APPENDIX B4

Construction Soil and Water Management Sub Plan

Windsor Bridge Replacement Project

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Glossary / Abbreviations

CEMP	Construction Environmental Management Plan
CoA	Condition of Approval
CSWMP	Construction Soil and Water Management Plan
DOI (NRAR)	Department of Industry (Natural Resources Access Regulator, NRAR), formally NSW Office of Water (NOW)
DPI (Fisheries)	Department of Primary Industries (Fisheries)
DPIE	Department of Planning, Industry and Environment (formerly Department of Planning and Environment (DPE))
EA	Environmental Assessment
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPL	Environmental Protection Licence
EWMS	Environmental Work Method Statements
ESR	Georgiou Environmental Site Representative
FM Act	*Fisheries Management Act 1994*
NOW	NSW Office of Water (now DOI NRAR)
OEH	Office of Environment and Heritage
PESCP	Progressive Erosion and Sediment Control Plan
SPIR	Submissions/Preferred Infrastructure Report
TfNSW	Transport for New South Wales

1 Introduction

1.1 Context

This Construction Soil and Water Management Sub Plan (CSWMP or Plan) forms part of the Construction Environmental Management Plan (CEMP) for the Windsor Bridge Replacement Project (the Project).

The Windsor Bridge Replacement Project Team, comprised of Transport for New South Wales (TfNSW)and Georgiou Group (Georgiou) have partnered together to undertake construction activities for the new road bridge over the Hawkesbury River at Windsor (the Windsor Bridge Replacement Project), on behalf of the New South Wales (NSW) government.

This CSWMP has been prepared to address the requirements of the Minister's Conditions of Approval (CoA), the environmental management measures listed in the Windsor Bridge Replacement Submissions/Preferred Infrastructure Report (SPIR) and all applicable legislation.

1.2 Background

The Project has been assessed as State Significant Infrastructure under Part 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The Windsor Bridge Replacement Project Environmental Impact Statement (EIS) was prepared by Sinclair Knight Merz in November 2012 for Roads and Maritime. The EIS was on public exhibition until 17 December 2012. A Submissions Report (and preferred infrastructure report) was finalised in May 2013 which addressed stakeholder submissions received during the EIS exhibition period. Following this, in December 2013, the Project was approved by the Minister for Planning and Infrastructure. The EIS assessed the impacts of construction and operation of the Project on soil and water quality.

As part of EIS development, a detailed soil, water and flooding assessment was prepared to address the requirements issued by the then Department of Planning. The soil, water and flooding assessment was included in the EIS as Working Paper 7 – Soil, sediments, water and waste, and Working Paper 8 – Hydrology. This assessment identified the potential for direct and indirect impacts on soil, water quality and hydrology but concluded that provided the proposed mitigation and management measures are implemented, any residual impacts would not be environmentally significant.

A Modification Report was submitted to DPIE in September 2019 and placed on public exhibition from 23 October 2019 to 7 November 2019. The submissions were addressed by Transport for NSW in the Submissions Report which was lodged with the Director-General in February 2020.

The Minister for Planning and Public Spaces approved the modification on 30 April 2020. The Minister's CoA were updated to incorporate the modification.

1.3 Environmental management systems overview

The overall Environmental Management System for the Project is described in the Construction Environmental Management Plan (CEMP).

The CSWMP is part of the Georgiou environmental management framework for the Project, as described in Section 4.1 of the CEMP. In accordance with CoA D5 (d), this Plan has been developed in consultation with the NSW Office of Environment and Heritage (OEH), Department of Primary Industries (Fisheries) (DPI (Fisheries)), Department of Industry (Natural Resources Access Regulator, NRAR)) (previously NSW Office of Water (NOW)) and NSW Environment Protection Authority (EPA). Appendix A8 of the CEMP contains a table

detailing consultation with relevant agencies to date, including dates, issues raised and how each issue has been addressed within this management plan. Ongoing consultation with the regulatory authorities will be carried out in accordance with Chapter 1 of the CEMP.

Management measures identified in this Plan will be incorporated into site or activity specific Environmental Work Method Statements (EWMS) and Progressive Erosion and Sediment Control Plans (PESCP).

1.3.1 Environmental Work Method Statements (EWMS)

Environmental work method statements (EWMS) are prepared to manage and control all activities that have the potential to negatively impact on the environment. EWMS will be prepared prior to the commencement relevant construction activities on site and will incorporate relevant mitigation measures and controls from management sub plans. They also identify key procedures to be used concurrently with the EWMS. EWMS are specifically designed to communicate requirements, actions, processes and controls to construction personnel using plans, diagrams and simply written instructions. EWMS will be prepared progressively in the lead up to and throughout construction in consultation with relevant members from the Project team, and approved by the Environmental Manager.

Refer to Section 4.1.3 of the CEMP. The review and document control processes for this EWMS are described in Section 9 of the CEMP.

1.3.2 Progressive Erosion and Sediment Control Plans (PESCP)

PESCPs are designed for use as a practical guide and may be produced in conjunction with Environmental Work Method Statement (EWMS) to provide more detailed site-specific environmental mitigation measures. These will be submitted progressively and prepared by the Project Environmental Site Representative with demonstrated skills and experience in preparing ESCPs in accordance with the Blue Book (Managing urban stormwater: soils and construction - Volume 1, 4th Edition) guidelines, in consultation with the environment team and construction personnel and will be updated as required when:

- Site conditions evolve.
- Flow paths change.
- Construction activities that affected the characteristics of ground conditions change.
- Other management plan changes that could impact on soil and water quality conservation.

Used together, the CEMP, strategies, procedures, EWMS and PESCP form management guides that clearly identify required environmental management actions for reference by Georgiou personnel and contractors.

The review and document control processes for this Plan are described in Section 9 of the CEMP.

2 Purpose and objectives

2.1 Purpose

The purpose of this Plan is to describe how the Georgiou proposes to manage and protect soil and water quality during construction of the Project.

2.2 Objectives

The key objective of the CSWMP is to ensure that impacts on water quality are minimised and within the scope permitted by the planning approval. To achieve this objective, Georgiou will undertake the following:

- Ensure best management practice controls and procedures are implemented during construction activities to avoid or minimise erosion/sedimentation impacts and potential impacts to water quality in rivers, creeks and groundwater along the Project corridor.
- Ensure appropriate measures are implemented to address the relevant CoA's outlined in Table 3.1, and the environmental management measures detailed in the SPIR (Table 3.2).
- Ensure appropriate measures are implemented to comply with all relevant legislation and other requirements as described in Section 3.1 of this Plan.

2.3 Targets

The following targets have been established for the management of soil and water impacts during the project:

- Ensure full compliance with the relevant legislative requirements, CoA and environmental management measures.
- Meet prescribed water quality discharge parameters for all planned basin discharges (i.e. those within design capacity) as set out in Table 7-1.
- Manage downstream water quality impacts attributable to the Project (i.e. maintain water waterway health by avoiding the introduction of nutrients, sediment and chemicals outside of that permitted by ANZECC guidelines).
- Ensure training on best practice soil and water management is provided to all construction personnel through site inductions.
- No proposed extraction of groundwater for construction use to ensure no impact on potable water supplies, groundwater dependent ecosystems, licenced abstractions or overlying soils.
- Manage potential or actual acid sulfate soils to minimise environmental impacts.
- Maintain and improve existing erosion control on the banks of the Hawkesbury River, through the early construction of scour protection on existing banks in the footprint of the new bridge.

3 Environmental requirements

3.1 Relevant legislation and guidelines

3.1.1 Legislation

Legislation relevant to soil and water management includes:

- *Environmental Planning and Assessment Act 1979 (EP&A Act)*
- *Environmental Planning and Assessment Regulation 2000*
- *Protection of the Environment Operations Act 1997* (POEO Act)
- *Protection of the Environment (General) Regulation 2009 (as amended)*
- *Water Management Act 2000*
- *Water Management Amendment Act 2014*
- *Water Management (General) Regulation 2011*
- *Fisheries Management Act 1994*
- *Soil Conservation Act 1938.*

Relevant provisions of the above legislation are explained in the register of legal and other requirements included in Appendix A1 of the CEMP.

3.1.2 Guidelines and standards

The main guidelines, specifications and policy documents relevant to this Plan include:

- Acid Sulfate Soil Manual (ASSMAC 1998)
- Acid Sulfate Soil and Rock – Victorian EPA Publication 655.1 – July 2009
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ 2000)
- Australian and New Zealand Guidelines for Water Quality Monitoring and Reporting (ANZECC and ARMCANZ 2000)
- Department of Environment and Conservation (DEC): Bunding & Spill Management. Insert to the Environment Protection Manual for Authorised Officers - Technical section "Bu" November 1997
- Managing Urban Stormwater: Soils and Construction. Landcom, (4th Edition) March 2004 (reprinted 2006) (the “Blue Book”). Volume 1 and Volume 2
- DIPNR Roads and Salinity Guideline, 2003
- Fairfull, S. and Witheridge, G. (2003) Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings. NSW Fisheries, Cronulla, 16 pp
- *NSW Fisheries, November 2003. Fishnote – Policy and Guidelines for Fish Friendly* Waterway Crossings (Ref: NSWF – 1181)
- TFNSW Dewatering Guideline
- RTA’s Code of Practice for Water Management – Road Development and Management (1999)
- Approved Methods for the Sampling and Analysis of Water Pollutants in NSW – March 2004

- Guidelines for the Management of Acid Sulphate materials: Acid Sulphate Soils, Acid Sulphate Rock and Monosulphidic Black Ooze (RTA 2005)
- TFNSW Environment Direction Management of Tannins from Vegetation Mulch.
- Stockpile Site Management Guideline, TFNSW 2015
- Environmental Best Management Practice Guideline for Concreting Contractors, DEC, 2004.

3.2 Minister's Conditions of Approval

The CoA relevant to this Plan are listed Table 3-2 below. A cross reference is also included to indicate where the condition is addressed in this Plan or other Project management documents.

Table 3-1 Conditions of approval relevant to soil and water

CoA No.	Condition Requirements	Document Reference
HAZARDS AND RISK		
C12	Dangerous goods, as defined by the Australian Dangerous Goods Code, shall be stored and handled strictly in accordance with: (a) all relevant Australian Standards; (b) for liquids, a minimum bund volume requirement of 110% of the volume of the largest single stored volume within the bund; and (c) the Environment Protection Manual for Authorised Officers: Bunding and Spill Management, Technical Bulletin (Environment Protection Authority, 1997). In the event of an inconsistency between the requirements listed from (a) to (c) above, the most stringent requirement shall prevail to the extent of the inconsistency.	Table 6-1 CEMP Appendix B12 – PIRMP
SOIL AND WATER QUALITY		
C23	Soil and water management measures consistent with Managing Urban Stormwater - Soils and Construction Vol I (Landcom, 2004) shall be employed during the construction of the SSI to minimise soil erosion and the discharge of sediment and other pollutants to land and/or waters.	Table 6-1 Section 7 Appendix B – Sediment Basin Management and Discharge Procedure Appendix E – Spoil Management Plan Appendix F – Stockpile Management Protocol

CoA No.	Condition Requirements	Document Reference
C24	The Applicant shall prepare and implement a **Water Quality Management Program** to monitor and minimise the impacts of the project on surface and groundwater quality and resources and wetlands, during construction and operation of the SSI. The Program shall be developed in consultation with the OEH, EPA, DPI (Fishing and Aquaculture) and NOW and shall include but not necessarily be limited to: (a) identification of surface and groundwater quality monitoring locations (including watercourses and waterbodies) which are representative of the potential extent of impacts from the project; (b) the results of the groundwater modelling undertaken under this consent; (c) identification of works and activities during construction and operation of the project, including emergencies and spill events, that have the potential to impact on surface water quality of potentially affected waterways; (d) development and presentation of parameters and standards against which any changes to water quality will be assessed, having regard to the Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000 (Australian and New Zealand Environment Conservation Council, 2000); (e) representative background monitoring of surface and groundwater quality parameters for a minimum of six months (considering seasonality) prior to the commencement of construction, to establish baseline water conditions, unless otherwise agreed by the Director-General; (f) a minimum monitoring period of three years following the completion of construction or until the affected waterways and/ or groundwater resources are certified by an independent expert as being rehabilitated to an acceptable condition. The monitoring shall also confirm the establishment of operational water control measures (such as sedimentation basins and vegetation swales); (g) contingency and ameliorative measures in the event that adverse impacts to water quality are identified; and (h) reporting of the monitoring results to the Department, OEH, EPA and NOW. The Program shall be submitted to the Director-General for approval 6 months prior to the commencement of construction of the project, or as otherwise agreed by the Director-General. A copy of the Program shall be submitted to the OEH, EPA, DPI (Fishing and Aquaculture) and NOW prior to its implementation.	Appendix A – Water Quality Management Program
C25	Prior to the commencement of site preparation and excavation activities, or as otherwise agreed by the Director-General, in areas identified as having a moderate to high risk of contamination, a site audit shall be carried out by a site auditor. A site audit report is to be prepared by the site auditor detailing the outcomes of Phase 2 contamination investigations within these areas. The site audit report shall detail, where relevant, whether the land is suitable (for the intended land use) or can be made suitable through remediation. A site audit statement(s) must be prepared verifying that the site has been remediated to a standard consistent with the intended land use. The site audit statement(s) shall be submitted to the Director-General prior to operation of the SSI, unless otherwise agreed by the Director-General. Note: Terms used in this condition have the same meaning as in the Contaminated Land Management Act 1997.	CEMP Appendix B8 – Contaminated Land Management Plan
CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN		

CoA No.	Condition Requirements	Document Reference
D4(e)(vi)	The Applicant shall prepare and (following approval) implement a Construction Environmental Management Plan for the project. The Plan shall outline the environmental management practices and procedures that are to be followed during construction, and shall be prepared in consultation with the relevant agencies and in accordance with the Guideline for the Preparation of Environmental Management Plans (Department of Infrastructure, Planning and Natural Resources, 2004). The Plan shall include, but not necessarily be limited to: an environmental risk analysis to identify the key environmental performance issues associated with the construction phase and details of how environmental performance would be monitored and managed to meet acceptable outcomes including what actions will be taken to address identified potential adverse environmental impacts. In particular, the following environmental performance issues shall be addressed in the Plan: (vi) measures to monitor and manage spoil, fill and materials stockpile sites including details of how spoil, fill or material would be handled, stockpiled, reused and disposed and a stockpile management protocol detailing locational criteria that would guide the placement of stockpiles and management measures that would be implemented to avoid/ minimise amenity impacts to surrounding residents and environmental risks (including to surrounding water courses). Stockpile sites that affect heritage, threatened species, populations or Endangered Ecological Communities require the approval of the Director-General, in consultation with the OEH;	Table 6-1 Appendix F – Stockpile Management Protocol
D5(d)	A Construction Soil and Water Quality Management Sub-plan to manage surface and groundwater impacts during construction of the project. The sub-plan shall be developed in consultation with the OEH, EPA, DPI (Fishing and Aquaculture) and NOW and include, but not necessarily be limited to:	This plan
	(i) identification of potential sources of erosion and sedimentation, and water pollution (including those resulting from maintenance activities);	Table 6-1 Section 5
	(ii) details of how construction activities would be managed and mitigated to minimise erosion and sedimentation consistent with condition C23;	Table 6-1 Section 1.3 Section 7 Appendix E – Spoil Management Plan
	(iii) where construction activities have the potential to impact on waterways or wetlands (through direct disturbance such as construction of waterway crossings or works in close proximity to waterways or wetlands), site specific mitigation measures to be implemented to minimise water quality, riparian and stream hydrology impacts as far as practicable, including measures to stabilise bed and/ or bank structures where feasible and reasonable, and to rehabilitate affected riparian vegetation to existing or better condition. The timing of rehabilitation of the waterways shall be identified in the sub-plan;	Table 6-1 Section 7 Appendix E – Spoil Management Plan CEMP Appendix B11 Vegetation Management Plan

CoA No.	Condition Requirements	Document Reference
	(iv) a contingency plan, consistent with the Acid Sulfate Soils Manual, to deal with the unexpected discovery of actual or potential acid sulfate soils, including procedures for the investigation, handling, treatment and management of such soils and water seepage;	CEMP Appendix B10 Acid Sulphate Soils Management Plan
	(v) a tannin leachate management protocol to manage the stockpiling of mulch and use of cleared vegetation and mulch filters for erosion and sediment control;	Appendix G – Management of Tannins from Vegetation Mulch
	(vi) construction water quality monitoring requirements consistent with condition C24; and	Appendix A – Water Quality Management Program
	(vii) a groundwater management strategy, including (but not necessarily limited to): i. description and identification of groundwater resources (including depths of the water table and water quality) potentially affected by the project based on groundwater modelling undertaken in accordance with this consent; ii. identification of surrounding licensed bores, dams or other water supplies and groundwater dependant ecosystems and potential groundwater risks associated with the construction of the project on these groundwater users and ecosystems; iii. measures to manage identified impacts on water table, flow regimes and quality and to groundwater users and ecosystems; iv. groundwater inflow control, handling, treatment and disposal methods; and v. a detailed monitoring plan to identify monitoring methods, locations, frequency, duration and analysis requirements;	Appendix A – Water Quality Management Program

4 Existing environment

The following sections summarise what is known about factors influencing soils and water within and adjacent to the Project corridor. The key reference documents are Chapter 7.6 and 7.7 of the EIS and Working Paper 7 – Soil, sediments, water and waste, and Working Paper 8 – Hydrology.

4.1 Topography and soil characteristics

4.1.1 Soil landscape

The 'Soil Landscapes of the Penrith 1:100 000 Sheet' (Bannerman and Hazelton, 1990) indicates the soil landscape at the Project site is classified as Freemans Reach. This soil landscape is an alluvium derived from the Narrabeen Group, Hawkesbury Sandstone and Wianamatta Group materials. The soils are typically deep brown sands and loams. It is a dynamic soil landscape where streambank erosion and deposition constantly occur, and the floodplains are subject to scour or sheet and rill erosion during floods.

The soils of the Freemans Reach soil landscape are highly erodible. They generally contain a high percentage of fine sand and have low to very low organic matter contents, and are moderately dispersible. The soil's erosion hazard is very high to extreme for concentrated flows and there is a high streambank erosion hazard.

Sediment samples were collected along the length of the Hawkesbury-Nepean River and from major embayments, creeks and reference locations. The sediments were analysed for a range of heavy metals including copper, lead, zinc, nickel, cobalt, cadmium, manganese and iron. Where possible, heavy metal concentrations in sediments were compared to reference locations and other estuaries in NSW to provide an indication of the comparative contamination. Generally the concentrations of heavy metals in the sediments in the main channel increased marginally with distance upstream, with the sediments at Windsor recording the highest concentrations in the main channel. Typical average concentrations of key heavy metals in the sediments around Windsor are about 26 micrograms per kilogram of copper, 39 micrograms per kilogram of lead and 110 micrograms per kilogram of zinc. These concentrations are below the low range Interim Sediment Quality Guidelines (ANZECC/ARMCANZ, 2000) and would be considered uncontaminated.

4.1.2 Acid sulphate soils

The Windsor Bridge Replacement EIS sampling of river bed sediments indicated that there are potentially low strength acid sulfate soils present within sediments near the southern bank. However as noted in the Acid Sulfate Soils Assessment Guidelines (ASSMAC 1998), estuarine sediments may give false positives to the presence of acid sulfate soil especially if there is a high proportion of organic matter in the sediments.

Georgiou will assume that the entirety of the alluvial sediment comprises either ASS or PASS soils and will undertake further testing of any excavated alluvial sediment to determine appropriate lime treatment rates. A detailed description of how interactions with acid sulfate and potential acid sulfate soils will be managed during the construction of the Project is given in the Acid Sulfate Materials Management Plan - Appendix B10 of the CEMP.

4.2 Surface water

Some sections of the Hawkesbury-Nepean River and its tributaries are recognised as providing environmental values such as water for irrigation and general use, livestock drinking, human consumption of aquatic food, raw drinking water and primary contact recreation.

Water quality monitoring at many sites in the Hawkesbury River has been routinely undertaken since the 1980s. Water quality of the Hawkesbury River was also recorded upstream and downstream of the proposed bridge crossing on 21 March 2012 (TFNSW , 2012c). The monitoring found that water quality upstream and downstream of the existing Windsor bridge and proposed replacement bridge is generally good for the parameters tested, and consistent with the assessment by DECC (2009). Average concentration of all parameters except dissolved oxygen was within the ANZECC/ARMCANZ (2000) guidelines for slightly disturbed lowland rivers. Dissolved oxygen concentrations at both sites exceeded the upper limit for dissolved oxygen (110 per cent saturation) with 114.3 per cent saturation upstream and 110.8 per cent saturation downstream.

4.3 Groundwater

A search of the NSW Natural Resources Atlas database identified no registered groundwater wells within the Project area. However one well (GW106373) is immediately adjacent to the Project near the corner of Wilberforce and Freemans Reach Roads. The groundwater bore information suggests:

- That in areas where there are gravels and sands in the top soil profile layers, there is an aquifer of good quality and low salinity water.
- That in areas where there are no are gravel and sands in the top soil profile layers, groundwater is only encountered at depths greater than at least 25m below surface and the groundwater is of relatively high salinity.

Apart from the salinity data contained in registered drilling bore logs there was no other information on the quality of groundwater in the study area. Groundwater flow would be expected to be towards the river as generally this would the lowest point in the aquifer.
The assessment of available data and the proposed construction methods demonstrate that the Project will have negligible impact on groundwater. Groundwater modelling is not considered to be required based on:

- Groundwater levels found to be approximately at the water level of the Hawkesbury River (SKM, 2013), and the proposed depth of open excavations on both southern and northern side of the Hawkesbury River are above the observed water table level.
- That piling is not expected to alter groundwater flows and/or directions, and all piles installed will be spaced and impermeable leading to negligible risk of aquifer mixing.

An increase in river levels could also cause groundwater levels to concurrently rise. If a significant flood event was to occur, work would be ceased and any flooded excavation managed accordingly.

The southern open excavation is not expected to intercept groundwater, and given the short term nature of the piling works on the northern side, and their construction as an impermeable and permanent concrete column, there will be negligible impact to groundwater both during construction and post-construction.

4.4 Rainfall

A summary of the rainfall records from the Bureau of Meteorology (Site 067105 – Richmond RAAF) is provided in Table 4-1 below. The average annual rainfall recorded at Windsor is

737.2 mm. February is the wettest month with an average monthly rainfall of 117 mm. July is the driest month with an average monthly rainfall of 29.6 mm.

Table 4-1 Summary of rainfall records

	Jan	Feb	Mar	Apr	Ma	Jun	July	Aug	Sep	Oct	Nov	Dec	Year
Mean rainfall (mm)	87.2	117	70.7	60.6	54.3	29.6	33.9	46.1	47.4	81.2	69.2	87.2	737
Mean rain days	7.8	8.1	7.6	6.2	5.4	5.7	4.1	3.6	4.7	5.4	7.6	6.8	73

4.5 Rainfall erosivity factor

The rainfall erosivity factor is a measure of the ability of rainfall to cause erosion (referred as "R" in the Revised Universal Soil Loss Equitation RUSLE). The rainfall erosivity factor is used to determine the soil loss in tonnes per hectare over one year, and is used in calculations when sizing construction sediment basins.

The Project has a Rainfall Erosivity Factor of 2500 based on the Rainfall Erosivity maps in the Blue Book (Managing urban storm water: soils and construction - Volume 1, 4th Edition).

It is also noted that the risk of rainfall erosion is slightly higher during summer months; therefore erosion control will need to be closely planned and managed during the months of December through March, as reflected by the monthly rainfall records in Table 4-1.

4.6 Flooding

The Nepean River extends to the Grose River junction, downstream the river becomes the Hawkesbury River. Large floods along the Hawkesbury River inundate floodplain areas downstream of Penrith and to a greater extent downstream of Yarramundi, including floodplains that are north and south of the river near Windsor. Flow in excess of the channel capacity inundates floodplains both to the north and south of the river between Yarramundi and Wilberforce. Flooding near Windsor is amplified due to restricted discharge through gorges downstream of Wilberforce. Much of the township of Windsor is built on a ridge above the river, the existing Windsor Bridge and the floodplain north of the river is at a lower elevation and has been subject to more frequent and deeper inundation than properties in Windsor. Inundation of the existing bridge can last for several days as the floodwaters slowly recede.

Flooding in the vicinity of Windsor is influenced by a number of contributing factors including:

- Large flows from the Nepean River and spills from Warragamba Dam.
- Flow from tributary creeks along the Nepean and Hawkesbury Rivers downstream of Penrith which increase the flow in the Hawkesbury River.
- Extensive floodplain areas that become inundated when flow in the river exceeds the channel capacity. Floodplains act to temporarily store and attenuate flow.
- Constrained waterway capacity through the gorge area downstream of Wilberforce/Sackville, causing floodwaters to back up upstream of the gorge, particularly in large and extreme floods.
- Colo River inflows downstream of Sackville gorge that can impede flow passing through the gorge.

4.6.1 Flood immunity of the existing bridge

Access to Windsor from areas north of Hawkesbury River (such as Wilberforce and Freemans Reach townships) during floods is limited by the level of the existing Windsor Bridge and low lying Chapters of Freemans Reach Road and Wilberforce Road. Levels along Freemans Reach Road vary between 9.6 and 12.8 metres AHD with the low point at the intersection with Wilberforce Road and a second low point at 10 metres AHD around 2 kilometres from Wilberforce Road. Levels along Wilberforce Road vary between 8.4 to 10.8 metres AHD between Windsor Bridge and where the road crosses Buttsworth Creek. Levels are based on Airborne Laser Survey data. Additionally Wilberforce Road is potentially inundated due to local catchment runoff surcharging culverts at Buttsworth Creek. The existing bridge is around 1.4 metres lower than the low point on Wilberforce Road and 2.6 metres lower than Freemans Reach Road.

Water level records for the river gauge at Windsor between 1987 and 2011 show there have been eight events for which water levels were higher than the level of the existing bridge (7 metres AHD). The average duration of these events was 43 hours.

5 Environmental aspects and impacts

5.1 Construction activities

Key aspects of the Project that could result in adverse impacts to soils and water include:

- Vegetation clearing and topsoil stripping.
- Earthworks and transport of material to stockpile
- Site access including movement of heavy vehicles across exposed earth.
- Utility and drainage works.
- Bridge construction including drilling and piling.
- Material stockpiles including the treatment of acid sulfate soil.
- In-situ concrete casting for bridge structures
- Paving activities.
- Water use
- Compounds operation including fuel and chemical storage, vehicle wash down, refuelling and chemical handling.
- Noxious weed treatment including herbicide spraying.
- Removal of riparian vegetation and installation of scour protection.
- Demolition of the existing bridge.

Refer also to the Aspects and Impacts Register included in Appendix A2 of the CEMP.

5.1.1 Water Use

Water for dust suppression and fill conditioning will be purchased town supply water from Windsor.

5.2 Potential Impacts

The potential for impacts on soil and water will depend on a number of factors. Primarily impacts will be dependent on the nature, extent and magnitude of construction activities and their interaction with the natural environment. Potential impacts attributable to construction might include:

- Exposure of soils during vegetation clearing and earthworks, creating the potential for off-site transport of eroded sediments and pollutants.
- Increased turbidity of waterway due to exposure, erosion, runoff, dust propagation and (riparian) vegetation removal).
- Production of tannins from mulch during clearing.
- Disturbance of acid sulphate soils, creating the potential for oxidation of these soils and subsequent generation of acidic run-off (Refer to Acid Sulfate Materials Management Plan - Appendix B10 of the CEMP)
- Alteration of surface and subsurface flows that could cause disturbances to hydrology.
- Contamination of soils, and surface and groundwater from accidental spills or oil leaks. This might include grease or fuel from machinery and vehicles, construction sites or

compounds, or spills of other chemicals that may be used during the course of construction.

- Disturbance of unidentified contaminated land and subsequent generation of contaminated runoff.
- Increased flood risk and influx.

Some impacts on soil and water attributable to the Project are anticipated. Relevant aspects and the potential for related impacts have been considered in a risk assessment at Appendix A2 of the CEMP. Chapter 6 provides mitigation measures that will be implemented to avoid or minimise those impacts.

6 Environmental control measures

A range of environmental requirements and control measures are identified in the various environmental documents, including the EIS, supplementary assessments, CoA and TfNSW documents, and from recent experience on similar road projects. Specific measures and requirements to address impacts on soil and water are outlined in table 6-1.

The management measures detailed in this SWMP are consistent with Managing Urban Stormwater - Soils and Construction Vol I (Landcom, 2004).

Table 6-1 Soil and water management and mitigation measures

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
GENERAL					
SW1	Training will be provided to all project personnel, including relevant sub-contractors on sound erosion and sediment control practices and the requirements from this plan through inductions, toolboxes and targeted training.		Pre-construction Construction	Construction Manager / Environment Manager	G38/G36, Good practice
PROCEDURES AND PLANS					
SW2	An erosion and sediment control plan will be developed for construction and updated progressively in accordance with Managing Urban Stormwater – Soils and Construction Volume 1 (Landcom, 2004) and Volume 2D (DECC, 2008). This plan will incorporate erosion control measure to limit the movement of soil from disturbed areas, and sediment control measures to remove any sediment from runoff prior to discharge into the river.	The Blue Book: Managing Urban Stormwater: Soils and Construction, Volume 1 and Volume 2 (Landcom, 2004), Appendix H	Pre-construction / Construction	ESR	CoA D5(d)(ii) G38 Section 2.1.2' EIS Table 10-1 SW1
SW4	The following EWMS will be prepared and implemented to manage soil and water impacts. • Installation of scour protection • Working in Waterways – Bridge Construction • Working in Waterways – Existing Bridge Demolition		Construction	Superintendent / Environment Manager	G36, G38
SW5	A water quality monitoring program has been developed for construction and operation. The plan will be implemented to assist in identifying water quality issues during construction and assessing the effectiveness of mitigation measures.	Water Quality Management Program, Appendix A	Pre-construction / Construction	ESR	CoA D4(d)(vi) G38 Section 2.3 EIS Table 10-1 SW3
SW6	The requirements of the spoil management plan attached at Appendix E will be implemented throughout construction. The plan includes, among other detail, the types of material expected to be encountered during construction, and how excavated material will be handled, transported, stockpiled, reused and disposed.	Appendix E	Construction	Superintendent / Foreman	CoA D4 (e)(iv)

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
SW7	All dewatering will be conducted in a manner that does not cause erosion and/or pollute the environment and must be done in accordance with the dewatering procedure (Appendix C) with a permit signed off by the ESR (Appendix D) by suitably trained personnel inducted on the requirements of the dewatering procedure.	Dewatering Procedure, Appendix C Dewatering Permit, Appendix D	Construction	Environmental Site Representative	C38 Cl 3.5
SW8	A spill management procedure (Appendix B12 – CEMP) will be developed and personnel will be inducted on its procedures in the event of a spill. All fuels and chemicals will be stored and used in accordance with the appropriate guidelines and standards	Australian Standard: AS1940 - 2004, The Storage and Handling of Flammable and Combustible Liquids (Standards Australia, 2004) Appendix B12 CEMP	Construction	Superintendent / Environmental Site Representative	G36 Good practice
SOIL EROSION CONTROL					
SW9	Appropriate measures will be implemented to contain any turbid water by applying best management practices such as silt curtains or similar.		Pre-construction / Construction	ESR, Superintendent	CoA D5(d)(iii) G38 Section 2.1.2 EIS Table 10-1 SW2
SW10	Works will be programmed to minimise the extent and duration of disturbance to vegetation. This will include leaving clearing (undertaken by manual means) and initial earthworks in intermittent and permanent watercourses until subsequent works are about to commence.		Pre-construction Construction	Superintendent / Foreman	G38
SW11	Wastewater or “dirty” water generated during the construction process will, wherever possible, be collected, treated and disposed of by appropriate means, including the installation of sediment barriers downslope of all disturbed areas. In areas where it is not possible to direct dirty water to sediment basins, other sediment controls will be implemented in accordance with “Blue book” best practice.		Construction	Superintendent / Foreman	G38
SW12	Clean and dirty water runoff will be adequately separated to avoid mixing where possible through the use of diversions, clean water drains, and the early installation of permanent drainage infrastructure.		Construction	Superintendent / Foreman	G38

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
SW13	The velocity of water flow over the construction site will be minimised by implementation/construction of level spreaders, check dams, bank and channel linings and other similar techniques.		Construction	Superintendent / Foreman	G38
SW14	Long term stockpiles eg those not accessed for greater than 10 days, access tracks, disturbed areas will be protected from wind blow dust by the implementation of appropriate measures including, but not limited to: • Seeding with cover crops. • Placement of hardstand material or similar. • Dampening of exposed surfaces with water.	Stockpile Management Plan, Appendix E	Construction	Superintendent / Foreman	G38
SW15	Exposed batter slopes, and other areas exposed for extended periods but not worked, will be protected from erosion during construction through temporary seeding, or the early implementation of permanent stabilisation measures eg topsoiling, seeding, revegetation.		Construction	Superintendent / Foreman	G38
SW16	Active work areas will be stabilised at the end of each day's work and/or just prior to inclement weather, by means such as grading or smooth drum rolling to create a smooth surface and by installing of temporary "catch" drains to prevent / minimise transport of sediment.		Construction	Superintendent / Foreman	G38
SW17	Sediment controls, such as traps (sediment fence) and check dams, will be installed where required, especially in smaller catchments where sediment basins have not been proposed.		Pre-construction / Construction	Superintendent / Foreman	G38
SW18	Barrier fences will be installed to delineate the extent of site disturbance.		Pre-construction / Construction	Superintendent / Foreman	G38
SW19	Erosion and sediment control structures will remain installed and maintained until sufficient vegetative cover is achieved.		Construction	Superintendent / Foreman	G38
SW20	Site compounds, access tracks, stockpile sites and temporary work areas will be located to minimise erosion.	Stockpile Management Plan, Appendix E	Pre-construction / Construction	Superintendent / Foreman	G38
SW21	Hardstand material, rumble grids or similar will be provided at exit points from construction areas onto public roads to minimise the tracking of soil and particulates onto public roads.		Pre-construction / Construction	Superintendent / Foreman	G38
SW22	Vehicle movements from site will be minimised during wet weather if the tracking of mud may become an issue.		Pre-construction / Construction	Superintendent / Foreman	Good practice

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
SW23	Loose rock, soil, debris etc will be removed from road surfaces (including sweeping of the road) at the end of each work shift.		Pre-construction / Construction	Superintendent / Foreman	G38
DRAINAGE AND WATERWAY					
SW24	EWMS will be developed in close consultation with the chosen demolition sub-contractor to refine methodologies to ensure the existing bridge will be demolished in in a way to reduce the risk of debris falling into the river		Demolition	Construction Manager / Environmental Site Representative	CoA C23 EIS Table 10-1 SW5
SW25	Debris and rubble will be prevented from entering the river.		Demolition	Construction Manager / Environmental Site Representative	CoA C23 EIS Table 10-1 SW6
SW26	Disturbance and turbidity will be contained by installing self-containment equipment such as silt curtains.		Demolition	Environmental Site Representative	CoA C23 G38 Section 2.1.2 EIS Table 10-1 SW8
SW27	Scheduling of demolition activities will occur to avoid or minimise the works taking place during times of higher rainfall and river flows.		Demolition	Construction Manager / Environmental Site Representative	G38 EIS Table 10-1 SW9
SW28	Where construction is occurring next to the river banks, adequate soil stabilisation controls will be implemented to ensure the risk of bank erosion is avoided. Where required, appropriate erosion control and weed suppression measures will be implemented (for example, the use of polymers in areas not directly adjacent to the river, the installation of geotextile material or thick jute mesh, or vegetation [avoiding introduction of exotic species were possible]).	CEMP, Appendix B11 Vegetation Management Plan, Section 4.3	Construction	Superintendent / Foreman	CoA 35 VMP
SW29	Avoid or minimise, where practicable, any activities in aquatic habitats and riparian zones.		Construction	Construction Manager / Environmental Site Representative	Good practice

