



Monthly Environmental Monitoring Report

August 2009

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1.0 Report Purpose and Scope

The report has been compiled to summarise the results of noise, air quality and vibration monitoring on the Airport Link and Northern Busway Project. The report also compares those results with compliance thresholds for environmental harm, community nuisance and loss of amenity nominated by the Coordinator General (Change Report July 2008).

The monitoring data covered in this report is for the August 2009 reporting period, from 15 June to 15 July 2009.

2.0 Monitoring Locations

Several monitoring locations exist within the project area as described in Figures 1-6. Note that the aerial photograph overlays used in Figures 1-6 do not accurately portray the extent of the project's progress to August 2009, though do serve a useful purpose in relating the monitoring locations to existing structures and infrastructure.

Figure 1: Bowen Hills



Legend

- Noise (during construction)
- Vibration
- Air (PM₁₀)
- Air (Dust Deposition)

Note – these locations are indicative only

Figure 2: Truro St



Legend

- Noise (during construction)
- Air (PM₁₀)

Note – these locations are indicative only

Figure 3: Northern Busway

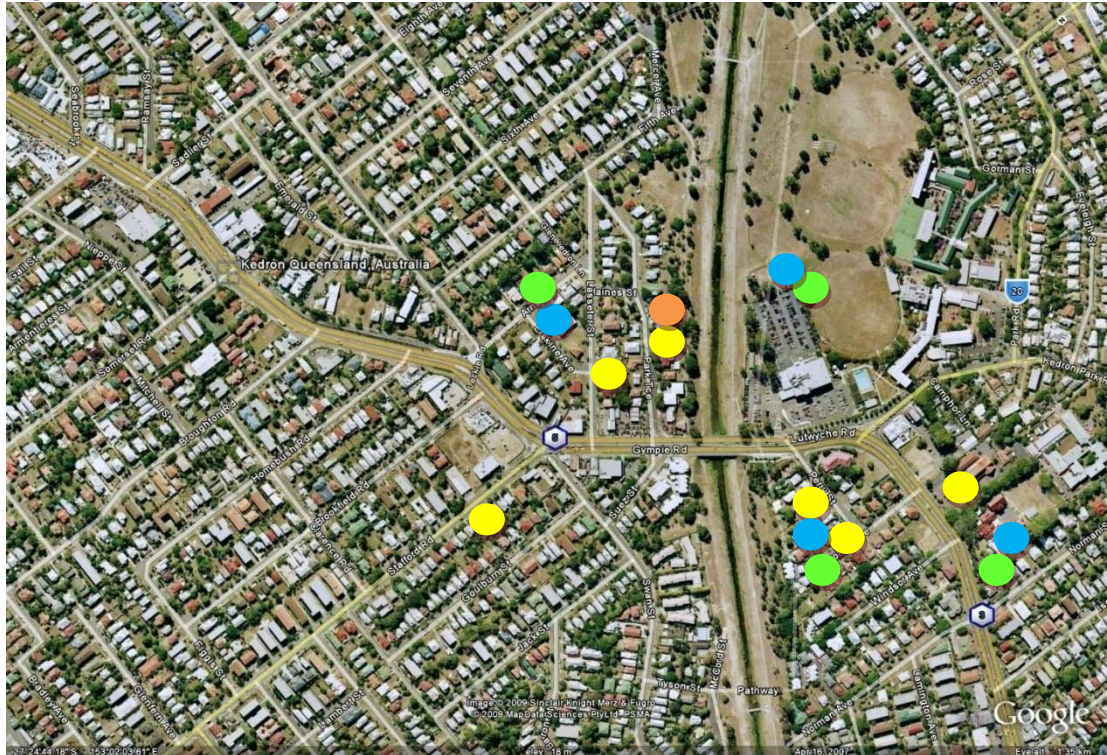


Legend

- Noise (during construction)
- Air (PM₁₀)

Note – these locations are indicative only

Figure 4: Kedron



Legend

- Noise (during construction)
 - Vibration
 - Air (PM₁₀)
 - Air (Dust Fallout)
- Note – these locations are indicative only

Figure 5: Toombul



- Noise (during construction)
 - Vibration
 - Air (PM₁₀)
 - Air (Dust Fallout)
- Note – these locations are indicative only

3.0 Noise Monitoring

TJH undertakes regular monitoring of noise levels at a variety of locations across the project to help measure impacts and assist the team plan works and appropriate mitigations if required. The type and timing of monitoring is influenced by the activities being undertaken and relevant Noise Goals (inside buildings and residents living areas where allowed at night and during the day). TJH have also undertaken external monitoring to better understand the pre-construction baseline and acoustic environment during works to assist TJH conduct risk assessments and nominate appropriate mitigation measures.

Monitoring involves 'attended' monitoring (where a member of the TJH environment team is observing noise sources and durations whilst noise measurements are taken) and 'unattended' monitoring (where the sound level meter with a datalogger is installed and collected at a later time).

Noise monitoring priorities are mostly influenced by predictive modelling undertaken for construction activities, responses from members of the community, access to residents' properties, availability of existing knowledge of the acoustic environment, and results of impact assessments undertaken by the TJH environment team and consultants.

Results of predictive modelling and monitoring are compared to Noise Goals nominated by the Coordinator General (Change Report October 2008) for the Airport Link and Northern Busway components of the project, the State Government (Environment Approvals Report, October 2008) for state controlled land relating to the Airport Roundabout Upgrade, and Brisbane Airport Corporation (Major Development Plan) for BAC controlled land.

3.1 Overview of Noise Mitigation Measures

Generally the main strategies adopted in order to mitigate noise during construction works have included the following:

1. Undertake noise modelling for sections of works adjacent to sensitive receptors.
2. Reasonable and practical mitigation measures that have been implemented to date include the following:
 - a. Temporary noise barriers (precast concrete barrier and plywood):
 - i. Lutwyche Road (Lutwyche, Kedron)
 - ii. Truro Street on all sides of worksite
 - iii. Federation Street (Bowen Hills)
 - iv. Morris/Gallway Street (Bowen Hills)
 - v. Lasseter St / Arnott St (Kedron)
 - vi. Kalinga Park (Toombul)
 - b. Temporary noise barrier (shipping container with plywood gap fillers, and extended sheet piles) installations:
 - i. Park Tce / Lasseter St (Kedron)
 - ii. Perry Street, (Kedron)
 - iii. Brookfield / Stafford Rd (Kedron)
 - iv. Formule 1 Hotel (Bowen Hills)
 - c. Acoustic shed has been built around the tunnel portal at:
 - i. Truro Street
 - ii. Bowen Hills
 - d. Consultation with property owners prior to commencing works and during construction works.

- e. Installation of mitigation measures at affected residents on a case-by-case basis.
- f. Investigating the early installation of permanent noise barriers at early stages.
- g. Investigation of alternative plant and equipment which inherently create less sound during operation.
- h. Acoustic shielding of various plant.
- i. Limiting work hours of various plant to minimise impact on sensitive receivers
- j. Regular awareness, training and reinforcement of work behaviours of staff, subcontractors, spoil haulage drivers, and delivery drivers to prevent or minimise noise generation in work areas.
- k. Use of temporary acoustic treatment (e.g. sound curtains around onsite generators and access/ egress from sites).
- l. Installation of directional reversing alarms (eg 'squarkers') on plant (especially those working out of normal working hours).
- m. Planning of works to occur wherever possible to normal working hours.
- n. Planning one-way construction access roads where possible to minimise the amount of reversing (eg airport roundabout).

3.2 Noise Monitoring Results

The results of TJH monitoring efforts are summarised for each project area in Tables a-e.

Table a: Noise Monitoring Results – Bowen Hills

No results to report

Table b: Noise Monitoring Results – Truro Street

Location	Monitoring Period	Average L _{Aeq} (dBA)	Baseline L _{Aeq} (dBA)	Average L _{A10} (dBA)	Baseline L _{A10} (dBA)	Comments
Unattended, External	15/07/09 – 18/07/09	63.7	68	64.6	71	Significant traffic impacts to the site recordings. Cars that run pass the sites were recorded at around 80dB and trucks were 100dB. Northern Busway team are also working in the area. Activities using the excavator and Piling Rig are in close proximity to the monitoring device, which has increase the average noise levels for this month.
Unattended, External	27/08/09 – 01/08/09	76.9	68	78.4	71	
Unattended, External	03/08/09 – 08/08/09	76.5	68	78.0	71	
Unattended, External	10/08/09 – 15/08/09	76.5	68	77.5	71	

