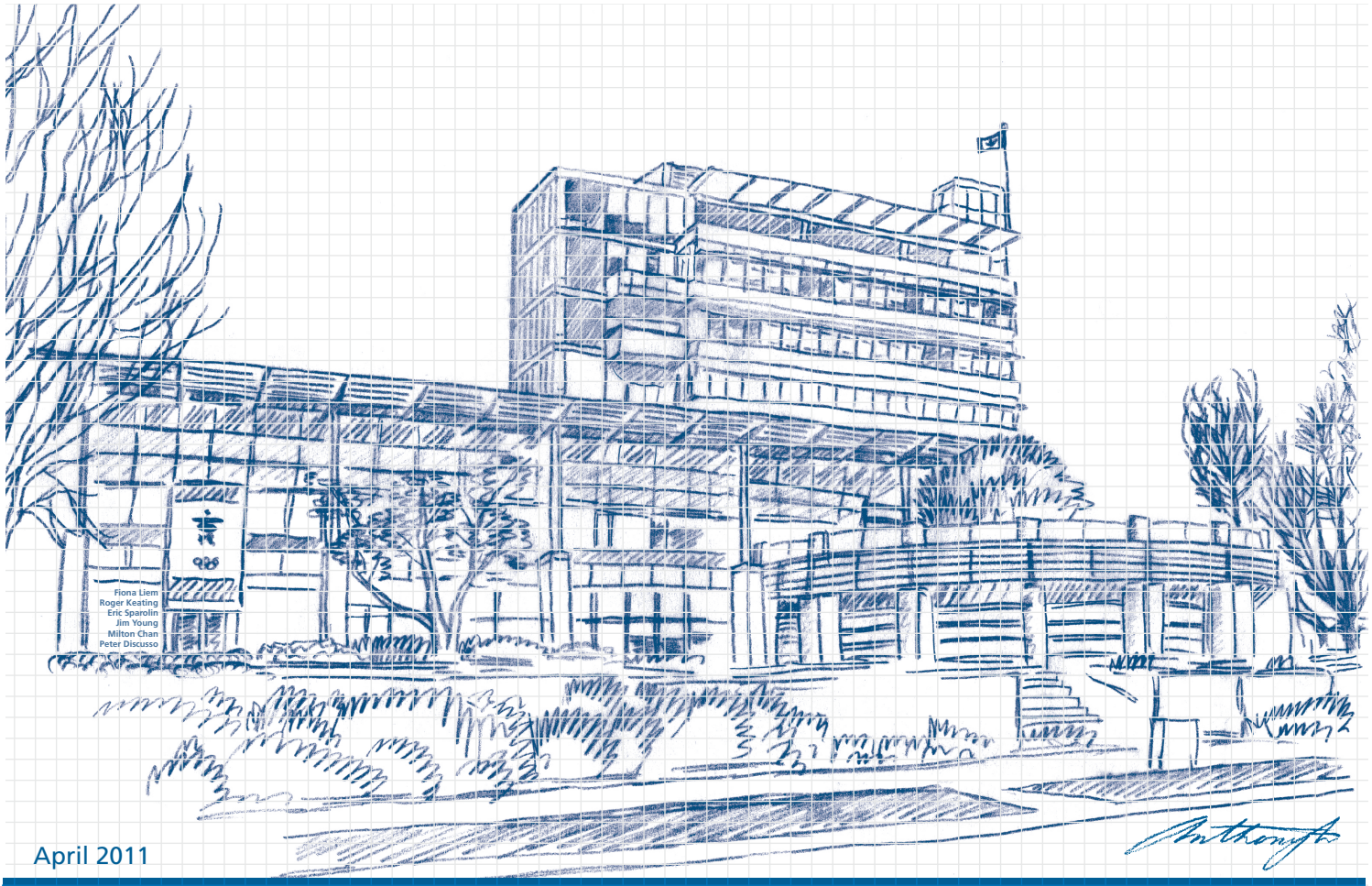

April 2011

City of Richmond Engineering Department

Supplementary Specifications and Detail Drawings

Richmond

City of Richmond
Engineering Department

SUPPLEMENTARY SPECIFICATIONS AND DETAIL DRAWINGS

(To complement Master Municipal Construction Documents (MMCD) – Platinum Edition)

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SCHEDULE A

SUPPLEMENTARY SPECIFICATIONS FOR CIVIL, ROADWAY LIGHTING AND TRAFFIC SIGNAL WORKS

PREAMBLE

The following Supplementary represent additions, amendments and deletions to various Specifications in the Master Municipal Construction Documents (MMCD) – Platinum Edition to suit the requirements of the City of Richmond.

The City of Richmond Supplemental Specifications and Detail Drawings, and the MMCD Platinum Edition, are minimum standards. Designs shall be engineered to provide required service levels on a site-specific basis.

SUPPLEMENTARY SPECIFICATIONS

- All Supplementary Specifications clauses will be suffixed with “ss” with the keywords for the changes in **bold**.
- The original specification to be changed is always deleted and replaced with the applicable Supplementary Specification.
- It is the user’s responsibility to check for updates/addenda to this specification.

SCHEDULE B

SUPPLEMENTARY SPECIFICATIONS FOR HORIZONTAL DIRECTIONAL DRILLING

The Supplementary Specifications hereunder shall apply to all horizontal directional drilling in the City of Richmond.

1.0 GENERAL

.1 This specification covers the requirements for furnishing all labour, equipment and materials associated with the installation of gravity sewer pipe and/or forcemain by directional drilling method. The gravity sewer pipe and/or forcemain shall be fusible high density polyethylene (HDPE) pipe as specified herein. This work shall include, but not be limited to, steerable directional boring equipment, boring pits and equipment, sheeting, maintenance of traffic and coordination with other contractors (if required), miscellaneous appurtenances to complete the work as shown on the contract drawings, cleanup and disposal of spoils, and restoration. Directional drilling operations shall be performed within the right of way and/or easements shown on the drawings.

.2 The work may include but not limited to:

.1 Excavation of drilling and receiving pits.
.2 Potholing or other similar practices as required to verify underground utilities along the entry and exit drill paths.
.3 Drilling of a pilot hole at prescribed line and grade.
.4 Reaming of the hole (as needed).
.5 Pullback of the pipe through the hole.
.6 Connect piping to manhole(s), wetwell and existing forcemain(s), etc. (as applicable and shown of the contract drawings).
.7 Video inspection of gravity main(s) including cleaning and flushing the main and use of inclinometer in front of the video camera on each section of gravity main between manholes and acceptance by the City prior to moving onto the next sewer pipe section. Upon completion of the gravity system and connection to a pump station (if applicable), flush and video inspect the entire system.
.8 All incidental work such as horizontal and vertical control points, survey, grids, permits, slurry treatment and disposal, shoring and casing of the pits if required, and all else necessary for the complete installation of the pipe in accordance with these specifications and contract drawings.

1.1. Related Work

.1	Traffic Control, Vehicle Access and Parking	Section 01 55 00
.2	CCTV Inspection of Pipelines	Section 33 01 30.1
.3	Cleaning of Sewers	Section 33 01 30.2
.4	Storm Sewers	Section 33 40 01
.5	Pipe Culverts	Section 33 42 13
.6	Manhole and Catchbasins	Section 33 44 01
.7	Sanitary Sewers	Section 33.30.01
.8	Sewage Forcemains	Section 33 34 01
.9	Waterworks	Section 33 11 01

1.2. Quality Assurance

.1 The requirements set forth in this specification specify a wide range of procedural precautions necessary to ensure that the very basic, essential aspects of a proper directional bore installation are adequately controlled. Strict adherence shall be required under specifically covered conditions outlined in this specification. Adherence to the specifications contained herein, or the City's approval of any aspect of any directional bore operation covered by this specification, shall in no way relieve the Contractor of their ultimate responsibility for the satisfactory completion of the work authorized under the Contract.

1.3. Submittals

.1 Work Plan:

.1 Prior to beginning work, the Contractor must submit to the City a general work plan outlining the procedure and schedule to be used to execute the project. Plan should document the thoughtful planning required to successfully complete the project.

.2 Such review and approval on behalf of the City shall be with respect to overall objectives of the project, impacts on existing facilities and businesses, and operational aspects only, and shall not in any way relieve the Contractor of his sole responsibility under this Contract for all aspects of final design and construction of the HDD installation.

.3 The submission shall include:

.1 Proposed drill path design (with drawings) for the City's approval. Drill path to clearly indicate radius of curvature, entrance / exit angles and depth of cover.
.2 Complete methodology specific to the HDD installation, including equipment specifications and capabilities, size of pilot hole, number and size of pre-reams, use of rollers, baskets, and side booms to suspend and direct pipe during pull back, type and capabilities of pilot hole tracking system including tolerances and operating personnel;
.3 Detailed drawing of work area(s), including locations and footprints of equipment, pipe storage/staging and the locations of drill entry, exit, and slurry containment pits;
.4 Detailed drawings of pull back installation showing surface features, and pipe handling;
.5 A sample of the proposed drilling, mud, survey, welding and pressure testing logs;
.6 Details illustrating response to inadvertent drill fluid migration (include drawings showing containment berms and pumps, etc.)
.7 All drill pipe used by the Contractor for pilot hole drilling, reaming and pull-back must have current mill inspection certificates (which are to be given to the City at time of contract award);
.8 Current mill inspection certificates for all down hole tools such as crossover subs, monels, hevi-wate, hole openers and any other tools

used by the Contractor (which are to be given to the City at time of contract award);

.9 Calibration records of all surface and downhole surveying equipment prior to and after arrival on site; and

.10 Details of fencing/hoarding for protection of public and site security.

.11 Environmental Plan for groundwater disposal and treatment, drilling mud disposal, environmental protection plan and a sediment erosion control plan for the work including weekly field inspections and reporting during construction.

.12 Contractor to submit pipe stress calculations for each stage of the installation process as the pipe is pulled through the bore. Calculations to clearly indicate if pipe is to be empty or filled with water during installation. Calculations to include:

.1 Internal pressure stress

.2 Bending stress

.3 Thermal stress

.4 Net longitudinal compressive stress (bending included)

.5 Equivalent tensile stress available to include progressive creep strain.

.6 Total longitudinal stress from sustained loads

.7 Short term and long term external differential pressure.

.13 Contractor to submit detailed design analysis, and calculations in the form of a technical report, under the seal of a professional engineer, registered in the Province of British Columbia.

.2 Equipment:

.1 Contractor to submit specifications on directional drilling equipment to be used to ensure that the equipment will be adequate to complete the project.

.3 Materials:

.1 Specifications on material to be used to be submitted to City. Material shall include the pipe, fittings and any other item that is to be an installed component of the project.

.2 The following Product Data is required from the pipe supplier and/or fusion provider:

.1 Name of the pipe manufacturer and a list of the piping and quantities to be provided by manufacturer.

.2 Product data and pipe supplier data indicating conformance with this specification and applicable standards, including written documentation regarding any intended variance from this specification and applicable standards. This will include experience of pipe supplier by years and number of projects; warranty information; and independent laboratory testing certification.

.3 Test results will be prepared and made available from the pipe extruder to the City upon request, for each extrusion run.

.4 As applicable, fusion joint data and fusion technician data indicating conformance with this specification and applicable standards, including written documentation regarding any intended variance from this specification and applicable standards. This will include fusion joint warranty information and recommended project specific fusion parameters, including criteria logged and recorded by data logger.

1.4. Job Conditions

.1 Environmental Requirements

.1 Drilling operations must not interfere with or endanger surface and activity upon the surface. Areas outside designated work areas should not be disturbed. Examine work area and notify City of conditions that may adversely affect work.

.2 Contractor shall conduct operations and schedule cleanup in a manner to cause the least possible obstruction and inconvenience to traffic, pedestrians and to adjacent property owners.

.2 Safety. The Contractor shall carry out the operations in strict accordance with all applicable health and safety regulations.

1.5. Payment

.1 Payment shall be in accordance with the Contract Documents and Supplementary Specifications

2.0 PRODUCTS

2.1 General

.1 HDPE pipe shall be from a single manufacturer, who is fully experienced, reputable and qualified in the manufacture of the HDPE pipe to be furnished. The pipe shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with these specifications.

.2 The pipe manufacturer shall provide a warranty against manufacturing defects of material and workmanship for a period of ten years after the final acceptance of the project by the City. The manufacturer shall replace at no expense to the City any defective pipe/fitting material including labour within the warranty period.

2.2 Connections

.1 Connections: connections used in conjunction with tie-ins to other gravity sewer piping and structures, shall be as indicated on the drawings or as directed by the City.

.2 HDPE Pipe, Joints and Fittings:

.1 The pipe shall be high performance, high molecular weight, high density polyethylene (HDPE) pipe. The pipe shall have minimum dimension ratio DR 21. The Contractor shall complete his own calculations for minimum dimension ratio required to complete the installation and if necessary increase the thickness of the pipe to meet the requirements of HDD. Reduction of the DR rating will not be acceptable.

.2 Pipe shall be made of virgin materials. The pipe shall contain no recycled compound except that generated in the manufacturer's own plant for resin of the same specification from the same raw material pipe.

.3 Fittings:

.1 All fittings for forcemains shall be Cast Iron Outside Dimension fittings fitted to stub end slip on flanges. Fittings for the gravity mains may be moulded or fabricated by the manufacturer. No Contractor fabricated fittings shall be used unless approved by the City.

.4 Pipe and Fittings shall be homogeneous throughout and free of: serious abrasion, cutting, or gouging of the outside surface extending to more than 10 percent of the minimum wall thickness in depth; cracks; kinking (generally due to excessive or abrupt bending); flattening; holes; blisters; and other injurious defects. They shall be uniform as commercially practical in color, opacity, density, and other physical properties. Any pipe and fittings not meeting these criteria shall be rejected.

.5 Joints:

.1 Pipe lengths shall be assembled in the field with butt-fused joints in accordance with ASTM D 2657 and the pipe manufacturer's written instructions shall apply. Joint strength shall be equal to or greater than the tensile strength of the pipe and shall indicate a ductile rather than brittle fracture when tested.

.2 Joint with Fusion Equipment: The fusion machine shall have hydraulic pressure control for fusing two pipe ends together and shall be equipped with gauges to monitor fusion pressures. The machine shall be equipped with an electric or gasoline engine powered facing unit to square and trim the pipe ends smooth and provide full surface contact with the heating plate. The heating plate on the fusion machine shall be electrically heated and thermostatically controlled with a temperature gauge and be capable of maintaining 500°F (260°C) with a tolerance of 10°F (2%). Fusion temperature shall be as recommended by the pipe manufacturer. The heater plate shall be equipped with suitable means to measure the temperature of plate surfaces and to assure uniform heating such as thermometers or pyrometers.

.3 Where excavations for pipe installation are made between manholes, the pipe shall be joined by butt-fusion or per manufacturer's recommendations.

.4 A factory qualified joining technician as designated by the pipe manufacturer shall perform all heat fusion joints.

.6 The finished HDPE pipe shall be continuous over the entire length of run between two manholes and shall be free from visual defects.

.7 Certification: Submit certified lab data or manufacturer's written certifications to verify the physical properties of the materials supplied under this specification.

.8 Rejection: Polyethylene pipe and fittings may be rejected for failure to meet any of the requirements of this specification.

.9 Pipe Dimension: Pipe supplied under this specification shall have an actual inside diameter not less than the diameters of pipe shown in the Contract Documents.

2.3 Directional Drilling Equipment

.1 General:

.1 As a minimum, the directional drilling equipment shall consist of a directional drilling rig of sufficient capacity to perform the bore and pullback the pipe, a drilling fluid mixing, delivery and recovery system of sufficient capacity to successfully complete the bore, a guidance system to accurately guide boring operations, a vacuum truck of sufficient capacity to handle the drilling fluid volume, personnel meeting the training requirements, and all other equipment required to complete the installation. The Contractor has the option of using a drilling fluid recycling system capable of removing solids from the drilling fluid so that the fluid can be re-used.

.2 Prior to delivery to the site, all drilling equipment shall be serviced, inspected for damage and repaired as necessary. The equipment shall be in good, safe operating condition.

.2 Drilling System:

.1 Drilling Rig: The directional drilling machine shall consist of a hydraulically powered system to rotate, push, and pull hollow drive pipe into the ground at a variable angle while delivering a pressurized fluid mixture to a guidable drill (bore) head. The machine shall be anchored to the ground to withstand the pulling, pushing and rotating pressure required to complete the bore. The hydraulic power system shall be self-contained with sufficient pressure and volume to power drilling operations. Hydraulic system shall be free of leaks. Rig shall have a system to monitor and record maximum pull-back pressure during pull-back

operations. The Contractor shall record this information and provide a copy to the City daily. The rig shall be grounded during drilling and pull-back operations. There shall be a system to detect electrical current from the drilling string and an audible alarm which automatically sounds when an electrical current is detected.

.2 Drill Head: The drill head shall be steerable by changing its rotation and shall provide the necessary cutting surfaces and drilling fluid jets.

.3 Mud or Mechanical Motors (if required): Mud or Mechanical motors shall be of adequate power to turn the required drilling tools.

.4 Drill Pipe: Shall be constructed of high quality 4130 seamless tubing, grade D or better, with a threaded box and bins. Tool joints should be hardened to 32-36 RC. If the Contractor chooses another type of drill pipe, the Contractor shall supply to the City the reason for change along with drilling rig manufacturer's approval.

.3 Guidance System:

.1 A magnetic guidance system (MGS), grade beacon or proven gyroscopic system shall be used to provide a continuous and accurate determination of the location of the drill head during the drilling operation. The directional drilling guidance system shall have the capability of measuring vertical and horizontal positions and roll. The system shall obtain an accuracy range within five (5) centimetres of the actual position of the drilling head. It shall enable the driller to guide the drill head by providing immediate information on the toll face, azimuth (horizontal direction) and inclination (vertical direction).

.2 The Contractor shall compute the position in the X, Y, and Z axis relative to the ground surface a minimum of every 1 meter. Ground surface elevation shall be based on surveyed field conditions.

.3 The guidance system shall be of a proven type and shall be operated by personnel trained and experienced with the system.

.4 The Contractor shall demonstrate a viable method to eliminate error. Contractor shall submit calibration results showing that the equipment is within tolerance. The Contractor shall follow the manufacturer's recommended calibration sequence and calibration time schedule.

.5 The guidance system shall be capable of generating a plot of the bore hole survey for the purpose of an as-built drawing.

.6 Contractor shall use a locating and tracking system capable of ensuring that the proposed horizontal and vertical alignment is installed as intended.

.4 Drilling Fluid System:

.1 Mixing System: A self contained, closed, drilling fluid mixing system shall be of sufficient size to mix and deliver drilling fluid. Mixing system shall continually agitate the drilling fluid during drilling operations.

.2 Drilling Fluid: The Contractor shall use a drilling fluid suitable for the soil conditions as they exist for the project. The Contractor shall fully determine the soil conditions prior to fluid selection (be it from additional geotechnical investigation, exposing utilities, digging a slurry catch pit or other method). This decision shall include product concentrations and additives.

.3 Delivery System: The drilling fluid pumping system shall have a capacity to provide an adequate flow rate and pressure to facilitate the HDD operation as defined in the construction documents. The delivery system shall have filters in-line to prevent solids from being pumped into the drill pipe. Connections between the pump and drill pipe shall be leak-free. Used drilling fluid and drilling fluid spilled during drilling operations shall be contained and conveyed to the drilling fluid recycling system (if used). A berm or containment system, minimum of 300mm high, shall be maintained around drill rigs, drilling fluid mixing system, entry and exit pits, and drilling fluid recycling system to prevent spills into the surrounding environment. Pumps and or vacuum trucks of sufficient size shall be in place to convey excess drilling fluid from containment areas to storage and recycling facilities.

.4 Drilling Fluid Recycling System: If the Contractor chooses to use a drilling fluid recycling system, the system shall separate sand, dirt and other solids from the drilling fluid to render the drilling fluid re-usable. Spoils separated from the drilling fluid will be stored in a suitable location, as approved by the City, for later use or disposal.

2.4 Other Equipment

.1 Pipe Rollers:

Pipe rollers, if required, shall be of sufficient size to fully support the weight of the pipe while being hydrotested and during pullback operations. Sufficient number of rollers shall used to prevent excess sagging of pipe. The pipe shall not be dragged across the surface.

.2 Pullback:

Contractor shall use breakaway swivel or mechanical “weak link” to prevent overstressing of the pipe.

.3 Pipe Rammers:

Hydraulic or pneumatic pipe rammers may only be used if necessary and with the authorization of the City.

.4 Restrictions:

Other devices or utility placement systems for providing horizontal thrust other than those previously defined in the preceding sections shall not be used unless approved by the City prior to commencement of the work. Consideration for approval will be made on an individual basis for each specified location. The proposed device or system will be evaluated prior to approval or rejection on its potential ability to complete the utility placement satisfactorily without undue stoppage and to maintain line and grade within the tolerances prescribed by the particular conditions of the project.

3.0 EXECUTION

3.1 General

.1 Delivery, Storage and Handling:

.1 The Contractor shall take precautions to protect the pipe while being handled. Chain, end hooks, or cables slings shall not be used to handle pipe.

.2 Pipe shall be stored on clean, level ground to prevent undue scratching or gouging of the pipe.

.3 Care shall be taken to protect the pipe from scarring, gouging, or excessive abrasion. Pipe with gouges greater than 10% of the minimum wall thickness will be rejected. The Contractor shall comply with the manufacturer's storage and handling requirements.

.2 The City must be notified 48 hours in advance of starting work. The Directional Drilling shall not begin until the City is present at the job site and agrees that proper preparations for the operation have been made. The City's approval for beginning the installation shall in no way relieve the Contractor of the ultimate responsibility for the satisfactory completion of the work as authorized under the Contract.

.3 Construction Practices:

.1 Repair of Damaged Sections: Segments of pipe having cuts or gouges on the exterior of the pipe in excess of 10% of the minimum wall thickness of the pipe shall be cut out and removed or that section of pipe will be rejected. The undamaged portions of the pipe shall be rejoined using the butt fusion joining method.

.2 Pipe Joining: Sections of polyethylene pipe should be joined into continuous lengths on the job site above ground. The joining method shall be performed in strict accordance with the pipe manufacturer's recommendations. The butt fusion equipment used in the joining procedure shall be capable of meeting all conditions, alignment, and

fusion pressure. Pipe lengths to be joined by thermal butt fusion shall be of the same type, grade, and class of polyethylene compound and supplied from the same raw material supplier.

.3 Handling of Fused Pipe: Fused segments of pipe shall be handled so as to avoid damage to the pipe. When lifting fused sections of pipe, chains or cable type chokers should be avoided. Nylon slings are preferred. Care should be exercised to avoid cutting or gouging the pipe.

.4 The pipe fusion machine shall have the following minimum design features:

.1 Guide rods shall be in a plane that passes through the centerline of the pipe thus cancelling the bending forces in the machine caused by the fusion forces.

.2 The clamp shall be mechanically or hydraulically operated and have the strength to "round up" the pipe close to the fused joint and clamp each piece of pipe on continuing straight centerline. The jaws shall be designed for quick installation and removal of inserts for smaller pipe sizes.

.3 The heater-plate shall be electrically heated, and thermostatically temperature controlled. The surface shall be smooth with a high quality Ryton coating. The machine shall be capable of maintaining the surface temperature set at the pipe manufacturer's recommended temperature range. The heater plate shall be equipped with an indicating thermometer but surface temperatures should be checked with a pyrometer occasionally. The heater surface shall be kept clean and free from plastic accumulation.

.4 The hydraulically operated machines shall have a pressure regulator to preset the correct pressure for the desired fusion force, and there shall be an auxiliary system to control "feed"' rate for the pipe face-off. Each machine shall be permanently equipped with a chart showing correct fusion pressure for each pipe size and wall thickness (DR).

.4 Installation Tolerances:

.1 Tolerance requirements for the installed pipe are performance orientated. Tolerances specified herein are the minimum requirements. It is the sole responsibility of the Contractor to select the appropriate types of equipment, work methods and procedures to meet the tolerance requirements.

.2 Should the pipe convey sewerage by gravity; it is essential that minimal to no changes in pipe slope occur and that a downward slope be maintained throughout the entire length of pipe. The tie-in elevations shown for the beginning and ending of the HDD work of the project must meet the elevations shown on the plans. The ends of the pipe shall be located (horizontally and vertically) such that the directional drilled pipe installed

according to this specification can be tied to other segments of sewer line without negative slopes or sags.

.3 The City reserves the right to reject pipes installed not meeting the tolerance requirements specified herein. It will be the responsibility of the Contractor to replace or repair rejected work with pipe meeting these requirements. No additional compensation shall be provided to the Contractor for replacement of pipe not meeting tolerance requirements.

.4 Sags in the sewer pipe shall not exceed 10% of nominal pipe diameter. Sags will only be allowed where the entering and exiting grades are adequate to provide velocities through the sag area sufficient for moving solids. No more than one sag area shall occur between two manholes. The City must approve the alignment of the bore before pipe can be pulled. If the pilot bore fails to conform to the above tolerances, the City may require a new pilot boring be made or localized repairs be made.

.5 It is the responsibility of the Contractor to implement means and procedures compatible with anticipated ground conditions. The Contractor shall have a representative who is thoroughly knowledgeable of the equipment and HDD procedures present at the job site during the entire installation and available to address immediate concerns and emergency operations.

.6 The City must be notified immediately if any condition is encountered that stops the forward progress of drilling operations. When it is determined that it is impossible to continue drilling operations, the Contractor shall determine the best course of action. The Contractor may be allowed to abandon the completed portion in place and start a new hole as directed by the City at no additional cost to the City.

.7 Contractor shall take responsibility for the restoration of any damage caused by heaving, settlement, separation of pavement, escaping drilling fluid, or the directional drilling operation, at no cost to the City.

.8 The installation of the sewer pipe into the bore hole shall be on the same day that the bore is completed to ensure the necessary support exists.

.9 The required piping shall be assembled in a manner that minimizes the obstruction of adjacent roadways, driveways or public activities. The Contractor shall erect temporary fencing around entry and exit pipes staging areas as needed. The Contractor staging areas shall be as approved by the City.

.10 Permits: The Contractor is responsible for obtaining all necessary permits. Copies of each permit shall be available to the City at the work site.

3.2 Personnel Requirements

.1 All personnel shall be fully trained in their respective duties as part of the directional drilling crew and in safety.

3.3 Drilling Procedure

.1 Site Preparation:

Work site as indicated on drawings, within right of way, shall be graded or filled to provide a level working area. No alterations beyond what is required for operations are to be made. Contractor shall confine all activities to designated work areas.

.2 Environmental Protection:

Contractor shall place silt fence between all drilling operations and any drainage, wetland, waterway or other area designated for such protection by contract documents, state, federal and local regulations. Additional environmental protection necessary to contain any hydraulic or drilling fluid spills shall be put in place, including berms, liners, turbidity curtains and other measures. Contractor shall adhere to all applicable environmental regulations.

.3 Safety:

Contractor shall adhere to all applicable state, federal and local safety regulations and all operations shall be conducted in a safe manner. Safety meetings shall be conducted at least weekly with a written record of attendance and topic submitted to the City.

.4 Pilot Hole:

.1 The Contractor shall follow the pipeline alignment as shown on the Drawings, within the specified tolerances. If adjustments are required, the Contractor shall notify the City for approval prior to making the adjustments.

.2 In the event of difficulties at any time during HDD operations requiring the complete withdrawal from the bore, the Contractor may be allowed to withdraw and abandon the bore and begin a second attempt at a location approved by the City.

.3 In the event that a drilling fluid fracture, inadvertent returns or returns loss occurs during pilot hole drilling operations, contractor shall cease drilling and advise the City. The Contractor along with the manufacturer of the rig or drilling mud supplier or his geotechnical engineer shall advise the City in writing the proposed method to deal with breakout.

.4 Establish an entry angle hole so that the curvature of the pilot hole does not exceed the allowable bending radius of the pipe. Entrance and exit angles of the drill should range between 8 and 20 degrees and 5 and 10 degrees respectively. Any deviation from those values shall first be approved by the Engineer.

.5 At completion of the pilot hole drilling, provide the City with tabulations of the horizontal and vertical alignment at minimum, intervals of 3 metres.

.6 Drilling mud shall be used during the drilling process. Contractor to limit mud pressure in the borehole to not exceed that which can be supported by the overburden to prevent heaving or hydraulic fracturing of the soil ("Frac-out").

.5 Pipe Installation:

.1 Horizontally directional drilled pipe shall be installed in accordance with the instruction of the manufacturer, as shown on the Drawings and as specified herein.

.2 Care shall be taken in loading, transporting and unloading to prevent injury to the pipe. Pipe or fitting shall not be dropped. All pipe or fitting shall be examined before installation, and no piece shall be installed which is found to be defective. Any damage to the pipe shall be repaired as directed by the City. If any defective pipe is discovered after it has been installed, it shall be removed and replaced with a sound pipe in a satisfactory manner by the contractor, at his own expense.

.3 Ropes, fabric or rubber protected slings and straps shall be used when handling pipes. Chains, cables or hooks inserted into the pipe ends shall not be used. Two slings spread apart shall be used for lifting each length of pipe.

.4 After the pilot hole is completed, the Contractor shall enlarge the hole by prereaming (as needed), and install a swivel to the reamer and commence pullback operations.

.5 Drilling mud shall be used during the reaming process. Contractor to limit mud pressure in the borehole to not exceed that which can be supported by the overburden to prevent heaving or hydraulic fracturing of the soil ("Frac-out").

.6 The pilot hole shall be back-reamed to accommodate and permit free sliding of the product inside the borehole according to the following minimum specifications.

Normal Pipe Diameter (mm)	Back-Ream Hole Diameter (mm)
50	75 to 100
75	100 to 150
100	150 to 200
150	250 to 300
200	300 to 350
250	350 to 400
≥ 300	At least 1.5 times product OD

.7 The pipe being pulled into the bore shall be protected and supported by rollers so that it moves freely and is not damaged by debris on the ground during installation. The pipe may not be dragged across the ground surface.

.8 Pullback forces shall not exceed the allowable pulling forces for the product pipe. The thickness of the pipe shall be increased by Contractor at their cost if pullback forces are anticipated to exceed the allowable pulling force on the specified pipe.

.9 The Contractor shall allow sufficient lengths of pipe to extend past the termination point 300mm minimum to allow connections to adjacent pipe sections or manholes. Pulled pipe shall be allowed 12 hours of stabilization prior making tie-ins. The length of extra product pipe shall be at the Contractor's discretion.

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6 Drilling Fluid:

.1 Disposal of excess drilling fluid and spoils will be the responsibility of the Contractor who shall comply with all relevant regulations, right-of-way, work space, and permit agreements. Excess drilling fluid and spoils shall be disposed of properly. The Contractor is responsible for transporting all excess drilling fluid and spoils to the disposal site and paying any disposal costs. Excess drilling fluid and spoils shall be transported in a manner that prevents accidental spillage onto roadways. Excess drilling fluid and spoils shall not be discharged into sanitary or storm systems, ditches or waterways.

.2 Drilling fluid returns (caused by fracturing of formations) at locations other than the entry and exit points shall be minimized. The Contractor shall immediately clean up any drilling fluid that inadvertently surfaces.

.3 The Contractor shall be responsible for all fees and provisions for a clean water supply for mixing of drilling fluid.

.4 The Owner reserves the right to require an on-site representative of the directional drilling equipment manufacturer and/or a representative of the drilling fluids manufacturer, knowledgeable in the use of the product(s), for a minimum of three (3) Working Days to assist in optimizing the installation, obtaining tolerances required and improving procedures. The cost for the on-site representative(s) will be paid by the Contractor.

