natural solutions
environmental consultants

Port of Brisbane Corporation

Final Report

Plant Survey of T1-3 Overflow & Car Precinct – Port of Brisbane (September 2008 Survey)

November 2008

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EXECUTIVE SUMMARY

Natural Solutions Environmental Consultants Pty Ltd have been commissioned by the Port of Brisbane Corporation (PBC) to undertake a plant survey along the T1-3 Overflow and Car Precinct areas located within the Port of Brisbane and to produce associated reporting. This is the third monitoring report detailing the results from the September 2008 plant survey.

The primary purpose for the on-going quarterly surveys is to monitor for any previously unrecorded incursions of weed species listed by the Australian Quarantine and Inspection Services (AQIS) that may arise on the sites (as listed in Appendix C). The secondary objective of the on-going quarterly surveys is to address the long-term management of these areas through continual monitoring of the occurrence and abundance of species considered to be exotic, including species declared under the *Land Protection (Stock Route Management) Regulations 2003* (LPR) and locally occurring weeds. Recommendations with respect to the ongoing management of plants within the T1-3 Overflow and Car Precinct areas are also provided.

Summary of Findings from the September 2008 Plant Surveys for the T1-3 Overflow Area

The following points summarise the findings of the September 2008 plant survey for the T1-3 Overflow area:

1. 49 plant species were recorded. This consisted of seven native species, three AQIS listed weed species and 39 exotic species;
2. The AQIS listed weed species recorded were Red Natal Grass (*Melinis repens*), Canadian Fleabane (*Conyza canadensis*) and Common Reed (*Phragmites australis*). Only one of these species, Canadian Fleabane, was not recorded during the previous June 2008 plant survey in this area (i.e. the remaining two species were recorded);
3. The recorded AQIS listed weed species occurred along the majority on the eastern side of the T1-3 Overflow area and within the constructed northern drain;
4. No individuals of the AQIS listed Siam Weed (*Chromolaena odorata*) were located during the plant survey;
5. No LPR declared species were located during the September 2008 plant survey;
6. Locally occurring exotic grasses such as Couch Grass (*Cynodon dactylon*) as well as exotic herbaceous species such as Sweet Melilotus (*Melilotus indicus*) and Cut-leaf Evening Primrose (*Oenothera laciniata*) were the dominant groups of exotic species observed throughout the majority of the T1-3 Overflow area;
7. Species diversity of AQIS listed weed species has remained consistent in comparison to the previous June 2008 survey results whilst abundance and coverage have declined; and
8. Species diversity of exotic species has slightly increased whilst abundance and coverage have remained relatively consistent in comparison to the previous June 2008 survey results.

Summary of Findings from the September 2008 Plant Surveys for the Car Precinct Area

The following points summarise the findings of the September 2008 plant survey for the Car Precinct area:

1. 61 plant species were recorded. This consisted of 12 native species, three AQIS listed weed species and 46 exotic species;
2. The AQIS listed weed species recorded were Common Reed (*Phragmites australis*), Red Natal Grass (*Melinis repens*) and Flax-leaf Fleabane (*Conyza bonariensis*). These species were recorded during the previous June 2008 plant survey in this area;
3. No individuals of the AQIS listed Siam Weed (*Chromolaena odorata*) were located during the plant survey;
4. Individuals of Groundsel (*Baccharis halimifolia*), Lantana (*Lantana camera*), Broad-leaved Peppertree (*Schinus terebinthfolia*) and Giant Parramatta Grass (*Sporobolus fertilis*), which are LPR declared species were recorded in the September 2008 plant survey. Only one of these species, Giant Parramatta Grass, was not recorded during the previous June 2008 plant survey in this area (i.e. the remaining three species were recorded);
5. Locally occurring exotic grass species such as Rhodes Grass (*Chloris gayana*) and Green Panic (*Megathyrsus maximus* var. *maximus*) as well as exotic herbaceous species such as Fireweed (*Senecio madagascariensis*), Wild Turnip (*Brassica toumefortii*) and Cut-leaf Evening Primrose (*Oenothera laciniata*) were the dominant exotic species observed throughout the majority of the Car Precinct area. Common Reed (*Phragmites australis*) was the dominant species in the wetter portions of the Car Precinct area such as within the trench and around the Visitor Lake;
6. Exotic species diversity has remained relatively consistent in comparison to the June 2008 plant survey results whereas abundance and coverage of exotic species has declined slightly; and
7. Species diversity, abundance and coverage of AQIS listed weed species have remained relatively consistent in comparison to the June 2008 plant survey results.

Summary of Recommendations

Recommendations regarding the long-term management of exotic species within the T1-3 Overflow and Car Precinct area are provided in this report. No specific recommendations are provided for the AQIS listed weed species that occur within the T1-3 Overflow and Car Precinct areas as current maintenance activities, such as slashing and spot spraying, are adequate measures to control such weeds. It is recommended that maintenance activities should include the removal of the LPR declared species. In addition, all areas within the T1-3 Overflow and Car Precinct area should be maintained as often as the more visible sections of the survey area, such as the roadside verge of Port Drive, are maintained (where practical and when necessary). It is also recommended that a more integrated and long term management of the weed species within the T1-3 Overflow and Car Precinct area is implemented through increasing the native plant cover.

1.0 INTRODUCTION

Natural Solutions Environmental Consultants Pty Ltd have been commissioned by the Port of Brisbane Corporation (PBC) to undertake regular surveys for weed species listed by Australian Quarantine and Inspection Service (AQIS) along the T1-3 Overflow and Car Precinct areas, Port of Brisbane[1] and to produce associated reporting detailing the findings from such surveys. In addition, plant species considered to be exotic/invasive including species declared under the *Land Protection (Stock Route Management) Regulations 2003* (LPR) and locally occurring weeds (hereafter collectively referred to as exotic species), and invasive natives are also included in the surveys and reporting.

These plant surveys have been implemented in response to a request from AQIS to increase surveillance for potential incursions of AQIS listed weed species that may be transported to the Port of Brisbane via newly arrived vehicles imported from overseas (as listed in Appendix C). Currently, vehicles imported to the Port of Brisbane facility are transported from the wharf areas via a road overpass and stored within the open hardstand areas of the T1-3 Overflow and Car Precinct areas. The potential therefore exists for the exotic seeds to spread and propagate in adjacent landscaped or grassy areas.

The surveys represent not only an immediate response to a potential weed incursion but are also part of a long-term monitoring program at the Port to survey for and identify weed species which may enter the country on containers or other materials shipped to and unloaded at the Port of Brisbane facility.

The plant surveys for T1-3 Overflow and Car Precinct Areas are currently planned to be undertaken on a three monthly interval over an initial 12 month monitoring period. This is the third report detailing the results from the September 2008 plant survey with previous reports prepared from surveys undertaken in:

- June 2008; and
- March 2008.

In addition, a Baseline Study was conducted in February 2008.

1.1 SITE DESCRIPTION

The plant surveys focus on the T1-3 Overflow and Car Precinct areas at the Port of Brisbane. The T1-3 Overflow and Car Precinct areas lie parallel to one another, with the Queensland Rail freight line separating these two areas, in the south-western portion of the Port of Brisbane (Figure 1).

The T1-3 Overflow area is situated along Port Drive and wraps around a large hardstand car parking area, extending past the car overpass and including a constructed drain located at the very northern end of the area (Figure 1). The T1-3 Overflow area consists of landscaped gardens and lawn on its western side and a sandy / gravel area on its eastern side. Its main purpose is to facilitate in absorbing and filtering excess stormwater that may potentially overflow from surrounding hardstand areas. The constructed drain in the northern section consists of a concrete channel surrounded by lawn designed to pipe stormwater runoff that has entered nearby stormwater drains out into the Brisbane River.

[1] The Port of Brisbane was originally called Fisherman Islands. Fisherman Islands however no longer exists as a location and is now known officially as Port of Brisbane.

The Car Precinct area is directly to the west of a large vehicle storage area (Figure 1). It takes in an area extending from the road overpass, situated at the northern end of the site, to around the entire edge of the Visitors Centre Lake (Figure 1). The Car Precinct area is a constructed drainage channel that comprises of a grass-lined trench with a series of concreted chutes that channel stormwater runoff from the hardstand vehicle storage facility to the east of the drain and into the trench. The trench provides drainage for excess water that may overflow from nearby areas, which is distributed either south through a stormwater outlet that flows into the Lake or north via a series of underground pipes and open drains and into the mouth of the Brisbane River.

Both of these areas currently have a regular maintenance schedule facilitated by the Port of Brisbane Corporation. This includes mowing and spraying for exotic species.

