Integrated Management System

Planning Approval Consistency Assessment Form

SM ES-FT-414

Sydney Metro Integrated Management System (IMS)

Assessment Name:	Sydenham Pit Changes
Prepared by:	Cameron Newling (JHLOR)
Prepared for:	Sydney Metro
Assessment number:	SSJ-04 SMCSWSSJ-JHL-WSS-EM-REC-000007
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The Planning Approval Consistency Assessment Form should be completed in accordance with the Sydney Metro Planning Approval Consistency Assessment Procedure (SM ES-PW-314) and Sydney Metro Environmental Planning and Approval Manual (SM ES-ST-216)

1.0 Existing Approved Project

Planning approval reference details (Application/Document No. (including modifications)):

Sydney Metro City & Southwest - Chatswood to Sydenham (SSI 15_7400)

Mod 1 - Victoria Cross Station and Artarmon Substation - Sydney Metro City & Southwest - Chatswood to Sydenham

Mod 2 - Central Walk - Sydney Metro City & Southwest - Chatswood to Sydenham

Mod 3 - Martin Place Metro Station - Sydney Metro City & Southwest - Chatswood to Sydenham

Mod 4 - Sydenham Station and Metro Facility South - Sydney Metro City & Southwest - Chatswood to Sydenham

Mod 5 – Blues Point Acoustic Shed

Date of determination:

EIS Approval Date – 09/01/2017

Modification 1 - 18/10/2017

Modification 2 – 21/12/2017

Modification 3 – 22/3/2018

Modification 4 – 13/12/2017

Modification 5 - 02/11/2018

Type of planning approval:

Part 5.1 - Critical State Significant Infrastructure

Description of existing approved project you are assessing for consistency:

The Sydenham Station and Junction Works (assessed in Mod 4) included the following in Section 6 of the modification report:

The proposed modification includes realigning and enclosing the existing open channels to facilitate construction of new tracks and the Sydney Metro Trains Facility South. Works at this location would involve:

- Realignment and enclosure of existing open channels through the Sydney Metro Trains Facility South site
- Construction of a new aqueduct structure over the existing Sydenham Pit and Drainage Pumping Station to the north of existing Pumping Station No. 1
- Provision of a new Sydney Water pumping station adjacent to Garden Street
- Adjustment to the access ramp to the Sydenham Pit and Drainage Pumping Station

The proposed modification would include drainage works to ensure that stormwater is managed appropriately within the rail corridor. The works would include new and modified drainage infrastructure, consisting of trunk stormwater conveyance and intertrack drainage.

In addition to the drainage works proposed within the rail corridor, new drainage infrastructure would be constructed outside the rail corridor in the following locations:

- Sydenham Pit and Drainage Pumping Station – elevated aqueduct structure to convey stormwater from the east side of the detention basin to the west side and in to the eastern channel, and provision of a new pumping station adjacent to Garden Street.

See Appendix A for the site plan from the Submissions Report detailing the aqueduct and new access ramp.

Relevant background information (including EA, REF, Submissions Report, Director General's Report, MCoA):

Sydenham Station and Sydney Metro Trains Facility South Modification Report (June 2017)

Sydenham Station and Sydney Metro Trains Facility South Modification Submissions Report (October 2017)

Conditions of Approval (13/12/17)

All proposed works identified in this assessment would be undertaken in accordance with the mitigation measures identified in the EIS/PIR/modification report, submissions report and the conditions of approval

2.0 Description of proposed development/activity/works

Describe ancillary activities, duration of work, working hours, machinery, staffing levels, impacts on utilities/authorities, wastes generated or hazardous substances/dangerous goods used.

As noted in the above section, the approved project included an access ramp adjacent to the aqueduct to allow vehicles to enter the pit and pump station for maintenance activities. As a result of design development, the location and orientation of the ramp has required to be redesigned. The revised design includes a single ramp with access off Garden St to allow direct access to the pit floor. It is straight ramp approximately 58m in length and 9m in width. It consists 2 sets of 3 exposed columns, concrete head stocks supporting straight rectangular precast concrete planks and a concrete decking. The two sides are flanked with 820mm high concrete vehicle barrier top with steel horizontal railing. Like the Aqueduct the Ramp is piled into the base of the pit and abutment walls. The base of the pit, at the junction with the new ramp is to be partially broken out to accommodate a 10m length of mass reinforced concrete block. At the top of the ramp the existing pit walls are to be excavated to accommodate a bridge beam and retaining element.

A single span bridge of 18m length is proposed from the Aqueduct to the Drainage Pumping Station. The structure runs parallel to the Pumping Station and is supported on piled abutment headstocks. The width of the bridge is determined by Sydney Water access and maintenance requirements. There is a 560mm separation between the western elevation of the pumping station and the new ramp to provide a visual separation.

It is also proposed to refurbish and reuse the existing pump station which would negate the need to construct a new pump station. In order to connect the new aqueduct to the pump station, a new weir structure and connection from the pump station into the aqueduct is required. The existing pump station pumps to a culvert that is being decommissioned in order to make way for the new rail line. The existing connection point is at a lower level than the proposed connection into the aqueduct. In order to connect to the higher aqueduct the two existing submersible pumps will require modification to the impellers. This will enable the pump to deliver the same flow at a higher head. The new pump will be selected to meet the higher head requirements. The three pump wells will also be modified to accommodate the new flow direction to connect to the aqueduct.

See Appendix B.

Works are expected to be undertaken during standard working hours with no change to the original durations. There would be a temporary loss of approximately 14 parking spaces on Garden St during the construction phase of the ramp and aqueduct. This would be from February 2019 for a period of approximately 12 months.

There would be no change to existing project staffing levels.

3.0 Timeframe

When will the proposed change take place? For how long?

February 2019 till the finalisation of construction works (estimated to be late 2021)

4.0 Site description

Provide a description of the site on which the proposed works are to be carried out, including, Lot and Deposited Plan details, where available. Map to be included here or as an appendix. Detail of land owner.

Works would be carried out within the current project modification boundary in the Sydenham Pit as shown in Appendix C.

5.0 Site Environmental Characteristics

Describe the environment (i.e., vegetation, nearby waterways, land use, surrounding land use), identify likely presence of protected flora/fauna and sensitive area.

The Sydenham Pit and Pump Station are State listed heritage listed items. The Sydenham Pit is a flood detention structure that receives water during storm events from the eastern channel. The pit is surrounded by Oleander weeds and no other vegetation. Surrounding the pit is predominantly commercial and light industrial properties, with the rail line immediately to the south east.

6.0 Justification for the proposed works

Address the need for the proposed works, whether there are alternatives to the proposed works (and why these are not appropriate), and the consequences with not proceeding with the proposed work.

The ramp design as shown in the modification and submissions report is not a practical outcome. It would need to be accessed off the new aqueduct and slopes down parallel to the aqueduct, with the low point of the ramp clashing with the revetment wall and existing ramp on the North Eastern edge of the Sydenham Pit. This configuration does not allow the 19m long vehicles (as required by Sydney Water) to access the base of the pit. The piles and support structure for the proposed ramp would hinder Sydney Water operations by crossing over the sump location and hindering access by the maintenance vehicles.

Several options were considered as an alternative:

1. Turning the ramp 90 degrees to the aqueduct whilst still maintaining access off the aqueduct (as indicated in the Reference Design)
2. Turning the ramp 90 degrees and accessing the ramp off Garden Street. This would entail significant impact to the existing revetment wall on the South Western side of the Sydenham pit
3. Maintaining a ramp parallel to the aqueduct, but accessing the ramp off Garden Street

In reviewing the options, the operability of the new ramp was carefully considered (i.e. the ease in which a 19m vehicle, which was stipulated by Sydney Water could access the ramp), and the impact on the heritage status of the ramp from an aesthetic and physical perspective.

For Option 1 - access off Garden St has been removed from consideration, as this area is part of an area wide urban design for the active transport corridor. The ramp running perpendicular off the aqueduct has a significant visual impact on the heritage infrastructure of the pit

For Option 2 - this option may be more discrete, however the impact on the heritage revetment wall was deemed to be intolerable. It would result in a large section of the wall being covered up by an earth retaining structure, and significant structural modification to the wall for stability purposes

For Option 3 – The location was moved to the Western corner of the pit, and designed to be largely independent of the revetment wall structure (except for the abutments for the ramp). The location was considered to have a tolerable visual impact from the key viewing directions.

Option 3 was selected as the preferred option.

The consequences of not proceeding with the redesign would result in a design outcome that would not be functional once constructed.

7.0 Environmental Benefit

Identify whether there are environmental benefits associated with the proposed works. If so, provide details:

The removal of the requirement for new a pump station would reduce the visual impacts that would have resulted, and a reduction in construction materials required. The end state would also result in fewer permanent parking spaces being lost as a result of the new access ramp.

8.0 Control Measures

Will a project and site specific EMP be prepared? Are appropriate control measures already identified in an existing EMP?

Works will be completed under the CEMP (Construction Environmental Management Plan) and sub plans approved by the DP&E on the 28/8/18.

9.0 Climate Change Impacts

Is the site likely to be adversely affected by the impacts of climate change? If yes, what adaptation/mitigation measures will be incorporated into the design?

No. The works are a redesign in an area already assessed for climate change impacts.

10.0 Impact Assessment – Construction

Attach supporting evidence in the Appendices if required. Make reference to the relevant Appendix if used.

Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed/activity, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
Flora and fauna	Approximately six to eight Oleander's will be removed to allow for the construction of the ramp and to allow for access from Garden St. This would be offset by retaining the equivalent amount of Oleanders that otherwise have needed removal to construct the access proposed in the modification report. Oleanders are listed as a toxic weed by the NSW Department of Primary Industries (DPI). The approved construction heritage management plan noted that some Oleander's would be removed as part of the works.	Implementation of mitigation measures as per the CEMP and Construction Heritage Management Plan. Removal and disposal would be carried out in accordance with the Biosecurity Act (2015). All Oleanders would be removed by an experienced tree removalist and disposed of at a licensed landfill. The CEMP would be updated to reflect removal of weeds. Additional plantings will be completed as per the landscape design report. However it is noted in the Heritage Impact Assessment that there is limited opportunities for succession planting on the top batter of the ashlar walling.	Y	Y	
Water	No change from the EIS and Modification	Implementation of mitigation measures as per the Construction Soil and Water Management Plan Preparation of ESCP	Y	Y	
Air quality	No change from the EIS and Modification	Implementation of mitigation measures as per the Air Quality Management Plan	Y	Y	

Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed/activity, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
Noise vibration	Minimal impacts. Works would be closer to the commercial buildings on Shirlow and Garden St however the impacts are not expected to be significant.	Implementation of mitigation measures as per the Construction Noise and Vibration Management Plan and Construction Noise and Vibration Management Plan Any works outside of normal hours will be subject to an out of hours work approval.	Y	Y	
Indigenous heritage	No change from the EIS and Modification	Implementation of mitigation measures as per the Construction Heritage Management Plan Unexpected Finds would be managed as per the Sydney Metro Unexpected Heritage Finds Procedure	Y	Y	
Non-indigenous heritage	A Heritage Impact Assessment (HIA) was included in the Stage 3 Design Report – See Attachment D. The access ramp would result in direct impacts to sandstone ashlar units within the vicinity of this work. This was assessed as neutral in trend. The access ramp would add a new visual element in the pit and alter the current open views of the pit, which would result in moderate (indirect) visual impact. It has been determined that the access ramp be located in the north west corner of the Pit, running parallel to the Aqueduct. It is considered that the potential impact is somewhat mitigated by this location as it is discretely located and removes	Where possible there would be reinstatement of reclaimed or new sandstone blocks in areas impacted by the works A visual inspection the walls by an experienced Geotechnical Engineer is required during removal of the blockwork to determine the appropriate stabilisation option and reuse options Implementation of mitigation measures as per the Construction Heritage Management Plan	Y	Y	

Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed/activity, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
	potential direct impact through conflict with the extant significant access ramp, as was the case with alternate options branching from the aqueduct itself. This was assessed as neutral in trend. The pump station access bridge and loading platform presents direct impacts to the significant fabric in the vicinity and indirect impacts to the presentation of this elevation and views and vistas toward it. This was assessed as negative in trend. The proposed upgrade of the existing Drainage Pumping Station for continued operations eliminates the need for an additional pumping station. This reduces the indirect visual impacts to the heritage item, its context and setting. The resulting upgrade does however present a significant major direct impact to the significant fabric of the Drainage Pumping Station, both internally and externally. The approved construction heritage management plan noted that some Oleander's would be removed as part of the works. 6 to 8 additional Oleanders would be need to be removed to facilitate the works. This would be offset by retaining the equivalent amount of Oleanders that otherwise have needed removal to construct the access proposed in the modification report.	Unexpected Finds would be managed as per the Sydney Metro Unexpected Heritage Finds Procedure The Heritage Working Group have been consulted during the design process.			
Community and stakeholder	Minimal changes to the approved project. As noted earlier, the access ramp would be closer to properties on Garden and Shirlow St.	Ongoing consultation and notification as per the Community Communications Strategy	Y	Y	

Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed/activity, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
Traffic	No change to traffic or heavy vehicle movements. Approximately 14 untimed parking spots will be removed temporarily to allow for construction of the access ramp. A number of the parking spaces were used by workers at the 11 Sydenham Road property which has now been vacated and demolished. No additional parking spaces have been identified as being available in the area. Ongoing consultation has occurred with Inner West Council and the use of the parking spaces will issued under a Road Occupancy Licence (ROL) and hoarding permit.	Implementation of mitigation measures as per the Construction Traffic Management Plan Comply with conditions specified in the ROL and hoarding permit.	Y	Y	
Waste	No change from the EIS and Modification	All waste generated will be classified and disposed of in accordance with the NSW EPA Waste Guidelines Implementation of mitigation measures as per the Waste Management Plan	Y	Y	
Social	No change from the EIS and Modification	No change from the EIS and Modification	Y	Y	
Economic	No change from the EIS and Modification	No change from the EIS and Modification	Y	Y	
Visual	There will be minor visual impacts associated with construction of the access ramp.	Implementation of mitigation measures as per the Visual Amenity Plan	Y	Y	
Urban design	No change from the EIS and Modification	No change from the EIS and Modification	Y	Y	
Geotechnical	No change from the EIS and Modification	Implementation of mitigation measures as per the Soil and Water Management Plan	Y	Y	

Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed/activity, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
Land use	No change from the EIS and Modification	No change from the EIS and Modification	Y	Y	
Climate Change	No change from the EIS and Modification	No change from the EIS and Modification	Y	Y	
Risk	No change from the EIS and Modification	No change from the EIS and Modification	Y	Y	
Other	No change from the EIS and Modification	No change from the EIS and Modification	Y	Y	
Management and mitigation measures	No change from the EIS and Modification	No change from the EIS and Modification	Y	Y	

11.0 Impact Assessment – Operation

Attach supporting evidence in the Appendix if required. Make reference to the relevant Appendix if used.

Aspect	Nature and extent of impacts (negative and positive) during operation (if control measures implemented) of the proposed activity/works, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
Flora and fauna	No change from the EIS and Modification	N/A	Y	Y	
Water	No change from the EIS and Modification	N/A	Y	Y	
Air quality	No change from the EIS and Modification	N/A	Y	Y	
Noise vibration	No change from the EIS and Modification	N/A	Y	Y	
Indigenous heritage	No change from the EIS and Modification	N/A	Y	Y	
Non-indigenous heritage	Construction impacts are described in the previous section. Whilst in operation, there would be permanent visual impacts associated with the access ramp and access bridge. The access ramp would add a new visual elements in the pit and alter the current open views of the pit, which would result in moderate (indirect) visual impact. This access bridge presents major direct impacts to the significant fabric in the vicinity and indirect impacts to the presentation of this elevation and views and vistas toward it.	As per the Design Report and the Heritage Impact Assessment The Heritage Working Group have been consulted during the design process	Y	Y	
Community and stakeholder	No change from the EIS and Modification	N/A	Y	Y	
Traffic	The original access ramp proposed in the modification report had provision for access off	As per the Design Report.	Y	Y	

Aspect	Nature and extent of impacts (negative and positive) during operation (if control measures implemented) of the proposed activity/works, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
	Garden St. This access would have resulted in the permanent removal of approximately 20 parking spaces. The new access ramp would result in a loss of approximately 4 to 6 parking spots, which is an overall positive change. There would be circumstances several times a year where 4 to 6 parking spots would need to be removed temporarily for several days to enable heavy vehicles to safely turn into the gate. This would be managed by Sydney Water.	Parking Study with Inner West Council as per the Modification Report to be completed by Sydney Metro.			
Waste	No change from the EIS and Modification	N/A	Y	Y	
Social	No change from the EIS and Modification	N/A	Y	Y	
Economic	No change from the EIS and Modification	N/A	Y	Y	

Aspect	Nature and extent of impacts (negative and positive) during operation (if control measures implemented) of the proposed activity/works, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
Visual	As per the section on Non-indigenous Heritage 3 Viewpoints were assessed as part of the Visual Impact Assessment (VIA) in the Station Design and Precinct Plan (SDPP) endorsed by the DRP. • Viewpoint 5 from Garden St was assessed to have no perceived change from the modification report and an overall negligible impact • Viewpoint 6 from Railway Parade was assessed to have a noticeable reduction from the modification report and an overall negligible impact • Viewpoint 11 from Shirlow St was assessed to have a noticeable reduction from the modification report and an overall moderate adverse impact.	As per section on Non-indigenous Heritage As per the SDPP and VIA	Y	Y	
Urban design	The access ramp will include a concrete vehicle barrier on both sides and architectural fascia on the western elevation. There will be a 560mm separation between the western elevation of the pumping station and the new ramp to ensure a clear visual separation between the old and the new. The access ramp will consist of 2 sets of 3exposed columns, concrete head stocks supporting straight rectangular precast concrete planks and a concrete decking. The two sides will be flanked with 820mm high concrete vehicle barrier tops with steel horizontal railing.	The ramp and access will be constructed as per the design report and drawings Urban Design elements were contained in the SDPP endorsed by the DRP	Y	Y	
Geotechnical	No change from the EIS and Modification	N/A	Y	Y	

Aspect	Nature and extent of impacts (negative and positive) during operation (if control measures implemented) of the proposed activity/works, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
Land use	No change from the EIS and Modification	N/A	Y	Y	
Climate Change	No change from the EIS and Modification	N/A	Y	Y	
Risk	No change from the EIS and Modification	N/A	Y	Y	
Other	No change from the EIS and Modification	N/A	Y	Y	
Management and mitigation measures	No change from the EIS and Modification	N/A	Y	Y	

12.0 Consistency with the Approved Project

Based on a review and understanding of the existing Approved Project and the proposed modifications, is there is a transformation of the Project?	No. The proposed works would not transform the project. The project would continue to provide a new metro rail line between Chatswood and Sydenham and allow access to the Sydenham Pit and Pump Station for Sydney Water to maintain it.
Is the project as modified consistent with the objectives and functions of the Approved Project as a whole?	Yes. The proposed works would be consistent with the objectives and functions of the approved project.
Is the project as modified consistent with the objectives and functions of elements of the Approved Project?	Yes. The changes are due to a redesign of the ramp and access to the pump station. It is still consistent with the objectives and functions of the Approved Project.
Are there any new environmental impacts as a result of the proposed works/modifications?	There would be new visual impacts associated with the new access ramp and direct impacts to the existing pump station as a result of the new access bridge. These impacts were assessed in the HIA prepared as part of the design process and were assessed as neutral in trend and negative in trend. All risks would be adequately addressed through the application of the mitigation measures in the above tables, REMM's and the conditions of approval
Is the project as modified consistent with the conditions of approval?	Yes. The proposed works would be consistent with the conditions of approval
Are the impacts of the proposed activity/works known and understood?	Yes. The impacts of the proposed works are understood.
Are the impacts of the proposed activity/works able to be managed so as not to have an adverse impact?	Yes. The impacts of the proposed works can be managed so as to avoid an adverse impact.

13.0 Other Environmental Approvals

Identify all other approvals required for the project:	NA

Author certification

To be completed by person preparing checklist.

I certify that to the best of my knowledge this Consistency Checklist: • Examines and takes into account the fullest extent possible all matters affecting or likely to affect the environment as a result of activities associated with the Proposed Revision; and • Examines the consistency of the Proposed Revision with the Approved Project; is accurate in all material respects and does not omit any material information.			
Name:	Cameron Newling	Signature:	
Title:	Environment Manager		
Company:	JHLOR	Date:	7/2/2019

Environmental Representative Review

(Additional step for City & Southwest projects only – if this is a CA against a Northwest Project or REF delete this table)

As an approved ER for the Sydney Metro City & Southwest project, I have reviewed the information provided in this assessment. I am satisfied that mitigation measures are adequate to minimise the impact of the proposed work.			
Name:	Annabelle Tungol Reyes	Signature:	
Title:	Environmental Representative	Date:	11/02/2019

This section is for Sydney Metro only.

