Sydney WATER

Environmental Assessment Addendum

Replacement Flows Project
Operational Noise Criteria – CoA 2.17 & 2.18

October 2010

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1 Introduction

1.1 Background to Project

The Replacement Flows Project (RFP) is a key part of the Western Sydney Recycled Water Initiative. This initiative is one of the measures adopted by the NSW Government to secure Sydney's water needs by increasing the use of recycled water for residential, irrigation and environmental purposes. This initiative is further outlined in the 2006 Metropolitan Water Plan (NSW Government, 2006).

The project connects the Penrith, St Marys and Quakers Hill sewage treatment plants (STPs) by pipes to allow treated wastewater from the three plants to be further treated at a new Advanced Water Treatment Plant (AWTP) at St Marys. The highly treated recycled water is released into the Hawkesbury-Nepean River below Penrith Weir to substitute for up to 18 billion litres of drinking water released each year from Warragamba Dam for environmental flows.

An Environmental Assessment (EA) for the RFP was placed on public exhibition from November to December 2006. A Preferred Project Report (PPR) was submitted to the Department of Planning in February 2007 and the Minister for Planning approved the Project on 20 June 2007, subject to Conditions of Approval (CoA).

On 17 August 2007 Sydney Water awarded the delivery and operation contract for the RFP to Deerubbin Water Futures (DWF) Consortium consisting of United Group Infrastructure (UGI), McConnell Dowell (McD) Constructors (Aust) and General Electric Betz who worked with Sydney Water to deliver this significant water recycling project. DWF are now operating the project's AWTP.

The project commenced construction in 2008 and operation began in August 2010.

This EA addendum has been prepared to support a request to modify the current wording of CoA 2.17 and 2.18 relating to operational noise criteria and measurement.

The main components of the project that would generate noise during operation are the AWTP and the various pumping stations at the STP sites.

1.2 Background to Operational Noise Requirements

Director-Generals Requirements for the EA (September 2006)

On 1 September 2006, the Director-General (D-G) of Planning issued Sydney Water with requirements to be addressed in the Environmental Assessment prepared for the Project.

The specific D-G requirements in relation to noise were:

> *Consider noise and vibration impacts during construction and operation and in a cumulative context through:*
>
> > *• assessment of noise impacts in accordance with NSW Industrial Noise Policy (EPA 2000) and noise control guidelines Construction Site Noise*

Environmental Assessment (November 2006)

During the EA phase, a noise impact assessment for the operation of the Project was undertaken in accordance with DECCW's Industrial Noise Policy (INP) (SKM 2006).

The main findings of the EA noise assessment were:

- the main sources of AWTP noise which could potentially cause an impact at residential receivers were the pumps, balance tanks and electrical substation
- the AWTP should be designed to ensure the operation of the plant meets the noise criteria outlined in the NSW Industrial Noise Policy (INP) (NSW EPA 2000).
- the noise level from the AWTP was predicted to exceed the Modified Amenity Criteria (according to the INP) at the nearest residential locations owned by Sydney Water in Trigg Street by approximately 6 dB(A)
- potential mitigation measures to reduce this level and achieve the INP criterion at the Sydney Water-owned Trigg Street properties were identified. The EA stated, however, that these would only be considered following consultation with Sydney Water and its tenants, in recognition of the possible re-zoning and sale of the residential land in Trigg Street for future industrial development
- the nearest privately owned residences to the AWTP at Forresters Road would not be affected by operational noise generated by the AWTP.

The operational noise assessment in the EA was based on attended (short-term) background noise monitoring results from site visits to the various STPs during the early part of the night time period. This level of assessment was considered appropriate, considering the pre-existing noise environment surrounding the STPs and the low level risk of impact associated with the proposed works

The EA includes Statement of Commitment (SoC) No. 19 regarding operational noise:

> *Mitigation measures would be implemented, including:*
>
> - *designing the AWTP building to ensure the operation of the plant meets the noise criteria outlined in the NSW INP (NSW EPA 2000).*

Exhibition of EA and Preferred Project Report (November 2006 to February 2007)

There was one submission received during the EA exhibition phase relating to general operational issues including noise. This was a recommendation to prepare an Operational Environmental Management Plan addressing noise, odour control and liquid waste management and requirements for plant monitoring, maintenance and failures.

There was no change made to the operational noise assessment in the Preferred Project Report and the above Statement of Commitment was repeated (but was re-numbered to SoC No. 25).

Director-General's Assessment Report (May 2007)

There is no specific assessment regarding operational noise issues in the D-G's assessment report, however, a general statement was made as follows:

> *The proposal has the potential to result in noise and vibration impacts and potentially significant impacts to traffic and access within the study area. The Department has therefore recommended that a number of conditions of approval be imposed on the Proponent to ensure that noise and vibration impacts are adequately mitigated to the extent possible to protect the surrounding community. ……During operation of the project, the recommended conditions require that the project be operated and maintained such that there is no increase in noise levels over those currently being emitted from each of the premises (St Marys STP, Quakers Hill STP and Penrith STP).*

Conditions of Approval (June 2007)

The Project was approved on 20 June 2007 with the following Conditions of Approval relating to operational noise criteria:

CoA 2.17

> *The Proponent shall design, operate and maintain the project such that there is no increase in noise levels over those currently being emitted from each of the premises (St Marys STP, Quakers Hill STP and Penrith STP)*

CoA 2.18

> *For the purpose of assessment of noise specified under condition 2.17 of this consent, noise from the project shall be:*
>
> *(a) measured at the most affected point on or within the Site boundary at the most sensitive receiver to determine compliance with condition 2.17; and*
>
> *(b) subject to the modification factors provided in Section 4 of the New South Wales Industrial Noise Policy (EPA, 2000), where applicable…*

CoA 3.2 and 3.3 also specify the operational noise monitoring requirements for the project.

