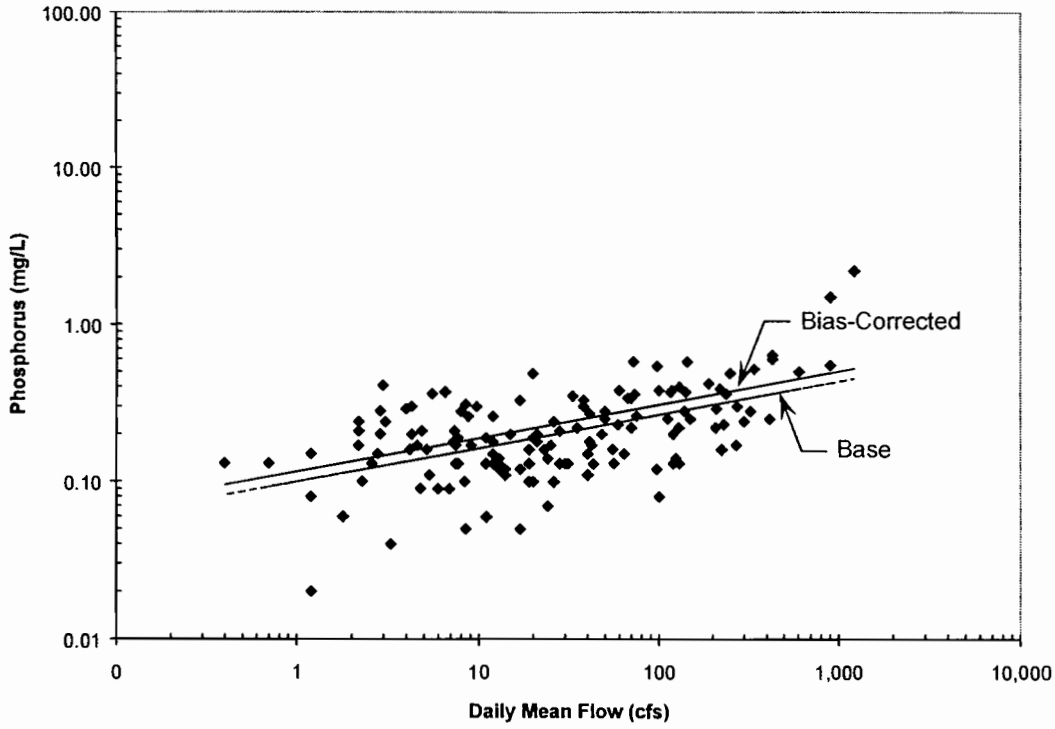


Figure 5 Regional Total Phosphorus Rating Curve

The rating curves for total N and total P determined were applied to the long-term continuous daily mean flow measurements in the streams listed in Table 10 to provide long-term continuous loading records for these streams. A total of ten years of flow records were used for most of the streams, which produced corresponding loading records of equal length. The continuous loads were then summed to provide total annual loads for the individual streams.

Table 11 shows the nutrients loads for the eight streams together with five types of primary land use acreages in the respective watersheds. The acreages of the land uses above the measuring stations were obtained from the EPA BASINS land use database (EPA, 2000).

Table 12 shows the nutrient loads per acre of drainage areas for the eight streams together with the five types of land use areas as percentages of total drainage areas in the respective watersheds. These values were obtained by normalizing the values in Table 11 by total drainage areas in the respective watersheds.

The normalized (per-acre) nutrient loads in the last two columns of Table 12 were correlated with the five types of normalized (percent) land uses in Columns 2-5 using multiple linear regression in the form of load equal to the sum of products between the land use percentages and corresponding loading rates. The regression coefficients thus determined represent estimates of regional loading rates for the five types of land uses. Table 13 shows the loading rates.

Since there has been a paucity of long-term land use-based loading monitoring data in the region and nationwide in general, direct verification of the loading rate estimates can not be reliably made. As an indirect verification of the estimates, the nutrient loading rates were divided by the sediment loading rates by land use to provide potency factors for the individual land uses. These potency factors were compared with those provided in EPA (1977) as shown in Table 14. Comparison of the data in Table 14 indicates that the potency factors determined based on nutrient and sediment loadings compare well qualitatively with literature ranges.

For urban areas, the present study estimates a total P loading rate of 0.00076 tons/acre/yr compared with approximately 0.00064 tons/acre/yr for residential and commercial lands provided by the EPA Nationwide Urban Runoff Program (NURP) database (EPA, 1983). Assuming a typical N/P ratio of 10, the latter gives a total N loading rate of 0.0064 tons/acre/yr, which compares fairly well with 0.0079 tons/acre/yr estimated by the present study. It is also worth noting that the present study predicts a higher loading rate from agricultural lands than from urban lands, which is consistent with values provided in EPA (2001).

Table 11 Nutrient Loads and Land Use Acreages

Stream	Land Use (acre)					Load (ton/yr)	
	Agricultural	Range	Barren	Urban/ Build-Up	Forest	Total N	Total P
San Dieguito River at Del Mar	42,212	108,670	1,677	13,547	44,341	10.6	1.0
San Diego River at Santee	8,198	174,197	3,939	28,265	32,204	136.1	12.7
San Diego Creek at Culver	8,016	10,690	1,455	5,734	335	47.6	4.4
San Juan Creek at San Juan Capistrano	9,737	56,825	1,568	1,179	5,724	74.9	7.1
San Luis Rey River at Oceanside	72,844	200,890	3,509	12,169	67,089	153.5	14.4
Santa Margarita River at Ysidora	90,260	346,237	8,340	12,862	32,091	431.9	41.4
Sweetwater River at Descanso	1,970	18,631	0	506	7,958	48.5	4.5
Santa Ana River at Santa Ana	194,763	431,967	25,481	218,243	203,003	961.8	92.9

