Safety In Design Report

Mimosa Park
22 Box Road Casula, NSW 2170

moir
landscape architecture

Revision	Date	Author	Checked
A	16.11.21	EB	JS

moir landscape architecture

LIVERPOOL CITY COUNCIL

Contents

01 Introduction & Approach to Safety in Design

1.1 Project Overview

This report has been prepared as part of the ongoing design process for a new pocket park located at 22 Box Road, Casula for the Liverpool City Council (Figure 1).
Through the ongoing design process several risks have been identified pertaining to public safety, accessibility, fall heights, maintainability and material selection.
In this report we aim to highlight potential risks of the project and outline the steps taken to reduce or eliminate these risks.

The key items with potential risk include:

- Site access
- Safety around vehicles and pedestrians
- Site contamination

The Safety in Design matrix at the end of this document highlights the shared obligation of the designer and the client, Liverpool City Council, in managing risk associated with their work systems.

Figure 1: Mimosa Park, Casula

1.2 Background

The proposed Mimosa park concept located in Casula seeks to provide a new local pocket park which shall offer informal recreation and leisure activities through maintaining a passive open space for the local residents. The park concept includes site retention, new native vegetation plantings to the western boundary, passive open space and new seating opportunities. This report details potential risks, and proposed actions put in place, to mitigate these risks. The identification of the risks and recommended actions have been nominated by the design team in association with Liverpool City Council.

1.3 What is Safety in Design (SiD)

Safety in Design (SiD) is a process defined as the integration of hazard identification and risk assessment methods early in the design process to eliminate or minimise health and safety risks throughout the life of the space being designed. Designers can achieve SiD through a structured approach to identifying hazards & risks associated with the design. By employing recognised risk management strategies, risks to users of a facility can be eliminated or significantly reduced through mitigation strategies and the implementation of design solutions based on risk assessments.

A sound approach to SiD includes assessment of risks during key phases of the design development, development of risk control options and direction for safe construction, installation, commissioning, operation and maintenance of the completed facility.

The Code of Practice for Safe Design of Buildings and Structures developed by WorkCover NSW identifies five key principles for safe design. Table 1: Principles of Safe Design demonstrates these principles.