1.3 Location of the STP sites and new RFP assets

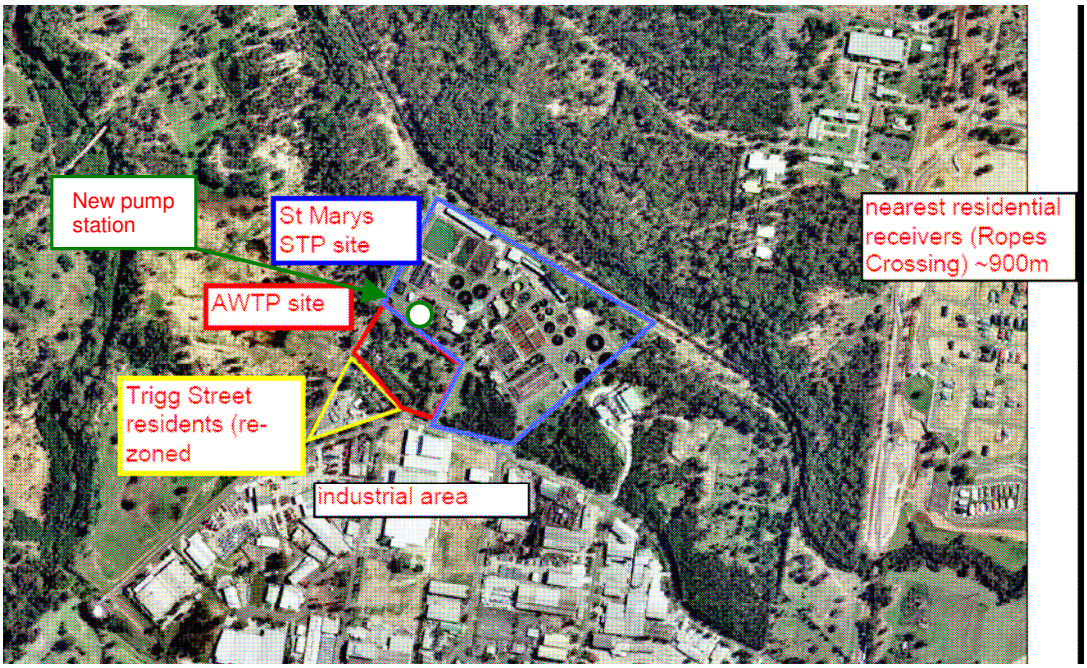
All three STP sites are located some distance from residential properties.

The Penrith STP site has a new pump station and effluent balance tank that generate operational noise. The site is located approximately 300m from the nearest residential receivers.

The Quakers Hill STP has a new pump station that generates operational noise. The site is located approximately 100m from the nearest residential receivers.

The AWTP is located on the St Marys STP site, which is surrounded by an industrial area. The AWTP is approximately 900m from the nearest private residential receivers (refer to **Figure 1**). The new noise sources at this site include a balance tank, scrubbers and pump station.

Figure 1 – AWTP site and surrounding landuse



Sydney Water owns five properties (each with a house) in Trigg Street adjacent to the St Marys STP and AWTP site. This land was zoned '5a – Special Uses (Sydney Water)' under the Penrith Local Environmental Plan (LEP) 1996. However, a Site Compatibility Certificate issued by the Department of Planning on 21 April, 2009 allows the land to be used in accordance with the '4a – General Industrial' zoning under that LEP. Sydney Water is currently preparing a revised subdivision application for this land.

The Trigg Street tenants were issued with a notice to vacate the properties on 1 July 2010. The notice requires all properties to be vacated on or before 1 October 2010. The houses will be demolished shortly after they are vacated and prior to the sale of the land for industrial development.

1.4 Requirement for this Addendum

In planning, designing and constructing the Project Sydney Water has interpreted CoA 2.17 in light of CoA 2.18, or more specifically that operational noise should not increase beyond current levels emitted from the sites *as measured at the nearest sensitive receivers*.

However, during email correspondence from the Department of Planning in April 2010 regarding the relocation of the Trigg Street residents it was discovered that Sydney Water's interpretation of CoA 2.17 was not consistent with the Department's interpretation of the Project approval. This was subsequently confirmed in writing by the Department in a letter to Sydney Water dated 20 August 2010.

This EA addendum provides justification for rewording CoA 2.17 and CoA 2.18 to enable operational noise assessment and monitoring for the project at the nearest sensitive receivers. This approach is considered inconsistent with the Minister's approval and therefore a modification under section 75W of the *Environmental Planning and Assessment Act 1979* (EP&A Act) would be required.

Whilst CoA 2.17 relates to all three STP sites, this addendum focuses on the St Marys STP site where most of the noise-generating project infrastructure (the AWTP) is located. The modification, if approved, would relate to all three STP sites.

2 Description of the Modification

2.1 Description of the current CoA 2.17 and 2.18

CoA 2.17 & 2.18 requires Sydney Water to control operational noise from the AWTP such that there is no increase in noise above the existing levels of 40dBA at or near (within 1m) the site boundary. This requirement applies to all the site boundaries of the AWTP irrespective of the adjacent landuse (refer to **Figure 1**).

2.2 Justification for requested change to CoA 2.17 and 2.18

Sydney Water engaged Heggies Pty Ltd to identify the mitigation measures that would be required to ensure no increase in noise at the boundary of the AWTP site above existing levels.

The technical memo is attached in **Appendix A.** The memo concludes that significant noise mitigation would be required at the AWTP site to meet the requirements of CoA 2.7, including:

- Acoustic treatment of the scrubbers using attenuators
- A concrete lid on the balance tank
- A 4m high, 800m long noise wall around the entire AWTP site and new pumping station site.

Figure 2 shows where these mitigation measures would be required.

Sydney Water has estimated that it would cost about $2.5 million to install these mitigation measures. The breakdown of costs is included in **Appendix B**.

Sydney Water has considered the 'reasonableness and feasibility' of these noise mitigation measures according to the criteria outlined in Section 1.4.5 of the INP and this assessment is contained in **Table 1.**

The assessment concluded that:

- It would be feasible to install the mitigation measures. However, the earth mound around the AWTP would need to be removed to allow the installation of the noise wall around the AWTP and the AWTP would need to be shut-down during the construction of the lid on the balance tank and installation of the attenuators
- The installation of the mitigation measures would not be reasonable because:
    - no sensitive receivers (residents) would benefit and there would be minimal (if any) benefit for the surrounding industrial receivers
    - the cost of the mitigation would far outweigh any benefits provided
    - the noise levels associated with the AWTP (without the mitigation measures) would comply with the INP criteria for the surrounding industrial receivers (an "Acceptable" level of 70dBA)
    - the removal of the existing noise mound would have short-term traffic and access impacts on the surrounding industrial/commercial area users
    - the new 4m high noise wall around the AWTP site would have a long-term visual impact

Figure 2 – Mitigation Measures required at AWTP to meet CoA 2.17 & 2.18 requirements