Table 12 Nutrient Loads and Land Use Acreages

Stream	Land Use (% total drainage)					Load ($10^{-3}M^3$/acre/yr)	
	Agricultural	Range	Barren	Urban/ Build-Up	Forest	Total N	Total P
San Dieguito River at Del Mar	20.0	51.4	0.8	6.4	21.0	0.050	0.005
San Diego River at Santee	3.2	69.9	1.6	11.3	12.9	0.546	0.051
San Diego Creek at Culver	30.4	40.6	5.5	21.8	1.3	1.807	0.169
San Juan Creek at San Juan Capistrano	13.0	75.7	2.1	1.6	7.6	0.998	0.095
San Luis Rey River at Oceanside	20.0	55.3	1.0	3.4	18.5	0.423	0.040
Santa Margarita River at Ysidora	18.3	70.3	1.7	2.6	6.5	0.877	0.084

Table 12 Cont.

STREAM	LAND USE (% TOTAL DRAINAGE)					LOAD ($10^{-3}M^3$/ACRE/YR)	
	AGRICULTURAL	RANGE	BARREN	URBAN/ BUILD-UP	FOREST	TOTAL N	TOTAL P
Sweetwater River at Descanso	6.8	64.1	0.0	1.7	27.4	1.669	0.156
Santa Ana River at Santa Ana	17.9	39.7	2.3	20.1	18.7	0.884	0.085

Table 13 Loading Rates by Land Uses

LAND USE	LOADING RATE (TON/ACRE/YR)	
	TOTAL N	TOTAL P
Agricultural	0.0121	0.0011
Range	0.0162	0.0015
Barren	0.1199	0.0111
Urban/Build-Up	0.0079	0.0008
Forest	0.0261	0.0024

Table 14 Potency Factor Comparison

LAND USE	POTENCY FACTOR (%)			
	PRESENT STUDY		EPA (1977)	
	TOTAL N	TOTAL P	TOTAL N	TOTAL P
Agricultural	0.19	0.017	0.10~0.25[1]	0.003~0.140[1]
Range	0.70	0.065	0.05~2.69[2]	0.022~0.450[2]
Barren	0.11	0.010		
Forest	0.31	0.029		

(1) For corn, wheat, and cotton based on continuous sampling.
(2) For pasture, alfalfa and brome grass based on continuous sampling.

Results

Nutrient loading rates developed from the analysis presented above were applied to the land uses in the Watershed to provide total nutrient loadings and identify primary source areas. For consistency with the use of local sediment loading estimate for Barren land uses, the regional N and P loading rates for Barren land uses were scaled by the regional potency factor for Barren land uses (Table 14) to provide corresponding local estimates. The existing land use distribution within the Watershed is shown in Figure 3. Table 15 summarizes the results of nutrient loadings from the Watershed into the Lagoon by land uses.

Table 15 Lagoon Nutrient Loading

LAND USE	AGRICULTURAL	RANGE	BARREN	URBAN/ BUILD-UP	FOREST	TOTAL
Area (acre)	1,743	1,300	421	6,609	103	10,176
%Total Watershed	15.6	11.6	3.8	59.1	0.9	91
Total N Loading (ton/yr)	21.1	21.1	15.7	52.2	2.7	112.7
Total P Loading (ton/yr)	1.9	2.0	1.4	5.0	0.2	10.6

The results in Table 15 indicate that the Watershed discharges annual totals of approximately 113 and 11 tons of total N and total P into the Lagoon, respectively. These amounts are relatively high compared with other smaller streams, which is consistent with the eutrophic tendencies historically observed in the Lagoon. Urban and Build-Up land uses contribute the greatest amounts of nutrients into the Lagoon, followed by Agricultural and Range land uses. Contribution from Forest land uses appears to be relatively small due to the relatively small acreage of forest present in the Watershed. The primary Source Areas for nutrients in the Lagoon are, therefore, areas designated as Urban/Build-Up, Agricultural, and Range land uses in Figure 3.

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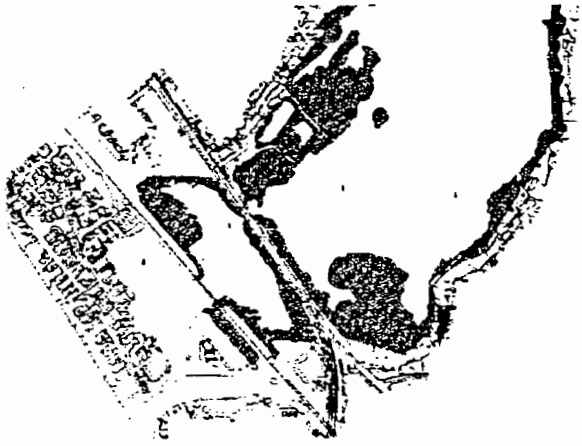
STA LAGOON LAND MANAGEMENT PLAN ELEMENTS

Lagoon Bathymetry, Water Quality, Biological Analysis, and Soils Analysis



West and central basins of Buena Vista Lagoon

by

COASTAL ENVIRONMENTS
2166 Avenida de la Playa
La Jolla, CA 92037

for

Buena Vista Lagoon Foundation
P.O. Box 520
Vista, CA 92085

Sediment sampling with tripod drill

COASTAL ENVIRONMENTS
2166 Avenida de la Playa
La Jolla, CA 92037

15 December 2000
CE Reference No. 00-02

BUENA VISTA LAGOON LAND MANAGEMENT PLAN ELEMENTS

LAGOON BATHYMETRY, WATER QUALITY, BIOLOGICAL ANALYSIS, AND SOILS ANALYSIS

by

COASTAL ENVIRONMENTS
2166 Avenida de la Playa
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for

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2166 Avenida de la Playa
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15 December 2000
CE Reference No. 00-02