Figure 1 - T1-3 Overflow and Car Precinct Survey Areas

Port of Brisbane Corporation

Compiled	Compiled By	Project Manager	Reference	Datum	Scale @ A4	0 75 150 Meters
19-06-2008	AC	NL	J08031_Figure1_overflow	GDA94	1:5,000	

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2.0 METHODOLOGY

The third quarterly plant survey was undertaken on the 16 September 2008 (hereafter referred to as the September 2008 plant survey). The September 2008 plant survey for the T1-3 Overflow area consisted of four transects running the entire length of the eastern, northern, western and southern boundaries of the hardstand area and measuring approximately 2m wide. Another transect with the same width dimensions ran along both banks of the constructed drain just north of the hardstand area. Transects were undertaken on foot using the random meander technique to ensure the majority of the overflow area was surveyed. The presence and abundance of any AQIS listed weeds as well as exotic (i.e. species declared under the LPR and locally occurring weeds) or invasive species that occurred along the transects were recorded on data sheets (Appendix D).

The September 2008 plant survey for Car Precinct area consisted of two transects, which ran along the western and southern boundary of the vehicle storage area and one non-linear transect that ran around the entire edge of the Visitors Centre Lake. Transects were undertaken on foot using the random meander technique to ensure the majority of the drain (including the bed, bank and top of bank areas) and lake banks were surveyed. The presence and abundance of any AQIS listed weeds as well as exotic or invasive species that occurred along the transects were recorded on data sheets (Appendix D).

Any plant species from both survey areas that were unable to be immediately identified on the site, were collected and appropriately labelled for further detailed analysis. Plant identifications were carried out by experienced ecologists using available flora and botanical reference material, where necessary.

It is currently planned for the plant surveys of both the T1-3 Overflow and Car Precinct areas to be undertaken on a quarterly basis over an initial 12 month period and then on a six monthly interval, during autumn (around March) and spring (around October) of each year.

2.1 AQIS TARGET WEEDS LIST

AQIS has prepared a list of weed species identified as weeds of interest within the Port of Brisbane area. This list is contained in Appendix C.

3.0 FINDINGS

3.1 T1-3 OVERFLOW AREA

Appendix A contains a list of plant species recorded during the September 2008 plant survey. The following points summarise the findings of the September 2008 plant survey for the T1-3 Overflow area:

1. 49 plant species were recorded. This consisted of seven native species, three AQIS listed weed species and 39 exotic species;
2. The AQIS listed weed species recorded were included Red Natal Grass (*Melinis repens*), Canadian Fleabane (*Conyza canadensis*) and Common Reed (*Phragmites australis*). Only one of these species, Canadian Fleabane, was not recorded during the previous June 2008 plant survey in this area (i.e. the remaining two species were recorded);
3. The recorded AQIS listed weed species occurred along the majority on the eastern side of the T1-3 Overflow area and within the constructed northern drain;
4. No individuals of the AQIS listed Siam Weed (*Chromolaena odorata*) were located during the plant survey;
5. No LPR declared species were located during the September 2008 plant survey;
6. Locally occurring exotic grasses such as Couch Grass (*Cynodon dactylon*) as well as exotic herbaceous species such as Sweet Melilotus (*Melilotus indicus*) and Cut-leaf Evening Primrose (*Oenothera laciniata*) were the dominant groups of exotic species observed throughout the majority of the T1-3 Overflow area;
7. Species diversity of AQIS listed weed species have remained consistent in comparison to the previous June 2008 survey results whilst abundance and coverage have declined; and
8. Species diversity of exotic species has slightly increased whilst abundance and coverage have remained relatively consistent in comparison to the previous June 2008 survey results.

3.2 CAR PRECINCT AREA

Appendix B contains a list of plant species recorded during the September 2008 plant survey for the Car Precinct area. The following points summarises the findings of the September 2008 plant survey for the Car Precinct:

1. 61 plant species were recorded. This consisted of 12 native species, three AQIS listed weed species and 46 exotic species;
2. The AQIS listed weed species recorded were Common Reed (*Phragmites australis*), Red Natal Grass (*Melinis repens*) and Flax-leaf Fleabane (*Conyza bonariensis*). These species were recorded during the previous June 2008 plant survey in this area;
3. No individuals of the AQIS listed Siam Weed (*Chromolaena odorata*) were located during the plant survey;
4. Individuals of Groundsel (*Baccharis halimifolia*), Lantana (*Lantana camera*) and Broad-leaved Peppertree (*Schinus terebinthfolia*) and Giant Parramatta Grass (*Sporobolus fertilis*), which are LPR declared species were recorded in the September 2008 plant survey. Only one of these species, Giant Parramatta Grass, was not recorded during the previous June 2008 plant survey in this area (i.e. the remaining three species were recorded);
5. Locally occurring exotic grass species such as Rhodes Grass (*Chloris gayana*) and Green Panic (*Megathyrsus maximus* var. *maximus*) as well as exotic herbaceous species such as Fireweed (*Senecio madagascariensis*), Wild Turnip (*Brassica toumefortii*) and Cut-leaf Evening Primrose (*Oenothera laciniata*) were the dominant exotic species observed throughout the majority of the Car Precinct area. Common Reed

(*Phragmites australis*) was the dominant species in the wetter portions of the Car Precinct area such as within the trench and around the Visitor Lake;

6. Exotic species diversity has remained relatively consistent in comparison to the June 2008 plant survey results whereas abundance and coverage of exotic species has declined slightly; and
7. Species diversity, abundance and coverage of AQIS listed weed species have remained relatively consistent in comparison to the June 2008 plant survey results.

4.0 DISCUSSION

4.1 T1-3 OVERFLOW AREA

4.1.1 Weed Species Observed at T1-3 Overflow Area

The September 2008 plant survey along the T1-3 Overflow area has identified a total number of 49 plant species. Of these, three are AQIS listed weed species and 39 are considered exotic.

The three AQIS listed weed species located within the T1-3 Overflow area during the September 2008 plant survey were Red Natal Grass (*Melinis repens*), Canadian Fleabane (*Conyza canadensis*) and Common Reed (*Phragmites australis*). These AQIS listed weed species generally occur throughout the Port of Brisbane area and are common weeds that are found in most disturbed areas within the Brisbane region. Nonetheless, the removal of these species and gradual replacement with native species is still recommended.

No LPR declared species were recorded during the September 2008 plant survey. This result is consistent with the previous June 2008 plant survey results. Unlike the previous June 2008 plant survey, no species listed as either a noxious or environmental weed by Brisbane City Council (BCC) were detected in the September 2008 plant survey.

4.1.2 Comparisons between T1-3 Overflow Surveys

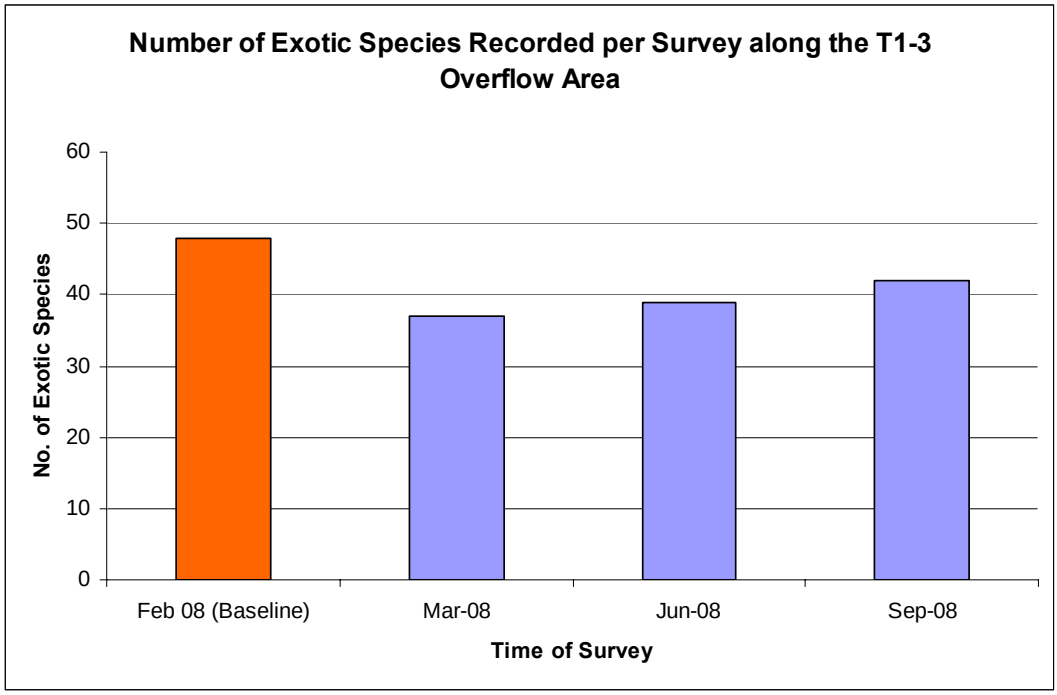
Three AQIS listed species were recorded during the September 2008 plant survey of the T1-3 Overflow area. All three species have been recorded at some stage of the T1-3 Overflow monitoring surveys (i.e. either from the June and/or March 2008 plant survey and/or the February 2008 baseline survey). Flax-leaf Fleabane (*Conyza bonariensis*), which was recorded in all the previous surveys, was not recorded in the current September 2008 plant survey. Although a slight variation in the type of AQIS species recorded is evident between the current survey (i.e. September 2008 plant survey) and all previous survey results, the diversity of AQIS listed species has remained consistent between the surveys. Furthermore the abundance and coverage of AQIS listed species within the T1-3 Overflow area has slightly declined since the June 2008 plant survey.