Application supported and submitted by			
Name:	Yvette Bucht	Date:	19/2/19
Title:	~~Environmental~~ Approvals Planning Manager	Comments:	
Signature:			

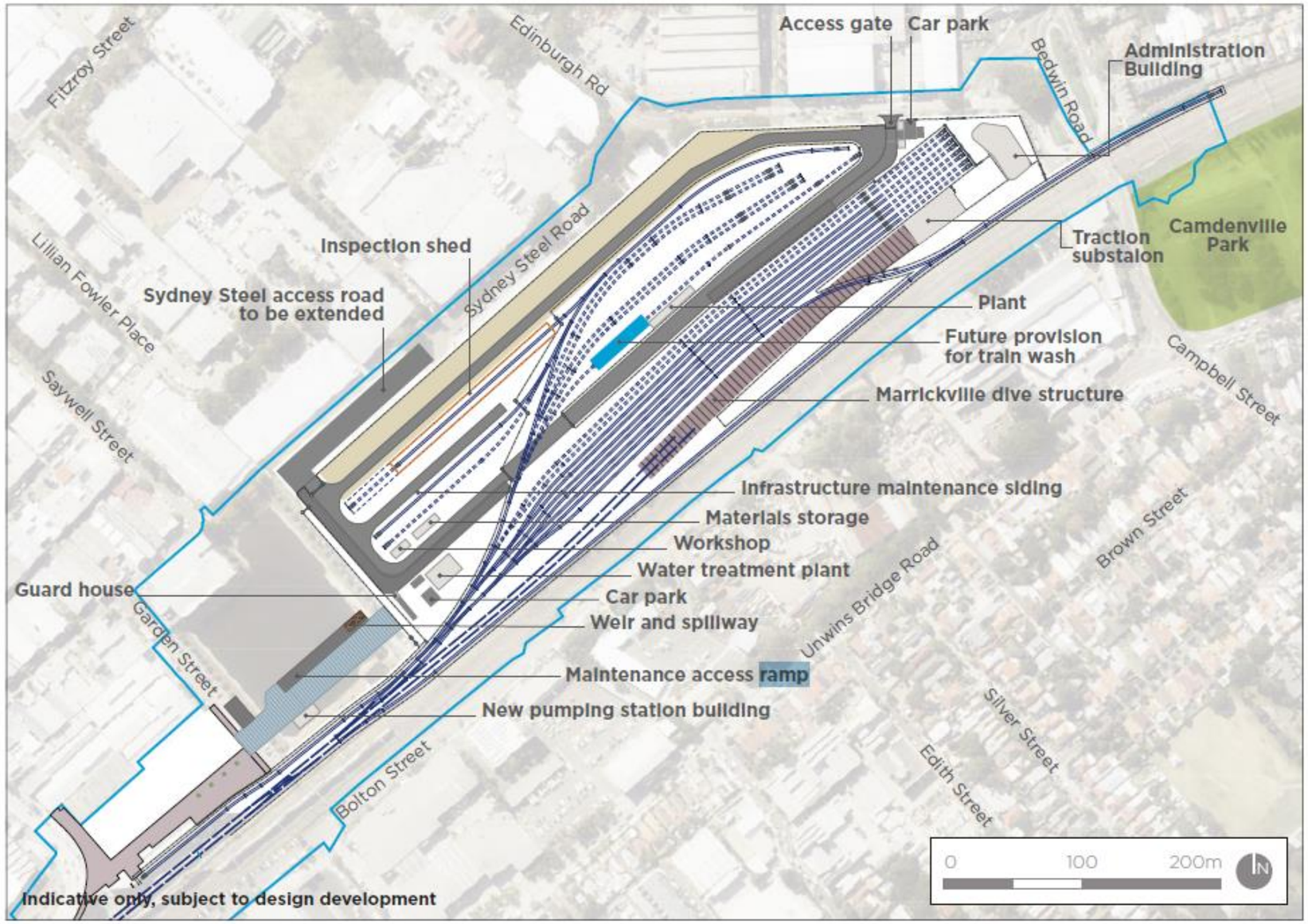
Based on the above assessment, are the impacts and scope of the proposed activity/modification consistent with the existing Approved Project?

Yes ☑ The proposed activity/works are consistent and no further assessment is required.

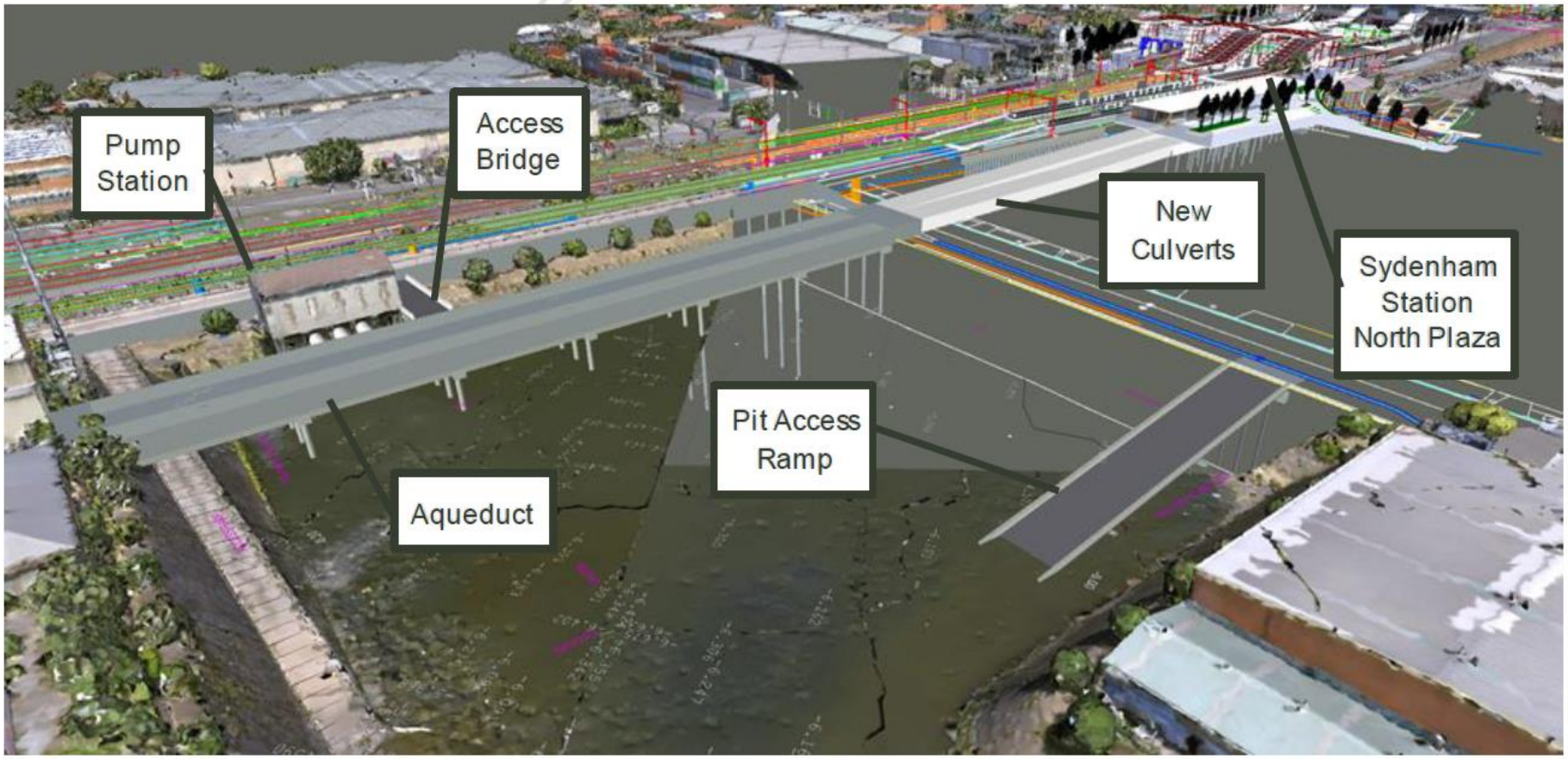
No ☐ The proposed works/activity is not consistent with the Approved Project. A modification or a new activity approval/ consent is required. Advise Project Manager of appropriate alternative planning approvals pathway to be undertaken.

Endorsed by			
Name:	FIL CERONE	Date:	21/2/19
Title:	~~Principal Manager~~ DIRECTOR ~~Northwest~~/City & Southwest, Sustainability, Environment & Planning	Comments:	
Signature:			

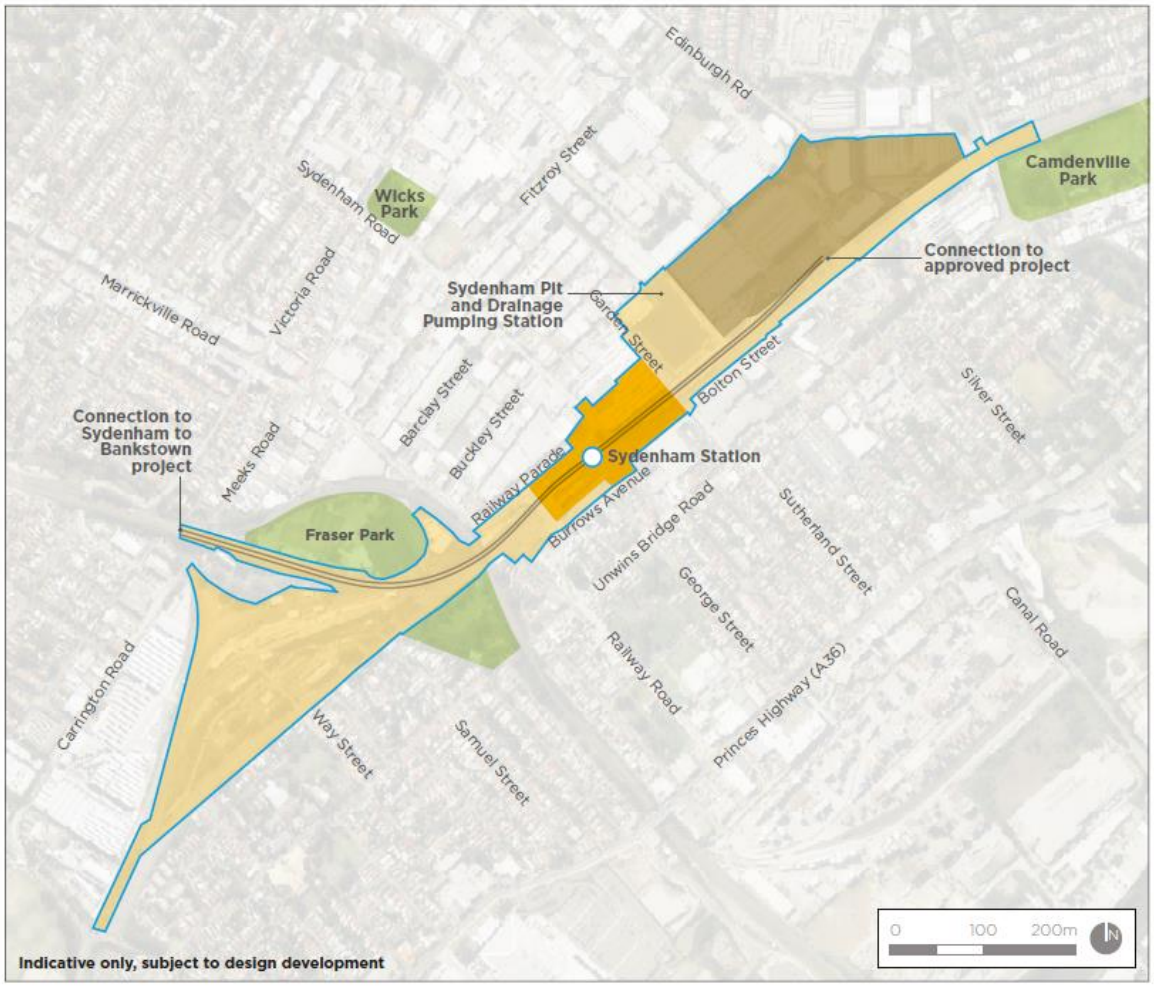
Appendix A – Plan from the Submissions Report



Appendix B – Redesigned Ramp and Access Bridge



Appendix C – Work Area



Appendix D – Heritage Impact Assessment

SYDENHAM PIT AND DRAINAGE PUMPING STATION STAGE 3
HERITAGE IMPACT ASSESSMENT AND TRACKING REGISTER

REF: SMCSWSSJ-JHL-WSS-HE-REP-830001

21 NOVEMBER 2018

REVISION B

PURCELL

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Rev	Date	Prepared by:	Checked by	Approver
A	14 September 2018	Purcell (Lucy Burke-Smith)		
B	21 November 2018	Purcell (Lucy Burke-Smith)		

PURCELL

CONTENTS

INTRODUCTION
BACKGROUND, CONTEXT & LIMITATIONS

BACKGROUND

This Heritage Impact Assessment (HIA) has been prepared as part of the Stage 3 Sydenham Pit and Drainage Pumping Station Design Milestone associated with the Sydenham Station and Junction (SSJ) Metro project.