BUENA VISTA LAGOON LAND MANAGEMENT PLAN ELEMENTS

WATER QUALITY

by

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BUENA VISTA LAGOON MANAGEMENT PLAN ELEMENTS

WATER QUALITY

1.0 INTRODUCTION

This study characterizes the current water quality conditions in the lagoon and establishes a sampling design and protocol for future monitoring. Measurements were made at six stations in the lagoon between June 1999 and November 1999. The 1999 water quality program was for a short period of time and did not cover all the seasons. Historical data from previous studies are included in this report to provide more information about the water quality in the lagoon. Historical studies and the current study indicate there are significant differences in water quality conditions between the four lagoon basins (Weir Basin, Railroad Basin, Central Basin, and Eastern Basin). Differences have been attributed to inflow from Buena Vista Creek, historical accumulation of sludge and plant detritus, recycling of nutrients, local urban and stormwater runoff, and sediment deposition.

2.0 SAMPLING DESIGN AND PROTOCOL

A total of six permanent water quality sampling stations were located in the open water area of the lagoon: one in the Weir Basin; one in the Railroad Basin; two in the Central Basin; and two in the East Basin (Figure 1). These stations were selected to represent large segments of the lagoon. Station locations were chosen to correspond to other existing historical water quality testing stations (e.g., Carpelan, 1960).

Each station was sampled monthly (from June 1999 to November 1999) for temperature, salinity, pH, and Dissolved oxygen (DO), and bi-monthly for:

Biological Oxygen Demand
Turbidity
Total Nitrogen (N) (total inorganic nitrogen + organic nitrogen)
Total Inorganic Nitrogen (nitrate + nitrite + ammonia N)
Total Phosphate Phosphorus (P)
Orthophosphate Phosphorous
Ammonia
Total and Fecal Coliform and Enterococcus

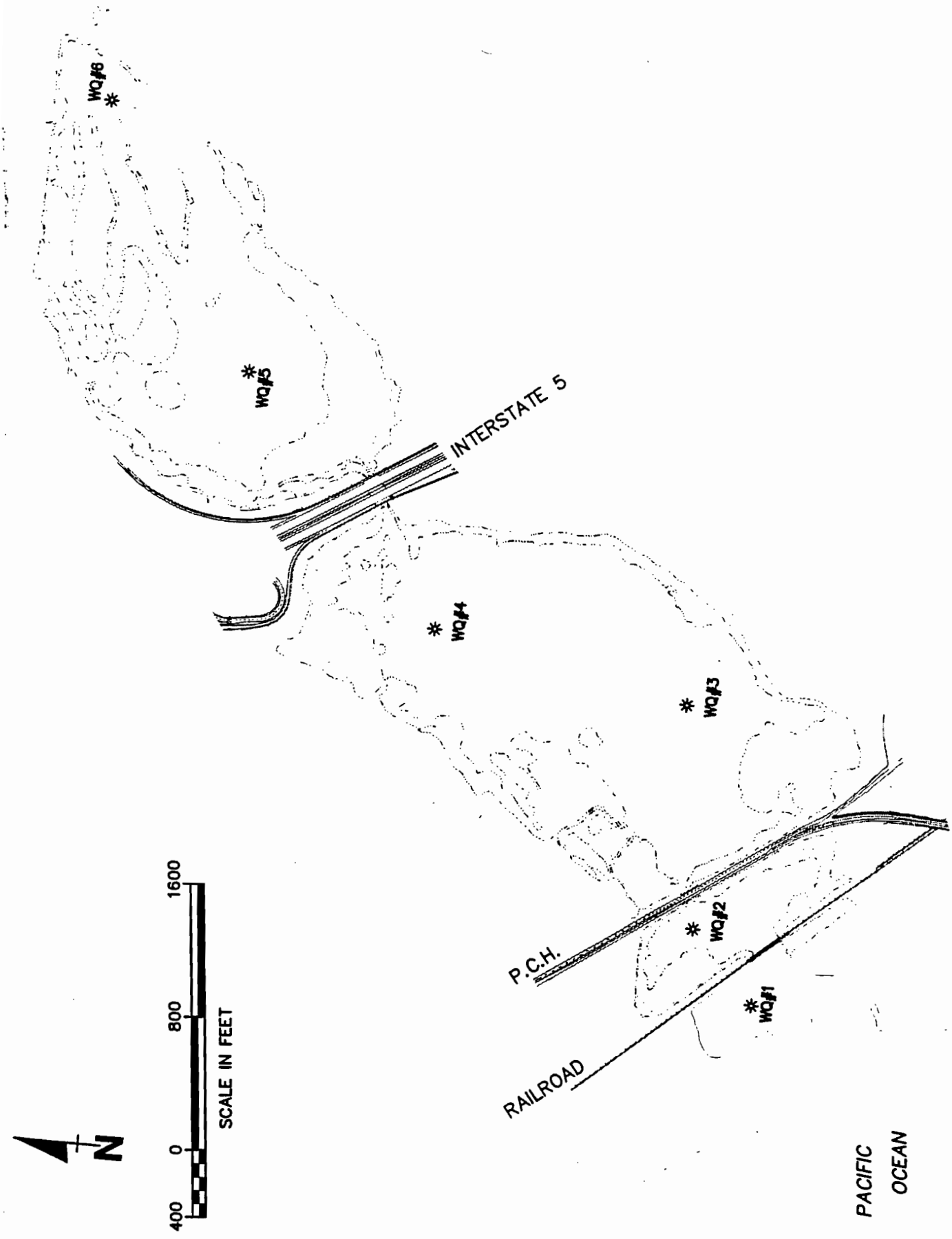

Figure 1. Location of water quality stations.