Table c: Noise Monitoring Results – Northern Busway

No results to report

Table d: Noise Monitoring Results – Kedron

Location	Monitoring Period	Average L_{Aeq} (15 min) (dBA)	CoG Goal L_{Aeq} (15 min) (dBA)	Average L_{A10} (15 min) (dBA)	CoG Goal L_{A10} (15 min) (dBA)	CoG Goal L_{Amax} (15 min) (dBA)	Comments
25 Park Tce, Kedron							
Bed room	24/07/2009 (9:25-9:39am)	46.7	45	47.5	55	NA	Attended – windows and doors closed. Key noise source: driven piling rigs being used in the Hutchinson work site (Not APL works) and TJH bored and sheet piling in the Kedron Brook (CC210 North). The Hutchinson piling works (DES- non TJH) were auditable in both the bedroom and living area. Due to the works occurring simultaneously it is difficult to differentiate between the two works and noise levels recorded.
Living room	24/07/2009 (9:55-10:09am)	45.6	45	44.7	55	NA	
Unit 4 15 Windsor ave, Kedron							
Living room	7/08/2009 (7:08-7:22)	54.4	45	51	55	NA	Attended – windows and doors open. Key noise sources: APL Staff (Windsor office, pre-start), minor surface works around office and traffic noise from Lutwyche rd. Monitoring session was undertaken with the windows open with large influence from Lutwyche rd traffic and resident. Noise mitigation presently installed includes a 3.5m noise wall along the length of Perry St
Living room	7/08/2009 (7:25-7:39am)	48.7	45	46.1	55	NA	Attended – windows and doors closed. Key noise sources: APL staff (Windsor pre-start), minor surface works around site office, resident and traffic noise from Lutwyche rd. Large influence from external noise sources were recorded during monitoring period. Key contributors included Trucks on Lutwyche rd and the resident's hair dryer. Noise mitigation presently installed includes a 3.5m noise wall installed along the length of Perry St
6 Erskine st, Kedron							
Living room	13/08/2009 (11:00-11:14am)	48.1	45	46.6	55	NA	Attended – windows and doors closed. Key noise sources: general construction, piling and road sweeper. Noise mitigation includes previously installed, double stacked containers perpendicular to the Perry St
Living room	13/08/2009 (11:15-11:30am)	49.2	45	49.1	55	NA	
8 Perry Street, Kedron							
	14/08/2009 (12:14-12:28pm)	45.5	45	46.7	55	NA	Attended – windows and doors closed. Key noise sources: dump and fill material, piling CC210 South, road sweeping and Lutwyche rd traffic.

Location	Monitoring Period	Average L _{Aeq} (15 min) (dBA)	CoG Goal L _{Aeq} (15 min) (dBA)	Average L _{A10} (15 min) (dBA)	CoG Goal L _{A10} (15 min) (dBA)	CoG Goal L _{Amax} (15 min) (dBA)	Comments
Upstairs living area							Heavy influence from Lutwyche rd traffic. Previously installed plywood noise wall and double-storey sea container wall appears to provide partial mitigation to this resident as road traffic noise was being directed between the two noise walls (gap between walls comprises a site access road). Alternative access not possible for practical and safety reasons. It should be noted this house is vacant during the day working hours.
Upstairs living area	14/08/2009 (12:29-12:43pm)	49.3	45	47	55	NA	
20 Stafford Road, Kedron							
Living/Dining area	15/08/2009 (9:56-10:10am)	52.5	45	53.5	55	NA	Attended - Windows open. Key noise sources: Traffic from Stafford rd and resident. Heavy influence from Stafford rd traffic (Dense transportation corridor, resident property categorised as R3) and resident.
Living/Dining area	15/08/2009 (10:11-10:25)	53.2	45	54.2	55	NA	
673 Lutwyche Road, Kedron							
Front Office	27/07/2009 (10:04-10:18pm)	45.1	45	41.6	55	NA	Attended - Windows closed Key noise sources: road noise, special circumstances works (Lutwyche rd) and resident. Monitoring session undertaken in work area. Night time noise goals are based upon sleep disturbance. As the areas monitored are work areas, results have been analysed against the day time noise goals. Mitigation for the both the worksite and property are currently being discussed with this landholder.
Front Office	27/07/2009 (10:19-10:33pm)	42.3	45	43.4	55	NA	
Conference room	27/07/2009 (10:37-10:51pm)	51.1	45	51.8	55	NA	Attended – Windows open. Key noise sources: road noise and special circumstances works (Lutwyche rd diversion) and resident. Monitoring session undertaken in work area. Night time noise goals are based upon sleep disturbance. As the areas monitored are work areas, results have been analysed against the day time noise goals. Mitigation for the both the worksite and property are currently being discussed with this landholder.
Conference room	17/07/2009 (10:52-11:06pm)	49.8	45	50.6	55	NA	

Table e: Noise Monitoring Results – Toombul

Location	Monitoring Period	L _{Aeq} (15 min) (dBA)	CoG Goal L _{Aeq} (15 min) (dBA)	L _{A10} (15 min) (dBA)	CoG Goal L _{A10} (15 min) (dBA)	Comments
44 Lewis Street, Toombul						
Internal, Attended	21/07/2009 9:51-10:06am	38.3	40	39.1	50	Noise sources observed: general construction (D-walls, piling, cranes, reverse beeping, jack hammering) plus non-TJH sources (Trains, planes, birds) Existing mitigation includes 6m noise wall and double stack containers.
Internal, Attended	21/07/2009 12:34 – 12:49pm	38.5	40	39.4	50	
Internal, Attended	21/07/2009 2:28 – 2:43pm	42.2	40	42.9	50	Noise exceedences from: general construction (D-walls, piling, cranes, reverse beeping, jack hammering) plus non-TJH sources (Trains, planes, birds). Existing mitigation includes 6m noise wall and double stack containers.
Internal, Attended	21/07/2009 3:42 – 3:57pm	40.3	40	40.8	50	Noise sources observed: general construction (D-walls, piling, cranes, reverse beeping, jack hammering) plus non-TJH sources (Trains, planes, birds). Existing mitigation includes 6m noise wall and double stack containers.
Internal, Attended	6/08/2009 10:12 – 10:27am	38.6	40	39.8	50	Noise sources observed: general construction (D-walls, piling, cranes, reverse beeping, jack hammering) plus non-TJH sources (Trains, planes, birds). Existing mitigation includes 6m noise wall and double stack containers.
Internal, Attended	6/08/2009 11:18 – 11:33am	43.3	40	41.4	50	Noise exceedences from: general construction (D-walls, piling, cranes, reverse beeping, jack hammering) plus non-TJH sources (Trains, planes, birds). Existing mitigation includes 6m noise wall and double stack containers.
Parkside Apartments, Bage Street, Toombul						
Internal, Attended	22/08/2009 9:52-10:07am	40.0	45	40.6	55	Noise sources observed: a mixture of non-TJH road traffic (Sandgate Rd) and general construction noise (excavators, beepers and motors)
Internal, Attended	22/08/2009 10:11-10:26am	40.0	45	40.2	55	

Location	Monitoring Period	L _{Aeq} (15 min) (dBA)	CoG Goal L _{Aeq} (15 min) (dBA)	L _{A10} (15 min) (dBA)	CoG Goal L _{A10} (15 min) (dBA)	Comments
Internal, Attended	22/08/2009 1:24-1:39pm	41.2	45	42.0	55	
Internal, Attended	22/08/2009 1:44-1:59pm	40.0	45	40.8	55	
70 Kalinga Street, Toombul						
Internal, Attended	30/07/2009 10:09-10:24am	35.4	40	36.6	50	Noise sources observed: general construction (D-walls, piling, cranes, reverse beeping, jack hammering) plus non-TJH sources (Trains, planes, birds). Existing mitigation includes 6m noise wall and double stack containers.
Internal, Attended	30/07/2009 12:56-1:11pm	39.7	40	40.6	50	
Internal, Attended	30/07/2009 2:42-2:57pm	40.9	40	41.5	50	
Internal, Attended	30/07/2009 3:44-3:59pm	38.9	40	39.8	50	
Internal, Attended	6/08/2009 9:46-10:01am	38.7	40	39.6	50	Noise sources observed: general construction (D-walls, piling, cranes, reverse beeping, jack hammering) plus non-TJH sources (Trains, planes, birds). Existing mitigation includes 6m noise wall and double stack containers.
Internal, Attended	6/08/2009 11:48-12:03pm	42.4	40	43	50	Noise exceedences from: general construction (D-walls, piling, cranes, reverse beeping, jack hammering) plus non-TJH sources (Trains, planes, birds). Existing mitigation includes 6m noise wall and double stack containers.
Internal, Attended	6/08/2009 3:21-3:26pm	40.5	40	41.2	50	Noise sources observed: general construction (D-walls, piling, cranes, reverse beeping, jack hammering) plus non-TJH sources (Trains, planes, birds). Existing mitigation includes 6m noise wall and double stack containers.
135 Bage Street, Toombul						
Internal, Attended	30/07/2009 9:10-9:25am	43.2	40	40.3	50	Noise exceedences from non-TJH sources (Trains, resident talking on phone and to neighbours). Construction noise not evident.
Internal, Attended	30/07/2009 9:32-9:47am	37.8	40	37.8	50	Construction noise not evident.
Internal,	30/07/2009	38.8	40	38.7	50	