A comparison between the results from the September 2008 and all previous survey results indicates that a slight variation exists between the numbers of exotic species recorded (i.e. diversity levels). However the results of the dominant family group for the September 2008 plant survey has remained relatively consistent in comparison with the previous surveys.

Table 1 and Graph 1 highlights and compares the number of exotic species identified in each plant survey as well as the February 2008 Baseline Survey of the T1-3 Overflow area.

TABLE 1 NUMBER OF EXOTIC SPECIES RECORDED PER SURVEY FOR THE T1-3 OVERFLOW AREA

SURVEY	NUMBER OF EXOTIC SPECIES RECORDED
Baseline Survey (Feb 08)	48
March 2008 Plant Survey	37
June 2008 Plant Survey	39
September 2008 Plant Survey	42



Graph 1 Number of Exotic Species Recorded per Survey along the T1-3 Overflow Area

Table 2 outlines the numbers of exotic species within each family that were recorded in the February 2008 baseline survey, March, June and September 2008 plant surveys.

TABLE 2 NUMBER OF EXOTIC SPECIES BY FAMILY FOR THE T1-3 OVERFLOW AREA

FAMILY	NUMBER OF EXOTIC SPECIES			
	FEB 08 BASELINE SURVEY	MAR 08	JUNE 08	SEP 08
Asteraceae	6	8	9	12
Poaceae	8	6	7	8
Fabaceae	11	8	5	5
Amaranthaceae	2	2	2	2
Brassicaceae	1	1	2	2
Onagraceae	1	1	2	2
Apiaceae	1	1	1	1
Caryophyllaceae	0	0	0	1
Commelinaceae	0	1	1	1
Cyperaceae	3	0	1	1
Malvaceae	2	1	1	1
Portulacaceae	2	2	1	1
Plantaginaceae	1	1	1	1
Primulaceae	1	1	1	1
Rubiaceae	1	1	1	1
Solanaceae	2	1	1	1
Verbenaceae	1	1	1	1
Boraginaceae	1	0	0	0
Chenopodiaceae	1	0	1	0
Euphorbiaceae	2	1	1	0
Papaveraceae	1	0	0	0
Typhaceae	0	0	0	0

Shading indicates dominant family groups

From the data contained in Tables 1 and 2 as well as in Graph 1 the following can be deduced:

1. There has been a slight increase in the number of exotic species recorded during the September 2008 survey within the T1-3 Overflow area since the June and March 2008 plant survey, however the number of exotic species recorded during the September 2008 plant survey is still lower than the number of exotic species recorded during the baseline survey in February 2008;
2. Alterations in the timing of maintenance activities prior to surveys across the T1-3 Overflow area as well as changes in weather conditions (i.e. from conditions that are generally considered to favour plant growth to conditions that hinder plant growth), were considered to be the contributing factors for the variation in

diversity, abundance and coverage between the February 2008 baseline survey, March and June 2008 plant survey;

3. For the September 2008 plant survey maintenance activities occurred only a few weeks prior to the survey, which was similar to the timing of maintenance activities prior to the June 2008 plant survey maintenance activities. Therefore coverage and abundance levels appeared to be similar to the low levels that were recorded during the June 2008 plant survey;
4. Lower abundance and coverage can reduce species competition and allows a more diverse community of exotic species to grow. As for the June 2008 plant survey, this factor may have resulted in higher recordings in the number of exotic species. However contrary to the June 2008 plant survey, the months preceding the September 2008 plant survey consisted of fairly good weather conditions, such as above average rainfall totals (see Section 4.3). This may have produced higher plant growth rates and therefore a greater number of exotic species to grow resulting in the slightly higher recording in the number of exotic species for the September 2008 plant survey in comparison to the June 2008 plant survey;
5. Low abundance and coverage also increases the delectability of different exotic species, which may have also contributed to a higher number of exotic species to be recorded in the September 2008 plant survey; and
6. The Asteraceae was the dominant family in the September 2008 plant survey. This family was also dominant in the previous June 2008 plant survey.

4.2 CAR PRECINCT AREA

4.2.1 Weed Species Observed at the Car Precinct Area

The September 2008 plant survey along the Car Precinct area identified a total number of 61 plant species. Of these, three are AQIS listed weed species and 46 are considered exotic.

The three AQIS listed weed species that were located within the Car Precinct area during the September 2008 plant survey were Common Reed (*Phragmites australis*), Red Natal Grass (*Melinis repens*) and Flax-leaf Fleabane (*Conyza bonariensis*). These species were also recorded in all the previous surveys and generally occur throughout the Port of Brisbane area. These species are common weeds that are found in most disturbed areas within the Brisbane region. Nonetheless, the removal of these weeds and the gradual replacement with native species is still recommended.

Four declared weeds listed under the LPR were recorded within the Car Precinct area during the September 2008 plant survey. The species, their Class under the LPR and abundance / indicative locations are outlined in Table 3. Under the LPR landholders are obliged to attempt to remove Class 2 species and encouraged to remove Class 3 species. Therefore consideration should be given to remove these declared species and control further establishment.

TABLE 3 THE CLASS AND ABUNDANCE OF THE LPR DECLARED SPECIES RECORDED DURING THE CAR PRECINCT AREA SURVEY SEPTEMBER 2008

CLASS	SPECIES	ABUNDANCE/LOCATION
Class 2 pest	Groundsel Bush (*Baccaris halimifolia*)	Few individuals along the western portion of the drain
	Giant Parramatta Grass (*Sporobolus fertilis*)	Clump found along the western portion of the drain near the train tracks
Class 3 pests	Lantana (*Lantana camera*)	Few individuals along the banks of the Visitor Centre Lake.
	Broad-leafed Peppertree (*Schinus terebinthifolia)*	Numerous individuals along the banks of the Visitor Centre Lake.

Groundsel Bush, Lantana and Broad-leafed Peppertree have been detected at some stage during the previous surveys of the Car Precinct area. Furthermore the abundance of these species has remained relatively consistent since the previous plant surveys. However Giant Parramatta Grass has not been previously recorded within the Car Precinct area.

The lack of previous detection of Giant Parramatta Grass could be a result of a recent outbreak occurring after the June 2008 plant survey. On the other hand, the lack of detection of this species could also be attributed to general survey limitations that may have produced a false-absence record during the previous surveys (i.e. the species is present, but is not detected). For example, immature individuals of this species may have been present but were not recorded due to the difficultly in detecting their presence.

Whilst not listed under LPR, Caster Oil Plant (*Ricinus communis*), Johnson Grass (*Sorghum halepense*), Wild Aster (*Aster subulatus*), Purple Morning Glory (*Ipomoea indica*) and Mile-a-Minute (*Ipomoea cairica*) are listed as environmental / noxious weeds by the BCC and were detected in the September 2008 plant survey. All of these species were also detected in the June 2008 plant survey.

4.2.2 Comparisons between Car Precinct Area Surveys

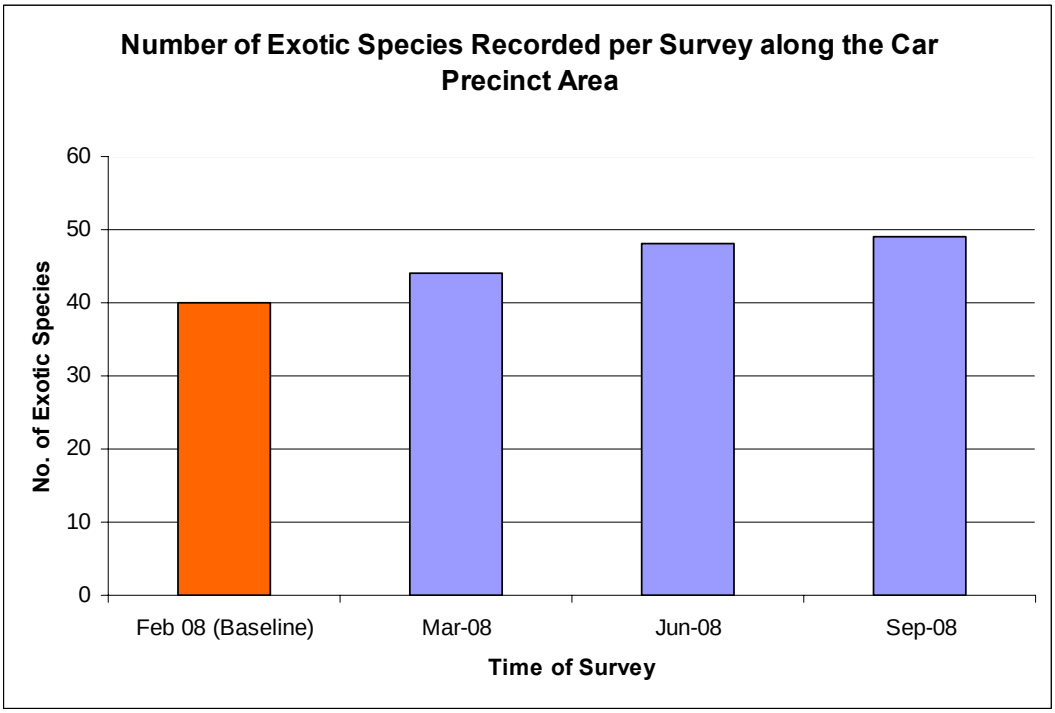
Three AQIS listed species were recorded during the September 2008 plant surveys of the Car Precinct area and these same species were recorded in previous surveys of the area. Species diversity, abundance and coverage of AQIS listed species recorded during the current survey (September 2008) has remained consistent since the previous survey results (i.e. June 2008).