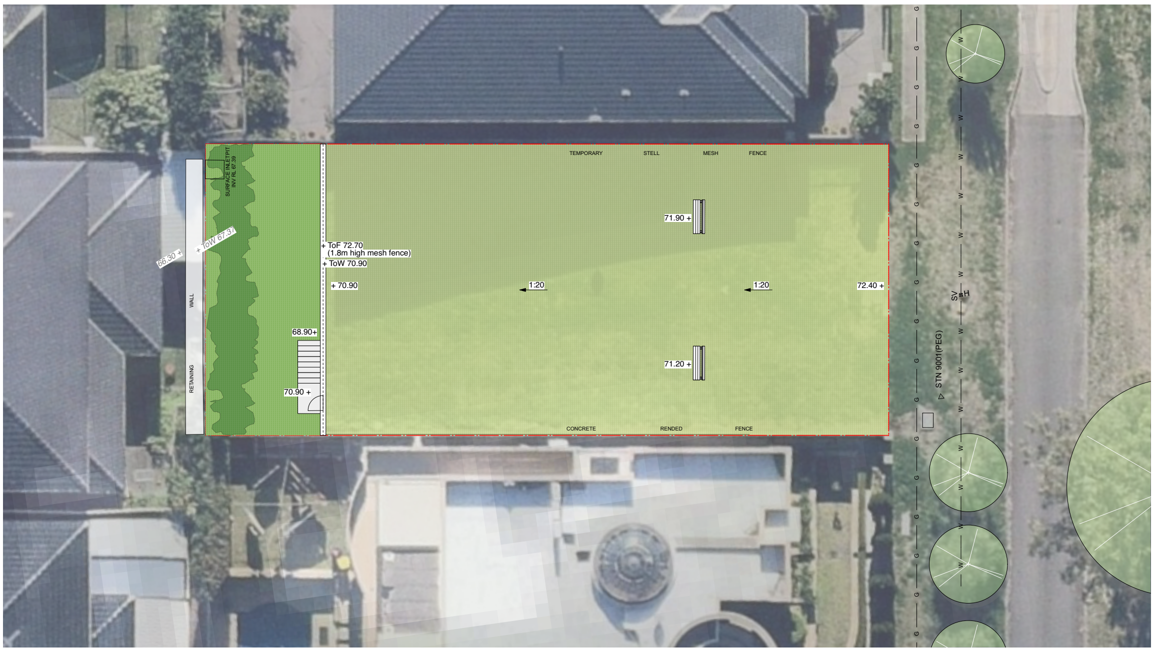

Figure 2: Mimosa Park Casula Concept

PRINCIPLES OF SAFE DESIGN		
Principle 1	People with Control	Safe design is everyone's responsibility – ensuring safe design rests with all parties influencing the design of a building, structure or space.
Principle 2	The Life Cycle	Safe design employs life cycle concepts – applying to every phase in the life cycle of a building or structure, from conception through to redevelopment and demolition.
Principle 3	Risk Management	Safe design implements risk management – through systematically identifying, assessing and controlling hazards.
Principle 4	Knowledge & Capability	Safe design requires knowledge and capability – which should be either demonstrated or accessed by any person influencing design.
Principle 5	Information Transfer	Safe design relies on information – requiring effective documentation and communication between everyone involved in the life cycle of a building or structure.

Table 1: Principles of Safe Design

The implementation of safe building design requires a thorough understanding of the WHS issues associated with each stage of a building's life cycle. These life cycle stages are summarised as below:

- Concept / schematic development
- Detailed design
- Construction
- Building occupation and operation
- Building maintenance & repair
- Renovation &/or modification
- Demolition or demobilisation

1.4 Harmonised National Workplace Health & Safety

As of the 1st of January 2012, the new harmonised National Workplace Health and Safety (WHS) legislation came into effect. As of August 2013, seven jurisdictions the Commonwealth, NSW, QLD, SA, TAS, ACT, and the NT have enacted Work Health & Safety legislation. VIC has stated that it supports the principle of harmonisation but will not implement model WHS laws in their current
form. The WHS model sets out new Codes of Practice aiming to regulate all the existing laws throughout the country, and create a more consistent Work Health and Safety standard for all Australian employers and workers.

Under the new Act, designers have a responsibility to ensure that their designs of built form elements eliminates and/or controls risks to the health and safety of people using them. Designers must also ensure that the facility is designed to eliminate or minimise the need for any hazardous manual task to be carried out and give information to each person who is provided with the design about any features that eliminate the need for these tasks to be carried out.

WorkCover NSW has developed the Code of Practice (CoP) for Safe Design of Buildings and Structures. The CoP was adopted in July 2014, and is referenced as a guide to realising the standards of WHS under the act.
NSW has also adopted a number of other codes, most particularly the Code of Practice on Managing Workplace Risks. This code contains information on hazard identification and risk assessment.
Of particular interest, designers of construction projects are required under the WHS legislation to provide a Safety in Design Report to their client identifying the health and safety aspects of the design. Health and safety consideration should be given to those hazards or risks relating to areas such as access, site conditions, working environment, fall prevention, plant, structural safety, manual handling, amenities and facilities, fire and emergencies, hazardous substances, noise exposure and radiation.
This Safety in Design report will specify the hazards relating to the design of the structure and any control strategies recommended. Designers are required to develop and implement methods and processes to ensure safe design. In addition to this, when a design is altered, an additional review must be conducted to ensure that modifications do not present new risks.

Clients or organisations responsible for commissioning / managing designers on behalf of their clients must consult with their design team to ensure that any hazards and risks that may be present in the completed structure or space are addressed. Additionally, clients are required to inform their designers of any risks and hazards that may exist in the area construction work is to take place.