This overview is an edited extract from the following documentation:

- *Chatswood to Sydenham – Sydenham Station and Sydney Metro Trains Facility South Modification Report, Main Report and Appendices*, prepared by Transport for NSW;
- *Chatswood to Sydenham – Sydenham Station and Sydney Metro Trains Facility South Modification Submissions Report,* prepared by Transport for NSW;
- *Sydenham Station and Sydney Metro Trains Facility South – Second Addendum to the Sydney Metro City & Southwest – Chatswood to Sydenham Historical Archaeological Assessment and Research Design,* prepared by Artefact Heritage, January 2018

The Sydney Metro City & Southwest project was declared by Ministerial Order on 10 December 2015 to be State significant infrastructure and critical State significant infrastructure. Planning approval was granted by the Minister for Planning under Part 5.1 of the EP&A Act on 9 January 2017. A modification was sought under section 115ZI of the EP&A Act to include works forming part of the Sydenham Station and Sydney Metro Trains Facility South package. The scope of the modification, and subsequently the scope of the wider SSJ project is summarised within the Modification Report[01] as follows:

- *Sydenham Station and precinct works – demolition and reconstruction of platforms 1 and 2 for metro rail operations and a new aerial concourse connecting to new station entries at Railway Parade and Burrows Avenue. Upgrades to transport interchange facilities and provision for active transport would be delivered as part of the station works*
- *Sydney Metro Trains Facility South – construction and operation of train stabling and maintenance facilities for the overall metro network. The scope includes earthworks, retaining walls, track and rail systems, construction of new buildings, plus operation of trains and maintenance activities within the stabling yard*
- *Track and rail system facilities – reconfiguration of existing track and rail systems to segregate the T3 Bankstown Line and the Goods Line, installation of metro tracks and rail systems including crossover and turnback facilities*
- *Adjustments to the Sydenham Pit and Drainage Pumping Station – including a new aqueduct over the pit, new pumping station and new maintenance access ramp*
- *Ancillary infrastructure and works – including fencing, maintenance access, utilities works, drainage, noise barriers, road and transport network works, bridge works, and temporary facilities to support construction.*

The Modification (SSI 7400 MOD 4) was approved by the Executive Director Priority Projects assessments, as a delegate of the Minister for Planning, 13 December 2017.

The scope of this HIA is limited to the SSJ Sydenham Pit and Drainage Pumping Station, with an assessment of the SSJ Station Precinct being provided within separate reports. The scope of the HIA is therefore focused on the following aspect of the approved modification:

> *Adjustments to the Sydenham Pit and Drainage Pumping Station – including a new aqueduct over the pit, new pumping station and new maintenance access ramp*

The Modification Report, Appendix E: Non-Aboriginal Technical Information notes that the original impacts of the proposed modification, to the Station Precinct are as follows:

Approved project impact:

> *Potential direct impacts – neutral (vibration). This item would not experience vibration above the screening criteria for cosmetic damage.*
>
> *Indirect impacts - minor (views and vistas). The establishment of the construction site in the adjacent property would result in minor temporary visual impact to the setting of the item. The southern services facility would be about 50 meters to the north-east of the heritage item and would have negligible long term visual impacts to the setting of the item[02].*
>
> *Direct impacts – moderate installation of aqueduct and viaduct, maintenance vehicle ramp.*

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01 Chatswood to Sydenham – Sydenham Station and Syndey Metro Trains Facility South Modification Report, prepared by Transport for NSW, undated, p.ii

02 Modification Report Appendix E: Non-Aboriginal Heritage Technical Information, p.12

Potential direct impacts – minor (vibration)

Indirect impacts - major (views and vistas)[03]

From this, the Modification Report describes the revised heritage impacts of the developed design as follows:

> *The proposed aqueduct to be anchored in Sydenham Pit and Drainage Pumping Station I proximity of the drainage pumping station would result in impacts to the heritage item. Provided that the aqueduct and pylons are sensitively designed to minimize such impacts, it is anticipated that the proposed modification would result in moderate direct and major visual impacts on the heritage item overall.*
>
> *Elements of exceptional significance of the heritage item including the pit sandstone walls and the pumping station would be retained for continued use in their original function. Direct and visual impacts of the drainage works located on the boundaries of the curtilage of the heritage item would result in negligible impacts visual impacts of the stabling facility to the east of the heritage item would be minor overall as they are in keeping with the industrial nature of the surrounding area. Visual impacts as a result of the aqueduct would be major as they would change the symmetry of the item and introduce a new visual element.*
>
> *Potential direct impacts as a result of vibration would be minor provided that mitigation measures are implemented. Overall, the level of heritage impact on Sydenham Pit and Drainage Pumping Station 1 would be major.*
>
> *The statement of significance indicates that Sydenham Pit and Drainage Pumping Station is historically, aesthetically and technically significance at a State level for being the first purpose built stormwater and drainage pumping station in the Sydney region. The site is also locally significant for having been built in response to increasing urban expansion from the 1870s, easing the impact of floodwaters and enabling the Marrickville township to expand. The item is also rare and representative of its type. Although the proposed aqueduct would result in major impact on the item, elements of exceptional significance would be retained and used for their original purpose. The landmark quality of the site, and the industrial character of the item would be retained within the urban landscape of the area and would continue to reflect the industrial context of the area. The item would remain rare and representative at a State level as it would still demonstrate its historic function and retain significant elements. Sydenham Pit and Drainage Pumping Station 1 would continue to meet the threshold for State significance*[04].

The modification also notes the following environmental impacts:

- *Some adverse landscape character and visual amenity impacts due to construction works and introduction of an aqueduct over the Sydenham Pit and Drainage Pumping Station*
- *Permanent changes to the existing stormwater drainage network, including the realignment of the Eastern Channel, modifications at the Sydenham Pit and Drainage Pumping Station, and raising of the Sydney Metro Trains Facility South and tracks to the above the probable maximum flood level*[05]

The proposed works are detailed in the following plans and documents forming part of the Stage 3 package:

- Sydenham Station and Junction Works Aqueduct - MEP Drawings SMCSWSSJ-JHL-WSS-ED-DWG-820 series DPK 820, Revision D, with drawings as indexed in SMCSWSSJ-JHL-WSS-ED-DWG-820002 Rev D
- Sydenham Station and Junction Works Aqueduct - Structural Drawings SMCSWSSJ-JHL-WSS-ED-DWG-830 series DPK 830, Revision D, with drawings as indexed in SMCSWSSJ-JHL-WSS-ED-DWG-830002 Rev D
- Sydenham Station and Junction Works Aqueduct – Civil Drawings SMCSWSSJ-JHL-WSS-ST-DWG-810 series DPK 810, Revision D, with drawings as indexed in SMCSWSSJ-JHL-WSS-ED-DWG-810002 Rev D

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03 Modification Report Appendix E: Non-Aboriginal Heritage Technical Information, p.12

04 Modification Report Appendix E: Non-Aboriginal Heritage Technical Information, p.12

05 Chatswood to Sydenham – Sydenham Station and SyndeySydney Metro Trains Facility South Modification Report, prepared by Transport for NSW, undated, p.iii

INTRODUCTION
BACKGROUND, CONTEXT & LIMITATIONS

LIMITATIONS

The purpose of this report is not to assess the proposed works from a first principles approach. The proposal has been assessed in detail through the Environmental Impact Statement, Modification Report and Appendices and was granted approval 13 December 2017, as outlined in the following supporting documentation:

- *Sydey Metro City and Southwest – Chatswood to Sydenham: Non-Aboriginal Heritage Impact Assessment, prepared by Artefact Heritage (2016b).*
- *Chatswood to Sydenham – Sydenham Station and Sydney Metro Trains Facility South Modification Report, Main Report, prepared by Transport for NSW;*
- *Chatswood to Sydenham – Sydenham Station and Sydney Metro Trains Facility South Modification Report, Main Report, Appendix E: Non-Aboriginal Technical Information* prepared by Transport for NSW;
- *Sydenham Station and Junction Main Works Construction Heritage Management Plan SMCSWSSJ-JHL-WSS-HE-PLN-000031, prepared by Purcell and Extent Heritage, 08/06/2018*

The focus of this report, as is outlined within the Schedule C1 STWC Appendix B6, is to assess the impacts of the design development against this established baseline and to track the overall trend of the emerging design, either positive or negative, and to consider the potential impacts of its finer detail to the significance of the items[06]. Furthermore, it seeks to assess the responsiveness of the emerging design against the Heritage Objectives of the project, as defined within Schedule C1 Appendix B6 of the SWTCs.

This HIA is limited to an assessment of the built non-Aboriginal heritage and the potential impacts of the proposal to the setting, context and significant fabric of the site. The report does not consider the potential impacts of the proposal to the archaeological significance or potential of site. An assessment of the archaeological potential of the site is provided separately within the Construction Heritage Management Plan (CHMP) dated April 2018 prepared by Purcell and Extent Heritage.

The assessment is limited to the design reports and engineering drawings as cited earlier within this introduction.

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06 Schedule C1, Appendix B6, p.2

UNDERSTANDING THE SITE
STUDY AREA

The works area of the Sydenham Pit and Drainage Pumping Station is defined by the boundary represented within the following diagram.