Location	Monitoring Period	L _{Aeq} (15 min) (dBA)	CoG Goal L _{Aeq} (15 min) (dBA)	L _{A10} (15 min) (dBA)	CoG Goal L _{A10} (15 min) (dBA)	Comments
Attended	1:34-1:49pm					
Internal, Attended	30/07/2009 1:52-2:07pm	36.4	40	36	50	
35 McGregor Street, Toombul						
Internal, Attended	7/08/2009 9:33-9:48am	43.5	45	40.7	55	Residence is used as a home office. Front door and office door open Construction noise not evident.
Internal, Attended	7/08/2009 9:50-10:05am	42.7	45	39.1	55	
89 Jackson Street, Toombul						
Internal, Attended	13/08/2009 9:51-10:06am	43.9	40	43.3	50	Noise exceedences from: general construction (D-walls, piling, cranes, reverse beeping, jack hammering, grinding) plus non-TJH sources (Trains, cars, resident). Existing mitigation includes 6m noise wall and double stack containers.
Internal, Attended	13/08/2009 10:09-10:24am	41.3	40	41.6	50	
Internal, Attended	13/08/2009 2:29-2:44pm	40.2	40	40.6	50	Noise sources observed: general construction (D-walls, piling, cranes, reverse beeping, grinding) plus non-TJH sources (Trains, cars, resident). Existing mitigation includes 6m noise wall and double stack containers.
Internal, Attended	13/08/2009 2:46-3:01pm	39.4	40	40.1	50	
78 Elliot Street, Toombul						
Internal, Attended	17/07/2009 12:38-12:53pm	51.1	45	51.6	55	Front door and back doors open. Noise sources observed: piling rig and reverse beeper, plus non-TJH sources (Radio, resident in kitchen, trains, birds). Existing mitigation includes 6m noise wall and double stack containers.
Internal, Attended	17/7/2009 12:54-1:08pm	46.8	45	45.8	55	
83 Stuckey Road, Toombul						
Internal, Attended	14/08/2009 8:56 – 9:11am	49.7	45	50.5	55	Noise exceedences from piling works (piling rig, reverse beepers, cranes) plus non-TJH noise sources (trains, resident, tv). Planned mitigation includes the installation of a shipping container noise wall, along Stuckey Road which has been delayed due to unexpected ground conditions experienced during the sewer relocation. Arrangements being made for installation of air-conditioning.
Internal, Attended	14/08/2009 9:13 – 9:28am	49.0	45	49.7	55	

Table f: Night-time Noise Monitoring Results – Toombul

Location	Monitoring Period	L _{Aeq} (15 min) (dBA)	CoG Goal L _{Aeq} (15 min) (dBA)	L _{AMAX} (dBA)	CoG Goal L _{AMAX} (dBA)	Comments
44 Lewis Street, Toombul						
External, Attended	7/08/2009 4:11-4:26am	34.7		48.0		Noise sources observed: general construction (Crane, steel movement) plus non-TJH sources (traffic, trains, cars, birds). Existing mitigation includes 6m noise wall and double stack containers.
External, Attended	7/08/2009 7:32-7:46pm	44.5		64.9		Noise sources observed: crane, plus non-TJH sources (trains, car, plane). Existing mitigation includes 6m noise wall and double stack containers.
70 Kalinga Street, Toombul						
External, Attended	7/08/2009 7:54 – 8:09pm	44.9		50.3		Noise sources observed from non-TJH sources (music from residence, trains, cars). Existing mitigation includes 6m noise wall and double stack containers.
External, Attended	8/08/2009 12:32 – 12:47am	43.2		69.4		Noise sources observed: general construction (Crane, steel movement, oxy) plus non-TJH sources (plane, dog, train). Existing mitigation includes 6m noise wall and double stack containers.
Adj 97 Jackson Street, Toombul						
External, Attended	7/08/2009 3:16 – 3:31am	34.9		49.0		Noise sources observed: general construction (Crane, steel movement) plus non-TJH sources (traffic, trains, cars, dogs). Existing mitigation includes 6m noise wall and double stack containers.
External, Attended	7/08/2009 3:42 – 3:57am	34.3		57.9		
External, Attended	7/08/2009 8:21 – 8:36pm	51.9		69.4		Noise sources observed: general construction (generator, steel movement, oxy) plus non-TJH sources (plane, dog, train). Existing mitigation includes 6m noise wall and double stack containers.
External, Attended	7/08/2009 11:03 – 11:18pm	40.3		50.1		Noise sources observed: general construction (crane, generator) plus non-TJH sources (train). Existing mitigation includes 6m noise wall and double stack containers.
External, Attended	8/08/2009 2:50 – 3:05am	42.1		48.3		Noise sources observed: general construction (steel movement) plus non-TJH sources (plane). Existing mitigation includes 6m noise wall and double stack containers.

Location	Monitoring Period	L _{Aeq} (15 min) (dBA)	CoG Goal L _{Aeq} (15 min) (dBA)	L _{AMAX} (dBA)	CoG Goal L _{AMAX} (dBA)	Comments
Adj 83 Elliot Street, Toombul						
External, Attended	7/08/2009 12:14-12:29am	37.4		48.0		Noise sources observed: general construction (Crane, steel movement) plus non-TJH sources (traffic, trains, cars, planes). Existing mitigation includes 6m noise wall and double stack containers.
External, Attended	7/08/2009 12:47-1:02am	35.6		49.6		
External, Attended	7/08/2009 8:46-9:01pm	42.4		62.8		Noise sources observed: general construction (Crane, steel movement, generator) plus non-TJH sources (trains, planes). Existing mitigation includes 6m noise wall and double stack containers.
External, Attended	8/08/2009 3:12-3:27am	39.3		62.9		Noise sources observed: general construction (steel movement) plus non-TJH sources (planes, animals). Existing mitigation includes 6m noise wall and double stack containers.

3.3 Compliance with Noise Goals

Exceedances of the Coordinator General's Noise Goals have been found during this monitoring period at a number of locations:

- 25 Park Terrace, Kedron
- 15 Windsor Ave, Kedron
- 6 Erskine Ave, Kedron (note house is empty during work hours)
- 8 Perry Street, Kedron (note house is empty during work hours)
- 20 Stafford Road, Kedron
- 673 Lutwyche Rd (monitoring period was night works under special circumstances)
- 44 Lewis Street, Toombul
- 70 Kalinga Street, Toombul
- 89 Jackson Street, Toombul
- 83 Stuckey Road, Toombul
- 78 Elliot Street, Toombul
- 135 Bage Street, Toombul

Construction activities are attributable to some of these exceedances though noise generated by existing traffic, trains and some other localised noise sources have also contributed. An investigation into each of these CoG-notifiable non-conformances has been, or is being undertaken, the results and recommendations of which will be forwarded to CNI, the Coordinator General and each affected property occupier/owner as required.

4.0 Air Quality Monitoring

TJH undertakes regular monitoring of air quality levels at a variety of locations across the project to help measure impacts and assist the team plan works and appropriate mitigations if required.

Monitoring involves sampling of dust deposition (monthly), and real-time respiratory dust (PM10) at a number of locations nominated by the Coordinator General. Monitoring of Total Suspended Particulates is also occurring at selected locations to alert TJH teams of any emerging dust exceedances and implement appropriate mitigations to prevent an exceedance of the CoG Air Quality Goals.

Results of monitoring are compared to Air Quality Goals nominated by the Coordinator General (Change Report October 2008) for the Airport Link and Northern Busway components of the project, the State Government (Environment Approvals Report, October 2008) for state controlled land relating to the Airport Roundabout Upgrade, and Brisbane Airport Corporation (Major Development Plan) for BAC controlled land.

4.1 Overview of Air Quality Mitigation Measures

The key strategies adopted to mitigate dust and air quality impacts during construction works have included the following:

1. Continual use of water carts during the following activities:
 - i. Bulk earthworks
 - ii. Haul roads
 - iii. Car parks and hardstands
 - iv. Demolition works
2. Investigation of appropriate soil binders (Water and Aeolian erosion prevention techniques).
3. Covering of haul vehicles.
4. Stabilisation of cleared areas with hardstand materials such as concrete and crushed rock.
5. Hydro-mulching, composting and laying geofab to batters.
6. Reduction of cleared / exposed soils with concrete paving and geo-fabric installation.
7. Road sweepers.
8. Design and future construction enclosed spoil handling facilities at portals.

4.2 Air Quality Monitoring Results – Respirable Dust (PM10)

The results of PM10 monitoring is shown in Tables / Figures a-i.