3.4 Testing

.1 Video inspection shall be conducted as the project is being installed including cleaning and flushing. This includes all mainline sewer between manholes and service connections, including use of inclinometer in front of the video camera for mainline sections only and televised in accordance with Section 33 01 30.1. Upon completion of the gravity system and any connection that is required, the entire system shall be cleaned and televised in accordance with Sections 33 01 30.1 and
33 01 30.2.

.2 Perform pressure and leakage testing of the completed forcemain to ASTM F2164, no leakage allowed.

.3 Clean pipes, fittings, valves and appurtenances of debris and water before installation. Carefully inspect materials for defects before installing. Remove defective materials from site.

.4 Prior to the flushing of the completed forcemain Contractor to submit a flushing methodology to the Contract Administrator for approval.

3.5 Cleaning, Site Restoration and Inspection

.1 Following drilling operations, Contractor will demobilize equipment and restore the worksite to original condition. All mud shall be disposed of by the Contractor.

.2 The Contractor is required to maintain the work site in a neat and orderly condition throughout the period of work and after completing the work at each site, remove debris, surplus material and temporary structures erected by the Contractor. Upon completion of work, the site must be restored to its former condition.

3.6 Record Keeping

.1 Contractor shall maintain a daily project log of drilling operations (including mud pressures, pull back forces, etc.), pipe fusing and a guidance system log with a copy given to City at completion of project.

.2 Contractor shall provide complete as-builts including horizontal and vertical alignments.

END OF SECTION

SCHEDULE C

SUPPLEMENTARY DETAIL DRAWINGS FOR INSTALLATION OF CIVIL WORKS

- The following Standard Detail Drawings in the Master Municipal Construction Documents are deleted and replaced by the listed Supplementary Detail Drawings.
- Minor changes to MMCD Standard Detail Drawings are identified by highlighting the changes and re-produced as Richmond's Supplementary Detail Drawings.
- More significant changes or additional details are presented as additional Supplementary Detail Drawings, which are also listed below:

DELETED STANDARD DETAIL DRAWINGS		REPLACEMENT/ ADDITIONAL SUPPLEMENTARY DETAIL DRAWINGS	
Dwg. #	**Drawing Title**	**Dwg. #**	**Drawing Title**
		G-4a-SD	Clear Crush Bedding
G5	Pavement Restoration	G-5a-SD	Pavement restoration
G6	Concrete Encasement for Watermain/Sewer Separation		
W2a	Water Service Connection - Service Box	W2a-SD	Standard 25mm dia. Service Connections
W2b W2d	Water Service Connection - Valve Box	W2b-SD	Standard 30mm, 40mm & 50mm Service Connections
		W2f-SD	Typical Commercial Meter Installation
		W2g-SD	Single Family Dwelling Water Meters and Meter Box Installation 50mm dia. and under for domestic use only.
W3	Gate Valve Installation	W3a-SD	Bell Gate Valve Installation
W4	Fire Hydrant Installation	W4a-SD	Fire Hydrant Installation (flanged)
		W4b-SD	Fire Hydrant Installation (PVC Lead)
		W4c-SD	Fire Hydrant Installation (bottom draw)
W6	Air Valve Assemblies – 25mm and 50mm Valves	W6-SD	Air Valve Assemblies – 25mm and 50mm Valves

DELETED STANDARD DETAIL DRAWINGS		REPLACEMENT/ ADDITIONAL SUPPLEMENTARY DETAIL DRAWINGS	
Dwg. #	**Drawing Title**	**Dwg. #**	**Drawing Title**
W7	Air Valve Assembly - 100mm Valve	W7-SD	Air Valve Assembly – 100mm Valve
W8	Blow-off for Watermain	W8-SD	100mm Capped End and Blow-off
W9	Blow-down Chamber		
W10	Waterworks Chamber Drain		
		W11-SD	Standpipe Detail for Sanitary Sewer Pump Station
		ST-3-SD	Typical 1.20m x 1.20m Cast-in-situ Manhole
		ST-5-SD	600mm dia. Reinforced Concrete Catchbasin
		ST-6-SD	Prefabricated Pan Catchbasin
		ST-7-SD	PVC Inspection Chamber/Lawn Drain Type 1A
		ST-8-SD	Inspection Chamber Type 2
		ST-9-SD	Inspection Chamber Type 3
S10	Inspection Chamber for 250 to 375 Storm Sewer Connection		
		ST-10c-SD	Storm Sewer Inlet with Safety Grillage
		ST-19-SD	Typical Construction Details of Flexible Joints for Sewer Installations
S8	Storm Sewer Service Connection	ST-20-SD	Storm Sewer Service Connection
		ST-21-SD	Perforated Drainage Trench Detail

DELETED STANDARD DETAIL DRAWINGS		REPLACEMENT/ ADDITIONAL SUPPLEMENTARY DETAIL DRAWINGS	
Dwg. #	**Drawing Title**	**Dwg. #**	**Drawing Title**
		ST-22-SD	Storm – Painted Fish Details
		SA-3-SD	Standard Construction Details for PVC Sanitary Sewer Installations
S4	Inside Drop Manhole	SA-4-SD	Inside Drop Manhole
		SA-6-SD	Outside Drop Manhole
S7	Sanitary Sewer Service Connection	SA-7-SD	Sanitary Sewer Service Connection
C1	Concrete Sidewalk, Infill and Barrier Curb	R-1-SD	Concrete Sidewalk, Infill and Barrier Curb
		R-1a-SD	Concrete Sidewalk, Boulevard and Barrier Curb
C2	Concrete Sidewalk and Barrier Curb	R-2-SD	Concrete Sidewalk and Barrier Curb
C3	Concrete Sidewalk and Rollover Curb	R-3-SD	Concrete Sidewalk and Rollover Curb
C7	Driveway Crossing for Barrier Curbs	R-7-SD	Driveway Crossing for Barrier Curbs
		R-7a-SD	Driveway Crossing for Barrier Curbs with varying Boulevard Widths
		R-8-SD	Existing Asphalt Driveway
		R-9-SD	Existing Concrete Driveway
		R-10-SD	Existing Gravel Driveway
		R-11-SD	Existing Driveway over 8 %
		R-12 -SD	Dual Wheelchair Ramp Design Standard (5% Wheelchair Ramp Slope)
		R-13 -SD	Dual Wheelchair Ramp Design Standard (6% Wheelchair Ramp Slope)
		R-14 -SD	Minimum Clearance for Pedestrian

DELETED STANDARD DETAIL DRAWINGS		REPLACEMENT/ ADDITIONAL SUPPLEMENTARY DETAIL DRAWINGS	
Dwg. #	**Drawing Title**	**Dwg. #**	**Drawing Title**
			Facilities
		R-15 -SD	Single Wheelchair Ramp Design Standard
		R-16 -SD	Sidewalk Drop Detail
		R-17 -SD	Urban Curb and Urban Curbs & Gutter Details
		R-18 -SD	Pavers & Tactile Warning Strips
		R-19 -SD	Converting Letdown Curb to Highback Curb

SCHEDULE D

SUPPLEMENTARY DETAIL DRAWINGS FOR INSTALLATION OF TRAFFIC SIGNALS

The following listed Standard Detail Drawings in the Master Municipal Construction Documents are deleted and/or replaced by the listed Supplementary Detail Drawings.

Significant changes or additional details are presented as Supplementary Detail Drawings, which are also listed below:

DELETED STANDARD DETAIL DRAWINGS		REPLACEMENT/ ADDITIONAL SUPPLEMENTARY DETAIL DRAWINGS	
Dwg. #	**Drawing Title**	**Dwg. #**	**Drawing Title**
		SD_A4-BASE	Type A4 Concrete Base & Anchor Bolt Cage Details
E1.1	Type M (Nema Cabinet) Concrete Controller Base	SD_M-BASE (Sht. 1 & 2)	Type M (Nema Cabinet) Concrete Controller Base
		SD_MCAB-PANEL (Sht. 1 to 4)	Type M Controller Cabinet & Service Panel Installation Details
E1.2	Type P (Nema Cabinet) Concrete Controller Base	SD_P-BASE (Sht. 1 & 2)	Type P (Nema Cabinet) Concrete Controller Base
		SD_PCAB-PANEL (Sht. 1 to 4)	Type P Controller Cabinet & Service Panel Installation Details
E1.5	Controller insulation (for model 170 cabinets)		
E2.1	Round Plastic Junction Box		
E5.1	Post Top Signal Head Mounting		
E5.2	Side of Pole Signal Head Mounting (Method 1)		
E5.4	Side of Pole Signal Head Mounting (Method 3)		

DELETED STANDARD DETAIL DRAWINGS		REPLACEMENT/ ADDITIONAL SUPPLEMENTARY DETAIL DRAWINGS	
Dwg. #	**Drawing Title**	**Dwg. #**	**Drawing Title**
E5.5	Overhead Signal Head Mounting (Spring Cushion End Hanger Method)		
E5.6	Overhead Signal Head Mounting (Spring Cushion Mid Hanger Method)		
E5.7	Overhead Signal Head Mounting (Plumbizer Method)		
E5.8	Overhead Signal Head Mounting (Plumbizer Method)		
E5.10	Overhead Signal Head Mounting On Pole Arm (Ball Hanger Method)		
E5.11	Overhead Signal Head Mounting On Span Wire (Ball Hanger Method)		
		SD_ST-NAME	Overhead Street Name Sign Mounting Details
E6.2	Pedestrian Push Button With Integral Sign		
E7.5	40A (120/240V) Street Lighting Service Panel in Service Base Wiring Diagram		
E7.13	Signal Cable Colour Code Sample (Ontario Spec Method)	SD_CABLE-CC	Signal Cable Colour Coding & Assignments
E7.15	Pole Mounted Receptacle		
E8.2	Detector Loops	SD_DET (Sht. 1 & 2)	Detector Loops
E8.4	Detector Loop to Shielded Cable Splices		
E8.5	Detector Loop Procedures and Rules		
E8.6	Detector Loop Procedures and Rules		

DELETED STANDARD DETAIL DRAWINGS		REPLACEMENT/ ADDITIONAL SUPPLEMENTARY DETAIL DRAWINGS	
Dwg. #	**Drawing Title**	**Dwg. #**	**Drawing Title**
E8.7	Typical Layout for Diamond and Round Traffic Signal Detector Loops		
E8.8	Pre-formed Diamond Detector Loop Installation Details		
E8.9	Pre-formed Diamond Detector Loop Installation Details		
E8.10	Pre-formed Diamond Detector Loop Installation Details		

SCHEDULE E

SUPPLEMENTARY DETAIL DRAWINGS FOR ROADWAY LIGHTING

- The following Standard Detail Drawings in the Master Municipal Construction Documents are deleted and replaced by the listed Supplementary Detail Drawings.
- Minor changes to MMCD Standard Detail Drawings are identified by highlighting the changes and re-produced as Richmond's Supplementary Detail Drawings.
- More significant changes or additional details are presented as additional Supplementary Detail Drawings, which are also listed below:

DELETED STANDARD DETAIL DRAWINGS		REPLACEMENT / ADDITIONAL SUPPLEMENTARY DETAIL DRAWINGS	
Drawing No.	**Drawing Title**	**Drawing No.**	**Drawing Title**
CE1.1	Concrete Base Index		
CE1.2	Type A and B Sonotube Concrete Bases		
CE1.3	Type C, C1, C2 & C3 Trapezoidal Shape Concrete Bases		
CE1.4	Type C, C1, C2 & C3 Trapezoidal Shape Concrete Bases		
CE1.5	Type C4 & C5 Spread Footing Shape Concrete Bases		
CE1.6	Type C4 & C5 Spread Footing Concrete Bases		
CE1.7	Type C4 & C5 Spread Footing Concrete Bases		
CE1.8	Type E2 Trapezoidal Shape Concrete Base		
CE1.9	Type E2 Trapezoidal Shape Concrete Base		
CE1.10	Types F1, L1 & 1 Spread Footing Shape Concrete Bases		
CE1.11	Types F1, L1 & 1 Spread Footing Shape Concrete		

DELETED STANDARD DETAIL DRAWINGS		REPLACEMENT / ADDITIONAL SUPPLEMENTARY DETAIL DRAWINGS	
Drawing No.	**Drawing Title**	**Drawing No.**	**Drawing Title**
	Bases		
CE1.12	Types F1, L1 & 1 Spread Footing Shape Concrete Bases		
CE1.13	Types F2, L2 & S2 Trapezoidal Shape Concrete Bases		
CE1.14	Types F2, L2 & S2 Trapezoidal Shape Concrete Bases		
CE1.15	1” ø Anchor Bolts		
CE1.16	Anchor Bolt Cage for Types 6, 7 and S Poles		
CE1.17	Anchor Bolt Cage for Types L Poles		
CE1.18	Concrete Base for Post Mounted Flasher Luminaire (Precast)		
CE1.19	Pole Base Installation Details		
CE1.20	Pole Base Installation Details		
		L0.1	Concrete Base Index
		L1.1	Type P1 and P6 Pedestal Concrete Base
		L1.2	Type P2 Service Pedestal Concrete Base
		L1.3	Type P3, P5 and P8 Pedestal Concrete Base
		L1.4	Type P4 Pedestal Concrete Base
		L1.5	Type P7 Pedestal Concrete Base
		L2.1	Type S1, S2, S7 and S8 Sonotube Concrete Base

DELETED STANDARD DETAIL DRAWINGS		REPLACEMENT / ADDITIONAL SUPPLEMENTARY DETAIL DRAWINGS	
Drawing No.	**Drawing Title**	**Drawing No.**	**Drawing Title**
		L2.2	Type S3 and S9 Sonotube Concrete Base
		L2.3	Type S4 Sonotube Concrete Base
		L2.4	Type S5 Sonotube Concrete Base
		L2.5	Type S6 Service Sonotube Concrete Base
		L3.1	Type 1, 2 and 3 Anchor Bolts
		L3.2	Concrete Base Irrigation Conduit
		L4.1	Type S Service Kiosk Concrete Base
		L4.2	Type M Service Kiosk Concrete Base
		L5.1	Service Panel - Pole Mounted
		L5.2	Service Base Mounted Service Panel 120/240 Volt
		L5.3	Service Base Mounted Service Panel 347/600 Volt 3Ø
		L5.4	Service Pole Mounted Service Panel 120/240 Volt
		L5.5	Service Pole Mounted Service Panel 347/600 Volt 3Ø
		L5.6	Service Panel Wiring Diagram 120/240 Volt (For Standard Lighting)
		L5.7	Service Panel Wiring Diagram 347/600 Volt 3Ø (For Standard Lighting)
		L5.8	Service Panel in Service Base
		L5.9	Pole Mounted Service Panel

DELETED STANDARD DETAIL DRAWINGS		REPLACEMENT / ADDITIONAL SUPPLEMENTARY DETAIL DRAWINGS	
Drawing No.	**Drawing Title**	**Drawing No.**	**Drawing Title**
			on Electrical Utility Pole
		L6.1	Type S Service Kiosk (For Decorative Lighting)
		L6.2	Type S Service Kiosk and Installation Detail (For Decorative Lighting)
		L6.3	Type M Service Kiosk (For City Centre Lighting and Tree Receptacles)
		L6.4	Type M Service Kiosk and Installation Detail (For City Centre Lighting and Tree Receptacles)
		L6.5	Service Kiosk Single Line Diagram 120/240 Volt (For City Centre Lighting)
		L6.6	Service Kiosk Single Line Diagram 120/240 Volt (For Tree Receptacles)
		L6.7	Service Kiosk Wiring Diagram 120/240 Volt (For Decorative Lighting)
		L7.1	120/240 Volt Pole Handhole Wiring Detail
		L7.2	120/240 Volt Pole Handhole Wiring Detail (For City Centre Lighting Only)
		L7.3	347/600 Volt 3Ø Pole Handhole Wiring Detail
		L7.4	240 Volt Pole Handhole Wiring Detail (For Extension of Existing Systems Only)
		L7.5	240/480 Volt Pole Handhole Wiring Detail (For Extension of Existing Systems Only)

DELETED STANDARD DETAIL DRAWINGS		REPLACEMENT / ADDITIONAL SUPPLEMENTARY DETAIL DRAWINGS	
Drawing No.	**Drawing Title**	**Drawing No.**	**Drawing Title**
		L7.6	Conductor Colour Code
		L8.1	Street Light Wiring Inside Concrete Junction Box
		L8.2	Tree Receptacle Wiring Inside Concrete Junction Box
		L9.1	Tree Receptacle Installation Detail
		L9.2	Junction Box Installation Details
		L9.3	Conduit Bury Detail
		L10.1	Underground Conduit in Paved Areas
		L10.2	Underground Conduit in Non-Paved Areas
		L11.1	7.62m Davit Luminaire Poles
		L11.2	9.14m Davit Luminaire Poles
		L11.3	13.72m Davit Luminaire Poles
		L11.4	Post Top Luminaire Poles
		L11.5	Pathway and Laneway Side Mounted Luminaire Poles
		L12.1	City Centre Type Laneway Luminaire Pole
		L12.2	City Centre Type Pedestrian Luminaire Pole
		L12.3	City Centre Type Roadway/Pedestrian Luminaire Pole
		L12.4	Steveston Type Luminaire Pole
		L12.5	Type 1 and 2 Decorative Luminaire Poles

DELETED STANDARD DETAIL DRAWINGS		REPLACEMENT / ADDITIONAL SUPPLEMENTARY DETAIL DRAWINGS	
Drawing No.	**Drawing Title**	**Drawing No.**	**Drawing Title**
		L12.6	Type 3 Decorative Luminaire Pole
		L12.7	Type 4 Decorative Luminaire Pole
		L12.8	Type 5 Decorative Luminaire Pole
		L12.9	Type 6 Decorative Luminaire Pole
		L12.10	Type 7 Decorative Luminaire Pole
		L12.11	Type 8 Decorative Pedestrian Luminaire Pole
		L13.1	Service Base
		L13.2	Pole Handhole and Cover Detail
		L13.3	Pole and Concrete Base Installation Details – 1
		L13.4	Pole and Concrete Base Installation Details – 2
		L13.5	Pole and Concrete Base Installation Details – 3
		L14.1	Underground Dip Service Connection Details
		L14.2	Minimum Clearances to Overhead Powerlines

SCHEDULE F

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SCHEDULE G

SUPPLEMENTARY SPECIFICATIONS AND DETAIL DRAWINGS FOR TREE PLANTING ON SIDEWALKS AND BOULEVARDS

The Supplementary Specifications hereunder shall apply to all tree planting work in the City of Richmond. They **replace the specifications in Section 32 93 01 – Planting of Trees, Shrubs and Ground Covers** in the Master Municipal Construction Documents (MMCD) – Platinum Edition except in particular items where specific reference are made to items under the MMCD.

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Page No.

SECTION 1 - MATERIALS

1.0 Definition

.1 **City** shall mean authorized representative of the Engineering Inspection Department

1.1 Tree Species

.1 The selection of tree species shall approved by the City. Should the specified tree not be available, the City shall be notified so that an alternate choice can be made. The developer/contractor shall not make substitutions without approval of the City.

1.2 Origin

.1 All plant material shall be nursery grown stock.

.2 All plant material shall comply with the B.C.S.L.A./C.S.N.T./B.C.N.T.A. Landscape Standard for container grown plants.

1.3 Tree Dimensions

.1 Each tree shall have a calliper of 7cm or not be less than 3m in overall height unless otherwise approved by the City. Each tree shall have a sturdy, straight trunk. Lowest branch height on all trees shall be at 1.8m unless otherwise approved by the City. Each tree shall have a well-balanced branching head with the branches growing out from the stem with reasonable symmetry. All trees shall be in wire baskets unless otherwise approved by the City. (Refer to Tables 9-1 and 9-2).

1.4 Root System

.1 All trees shall be in wire baskets unless otherwise approved by the City. Container grown stock shall have sufficiently well-established root system to hold the soil together when removed from the container. In all cases, the root system shall be strong, fibrous, free of disease, insects, defects or injuries and shall be sufficiently developed to guarantee successful transplantation.

TABLE 9-1
MINIMUM ROOTBALL DIAMETERS FOR CONIFEROUS TREES

Height (cm)	Minimum Rootball Diameters (cm)		
	Dwarf and Medium	Tall and Columnar	Tall and Broad
30 cm	20	-	-
40 cm	25	-	-
50 cm	30	25	25
60 cm	30	30	30
80 cm	35	30	35
1.0 M	45	35	40
1.25 M	50	35	45
1.50 M	60	40	50
1.75 M	70	45	55
2.0 M	-	50	60
2.5 M	-	55	70
3.0 M	-	70	85
• For conifers 200 cm and taller, caliper shall override height using the same caliper to rootball diameter as deciduous trees.			

TABLE 9-2
MINIMUM ROOTBALL DIAMETERS FOR DECIDUOUS TREES

Caliper	Minimum Rootball Diameters (cm)	
	Zone 5 & Below	Zone 6 & Above
4	50	-
4.5	55	50
5	60	55
6	70	60
7	75	70
8	80	80
9	95	90
10	105	100
12.5	125	110
15	150	120
17.5	170	130
20	200	140
For every 2.5 cm of caliper over 20 cm, rootball diameter shall increase by 10 cm.		

1.5 Condition

.1 All plant material shall be of good health and vigour with no visible signs of disease, insect pests, damage or other objectionable disfigurements.

.2 The contractor is responsible for contacting the City for inspection and approval of the trees on site and before planting.

SECTION 2 - INSTALLATION

2.1 Subgrade and Topsoil

.1 Prior to placing topsoil in boulevard planting areas, the subgrade shall be established at 300mm below finished grade for all ground cover areas, and 450mm below finished grade for all shrub areas.

.2 Grade transitions shall be smooth and even, and shall be such that ponding cannot occur on the subgrade surface.

.3 Debris, roots, branches, stones, building material, contaminated subsoil, visible weeds and anything else that may interfere with the proper growth and development of the planted boulevard, shall be removed from the subgrade prior to installing the topsoil.

.4 Screened topsoil shall be installed at the following minimum depths prior to shrub planting in the boulevard: ground cover areas - 300mm, shrub areas - 450mm.

2.2 Time of Planting

.1 Planting work is to be completed during normal planting seasons as dictated by prevailing weather conditions. Planting in frozen ground or with frozen rootballs is not acceptable.

.2 Planting will not be permitted during extremely hot, dry weather, or during heavy rain.

.3 All necessary precautions are to be taken to protect the plant material from prevailing weather conditions during transportation, storage and planting.

2.3 Location of Planting

.1 Trees are to be planted no more than 9.0m apart, unless otherwise approved by the City. Actual tree numbers, spacing and locations will vary according to site conditions and amenities. Locations will be staked out by the developer/contractor according to the plans and verified on site by the City prior to planting. If underground obstructions are uncovered these are to be reported to the City for resolution.

2.4 Planting Procedures - Trees

.1 All trees shall be planted as per Supplementary Detail Drawings G-1-SD and G-2-SD.

.2 All trees shall be planted, set plumb, in holes large enough to accommodate the entire rootball plus topsoil. Therefore, holes should be excavated the diameter of the rootball plus 600 mm. The holes shall then

be backfilled with topsoil to bring the plant material to the depth they were originally growing in the nursery. All trees shall be planted so that after settlement they will be at the original growing medium depth.

.3 Ensure top of rootball is at or slightly above finished grade. Remove top 1/3 of Burlap from rootball and twine from base of trunk (and/or wire basket “lifting loops” and top row of basket). Remove any soil on top of “original” rootball.

.4 Once the trees are in place, the holes are to be backfilled with topsoil mixed with a high phosphate fertilizer applied at a rate according to the manufacturer's recommendations. The holes shall be backfilled, tamped and watered in layers to help secure the tree and eliminate large air pockets.

.5 Once planted, the trees are to be securely staked using two (2) 8ft., 50mm to 75mm diameter pressure treated stakes and tied with Arborite® or approved equal banding attached to each stake with a shingle nail.

.6 Install Aborguard® to protect the tree trunk.

2.5 Planting Procedures

.1 All plants for planting areas shall be delivered to the site and protected from sun and drying winds. Plants that cannot be planted immediately on delivery shall be kept well watered.

.2 Plants shall be planted so that after settlement they will be at the original growing medium depth. Allow for settling of the growing medium after planting so that the total depth of the rootball remains in the topsoil.

.3 Plants shall be set plumb in the planting beds or planting pits, except where the plant's character requires variation from this.

.4 Upon completion of boulevard planting, the soil shall be raked to remove any debris brought to the surface by the planting operations. After raking the planting area should be mulched with 75mm of bark mulch placed in an even layer over the soil surface.

.5 Once planting and mulching is completed, the site shall be cleaned of all excess soil, rock and debris.

2.6 Plant Maintenance

.1. The developer/contractor is responsible for all necessary maintenance of the plant material for the duration of the Maintenance Period. This shall include any procedure necessary to maintain all plants in a healthy growing condition such as watering, plant nutrition, weeding, pruning and treatment for disease and pests. All planting beds shall have all weeds removed at least once per month during the growing season by hand-pulling or hoeing. Plants are to be watered as often as required to ensure

that no stress occurs to the plants during hot weather. (As often as twice per week in hot weather).

SECTION 3 - SUPPLEMENTARY DETAIL DRAWINGS

Additional Supplementary Detail Drawings	
Drawing No.	**Drawing Title**
P-1-SD	Tree Planting Detail – Profile (Detached Sidewalk)
P-1a-SD	Root Barrier Detail – Plan (Detached Sidewalk)
P-2-SD	Tree Planting Detail – Profile (Paved Blvd / Sidewalk)
P-2a-SD	Root Barrier Detail – Plan (Paved Blvd / Sidewalk)
P-3-SD	Concrete Tree Grate (With Tree Grate Support)
P-4-SD	Concrete Tree Grate (With Concrete Collar)
P-5-SD	Ductile Tree Grate (with Concrete Collar)
P-6-SD	Tree Planting Distances
P-7a-SD	Tree Protection and Tree Protection Distance Table
P-7b-SD	Typical Drip Line on a Tree

SCHEDULE H

SUPPLEMENTARY DETAIL DRAWINGS FOR IRRIGATION

Drawing No.	Drawing Title
IR-B-1	Basket Irrigation Detail on City Centre Lighting Pole
IR-C-1	Above Ground Chamber for Double Check Valve Assemblies 38 mm to 19 mm (1 ½" to ¾")
IR-C-2	Above Ground Chamber for Double Check Valve Assemblies (50 mm ø or Greater)
IR-C-3	Typical Master Valve and Flow Meter Detail
IR-C-4	Automatic Valve Box Detail
IR-C-5	Low Flow Automatic Valve Filter and Pressure Regulator Detail
IR-S-1	Sports Field / Large Park: Hydraulic Rotor Sprinkler Detail
IR-S-2	Median / Boulevard: Irrigation Sprinkler Detail
IR-S-3	Irrigation Detail: Boulevard Tree with Grate

Section 01 52 01 – Temporary Structures			
Add the following			
1.0	.3 (ss) new	General	Location to be pre-approved by Contract Administrator.
1.1	.4 (ss) new	Section Includes	Portable washrooms.

Section 01 53 01 – Temporary Facilities			
Add the following			
1.0	.3 (ss) new	General	Location to be pre-approved by Contract Administrator.
1.6	.2 (ss) new	Hoarding	A license to encroach agreement is required for all hoarding structures on City property.

Section 01 55 00 – Traffic Control, Vehicle Access and Parking			
Add the following			
1.4	.14 (ss) new		Open excavation to be backfilled before the Contractor leaves the site at the end of the working day with the exception of a maximum of 12 m length (measured at the surface) that can be left open. At the discretion of the City, plating of the excavation may be permitted. Refer to 3.8.3 (ss) of Section 32 12 16, for paving requirements.
	.15 (ss) new		Maximum length of plate in a travel lane to be 12 m. Plates to be secured by pins and temporary asphalt ramp at edges of plates.
	.16 (ss) new		Authorized open excavation during non-working hours to be fenced off to prevent pedestrian access and a temporary vehicle barrier to be placed between the travel lane of traffic, if the excavation is within 1.5 m of the travelled roadway. The barrier to be a minimum of Transportation Association of Canada (TAC) standard.

Section 01 57 01 – Environmental Protection			
Add the following			
1.2.	1.4 (ss) new	Temporary Erosion and Sediment Controls	Pre-test all groundwater before conducting any dewatering activity to ensure that water quality is acceptable to Federal and Provincial requirements. Ensure quality of water discharged from work or extracted from ground is meeting Federal and Provincial requirements as well as the City's Pollution Prevention and Clean Up Bylaw No.8475, for discharging into watercourses and storm sewers and **Greater Vancouver Storm and Sanitary District requirements for discharging into sanitary sewers** throughout the dewatering period.

Section 03 30 20 – Concrete Walks, Curbs and Gutters			
Delete			
		3.2.1 3.5.7 3.7.1 3.9.1	3.9.4 3.11.2 3.15.2
Add the following			
3.2	.1 (ss)	Subgrade Preparation	Place **115mm of – Granular base and 150mm of – 19mm clear crush rock as sub-base for curb and gutter** and minimum of 100mm granular base material to design grade as shown on Contract Drawings, including **Supplementary** Detail Drawings.
3.5	.7 (ss)	Concrete Placement	Place concrete in forms, ensuring no segregation of aggregate and consolidate with approved mechanical vibrator or power screed **unless otherwise specified**.
3.5	.12 (ss) **new**	Monolithic Pour	**No monolithic pours of concrete** between sidewalk, driveways, driveway crossings and curb and gutter unless specifically shown on Contract Drawings or approved by Contract Administrator.
3.7	.1 (ss)	Driveway Crossings and Wheelchair Ramps	Construct driveway crossings and wheel chair ramps where shown on Contract Drawings to Standard Detail Drawings and **directional wheelchair ramps to Supplementary Detail Drawing R-12-SD and lowered driveway crossings to Supplementary Detail Drawing R-16-SD.**
3.9	.1 (ss)	Expansion Joints	Form transverse expansion joints at both ends of curb returns and at a maximum spacing of 9.0m for sidewalks, 9.0m for curb and gutter, at each end of driveway crossings, at tangent points on circular work, **at catch basins, and driveway crossings**.
3.15	.2 (ss)	Curing	Where temperature is below 5^{o}C, maintain all concrete at temperature not less than 10^{o}C for at least 72 hours and protect from freezing for at least another 72 hours or such time as required to ensure proper curing of concrete. **Admixtures** for prevention of freezing may only be used with the permission **of the Contract Administrator**.
3.17	.3 (ss) **new**	Acceptance	**Minimum length of replacement** of defective curb and gutter is 3.0m leaving a minimum of 3.0m existing.
3.19	.1 (ss) new	Temporary asphalt sidewalks	Temporary asphalt sidewalk shall be a minimum 50 mm asphalt over permanent sidewalk base. To be flush with adjacent sidewalk.

3.20	.1 (ss) new	Sidewalk replacement	Temporary or permanent sidewalk needs to be installed within 5 working days of concrete sidewalk removal.
3.21	.1 (ss) new	Highback curb	When replacing driveway letdown with highback curb, construct as shown on Supplementary Detail Drawing R-19-SD.

Section 26 42 13 – Cathodic Protection			
Add the following			
1.0.	.2 (ss) new	General	This section also applies to any other type of underground City infrastructure.

Section 26 56 01 – Roadway Lighting		
Delete		
	2.5	2.14
	2.6	3.4.1 & 3.4.2
	2.7	3.5.1, 3.5.2, 3.5.3 & 3.5.5
	2.8.1	3.6.1, 3.6.2, 3.6.5, 3.6.7
	2.9	3.8.1, 3.8.3, 3.8.4, 3.8.6 to 3.8.11 (inclusive)
	2.10.1.1	3.9.1
	2.11	

Add the following			
1.3	.4 (ss)	Shop Drawings	Shop drawings for pole structures, where required, to be sealed by a Professional Engineer **registered in British Columbia.**
1.4	.4 (ss) new	Electrical Energy Supply	Arrange for and pay all necessary connection and disconnection fees charged by the Utility Company.
1.5	.1 (ss)	Contractor Qualifications	All electrical work to be performed by a Registered Electrical and Inspection Contractor under provisions of British Columbia Electrical Safety Act **and licensed to do works within the City of Richmond.**
1.6	.4 (ss) new .5 (ss) new .6 (ss) new	Permits and Tests	Contractor to arrange for all inspection of work as required by Contract Documents Obtain approval of all buried portions of the installation from the Electrical Energy Inspector and the City before any backfilling is commenced. Obtain certificate of approval from the Electrical Energy Inspector upon completion of all roadway lighting works and shall forward a copy of the said certificate to the Utility Company.
1.8	.2 (ss) new	Record Drawings	Final payment(s) will be withheld until record drawings are received.
2.2	.1.3 (ss) new .2.4 (ss) new .2.5 (ss) new	Conduit	Pipe, couplings, adaptors, bonds and fittings to be rigid steel hot dip galvanized. Only factory conduit bends acceptable. Each standard length of pipe, coupling, adaptor, bend and fitting to bear CSA certification label.
2.3	.1 (ss)	Trench Marker Tape	Minimum **150** mm wide, minimum 3.5 mil thick, heavy-duty polyethylene. Yellow with black letters displaying: "CAUTION – ELECTRICAL LINE BURIED BELOW"
2.5	.1 (ss) new	Junction boxes	Concrete junction boxes to be A.E. Concrete Pre-Cast Products Ltd. or Kon Kast Products Ltd. No. 37 and No. 66

<table>
<tr><td></td><td></td><td></td><td>types or approved equal. Concrete junction boxes to have steel lids with 3/8"Ø x 1" long bonding stud welded to underside of lids. Steel lids to be hot dip galvanized and labelled as specified on Contract Drawings.</td></tr>
<tr><td>2.6
new</td><td>.1 (ss)

.2 (ss)

.3 (ss)

.4 (ss)

.5 (ss)

.6 (ss)

.7 (ss)

.8 (ss)

.9 (ss)

.10 (ss)

.11 (ss)</td><td>Concrete bases</td><td>Bases to be pre-cast or cast-in-place concrete as shown on City of Richmond Detail Drawings and Contract Drawings. For cast-in-place concrete, refer to MMCD Section 03 30 53.
Concrete mix to meet the following requirements:
<table><tr><td>Minimum compressive strength at 28 days</td><td>30 MPa</td></tr><tr><td>Maximum nominal aggregate size</td><td>28mm</td></tr><tr><td>Maximum W/C ratio by mass</td><td>0.45</td></tr><tr><td>Air content</td><td>4 to 6%</td></tr><tr><td>Slump</td><td>30mm to 70mm</td></tr></table>
Base slab and the pedestal shall be constructed as a monolithic structure.

Maximum of four conduits shall enter the base of a luminaire pole, however more than four may enter a service base.

Top of bases to be trowelled smooth and level with bevelled edges. Top surface is not to vary by more than 3 mm in depth as measured across the widest surface.

Top of base to be "V" grooved for drainage as shown on the City of Richmond Detail Drawings and Contract Drawings.

All concrete to be fully vibrated.

Reinforcing steel to conform to CAN/CSA G30.18M 400R.

Anchor bolts to be Ministry of Transportation and Highways material standard pre-approved product.

Anchor bolts to be hot dip galvanized.</td></tr>
<tr><td>2.7
new</td><td>.1 (ss)

.2 (ss)</td><td>Poles and Related Equipment</td><td>Poles, arms and extensions to be City of Richmond pre-approved product.

Poles to be supplied with hot dip galvanized finish unless specified otherwise on City of Richmond Detail Drawings and Contract Drawings.</td></tr>
</table>

	.3 (ss) .4 (ss)		Poles and service base to be manufactured to meet or exceed Ministry of Transportation and Highways material standards, Section 301 - Traffic Signal, Luminaire and Sign Poles. Handholes to be supplied on poles on opposite side to direction of traffic.
2.8	.1 (ss) .5 (ss) new .5.1 (ss) .5.2 (ss) .5.3 (ss)	Conductors and Cables	Single conductors: 600V, conductor size (AWG) as noted on Contract drawings, stranded copper type RW90 XLPE insulated, to conform to CSA C22.2 No. 38, 90^0, and colour coded per CEC. Minimum conductor sizes to be as follows, unless specified otherwise on Contract Drawings: No. 6 AWG for feeder conductors in conduit. No. 8 AWG for bond conductors in conduit. No. 12 AWG for luminaire conductors in pole.
2.9	.1 (ss) new	Conductor Tags	Conductor tags in all pole handholes, junction boxes and all access points to be TY-RAP TY5532MX or approved equal.
2.10	.1 (ss) new	Conductor Connectors	Conductor connects to be Burndy Servit type KS. Soldered or screw type connections will **NOT** be accepted.
2.11	.1 (ss) new .2 (ss) new .3 (ss) new	Fuses and Fuse Holders	Fuses to be 10A Buss KTK for roadway lighting and 15A Buss KTK for roadway tree lighting. Fuse holders to be Elastimold or Buchanan 65 with 2 "L" type rubber insulating boots for single conductor and Elastimold or Buchanan D65 with 4 "L" type rubber insulating boots for two conductors. Fuses and fuse holders shall be rated at a **minimum of 600V**.
2.14	.1 (ss) .2 (ss) .3 (ss) .4(ss) .5 (ss) .6 (ss)	Luminaires	Luminaires to be City of Richmond pre-approved products. 120/240V dual ballast required for 120/240V and 240/480V 1Ø power systems and 347V for a 347/600V 3Ø power system. Refractors or lenses shall be glass only, for decorative luminaires acrylic or polycarbonate may be accepted upon prior approval by City of Richmond. Tempered glass shall be used for all flat glass lenses. Ballasts to generally be CWI type, CWA type may be accepted for 120V systems only upon prior approval by City of Richmond. Luminaires shall have an integral ballast with quick disconnect features.

	.7 (ss) .8 (ss) .9 (ss) .10 (ss)		HID lamp sockets to be Mogul base except for 100W metal halide City Centre luminaires which are to be medium base. Luminaire voltage, wattage and distribution type to be as specified on Contract Drawings. Confirm service voltage prior to ordering luminaires. Luminaire mounting to accommodate luminaire poles as shown on Contract Drawings and City of Richmond Detail Drawings.
2.18 new	.1 (ss) .1.1 (ss) .1.2 (ss) .1.3 (ss) .1.4 (ss)	Service Panels and Kiosks	Service panels and kiosks to be: City of Richmond pre-approved products; CSA approved, meet current Canadian Electrical Code requirements; EEMAC 3R enclosure manufactured out of stainless steel; and Type as detailed on Contract Drawings and City of Richmond Detail Drawings.
2.19 new	.1 (ss) .2 (ss) .3 (ss)	Grounding and Bonding	All grounding and bonding equipment to be in accordance with Canadian Electrical Code and latest Electrical Safety Branch amendments. Bond rigid steel conduits and junction box lids. Pole bonding as per City of Richmond Detail Drawings
2.20 new	.1 (ss) .2 (ss) .3 (ss)	Receptacles	Receptacle to be 15A-120V premium spec. grade corrosion resistant duplex. Cover to be double spring door type for wet locations (Crouse Hinds WLRD-1 or approved equal). Cover shall have Lamicoid name plate labelling maximum wattage
2.21 new	.1 (ss) .2 (ss)	Photocells and Receptacles	Photocell to be locking type, 120V, 208-277V and 347V or approved equal. Photocell receptacles to be locking type or approved equal.
2.22 new	.1 (ss)	HID Lamps	HID lamps to be Ministry of Transportation and Highways and City of Richmond pre-approved products.
2.23 new	.1 (ss)	Paint	Poles requiring painting to be supplied by pole fabricator. Paint specification and colour to be as specified on contract drawings. Finish coat shall be fully protected by pole fabricator to prevent any damage from occurring during shipping.

3.2	.1 (ss) .2 (ss) new	Excavating, Trenching and Backfilling	Refer to MMCD Section 31 23 01 - Excavating, Trenching and Backfilling **in conjunction with City of Richmond Detail Drawings and Contract Drawings.** Backfill shall be placed in lifts not exceeding 300mm in depth, each lift shall be compacted by approved means to obtain minimum compaction as specified in 3.2.1.
3.3	.1 (ss) new .7 (ss) new	Concrete Bases	Install concrete bases as shown on City of Richmond Detail Drawings and Contract Drawings. Use special precautions when installing bases near curb, gutter and sidewalk as to prevent undermining, breaking and cracking.
3.4	.1 (ss) .2 (ss)	Junction Boxes	Install junction boxes as shown on **City of Richmond Detail Drawings and Contract Drawings.** Install boxes on concrete brick base and drain rock.
3.5	.1 (ss) .2 (ss) .3 (ss) .4 (ss) new .5 (ss) new .6 (ss) new .7 (ss) new	Underground Conduit	Install R.PVC underground conduits as shown on **City of Richmond Detail Drawings** unless shown otherwise on Contract Drawings. Minimum cover over conduits to be **1000mm unless specified otherwise on Contract Drawings.** Place trench marker tape 300mm below finished grade. No run of conduit shall contain more than the equivalent of 4-90 degree bends. Conduits shall be blown out with compressed air, from both ends if necessary, then swabbed out to remove stones, dirt, water and other materials which may have entered during installation. Nylon pull line shall be placed in all conduits installed by open trench and trenchless technology ready for installation of conductors. Unused conduit stub ends to be capped and location marked.
3.6	.1 (ss) .2 (ss)	Poles and Related Equipment	Install poles and related equipment as shown on **City of Richmond Detail Drawings and Contract Drawings**. Where minimum pole to powerline clearances as shown on **City of Richmond Detail Drawing** cannot be maintained, advise the Contract Administrator and defer further work pending instructions.
	.5 (ss)		Install davit pole arms at right angle to street centerline unless shown otherwise on Contract Drawings.

	.7 (ss)		Install poles with handholes positioned on opposite side to direction of traffic unless specified otherwise on Contract Drawings.
	.8 (ss)		Mount base of pole on lower nuts and washers placed on anchor bolts prior to erection of pole. Then install upper nuts and washers and secure snugly. The upper and lower nuts shall then be adjusted to plumb luminaire pole. Pole base to be located at approximately centerline of anchor bolt projection.
	.11 (ss) new		Conductors located between top of concrete base and the bottom of pole base shall be in conduit. Exposed conductors will not be accepted.
3.8	.1 (ss)	Wiring	Install wiring in pole handholes as shown on **City of Richmond Detail Drawings and Contract Drawings.**
	.4 (ss)		Single conductor sizes and colour to be as specified on Contract Drawings **and City of Richmond Detail Drawings**.
	.6 (ss)		Wire each luminaire and receptacle separately from base of pole. Run separate neutral and bonding conductor from base of pole to each luminaire **and receptacle**.
	.7 (ss)		Neatly arrange and bundle wiring in junction boxes, pole handholes and service panels. **Conductor connectors in all access points to be installed in the up-right position, allowing for easy access, to the satisfaction of the Contract Administrator.**
	.8 (ss)		Secure conductor splices with **split bolt** type connectors only. Looping of conductors with "T" taps will **NOT** be accepted.
	.9 (ss)		Sealing of connections in all junction boxes shall be double dipped with 3M Scotchkote and then taped with Bishop BI-Seal, Phillips Rotunda or 3M Self-Holding Tape or approved equal, wrap tape in between the conductors to further prevent water entering and cover with PVC tape. (Minimum 6 layers of each).
	.10 (ss) new		Sealing of connections in pole handholes shall be insulated 3 mm (1/8") thick all around with 3M Scotch 33 Tape or approved equal.
	.11 (ss)		Bond all luminaires, receptacles and steel junction box lids with a No. 12 RW90 **green** conductor.
3.9	.1 (ss)	Pole Mounted and Tree Receptacles	Install pole mounted **and tree receptacles** as shown on **City of Richmond Detail Drawings and Contract Drawings**.

Section 31 05 17 – Aggregates and Granular Materials			
Delete			
		2.6.1 (First sentence), 2.11.1	
Add the following			
2.5	.2 (ss) new	River Sand	River sand may be used for road sub-base material. River sand is not a permitted material for any other location unless approved with written confirmation from the City.
2.6	.1 (ss)	Drain Rock	To consist of **clear crushed rock** conforming to following gradations: (as given in table in 2.6.1. of this Section) **Use of fine (Torpedo Gravel)** is only allowed as shown on Contract Drawings or as specifically instructed by Contract Administrator. Recycled aggregate material will be considered subject to Supplementary Specification 2.11.1 (ss).
2.7	.3 (ss) **new**	Granular Pipe Bedding and Surround Material	Recycled asphalt shall **not be used as pipe bedding** and surround material.
2.11	.1 (ss)	Recycled Aggregate Material	Aggregates containing recycled material may be utilized if approved by the Contract Administrator. In addition to meeting all other conditions of this specification, recycled material should not reduce the quality of construction achievable with quarried materials. Recycled material should consist only of crushed Portland cement concrete or **crushed asphaltic pavements (with exceptions for recycled asphalt as per Supplementary Specification 2.7.3 (ss))**; other construction and demolition materials such as bricks, plaster, etc. are not acceptable.

Section 31 23 01 – Excavating, Trenching and Backfilling			
Delete			
		3.6.6.4 3.6.7.1 3.6.7.3 to .8	
Add the following			
3.6	.6.4 (ss) new	Temporary Pavement Patching	Place temporary pavement as per Supplementary Detail Drawing G-5-SD.
3.6	.7.5 (ss) new	Permanent Pavement Restoration	Restore pavement as detailed on Supplementary Detail Drawing G-5-SD and as per the current City pavement restoration bylaw.

Section 31 23 23 – Controlled Density Fill			
Add the following:			
3.4	.9 (ss) new	Pipe-Filling	Fill-in procedure to be submitted for approval by Contract Administrator.

Section 32 01 11 – Pavement Surface Cleaning and Removal of Pavement Markings			
Add the following:			
3.1	.5 (ss) new	Removals	Painting over with black paint is not acceptable.

Section 32 12 16 – Hot-mix Asphalt Concrete Paving			
Delete			
		2.2.2 3.3.4 3.4.5 3.5.4	3.7.3.4 3.7.5
Add the following			
2.2	.2 (ss)	Mix Design	Mix may contain up to a maximum 10% by mass of Recycled Asphalt content (RAP). The use of shingles (recycled) is not permitted in the design mix.
3.3	.4 (ss)	Preparation	When matching new pavement with existing pavement, **saw-cut or grind** to make a nearly vertical (about 10 degree) cut to ensure the new pavement to bear onto the existing pavement.
3.4	.5 (ss)	Transporta-tion of Mix	Deliver loads continuously in covered vehicles and immediately spread and compact. Deliver and place mixes at temperature within specified range. Temperature of mix upon placement **shall be within 15°C specified in the mix design.**
3.5	.4 (ss)	Lift Thickness	Place asphalt concrete in compacted lifts of thickness as shown on the Contract Drawings or as approved by the Contract Administrator (must meet compaction requirements): .1 Levelling course(s) to thickness required but not exceeding 50mm each. .2 Lower course in layers not to exceed 50mm each. .3 Surface course in layers of maximum 60mm each.
3.7	.3.1 (ss) .4 (ss) .5 (ss)	Joints	Offset longitudinal joints in succeeding lifts by at least 150 mm. **Longitudinal joints should not be in wheel path**. Before rolling, carefully remove and discard coarse aggregate in material overlapping joint with a lute or rake. **Ensure that no loose material is disposed or broadcast onto the freshly laid asphalt.** Construct butt joints at locations and to the details as shown on Contract Drawings. **.1 Apply bitumous tack coat to the edge of adjacent asphalt mat when temperatures of the asphalt mat drop below 80°C.**
3.8	.3 (ss) new	Pavement Patching	All excavations associated with underground utilities on all roads are to be reinstated to initial full depth (temporary or not) with hot mix asphalt at the end of the working day. Contractor responsible for continued maintenance including

			but not limited to dust control, sweeping, etc. prior to patching.
	.4 (ss) new	Trench	Minimum widths: For section line, arterial, collector and local roads with buses on it, initial trench dimensions to be in accordance with Supplementary Detail Drawing G-5-SD with full depth asphalt restorations. Final trench restoration to be in accordance with the current City Pavement Restoration bylaw. For local roads: Initial: G-5-SD with full depth restoration Final: G-5-SD
3.12	.2 (ss) new	Clean-Up	Clean up all side casted asphalt from curb & gutter and boulevards and remove from site.

Section 32 12 17 – Superpave hot-mix asphalt concrete paving			
Add the following:			
2.1	.2 (ss)	Materials	Mix may contain up to a maximum 10% mass of RAP (recycled asphalt content). The use of shingles (recycled) is not permitted in the design mix.
3.12	.2 (ss)	Clean-Up	Clean up all side casted asphalt from curb & gutter and boulevards and remove from site.

Section 32 17 23 – Painted Pavement Markings			
Add the following:			
3.3	.3.2 (ss)	Application	Temperature of surface to be marked shall not be less than 10^{o}**C or as per manufacturer's specifications.**

Section 32 91 21 – Topsoil and Finish Grading			
Delete			
		1.3.1 1.3.2 2.2.1.3 2.3 2.4 2.6 2.8 2.9 Table 1 2.10.4 2.10.5	2.10.8 2.10.9 2.10.10 2.10.11 2.10.12 2.10.14 2.10.17 Table 2 3.4 Table 3 3.5
Add the following			
1.3	.1 (ss) **new** .2 (ss) new	Soil Quality Control	Growing medium preparation to be done by a company with a minimum of five (5) years experience in the process of measuring and mixing of constituent components that make up a prepared medium mix. The prepared growing medium shall match the standard established by the approved tested sample after all recommended amendments have been added.
1.5	.2 (ss) new .3 (ss) new .4 (ss) new	Inspection and Testing	Submit to the Contract Administrator a copy of a growing medium analysis from a laboratory approved by the Contract Administrator. The analysis shall be of tests done on the proposed growing medium from samples taken at the supply source within three weeks immediately prior to soil placement. Cost of initial analysis and subsequent tests to ensure compliance with specification shall be borne by the Contractor. Results of these tests shall be presented to the *Contract Administrator* for review at least seven (7) days **BEFORE** any growing medium delivery to site. The analysis shall include break down of the following components: particle size class and properties, total nitrogen by weight, carbon to nitrogen ratio, available levels of phosphorus, potassium, calcium, magnesium in parts per million, electrical conductive, soluble salt content, organic matter by weight, and pH value. The analysis shall outline the testing laboratory's recommendations for amendments, fertilizer and other required modifications to make the proposed growing medium meet the requirements of this specification. The soil test results from the testing laboratory shall be legible (i.e. type-written not hand written) and signed by a qualified soil scientist. Any further testing due to growing medium failing to meet specifications will be paid by the Contractor.

<table>
<tr><td></td><td>.5 (ss) new</td><td></td><td>At the discretion of the Contract Administrator submit up to two additional samples at intervals outlined by Contract Administrator of growing medium taken from material delivered to site. Samples shall be taken from a minimum of three random locations and mixed to create a single uniform sample for testing. Results of these tests shall be presented to the Contract Administrator for review.</td></tr>
<tr><td></td><td>.6 (ss) new</td><td></td><td>Growing medium failing to satisfy specifications or being considered by the Contract Administrator to be uneconomical to be adjusted will be rejected and not permitted for use in the project.</td></tr>
<tr><td></td><td>.7 (ss) new</td><td></td><td>In the event of a dispute on the quality of the growing medium, the Contract Administrator will perform independent testing and the Contract Administrator’s results will be binding.</td></tr>
<tr><td>1.6 new</td><td>.1 (ss)</td><td>Samples</td><td>Submit to the Contract Administrator samples of the following materials:</td></tr>
<tr><td></td><td>.1.1 (ss)</td><td></td><td>Dolomite Limestone: .5 kg (1.1 lbs.)</td></tr>
<tr><td></td><td>.1.2 (ss)</td><td></td><td>Organic Material: .5 kg (1.1 lbs.)</td></tr>
<tr><td></td><td>.2 (ss)</td><td></td><td>Growing Medium Sample: One composite sample. Samples shall be composite of at least three samplings from the proposed source, and shall be at least one (1) litre in volume and taken from a stockpile to be used for work of this project. Samples older than one (1) month will be rejected.</td></tr>
<tr><td>1.7 new</td><td>.1 (ss)</td><td>Product Handling</td><td>Do no move or work growing medium or additives when they are excessively wet, extremely dry, frozen or in any manner which will adversely affect growing medium structure. Growing medium whose structure has been compromised by handling under these conditions will be rejected and shall be replaced by the Contractor at no cost to the Contract Administrator.</td></tr>
<tr><td></td><td>.2 (ss)</td><td></td><td>Protect growing medium and additives against extreme wetting by rain or other agents, and against contamination by weeds and insects.</td></tr>
<tr><td></td><td>.3 (ss)</td><td></td><td>Deliver fertilizer and other chemicals in manufacturer’s original containers. Protect against and moisture until incorporated into the work.</td></tr>
<tr><td></td><td>.4 (ss)</td><td></td><td>All growing medium will be delivered to site premixed from the approved supplier. The Contractor shall maintain the same supplier throughout the life of the project.</td></tr>
<tr><td>2.6</td><td>.1 (ss) new</td><td>Sand</td><td>Hard, sharp, granular, river pump sand, well washed and free of contaminants, chemical and organic matter. Particle sizes by weight:
<table>
<tr><td>SIEVE SIZE</td><td>CLASSIFICATION</td><td>% RETAINED</td></tr>
<tr><td>No. 4 (4.76 mm)</td><td>Fine gravel</td><td>0%</td></tr>
<tr><td>No. 10 (2.0 mm)</td><td>Fine gravel</td><td>0 – 5%</td></tr>
</table></td></tr>
</table>

<table>
<tr><td></td><td></td><td></td><td>
<table>
<tr><td>No. 18 (1.0 mm)</td><td>Very coarse sand</td><td>1 – 10%</td></tr>
<tr><td>No. 35 (0.50 mm)</td><td>Coarse sand</td><td>15 – 20%</td></tr>
<tr><td>No. 60 (0.25 mm)</td><td>Medium sand</td><td>50 – 75%</td></tr>
<tr><td>No. 140 (0.105 mm)</td><td>Fine sand</td><td>5 – 15%</td></tr>
<tr><td>No. 270</td><td>Very fine sand</td><td>0 – 2%</td></tr>
<tr><td>Passing No. 270</td><td>Silt, clay</td><td>0%</td></tr>
</table>
</td></tr>
<tr><td>2.8</td><td>.1 (ss)
new</td><td>Wood Residuals</td><td>Wood residuals in the form of saw dust, wood chips, etc. shall not be included in the make up of the growing medium.</td></tr>
<tr><td>2.9</td><td>.1 (ss)

.2 (ss)
.3 (ss)

.4 (ss)

.5 (ss)</td><td>Fertilizer</td><td>Complete commercial synthetic slow release fertilizer meeting the requirements of the Canada Fertilizer Act, packed in water proof containers, clearly marked with the name of the manufacture, weight and analysis.

Formulation ratio: as per soil test recommendations.
To be the fertilizers recommended in the soils analysis report or approved by the Contract Administrator.
Contractor to provide proof of purchase and application of fertilizers and liming agents in the forms of receipts.
Substitutions for fertilizers will not be permitted without the approval of the Contract Administrator.</td></tr>
<tr><td>2.10</td><td>.4 (ss)
new
.5 (ss)
new

.8 (ss)

.9 (ss)

.10 (ss)

.11 (ss)
new

.12 (ss)

.14 (ss)
new</td><td>Growing Medium</td><td>Available Calcium to be 500 to 2500 ppm by dry weight.

For growing media high in % sand, a soil may become acceptable after leaching with fresh water followed by thorough drainage prior to planting

Total Nitrogen to be 0.2 to 0.5 % by dry weight

Available Phosphorus to be 25 to 250 ppm by dry weight

Available Potassium to be 50 to 1,000 ppm by dry weight

Available Magnesium to be 50 to 500 ppm by dry weight

Carbon to Nitrogen ratio (C/N) to be not more than 20:1.

Texture: particle sizes and proportions of each size particle to be within ranges shown in Table 2 for intended application. Where “Gravel” in Table 2 is indicated, this should be read to include debris and wood chips.</td></tr>
</table>

<table>
<tr>
<td>2.11 (ss) new</td>
<td>.1</td>
<td>Standard for Prepared Growing Medium</td>
<td>
<table>
<tr><td></td><td colspan="2">(Measured in % Dry Weight)</td></tr>
<tr><td>1. Particle Size Class and Properties</td><td>Lawns</td><td>Other Planting Areas</td></tr>
<tr><td>Sand (Larger than 0.05 mm and smaller than 0.02 mm)</td><td>75 – 85%</td><td>70 – 80%</td></tr>
<tr><td>Silt (Larger than 0.002 mm and smaller than 0.05 mm)</td><td>2 – 5%</td><td>5 – 10%</td></tr>
<tr><td>Clay (Smaller than 0.002 mm)</td><td>2 – 5%</td><td>2 – 5%</td></tr>
<tr><td>Organic Material Content</td><td>5 – 10%</td><td>10 – 15%</td></tr>
<tr><td>Rock and Gravel (2 mm)</td><td>0 – 2%</td><td>0 – 2%</td></tr>
<tr><td>(Particle size in Per cent (%) of Dry Weight)</td><td></td><td></td></tr>
<tr><td>2. Acidity (pH):</td><td>6.0 – 6.5</td><td>5.0 – 6.0</td></tr>
<tr><td>3. Cation exchange capacity:</td><td>30 – 50 meq.</td><td>30 – 50 meq.</td></tr>
<tr><td>4. Carbon to nitrogen ratio:</td><td>Maximum 40:1</td><td>Maximum 40:1</td></tr>
<tr><td>5. Fertility:</td><td></td><td></td></tr>
<tr><td>Total nitrogen:</td><td>0.4 – 0.8% by weight</td><td>0.4 – 0.8% by weight</td></tr>
<tr><td>Available phosphorus</td><td>70 – 80 ppm</td><td>70 – 80 ppm</td></tr>
<tr><td>Available potassium</td><td>150 – 250 ppm</td><td>150 – 250 ppm</td></tr>
<tr><td>Available magnesium</td><td>50 – 500 ppm</td><td>50 – 500ppm</td></tr>
<tr><td>Available calcium</td><td>500 – 2500 ppm</td><td>500 – 2500 ppm</td></tr>
<tr><td colspan="3">6. Salinity: Maximum saturation extract conductivity: 3.0 millihos/cm at 25 degrees C.</td></tr>
<tr><td colspan="3">7. Hydraulic Conductivity: Minimum saturated hydraulic conductivity 5.0 – 7.0 cm/hour in place.</td></tr>
</table>
</td>
</tr>
<tr>
<td>2.12 (ss) new</td>
<td>.1</td>
<td>Lime</td>
<td>Coarse (unless noted otherwise), ground dolomite limestone containing minimum 85% of total carbonates.</td>
</tr>
</table>

2.13	.1 (ss) new .2 (ss) new .3 (ss) new .4 (ss) new .5 (ss) new	Organic Materials	Submit sample prior to shipping to site. **Organic Material shall be, black/brown in colour made up of fully composted organics (i.e. no sawdust or wood chips)** Growing medium deficient of organic matter and fertility will be achieved using fully composed organic matter either peat or animal manure. A surface horizon of increased organic matter and fertility will be achieved by top dressing the required depth of organic matter following by thorough tillage into the top 15 cm of soil. Peat is recommended for soils requiring an immediate acidification (lower pH). Proposed peats will be locally harvested offering a pH between 3.0 and 5.0.
3.2	.6 (ss) new .7 (ss) new	Preparation of Subgrade	Scarify and / or break up and loosen existing sub grade and compacted gravel areas to a minimum depth of 200 mm (8") to allow for proper drainage in all planting areas and tree pits. Ensure proper drainage in all tree pits, shrub beds, planters and miscellaneous planting areas.
3.3	.4 (ss) new .5 (ss) new	Processing Growing Medium	Screen growing medium with mechanical screening equipment. Thoroughly mix imported growing medium with recommended additives during screening process to produce a growing medium structure with the particle size class and properties as specified in 2.02. No hand mixing will be accepted unless specifically approved by the *Contract Administrator*. Screening and mixing of growing medium on site will be not be allowed. All growing medium is to arrive pre-mixed.
3.4	.1 (ss) new .2 (ss) new .3 (ss) new .4 (ss) new	Placement of Growing Medium	Do not place growing medium until *Contract Administrator* has reviewed subgrade. Ensure that irrigation lines, tree root barriers, subgrade drainage, etc. to be installed have been reviewed by the Contract Administrator prior to the placing of growing medium. Break up and loosen subgrade and compacted gravel areas to allow for proper drainage in planting areas and planted islands. Place prepared growing medium in compacted layers of 100 mm to 150 mm (4" to 6") in planting areas on grade. Lightly roll each layer of placed topsoil, firm against deep foot printing, with a fine loose texture.

	.5 (ss) new		Ensure proper drainage in all shrub and tree pits.
	.6 (ss) new		Place growing medium to the required finished grades with adequate moisture, in uniform layers, during dry weather, over approved, dry, unfrozen subgrade where planting is indicated to the following minimum depths: Tree pits: To depth of rootball Shrub beds: 450 mm (1'-6") Ground cover areas: 300 mm (1'-0") Lawn area: 200 mm (8")
	.7 (ss) new		Apply lime, or other growing medium amendment at rate determined by testing laboratory's recommendations.
	.8 (ss) new		Mix amendments well into full depth of growing medium by cultivating or roto tilling prior to application of fertilizer.
3.5	.1 (ss) new	Application of Fertilizer	Apply fertilizer at least two weeks after lime application and at least 6 days before planting.
	.2 (ss) new		Spread fertilizer with mechanical spreaders over entire area of growing medium at rate recommended by the testing laboratory. Mix fertilizer thoroughly into upper 100 mm (4") of growing medium.
	.3 (ss) new		Incorporate lime into the top 15 cm depth of growing medium.
	.4 (ss) new		Slow release fertilizers will be surface applied to avoid contact with applied lime.
	.5 (ss) new		Spread fertilizer evenly over growing medium with a suitable mechanical spreader. Applications of fertilizer or lime by hand is not acceptable.
3.6	.3 (ss) new	Finish Grading	Fine grade (manually) growing medium to contours and elevations shown on drawings or as directed by Contract Administrator. Eliminate rough spots and low areas to ensure positive drainage.
	.4 (ss) new		Leave surface smooth, uniform, firm against deep foot printing, with a fine loose texture.
3.7	.2 (ss) new	Acceptance	Eliminate all weeds and weed roots from growing medium.
	.3 (ss) new		Contract Administrator to review all methods of weed removal other than by mechanical or hand pulling prior to start of operation.

3.10	.1 (ss) new	Pest and weed control	All methods of pest and weed control to be in compliance with the City's "Pesticide use control bylaw".

Section 32 92 23 - Sodding			
Delete			
		2.1.1	
Add the following			
2.1	.1 (ss) **new**	Sod	Sod to be approved by Contract Administrator and to be nursery grown, true to type, conforming to standards of Nursery Sod Growers' Association and their Nursery Sod Specifications. Sod to be quality, cultured turf grass grown from seed approved by Canada Department of Agriculture, free of diseases, clovers, stones, pests and debris. **Sod with mesh embedded to facilitate handling will not be accepted.** Sod to be relatively free of weeds, containing no more than two broadleaf weeds or ten annual weeds or weedy grasses per 40.0m^2.