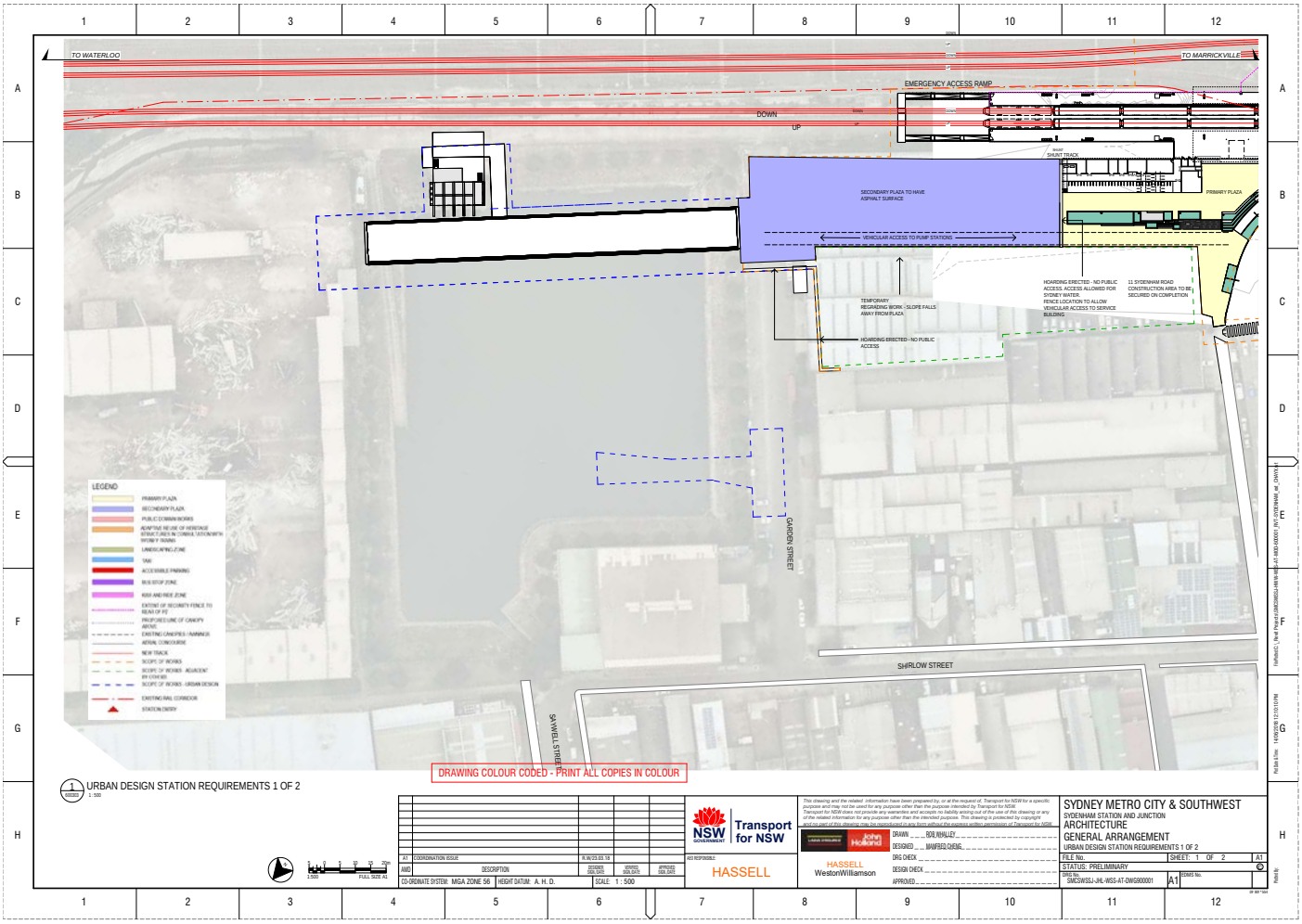

Fig 1. SMCSWSSJ-HWW-WSS-AT-MOD-6000001_RVT-SYDENHAMSheet-90001

UNDERSTANDING THE SITE
HERITAGE LISTING AND APPLICABLE LEGISLATION

The following summary of legislation is extracted from the CHMP, dated 08/06/2018, prepared by Purcell and Extent Heritage. Given the scope of this study it is limited to an outline of the legislation applicable to built non-Aboriginal heritage.

ENVIRONMENTAL PLANNING AND ASSESSMENT (EPA) ACT 1979

The EPA Act establishes a system of environmental planning and assessment of development proposals for the State. The project has been assessed under Part 5.1 of this Act, and is subject to the Minister's Conditions of Approval. Compliance and responsiveness to the approval conditions and obligations are assessed through this HIA and its tracking register.

ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

The main purpose of this Act is to provide for the protection of the environment especially those aspects that are of national environmental importance and to promote ecological sustainable development.

Heritage places are listed on the National Heritage List (NHL) for their 'outstanding heritage value to the nation' and are owned by a variety of constituents, including government agencies, organisations or individuals. Only items owned or controlled by the Commonwealth that have met the threshold for national heritage listing under the Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act) are listed on the Commonwealth Heritage List (CHL) and afforded protection under the EPBC Act.

In this instance the EPBC Act is not relevant as no NHL, CHL or WHL items are present within or in proximity to the study area.

HERITAGE ACT 1977 (NSW)

This Act provides for the preservation and conservation of heritage items such as building, works, relic, places of historic interest, scientific, cultural, social, archaeological, architectural, natural or aesthetic significance.

It is an offence under this Act to wilfully and knowingly damage or destroy items of heritage value. It is an offence to demolish damage, move or develop around any place, building, work, relic, moveable object, precinct, or land that is the subject of an interim heritage order or listing on the State Heritage Register or heritage listing in a Local Environmental Plan without an approval from the Heritage Council (NSW) or local council. Under Section 146 of the Act the Heritage Council must be notified if a relic that is uncovered during the execution of works. The projects CHMP, dated 08/06/2018, outlines the archaeological potential for the site, together with the unanticipated finds procedure to be implemented in the event that a relic is uncovered.

Heritage Items that are identified on the site are addressed as part of the Condition of Approval (CoA). An approval under Part 4, or an excavation permit under section 60 or 139, of the Heritage Act 1977 is not required for works approved under Part 5.1 of the EP&A Act.

HERITAGE LISTINGS

The following table provides a summary of the statutory listings applicable to the boundary defined as the Sydenham Station Precinct. Figure 2, as represented within the Modification Report, shows these listings relevant to adjacent sites of significance.

Item	*Listing*	*Location*
Sydenham Railway Station Group	• *State Heritage Register SHR #01254* • *s.170 Heritag and Conservation Register - Railcorp* • *Inner West Council (Schedule 5 Marrickville LEP 2001)*	*Gleeson Ave, Burrows Ave and Railway Parade, Sydney, NSW*
Sydenham Pit and Drainage Pumping Station 1	• *State Heritage Register SHR #01644* • *s.170 Heritage and Conservation Register – Sydney Water* • *Inner West Council (Schedule 5 Marrickville LEP 2001)*	*Garden Street, Marrickville, NSW*
Brick retaining walls	*Inner West Council (Schedule 5 Marrickville LEP 2001)*	*Marrickville Road and Railway Parade*

UNDERSTANDING THE SITE
HERITAGE LISTING AND APPLICABLE LEGISLATION

Fig 2-. Identification of heritage items within the vicinity of the Sydenham Station Precinct. Source: Metro

UNDERSTANDING THE SITE
SIGNIFICANCE, DESCRIPTION AND HISTORIC OVERVIEW

STATEMENT OF SIGNIFICANCE

The following Statement of Significance is taken from the NSW State Heritage Register citation for the item:

> *The Sydenham Pit and Pumping Station is of historic, aesthetic and technical significance. Historically, it is the first such infrastructure built in the SWC system and is an intact and major component of the Marrickville low level stormwater drainage infrastructure that was built in response to increasing urban expansion since the 1870s in an area prone to flooding. Its large scale and labour intensive construction method of excavating the pit reflects the abundance of labour during the Great Depression and the type of public works undertaken to provide relief work for the unemployed. Aesthetically, the use of pitched dry packed ashlar sandstone walls to line the sides of the pit provides a pleasantly textured and coloured finish to the pit. It is a major landmark and dramatic component of the industrial landscape of Sydenham particularly as viewed from the railway. The pumping station is a very good example of a utilitarian building displaying Inter-War Mediterranean style architectural details. Technically, the pumping plant contains good working examples of 1930s pumps, particularly three Metropolitan Vickers pumps, and its original electrical mains equipment has been preserved insitu during upgrading in c1992*[07].

DESCRIPTION OF SYDENHAM PIT AND DRAINAGE PUMPING STATION NO.1

The following description of the Sydenham Pit and Drainage Pumping Station is extracted from the NSW State Heritage Register citation for the item:

> *Sydenham Storage Pit and Pumping Station consists of two distinct parts: the pit and pumping station (albeit they are integral in operation). The pit consists of a nine metre deep basin with the sides formed into batters. The batters are faced with sandstone blocks laid horizontally in courses of about 300mm. The width of the blocks range from square to over one metre in length. The blocks are dressed on four sides with the face sparrow picked. Along the top of the stone facing wall, earth batters and an open concrete drain were formed. An access ramp to the base of the pit is located along the northern wall with entry from Railway Parade. The stone walls are penetrated by channel outlets in the southeast corner and in the centre of the western edge. The boundary of the site is planted with Oleanders. The pumping station is constructed of reinforced concrete and consists of a series of fins that rise 12 metres from the base of the pit to support the pump house that has its floor level about 1.8 metres above Railway Parade. Five concrete fins interspaced with four cylindrical concrete water shafts are incorporated, with the southern facade supported by three concrete piers joined by a horizontal cross-beam in the centre. The floor of the pumphouse overhangs the end concrete fin by about a metre and is supported by four concrete brackets. The pumphouse has the approximate internal dimensions of 7.2m wide x 17m long and 5.6m ceiling height. A switch room adjoins the eastern facade of the main pump room and has the approximate internal dimensions of 4.8m x .9m. The pumphouse has a tiled gable roof which continues down at the same pitch over the switch room. The southern and northern facades have three closely spaced vertical steel framed windows that form a square in the centre of the wall. The tops of the windows are overhung by a concrete lintel. Along the western facade of the pumphouse are five vertical windows centred on the void between the concrete fins. The building was designed in a version of the Inter-War Mediterranean domestic style*[08].

HISTORICAL OVERVIEW

The following historical overview is extracted from the NSW State Heritage Register citation for the item:

> *With the completion of the Illawarra railway beyond Sydenham in the 1880's, the urburbanisation of the Marrickville Valley increased rapidly. It was soon found that the valley had significant drainage problems, which were partly solved by the construction of a stormwater pumping station in Carrington Road , Marrickville in 1897 (now known as Marrickville Sewage & Stormwater pumping Station - SP271) and three main stormwater channels, comprising the Eastern, Western and Central Channels.*
>
> *In the 1930's the government decided to improve the drainage system, which included an allocation of unemployment relief funds for drainage works in Marrickville Muncipality. The scheme included the drainage of the northern section of the low level area north of Marrickville Road, comprising the excavation of a storage pit, the erection of a pumping station with a rising main discharging into the Eastern Channel and the construction of a system of channels discharging into the pit. The pit and pumping station were constructed by the Public Works Department in the late 1930's and transferred to the MWS &DB in 1941*[09].

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07 http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=5053883