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
SW30	Protect and signpost as environmentally sensitive areas, all waterways areas in or adjacent to the Site which are excluded from the work areas.		Construction	Construction Manager / Environmental Site Representative	Good practice
SW31	Operate boats or other watercraft in a manner that prevents boat wash which could cause erosion of the banks.		Construction	Construction Manager / Environmental Site Representative	Good practice
SW32	Staging of proposed works to minimise disturbance on banks.		Construction	Construction Manager / Environmental Site Representative	Good practice
SW33	All works near riparian zones will have adequate sediment and erosion control, with relevant ESCP's updated as required. The ESCP's will have a focus on erosion measures in the flood zone.	Progressive Erosion and Sediment Control Plan (updated as required)	Construction	Construction Manager / Environmental Site Representative	Good practice
SW34	Marine spill kits to be located on watercraft and on the banks of each work area		Construction	Construction Manager / Environmental Site Representative	Good practice
SW35	Hydrophobic oil booms will be deployed in the waterway parallel to banks for additional protection where necessary.		Construction	Construction Manager / Environmental Site Representative	Good practice
SW36	Plant and machinery able to be tracked away from the waterway will be refueled a minimum of 20m away from waterway. Where machinery in unable to be relocated, additional measures will be installed including impervious temporary bunding and deployment of additional hydrophobic oil booms.		Construction	Construction Manager / Environmental Site Representative	Good practice

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
SW37	Areas disturbed as a result of the project will be stabilised and rehabilitated through a progressive landscaping program that takes advantage of optimal growing conditions and is appropriate to the final land use.	Vegetation Management Plan (CEMP Appendix B11)	Construction	Construction Manager / Environmental Site Representative	VMP
SW38	A riparian corridor consisting of vegetation from the relevant local native vegetation communities will be established along the Hawkesbury River bank areas disturbed by the project with the exception of those areas required for scour protection for the safety of the bridge. Rehabilitation will be undertaken progressively during the construction period in accordance with the Vegetation Management Plan.	Vegetation Management Plan (CEMP Appendix B11)	Construction	Construction Manager / Environmental Site Representative	VMP
GROUNDWATER					
SW39	Monitoring of groundwater at piezometers installed for the project and the adjacent groundwater bore will be undertaken to identify any impacts during construction. If any impacts on groundwater levels or quality are detected, the potential cause and environmental management measures will be identified and developed.	Water Quality Management Program (Appendix A)	Pre-construction / Construction	Environmental Site Representative	CoA D5(d)(vii)(ii) EIS Table 10-1 SW22
SW40	An increase in river levels could also cause groundwater levels to concurrently rise. In the event of significant flooding, excavation works would cease and any flooded excavation would be managed as follows; • Water inside the excavation will be tested and dewatered in accordance with the Dewatering Permit, Appendix D. • Following dewatering the excavation will be backfilled as soon as practical to prevent any further water ingress	Water Quality Management Program (Appendix A) Dewatering Permit Appendix D	Pre-construction / Construction	Environmental Site Representative	CoA D5(d)(vii)
WATER QUALITY AND USE					
SW41	Water quality monitoring will occur in accordance with the Water Quality Monitoring Program.	Water Quality Management Program (Appendix A)	Pre-construction / Construction	Engineers	EIS Table 10-1 SW8
SW42	Water captured in sediment basins and other areas will be reused for dust suppression, compaction, or other construction activities in preference to potable water. Reuse of water from sediment basins will permitted following approval by environment staff.		Construction	Superintendent / Foreman	G38

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
MATERIAL STORAGE AND MANAGEMENT					
SW43	Concrete pumping or concreting activities will be undertaken in accordance with Environmental Best Management Practice Guideline for Concreting Contractors 2002 to prevent and/or minimise spillages.		Construction	Superintendent / Foreman	good practice
SW44	Designated impervious bunded facilities will be provided for washout of concrete trucks and cleaning and/or maintenance of other vehicles, plant or equipment. These facilities will be located at least 40 metres away from natural and built drainage lines.		Construction	Superintendent / Foreman	G38
SW45	Dangerous goods, as defined by the Australian Dangerous Goods Code, shall be stored and handled strictly in accordance with: (a) all relevant Australian Standards; (b) for liquids, a minimum bund volume requirement of 110% of the volume of the largest single stored volume within the bund; and (c) the Environment Protection Manual for Authorised Officers: Bunding and Spill Management, Technical Bulletin (EPA, 1997). In the event of an inconsistency between the requirements listed from (a) to (c) above, the most stringent requirement shall prevail to the extent of the inconsistency.		Construction	Superintendent Foreman	CoA C12
SW46	All chemicals and fuels associated with construction will be stored in roofed and bunded areas. Spill kits will be provided at all chemical storage facilities/compound sites.		Pre-construction / Construction	Superintendent / Foreman	EIS, Table 10-1 SW13
SW47	Vegetation and mulch erosion and sediment control filters will only be used where it can be demonstrated that tannin leachate will not be discharged from the site either overland or into groundwater.	Appendix G	Construction	Environment Manager / Foreman	Good practice
SW48	Where refuelling on site is required, the following management practices will be implemented: • Refuelling will be undertake on level ground and at least 20 metres from drainage lines, waterways and/or environmentally sensitive areas. • Refuelling will be undertaken within the designated refuelling areas with appropriate bunding and/or absorbent material.		Construction	Foreman	Good practice

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
	• Will not be undertaken on or in the vicinity vegetated areas (even roadside grasses). • Will be attended at all times. • Spill kits will be readily available and personnel trained in their use. A spill kit will be kept on the refuelling truck at all times. • Hand tools will be refuelled within lined trays of site vehicles wherever possible.				
REHABILITATION AND LANDSCAPING					
SW49	Disturbed areas will be progressively stabilised during the construction phase eg with a cover crop, hydromulch, hydroseeding, topsoil and/or mulch. Wherever possible, permanent landscaping and revegetation works will take place progressively in accordance with the Vegetation Management Plan.	CEMP, Appendix B11	Construction	Superintendent / Foreman	G38
SW50	Topsoil and mulched vegetation will be stockpiled and reused within the general areas from which it is removed where practical.	Stockpile Management Plan, Appendix E	Construction	Superintendent / Foreman	Good practice
SW51	Other material kept stockpiled must be kept separated from the topsoil stockpiles	Stockpile Management Plan, Appendix E	Construction	Superintendent / Environmental Site Representative	G38 Cl 3.2
MONITORING					
SW52	Rainfall forecasts will be monitored daily and the site managed to avoid erosion and sedimentation, and to minimise the impact of heavy rainfall and flood events.		Construction	Superintendent ESR	G38
SW53	Erosion and sediment controls will be inspected at least daily (with maintenance and/or modifications made as necessary). Inspections and/or maintenance during wet-weather maybe increased where necessary.		Construction	Foreman	Good practice
SW54	All surface water quality monitoring will be undertaken in accordance with the Water Quality Management Program attached at Appendix A.	Water Quality Management	Construction	ESR	CoA D4(d)(vi) G38 Section 2.3

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
		Program, Appendix A			EIS Table 10-1 SW3
SW55	All groundwater monitoring will be undertaken in accordance with the requirements for groundwater monitoring within the approved Water Quality Management Program.	Water Quality Management Program, Appendix A	Construction	ESR	CoA D5(d)(vii)(ii) EIS Table 10-1 SW22
RECORDS					
SW56	Records of dewatering activities will be maintained. Details will include: i. A copy of the work method statement(s). ii. Date, time and estimated volume released at each discharge location. iii. Water quality test results for each discharge. iv. The personnel approving the dewatering activities. v. Evidence of discharge monitoring, or risk assessment and mitigation measures used to eliminate the risks of pollution.	Appendix C Dewatering Procedure Appendix D, Dewatering Permit	Construction	ESR	G38

7 Erosion and Sediment Control Plans

Erosion and sediment control measures will be prepared prior to disturbance, or as site conditions dictate, during a change in site layout, and documented in progressive ESCP. These may be specific to a site, a sub-site, sub-catchment or individual component of the work. For example:

- Clearing, grubbing and removal of topsoil.
- Works in waterways or drainage lines.
- Earthworks.
- The installation of a culvert extension.

ESCPs will include but not be limited to:

- Contours and clean and dirty water drainage paths.
- Sediment basins and/or sumps and designated pump out locations.
- Limit of disturbance.
- Location and type of control measures.
- Order of works schedule.
- Specific construction details.
- Personnel responsible for maintenance of erosion and sediment controls.

A primary ESCP has been developed for the project (Appendix H), this plan is indicative only and forms a basis for which the progressives ESCP's will be developed from.

ESCPs will be developed by the ESR in accordance with the Blue Book Guidelines.

7.1 Key Management Strategies

The erosion and sediment control (ESC) measures employed on the site will involve a number of principles and control measures, designed to minimise erosion and sedimentation impacts on the surrounding environment. This includes the incorporation of specific structures, such as sediment basins, and measures to minimise erosion and sedimentation associated with the Project, to be implemented in conjunction with various management techniques. This overall erosion and sedimentation management strategy will collectively fulfil the principles of best practice as detailed in the previously mentioned manuals. This will ensure a 'preventative' rather than a 'cosmetic or remedial' approach to erosion and sediment control.

The following key principals will apply to all areas and stages of construction on the Project:

1 Minimise extent and duration of disturbance.

2 Control stormwater flows onto, through and from the site.

3 Erosion control strategies to prevent on-site damage.

4 Sediment control strategies to prevent off-site damage.

5 Progressive stabilisation following completion of work areas.

6 Inspection, Maintenance and Improvement.

The following additional management practices are to be adopted (in addition to those described above):

- Collaborative approach with TfNSW and Environmental Representative with the design and implementation of ESCPs and controls. Georgiou will present and discuss the ESCPs with the focus on improving the quality and effectiveness of the plans and controls.
- Adoption of alternative technologies/strategies including inlet sumps; pre dosing of basins including inlets and outlets.
- Greater investment in erosion control as opposed to sediment control.
- Environmental inspection on controls and basin volumes prior to predicted rainfall events to ensure the project is in a state to receive rainfall.

7.2 Site Stabilisation

The ESCPs will identify areas requiring stabilisation and methods of stabilisation required during the construction process. The EWMS will incorporate a risk assessment for disturbed areas and stockpiles, a monitoring program for stabilised areas and a process for determining if the controls are successful and if additional stabilisation methods / controls are required.

All high risk areas identified in the EWMS will be stabilised within 2 weeks of the area being completed to design levels and all medium areas will be stabilised within 1 month of works being completed.

7.3 Working within or near waterways

The installation of scour protection, construction of the new bridge and demolition of the existing bridge are considered particularly sensitive due to the requirement for works in and over water and the high potential for sediment impacts.

A specific EWMS will be developed by the ESR, Project Engineer and representatives of the wider project team for the works in and adjacent to the waterways which will detail specific controls and methodologies to be implemented to minimise the potential for impacts to the water quality and riparian fauna and flora. These include:

- Avoiding or minimising, where practicable, any activities in aquatic habitats and riparian zones
- protect and signpost as environmentally sensitive areas, all waterways areas in or adjacent to the Site which are excluded from the work areas
- operate boats or other watercraft in a manner that prevent boat wash which could cause erosion of the banks
- In water controls – silt curtains for demolition and construction
- Capture measures for demolition debris and concrete during construction
- Staging of proposed works to minimise disturbance on banks
- Extensive use of erosion and sediment controls with a focus on erosion measures in the flood zone.
- Diversion of clean water around the site.
- Final stabilisation and protection works to be completed as soon as practical.

7.4 Key Erosion and Sediment Control Measures

The following measures are to be implemented where soil disturbance occurs to control water flows, and filter or capture sediment. A combination of these measures would be required in areas that cannot be directed to sediment basins and/or produce a potential soil loss of less than 150m3 per year. These would be installed in accordance with design principals contained in the Blue Book (Landcom, 2014).

7.4.1 Diversion Banks and Berms

Diversion banks and berms are earth structures and assist in reducing site erosion by:

- Reducing the length of slope (and the potential soil loss).
- Increasing the time of concentration of overland flow.
- Managing the direction and flow path of site water.
- Directing overland flow to a stable outlet point.
- Diverting run-on water around the construction site.

These structures are effective at reducing erosion potential and form a critical part of the ESCP. They are relatively simple to construct and are to be implemented during all stages of the construction program where appropriate.

7.4.2 Stormwater Management

Management of clean and dirty water catchments and the runoff entering and generated onsite is essential to effectively manage soil and water onsite.

Prior to construction works commencing, construction of upslope diversion drains or bunding is required to separate runoff entering from ‘clean’ offsite upslope catchments and runoff generated from ‘dirty catchments’. In the case of this project the upslope diversion drains are will be the existing verge drains from the existing road which is directly upslope of the construction site. These existing drains are stabilised and will be maintained clean by installing dirty water berms at any areas where construction runoff can enter.

7.4.3 Soil Protection

Where soil disturbance is undertaken, and it is not feasible to construct sediment control measures or implement final rehabilitation, the potential for erosion will be minimised by applying mulch cover, application of a polymer or covering the site with geotextile, heavy duty plastic or similar as a temporary measure. This is particularly relevant to areas of staged construction (fill areas and culverts) and areas in the flood zones of the watercourses onsite.

7.4.4 Mulch

Given the location of the proposed alignment and the small amount of clearing of vegetation that would be required it is proposed that the obtained mulch material would be reused on site as an erosion or sediment control as mulch berms for filtration of site water during the clearing and topsoil stripping stages. Mulch is very effective in controlling sediment and has the added benefits of being biodegradable, and easy to maintain. However, as there can be problems with tannin seeping from the mulch which can make its way into waterways, its use will need to be appropriately managed by controlling widths, heights and locations such as using away from waterways and low lying areas.

Use of mulch will comply with TFNSW protocols and leachate will be managed carefully to ensure it does not enter the environment off site or sediment basins (as per TFNSW Environmental Direction 25; Management of Tannins from Vegetation Mulch, Appendix E).

7.4.5 Sediment Fence

The use of sediment fence will be minimised on the Project where other measures may be more appropriate (e.g. mulch bunds, rock socks, diversion banks) for the following reasons:

- Sediment fence can be labour intensive and difficult to maintain mechanically.
- High maintenance requirement and cost.
- Sediment fence is generally ineffective for particles smaller than sand.

However, there will be occasions where sediment fence provides the most appropriate sediment control solution, particularly where space is limited or mechanical installation of measures is not considered practical. Sediment fence will be woven polypropylene and cotton/geotextile thread with a flow rate >110 litres/m2/sec to AS3706.9.

7.4.6 Sediment Basins

Sediment basins are designed to capture and provide settlement time for colloidal suspended particles with treatment. These basins are located to achieve maximum water flows from the disturbed catchments only and require other controls to ensure that clean water from undisturbed catchments is not directed to these basins.

Basins are to be constructed in catchments where the potential soil loss using the RUSLE is greater than 150m3 / year. They are to be designed in accordance with the blue book design capacity and where space allows will be designed to the 85th %ile 5 day rainfall depth for Windsor (Blue Book Table 6.3a). Rainfall above the basin design rainfall depth of 33.2mm will see the basins overtop via the stabilised spillway and discharge to the environment.

As the construction catchment for the Windsor Bridge project are <0.5ha in area and have an estimated soil loss less than150m^3 / year it is not expected that sediment basins will be required. However, the northern stormwater system will discharge into a permanent water quality basin near the south eastern corner of the new roundabout on the northern bank and until all of the upslope catchment is stabilised with pavement and landscaping this operational basin will need to be managed as a temporary sediment basin in accordance with the in accordance with the ‘Blue Book’.

Temporary sediment basins are not proposed, however there is an operational basin to be constructed. It is likely that for a period of time this will need to be managed as a temporary construction sediment basin until such a time the upslope catchment is stabilised with pavement and landscaping. This operational basin is to be constructed in accordance with the design provided by TfNSW and the details in G38 Cl 3.7, these requirements include:

- Design the construction sediment retention basins in accordance with the BLUE BOOK (Landcom 2014) guidelines.
- Prepare the Site under proposed embankments by ripping to a depth of 100 mm and excavating a trench at least 600 mm deep by 1200 mm wide along the centreline of the proposed embankment.
- Construct the embankment in layers not exceeding 200 mm and compacted so that the relative compaction is not less than 95.0 per cent using material with a Plasticity Index not less than 15 and not more than 30, and a grading such that at least 20 per cent by mass of material passes the 425 micron sieve.

- Construct inlets, outlets and spillways as soon as possible using rock filled woven galvanised steel mattresses laid on a needle punched, mechanically bonded, non-woven geotextile filter fabric.

For the period that this basin is managed as a temporary construction basin the testing, treatment and discharge are to be managed accordance with Appendices B-D, which have been developed to satisfy the requirements of G38 Cl 3.7.

Training on basin construction and operation is provided in Appendix B.

8 Compliance management

8.1 Roles and responsibilities

The Georgiou Project Team's organisational structure and overall roles and responsibilities are outlined in Section 4.2 of the CEMP. Specific responsibilities for the implementation of environmental controls are detailed in Section 6 of this Plan.

8.2 Training

All employees, contractors and utility staff working on site will undergo site induction training relating to soil and water management issues. The induction training will address elements related to soil and water management including:

- Roles and responsibilities for soil and water management.
- The location of sensitive receiving waters.
- Water quality management and protection measures.

Targeted training in the form of toolbox talks or specific training will also be provided to personnel with a key role in soil and water management. Examples of training topics include:

- ERSED control installation methodology.
- Sediment basin operation.
- Sediment basin maintenance.
- Working near or in drainage lines and waterways.
- Emergency response measures in high rainfall events.
- Preparedness for high rainfall events.
- Lessons learnt from incidents and other event e.g. high rainfall/flooding.
- Mulch and tannin management.
- Spill response.
- Stockpile location criteria.

Further details regarding staff induction and training are outlined in Section 5 of the CEMP.

8.3 Monitoring and inspection

Regular monitoring and inspections will be undertaken in the lead up to, during and following construction. Monitoring and inspections will include, but not be limited to:

- Up and downstream of the project alignment water quality monitoring at nominated locations.
- Groundwater monitoring, both level and quality at nominated locations.
- Construction sediment basin water quality prior to discharge.
- Monitoring of spoil, fill and materials stockpile sites including how materials are stockpiled, reused and/or disposed.
- Weekly and post rainfall inspections to evaluate the effectiveness of erosion and sediment controls measures in accordance with Section 8.1.1 of the CEMP.
- Monitoring of rainfall to determine if local rainfall events may trigger a wet weather surface water sampling event as required in Chapter 6.4 of the Water Quality Management Program.
- Monitoring of testing and discharge from water from sediment basins.

Additional requirements and responsibilities in relation to inspections are documented in Section 8.2 of the CEMP.

Surface water quality monitoring will be undertaken in accordance with the *Australian Guidelines for Water Quality Monitoring and Reporting* (October 2000).

Prior to controlled discharge of water from basins to the environment, sampling and testing to undertaken by the ESR or trained site delegates and laboratory confirmation will occur to ensure that the water quality criteria listed in Table 8-2 is met. The Dewatering Procedure (Appendix C) prescribes water quality parameters to be measured and associated discharge criteria. The water quality discharge criterion for the Project is listed in Table 8-2.

Table 8-1 Discharge water quality criteria

Parameter	Criteria	Sampling method	Analytical method
pH*	6.5 –8.5	Probe or Grab Sample	Field analysis and confirmed as required with laboratory assessment
Turbidity	TBA following correlation with TSS results	Grab Sample	Field analysis and confirmed as required with laboratory assessment, regularly updating correlations and having a factor of conservatism.
Total Suspended Solids*	50 mg/L	Grab Sample	Laboratory analysis
Oil and Grease*	No visible	Grab Sample	Field analysis and confirmed as required with laboratory assessment

An NTU / TSS correlation will be achieved to determine water quality on site prior to discharge using NTU monitoring equipment. The NTU correlation will be achieved through laboratory analysis of water quality samples for NTU and TSS from the Project. This will enable a NTU value for the Project site that represents 50mg/L TSS to be established.

8.4 Incident response and reporting

An Incident Reporting Procedure (CEMP Appendix A5) covers incidents involving soil and water quality. A Pollution Incident Response Management Plan (CEMP - Appendix B12) has been developed to minimise the impact of spills including details on the requirements for managing, cleaning up and reporting.

8.5 Weather monitoring

Rainfall at the premises will be measured and recorded in millimetres per 24-hour period at the same time each day from the time that the site office associated with the activities is

established. An automatic rainfall intensity/ weather device will be installed at the main site compound and weather results will be monitored daily.

8.6 Auditing

Audits (both internal and external) will be undertaken to assess the effectiveness of environmental controls, compliance with this sub plan, CoA, environmental management measures and other relevant approvals, licenses and guidelines.

Audit requirements are detailed in Section 8.3 of the CEMP.

8.7 Reporting

Reporting requirements and responsibilities are documented in the Water Quality Monitoring Program (Appendix A) and Chapter 6 and Section 8.5 of the CEMP.

Additional reporting of water discharge from sediment basins is to be in accordance with the Sediment Basin Management and Discharge Procedure (Appendix B), with results of discharges included in the monthly report (Section 8.5 of the CEMP).

9 Review and improvement

9.1 Continuous improvement

Continuous improvement of this Plan will be achieved by the ongoing evaluation of environmental management performance against environmental policies, objectives and targets for the purpose of identifying opportunities for improvement.

The continuous improvement process will be designed to:

- Identify areas of opportunity for improvement of environmental management and performance.
- Determine the cause or causes of non-conformances and deficiencies.
- Develop and implement a plan of corrective and preventative action to address any non-conformances and deficiencies.
- Verify the effectiveness of the corrective and preventative actions.
- Document any changes in procedures resulting from process improvement.
- Make comparisons with objectives and targets.

9.2 CSWMP update and amendment

The processes described in Section 8 and Section 9 of the CEMP may result in the need to update or revise this Plan. This will occur as needed.

Only the Environmental Site Representative, or delegate, has the authority to change any of the environmental management documentation.

A copy of the updated plan and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure – refer to Section 10.2 of the CEMP.

Soil and Water Management Plan
Appendix A
Water Quality Management Program

Soil and Water Management Plan

Appendix B

Sediment Basin Management and Discharge Procedure

Revision history

Revision	Date	Description	Approval
1			
B	19/06/18	RMS review	
A	28/05/18	For review	

Distribution of controlled copies

Copy no.	Issued to	Version
1	RMS	A
2	RMS	B
3		
4		
5		

Sediment Basin Management and Discharge Procedure

Purpose
To operate effectively, protect the environment and comply with legislative requirements, sediment basins require ongoing management and maintenance.
This procedure details the sediment basin management process to ensure:

- the sediment basins are maintained to retain maximum capacity in advance of predicted rainfall.
- the integrity of the basins remains intact.
- the quality of the water meets the criteria set prior to being reused onsite or discharged.

Scope
The management of a sediment basin involves inspecting the basin regularly, testing the quality of water in the basin, treating the water to ensure the quality meets specified criteria, and reusing the water for dust suppression or releasing the treated water in a controlled manner. Maintenance of a sediment basin refers to any repair work undertaken on the walls, and/or the removal of accumulated sediment to maintain capacity.

Induction/Training
The relevant personnel will be trained and inducted on the management of basin discharge and the procedure through a Toolbox signoff below. Only trained personnel will be authorised to test and discharge water from sediment basins.

The ESR is the only authorised person to issue a 'dewatering permit' (Appendix D) which allows water to be discharged out of the basin.
See Table 1 below for detailed procedures on sediment basin management. A dosing method for lowering pH (where required) is included below.

Timing of Works
If constructed for the Project, the sediment basin will be inspected weekly (as a minimum) as part of the standard ESR site inspection protocol to identify water testing requirements and maintenance actions.

Sediment basin maintenance would be required when physical damage or potential collapse of any part of the basin is observed. The removal of accumulated sediment will be required when ≥30% of the basin capacity is lost.

Procedure

Table 1 Sediment Basin Management and Discharge Procedure

#	Sequence of Work Activities	Potential Hazards	Risk	Safeguards/Controls	Responsibility
	How will the work be done?	*What harm can occur?*	*Low-Med-High*	*How can the risk be minimised?*	*Who will ensure that controls are in place?*
1	Provide training to personnel involved in sediment basin management/maintenance	Non-compliance with legislation requirements	Med	• Toolbox field operators on the requirements of this EWMS • Provide specific training on basin management to ERSED personnel and persons authorised to discharge basins	Foreman Project Engineer ESR
2	Inspect sediment basin prior and after each rain event, if no rain evident, at least weekly	Non-compliance with project requirements	Med	• Inspect for any maintenance requirements (e.g. any sign of damage/breach in the wall, excessive sediment accumulation)	ESR
3	Test the quality of the water in the basin	Release of polluted water to the environment	Med	• Select a safe, accessible sampling point. Ensure it is not too steep or slippery • Take a sample of water from just below the surface • Use the Water Quality Report form to record: o The pH of water detained in the basin (measured using a pH probe – calibrated) o The turbidity of the water (measured using the turbidity probe – calibrated) o The presence of oil and grease (visual) • If TSS of the water is >50mg/L water is not to be pumped.	ESR
4	Remove oil and grease	Release of polluted water to the environment	Low	• Using an absorbent spill pad (or boom for larger quantities), remove any visible oil and grease from the surface of the water • Dispose of the fabric in accordance with the manufacturers recommendations • In case of a large spill, allow for the basin to be pumped into a contaminated waste removal truck and disposed of at an approved facility	ESR / Foreman
5	Flocculate the basin	Release of polluted water to the environment	Med	• After rainfall generating runoff received, flocculation will be required to meet the levels below: o pH must be between 6.5-8.5 o Turbidity = correlation with 50 m/L TSS o No visible hydrocarbon sheen • Apply gypsum by direct application and spread over the surface. o General guide for gypsum application is 30-50kg/100m³ of volume, however this will vary depending on the soil type • Record the quantity of gypsum added to the basin and the time it was added	ESR / Foreman ESR ESR / Foreman / engineer

#	Sequence of Work Activities	Potential Hazards	Risk	Safeguards/Controls	Responsibility
	How will the work be done?	*What harm can occur?*	*Low-Med-High*	*How can the risk be minimised?*	*Who will ensure that controls are in place?*
				o Maintain a stock of gypsum and lime on site for use in basin management activities • For lab analysis, the levels should be: o pH must be between 6.5-8.5 o TSS <50mg/L o Oil and grease not visible or <10mg/L • Recording of results to be done by ESR	
6	Correct the pH	Change in the character of downstream receiving waters	High	• If the measure pH was less than 6.5 add lime to the basin o Approximate guide is 5-10kg/basin, however this will vary from basin to basin, lime to be added providing even coverage over the basin • Re-test after lime application, giving the pH time to adjust o Depending on size of basin and quantity of water held this will be after 2 hours • On the Sediment Basin Checklist, record the quantity of lime added to the basin • Where pH is greater than 8.5, hydrochloric acid (HCL) should be added to the basin. See attached methodology **NB Personnel to be toolboxed on safe use of HCL**	ESR / Foreman
7	Allow time for settlement	Release of turbid water to the environment	High	• Allow approximately 24 hours for the solids contained in the water to settle. If rain is experienced during this time, it may be necessary to commence the process again starting at point 4 above. • The water should appear 'cleaner' and less coloured if the settlement process has been effective.	ESR / Foreman
8	Re-test the basin	Release of polluted water to the environment	High	• Determine the pH and turbidity levels of the basin. Record the results on the Water Quality Report Form.	ESR / Foreman
9	Release the basin / reuse for dust suppression	Release of dirty water to the environment	High	• Only authorised personnel are permitted to release any basin. • Charge siphon pipe and release end cap to draw water from basin to receiving water. • Turn on the pump and throttle down to allow slower release of water so as not to stir up sediment and cause erosion at the outlet. (only trained personnel to operate basin dewatering pumps) • Maintain a register of all basin discharges	ESR / Foreman
10	Undertake maintenance works	Failure of basin resulting in discharge of dirty water to environment	Low	• If a maintenance issue is identified (See point 2 above), arrange for immediate rectification of the problem and record on the Soil & Water Quality checklist.	Foreman

#	Sequence of Work Activities	Potential Hazards	Risk	Safeguards/Controls	Responsibility
	How will the work be done?	*What harm can occur?*	*Low-Med-High*	*How can the risk be minimised?*	*Who will ensure that controls are in place?*
11	Remove accumulated sediment	Reduced capacity Overtopping resulting in discharge of stormwater to environment	Low	• If sediment levels within the basin exceed 30% of the total capacity, arrange for removal. • Identify a suitable location for disposal of the sediment. • Construct a containment area (earth bund) to place and hold sediment until it dries. • Consider reuse options (e.g. Landscaping, fill, and disposal/burial).	Foreman

Toolbox – Sediment Basin Management and Maintenance

- To operate effectively, protect the environment and comply with the site requirements, sediment basins require ongoing management and maintenance.
- The management of a sediment basin involves:
    - inspecting the basin at least weekly and after rainfall (>10mm in 24 hrs)
    - testing the pH and turbidity
    - treating the water
    - testing the quality of the treated water in the basin to ensure the quality meets specified criteria
    - Releasing the treated water in a controlled manner.
- Maintenance of a sediment basin refers to:
    - Any repair work undertaken on the walls, spillway etc.
    - The removal of accumulated sediment to maintain capacity.
- The management of sediment basins is controlled under the project requirements. The quality of water contained in a basin must meet blue book (Landcom 2004) criteria BEFORE it can be discharged. Non-compliance with the criteria can lead to fines being imposed on Georgiou and individuals by the EPA.
- The sediment basin will be inspected following a rain event that generates runoff OR when greater than 10mm of rain is recorded in any 24 hour period.
- A wet weather inspection will be completed after each rainfall event and include each basin. The checklist is to be completed by the ESR or nominated delegate and will be used to prepare a report to Roads and Maritime.
- Select a safe, accessible sampling point located near the spillway and take a sample of water from a depth of approximately 30cm.
- Install a marker to identify the 5 day rainfall depth and settlement zone of the basin
- Water quality parameters are pH, turbidity and a visual inspection for oil and grease.
- If pH is low it must be corrected with Lime prior to discharge.
- If pH is high neutralise with hydrochloric acid.
- If an oil or grease sheen is evident it must be skimmed off prior to discharge.
- If the test results exceed 50mg/L the water is too dirty to release without additional flocculation.
- The approved flocculent for this project is gypsum.

- Only authorised personnel are permitted to release any basin. Those people are those that have been toolboxed on the requirements of this procedure and instructed by the ESR.
- If a maintenance issue is identified, arrange for immediate rectification of the problem by alerting the Foreman.
- Need to install a 30% marker in the sediment basins for ease of reference.

Hydrochloric Acid (HCL) Dosing Method
The following steps detail the procedure to follow when dosing the basins/pits with HCL.

1. Test water in basin/pit with pH meter.
2. If pH between 6.5 and 8.5, take no action.
3. If pH above 8.5, add HCL (32% muriatic acid).

a. Determine the volume of water in basin/pit (in m^3, see table below)
b. Determine amount of acid required, by either;
   i. Using dosing rate table below; or
   ii. Adding a known amount of acid (initially 0.04%) to a 10 litre sample of the basin/pit water until the pH reaches acceptable limits. Once the required percentage has been determined, calculate the actual amount of lime or acid to be added by multiplying the volume of water in the basin/pit by the determined percentage;
   iii. Add the required amount of acid to the basin/pit inlet to allow mixing as runoff flows into and around the basin.

4. Monitor pH level while dosing and record on Water Quality Report form.
5. Stop dosing once pH level drops below 7.

Table 2 HCL Dosing rate to lower PH by approximately 1.5 units

ID	Capacity m^3	Approx. HCL (L) to lower by 1.5pH
Basin	1200	80
	960	65
	720	50
	600	40
	360	25

Safety Precautions
The following safety precautions must be taken when using HCL:

- Suitable PPE must be worn, including at a minimum:
  - gloves;
  - eye protection;
  - dust mask; and
  - long sleeves/trousers
- Dosing can be carried out by two people. These people must have been toolboxed in this procedure.
- HCL to be stored in designated secure bunded area.

HCL to be included on SDS Register and register to be kept up to date.

Soil and Water Management Plan

Appendix C

Dewatering Procedure

Revision history

Revision	Date	Description	Approval
1			
B	19/06/18	RMS review	
A	28/05/18	For review	

Distribution of controlled copies

Copy no.	Issued to	Version
1	RMS	A
2	RMS	B
3		
4		
5		

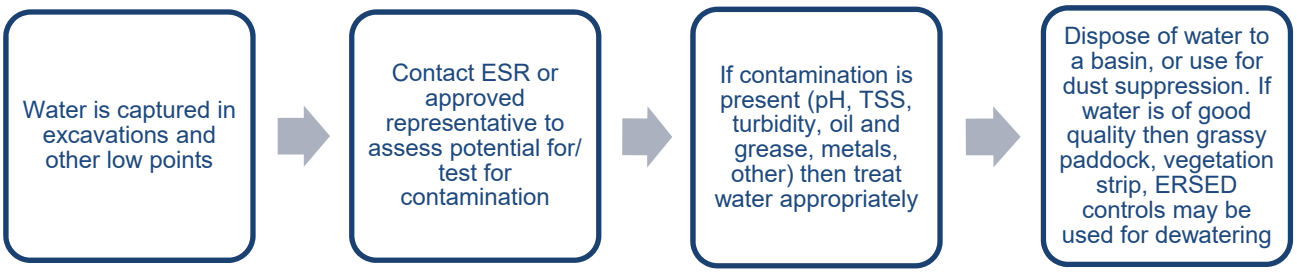
Dewatering Procedure

Purpose

This procedure details the process for dewatering excavations and other water capture points in the construction areas of the project.

Scope

The dewatering of water capture points and general low points (including excavations on the alignment) is required to maintain capacity. This procedure does not refer to the dewatering of permanent or temporary sediment basins. These are dealt with in the Sediment Basin Management and Discharge Procedure (Appendix B).



Induction/Training

All Georgiou personnel are to be inducted on the existence of this procedure during the project induction, and in more detail as required in site inductions and regular Toolbox Talks.

Procedure

Identifying Dewatering Points

This procedure relates to all water capture points not identified as discharge locations. This includes locations such as below ground excavations where groundwater or stormwater has been captured, or above groundwater capture points (e.g. depressions on the alignment).

Assessing Contamination

Potential contamination could be from numerous sources. The most likely sources will be Total Suspended Solids (TSS), oil and grease, pH, metals (in Acid Sulphate Soil (ASS) areas).

Where the main water source is from stormwater, TSS and oil and grease would be considered likely pollutants. Where groundwater is the main water source, influence from ASS in the form of pH and metals must be considered as potential pollutants.

Treating Contaminated Water

The treatment of contaminated water would be done by following the Sediment Basin Management and Discharge Procedure (Appendix B).
Where TSS treatment is required, transfer to the treatment basin shall occur first as solids will be stirred up during transport/pumping.

Dewatering

Where dewatering is required, the quantity and quality of water is to be considered. For large quantities or poor quality, as assessed by the ESR, the water will be removed by water trucks and used for onsite dust suppression or pumped/carted to the storage basin or removed from the site as liquid waste. The water must be tested by the ESR or approved representative on the day of discharge.
All water leaving the site will be released through appropriate ERSED controls (basin, sediment trap or fence, mulch or grass filters).

Pumps must only be operated by experienced dewatering crews toolboxed on this procedure. During dewatering, pumps must be supervised at all times to ensure that sediment is not picked up during discharge and water is discharged through ERSED controls.

Soil and Water Management Plan

Appendix D

Dewatering Permit

Revision history

Revision	Date	Description	Approval
1			
0	19/06/18	RMS review	
A	28/05/18	For review	

Distribution of controlled copies

Copy no.	Issued to	Version
1	RMS	A
2	RMS	B
3		
4		
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Dewatering Permit

A. General Information		Checklist Number:	
SEDIMENT BASIN NUMBER:		DATE:	
OTHER DISCHARGE POINT: (Mulch retention basin, trench / excavation, concrete washout)		Hours since last rain event:	
Name of Operator:		The rainfall recorded of last rainfall event (mm):	
B. Dewatering Requirements	**Y/N**	**Comments & any action required**	
Can the water be reused on site for dust suppression or fill conditioning?		***If yes, test for 1 and 3 below***	
Does the water require direct discharge to ground as a concentrated flow or to a water course?		***If yes, answer all 4 questions below***	
C. Testing Requirements (PER to carry out)	**Y/N**	**Result / Comment**	
1. Is the pH reading of the basin between 6.5-8.5pH?			
2. Is the TSS reading of the basin less than 50mg/L?			
3. No signs of Oil/hydrocarbon sheen?			
4. If dewatering via a pump, has the inlet been floated to draw upon the clean surface waters?			