Section 32 93 01 – Planting of Trees, Shrubs and Ground Cover
Section 32 93 01 – “Planting of Trees, Shrubs and Ground Covers” will not be applicable for which the Supplementary Specifications and Detail Drawings in Schedule G will apply.

Section 33 01 30.1 – CCTV Inspection of Pipes			
Delete			
		1.6.6	
Add the following:			
3.1	.12.1 (ss)	CCTV Inspection	Manhole (from to) **using the City's manhole numbering system.**
	.12.1.10 (ss) new		Pipe length reference number will conform to the City's standard practices.
	.12.1.11 (ss) new		If a pipeline requires a reverse run, due to blockage or obstruction, then it should be clearly indicated on the CCTV footage and on the report that it is a reverse run.
	.19 (ss) new		If the presence of debris or roots is obstructing the CCTV inspection, the Contractor will be required to remove the debris and/or roots in accordance with Section 30 01 30.2, Cleaning of Sewers, of these specifications and attempt to retelevise the sewer line. The additional set up time for the second attempt will be payable under clause 1.6.8 (ss).
	.20 (ss) new		In the interest of quality control an initial sample section of the CCTV inspection area, approximately 200m long, is to be submitted to the City to be assessed and evaluated to ensure the inspection and reports comply with WRc standards. Any deviation from these standards will be noted and returned to the Contractor to be redone. Once rectified, reports are to be submitted to the Contract Administrator concurrently with CCTV inspection on a bi-weekly basis.
	.21 (ss) new		Detailed daily schedules specifying where CCTV inspection is taking place will be submitted in advance to the Contract Administrator.
	.22 (ss) new		The CCTV inspection shall be carried out in a continuous manner, without changing or moving between different locations or catchment areas, in accordance with the inspection plan unless obstructions or high flows do not allow this.

	.23 (ss) new		Should a manhole be found that is not shown on the City Record Plans, the Contractor shall identify, reference and add such manholes to the City's inventory, obtaining a manhole number from the City. Should the Contractor not be able to locate a manhole shown on the City Record Plans, the Contractor shall await instructions from the City.
	.24 (ss) new		If any manhole or pipe line to be inspected lies within private property, the Contractor shall acquire permission to inspect the pipe from the owner of the property at least 3 day in advance.
3.8	.3 (ss)	Inspection Reporting Hard Copies & Digital Format	Present report in 215 mm x 280 mm three ring (D type) binder. **DVD-R will be incorporated into the binder in an appropriate DVD/CD binder sleeve.**
3.13 (ss) new		Manhole Inspection	Contractor is to carry out a visual inspection of the inside of all manholes from street level, note and photograph structural defects e.g. condition of ladder rungs, grouting etc., and submit findings in a separate 215 mm x 280 mm three ring (D-type) binder with DVD-R containing photographs inserted at the back of the binder in appropriate DVD/CD binder sleeves. Report to be in the format of a four column table where the first column will contain the four digit manhole number, the second will contain the location of the manhole, the third will contain the number of the DVD-R where the photographs are stored, and the forth will contain noted defects. Photographs are also to be incorporated into the report, clearly labelled with the manhole number.

Section 33 01 30.2 – Cleaning of Sewers			
Delete			
		1.5.2	

Section 33 05 23 – Trenchless Sewer Pipe Bursting			
Add the following			
1.0	.1 (ss)		Section 33 05 23 refers to those portions of the work that are unique to the supply and installation of High Density Polyethylene (HDPE) **and restrained PVC** gravity sewer main by-pipe bursting. This section must be referenced to and interpreted simultaneously with all other sections pertinent to the works described herein.

Section 33 05 24 – Cured-in-Place-Pipe Liners			
Delete the following			
		1.5.1 3.5.3 3.8.3	
Add the following			
1.0	.2 (ss) new	General	The Supplementary Specification also covers the repairs of defective sewers at select locations by Trenchless Point Repair (TPR) methods utilizing Cured-in-place-pipe products.
1.5	.1 (ss)	Submissions	The Contractor shall submit for approval the following information to the Contract Administrator for each manhole to manhole section and TPR at least seven (7) days prior to the commencement of any site work:
1.5	.1.7 (ss) new		Documentation that the resin proposed for use has not exceeded its shelf life as recommended by the manufacturer of the resin.
	.1.8 (ss) new		Details of grout system proposed for void filling and an installation protocol for same.
	.2 (ss) new		An operations protocol outlining:
	.2.1 (ss) new		Resin impregnation protocol, identifying;
	.2.2(ss) new		Details of the wet-out operation.
	.2.3(ss) new		Documentation that the resin proposed for use has not exceeded its shelf life as recommended by the manufacturer of the resin.
	.2.4(ss) new		The volume of resin to be impregnated at each repair location including the proposed excess allowable for polymerization and migration into cracks and joints of the host pipe.
1.5	.3 (ss) new		Construction installation protocol identifying;
	.3.1 (ss) new		Proposed methods to fill voids outside the host pipe (where required).
	.3.2 (ss) new		Limiting capacity of the flow through bypass piping.

	.3.3 (ss) new		Details of the proposed liner installation method.
	.3.4(ss) new		Means of curing proposed (ambient, steam, etc.) and quality assurance procedures in-place to determine curing requirements are achieved.
	.3.5(ss) new		The minimum pressure to hold the tube tight against the existing conduit and the maximum pressure so as not to damage the conduit.
	.3.6(ss) new		Anticipated timing for execution of the point repair, and, if appropriate, for service lateral reinstatement.
1.6	.4 (ss) new	Records	Upon completion of the point repairs, the Contractor shall provide the Contract Administrator with an inspection report, containing the pre and post-lining inspections prior to Total Performance. An inspection report containing the warranty inspection shall be submitted prior to Final Acceptance.
1.7	.2 (ss) new	Material Samples	Physical samples of point repairs shall be taken in accordance with the following:
	.2.1 (ss) new		The Contractor shall be prepared to construct 1 field sample during the course of the work. Samples shall consist of a section of repair material that has be inserted through a like diameter form and cured in the invert of the manhole under existing flow conditions.
	.2.2 (ss) new		The minimum sample size shall be 200 mm in length by the full diameter. The sample shall be provided to the Contract Administrator intact in the form. The Contractor shall provide the necessary forms for sample forming and secure the samples. The Contractor shall coordinate and pay for material testing.
	.2.3 (ss) new		A plate sample shall be prepared for each point repair undertaken in addition to the physical samples noted above from material taken from the actual repair (tube and resin) and cured in a manhole section adjacent to the repair for the duration of the repair.
	.2.4 (ss) new		Where feasible, connection coupons of sufficient size shall be obtained from connection reinstatement operations.
	.3 (ss) new		All physical samples of point repair shall be tested to confirm the flexural strength and flexural modulus in accordance with the requirements of ASTM D5813 and D790

1.7	.4 (s) new		The point repair liner thickness will be measured in accordance with the requirements of ASTM D5813 and ASTM D3567 for conformance with the design requirements
2.5	.1(ss) new	CIPP Point Repair Products	Minimum material requirements for Internal CIPP point repairs shall conform to ASTM D5813 “Standard Specification for Cured-In-Place Thermosetting Resin Sewer Pipe” and the supplemental requirements noted herein. In accordance with ASTM D5813 and the supplemental requirements noted herein, CIPP point repairs shall be designed as either Type II for end use in a partially deteriorated conduit or Type III for and use in a fully deteriorated conduit. CIPP point repairs shall be carried out with Grade 1 – thermosetting polyester resin or Grade 2 – epoxy resin.
2.6	.1 (ss) new .1.1 (ss) new .1.2 (ss) new	Approved Products for Grouting Outside the Host Pipe	Where voids are required to be filled outside the host pipe they shall be filled with either. An acrylamide grout with appropriate additives for external grouting such as diatomaceous earth, silica flour, bentonite, or Portland cement. A hydrophyilic urethane grout.
3.1	.1 (ss) new .3 (ss) new .4 (ss) new .5 (ss) new	Workmanship and Finish	Finished CIPP liners and point repairs shall conform to Clause 6.2 *Workmanship* of ASTM D5813 and the supplementary requirements noted herein. If the CIPP liner or point repair does not fit tight against the host pipe at its termination points or at connecting pipe(s), the interface shall be completely sealed with acrylic grout compatible with the CIPP repair system. The termination points of the CIPP liner or point repair shall provide a smooth and uniform flow transition from the host pipe to the repair for the full circumference of the repair. The CIPP liner or point repair shall be cut to reinstate the full diameter of the existing service connection. The finish of the cut out shall provide a smooth transition from the connection to the CIPP liner or point repair.

3.3	.4 (ss) new	Sewer Flow Management	If the prevailing flow condition in the sewer to be repaired is substantially in excess of the flow through capacity of the Contractor's proposed point repair system the Contractor shall be responsible for bypassing existing sewer flow from upstream sewers during construction around the point of repair. Under no circumstances shall sewer flow be diverted directly to the environment of storm sewers.
	.5 (ss) new		The Contractor shall review the Environment Canada weather forecast prior to commencement of CIPP repair operations.
	.6 (ss) new		Where the anticipated weather conditions are such that anticipated sewer flow will substantially exceed the flow through capacity of the Contractor's proposed CIPPrepair system, commencement of construction shall be delayed until favourable weather is forecast.
3.4	.2 (ss) new	Verifying Existing Sewer Dimensions	Prior to manufacture of the point repair fabric tube for any location the Contractor shall site verify dimensional requirements (diameter, length, etc.) for each section of sewer where CIPP repairs are proposed.
	.3 (ss) new		At each location a minimum of 2 sets of measurements shall be made on each pipe to confirm the existing pipe's cross section dimensions. The measurements shall be made at the entrance to the pipe and at a distance of 500 mm or greater within the section.
	.4 (ss) new		Cross section dimensions shall be obtained by the use of a set of calibrated calipers, a steel tape, or other suitable measuring device. A cloth or non-calibrated tape is not suitable for use. The measurements shall be accurate to +/- 1 mm.
	.5 (ss) new		Dimensional requirements for the remainder of the pipe shall be estimated based on the dimensional checks and the television inspection available for viewing during the bidding process.
3.5	.3	Preparation	The Contractor shall perform all sewer inspection in accordance with CCTV Video Inspection Supplementary Specifications. A minimum of three sewer inspections shall be performed during the course of the work.
	.3.1 (ss) new		Pre-CIPP repair inspection (after sewer cleaning and preparation for lining).
	.3.2 (ss) new		Post-CIPP repair inspection (subsequent to execution of the repairs and any service lateral reinstatement).

	.3.3 (ss) new		Warranty inspection – final acceptance.
3.5	.7 (ss) new	Preparation	At locations where existing voids are noted outside the host pipe, either in the Bid Documents or in the pre-point repair inspection, the voids shall be filled with an approved grout material either prior to or after effecting the point repair in a manner approved by the Contract Administrator.
3.8	.3 (ss)	Service Reconnection	After the point repair has adequately cured, the Contractor shall reinstate any existing active sewer connections effected by the repair. Reinstatement shall be performed from the interior of the pipeline by means of a television camera and a remote controlled cutting device or by manual means in man accessible and man entry diameter ranges. Sewer connection reinstatement shall fully 100% of the original cross sectional area of the service.
	.3.1 (ss) new		Reinstatement of service connections shall be performed in such a manner so as to remove the coupon with as much material intact as practical. All connection coupons shall be provided to Contract Administrator immediately subsequent to reinstatement.
	.3.2 (ss) new		Manual re-opening is acceptable in large diameter pipes where permitted by Worksafe BC regulations.
	.5.1		Any voids between the point repair liner and the existing sewer connection shall be grouted with approved non-shrink cement grout material.
	.7 (ss) new		In areas where CIPP repairs span an existing connection pipe the Contractor shall confirm the status of the connecting pipe by dye testing methods.
3.11	.1 (ss) new	Design Objectives for TPR	In regards to Design Objectives for Trenchless Point Repair, refer to Contract Documents or Contract Administrator.

Section 33 11 01 – Waterworks			
Delete			
		2.1.1 2.2.1 2.2.2.2 (joints) 2.2.4.3 2.2.4.9 and .10 2.2.4.12.1.7 2.2.4.12.3 2.2.4.13.1 to .4 2.2.5 2.3.2.1, .2, .3 2.3.7.1 and .2 2.5.1 2.5.3.3.2.2	2.6.1.1 and .2 2.6.1.8 2.6.2 2.6.3 2.7.3.2 2.8.1 2.9.1 2.2.6.3 3.4.3 3.6.6 3.10.1 & .7 3.12.2 3.13 3.14.1 3.19.2 3.21.8
Add the following			
2.1	.1 (ss)	General	Pipe material as shown on Contract Drawings, excluding main pipe within chambers which shall be steel, and leads to fire hydrants which shall be PVC.
2.2	.2.2 (ss) .2.3 (ss) new .2.4 (ss) **new**	Polyvinyl Chloride (PVC) Pressure Pipe	Joints for bell and spigot PVC pipe to be push-on integrally thickened bell and spigot type to ASTM D3139, **section 6.2** with single elastomeric to ASTM F477. Provide a minimum of one pipe length, at the discretion of the City, for testing purposes. Provide a length of pipe for every 1000 m of pipe installed. All pipe shall be DR18 minimum.
2.2	.3.3.5 (ss) **new**	Fittings	Electrofusion couplings to ANSI/NSF61, FM1613, ASTM F1055 and AWWA C906 suitable for pressure rating specified and fusion of the main as specified in Contract Documents.
2.2	.4.5 (ss)	Fittings	PVC fabricated fittings shall conform to either AWWA C900 or AWWA C905 and be certified to CSA B137.3. Fabricated fittings to be made from CSA certified PVC pipe of the same pressure class or pressure rating as the pipe. **Use of multi-sectional PVC fittings for pipes 300 mm diameter and**

			greater is not permitted
2.2	.4.9 (ss) new	Nuts & Bolts, Tie rods and Nuts	All bolts, nuts, internally threaded couplings, washers and tie rods for assembling and securing waterworks fittings and all gate valves referred to in this Section to be **stainless steel Type 304 and passivated** with yield point of not less than 276 MPa. "**A food grade lubricant**" to be used on all bolts and nuts.
2.2	.4.12.3 (ss) **new**	Coupling and Flanged Coupling Adapters	Mechanical couplings shall be supplied with central register removed. All components to be coated with epoxy or polyurethane conforming to AWWA C210 or C222. Gaskets to be of the "plain gasket" variety made from rubber. All bolts, nuts and tie rods **to 2.2.4.9 (ss)** of this Section**.** Anti-corrosion protection to **3.14 (ss)** of this Section.
2.2	.4.13.1 (ss) **new**	Joint Restraint Devices	**EBAA and Uni-Flange or approved equal**. All bolts, nuts and tie rods to **Sub-section 2.2.4.9 (ss)** of this Section. Anti-corrosion protection to **3.14 (ss)** of this Section.
2.2	.6.3 (ss)	Steel Pipe	Finishes: Exterior coating shall be liquid epoxy to AWWA C210 or Liquid polyurethane to AWWA C222. Interior lining shall be NSF 61 certified and shall be liquid epoxy to AWWA C210 or liquid polyurethane to AWWA C222.
2.2	.7 (ss) new .7.1 (ss) new	Pipe delivery	 All piping to be capped and plugged by the factory prior to delivery to site.
2.3	.2.1 (ss) .2.2 (ss) .2.3 (ss)	Mainline Gate Valves	Location of solid wedge valves and resilient seated valves as shown on Contract Drawings. **Bronze mounted gate valve** to AWWA C500: **100mm** to **600mm** to working pressure **1725 kPa (250 psi)**; grey cast iron or cast ductile iron body, bronze mounted solid wedge, non-rising stem, hub or flanged ends, **manganese bronze or approved equal and passivated valve stems and nuts, open counter-clockwise with secured wrench nut.** **Resilient seated gate valve** to AWWA C509: **100mm** to **600mm** to working pressure **1725 kPa (250 psi)**; grey cast iron or cast ductile iron body, resilient seated, non-rising stem, hub or flanged ends, **manganese bronze or approved equal and passivated valve stems and nuts, open counter-clockwise with secured wrench nut.**
2.3	.7.1 (ss) .7.2 (ss)	Service Valve Boxes	Curb stop valve boxes (300 mm from property line) or smaller services to be as per Detail Drawing W2b-SD. Curb stop valve boxes (300 mm from property line) on 32mm to 50mm dia. services to be as per Detail Drawing W2b-SD

2.5	.1 (ss)	Service Connections, Pipe, Joints and Fittings	Pipe diameter 19mm to 50mm to be Polyethylene to AWWA C901, Pressure Class 160 tubing certified to CSA B137.1 **complete with tracer wire** in accordance with manufacturer's recommendations.
2.5	.6 (ss) **new** .6.1 (ss) **new** 6.2 (ss) **new**	Small Water Meter	 Meter - Residential meters to be sized down. - To be positive displacement rotating disk type and shall conform to AWWA C700. - To have bronze case and iron pipe thread connections. - To have bronze base plate for inside application, and plastic base plate for outside application. - Minimum flow at 5 psi head loss for 19mm meter to be 24 gpm and for 25mm diameter meter to be 41 gpm. Registers - Encoder- type remote registration conforming to the latest version of AWWA C707 - Power for data transmission to be supplied by an interrogation device. - To be compatible with various brands of interrogation equipment. - Six digit visual registration in unit of cubic meters together with a full test sweep hand or dial divided in graduations of 0.01m^3. - Encoder to simultaneously encode in digital format at least six significant digits of the meter reading to one cubic meter and meter identification number through a remote receptacle. - Month and year of manufacture and other identification information to be clearly shown on the face - To have moisture protection for internal components. Contact and connections to be corrosion-proof. - Terminal to be provided with port cover or to be factory sealed. - Wheels used in the register assembly to be provided with spring type or magnetic sensing type contacts. - To be sealed to prevent tampering and base and mounting to be integral components to prevent disassembly with attachment to the meter via a bayonet attachment together with a tamper-proof plastic seal pin. - To be removable from the meter without disassembling the meter body and without taking the

			- meter out of service. - To be easily upgraded to Automated Meter Reading through adding a meter interface unit. Materials to be compatible with the normal water meter environment and with the materials in the water meter itself.
2.5	6.3 (ss) **new**		Remote Receptacles - To be either wall or pit mount style with wall mounted units to accept terminal screw connection when installed. - Without showing identity number and with no data storage or poser source. - To be corrosion and ultra-violet degradation resistant and unaffected by rain or condensation and suitable for rugged long service life. - To be provided with colour coded wire terminals (red, green and black) and incorporated with the function of a cable clamp or strain relief coupling. - To provide interrogation through inductive coupling to transfer data without physical connection of the reading device.
2.6	.1.1 (ss) .1.2 (ss) .1.8 (ss) .1.12 (ss) **new** .1.13 (ss) **new** .1.14 (ss) **new**	Hydrants	Shut-off: compression type or slide gate type **as specified in Contract Documents.** Inlet connection: to be 150mm nominal diameter, bell type with harness lugs **or all flanged boots.** Opening direction: counter clockwise **with minimum 15 turns to fully open except for type C-71P hydrant, which has 12 turns, will be acceptable**. **O-ring seal** ball thrust bearing operation mechanism. Positive, **mechanically activated drain** mechanism. Hydrant barrel and stem to have a **reduced strength self-sealing breakaway section.**
2.6	.2 (ss) - **new**	Hydrants	Hydrant parts shall be thoroughly **wire brushed and painted** as follows: The outside of the bonnet **and smaller port caps** shall receive two coats of white oil paint. All other outside ferrous parts, which after installation of hydrant will be above ground line, shall be given two coats of Fire Hydrant Red oil paint. All remaining internal and external ferrous parts shall be coated with a tough, durable coating or epoxy or polyurethane conforming to AWWA C210 or C222, or other approved equal.
2.6	.3 (ss)	Hydrants	Approved standard 150mm fire hydrants are **Terminal City C-71P Traffic Type, Terminal City No. 1, Brigadeer Type , 1, Canada Valve Century type or approved equal. Only**

			one type of hydrant per contract is permitted.
2.7	.3.2 (ss) **new**	Curb Stop	**40**mm and 50mm to be **50mm cast iron gate valve** reduced with brass bushings to suit pipe or ball type construction.
2.7	.5 (ss) **new** .5.1 (ss) **new** .5.2 (ss) **new** .5.3 (ss) **new** .5.4 (ss) **new** .5.5 (ss) **new**	Small Water Meter Installation - Materials	 Valve - To be of bronze case with compression fitting on one end and meter flange on the other. - To be ball or cylinder type using rubber o-ring seals. - To be actuated through a curb stop style operating nut with a lock wing on the valve case. Dual Check Valve - To have a meter flange on the upstream side and a compression fitting on the downstream side. - To be submitted to Contract Administrator for approval for use. Bolts and Nuts – See 2.2.4.9 (ss) Meter Box – For Boulevard Use - To be made of HDPE material with the lid in green in colour and rated for pedestrian loading. - Internal dimensions to be 616 x 952 x 457 mm (24.25 x 37.5 x 18 inches). - To be submitted to Contract Administrator for approval for use. Meter Box – For Sidewalk and Driveway Use - To be concrete number T2-66 box with a steel lid pre drilled for a box mounted remote receptacle and with the meter box and lid rated for H20 traffic loading.
2.8	.1 (ss)	Granular Pipe Bedding and Surround Material	As shown on **Standard Detail Drawings with materials for bedding and surround** as specified on Contract Drawings
2.9	.1 (ss)	Backfill Material	As shown on **Standard Detail Drawings with materials for backfill and** as specified on Contract Drawings
3.4	.3 (ss) **new**	Concrete Bedding and Encasement	Open excavation to be backfilled before the Contractor leaves the site at the end of the working day. Backfilling of uncured concrete will not be permitted. At the discretion of the City, plating of the excavation may be permitted.

3.6	.6 (ss) **new**	Pipe Installation	**Joint deflection not permitted for PVC pipe**. Deflections in PVC pipelines to be achieved using pre-fabricated 5 degree PVC bends or high deflection PVC couplings, both rated for 1380 kPa operating pressure. For other pipes, do not exceed maximum joint deflection specified in AWWA C600 or recommended by pipe manufacturer.
3.6	.10.11 (ss) **new**	Joints	Pipe joints to be wrapped with Denso tape within 3.0m horizontal or 0.5m vertical **separation with storm and sanitary sewer** including ditches as per Provincial Health Regulations. Pipe crossing within 0.5 m of a storm, sanitary sewer or ditch is to cross midway between joints.
3.6	.10.12 (ss) new	Joints	Electrofusion couplings to be installed by certified trained personnel in accordance to manufacturer's recommendations. Contractor to provide copy of certificate.
3.6	.15 (ss) new	Crossing of Existing AC Watermain	Any crossings of existing AC watermains will be replaced with approved material by City Forces.
3.10	.1 (ss) .7 (ss)	Service Connection Installation	Install service connections to 3.6 of this Section and as shown on **Supplementary Detail Drawings W2a-SD and W2b-SD**, Contract Drawings or as directed by Contract Administrator. Tap main as shown on **Supplementary Detail Drawings W2a-SD and W2b-SD**, not closer to a joint nor closer to adjacent tapping than recommended by manufacturers, or 1.0m, whichever is greater. No two adjacent tappings on same pipe length to be on same plane of pipe.
3.10	.13 (ss) **new**	Tracer Wires	Tracer wire shall be 12 to 14 gauge coated copper and secured to top of pipe. Wrapping around the pipe will not be permitted. Install tracer wire on service connection. Tracer wire to be secured to connection and accessible to all valve boxes and / or meter boxes.
3.10	.14 (ss) **new** .14.1 (ss) **new** .14.2 (ss) **new**	Small Water Meter Installation	 Water meter and meter box – Install in accordance with Supplementary Detail Drawing W2g-SD. - Meter box not to be located in present or future vehicular parking or traffic areas. - All pipings to be aligned for meter to sit horizontally. Radio Detect – Wall Mounted - Must be accessible for meter reading. - Install communication cable in accordance with the

			manufacturer's instruction with length not exceeding 30.0m.
	.14.3 (ss) **new**		Remote Receptacle – Meter Box Lid Mounted - Connecting cable to remote receptacle to be 1.8 m length minimum and of 22 gauges three colour wire. - Electrical connections to be waterproof.
3.10	.15.1 (ss) new	Service Connection installation	Sawcut adjacent curb on alignment of service connection and paint blue.
	.15.2 (ss) new		Grind or saw cut valve box frame on alignment of watermain or service connection as per W3a-SD
3.12	.2 (ss)	Hydrants	Install hydrant assemblies in accordance with AWWA Manual of Practice No. M17 and in accordance with **Supplementary Detail Drawing W4a-SD, W4b-SD and W4c-SD**.
3.13	(ss) new	Thrust Block	Thrust blocks shall not be used in the City of Richmond. Consideration for the use of thrust blocks will be given upon written application to the Contract Administrator.
3.14	.1 (ss) **new**	Corrosion Protection	Protect installed ductile fittings, dresser type couplings, flanged joints and restraint clamps and all metal fittings from corrosion by wrapping with 100mm wide **Denso tape** or approved equal.
3.19	.2 (ss)	Testing Procedure	With the exception of HDPE pipe, before pipe is filled with water, pipe bedding, **installation of 75 x 300 mm (3" x 12") wood blocking/wedges (pressure treated) underneath hydrants and valves** and backfilling to be competed as required in this specification. Fill each section of pipe and allow to remain to be full of water for at least a period of 24 hours before commencement of any pressure test. Submit pipeline and appurtenances including fire hydrants to a test of 1035 kPa **(150 psi)** unless otherwise specified. Ensure that test pressure does not exceed pipe or thrust restraint design pressures. Maximum allowable leakage rate at test pressure not to exceed 1.25 litres per mm diameter of pipe per kilometre per 24-hour period. Minimum duration of test period to be 2 hours. Maximum test pressure should not exceed those specified in CSA B137.3-Table 9.
	.7 (ss) new		Perform pressure and leakage testing of High Density Polyethylene (HDPE) piping to ASTM F2164, no leakage allowed.
3.21	.8 (ss) new	Disinfection and Flushing Procedures	After completion of chlorination, flush chlorinated water from system, hydrants and services until chlorine concentration in remaining water is **higher than the incoming water** by between 0 to 0.3 mg/L chlorine residual. Chlorine residual shall not exceed 0.5 mg/L. All chlorinated water including

			flushing water discharged upon completion of testing and flushing may be discharged into adjacent sanitary sewer system or trucked away. Contractor to notify GVSDD prior to discharging chlorinated and flushing water into sanitary sewer. Under no circumstances shall water be discharged into storm sewer system or natural streams without complete dechlorination.
3.21	.10 (ss)	Disinfection and Flushing Procedures	Microbiological testing must be completed and accepted by the City prior to connection to the City system. Collection of the sample and analysis must be competed by an independent testing company approved by the City. The report received shall have a section specifically stating whether the results of the analysis pass or fail according to Provincial Requirements (Drinking Water Protection Act and Regulations).
3.24	.1 (ss) new	Abandoned Watermains	Abandoned watermains in arterial, collector or bus routes to be filled with a control density fill or approved equal.

Section 33 30 01 – Sanitary Sewer			
Delete			
		2.1.1 to .4 3.4.3 3.6.6.1	3.6.6.2 3.12.1 3.18
Add the following			
2.1	.1 (ss) new	Concrete Pipe	Concrete pipe not permitted for use in Sanitary Sewer
2.7	.1 (ss) **new** .2 (ss) **new**	High Density Poly-ethylene Pipe	**Pipe** .1 To AWWA C906 pressure class specified in Contract Documents. .2 Iron pipe size equivalent outside diameter. .3 To be compatible with specified mechanical joint fittings and valves without special adapters. .4 Other ribbed pipes of HDPE materials may be used where specified in the Supplementary Specifications or Contract Drawings. .5 Smooth transitions at invert for material and size changes. **Joints** .1 Heat butt fusion to ASTM D2657 and in accordance with manufacturer's recommendations. .2 Gasket joints for bell ends to ribbed HDPE pipes in accordance with manufacturer's recommendations.
3.4	.3 (ss)	Concrete Bedding and Encasement	Open excavation to be backfilled before the Contractor leaves the site at the end of the working day. Backfilling of uncured concrete will not be permitted. At the discretion of the City, plating of the excavation may be permitted.
3.6	.6.2 (ss)	Pipes on Curved Alignments	Smooth PVC pipe: for 100mm to 300mm sizes conform to required curvature by **minimum bending pipe barrel through applying light manual pressure**. For greater curvature, **use 5 degree prefabricated PVC bends**. Joint deflection not permitted for smooth PVC pipe.
3.6	.14 (ss) **new**	Water-proofing concrete manholes and Inspection Chambers	Apply vapour barrier coating to concrete manholes and inspection chambers to ensure waterproofing.

3.6	.15 (ss) **new**	Crossings of existing AC sanitary sewer	Any crossings of existing AC sanitary sewers will be replaced by approved materials by City Forces.
3.12	.1 (ss)	Leakage Testing - General	Upon completion of cleaning and flushing of each section, carry-out low pressure air leakage testing.
3.12	.4 (ss) **new**		Perform pressure and leakage testing of High Density Polyethylene (HPDE) piping to ASTM F1417.
3.18	(ss) **new**	Video Inspection	The Contractor shall video inspect all completed sanitary sewers following completion of installation. The video inspection report shall conform to Supplementary Specification Section 33 01 30.1 –CCTV Inspection of Pipelines. .1 Should video inspection indicate apparent deficiencies, Contract Administrator may direct Contractor to perform **additional testing** as follows. .2 **Additional testing** may include passing rubber ball, mandrel or test plug having a minimum dimension of 95% of diameter of sewer pipe completely through pipes and appurtenances. A light test may be performed in lieu of ball test at discretion of Contract Administrator.
3.21	(ss) **new**	Abandoned Sanitary Sewer	Abandoned sanitary sewers in arterial, collector or bus routes to be filled with a control density fill or approved equal.

Section 33 34 01 – Sewage Forcemain			
Delete			
		2.2.1 2.2.5.3 2.2.5.9 & .10 2.2.13.3 & .4 3.4.3 3.9 3.10.1 to .3	
Add the following			
2.2	.4.4 (ss) **new**	Electro-fusion couplings	Electrofusion couplings to FM1613, ASTM F1055 and AWWA C906 suitable for pressure rating specified and fusion of the main as specified in Contract Documents.
2.2	.5.9 (ss) new	Nuts, & Bolts Tie rods and Nuts	All bolts, nuts, internally threaded couplings, washers and tie rods for assembling and securing waterworks fitting and all gate valve and curb stop extension rods referred to in this Section to be **stainless steel Type 304 and passivated** with yield point of not less than 276 MPa. "**Never Seez**" or approved equal to be used on all bolts and nuts.
3.4	.3 (ss) new	Concrete Bedding and Encasement	Open excavation to be backfilled before the Contractor leaves the site at the end of the working day. Backfilling of uncured concrete will not be permitted. At the discretion of the City, plating of the excavation may be permitted.
3.6	.10.17 (ss) **new**	Joints	Electrofusion couplings to be installed by certified trained personnel and in accordance to manufacturer's recommendations. Contractor to provide copy of certificate.
3.6	.11 (ss) **new**	Crossing of AC sewage forcemains	Any crossings of existing AC sewage forcemains will be replaced with approved materials by City forces.
3.9	(ss)	Thrust Blocks	Thrust blocks shall not be used in the City of Richmond. Consideration for the use of thrust blocks will be given upon written application to the Contract Administrator.
3.15	.6 (ss)	Pressure Testing Procedure	Perform pressure and leakage testing of High Density Polyethylene (HDPE) piping to **ASTM F2164 and** AWWA M55; no leakage allowed.
3.17	(ss) **new**	Abandoned Sewage Forcemains	Abandoned Sewage forcemains in arterial, collector or bus routes to be filled with control density fill or approved equal.

Section 33 40 01 – Storm Sewers			
Delete			
		2.1.1 2.1.2 2.3.3 2.5 2.6.6 2.6.8.1	2.7.1 3.4.3 3.6.6.1 3.6.6.2 3.12.1 3.15.2
Add the following			
2.1	.1 (ss) .2 (ss)	Concrete Pipe	Non-reinforced circular concrete pipe and fittings: to ASTM C14M class 3, **minimum diameter 375mm**, maximum diameter 600mm, designed for flexible rubber gasket joints to ASTM C443M. Reinforced circular concrete pipe and fitting: to ASTM C76M class III for all pipe **greater than 600mm diameter and for 300mm diameter**, designed for flexible rubber gasket joints to ASTM C443M.
2.3	.3 (ss) .6 (ss) new	PVC Pipe, Mainline Profile	Pipes to have factory assembled spigot gaskets and integral bell joint features; joints to conform to all requirements ASTM D3212; elastomatic gaskets to confirm to ASTM F477 **or manufacturer approved method.** The use of spiral ribs is not permitted:
2.5	.1 (ss) **new** .2 (ss) **new**	**High Density Polyethylene Pipe**	**Pipe** .1 To AWWA C906 pressure class specified in Contract Documents. .2 Iron pipe size equivalent outside diameter. .3 To be compatible with specified mechanical joint fittings and valves without special adapters. .4 Other ribbed pipes of HDPE materials may be used where specified in the Supplementary Specifications or Contract Drawings. .5 Smooth transitions at invert for material and size changes. **Joints** .1 Heat butt fusion to ASTM D2657 and in accordance with manufacturer's recommendations. .2 Gasket joints for bell ends to ribbed HDPE pipes in accordance with manufacturer's recommendations. .3 Electrofusion couplings to be installed by certified trained personnel and in accordance to manufacturer's recommendations. Contractor to provide copy of certificate.

	.3 (ss) **new**		**Fittings** .1 Fabricated HDPE mitred fittings to AWWA C906 suitable for pressure rating specified in Contract Documents. .2 Moulded HDPE fittings to ASTM 3261 suitable for pressure rating specified and fusion to main pipe, dimensions as specified in Contract Documents. .3 Flanged joints to AWWA C906 flat faced stub end and loose hot-dip galvanized ductile iron (ASTM A536) backup ring drilling to ANSI B16.1, ANSI B16.5, or AWWA C207, class suitable for pressure rating specified in Contract Documents. .4 Nuts and bolts as specified for "Fittings" in this section. .5 Fittings for ribbed HDPE pipes to be compatible with the pipes specified.
2.6	.8.1 (ss) .8.3 (ss) new	Field installed Tees and Wyes	In-situ installation of tees and wyes into concrete, HDPE, PVC or steel spiral rib mainline pipes shall be made with approved PVC saddle installed to the manufacturer's specifications into a neatly cored hole in the pipe wall. **Such installation may only be carried out in exceptional circumstances with specific prior approval of the Contract Administrator.** The use of electrofused tees and wyes to be approved by the Contract Administrator.
2.6	.11 (ss) **new**	Flexible Joints	Where connections join concrete pipes, manholes or catchbasins, provide **flexible joints** as shown on Supplementary Detail Drawing **ST-19-SD**.
2.9	.1 (ss)	Granular Pipe Bedding and Surround Material	As shown on **Standard Detail Drawings with materials for bedding and surround** and as specified on Contract Drawings
3.4	.3 (ss)	Concrete Bedding and Encasement	Open excavation to be backfilled before the Contractor leaves the site at the end of the working day. Backfilling of uncured concrete will not be permitted. At the discretion of the City, plating of the excavation may be permitted.
3.6	.6.1 (ss) 6.2 (ss)	Pipes on Curved Alignments	Concrete pipe and ribbed profile PVC plastic pipe. Do not exceed joint deflection recommended by pipe manufacturers **or 3 degrees whichever is less**. Smooth profile PVC pipe: for 100mm to 300mm sizes conform to required curvature by minimum bending pipe barrel **through applying light manual pressure**. For greater curvature, **use 5 degree prefabricated PVC bends**. Joint deflection not permitted for smooth profile PVC pipe.

3.6	.14 (ss) new	Crossing of AC storm sewers	Any crossings of existing AC storm sewers will be replaced with approved materials by City forces.
3.10	.1 (ss)	Service Connection Installation	Install service connections to 3.6 and as shown on **Drawing ST-20-SD.**
	.2 (ss)		Install 40 X 90 mm marker stake at service terminus. Paint and mark as shown on **Supplementary** Detail Drawing ST-20-SD.
	.3 (ss)		Where specified, install chamber at specified location, set plumb and to specified elevation as shown on **Supplementary** Detail Drawing **ST-7-SD, ST-8-SD, ST-9-SD and ST-20-SD**, as applicable. If inspection chamber located in driveway, lane or paved surface install cover or lid as shown on **Supplementary** Detail Drawing **ST-8-SD, ST-9-SD and ST-20-SD** as applicable.
3.12	.1 (ss)	Inspection and Testing	The Contractor shall video inspect all completed storm sewers following completion of installation. The video inspection report shall conform to Supplementary Specification Section 33 01 30.1 –CCTV Inspection of Pipelines.
	.4 (ss) **new**		Perform pressure and leakage testing of High Density Polyethylene (HDPE) piping to ASTM F1417.
3.15	.2 (ss)	Perforated Drain Pipe	Drain pipe to be a 100 mm minimum **and the insert at the catchbasin to be grouted in.**
3.16	(ss) new	Abandoned Storm Sewers	Abandoned storm sewers in arterial, collector or bus routes to be filled with control density fill or approved equal.

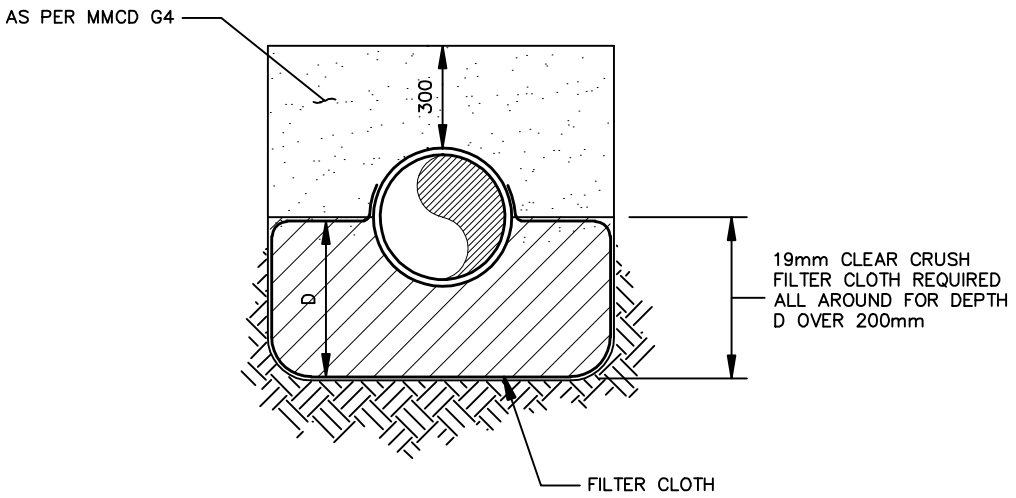
Section 33 42 13 – Pipe Culverts			
Delete			
		1.5.4 2.1 2.2.1 & .2	3.3 3.4.1.1 to .3
Add the following			
1.0	.2 (ss) **new**	General	Section 33 42 13 does **not apply to ditch crossings and frontage tiles** constructed by individual property owners with lines and levels not conforming to the future storm sewer design. For such ditch crossings and frontage tiles, the Richmond Watercourse Crossing Bylaw will apply.
2.2	.1 (ss) .2 (ss)	Concrete Pipe	Non-reinforced circular concrete pipe and fittings: to ASTM C14M class 3, **minimum diameter 375mm**, maximum diameter **600** mm, designed for flexible rubber gasket joints to ASTM C443M. Reinforced circular concrete pipe and fitting: to ASTM C76M Class III for all pipe **greater than 600mm diameter and for 300mm diameter**, strength class as shown on Contract Drawings, designed for flexible rubber gasket joints to ASTM C443M.
3.1	.4 (ss) **new**	Crossing of Existing AC Pipe Culverts	Any crossings of existing AC pipe culverts shall be replaced with approved materials by City forces.
3.4	.3 (ss) **new**	Joints Corrugated Steel Culverts	Use of mechanical coupler, construction joint or manhole when connecting to existing pipe culvert as permitted by Contract Administrator.
3.10	.2 (ss) **new**	Endwalls	PVC and fibreglass end walls may be considered. If accepted by the City, shop drawings shall be submitted for approval.
3.11	(ss) **new**	Abandoned Pipe Culverts	Abandoned pipe culverts in arterial, collector or bus routes to be filled with control density fill or approved equal.

Section 33 44 01 – Manholes and Catchbasins			
Delete			
		2.1.10.1 2.1.11 2.1.13 2.1.19 2.1.20 2.1.23	3.3.6 3.3.7 3.3.10 3.5.1 3.6.1
Add the following			
2.1	.7.3 (ss) **new**	Cast Iron Frame and Cover	Cover with at least two holes for lifting and ventilation and to have the words, **"RICHMOND STORM SEWER" and a fish or "RICHMOND SANITARY SEWER",** cast in raised capital letters and pattern in the top face of the cover.
2.1	.10.1 (ss)	Precast Catchbasin Sections	As shown on **Supplementary Detail Drawing ST-5-SD**.
2.1	.11 (ss)	Catchbasin Leads	Catchbasin leads to be minimum 150mm diameter and of PVC **DR28**.
2.1	.13 (ss) **new**	Catchbasin Frame and Grate	As shown on Supplementary Detail Drawings ST-5-SD, ST-6-SD. To be Dobney B25A or approved equal capable of withstanding H20 loading.
2.1	.19 (ss)	Inspection Chambers/ Lawn Drains	Inspection chambers/lawn drains to be as shown on **Supplementary Detail Drawings ST-7-SD, ST-8-SD and ST-9-SD.**
3.3	.5.1 (ss) **new** .5.1.1 (ss) .5.1.2 (ss) .5.1.3 (ss)	Manhole Installation	In order to allow sufficient manoeuvrability for CCTV camera inspection: 150 mm dia pipe installed at a 90 degree intersection requires at least 660 mm (26 in)separation. 200 mm pipe at a 90 degree intersection requires at least 500 mm (20 in)separation. Any larger pipe diameter will require at least 400 mm (16 in) separation.
3.3	.6 (ss)	Manhole Installation	Connect concrete pipe into manhole using spigot or bell precast into manhole wall or, alternately, grout pipe into pre-formed rough core in manhole wall using fast setting grout. **Manhole ring joints to be grouted on inside and outside of manhole.**
	.6.1 (ss) **new**		Manhole openings constructed in the field shall not exceed 150 mm larger than the outside pipe diameter. Under no circumstances shall there be less than 300 mm of intact

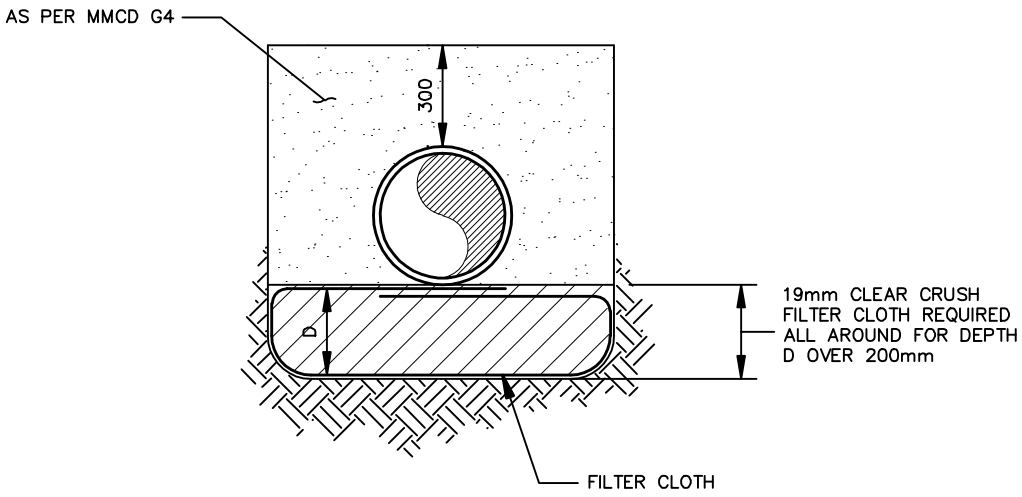
			and undamaged manhole remaining following opening construction.
3.3	.7 (ss) **new**	Manhole Installation	Connect PVC pipe to manhole or catchbasin using flexible joint, either sand coated pipe (maximum length of 300mm) or sand coated collar grouted in the wall using fast setting flexible grout, all as per ST-19-SD
3.3	.10 (ss)	Benching	Where possible, form channelling using half-sections of pipe or suitable fittings. Bench to direct flow parallel to main flow of sewer. Form top of benching as high as **half way up the sewer pipe to facilitate access to CCTV camera**. Finish concrete to smooth surface using steel trowel.
3.3	.19 (ss) **new**	Paint Sanitary M.H. & I.C.	Paint outside surface of the completed sanitary manholes and inspection chambers with two coats of waterproof vapour barrier (Sika seal or approved similar) and left until thoroughly dry before placing any backfill material.
	.21 (ss) **new**	AC Mains	Any crossings of existing AC mains will be replaced with approved materials by City forces.
3.5	.1 (ss)	Catchbasin Installation	Install catchbasins as shown on **Supplementary Detail Drawing ST-5-SD** to general standards and installation procedures described in 3.3 of this section.
3.6	.1 (ss) new	Inspection Chambers/ Lawn Drain Installation	Install inspection chambers/lawn drains as shown on **Supplementary Detail Drawing ST-7-SD, ST-8-SD and ST-9-SD.**
3.12	(ss) **new**	Abandoned Mains	Abandoned mains in arterial, collector or bus routes to be filled with a control density fill or approved equal.

Section 34 41 13 – Traffic Signals			
Delete			
		2.1.3 3.3.1 3.5.2 3.6.1	3.7.1 3.12.1 3.14.4
Add the following			
1.4	.4 (ss) **new**	Electrical Energy Supply	The Owner will process a **letter of application to B.C. Hydro** for the service connection and will bear the connection fee.
1.5	.3 (ss) **new**	Electrician (Traffic Signal) qualification	All on-site traffic signal installation shall be under the responsibility of a **primary journeyman electrician** with proven experience in installing traffic signal systems. This primary journeyman electrician is expected to be on the work site and report work progress to the City of Richmond Traffic Signal Operations staff in addition to reporting to the Contract Administrator.
2.1	.3 (ss) **new**	General	All products shall be in accordance with the **List of Approved Materials and Products** which can be obtained from the City of Richmond, Traffic Signal's Department. Any products not listed, refer to BC MOT Specifications.
3.1	.5 (ss) **new**	General	During the installation of the signal system, **maintain the existing signals and/or signs** as noted on the Contract Drawings. If temporary or permanent relocations are required, such signals and/or signs shall be reinstated as required under the Contract Documents or as directed by the Contract Administrator.
3.3	.1.1 (ss) .1.2 (ss) **new**	Concrete Bases	Install concrete bases as shown on Standard Detail Drawings CE1.1 to CE1.20 and CE1.3 to CE1.7 and **Supplemental Drawing SD_A4-BASE.** For Standard Detail Drawings CE1.10, CE1.13 & CE1.16, anchor bolts for Type F1, S1, F2, and S2 bases shall be **"Galvanized AISI/SAE 4140 Grade Anchor Bolts"**, and NOT Grade 150 DYWIDAG as shown therein.
3.5	.2 (ss)	Under-ground Conduit	Conduit installed in **boulevard areas to be a minimum of 1.0m deep** to accommodate proposed and/or future tree planting. Conduit installed under paved surfaces or under concrete sidewalk shall have a minimum of 0.6m cover.

	.6 (ss) **new** .7 (ss) **new**		Traffic signal communications conduit shall NOT be installed using short 90 degree bends. When a change occurs in the running line of the conduit, **gradual sweeping bends** shall be used to accommodate this. Traffic signal communications conduit shall enter and leave **junction boxes in the horizontal position** (no bends) and shall run straight through the junction box unless a change in alignment occurs, or as otherwise specified on the Contract Drawings.
3.6	.1 (ss)	Poles and Related Equipment	Install poles and related equipment as shown on Standard Detail Drawings E4.1 to E4.22, E10.1 to E10.10 **or as shown on Contract Drawings.**
3.7	.1 (ss)	Signal Heads Mounting	Install traffic and pedestrian signal heads as shown on Standard Detail Drawings **E5.3 and E5.9 only**.
3.13	.1 (ss)	Electrical Service Panels	Mount electrical service panels in service base or on poles as shown on Standard Detail Drawings E7.2 to E7.9 or on the **back side of controller cabinets as shown on Supplementary Detail Drawings SD_MCAB-PANEL and SD_PCAB-PANEL,** or as noted on Contract Drawings.
3.14	.4 (ss)	Wiring	Signal cable colour coding to be as shown on Supplemental Detail Drawing **SD_CABLE-CC** unless specified otherwise on Contract Drawings.
3.17	.1 (ss) .3 (ss) **new**	Detector Loops Detector Loops	Detector loops to be diamond, quadrapole, round, rectangular or square type as specified on Contract Drawings. Install in accordance with Standard Detail Drawings **E8.1, E8.3 and Supplemental Drawings SD_DET, sheets 1 and 2**. Detector loop to shielded **cable splices** may be made by soldering the twisted conductors together and then sealing the splice using a gel filled marrette. Where the conductors first leave the protection of the insulated jacket this area will be taped and coated with 3M Scotchkote electrical coating.
3.28	.1 (ss) **new**	Overhead Street Name Signs	Install **overhead street name signs** as shown on Supplemental Drawing SD_ST-NAME.



PIPE SIZE UP TO & INCLUDING 525mm ø



PIPE SIZE OVER 525mm ø

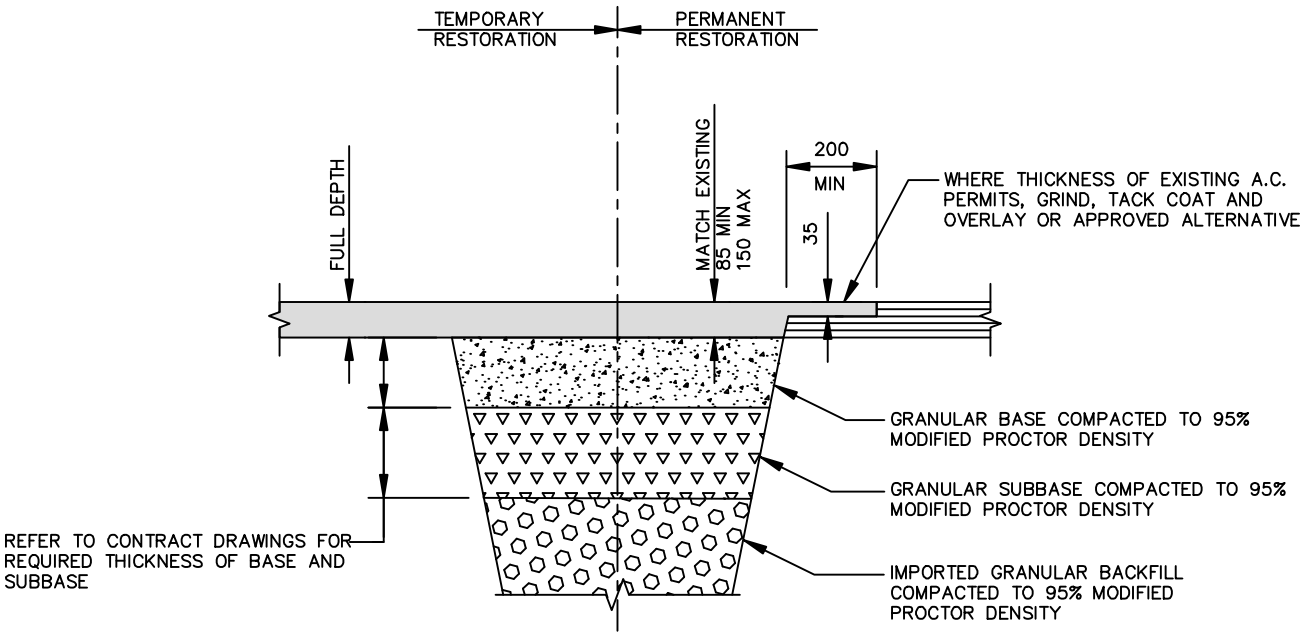
NOTES:

1. CITY APPROVAL REQUIRED PRIOR TO USE OF THIS DETAIL
2. 300 MIN OVERLAP OF FILTER CLOTH

Richmond

CLEAR CRUSH BEDDING

TECH. :	SCALE : NTS	DRAWING NUMBER : G-4a-SD
DR. :	DATE : DEC. 2010	
ENG. :	REV. DATE :	SHEET No. : 1 OF 1



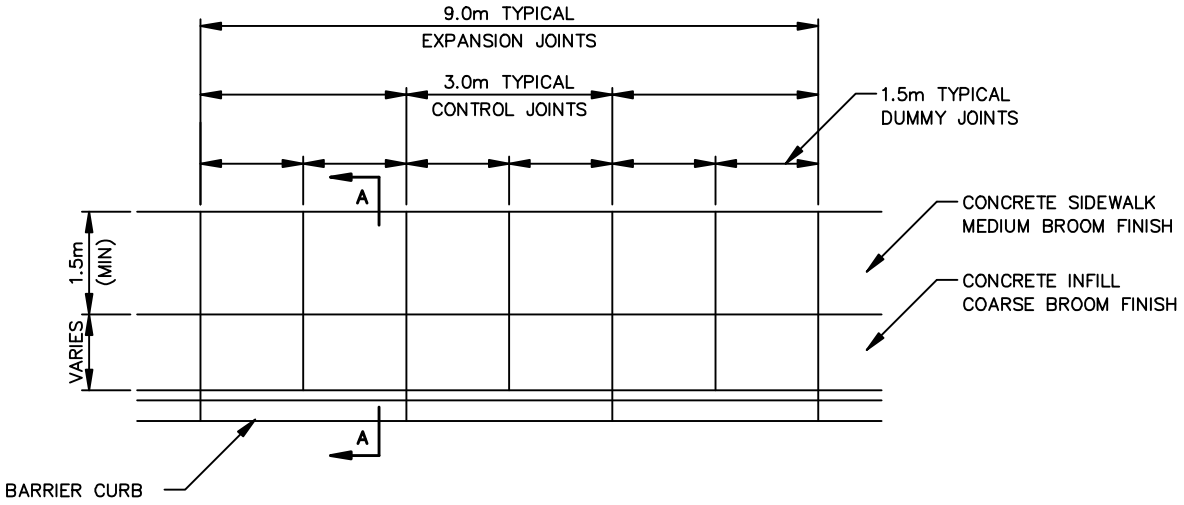
NOTES:

1. WHEN THE EDGE OF TRENCH IS 500mm OR LESS FROM THE FRONT EDGE OF GUTTER OR EDGE OF PAVEMENT, FINAL PAVEMENT RESTORATION WILL REQUIRE THE ENTIRE 500mm SECTION TO BE REPLACED FROM THE TRENCH TO THE EDGE OF THE GUTTER OR EDGE OF PAVEMENT.
2. ALL PAVEMENT RESTORATION ARE TO BE COMPLETED AS PER THE CURRENT CITY PAVEMENT RESTORATION BYLAW.
3. REFER TO CONTRACT DRAWINGS, SECTIONS 31 23 01 AND 32 12 16 FOR DETAILED SPECIFICATIONS.

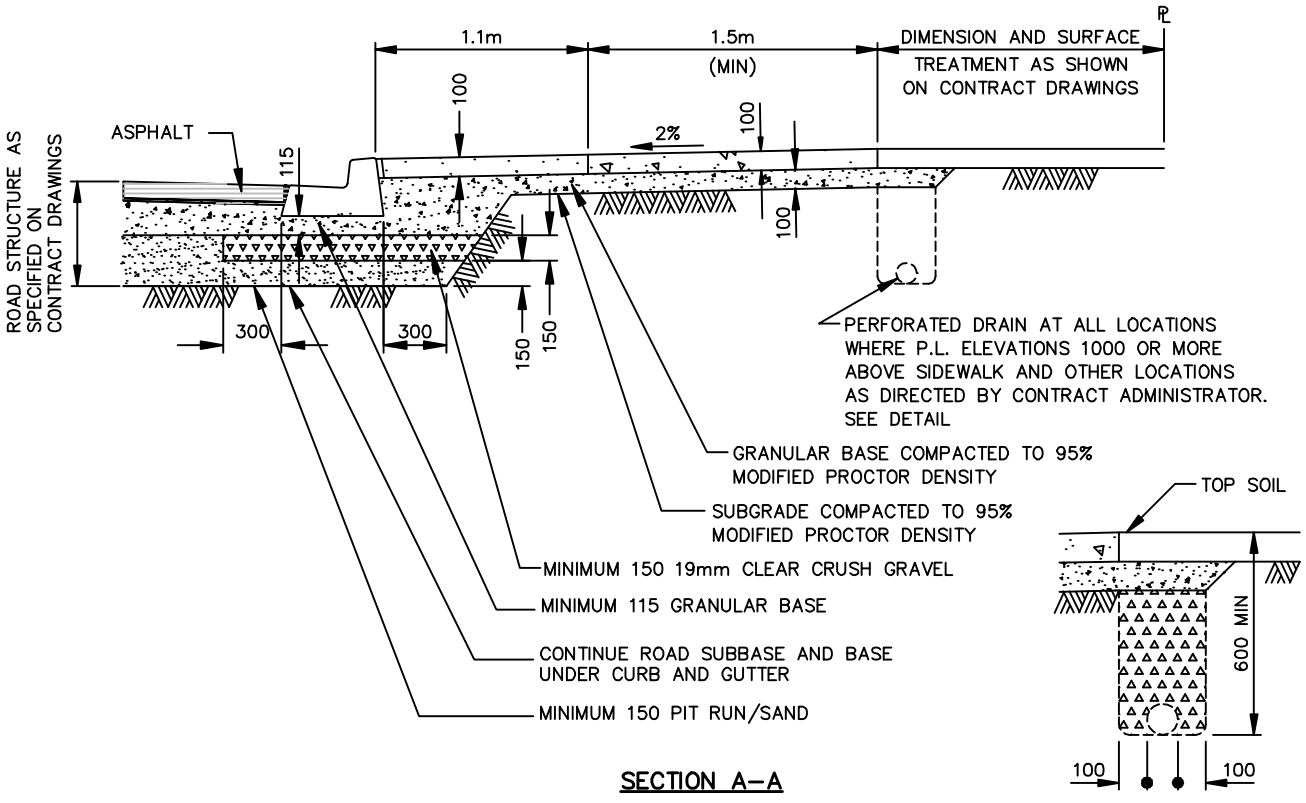
Richmond

PAVEMENT RESTORATION

TECH. :	SCALE : NTS	DRAWING NUMBER : G-5-SD
DR. :	DATE : JAN. 2011	
ENG. :	REV. DATE :	SHEET No. : 1 OF 1



PLAN



SECTION A–A

DETAIL

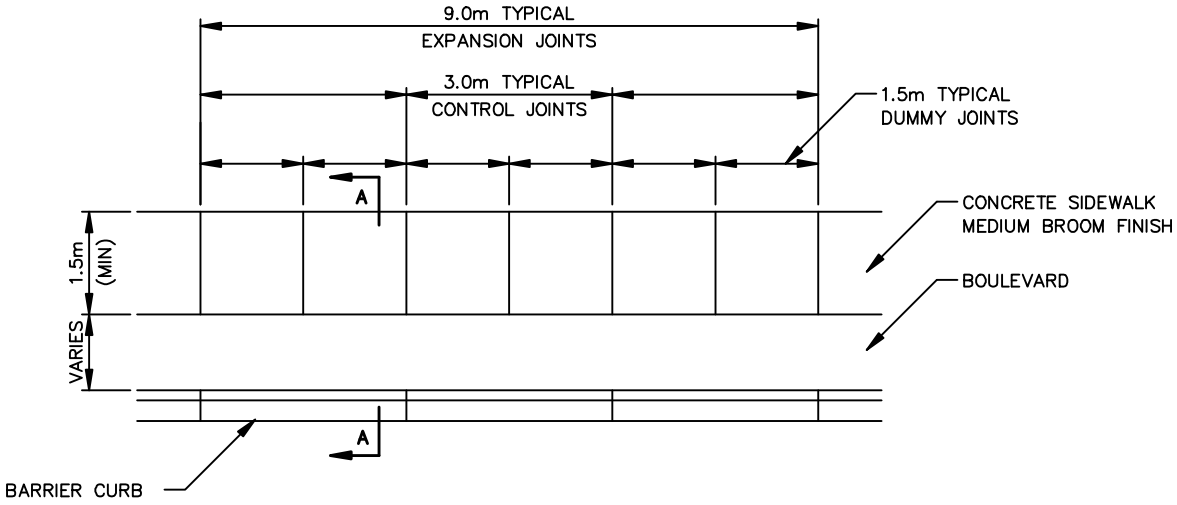
NOTES:

1. REFER TO DRAWING C4 OR C5 FOR CURB AND GUTTER DIMENSIONS.
2. REFER TO CONTRACT DRAWINGS AND SECTION 03 30 20 FOR DETAILED SPECIFICATIONS.
3. LONGITUDINAL EXPANSION JOINT FOR INFILL STRIP DELETED

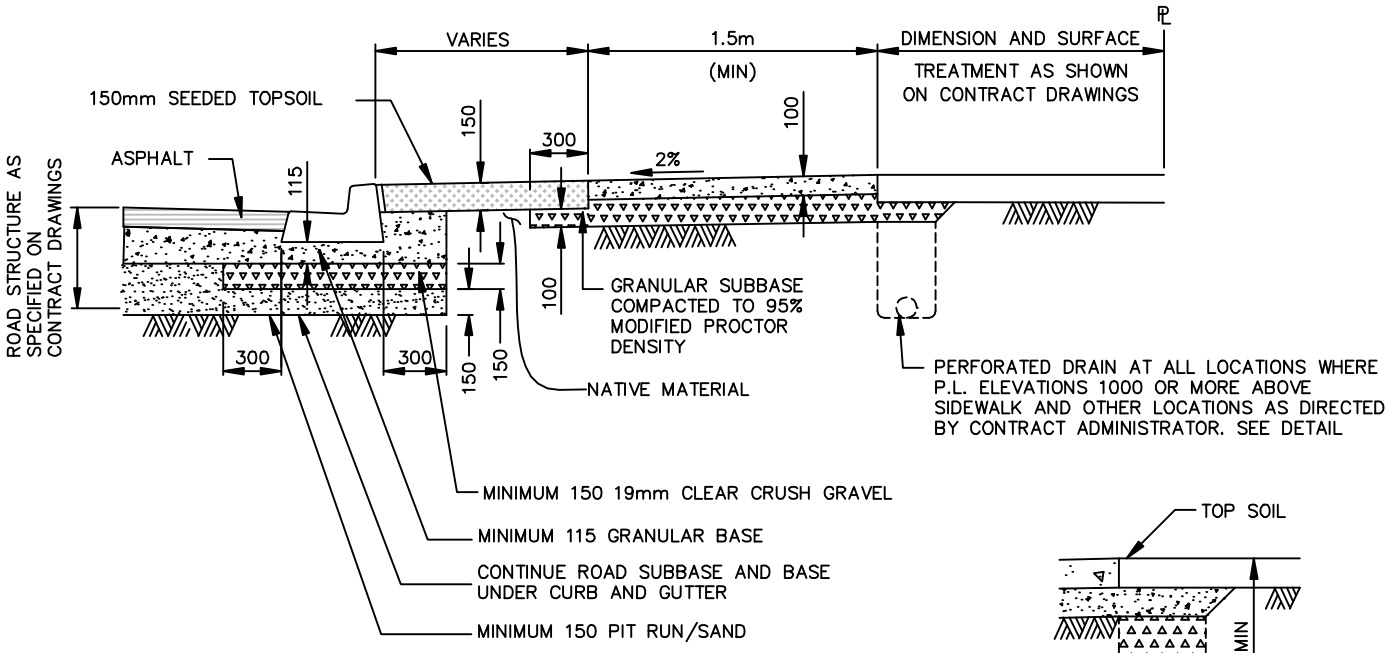
Richmond

CONCRETE SIDEWALK, INFILL AND BARRIER CURB

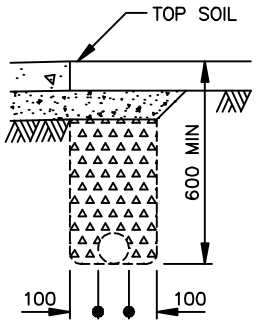
TECH. :	SCALE : NTS	DRAWING NUMBER : R–1–SD
DR. :	DATE : OCT. 2003	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



PLAN



SECTION A–A



DETAIL

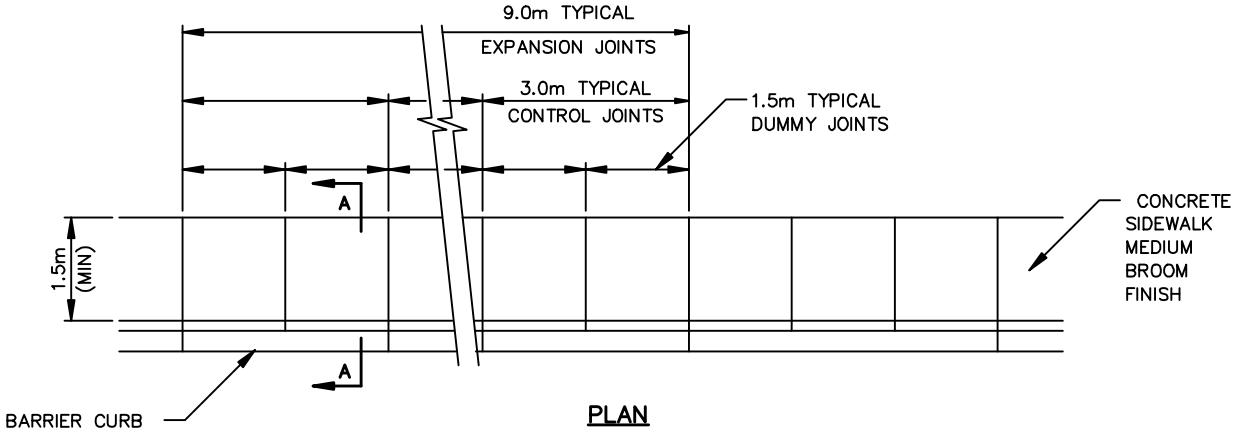
NOTES:

1. REFER TO DRAWING C4 OR C5 FOR CURB AND GUTTER DIMENSIONS.
2. REFER TO CONTRACT DRAWINGS AND SECTION 03 30 20 FOR DETAILED SPECIFICATIONS.
3. LONGITUDINAL EXPANSION JOINT FOR INFILL STRIP DELETED

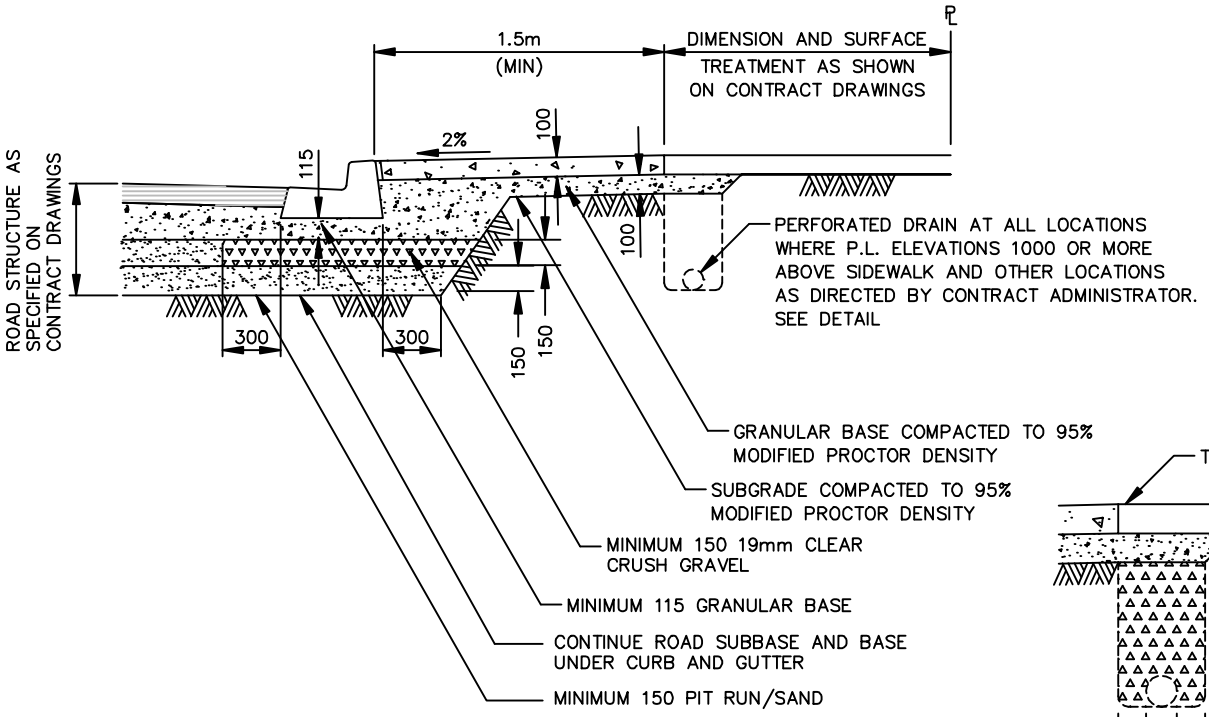
Richmond

CONCRETE SIDEWALK, BOULEVARD AND BARRIER CURB

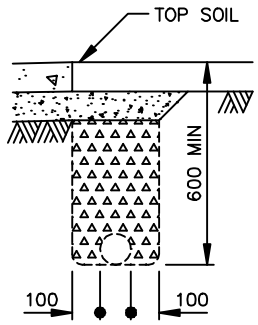
TECH. :	SCALE : NTS	DRAWING NUMBER : R–1a–SD
DR. :	DATE : DEC. 2010	
ENG. :	REV. DATE :	SHEET No. : 1 OF 1



PLAN



SECTION A–A



DETAIL

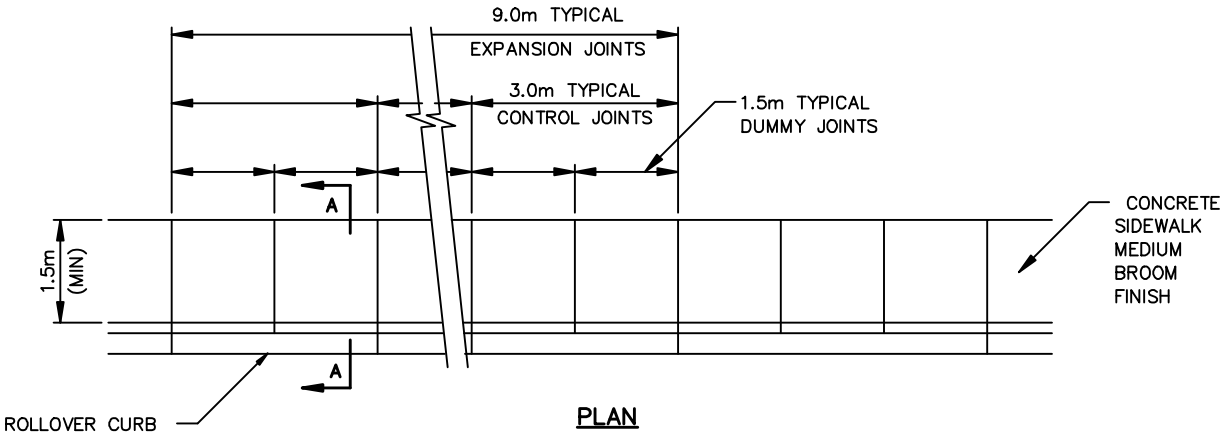
NOTES:

1. REFER TO DRAWING C4 OR C5 FOR CURB AND GUTTER DIMENSIONS.
2. REFER TO CONTRACT DRAWINGS AND SECTION 03 30 20 FOR DETAILED SPECIFICATIONS.
3. LONGITUDINAL EXPANSION JOINT BETWEEN CURB & SIDEWALK DELETED

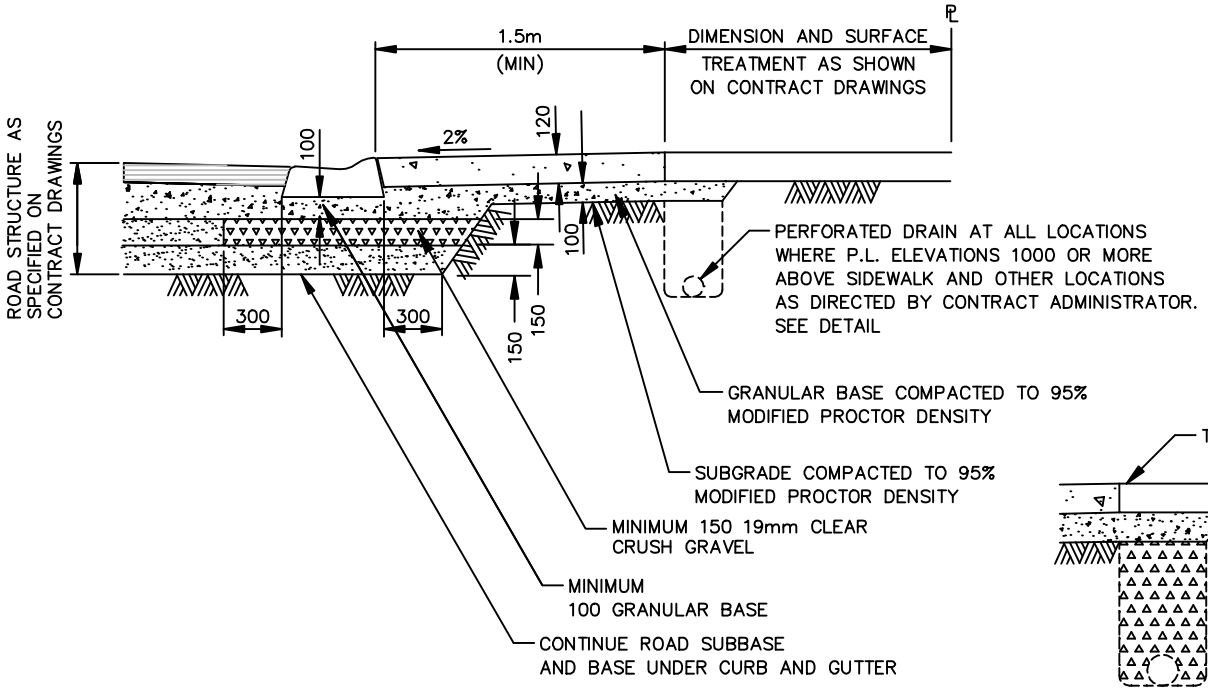
Richmond

CONCRETE SIDEWALK AND BARRIER CURB

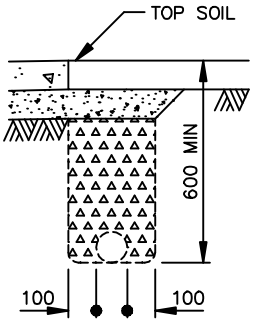
TECH. :	SCALE : NTS	DRAWING NUMBER : R–2–SD
DR. :	DATE : OCT. 2003	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



PLAN



SECTION A–A



DETAIL

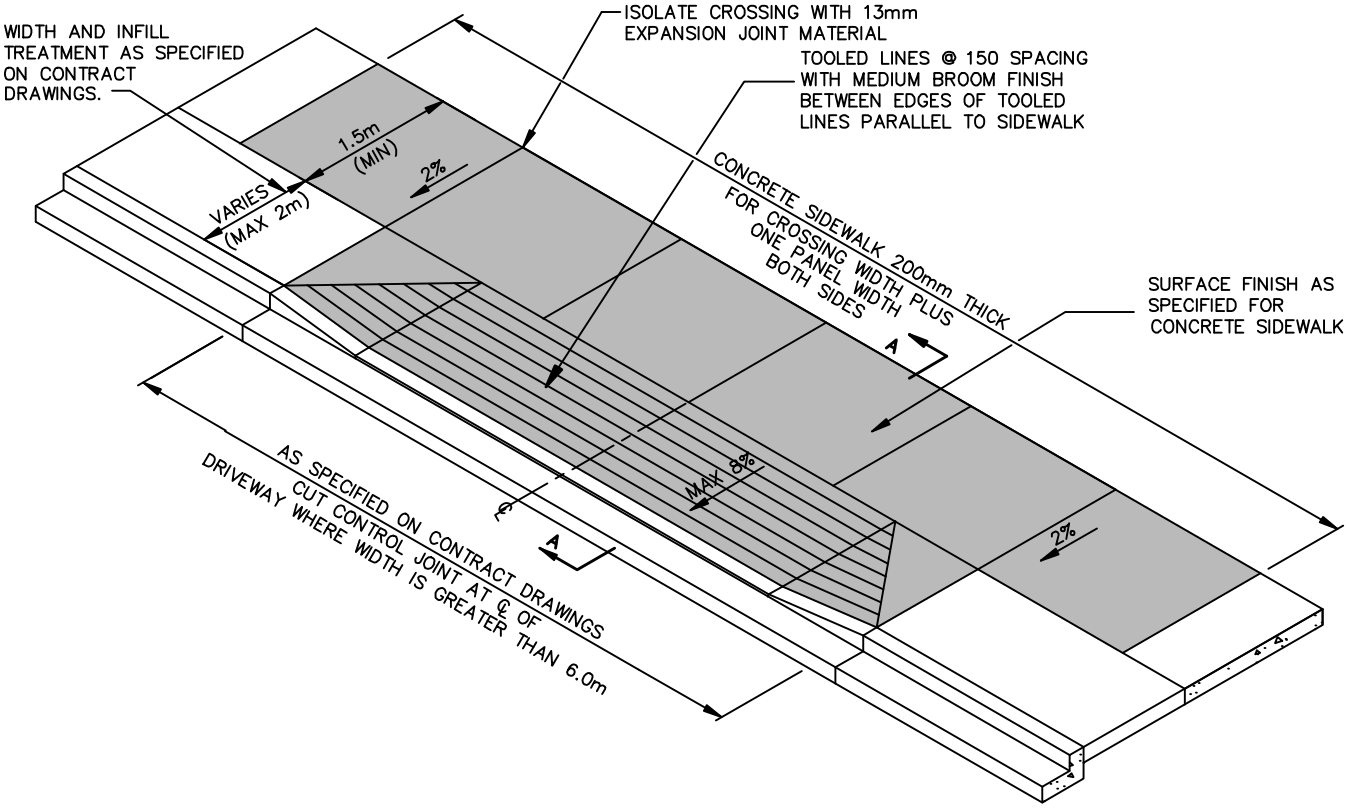
NOTES:

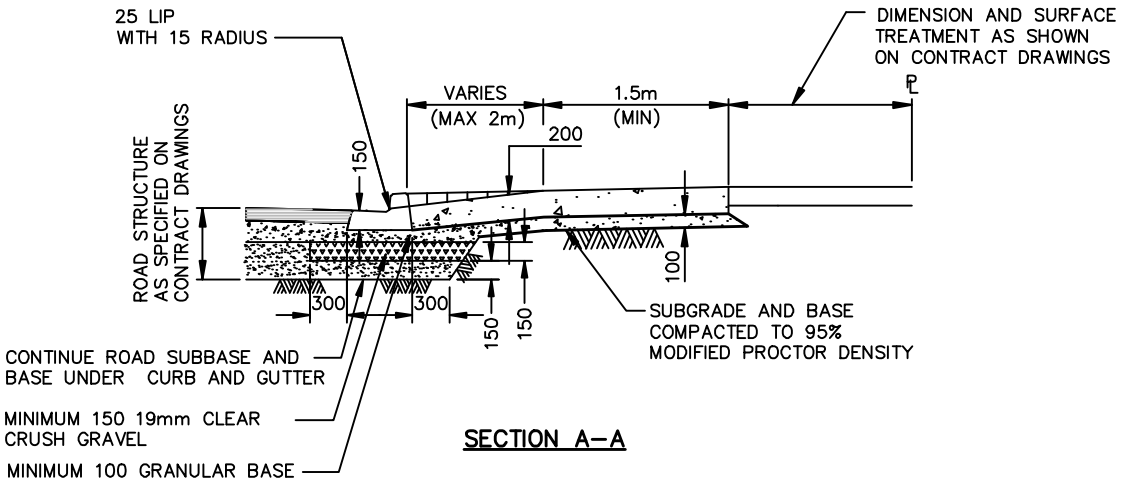
1. REFER TO DRAWING C4 OR C5 FOR CURB AND GUTTER DIMENSIONS.
2. REFER TO CONTRACT DRAWINGS AND SECTION 03 30 20 FOR DETAILED SPECIFICATIONS.
3. LONGITUDINAL EXPANSION JOINT BETWEEN CURB & SIDEWALK DELETED

Richmond

CONCRETE SIDEWALK AND ROLLOVER CURB

TECH. :	SCALE : NTS	DRAWING NUMBER : R–3–SD
DR. :	DATE : OCT. 2003	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1





SECTION A–A

NOTES:

1. DRIVEWAYS ORIENTATED AT 90° TO CURB, UNLESS SPECIFIED OTHERWISE ON CONTRACT DRAWINGS.
2. REFER TO CONTRACT DRAWINGS AND SECTION 03 30 20 FOR DETAILED SPECIFICATIONS.
3. DRIVEWAYS CROSSINGS TO BE CONSTRUCTED IN ACCORDANCE WITH THE CITY'S CURRENT RESIDENTIAL LOT (VEHICULAR) ACCESS REGULATION BYLAW AND AS DIRECTED BY THE CITY ENGINEERING INSPECTOR.

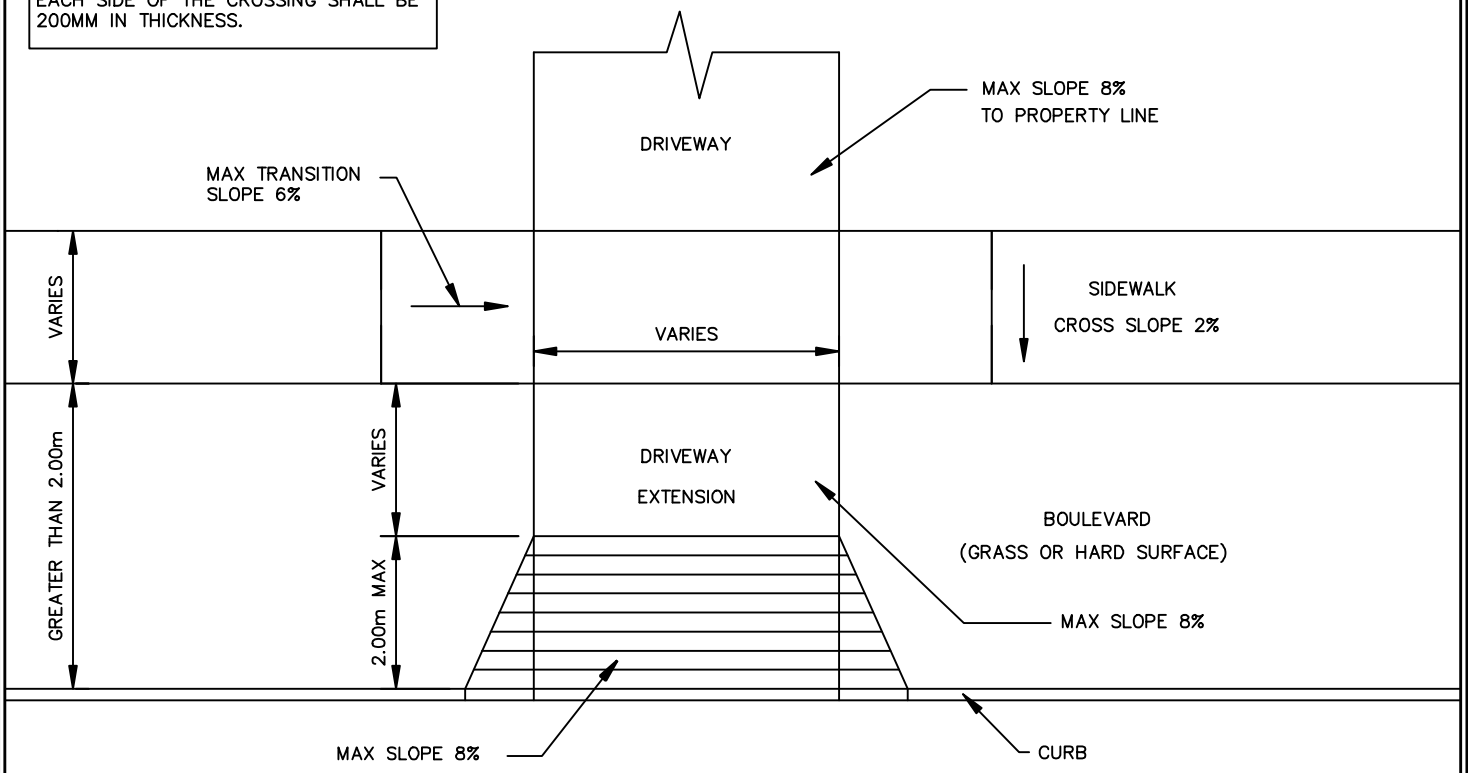
Richmond

DRIVEWAY CROSSING FOR BARRIER CURBS

TECH. :	SCALE : NTS	DRAWING NUMBER : R–7–SD
DR. :	DATE : OCT. 2003	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1

ALL CROSSINGS AND ONE PANEL ON EACH SIDE OF THE CROSSING SHALL BE 200MM IN THICKNESS.

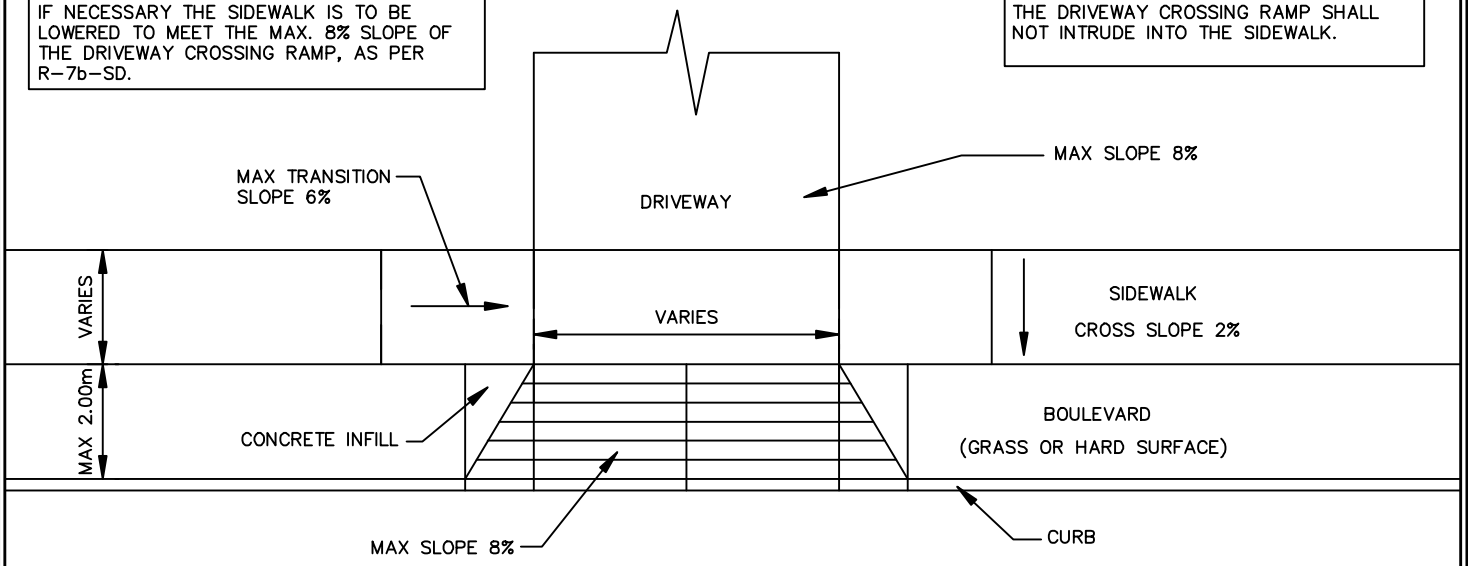
WIDE BOULEVARD



NARROW BOULEVARD

IF NECESSARY THE SIDEWALK IS TO BE LOWERED TO MEET THE MAX. 8% SLOPE OF THE DRIVEWAY CROSSING RAMP, AS PER R-7b-SD.

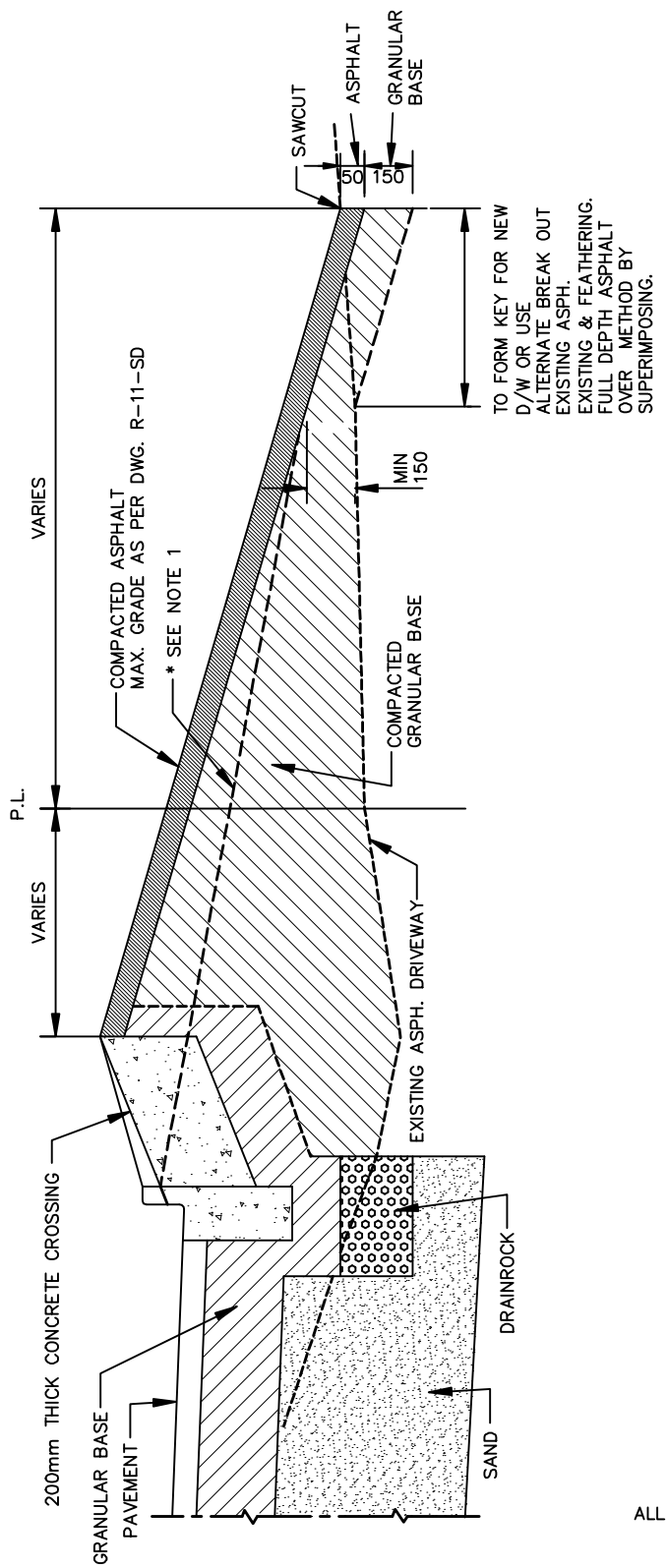
THE DRIVEWAY CROSSING RAMP SHALL NOT INTRUDE INTO THE SIDEWALK.



Richmond

DRIVEWAY CROSSING FOR BARRIER CURBS WITH VARYING BOULEVARD WIDTHS

TECH. :	SCALE : NTS	DRAWING NUMBER : R-7a-SD
DR. :	DATE : OCT. 2003	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



NOTES:

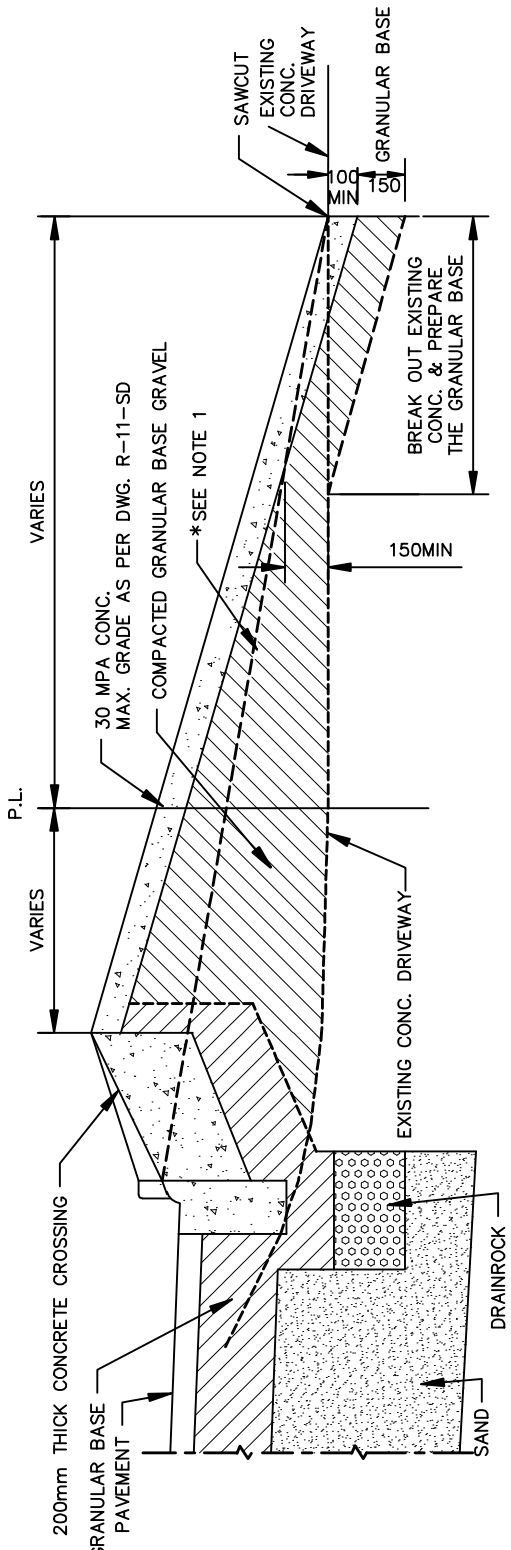
1) * WHERE NO SIDEWALK IS REQUIRED AS INDICATED BY THE BROKEN LINE, BASE MATERIALS, GRADE, ETC. SHALL BE TO THE SAME STANDARDS AS WHEN SIDEWALK IS REQUIRED.

ALL DIMENSIONS SHOWN IN MILLIMETERS

Richmond

EXISTING ASPHALT DRIVEWAY

TECH. :	SCALE : NTS	DRAWING NUMBER : R-8-SD
DR. :	DATE : OCT. 2003	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



NOTES:

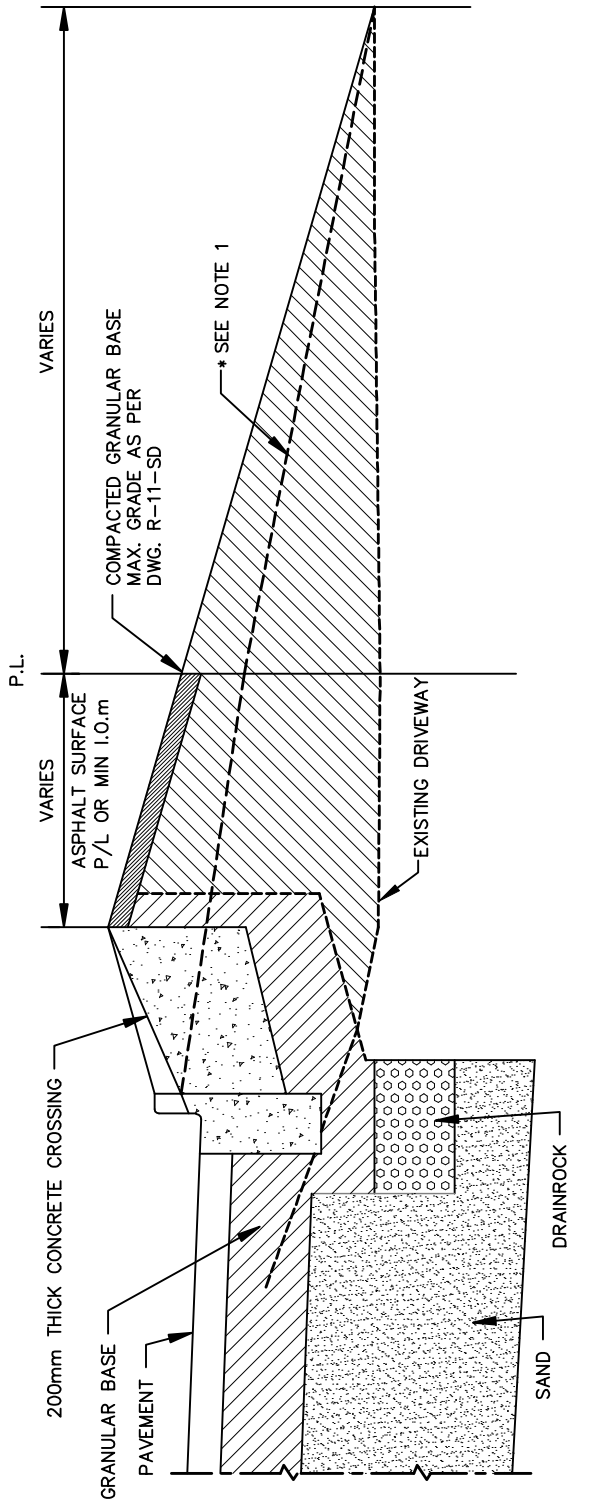
1)* WHERE NO SIDEWALK IS REQUIRED AS INDICATED BY THE BROKEN LINE, BASE MATERIALS, GRADE, ETC. SHALL BE TO THE SAME STANDARDS AS WHEN SIDEWALK IS REQUIRED.

ALL DIMENSIONS SHOWN IN MILLIMETERS

Richmond

EXISTING CONCRETE DRIVEWAY

TECH. :	SCALE : NTS	DRAWING NUMBER : R-9-SD
DR. :	DATE : OCT. 2003	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



NOTES:

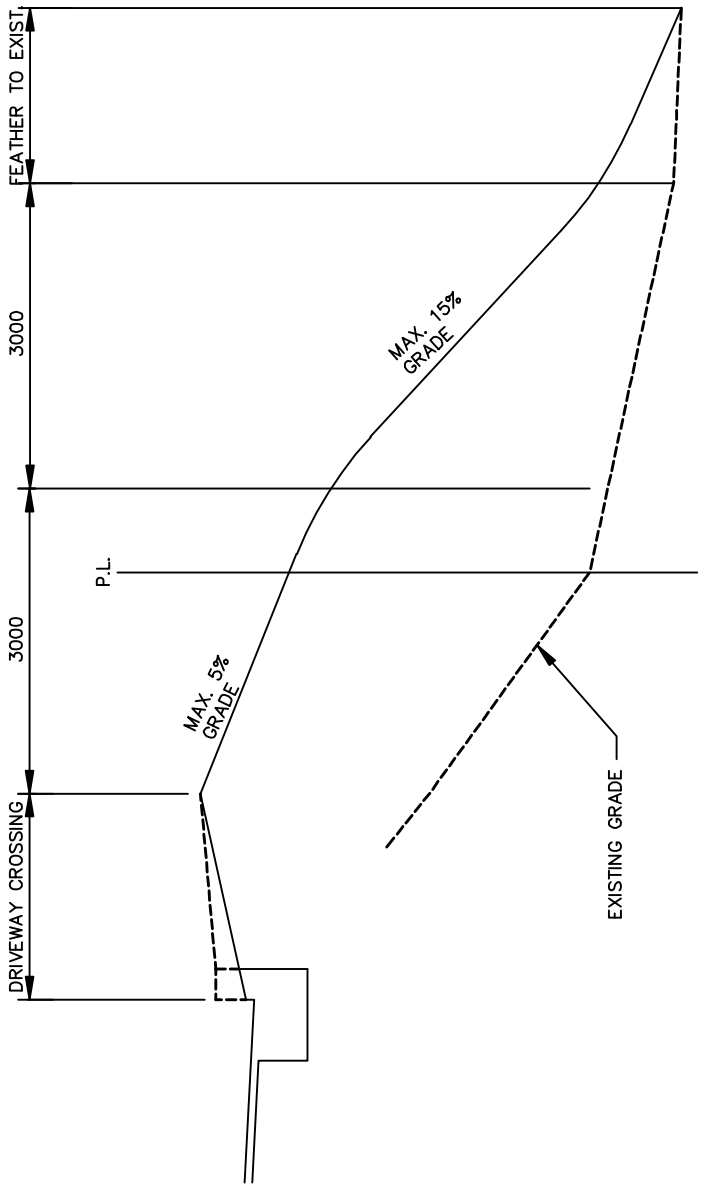
1)* WHERE NO SIDEWALK IS REQUIRED AS INDICATED BY THE BROKEN LINE, BASE MATERIALS, GRADE, ETC. SHALL BE TO THE SAME STANDARDS AS WHEN SIDEWALK IS REQUIRED.

ALL DIMENSIONS SHOWN IN MILLIMETERS

Richmond

EXISTING GRAVEL DRIVEWAY

TECH. :	SCALE : NTS	DRAWING NUMBER : R-10-SD
DR. :	DATE : OCT. 2003	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



NOTES:

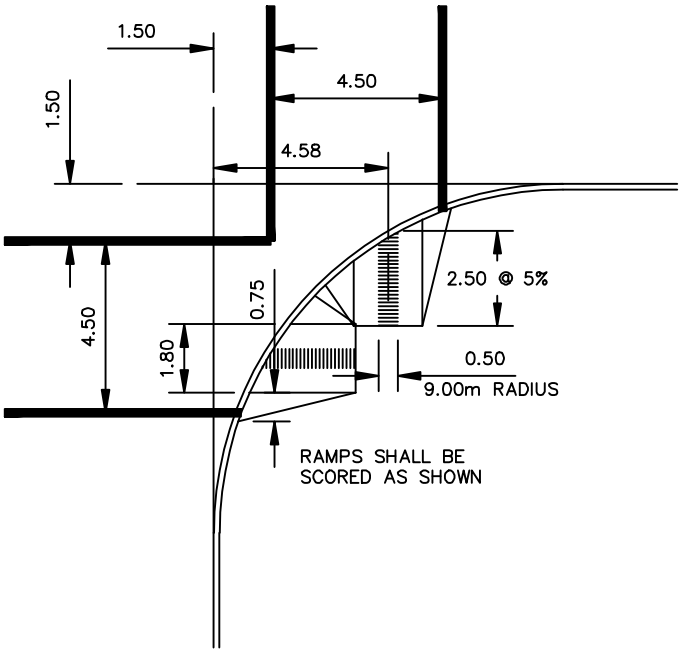
1) WHERE STEEPER GRADES ARE NECESSARY, CONSULT ENGINEER

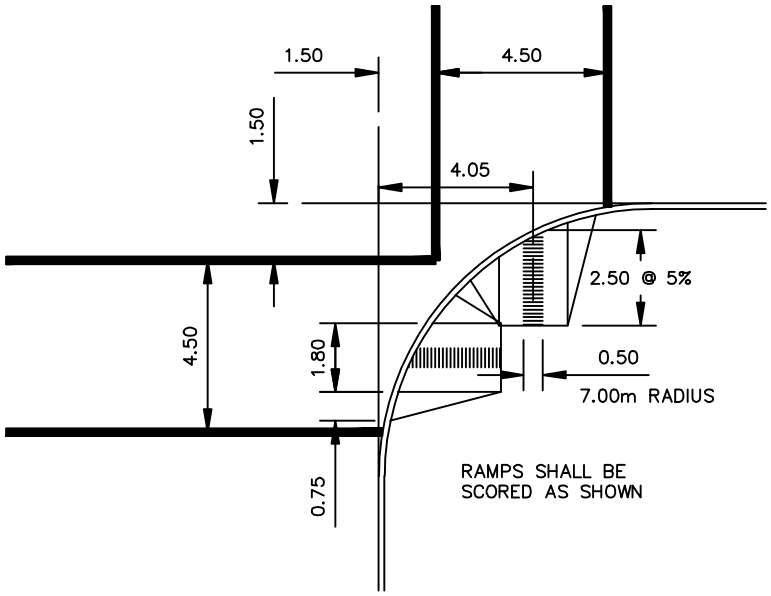
ALL DIMENSIONS SHOWN IN MILLIMETERS

Richmond

EXISTING DRIVEWAY OVER 8%

TECH. :	SCALE : NTS	DRAWING NUMBER : R–11–SD
DR. :	DATE : OCT. 2003	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1

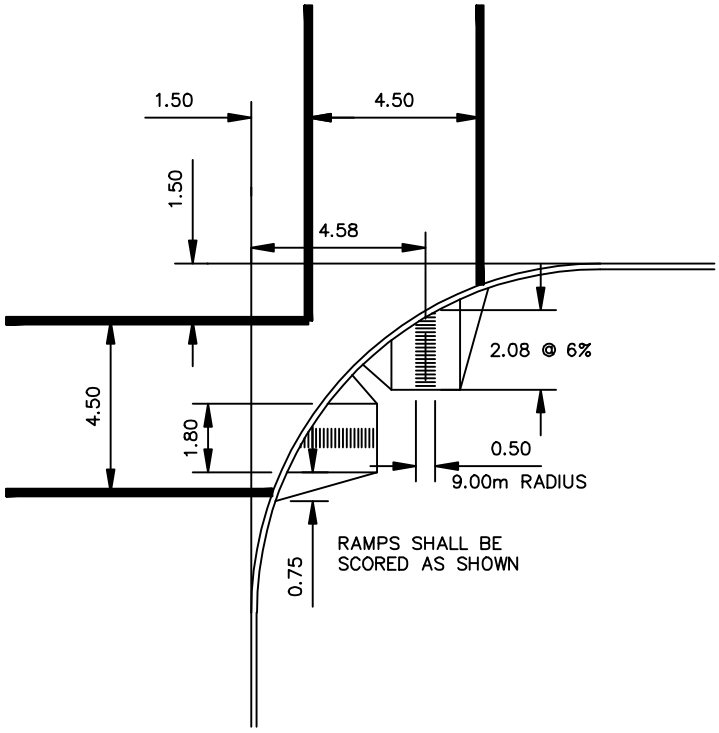


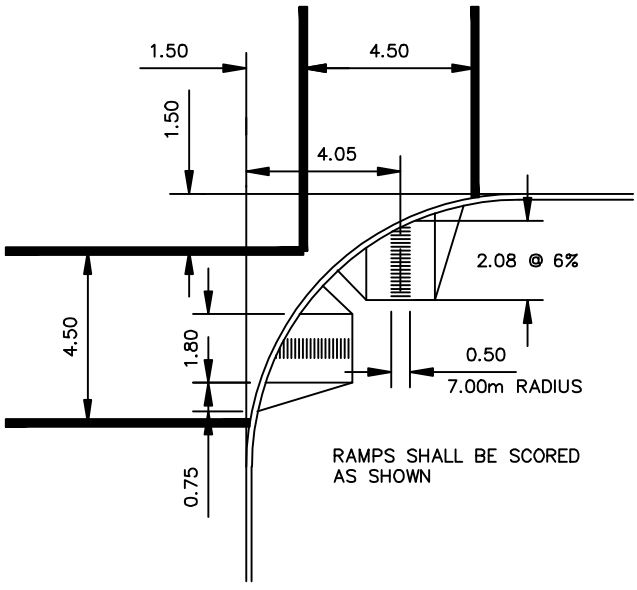


Richmond

DUAL WHEELCHAIR RAMP DESIGN STANDARD (5% WHEELCHAIR RAMP SLOPE)

TECH. :	SCALE : NTS	DRAWING NUMBER : R-12-SD
DR. :	DATE : DEC. 2010	
ENG. :	REV. DATE :	SHEET No. : 1 OF 1

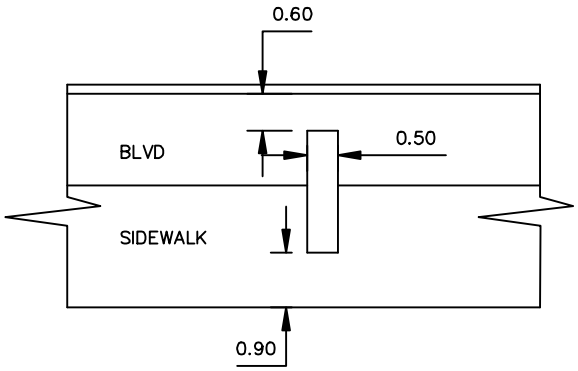


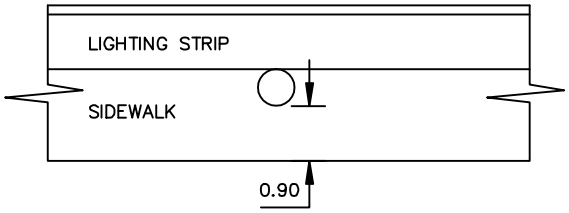


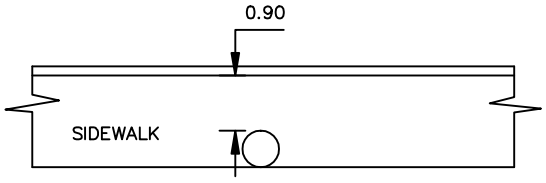
Richmond

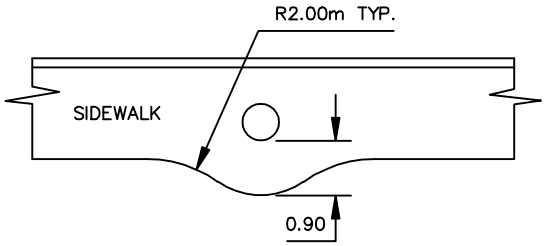
DUAL WHEELCHAIR RAMP DESIGN STANDARD (6% WHEELCHAIR RAMP SLOPE)

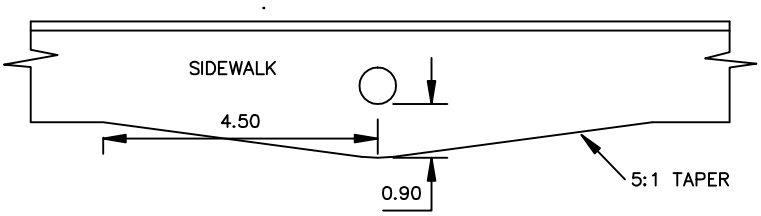
TECH. :	SCALE : NTS	DRAWING NUMBER : R-13-SD
DR. :	DATE : DEC. 2010	
ENG. :	REV. DATE :	SHEET No. : 1 OF 1





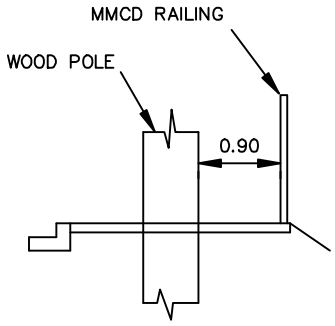






PREFERRED METHOD

PLAN – EXAMPLES



SECTION

THE REQUIREMENT FOR A SAFETY RAIL IS BASED ON THE BC MOTI, SUPPLEMENT TO TAC GEOMETRIC DESIGN GUIDE, SECTION 660. AS AMENDED FROM TIME TO TIME.

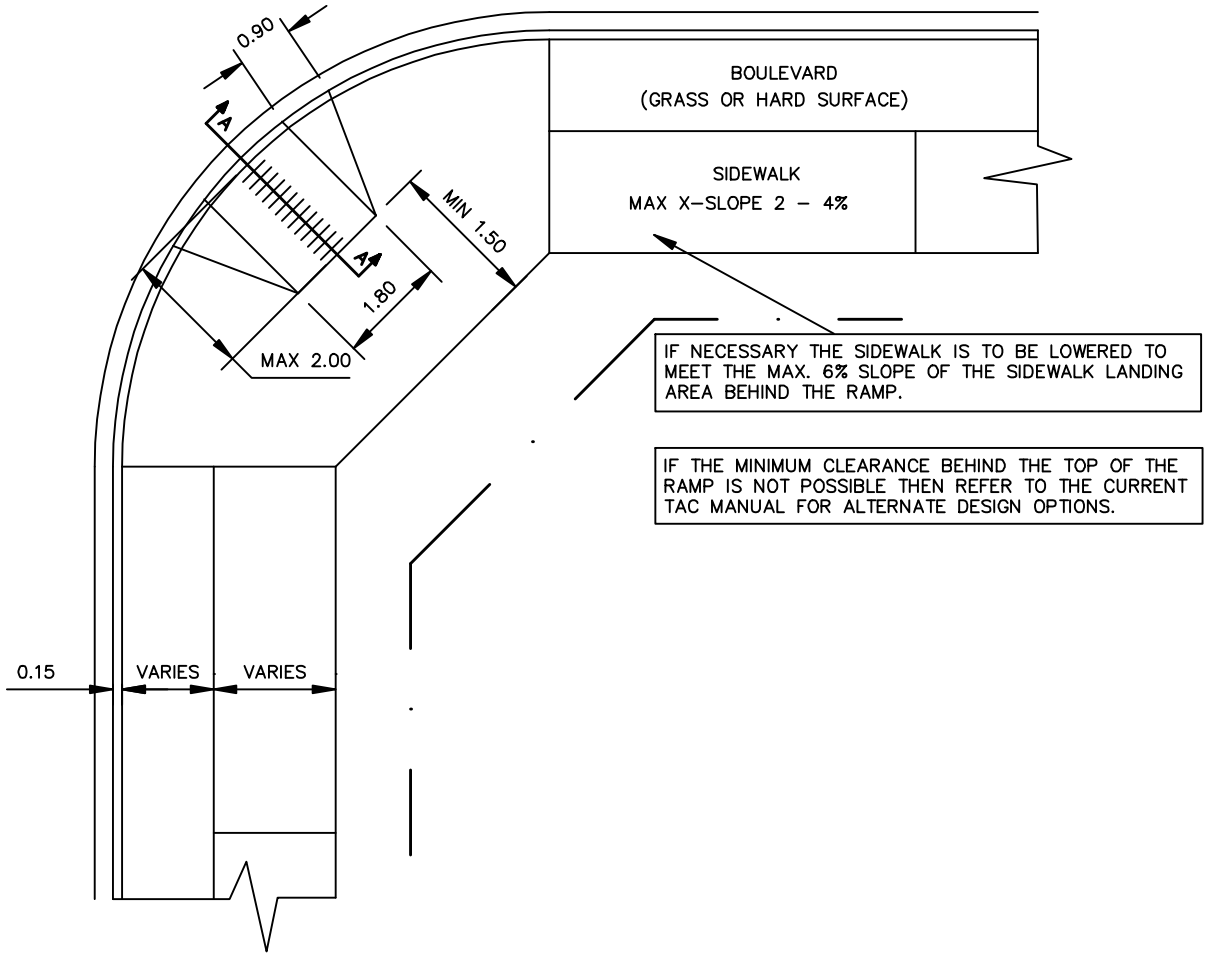
NOTES:

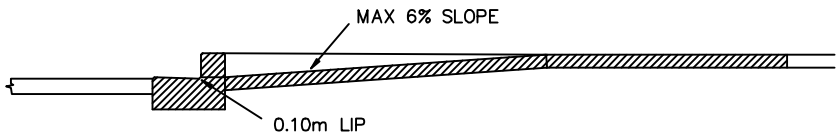
THE MINIMUM CLEARANCE FROM VERTICAL OBSTRUCTIONS IN ALL CASES IS 0.90M FOR A MAXIMUM DISTANCE OF 0.5M.

Richmond

MINIMUM CLEARANCE FOR PEDESTRIAN FACILITIES

TECH. :	SCALE : NTS	DRAWING NUMBER : R–14–SD
DR. :	DATE : DEC. 2010	
ENG. :	REV. DATE :	SHEET No. : 1 OF 1



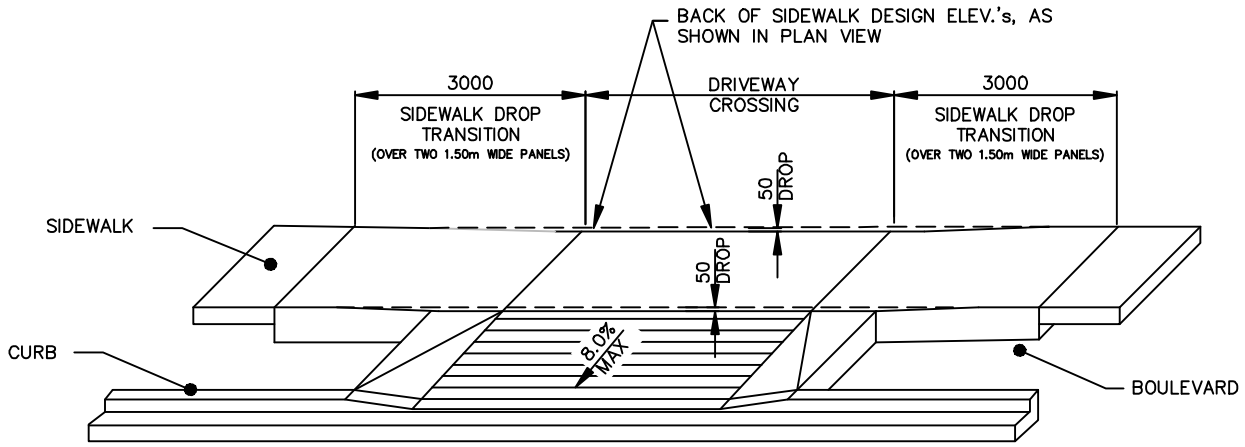


CROSS–SECTION A – A

Richmond

SINGLE WHEELCHAIR RAMP DESIGN STANDARD

TECH. :	SCALE : NTS	DRAWING NUMBER : R–15–SD
DR. :	DATE : DEC. 2010	
ENG. :	REV. DATE :	SHEET No. : 1 OF 1

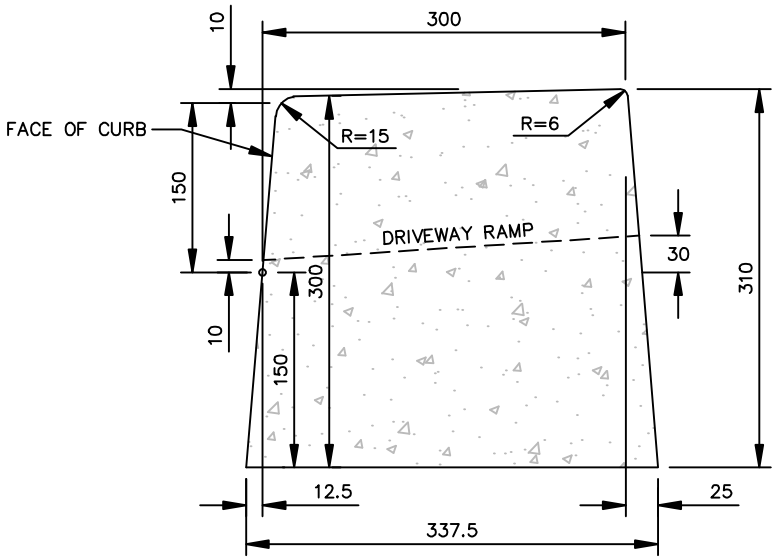


SIDEWALK 50mm DROP DETAIL
(AT DRIVEWAYS)

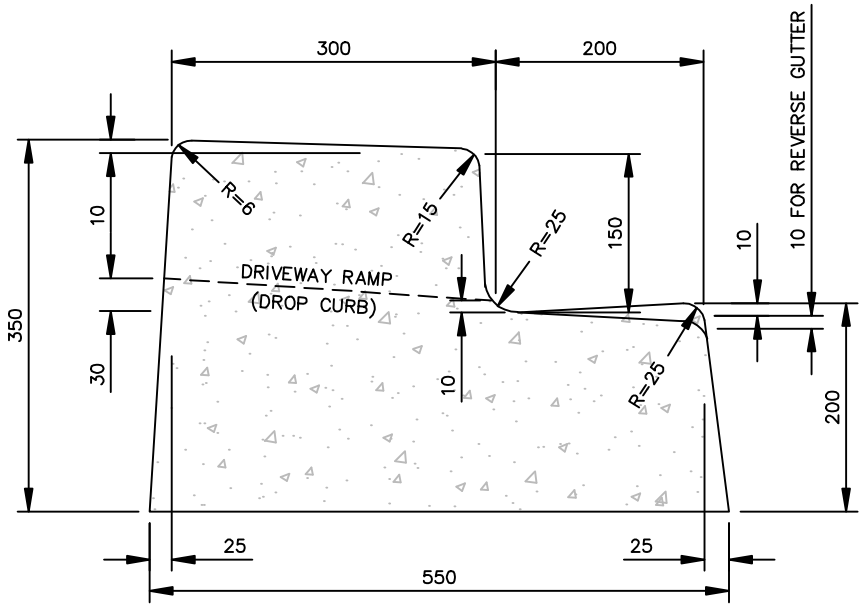
Richmond

SIDEWALK DROP DETAIL

TECH. :	SCALE : NTS	DRAWING NUMBER : R-16-SD
DR. :	DATE : DEC. 2010	
ENG. :	REV. DATE :	SHEET No. : 1 OF 1



URBAN CURB (RUC)

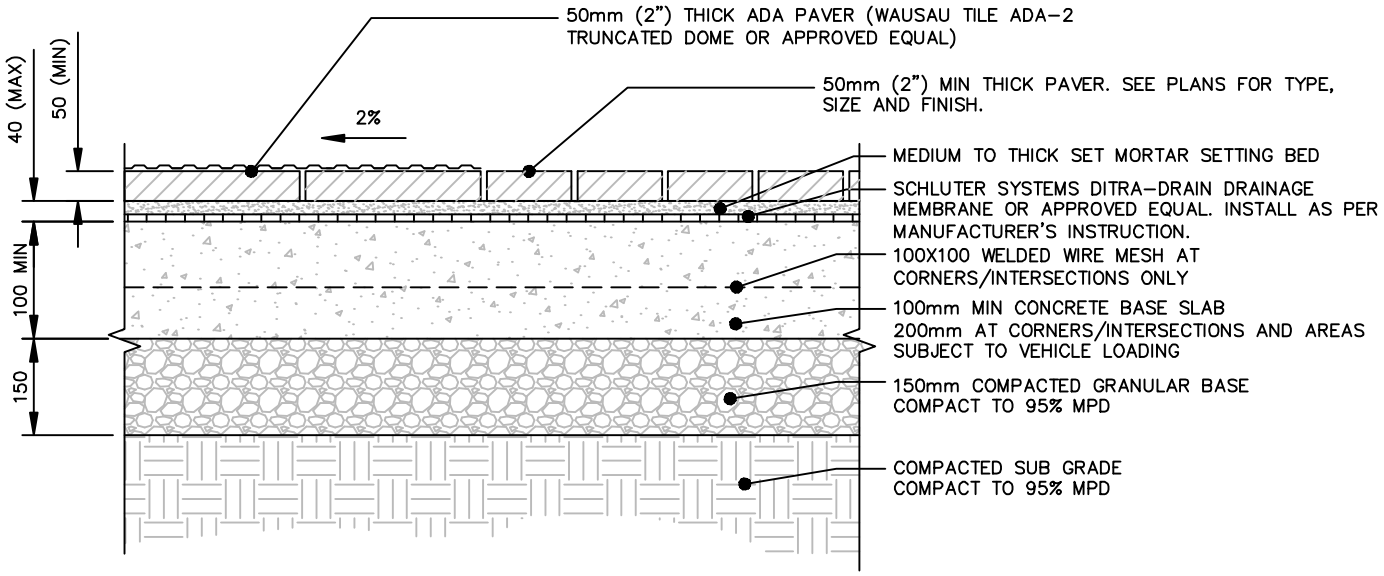


URBAN CURB & GUTTER (RUC-G)