It is recommended that the SiD Report be passed onto any participant in the project who may extend the design or further develop the design. This includes D&C Sub-contractors, designing fabricators, and specialist design consultants. In addition to this, the legislation recommends that the SiD Report be issued in parallel with the completed design documents to the principal contractor (if not already involved in the design), associated authorities, building certifier, or agencies involved in the assessment or critique of the design.

Clients and designers must consult with the project stakeholders who will be using the facility / workplace, during the planning phase of the project, as their health and safety may be affected by the new design.

The benefits of employing a design risk management process during the development of a design extend beyond the provisions of a facility that can be constructed and operated safely. Table 2: Benefits of SiD Process demonstrates the positive outcomes achieved via this process.

BENEFITS OF THE SID PROCESS		
Design	• Identification of potential risks. • Elimination, reduction and control of risks.	• Reduction of abortive design. • Reduced need for post--delivery retrofits.
Construction	• Communication of residual risk to the contractor and sub-contractors. • Reduced likelihood of work site accidents and injury.	• Reduction in contractor risk contingency. • Greater time and cost certainty.
Operation	• Increased health and safety for building occupants. • Increased health and safety to members of the public.	• Reduced operator WHS costs. • Amplified organisational image. • Reduction in civil claims.
Maintenance	• Safe practice for maintenance strategies. • Reduced likelihood of workplace accidents and injury.	• Reduction in maintenance costs. • Streamlined maintenance strategies (time • & cost benefits).
Refurbishment / Demolition	• Communication of residual risk to the contractor and sub-contractors. • Reduced likelihood of unplanned events.	• Reduction in Contractor risk contingency. • Greater time and cost certainty.

Table 2: Benefits of SiD Process

1.4 Objectives of the Safety in Design Process & Report

The objectives of the SiD process and report is to ensure that safe design principles are undertaken by the company on each project in alignment with WHS legislation.

As building design impacts on the overall safety of a completed facility and often plays a significant role in determining operational WHS within the built environment, the SiD process must be seen as an essential element in achieving best practice outcomes. Employing the SiD process should result in minimisation of illness and injury to contractors, end users operating the facility, and facilities staff maintaining the building.

Further to this, the SiD process presents positive commercial outcomes for designers, contractors and clients alike. The cost associated with unsafe design can be generated through the need to retrofit additional building infrastructure, inefficient operations, higher insurance premiums, and potentially litigation or civil action. It is substantially more economical to eliminate workplace safety hazards through the implementation of a structured risk management process during the design phase.

02 Safety in Design Methodology

2.1 Safe Design Process

The following section of this report describes the methodology and implementation of the SiD process. The safe design process should be engaged as early as possible in the development of the design. By considering SiD during the very early concept design phase, fundamental decision-making can occur during preliminary design development. This will avoid unnecessary reworks or abortive design. The steps below describes the eight steps associated with the delivery of safe design through the SiD process.

STEP 1: DISCUSS THE PROJECT

The design team and Client representative involved in the development of the design must collaboratively plan and discuss the project to ensure the exchange of information. The designers and Client must identify all operations to take place in and around the facility to ensure the design can be tailored to the operational requirements. These discussions will also help to identify the potential hazards and risk associated with the intended operations.

STEP 2: IDENTIFY KEY STAKEHOLDERS

The project team is to identify additional project stakeholders for inclusion in the consultation process. The operational expertise of the facilities users should be drawn upon to help develop functional design.

STEP 3: DETERMINE THE CONSULTATION PROCESS

Once the design team has been established, the design manager should determine the approach to communication and collaboration.

STEP 4: PREPARE A RISK AND SOLUTIONS REGISTER

The design team should conduct a preliminary risk analysis in consultation with key project stakeholders. The intention of this step is to identify all conceivable risks and hazards that are relevant to the facility and its intended operations. All risks and hazards will be recorded in the risk register. Once all risks and hazards have been identified, the design team is to identify the likelihood and consequence associated with the risk. Commonly this is achieved through a quantitative assessment to establish a risk ranking.

