

4. Specification

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Specification

1 GENERAL

1.1 Outline of Works

1.1.1 Scope

Nothing in this clause is to limit, modify or alter the extent or description of the works set out in detail elsewhere in the Contract documents. The works generally include, without necessarily being limited to the preparation and construction of:

- Erection of temporary barricade fencing and temporary protective fencing to grassed areas.
- Set-out and bulk earthworks;
- Removal of some existing vegetation;
- Co-ordinate the removal of aquatic fauna. Native fish and turtles to be returned to the pond at completion of the project. Exotic fish and exotic and native ducks to be appropriately re-housed.
- Careful removal of the “Rainman” sculpture. Co-ordination of repairs with Council. Storage of the sculpture pedestal within the Contractor’s storage area. Replacement of the sculpture to its original location following repairs. Includes crane hire. Council to engage the artist to undertake repairs as a separate contract (including transportation to and from the artist’s studio);
- De-watering and de-sludging of the pond (including disposal to authority’s requirements);
- Preparation of new subgrade, sub-base and base for the installation of the pond liner;
- Supply and installation of the pond liner;
- Construction of the “weir” wall;
- Construction of the concrete planter ledge;
- Supply and installation of planter boxes within the pond;
- Removal and replacement of existing granite rocks to the filtration pond edge;
- Supply and placement of additional granite rocks to some of the filtration pond edge;
- Cultivation of soil to garden bed areas;
- Supply and placement of salvaged site soil / imported topsoil;
- Formation of the new filtration pond;

- Formation of the new creek bed / filtration bed;
- Supply and planting of 150mm diameter pots and tube plants;
- Supply and spreading of mulch to garden bed areas;
- Reinstatement of grassed areas destroyed or damaged during works;
- Stock the pond with native fish;
- Maintenance period of 12 weeks;
- All other components listed on the drawings or within this Specification as forming part of the Contract Works.

1.2 Site and Construction Facilities

1.2.1 The Site

The site is within the St Kilda Botanical Gardens on Herbert Street in St Kilda (Melways Map Reference 2P D10). Prior to submitting a tender, Contractors are to familiarise themselves with:

- All visible existing conditions on and adjacent to the site; and
- Conditions of access to the site.

1.2.2 Drawings

LANDSCAPE DRAWINGS

L1 – Existing Conditions and Demolition Plan

L2 – Set Out Plan

L3 – Planting Plan

L4 – Construction Details (Sheet 1)

L5 – Construction Details (Sheet 2)

The Superintendent may provide new or revised Drawings to the Contractor during the Contract as deemed necessary for extra detail or as a result of any variation directed by the Superintendent. Advise the Superintendent immediately during the tender phase of any errors or omissions in the Drawings or Specification. Any such errors or omissions will not be considered a means for a Contract variation.

Check all Drawings carefully and advise the Superintendent of any discrepancies, errors or omissions.

1.2.3 Setting out the Works

Set out the Works in accordance with the dimensions shown on the Drawings.

Set on the ground all reference points in such a way that they will not be disturbed by the Contractor's operations.

The Contractor is solely responsible for the correct setting out of the Works. The Contractor must inform the Superintendent immediately when the lines of the Works have been set out and before any excavation or other work is carried out.

Figured dimensions take precedence over scale measurements and large scale drawings over small scale. Unless otherwise specified, the drawings and specification include everything reasonably for the proper and entire completion of the work, notwithstanding any omission in the specification or drawings. Discrepancies between the specification and drawings are to be verified with the Superintendent before proceeding with the particular work. Failure to do so will not be taken as a reason to claim for extra work.

1.2.4 Construction Services

Water supply may be obtained from the Botanical Gardens depot adjacent to the site. Electric power is also available from the depot and may also be obtained from the conservatory and the pump box, which may be more convenient. The Contractor is to make their own arrangements for the provision of any other services as required and is to pay all associated fees and charges.

1.2.5 Signage

Signage is to be supplied by the Contractor. "Trucks Entering" (or equivalent) signs must be used when materials are being delivered.

1.2.6 Sanitary Arrangements

Provide chemical type sanitation facilities at the Site for the use of its employees and must ensure that all facilities are serviced and cleaned regularly, or the Contractor may use public toilet facilities.

1.2.7 First Aid and Medical Facilities

The Contractor in all respects is to be fully responsible for first aid services to its staff and workmen including transport of injured personnel to hospital or other appropriate accommodation as and when required.

The provisions for first aid must not be less than those required by the Occupational Health and Safety Code of Practice.

1.2.8 Fire Precautions

Provide, operate and maintain adequate fire fighting equipment for the protection of the Works and the Contractor's plant and equipment. The Contractor must take all necessary measures to prevent fire during the work under the Contract and prevent damage to or destruction by fire of the vegetation in and surrounding the area of the Works.

The Contractor is to comply with the requirements of the Metropolitan Fire Brigades Act 1958 and any relevant Regulations, and any other regulations, and

is to ensure that all persons under the control of the Contractor comply with these requirements.

1.2.9 Temporary Fencing and Protection of Existing Infrastructure and the Works

Erect a protective 2 metre high cyclone mesh fence to the perimeter of the works area as per the drawings to ensure that unauthorised entry into the site is not possible at the commencement of site works.

Use methods such that the risk of any potential damage to existing infrastructure and the Works is minimised.

These methods include minimising the amount of material stockpiled within the site, minimising the amount of excavation open at any time, and that at the completion of each days work the site is to be left in a condition which will minimise the risk of damage. This is especially important prior to weekends and rostered days off (RDO).

1.2.10 Access, Security and Use of the Site, Machinery and Protection of Existing Paths

Access to the site is available via the service entry gate located on Herbert Street. The open grassed area next to this entry point may be utilised by the Contractor as a storage / equipment area during the contract works. The grass in this area is to be reinstated to the approval of the Superintendent at completion of the works as per the Grassing Reinstatement clauses of this Specification.