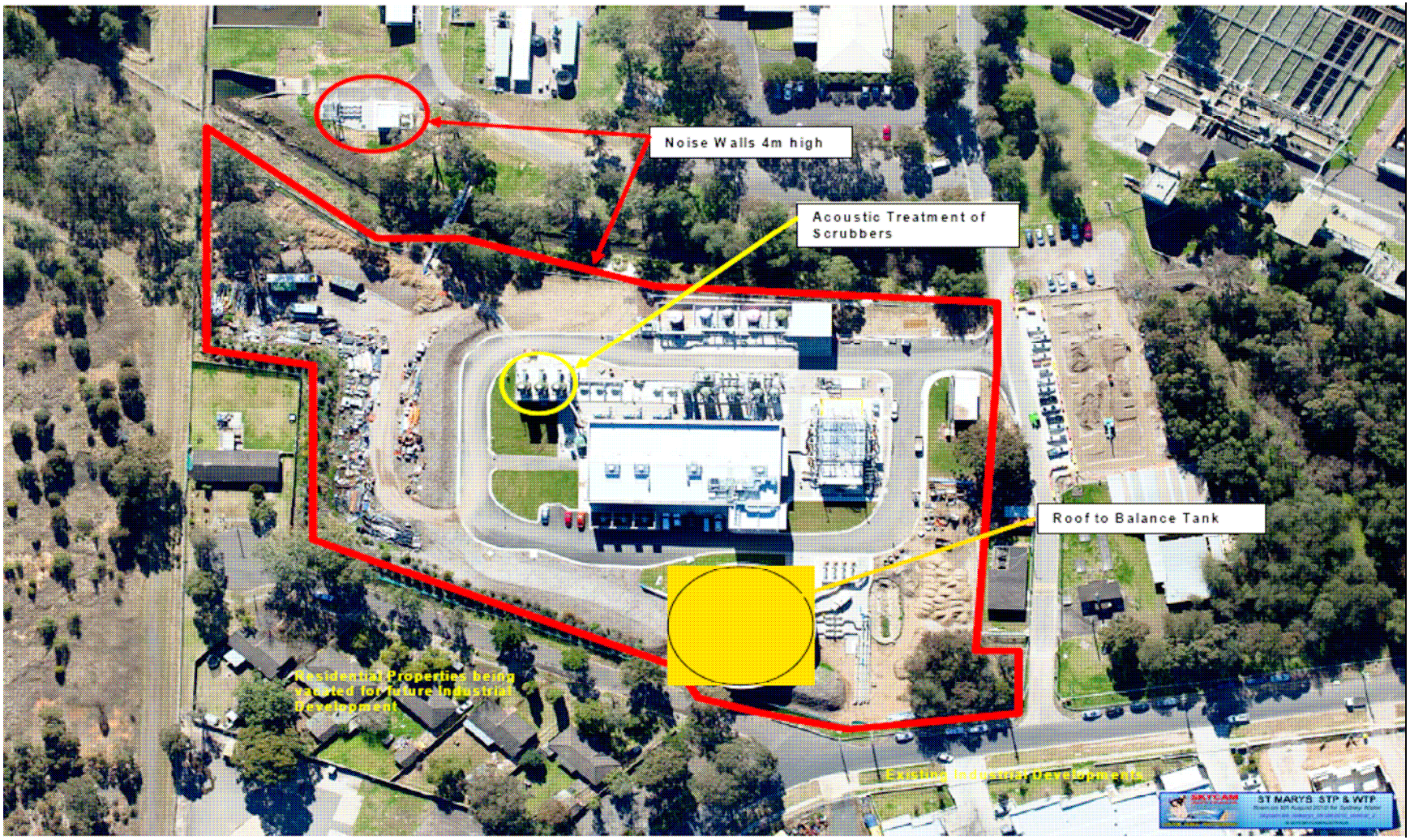


Table 1 – Assessment of Reasonableness and Feasibility of noise mitigation measures required to meet requirements of CoA 2.17 & 2.18 (criteria are from S. 1.4.5 of INP)