Once the risks are assessed the design team will develop solutions to each of the risks to either eliminate or mitigate the effect of the risk. Each solution will be documented in the risk register.

STEP 5: PREPARE AN INITIAL REPORT TO CLIENT

On completion of the risk assessment, a report to the client will be prepared to identify the intended design solutions for review and approval.

STEP 6: AMEND AND FINALISE THE DESIGN

Based on the Client's review and acceptance of the report, the design is to be updated in alignment with the documented strategies.

STEP 7: PROVIDE A FINAL REPORT TO THE CLIENT & PRINCIPAL CONTRACTOR

On completion of the design, a final SiD report is to be prepared and issued to the client and principal contractor for construction. It is recommended that the final SiD report be passed onto the facility occupant to contribute to their development of safe work practices and procedures. The report must identify any residual risk, so that further operational controls can be developed by the facility operator.

STEP 8: REVIEW THE DESIGN

As design development in certain projects continues into the construction phase through the development of workshop drawings and contractor proposed alternatives, it is important that any risk controls potentially affected by these elements are re-assessed. Furthermore, if additional information with regard to facility operations becomes available post completion of the design documentation, further assessment and development of controls may be necessary.

03 Risk Management - Safety In Design

3.1 Risk Management

Designers, design managers & individuals involved in the production of the design should endeavour to eliminate any foreseeable hazards that may arise from the design. As it is not always reasonably practical to eliminate all risks associated with the built environment, designers and design managers must implement risk control measures through a structured approach to risk management. Risk management must form an integral part of the design development process. Ideally, risk management should be discussed regularly at design meetings, and through planned workshops to ensure key decision making and design development is cognisant of the necessary risk controls required to deliver safe design.

The risk management process includes four key stages to developing and maintaining safe outcomes. These stages are described below and further represented in Figure 1: Risk Management Process.

- Hazard identification – identification of potential hazardous situations that could result in injury or illness.
- Risk assessment – assessment of how likely the risk is and the associated consequence if the hazard occurs.
- Risk elimination / control – elimination or control of the risk through planned strategies and mitigation measures.
- Evaluation and review – recurring review of risk controls and mitigation measures to ensure they remain current and appropriate.

Figure 1: Risk Management Process

3.2 Risk Evaluation

Safety risks present within the design of a space can be categorised by the following:

RISK TYPE	
TYPE	**DESCRIPTION**
R	Reliability
A	Accessibility
M	Maintainability
B	Buildability
O	Operability
S	Security

3.3 Hierarchy of Controls

The two key definitions of risk controls are as follows:
Static controls – the physical components part of the designed environment that will be handed over to the end user. These controls are the responsibility of the project team, including the subcontractors, the landscape architects, the engineering designers and other sub-consultants on the project.

Dynamic controls – the administrative procedures to be implemented by the 'tenant' during the operation of the facility.

Risk mitigation strategies that form the outcome of the SiD process can be characterised by the following hierarchy of controls shown in the Table 3: Hierarchy of Controls. The name 'hierarchy of controls' emphasises that elimination of a risk will always be preferred to mitigation or reduction strategies where achievable.

HIERACHY OF CONTROLS		
CLASS	**CONTROL**	**DESCRIPTION**
1	Elimination	Design the hazard out of the landscape or built form element.
2	Substitution	Substitute less hazardous materials, fixtures, fittings, plant or construction methods.
3	Isolate	Use guards or barriers to limit access to the hazard.
4	Engineering	Minimise risk by engineering means.
5	Administrative Controls	Recommend the establishment of systems of work or signage, where required, to control residual risks.
6	Personal Protective Equipment	Recommend suitable personal protective equipment and training, where required, to control residual risks.

Table 3: Hierachy of Controls

3.4 Risk Evaluation

Risks will be evaluated in alignment with the table below. High and extreme rated risks will require additional controls. The likelihood allocation combined with the consequence score identifies the risk ranking as displayed in the matrix below.

RISK EVALUATION							
			Determine the Consequence				
			1	**2**	**3**	**4**	**5**
			Insignificant	Minor	Moderate	Major	Catastrophic
Determine the Likelihood (L)	**A**	Almost Certain	High	High	Extreme	Extreme	Extreme
	B	Likely	Moderate	High	High	Extreme	Extreme
	C	Possible	Low	Moderate	High	Extreme	Extreme
	D	Unlikely	Low	Low	Moderate	High	Extreme
	E	Rare	Low	Low	Moderate	High	High

3.5 Severity of Consequences

Table 4 below, identifies the ascending severity of consequences. The greater the consequence the higher numeric scores, for example, 1 represents an insignificant consequence, while 5 represents a catastrophic consequence.

SEVERITY OF CONSEQUENCE	
SCORE	**CONSEQUENCE**
1	Occurrence would have an insignificant impact on the operation of the built form elements and the health & safety of the users of the space.
2	Occurrence would have a minor impact on the operation of the built form elements and the health & safety of the users of the space.
3	Occurrence would have a moderate impact on the operation of the built form elements and the health & safety of the users of the space.
4	Occurrence would have a major impact on the operation of the built form elements and the health & safety of the users of the space.
5	Occurrence would have a significant impact on the operation of the built form elements and the health & safety of the users of the space.

Table 4: Severity of Consequences

MIMOSA PARK, CASULA - SAFETY IN DESIGN MATRIX - DESIGN REV A															
RISK ID	ISSUE	TYPE OF RISK (RAMBOS)	FORSEEABLE RISK ASSOCIATED	LIKELIHOOD (A-E)	CON-SEQUENCES	RISK SCORE	CONTROL DESCRIPTION/ ACTION	ACTION BY	CONTROL HIERARCHY	CONTROL TYPE STATIC/ DYNAMIC	LIKELIHOOD (A-E)	CON-SEQUENCE S	RISK SCORE	ADDITIONAL CONTROL REQUIRED
1.1	Signicant level change across the site.	A, B	Accidents, where park users may injure themselves due to unsafe access across the site.	B	3	High	Ensure that earthworks and retention provide safe access across the site with a maximum slope of 1:20.	Moir LA	ELIMINATION	STATIC	D	2	Low	
1.2	Blind spots and areas shielded from view within the park.	A, B, S	Reduction in clear sightlines and passive surveillance increased the prevalence of anti-social behaviour.	B	4	Extreme	Ensure that earthworks and retention allows for clear and open sightlines to all areas of the park. Ensure sufficient sitelines into the park and promote passive surveillance through location of bench seating.	Moir LA	ELIMINATION	STATIC	D	3	Moderate	
1.3	Conflict between vehicles and pedestrians.	A	Accidents, where pedestrians and vehicles come into conflict	C	4	Extreme	Maintain turfed verge to ensure pedestrians can walk off the road when required.	Moir LA	ELIMINATION	STATIC	D	3	Moderate	
1.4	Existing drop off to property below site.	A, B, S	Accidents, where park users injure themselves by falling off existing retaining wall to property below	B	5	Extreme	Provide a signifcant buffer of native planting along retaining wall / boundary enclosed by a new retaining wall with 1.8m high fence above to prohibit access.	Moir LA	ELIMINATION	STATIC & DYNAMIC	E	3	Moderate	
1.5	Longevity and appropriateness of materials.	R, B, O	Unsuitable materials for the setting failing and becoming hazardous. Materials becoming a maintenance issue and burdensome to Council. Materials failing due to climatic conditions or events, such as bushfires.	C	2	Moderate	Ensure that all materials chosen vigorously analysed to ensure that the are appropriate and cognisant of their setting. Discuss with industry experts about the suitability of all materials chosen for the location and climate	Moir LA	ELIMINATION/ SUBSTITUTION	STATIC	E	1	Low	
1.6	Plants not suitable to the climate or maintenance availability	M, B	Mass die backs of plants dying before opportunity to get established	C	2	Moderate	Ensure plant selection is suitable to the Liverpool climate. All species to be of low maintenance.	Moir LA	ELIMINATION	STATIC	C	1	Low	
1.7	Greenfield site, areas of identified asbestos	A, B	exposure of hasardous materials	B	4	Extreme	Site remediation incorpated into the design	Moir LA	ELIMINATION	STATIC	D	3	Moderate	