Inspect the site during tender period, to assess site access limitations, and extent of existing landscape elements.

Erect a safety fence around the site to keep unauthorised personnel out both during and outside construction hours.

Access is to be limited to limited to within the temporary fencing as shown on the plans. Traversal of other areas with machinery is not permitted. Protect existing paths by installing heavy duty "duck boarding" across paths where machinery and vehicle access is required. Limit the amount of area which is accessed by machinery and vehicles and where materials are stored to reduce damage to grassed areas. Accessed areas and damaged grass within the gardens will require reinstatement of grass cover at the completion of the pond works.

Ensure at the end of each days operations, that all exterior compound fences are in a condition to provide security for the work site, equipment and materials. Plant and equipment on the Site is to be securely locked to prevent their operation or removal by unauthorised persons.

Take care to prevent undue damage to the surrounding areas.

No deleterious substances such as oil, petrol, diesel fuel, lime, cement or paint is to be stored on any grassed areas and adequate precautions must be taken to prevent the spillage of any such substance. All waste substances are to be collected, removed from the Site and disposed of in a lawful manner.

All rubbish is to be collected, stored in an approved manner and periodically, or when directed, disposed of off Site.

No excavation of soil other than that required for the construction of the Works is permitted without the written approval of the Superintendent.

1.3 General Requirements of Work

1.3.1 Works Program

Complete the Works by the Date for Practical Completion stated in Annexure A of the General Conditions of Contract.

The Contractor is to, not less than 14 days after the Date of Acceptance of Tender, submit a construction program to the Superintendent in a form and in such detail to the satisfaction of the Superintendent.

1.3.2 Hours and Days of Work

The hours of working at the Site under the Contract are restricted to between 7.00 am and 6.00 pm Monday to Friday inclusive, but excluding public holidays and industry rostered days off. No work at the Site, other than routine maintenance on the Contractor's plant will be permitted outside of these hours without the prior written approval of the Superintendent.

1.3.3 Extension of Time

Notify the Superintendent immediately when delays are likely in the completion of works due to inclement weather or delays beyond the control of the Contractor. The Superintendent may allow extension of time to the completion date of the Contract in consideration of time extension claims.

1.3.4 Cleaning Up

At all times, the works are to be kept consistently cleared of rubbish and be maintained in a safe and tidy condition.

1.3.5 Occupational Health and Safety

Comply with the requirements of the Occupational Health and Safety Act 2004, all relevant Regulations and the Codes or Draft Codes of Practice which are relevant under the Contract.

1.3.6 Permits

Contact every necessary Service Authority and fully comply with the requirements of every authority for the location and protection of services:

The Contractor is fully responsible for any repairs/diversions to services required during the course of the works.

1.3.7 Non-Conforming Materials and Work

All non-conforming materials and work are to be repaired or replaced so that the Works meet all the requirements of this Specification.

1.4 Quality Assurance

1.4.1 Quality System

Plan, establish and maintain a quality system complying with AS 9001.

1.4.2 Standards and Codes

All materials and workmanship must comply in all respects with the requirements of such codes and standards issued by the Standards Association of Australia and current at the date of tender, as may be applicable to any part of the Works.

In the event of there being any conflict between this Specification, the Drawings and any code or standard, this Specification is to take precedence over the Drawings.

1.4.3 Quality Assurance Records

Supply two copies of a report detailing the results of all quality control and testing undertaken within 3 weeks of completion of the Works.

1.4.4 Workmanship and Materials

All materials are to be new unless otherwise specified and all materials and workmanship are to be the best quality throughout and subject to the approval of the Superintendent.

1.4.5 Damage

The Contractor is responsible for damage to property in accordance with the Contract. Protect all adjoining properties from damage throughout the duration of the Contract. The Contractor is responsible for the complete protection of the work executed under this Contract against all damage.

1.4.6 Supervision

Supervise the whole of the landscape work and provide a competent site foreperson authorised by him/her to receive and carry out instructions from the Superintendent. That person must be available to make and receive calls on a mobile phone during working hours for the duration of the contract.

1.4.7 Tender Pricing

Provide a lump sum tender based on all components documented.

Provide unit rates for the following items:

- Erection of temporary barricade fencing and temporary protective fencing to grassed areas.
- Set-out and bulk earthworks;
- Removal of some existing vegetation;
- Co-ordinate the removal of aquatic fauna. Native fish and turtles to be returned to the pond at completion of the project. Exotic fish and exotic and native ducks to be appropriately re-housed.
- Careful removal of the “Rainman” sculpture. Co-ordination of repairs with Council. Storage of the sculpture pedestal within the Contractor’s storage area. Replacement of the sculpture to its original location following repairs. Includes crane hire. Council to engage the artist to undertake repairs as a separate contract (including transportation to and from the artist’s studio);
- De-watering and de-sludging of the pond (including disposal to authority’s requirements);
- Preparation of new subgrade, sub-base and base for the installation of the pond liner;
- Supply and installation of the pond liner;
- Construction of the “weir” wall;
- Construction of the concrete planter ledge;
- Supply and installation of planter boxes within the pond;
- Removal and replacement of existing granite rocks to the filtration pond edge;
- Supply and placement of additional granite rocks to some of the filtration pond edge;
- Cultivation of soil to garden bed areas;
- Supply and placement of salvaged site soil / imported topsoil;
- Formation of the new filtration pond;
- Formation of the new creek bed / filtration bed;
- Supply and planting of 150mm diameter pots and tube plants;
- Supply and spreading of mulch to garden bed areas;
- Reinstatement of grassed areas destroyed or damaged during works;
- Stock the pond with native fish;
- Maintenance period of 12 weeks;
- All other components listed on the drawings or within this Specification as forming part of the Contract Works.