- ***If answered YES to all the relevant testing requirements go to Section E for sign off***
- ***If answered NO to the relevant testing requirements complete Section D***

D. TREATMENT

If answered NO to the relevant testing requirements

follow with treatment and record the following details below

Treatment Details	Volumes used (L)
What chemicals were used for treatment?	Gypsum or other TFNSW approved Floc _____ L hydrochloric acid _____L Ag Lime _____ L Spill absorbent material _____Kg

POST TREATMENT

After treatment has occurred and the basin been left to compensate for 24 -48hrs

Return to Section C and retest. If the test results pass complete section E for SIGN OFF.

ESR

Name: ..... Signature:..... Date: .....

Date & Time of field test and sample: ……..

Soil and Water Management Plan

Appendix E

Spoil Management Plan

Revision history

Revision	Date	Description	Approval
1			
B	19/06/18	RMS review	
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Spoil Management Plan

Introduction

Purpose

This Plan details the requirements for the planning, locations, types and handling of spoil and fill on the Project. The objectives of this procedure are to:

- identify spoil and fill issues potentially arising from the Project.
- present processes for spoil and fill material handling, transportation and movement, stockpiling, reuse and disposal to protect the environment and maximise the reuse of earthen materials generated on site.
- identify and describe measures to be implemented relating to spoil and fill activities that may impact on air quality, sedimentation, contamination, noise and local amenity.

Scope

Spoil is defined as being surplus excavated material.

This Plan addresses and details the following issues:

- Excavation, handling, haulage, disposal and reuse methodology, including on-site storage and stockpiling arrangements;
- Processes and procedures that will be used for the management of spoil, including those for Virgin Excavated Natural Material (VENM), Excavated Natural Material (ENM), contaminated and unsuitable material;
- Measures that will be implemented to both reduce spoil quantities and maximise the beneficial reuse of spoil that will be generated during the performance of the works;
- Nominated quantities for reuse of spoil within the construction site, for beneficial reuse of spoil off site and for spoil disposal; and
- Processes and procedures for the management of the environmental and social impacts of spoil transfer and reuse.

Induction/Training

All Georgiou personnel are to be inducted on the existence of this plan during the project induction, and in more detail as required in site inductions and regular Toolbox Talks.

Aspects and Impacts

Aspects

The key aspects of the Project that could result in the generation and management of spoil and fill materials are:

- clearing of vegetation;
- stripping of topsoil;
- excavation of earthen material;
- import and transport of earthen material;
- storage/stockpiling of spoil, topsoil and mulch; and
- reuse of spoil, topsoil and mulch.

Impacts

The potential spoil and fill impacts that may occur during construction include:

- water pollution due to sediment runoff from spoil excavation and excess spoil storage.
- weed infestation from dispersion of seeds
- air pollution due to dust generated from stockpiles.
- flora and fauna impacts due to sediment runoff from spoil excavation.
- water, soil and air pollution from inappropriate storage, handling and disposal of spoil.
- mud-tracking during haulage operations.
- impact on soil microbiological activity.

It is likely that acid sulfate soils will be encountered during the construction work. Management and mitigation measures of acid sulfate soils are presented in the Acid Sulfate Soil Management Procedure (Appendix B10 – CEMP)

Spoil and Fill Information

Expected volumes
It is expected that approximately 15, 000m^3 of excess material to be generated from excavation works and piling works over the life of the Project.

Material Types
Although the project would require the importation of about 10,800 cubic metres of fill material, the excess spoil would be generated including:

- Soils – This includes topsoil and natural B horizon soils (ie. soils between the topsoil and underlying bedrock).
- Fill material – This includes imported soils and other material that has been used for infilling (eg. old concrete, wood).
- Natural rock – This material would be generated from bored piling activities and where excavation of bed rock is required (eg. for service relocations).
- Road construction material – This would include material generated from the demolition of the existing roads such as asphalt, geotechnically stabilised road sub-base and base material.
- River bed sediments – This material would originate from dredging for the installation of scour protection.

Spoil Classification
Spoil generated during the construction of the Project will firstly (preferably before excavation) be assessed against the requirements for Virgin Excavated Natural Material (VENM) detailed within the *Protection of the Environment Operations Act 1997*(POEO Act).

If the material is not deemed to be VENM an assessment of the suitability of any current general resource recovery exemptions issued under the Protection of the Environment Operations (Waste) Regulation 2005 will be undertaken. Current general resource recovery exemptions that may apply to the Project are:

- The excavated natural material exemption 2012
- The excavated public road material exemption 2012

Spoil that cannot be re-used under any of the exemptions stated above, or classified as VENM will require waste classification in accordance with the Waste Classification Guidelines, 2009 prior to offsite disposal at an appropriately licensed facility.

Virgin Excavated Natural Material (VENM)
Natural rock generated from bored piling activities and excavation into bed rock is expected to be classified as VENM and will be classified in accordance with the *Waste Classification Guidelines: Part 1 Classifying Waste* (EPA 2014):
Virgin excavated natural material means natural material (such as clay, gravel, sand, soil or rock fines):

- That has been excavated or quarried from areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial, mining or agricultural activities
- That does not contain sulfidic ores or soils, or any other waste, and includes excavated natural material that meets such criteria for virgin excavated natural material as may be approved from time to time by a public notice published in the NSW Government Gazette.

The Georgiou Environmental Site Representative will consider the following four questions when classifying material as VENM:

1. Are manufactured chemicals or process residues present?
2. Are sulfidic ores or soil present?
3. Are naturally occurring asbestos soils present?
4. Is there any other waste present?

If material meets the definition of VENM it can be reused on or offsite without prior testing. However, if there is any doubt as to whether the material is VENM, Georgiou will sample and test the material as per the excavated natural material resource recovery exemption to confirm that the material is free of contaminants.

Excavated Natural Material (ENM)
If spoil is unable to be classified as VENM it will be sampled, and tested to determine whether it meets the excavated natural material (ENM) classification criteria in accordance with the *Protection of the Environment Operations* (Waste) Regulation 2014 (the Regulation) current general resource recovery exemption, the excavated natural material exemption 2014:

> *Excavated natural material (ENM) means naturally occurring rock or soil (including but not limited to materials such as sandstone, shale, clay and soil) that has:*
>
> *a) Been excavated from the ground, and*
> *b) Contains at least 98% by weight natural material, and*
> *c) Does not meet the definition of Virgin Excavated Natural Material in the Act*
>
> *ENM does not include material that has been processed or contains acid sulphate soils or potentially acid sulphate soils.*

Spoil Reduction, Reuse and Disposal

Spoil Reuse

Natural Rock

The natural rock and the road construction material would be geotechnically suitable for reuse for road construction. During the EIS, reuse of this material was not thought to be possible due to space restrictions making on-site stockpiling impractical, however TfNSW have leased land for stockpiling adjacent to Wilberforce Road allowing this material to now be reused on site.

Soil
Soils from the northern river bank would be suitable for landscaping, priority will be made to stockpile these soils at the land leased by Roads and Maritime, however this may not be possible. Where stockpiling is not possible, these soils would either be stockpiled off-site with appropriate approvals for later use on the project or sent to recycling facilities.

Other Spoil Materials
All other excess spoil materials would be likely to be geotechnically unsuitable for road construction or unsuitable for landscaping. On the southern bank, small quantities (less than 500 cubic metres) of geotechnically unsuitable fill and soil material would be generated. If this material cannot be reused in fill embankments it would likely be classified as General Solid Waste (non-putrescible) and would be disposed of at an appropriately licensed landfill.

Initial sampling of the river bed sediments indicates that low strength acid sulphate soils may be present near the southern bank. Further sampling would be required as part of the detailed design to confirm the presence of acid sulphate soils. The management of acid sulfate materials is detailed in Appendix B10 of the CEMP, Acid Sulfate Material Management Plan.

On-site Spoil Management

The management of stockpiling of materials on site is described in Appendix F of the Soil and Water Management Plan. A register of approved stockpiles can be found in the Approved Stockpile Register (Appendix B – Stockpile Management Protocol).

Dust and erosion and sediment control measures will be implemented as required to minimise air and water quality impacts as per the Air Quality Management Plan and the Soil and Water Management Plan.

Spoil Disposal

Given there limited area with regard to stockpiling excavated material on site and the predicted geotechnically unsuitable nature of some of the materials, it is necessary to identify measures for spoil disposal.

Waste (and spoil) disposal is to be in accordance with the *Protection of the Environment Operations Act 1997* and the *Waste Avoidance and Resource Recovery Act 2001*. Wastes that are unable to be reused or recycled will be disposed of offsite to an EPA approved waste management facility following classification. Details of waste types, volumes and destinations are to be recorded in the Waste Management Register (CEMP Appendix B7).

Prior to transporting wastes to a place that is not owned by TfNSW and is not a licensed waste facility Georgiou must submit to the Principal a completed and signed notice under section 143(3A) of the POEO Act ("s.143 Notice"). This includes waste transported for reuse, recycling, and disposal or stockpiling. Waste in this context means any surplus material and includes spoil, Virgin Excavated Natural Material ("VENM"), Excavated Natural Material ("ENM"), crushed rock, reclaimed asphalt pavement, mulched vegetation, waste concrete, etc. All proposed waste re-use options must comply with the POEO Act and associated regulations.

Further details, including the steps to be taken to obtain the "s.143 Notice" from the landholder, and the template (or proforma) letter to the landholder, can be found in TFNSW Environment Technical Direction ETD 2015/020 "Legal offsite disposal of TfNSW Services waste"

This process is a hold point under TFNSW specification G36, cl 4.11.4. The hold point submission requirement is the completed and signed original copy of "s.143 Notice" received from the landholder receiving the waste with evidence that the Waste Site has the appropriate planning consent.

Note that on Windsor Bridge Replacement Project, it is very unlikely that any soil generated onsite will be given to a 3rd party offsite under a "s.143 Notice" and this will only occur with acceptance from the Roads and Maritime.

Approved waste management facilities located in the vicinity of the Project include (but are not limited to) those detailed in (CEMP Appendix B7). Prior to disposing waste at a facility, the license details of the facility will be confirmed to ensure compliance.

Spoil Transport

Spoil will be transported by registered road trucks. Spoil haulage routes are identified in the CEMP Appendix B1 - Construction Traffic Management Plan (CTMP) and have been selected to minimise impacts to sensitive receivers, the travelling public, and the local community whilst meeting compliance with road traffic rules in relation to vehicle length and weight limits.

The routes identified provide access for sites where spoil disposal and reuse is known and utilise the arterial road network to the greatest extent practicable. The Project has minimised the impact of haulage movement noise on local roads by restricting spoil haulage on local roads, however there are some instances where the project has identified a need for heavy vehicles, including spoil haulage trucks, to utilise local roads in the vicinity of the project, as described in the CTMP.

In accordance with the spoil management hierarchy, the project will work with local councils to identify spoil reuse opportunities where feasible.

The Project aims to maximise haulage movements during standard construction hours, thereby minimising potential noise impacts from night time spoil activities. The Project will program its night time spoil haulage on public roads with the aim to minimise any increase in road traffic noise levels by maximising haulage during day and evening periods. Mitigation measures described in the CEMP Appendix B3 - Noise and Vibration Management Plan (NVMP) will also be implemented.

Spoil Management Hierarchy

The management of spoil generated from the Windsor Bridge Replacement Project will be guided by the hierarchy detailed in Table 1 below.

Table-1 Hierarchy of spoil management

Rank	Control Measure	Implementation Example	Potential to implement on Project
1	Avoid and reduce spoil generation	▪ Reduce the amount of spoil being generated through design and construction methodology.	Limited
2	Reuse within Project	▪ Reuse in the Project to fill embankments and mounds within short haulage distance of source. ▪ Restoration of any pre-existing contaminated sites within the Project boundaries. ▪ Reuse as a feed product in construction materials (e.g. concrete).	Preferred but dependant on area available for stockpiling
3	Reuse for environmental works	▪ Reuse in revegetation and rehabilitation projects ▪ Rising water table/salinity remediation works ▪ Reuse in flood mitigation works	Preferred as stockpiling on site is restricted
4	Reuse on other development projects	▪ Reuse for fill embankments and mounds on projects within an economic transport distance from site.	Preferred as stockpiling on site is restricted
5	Reuse for land restoration	▪ Reuse for land reclamation or remediation works ▪ Reuse to fill disused facilities, e.g. mines and quarries, to enable ecological rehabilitation or other ecologically beneficial end use.	Preferred as stockpiling on site is restricted
6	Reuse for landfill management	▪ Reuse to cap completed landfill cells ▪ Reuse in daily covering of landfill waste	Limited
7	Dispose offsite as waste	▪ Disposal of excess spoil as waste at an approved facility licensed to receive that material	Potential but not preferred

Record keeping

Records of imported or exported material will be kept including, tips sheets, purchasing or other imported fill records and any documentation required to dispose material off site as detailed in CEMP Appendix B7 – Construction Waster and Energy Management Sub Plan.

Records will be kept up to date by Engineers and Foremen. Any Section 143 certificates will be completed and retained for any material to be disposed of or stored temporarily outside the Project boundary. All offsite disposal of spoil at an appropriately licensed facility will be recorded in the Waste Management Register (CEMP Appendix B7).

Soil and Water Management Plan

Appendix F

Stockpile Management Protocol

Revision history

Revision	Date	Description	Approval
1			
B	19/6/18	RMS review	
A	28/05/18	For review	

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1	RMS	A
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3		
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5		

Stockpile Management Protocol

Introduction

Purpose

This protocol outlines the locational criteria used to guide the placement of temporary stockpiles and provides both standard and site-specific mitigation measures to be implemented to minimise impacts on the environment. Stockpiles sites may typically be required to store material including, but not limited to:

- Temporary storage of excavated material to be used in fill embankments and other design features.
- Acid Sulfate Material (ASM) subject to treatment prior to reuse.
- Temporary storage of excavated material unsuitable for reuse in the formation.
- Excess concrete, pavement, rock, steel and other material stored for either future use in the Project or prior to removal from site.
- Topsoil, mulch, excess timber for landscaping and revegetation works.

Induction and Training

Personnel involved in planning or managing stockpiles will be trained in the requirements of this Protocol. Training will also include inductions, toolbox talks, pre-starts and targeted training as required.

Scope

This protocol is relevant to the planning, placement and management of all stockpiles on/related to the works associated with the Windsor Bridge Replacement Project.

Stockpile Location Criteria

Stockpiles on the Project will be located according to the following criteria in accordance with TFNSW spec G38 and CoA C8:

- Locate stockpiles outside of the tree protection zone of trees or native vegetation identified for retention.
- Locate stockpiles at least 5 m from likely areas of concentrated water flows and at least 10 m from waterways that are classified as Class 1 and Class 2 from the DPI Fisheries guideline “Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings”. Be located at least 5 metres clear of all areas of possible concentrated water flow.
- Be located on land with slopes less than 10%
- Have ready access to the road network or direct access to the construction corridor.
- On land that does not require the removal of threatened species, Endangered Ecological Communities (EECs) or roosting habitat for listed threatened fauna species or native vegetation clearing beyond what is already required for the Project.
- Be located in areas of low heritage conservation significance (including identified Aboriginal cultural value) and not impact on heritage sites beyond those already impacted by the project.
- Be located within the approved EIS Boundary.

The Environmental Site Representative will review all proposed stockpile sites against the criteria above and if compliant the location will be approved and included with mitigation measures in the relevant progressive erosion and sediment control plan (PESCP).

Protocol

Prior to the establishment of any stockpile on site as part of the Project, ensure that:

1. The location of the stockpile is considered against the site selection criteria contained above and the ‘Stockpile Location Assessment’ (Appendix A – Stockpile Management Protocol) is completed.
2. Once the stockpile is approved through the ‘Stockpile Location Assessment’ details of the stockpile are to be input to the ‘Approved Stockpile Register’ (Appendix B – Stockpile Management Protocol)
3. Mitigation measures for each stockpile site include as a minimum:

- Materials will not be stockpiled under the drip line of trees or native vegetation to be retained, and never pushed up around the base of trees.
- Erosion and sedimentation controls will be erected between the site and any drainage lines or down-slope areas, an Erosion and Sediment Control Plan will be prepared or adjustments made to the existing Progressive Erosion and Sediment Control Plan.
- A diversion bund will be installed on the uphill side of the stockpile to divert water around the site.
- Keep topsoil that is not contaminated by noxious weeds in stockpiles for later spreading on fill batters and other areas. Other material may also be stockpiled but kept separated from the topsoil stockpiles.
- Implement measures to prevent the growth of weeds in topsoil stockpiles.
- Comply with the Flood Management Plan to minimise the effects of flood events on stockpile areas.
- Stockpiles of topsoil containing noxious weeds will be kept separate and signage placed.
- Mulch stockpiles are to be managed in accordance with the TfNSW Environmental Direction Management of Tannins from Vegetation Mulch, which requires all mulch stockpiles to be bunded and if tannin is noted in excess a sump will be provided to trap excess leachate. Mulch must be stockpiled away from drainage lines and outside of low lying areas.
- Long-term stockpiles (i.e. to remain for greater than 20 days) will be stabilised with cover crop or similar within 7 days of the completion of stockpiling as per the mitigation measures in the CSWMP.
- Where stockpiles are located within 200 metres of residences, these stockpile areas will be monitored for odour. If nuisance odours are generated and are impacting sensitive receivers, odour control measures will be implemented, if feasible and reasonable. If this is not possible, material found to be emitting odours will be relocated to an alternative stockpile location away from residences.
- Mulch stockpile management, including leachate containment, will be in accordance with the CSWMP.
- Dust management measures (including for vehicle movements associated with stockpiling activities) will be implemented in accordance with the requirements of the Air Quality Management Sub-Plan.
- All exit points from the stockpile area to public roads are to be stabilized and include rumble pads or rocks to prevent mud tracking.
- The rehabilitation of the stockpile areas following their removal is as follows:
  - Where no further stockpiling or work is proposed on the disturbed site, they would be rapidly and progressively stabilized and/or rehabilitated as they are completed. Rehabilitation would aim to achieve at least 70% cover (ie C-factor of 0.05 or less) within 60 days.
  - Where further works or stockpiling is proposed, temporary ground covers would be used for any temporary cessation in works in an area exceeding 20 days, to achieve at least 50% cover (i.e. a C-factor of 0.15 or less). This would apply to stockpile sites and other exposed areas and measures may include (but not limited to) biodegradable polymer soil binders, geotextile fabrics, erosion control blankets, temporary seeding and mulching.

4. In accordance with TFNSW Specification R44, topsoil stockpiles must:
- be free from subsoil, other excavated materials, contaminated materials, refuse, clay lumps and stones, timber or other rubbish;
- be trimmed to a regular shape to facilitate measuring with a height not exceeding 2m and batter slopes not steeper than 2:1
- be seeded with a sterile cover crop in accordance with Specification TFNSW R178, to encourage vegetation cover. Seeding must be carried out progressively within seven days of completion of each 500 m^2 of exposed batter face.

5. The Georgiou ESR will sign off on the stockpile location against the protocol above and include the location and controls in the relevant progressive ESCP.

6. If any stockpile site is to be located on private land, obtain from the landholder an approved notice under s.143 of the *Protection of the Environment Operations Act 1997* prior to commencement of stockpiling. This process will also require consultation with TFNSW to ensure all approvals are in place prior to stockpiling offsite.
7. Stockpile sites that affect heritage, threatened species, populations or Endangered Ecological Communities require the approval of the Planning Secretary, in consultation with the OEH in accordance with CoA D4 (e)(vi).

Appendix A
Stockpile Location Assessment

Stockpile Location Assessment					
Project: Windsor Bridge Replacement Project					
Date:		**Location/Chainage:**			
#	**Criteria.**	**Yes**	**No**	**N/A**	**Comments**
1	*Is the stockpile within the approved EIS boundary?*				
2	*Is the stockpile located outside of the tree protection zone of trees or native vegetation identified for retention?*				
3	*Is the stockpile located 5m away from concentrated water flows?*				
4	*Is the stockpile located 10m away from waterways that are classified as Class 1 or 2 key Fish Habitats?*				
5	*Is the site on land that does not require the removal of threatened species, EECs or roosting habitat for listed threatened fauna species?*				
6	*Is the site located so that the appropriate erosion and sediment control measures can be installed and will operate effectively, ie located on land with slopes less than 10%?*				
7	*Does the stockpile have ready access to the road network or direct access to the construction corridor?*				
8	*Is the site located in areas of low heritage conservation significance (including identified Aboriginal cultural value) and not impact on heritage sites beyond those already impacted by the project?*				
Non-compliant stockpile locations: If **NO** was answered to any of the above questions, then further environmental assessments are required and approval by the Planning Secretary, in consultation with the OEH may be required in accordance with CoA D4 (e)(vi)					
Compliant stockpile locations: If the proposed stockpile location is compliant with the above criteria this completed form and a copy of the Sensitive Area Plan's with the stockpile location marked must be submitted to the Project Environmental Site Representative for approval prior to the establishment of the stockpile site.					
Once approved, the stockpile location must be recorded in the project stockpile register (Appendix B)					
Prepared by: **Date:**		**ESR Approval:** **Date:**			

Appendix B
Example Stockpile Site Register

Approved Stockpile Register			
Windsor Bridge Replacement Project			
Stockpile number			
Chainage			
Material to be stockpiled? (i.e. VENM, Topsoil, Mulch, Waste Concrete etc)			
Approximate amount of material to be stockpiled?			
Is the stockpile within the approved EIS boundary?			
Is the stockpile located out of vegetation protection zones?			
Is the stockpile located 5m away from concentrated water flows?			
Is the stockpile located 10m away from waterways that are classified as Class 1 or 2 key Fish Habitats?			
Is the site on land that does not require the removal of threatened species, EECs or roosting habitat for listed threatened fauna species?			
Is the site located so that the appropriate erosion and sediment control measures can be installed and will operate effectively?			
Does the stockpile have ready access to the road network or direct access to the construction corridor?			
Is the site located in areas of low heritage conservation significance (including identified Aboriginal cultural value) and not impact on heritage sites beyond those already impacted by the project?			
Is the stockpile site compliant with the locational criteria and approved by the Project Environmental Site Representative?			
Date of the stockpile approval			
Comment any additional information/mitigation measures			

Soil and Water Management Plan

Appendix G

TFNSW Technical Direction: Management of Tannins from Vegetation Mulch

Soil and Water Management Plan
Appendix H
Primary Erosion and Sediment Control Plan

Primary ESCP – Windsor Bridge Replacement Project

General Notes

- This primary ESCP has been developed to detail proposed erosion and sediment controls for the various stages of the works for the Windsor Bridge Replacement project.
- The works on the South side of the Hawkesbury River have been separated into 5 stages of construction.
- The works on the North side of the Hawkesbury River have been separated into 5 stages of construction
- The location of temporary controls on this plan are indicative only with actual sites to be determined during work
- Controls removed or disturbed due to works to be reinstated prior to weekends and forecast rain and areas to be fully secured with controls prior to any temporary suspension of works.
- Adequate time to be permitted to 'secure' the project prior to forecast rainfall.
- This plan has been prepared as per blue book guidelines and standard drawings – volume 2, 2A and 2D
- Other CEMP Sub Plans relevant to Environmental Management include; the air quality management plan, Waste and energy management plan, noise and vibration management plan, acid sulfate soil management plan, flora and fauna management plan and flood warning and evacuation management plan.

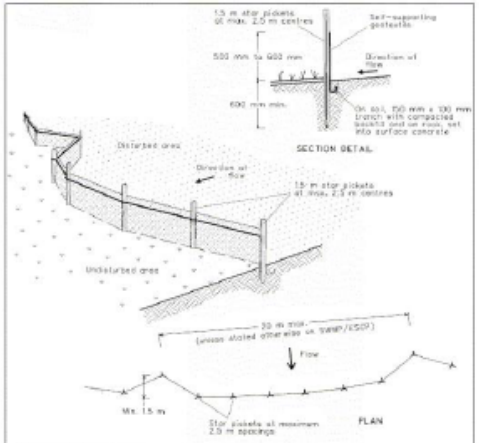
Specific Construction details

1. Site works will not start until the erosion and sediment controls are installed and functional for the relevant stage of works and catchment.
2. Sediment fences with be installed in accordance with the Blue Book (Landcom 2004) standard drawing.
3. Areas of the site are subject to salvage and monitoring pre and during construction as detailed in the Windsor Bridge Replacement Heritage Excavation Salvage Zone Plan
4. All 'clean' and 'dirty' water to be separated
5. Approved bins for building waste, putrescible waste will be provided and arrangements made for regular collection and disposal.
6. Temporary ablution facilities will be installed with sewage holding tanks, arrangements made for regular collection and disposal
7. All hydrocarbons and chemicals are to be bunded. The bund is to be 120% capacity of the largest container stored.
8. Keep adequate quantities of suitable materials to counteract spillage readily available. Clean up all chemical spills immediately.
9. Designate an impervious bunded wash-down facility for concrete trucks and other vehicles.
10. Any proposed stockpile areas are to be approved by RMS and stabilised in accordance with RMS Technical Guideline EMS-TG-010: Stockpile Site Management and the Blue Book Guidelines. This includes covering, or otherwise protecting from erosion. Eg. Temporary vegetation (seeding in accordance with R178 spec, polymer application etc.
11. Manage all potential dust offsite impacts in accordance with the construction air quality management plan.

Monitoring and Maintenance

- All erosion and sediment controls will be checked at least weekly and after 10mmof rainfall or where runoff occurs to ensure they are maintained in a fully functional condition.
- Any maintenance / repair and improvement requirements must be promptly rectified within an agreed time and recorded.
- The tracking of mud /soil material onto local roads to be monitored and controlled
- Any construction dewatering is to be monitored for compliance with the SWMP procedures and permit.
- Rainfall is to be measured daily and recorded.
- Monitor the Bureau of Meteorology forecast daily for potential heavy rainfall events and prepare the site to minimise impact of heavy rainfall events and flood events.
- The Construction Flood Warning and Evacuation plan is to be followed in preparation for a flood event and it will be developed in accordance with the Hawkesbury Nepean Flood Emergency Sub Plan (HNFESP)

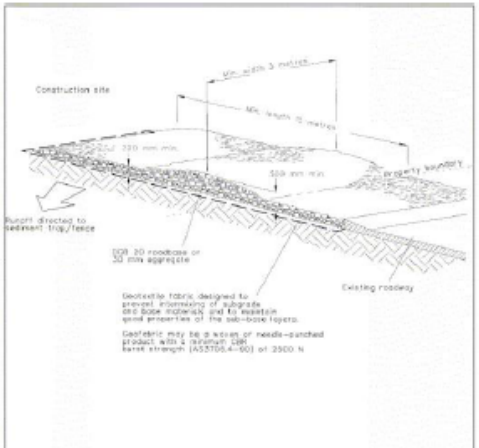
Typical details for erosion and sediment controls (Landcom 2004)



Construction Notes

1. Construct sediment fences as close as possible to being parallel to the contours of the site, but with small returns as shown in the drawing to limit the catchment area of any one section. The catchment area should be small enough to limit water flow if concentrated at one point to 60 litres per second in the design storm event, usually the 10-year event.
2. Cut a 150-mm deep trench along the upslope line of the fence for the bottom of the fabric to be entrenched.
3. Drive 1.5 metre long star pickets into ground at 2.5 metre intervals (max) at the downslope edge of the trench. Ensure any star pickets are fitted with safety caps.
4. Fix self-supporting geotextile to the upslope side of the posts ensuring it goes to the base of the trench. Fix the geotextile with wire ties or as recommended by the manufacturer. Only use geotextile specifically produced for sediment fencing. The use of shade cloth for this purpose is not satisfactory.
5. Join sections of fabric at a support post with a 150-mm overlap.
6. Backfill the trench over the base of the fabric and compact it thoroughly over the geotextile.

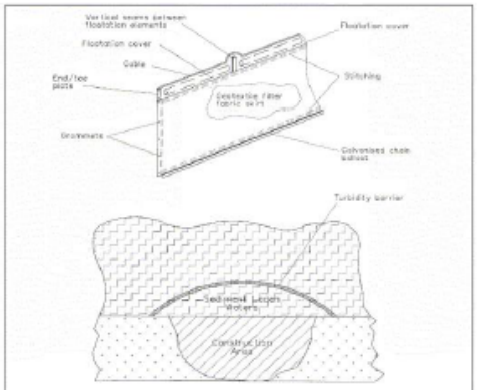
SEDIMENT FENCE SD 6-8



Construction Notes

1. Strip the topsoil, level the site and compact the subgrade.
2. Cover the area with needle-punched geotextile.
3. Construct a 200-mm thick pad over the geotextile using road base or 30-mm aggregate.
4. Ensure the structure is at least 15 metres long or to building alignment and at least 3 metres wide.
5. Where a sediment fence joins onto the stabilised access, construct a hump in the stabilised access to divert water to the sediment fence.

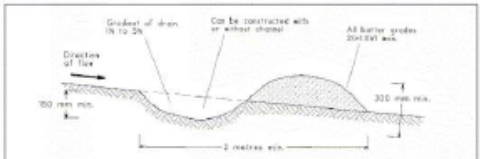
STABILISED SITE ACCESS SD 6-14



Construction Notes

1. Use turbidity barriers only where high flows are unlikely to remove accumulated sediment and/or move the curtain significantly.
2. Where the barrier is to remain in place for more than one month, ensure the floatation cover is a UV-resistant, durable material.
3. Use only closed cell foam or foam-filled PVC piping as floatation elements. Do not use unfilled pipe.
4. Use only woven or heat-set non woven geotextiles. Needle-punched, non woven geotextiles can become fouled with debris that float and delaminate them as they move with the waves or currents.
5. Remove captured sediment before the barrier is decommissioned.
6. In tidal areas, ensure the barrier can rise and fall without being moved from its position.

TURBIDITY BARRIER SD 6-10

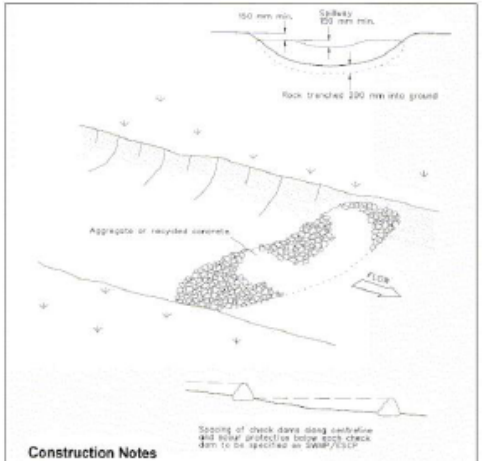


NOTE: Only to be used as temporary bank where maximum upslope length is 80 metres.

Construction Notes

1. Build with gradients between 1 percent and 5 percent.
2. Avoid removing trees and shrubs if possible - work around them.
3. Ensure the structure are free of projections or other irregularities that could impede water flow.
4. Build the drains with circular, parabolic or trapezoidal cross sections, not V shaped.
5. Ensure the banks are properly compacted to prevent failure.
6. Complete permanent or temporary stabilisation within 10 days of construction.

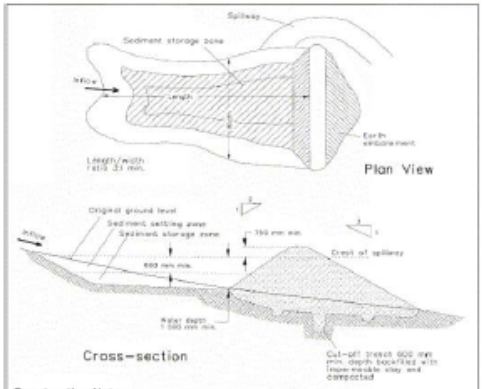
EARTH BANK (LOW FLOW) SD 5-5



Construction Notes

1. Check dams can be built with various materials, including rocks, logs, sandbags and straw bales. The maintenance program should ensure their integrity is retained, especially where constructed with straw bales. In the case of bales, this might require their replacement each two to four months.
2. Trench the check dam 200 mm into the ground across its whole width. Where rock is used, fill the interstices to at least 150 mm above the ground surface to reduce the risk of undercutting.
3. Normally, their maximum height should not exceed 800 mm above the gully floor. The centre should act as a spillway, being at least 150 mm lower than the outer edges.
4. Space the dams so the toe of the upstream dam is level with the spillway of the next downstream dam.

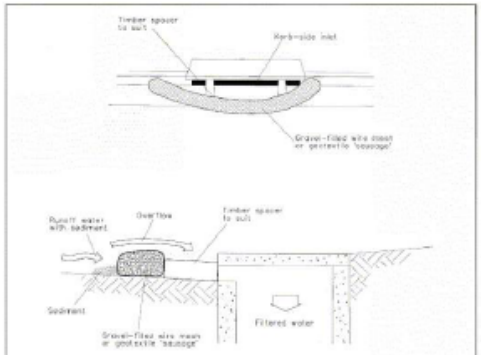
ROCK CHECK DAM SD 5-4



Construction Notes

1. Remove all vegetation and topsoil from under the dam wall and from within the storage area.
2. Construct a cut-off trench 600 mm deep and 1,200 mm wide along the centreline of the embankment extending to a point on the gully wall level with the inlet crest.
3. Maintain the trench free of water and recompact the materials with equipment as specified in the SWMP to 95 per cent Standard Proctor Density.
4. Select fill following the SWMP that is free of roots, wood, rock, large stone or foreign material.
5. Prepare the site under the embankment by ripping to at least 100 mm to help bond compacted fill to the existing substrate.
6. Spread the fill in 150 mm to 150 mm layers and compact it at optimum moisture content following the SWMP.
7. Construct the emergency spillway.
8. Rehabilitate the structure following the SWMP.

EARTH BASIN - WET
(APPLIES TO TYPE D AND TYPE F SOILS ONLY) SD 6-4

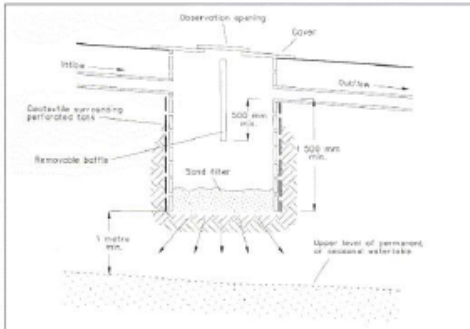


NOTE: This practice only to be used where specified in an approved SWMP/ESCP.

Construction Notes

1. Install fillers to kerb inlets only at sag points.
2. Fabricate a sleeve made from geotextile or wire mesh longer than the length of the inlet pit and fill it with 25 mm to 50 mm gravel.
3. Form an elliptical cross-section about 150 mm high x 400 mm wide.
4. Place the filter at the opening leaving at least a 150-mm space between it and the kerb inlet. Maintain the opening with spacer blocks.
5. Form a seal with the kerb to prevent sediment bypassing the filter.
6. Sandbags filled with gravel can substitute for the mesh or geotextile providing they are placed so that they firmly abut each other and sediment-laden waters cannot pass between.