AWTP site at St Marys STP	FEASIBILITY (engineering considerations)	REASONABLENESS				OTHER (social, environmental considerations, etc)
		Noise mitigation benefits – amount of noise reduction provided, number of people protected	**Cost of mitigation – cost of mitigation versus benefit provided**	**Community views – aesthetic impacts and community wishes**	**Noise levels for affected land uses – existing and future levels, and changes in noise levels**	
Hebel (concrete) noise wall 800m long and 4m high around the AWTP site boundary and new pumping station	Feasible - a 4m high noise wall would require substantial footings for support. The existing earth mound (2.5m high) would need to be removed so that the 4m high noise wall can be built in its place. This is because it is unlikely that the mound could support the new wall.	North/ west boundary - a 150m long noise barrier would 'protect' a bushland area (ADI site). South-west boundary – a 160m long noise barrier would 'protect' future commercial properties. If the buildings on these properties are double storied they would be too high to benefit from the noise wall Southern boundary – a 50m long noise wall would 'protect' Links Road and existing factories across the road, where the INP's 'Acceptable' noise limit is 70dBA for industrial receivers. Eastern/ northern boundary –a 340m long noise wall would 'protect' the St Marys STP, which is owned and operated by Sydney Water.	This mitigation measure would cost approximately $1.9 million but would not benefit any 'sensitive receivers' (ie. residential premises, schools, hospitals, places of worship). The nearest sensitive receivers to the AWTP are residents in Ropes Crossing, approximately 900m away. They are unlikely to notice any increases in noise caused by the un-mitigated operation of the AWTP. There are commercial/ industrial buildings on the southern side of the AWTP and similar buildings will be built on the western side of the AWTP in the future. However, these new properties would not benefit from a noise wall because they are likely to produce similar noise levels and to be too high to benefit from the wall.	The AWTP is located within the Links Road industrial area. No residents live near the AWTP. A 4m high concrete noise wall around the AWTP site would give the AWTP a 'prison-like' appearance. It is likely that the wall would be subject to graffiti, given the location of the AWTP within a remote industrial area. This would require ongoing, extra maintenance by Sydney Water. The AWTP contains a recycled water public education facility used by school groups and interested community members. A 4m high noise would substantially detract from the visitor experience of the AWTP.	The recommended mitigation measures would ensure that there are no increases in noise above the existing level of 40dBA at the AWTP site boundary. However, noise levels would increase slightly as the distance from the noise wall increased. The affected landuses surrounding the AWTP (commercial/ industrial properties) have noise limits of 70-75dBA according to the INP criteria for industrial receivers. There are two potential changes in landuse surrounding the AWTP: 1. the sale of the Sydney Water Trigg Street land for industrial development, once a subdivision DA is approved. 2. a future employment area (of commercial/industrial properties) to be developed to the north west of the AWTP site. As both new landuses will be industrial/commercial, the INP noise limit of 70-75dBA for industrial receivers will apply. The nearest future housing development is approximately 750m to the north west (ADI central precinct). The timing of this development is unknown. These residents are unlikely to be affected by the AWTP noise.	The existing 2.5m high earth mound would need to be removed to allow the installation of a 4m high noise wall. The removal of this earth mound would have short-term access and traffic impacts on the surrounding industrial/commercial area users. The new wall would have long-term visual impacts. The earth mound is covered by established vegetation planted more than 2 years ago prior to construction to provide an attractive entrance to the AWTP site. Its removal would reduce the visual appeal of the AWTP site.
Acoustic treatment to dust scrubber intakes and discharge	Feasible – but the AWTP would need to be shut-down for a short period for the installation of the attenuators.	Placing attenuators on the scrubbers would be of minimal (if any) benefit to the commercial/ industrial receivers and STP because they are unlikely to be able to hear the noise from the scrubbers above the general industrial noise in the area.	Acoustically treating the scrubbers would cost approximately $93,000. However this expenditure would be of minimal (if any) benefit to commercial/industrial receivers because they are unlikely to be able to hear the noise from the scrubbers above the general industrial noise in the area.	Installing attenuators on the scrubbers would not have any aesthetic impacts because the AWTP is located within the St Marys STP and the attenuators are not likely to be visible to the general public.	As above	None
Lid on the balance tank (7 m high)	Feasible - but the AWTP would need to be shut-down for 3-4 weeks for the installation of the lid. The tank would become a 'confined space' and operation and maintenance personnel would need to follow 'confined space' procedures for accessing the tank.	Placing a lid on the balance tank would be of minimal (if any) benefit to the surrounding commercial/ industrial receivers because they are unlikely to be able to hear the 'splashing' noise of the tank filling (measured as 51dBA at the boundary) above the general industrial noise in the area. This noise may not even be audible on the other side of the street where the industrial receivers are located.	Placing a lid on the balance tank would cost approximately $335,000. However, this expenditure would not benefit any sensitive receivers and the industrial receivers are unlikely to be able to hear the 'splashing' noise of the tank filling above the general industrial noise in the area. This noise may not even be audible on the other side of the street where the industrial receivers are located.	Enclosing the balance tank would not have any aesthetic impacts because the AWTP is located within the St Marys STP and the lid would not be visible to the general public.	As above	None

2.3 Description of revised CoA 2.17 and 2.18

Should the requested modification to CoA 2.17 & 2.18 be approved by the Director-General, Sydney Water would undertake operational noise monitoring (in accordance with CoA 3.2) at the nearest privately owned residential receivers. Monitoring would determine if there are increases in noise levels above the noise levels emitted from the sites prior to construction, ***as measured at the nearest sensitive receivers.*** If increases in noise levels are found, mitigation measures would then be adopted to meet the requirements of CoA 2.17 and 3.3.

2.4 Benefits of a revised CoA 2.17 and 2.18

The benefits of a revised CoA 2.17 & 2.18 would include the following:

- Sydney Water could effectively target expenditure on beneficial mitigation measures for sensitive receivers if the operational monitoring finds increases in noise levels at the nearest sensitive receiver locations above the noise levels emitted from the sites prior to construction
- Sydney Water would avoid the considerable cost ($2.5M) of mitigating noise at the AWTP site that would be of little or no benefit to the local, industrial community
- the inconvenience and impacts associated with removing the vegetated earth mound around the AWTP and shutting the AWTP down during the installation of the new noise mitigation measures would be avoided
- the long-term visual impact of the 4m high noise wall around the AWTP would be avoided.

2.5 Potential impacts resulting from modifying CoA 2.17 and 2.18

Adjoining industrial receivers on the southern side of the AWTP site could be potentially affected by higher noise levels emitted from the AWTP than those permitted by the current CoA 2.17.

However, the noise levels emitted by the AWTP would be consistent with the INP's acceptable noise levels for industrial receivers (and for their own premises) and any impacts would be considered negligible.

3 Regulatory and other requirements

The Replacement Flows Project was assessed under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and approved by the Minister for Planning on 20 June 2007 subject to Conditions of Approval (CoA).

Sydney Water has identified an alternate approach to operational noise management that would be consistent with the INP but inconsistent with the Department's interpretation of CoA 2.17. A modification to the Minister's Approval is required to resolve the inconsistency.

Section 75W of the EP&A Act allows a proponent to request the Minister for Planning to modify the Minister's approval for a Part 3A project.

4 Environmental assessment

The key environmental issue associated with a change to CoA 2.17 and 2.18 is operational noise, aspects of which are considered in **Section 2** above. All other environmental issues associated with the revised CoA 2.17 and 2.18 and the current wording of CoA 2.17 and 2.18 are briefly considered in **Table 2** below.

Table 2 Other environmental issues – revised CoA 2.17 and 2.18

Aspect	Potential Environmental Impacts – revised CoA 2.17 & 2.18	Potential Environmental Impacts of substantial mitigation to achieve CoA 2.17 & 2.18
Waste management	None	The existing earth mound would need to be removed to enable construction of a 4m high noise wall. This would result in approximately 2,200 tonnes of spoil needing to be removed from the AWTP. There is no additional space on-site for reuse of this spoil at the AWTP or STP.
Flora and fauna	None	The vegetation that was planted along the mound prior to construction would need to be removed to enable construction of a 4m high noise wall. This landscaping currently provides an attractive entrance to the AWTP site.
Geology, soils and water	None	Potential extra temporary soil and water impacts during the removal of the earth mound with up to 70 trucks required to removal the spoil from site.
Heritage	None	None
Landuse and tenure	None	None
Visual	None	A 4m high concrete noise wall around the AWTP site would give the AWTP a 'prison-like' appearance. It is likely that the wall would be subject to graffiti, given the location of the AWTP within a remote industrial area. The AWTP contains a recycled water public education facility used by school groups and interested community members. A 4m high noise would substantially detract from the visitor experience of the AWTP
Air quality	None	Potential temporary air impacts due to dust generation during the emoval of the earth mound and transportation of the spoil offsite.
Traffic	None	Extra traffic movements (up to 70 trucks) required to and from the AWTP to remove the spoil from the earth mound off-site.