2 DEMOLITION AND EARTH WORKS

2.1 General

2.1.1 Scope

This Section specifies requirements for:

- temporary fencing
- protection of existing trees
- de-watering and de-sludging of the pond
- All works and activities to be undertaken prior to construction.

2.2 Site Preparations and excavation

2.2.1 Temporary Fencing

Temporary fencing as per clause 1.2.9 will be erected by the Contractor and retained until completion of the landscape maintenance period.

2.2.2 Trees to Remain

Trees to be retained as indicated on the drawings are to be adequately protected from the site works.

If necessary, hand methods of excavation are to be undertaken to protect existing trees.

2.2.3 Protection of Existing Trees

- Keep the area within drip line free of all equipment, building materials and debris. Do not lean materials, equipment or debris against trunks.
- Do not carry out cut and fill operations within the drip line of any trees to be retained.
- When excavations are carried out in the vicinity of trees to be retained, use hand excavation to locate any roots. Clean cut roots that need to be removed before commencing machine excavation with a saw. Do not use an axe to cut roots. Seal tree root cuts with "Steriprune" or equivalent approved tree wound sealant.
- Should any trees nominated to be retained be removed or damaged in error by the Contractor, damage will be applied in accordance with the following formula and will be deducted from the Contract sum:

One hundred dollars (\$100.00) per 25mm diameter of trunk or any branch removed up to maximum of two thousand dollars (\$2,000.00) per tree. The diameter of the trunk will be measured 1200mm above

the base of the tree or in the case of a branch, 1200mm above the base of the branch.

2.2.4 Drainage and Dewatering of Existing Pond

Dewater the existing pond. In dewatering the pond, the Contractor is to:

- (i) not discharge any drainage, dewatering, flushing or other waters into a sewer.
- (ii) not discharge any water polluted by fuels, chemicals, human rubbish or waste, or silts and sediments from disturbed areas of the site, including access routes, into any drain or watercourse or on to garden areas.
- (iii) make allowances for passage of large flows that could cause erosion or damage to the Works and/or adjacent land and assets.

The Contractor is to provide, maintain and operate:

- a. Such intercepting works as are necessary to prevent surface water entering the Works. This includes temporary diversion of the overflow pipe that is connected from the conservatory roof to the pond.
- b. All necessary pumping and other equipment for dewatering the various parts of the works and maintaining them free from water until the works have been completed.

Provide complete standby dewatering equipment where failure of the system could lead to danger to life or damage to partially completed structures.

Liaise with Council Officer (Jeff Baker: 0412 742 790, or Christa Mitchell: 0434 316 523) regarding the disposal of pond water within the Botanical Garden grounds to water surrounding garden beds. No sludge is to be spread within the gardens. All sludge from the pond is to be removed from the works site and disposed of at the Contractor's expense to a point of legal discharge.

Sludge can be left to dry within the pond following de-watering. If sludge is to be stockpiled outside of the pond area to dry-out / drain while works continue, the sludge is to be stockpiled within the Contractor's works storage area.

2.2.5 Removal of Rubbish

Dispose of all rubbish and waste soil/sludge generated from the implementation works as it occurs. Dispose of rubbish off-site to a point of legal discharge and make allowances for loading, tip fees and cartage costs.

Following dewatering, the sludge is to be left in the pond for two weeks to dry out. Once the sludge is dried sufficiently, it is to be removed and stockpiled in consultation with Council's Park Officer.

Temporary stockpiling of excavated material must be within the boundaries of the construction site subject to the approval of the Superintendent. Excavated

material suitable for fill construction, and which cannot be used immediately, is to be stockpiled.

Materials suitable for fill construction are to be stockpiled separately from unsuitable materials and the Contractor must ensure that the materials do not cross contaminate.

Such excavated materials are to be stockpiled or disposed of so as not to interfere with the operation of any facilities or any water courses, and disposal areas are to generally be levelled and trimmed to reasonably regular lines to the approval of the Superintendent.

2.2.6 Rainman Sculpture

The Contractor is to co-ordinate with the artist regarding removal of the Rainman sculpture. The Contractor is responsible for the provision of a suitable crane for lifting the sculpture and loading on to the transport vehicle (vehicle provided by the artist) and include all costs in their tender sum for both the removal and then the reinstatement of the sculpture and base following the repairs. The base / pedestal is to be stored in the Contractor's works storage area.

Following the careful removal of the sculpture, Council will co-ordinate all necessary repair works to be undertaken to the sculpture. Council will engage an artist directly and the cost of the repair works and transportation of the sculpture to and from the artist studio are not included as part of the Contractor's tender sum. The repair time is estimated at 2 weeks.

Following the completion of liner works, the Contractor is to re-install the sculpture in its original location. Additional geotextile fabric is to be placed beneath the sculpture to protect the liner as per clause 5.1.9.

2.2.7 Removal and Relocation / Return of Existing Aquatic Fauna

The Contractor is to co-ordinate the removal and relocation / return of existing aquatic fauna to be undertaken by a suitably qualified wildlife officer to the approval of the Superintendent.

All native fish and turtles are to be removed, appropriately kept during the construction period and then returned to the pond at completion of the project. Exotic fish, exotic ducks and native ducks are to be re-housed as appropriate for each species.

3 CONCRETE WORK

3.1.1 General

The work to be performed under this section of the Specification includes the supply of all labour, tools, materials and plant necessary for the construction of the concrete footing for the “weir” wall and for the construction of the planter box ledge.

3.1.2 Formation

Prior to placing of formwork, the foundation is to be trimmed to line and level. Any soft, wet or unstable areas which exist or have developed are to be removed, replaced with fine crushed rock, or other approved material.

3.1.3 Formwork

Formwork and framing for concrete must be in accordance with the provisions of Australian Standard AS 3610-1995 ‘Formwork for Concrete’. Formwork is to be supplied as necessary to carry out the work in a professional and competent manner. Formwork is to be straight, free from defects, robust and well-conditioned timber or other approved material, kept cleaned and oiled. Forms are to conform to the shape, lines and dimensions required in the finished concrete. Careful attention is to be given to tie rod spacing and pattern.