MESH AND GRAVEL INLET FILTER SD 6-11

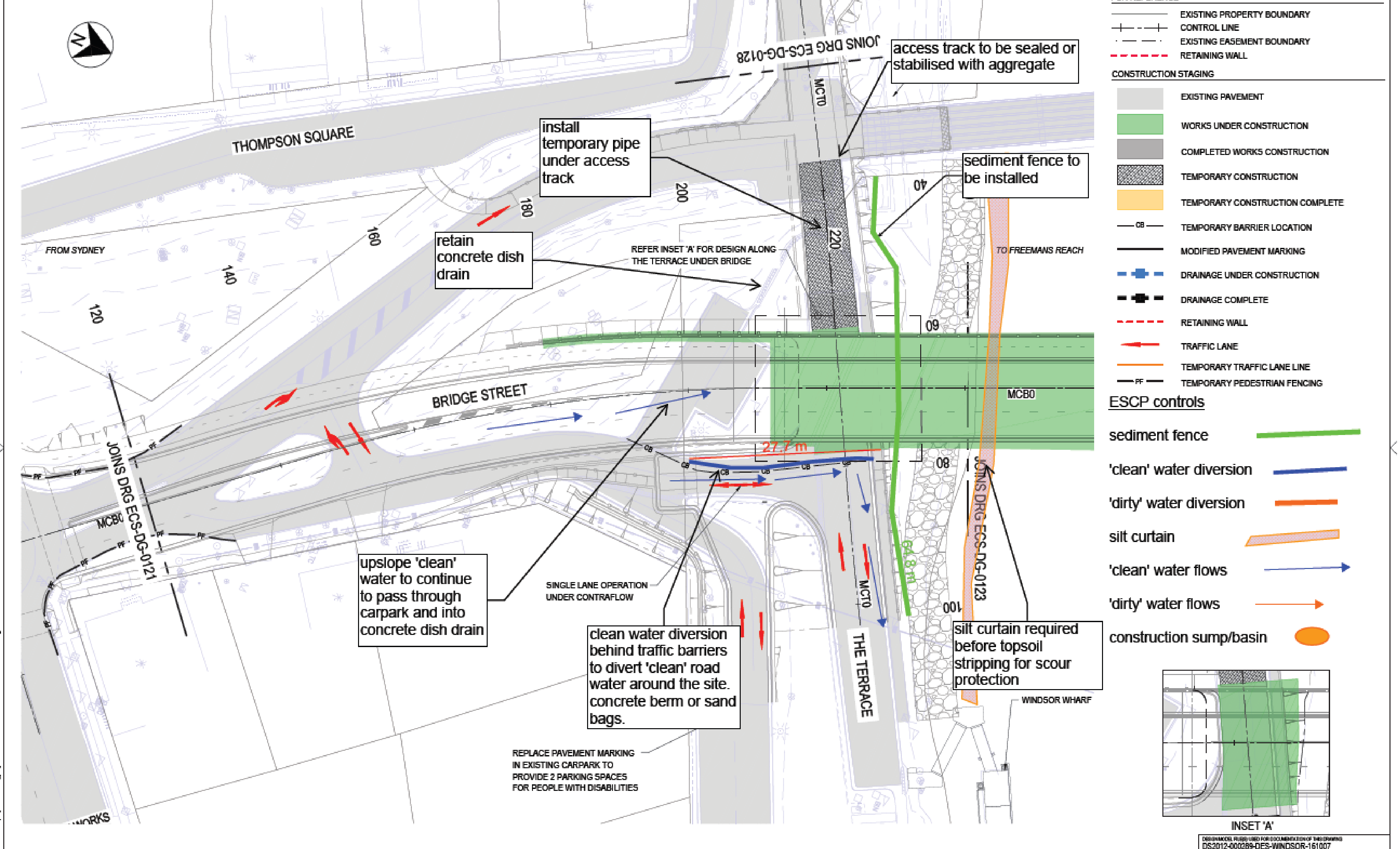


Construction Notes

1. Join the inlet to the polluted supply taking any suitable step to remove bulky material before it can enter the sump.
2. Connect the outlet to a safe disposal area following the ESCP/SWMP.
3. Place a geotextile liner on the outside of the pit.
4. Install a removable baffle, central to the inflow/outflow and normal to the direction of flow, ensuring that it reaches 500 mm below the invert of the outlet pipe.
5. Install a cover over the pit with an observation port and access cover.

INFILTRATION SUMP SD 6-6

STAGE 1 SOUTHSIDE - ESCP



THOMPSON SQUARE
JOINS DRG ECS-DG-0128
access track to be sealed or stabilised with aggregate
install temporary pipe under access track
sediment fence to be installed
retain concrete dish drain
REFER INSET 'A' FOR DESIGN ALONG THE TERRACE UNDER BRIDGE
FROM SYDNEY
TO FREEMANS REACH
BRIDGE STREET
MCT0
MCB0
JOINS DRG ECS-DG-0121
JOINS DRG ECS-DG-0123
27.7 m
64.8 m
upslope 'clean' water to continue to pass through carpark and into concrete dish drain
SINGLE LANE OPERATION UNDER CONTRAFLOW
clean water diversion behind traffic barriers to divert 'clean' road water around the site. concrete berm or sand bags.
silt curtain required before topsoil stripping for scour protection
THE TERRACE
WINDSOR WHARF
REPLACE PAVEMENT MARKING IN EXISTING CARPARK TO PROVIDE 2 PARKING SPACES FOR PEOPLE WITH DISABILITIES
LEGEND
FOR REFERENCE
EXISTING PROPERTY BOUNDARY
CONTROL LINE
EXISTING EASEMENT BOUNDARY
RETAINING WALL
CONSTRUCTION STAGING
EXISTING PAVEMENT
WORKS UNDER CONSTRUCTION
COMPLETED WORKS CONSTRUCTION
TEMPORARY CONSTRUCTION
TEMPORARY CONSTRUCTION COMPLETE
TEMPORARY BARRIER LOCATION
MODIFIED PAVEMENT MARKING
DRAINAGE UNDER CONSTRUCTION
DRAINAGE COMPLETE
RETAINING WALL
TRAFFIC LANE
TEMPORARY TRAFFIC LANE LINE
TEMPORARY PEDESTRIAN FENCING
ESCP controls
sediment fence
'clean' water diversion
'dirty' water diversion
silt curtain
'clean' water flows
'dirty' water flows
construction sump/basin
INSET 'A'

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: DS2012-000289-DES-WINDSOR-161007

REV	DATE	DESCRIPTION	DRAWN	REVIEWED	APPROVAL
4	21.12.16	ISSUED FOR INFORMATION	SH	BDP	TR
3	-	NOT USED	-	-	-
2	-	NOT USED	-	-	-
1	-	NOT USED	-	-	-
0	-	NOT USED	-	-	-

TITLE	INITIAL	DATE
DRAFTSPERSON	JP	
DRAFTING CHECK	SH	
DESIGNER	KL	
DESIGN CHECK	BDP	
PROJECT MANAGER	TR	

ORIGINAL DRAWING AT A3 SIZE — SCALE 1:500 AT A3

CO-ORDINATE SYSTEM MGA Zone 56 — HEIGHT DATUM A.H.D.

DRAWINGS / DESIGN PREPARED BY: JACOBS, 177 Pacific Highway, North Sydney, SYDNEY, NSW 2060, AUSTRALIA. Tel: (02) 9928 2100 Fax: (02) 9928 2500 Web: www.jacobs.com

CLIENT: NSW Transport Roads & Maritime Services

PREPARED FOR: DIVISION: INFRASTRUCTURE DEVELOPMENT; BRANCH: GREATER SYDNEY PROGRAM OFFICE; DEPARTMENT: PROJECT DELIVERY PROGRAM 1

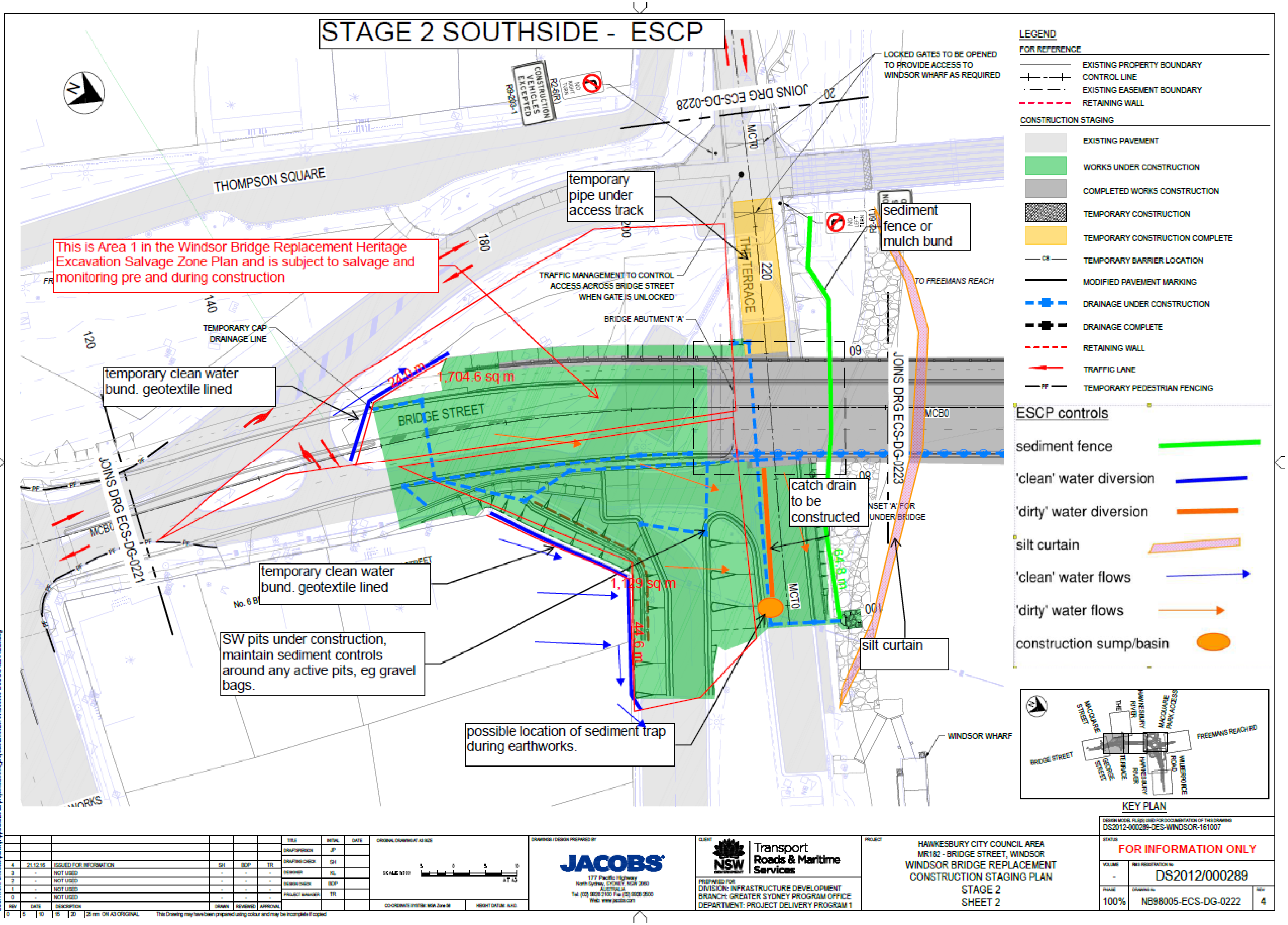
PROJECT: HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
CONSTRUCTION STAGING PLAN
STAGE 1
SHEET 2

STATUS: FOR INFORMATION ONLY

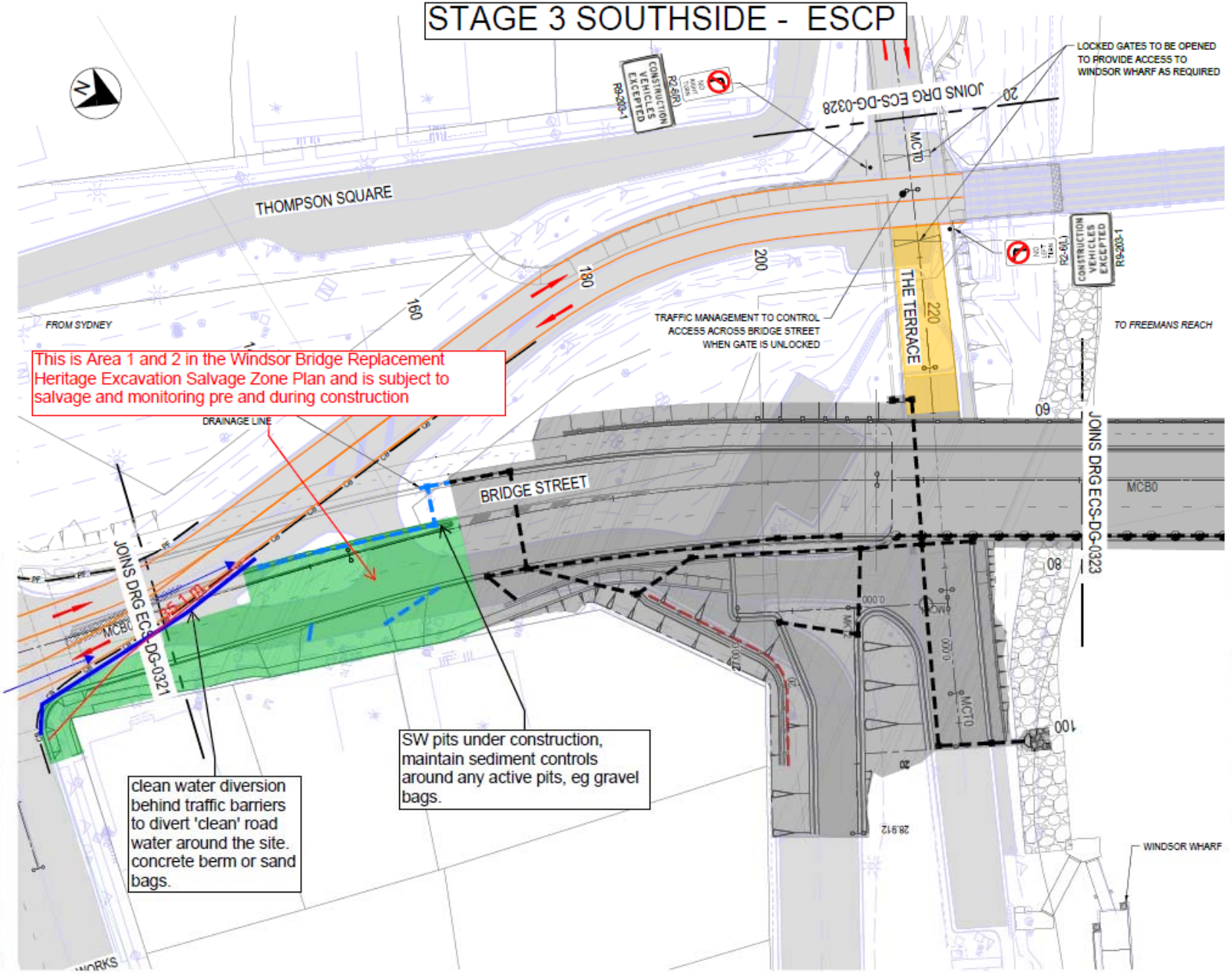
VOLUME: - | RMS REGISTRATION No: DS2012/000289

PHASE: 100% | DRAWING No: NB98005-ECS-DG-0122 | REV: 4

0 | 5 | 10 | 15 | 20 | 25mm ON A3 ORIGINAL — This Drawing may have been prepared using colour and may be incomplete if copied


STAGE 2 SOUTHSIDE - ESCP
THOMPSON SQUARE
This is Area 1 in the Windsor Bridge Replacement Heritage Excavation Salvage Zone Plan and is subject to salvage and monitoring pre and during construction
temporary pipe under access track
sediment fence or mulch bund
LOCKED GATES TO BE OPENED TO PROVIDE ACCESS TO WINDSOR WHARF AS REQUIRED
JOINS DRG ECS-DG-0228
TRAFFIC MANAGEMENT TO CONTROL ACCESS ACROSS BRIDGE STREET WHEN GATE IS UNLOCKED
BRIDGE ABUTMENT 'A'
TEMPORARY CAP DRAINAGE LINE
temporary clean water bund. geotextile lined
240 m
1,704.6 sq m
BRIDGE STREET
THE TERRACE
TO FREEMANS REACH
JOINS DRG ECS-DG-0223
JOINS DRG ECS-DG-0221
catch drain to be constructed
INSET 'A' FOR UNDER BRIDGE
temporary clean water bund. geotextile lined
1,129 sq m
44.6 m
64.8 m
SW pits under construction, maintain sediment controls around any active pits, eg gravel bags.
silt curtain
possible location of sediment trap during earthworks.
WINDSOR WHARF
LEGEND
FOR REFERENCE
EXISTING PROPERTY BOUNDARY
CONTROL LINE
EXISTING EASEMENT BOUNDARY
RETAINING WALL
CONSTRUCTION STAGING
EXISTING PAVEMENT
WORKS UNDER CONSTRUCTION
COMPLETED WORKS CONSTRUCTION
TEMPORARY CONSTRUCTION
TEMPORARY CONSTRUCTION COMPLETE
TEMPORARY BARRIER LOCATION
MODIFIED PAVEMENT MARKING
DRAINAGE UNDER CONSTRUCTION
DRAINAGE COMPLETE
RETAINING WALL
TRAFFIC LANE
TEMPORARY PEDESTRIAN FENCING
ESCP controls
sediment fence
'clean' water diversion
'dirty' water diversion
silt curtain
'clean' water flows
'dirty' water flows
construction sump/basin
KEY PLAN
BRIDGE STREET
FREEMANS REACH RD
JACOBS
Transport Roads & Maritime Services
PREPARED FOR DIVISION: INFRASTRUCTURE DEVELOPMENT
BRANCH: GREATER SYDNEY PROGRAM OFFICE
DEPARTMENT: PROJECT DELIVERY PROGRAM 1
HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
CONSTRUCTION STAGING PLAN
STAGE 2
SHEET 2
FOR INFORMATION ONLY
DS2012/000289
DS2012-000289-DES-WINDSOR-161007
100%
NB98005-ECS-DG-0222
4
ISSUED FOR INFORMATION
NOT USED

STAGE 3 SOUTHSIDE - ESCP



LEGEND

FOR REFERENCE

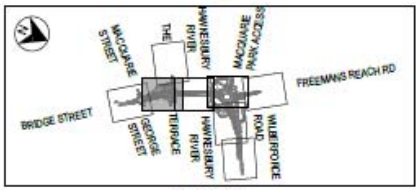
- EXISTING PROPERTY BOUNDARY
- CONTROL LINE
- EXISTING EASEMENT BOUNDARY
- RETAINING WALL

CONSTRUCTION STAGING

- EXISTING PAVEMENT
- WORKS UNDER CONSTRUCTION
- COMPLETED WORKS CONSTRUCTION
- TEMPORARY CONSTRUCTION
- TEMPORARY CONSTRUCTION COMPLETE
- CB — TEMPORARY BARRIER LOCATION
- MODIFIED PAVEMENT MARKING
- DRAINAGE UNDER CONSTRUCTION
- DRAINAGE COMPLETE
- RETAINING WALL
- TRAFFIC LANE
- TEMPORARY TRAFFIC LANE LINE
- PF — TEMPORARY PEDESTRIAN FENCING

ESCP controls

- sediment fence
- 'clean' water diversion
- 'dirty' water diversion
- silt curtain
- 'clean' water flows
- 'dirty' water flows
- construction sump/basin



KEY PLAN

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2	-	NOT USED	-	-	-
1	-	NOT USED	-	-	-
0	-	NOT USED	-	-	-

TITLE | INITIAL | DATE
DRAFTSPERSON | JP
DRAFTING CHECK | SH
DESIGNER | KL
DESIGN CHECK | BDP
PROJECT MANAGER | TR

ORIGINAL DRAWING AT A3 SIZE
SCALE 1:500 — 5 0 5 10 — AT A3

0 5 10 15 20 25 mm ON A3 ORIGINAL — This Drawing may have been prepared using colour and may be incomplete if copied

CO-ORDINATE SYSTEM: MGA Zone 56 | HEIGHT DATUM: A.H.D.

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177 Pacific Highway
North Sydney, SYDNEY, NSW 2060
AUSTRALIA
Tel: (02) 9928 2100 Fax: (02) 9928 2500
Web: www.jacobs.com

CLIENT
NSW Transport Roads & Maritime Services
PREPARED FOR
DIVISION: INFRASTRUCTURE DEVELOPMENT
BRANCH: GREATER SYDNEY PROGRAM OFFICE
DEPARTMENT: PROJECT DELIVERY PROGRAM 1

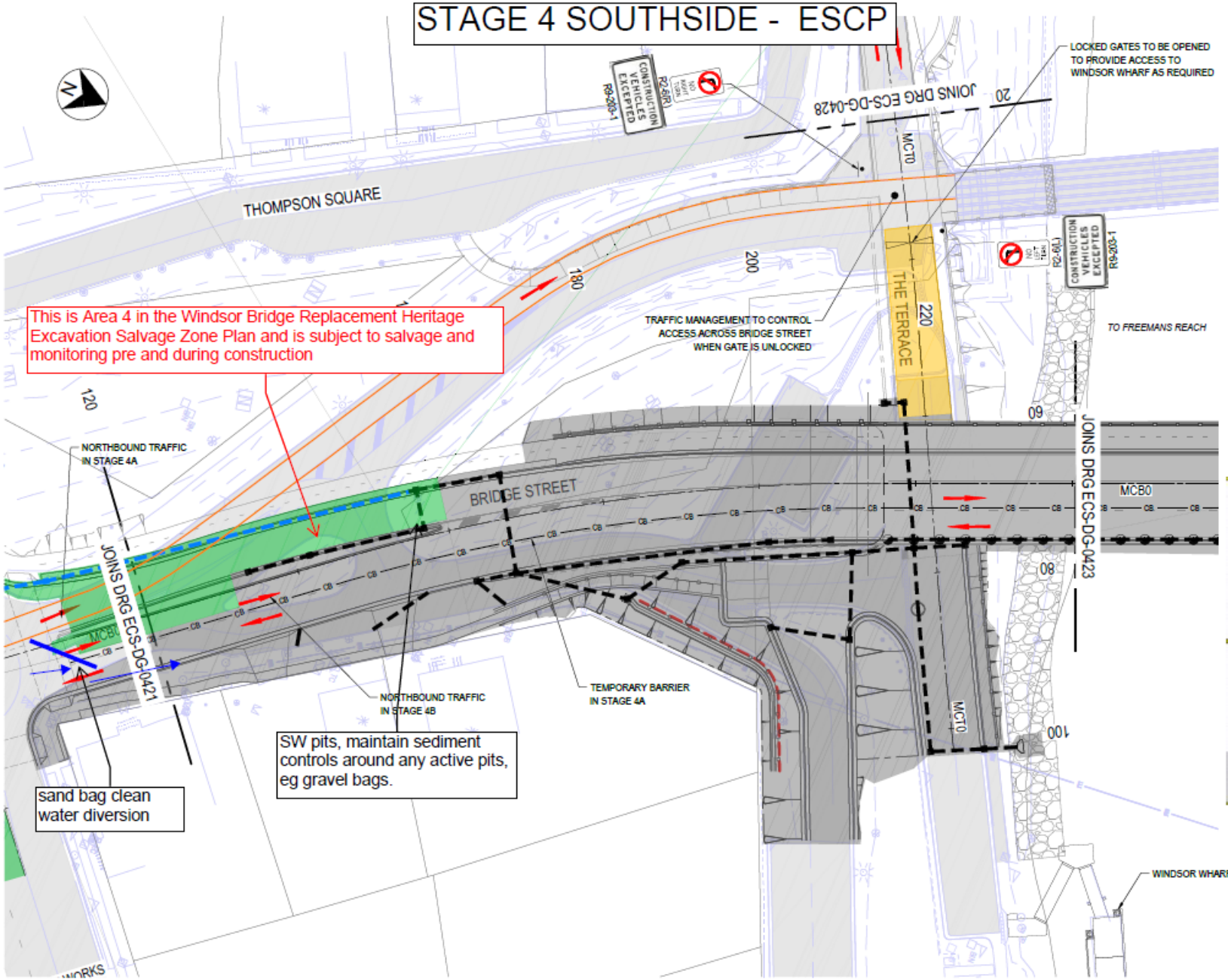
PROJECT
HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
CONSTRUCTION STAGING PLAN
STAGE 3
SHEET 2

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING
DS2012-000289-DES-WINDSOR-161007

STATUS: FOR INFORMATION ONLY

VOLUME	R&M REGISTRATION No	
-	DS2012/000289	
PHASE	DRAWING No	REV
100%	NB98005-ECS-DG-0322	4

STAGE 4 SOUTHSIDE - ESCP



LEGEND

FOR REFERENCE

- EXISTING PROPERTY BOUNDARY
- CONTROL LINE
- EXISTING EASEMENT BOUNDARY
- RETAINING WALL

CONSTRUCTION STAGING

- EXISTING PAVEMENT
- WORKS UNDER CONSTRUCTION
- COMPLETED WORKS CONSTRUCTION
- TEMPORARY CONSTRUCTION
- TEMPORARY CONSTRUCTION COMPLETE
- CB — TEMPORARY BARRIER LOCATION
- MODIFIED PAVEMENT MARKING
- DRAINAGE UNDER CONSTRUCTION
- DRAINAGE COMPLETE
- RETAINING WALL
- TRAFFIC LANE
- TEMPORARY TRAFFIC LANE LINE

ESCP controls

- sediment fence
- 'clean' water diversion
- 'dirty' water diversion
- silt curtain
- 'clean' water flows
- 'dirty' water flows
- construction sump/basin

KEY PLAN

REV	DATE	DESCRIPTION	DRAWN	REVIEWED	APPROVAL
4	21.12.15	ISSUED FOR INFORMATION	SH	SDP	TR
3	-	NOT USED	-	-	-
2	-	NOT USED	-	-	-
1	-	NOT USED	-	-	-
0	-	NOT USED	-	-	-

TITLE	INITIAL	DATE
DRAFTSPERSON	JP	
DRAFTING CHECK	SH	
DESIGNER	KL	
DESIGN CHECK	SDP	
PROJECT MANAGER	TR	

ORIGINAL DRAWING AT A3 SIZE — SCALE 1:500 — AT A3

CO-ORDINATE SYSTEM: MGA Zone 56 — HEIGHT DATUM: A.H.D.

0 5 10 15 20 25 mm ON A3 ORIGINAL — This Drawing may have been prepared using colour and may be incomplete if copied

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Transport NSW Roads & Maritime Services

PREPARED FOR
DIVISION: INFRASTRUCTURE DEVELOPMENT
BRANCH: GREATER SYDNEY PROGRAM OFFICE
DEPARTMENT: PROJECT DELIVERY PROGRAM 1

PROJECT

HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
CONSTRUCTION STAGING PLAN
STAGE 4
SHEET 2

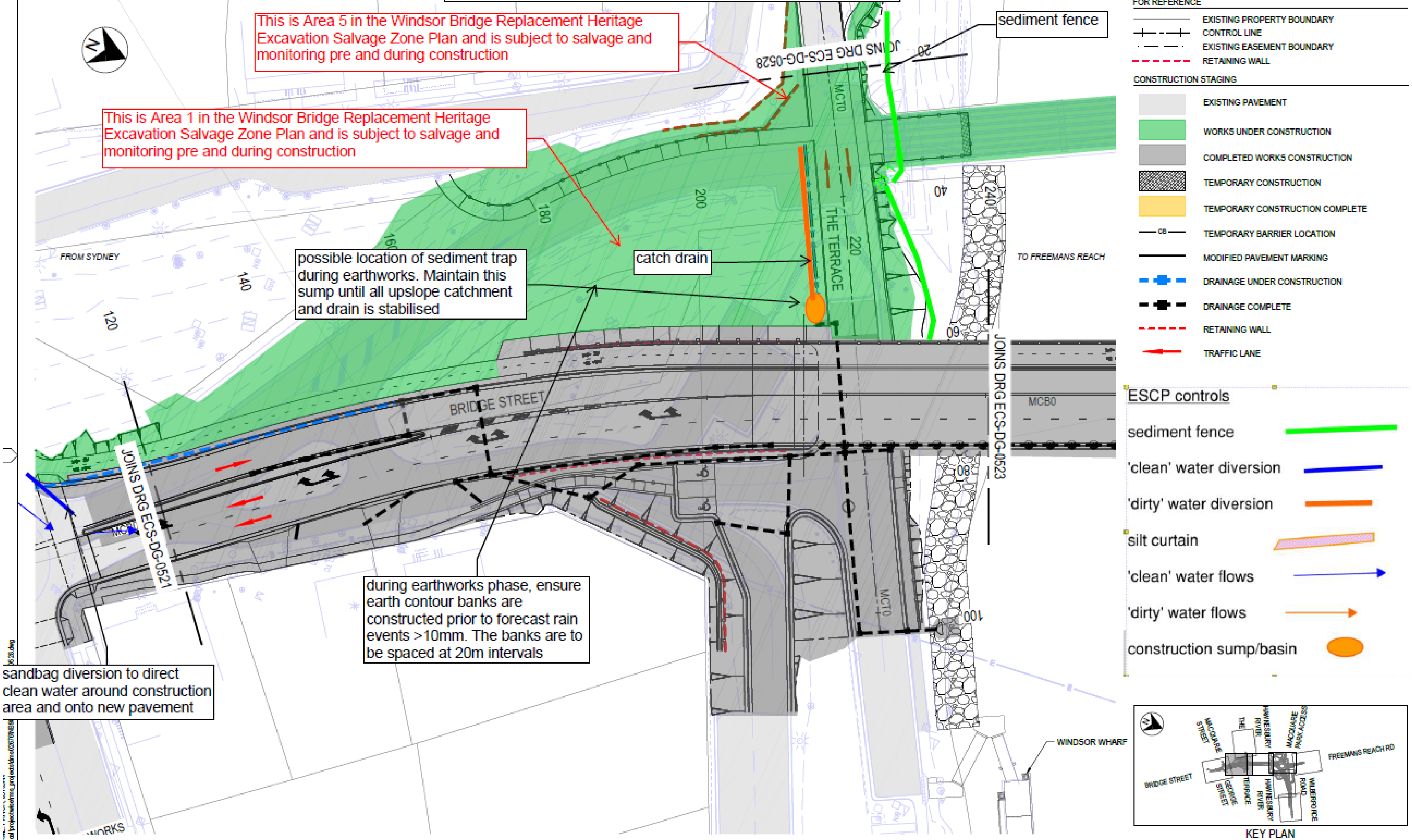
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: DS2012-000289-DES-WINDSOR-161007

STATUS: FOR INFORMATION ONLY

VOLUME	RMS REGISTRATION No.
-	DS2012/000289

PHASE	DRAWING No.	REV
100%	NB98005-ECS-DG-0422	4

STAGE 5 SOUTHSIDE - ESCP



This is Area 5 in the Windsor Bridge Replacement Heritage Excavation Salvage Zone Plan and is subject to salvage and monitoring pre and during construction
This is Area 1 in the Windsor Bridge Replacement Heritage Excavation Salvage Zone Plan and is subject to salvage and monitoring pre and during construction
sediment fence
JOINS DRG ECS-DG-0528
MCT0
THE TERRACE
catch drain
possible location of sediment trap during earthworks. Maintain this sump until all upslope catchment and drain is stabilised
FROM SYDNEY
TO FREEMANS REACH
BRIDGE STREET
MCB0
JOINS DRG ECS-DG-0523
JOINS DRG ECS-DG-0521
during earthworks phase, ensure earth contour banks are constructed prior to forecast rain events >10mm. The banks are to be spaced at 20m intervals
sandbag diversion to direct clean water around construction area and onto new pavement
WINDSOR WHARF
LEGEND
FOR REFERENCE
EXISTING PROPERTY BOUNDARY
CONTROL LINE
EXISTING EASEMENT BOUNDARY
RETAINING WALL
CONSTRUCTION STAGING
EXISTING PAVEMENT
WORKS UNDER CONSTRUCTION
COMPLETED WORKS CONSTRUCTION
TEMPORARY CONSTRUCTION
TEMPORARY CONSTRUCTION COMPLETE
TEMPORARY BARRIER LOCATION
MODIFIED PAVEMENT MARKING
DRAINAGE UNDER CONSTRUCTION
DRAINAGE COMPLETE
RETAINING WALL
TRAFFIC LANE
ESCP controls
sediment fence
'clean' water diversion
'dirty' water diversion
silt curtain
'clean' water flows
'dirty' water flows
construction sump/basin
BRIDGE STREET
FREEMANS REACH RD
KEY PLAN

REV	DATE	DESCRIPTION	DRAWN	REVIEWED	APPROVAL
4	21.12.16	ISSUED FOR INFORMATION	SH	BDP	TR
3	-	NOT USED	-	-	-
2	-	NOT USED	-	-	-
1	-	NOT USED	-	-	-
0	-	NOT USED	-	-	-

TITLE	INITIAL	DATE
DRAFTSPERSON	JP	
DRAFTING CHECK	SH	
DESIGNER	KL	
DESIGN CHECK	BDP	
PROJECT MANAGER	TR	

ORIGINAL DRAWING AT A3 SIZE

SCALE 1:500 AT A3

CO-ORDINATE SYSTEM: MGA Zone 56 — HEIGHT DATUM: A.H.D.

25 mm ON A3 ORIGINAL — This Drawing may have been prepared using colour and may be incomplete if copied

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CLIENT: NSW Government — Transport Roads & Maritime Services

PREPARED FOR
DIVISION: INFRASTRUCTURE DEVELOPMENT
BRANCH: GREATER SYDNEY PROGRAM OFFICE
DEPARTMENT: PROJECT DELIVERY PROGRAM 1

PROJECT
HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
CONSTRUCTION STAGING PLAN
STAGE 5
SHEET 2

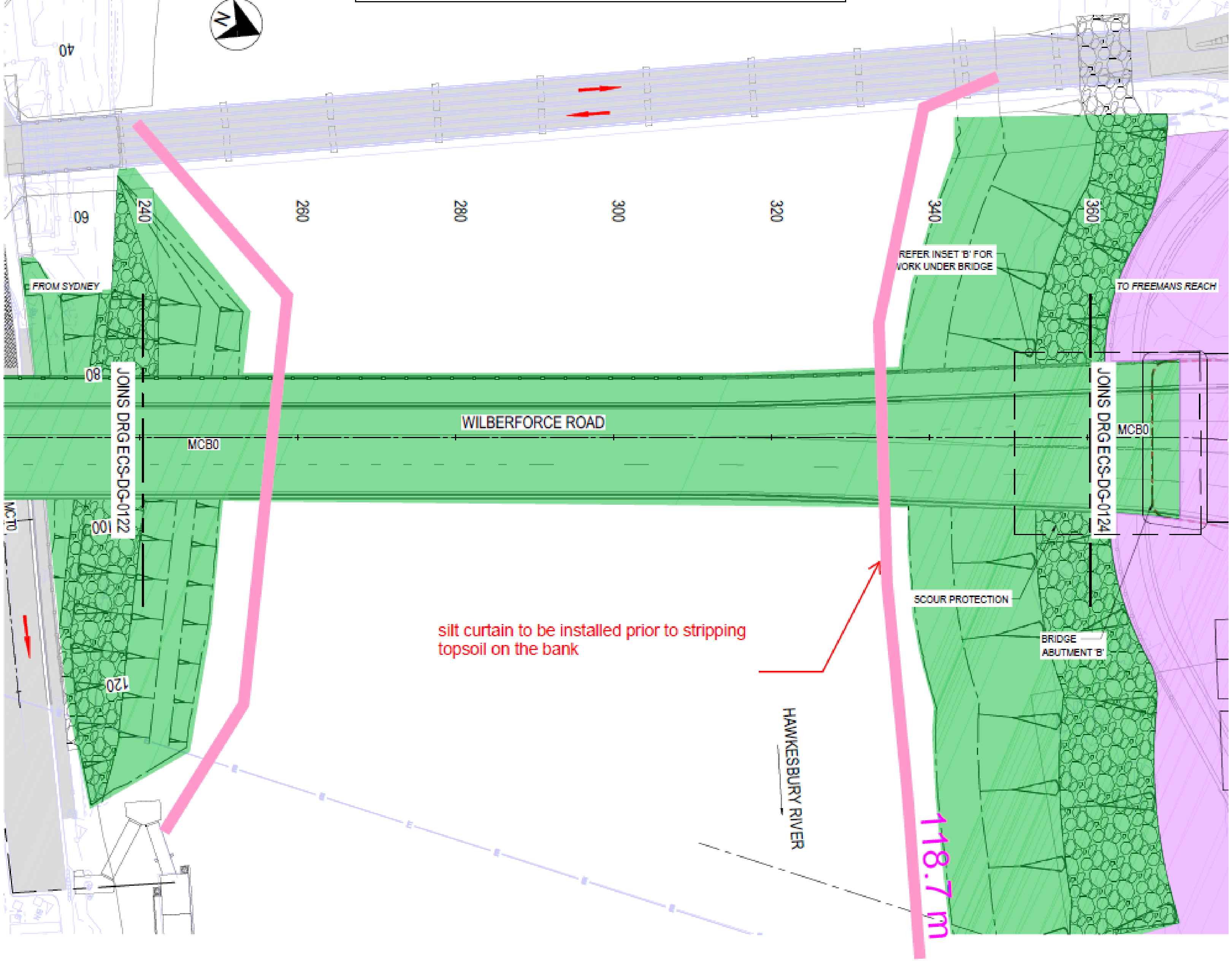
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: DS2012-000289-DES-WINDSOR-161007

STATUS: FOR INFORMATION ONLY

VOLUME: - | RMS REGISTRATION No: DS2012/000289

PHASE: 100% | DRAWING No: NB98005-ECS-DG-0522 | REV: 4

STAGE 1 NORTHSIDE - ESCP



LEGEND

FOR REFERENCE

- EXISTING PROPERTY BOUNDARY
- CONTROL LINE
- EXISTING EASEMENT BOUNDARY

CONSTRUCTION STAGING

- EXISTING PAVEMENT
- WORKS UNDER CONSTRUCTION
- COMPLETED WORKS CONSTRUCTION
- TEMPORARY CONSTRUCTION
- TEMPORARY CONSTRUCTION COMPLETE
- AREA FOR CONTRACTORS FACILITIES
- AREA TO BE KEPT CLEAR AT ALL TIMES
- RETAINING WALL
- TEMPORARY BARRIER LOCATION
- TEMPORARY PEDESTRIAN FENCING
- TEMPORARY PAVEMENT MARKING
- DRAINAGE UNDER CONSTRUCTION
- DRAINAGE COMPLETE
- TRAFFIC LANE

NOTES

1. AREAS UNDER TRAFFIC SHALL BE EFFECTIVELY DRAINED AT ALL TIMES.
2. ALL REDUNDANT PAVEMENT MARKINGS SHALL BE REMOVED BEFORE TRAFFIC SWITCH.
3. ACCESS TO RESIDENTIAL AND COMMERCIAL PROPERTIES SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION.