5 Conclusion and proposed modification

This EA Addendum has been prepared to support a modification request to amend the wording of CoA 2.17 and 2.18, which relate to operational noise criteria for the Replacement Flows Project.

Sydney Water has identified the mitigation measures required to meet the requirements of CoA 2.17 and 2.18, that is, no increase in noise levels from the AWTP as measured at the site boundary. The technical assessment undertaken by Heggies for Sydney Water concluded that substantial mitigation measures would be required at the AWTP site in order to limit noise to pre-construction levels. The cost of these mitigation measures was estimated at $2.5 million.

A 'reasonable and feasible' analysis of these mitigation measures undertaken by Sydney Water in accordance with the criteria outlined in DECCW's Industrial Noise Policy (EPA, 2000) found that the cost of the mitigation measures would far outweigh any benefits given the location of the AWTP site within an industrial area and distance to any residential receivers.

If adopted, Sydney Water's proposed amendments to the wording of CoA 2.17 and 2.18 would mean that operational noise monitoring would be undertaken at the nearest sensitive receivers and any mitigation measures would be targeted to benefiting those communities. The proposed amendments to CoA 2.17 and 2.18 would also be consistent with DECCW's Industrial Noise Policy (EPA, 2000).

Sydney Water suggests either of the following modifications to CoA 2.17 and 2.18:

Option 1

CoA 2.17

> *The Proponent shall design, operate and maintain the project such that* ***noise from each of the premises (St Marys STP, Quakers Hill STP and Penrith STP) complies with the requirements of the New South Wales Industrial Noise Policy (EPA, 2000).***

CoA 2.18

> *Not used*

OR

Option 2

CoA 2.17

> *The Proponent shall design, operate and maintain the project such that there is no increase in noise levels over those currently emitted from each of the premises (St Marys STP, Quakers Hill STP and Penrith STP),* ***as measured at the nearest sensitive receivers.***

CoA 2.18

> *For the purpose of assessment of noise specified under condition CoA 2.17 of this consent, noise from the project shall be:*
>
> *(a) measured at the most affected point* ***~~on or within Site boundary~~*** *at the most sensitive receiver to determine compliance with condition 2.17; and…..*

References

EPA 2000, *NSW Industrial Noise Policy*, Department of Environment, Climate Change and Water, 2000

Sinclair Knight Merz 2006, *Replacement Flows Project Noise and Vibration Assessment,* October 2006 (Appendix F of Environmental Assessment)

Appendix A – Heggies Technical Memo

28 September 2010

10-9064 L003 Modifying CoA 2.17 20100928

Sydney Water Corporation
Level 10, 1 Smith Street
PARRAMATTA NSW 2150

Attention: Ms Sally Spedding

Dear Sally

Modification to CoA 2.17 and 2.18
AWTP Site, St Marys

1 INTRODUCTION

As part of the *Replacement Flows Project*, Sydney Water Corporation (Sydney Water) is in the process of commissioning a new Advanced Water Treatment Plant (AWTP) at St Marys, NSW. In discussions with the Department of Planning (DoP) a difference in understanding has come to light in relation to noise emissions from the site.

Consequently, Sydney Water is applying to amend DoP Condition of Approval (CoA) 2.17 and 2.18 and this report provides technical support to the application.

This report provides:

- An outline of the issues in relation to the noise criteria
- A description of new noise sources and an indication of the exceedances at the site boundary
- A discussion on the mitigation required to comply with the current reading of the criteria set by CoA 2.17 and 2.18
- A discussion of the reasonableness /feasibility to comply with the current reading of the criteria set by CoA 2.17 and 2.18
- Suggested wording for a modified CoA 2.17 and 2.18

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2 CRITERIA

2.1 CoA 2.17 and 2.18

Condition 2.17 is stated, in its entirety, below:

Operation Noise

> *2.17 The Proponent shall design, operate and maintain the project such that there is no increase in noise levels over those currently being emitted from each of the premises (St Marys STP, Quakers Hill STP and Penrith STP).*
>
> *2.18 For the purpose of assessment of noise specified under condition 2.17 of this consent, noise from the project shall be:*
>
> > *a) measured at the most affected point on or within the Site boundary at the most sensitive receiver to determine compliance with condition 2.17; and*
> >
> > *b) subject to the modification factors provided in Section 4 of the New South Wales Industrial Noise Policy (EPA, 2000), where applicable.*
>
> *Notwithstanding, should direct measurement of noise from the project be impractical, the Proponent may employ an alternative noise assessment method deemed acceptable by the DECC (refer to Section 11 of the New South Wales Industrial Noise Policy (EPA, 2000)). Details of such an alternative noise assessment method accepted by the DECC shall be submitted to the Director-General prior to the implementation of the assessment method.*

2.1.1 Current reading of CoA2.17 and 2.18 noise criteria

Earlier work by Heggies (Report ref 10-5224-R1, dated 18 June 2008), established that the night-time rating background level (RBL) at 6 Triggs Street approximately 6 m from the site boundary was 40 dBA.

Since no noise levels were obtained around the site's perimeter prior to the construction of the AWTP, the background level of 40 dBA is taken as having existed around the site.

Further, since the AWTP is to operate 24 hours a day, the current reading of CoA 2.17 and 2.18 is that noise at the AWTP site boundary is not to exceed 40 dBA.

2.2 Typical Noise Criteria

It is more usual (as Sydney Water had assumed in reading CoA 2.18) to set criteria in relation to noise levels at potentially affected receiver locations - be they residential, commercial or industrial (or other) – as is required by the NSW Department of Environment, Climate Change and water (DECCW) Industrial Noise Policy (INP).

Examples of DoP Conditions are given below. (The underlining is provided to emphasise the aspect under discussion.)

> "*To determine compliance with the $L_{Aeq(period)}$ noise limits, noise from the project is to be measured at the most affected point within the residential boundary. Where it can be demonstrated that direct measurement of the noise from the project is impractical, alternative means of determining compliance (see Chapter 11 of the NSW Noise Policy) may be accepted. The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable."*

and

> "*Noise from the premises is to be measured at the most affected point or within the residential boundary or at the most affected point within 30 m of the dwelling (rural situations) where the dwelling is more than 30 m from the boundary to determine compliance with the $L_{Aeq(15\ minute)}$ noise limits."*

In each of these the requirement is to control the level of the new noise as measured at the sensitive (residential) receiver and not at the edge of the proponent's site.