Fig a Daily PM₁₀ results for Morris St, Bowen Hills

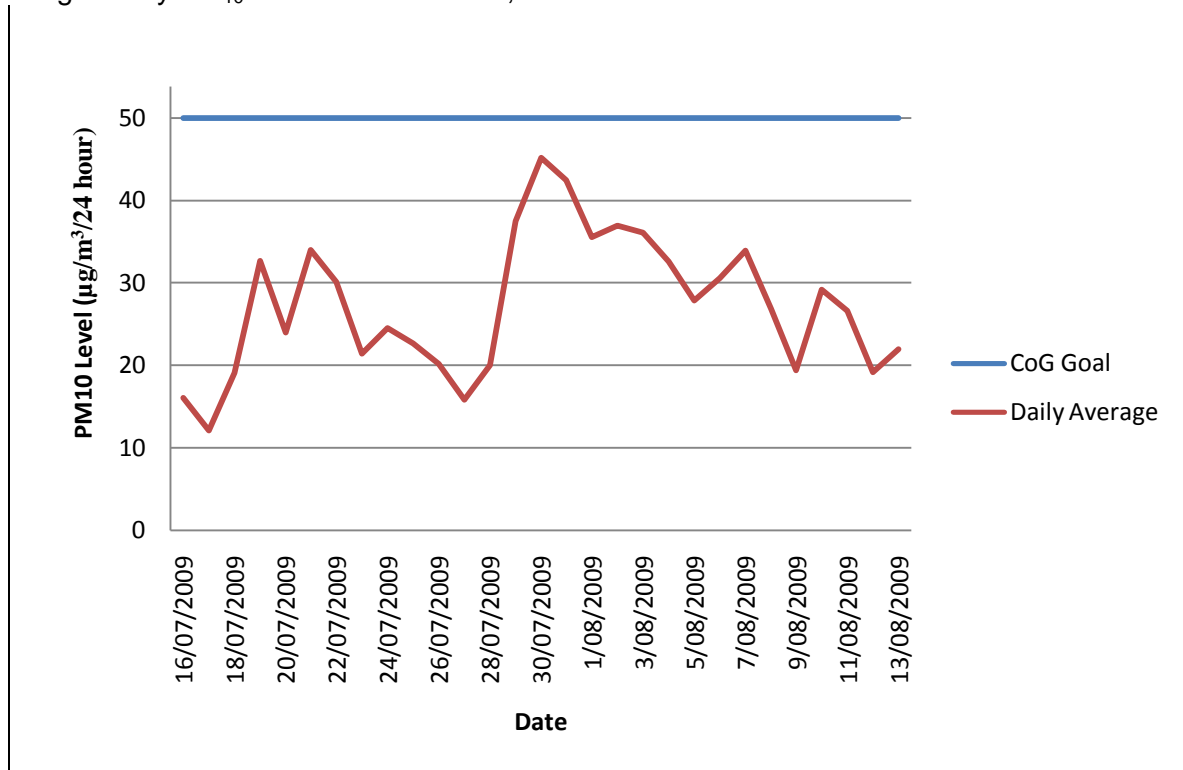


Table a: PM₁₀ Results – Morris St, Bowen Hills

Monitoring Period (midnight-midnight)	Daily PM ₁₀ (µg/m ³)	CoG PM ₁₀ Goal (µg/m ³ /day)	Comments
Thu 16/07/2009	16	50	
Fri 17/07/2009	12	50	
Sat 18/07/2009	19	50	
Sun 19/07/2009	33	50	
Mon 20/07/2009	24	50	
Tue 21/07/2009	34	50	
Wed 22/07/2009	30	50	
Thu 23/07/2009	21	50	
Fri 24/07/2009	25	50	
Sat 25/07/2009	23	50	
Sun 26/07/2009	20	50	
Mon 27/07/2009	16	50	
Tue 28/07/2009	20	50	
Wed 29/07/2009	38	50	
Thu 30/07/2009	45	50	
Fri 31/07/2009	43	50	
Sat 1/08/2009	36	50	
Sun 2/08/2009	37	50	
Mon 3/08/2009	36	50	
Tue 4/08/2009	33	50	
Wed 5/08/2009	28	50	

Thu 6/08/2009	31	50	
Fri 7/08/2009	34	50	
Sat 8/08/2009	27	50	
Sun 9/08/2009	19	50	
Mon 10/08/2009	29	50	
Tue 11/08/2009	27	50	
Wed 12/08/2009	19	50	
Thu 13/08/2009	22	50	

Note: AS 3580.10.1: 2003 requires a statement to be included with results when all of the siting recommendations are not able to be satisfied. The dust gauge is located such that a 120 degree skyward field is partially obscured by a building or treeline. Full satisfaction of AS recommendations is not possible to satisfy gauge security and access provisions.

Fig b Daily PM₁₀ Results for Truro St

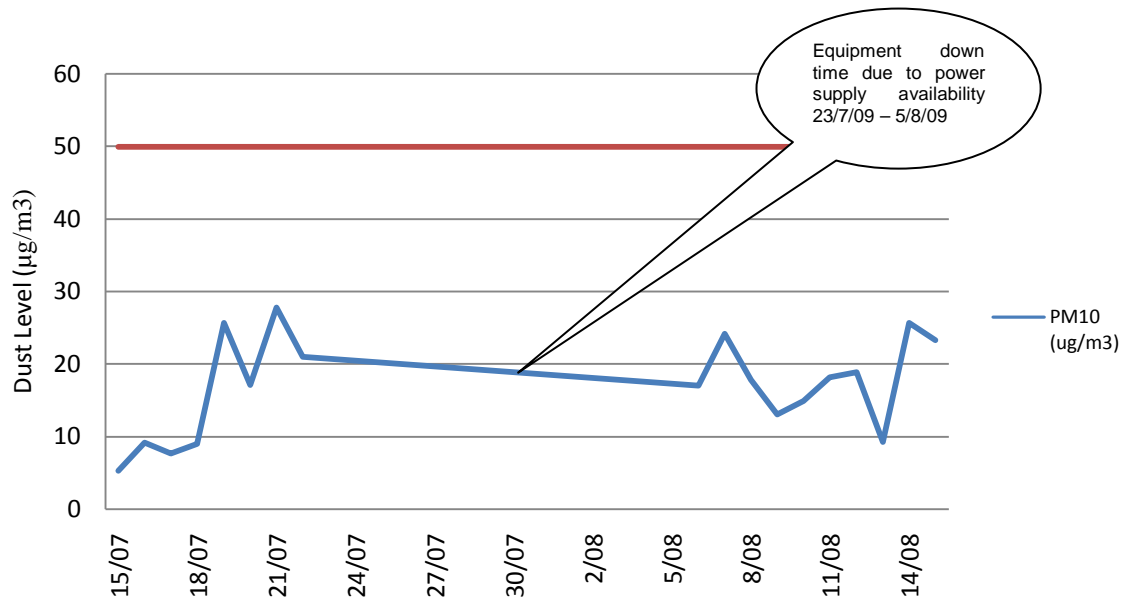


Table b: PM₁₀ Results – Truro Street

Monitoring Period (midnight-midnight)	Daily PM ₁₀ (µg/m ³)	CoG PM ₁₀ Goal (µg/m ³ /day)	Comments
15/07/2009	5.3	50	
16/07/2009	9.2	50	
17/07/2009	7.7	50	
18/07/2009	9	50	
19/07/2009	25.7	50	
20/07/2009	17.1	50	
21/07/2009	27.8	50	
22/07/2009	21	50	
6/08/2009	17	50	
7/08/2009	24.2	50	
8/08/2009	17.8	50	
9/08/2009	13.1	50	
10/08/2009	14.9	50	
11/08/2009	18.2	50	
12/08/2009	18.9	50	
13/08/2009	9.3	50	
14/08/2009	25.7	50	

Note: AS 3580.10.1: 2003 requires a statement to be included with results when all of the siting recommendations are not able to be satisfied. The dust gauge is located such that a 120 degree skyward field is partially obscured by a building or treeline. Full satisfaction of AS recommendations is not possible to satisfy gauge security and access provisions.