08 http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=5053883

09 http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=5053883

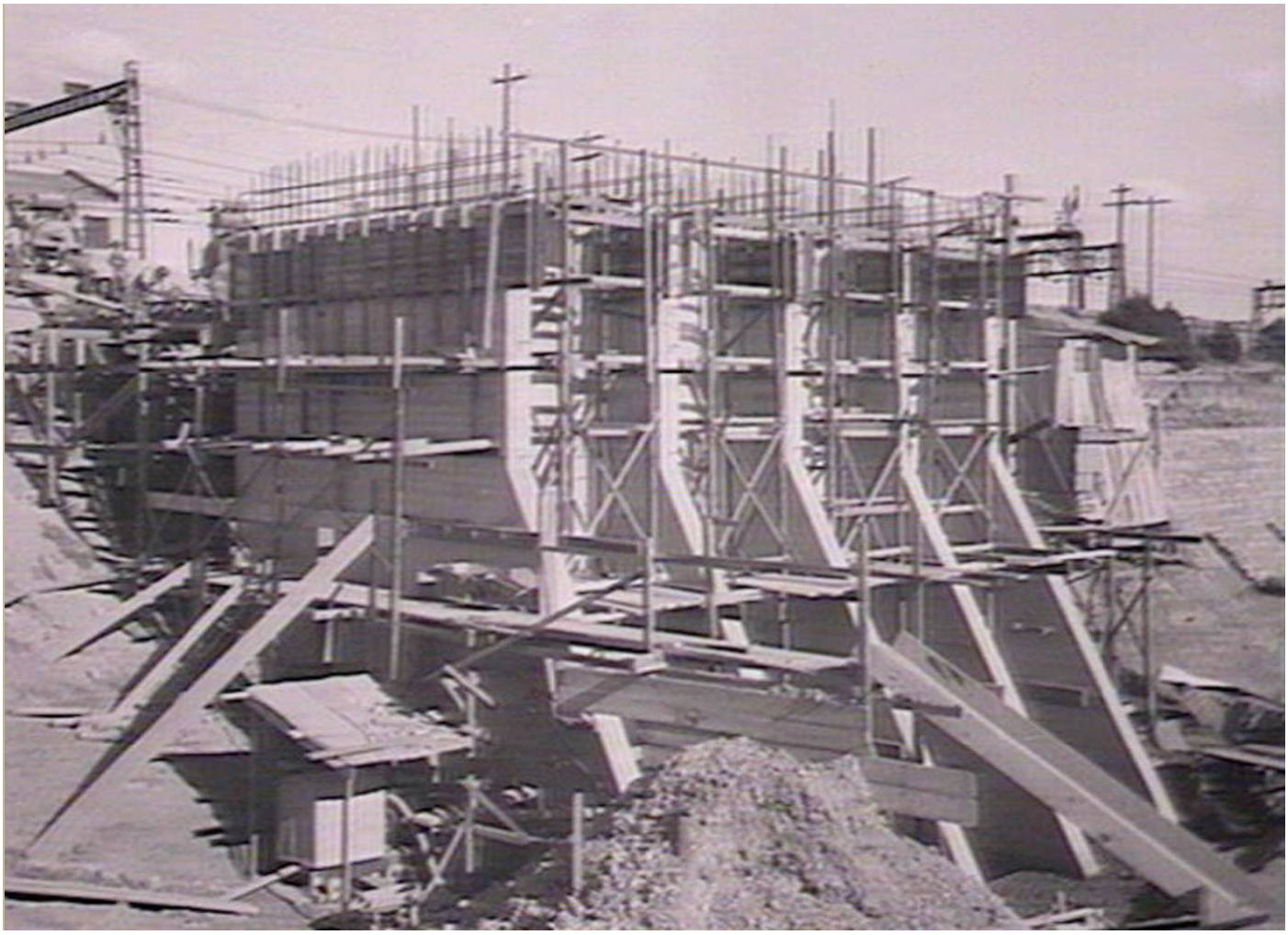

Fig 3. - Marrickville low level drainage pump well under construction, Government Printing Office 1 - 28493, 1938. Source: State Library of NSW.

REFERENCE DESIGN

OPTIONS ANALYSIS

The Modification Report outlines the following options analysis undertaken during the reference design period:

- *Option 1: Aqueduct across the Sydenham Pit and Drainage Pumping Station*
- *Option 2: Enclosed culverts under the new Sydney Metro tracks between the existing Sydney Trains tracks and Sydenham Pit and Drainage Pumping Station*
- *Option 3: Open channel along the existing embankment of Sydenham Pit and Drainage Pumping Station adjacent to the new Sydney Metro tracks.*

Option 1, when compared with Option 2 and 3, would require the least amount of interface with the existing stormwater system during construction, and maintenance during operation would not impact on Sydney Metro services. The aqueduct would provide a potential future pedestrian connection across Sydenham Pit and Drainage Pumping Station to Sydenham Station and enable vehicular access for maintenance purposes. While the original State heritage listed pumping station would be maintained (non-operational), the viaduct and new access ramp would have moderate adverse visual and moderate-major adverse heritage impacts and minor flooding impacts to properties on Garden Street.

Option 2 would have lower adverse visual and heritage impacts as the level of physical intervention on Sydenham Pit and Drainage Pumping Station would be minimised. The original pumping station would be maintained and supplemented with a new pumping station and there would be no significant flooding impacts on local properties. However, the option poses a construction risk due to impacts on existing flooding channels that would result in a temporary channel capacity loss of 50 per cent. The new culverts have the potential to cause upstream draining issues during operation, are not the preferred option of Sydney Water due to maintenance access and ventilation / emergency egress, and would impact Sydney Metro operations during structural maintenance periods. Option 2 would require land ownership transfer and would impact reliability of the Sydney Metro track cross-over.

Option 3 would provide independent access to new pumping station facilities and to Sydenham Pit and Drainage Pumping Station. Drainage maintenance would not impact on Sydney Metro operations but may result in flooding impacts at Garden Street. Option 3 would result in moderate adverse visual impacts and major adverse heritage impacts, as the existing pumping station would need to be demolished and replaced with a new pumping station. Option 3 would also require extensive demolition of the eastern and southern pit walls and would substantially reduce the original size of the pit.[10]

THE PREFERRED OPTION

The Modification Report concludes the following preferred option:

Option 1 has been selected as the preferred option. The preferred option would not result in maintenance access issues for Sydney Water and Sydney Metro operations and presents a low construction risk as the infrastructure would be built without impacting the existing drainage channels. While the aqueduct would impact on the open character of Sydenham Pit and Drainage Pumping Station, the legibility of the existing pit and pump station would be retained. The existing pump station would be retained as a non-operational feature with opportunities to repurpose the building and provide public access to the heritage site. The aqueduct would also present opportunities for future pedestrian connection to Sydenham Station[11].

DEVELOPED DESIGN – STAGE 3 OVERVIEW

The design, developed from the basis of the Reference Design, represents an iterative design process which has sought to balance the brief requirements with the protection and enhancement of the heritage values of the significant structures forming part of the Sydenham Pit and Drainage Pumping Station. A detailed overview of the works is outlined within the Stage 3 Aqueduct Civil, Structures and MEP Design Reports, prepared by AGJV. The following overview is provided for reference:

Aqueduct Structure
Echoing the functional approach of original construction, the aqueduct is of a simple modern design reflecting a contemporary engineering and construction technique. It consists of a rectilinear box bridge structure 4m in height and 14m in width, spanning approximately 120m across the pit in the east-west direction. It is supported by five bays of three circular vertical concrete columns, headstocks and U-shaped superstructure channels. All components are in an off-form concrete finish with form ties expressed on the bridge elevation.

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10 Chatswood to Sydenham – Sydenham Station and Sydney Metro Trains Facility South Modification Report, prepared by Transport for NSW, undated, p.23

11 Chatswood to Sydenham – Sydenham Station and Sydney Metro Trains Facility South Modification Report, prepared by Transport for NSW, undated, p.23

Fig 4 - Views to the Pit and Pumping Station. Source: HASSELL+WW

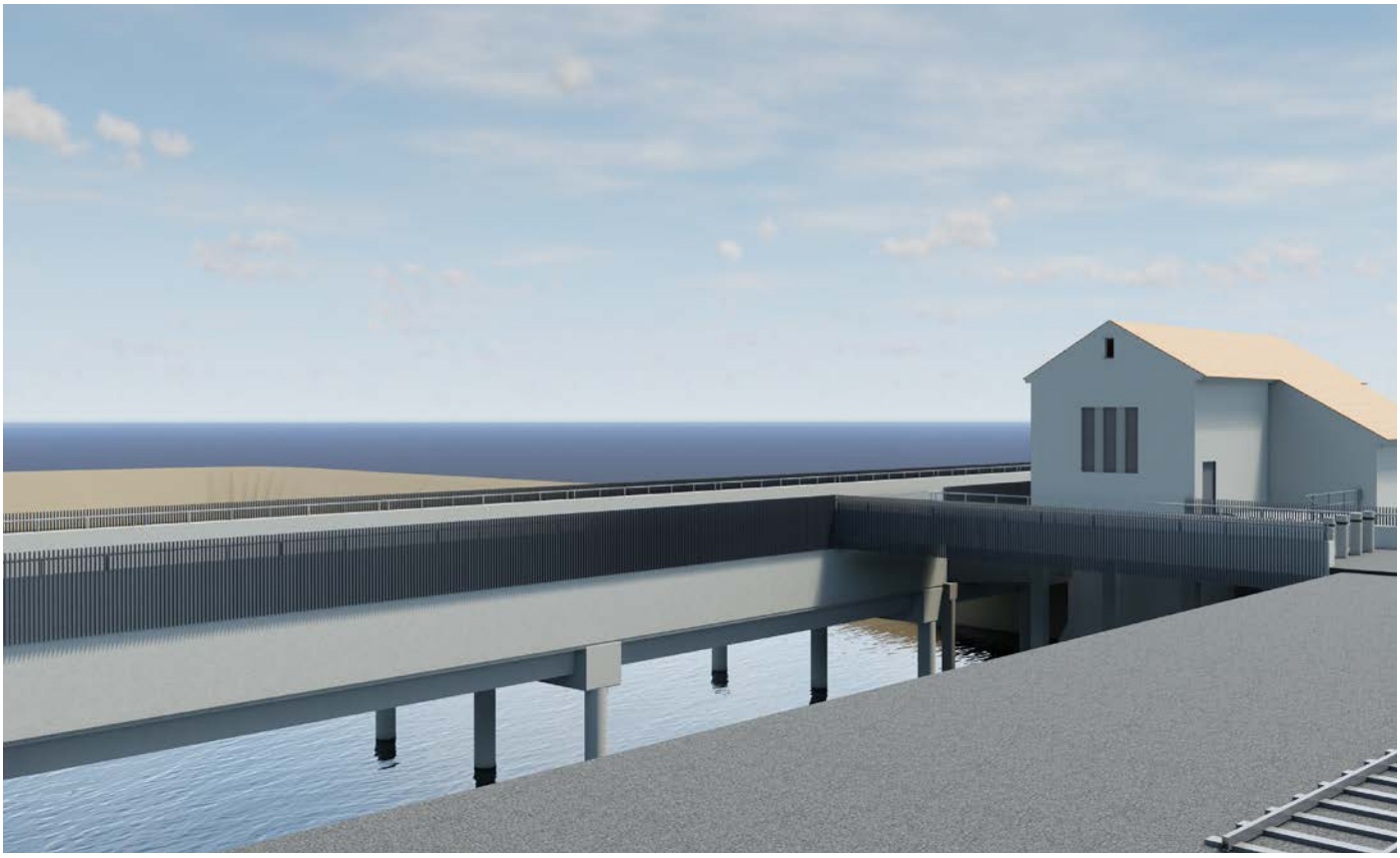

Fig 5- Views to the Pit and Pumping Station. Source: HASSELL+WW

HERITAGE IMPACT ASSESSMENT
PROPOSED WORK - OVERVIEW

Fig 6 - Views to the Pit and Pumping Station. Source: HASSELL+WW

Road Maritime Services (RMS) standard F-type precast concrete vehicle barriers are to be installed on the bridge deck on both sides of the aqueduct. To ensure colour consistency between the cast instu bridge and structural element and precast vehicle barrier, a painted concrete finish (Newkaw or acceptable equivalent) is to be applied to all exposed concrete surfaces. An anti-graffiti coating is included in the finishes specification as part of the anti-vandalism measures.

The combined height of the aqueduct installation will be 5m. It presents a significant impact to the vista of the southern elevation of the pit wall and pump house. The design includes an architectural fascia consisting of 2m high black grey powder coated vertical aluminium fins are set in front of the concrete barriers and oversailing below the floor finish line. The intention is to divide the visual bulk by introducing the second element to achieve a 50:50 proportion and a shadow line on the overall elevation.

The embankment at the aqueduct and pit wall interface at the eastern and western end consists of a concrete retaining wall with sloped face which mirror the rake of the sandstone pit wall.

The aqueduct is structurally is independent of the existing Pump Station and Pit. It diverts and carry's the existing stormwater channel and culvert away from the current position within the Sydney Metro alignment along the southern boundary of Sydenham Pit. The aqueduct is piled into the base of the pit and its abutment walls.

Pit Access Ramp

To provide maintenance access to the existing pumping station, a new concrete access ramp is to be added off Garden Street. It will include the same concrete vehicle barrier on both sides and architectural fascia on the western elevation.

The vehicular access ramp is to be located on the northern end of Garden Street. It is straight ramp approximately 58m in length and 9m in width. It consists 2 sets of 3 exposed columns, concrete head stocks supporting straight rectangular precast concrete planks and a concrete decking. The two sides are flanked with 820mm high concrete vehicle barrier top with steel horizontal railing. Like the new aqueduct the ramp is piled into the base of the pit an abutment walls. The base of the pit, at the junction with the new ramp is to be partially broken out to accommodate a 10m length of mass reinforced concrete block(ReportDrawing 830301 Rev D, Drawing 830345 Rev B). At the top of the ramp the existing pit walls are to be excavated to accommodate a bridge beam and retaining element (Drawing 830301 Rev D).

Pump Station Access Bridge

A single span bridge of 18m length is proposed from the new aqueduct to the existing Drainage Pumping Station. The structure runs parallel to the Pumping Station and is supported on piled abutment headstocks. The width of the bridge is determined by Sydney Water access and maintenance requirements. There is a 560mm separation between the western elevation of the pumping station and the new access bridge to provide a visual separation.

Pit Walls

There are several locations where either the condition of the batter walls, or the nature of the works will require remedial treatment. The Civil Design Report outlines several remedial options (see Section 2.7) which will require detailed input from the Heritage Consultants through Stage 3 design development,

Drainage Pumping Station

The Stage 3 design requires significant modifications to the existing pumping station building fabric. It will include the addition of a new flume connection between the new aqueduct and the existing pumping station and significant penetrations to the existing northern concrete wall between the supporting fins. The shape and configuration of the flume is driven by hydraulic design, which features an angled orientation towards the flow of the water downstream (westward) and a stepped top profile. The design includes a 100mm gap that separates the bottom edge of the existing concrete beam from the new flume top. There is also a desire to retain the flare feature at the top of the existing fin wall which is part of the key defining features of the pumping station.

The existing pump station currently holds two new pumps, a heritage Vickers pump and empty well. The pump station currently discharges pit flows from the three wells into skewed culverts which connect to the wall of the existing stormwater culvert. In order to connect the new aqueduct to the pump station, a new weir structure and access into the aqueduct is required (see Figure 25 and 26 of the Aqueduct Structural Design Report).

On the pumping station's southern elevation, a new raised platform is proposed to be set flush with the existing pumping station floor level in order to provide easy maintenance access for future pump replacement. Stage 3 design development expored options for a steel deck alternative to the proposed concrete deck, the objective being to achieve a reversible solution that reduced the physical impact to the existing heritage fabric. It is understood that operational requirements require the proposed suspended concrete slab. This will also require the demolition of the top two stairs of the existing access flight to entrance door of the Drainage Pumping Station (Drawings 830620 Rev A, 830621 Rev A, 830625 Rev A).

Several upgrades are required to the Mechanical and Electrical components of the Pumping Station. Wet well number three will be fitted with concrete rings to reduce the diameter of the well similarly to the other two wet wells which have recently been modified by Sydney Water. The rings will be secured in place by filling the void between the rings and the existing walls with concrete. All three pump wells will be modified to accommodate the new flow direction to connect to the aqueduct. Pump well 1 will also be modified to accommodate a new submersible pump. This will consist of replicating the modifications previously made to pump wells 2 and 3. The existing dry well sump pump is also to be converted to a wet well arrangement.

Three connections are proposed at the outer wall of the existing wells. These connections replicate the previous modifications in the wells, directing flow over a weir profile into the chamber which connects to the aqueduct in a skewed alignment, similar to the connection at the existing twin cell culverts. Modification of the existing pump station consists of demolition of the well outer wall and construction of a new chamber between the existing building buttress walls.

Several electrical transfer switches, boards and panels require replacement. These are mostly being replaced in existing locations, with the exception of the Pump 1 Starter Panel, which is new and required cutting of the concrete slab for reticulation, and is to be covered in checker plate access panels as per existing. While the nominated replacement switchboard will be smaller in size it will still obstruct part of the windows as per the existing configuration. Intrusive internal brick walls are to be removed as part of the scope, opening the room to its original configuration. Removable handrails to the perimeter of Pump 1 will be detailed to match those currently used for Pumps 2 and 3.

Lighting requirements for external areas, including the loading platform and maintenance access bridge will be further developed to mitigate impacts to significant fabric and options sought which do not affix these items to the exterior envelope of the Drainage Pumping Station.

Metro Corridor retaining wall

The realignment of rail corridor and change in relative level require the construction of a retaining wall which conflicts with the southern Pit walls and returns from the southern wall along the east and west perimeter of the Pit to the connection with the new aqueduct. A significant number of structural piles are required along this element as outlined within Drawing 830106 Rev B.

Landscaping

Replacement fencing is required to the perimeter of the Pit and Drainage Pumping Station. This takes the form of closed space welded mesh security fencing, and chain mesh segregation fencing as outlined within Drawing SMCSWSSJ-JHL-WSS-CE-DWG-930351 Revision A. The works required for the retaining wall parallel to the Metro corridor will impact the Oleander plantings, requiring their removal and limiting opportunities for succession planting, equally the top batter of ashlar walling will be directly impacted by these works.

HERITAGE STRATEGY

Section 3.5.2 of the Modification Report provides a Heritage Strategy, developed by TfNSW which outlines the approach which has informed the Reference Design forming the basis of the SSJ Project. This Strategy is largely focused on the Station however its principles, cited below, inform the assessment of the potential impacts of the emerging design:

The design [of the station] has been undertaken having regard to the heritage values [of the station and the wider T3 Bankstown Line overall,] and has sought to:

- *Recognise and demonstrate the heritage significance of all phases of rail transport development along the Bankstown Railway Line*
- *Retain and conserve, wherever possible, elements of heritage significance, so that functional relationships can be understood and interpreted*
- *Remove intrusive [station] elements that detract from the core heritage values*
- *Adaptively reuse the retained and conserved heritage buildings for [station and] related functions*
- *Carefully and clearly express the presence of Sydney Metro with new high quality design elements*
- *Deliver a functionally viable [line, stations, and] precincts, while enhancing the legibility of key heritage value*[12].

Table 3-1 summarises the justification for those impacts on heritage items which are proposed to be removed as part of the proposed modification. Further information on the potential heritage impacts of the project are provided in Chapter 14 (Non-Aboriginal heritage)[13].

Table 3-1 of the Modification Report (Modification Report p.28) notes the following Justification of heritage impacts for the Station.

Heritage elements directly impacted	Justification
Sydenham Pit and Drainage Pumping Station No.	Works, including the new pumping station, are required to address existing drainage issues and potential impacts, with regard to local flooding conditions tied to ageing infrastructure. A number of options were considered, some of which had greater impacts on the heritage elements of the Sydenham Pit and Drainage Pumping Station. From those options that also meet the drainage needs, the proposed works have the least heritage impact, with the existing pumping station retained in its current position, and a new aqueduct proposed to be constructed across the pit at a suitable distance from the pumping station. The new aqueduct would be designed to contrast with, and minimise impact on, existing views to the pumping station. The new pumping station would be built with a modern design so it reads as a new element within this infrastructure asset. The design has evolved to ensure minimal impact on the existing wall and floor of the pit. Where materials need to be disturbed or impacted, they would be reused wherever possible. An access ramp would be positioned and designed to minimise its visual impact.

12 Modification Report, p. 27-28

13 Chatswood to Sydenham – Sydenham Station and Syndey Metro Trains Facility South Modification Report, prepared by Transport for NSW, undated, p.27

HERITAGE IMPACT ASSESSMENT
PROPOSED WORKS - ADAPTIVE REUSE

The NSW Heritage Council Policy, Altering Heritage Assets acknowledges that:

> *Many heritage items can be altered or extended without unduly compromising their importance. Indeed, it is possible to enhance or reinforce their significance by an adaptive reuse that involves sympathetic alterations and additions…*
>
> *In general, the success or failure of alterations and additions in heritage terms is directly related to the degree to which the design acknowledges and retains the significance of the place*[14].

Schedule C1 Appendix B6 of the SWTCs[15] requires the development of an Adaptive Re-use Strategy for the item. The objective of the strategy is to identify compatible uses which do *'…not result in the removal of significant fixtures, fabric or design integrity, require the subdivision of significant interior spaces or the addition of obtrusive new elements or signage.'*[16] In addition new uses seek to *'…allow for public access to the retained platform buildings, and be directly associated with the functions of Sydenham Station as a railway transport facility.*[17]'

The strategy for Adaptive Reuse of the Pit and Drainage Pumping Station seeks to facilitate the continuation of this historic and compatible use, enhance presentation and interpretation and ensure the viable long term use and activation of the item into the future. This is to be balanced with the implications of the technical and operational requirements of current and project standards and practice with a forecast to long term operation.

As the item is to be maintained in continued operation its adaptive re-use potential is somewhat limited. It is however noted that continue use takes preference to adaptive re-use and that through the delivery of an interpretation programme managed occasional public access will deliver an enhanced engagement and awareness by the community with the item.

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14 Altering Heritage Assets, NSW Heritage Council Policy No.2, undated, p.3

15 Schedule C1, Appendix B6, p.6

16 Schedule C1, Appendix B6, p.11

17 Schedule C1, Appendix B6, p.11

HERITAGE IMPACT ASSESSMENT
METHODOLOGY AND CRITERIA FOR ASSESSMENT

METHODOLOGY

The impacts of the proposal to the significance and values of the subject items is comprehensively outlined within the projects Environmental Impact Statement the Modification Report and its Appendix E. These reports form the baseline assessment. The purpose of this HIA is to assess the impacts of the design development against this established baseline and to track the overall trend of the emerging design, either positive or negative, and the potential impacts to the significance of the items arising from its detailed development[18]. Furthermore it seeks to assess the responsiveness of the emerging design against the Heritage Objectives of the project, as defined within Schedule C1 Appendix B6 of the SWTCs.

In providing this assessment we have developed a tracking register to demonstrate the responsiveness of the design development to:

- *'…achieve an outcome that minimises the adverse impacts on heritage buildings, elements, fabric, spaces and vistas…[19]'*
- its compliance with all heritage consent conditions.
- an appropriate adaptive reuse approach to heritage items nominated for retention.

GUIDANCE DOCUMENTATION

Consistent with the Modification Report the following guidance documents have been referenced as is applicable to the scope of works and their potential impacts:

- *NSW Heritage Manual 1996 (Heritage Office and Department of Urban Affairs and Planning, 1996)*
- *Assessing Heritage Significance (Heritage Office, 2001)*
- *Statements of Heritage Impact (Heritage Office, 2002)*
- *Railway Footbridges Heritage Conservation Strategy, NSW Government Architect's Office (August 2016)*
- *Railway Overhead Booking Offices Heritage Conservation Strategy, Transport for NSW (2014)*
- *Heritage Platforms Conservation Management Strategy, Sydney Trains (2015)*
- *Canopies and Shelters, Design Guide for Heritage Stations, Sydney Trains (December 2016)*
- *Design in Context Guidelines for infill Development in the Historic Environment,*
- *NSW Heritage Office (June 2006).*
- *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance (Australian ICOMOS, 2013) 'The Burra Charter'*

TERMINOLOGY AND CRITERIA FOR ASSESSMENT

The Modification Report employs the following definitions with regard to impacts, with the magnitude of potential impacts employing the relevant terminology.