However, Sydney Water accepted the current wording of CoA 2.17 and 2.18 at the time of Project approval in 2007.

2.2.1 The Industrial Noise Policy (INP)

The entire area surrounding the AWTP is zoned for industrial use, including the Triggs Street residential properties which were re-zoned for industrial use in 2009. The nearest receivers are located approximately 900 m away from the site.

Since the area surrounding the site is zoned for industrial use, it is relevant to consider the criteria set out in the Industrial Noise Policy. The DECCW INP recommends an "Acceptable" level of 70 L_{Aeq} for industrial receivers, as shown in **Table 1**.

Table 1 DECCW INP Criteria for Industrial Receivers

Type of Receiver	Indicative Noise Amenity Area	Time of Day	Recommended L_{Aeq} Noise Level, dB(A)	
			Acceptable [1]	Recommended Maximum [1]
Industrial premises	All	When in use	70	75

Note 1: Note 8 in Section 2.2.1 of the INP states: The acceptable and recommended maximum LAeq noise levels can provide a guide to applying the negotiation process set out in Section 8. While negotiation between the proponent and the community for an agreed noise level can occur at any time, typically the proponent would negotiate with the EPA where noise-level emissions fall between the acceptable and recommended maximum. For site levels beyond the recommended maximum levels, the proponent would need to negotiate directly with the community

Thus, the current reading of CoA 2.17 and 2.18 requires the noise from the AWTP site to be controlled to a much more restrictive level (40 dBA) than would typically be required for such a location (70 dBA).

3 OPERATIONAL NOISE

3.1 Noise Survey

A brief noise survey of the fully operational AWTP was undertaken on Tuesday 31st August 2010.

Measurements were taken using a Bruel & Kjaer 2260i "Observer" Sound Level Meter (serial number 2414604). Calibration was made before and after the survey using a Bruel & Kjaer type 4231 Sound Level Calibrator with no significant drift of calibration (ie, less than 0.5dB).

3.2 Survey Results

The measurements positions are shown in **Figure 1**, and the measured levels are shown in **Table 2.**

Figure 1 Site Layout and Measurement Positions

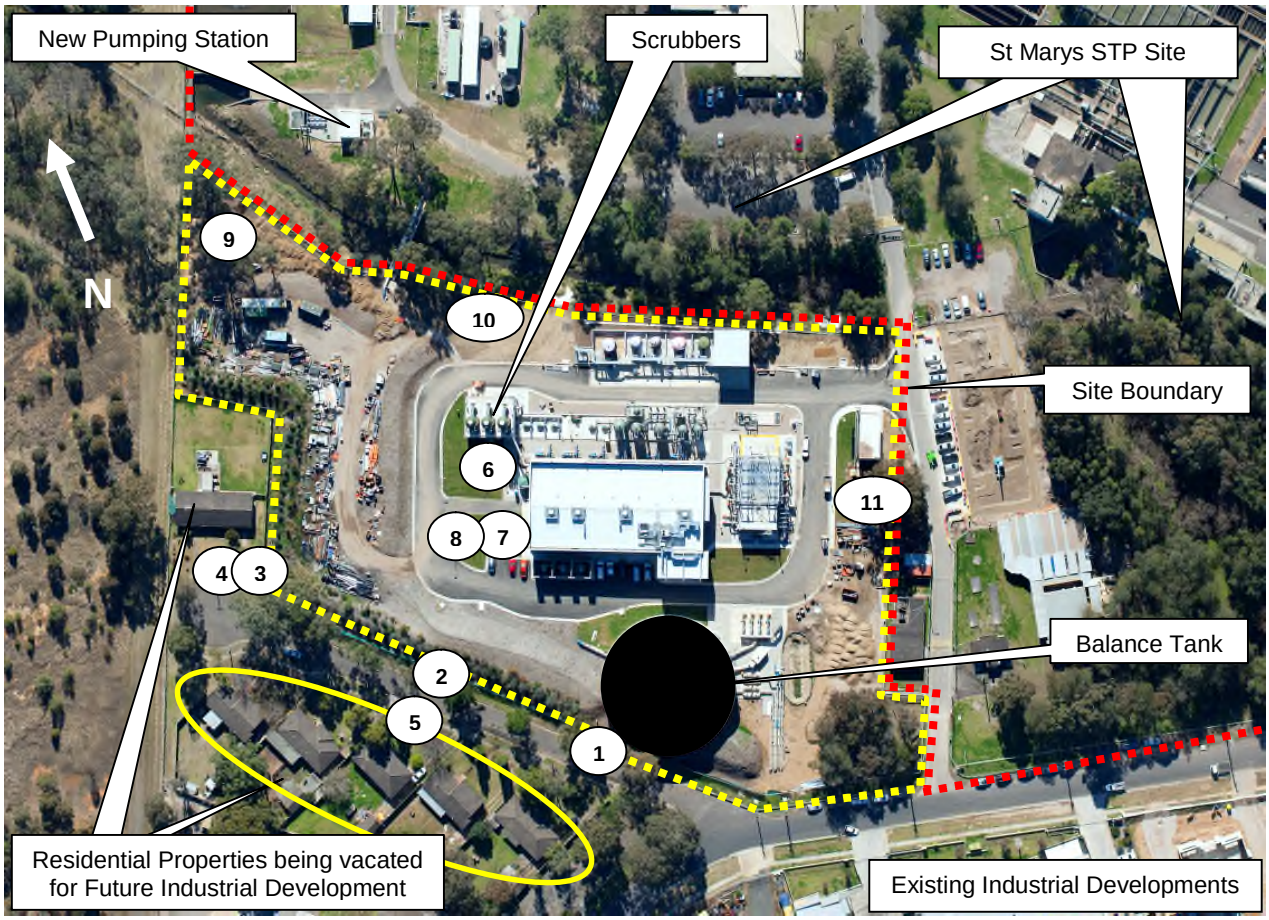


Table 2 Noise Levels on and around Site

Measurement Reference	Measurement Position	Noise Sources	Noise Level (L_{A90})[1]
1	Triggs Street, 1m from site boundary	Splashing from Balance Tank audible above general AWTP noise	51
2	Triggs Street, 1m from site boundary	General, Scrubbers	48
3	6 Triggs Street, 1m from site boundary, 1.5m above ground level	General, Scrubbers, Recycled Water pumps	47
4	6 Triggs Street, 1m from site boundary, 2.5m above ground level	General, Scrubbers, Recycled Water pumps	51
5	Across Triggs Street, approx 18 from site boundary	General, Scrubbers	51
6	10m from Recycled Water pumps	Recycled Water pumps	68
7	2m from Switchroom lourvre	Switchroom	78
8	10m from Switchroom lourvre	Switchroom	70
9	North-east corner of site	General, Scrubbers, New Pumping Station	53
10	North side of site	General, Scrubber air inlets, New Pumping Station	64
11	South of High Voltage Switchroom, near site entry	General	55

Note 1: Due to the presence of some intermittent construction noise, the LA90 metric is quoted, rather than the LAeq, as permitted by the NSW DECCW INP. (The LAeq levels would have been unduly affected by the construction work noise.) Since noise from the AWTP is constant, the LA90 levels can be taken as representing the continuous operational noise from the site.