Fig c Daily PM₁₀ Results for Lamington Ave, Northern Busway

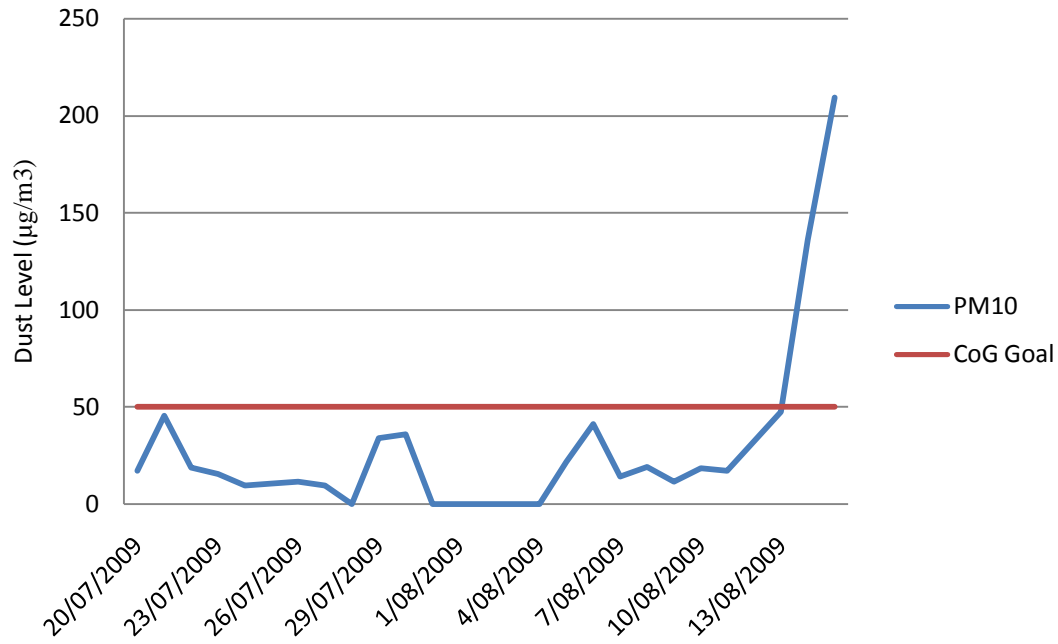
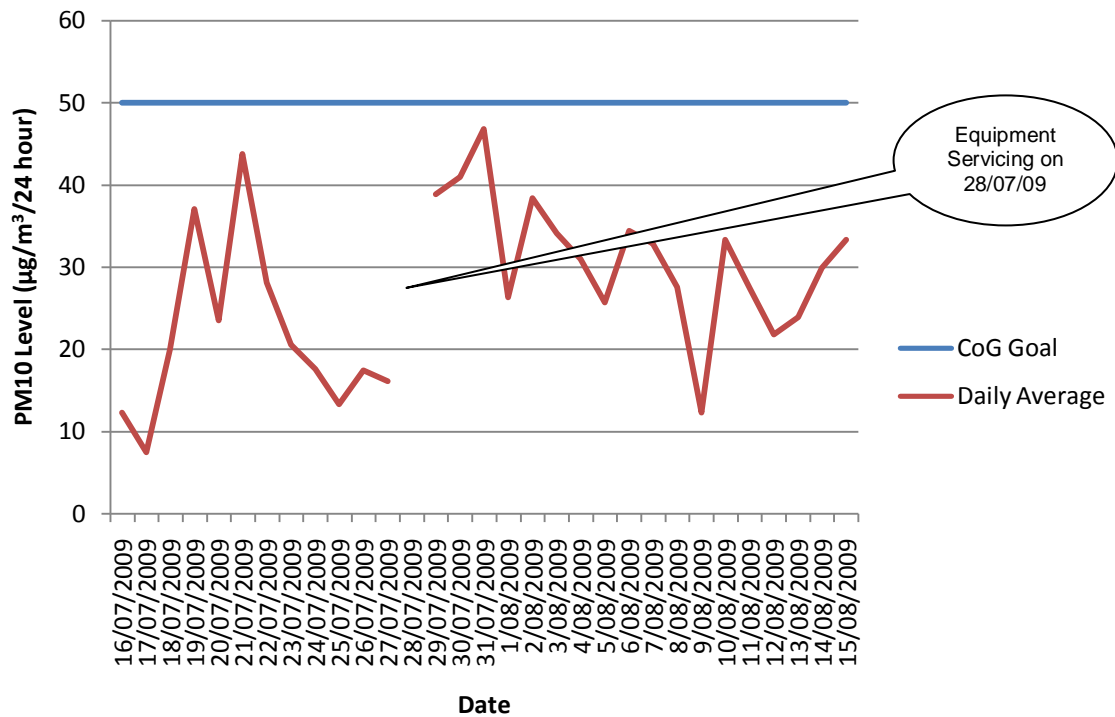


Table c: PM₁₀ Results – Lamington Ave, Northern Busway

Monitoring Period (midnight-midnight)	Daily PM ₁₀ (µg/m ³)	CoG PM ₁₀ Goal (µg/m ³ /day)	Comments
15/07/2009	5.3	50	
16/07/2009	9.2	50	
17/07/2009	7.7	50	
18/07/2009	9	50	
19/07/2009	25.7	50	
20/07/2009	17.1	50	
21/07/2009	27.8	50	
22/07/2009	21	50	
6/08/2009	17	50	
7/08/2009	24.2	50	
8/08/2009	17.8	50	
9/08/2009	13.1	50	
10/08/2009	14.9	50	
11/08/2009	18.2	50	
12/08/2009	18.9	50	
13/08/2009	9.3	50	
14/08/2009	25.7	50	

Note: AS 3580.10.1: 2003 requires a statement to be included with results when all of the siting recommendations are not able to be satisfied. The dust gauge is located such that a 120 degree skyward field is partially obscured by a building or treeline. Full satisfaction of AS recommendations is not possible to satisfy gauge security and access provisions.

Fig d Daily PM₁₀ Results for Erskine St, Kedron

 Table d: PM₁₀ Results – 20 Erskine Street, Kedron

Monitoring Period (midnight-midnight)	Daily PM ₁₀ (µg/m ³ /day)	CoG PM ₁₀ Goal (µg/m ³ /day)	Comments
Thur 16/07/2009	12.3	50	
Fri 17/07/2009	7.5	50	
Sat 18/07/2009	20	50	
Sun 19/07/2009	37.1	50	
Mon 20/07/2009	23.5	50	
Tues 21/07/2009	43.8	50	
Wed 22/07/2009	28.1	50	
Thur 23/07/2009	20.6	50	
Fri 24/07/2009	17.6	50	
Sat 25/07/2009	13.3	50	
Sun 26/07/2009	17.5	50	
Mon 27/07/2009	16.1	50	
Tues 28/07/2009	-	50	Equipment servicing – data incomplete.
Wed 29/07/2009	38.9	50	
Thur 30/07/2009	41	50	
Fri 31/07/2009	46.8	50	
Sat 1/08/2009	26.3	50	
Sun 2/08/2009	38.4	50	
Mon 3/08/2009	34.1	50	
Tues 4/08/2009	31	50	
Wed 5/08/2009	25.7	50	
Thur 6/08/2009	34.4	50	
Fri 7/08/2009	32.9	50	
Sat 8/08/2009	27.6	50	
Sun 9/08/2009	12.3	50	

Mon 10/08/2009	33.3	50	
Tues 11/08/2009	27.5	50	
Wed 12/08/2009	21.8	50	
Thur 13/08/2009	23.9	50	
Fri 14/08/2009	29.9	50	
Sat 15/08/2009	33.3	50	

Fig e Daily PM₁₀ Results for Kedron State High School Oval, Kedron

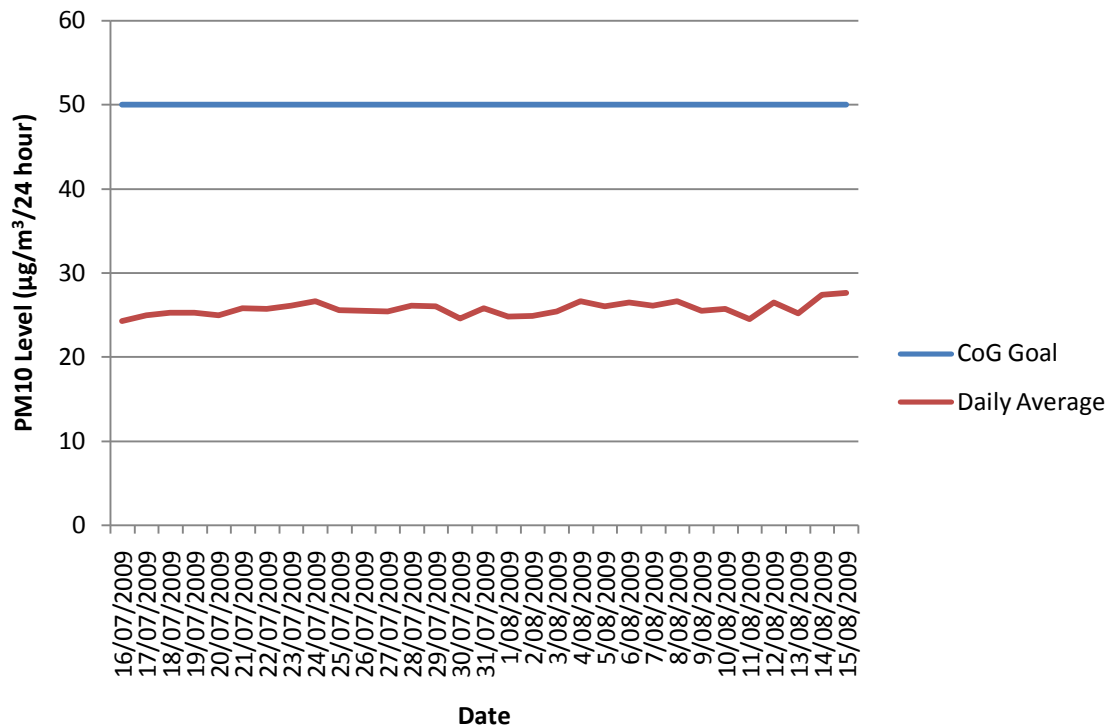


Table e: PM₁₀ Results – Kedron State High School Oval

Monitoring Period (midnight-midnight)	Daily PM ₁₀ (µg/m ³ /day)	CoG PM ₁₀ Goal (µg/m ³ /day)	Comments
Thur 16/07/2009	24.3	50	
Fri 17/07/2009	25	50	
Sat 18/07/2009	25.3	50	
Sun 19/07/2009	25.3	50	
Mon 20/07/2009	25	50	
Tues 21/07/2009	25.8	50	
Wed 22/07/2009	25.7	50	
Thur 23/07/2009	26.1	50	
Fri 24/07/2009	26.6	50	
Sat 25/07/2009	25.6	50	
Sun 26/07/2009	25.5	50	
Mon 27/07/2009	25.4	50	
Tues 28/07/2009	26.1	50	
Wed 29/07/2009	26	50	
Thur 30/07/2009	24.6	50	
Fri 31/07/2009	25.8	50	
Sat 1/08/2009	24.8	50	
Sun 2/08/2009	24.9	50	
Mon 3/08/2009	25.4	50	
Tues 4/08/2009	26.6	50	
Wed 5/08/2009	26	50	
Thur 6/08/2009	26.5	50	
Fri 7/08/2009	26.1	50	
Sat 8/08/2009	26.6	50	

Sun 9/08/2009	25.5	50	
Mon 10/08/2009	25.7	50	
Tues 11/08/2009	24.5	50	
Wed 12/08/2009	26.5	50	
Thur 13/08/2009	25.2	50	
Fri 14/08/2009	27.4	50	
Sat 15/08/2009	27.6	50	

Note: AS 3580.10.1: 2003 requires a statement to be included with results when all of the siting recommendations are not able to be satisfied. The dust gauge is located such that a 120 degree skyward field is partially obscured by a building or treeline. Full satisfaction of AS recommendations is not possible to satisfy gauge security and access provisions.