Sufficient forms are to be provided for them to be set for the full length of the section in advance of concrete placing. Forms are to be properly supported and braced to maintain position during and after the placing of concrete and must not be stripped until the concrete has hardened and obtained sufficient strength to support its even weight and any construction loads without damage to the concrete.

In no case is the formwork to be removed before 12 hours after placing the concrete.

3.1.4 Joints

At even intervals, joints are to be constructed by the use of Abelflex expansion joint or approved equivalent at maximum 2.40m centres. The expansion joints are to be sealed with a waterproof sealant such as Bostik Seal-N-Flex or approved equivalent.

3.1.5 Ready Mixed Concrete

The mixing and delivery of ready mixed concrete is to comply with AS1379-1997 ‘Specification for the supply of Concrete’.

3.1.6 Reinforcing

Reinforcement for concrete is to comply with the requirements of the following as applicable:

AS1302-1991 Steel Reinforced Bars for Concrete;

AS1303-1991 Steel Reinforced Wire for Concrete;

AS1304-1991 Welded Wire Reinforcing Fabric for Concrete.

At the time concrete is placed, check that reinforcement is free from loose mill-scale, loose rust, mud, oil, grease, paint and other coatings which would reduce the bond between the concrete and the reinforcement.

Accurately fix the reinforcement in accordance with the landscape drawings at the time the concrete is placed. Variations from position may be permitted not exceeding those specified herein. Reinforcing is to be free from bends and similar defects, and securely fastened and maintained in position until the concrete is placed.

Cutting of reinforcement by other trades is not permitted except by special permission in which case additional reinforcing bars are to be inserted as directed.

When splices, not already shown on the contract drawings are found necessary, submit details of the proposed splices for approval by the Superintendent.

Request an inspection for approval by the Superintendent of reinforcement placement and fixing prior to ordering concrete.

3.1.7 Pouring

All concrete is to be placed in daylight and under the direction of the Superintendent. Concrete is to conform to AS 1379 and have a minimum 28-day compressive strength of 30 MPa when tested in compliance with AS 1012.

At least 24 hours' notice must be given to the Superintendent of any intention to pour. No concrete is to be poured without the prior consent of the Superintendent following his inspection of formwork, equipment, and all materials to be used in the pour.

Prior to placing concrete, all formwork, equipment to handle concrete, excavated areas, reinforcement and existing adjacent concrete are to be clean of all foreign matter and water. Reinforcement is to be securely supported in position by wiring and bar chairs.

Immediately before placing any concrete, the sand or crushed rock bed is to be uniformly wetted with a hose having a spraying nozzle so that it will not absorb moisture from the concrete when placed. There are to be no pools of water on the base material.

Whenever the placing of concrete is delayed and poured concrete has taken its initial set, the point of stopping will be deemed a construction joint. This will be made only where approved in writing by the Superintendent.

Before placing new concrete on or against concrete which has set, the forms are to be re-tightened and the surface of the set concrete is to be roughened as required by the Superintendent, thoroughly cleaned of foreign matter, laitance and loose or porous material and saturated with water. The surface is to then be covered with a thin coating of stiff neat cement to ensure a proper bond and concreting may then proceed immediately.

Vibrate concrete to remove all voids.

3.1.8 Placing

After mixing, convey concrete to the place of final deposit without delay and place immediately. Job mixed concrete, not placed within twenty minutes of mixing will be rejected. Prevent the segregation or loss of the ingredients during handling. Dropping the concrete from a height greater than 1200mm, depositing large quantities at any point, and moving or working it along the forms will not be permitted. Maintain a plastic surface until the completion of the pour.

Where concrete is required to be carted by barrow or similar conveyance a distance exceeding 50 metres from the mixer, then place the concrete on a spreading platform after transport from the mixer. Turn over to ensure that consistency is constant and then shovel into place. Under no circumstances is concrete to be thrown from shovels.

3.1.9 Compacting

During and immediately after placing, thoroughly compact the concrete by means of continuous tamping, spading, slicing, or vibrating as specified.

Take care to fill every part of the forms, to force the concrete under and around the reinforcement without displacing it, and to remove all air bubbles and voids. Employ tradesmen with compacting experience in concrete work and vibrating equipment.

3.1.10 Curing and Protection of Concrete

Approved covering is to be provided to protect the concrete surfaces against rain, hail, dust or any other cause that may damage the concrete during the carrying out of the work.

The formwork may be stripped after 24 hours, but sufficient formwork must be provided to protect all exposed edges for at least four (4) days or longer, where in the opinion of the Superintendent, damage is likely to occur.

Protect concrete from premature drying at least seven (7) days after initial set has taken place. Place a membrane, heavy hessian or builder's plastic, in intimate contact with the concrete surface. Maintain concrete surface continuously wet for the duration of the curing period.

3.1.11 Finishing

After striking off the concrete to approximately the correct shape and grade the whole of the exposed surface is to be trowelled to a smooth impervious finish with a steel trowel or float and be free from all imperfections and true to grade and section.

4 LINER PREPARATION

4.1.1 Extent of Works

Construct compacted sand base layer and supply and lay geotextile underlay as shown on the drawings.

4.1.2 Preparation of Base

Following dewatering and sludge removal, remove any rubble, concrete, rocks and stones. Prepare the base so that it is clean, smooth, compacted, free of aggressive angle changes, stones and small cavities. Grade and trim the base to a smooth texture to the profile desired. Request an inspection by the Superintendent for approval.

- (i) All plant growth must be removed from the base prior to compaction in order to avoid any gas generation and compression of the base. The use of a durable weed killer will be required. The weed killer must not contain any components which might affect the Lining System. Details of weed killer and manufacturer's advice are to be submitted to the Superintendent prior to use.
- (ii) Place a nominal 100mm coarse sand bedding layer on top of the prepared base and compacted. The supporting surface must not contain any loose stone with a diameter exceeding 5 mm.
- (iii) The existing liner may be retained in place if the Superintendent is satisfied that the prepared and compacted base will meet the liner manufacturer's specification requirement for base preparation.
- (iv) Compaction of base layer and Testing. All fill construction is to be made to the lines, grades and dimensions shown on the Drawings or as directed by the Superintendent.
- (v) All fill is to be compacted to achieve a minimum of 95% of the maximum dry density as determined by AS1289.5.1.1 or a minimum density index of 65 in accordance with AS 1289 E6.1 for cohesion-less soils, unless shown otherwise on the drawings.

- (vi) Upon completion of earthworks, any areas showing signs of failure through excessive moisture content, rutting, slumping or heaving are to be removed and replaced in accordance with this Specification.

4.1.3 Geotextile Underlay

Install a 6mm non-woven fabric (A64 Bidim® or similar approved) geotextile liner underlay in accordance with the Drawings. Supply and lay a geotextile underlay over the entire pond area on top of the prepared compacted sand base and over the concrete ledge, except where the liner is adhered to a structure. Alternative materials must receive written approval from the Superintendent prior to ordering.

- (i) Lay material on a smooth surface free of irregularities, vegetation and stones.
- (ii) Care must be taken during the installation to ensure that the geotextile is not damaged. Any torn, ripped, creased or worn geotextile is to be replaced prior to advancing the works at the Contractor's expense.
- (iii) At finished edges, geotextile ends are to be trimmed to a tidy, even finish.
- (iv) Geotextile is not to be exposed at the finished surface.
- (v) Join rolls by overlapping at least 300 mm.
- (vi) Place temporary ballast over the geotextile to avoid uplift in windy conditions.
- (vii) Damaged geotextile is to be removed and replaced at the Contractor's expense.

5 LINER

5.1.1 General

Install rubberised liner membrane on a prepared base with geotextile as shown on the drawings. Sealing is to be provided on all interfaces and terminations of the liner to the appropriate specification and standard.

5.1.2 Referenced Documents

The following documents have been referenced in the development of this specification;

- (i) Firestone EPDM Geomembrane Technical Specification Guidelines- Section II installation Guide
www.membraneliners.com.au/pdf/Section%20II-%20EPDM%20Geomembrane%20Installation%20Guide%20-%202.pdf
- (ii) Firestone Lining System Installation Guidelines
www.firestonebpe.com/lining/tech_data/tech_guidelines/_en/index.shtm
- (iii) Proliner EPDM Installation Manual. Clearpond, www.clearpond.com.au

5.1.3 Specification

The liner is to be EPDM rubber (ethylene propylene diene Monomer) or equivalent with a minimum thickness of 1mm. Alternative materials must receive written approval from the Superintendent prior to ordering. The liner is to be;

- (i) A Black rubberised membrane
- (ii) Water resistant
- (iii) Temperature resistant (approximate range: -45°C to 130°C)
- (iv) Stored in a dry place until use
- (v) Resistant to UV radiation

Care must be taken when moving, transporting or handling to avoid sources of punctures and physical damage. Isolate waste products, such as petroleum products, greases, oils (mineral and vegetable) and animal fats from the liner membrane.

5.1.4 Method

All installation details are to be in accordance with the Manufacturer's guidelines and if a conflict between the manufacturer's guidelines and this Specification arises then the maximum of cover required from either this Specification or the Manufacturer's guideline is to be adopted.

Unroll and/or unfold the panels into the position indicated on the layout plan. Generally, side slope panels are placed and temporarily ballasted (eg sand bags) first, followed by the bottom panels.

Unroll the liner membrane panels down the side slopes and temporarily anchor the liner to avoid movement down slope.

Damage to the supporting soil or geotextile underlay must be repaired before advancing the works.

Place temporary ballast (sand bags) over the geotextile to avoid uplift in windy conditions.

5.1.5 Joining

Join separate liner membrane sheets to the liner Manufacturer's specification & details. The seaming of adjacent panels is to be performed immediately after the relaxation of the liner membrane.

All panels are to be installed without tension and without wrinkles overlapping by at least 200mm. All seams on side slopes are to be parallel with the slope (i.e., up and down the slope).

Clean the seam area and dry before applying the adhesive. Cease the application of the adhesive when the atmospheric conditions are unfavourable (humidity, condensation or rain). The liner membrane is not to be moved or disturbed during application of the adhesive and until it has fully bonded.

Request an inspection of the liner half way through the laying process, then at completion for approval by the Superintendent.

5.1.6 Toe anchoring

The liner is to be anchored at the toe of the bank slope to the Manufacturer's specification and details. Clean, inert fill should be used and compacted to the liner Manufacturer's specification.

5.1.7 Liner termination

The liner is to be terminated beneath the existing brick coping overhang and sealed with a water proof sealant to the liner manufacturer's specification and details.

Connections of the liner membrane to concrete/masonry structures are to comply with the following:

- (i) Connection surfaces must be smooth, clean and free of any sharp protrusions
- (ii) The liner membrane must be fully adhered to the walls using adhesive as required by the Manufacturer's specification.

- (iii) Fasten the liner membrane using termination bars and fasteners adapted to concrete/masonry. Apply a waterproof sealant between the liner membrane and the wall as shown in the Manufacturer's details.

5.1.8 Penetrations

Seal all penetrations to the liner Manufacturer's specification. Apply a water proof sealant at all interfaces between the liner and a penetration.

5.1.9 Additional Geotextile

Additional geotextile (refer to section 4 of this document) is to be placed on top of the installed liner membrane to protect it where;

- (i) The 'Rainman' structure support (large sandbag) will be placed
- (ii) Beneath all boulders or specimen field stones to be placed in the pond
- (iii) Between the planting crates and the liner on the extended concrete ledge

5.1.10 Completion

On completion of the liner (to Manufacturer's specification), the pond is to be filled with recycled water to Council's requirements. The pond is also to be restocked with native fish. Superintendent is to confirm requirements with the relevant Council Officer (Jeff Baker: 0412 742 790, or Christa Mitchell: 0434 316 523).

All work performed is to comply with the appropriate Australian Standards and all rules and regulations of relevant Statutory Authorities.

6 Weir wall

6.1.1 Extent of Works

The work to be performed under this section of the Specification includes the supply of all labour, tools, materials and plant necessary for the construction of the “weir” wall.

6.1.2 Samples

Provide samples and request the approval of the Superintendent of granite rock capping and exfoliated granite slabs proposed for use prior to ordering through colour sample and photograph of size range with survey staff or measuring device clearly shown in photograph of rock sizes to be obtained.

Rocks are to match the existing granite rocks located in the existing filtration pond and channel, which are to be re-used for the filtration pond edging.

Concrete Footing and Masonry Blockwork

Construct a 600 x 300mm reinforced concrete footing as detailed in the drawings. Concrete and reinforcement are to meet all the standards and clauses of this Specification.

Mortar joints are to be 10mm struck flush. Mortar is to be a 1:1:6 bricklaying mix.

The concrete footing and masonry blockwork wall are to be dowelled to the existing to the existing concrete pond edge wall and the junctions waterproofed with a waterproof sealant such as Bostik Seal-N-Flex or approved equivalent. Secure dowel into stone with Ramset 'Chemset 101' Injection Grout.

6.1.3 Granite Cladding

Fix each granite cladding slab with two 6mm galvanised steel dowels at the top edge and bed the bottom edge of the cladding into a 75 x 75mm concrete strip.

Carefully pre-drill the granite cladding slabs to receive the dowels with the appropriate drill bit to avoid cracking or fracturing of the stone. Secure dowel into stone with Ramset 'Chemset 101' Injection Grout.

Secure the bottom edge of the granite cladding slabs with a 75 x 75mm concrete strip. Pour the concrete over 25mm of packing sand and a protective layer of geotextile to protect the liner below.

Seal all gaps with Bostik Seal-N-Flex sealant or approved equivalent.

6.1.4 Rockwork

Fix granite boulder caps with 1:1:6 mortar mix to the top of the masonry weir wall. Bed granite caps securely and ensure there are no voids between the cap and the masonry wall. Granite caps to have a width no less than 550mm and no

greater than 650mm. Height of caps to be no less than 100mm. No part of the top of the wall should be visible beneath the granite caps. Sides of the caps to touch each other as closely as possible to avoid large mortar junctions.

Gently grade the granite caps from the filtration pond water level up to the granite caps at both ends of the weir wall which are to be larger in height to contain the water. The level of the tops of the granite caps at each end of the wall are to match the top of the filtration pond edge.

6.1.5 Liner Protection

Supply and lay an additional layer of geotextile over the liner at any point where a material is to be laid over the liner. Refer to section 4 of this document for geotextile specifications.

7 ROCKWORK

7.1.1 Extent of Works

Construct granite rockwork embankments and rock beaching to the filtration pond edge as shown on the drawings.

7.1.2 Samples

Provide samples and request the approval of the Superintendent of rocks proposed for use prior to ordering through colour sample and photograph of size range with survey staff or measuring device clearly shown in photograph of rock sizes to be obtained.

Rocks are to match the existing granite rocks within the filtration pond and channel, which are to be re-used for the filtration pond edging.

7.1.3 Granite Rockwork

Supply and set out selected rocks to areas shown as rockwork. Allow for delivery, excavator, crane, cartage and placement of rocks.

Confirm perimeter alignment of rock embankment with Superintendent prior to bedding preparation. General rocked areas will be pegged or marked with spray paint by the Contractor.

Supply 50% of rocks that are less than 600 mm diameter in the smallest dimension and 50% of rocks that are greater than 600 mm in the smallest dimension. Rocks are to be generally elongated with rounded sides and no sharp edges.

At tendering provide a unit cost for supply and placement of the two sizes of rocks ie: Rocks less than 600mm diameter and rocks greater than 600mm.

7.1.4 Liner Protection

Provide an additional layer of geotextile is to be placed on top of the installed liner membrane to protect it from damage where rocks are to be placed over the liner (around the perimeter of the filtration pond). A 75mm (minimum) layer of packing sand is to be placed over the additional layer of geotextile as a bedding layer for the rocks. This layer is to be shaped to firmly hold the rocks in place.

7.1.5 Rock Placement

Set rocks on a prepared bedding as detailed in the drawings on confirmation and approval of specific alignment of rockwork to the filtration pond's edge by the Superintendent. Ensure that one third to half of each rock is below the normal water level of the filtration pond. Rocks must be in a balanced and harmonious relationship with respect to the adjacent rock. Place rocks in a structured row

generally with the larger rocks to the base. Smaller rocks < 600mm diameter can be used as infill.

7.1.6 Topsoil Within Rocks

Place an imported top soil mix between all rock crevices. Refer to section 8.14 for soil mix specifications.

8 CULTIVATION AND SOILS

8.1.1 Extent of Works

The Contractor is to grade to final subsurface levels and cultivate the site soil prior to spreading imported topsoil to areas of planting, as shown on the drawings.

8.1.2 Subgrades and Trimming Following Bulk Earthworks

Ensure all surfaces are free draining. Request an inspection of the trimmed and cultivated surfaces for approval by Superintendent.

8.1.3 Cultivation of Site Soil to Garden Areas

Prior to spreading imported topsoil to all new garden areas, cultivate site soil / fill material to a depth of 150mm by mechanical means. Supply and spread gypsum evenly over all garden bed areas at a rate of 1kg/m². Allow fallow period of seven (7) days prior to spreading imported topsoil.

8.1.4 Imported Topsoil for Garden Beds

For new garden areas, spread imported top soil as a 50/50 mix of grey/brown medium to heavily textured loam and black sandy loam. Gently haunch the topsoil into adjoining grassed areas and pathways. Spread to a lightly rolled depth of 150mm. At time of tendering supply 1kg sample of imported top soil intended for use as top soil for testing and reference sample. Supply sample to Superintendent for approval.

8.1.5 Imported Topsoil for Aquatic Planting (Filtration Pond)

Within the filtration pond, a 50 / 50 topsoil mix of clean imported topsoil (black sandy loam and grey-brown medium textured loam) and washed granitic sand to a depth of 200mm. At time of tendering supply 1kg sample of imported top soil intended for use as top soil for testing and reference sample. Supply sample to Superintendent for approval.

8.1.6 Final Grading

Planted areas are to be finished to form a gently crowned appearance or to conform to levels already established in the bulk earthworks and are to finish flush with adjacent surfaces. Gently grade soil to adjoining grassed areas and pathways.

8.1.7 Reinstatement of Grassed Areas

To the existing grassed perimeter area used for machinery access during the works, reinstate compacted and worn grassed areas at completion of the works. Deep rip the surface to 300mm in a criss cross (90° angles) pattern and then

cultivate to a fine tilth by mechanical means. Request an inspection by the Superintendent for approval of the ripping and cultivation process, prior to imported top soil. Refer to section 10 of this Specification.

9 PLANTING

9.1.1 Extent of Works

The Contractor is to provide plant material from an approved nursery/supplier, fertilisers and labour to plant plants as set out and scheduled on drawings.

9.1.2 Plant Material

All plant material is to be obtained from an approved nursery/supplier where plants are exposed and have been hardened-off in the open. Plants are to be healthy, well-grown specimens, free of pest and diseases.

Plants are to be delivered to the site in such a manner as to prevent damage in transit.

9.1.3 Setting Out

The Contractor is to set out the plant material in accordance with the planting plan and obtain the on-site approval of the Superintendent prior to planting.

9.1.4 Container and Plant Sizes

Plant materials are to be supplied in the following minimum sizes:

- (i)** Shrubs - 150mm pots
- (ii)** Ground covers - 150mm pots and tubestock 20-25mm diameter
- (iii)** Tufting plants - tubestock 20-25mm diameter
- (iv)** Aquatic plants - tubestock 20-25mm diameter

9.1.5 Planting Conditions

Planting must not be carried out if the soil is very wet and waterlogged, or during periods of adverse or extreme weather or windy conditions.

9.1.6 Planting Procedure for Shrubs, Groundcovers, Tufting Plants and Aquatic Plants in Tubes

- Thoroughly soak the plant before planting.
- Over-excavate each plant hole by at least three times the pot diameter and pot height.
- If the soil is very dry fill with water and allow to drain completely.
- Fertilise at the following rate:
 - o Tubestock - 'Osmocote' (long life) 15gms each

- 150mm pots - 'Osmocote' (long life) 25gms each
- Place fertiliser in the bottom of the hole and cover with soil to ensure there is no contact between the roots and fertiliser.
- Place the plant into the hole and backfill with approved topsoil free from weeds, stones, clods of subsoil and other extraneous matter.

9.1.7 Garden Mulch

After planting plants, supply and spread Eucy mulch to an average depth of 75mm (+/- 10mm) after the formation of the water bowl. Mulch level to finish above adjacent paved surfaces. Supply a sample of mulch intended for use for approval of Superintendent prior to ordering mulch.

Mulch is to be free from soil clods, rocks and all other non-organic matter. Keep mulch away from the trunks to avoid rotting at ground level. Apply mulch regularly to maintain mulch level as specified.

9.1.8 Malicious and Unlawful Damage

In the case of plants that are damaged or destroyed unlawfully by others prior to completion of the Maintenance and Establishment Period, damage is to be rectified and include replacement of stolen or severely damaged material. The Contractor must report such malicious damage to the Superintendent prior to replacement.

Prior to Practical Completion, the Contractor will be responsible for all costs incurred to rectify damage. After Practical Completion, but prior to completion of the Maintenance and Establishment Period, assessment of the extent of damage caused and cost of reinstatement will be determined by the Superintendent, and paid for by the Principal by way of a contract variation. All other reinstatement costs not covered by this clause will be borne by the Contractor.

10 GRASSING REINSTATEMENT

10.1.1 Extent of Works

The Contractor is to reinstate any grassed areas damaged during the course of the works.

10.1.2 Instant Turf Grassed Areas

- **Preparation**

For reinstated grassed areas, spread imported top soil as a 50/50 mix of grey/brown medium to heavily textured loam and black sandy loam. Gently haunch the topsoil into adjoining grassed areas and pathways. Spread to a lightly rolled depth of 100mm. At time of tendering supply 1kg sample of imported top soil intended for use as top soil for testing and reference sample. Supply sample to Superintendent for approval. Imported top soil is to be graded to a smooth surface to ensure free surface drainage. No clods larger than 100mm diameter are to be left. Cultivate surface soil to a fine friable tilth by mechanical means. Match existing site surface grades. The surface is to be free of depressions and undulations with the variance being no greater than 50mm over a 5 metre length. In case of adverse weather conditions the work may be suspended at the direction of the Superintendent. To areas of grass to be reinstated, cultivate the site soil to a depth of 200mm by mechanical means and when soil is in a friable condition.

- **Levels**

Lightly roll topsoil to finish 15mm above junctions with other surfaces / edges.

During the fallow period, lightly hose the prepared surface to aid settlement. Fill any areas of subsidence with stockpiled topsoil to maintain grades and tolerances.

At the time of laying, cultivate the seed bed to a depth of 25mm by raking soil in transverse directions to give a loose surface to receive turf.

- **Fertiliser**

Spread fertiliser at the rate recommended by the turf supplier.

- **Turf**

Instant turf is to be Kikuyu grass.

- **Conditions**

Preparation and laying operations will be suspended if soil is wet, or during periods of adverse weather conditions.

- **Protection of Grassed Areas**

At commencement of reinstatement works a temporary protective 1.5 metre high orange paraweb fence supported on 3 strands of wire fixed to star pickets will be erected around the area to have grass reinstated. The fence is to be constructed at seeding and is to remain until final completion as follows:

- o Steel star pickets at 3 metre centres driven securely into the ground.
- o Three strands of wire fixed securely to the star pickets, supporting orange paraweb to 1.5 metres high.
- o The top and bottom strands of wire fence, tie plastic road marking tape (red and white striped) available from Deneffe Signs telephone (03) 9431-0999, spanning full height and length of the fence. Tie tape at regular intervals to achieve secure fastening. Ensure tape remains securely fixed to wire fence throughout the maintenance and establishment period.

- **Practical Completion**

Upon receipt of Notice of Practical Completion, the Contractor is to cut the grass using a cylinder mower. Immediately after the first cut, spread fertiliser at the rate specified by the turf supplier. The fertiliser must not be spread on wet grass and is to be evenly spread over the entire grass surface and thoroughly watered after application.

- **Mowing**

Allow for mowing during the maintenance period. Initially mow with a sharp rotary type mower, taking care to cut no more than one third of the leaf area in any one mow. Grass is to be maintained at 50mm height. Subsequent mowing can be done with a reel type mower. The grass is to be cut in even swathes. Grass cutting is to be done evenly over the entire grassed areas.

- **Weed Control**

Inspect grass on a weekly basis and if weeds become apparent, remove weed growth by cultivation. Selective herbicides may be used at the Contractor's direction. Ensure that weed spraying is carried out on a calm day and protect all trees, shrubs and ground covers from spray drift damage.

- **Watering**

Water grass regularly to supplier's recommendations.

11 MAINTENANCE AND ESTABLISHMENT

11.1.1 General

The Contractor is to maintain and establish the works for a period of twelve (12) weeks, during which they are to make good all defects after the issue of the Certificate of Practical Completion by the Superintendent.

Maintenance and Establishment means the care and maintenance of the contract area by accepted horticultural practices, as well as rectifying any defects that become apparent in the works under normal use. This is to include, but is not limited to, the following items where required:

- Watering
- Fertilising
- Weeding
- Pest and disease control
- Replanting
- Cultivation
- Pruning
- Maintaining neatness and tidiness of site
- Replacement of dying or dead plants
- Topping-up of mulch

11.1.2 Malicious and Unlawful Damage

In the case of plants being damaged or destroyed unlawfully by others during the defects liability period, such damage is to be rectified as specified above for faulty materials and workmanship. Rectification includes replacement of stolen or severely damaged material at the cost of the Principal.

The Contractor must report such malicious damage to the Superintendent who will inspect the damage prior to replacement.

Immediately after the Contractor has carried out the replacement, they are to request a further inspection and written approval of the replacement. The Contractor is to show such replacements on a site plan that will be maintained up to date by them with each amendment duly authorised by the Superintendent.

11.1.3 Commencement of Maintenance and Establishment

The Contractor is to give the Superintendent seven (7) days notice that the works are practically complete for commencement of maintenance/establishment

period. The Superintendent will inspect the works and if any defects or deficiencies are found, they must be rectified within 14 days.

Before requesting the works practically complete, the Contractor must ensure that all works of the contract are complete.

11.1.4 Protection

All planted areas are to be protected from damage, whether malicious, irresponsible or accidental.

11.1.5 Mulched Surfaces

All mulched surfaces are to be maintained in a clean and tidy condition and be reinstated if necessary, as specified.

11.1.6 Spraying

The Contractor is to spray against insect and fungus infestation if considered necessary by the Superintendent. All spraying is to be carried out in accordance with the manufacturer's directions.

11.1.7 Planted Areas

Garden beds are to be maintained weed free, mulch kept topped up to specified depth and kept clear of plant stems.

The Contractor is responsible for the Maintenance and Establishment of all planting works.

11.1.8 Watering

All plants are to be watered regularly so as to ensure continuous healthy growth. The minimum acceptable requirement for shrubs is 25mm watering during each period of one week.

11.1.9 Weeding and Rubbish Removal

During the Maintenance and Establishment period, remove by hand, rubbish and weed growth that may occur/re-occur throughout the Contract area. This work is to be carried out regularly so that at weekly intervals the area may be observed in a completely clean and tidy condition.

11.1.10 Replacements

The Contractor is to replace all plants and grass that are missing, unhealthy or dead at their cost. Replacements are to be of similar size and quality and identical species or variety to the plant that has failed, and replaced immediately unless otherwise directed.

11.1.11 Soil Subsidence

Any soil subsidence or erosion, which may occur after the soil filling and preparation operations, is to be made good.

11.1.12 Pruning

Shrubs are to be pruned as directed by the Superintendent. Pruning is to be undertaken to maintain a healthy dense canopy to all plants. Any damaged growth is to be pruned.

11.1.13 Insurance

The Contractor is advised to ensure adequate insurance cover for his/her work during the Maintenance and Establishment period.

11.1.14 Urgent Works

Notwithstanding anything to the contrary of the Contract, the Superintendent may instruct the Contractor to perform urgent maintenance works. Should the Contractor fail to carry out the work immediately, the Superintendent reserves the right without further notice to employ others to carry out such work and charge it to the Contractor.

11.1.15 Completion

The Contractor must ensure that all works of the Contract are complete immediately prior to the expiry date of the Contract time. The Contractor is to remove all debris from the site and any material he/she may have stored on or adjacent to the site, leaving the area tidy to the satisfaction of the Superintendent.

The Contractor is to show such replacements on a site plan that is to be maintained by them up to date with each amendment duly authorised by the Superintendent.