3.3 Exceedances at the Site Boundary

Table 2 shows exceedances of 7 dBA to 11 dBA above the pre-existing background noise of 40 dBA (ie, levels in the order of 47 dBA to 51 dBA) on the southern boundary, which is adjacent to existing and future industrial areas.

Exceedances of approximately 6 dBA were predicted by SKM during the Environmental Assessment phase at Triggs Street - ie, levels in the order or 53 dBA.

At the northern and eastern boundaries, **Table 2** shows exceedances of 13 and 24 dBA due to noise from the Scrubbers. However these are internal boundaries to the St Marys STP site, which is a SWC asset (**Section 2.1.1** refers). It should be noted that the measured levels of all boundaries (**Table 2**) comply with the INP Industrial Criteria (70 d BA).

4 MITIGATION REQUIRED

4.1 General Items

To achieve no increase at or near the AWTP site boundary (as per the current reading of CoA 2.17 and 2.18) would require significant noise mitigation to numerous items of plant, situated throughout the site.

Controlling noise at source is often preferable. To do so, however, required mitigation measures would (assuming no re-selection for quieter equipment) primarily include enclosures over and around plant and re-sizing of acoustic attenuators / louvres. Both these might require up-grading of mechanical plant to provide increased ventilation to the enclosed equipment.

An alternative approach is to control the noise at the receiver location. In this instance, the simplest way of ensuring no greater than 40 dBA at the site boundary would be to provide a noise barrier (wall) around the perimeter of the site - or, rather, just inside the boundary, to control the noise at the boundary.

Calculations show that an improvement in the order of 6 dBA to the barrier effect of the existing 2.5 m high earth bund to Triggs Street, can be achieved through providing a "noise wall" 4 m high in place of the bund (ie, the bund would need to be removed and a noise wall constructed in its place).

4.2 Scrubbers

The Scrubbers are located too high (approximately 10 m high) to control by a noise barrier and an alternative strategy is required.

In principle, attenuators ("splitter silencers") should be provided to the air intakes and an un-podded circular attenuator should be provided to the vertical air discharge.

Due to the greater noise exceedances at the northern boundary, more severe noise control measures would be required to control the noise to the northern boundary compared to the southern boundary.

4.2.1 Southern Boundary

To control noise to the 40 dBA criterion at Triggs Street, the following indicative treatment would be required.

- Air intake attenuators: NAP Silent Flo type D50 / 1500 (1500 mm long; 200 mm splitters; 50% open area) providing an insertion loss in the order of 31 dB at 1 kHz).
- Air discharge: a one-diameter long un-podded circular silencer, providing an insertion loss in the order of 5 dB at 125 Hz

4.2.2 Northern and Eastern Boundaries

To control noise to the 40 dBA criterion at the boundary towards the St Marys STP site, the following indicative treatment would be required.

- Air intake attenuators: NAP Silent Flo type D50 / 2400 (2400 mm long; 200 mm splitters; 50% open area) providing an insertion loss 8in the order of 45 dB at 1 kHz).
- Air discharge: a two-diameter long un-podded circular silencer, providing an insertion loss in the order of 8 dB at 125 Hz

4.3 Balance Tank

We understand that the balance tank (approximately 7 m high) is also a noise source that cannot, for operational reasons be treated by extending its perimeter wall to form a "noise wall". The noise source from the balance tank is a "splashing" audible above the general AWTP noise. As such, a lid (or roof) would be required to control the noise from this unit to meet the current reading of CoA 2.17 and 2.18.

The surface mass of the lid would need to be not less than 7kg/m^2.

4.4 Summary of Measures Required

Appendix A shows the extent of the measures that would likely be required to meet “no increase at the boundary”, as per current reading of CoA 2.17 and 2.18.

5 REASONABLENESS TO COMPLY

In considering the feasibility and reasonableness of complying with noise criteria, the INP states:

- "feasibility relates to engineering considerations and what can be practically built",

and

- "reasonableness relates to the application of judgement in arriving at a decision, taking into account the following factors:"
    - noise mitigation benefits - amount of noise reduction provided, number of people protected
    - cost of mitigation - cost of mitigation verses benefit provided
    - community views - aesthetic impacts and community wishes
    - noise levels for affected land uses - existing and future levels, and changes in noise levels

We do not consider it reasonable to comply with the current reading of the criteria for the following reasons.

5.1 Noise to Nearest Affected Premises

While it would be reasonable to require noise from the site to be controlled at affected residential (or commercial or industrial) premises, it is not reasonable to require noise from the site to be controlled at the site's own boundary.

The nearest residential receivers are located in Ropes Crossing, approximately 900 m away. At this distance, the noise from the AWTP will be well below the background noise (that is likely due to road traffic) and quite likely inaudible – even though the noise at the boundary of the AWTP site will have increased. It is therefore unnecessary, and unreasonable, to require noise from the site not to be increased at the site boundary.

5.2 Lack of Benefit to Neighbourhood

The current CoA 2.17 and 2.18 require the noise to be controlled "at the most affected point on the site boundary". This can be achieved by providing a "noise wall" just inside the boundary. However, as the industrial receiver locations are further from the wall, the barrier becomes less effective and the resultant noise will increase. (This is currently evidenced by measurement locations 2 and 5, from **Table 2**).

5.3 Unnecessary Reduction to Remainder of STP

It seems common sense that it is unnecessary to control noise from the AWTP site to the remainder of the St Marys STP site as this is also a SWC operated industrial site producing a similar type of operational noise. However, it appears that this is what is required by the current reading of CoA 2.17 and 2.18.