ESCP controls

- sediment fence
- 'clean' water diversion
- 'dirty' water diversion
- silt curtain
- 'clean' water flows
- 'dirty' water flows
- construction sump/basin

REV	DATE	DESCRIPTION	DRAWN	REVIEWED	APPROVAL
2	03.11.17	FOR INFORMATION ONLY	SH	BDP	TR
1	01.09.17	FOR INFORMATION ONLY	SH	BDP	TR
0	13.04.17	FOR INFORMATION ONLY	SH	BDP	TR

TITLE	INITIAL	DATE
DRAFTSPERSON	JP	03.11.17
DRAFTING CHECK	SH	03.11.17
DESIGNER	DH	03.11.17
DESIGN CHECK	BDP	03.11.17
PROJECT MANAGER	TR	03.11.17

ORIGINAL DRAWING AT A3 SIZE
SCALE 1:500 AT A3
CO-ORDINATE SYSTEM: MGA Zone 56 HEIGHT DATUM: AHD

25 mm ON A3 ORIGINAL This Drawing may have been prepared using colour and may be incomplete if copied

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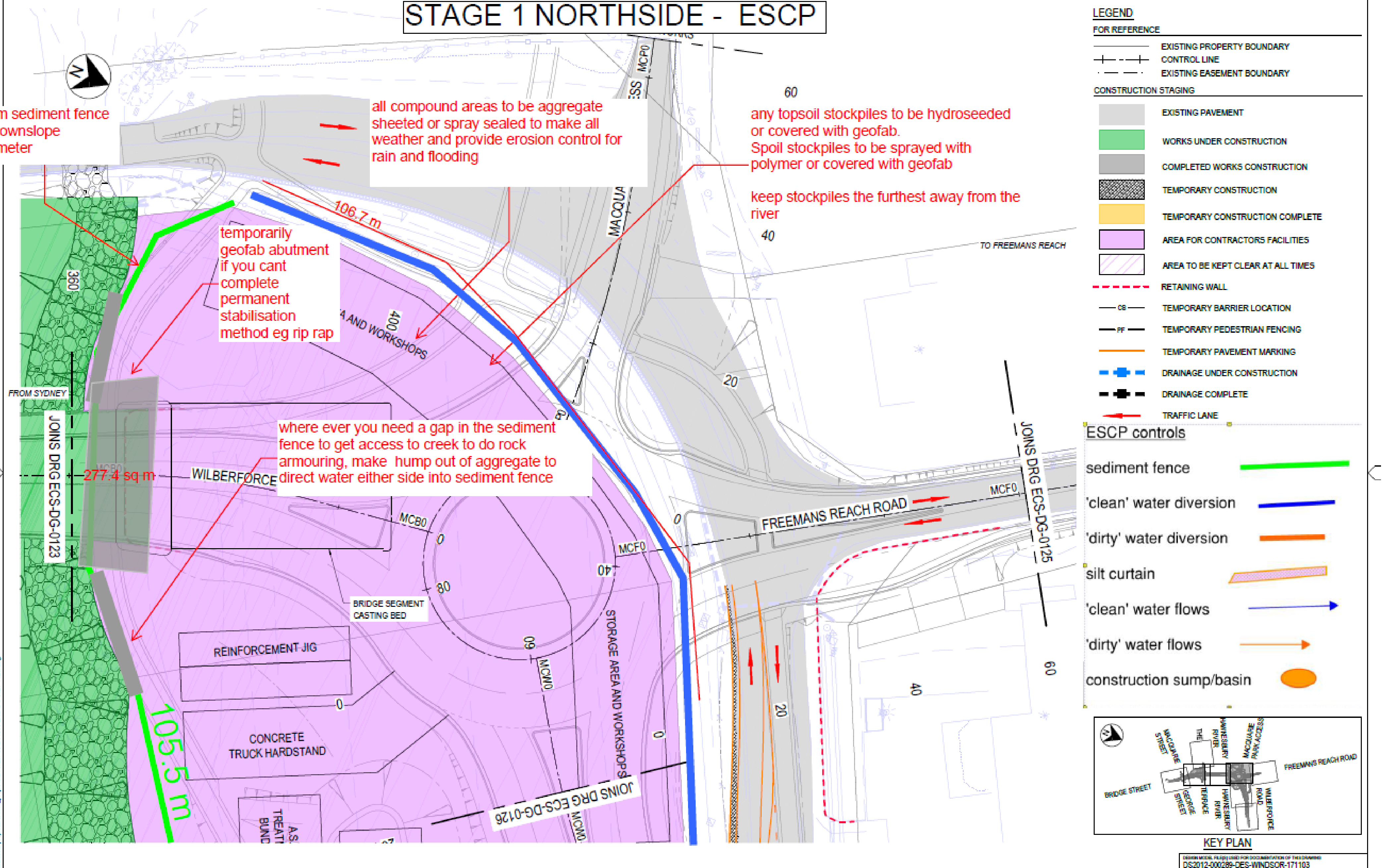
CLIENT
NSW GOVERNMENT Transport Roads & Maritime Services
PREPARED FOR
GREATER SYDNEY PROJECT OFFICE
SYDNEY OUTER

PROJECT
HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
CONSTRUCTION STAGING PLAN
STAGE 1
SHEET 3

DS2012-000289-DES-WINDSOR-171103
STATUS: FOR INFORMATION ONLY
VOLUME: -
RMS REGISTRATION No: DS2012/000289
PHASE: -
DRAWING No: NB98005-ECS-DG-0123
REV: 2

STAGE 1 NORTHSIDE - ESCP


250m sediment fence on downslope perimeter
all compound areas to be aggregate sheeted or spray sealed to make all weather and provide erosion control for rain and flooding
any topsoil stockpiles to be hydroseeded or covered with geofab.
Spoil stockpiles to be sprayed with polymer or covered with geofab
keep stockpiles the furthest away from the river
temporarily geofab abutment if you cant complete permanent stabilisation method eg rip rap
where ever you need a gap in the sediment fence to get access to creek to do rock armouring, make hump out of aggregate to direct water either side into sediment fence
106.7 m
105.5 m
277.4 sq m
TO FREEMANS REACH
FROM SYDNEY
JOINS DRG ECS-DG-0123
JOINS DRG ECS-DG-0125
JOINS DRG ECS-DG-0126
WILBERFORCE
FREEMANS REACH ROAD
MACQUA
BRIDGE SEGMENT CASTING BED
REINFORCEMENT JIG
CONCRETE TRUCK HARDSTAND
STORAGE AREA AND WORKSHOPS
A AND WORKSHOPS
LEGEND
FOR REFERENCE
EXISTING PROPERTY BOUNDARY
CONTROL LINE
EXISTING EASEMENT BOUNDARY
CONSTRUCTION STAGING
EXISTING PAVEMENT
WORKS UNDER CONSTRUCTION
COMPLETED WORKS CONSTRUCTION
TEMPORARY CONSTRUCTION
TEMPORARY CONSTRUCTION COMPLETE
AREA FOR CONTRACTORS FACILITIES
AREA TO BE KEPT CLEAR AT ALL TIMES
RETAINING WALL
TEMPORARY BARRIER LOCATION
TEMPORARY PEDESTRIAN FENCING
TEMPORARY PAVEMENT MARKING
DRAINAGE UNDER CONSTRUCTION
DRAINAGE COMPLETE
TRAFFIC LANE
ESCP controls
sediment fence
'clean' water diversion
'dirty' water diversion
silt curtain
'clean' water flows
'dirty' water flows
construction sump/basin
KEY PLAN
BRIDGE STREET
FREEMANS REACH ROAD

DS2012-000289-DES-WINDSOR-171103

FOR INFORMATION ONLY

REV	DATE	DESCRIPTION	DRAWN	REVIEWED	APPROVAL
2	03.11.17	FOR INFORMATION ONLY	SH	BDP	TR
1	01.09.17	FOR INFORMATION ONLY	SH	BDP	TR
0	13.04.17	FOR INFORMATION ONLY	SH	BDP	TR

TITLE	INITIAL	DATE
DRAFTSPERSON	JP	03.11.17
DRAFTING CHECK	SH	03.11.17
DESIGNER	DH	03.11.17
DESIGN CHECK	BDP	03.11.17
PROJECT MANAGER	TR	03.11.17

SCALE 1:500 AT A3

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North Sydney, SYDNEY, NSW 2060
AUSTRALIA

Transport Roads & Maritime Services
PREPARED FOR GREATER SYDNEY PROJECT OFFICE SYDNEY OUTER

HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
CONSTRUCTION STAGING PLAN
STAGE 1
SHEET 4

DS2012/000289

NB98005-ECS-DG-0124 | REV 2

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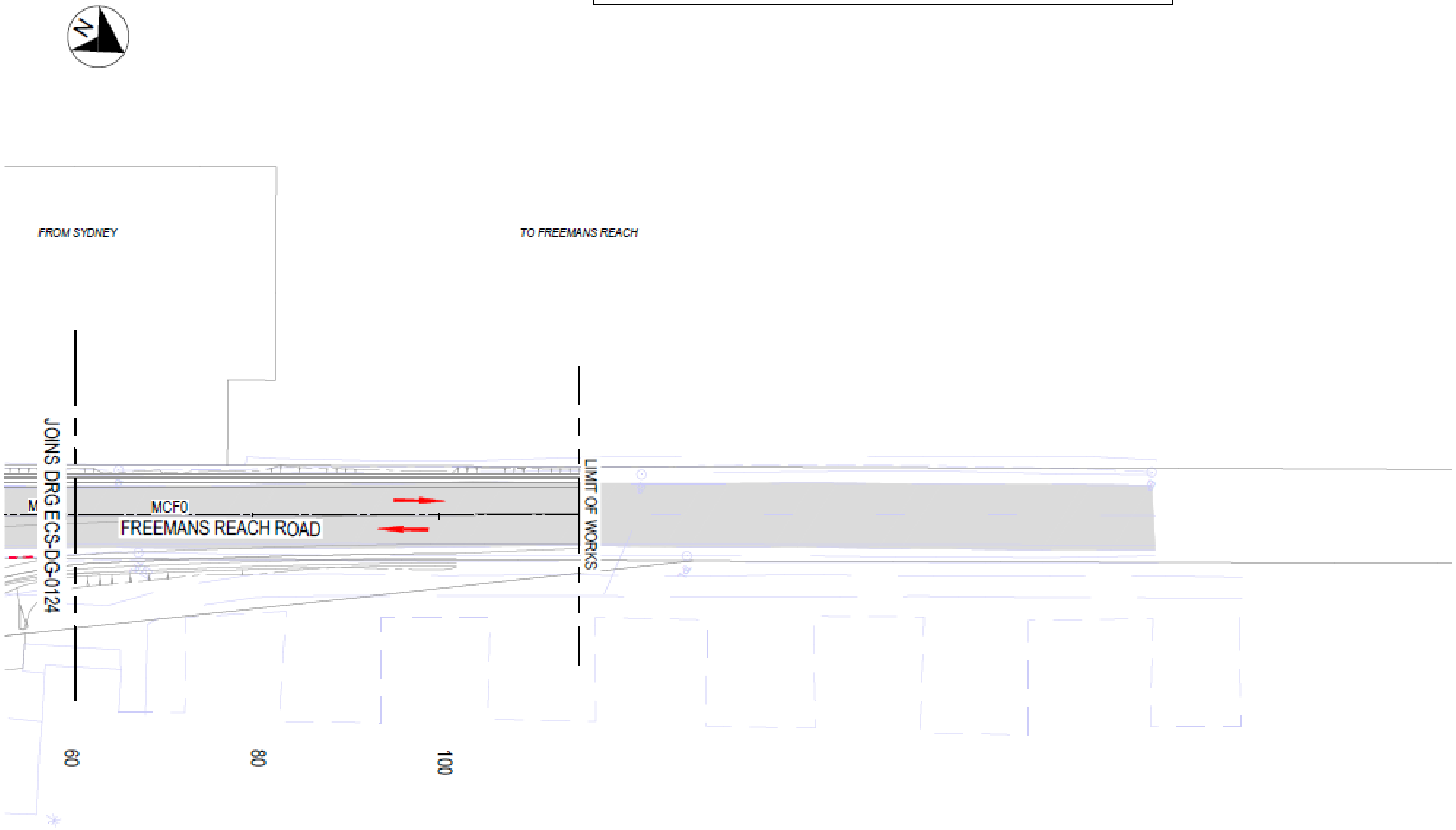
STAGE 1 NORTHSIDE - ESCP



LEGEND

FOR REFERENCE

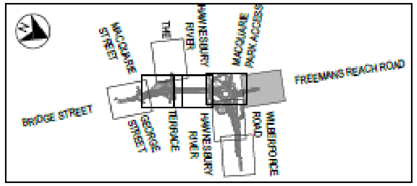
- EXISTING PROPERTY BOUNDARY
- CONTROL LINE
- EXISTING EASEMENT BOUNDARY

CONSTRUCTION STAGING

- EXISTING PAVEMENT
- WORKS UNDER CONSTRUCTION
- COMPLETED WORKS CONSTRUCTION
- TEMPORARY CONSTRUCTION
- TEMPORARY CONSTRUCTION COMPLETE
- AREA FOR CONTRACTORS FACILITIES
- AREA TO BE KEPT CLEAR AT ALL TIMES
- RETAINING WALL
- TEMPORARY BARRIER LOCATION
- TEMPORARY PEDESTRIAN FENCING
- TEMPORARY PAVEMENT MARKING
- DRAINAGE UNDER CONSTRUCTION
- DRAINAGE COMPLETE
- TRAFFIC LANE

NOTES

1. AREAS UNDER TRAFFIC SHALL BE EFFECTIVELY DRAINED AT ALL TIMES.
2. ALL REDUNDANT PAVEMENT MARKINGS SHALL BE REMOVED BEFORE TRAFFIC SWITCH.
3. ACCESS TO RESIDENTIAL AND COMMERCIAL PROPERTIES SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION.



KEY PLAN

REV	DATE	DESCRIPTION	DRAWN	REVIEWED	APPROVAL
2	03.11.17	FOR INFORMATION ONLY	SH	BDP	TR
1	01.09.17	FOR INFORMATION ONLY	SH	BDP	TR
0	13.04.17	FOR INFORMATION ONLY	SH	BDP	TR

TITLE	INITIAL	DATE
DRAFTSPERSON	JP	03.11.17
DRAFTING CHECK	SH	03.11.17
DESIGNER	DH	03.11.17
DESIGN CHECK	BDP	03.11.17
PROJECT MANAGER	TR	03.11.17

SCALE 1:500 AT A3

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CLIENT: NSW Transport Roads & Maritime Services

PREPARED FOR: GREATER SYDNEY PROJECT OFFICE, SYDNEY OUTER

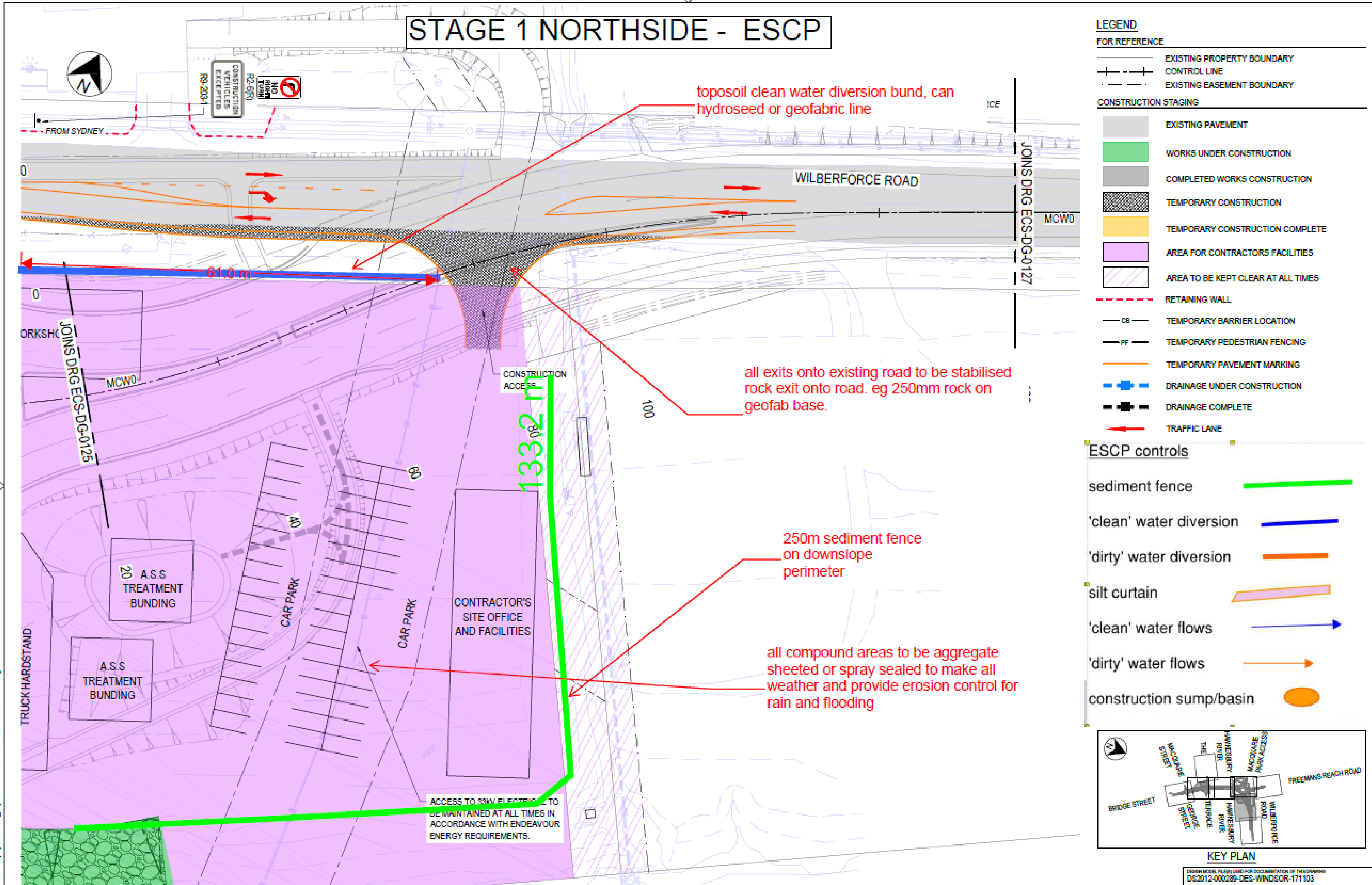
PROJECT: HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
CONSTRUCTION STAGING PLAN
STAGE 1
SHEET 5

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: DS2012-000289-DES-WINDSOR-171103

STATUS: FOR INFORMATION ONLY

RMS REGISTRATION No: DS2012/000289

DRAWING No: NB98005-ECS-DG-0125 REV 2


STAGE 1 NORTHSIDE - ESCP
FROM SYDNEY
WILBERFORCE ROAD
MCW0
JOINS DRG ECS-DG-0127
JOINS DRG ECS-DG-0125
toposoil clean water diversion bund, can hydroseed or geofabric line
61.0 m
all exits onto existing road to be stabilised rock exit onto road. eg 250mm rock on geofab base.
CONSTRUCTION ACCESS
133.2 m
250m sediment fence on downslope perimeter
all compound areas to be aggregate sheeted or spray sealed to make all weather and provide erosion control for rain and flooding
A.S.S TREATMENT BUNDING
A.S.S TREATMENT BUNDING
CAR PARK
CAR PARK
CONTRACTOR'S SITE OFFICE AND FACILITIES
TRUCK HARDSTAND
ACCESS TO 33kV ELECTRIC TO BE MAINTAINED AT ALL TIMES IN ACCORDANCE WITH ENDEAVOUR ENERGY REQUIREMENTS.
LEGEND
FOR REFERENCE
EXISTING PROPERTY BOUNDARY
CONTROL LINE
EXISTING EASEMENT BOUNDARY
CONSTRUCTION STAGING
EXISTING PAVEMENT
WORKS UNDER CONSTRUCTION
COMPLETED WORKS CONSTRUCTION
TEMPORARY CONSTRUCTION
TEMPORARY CONSTRUCTION COMPLETE
AREA FOR CONTRACTORS FACILITIES
AREA TO BE KEPT CLEAR AT ALL TIMES
RETAINING WALL
TEMPORARY BARRIER LOCATION
TEMPORARY PEDESTRIAN FENCING
TEMPORARY PAVEMENT MARKING
DRAINAGE UNDER CONSTRUCTION
DRAINAGE COMPLETE
TRAFFIC LANE
ESCP controls
sediment fence
'clean' water diversion
'dirty' water diversion
silt curtain
'clean' water flows
'dirty' water flows
construction sump/basin
KEY PLAN
BRIDGE STREET
FREEMANS REACH ROAD

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: DS2012-000289-DES-WINDSOR-171103

REV	DATE	DESCRIPTION	DRAWN	REVIEWED	APPROVAL
2	03.11.17	FOR INFORMATION ONLY	SH	BDP	TR
1	01.09.17	FOR INFORMATION ONLY	SH	BDP	TR
0	13.04.17	FOR INFORMATION ONLY	SH	BDP	TR

TITLE	INITIAL	DATE
DRAFTSPERSON	JP	03.11.17
DRAFTING CHECK	SH	03.11.17
DESIGNER	DH	03.11.17
DESIGN CHECK	BDP	03.11.17
PROJECT MANAGER	TR	03.11.17

SCALE 1:500 AT A3

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CLIENT: NSW Transport Roads & Maritime Services

PREPARED FOR: GREATER SYDNEY PROJECT OFFICE SYDNEY OUTER

PROJECT: HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
CONSTRUCTION STAGING PLAN
STAGE 1
SHEET 6

STATUS: FOR INFORMATION ONLY

RMS REGISTRATION No: DS2012/000289

DRAWING No: NB98005-ECS-DG-0126 REV 2

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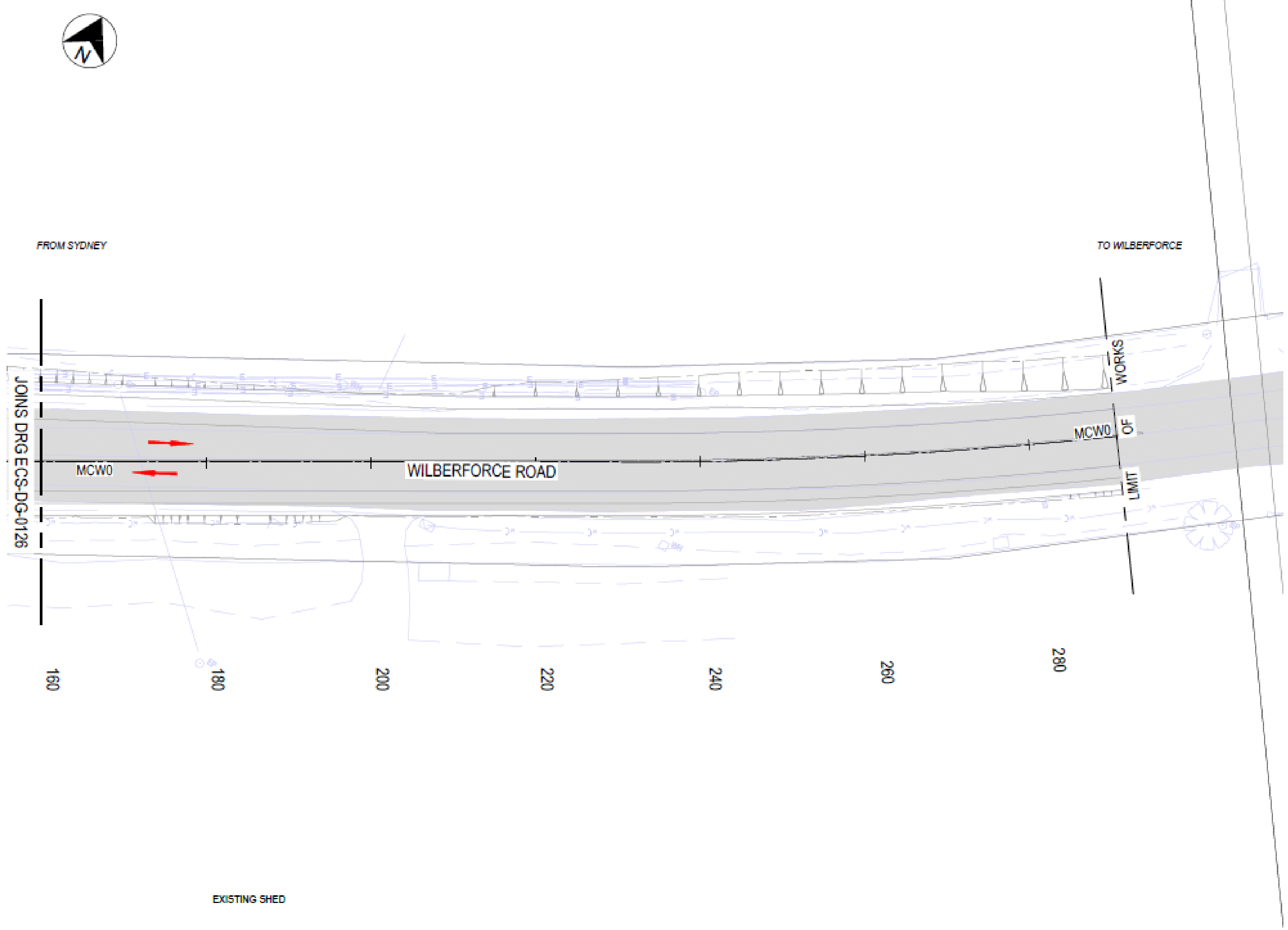
STAGE 1 NORTHSIDE - ESCP



LEGEND

FOR REFERENCE

- EXISTING PROPERTY BOUNDARY
- CONTROL LINE
- EXISTING EASEMENT BOUNDARY

CONSTRUCTION STAGING

- EXISTING PAVEMENT
- WORKS UNDER CONSTRUCTION
- COMPLETED WORKS CONSTRUCTION
- TEMPORARY CONSTRUCTION
- TEMPORARY CONSTRUCTION COMPLETE
- AREA FOR CONTRACTORS FACILITIES
- AREA TO BE KEPT CLEAR AT ALL TIMES
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- DRAINAGE COMPLETE
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ESCP controls

- sediment fence
- 'clean' water diversion
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- 'clean' water flows
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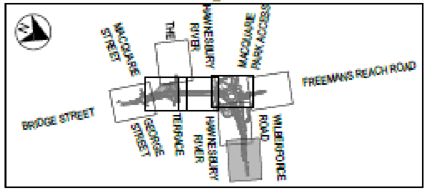

KEY PLAN

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: DS2012-000289-DES-WINDSOR-171103

REV	DATE	DESCRIPTION	DRAWN	REVIEWED	APPROVAL
2	03.11.17	FOR INFORMATION ONLY	SH	BDP	TR
1	01.09.17	FOR INFORMATION ONLY	SH	BDP	TR
0	13.04.17	FOR INFORMATION ONLY	SH	BDP	TR

TITLE	INITIAL	DATE
DRAFTSPERSON	JP	03.11.17
DRAFTING CHECK	SH	03.11.17
DESIGNER	DH	03.11.17
DESIGN CHECK	BDP	03.11.17
PROJECT MANAGER	TR	03.11.17

ORIGINAL DRAWING AT A3 SIZE — SCALE 1:500 AT A3

CO-ORDINATE SYSTEM: MGA Zone 56 — HEIGHT DATUM: A.H.D.

0 | 5 | 10 | 15 | 20 | 25 mm ON A3 ORIGINAL — This Drawing may have been prepared using colour and may be incomplete if copied

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CLIENT: NSW Government Transport Roads & Maritime Services

PREPARED FOR: GREATER SYDNEY PROJECT OFFICE, SYDNEY OUTER

PROJECT:
HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
CONSTRUCTION STAGING PLAN
STAGE 1
SHEET 7

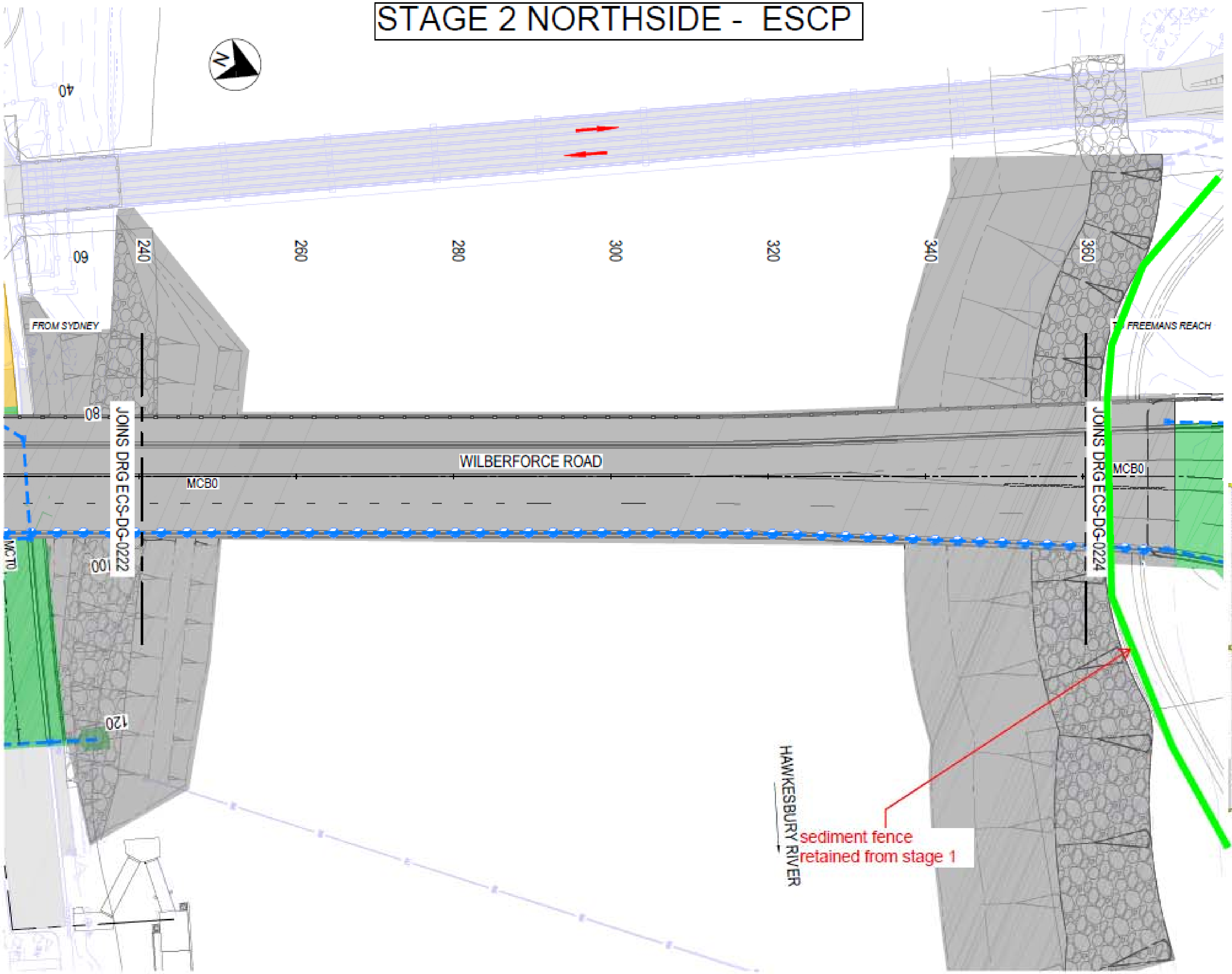
STATUS: FOR INFORMATION ONLY

VOLUME: - | RMS REGISTRATION No: DS2012/000289

PHASE: - | DRAWING No: NB98005-ECS-DG-0127 | REV: 2

DATE: 1/11/2017 1:37:53PM LOGIN NAME: PARISH, JORDAN LOCATION: C:\users\parishj\appdata\local\projectwise\rms_projects\dms00267\NB98005-ECS-DG-0127-0128.dwg

STAGE 2 NORTHSIDE - ESCP



LEGEND

FOR REFERENCE

- EXISTING PROPERTY BOUNDARY
- CONTROL LINE
- EXISTING EASEMENT BOUNDARY

CONSTRUCTION STAGING

- EXISTING PAVEMENT
- WORKS UNDER CONSTRUCTION
- COMPLETED WORKS CONSTRUCTION
- TEMPORARY CONSTRUCTION
- TEMPORARY CONSTRUCTION COMPLETE
- AREA FOR CONTRACTORS FACILITIES
- AREA TO BE KEPT CLEAR AT ALL TIMES
- RETAINING WALL
- CB — TEMPORARY BARRIER LOCATION
- PF — TEMPORARY PEDESTRIAN FENCING
- TEMPORARY PAVEMENT MARKING
- DRAINAGE UNDER CONSTRUCTION
- DRAINAGE COMPLETE
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ESCP controls

- sediment fence
- 'clean' water diversion
- 'dirty' water diversion
- silt curtain
- 'clean' water flows
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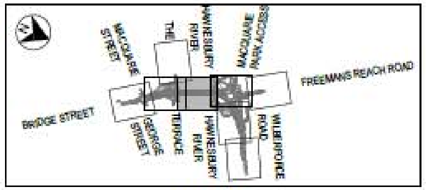

KEY PLAN

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: DS2012-000289-DES-WINDSOR-171103

REV	DATE	DESCRIPTION	DRAWN	REVIEWED	APPROVAL
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TITLE	INITIAL	DATE
DRAFTSPERSON	JP	03.11.17
DRAFTING CHECK	SH	03.11.17
DESIGNER	DH	03.11.17
DESIGN CHECK	BDP	03.11.17
PROJECT MANAGER	TR	03.11.17

ORIGINAL DRAWING AT A3 SIZE
SCALE 1:500 AT A3
CO-ORDINATE SYSTEM: MGA Zone 56
HEIGHT DATUM: A.H.D.