- **Direct impacts,** resulting in the demolition or alteration of fabric of heritage significance
- **Indirect impacts,** resulting in changes to the setting or curtilage of heritage items or places, historic streetscapes or views
- **Potential direct impact,** resulting in impacts from vibration and demolition of adjoining structures.

18 Schedule C1, Appendix B6, p.2
19 Ibid

HERITAGE IMPACT ASSESSMENT
TRACKING REGISTER

The tracking register outlines the requirements and obligations applicable to the project, as extracted from the following documentation:

- Sydenham Modification Report Appendix E Non-Aboriginal Heritage Technical Information
- Schedule C1 SWTCs, Appendix B6 version 1
- Policies of the Draft Sydenham Pit and Drainage Pumping Station Conservation Management Plan.

ASSESSMENT AGAINST: Sydenham Modification Report Appendix E Non-Aboriginal Heritage Technical Information
OVERVIEW: The following table has been developed with reference to the Modification Report and its assessment of the potential impacts of the Reference Design. It provides a commentary of the Stage 1 Design and notes a positive, neutral or negative trend of the design status against that of the Modification Reports assessed impact.

ELEMENT	GRADING	MODIFICATION REPORT ASSESSMENT OF IMPACT	COMMENTARY OF THIS HIA	STAGE 1 TRACKING	STAGE 2 TRACKING	STAGE 3 TRACKING
Aqueduct	New item	*'Provided that the aqueduct and pylons are sensitively designed to minimize impacts, it is anticipated that the proposed modification would result in moderate direct impact and major visual impact on the heritage item overall'* *'Visual impacts as a result f the aqueduct would be major as they would change the symmetry of the item and introduce a new visual element.'* *– Appendix E, p.12*	The design for the Aqueduct remains largely as per the reference design with some enhancements to the design articulation of pylons and railings.	Not accessed	Neutral in trend	Neutral in trend
Additional pumping station	New item	Construction of a new pumping station building and access road – Moderate direct impact. As the bulk of the new pumping station is somewhat reduced by retaining the original pumping station, there would be a minor-moderate visual impact	The design removes from the scope the additional pumping station.	Not assessed	Positive in trend	Positive in trend
Pit access ramp	New item	The pit access ramp would add a new visual elements in the pit and alter the current open views of the pit, which would result in moderate (indirect) visual impact	Options for the Pit access ramp have been assessed against criteria including potential. Operational and heritage impacts. It has been determined that the access ramp be located in the north west corner of the Pit, running parallel to the Aqueduct. It is considered that the potential impact is somewhat mitigated by this location as it is discretely located and removes potential direct impact through conflict with the extant significant access ramp, as was the case with alternate options branching from the aqueduct itself.	Not assessed	Neutral in trend	Neutral in trend
Upgrade and continued use of existing Drainage Pumping Station	Excpetional	Not assessed	The proposed upgrade of the existing Drainage Pumping Station for continued operations eliminates the need for an additional pumping station. This reduces the indirect visual impacts to the heritage item, its context and setting. The resulting upgrade does however present a significant major direct impact to the significant fabric of the Drainage Pumping Station, both internally and externally. Design development and mitigation can only contribute to a certain point given the performance and operational requirements of the brief.	Not assessed	Positive in indirect impact but negative direct impact to fabric	Positive in indirect impact but negative direct impact to fabric
Modification to batter wall for all junctions	Exceptional	Assessment unknown	Works will result in direct impacts to sandstone ashlar units within the vicinity of this work. The works methodology allows for the reinstatement of reclaimed or new sandstone blocks in areas impacted by the works, with the exception of 1500mm of abutments.	Not assessed	Neutral in trend	Neutral in trend
Modification to batter wall for retaining of rail corridor	Exceptional	Assessment unknown	Works will result in direct impacts to sandstone ashlar units within the vicinity of this work.	Not assessed	Neutral in trend	Neutral in trend
Removal of Oleanders including replaced items	High	Assessment unknown	The major direct impact of the removal of Oleanders to the southern perimeter of the Pit cannot be mitigated through succession planting due to the adjacency of the Metro line retaining wall.	Not assessed	Neutral in trend	Neutral in trend
Perimeter fencing	New item	Assessment unknown	The proposed fencing, while not of high design specification presents nno greater overall impact to the views, vistas and setting	Not assessed	Neutral in trend	Neutral in trend

Pump Station Access Bridge and Loading Platform	New item	New scope item	These items present major direct impacts to the significant fabric in the vicinity and indirect impacts to the presentation of this elevation and views and vistas toward it.	Not assessed	Negative in trend	Negative in trend

ASSESSMENT AGAINST: Policies of the Conservation Management Plan OVERVIEW: The following table has been developed with reference to the policies of the Conservation Management Plan. Assessment against these policies was included within the Modification Report and is provided by way of tracking assessed and potential impacts	
Recommendation	
Sydenham Pit and Drainage Pumping Station should be conserved as an operating element of the Sydney stormwater system, continuing its historic function. The surviving historic fabric of Exceptional and High Significance should be retained and conserved. This includes maintenance, repair and reconstruction where appropriate. Conservation should be undertaken in the context where the original primary function of the item is retained, and that Sydenham Pit and Drainage Pumping Station is fully operational.	Sydenham Pit and Drainage Pumping Station will be retained as an operating element of the Sydney stormwater system, continuing its historic function. Historic fabric of Exceptional and High significance will be impacted by the works, as is outlined within this assessment report.
The significance fabric is testament to the skill of past trades people. Repair work should be based on the principle of doing as little as possible and as much as necessary to conserve the item, retaining original material and detailing. All surviving elements of the historic built fabric shall be retained and repaired rather than replaced. It should be conserved in accordance with the levels of significance identified in Section 4.5 - Schedule of Conservation Works of this Conservation Plan. The priority of works is to be allocated in accordance with the condition of the elements affected.	The scope of works allows for of make-good to those areas impacted by the works, as is represented by the methodology for the Pit walls, outlined within the Civil package. General maintenance works are understood to be beyond the scope of this contract.
Any eventual repairs or upgrading of the site elements of High and Exceptional level of significance should be based on respect of the historic fabric. Any upgrading of the Pump House, machinery or Pit, or any other site elements and installation of new services must respect the item's significance and the general integrity of the item's significance historic fabric. The removal of machinery or movable elements deteriorated beyond repair and their replacement with modern elements is generally considered acceptable, provided that the original elements are assessed for suitability to be included in the movable heritage collection of the site.	Subject to the completion of the Materials Conservation and Salvage Register machinery and movable elements nominated for replacement and removal will be managed in accordance with the Salvage Policy for the Metro project and in consultation with Sydney Water.
Any archaeological resources potentially encountered on the property should be conserved in accordance with the requirements of the NSW Heritage Act 1977 and their potential for interpretation considered.	This will be managed through the implementation of the Construction Heritage Management Plan

ASSESSMENT AGAINST SCHEDULE C1 SWTC APPENDIX B6 ADAPTIVE REUSE REQUIREMENTS OVERVIEW: The following assessment is based on Section 3.6 of Schedule C1 SWTCs Appendix B6.		
3.6(a) iii	The Adaptive Reuse Strategy must prioritise continued use of elements for their original purpose, or alternatively for the purpose to which they have been adapted where this is compatible with their design, fabric and heritage significance, whilst ensuring the continued use does not:	Not applicable. The continued use of the Drainage Pumping Station is the most compatible and appropriate use. This limits the requirement and suitability of alternate uses through a program of adaptive re-use.
	A. Result in the removal of significant elements, fabric or design integrity;	
	B. require the subdivision of significant interior spaces;	
	C. require the addition of obtrusive new elements or signage.	
3.6(a) iv	Where a new use is proposed, ensure that the proposed use does not:	Not applicable. Continued, rather than new use proposed.
	A. result in the removal of significant fixtures, fabric or design integrity;	
	B. require the subdivision of significant interior spaces;	
	C. require the addition of obtrusive new elements or signage.	

HERITAGE IMPACT ASSESSMENT
SUMMARY OF ASSESSMENT AND CONCLUDING REMARKS

SUMMARY OF ASSESSMENT

The design presents a balance of positive and negative trends when assessed against the Reference Design. It balances of the operational and performance objectives of the brief against the protection and enhancement of heritage values. The following should be considered to ensure the retention and enhancement of the heritage values of Sydenham Station in the delivery of the SSJ Metro project:

- Relocation of the proposed flood lighting from the exterior of the Drainage Pumping Station to locations which doe not present direct fabric impact to the Pit or Drainage Pumping Station;
- Recording of heritage items prior to the commencement of works, in accordance with the SWTCs and Conditions of Approval;
- Development of an Interpretation Plan following approval of the Stage 2 Interpretation Strategy;
- A finalised assessment of the heritage features and movable heritage collection and a strategy for their protection, retention and salvage.

CONCLUDING REMARKS

The Modification Report acknowledged that the proposal would have a major impact on the Sydenham Pit and Drainage Pumping Station No. 1, but that the item would continue to meet the threshold for State significance.

> *"Although the proposed aqueduct would result in a major impact on the item, elements of exceptional significance would be retained and used for their original purpose… The item would remain rate and representative at s State level as it would still demonstrate its historic function and retain significant elements. Sydenham Pit and Drainage Pumping Station 1 would continue to meet the threshold for State significance.[20]"*

The report states that the '*…substantial benefits to Sydney Metro and Sydney Trains customers at Sydenham Station which are expected to outweigh any potential additional impacts of the proposed modification[21].*' It is recognised that many of the impacts outlined within the HIA have been anticipated through the assessment forming part of the Modification Report. It is however important to note the incremental impacts arising through design development which are naturally not assessed through concept design. The impacts of the new aqueduct, the Metro corridor retaining wall and the new access ramp are in principle neutral in trend, while noting that they do present major direct and indirect impacts to the Pit, Drainage Pumping Station and associated heritage features.

The omission of the additional Pumping Station, which formed part of the Reference Design, and the continued use of the Sydneham Pit and Drainage Pumping Station can be considered a positive trend. Such an outcome reduces the major indirect visual impacts of the project to the historic setting, context and its associated views and vistas. It is however important to note that the impacts of upgrading the existing Drainage Pumping Station to contemporary standards, and to performance levels as required by the brief, ; the new access bridge from the aqueduct and new loading platform present an increase in the direct impact to the significant fabric of both the Pit and Drainage Pumping Station. With reference to the '*terminology for assessing the magnitude of heritage impact'*[22] these actions have the potential to '*…have long term and substantial impact on the significance of a heritage item. Actions that would remove key historic building elements, key historic landscape features… thereby resulting in a change of historic character or altering of a historic resource. These actions cannot be fully mitigated[23].*'

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20 Modification Report Appendix E: Non-Aboriginal Heritage Technical Information, p.13

21 Chatswood to Sydenham – Sydenham Station and Syndey Metro Trains Facility South Modification Report, prepared by Transport for NSW, undated, p.iv

22 Chatswood to Sydenham – Sydenham Station and Syndey Metro Trains Facility South Modification Report, prepared by Transport for NSW, undated, Table 14-1, p.173

23 Chatswood to Sydenham – Sydenham Station and Syndey Metro Trains Facility South Modification Report, prepared by Transport for NSW, undated, Table 14-1, p.173