5.4 Surrounding Industrial Receivers

In light of the fact that the nearest affected residential receivers (Triggs Street) are being vacated for future industrial development and the area has been re-zoned "industrial", it is unreasonably onerous to require noise from the AWTP site to be controlled to the INP residential criteria (40 dBA) rather than industrial criteria (70 dBA).

The number of people to benefit from the "no increase / 40 dBA" criteria is minimal - given:

- noise from other industrial premises in the vicinity of the site will only be required to be controlled to 70 dBA
- there will be no residential receivers in the vicinity (the nearest being 900m away)

6 SUGGESTED WORDING FOR A MODIFIED COA 2.17 AND 2.18

Suggested wording for a modified CoA 2.17 and 2.18

2.17

The Proponent shall design, operate and maintain the project such that noise from each of the premises (St Marys STP, Quakers Hill STP and Penrith STP) complies with the requirements of the New South Wales Industrial Noise Policy (EPA, 2000).

2.18

Not used.

7 CONCLUSION

This report outlines issues relating to the current reading of noise criteria (CoA 2.17 and 2.18) applying to the site.

The report demonstrates that the current reading of the CoA 2.17 and 2.18 places unreasonable and unnecessarily onerous criteria on the operators of the site and instead, offers alternative criteria in keeping with the best industry practice.

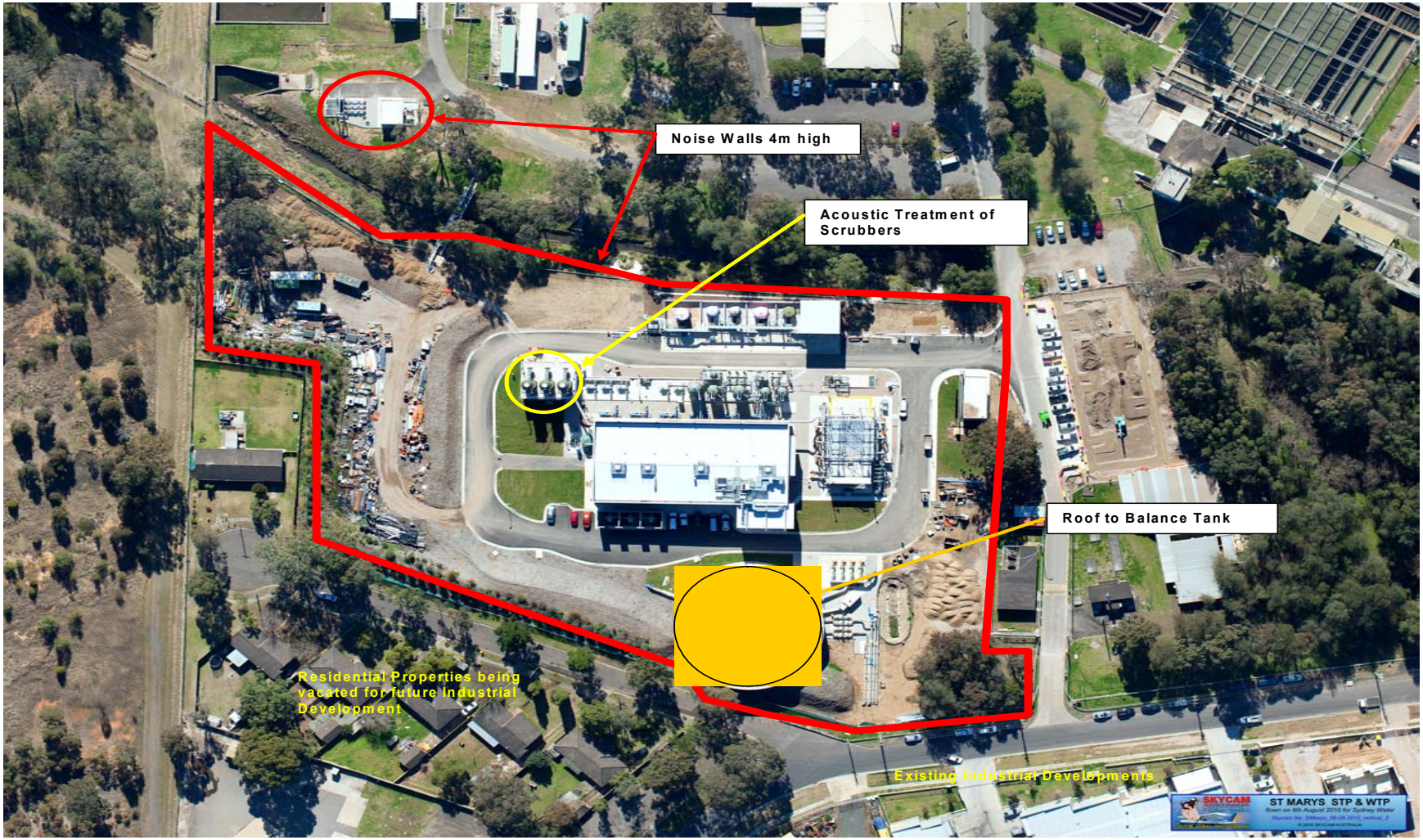
While this report focuses on the St Marys STP site (AWTP infrastructure), similar measures would be required at the Penrith STP and Quakers Hill STP sites.

Yours sincerely

H Gwatk

HOWARD GWATKIN
Senior Project Consultant

Required Noise Wall



Appendix B – Cost Estimate for Mitigation Measures to achieve current wording of CoA 2.17 & 2.18

NOISE TREATMENT FOR AWTP TO MEET DoP REQUIREMENTS
ORDER OF COST ESTIMATE

AWTP Perimeter Sound Wall

Noise Barrier Panel rate (Rawlinsons 2010) $/m2			**$172**	
Height (M)			**4**	
Rate ($/m)			**$688**	
Noise Barrier Structural Steel & Footings (Rawlinsons 2010)				
Rate ($/m)			**$600**	
Total			**$1,288**	**Say** **$1,300**

	Length	**Rate per meter**		**Total**
	700	$1,300		$910,000
Noise Rated Gate			**Item**	$75,000
Sound rated roof to balance tank			**Item**	$180,000
Accoustic Treatment of Scrubbers (air intake attenuators and discharge silencers)			**Item**	$50,000
STP Noise Barrier	100	$1,300		$130,000
Total Labour and Materials				$1,345,000
Design			15%	$201,750
Contractor overheads, margin, etc			27%	$417,623
SWC Overheads			10%	$196,437
Contingency			15%	$324,121
			TOTAL	**$2,484,931**
			Say	**$2,500,000**