Fig f Daily PM₁₀ Results for Woolloowin State School, Kedron

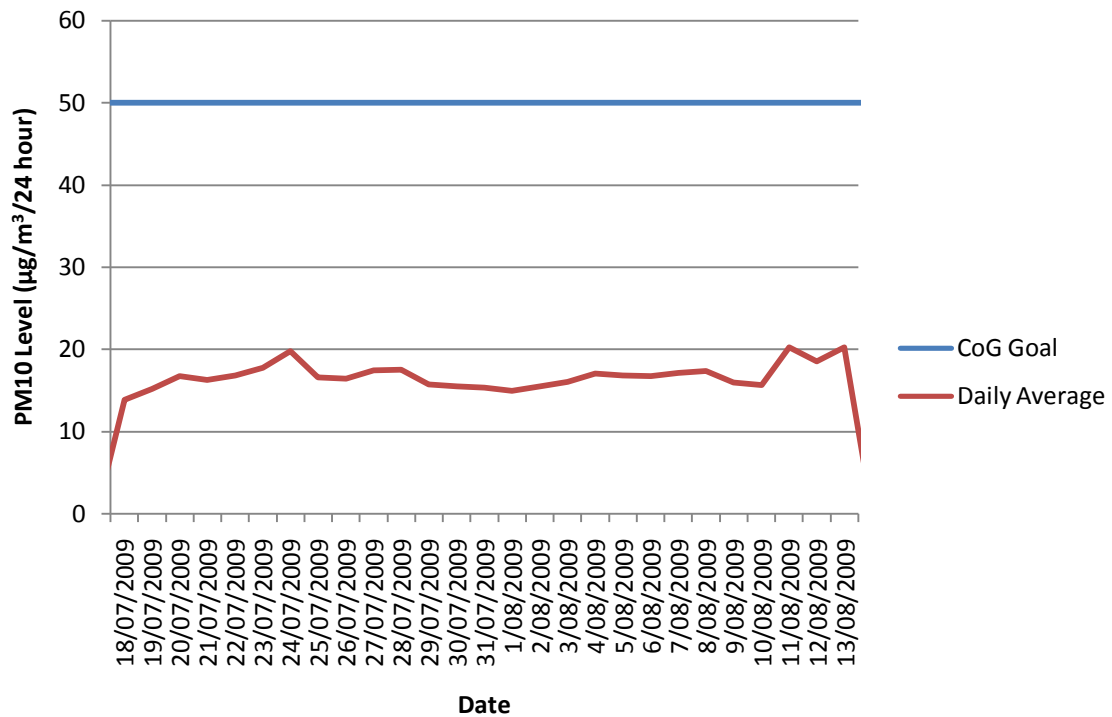


Table f: PM₁₀ Results – Woolloowin State School, Front Office

Monitoring Period (midnight-midnight)	Daily PM ₁₀ (µg/m ³ /day)	CoG PM ₁₀ Goal (µg/m ³ /day)	Comments
Thur 16/07/2009	-	50	
Fri 17/07/2009	-	50	
Sat 18/07/2009	13.9	50	
Sun 19/07/2009	15.2	50	
Mon 20/07/2009	16.8	50	
Tues 21/07/2009	16.3	50	
Wed 22/07/2009	16.9	50	
Thur 23/07/2009	17.8	50	
Fri 24/07/2009	19.8	50	
Sat 25/07/2009	16.6	50	
Sun 26/07/2009	16.5	50	
Mon 27/07/2009	17.5	50	
Tues 28/07/2009	17.6	50	
Wed 29/07/2009	15.8	50	
Thur 30/07/2009	15.5	50	
Fri 31/07/2009	15.4	50	
Sat 1/08/2009	15	50	
Sun 2/08/2009	15.5	50	
Mon 3/08/2009	16.1	50	
Tues 4/08/2009	17.1	50	
Wed 5/08/2009	16.9	50	
Thur 6/08/2009	16.8	50	
Fri 7/08/2009	17.2	50	
Sat 8/08/2009	17.4	50	
Sun 9/08/2009	16	50	

Mon 10/08/2009	15.7	50	
Tues 11/08/2009	20.3	50	
Wed 12/08/2009	18.6	50	
Thur 13/08/2009	20.3	50	
Fri 14/08/2009	-	50	Equipment servicing – data incomplete.
Sat 15/08/2009	-	50	Equipment servicing – data incomplete.

Note: AS 3580.10.1: 2003 requires a statement to be included with results when all of the siting recommendations are not able to be satisfied. The dust gauge is located such that a 120 degree skyward field is partially obscured by a building or treeline. Full satisfaction of AS recommendations is not possible to satisfy gauge security and access provisions.

Fig g Daily PM₁₀ Results for Perry St, Kedron

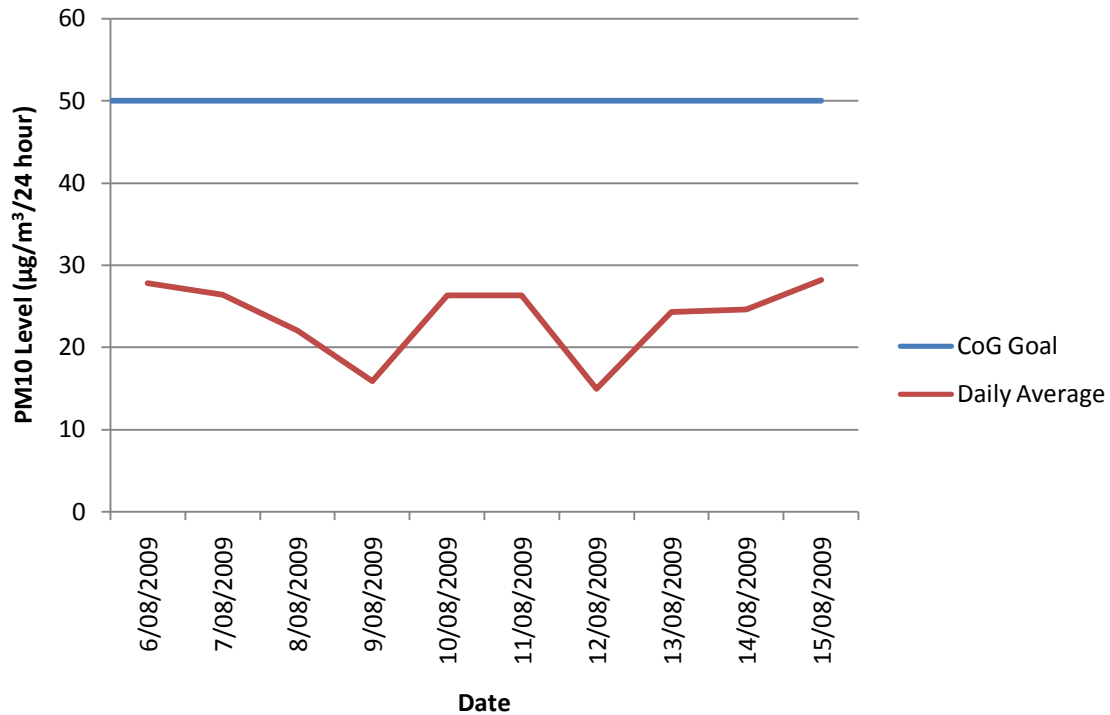


Table g: PM₁₀ Results – 8 Perry St, Kedron

Monitoring Period (midnight-midnight)	Daily PM ₁₀ (µg/m ³ /day)	CoG PM ₁₀ Goal (µg/m ³ /day)	Comments
Thur 16/07/2009	-	50	Commissioning of AQ unit
Fri 17/07/2009	-	50	
Sat 18/07/2009	-	50	
Sun 19/07/2009	-	50	
Mon 20/07/2009	-	50	
Tues 21/07/2009	-	50	
Wed 22/07/2009	-	50	
Thur 23/07/2009	-	50	
Fri 24/07/2009	-	50	
Sat 25/07/2009	-	50	
Sun 26/07/2009	-	50	
Mon 27/07/2009	-	50	
Tues 28/07/2009	-	50	
Wed 29/07/2009	-	50	
Thur 30/07/2009	-	50	
Fri 31/07/2009	-	50	
Sat 1/08/2009	-	50	
Sun 2/08/2009	-	50	
Mon 3/08/2009	-	50	
Tues 4/08/2009	-	50	
Wed 5/08/2009	-	50	
Thur 6/08/2009	27.8	50	
Fri 7/08/2009	26.4	50	
Sat 8/08/2009	22.1	50	
Sun 9/08/2009	15.9	50	
Mon 10/08/2009	26.3	50	
Tues 11/08/2009	26.3	50	
Wed 12/08/2009	15	50	
Thur 13/08/2009	24.3	50	
Fri 14/08/2009	24.6	50	
Sat 15/08/2009	28.2	50	

Note: AS 3580.10.1: 2003 requires a statement to be included with results when all of the siting recommendations are not able to be satisfied. The dust gauge is located such that a 120 degree skyward field is partially obscured by a building or treeline. Full satisfaction of AS recommendations is not possible to satisfy gauge security and access

provisions.