MIMOSA PARK, CASULA - SAFETY IN DESIGN MATRIX - CONSTRUCTION REV A

RISK ID	ISSUE	TYPE OF RISK (RAMBOS)	FORSEEABLE RISK ASSOCIATED	LIKELIHOOD (A-E)	CON-SEQUENCES	RISK SCORE	CONTROL DESCRIPTION/ ACTION	ACTION BY	CONTROL HIERARCHY	CONTROL TYPE STATIC/ DYNAMIC	LIKELIHOOD (A-E)	CON-SEQUENCES	RISK SCORE	ADDITIONAL CONTROL REQUIRED
1. GENERAL														
1.1	General excavations.	**S**	Personal injury whilst using manual tools or machinery.	**D**	**5**	**Extreme**	It is the responsibility of the contractor to ensure all works relating to excavations are undertaken by fully qualified professionals. Contractor to provide team with appropriate PPE that is in good working order. A work risk assessment must be prepared for every excavation, hazards identified and a work method statement provided and implemented.	Contractor	Engineering	Static	**E**	**4**	**High**	
1.2	Site access	**A,S**	Personal injury. Safety to general public. Safety of on-site staff.	**D**	**4**	**High**	It is the responsibility of the contractor and project manager to provide safe all weather access to the site. Appropriate and secure barriers, fencing and signage is to be installed to prohibit unauthorised access.	Contractor	Engineering	Static	**E**	**2**	Low	
1.3	Working with other trades	**S**	Conflict of on-site workers and equipment.	**D**	**2**	Low	It is the responsibility of the Civil Contractor, Principal Contractor and the Project Manager to coordinate all work areas where multiple trades need to work in close proximity and ensure safe work practices are implemented.	Contractor	Engineering	Static	**E**	**2**	Low	
1.4	Demolition works	**B**	Exposure to dangerous contaminants such as asbestos.	**C**	**3**	**High**	All demolition works to be carried out by an experienced and accredited professional. Suitable PPE is to be worn throughout all stages of demolition works. A work risk assessment must be prepared prior to the commencement of demolition works.	Contractor	Engineering	Static	**D**	**2**	Low	
1.5	Existing underground services.	**B**	Damage to existing services.	**D**	**3**	**Moderate**	It is the responsibility of the Civil Contractor and Principal Contractor to engage a qualified underground service locator to identify all underground services prior to any excavation occurring in all areas.	Contractor/ Civil Consultant	Engineering	Static	**E**	**3**	**Moderate**	

MIMOSA PARK - OPINION OF PROBABLE COSTS REV A

The following figures provide an indication of the probable order of costs for the specified works as described in the Moir LA Mimosa Park dated 16/11/2021. This is for the park only and does not include any costs associated with the design of the drainage channel.This is not an estimate and is intended to give an indication of the probable costs. Should a detailed accurate estimate be required, it is recommended that the services of a qualified quantity surveyor be engaged.

Item No.	RCL	Description (Supply and install unless noted otherwise)	Quantity	Unit	Rate ($/unit)	Amount ($)
1.0		**PRELIMINARIES**				
1.1		Site mobilisation and establishment	1	item	$2,500.00	$2,500.00
1.2		Supply and install temporary fence	1	lin.m.	$6,000.00	$6,000.00
1.3		Letter box drop to residents	1	lin.m.	$1,000.00	$1,000.00
TOTAL						**$9,500.00**
2.0		**DEMOLITION**				
2.1		Demolition and disposal of existing pathways	0	m2	$17.00	$0.00
2.2		Demolition and disposal of existing play equipment	0	items	$1,000.00	$0.00
TOTAL						**$0.00**
3.0		**EARTHWORK**				
3.1		Allowance to box out footpaths, pavements and other finishes and stockpile onsite for disposal offsite	1	item	$10,000.00	$10,000.00
TOTAL						**$10,000.00**
4.0		**PAVING WORKS / STAIRS**				
4.1		Supply and Install 100mm thick reinforced concrete paving	0	sq.m.	$110.00	$0.00
4.2		Supply and Install 1200mm wide concrete stairs	1	item	$3,500.00	$3,500.00
4.3		Supply of static guard during curing	1	item	$1,000.00	$1,000.00
TOTAL						**$4,500.00**
5.0		**STORMWATER & DRAINAGE**				
5.1		Supply and install 300 diameter RCP stormwater pipe <=1500 deep	0	lin.m.	$195.00	$0.00
5.2		Allowance to connect stormwater pipe into existing pit	0	each	$750.00	$0.00
5.3		Allowance for 100 diameter socked subsoil drainage	0	lin.m.	$40.00	$0.00
5.4		Extra over allowance for flushing points to last	0	each	$95.00	$0.00
5.5		Tailouts to subsoil drainage lines/connection to existing stormwater lines	0	each	$325.00	$0.00
TOTAL						**$0.00**
6.0		**SERVICES & UTILITIES**				
6.1		Allowance for connection to Potable Water service	0	item	$ 1,500.00	$0.00
6.2		Allowance for water meter assembly & backflow prevention device	0	item	$ 1,600.00	$0.00
6.3		Allowance for potable water reticulation	0	lin.m.	$45.00	$0.00
6.4		Allowance for isolation valve	0	each	250	$0.00
6.5		Vandal proof hose tap	0	each	650	$0.00
6.6		Allowance for 150mm dia pipe to existing connection	0	lin.m.	$50.00	$0.00
TOTAL						**$0.00**
7.0		**RETENTION & FENCING**				
7.1		Supply and Install retaining wall	15.5	lin.m.	$500.00	$7,750.00
7.2		Supply and Intall 1800mm high safety fencing	15.5	lin.m.	$150.00	$2,325.00
7.3		Supply and Intall maintenance access gate	1	item	$800.00	$800.00
TOTAL						**$10,075.00**
8.0		**PARK FURNITURE**				
8.1		Supply Parkway Seat	2	item	$841.00	$1,682.00
8.2		Freight cost for Gossi Furniture	1	item	$560.00	$560.00
8.3		Supply and Install of stainless steel hand rails	4	lin. m	$150.00	$600.00
TOTAL						**$2,842.00**
9.0		**SOFTSCAPE**				
9.1		Place ameliorated site topsoil to garden bed areas 300mm	95	m2	$9.00	$855.00
9.2		Place pine mini nuggets mulch to garden beds areas to 100mm depth	95	m2	$20.00	$1,900.00
9.3		Supply and install 200L tree with stakes	0	each	$350.00	$0.00
9.4		Supply and install 75L tree with stakes	0	each	$250.00	$0.00
9.5		Supply and install 25L tree with stakes	0	each	$150.00	$0.00
9.6		Supply & plant 8-10" pots	150	each	$20.00	$3,000.00

9.7		Supply and lay Kikuyu turf install 50mm imported turf underlay to any damaged areas	450	each	$15.00	$6,750.00
9.8		Plant and turf establishment over 6 weeks	1	item	$1,000.00	$1,000.00
TOTAL						**$13,505.00**
10.0		**PROJECT COMPLETION**				
10.1		Site clean up and dis-establishment	1	item	$5,000.00	$5,000.00
TOTAL						**$5,000.00**
11.0		**MAINTENANCE PERIOD**				
11.1		Maintenance period (10 weeks)	1	item	$10,000.00	$10,000.00
11.2		Submit electronic survey of completed works	1	item	$500.00	$500.00
					SUBTOTAL	**$10,500.00**
					TOTAL OF WORKS	**$65,922.00**
					10% GST	$6,592.20
					10% Contingency	$6,592.20
					TOTAL ESTIMATED COST INC. GST	**$79,106.40**