

POWER AND WATER CORPORATION

PUBLIC ENVIRONMENT REPORT STAGE 1: EAST POINT EFFLUENT RISING MAIN



November 2011

PowerWater

WE VALUE SAFETY
INTEGRITY
TEAMWORK
COMMITMENT
COMMUNICATION

Table of Contents

Executive Summary	xii
Related Actions	xviii
Features of Surrounding Environment	xviii
East Point Recreation Reserve.....	xix
East Point Aquatic Life Reserve	xix
Residential Receptors.....	xix
Ludmilla Creek.....	xx
Groundwater Resources	xx
Potential Impacts and Management Measures	xx
Erosion and Sedimentation	xx
Acid Sulphate Soils.....	xxi
Contaminated Runoff	xxi
Noise and Vibration.....	xxi
Air Quality.....	xxii
Disturbance Area	xxii
Terrestrial Flora, Fauna and Weeds	xxiii
Impacts on the Built Environment	xxiv
Land-use.....	xxv
Road Network and Traffic.....	xxv
Impacts on the Socio-economic Environment	xxv
Visual Amenity, Dust and Noise Levels	xxv
Employment.....	xxv
Sites of Recreational and Socio-economic Importance	xxv
Prevention, Mitigation and Management of Potential Impacts	xxvi
Environmental Management Framework	xxvi
Acid Sulphate Soils.....	xxvi
Erosion and Sedimentation	xxviii
Contaminated Runoff	xxviii
Noise and Vibration.....	xxix
Air Quality.....	xxix
Terrestrial Flora and Fauna	xxx
Biting Insects	xxx
Land-use.....	xxxi

Table of Contents

1	Introduction	1
1.1	Background.....	2
1.1.1	Project Title	2
1.1.2	Proponent.....	2
1.1.3	Scope, Purpose and Structure of the Draft Public Environmental Report	2
1.1.4	Objective of the Proposed Development	4
1.2	Context of the Proposed Development	4
1.2.1	Setting of the Proposed Development	4
1.2.2	Features of Sewage Management in Darwin.....	7
1.2.3	Tenure.....	8
1.2.4	Features of Surrounding Environment.....	8
1.3	Regulatory Framework for Environmental Assessment	11
1.3.1	Environmental Impact Assessment.....	11
1.3.2	Initial Notification (NOI and EPBC Referral).....	11
1.3.3	Level of Assessment Set for the Proposed Development.....	13
1.3.4	Public Review of the Guidelines.....	13
1.3.5	Preparation of the Draft Public Environmental Report.....	13
1.3.6	Submission of Draft Public Environmental Report and Public Review	14
1.3.7	Preparation of the Final PER	14
1.3.8	Government Assessment and Final Approval	14
1.4	Regulatory Environment	14
1.4.1	Commonwealth and NT Legislation	14
1.4.2	Licensing Requirements.....	17
1.4.3	Other Regulatory Obligations.....	18
2	Description of the Proposed Development	21
2.1	Project History	22
2.2	Objectives, Benefits and Justification for the Proposal.....	22
2.2.1	Increased Sewerage Treatment Capacity.....	24
2.2.2	Compliance with NT Legislative Requirements	24
2.2.3	Improved Sewage Treatment Performance.....	24
2.3	Proposed Action	25
2.3.1	Design.....	25
2.3.2	Construction.....	27

Table of Contents

2.3.3	Operations.....	31
2.4	Related Actions.....	32
2.4.1	Upgrade of Ludmilla Wastewater Treatment Plant	32
2.4.2	Proposed East Point Outfall	37
2.4.3	Larrakeyah Ocean Outfall	37
3	Alternatives.....	38
3.1	Reasons for the Proposal.....	39
3.2	Alternatives to the Proposed Development	39
3.2.1	Consequences of Not Proceeding.....	39
3.2.2	Alternatives to the Proposed Development	39
3.3	Alternative Outfall Locations and Configurations	40
3.4	Alternative Pipeline Material and Installation Options	41
4	Existing Environment.....	42
4.1	Physical Environment.....	43
4.1.1	Climate.....	43
4.1.2	Topography	45
4.1.3	Geology	45
4.1.4	Soils.....	47
4.2	Biological Environment	52
4.2.1	Terrestrial ecology	52
4.2.2	Terrestrial Flora.....	52
4.2.3	Terrestrial Fauna.....	55
4.2.4	Threatened Flora and Fauna Species Recorded in Surrounding Areas	57
4.2.5	Migratory and Marine Species	58
4.2.6	Habitat Connectivity.....	59
4.2.7	Significance of Vegetation Communities.....	59
4.2.8	Declared Weeds and Other Naturalised Species	60
4.3	Biting insects	62
4.3.1	Background.....	62
4.3.2	Potential Human Health Impacts from Biting Insects.....	62
4.3.3	Vector Transmitted Arboviral Diseases	64
4.4	Built Environment.....	65
4.4.1	Existing Adjacent Land-uses.....	65

Table of Contents

4.4.2	Road Network and Traffic	67
4.5	Socio-economic Environment.....	69
4.5.1	Employment	69
4.5.2	Community Attitudes	69
4.5.3	Cultural Heritage	70
5	Potential Impacts.....	73
5.1	Impacts on the Physical Environment.....	74
5.1.1	Erosion and Sedimentation	75
5.1.2	Acid Sulphate Soils.....	75
5.1.3	Contaminated Runoff	75
5.1.4	Noise and Vibration.....	76
5.1.5	Air Quality.....	76
5.2	Impacts on the Biological Environment	77
5.2.1	Disturbance Area	77
5.2.2	Terrestrial Flora, Fauna and Weeds	78
5.2.3	Biting Insects	79
5.3	Impacts on the Built Environment	80
5.3.1	Land-use.....	80
5.3.2	Road Network and Traffic	80
5.4	Impacts on the Socio-economic Environment.....	81
5.4.1	Visual Amenity, Dust and Noise Levels	81
5.4.2	Employment	81
5.4.3	Sites of Recreational and Socio-economic Importance	81
5.4.4	Itinerants.....	81
5.4.5	Cultural Heritage	81
6	Preliminary Risk Analysis.....	83
6.1	Aims and Scope.....	84
6.2	Preliminary Impact and Risk Assessment	84
6.2.1	Overview of the Approach	84
6.2.2	What is Risk.....	86
6.3	Risk Identification	86
6.3.1	Estimating Likelihoods	87
6.3.2	Estimating Consequence.....	87

Table of Contents

6.4	Risk Identification	88
6.4.1	Events and Inputs Risk Register	88
6.5	Impact Analysis.....	90
6.5.1	Known Impacts.....	92
6.5.2	Potential (Risk) Events.....	92
6.6	Risk Assessment: Upgraded Ludmilla WWTP and Existing East Point Outfall	92
6.7	Further Works	97
7	Mitigation, Management and Monitoring	98
7.1	Environmental Management Framework.....	99
7.2	Mitigation of Impacts on the Physical Environment.....	100
7.2.1	Acid Sulphate Soils.....	100
7.2.2	Erosion and Sedimentation	103
7.2.3	Contaminated Runoff	104
7.2.4	Noise and Vibration.....	105
7.2.5	Air Quality.....	105
7.3	Mitigation of Impacts on the Biological Environment	106
7.3.1	Terrestrial Flora and Fauna	106
7.3.2	Biting Insects	108
7.4	Mitigation of Impacts on the Build Environment	109
7.4.1	Land-use.....	109
7.4.2	Road Network and Traffic	109
7.5	Mitigation of Impacts on the Socio-economic Environment.....	110
7.5.1	Visual Amenity, Dust and Noise Levels	110
7.5.2	Employment	110
7.5.3	Sites of Recreational and Socio-economic Importance	110
7.5.4	Itinerants.....	110
8	Marine Water and Sediment Monitoring Program	111
8.1	Introduction	112
8.2	Water Quality Monitoring Program	112
8.3	Recreational and Cultural Water Quality Monitoring Program	113
8.4	Sediment Monitoring Program.....	113

Table of Contents

9	Public Involvement and Consultation.....	115
9.1	Community Consultation and Communication Strategy.....	116
9.1.1	Objective of the Community Consultation and Communication Strategy.....	116
9.1.2	Consultation Process.....	116
9.2	Key Stakeholders and Selected Level of Consultation	117
9.3	Consultation Program	118
9.3.1	Phase 1 Consultation.....	118
9.4	Consultation during Exhibition of this DEIS	121
10	Acknowledgements.....	122
11	References	124

Table of Contents

Tables

Table 1-1	Real Property Description Details for Proposed Development Corridor	4
Table 1-2	Current Licence Limits and PWC's Achievable Effluent Quality Targets for the Ludmilla WWTP	18
Table 1-3	Policies and Guidelines Relevant to the Proposed Development.....	18
Table 2-1	Ludmilla WWTP influent water quality parameters 2005-2009.....	35
Table 2-2	Existing Ludmilla WWTP Waste Discharge Licence (150) Effluent Quality Requirements..	35
Table 4-1	Long-Term Climate Data - Darwin Airport (1941 to 2011).....	44
Table 4-2	Land Unit Properties.....	47
Table 4-3	Listed Threatened Fauna Species / Site Records	55
Table 4-4	Listed Threatened Flora and Fauna Species Recorded in Surrounding Areas.....	57
Table 4-5	Weed Species Recorded along the Proposed Development Corridor and their Classification under the <i>Weeds Management Act 2001</i> (NT).....	61
Table 5-1	Areas of Clearing and Disturbance of Each Vegetation Community (1 to 5)	77
Table 6-1	Example of an Alternative Guide to Quantification of Likelihood.....	87
Table 6-2	Range of Consequence Levels and Generic Descriptions.....	88
Table 6-3	Risk Events for the Duplication of the Proposed Development	89
Table 6-4	Overall Potential Impacts (Risk) Profile.....	90
Table 6-5	Current Outfall Conditions at Larrakeyah Outfall and Ludmilla WWTP	93
Table 6-6	Current Outfall Conditions at Ludmilla WWTP (Combined Effluent).....	93
Table 6-7	Daily Loading to Darwin Harbour	94
Table 6-8	Daily Loading to East Point.....	94
Table 7-1	Liming rates	102
Table 9-1	Stakeholder Register and Level of Consultation.....	117
Table 9-2	Stakeholder Comments, Issues and Concerns	119
Table 10-1	List of Contributors	123

Table of Contents

Figures

Figure 1-1	Darwin Regional Setting.....	5
Figure 1-2	Location of Proposed Development.....	6
Figure 1-3	NT Environmental Impact Assessment Process.....	12
Figure 2-1	Larrakeyah Outfall Closure Plan Works Program.....	23
Figure 2-2	Proposed Alignment for the Duplicated Effluent Rising Main.....	26
Figure 2-3	Key Components of Construction Program.....	31
Figure 2-4	Site Arrangement for the Upgraded Ludmilla WWTP.....	32
Figure 2-5	Proposed Alignment for the Duplicated Effluent Rising Main.....	34
Figure 4-1	Contour Map of East Point and Ludmilla Area.....	46
Figure 4-2	Land units at East Point.....	48
Figure 4-3	Potential occurrence Acid Sulphate Soil in and adjacent to the Project Area.....	50
Figure 4-4	Potential occurrence Acid Sulphate Soil in and adjacent to the Project Area.....	51
Figure 4-5	Extent of Vegetation Communities at East Point and Ludmilla Creek and the Location of the Proposed Pipeline Corridor.....	56
Figure 4-6	Routine Mosquito Control Sites at East Point / Ludmilla.....	63
Figure 4-7	Land-use Figure.....	66
Figure 4-8	Road Network Supporting the Proposed Development.....	68
Figure 4-9	Areas of Cultural Heritage.....	72
Figure 5-1	Trees Planted Adjacent to Colivas Road.....	82
Figure 6-1	Overview of ISO 31000 Risk Management Process.....	85
Figure 6-2	Dispersion of a Conservative Parameter at Current Discharge (Average Volume 9.5 ML/day), Dry Weather Flow Conditions.....	95
Figure 6-3	Dispersion of a Conservative Parameter at Combined Discharge (Average Volume 12.5 ML/day), Dry Weather Flow Conditions.....	96

Table of Contents

Plates

Plate 1-1	Existing East Point Outfall Discharge Point.....	8
Plate 4-1	Community 1: Coastal Monsoon Vine Forest	52
Plate 4-2	Community 2: Low to Mid - Mixed Species Closed to Open Forest.....	53
Plate 4-3	Community 3: Low to Mid- Mixed Species Open Woodland	53
Plate 4-4	Community 4: Mangrove (mangal) forest	54
Plate 4-5	Community 5: Urban (parkland; development sites).....	54
Plate 4-6	Colivas Road Interaction with the Proposed Development	67
Plate 4-7	East Point Reserve Bicycle Track.....	67
Plate 4-8	Ack-Ack Battery.....	71

Appendices

Appendix A	NRETAS Guidelines
Appendix B	Waste Discharge Licence No. 149 and 150
Appendix C	Detailed Design Alignment of the Duplicated ERM
Appendix D	Geotechnical Investigation along proposed alignment
Appendix E	Acid Sulphate Soil Investigation
Appendix F	Species List
Appendix G	EPBC Database Search
Appendix H	Archaeology and Heritage Assessment
Appendix I	AAPA Certificates
Appendix J	Power and Water Land Management Procedure
Appendix K	Chemical Management, Assessment, Purchase, Handling, Storage, Disposal and Training Requirements Procedure
Appendix L	Contractor OHSE Management Procedure
Appendix M	Emergency Response Procedure
Appendix N	Hazard/Incident Recording, Reporting and Investigation Procedure
Appendix O	Risk Management Procedure
Appendix P	Draft Biting Insects Management Plan
Appendix Q	Draft Water and Sediment Monitoring Program
Appendix R	Waste Management Procedure

Abbreviations

Abbreviation	Description
%	Percentage
°C	Degrees centigrade
AASS	Actual Acid Sulphate Soils
ADWF	Average Dry Weather Flow
AHD	Australian Height Datum
ANZECC	Australia and New Zealand Environment Conservation Council
AQIS	Australian Quarantine and Inspection Service
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
ASS	Acid Sulphate Soils
AASS	Actual Acid Sulphate Soils
ASSMP	Acid Sulphate Soils Management Plan
BFV	Barmah Forest Virus
BGL	Below Ground Level
BIMP	Biting Insect Management Plan
BOD	Biochemical Oxygen Demand
BoM	Bureau of Meteorology
CAS	Chemical Assisted Sedimentation
CBD	Central Business District
CEMP	Construction Environmental Management Plan
CFU	Colony Forming Units
CP	Community Purpose
CRS	Chromium Reducible Sulphur
Cwlth	Commonwealth
DCC	Darwin City Council
DHAC	Darwin Harbour Advisory Committee
DHF	Department of Health and Families
DLP	Department Lands and Planning
EA Act	The <i>Environmental Assessment Act 1982</i> and the <i>Environmental Assessment Amendment Act 1994</i>
EAAP	<i>Environmental Assessment Administrative Procedures</i>
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EMU	Environmental Management Unit
EP	Equivalent Persons
EPALR	The East Point Aquatic Life Reserve
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EPO	East Point Outfall
ERM	Effluent Rising Main
ESDMP	Erosion, Sedimentation and Drainage Management Plan
Fisheries Act	<i>Fisheries Act 1998</i>
HAC	Heritage Advisory Council
HDPE	High-density Polyethylene
IMS	Integrated Management System
ISO	International Standards Organisation

Abbreviations

Abbreviation	Description
kL	Kilo-litre
Km	Kilometer
Km/h	Kilometer per hour
KUNV	Kunjin Virus
L/s	Litre per Second
LOCP	Larrakeyah Outfall Closure Program
LU	Land-Units
m	Meter
m ²	Square Meter
mL	Millilitre
mm	Millimetre
MNES	Matters of National Environmental Significance
MVEV	Murray Valley Encephalitis Virus
NEPC (NT)	National Environment Protection Council (NT)
NEPM	National Environment Protection Measure
NOI	Notice of Intent
NRETAS	NT Department Natural Resources, Environment, the Arts and Sport
NT	Northern Territory
NT Minister	The NT Minister for Natural Resources, Environment and Heritage
NTG	Northern Territory Government
NTGS	Northern Territory Geological Survey
OH&S	Occupational Health and Safety
PASS	Potential Acid Sulphate Soils
PER	Public Environmental Report
Proposed Development	Duplicated Effluent Rising Main
PS	Public Space
PVC	Polyvinyl Chloride
PWC	Power and Water Corporation
PWCNT	Parks and Wildlife Commission of the NT
RRV	Ross River Virus
SCI	Statement of Corporate Intent
SEWPAC	Commonwealth Department of Sustainability, Environment, Water, Population and Communities
The Final PER	The Draft PER together with the Supplement
The Guidelines	Guidelines for the Preparation of a Public Report, Duplication of the East Point Effluent Rising Main and Extension of the EPO, February 2010
TN	Total Nitrogen
TP	Total Phosphorous
TSS	Total Suspended Solids
U	Utilities
WDL	Waste Discharge License
WSAA	Water Services Association of Australia
WSP	Waste Stabilisation ponds
WWII	World War Two
WWTP	Wastewater Treatment Plant