Fig. h Daily PM₁₀ Results for Kalinga St, Toombul

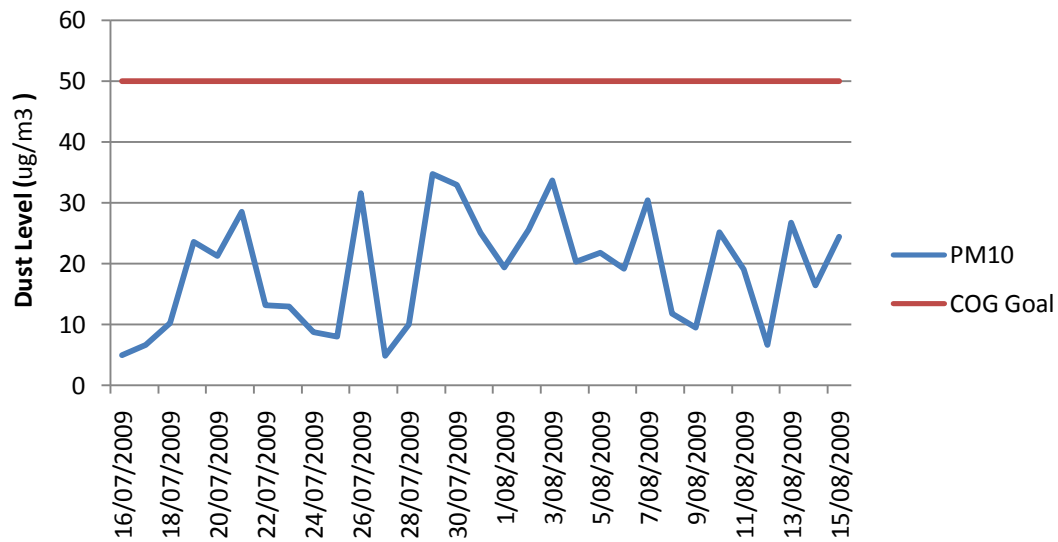


Table h: PM₁₀ Results – Kalinga St, Toombul

Monitoring Period (midnight-midnight)	Daily PM ₁₀ (µg/m ³ /day)	CoG PM ₁₀ Goal (µg/m ³ /day)	Comments
Thurs 16/07/2009	5	50	
Fri 17/07/2009	6.7	50	
Sat 18/07/2009	10.2	50	
Sun 19/07/2009	23.6	50	
Mon 20/07/2009	21.3	50	
Tues 21/07/2009	28.5	50	
Wed 22/07/2009	13.2	50	
Thurs 23/07/2009	13	50	
Fri 24/07/2009	8.8	50	
Sat 25/07/2009	8	50	
Sun 26/07/2009	31.5	50	
Mon 27/07/2009	4.9	50	
Tues 28/07/2009	10	50	
Wed 29/07/2009	34.7	50	
Thurs 30/07/2009	32.9	50	
Fri 31/07/2009	25	50	
Sat 1/08/2009	19.4	50	
Sun 2/08/2009	25.6	50	
Mon 3/08/2009	33.6	50	
Tues 4/08/2009	20.3	50	
Wed 5/08/2009	21.8	50	
Thurs 6/08/2009	19.2	50	
Fri 7/08/2009	30.4	50	
Sat 8/08/2009	11.8	50	
Sun 9/08/2009	9.5	50	
Mon 10/08/2009	25.2	50	
Tues 11/08/2009	19.1	50	
Wed 12/08/2009	6.7	50	
Thurs 13/08/2009	26.7	50	
Fri 14/08/2009	16.4	50	
Sat 15/08/2009	24.4	50	

Note: AS 3580.10.1: 2003 requires a statement to be included with results when all of the siting recommendations are not able to be satisfied. The dust gauge is located such that a 120 degree skyward field is partially obscured by a building or treeline. Full satisfaction of AS recommendations is not possible to satisfy gauge security and access provisions.

Fig i Daily PM₁₀ Results for Kalinga Park (Alma Rd), Toombul

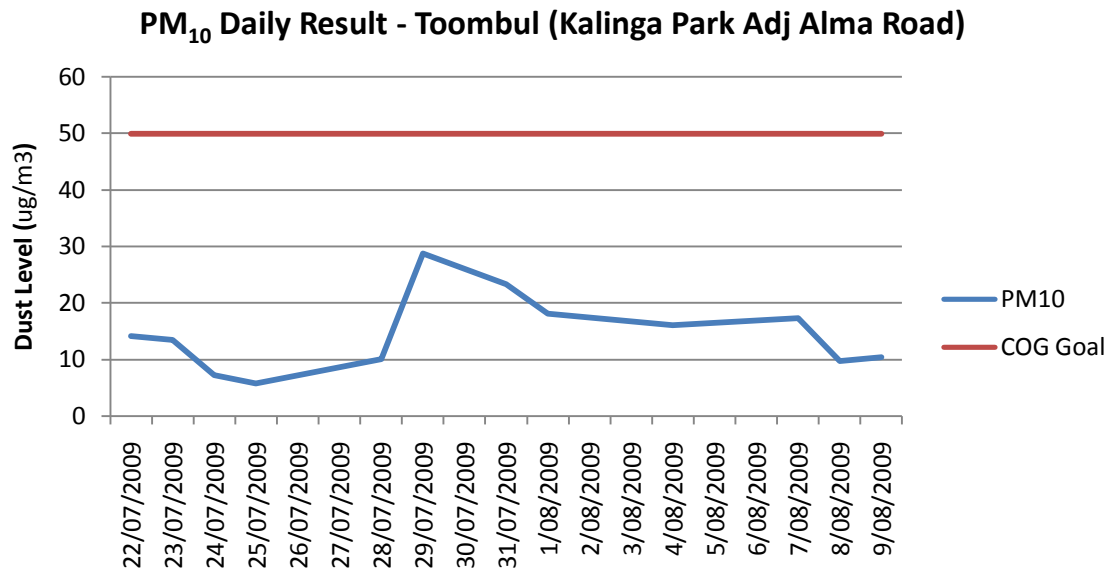


Table i: PM₁₀ Results – Kalinga Park (Alma Rd), Toombul

Monitoring Period (midnight-midnight)	Daily PM ₁₀ (µg/m ³ /day)	CoG PM ₁₀ Goal (µg/m ³ /day)	Comments
Wed 22/07/2009	14.2	50	
Thurs 23/07/2009	13.5	50	
Fri 24/07/2009	7.3	50	
Sat 25/07/2009	5.8	50	
Tues 28/07/2009	10.1	50	
Wed 29/07/2009	28.8	50	
Thurs 30/07/2009	26.1	50	
Fri 31/07/2009	23.4	50	
Sat 1/08/2009	18.1	50	
Tues 4/08/2009	16.1	50	
Fri 7/08/2009	17.3	50	
Sat 8/08/2009	9.8	50	
Sun 9/08/2009	10.5	50	

Note: AS 3580.10.1: 2003 requires a statement to be included with results when all of the siting recommendations are not able to be satisfied. The dust gauge is located such that a 120 degree skyward field is partially obscured by a building or treeline. Full satisfaction of AS recommendations is not possible to satisfy gauge security and access provisions.

4.3 Air Quality Monitoring Results – Dust Deposition

Dust deposition monitoring is undertaken on a monthly basis using a bottle and funnel placed 2m ± 0.2m above ground level in accordance with Australian Standard AS 3580.10.1: 2003 and at locations nominated by the Coordinator General. Dust Deposition results are displayed in tables a-c

Table a: Dust Deposition Results – Bowen Hills

Monitoring Period (midnight-midnight)	Dust Fallout (g/m ² /mth)	CoG Dust Fallout Goal (g/m ² /mth)	Comments
5 Morris St 10/7/09 – 7/8/09	0.4	4	Sampling period 28 days.
Site Office 10/7/09 -7/8/09	0.8	4	Sampling period 28 days.

Note: - All samples assessed at a NATA accredited laboratory.
 - AS 3580.10.1: 2003 requires a statement to be included with results when all of the siting recommendations are not able to be satisfied. The Woolloowin and DES dust gauges are located such that a 120 degree skyward field is partially obscured by a building or treeline. Full satisfaction of AS recommendations is not possible to satisfy gauge security and access provisions.