DRAWING/DESIGN PREPARED BY
JACOBS
177 Pacific Highway
North Sydney, SYDNEY, NSW 2060
AUSTRALIA
Tel: (02) 9928 2100 Fax (02) 9928 2500
Web: www.jacobs.com

CLIENT
NSW Government Transport Roads & Maritime Services

PREPARED FOR
GREATER SYDNEY PROJECT OFFICE
SYDNEY OUTER

PROJECT
HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
CONSTRUCTION STAGING PLAN
STAGE 2
SHEET 3

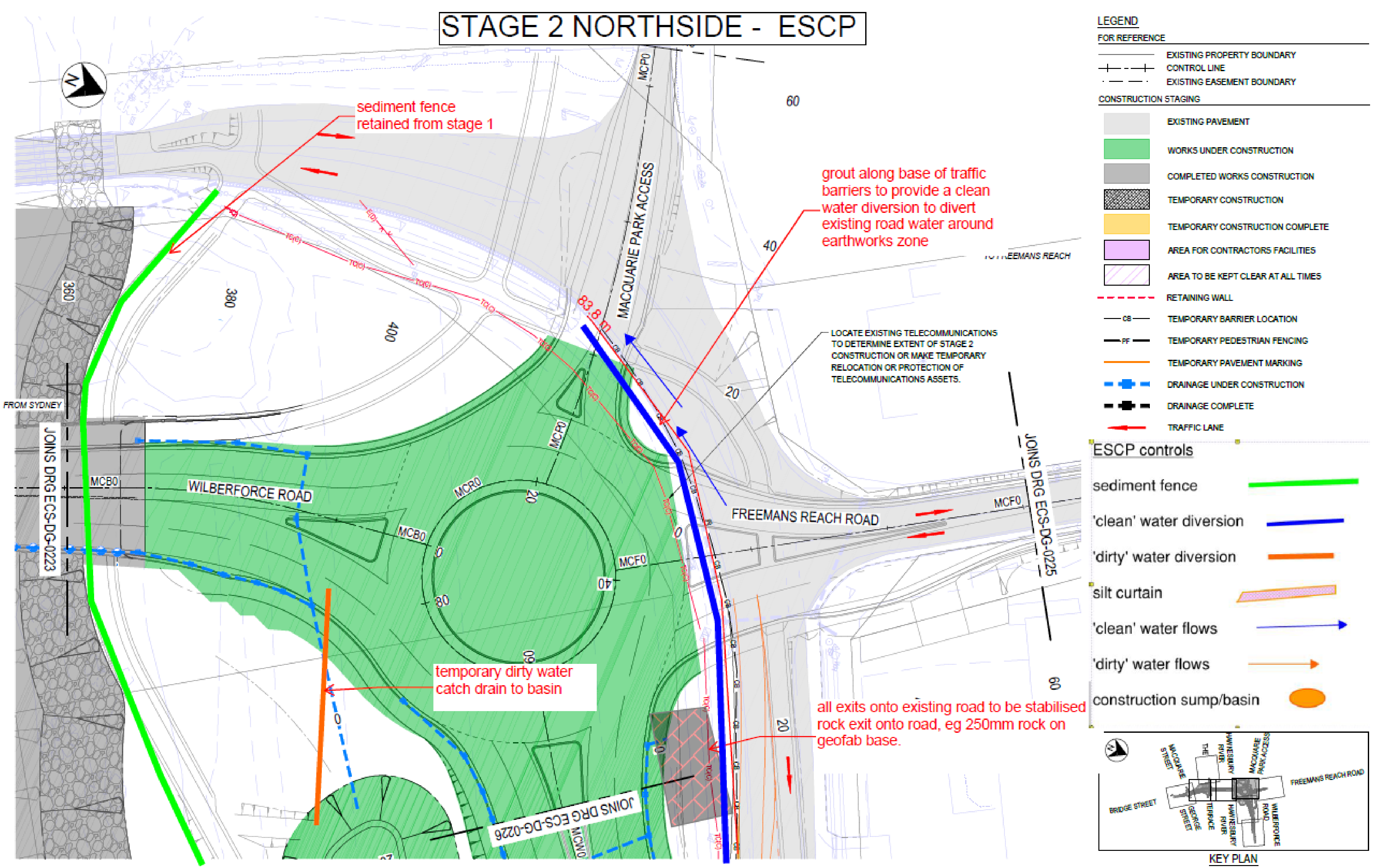
STATUS
FOR INFORMATION ONLY

VOLUME	RMS REGISTRATION No.
-	DS2012/000289

PHASE	DRAWING No.	REV
-	NB98005-ECS-DG-0223	2

0 | 5 | 10 | 15 | 20 | 25 mm ON A3 ORIGINAL — This Drawing may have been prepared using colour and may be incomplete if copied

STAGE 2 NORTHSIDE - ESCP



sediment fence retained from stage 1
grout along base of traffic barriers to provide a clean water diversion to divert existing road water around earthworks zone
LOCATE EXISTING TELECOMMUNICATIONS TO DETERMINE EXTENT OF STAGE 2 CONSTRUCTION OR MAKE TEMPORARY RELOCATION OR PROTECTION OF TELECOMMUNICATIONS ASSETS.
temporary dirty water catch drain to basin
all exits onto existing road to be stabilised rock exit onto road, eg 250mm rock on geofab base.
MACQUARIE PARK ACCESS
WILBERFORCE ROAD
FREEMANS REACH ROAD
FROM SYDNEY
83.8 m
JOINS DRG ECS-DG-0223
JOINS DRG ECS-DG-0225
JOINS DRG ECS-DG-0226
LEGEND
FOR REFERENCE
EXISTING PROPERTY BOUNDARY
CONTROL LINE
EXISTING EASEMENT BOUNDARY
CONSTRUCTION STAGING
EXISTING PAVEMENT
WORKS UNDER CONSTRUCTION
COMPLETED WORKS CONSTRUCTION
TEMPORARY CONSTRUCTION
TEMPORARY CONSTRUCTION COMPLETE
AREA FOR CONTRACTORS FACILITIES
AREA TO BE KEPT CLEAR AT ALL TIMES
RETAINING WALL
TEMPORARY BARRIER LOCATION
TEMPORARY PEDESTRIAN FENCING
TEMPORARY PAVEMENT MARKING
DRAINAGE UNDER CONSTRUCTION
DRAINAGE COMPLETE
TRAFFIC LANE
ESCP controls
sediment fence
'clean' water diversion
'dirty' water diversion
silt curtain
'clean' water flows
'dirty' water flows
construction sump/basin
KEY PLAN
BRIDGE STREET
FREEMANS REACH ROAD

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: DS2012-000289-DES-WINDSOR-171103

REV	DATE	DESCRIPTION	DRAWN	REVIEWED	APPROVAL
2	03.11.17	FOR INFORMATION ONLY	SH	BDP	TR
1	01.09.17	FOR INFORMATION ONLY	SH	BDP	TR
0	13.04.17	FOR INFORMATION ONLY	SH	BDP	TR

TITLE	INITIAL	DATE
DRAFTSPERSON	JP	03.11.17
DRAFTING CHECK	SH	03.11.17
DESIGNER	DH	03.11.17
DESIGN CHECK	BDP	03.11.17
PROJECT MANAGER	TR	03.11.17

SCALE 1:500 AT A3

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PREPARED FOR: GREATER SYDNEY PROJECT OFFICE SYDNEY OUTER

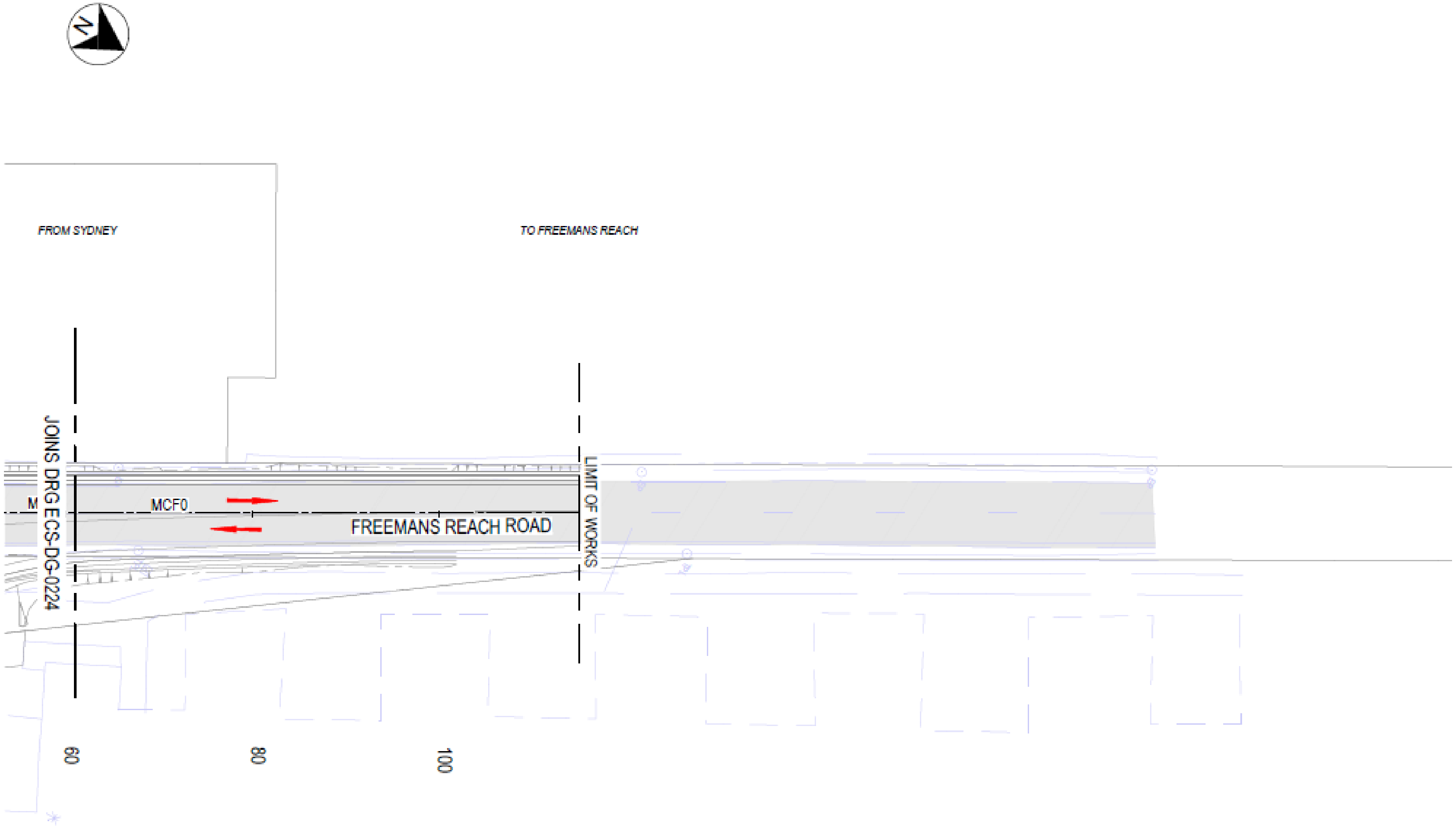
PROJECT: HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
CONSTRUCTION STAGING PLAN
STAGE 2
SHEET 4

STATUS: FOR INFORMATION ONLY

VOLUME: - | RMS REGISTRATION No: DS2012/000289

PHASE: - | DRAWING No: NB98005-ECS-DG-0224 | REV: 2

STAGE 2 NORTHSIDE - ESCP



LEGEND

FOR REFERENCE

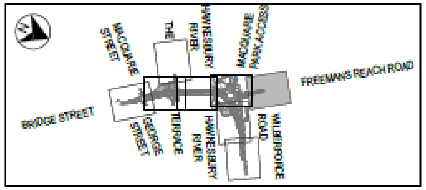
- EXISTING PROPERTY BOUNDARY
- CONTROL LINE
- EXISTING EASEMENT BOUNDARY

CONSTRUCTION STAGING

- EXISTING PAVEMENT
- WORKS UNDER CONSTRUCTION
- COMPLETED WORKS CONSTRUCTION
- TEMPORARY CONSTRUCTION
- TEMPORARY CONSTRUCTION COMPLETE
- AREA FOR CONTRACTORS FACILITIES
- AREA TO BE KEPT CLEAR AT ALL TIMES
- RETAINING WALL
- TEMPORARY BARRIER LOCATION
- TEMPORARY PEDESTRIAN FENCING
- TEMPORARY PAVEMENT MARKING
- DRAINAGE UNDER CONSTRUCTION
- DRAINAGE COMPLETE
- TRAFFIC LANE

ESCP controls

- sediment fence
- 'clean' water diversion
- 'dirty' water diversion
- silt curtain
- 'clean' water flows
- 'dirty' water flows
- construction sump/basin



KEY PLAN

REV	DATE	DESCRIPTION	DRAWN	REVIEWED	APPROVAL
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PROJECT MANAGER	TR	03.11.17

ORIGINAL DRAWING AT A3 SIZE

SCALE 1:500 AT A3

CO-ORDINATE SYSTEM: MGA Zone 56 — HEIGHT DATUM: A.H.D.

0 5 10 15 20 25 mm ON A3 ORIGINAL. This Drawing may have been prepared using colour and may be incomplete if copied

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CLIENT: NSW Government — Transport Roads & Maritime Services

PREPARED FOR: GREATER SYDNEY PROJECT OFFICE, SYDNEY OUTER

PROJECT: HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
CONSTRUCTION STAGING PLAN
STAGE 2
SHEET 5

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: DS2012-000289-DES-WINDSOR-171103

STATUS: FOR INFORMATION ONLY

VOLUME: - RMS REGISTRATION No: DS2012/000289

PHASE: - DRAWING No: NB98005-ECS-DG-0225 REV: 2

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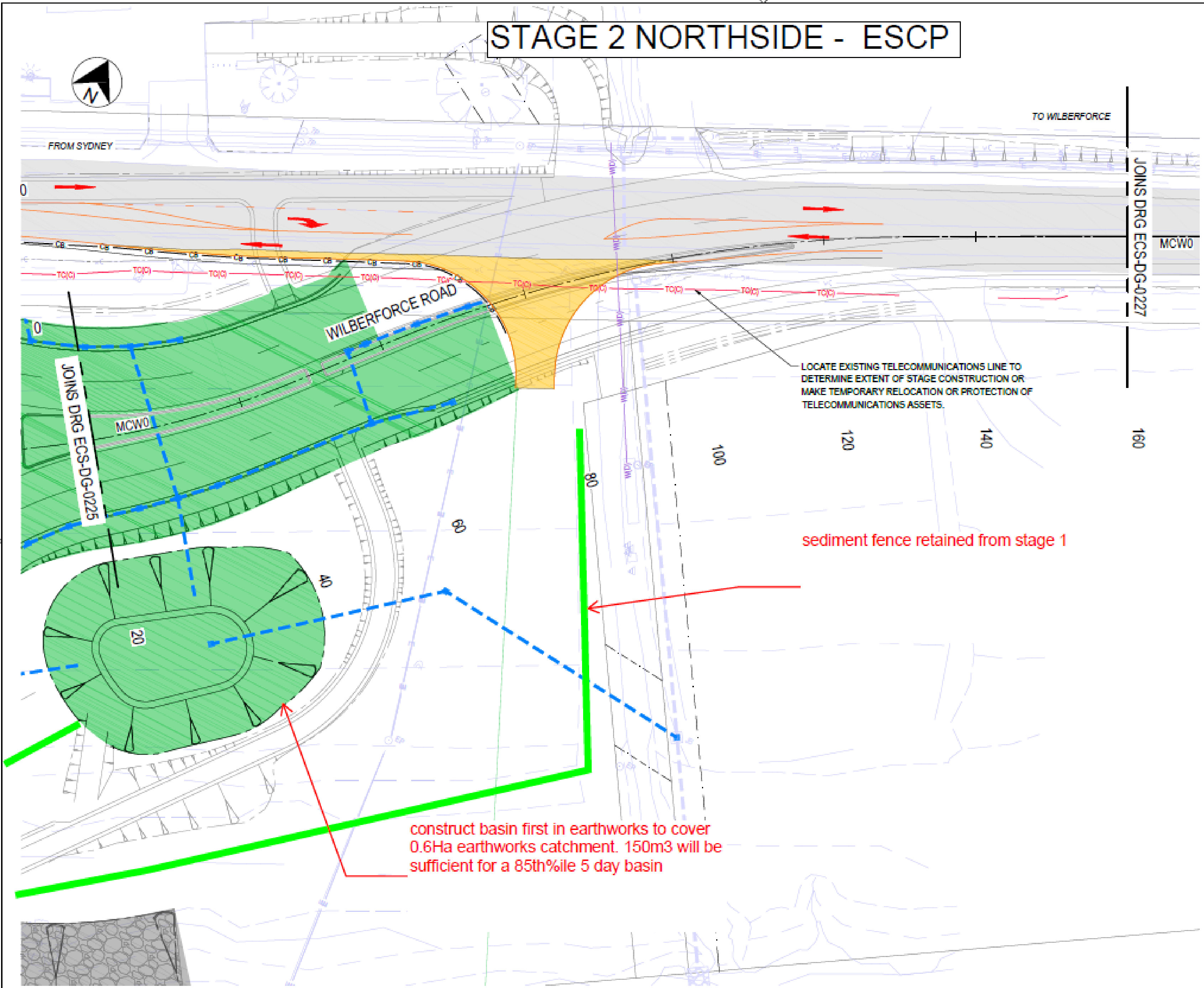
STAGE 2 NORTHSIDE - ESCP



LEGEND

FOR REFERENCE

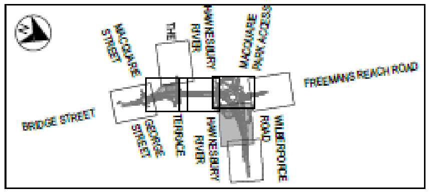
- EXISTING PROPERTY BOUNDARY
- CONTROL LINE
- EXISTING EASEMENT BOUNDARY

CONSTRUCTION STAGING

- EXISTING PAVEMENT
- WORKS UNDER CONSTRUCTION
- COMPLETED WORKS CONSTRUCTION
- TEMPORARY CONSTRUCTION
- TEMPORARY CONSTRUCTION COMPLETE
- AREA FOR CONTRACTORS FACILITIES
- AREA TO BE KEPT CLEAR AT ALL TIMES
- RETAINING WALL
- TEMPORARY BARRIER LOCATION
- TEMPORARY PEDESTRIAN FENCING
- TEMPORARY PAVEMENT MARKING
- DRAINAGE UNDER CONSTRUCTION
- DRAINAGE COMPLETE
- TRAFFIC LANE

ESCP controls

- sediment fence
- 'clean' water diversion
- 'dirty' water diversion
- silt curtain
- 'clean' water flows
- 'dirty' water flows
- construction sump/basin



KEY PLAN

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PROJECT MANAGER	TR	03.11.17

SCALE 1:500 AT A3

JACOBS
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Transport Roads & Maritime Services

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GREATER SYDNEY PROJECT OFFICE
SYDNEY OUTER

HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
CONSTRUCTION STAGING PLAN
STAGE 2
SHEET 6

DS2012-000289-DES-WINDSOR-171103

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RMS REGISTRATION No DS2012/000289

DRAWING No NB98005-ECS-DG-0226 REV 2

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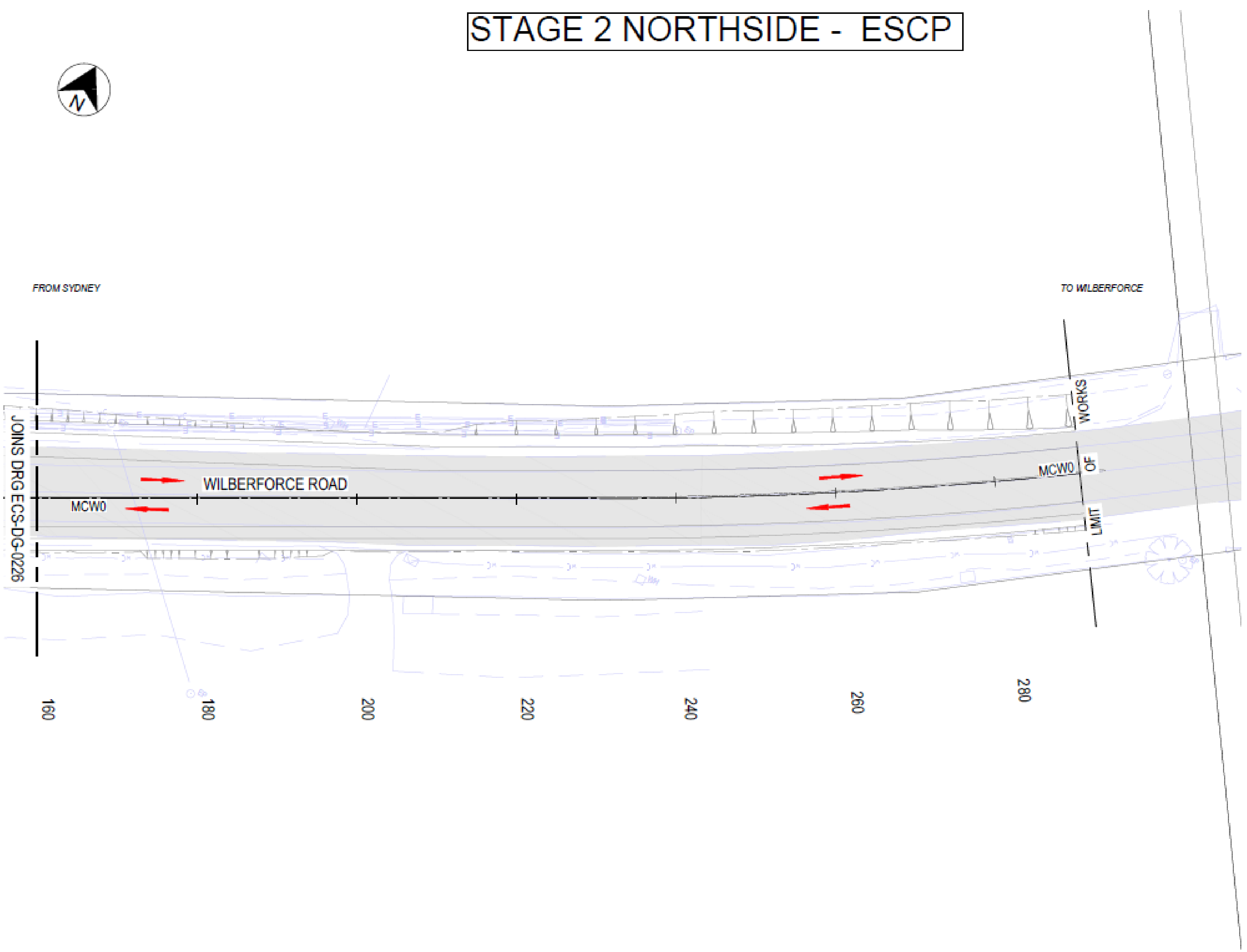
STAGE 2 NORTHSIDE - ESCP



LEGEND

FOR REFERENCE

- EXISTING PROPERTY BOUNDARY
- CONTROL LINE
- EXISTING EASEMENT BOUNDARY

CONSTRUCTION STAGING

- EXISTING PAVEMENT
- WORKS UNDER CONSTRUCTION
- COMPLETED WORKS CONSTRUCTION
- TEMPORARY CONSTRUCTION
- TEMPORARY CONSTRUCTION COMPLETE
- AREA FOR CONTRACTORS FACILITIES
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- RETAINING WALL
- TEMPORARY BARRIER LOCATION
- TEMPORARY PEDESTRIAN FENCING
- TEMPORARY PAVEMENT MARKING
- DRAINAGE UNDER CONSTRUCTION
- DRAINAGE COMPLETE
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ESCP controls

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- 'clean' water flows
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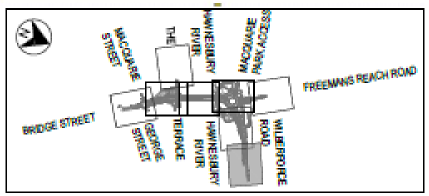
- construction sump/basin



KEY PLAN

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DESIGNER	DH	03.11.17
DESIGN CHECK	BDP	03.11.17
PROJECT MANAGER	TR	03.11.17

ORIGINAL DRAWING AT A3 SIZE

SCALE 1:500 AT A3

CO-ORDINATE SYSTEM: MGA Zone 56 | HEIGHT DATUM: A.H.D.

0 5 10 15 20 25 mm ON A3 ORIGINAL This Drawing may have been prepared using colour and may be incomplete if copied

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NSW Transport Roads & Maritime Services

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SYDNEY OUTER

PROJECT

HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
CONSTRUCTION STAGING PLAN
STAGE 2
SHEET 7

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING
DS2012-000289-DES-WINDSOR-171103

STATUS
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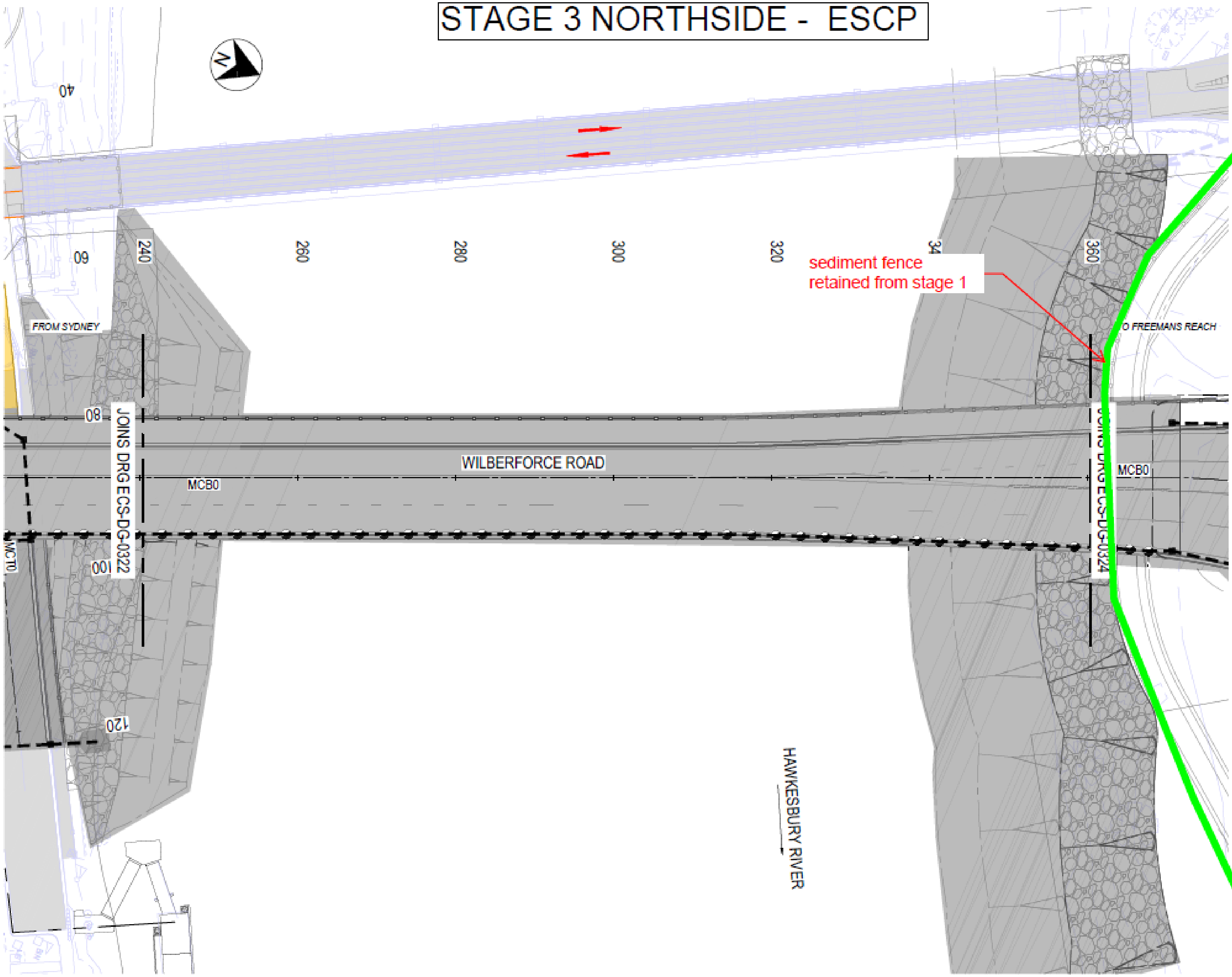
VOLUME: - | RMS REGISTRATION No: DS2012/000289

PHASE: - | DRAWING No: NB98005-ECS-DG-0227 | REV: 2

STAGE 3 NORTHSIDE - ESCP



LEGEND

FOR REFERENCE

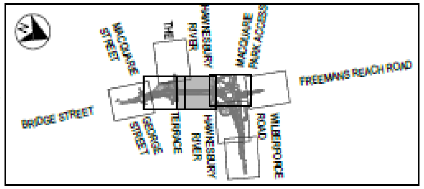
- EXISTING PROPERTY BOUNDARY
- CONTROL LINE
- EXISTING EASEMENT BOUNDARY

CONSTRUCTION STAGING

- EXISTING PAVEMENT
- WORKS UNDER CONSTRUCTION
- COMPLETED WORKS CONSTRUCTION
- TEMPORARY CONSTRUCTION
- TEMPORARY CONSTRUCTION COMPLETE
- AREA FOR CONTRACTORS FACILITIES
- AREA TO BE KEPT CLEAR AT ALL TIMES
- RETAINING WALL
- CB — TEMPORARY BARRIER LOCATION
- PF — TEMPORARY PEDESTRIAN FENCING
- TEMPORARY PAVEMENT MARKING
- DRAINAGE UNDER CONSTRUCTION
- DRAINAGE COMPLETE
- TRAFFIC LANE

ESCP controls

- sediment fence
- 'clean' water diversion
- 'dirty' water diversion
- silt curtain
- 'clean' water flows
- 'dirty' water flows
- construction sump/basin



KEY PLAN

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DRAFTSPERSON	JP	03.11.17
DRAFTING CHECK	SH	03.11.17
DESIGNER	DH	03.11.17
DESIGN CHECK	BDP	03.11.17
PROJECT MANAGER	TR	03.11.17

ORIGINAL DRAWING AT A3 SIZE

SCALE 1:500 AT A3

CO-ORDINATE SYSTEM: MGA Zone 56 | HEIGHT DATUM: A.H.D.

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PREPARED FOR: GREATER SYDNEY PROJECT OFFICE, SYDNEY OUTER

PROJECT: HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
CONSTRUCTION STAGING PLAN
STAGE 3
SHEET 3

STATUS: FOR INFORMATION ONLY

VOLUME: - | RMS REGISTRATION No: DS2012/000289

PHASE: - | DRAWING No: NB98005-ECS-DG-0323 | REV: 2

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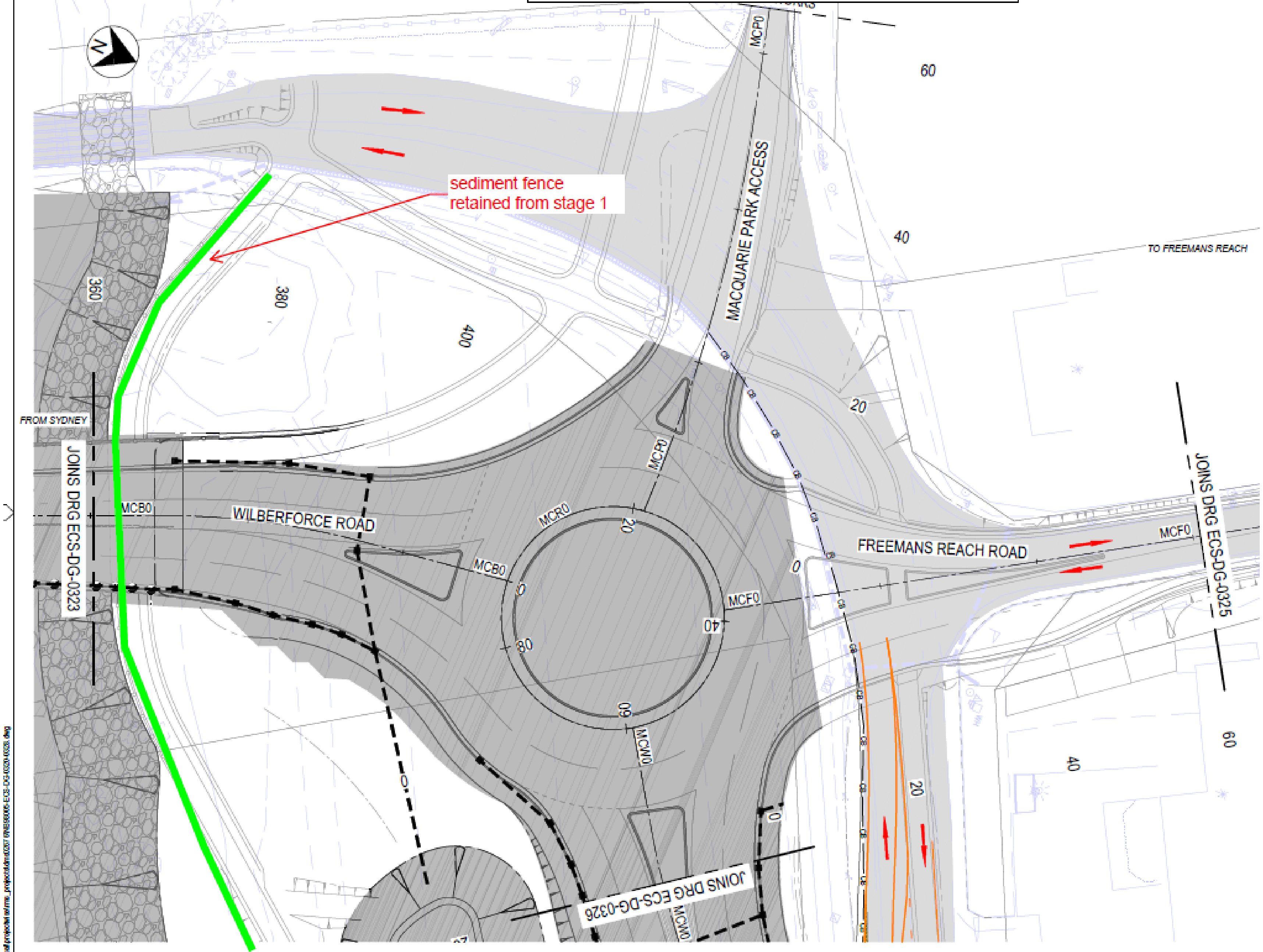
STAGE 3 NORTHSIDE - ESCP



LEGEND

FOR REFERENCE

- EXISTING PROPERTY BOUNDARY
- CONTROL LINE
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CONSTRUCTION STAGING

- EXISTING PAVEMENT
- WORKS UNDER CONSTRUCTION
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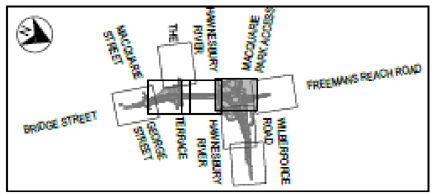
ESCP controls

- sediment fence
- 'clean' water diversion
- 'dirty' water diversion
- silt curtain
- 'clean' water flows
- 'dirty' water flows
- construction sump/basin



KEY PLAN

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: DS2012-000289-DES-WINDSOR-171103

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DESIGNER	DH	03.11.17
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PROJECT MANAGER	TR	03.11.17

ORIGINAL DRAWING AT A3 SIZE — SCALE 1:500 AT A3

CO-ORDINATE SYSTEM: MGA Zone 56 — HEIGHT DATUM: A.H.D.

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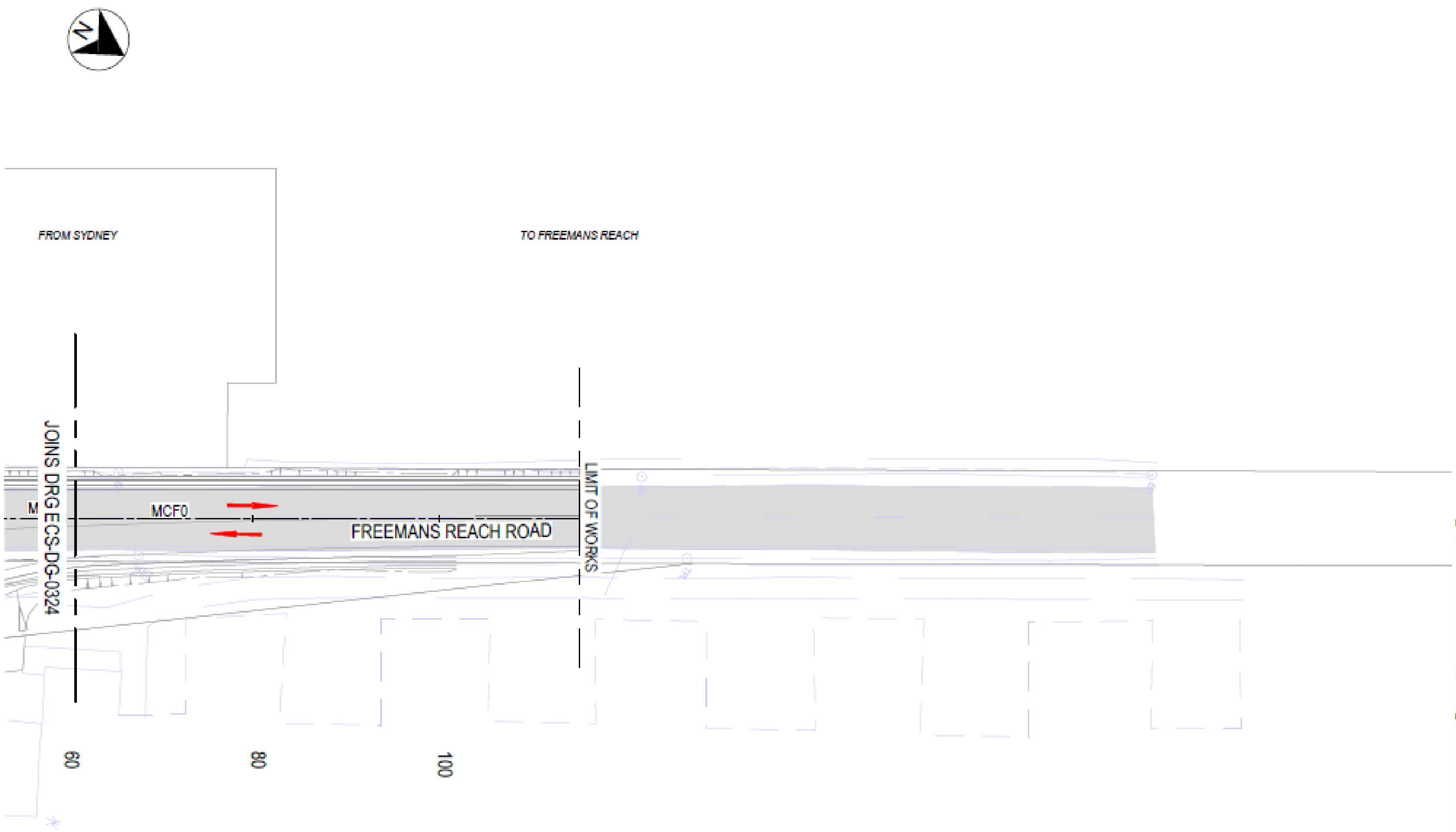
PROJECT: HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
CONSTRUCTION STAGING PLAN
STAGE 3
SHEET 4

STATUS: FOR INFORMATION ONLY

VOLUME: - | RMS REGISTRATION No: DS2012/000289

PHASE: - | DRAWING No: NB98005-ECS-DG-0324 | REV: 2

STAGE 3 NORTHSIDE - ESCP



LEGEND

FOR REFERENCE

- EXISTING PROPERTY BOUNDARY
- CONTROL LINE
- EXISTING EASEMENT BOUNDARY

CONSTRUCTION STAGING

- EXISTING PAVEMENT
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ESCP controls

- sediment fence
- 'clean' water diversion
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- 'clean' water flows
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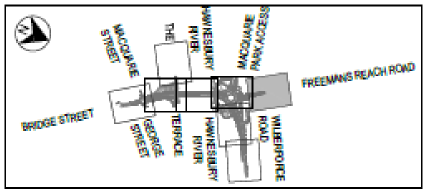
- construction sump/basin



KEY PLAN

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: DS2012-000289-DES-WINDSOR-171103

REV	DATE	DESCRIPTION	DRAWN	REVIEWED	APPROVAL
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TITLE	INITIAL	DATE
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DRAFTING CHECK	SH	03.11.17
DESIGNER	DH	03.11.17
DESIGN CHECK	BDP	03.11.17
PROJECT MANAGER	TR	03.11.17

ORIGINAL DRAWING AT A3 SIZE

SCALE 1:500 — 5 0 5 10 — AT A3

CO-ORDINATE SYSTEM: MGA Zone 56 | HEIGHT DATUM: A.H.D.

0 | 5 | 10 | 15 | 20 | 25 mm ON A3 ORIGINAL — This Drawing may have been prepared using colour and may be incomplete if copied

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CLIENT: NSW Government Transport Roads & Maritime Services

PREPARED FOR: GREATER SYDNEY PROJECT OFFICE SYDNEY OUTER

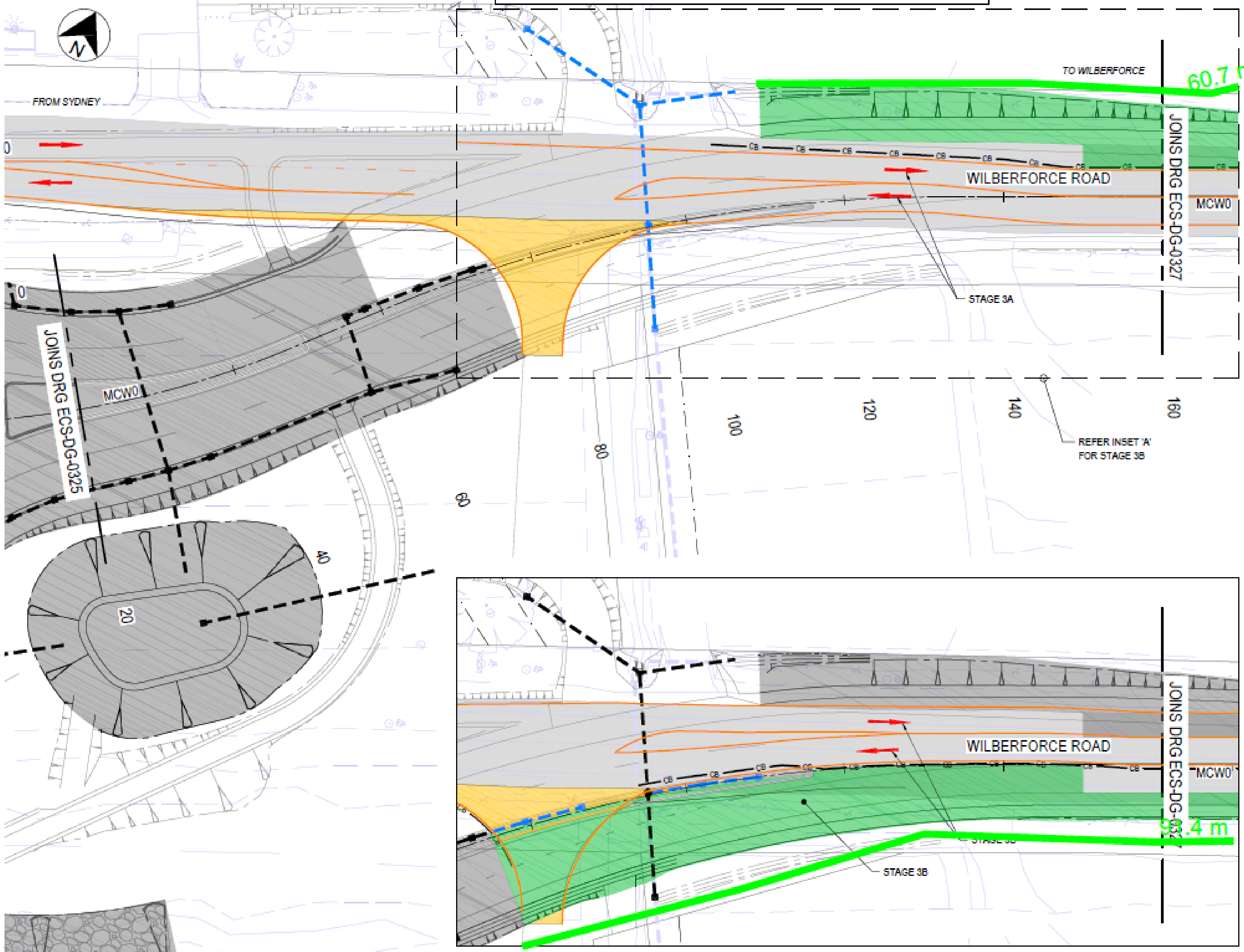
PROJECT:
HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
CONSTRUCTION STAGING PLAN
STAGE 3
SHEET 5

STATUS: FOR INFORMATION ONLY

VOLUME: - | RMS REGISTRATION No: DS2012/000289

PHASE: - | DRAWING No: NB98005-ECS-DG-0325 | REV: 2

STAGE 3 NORTHSIDE - ESCP



LEGEND

FOR REFERENCE
- EXISTING PROPERTY BOUNDARY
- CONTROL LINE
- EXISTING EASEMENT BOUNDARY

CONSTRUCTION STAGING
- EXISTING PAVEMENT
- WORKS UNDER CONSTRUCTION
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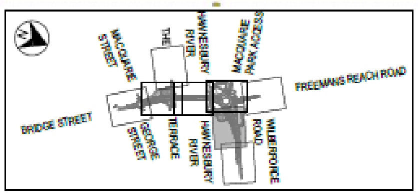

KEY PLAN

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: DS2012-000289-DES-WINDSOR-171103

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ORIGINAL DRAWING AT A3 SIZE — SCALE 1:500 AT A3

CO-ORDINATE SYSTEM: MGA Zone 56 — HEIGHT DATUM: A.H.D.

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MR182 - BRIDGE STREET, WINDSOR
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CONSTRUCTION STAGING PLAN
STAGE 3
SHEET 6

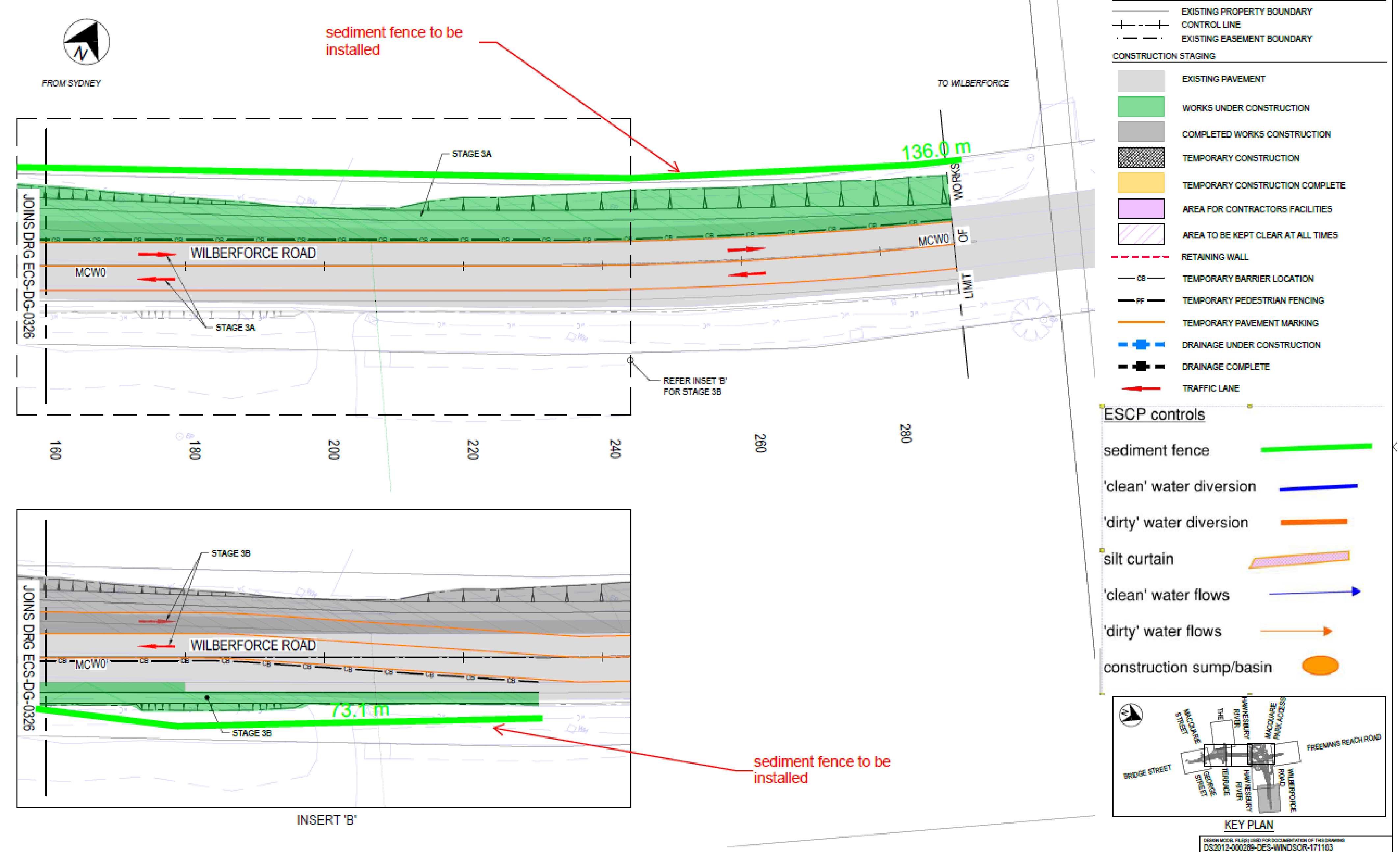
STATUS: FOR INFORMATION ONLY

VOLUME	RMS REGISTRATION No
-	DS2012/000289

PHASE	DRAWING No	REV
-	NB98005-ECS-DG-0326	2

0 5 10 15 20 25 mm ON A3 ORIGINAL — This Drawing may have been prepared using colour and may be incomplete if copied

STAGE 3 NORTHSIDE - ESCP



FROM SYDNEY
TO WILBERFORCE
N
sediment fence to be installed
136.0 m
STAGE 3A
WORKS LIMIT OF
WILBERFORCE ROAD
MCW0
JOINS DRG ECS-DG-0326
REFER INSET 'B' FOR STAGE 3B
160
180
200
220
240
260
280
STAGE 3B
73.1 m
sediment fence to be installed
INSERT 'B'
LEGEND
FOR REFERENCE
EXISTING PROPERTY BOUNDARY
CONTROL LINE
EXISTING EASEMENT BOUNDARY
CONSTRUCTION STAGING
EXISTING PAVEMENT
WORKS UNDER CONSTRUCTION
COMPLETED WORKS CONSTRUCTION
TEMPORARY CONSTRUCTION
TEMPORARY CONSTRUCTION COMPLETE
AREA FOR CONTRACTORS FACILITIES
AREA TO BE KEPT CLEAR AT ALL TIMES
RETAINING WALL
TEMPORARY BARRIER LOCATION
TEMPORARY PEDESTRIAN FENCING
TEMPORARY PAVEMENT MARKING
DRAINAGE UNDER CONSTRUCTION
DRAINAGE COMPLETE
TRAFFIC LANE
ESCP controls
sediment fence
'clean' water diversion
'dirty' water diversion
silt curtain
'clean' water flows
'dirty' water flows
construction sump/basin
BRIDGE STREET
FREEMANS REACH ROAD
KEY PLAN

REV	DATE	DESCRIPTION	DRAWN	REVIEWED	APPROVAL
2	03.11.17	FOR INFORMATION ONLY	SH	BDP	TR
1	01.09.17	FOR INFORMATION ONLY	SH	BDP	TR
0	13.04.17	FOR INFORMATION ONLY	SH	BDP	TR

TITLE	INITIAL	DATE
DRAFTSPERSON	JP	03.11.17
DRAFTING CHECK	SH	03.11.17
DESIGNER	DH	03.11.17
DESIGN CHECK	BDP	03.11.17
PROJECT MANAGER	TR	03.11.17

SCALE 1:500

JACOBS
177 Pacific Highway
North Sydney, SYDNEY, NSW 2060
AUSTRALIA

CLIENT: NSW Transport Roads & Maritime Services
PREPARED FOR: GREATER SYDNEY PROJECT OFFICE SYDNEY OUTER

PROJECT:
HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
CONSTRUCTION STAGING PLAN
STAGE 3
SHEET 7

DS2012-000289-DES-WINDSOR-171103

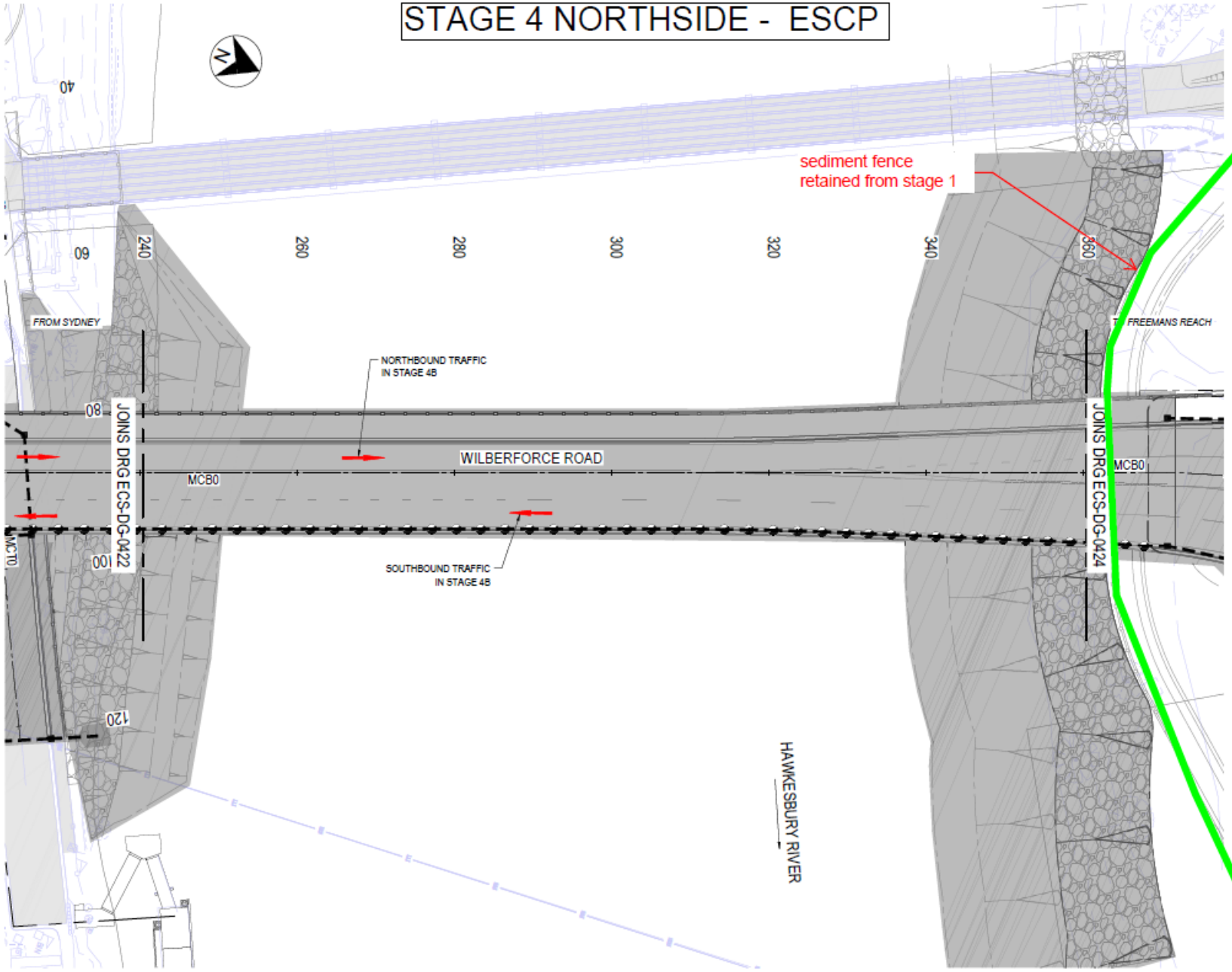
STATUS: FOR INFORMATION ONLY

VOLUME: - RMS REGISTRATION No: DS2012/000289

PHASE: - DRAWING No: NB98005-ECS-DG-0327 REV: 2

25 mm ON A3 ORIGINAL. This Drawing may have been prepared using colour and may be incomplete if copied

STAGE 4 NORTHSIDE - ESCP



LEGEND

FOR REFERENCE

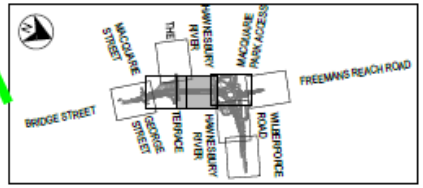
- EXISTING PROPERTY BOUNDARY
- CONTROL LINE
- EXISTING EASEMENT BOUNDARY

CONSTRUCTION STAGING

- EXISTING PAVEMENT
- WORKS UNDER CONSTRUCTION
- COMPLETED WORKS CONSTRUCTION
- TEMPORARY CONSTRUCTION
- TEMPORARY CONSTRUCTION COMPLETE
- AREA FOR CONTRACTORS FACILITIES
- AREA TO BE KEPT CLEAR AT ALL TIMES
- RETAINING WALL
- CB — TEMPORARY BARRIER LOCATION
- PF — TEMPORARY PEDESTRIAN FENCING
- TEMPORARY PAVEMENT MARKING
- DRAINAGE UNDER CONSTRUCTION
- DRAINAGE COMPLETE
- TRAFFIC LANE

ESCP controls

- sediment fence
- 'clean' water diversion
- 'dirty' water diversion
- silt curtain
- 'clean' water flows
- 'dirty' water flows
- construction sump/basin



KEY PLAN

REV	DATE	DESCRIPTION	DRAWN	REVIEWED	APPROVED
2	03.11.17	FOR INFORMATION ONLY	SH	BDP	TR
1	01.09.17	FOR INFORMATION ONLY	SH	BDP	TR
0	13.04.17	FOR INFORMATION ONLY	SH	BDP	TR

TITLE	INITIAL	DATE
DRAFTSPERSON	JP	03.11.17
DRAFTING CHECK	SH	03.11.17
DESIGNER	SH	03.11.17
DESIGN CHECK	BDP	03.11.17
PROJECT MANAGER	TR	03.11.17

ORIGINAL DRAWING AT A3 SIZE — SCALE 1:500 — AT A3

CO-ORDINATE SYSTEM: MGA Zone 56 — HEIGHT DATUM: A.H.D.

DRAWING / DESIGN PREPARED BY

JACOBS
177 Pacific Highway
North Sydney, SYDNEY, NSW 2060
AUSTRALIA
Tel: (02) 9928 2100 Fax: (02) 9928 2500
Web: www.jacobs.com

CLIENT

Transport NSW Roads & Maritime Services

PREPARED FOR
GREATER SYDNEY PROJECT OFFICE
SYDNEY OUTER

PROJECT

HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
CONSTRUCTION STAGING PLAN
STAGE 4
SHEET 3

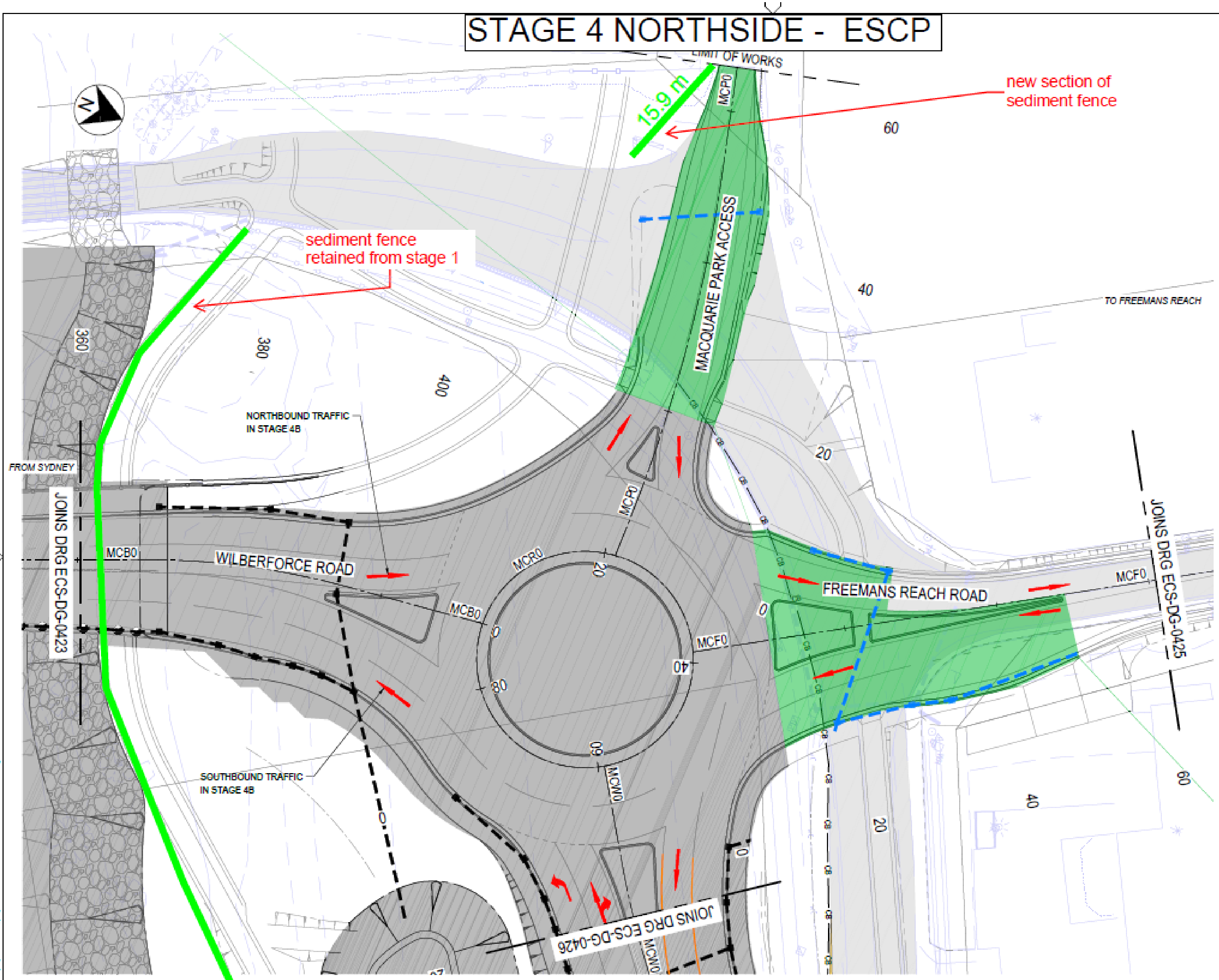
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING
DS2012-000289-DES-WINDSOR-171103

STATUS
FOR INFORMATION ONLY

VOLUME	RMS REGISTRATION No	
-	DS2012/000289	
PHASE	DRAWING No	REV
-	NB98005-ECS-DG-0423	2

0 5 10 15 20 25 mm ON A3 ORIGINAL — This Drawing may have been created using colour and may be incomplete if copied

STAGE 4 NORTHSIDE - ESCP



LEGEND

FOR REFERENCE

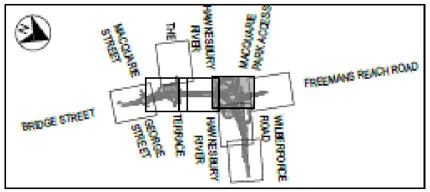
- EXISTING PROPERTY BOUNDARY
- CONTROL LINE
- EXISTING EASEMENT BOUNDARY

CONSTRUCTION STAGING

- EXISTING PAVEMENT
- WORKS UNDER CONSTRUCTION
- COMPLETED WORKS CONSTRUCTION
- TEMPORARY CONSTRUCTION
- TEMPORARY CONSTRUCTION COMPLETE
- AREA FOR CONTRACTORS FACILITIES
- AREA TO BE KEPT CLEAR AT ALL TIMES
- RETAINING WALL
- TEMPORARY BARRIER LOCATION
- TEMPORARY PEDESTRIAN FENCING
- TEMPORARY PAVEMENT MARKING
- DRAINAGE UNDER CONSTRUCTION
- DRAINAGE COMPLETE
- TRAFFIC LANE

ESCP controls

- sediment fence
- 'clean' water diversion
- 'dirty' water diversion
- silt curtain
- 'clean' water flows
- 'dirty' water flows
- construction sump/basin



KEY PLAN

REV	DATE	DESCRIPTION	DRAWN	REVIEWED	APPROVAL
2	03.11.17	FOR INFORMATION ONLY	SH	BDP	TR
1	01.09.17	FOR INFORMATION ONLY	SH	BDP	TR
0	13.04.17	FOR INFORMATION ONLY	SH	BDP	TR

TITLE	INITIAL	DATE
DRAFTSPERSON	JP	03.11.17
DRAFTING CHECK	SH	03.11.17
DESIGNER	DH	03.11.17
DESIGN CHECK	BDP	03.11.17
PROJECT MANAGER	TR	03.11.17

ORIGINAL DRAWING AT A3 SIZE — SCALE 1:500 AT A3

DRAWINGS / DESIGN PREPARED BY: JACOBS, 177 Pacific Highway, North Sydney, SYDNEY NSW 2060, AUSTRALIA

CLIENT: Transport Roads & Maritime Services

PREPARED FOR: GREATER SYDNEY PROJECT OFFICE, SYDNEY OUTER

PROJECT:
HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
CONSTRUCTION STAGING PLAN
STAGE 4
SHEET 4

DS2012-000289-DES-WINDSOR-171103

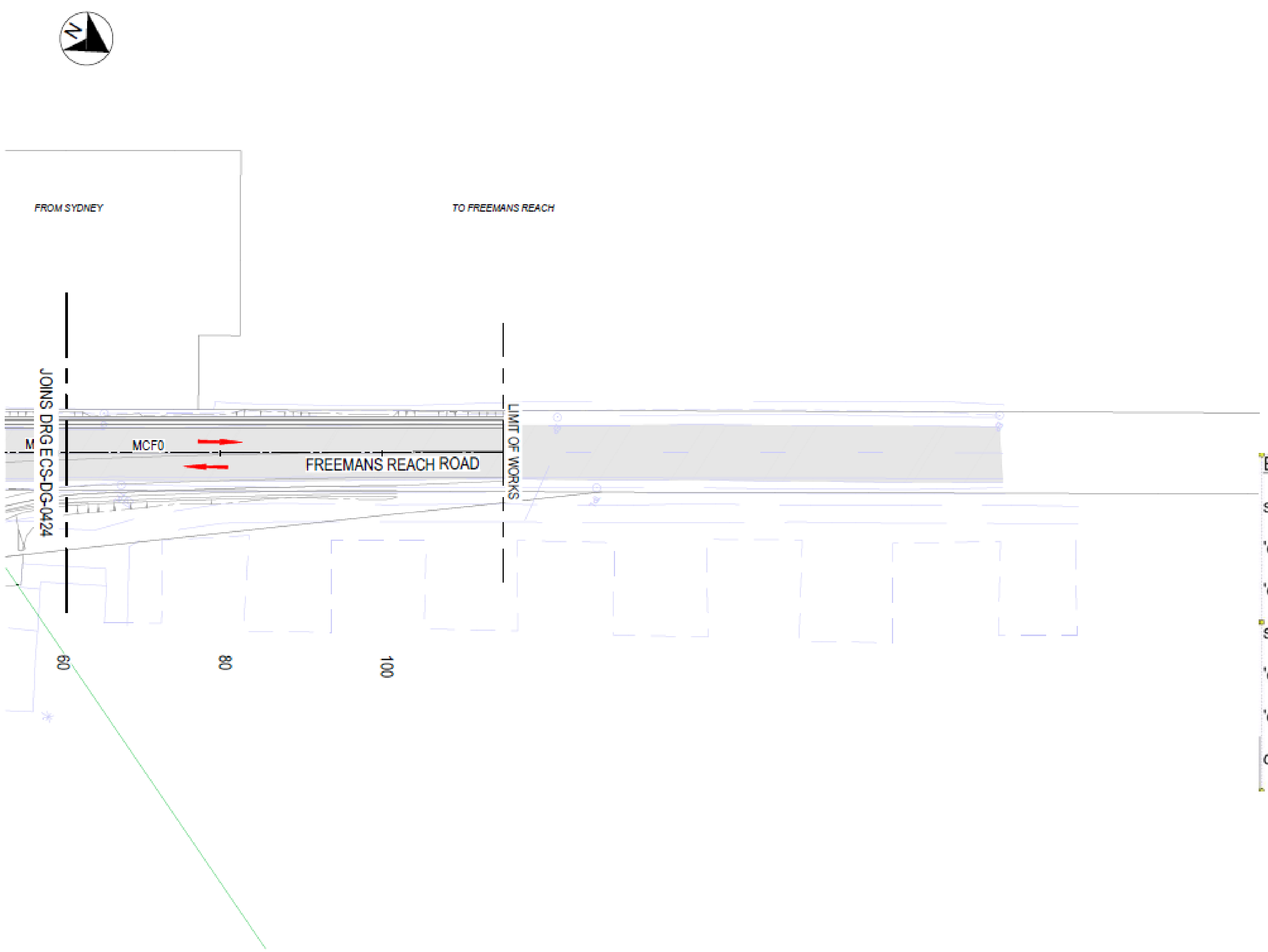
STATUS: FOR INFORMATION ONLY

VOLUME: - RMS REGISTRATION No: DS2012/000289

PHASE: - DRAWING No: NB98005-ECS-DG-0424 REV: 2

0 5 10 15 20 25mm ON A3 ORIGINAL — This Drawing may have been prepared using colour and may be incomplete if copied

STAGE 4 NORTHSIDE - ESCP

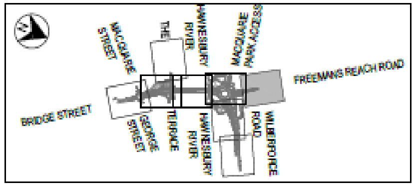


LEGEND

FOR REFERENCE
- EXISTING PROPERTY BOUNDARY
- CONTROL LINE
- EXISTING EASEMENT BOUNDARY

CONSTRUCTION STAGING
- EXISTING PAVEMENT
- WORKS UNDER CONSTRUCTION
- COMPLETED WORKS CONSTRUCTION
- TEMPORARY CONSTRUCTION
- TEMPORARY CONSTRUCTION COMPLETE
- AREA FOR CONTRACTORS FACILITIES
- AREA TO BE KEPT CLEAR AT ALL TIMES
- RETAINING WALL
- TEMPORARY BARRIER LOCATION
- TEMPORARY PEDESTRIAN FENCING
- TEMPORARY PAVEMENT MARKING
- DRAINAGE UNDER CONSTRUCTION
- DRAINAGE COMPLETE
- TRAFFIC LANE

ESCP controls
- sediment fence
- 'clean' water diversion
- 'dirty' water diversion
- silt curtain
- 'clean' water flows
- 'dirty' water flows
- construction sump/basin



KEY PLAN

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: DS2012-000289-DES-WINDSOR-171103

REV	DATE	DESCRIPTION	DRAWN	REVIEWED	APPROVAL
2	03.11.17	FOR INFORMATION ONLY	SH	BDP	TR
1	01.09.17	FOR INFORMATION ONLY	SH	BDP	TR
0	13.04.17	FOR INFORMATION ONLY	SH	BDP	TR

TITLE	INITIAL	DATE
DRAFTSPERSON	JP	03.11.17
DRAFTING CHECK	SH	03.11.17
DESIGNER	DH	03.11.17
DESIGN CHECK	BDP	03.11.17
PROJECT MANAGER	TR	03.11.17

ORIGINAL DRAWING AT A3 SIZE — SCALE 1:500 AT A3

CO-ORDINATE SYSTEM: MGA Zone 56 — HEIGHT DATUM: A.H.D.