Analysis of the survey data indicates that between the February 2008 baseline survey and June 2008 plant survey the number of exotic species recorded increased. However between the June 2008 plant survey and the September 2008 plant survey the number of exotic species recorded has remained relatively consistent. Furthermore results of the dominant family group have also remained consistent between all the surveys.

Table 4 and Graph 2 highlights and compares the number of exotic species identified in each plant surveys as well as the February 2008 Baseline Survey of the Car Precinct area.

TABLE 4 NUMBER OF EXOTIC SPECIES RECORDED PER SURVEY FOR THE CAR PRECINCT AREA

SURVEY	NUMBER OF EXOTIC SPECIES RECORDED
Baseline Survey (Feb 08)	40
March 2008 Plant Survey	44
June 2008 Plant Survey	48
September 2008 Plant Survey	49



Graph 2 Number of Exotic Species Recorded per Survey along the Car Precinct Area

Table 5 outlines the number of exotic species within each family that were recorded in the February 2008 baseline, March 2008, June 2008 and September 2008 plant surveys.

TABLE 5 NUMBER OF EXOTIC SPECIES BY FAMILY FOR THE CAR PRECINCT AREA

FAMILY	NUMBER OF EXOTIC SPECIES			
	FEB 08 BASELINE SURVEY	MAR 08	JUNE 08	SEP 08
Asteraceae	8	11	13	14
Poaceae	6	9	9	10
Fabaceae	5	7	5	5
Verbenaceae	0	2	2	3
Brassicaceae	1	0	2	2
Euphorbiaceae	3	0	3	2
Convolvulaceae	2	2	2	2
Onagraceae	1	1	1	2
Amaranthaceae	3	2	1	1
Anacardiaceae	1	1	1	1
Boraginaceae	0	0	0	1
Cyperaceae	2	2	2	1
Commelinaceae	0	1	1	1
Malvaceae	1	1	1	1
Plantaginaceae	0	1	1	1
Primulaceae	1	1	1	1
Solanaceae	1	1	1	1
Polygonaceae	0	1	1	0
Portulacaceae	2	1	1	0
Typhaceae	0	0	0	0
Apocynaceae	1	0	0	0
Oxalidaceae	1	0	0	0
Rubiaceae	1	0	0	0

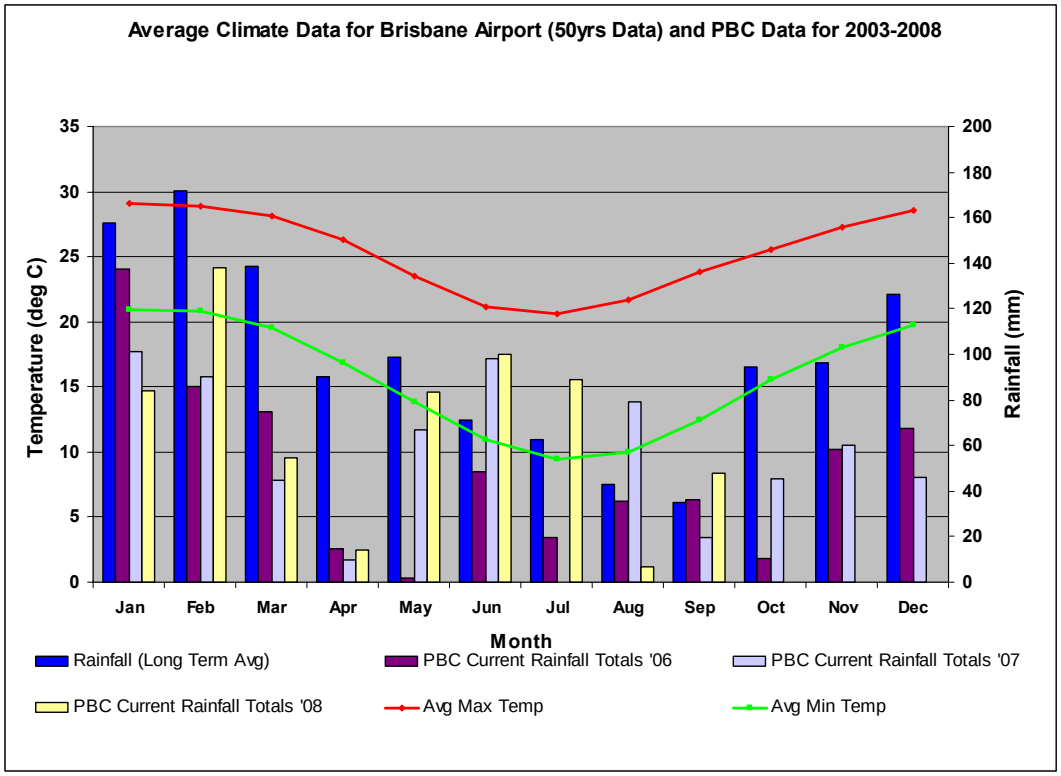
Shading indicates dominant family group

The above Tables 4 and 5 as well as Graph 2 indicate:

1. From the February 2008 baseline survey and the June 2008 plant survey there has been a gradual increase in the number of exotic species within the Car Precinct area. However recent results (September 2008) indicate a possible plateau in the number of exotic species within the Car Precinct area;
2. Alterations in the timing of maintenance activities prior to surveys across the Car Precinct area as well as changes in weather conditions (i.e. from conditions that are generally considered to favour plant growth to conditions that hinder plant growth), were considered to be the contributing factors for the variation in diversity, abundance and coverage between the February 2008 baseline survey, March and June 2008 plant survey;
3. The timing of maintenance activities prior to the September 2008 plant survey (i.e. 2 months prior) across the majority of the Car Precinct area was similar to the timing prior to the June 2008 plant survey. However unlike the June 2008 plant survey, maintenance around the Visitor Lake occurred approximately one week prior to the September 2008 plant survey. This produced slightly lower abundance and coverage in exotic species for the current survey compared to the June 2008 plant survey;
4. Weather conditions that are considered favourable to plant growth (i.e. above average rainfall totals) occurred over the months preceding the September 2008 plant survey (see Section 4.3). It was therefore expected that with the combination of good weather conditions and low abundance and coverage, a more diverse community of exotic species would have grown and a higher number of exotic species would have been recorded for the September 2008 plant survey. However exotic species numbers for the September 2008 plant survey were relatively consistent with the June 2008 plant survey even though the months preceding the June 2008 plant survey received poor weather conditions (i.e. not conducive to plant growth) (see Section 4.3). Similarities in exotic species numbers between the two surveys is most likely attributed to the fact that some maintenance activities were undertaken just a week prior to the September 2008 survey, which would not only lower abundance and coverage but would remove the majority of exotic species growing in that area of the Car Precinct. The recent maintenance would have also removed identifying features of the exotic vegetation, making it harder to detect and thus record exotic species; and
5. Dominance in the Asteraceae family has remained consistent for all surveys.

4.3 WEATHER CONDITIONS

The following graph (Graph 3) illustrates the broad climatic conditions from 2006 – 2008 including the rainfall recorded at the Port of Brisbane as well as the long term rainfall and temperature averages (taken from the Brisbane Airport).



Graph 3 Long-term Climatic Averages compared with the Port of Brisbane Rainfall Data

The following can be derived from this data with respect to the plant growth around T1-3 Overflow and Car Precinct areas:

- The end of 2007 comprised of a significant period of rainfall, which broke an extended dry period that the South East Queensland region was experiencing (Figure 4). This reprieve in harsh climatic conditions would have allowed a greater amount of exotic species to regerminate and grow extensively throughout both areas. This is indicated by the high exotic species diversity and coverage recorded in the February 2008 baseline survey;
- Rainfall rates and totals as well as temperatures generally decline during the season of autumn. Particularly for the months of April and May in 2008, rainfall totals were well below long term averages (Figure 4). Such weather conditions reduce or halt the growth rate of plants and could have contributed to the decline in abundance and coverage of both exotic and AQIS listed species, which was observed within most areas of the Car Precinct and T1-3 Overflow area during the June 2008 plant survey;
- Lower coverage and abundance leads to a decrease in species competition and allows a greater number of exotic species to occur in an area and may allow the species that are usually out-competed by more aggressive and dominant exotic species to be recorded / occur. This situation would have contributed to the general higher diversity levels recorded during the June 2008 plant survey;
- Although temperatures have continued to be low over the months preceding the September 2008 plant survey, rainfall totals have been well above average for the June and July months before the current survey (Figure 4). An increase in the availability of water in the soil profile produces favourable conditions for plants and can result in an increase in growth rates. This increase may have contributed to the increase in exotic species numbers that were recorded along the T1-3 Overflow area. Furthermore, regardless of maintenance along the T1-3 Overflow area occurring only a few weeks prior to the September 2008 plant survey,

abundance and coverage were able to return to the similar levels that were recorded during the June 2008 plant survey possibly due to these favourable conditions; and

- Due to the timing of maintenance in some portions of the Car Precinct area occurring only one week prior to the September 2008 plant survey, the favourable weather conditions could not have a contributing effect on abundance, coverage and diversity levels of a large survey portions of the Car Precinct area. Therefore the timing of maintenance is considered to be the main influencing factor, which caused a slight decrease in abundance and coverage and relatively consistent diversity recordings.

5.0 RECOMMENDATIONS

The current weed management program of the T1-3 Overflow and Car Precinct areas consists of general landscaping maintenance activities such as spot spraying / hand pulling of exotic species, tending to garden beds and mowing of the lawns. This approach appears to be successful in reducing weed coverage and amount of exotic species in some locations of the survey areas, particularly along roadsides. Maintenance of these areas receives the greatest attention as these areas are more visible to the public and there is a maintenance contract in place, which ensures that these areas are maintained on a regular basis. However this means that other less visible areas, such as along the eastern side of the T1-3 Overflow area as well as the western side of the Car Precinct are not maintained as often as the more visible areas.

This has previously been observed particularly in the summer months (i.e. during the February 2008 baseline survey and March 2008 plant survey) to allow exotic species abundance and coverage to increase to substantial levels in these portions of the survey area. Even during the end of the winter months when plant growth generally declines (i.e. September 2008 plant survey) exotic species within areas that receive less frequent maintenance are able to grow to a point where they can produce seeds or propagules and thus spread further across the survey area and Port of Brisbane. This therefore highlights the need to implement greater measures in these sections to ensure exotic species coverage is kept to a minimum in all areas of the survey at all times / seasons.

There appears to be little change in the abundance and coverage of LPR declared species that were recorded in the previous June 2008 plant survey. In particular individual shrubs / trees of Lantana and Broad-leafed Peppertree that were observed around the Visitor Lake in the previous June 2008 plant survey were observed again in the current September 2008 plant survey. This is most likely a result of the maintenance methods employed along the lake. Maintenance in the form of mowing and slashing occurs around the lake up until the banks where vegetation both native and exotic is left to provide habitat for the waterbirds as well to stabilise the banks. Therefore any exotic species, including LPR declared species located close to the bank can potentially be left untreated. It is therefore recommended that the identification and removal of LPR declared species should be included as part of the routine maintenance and management of the Visitor Centre Lake. Furthermore attention should also be given to the identification and removal of LPR declared Giant Parramatta Grass, which was recently observed in the September 2008 plant survey.

The AQIS listed weed species that were located within both the T1-3 Overflow and Car Precinct area are common weeds found throughout the Brisbane region. Current maintenance activities such as slashing and spot spraying are adequate measures to control AQIS listed weeds as demonstrated by the observed decline in abundance and coverage or diversity of AQIS listed species across the T1-3 Overflow and Car Precinct areas.

Planting native vegetation is a technique often employed in weed management. Increasing the native understorey diversity increases competition for resources and assists in exotic species suppression. Such measures for the long-term management of exotic species occurring within the survey areas should be integrated into the current weed management programs for both the T1-3 Overflow and Car Precinct Areas.

The following recommendations are therefore made for the T1-3 Overflow and Car Precinct areas:

- All survey areas are to be regularly maintained. Areas less visible i.e. the eastern side of the T1-3 Overflow area and the western side of the Car Precinct should be maintained as often (where practicable) as the other sections of the survey area, when required;
- An attempt should be made to remove all LPR declared species and their specific identification and removal should be included as part of routine maintenance and management of the areas, particularly for the Visitor Centre Lake;
- A recommended planting schedule of native species and appropriate densities should be prepared for the western and southern trench of the Car Precinct area and the northern drain in the T1-3 Overflow area; and
- Continue programmed monitoring of the diversity and abundance levels of exotic species within the T1-3 Overflow and Car Precinct area through quarterly plant surveys for the first year of surveying and then bi-annual surveys following this.

6.0 REFERENCES

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APPENDIX A Survey Results of T1-3 Overflow Area

SPECIES	COMMON NAME	AQIS LISTED	LPR CLASS	SEP 08 PLANT SURVEY	JUNE 08 PLANT SURVEY	MAR 08 PLANT SURVEY	FEB 08 BASELINE SURVEY
Aizoaceae							
*Carpobrotus glaucescens**	Pigface*	-	-	X		X	X
*Sesuvium portulacastrum**	Sea Purslane*	-	-				X
Amaranthaceae							
Alternanthera pungens	Khaki Weed						
Amaranthus viridis	Green Amaranths	-	-	X	X	X	X
Gomphrena celosioides	Gomphrena Weed	-	-	X	X	X	X
Anacardiaceae							
Schinus terebinthifolius	Broad-leaved Peppertree	-	3				
Apiaceae							
Hydrocotyle ranunculoides	Pennywort	-	-	X	X	X	X
Asclepiadaceae							
Gomphocarpus physocarpus	Balloon Cotton Bush	-	-				
Asparagaceae							
Asparagus aethiopicus cv. Sprengeri	Asparagus Fern	-	3				
Asteraceae							
Ageratum houstonianum	Blue Billy-Goat	-	-	X			
Aster subulatus	Wild Aster	-	-		X		
Baccharis halimifolia	Groundsel Bush	-	2			X	
Bidens pilosa	Cobblers Pegs	-	-	X	X		X
Calyptocarpus vialis	Creeping Cinderella Weed	-	-	X	X		
Conyza bonariensis	Faxleaf Fleabane	✓	-		X	X	X
Conyza canadensis	Canadian Fleabane	✓	-	X		X	X
Conyza sumatrensis	Tall Fleabane	-	-	X			
Crassocephalum crepidioides	Thickhead	-	-	X	X	X	
Emilia sonchifolia	Emilia	-	-	X	X		
Gamochaeta sp.	A Cudweed	-	-	X			
Hypochaeris radicata	Flatweed	-	-	X		X	X
Senecio madagascariensis	Fireweed	-	-	X	X	X	X

SPECIES	COMMON NAME	AQIS LISTED	LPR CLASS	SEP 08 PLANT SURVEY	JUNE 08 PLANT SURVEY	MAR 08 PLANT SURVEY	FEB 08 BASELINE SURVEY
Sonchus oleraceus	Rough Sow Thistle	-	-	X	X	X	X
Tagetes minuta	Stinking Roger	-	-			X	
Tridax procumbens	Tridax Daisy	-	-	X	X	X	X
Brassicaceae							
Brassica tournefortii	Wild Turnip	-	-	X	X		
Lepidium africanum	Common Peppercress	-	-	X	X	X	X
Boraginaceae							
Heliotropium amplexicaule	Blue Heliotrope	-	-				X
Cactaceae							
Opuntia sp	Prickly Pear	-	2				
Caryophyllaceae							
Cerastium glomeratum	Sticky Mouse-ear Chickweed	-	-	X			
Casuarinaceae							
*Casuarina littoralis**	Black Sheoak*	-	-				X
Chenopodiaceae							
Chenopodium ambrosioides	Mexican Tea	-	-				X
Einadia sp.	-	-	-		X		
Commelinaceae							
Commelina benghalensis	-	-	-			X	
Commelina diffusa (C. cyanea)	Wandering Jew	-	-	X	X		
Convolvulaceae							
Ipomoea so (alba)	White Ipomoea	-	-				
Ipomoea cairica	Mile-a-Minute	-	-				
*Ipomoea pes-caprae**	Goats Foot Convolves*	-	-	X	X	X	X
Cyperaceae							
Cyperus difformis	Rice Sedge	-	-				X
Cyperus eragrostis	Umbrella Sedge	-	-	X			X
*Cyperus exaltatus**	Giant Sedge*	-	-				
Cyperus involucratus	-	-	-		X		X
Cyperus polystachuos	-	-	-				
*Isolepsis cernua**	Nodding Club Rush*	-	-		X		
Euphorbiaceae							
Chamaesyce maculata	Caustic Weed	-	-				

SPECIES	COMMON NAME	AQIS LISTED	LPR CLASS	SEP 08 PLANT SURVEY	JUNE 08 PLANT SURVEY	MAR 08 PLANT SURVEY	FEB 08 BASELINE SURVEY
Euphorbia hirta	Asthma Plant	-	-				
Chamaesyce prostrata	Red Caustic Creeper	-	-		X	X	X
Euphorbia sp.	Spurge	-	-				
Phyllanthus virgatus	Creeping Phyllanthus	-	-				
Ricinus communis	Castor Oil Bush	-	-				X
Fabaceae							
Crotalaria incana	Woolly Rattle Pod	-	-			X	
Crotalaria lanceolata subsp. *lanceolata*	Lance-leaf Rattle Pod	-	-		X	X	X
Crotalaria pallida	Rattle Pod	-	-				
*Cullen tenax**	Emu Foot*	-	-	X			
Desmodium uncinatum	Silver Leafed Desmodium	-	-				
Indigofera hirsuta	Hairy Indigo	-	-			X	X
*Lotus cruentus**	Redflower Lotus*	-	-	X			
Macroptilium atropurpureum	Siratro	-	-	X	X	X	X
Macroptilium lathyroides	Phasey Bean	-	-			X	X
Medicago lupulina	Black Medic	-	-	X		X	X
Medicago polymorpha	Burr Medic	-	-				
Medicago sativa	Lucerne	-	-				
Melilotus albus	Bokhara	-	-				X
Melilotus indicus	Sweet Melilotus	-	-	X	X		X
Neonotonia wightii	Glycine	-	-				X
Swainsona galegifolia	Smooth Darling Pea	-	-				X
*Sesbania cannabina**	Sesbania Pea*	-	-	X	X	X	X
Stylosanthes hamata	Verano Stylo	-	-	X	X	X	X
Trifolium repens	White Clover	-	-	X	X	X	X
*Vigna marina**	Yellow Beach Bean*	-	-				
Malvaceae							
Sida cornifolia	Flannel Weed	-	-				X
Sida rhombifolia	Common Sida	-	-	X	X	X	X
Onagraceae							
Oenothera drummondii subsp. *drummondii*	Beach Primrose	-	-	X	X	X	X

SPECIES	COMMON NAME	AQIS LISTED	LPR CLASS	SEP 08 PLANT SURVEY	JUNE 08 PLANT SURVEY	MAR 08 PLANT SURVEY	FEB 08 BASELINE SURVEY
Oenothera laciniata	Cut-leaf Evening Primrose	-	-	X	X		
Oxalidaceae							
Oxalis corniculata	Creeping Oxalis	-	-				
Papaveraceae							
Argemone ochroleuca var. *ochroleuca*	Mexican Poppy	-	-				X
Passifloraceae							
Passiflora cairica	Stinking Passion Vine	-	-				
Passiflora subpeltata	White Passion Flower	-	-				
Plantaginaceae							
Plantago lanceolata	Lamb's Tongue	-	-	X	X	X	X
Poaceae							
Brachiaria decumbens	Signal Grass	-	-	X		X	
Brachiaria mutica	Para Grass	-	-				
Cenchrus ciliaris	Buffel Grass	-	-				
Cenchrus echinatus	Mossman River Grass	-	-	X	X	X	X
Chloris gayana	Rhodes Grass	-	-	X	X	X	X
Chloris truncata	Windmill Grass	-	-		X		X
Chloris virgata	Feather-top Rhodes Grass	-	-		X	X	X
Cynodon dactylon	Couch Grass	-	-	X		X	X
Dichanthium aristatum	Angleton Grass	-	-				
Digitaria ciliaris	Summer Grass	-	-				
Eleusine indica	Crowsfoot Grass	-	-				
Eragrostis tenuifolia	Elastic Grass	-	-	X			
Hemarthria uncinata	Mat Grass	-	-				
*Imperata cylindrical**	Blady Grass*	-	-			X	X
Lolium x hybridum	A Ryegrass	-	-	X			
Melinis repens	Red Natal Grass	✓	-	X	X	X	X
Melinis minutiflora	Molasses Grass	-	-				
Poa annua	Winter Grass	-	-				
Panicum effusum	Hairy Panic	-	-				
Panicum maximum	Green Panic	-	-	X	X		X
Paspalum dilatatum	Paspalum	-	-		X		

SPECIES	COMMON NAME	AQIS LISTED	LPR CLASS	SEP 08 PLANT SURVEY	JUNE 08 PLANT SURVEY	MAR 08 PLANT SURVEY	FEB 08 BASELINE SURVEY
*Phragmites australis**	Common Reed*	✓	-	X	X		
Setaria sp.	Pigeon Grasses	-	-				X
Sorghum halepense	Johnson Grass	-	-				
Urochloa mosambicensis	Sabi Grass	-	-				
Portulacaceae							
Portulaca pilosa	Hairy Pigweed	-	-	X	X	X	X
Portulaca oleracea	Pigweed	-	-			X	X
Primulaceae							
Anagallis arvensis	Scarlet Pimpernel	-	-	X	X	X	X
Rubiaceae							
Richardia brasiliensis	Mexican Clover	-	-	X	X	X	X
Sapindaceae							
Cardiospermum halicacabum	Balloon Vine	-	-				
Dodonaea triquetra	Hop Bush	-	-				
Solanaceae							
Physalis ixocarpa	Ground Cherry	-	-				X
Solanum seaforthianum	Brazilian Nightshade	-	-		X		
Solanum nigrum	Blackberry Nightshade	-	-	X		X	X
Typhaceae							
Typha orientalis	Cumbungi / Typha*	-	-	X	X		X
Ulmaceae							
Celtis sinensis	Chinese Celtis	-	3				
Verbenaceae							
Lantana camara	Lantana	-	3				
Lantana montevidensis	Creeping Lantana	-	3				
Verbena bonariensis	Purple Top	-	-				
Verbena aristigera	Mayne's Pest	-	-	X	X	X	X
Vitex trifolia var *trifolia**	Coastal Vitex*	-	-				

Notes: -

- * designates indigenous species
- LPR – *Land Protection (pest and stock route management) Regulations* 2003, Schedule 2.

APPENDIX B Car Precinct Survey Results

SPECIES	COMMON NAME	AQIS LISTED	LPR CLASS	SEP 08 PLANT SURVEY	JUINE 08 PLANT SURVEY	MAR 08 PLANT SURVEY	FEB 08 BASELINE SURVEY
Aizoaceae							
*Carpobrotus glaucescens**	Pigface*	-	-			X	X
*Sesuvium portulacastrum**	Sea Purslane*	-	-	X	X	X	X
*Tetragonia tetragonoides**	New Zealand Spinach*	-	-		X		
Amaranthaceae							
Alternanthera pungens	Khaki Weed	-	-				X
Amaranthus viridis	Green Amaranths	-	-	X	X	X	X
Gomphrena celosioides	Gomphrena Weed	-	-			X	X
Anacardiaceae							
Schinus terebinthifolius	Broad-leaved Peppertree	-	3	X	X	X	X
Apocynaceae							
Catharanthus roseus	Pink Periwinkle	-	-				X
Asclepiadaceae							
Gomphocarpus physocarpus	Balloon Cotton Bush	-	-				
Asparagaceae							
Asparagus aethiopicus cv. Sprengeri	Asparagus Fern	-	3				
Asteraceae							
Ageratum houstonianum	Blue Billy-Goat	-	-	X	X	X	X
Aster subulatus	Wild Aster	-	-	X	X	X	
Baccharis halimifolia	Groundsel Bush	-	2	X	X	X	X
Bidens pilosa	Cobblers Pegs	-	-	X	X	X	X
Conyza bonariensis	Flaxleaf Fleabane	✓	-	X	X	X	
Conyza canadensis	Canadian Fleabane	✓	-			X	X
Conyza sumatrensis	Tall Fleabane	-	-	X			
Crassocephalum crepidioides	Thickhead	-	-	X	X	X	
Emilia sonchifolia	Emilia	-	-	X	X		
Hypochaeris radicata	Flatweed	-	-	X	X	X	X
Onopordum acanthium	Scotch Thistle	-	-	X	X		
Pseudognaphalium	Jersey	-	-	X	X		

SPECIES	COMMON NAME	AQIS LISTED	LPR CLASS	SEP 08 PLANT SURVEY	JUINE 08 PLANT SURVEY	MAR 08 PLANT SURVEY	FEB 08 BASELINE SURVEY
luteoalbum	cudweed						
Senecio madagascariensis	Fireweed	-	-	X	X	X	X
Sonchus oleraceus	Rough Sow Thistle	-	-	X	X		X
Sphagneticola trilobata	Singapore Daisy	-	3				
Tridax procumbens	Tridax Daisy	-	-	X	X	X	X
Tagetes minuta	Stinking Roger	-	-			X	
Brassicaceae							
Brassica tournefortii	Wild Turnip	-	-	X	X		
Lepidium africanum	Common Peppercress	-	-	X	X		X
Boraginaceae							
Heliotropium amplexicaule	Blue Heliotrope	-	-	X			
Cactaceae							
Opuntia sp	Prickly Pear	-	2				
Commelinaceae							
Commelina diffusa (C. cyanea)	Wandering Jew	-	-	X	X	X	
Commelina benghalensis	-	-	-				
Convolvulaceae							
Cuscuta campestris	Dodder	-	-				
Convolves arvensis	European Bindweed	-	-				
Ipomoea indica	Purple Morning Glory	-	-	X	X	X	X
Ipomoea cairica	Mile-a-Minute	-	-	X	X	X	X
*Ipomoea pes-caprae**	Goats Foot Convolves*	-	-				X
Cyperaceae							
*Bolboschoenus caldwellii**	-	-	-	X			
*Carex appressa**	Tall Sedge*	-	-				
Cyperus difformis	Rice Sedge	-	-				X
Cyperus congestus	Clustered Flatsedge	-	-				
Cyperus eragrostis	Umbrella Sedge	-	-	X		X	X
Cyperus involucratus	-	-	-		X	X	
Cyperus rotundus	Nut Grass	-	-				
Cyperus polystachyos	Bunchy Sedge	-	-		X		

SPECIES	COMMON NAME	AQIS LISTED	LPR CLASS	SEP 08 PLANT SURVEY	JUINE 08 PLANT SURVEY	MAR 08 PLANT SURVEY	FEB 08 BASELINE SURVEY
*Fimbristylis ferruginea**	Rusty Sedge*	-	-	X	X	X	
*Isolepis cernua**	Nodding Club Rush*	-	-	X	X	X	
*Isolepis nodosa**	Knobby Club Rush*	-	-	X	X	X	
*Schoenoplectus mucronatus**	-	-	-	X	X		
Euphorbiaceae							
Chamaesyce drummondii	Caustic Creeper	-	-	X			X
Chamaesyce maculata	Eyebane	-	-		X		X
Chamaesyce prostrata	Red Caustic Creeper	-	-		X		X
Euphorbia hirta	Asthma Plant	-	-				
Euphorbia sp.	Spurge	-	-				
*Macaranga tanarius**	Macaranga*	-	-		X	X	
Phyllanthus virgatus	Creeping Phyllanthus	-	-				
Ricinus communis	Castor Oil Plant	-	-	X	X		
Fabaceae							
Crotalaria incana	Woolly Rattle Pod	-	-			X	
Crotalaria lanceolata subsp. *lanceolata*	Lance-leaf Rattle Pod	-	-		X	X	X
Desmodium uncinatum	Silver Leafed Desmodium	-	-				
Indigofera hirsuta	Hairy Indigo	-	-				X
Macroptilium atropurpureum	Siratro	-	-	X	X	X	X
Macroptilium lathyroides	Phasey Bean	-	-	X	X	X	
Medicago lupulina	Black Medic	-	-	X			
Medicago polymorpha	Burr Medic	-	-				
Medicago sativa	Lucerne	-	-				
Melilotus albus	Bokhara	-	-				
Melilotus indicus	Sweet Melilotus	-	-	X	X		
Neonotonia wightii	Glycine	-	-			X	X
*Sesbania cannabina**	Sesbania Pea*	-	-	X	X	X	X
Stylosanthes hamata	Verano Stylo	-	-	X	X	X	X
Trifolium repens	Clover	-	-			X	
*Vigna marina**	Yellow Beach Bean*		-	X		X	

SPECIES	COMMON NAME	AQIS LISTED	LPR CLASS	SEP 08 PLANT SURVEY	JUINE 08 PLANT SURVEY	MAR 08 PLANT SURVEY	FEB 08 BASELINE SURVEY
Graminea							
*Paspalum distichum**	Water Couch*	-	-	X	X	X	
Juncaceae							
*Juncus kraussii**	Jointed Rush*	-	-	X	X	X	
Malvaceae							
Sida cornifolia	Flannel Weed	-	-				
Sida rhombifolia	Common Sida	-	-	X	X	X	X
Onagraceae							
Oenothera drummondii subsp. *drummondii*	Beach Primrose	-	-	X	X	X	X
Oenothera laciniata	Cut-leaf Evening Primrose	-	-	X			
Oxalidaceae							
Oxalis corniculata	Creeping Oxalis	-	-				X
Passifloraceae							
Passiflora cairica	Stinking Passion Vine	-	-				
Passiflora subpeltata	White Passion Flower		-				
Plantaginaceae							
Plantago lanceolata	Lamb's Tongue	-	-	X	X	X	
Poaceae							
Arundo donax	Giant Reed	-	-		X	X	X
Brachiaria decumbens	Signal Grass	-	-		X	X	
Brachiaria mutica	Para Grass	-	-				
Cenchrus ciliaris	Buffel Grass	-	-				
Cenchrus echinatus	Mossman River Grass	-	-	X	X	X	X
Chloris gayana	Rhodes Grass	-	-	X	X	X	X
Chloris truncata	Windmill Grass	-	-		X		
Chloris virgata	Feather-top Rhodes Grass	-	-	X	X		
*Cymbopogon refractus**	Barbed Wire Grass*	-	-	X	X	X	
Cynodon dactylon	Couch Grass	-	-	X	X	X	X
Dichanthium aristatum	Angleton Grass	-	-				
Digitaria ciliaris	Summer Grass	-	-				

SPECIES	COMMON NAME	AQIS LISTED	LPR CLASS	SEP 08 PLANT SURVEY	JUINE 08 PLANT SURVEY	MAR 08 PLANT SURVEY	FEB 08 BASELINE SURVEY
Eleusine indica	Crowsfoot Grass	-	-				
Eragrostis tenuifolia	Elastic Grass	-	-	X			
Hemarthria uncinata	Mat Grass	-	-				
*Imperata cylindrical**	Blady Grass*	-	-			X	X
Melinis repens	Red Natal Grass	✓	-	X	X	X	X
Melinis minutiflora	Molasses Grass	-	-				
Poa annua	Winter Grass	-	-				
Panicum effusum	Hairy Panic	-	-				
Panicum maximum	Green Panic	-	-	X	X	X	X
Paspalum dilatatum	Paspalum	-	-	X		X	
*Phragmites australis**	Common Reed*	✓	-	X	X	X	X
Setaria sp.	Pigeon Grasses	-	-			X	
Sorghum halepense	Johnson Grass	-	-	X			
Sporobolus fertilis	Giant Parramatta Grass	-	2	X			
Urochloa mosambicensis	Sabi Grass	-	-				
Polygonaceae							
Rumex brownii	Swamp Dock	-	-			X	
Rumex crispus	Curled Dock	-	-		X		
Portulacaceae							
Portulaca pilosa	Hairy Pigweed	-	-		X	X	X
Portulaca oleracea	Pigweed	-	-				X
Primulaceae							
Anagallis arvensis	Scarlet Pimpernel	-	-	X	X	X	X
Rubiaceae							
Richardia brasiliensis	Mexican Clover	-	-				X
Sapindaceae							
Cardiospermum halicacabum	Balloon Vine	-	-				
*Dodonaea triquetra**	Hop Bush*	-	-				
Solanaceae							
Solanum seaforthianum	Brazilian Nightshade	-	-				

SPECIES	COMMON NAME	AQIS LISTED	LPR CLASS	SEP 08 PLANT SURVEY	JUINE 08 PLANT SURVEY	MAR 08 PLANT SURVEY	FEB 08 BASELINE SURVEY
Solanum nigrum	Blackberry Nightshade	-	-	X	X	X	X
Typhaceae							
Typha orientalis	Cumbungi / Typha*	-	-		X	X	X
Ulmaceae							
Celtis sinensis	Chinese Celtis	-	3				
Verbenaceae							
Lantana camara	Lantana	-	3	X	X		
Lantana montevidensis	Creeping Lantana	-	3				
Verbena bonariensis	Purple Top	-	-	X		X	
Verbena aristigera	Mayne's Pest	-	-	X		X	
Verbena officinalis	Common Verbena	-	-		X		
Vitex trifolia var *trifolia**	Coastal Vitex*	-	-				

Notes: -

- * designates indigenous species
- LPR – *Land Protection (pest and stock route management) Regulations 2003*, Schedule 2.

APPENDIX C Weed Target List (AQIS)

FAMILY	GENUS SPECIES	AUTHOR	COMMON NAME	COMMENTS
Asteraceae	*Chromolaena odorata*	(L.) King and Robinson	Siam Weed, Christmas Bush	Pastures, oil palm, rubber, coffee, cashew, fruit, maize, forestry. Toxic to livestock. Major environmental weed: secondary forests, roadsides, disturbed sites.
Asteraceae	*Conyza bonariensis*	Lamp & Collet Richardson *et al.*	Flax-leaf Fleabane	Common weed of waste places, particularly in suburban areas
Asteraceae	*Conyza Canadensis*	Lamp & Collet Richardson *et al.*	Canadian Fleabane	Closely related to *Conyza bonariensis* that has become prolific in urban areas, roadsides, disturbed sites and waterways
Poaceae	*Andropogon virginicus*	Richardson *et al.*	Whisky Grass	A weed of roadsides and disturbed sites
Poaceae	*Danthonia* sp.	Richardson *et al.*	Heath Grass	Found on damp soils, usually with native species in bushland and grassland
Poaceae	*Imperata conferta*	AQIS	Cogongrass	Coconut, roadsides, hillsides, streams and trails in dense or open forest.
Poaceae	*Melinis repens* (previously known as *Rhynchelytrum repens*)	Lamp & Collet Richardson *et al*.	Red Natal Grass	A weed of roadsides, railway lines and wastelands. May also invade rundown, abandoned cultivated paddocks.
Poaceae	*Miscanthus sinensis*	Richardson *et al*.	Eulalia	Commonly cultivated and now escaping along roadsides and railway lines. Does not usually occur in Queensland.
Poaceae	*Phragmites australia*	Lamp & Collet Richardson *et al*.	Common Reed	Most widespread of all grasses
Poaceae	*Saccharum spontaneum*	AQIS	Wild Sugarcane	Waste areas, fallow fields, marshes, banks of streams and ponds, sand dunes, along railways or highways, and in or around fields.
Ulmaceae	*Ulmus* sp.	Richardson *et al.*	Elms	Widely grown as street trees and in parks. Can form dense stands

Source: Lamp & Collet, 1999; Richardson *et al.*, 2007; AQIS, 2008.

APPENDIX D Plant Survey Data Sheet

FAMILY / SPECIES	COMMON NAME	FORM	DECLARATION CATEGORY (LPR)	PRESENCE	ABUNDANCE
Aizoaceae					
Carpobrotus glaucescens [n]	Pigface	v	-		
Sesuvium portulacastrum [n]	Sea Purslane	h	-		
Amaranthaceae					
Alternanthera pungens	Khaki Weed	h,w	-		
Amaranthus quitensis	South American Amaranthus	h.w	-		
Amaranthus viridis	Green Amaranthus	h,w	-		
Gomphrena celosioides	Gomphrena Weed	h,w	-		
Anacardiaceae					
Schinus terebinthifolia	Broad-leaved Peppertree	s,w	3		
Asclepiadaceae					
Gomphocarpus physocarpus	Balloon Cotton Bush	s,w	-		
Asparagaceae					
Asparagus aethiopicus cv. Sprengeri	Asparagus Fern	v,w	3		
Asteraceae					
Ageratum houstonianum	Blue Billy-Goat	h,w	-		
Ambrosia artemisiifolia	Annual Ragweed	h,w	2		
Baccharis halimifolia	Groundsel Bush	s,w	2		
Bidens pilosa	Cobblers Pegs	h,w	-		
Calyptocarpus vialis	Creeping Cinderella Weed	h,w	-		
Cirsium vulgare	Spear Thistle	h,w	-		
Conyza bonariensis	Flaxleaf Fleabane	h,w	-		
Conyza pusilla	Canadian Fleabane	h,w	-		
Crassocephalum crepidioides	Thickhead	h,w	-		
Emilia sonchifolia	Emilia	h,w	-		
Hypochaeris radicata	Flatweed	h.w	-		
Parthenium hysterophorus	Parthenium Weed	h,w	2		
Senecio sp (lautus)	Fireweed	h	-		
Sonchus oleraceus	Rough Sow Thistle	h,w	-		
Sphagneticola trilobata	Singapore Daisy	h,w	3		
Tagetes minuta	Stinking Roger	h,w	-		
Agavaceae					
Agave sp.	Agave	w,p	-		

FAMILY / SPECIES	COMMON NAME	FORM	DECLARATION CATEGORY (LPR)	PRESENCE	ABUNDANCE
Avicenniaceae					
Avicennia marina [n]	Grey Mangrove	t	-		
Boraginaceae					
Heliotropium amplexicaule	Blue Heliotrope	h,w	-		
Cactaceae					
Opuntia sp.	Prickly Pear	s,w	2		
Casuarinaceae					
*Casuarina equisetifolia**	Coastal Sheoak	t	-		
*Allocasuarina littoralis**	Black Sheoak	t	-		
Caesalpiniaceae					
Crotalaria paniculata	Poor Mans Gold	h	-		
Senna pendula var *glabrifolia*	Easter Cassia	s,w	-		
Convolvulaceae					
Cuscuta campestris	Dodder	v,w	-		
Convolvulus arvensis	European Bindweed	h,w	-		
Ipomoea sp. (alba)		v,w	-		
Ipomoea cairica	Mile-a-Minute	v,w	-		
Ipomoea pes-caprae [n]	Goats Foot Convolves	v	-		
Cyperaceae					
Cyperus congestus	Clustered Flatsedge	a,w	-		
Cyperus eragrostis	Umbrella Sedge	a,w	-		
Euphorbiaceae					
Chamaesyce maculata	Caustic Weed	h,w	-		
Euphorbia hirta	Asthma Plant	h,w	-		
Euphorbia prostrata	Caustic Creeper	h,w			
Euphorbia sp.	Spurge	h,w	-		
Macaranga tanarius [n]	Macaranga	t (p)	-		
Phyllanthus virgatus	Creeping Phyllanthus	h,w	-		
Fabaceae					
Crotalaria pallida	Rattle Pod	h,w	-		
Desmodium uncinatum	Silver-leafed Desmodium	v,w	-		
Macroptilium atropurpureum	Siratro	v,w	-		
Macroptilium lathyroides	Phasey Bean	v,w	-		
Medicago polymorpha	Burr Medic	h,w			
Medicago sativa	Lucerne	h,w	-		
Melilotus indicus	Sweet Melilotus	h,w	-		
Neonotonia wightii	Glycine	v,w	-		

FAMILY / SPECIES	COMMON NAME	FORM	DECLARATION CATEGORY (LPR)	PRESENCE	ABUNDANCE
Sesbania cannabina	Sesbania Pea	h,w	-		
Trifolium repens	White Clover	h,w	-		
Lauraceae					
Cinnamomum camphora	Camphor Laurel	t,w	3		
Malvaceae					
Hibiscus tiliaceus [n]	Cotton Tree	t	-		
Modiola caroliniana [n]	Red Flower Mallow	h,w	-		
Sida cornifolia	Flannel Weed	h,w	-		
Sida rhombifolia	Common Sida	h,w	-		
Mimosaceae					
Acacia aulacocarpa [n]	Hickory Wattle	t	-		
Myrtaceae					
Eucalyptus robusta [n]	Swamp Mahogany	T,(p)	-		
Lophostemon confertus [n]	Brush Box	T,(p)	-		
Melaleuca linariifolia [n]	Flax-leafed Paperbark	t,(p)	-		
Melaleuca quinquenervia [n]	Paperbark Teatree	T,(p)	-		
Onagraceae					
Oenothera drummondii [n]	Beach Evening Primrose	s	-		
Oxalidaceae					
Oxalis corniculata	Creeping Oxalis	h,w	-		
Pandanaceae					
Pandanus tectorius [n]	Screw Pine	t,(p)	-		
Passifloraceae					
Passiflora cairica	Stinking Passion Vine	v,w	-		
Passiflora subpeltata	White Passion Vine	v,w	-		
Plantaginaceae					
Plantago lanceolata	Lamb's Tongue	h,w	-		
Plantago major	Great Plantain	h,w	-		
Poaceae					
Brachiaria decumbens	Signal Grass	g,w	-		
Brachiaria mutica	Para Grass	g,w	-		
Cenchrus ciliaris	Buffel Grass	g,w	-		
Cenchrus echinatus	Mossman River Grass	g,w	-		
Chloris gayana	Rhodes Grass	g,w	-		
Chloris truncata	Windmill Grass	g,w	-		
Chloris virgata	Feather-top Rhodes Grass	g,w	-		

FAMILY / SPECIES	COMMON NAME	FORM	DECLARATION CATEGORY (LPR)	PRESENCE	ABUNDANCE
Cynodon dactylon	Couch Grass	g,w	-		
Dichanthium aristatum	Angleton Grass	h,w	-		
Digitaria ciliaris	Summer Grass	g,w	-		
Eleusine indica	Crowsfoot Grass	g,w	-		
Hemarthria uncinata	Mat Grass	g,w	-		
Imperata cylindrica [n]	Blady Grass	g	-		
Melinis repens	Red Natal Grass	g,w	-		
Melinis minutifolium	Molasses Grass	g,w	-		
Poa annua	Winter Grass	g,w	-		
Panicum effusum	Hairy Panic	g	-		
Panicum maximum	Green Panic	g,w	-		
Paspalum dilatatum	Paspalum	g,w	-		
Phragmites australis [n]	Common reed	g	-		
Sorghum halepense [n]	Johnson grass	g,w	-		
Typha orientalis [n]	Typha	g	-		
Urochloa mosambicensis	Sabi Grass	g,w	-		
Portulacaceae					
Portulaca pilosa	Hairy pigweed	h,w	-		
Primulaceae					
Anagallis arvensis	Scarlet Pimpernel	h,w	-		
Proteaceae					
Banksia integrifolia [n]	Coastal Banksia	t (p)	-		
Sapindaceae					
Cardiospermum halicacabum	Balloon Vine	v,w	-		
Cupaniopsis anacardioides [n]	Tuckeroo	T	-		
Dodonaea triquetra	Hop Bush	s	-		
Solanaceae					
Solanum nigrum	Brazilian Nightshade	s,w	-		
Verbenaceae					
Lantana camara	Lantana	s,w	3		
Lantana montevidensis	Creeping Lantana	w	3		
Verbena bonariensis	Purple Top	h,w	-		
Verbena aristigera		h,w	-		
Vitex trifolia var *trifolia* [n]		s	-		

- LPR – *Land Protection (pest and stock route management) Regulations 2003*, Schedule 2.