Table b: Dust Deposition Results – Kedron

Location and Monitoring Period (midnight-midnight)	Dust Fallout (g/m ² /mth)	CoG Dust Fallout Goal (g/m ² /mth)	Comments
Woolloowin State School 9/07/09 - 10/08/09	0.4	4	Complies with Goals. Location does not meet requirements for siting due to proximity of buildings and trees.
Kedron DES Site 9/07/09 - 10/08/09	0.9	4	Complies with Goals. Location does not meet requirements for siting due to proximity of buildings and trees.
Erskine St, Kedron 9/07/09 - 10/08/09	0.9	4	Complies with Goals. Location does not meet requirements for siting due to proximity of buildings and trees.

Note: - All samples assessed at a NATA accredited laboratory.
 - AS 3580.10.1: 2003 requires a statement to be included with results when all of the siting recommendations are not able to be satisfied. The Woolloowin and DES dust gauges are located such that a 120 degree skyward field is partially obscured by a building or treeline. Full satisfaction of AS recommendations is not possible to satisfy gauge security and access provisions.

Table c: Dust Deposition Results – Toombul

Location and Monitoring Period (midnight-midnight)	Dust Fallout (g/m ² /mth)	CoG Dust Fallout Goal (g/m ² /mth)	Comments
68 Kalinga St 22/06/09 – 22/07/09	1.2	4	Complies with Goals. Location does not meet requirements for siting due to proximity of buildings and trees.
Alma Rd 22/06/09 – 22/07/09	0.9	4	Complies with Goals. Location does not meet requirements for siting due to proximity of buildings and trees.
Toombul Indoor Sports Complex – Bage Street 22/06/09 – 22/07/09	0.6	4	Complies with Goals. Location does not meet requirements for siting due to proximity of buildings and trees.

Note: - All samples assessed at a NATA accredited laboratory.
 - AS 3580.10.1: 2003 requires a statement to be included with results when all of the siting recommendations are not able to be satisfied. All dust gauges are located such that a 120 degree skyward field is partially obscured by a building or treeline. Full satisfaction of AS recommendations is not possible to satisfy gauge security and access provisions.

4.4 Compliance with Air Quality Goals

One exceedance of the CoG air quality goals was recorded this month at Northern Busway Site. The result was a PM10 24hr avg level of 136.1 ug/m³ on the 14/8/09 (against the goal of 50ug/m³) which was recorded at the Lamington Ave Air Quality Station. Investigations indicate the exceedance was influenced by a backhoe working and site deliveries within close proximity to the unit without adequate dust suppression occurring during these activities. An NCR has been raised and distributed to the relevant parties.

Outcomes include:

- the purchase of a mobile water trailer to assist in suppression
 - regular visits / programming of water carts to visit the Busway area
 - toolbox talk to crew on dust management
- (Note: Air Quality EPP allows up to 5 instances of exceedances of the 24hr goal per calendar year)

5.0 Vibration Monitoring

TJH undertakes monitoring of vibration levels at a variety of locations across the project to help measure impacts and assist the team plan works and appropriate mitigations if required. Monitoring involves measuring peak particle velocity (mm/s) at a number of sensitive receptors.

Results of monitoring are compared to Vibration Goals nominated by the Coordinator General (Change Report October 2008) for the Airport Link and Northern Busway components of the project.

5.1 Overview of Vibration Mitigation Measures

The key strategies adopted during this monitoring period to mitigate vibration impacts during construction works have included:

1. Predictive modelling of anticipated risks and impacts.
2. Building condition surveys of properties which are likely to experience vibration levels in excess of the levels for minimal risk of cosmetic damage outlined in the CoG Report.
3. Selection of alternative construction equipment / methodology where possible
4. Review of monitoring data for the activities undertaken and checking the robustness of the predictive modelling.
5. Consideration when purchasing or hiring equipment that will meet the CoG goals.

5.2 Vibration Monitoring Results

Monitoring has been undertaken at Bowen Hills and Kedron during this monitoring period as a result of rock hammering, bored piling and tunnelling activities. Real-time monitoring data is collected though for the purpose of reporting all data is collated as shown in Tables a-d

Table a: Vibration Monitoring Results Summary – Bowen Hills

Location	Maximum Peak Particle Velocity (mm/s)	CoG Vibration Goal (mm/s)	Comments
Byrne Street sewer VSO manhole	16.6	25	Monitoring vibration impacts from local rock hammering
Byrne Street sewer North	5.4	25	Monitoring vibration impacts from local rock hammering
Byrne Street sewer South	1.2	25	Monitoring vibration impacts from local rock hammering
Formule 1 Hotel (external)	7.7*	5 / 10**	Monitoring vibration impacts from local rock hammering and tunnelling by roadheader.
28 Federation St	3.1	10	Monitoring vibration impacts from local rock hammering

*Impulsive result possibly from external source

** 5mm/sec for continuous vibration, 10mm/sec for transient (impulsive) vibration

Table b: Vibration Monitoring Results Summary – Truro St

Location	Monitoring Period	Monthly Average Peak Particle Velocity (mm/s)	CoG Vibration Goal (mm/s)	Comments
Truro Street Slip Lane	13/8/09	<0.03	5	Monitoring vibration impacts from 20 Tonne excavator working in the tunnel

Table c: Vibration Monitoring Results Summary – Kedron

Location	Monitoring Period	Maximum Peak Particle Velocity (mm/s)	CoG Vibration Goal (mm/s)	Comments
25 Park Tce	24/7/09	0.603	5	Monitoring vibration impacts from local bored / sheet piling operations.

Table d: Vibration Monitoring Results Summary – Toombul

Location	Monitoring Period	Event Peak Particle Velocity (mm/s)	CoG Vibration Goal (mm/s)	Comments
Site Boundary Lewis Street	29/07/2009 8:45-9:02am	0.175	5	Monitoring vibration impacts from d-wall operations in response to a community complaint.
Adj 83 Stuckey Road	29/07/2009 9:17 – 9:35am	0.333	5	Monitoring vibration impacts from bored piling in response to a community complaint.
916 Sandgate Road	29/07/2009 9:54 – 10:11am	0.746	5	Monitoring baseline vibration levels prior to commencement of driven piling.
Centro Toombul Site Offices	31/07/2009 11:06-11:22am	0.222	5	Monitoring baseline vibration levels prior to commencement of driven piling.
4 Wongara Street	31/07/2009 11:31-11:47am	0.698	5	Monitoring baseline vibration levels prior to commencement of driven piling.
First Airtrain pillar	31/07/2009	0.762	5	Monitoring baseline vibration

west Sandgate Road	11:53-12:13pm			levels prior to commencement of driven piling.
Ross Park	31/07/2009 12:16 – 12:32pm	0.730	5	Monitoring baseline vibration levels prior to commencement of driven piling.
4 Wongara Street	3/08/2009 10:51 – 11:20am	0.444	5	Monitoring vibration impacts from driven piling operations.
First Airtrain pillar west Sandgate Road	3/08/2009 2:19-2:35pm	0.540	5	Monitoring vibration impacts from driven piling operations.
916 Sandgate Road	3/08/2009 2:50-3:35pm	0.333	5	Monitoring vibration impacts from driven piling operations.
Median strip between 35 & 37 Lewis Street	4/08/2008 10:18-10:49am	1.64	5	Monitoring vibration impacts from sewer relocation activities in response to a community complaint.
First Airtrain pillar west Sandgate Road	4/08/2009 1:44-2:00pm	0.317	5	Monitoring vibration impacts from driven piling operations.
916 Sandgate Road	6/08/2009 2:28-2:52pm	0.317	5	Monitoring vibration impacts from driven piling operations.
First Airtrain pillar west Sandgate Road	7/08/2009 7:34-7:53am	0.460	5	Monitoring vibration impacts from driven piling operations.
First Airtrain pillar west Sandgate Road	14/08/2009 10:23-10:33am	0.667	5	Monitoring vibration impacts from driven piling operations.

5.3 Compliance with Vibration Goals

The values shown in Tables a-d do not identify any exceedances with Vibration Goals.

6.0 Community Enquiries and Complaints

190 community complaints were reported to the project between 15 July and 15 August 2009. Issues raised included:

Issues Raised: 15 Jul 2009 - 15 Aug 2009		
Issue	No.	No .of stakeholders
Site noise	51	23
Site dust	23	16
Site out-of-hours	23	19
Traffic Management	19	16
Roadheader noise	17	1
Parking	15	15
Roadheader out-of-hours	9	2
Worker Behaviour	8	8
Consultation	8	7
Site vibration	8	5
Haulage	8	8

General Construction	6	5
Driver Behaviour	6	6
Operational Air Quality	4	3
PUPs out-of-hours	4	4
Site lighting	3	2
Property Impacts	3	3
PUPs noise	3	3
PUPs reinstatement	3	3
Lane closure	3	3
Vehicle Damage	2	2
Flora/ Fauna	2	2
Water/Flooding	1	1
Safety	1	1
Events Matching Search	189	100

Top 5 issues raised:

