Appendix G

Hazards and risks tables

BELMORE PARK COMMERCIAL OFFICE AND SUBSTATION
ENVIRONMENTAL ASSESSMENT REPORT
PRELIMINARY REVIEW OF RISKS AND HAZARDS

Item	Risk Description / Element	Potential Impacts and Consequences	Proposed Mitigation Measures
Construction - Environmental / Social Risks			
	Geology / Geotechnical Risks; ▪ Poor Ground Conditions ▪ Settlement; ▪ Contamination and Disposal; ▪ Geological faults.	▪ Reduction if progress of works; ▪ Ground settlement, settlement of building foundations and potential cracking/structural damage to building structures; ▪ Health impacts associated with contamination issues; ▪ Adverse environmental impacts associated with ground contamination; ▪ Disruption to businesses and general public amenity.	▪ Geotechnical investigations and analysis; ▪ Building structural design based on interpreted ground conditions and known areas of risk; ▪ Dilapidation and basement survey of buildings potentially affected by building works; ▪ Contamination studies and management plans to be developed to deal with the disposal of contaminated soil.
	Hydrogeology / Groundwater Groundwater Chemistry, Treatment and disposal;	▪ Contamination issues affects from PASS; ▪ Contamination of receiving waters	▪ Geotechnical investigations and analysis; ▪ Building structural design based on interpreted ground conditions and known areas of risk; ▪ Contamination studies and management plans to be developed to deal with the disposal of contaminated soil.
	Surface Water ▪ Erosion and Sedimentation; ▪ Stormwater runoff and disposal;	▪ Pollution of waterways as a result of erosion and sedimentation; ▪ DEC sanctions and fines; ▪ Potential undermining/damage to above ground structures	▪ Local site controls and management plans; ▪ Implementation of checking/maintenance of sedimentation and erosion controls; ▪ Water treatment before disposal. Collection and analysis of water samples during construction.
	Ecology / Flora and Fauna ▪ Clearing of vegetation / flora; ▪ Groundwater disposal and affect on aquatic habitat in receiving waters	▪ Damage to aquatic ecology; ▪ Turbidity / algae blooms in receiving waters.	▪ Water treatment before disposal. Collection and analysis of water samples during construction;
	Existing / Proposed Underground Assets ▪ Building clearances and undermining of existing buildings and other underground services; ▪ Clearances and undermining of existing building basements	▪ Settlement and structural damage to existing buildings, other underground services; ▪ Collapse of existing buildings; ▪ Stray currents and electrocution	▪ Geotechnical investigations and analysis; ▪ Review as-built data and survey from existing underground structures; ▪ Building structural design based on interpreted ground conditions; ▪ Dilapidation and basement survey of buildings potentially affected by building works

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Construction - Environmental / Social Risks			
	Noise and Vibration / Regenerated Noise ▪ Surface Construction Activity; ▪ Ground Vibration / Regenerated Noise; ▪ Rock Breaking; ▪ Traffic / Construction Plant; ▪ Ventilation Plant.	▪ Structural damage to buildings; ▪ Loss of public amenity; ▪ Complaints ▪ Sleep and general public disturbance;	▪ Limited hours of operation for surface works; ▪ Limited hours for rock-breaking activities; ▪ Noise attenuation structures used at surface; ▪ Measurement of background levels and noise monitoring during construction works; ▪ Community consultation and liaison; ▪ Investigate alternate / multiple haulage routes for spoil disposal; ▪ Selection of specialist equipment to suit likely ground conditions and minimise regenerated noise; ▪ Dilapidation and basement survey of buildings potentially affected by building works;
	Settlement / Property Impacts ▪ Settlement (ground, roads and buildings);	▪ Reduction if progress of works; ▪ Ground settlement, settlement of building foundations and potential cracking/structural damage to building structures; ▪ Disruption to businesses and general public amenity.	▪ Geotechnical investigations and analysis; ▪ Building structural design based on interpreted ground conditions and known areas of risk; ▪ Dilapidation and basement survey of buildings potentially affected by building works; ▪ Selection of specialist equipment to suit likely ground conditions;
	Dust / Air Quality ▪ Surface Works; ▪ Shaft Excavation; ▪ Trenching for cable routes; ▪ Building Excavation; ▪ Spoil stockpiles, handling and transport; ▪ Construction Ventilation; ▪ Bulk excavation (substation sites); ▪ Equipment exhausts;	▪ General health to the public and works; ▪ Air pollution; ▪ General public amenity and comfort; ▪ Breach of environmental standards; ▪ Worksite aesthetics; ▪ Public complaints;	▪ Environmental management plans; ▪ Dust suppression measures utilised on site; ▪ Covering of spoil stockpiles and trucks leaving the site; ▪ Filtration /scrubbers for ventilation plant; ▪ Regular maintenance of vehicles /plant used on site; ▪ Monitoring and measurement of air quality during construction works;
	Social Issues ▪ Public perception of risks associated with building (ie building collapse, fatalities etc);	▪ Loss of reputation; ▪ Increase in objections to the project; ▪ Poor publicity; ▪ Scare mongering;	▪ Community consultation; ▪ Planning / information forums; ▪ Regular project updates.

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Environmental / Social Risks			
	Traffic and Transport ▪ Disruption to local traffic; ▪ Haulage Routes; ▪ Road Dilapidation; ▪ Road Closures; ▪ Loading / Unloading Materials and equipment; ▪ Pedestrians and other road users; ▪ Spoil disposal; ▪ Parking; ▪ Queuing in the vicinity of construction sites; ▪ Disruption to special events;	▪ Noise and vibration; ▪ Air quality and pollution; ▪ General public safety; ▪ Erosion and sedimentation tracking onto roads; ▪ Complaints and access restrictions to local residents and businesses; ▪ Traffic congestion; ▪ Damage to roads; ▪ Loss or disruption of parking;	▪ Traffic assessment and route/intersection analysis; ▪ Traffic modelling; ▪ Traffic management plans during construction; ▪ Restrictions on working hours for loading/unloading of materials; ▪ Environmental Management Plans dealing with erosion and sedimentation; track washes, street cleaning etc; ▪ Dilapidation surveys along affected roads/haulage routes; ▪ Assess alternate routes for haulage and general construction traffic; ▪ Rerouting of bussing and other public transport; ▪ Consultation with RTA, CoS, MoT and State Transit; ▪ Dedicated pedestrian walkways to be maintained around construction sites; ▪ Signage in and around construction sites;
	Waste Management and/or Reuse ▪ Control of hazardous wastes; ▪ Contamination (Surface Works); ▪ Recycling and/or Disposal; ▪ Hazardous materials associated with demolition of existing assets / buildings;	▪ Health and safety of workers and the general public; ▪ Environmental harm and contamination as a result of waste disposal; ▪ Hazardous materials associated with demolition causing damage to the environment or health of employees; ▪ Use of landfill – inefficient use of resources;	▪ Waste management plans; ▪ Contamination assessment; ▪ Assessment of options for re-use of spoil (VENM) and other waste materials; ▪ Treatment and isolation of hazardous materials during construction activities; ▪ Assessment of sites for disposal of materials; ▪ EMP to include mitigation measures for control and storage and handling of hazardous materials;
	Heritage / Archaeology ▪ Known heritage sites affected by works; ▪ Areas of Archaeological significance; ▪ Spoil removal; ▪ Buried or unknown heritage items	▪ Damage to heritage buildings and other assets; ▪ Delay to works; ▪ Legal and statutory issues;	▪ Cultural and heritage assessment; ▪ Monitoring during construction; ▪ Dilapidation survey of heritage buildings; ▪ Awareness on notification and treatment during construction (eg stop work provisions);
	Visual Amenity / Landscape/Disturbance ▪ Construction sites; ▪ Pedestrian access and management; ▪ Night works / lighting; ▪ Waste and rubbish; ▪ Dust and air quality; ▪ Tracking of sediments onto public roadways; ▪ Noise ▪ Parking; ▪ Visual amenity of new buildings; ▪ Urban planning;	▪ Complaints; ▪ General public disturbance and perception; ▪ Potential to delay works; ▪ Inappropriate urban design;	▪ Consultation and planning; ▪ Design review; ▪ Environmental Management Plans; ▪ Landscape design and planning;

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Environmental / Social Risks			
	Land Use ▪ Land use/re-use after construction;	▪ Inadequate use /waster of redundant land after construction works;	▪ Assess options for land use / development after construction works that maximise public amenity;
	Other Risks ▪ Security;	▪ Damage / vandalism to construction sites and equipment; ▪ OH&S risks to workers and the general public;	▪ Security management plan to be developed during construction to restrict public access to worksites;

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Operating Risks			
	Structural Integrity / Settlement ▪ Settlement; ▪ Building collapse or other structural failures;	▪ Injury or death to maintenance workers or the general public; ▪ Ground settlement, settlement of building foundations and potential cracking/structural damage to building structures; ▪ Damage to electrical assets within the building; ▪ Disruption to businesses and general public amenity.	▪ Building structural design based on interpreted ground conditions and likely permanent groundwater and earth pressure loads during construction; ▪ Building lining to be designed to accommodate all in-service loads; ▪ Structural inspections to be undertaken regularly throughout the operation phase of the building;
	Operating Noise Impacts ▪ Noise from ventilation systems and other operating plant.	▪ Loss of public amenity; ▪ Complaints ▪ Sleep and general public disturbance;	▪ Noise generating operational plant to be designed with acoustic enclosures/dampers, if and where required;
	EMF, Earthing and Electrolysis ▪ Stray currents and electrocution	▪ Public exposure and /or perception to EMF; ▪ Electrocution as a result of stray currents; ▪ Corrosion and/or other damage to assets adjacent to the building and substations;	▪ Design of substation structure based on the principle of prudent avoidance in regard to EMF issues; ▪ Earthing design; ▪ Use of fibre-glass and steel-fibre structural elements and support to mitigate stray currents; ▪ Monitoring of EMF levels during operation.
	Air Quality and Ventilation ▪ Dust and other pollutants from operating ventilation plant systems; ▪ SF6 discharges from substation	▪ General health to the public and workers; ▪ Air pollution; ▪ General public amenity and comfort; ▪ Breach of environmental standards; ▪ Worksite aesthetics; ▪ Public complaints	▪ Design of filtration systems, where required, for operating ventilation systems; ▪ Design locations of ventilation outlets to minimise exposure of nearby residents and businesses. Outlets to be located away from likely or sensitive receivers; ▪ Design of monitoring of SF6 operating systems; ▪ Minimise/exclude the use of polluting generating equipment and materials during maintenance and operating tasks.
	Traffic Management during operation ▪ Disruption to local traffic; ▪ Material / equipment deliveries.	▪ Noise; ▪ Air quality and pollution; ▪ General public safety.	▪ Road closures / local traffic management plans during delivery of major equipment or maintenance tasks; ▪ Major equipment to be delivered during normal operating hours;
	Groundwater Management and Stormwater ▪ Groundwater Chemistry, Treatment and Disposal;	▪ Pollution / contamination of waterways and parklands;	▪ Design of permanent building lining to minimise water ingress; ▪ Design and construction of permanent water treatment plant to treat groundwater before disposal; ▪ Regular maintenance of WTP facilities; ▪ Regular disposal of wastes (eg. sludge) generated from water treatment ▪ Regular monitoring, testing and analysis of water samples during operation.
	Fire / Explosion; ▪ Substation plant and equipmen.	▪ Injury to staff and/or general public; ▪ Damage to electrical infrastructure.	▪ Design of permanent fire systems included in building/substation design; ▪ Monitoring systems included in building/substation design; ▪ Access restrictions to substation facilities; ▪ Minimise / prevent the use of fire generating materials during operation; ▪ Emergency evacuation and response procedures;

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Operating Risks			
	Cable / Substation Security	▪ Injury to the general public; ▪ Vandalism and other damage to electrical infrastructure;	▪ Design of substations to include security measures to prevent access from unauthorised personnel; ▪ Monitoring of substation entrances; ▪ Operational security management plans to be developed;
	Operational Safety Risks	▪ Injury to the operational / maintenance staff.	▪ Operational safety management plans ▪ General operating PPE; ▪ Emergency evacuation procedures.
	Other Operating Risks ▪ Waste / contamination; ▪ Visual amenity and landscape; ▪ Land use and zoning.	▪ Health and safety of workers and the general public; ▪ Environmental harm and contamination as a result of waste disposal; ▪ General public amenity and complaints.	▪ Operational waste management plans to be developed, including waste disposal protocols; ▪ Urban design of substation and other above-ground structures to take into account general public and visual amenity; ▪ Consider land-use options after construction that maximise public amenity and use.

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Construction Safety Risks			
	Building Collapse	▪ Injury or death to construction personnel or members of the general public; ▪ Damage to existing underground or above-ground infrastructure.	▪ Geotechnical investigations and analysis; ▪ Building structural design based on interpreted ground conditions and known areas of risk;; ▪ Selection of other specialist equipment to suit likely ground conditions; ▪ Emergency response and evacuation procedures.
	Fire / Explosion / Smoke Management	▪ Injury or death to construction personnel or members of the general public; ▪ Damage to existing underground or above-ground infrastructure.	▪ Fire suppression fire engineered systems to be utilised throughout all construction sites; ▪ Control of hazardous / flammable materials. ▪ Emergency response and evacuation procedures.
	Dust / Air Quality / Ventilation	▪ Injury to construction personnel or members of the general public.	▪ Design of filtration systems, where required, for construction ventilation systems; ▪ Personnel PPE such as dusk masks, re-breathers; ▪ Design of monitoring of SF6 operating systems; ▪ Minimise/exclude the use of polluting generating equipment and materials during construction;
	Access / Egress / Emergency Evacuation	▪ Injury to construction personnel or members of the general public.	▪ Construction Safety Management Plans ▪ Building site safety induction; ▪ Building communication systems; ▪ Emergency response and evacuation procedures.
	Hazardous Materials	▪ Injury to construction personnel or members of the general public.	▪ Safety Management Plan to include protocols/procedures for the control, storage and use of hazardous materials; ▪ Emergency response and evacuation procedures.
	Flooding	▪ Injury to construction personnel or members of the general public.	▪ Temporary drainage and pump systems; ▪ Bunding of surface facilities and structures; ▪ Emergency response and evacuation procedures.
	Traffic /Plant Management	▪ Injury to construction personnel or members of the general public.	▪ Construction traffic management plans; ▪ Safety Management Plans and Induction;
	General OH&S Risks and Management ▪ Tools and equipment; ▪ Trips and falls; ▪ Drugs and Alcohol; ▪ Electrical Hazards /Substation works; ▪ Confined spaces; ▪ Work at Heights.	▪ Injury to construction personnel or members of the general public.	▪ Construction Safety Management Plans; ▪ Construction safety inductions; ▪ Hazard and Risk Assessments; ▪ Safe Work Method Statements; ▪ Emergency response and evacuation procedures.