Water quality measurements were made in the field from a small two-man kayak. Temperature, salinity, pH, and DO were measured electronically in the field, using a YSI (#85) DO/temperature/salinity/conductivity meter. Prior to each survey, the YSI instrument was calibrated. These parameters were recorded near the surface and near the bottom. Other parameters required samples of water for laboratory analyses. The water analysis was performed by a certified laboratory (Pat-Chem Laboratories, 4805-B Mercury St, San Diego, CA 92111). The results of their analysis is presented in Appendix B. Due to the shallowness of the lagoon, all water samples were collected at the surface in approximately 0.5 ft depth of water. To account for diurnal differences in concentrations of dissolved oxygen due to plant photosynthesis and respiration, the surveys were conducted between 0600 and 0900 hours.

3.0 WATER QUALITY CHARACTERISTICS FROM THE RECENT MEASUREMENTS

Monthly surveys were conducted during September and November. Bi-monthly surveys taken from the lagoon were conducted during June, July (extra), August, and October.

Results of all water quality measurements taken monthly are presented in Table 1. Results of chemical analyses of water samples taken bimonthly are presented in Table 2. These data are summarized as mean values and ranges for each parameter by basin in Table 3.

The data did not cover the wet season (November to April), therefore, it may not be used to describe seasonal changes in the lagoon.

The monitoring period occurred during the dry season, and little to no rainfall occurred in San Diego County. The coastal zone had below normal air temperatures and increased cloud conditions due to a strong 1999 La Nina period. The only inflow to the lagoon was from non-point source urban runoff. No tidal exchange occurred. However, during the study period, the water level in the lagoon twice rose approximately 12 in. above the elevation of the weir, due to accumulation of urban runoff (Figure 2) and the presence of a sand berm at the mouth of the lagoon. Accumulation of water ceased briefly when the inlet was opened on about 10 July 1999 and again on about 30 October 1999. Since the water level in the lagoon continued to rise throughout the study period, the evaporation rate did not exceed the accumulation rate. Consequently, no comparisons can be made to the historical data of Purer (1942) where salinities ranged from fresh (2 ppt) to hypersaline (64 ppt) levels. Salinity concentrations within the lagoon did, however, resemble the more current data of Carpelan (1958 - 1959) and Peters *et al.* (1979 - 1983), where salinity values remained below 5 ppt for the majority of the time. Historical data are summarized in Appendix A.

Dissolved oxygen measurements within the lagoon showed large fluctuations in the West and Central Basins, where concentrations dropped below safe levels (i.e., below 2.0 mg/l), especially in the Railroad Basin from July through October and the eastern Central Basin during September and October. The East Basin exhibited some variability in dissolved oxygen concentrations, but concentrations remained above safe levels. This variability may have been partly due to the unique

Table 1. Results of water quality measurements taken in Buena Vista Lagoon, June through October 1999.

Data obtained from a YSI 85 hand held meter

Date	Station	D.O.		Salinity		Temperature	
		Surface	Bottom	Surface	Bottom	Surface	Bottom
6/16/1999	1	2.99	0.74	5.9	8.5	22.2	22.2
7/12/1999	1	5.77	1.67	1.7	1.7	26.2	26.0
8/16/1999	1	8.49	7.16	3.1	3.1	24.1	24.4
9/17/1999	1	6.50	6.15	2.9	2.9	22.1	22.2
10/25/1999	1	8.56	8.45	2.7	2.7	20.0	20.1
6/16/1999	2	7.47	6.99	2.6	2.6	22.4	22.4
7/12/1999	2	3.72	0.03	1.7	1.7	24.9	24.1
8/16/1999	2	0.67	0.11	2.0	2.0	22.6	22.6
9/17/1999	2	0.24	0.04	2.1	2.2	20.5	20.5
10/25/1999	2	0.45	0.07	2.4	2.4	18.6	18.9
6/16/1999	3	5.25	5.88	1.8	1.8	22.2	22.2
7/12/1999	3	10.42	0.83	1.6	1.7	24.5	23.7
8/16/1999	3	4.61	3.00	2.0	2.0	22.1	22.2
9/17/1999	3	2.44	1.91	2.2	2.2	20.6	20.6
10/25/1999	3	4.35	4.04	2.4	2.4	19.4	19.5
6/16/1999	4	4.13	3.94	1.8	1.8	22.2	22.2
7/12/1999	4	13.49	0.17	1.8	1.9	25.2	23.2
8/16/1999	4	8.56	4.35	2.1	2.1	23.5	23.7
9/17/1999	4	0.23	0.05	2.3	2.3	21.3	21.3
10/25/1999	4	1.42	0.79	2.3	2.3	18.6	18.6
6/16/1999	5	7.11	7.23	1.3	1.3	21.9	22.0
7/12/1999	5	3.99	4.04	1.7	1.7	25.9	25.8
8/16/1999	5	3.69	3.93	2.1	2.1	22.9	23.0
9/17/1999	5	4.79	4.71	2.1	2.1	20.4	20.4
10/25/1999	5	7.82	7.39	1.8	1.8	17.0	17.1
6/16/1999	6	4.63	4.34	1.3	1.3	21.7	21.8
7/12/1999	6	9.80	6.37	1.4	1.4	24.5	23.8
8/16/1999	6	7.46	5.26	1.4	1.5	23.0	22.8
9/17/1999	6	5.18	3.42	1.4	1.4	20.6	20.5
10/25/1999	6	7.43	7.37	1.6	1.6	17.1	18.8
Mean		**5.39**	**3.68**	**2.1**	**2.2**	**21.9**	**21.8**

Table 2. Results of analytical chemistry measurements of water samples collected in Buena Vista Lagoon, June through October 1999.

Buena Vista Water Quality Sampling

Data analyzed at Pat-Chem Laboratories using standard EPA methods

Sample Date	Station	pH	T.K.N	Ammonia	Nitrate	Nitrite	BOD	Ortho P.	T. Phosphorous	Turbidity	Total Coliform	Fecal Coliform	Enteroccus
6/16/99	1	8.6	0.53	0.18	0.80	0.10	5	<0.5	0.30	2.5	80	8	N/A
7/12/99	1	8.9	1.48	0.07	0.02	0.02	5	0.04	0.05	8.9	130	4	2
8/16/99	1	9.0	1.99	0.12	0.02	0.02	7	0.02	0.02	3.4	240	7	2
9/17/99													
10/25/99	1	8.9	1.76	0.13	0.25	0.03	5	0.12	0.12	8.4	1600	90	2
6/16/99	2	8.0	0.51	0.08	0.60	0.10	6	<0.5	0.30	1.8	240	12	N/A
7/12/99	2	9.0	1.65	0.06	0.02	0.02	5	0.02	0.02	3.7	280	8	2
8/16/99	2	8.2	1.59	0.13	0.02	0.02	5	0.02	0.02	4.7	900	2	2
9/17/99													
10/25/99	2	7.5	1.37	0.08	0.51	0.03	5	0.10	0.10	1.6	1600	1600	22
6/16/99	3	10.1	0.43	0.20	0.50	0.10	5	<0.5	0.30	0.5	4	12	N/A
7/12/99	3	9.8	1.71	0.06	0.02	0.02	5	0.02	0.02	10.2	4	2	2
8/16/99	3	9.7	1.44	0.09	0.02	0.02	5	0.02	0.02	0.7	13	2	8
9/17/99													
10/25/99	3	9.0	1.35	0.12	0.10	0.02	5	0.08	0.08	11.0	900	50	30
6/16/99	4	9.3	0.46	0.05	0.60	0.10	5	<0.5	0.30	0.9	130	2	N/A
7/12/99	4	9.2	4.33	0.20	0.02	0.02	5	0.02	0.02	1.3	8	2	2
8/16/99	4	9.4	1.46	0.12	0.02	0.02	5	0.02	0.02	0.6	50	50	30
9/17/99													
10/25/99	4	7.8	1.23	0.14	0.09	0.03	5	0.13	0.13	1.3	900	300	80
6/16/99	5	7.9	1.10	0.75	0.50	0.10	5	<0.5	0.40	7.7	30	8	N/A
7/12/99	5	8.2	1.63	0.06	0.02	0.02	6	0.12	0.12	14.6	240	130	2
8/16/99	5	8.1	1.69	0.13	0.02	0.02	6	0.02	0.02	5.5	23	33	33
9/17/99													
10/25/99	5	8.5	1.32	0.09	0.25	0.02	5	0.24	0.24	12.5	50	50	22
6/16/99	6	7.7	0.62	0.26	0.50	0.10	5	<0.5	0.30	1.9	300	70	N/A
7/12/99	6	7.9	1.97	0.05	0.02	0.02	5	0.02	0.02	1.6	500	130	2
8/16/99	6	8.2	1.80	0.11	0.02	0.02	5	0.02	0.02	0.9	900	2	2
9/17/99													
10/25/99	6	8.1	1.74	0.11	0.25	0.02	5	0.36	0.36	10.4	50	50	4
Average		8.6	1.47	0.14	0.22	0.04	5	0.08	0.14	4.9	382	109	14

no chem analysis

equals test for phosphate as P, where others are Orthophosphate, sample dropped for analysis

Note: the sample date 6/16/99. Detection levels were set too high for Nitrit. ..h for Phosphorus measurements.

The last two dates the limits were dropped from mg/l to micrograms/l

Table 3. Mean values of all water quality parameters measured in Buena Vista Lagoon, June through October 1999 by basin.

MEASUREMENT	BASIN			AVERAGE (MEAN + RANGE)
	West	Central	East	
BOD (mg/l)	5.3	5.0	5.11	5 (<5 – 7)
PH (units)	8.5	9.3	8.0	8.6 (7.5 –10.1)
Turbidity (NTU)	4.3	3.3	6.9	4.9 (0.6 – 14.6)
Temperature surface (°C)	22.4	22.0	21.5	21.94 (17.0 – 26.2)
Temperature bottom (°C)	22.3	21.7	21.6	21.89 (17.1 – 26)
Salinity surface (ppt)	2.7	2.0	1.6	2.12 (1.3 – 5.9)
Salinity bottom (ppt)	3.0	2.0	1.6	2.22 (1.3 – 8.5)
Dissolved Oxygen surface (mg/l)	4.49	5.49	6.19	5.39 (0.23 – 5.39)
Dissolved Oxygen bottom (mg/l)	3.14	2.50	5.41	3.68 (0.03 – 8.45)
Orthophosphate (mg/l)	0.05	0.05	0.13	0.077 (0.02 – 0.36)
Total Phosphorus (mg/l)	0.12	0.11	0.19	0.138 (0.02 – 0.4)
Nitrate (mg/l)	0.28	0.17	0.20	0.22 (<0.02 – 0.8)
Nitrite (mg/l)	0.04	0.04	0.04	0.04 (<0.02 – 0.03)
TKN (mg/l)	1.36	1.55	1.48	1.47 (0.43 - 4.33)
Ammonia (mg/l)	0.11	0.12	0.20	0.14 (<0.05 – 0.75)
Total Coliform (mpn/100mls)	634	251	262	382 (<4 - ≥ 1600)
Fecal Coliform (mpn/100 mls)	216	51	59	109 (< 2 ≥ 1600)
Enterococcus (mpn/100 mls)	5	25	11	13.8 (<2 – 80)

Note: Means were calculated using numbers within the detection limits. Numbers reported below the detection limits are shaded in gray in the above table. For numerical calculations only, those numbers were assumed to equal the detection limit. Detection limits for nitrate, nitrite, and total phosphorus, were lowered after the 6/16/99 sample date from 0.1mg/l, 0.1mg/l, and 0.05mg/l, to 0.02 mg/l for all three. Ammonia detection limits were raised from 0.02 mg/l to 0.05 mg/l after the 6/16/99 sample date. Phosphate as P was dropped and not included in the mean after the first sample date and replaced with orthophosphate with a detection limit of 0.02 mg/l.

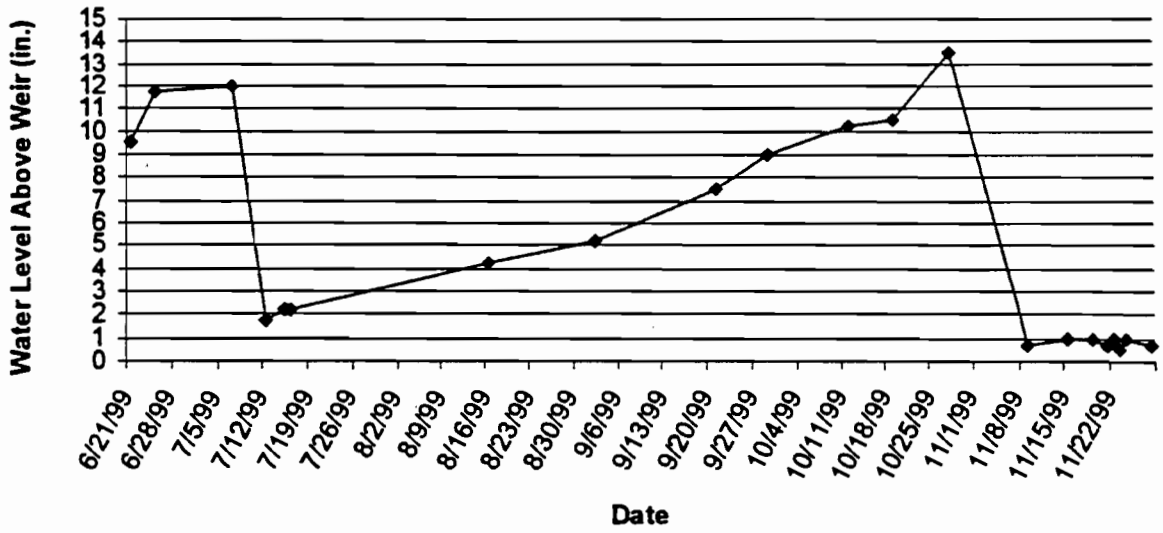

Figure 2. Changes in water level above the weir at Buena Vista lagoon during 1999.

conditions associated with the locations of the water quality stations sampled in the East Basin. Station 5 is located in very shallow water (i.e., 1.5 ft), and Station 6 is located in deep water with little submerged vegetation, near the terminus of Buena Vista Creek. In contrast, dissolved oxygen levels in the bottom water at Stations 1- 4, which exhibited large stands of submerged aquatic vegetation, were significantly lower than levels in the surface waters.

Water temperature varied throughout the lagoon. Small differences in temperatures between sampling stations were observed, but this was usually only about 1 to 2 degrees. These differences are probably related to differences in station characteristics, e.g., water depth and amount of submersed vegetation. Temperature differences within stations, i.e., surface and bottom water, were minimal because measurements were made early in the morning before any thermocline would have developed. Differences in temperatures recorded at Stations 5 and 6 are due to extreme shallowness and proximity to the terminus of Buena Vista Creek. It should be noted that even though no measurements were made during the benthic surveys which were conducted throughout the day, a noticeable thermocline was evident at Stations 1 through 4. This thermocline developed during the day and would break down by the next morning. Vertical mixing at these stations was constrained by the presence of submersed aquatic vegetation and a floating alga mat.

Biological Oxygen Demand (BOD) remained low during the entire study period. Only three measurements were above the detection limits, and they were still within 2 mg/l of the 5 mg/l detection limit. Previous studies by Carpelan (1960) and Peters *et al.* (1985) show similar results. High BOD does not appear to occur in the system.

pH measurements were typical of a freshwater system. Concentrations remained slightly basic until the algal bloom die-off occurred. Then the increase in bacterial activity decreased the pH levels due to acidic waste produced by the bacteria bloom. This occurred at many of the stations when bacterial blooms were present and pH levels tended to drop below the neutral point.

Nutrients were measured at all stations and compared to previous studies in the lagoon (Carpelan, 1960; and Peters *et al.*, 1985). Peters *et al.* reported concentrations of orthophosphate, total phosphorus, total inorganic nitrogen, and total nitrogen. Peters *et al.* also proposed water quality objectives for these nutrients,. Water quality objectives for orthophosphate and total phosphate were proposed as annual objectives, whereas water quality objectives for the nitrogen nutrients were proposed as seasonal objectives for the periods of October-March and April-September.

The mean concentration of orthophosphate for the entire lagoon was 0.07 mg/l. Respective mean concentrations for the West, Central, and East Basins were 0.05, 0.05, and 0.13 mg/l. respectively. Peters *et al.* (1985) measured means of 0.13 mg/l for October-March and 0.09 MG/l for April-September sampling periods. The proposed annual water quality objective for orthophosphate for the entire lagoon was 0.16 mg/l. For the current sampling period, representing the April-September time period, orthophosphate concentrations exceeded the measured values of Peters *et al.* only in the East Basin. No seasonal objective was given, but measured results show the lagoon to be close to the concentrations observed by Peters *et al.* (1985). If this current concentration trend continues during the year 2000, it is likely that the annual objective would be

met for this constituent. The observed concentrations by basin shows that the East Basin had the highest concentrations, probably due to urban runoff and reduced flows through the cattails near the I-5 Bridge.

Peters *et al.* (1985) also reported seasonal measured values and proposed an annual water quality objective for total phosphorus. Their measured seasonal means were 0.28 mg/l for October-March and 0.20 mg/l for April-September, and their proposed annual water quality objective was a mean of 0.25 mg/l. The current survey showed a mean concentration of total phosphorus for the entire lagoon of 0.14 mg/l, and means of 0.12 mg/l, 0.11 mg/l, and 0.19 mg/l for the West, Central, and East Basins respectively. All concentrations were below the values measured by Peters *et al.* (1985), and the overall mean for the lagoon shows that the levels should meet the proposed annual water quality objective. Since little to no rainfall occurred during the sampling period, the first rain, which occurred in December, should have increased those levels significantly. Additional nutrient sampling should be done to complete a full year's survey to document the magnitude of seasonal changes and to enable comparison with the water quality objectives proposed by Peters *et al.* (1985).

Peters *et al.* (1985) were unable to define an annual water quality objective for nitrogen, but instead proposed seasonal objectives based on his observed concentrations. Peters et al. (1985) evaluated total nitrogen, which is comprised of organic and inorganic forms of nitrogen (which includes ammonia, nitrate, and nitrite forms of nitrogen). They observed levels of total inorganic nitrogen for October-March of 1.1 mg/l and of 0.60 mg/l for April-September. The proposed objective for the lagoon was 1.3 mg/l and 0.75 mg/l for the seasonal means respectively. Current sampling results, assuming that all values lower than the detection limit are set at the detection limit, show a mean level of total inorganic nitrogen of 0.13 mg/l, and means for the West, Central, and East Basin of 0.14 mg/l, 0.11 mg/l, and 0.14 mg/l. Levels for the entire lagoon and for each basin were well below the measured values and the seasonal objectives of Peters *et al.*. Peters' total nitrogen measurements for October-March were 2.5 mg/l, and 1.9 for April-September. The objective for the lagoon was put at 2.6 mg/l and 2.1 mg/l for the seasonal means respectively. Current mean concentrations, which include the above nitrogen samples and T.K.N. samples, are 0.46 mg/l for the entire lagoon, and 0.45, 0.47, and 0.48 mg/l for the West, Central, and East Basins respectively.

Since the nitrogen concentrations were low compared to the values reported by Peters *et al.* (1985), this indicates that the current nitrogen nutrient loading within the lagoon during this time period is low. This may be due to the lack of rainfall and runoff into the lagoon. Although concentrations were low, large alga blooms were evident during several of the surveys.

Concentrations of ammonia also are similar to Carpelan's (1960) data collected during 1958-1959, when concentrations were higher during the late winter/early spring. Carpelan (1960) measured concentrations from below 0.05 mg/l to near 0.45 mg/l. Current data show individual levels (not means) of similar quantities from less than 0.05 mg/l to one spike of 0.75 mg/l. [The similarity in ammonia concentrations between the current data and that of Carpelan (1960) and Peters *et al.* (1985) suggests that concentrations have stayed relatively similar for a period of over 30 years.] Both Carpelan (1960) and Peters *et al.* (1985) reported strong seasonality. The water

quality objectives proposed by Peters *et al.* (1985) account for the effects of season on concentrations.

Measurements of bacteria were also made at each station. Bacteria counts remained at safe levels (according to the County Water Body Contact Standards) throughout the lagoon, with the exception of Station 2 in the West Basin on 10/25/99, where the level measured was >1600 for total coliforms and >1600 for fecal coliforms. The County standard is 10,000 for total coliforms and 400 for fecal coliforms.

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APPENDIX A

HISTORICAL WATER QUALITY DATA

APPENDIX A

HISTORICAL WATER QUALITY DATA

Purer (1942) monitored salinity in Buena Vista Lagoon from January 1939 to June 1940. Her data are shown in Figure A-1. Her data exhibit a very large variation in salinity, ranging from 64 - 2 ppt. The salinity value of about 34 ppt in February 1939 decreased dramatically to about 13 ppt in March and 10 ppt in April. The salinity then increased to about 49 ppt in September and 64 ppt in December.. The salinity then took another dramatic decrease to about 14 ppt in January 1940 and 2 ppt in February. The salinity remained below 5 ppt through May 1940. During this period the salinity ranged from 64 - 2 ppt and probably only supported euryecious (i.e., tolerant) species.

Carpelan (1960, 1969) monitored monthly changes in water quality conditions (temperature, salinity, pH, and DO). Measurements were made at three stations located throughout Buena Vista Lagoon from June 1958 to September 1959. During this period, treated wastewater was discharged into the Railroad Basin at a rate of approximately 6,000 m^3 per day. Carpelan data show:

1) Surface water temperature during summer ranged from 25° - 28° C, during winter from 13° - 14° C, and during spring from 19° - 25° C. Between October and November, the average water temperature decreased from 26° to 12° C (Figure A-2).

2) The annual change in salinity ranged from 2.0 to 6.4 ppt (Figure A-3). Salinity increased from August through January (probably due to evaporation) and decreased during February through May (probably from accumulation of stormwater runoff). The maximum and minimum salinities were 5.1 and 2.0 ppt in the East Basin (Station E), 6.4 and 2.7 in the Central Basin (Station C), and 6.4 and 2.6 in the Railroad Basin (Station B).

3) Differences in pH changes between basins. pH in Railroad Basin (Station B) ranged from 6.9 (in February) to 10.5 (in June), pH in the Central Basin ranged from 7.7 (in March) to 10.2 (in June), and in the East Basin from 7.8 (March) to 9.9 (August).

4) Seasonal trends in dissolved oxygen values are shown in Figure A-4 by basin. The lowest concentrations occurred during February - April. There were two peaks of high concentrations: one during July - September and one during December - January.

5) B.O.D. results from 3 samples collected during April (1959) showed a biological oxygen demand of 6 - 7 ppm.

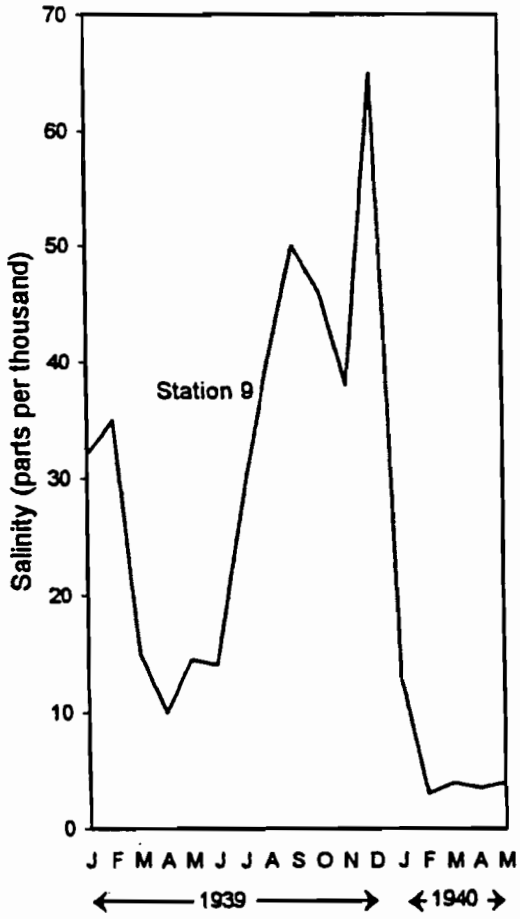

Figure A-1. Salinity of water sampled in Buena Vista Lagoon, January 1939 through May 1940 (from Purer 1942).

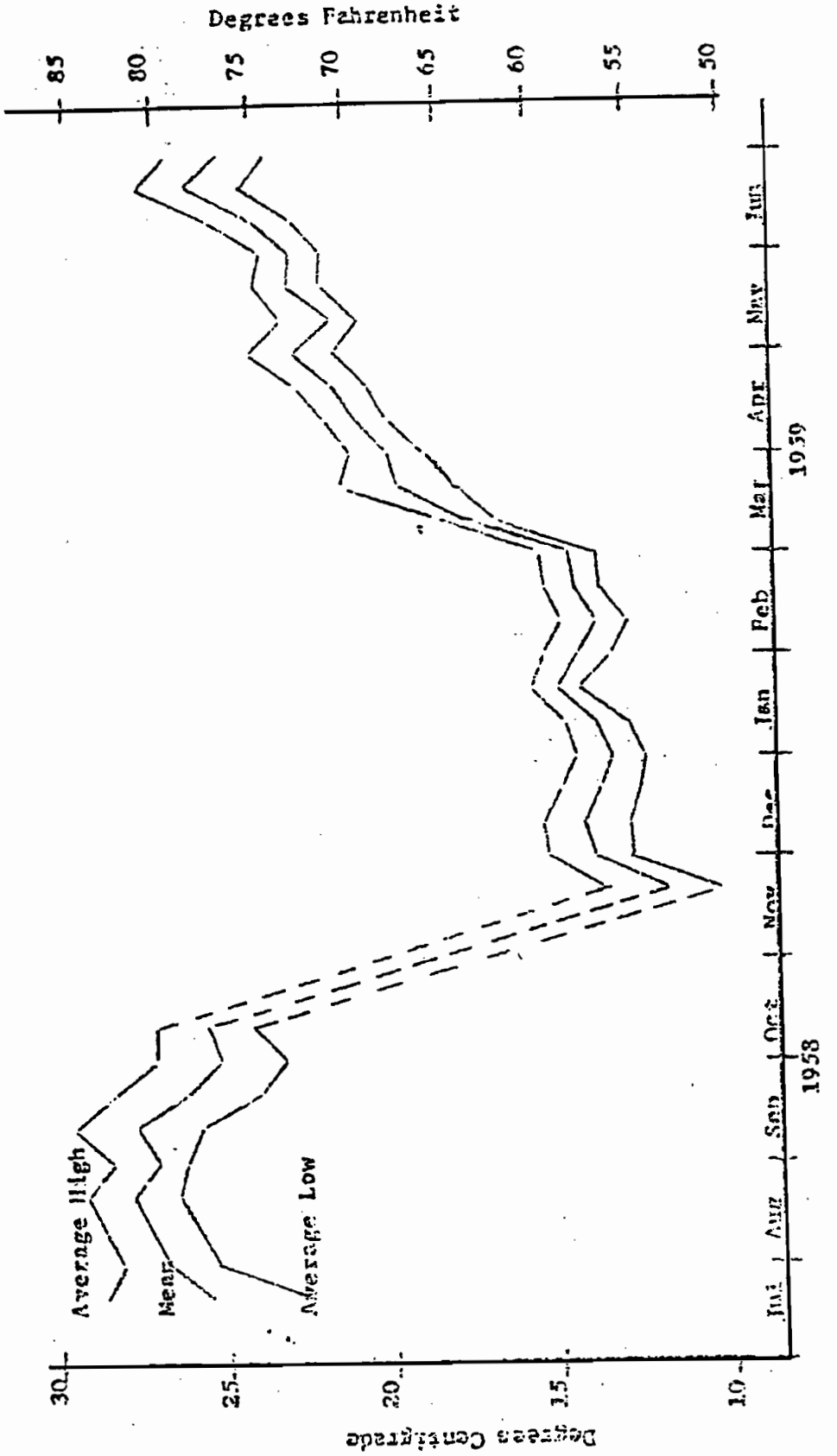

Figure A-2. Surface water temperature measured in Buena Vista Lagoon (from Carpelan 1960).