0 5 10 15 20 25 mm ON A3 ORIGINAL. This Drawing may have been prepared using colour and may be incomplete if copied

DRAWINGS / DESIGN PREPARED BY: JACOBS, 177 Pacific Highway, North Sydney, SYDNEY, NSW 2060 AUSTRALIA

CLIENT: NSW Government — Transport Roads & Maritime Services

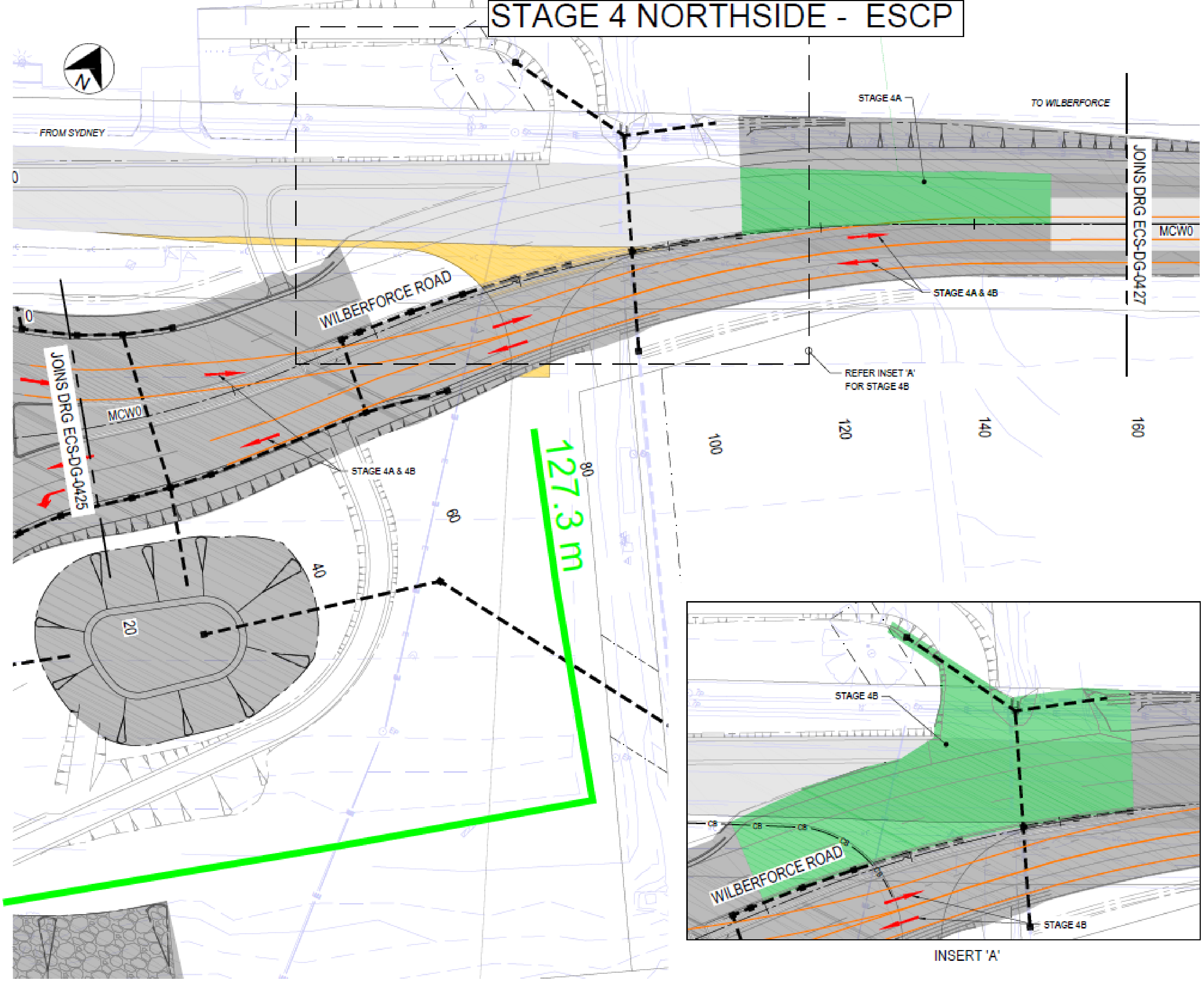
PREPARED FOR: GREATER SYDNEY PROJECT OFFICE SYDNEY OUTER

PROJECT: HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
CONSTRUCTION STAGING PLAN
STAGE 4
SHEET 5

STATUS: FOR INFORMATION ONLY

VOLUME	RMS REGISTRATION No	
-	DS2012/000289	
PHASE	DRAWING No	REV
-	NB98005-ECS-DG-0425	2

STAGE 4 NORTHSIDE - ESCP



INSERT 'A'

LEGEND

FOR REFERENCE

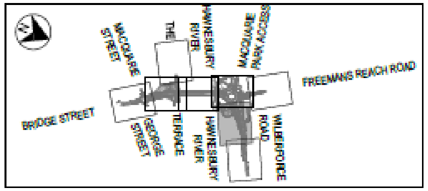
- EXISTING PROPERTY BOUNDARY
- CONTROL LINE
- EXISTING EASEMENT BOUNDARY

CONSTRUCTION STAGING

- EXISTING PAVEMENT
- WORKS UNDER CONSTRUCTION
- COMPLETED WORKS CONSTRUCTION
- TEMPORARY CONSTRUCTION
- TEMPORARY CONSTRUCTION COMPLETE
- AREA FOR CONTRACTORS FACILITIES
- AREA TO BE KEPT CLEAR AT ALL TIMES
- RETAINING WALL
- CB — TEMPORARY BARRIER LOCATION
- PF — TEMPORARY PEDESTRIAN FENCING
- TEMPORARY PAVEMENT MARKING
- DRAINAGE UNDER CONSTRUCTION
- DRAINAGE COMPLETE
- TRAFFIC LANE

ESCP controls

- sediment fence
- 'clean' water diversion
- 'dirty' water diversion
- silt curtain
- 'clean' water flows
- 'dirty' water flows
- construction sump/basin



KEY PLAN

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: DS2012-000289-DES-WINDSOR-171103

REV	DATE	DESCRIPTION	DRAWN	REVIEWED	APPROVAL
2	03.11.17	FOR INFORMATION ONLY	SH	BDP	TR
1	01.09.17	FOR INFORMATION ONLY	SH	BDP	TR
0	13.04.17	FOR INFORMATION ONLY	SH	BDP	TR

TITLE	INITIAL	DATE
DRAFTSPERSON	JP	03.11.17
DRAFTING CHECK	SH	03.11.17
DESIGNER	DH	03.11.17
DESIGN CHECK	BDP	03.11.17
PROJECT MANAGER	TR	03.11.17

ORIGINAL DRAWING AT A3 SIZE
SCALE 1:500 — 5 0 5 10 — AT A3
CO-ORDINATE SYSTEM: MGA Zone 56
HEIGHT DATUM: A.H.D.

DRAWINGS / DESIGN PREPARED BY
JACOBS
177 Pacific Highway
North Sydney, SYDNEY, NSW 2060
AUSTRALIA
Tel: (02) 9928 2100 Fax (02) 9928 2500
Web: www.jacobs.com

CLIENT
NSW Government — Transport Roads & Maritime Services

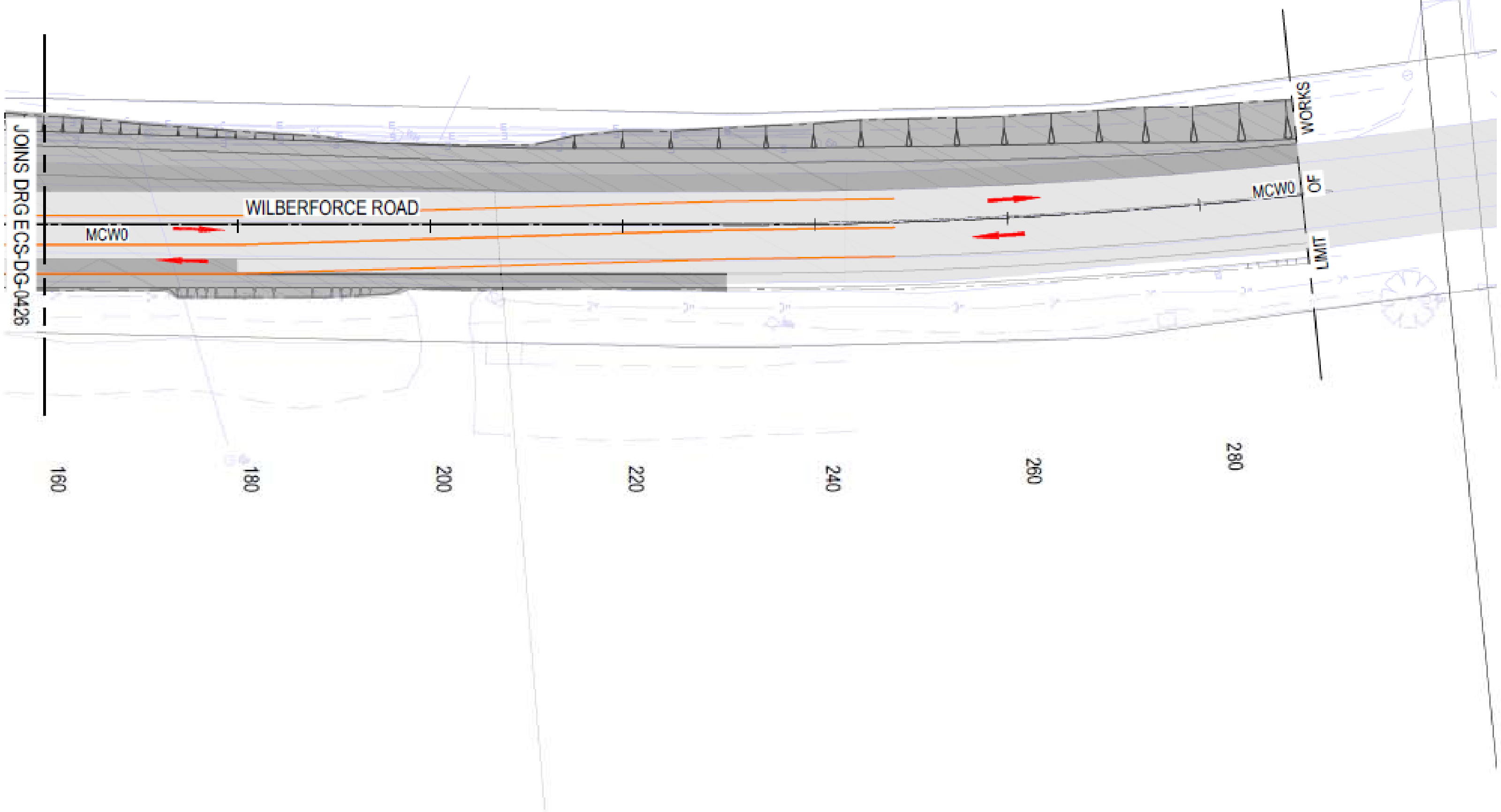
PREPARED FOR
GREATER SYDNEY PROJECT OFFICE
SYDNEY OUTER

PROJECT
HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
CONSTRUCTION STAGING PLAN
STAGE 4
SHEET 6

STATUS
FOR INFORMATION ONLY

VOLUME	RMS REGISTRATION No	
-	DS2012/000289	
PHASE	DRAWING No	REV
-	NB98005-ECS-DG-0426	2

STAGE 4 NORTHSIDE - ESCP



LEGEND

FOR REFERENCE

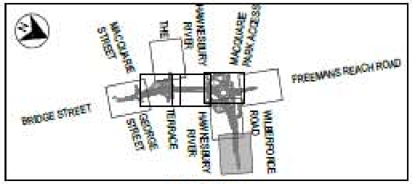
- EXISTING PROPERTY BOUNDARY
- CONTROL LINE
- EXISTING EASEMENT BOUNDARY

CONSTRUCTION STAGING

- EXISTING PAVEMENT
- WORKS UNDER CONSTRUCTION
- COMPLETED WORKS CONSTRUCTION
- TEMPORARY CONSTRUCTION
- TEMPORARY CONSTRUCTION COMPLETE
- AREA FOR CONTRACTORS FACILITIES
- AREA TO BE KEPT CLEAR AT ALL TIMES
- RETAINING WALL
- TEMPORARY BARRIER LOCATION
- TEMPORARY PEDESTRIAN FENCING
- TEMPORARY PAVEMENT MARKING
- DRAINAGE UNDER CONSTRUCTION
- DRAINAGE COMPLETE
- TRAFFIC LANE

ESCP controls

- sediment fence
- 'clean' water diversion
- 'dirty' water diversion
- silt curtain
- 'clean' water flows
- 'dirty' water flows
- construction sump/basin



KEY PLAN

DS2012-000289-DES-WINDSOR-171103

REV	DATE	DESCRIPTION	DRAWN	REVIEWED	APPROVAL
2	03.11.17	FOR INFORMATION ONLY	SH	SDP	TR
1	01.09.17	FOR INFORMATION ONLY	SH	SDP	TR
0	13.04.17	FOR INFORMATION ONLY	SH	SDP	TR

TITLE	INITIAL	DATE
DRAFTSPERSON	JF	03.11.17
DRAFTING CHECK	SH	03.11.17
DESIGNER	DH	03.11.17
DESIGN CHECK	SDP	03.11.17
PROJECT MANAGER	TR	03.11.17

ORIGINAL DRAWING AT A3 SIZE

SCALE 1:500 AT A3

CO-ORDINATE SYSTEM: MGA Zone 56 — HEIGHT DATUM: A.H.D.

0 | 5 | 10 | 15 | 20 | 25 mm ON A3 ORIGINAL — This Drawing may have been prepared using colour and may be incomplete if copied

DRAWINGS / DESIGN PREPARED BY: JACOBS, 177 Pacific Highway, North Sydney, SYDNEY, NSW 2060, AUSTRALIA, Tel (02) 9928 2100 Fax (02) 9928 2500, Web: www.jacobs.com

CLIENT: NSW Transport Roads & Maritime Services

PREPARED FOR: GREATER SYDNEY PROJECT OFFICE, SYDNEY OUTER

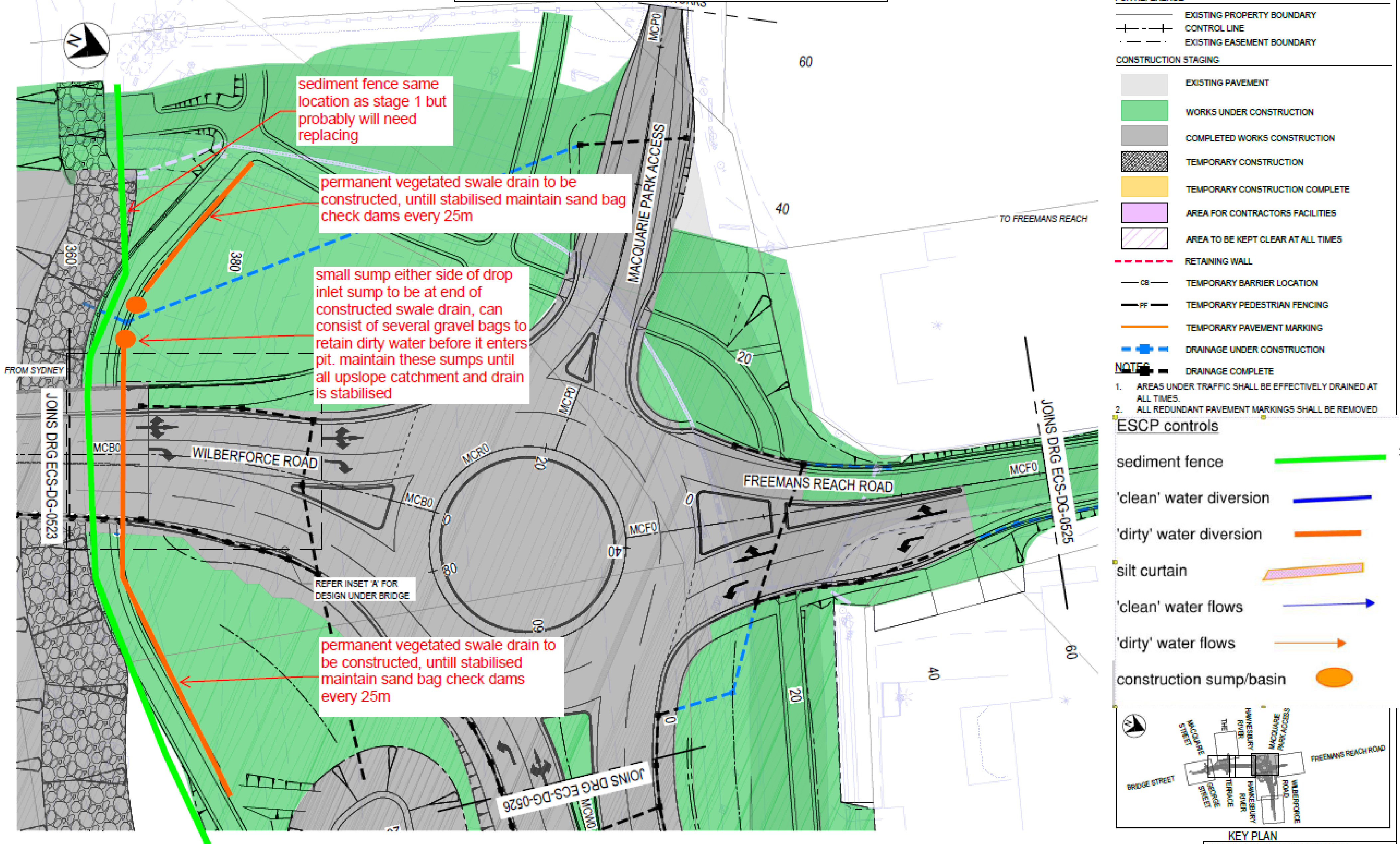
PROJECT: HAWKESBURY CITY COUNCIL AREA, MR182 - BRIDGE STREET, WINDSOR, WINDSOR BRIDGE REPLACEMENT, CONSTRUCTION STAGING PLAN, STAGE 4, SHEET 7

STATUS: FOR INFORMATION ONLY

VOLUME: - | RMS REGISTRATION No: DS2012/000289

PHASE: - | DRAWING No: NB98005-ECS-DG-0427 | REV: 2

STAGE 5 NORTHSIDE - ESCP



sediment fence same location as stage 1 but probably will need replacing
permanent vegetated swale drain to be constructed, untill stabilised maintain sand bag check dams every 25m
small sump either side of drop inlet sump to be at end of constructed swale drain, can consist of several gravel bags to retain dirty water before it enters pit. maintain these sumps until all upslope catchment and drain is stabilised
permanent vegetated swale drain to be constructed, untill stabilised maintain sand bag check dams every 25m
MACQUARIE PARK ACCESS
WILBERFORCE ROAD
FREEMANS REACH ROAD
TO FREEMANS REACH
FROM SYDNEY
JOINS DRG ECS-DG-0523
JOINS DRG ECS-DG-0525
JOINS DRG ECS-DG-0526
REFER INSET 'A' FOR DESIGN UNDER BRIDGE
LEGEND
FOR REFERENCE
EXISTING PROPERTY BOUNDARY
CONTROL LINE
EXISTING EASEMENT BOUNDARY
CONSTRUCTION STAGING
EXISTING PAVEMENT
WORKS UNDER CONSTRUCTION
COMPLETED WORKS CONSTRUCTION
TEMPORARY CONSTRUCTION
TEMPORARY CONSTRUCTION COMPLETE
AREA FOR CONTRACTORS FACILITIES
AREA TO BE KEPT CLEAR AT ALL TIMES
RETAINING WALL
TEMPORARY BARRIER LOCATION
TEMPORARY PEDESTRIAN FENCING
TEMPORARY PAVEMENT MARKING
DRAINAGE UNDER CONSTRUCTION
DRAINAGE COMPLETE
NOTES
1. AREAS UNDER TRAFFIC SHALL BE EFFECTIVELY DRAINED AT ALL TIMES.
2. ALL REDUNDANT PAVEMENT MARKINGS SHALL BE REMOVED
ESCP controls
sediment fence
'clean' water diversion
'dirty' water diversion
silt curtain
'clean' water flows
'dirty' water flows
construction sump/basin
KEY PLAN
BRIDGE STREET
FREEMANS REACH ROAD

REV	DATE	DESCRIPTION	DRAWN	REVIEWED	APPROVAL
2	03.11.17	FOR INFORMATION ONLY	SH	BDP	TR
1	01.09.17	FOR INFORMATION ONLY	SH	BDP	TR
0	13.04.17	FOR INFORMATION ONLY	SH	BDP	TR

TITLE	INITIAL	DATE
DRAFTSPERSON	JP	03.11.17
DRAFTING CHECK	SH	03.11.17
DESIGNER	DH	03.11.17
DESIGN CHECK	BDP	03.11.17
PROJECT MANAGER	TR	03.11.17

SCALE 1:500 AT A3

COORDINATE SYSTEM: MGA Zone 56 | HEIGHT DATUM: A.H.D.

DRAWINGS / DESIGN PREPARED BY: JACOBS, 177 Pacific Highway, North Sydney, SYDNEY, NSW 2060, AUSTRALIA. Tel: (02) 9928 2100 Fax: (02) 9928 2500 Web: www.jacobs.com

CLIENT: NSW Transport Roads & Maritime Services

PREPARED FOR: GREATER SYDNEY PROJECT OFFICE SYDNEY OUTER

PROJECT: HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
CONSTRUCTION STAGING PLAN
STAGE 5
SHEET 4

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: DS2012-000289-DES-WINDSOR-171103

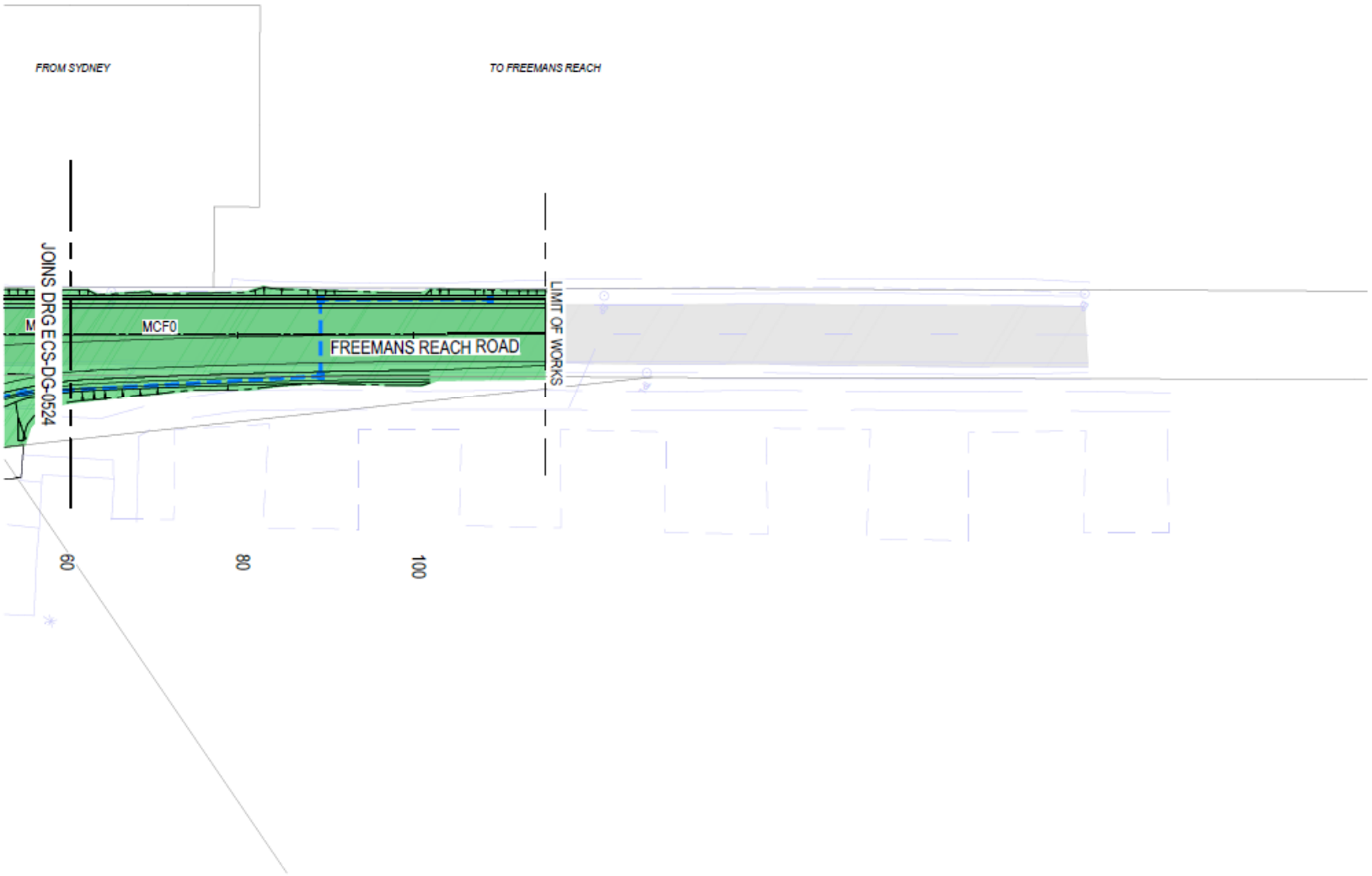
STATUS: FOR INFORMATION ONLY

VOLUME: - | RMS REGISTRATION No: DS2012/000289

PHASE: - | DRAWING No: NB98005-ECS-DG-0524 | REV: 2

0 5 10 15 20 25 mm ON A3 ORIGINAL. This Drawing may have been prepared using colour and may be incomplete if copied

STAGE 5 NORTHSIDE - ESCP



LEGEND

FOR REFERENCE

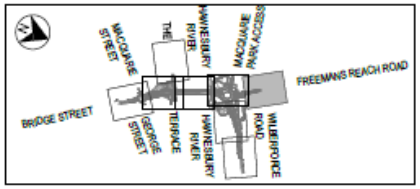
- EXISTING PROPERTY BOUNDARY
- CONTROL LINE
- EXISTING EASEMENT BOUNDARY

CONSTRUCTION STAGING

- EXISTING PAVEMENT
- WORKS UNDER CONSTRUCTION
- COMPLETED WORKS CONSTRUCTION
- TEMPORARY CONSTRUCTION
- TEMPORARY CONSTRUCTION COMPLETE
- AREA FOR CONTRACTORS FACILITIES
- AREA TO BE KEPT CLEAR AT ALL TIMES
- RETAINING WALL
- CB — TEMPORARY BARRIER LOCATION
- PF — TEMPORARY PEDESTRIAN FENCING
- TEMPORARY PAVEMENT MARKING
- DRAINAGE UNDER CONSTRUCTION
- DRAINAGE COMPLETE
- TRAFFIC LANE

ESCP controls

- sediment fence
- 'clean' water diversion
- 'dirty' water diversion
- silt curtain
- 'clean' water flows
- 'dirty' water flows
- construction sump/basin



KEY PLAN

REV	DATE	DESCRIPTION	DRAWN	REVIEWED	APPROVAL
2	03.11.17	FOR INFORMATION ONLY	SH	BDP	TR
1	01.09.17	FOR INFORMATION ONLY	SH	BDP	TR
0	13.04.17	FOR INFORMATION ONLY	SH	BDP	TR

TITLE	INITIAL	DATE
DRAFTSPERSON	JP	03.11.17
DRAFTING CHECK	SH	03.11.17
DESIGNER	DH	03.11.17
DESIGN CHECK	BDP	03.11.17
PROJECT MANAGER	TR	03.11.17

ORIGINAL DRAWING AT A1 SIZE — SCALE 1:500 AT A1 — CO-ORDINATE SYSTEM: MGA Zone 56 — HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: JACOBS, 177 Pacific Highway, North Sydney, SYDNEY, NSW 2060, AUSTRALIA, Tel: (02) 9928 2100 Fax: (02) 9928 2500, Web: www.jacobs.com

CLIENT: Transport Roads & Maritime Services — PREPARED FOR: GREATER SYDNEY PROJECT OFFICE, SYDNEY OUTER

PROJECT: HAWKESBURY CITY COUNCIL AREA, MR182 - BRIDGE STREET, WINDSOR, WINDSOR BRIDGE REPLACEMENT, CONSTRUCTION STAGING PLAN, STAGE 5, SHEET 5

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: DS2012-000289-DES-WINDSOR-171103

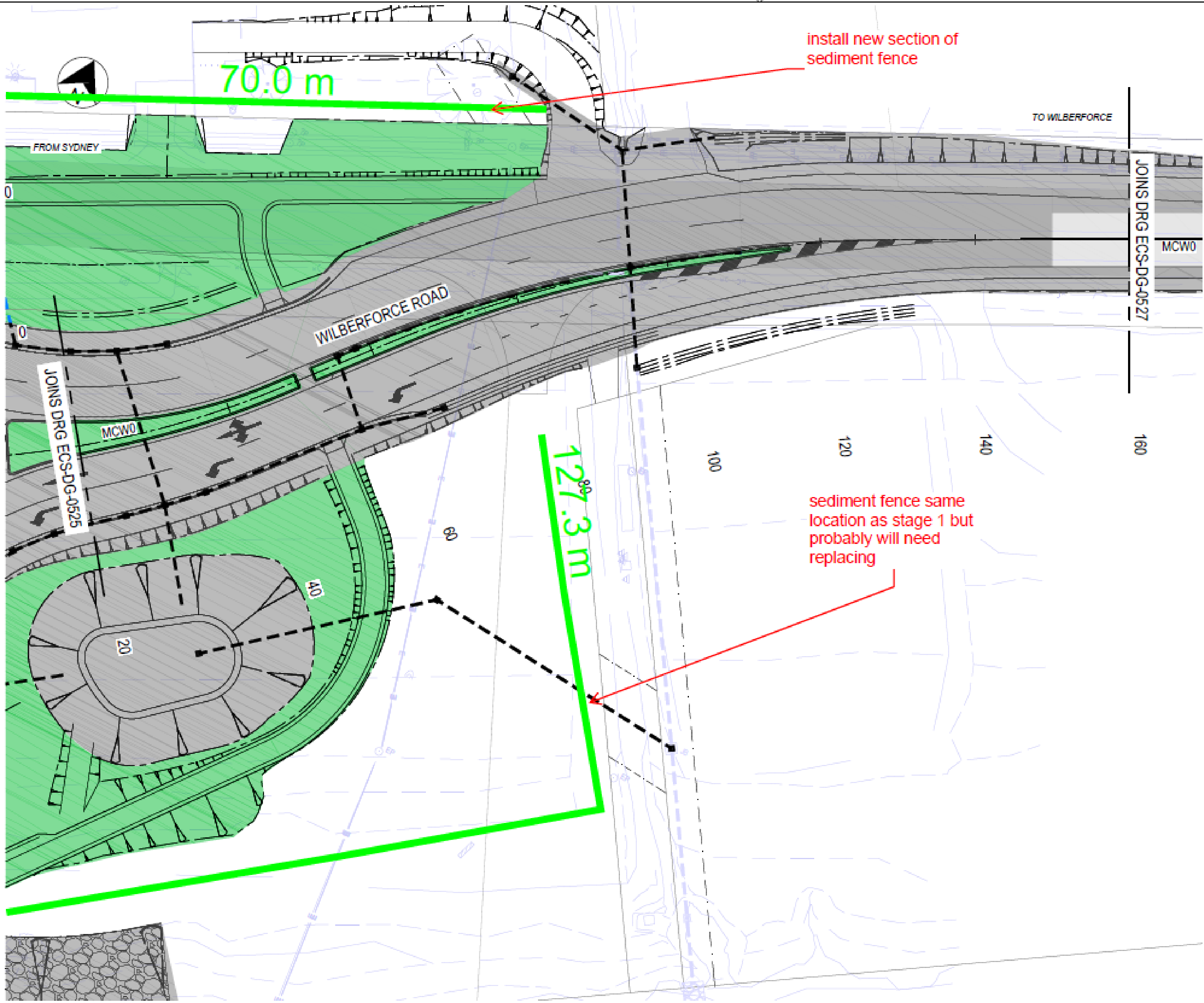
STATUS: FOR INFORMATION ONLY

VOLUME: - — RMS REGISTRATION No.: DS2012/000289

PHASE: - — DRAWING No.: NB98005-ECS-DG-0525 — REV: 2

0 5 10 15 20 25 mm ON A3 ORIGINAL

LOCATION: C:\Users\...\NB98005-ECS-DG-0525.dwg



LEGEND

FOR REFERENCE

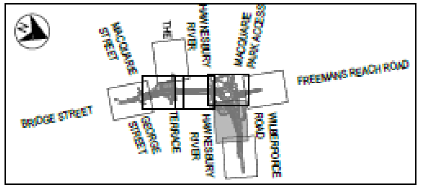
- EXISTING PROPERTY BOUNDARY
- CONTROL LINE
- EXISTING EASEMENT BOUNDARY

CONSTRUCTION STAGING

- EXISTING PAVEMENT
- WORKS UNDER CONSTRUCTION
- COMPLETED WORKS CONSTRUCTION
- TEMPORARY CONSTRUCTION
- TEMPORARY CONSTRUCTION COMPLETE
- AREA FOR CONTRACTORS FACILITIES
- AREA TO BE KEPT CLEAR AT ALL TIMES
- RETAINING WALL
- TEMPORARY BARRIER LOCATION
- TEMPORARY PEDESTRIAN FENCING
- TEMPORARY PAVEMENT MARKING
- DRAINAGE UNDER CONSTRUCTION
- DRAINAGE COMPLETE
- TRAFFIC LANE

ESCP controls

- sediment fence
- 'clean' water diversion
- 'dirty' water diversion
- silt curtain
- 'clean' water flows
- 'dirty' water flows
- construction sump/basin



KEY PLAN

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: DS2012-000289-DES-WINDSOR-171103

REV	DATE	DESCRIPTION	DRAWN	REVIEWED	APPROVAL
2	03.11.17	FOR INFORMATION ONLY	SH	BDP	TR
1	01.09.17	FOR INFORMATION ONLY	SH	BDP	TR
0	13.04.17	FOR INFORMATION ONLY	SH	BDP	TR

TITLE	INITIAL	DATE
DRAFTSPERSON	JP	03.11.17
DRAFTING CHECK	SH	03.11.17
DESIGNER	DH	03.11.17
DESIGN CHECK	BDP	03.11.17
PROJECT MANAGER	TR	03.11.17

ORIGINAL DRAWING AT A3 SIZE

SCALE 1:500 AT A3

CO-ORDINATE SYSTEM: MGA Zone 56 — HEIGHT DATUM: A.H.D.

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CLIENT: NSW Government, Transport Roads & Maritime Services

PREPARED FOR: GREATER SYDNEY PROJECT OFFICE, SYDNEY OUTER

PROJECT: HAWKESBURY CITY COUNCIL AREA, MR182 - BRIDGE STREET, WINDSOR

WINDSOR BRIDGE REPLACEMENT
CONSTRUCTION STAGING PLAN
STAGE 5
SHEET 6

STATUS: FOR INFORMATION ONLY

VOLUME: - | RMS REGISTRATION No: DS2012/000289

PHASE: - | DRAWING No: NB98005-ECS-DG-0526 | REV: 2

0 5 10 15 20 25 mm ON A3 ORIGINAL — This Drawing may have been prepared using colour and may be incomplete if copied