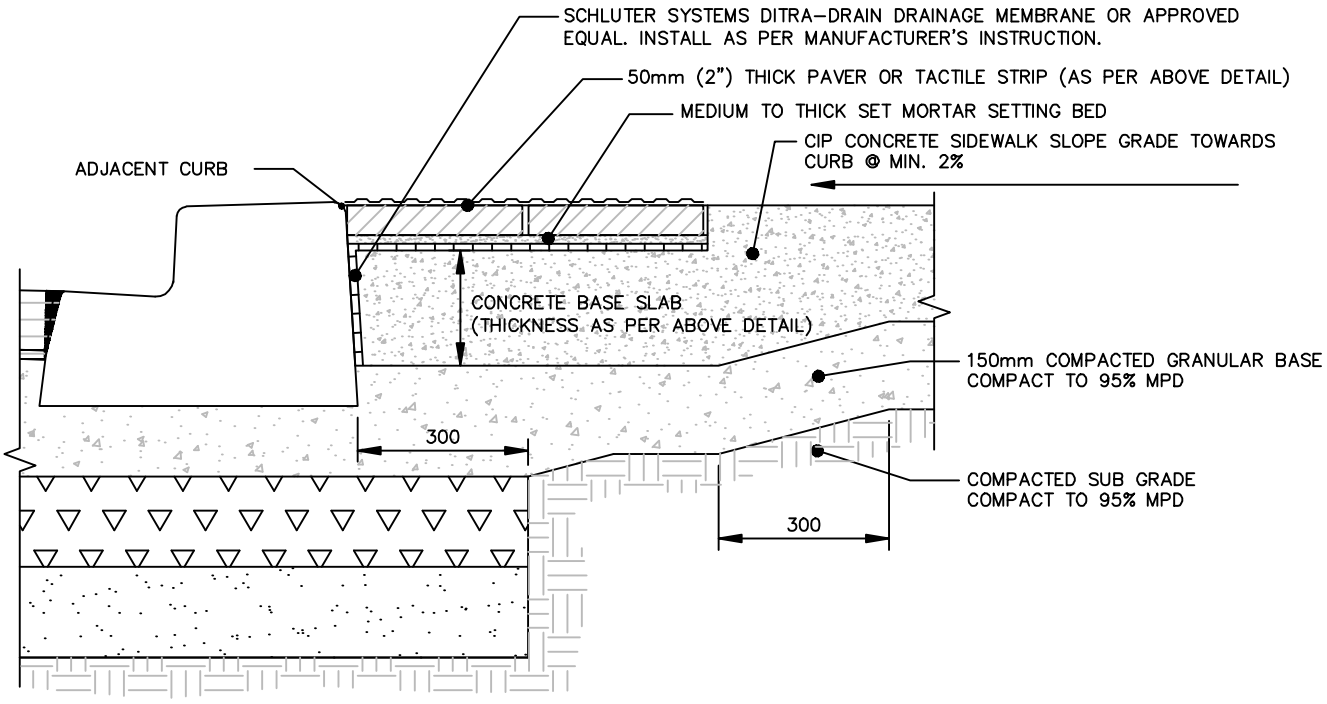
Richmond

URBAN CURB AND URBAN CURB & GUTTER DETAILS

TECH. :	SCALE : NTS	DRAWING NUMBER : R-17-SD
DR. :	DATE : DEC. 2010	
ENG. :	REV. DATE :	SHEET No. : 1 OF 1



TACTILE WARNING STRIP AND PAVER DETAIL

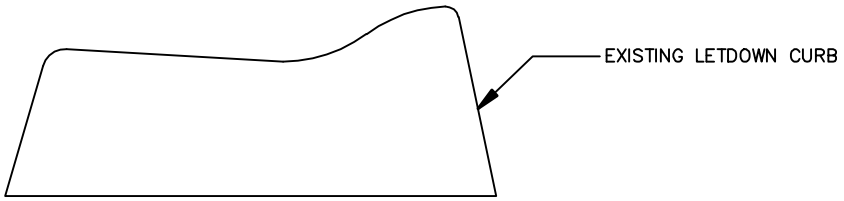


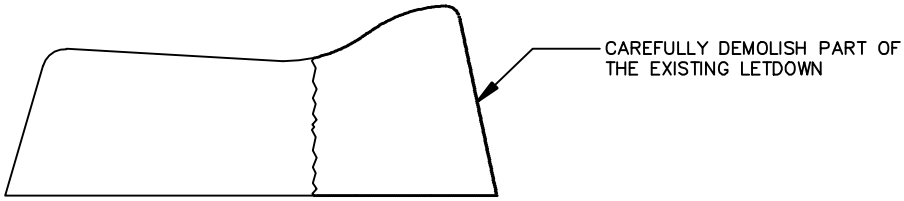
TACTILE WARNING STRIPS AND PAVERS AT CURB AND TRANSITION TO CONCRETE SIDEWALK

Richmond

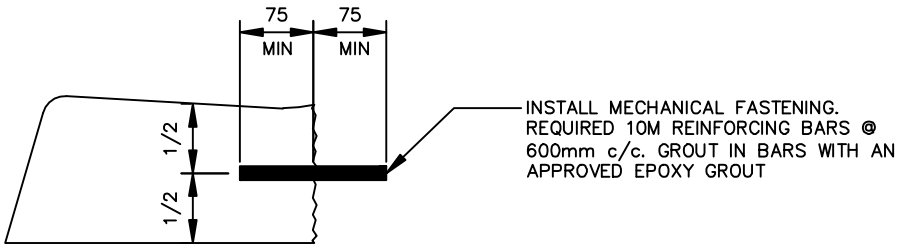
PAVERS & TACTILE WARNING STRIPS

TECH. :	SCALE : NTS	DRAWING NUMBER : R-18-SD
DR. :	DATE : DEC. 2010	
ENG. :	REV. DATE :	SHEET No. : 1 OF 1

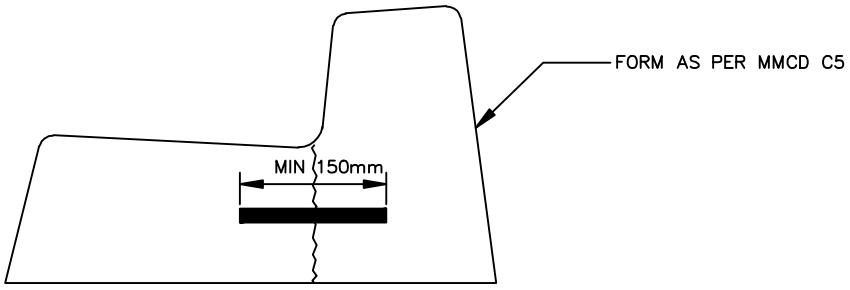




STEP 1



STEP 2



STEP 3

Richmond

CONVERTING LETDOWN CURB TO HIGHBACK CURB

TECH. :	SCALE : NTS	DRAWING NUMBER : R-19-SD
DR. :	DATE : DEC. 2010	
ENG. :	REV. DATE :	SHEET No. : 1 OF 1

		CONCRETE BASE INDEX
TYPE	DRAWING	POLE TYPES
P1	L1.1	7.62m & 9.14m DAVIT LUMINAIRE POLES
P2	L1.2	SERVICE BASE
P3	L1.3	CITY CENTRE TYPE ROADWAY/PEDESTRIAN LUMINAIRE POLES
P4	L1.4	13.72m DAVIT LUMINAIRE POLES
P5	L1.3	8.55m TYPE 3 DECORATIVE LUMINAIRE POLE
P6	L1.1	7.33m TYPE 4 DECORATIVE LUMINAIRE POLE
P7	L1.5	5.27m TYPE 6 DECORATIVE LUMINAIRE POLE
P8	L1.3	9.14m TYPE 7 DECORATIVE LUMINAIRE POLE
S1	L2.1	4.57m PATHWAY & 5.79m LANEWAY SIDE MOUNTED LUMINAIRE POLES & 4.57m & 6.09m POST TOP LUMINAIRE POLES
S2	L2.1	4.88m STEVESTON TYPE LUMINAIRE POLE
S3	L2.2	CITY CENTRE TYPE PEDESTRIAN LUMINAIRE POLES & LANEWAY LUMINAIRE POLES
S4	L2.3	4.57m TYPE 1 AND TYPE 2 DECORATIVE LUMINAIRE POLES
S5	L2.4	7.62m & 9.14m DAVIT LUMINAIRE POLES (FOR USE BY PERMISSION OF THE CITY OF RICHMOND ONLY)
S6	L2.5	SERVICE BASE (FOR USE BY PERMISSION OF THE CITY OF RICHMOND ONLY)
S7	L2.1	4.57m TYPE 1 DECORATIVE LUMINAIRE POLE
S8	L2.1	4.82m TYPE 5 DECORATIVE LUMINAIRE POLE
S9	L2.2	4.70m TYPE 8 DECORATIVE LUMINAIRE POLE

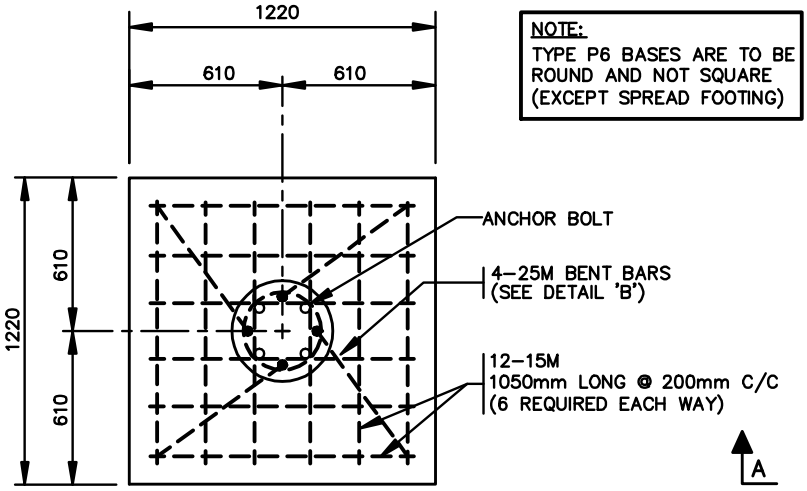
NOTES

1. REFER TO CONTRACT DRAWINGS AND SCHEDULE 'E' FOR DETAILED SPECIFICATIONS.

Richmond

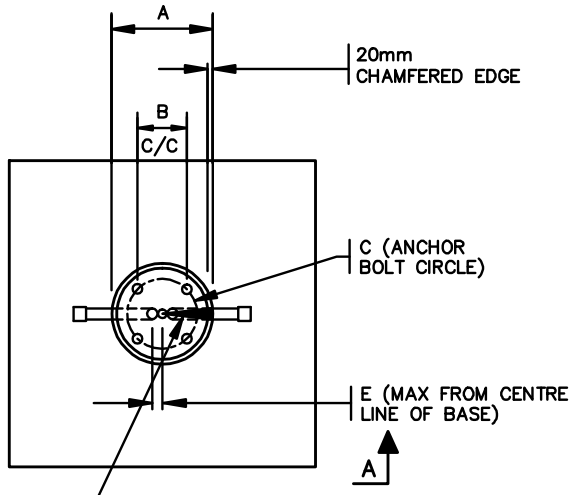
CONCRETE BASE INDEX

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L0.1
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JUNE/03	SHEET No. : 1 OF 1



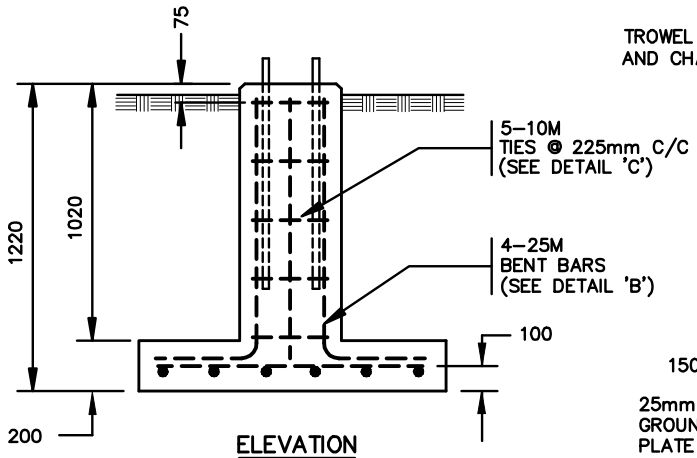
PLAN

NOTE:
TYPE P6 BASES ARE TO BE ROUND AND NOT SQUARE (EXCEPT SPREAD FOOTING)

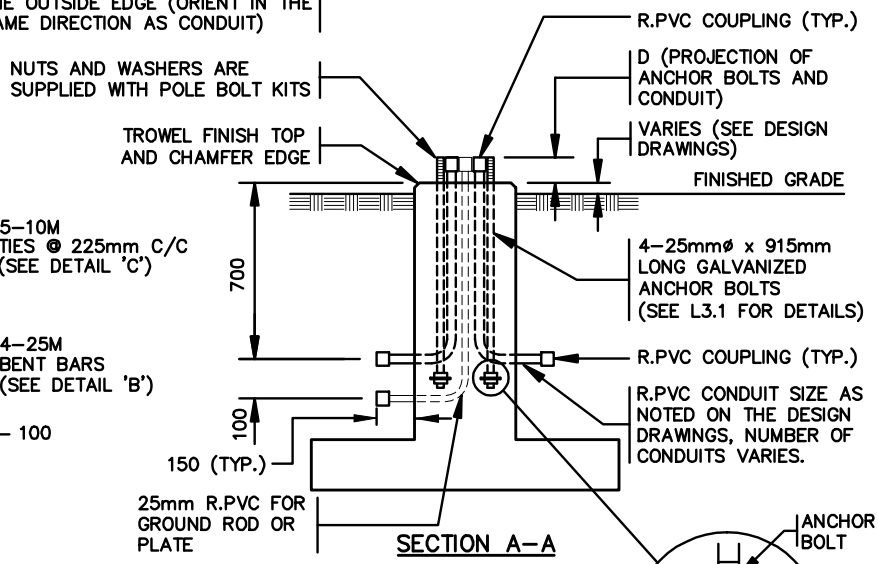


PLAN

'V' GROOVE DRAIN TO START AT ZERO DEPTH AND WIDTH IN THE CENTRE OF THE BASE AND EXTEND TO A 10mm DEPTH AND WIDTH AT THE OUTSIDE EDGE (ORIENT IN THE SAME DIRECTION AS CONDUIT)

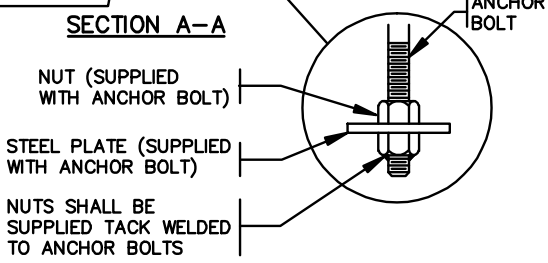


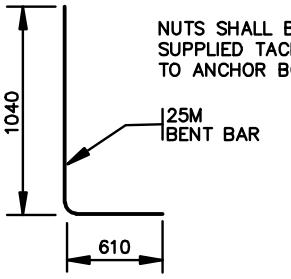
ELEVATION



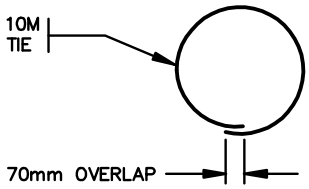
SECTION A–A

BASE TYPE	POLE TYPE	A	B	C	D	E
P1	7.62m AND 9.14m DAVIT LUMINAIRE POLE	400	197	279	100	40
P6	7.33m TYPE 4 DECORATIVE LUMINAIRE POLE	510	197	279	100	40





DETAIL 'B'



DETAIL 'C'

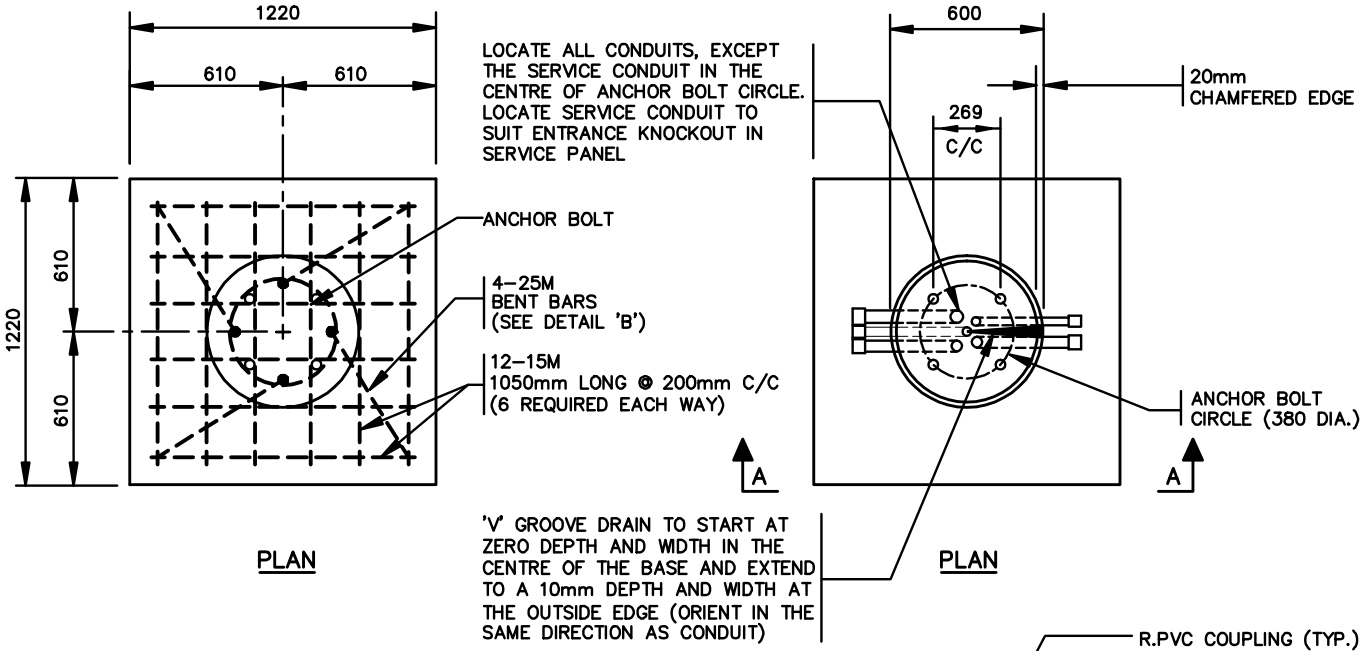
NOTES

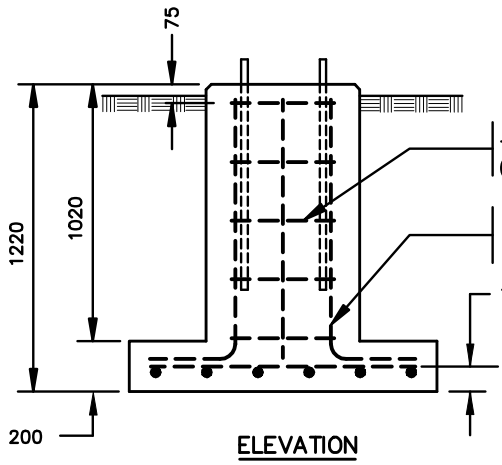
1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. ALL HARDWARE SHALL BE GALVANIZED.
3. APPLY LUBRIPLATE OR OTHER SUITABLE GREASE TO EXPOSED PORTION OF ANCHOR BOLTS AND NUTS.
4. CONCRETE SHALL HAVE A MINIMUM STRENGTH OF 30 MPa AT 28 DAYS.
5. YIELD STRENGTH OF REBAR SHALL BE MIN. 400 MPa.
6. REINFORCING STEEL SHALL HAVE MIN. 40mm COVER UNLESS OTHERWISE NOTED.
7. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

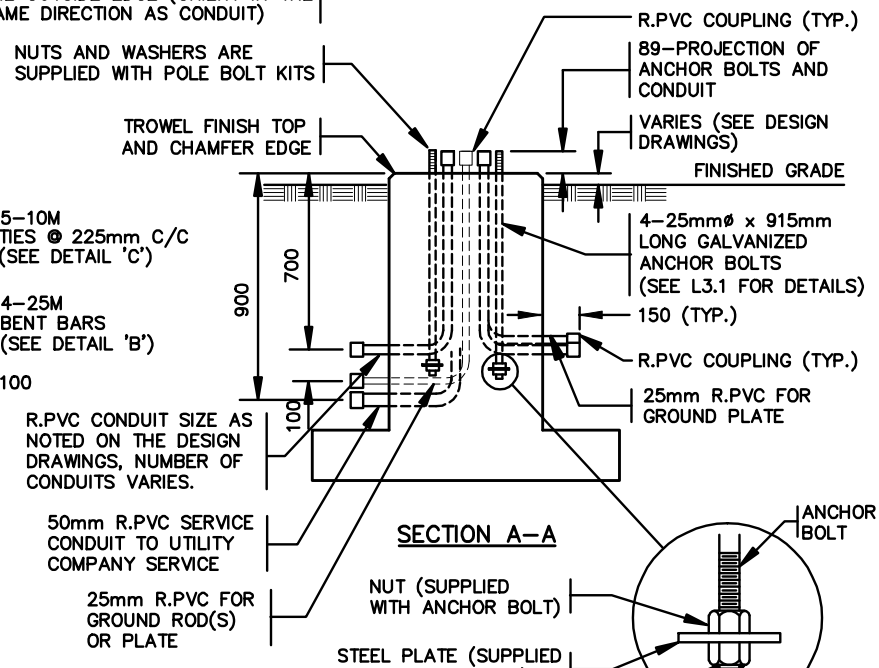
Richmond

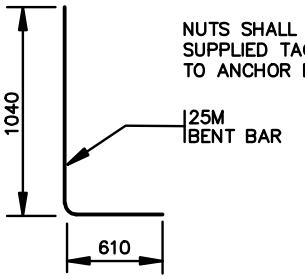
TYPE P1 AND P6 PEDESTAL CONCRETE BASE

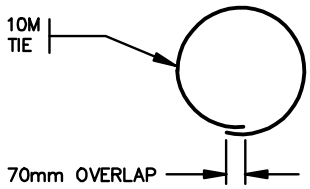
TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L1.1
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1











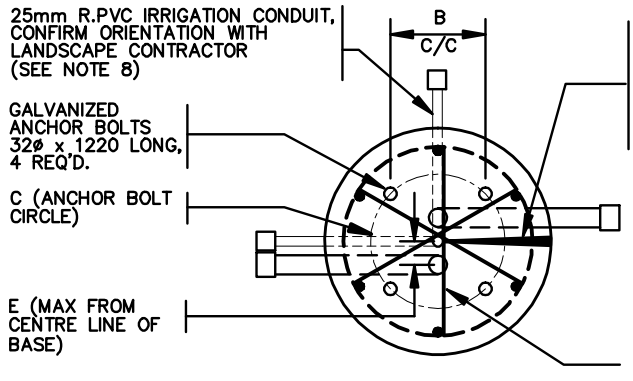
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. ALL HARDWARE SHALL BE GALVANIZED.
3. APPLY LUBRIPLATE OR OTHER SUITABLE GREASE TO EXPOSED PORTION OF ANCHOR BOLTS AND NUTS.
4. CONCRETE SHALL HAVE A MINIMUM STRENGTH OF 30 MPa AT 28 DAYS.
5. YIELD STRENGTH OF REBAR SHALL BE MIN. 400 MPa.
6. REINFORCING STEEL SHALL HAVE MIN. 40mm COVER UNLESS OTHERWISE NOTED.
7. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

Richmond

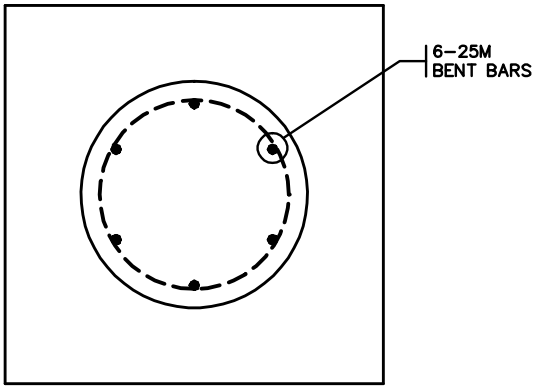
TYPE P2 SERVICE PEDESTAL CONCRETE BASE

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L1.2
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1

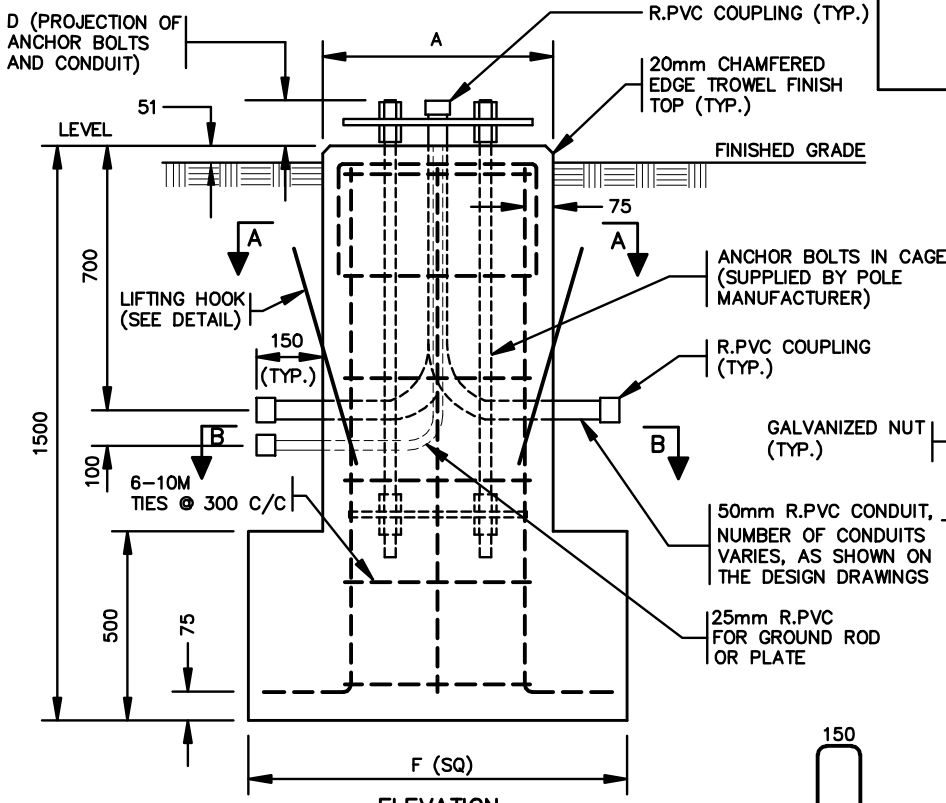


SECTION A-A

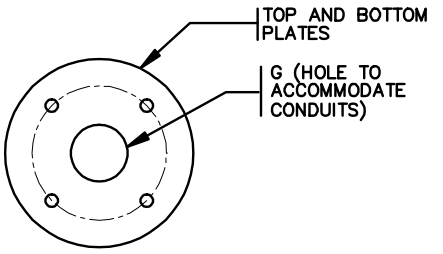
NOTE:
BASES ARE TO BE ROUND AND NOT SQUARE (EXCEPT SPREAD FOOTING)

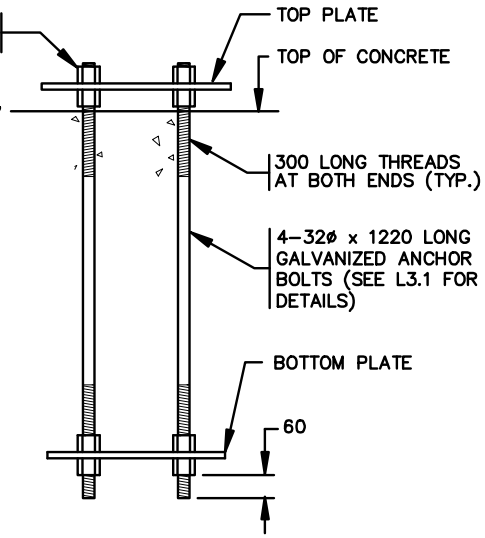


SECTION B-B

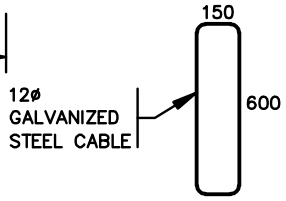


ELEVATION





ANCHOR BOLT CAGE DETAIL



LIFTING HOOK DETAIL

NOTES

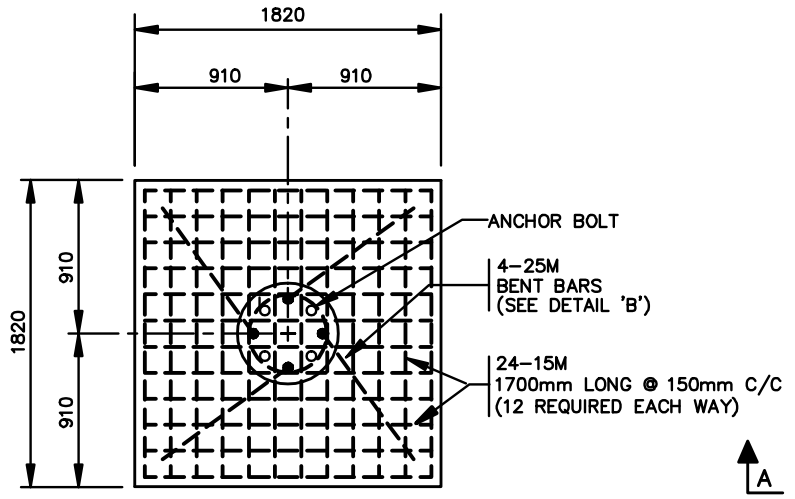
1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. ALL HARDWARE SHALL BE GALVANIZED.
3. APPLY LUBRIPLATE OR OTHER SUITABLE GREASE TO EXPOSED PORTION OF ANCHOR BOLTS AND NUTS.
4. CONCRETE SHALL HAVE A MINIMUM STRENGTH OF 30 MPa AT 28 DAYS.
5. YIELD STRENGTH OF REBAR SHALL BE MIN. 400 MPa.
6. REINFORCING STEEL SHALL HAVE MIN. 40mm COVER UNLESS OTHERWISE NOTED.
7. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

BASE TYPE	POLE TYPE	A	B	C	D	E	F	G
P3	CITY CENTRE TYPE ROADWAY AND PEDESTRIAN LUMINAIRE POLE	600	252	356	120	40	1000	150
P5	8.55m TYPE 3 DECORATIVE LUMINAIRE POLE	530	206	292	120	40	1000	150
P8	9.14m TYPE 7 DECORATIVE LUMINAIRE POLE	600	206	292	120	40	1200	219

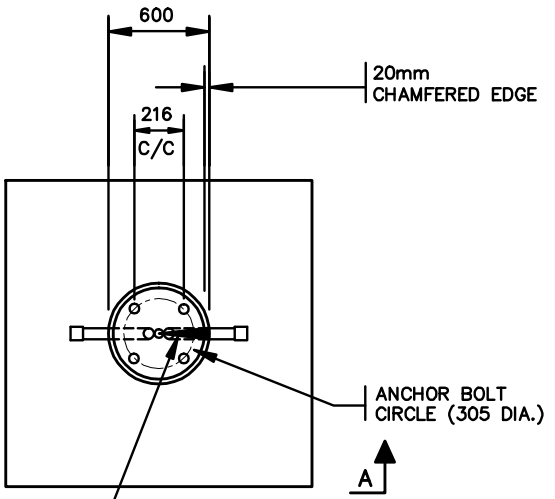
Richmond

TYPE P3, P5 AND P8 PEDESTAL CONCRETE BASE

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L1.3
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1

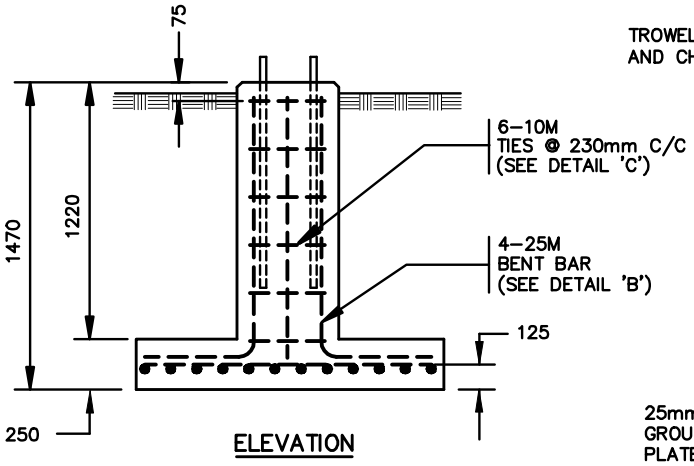


PLAN

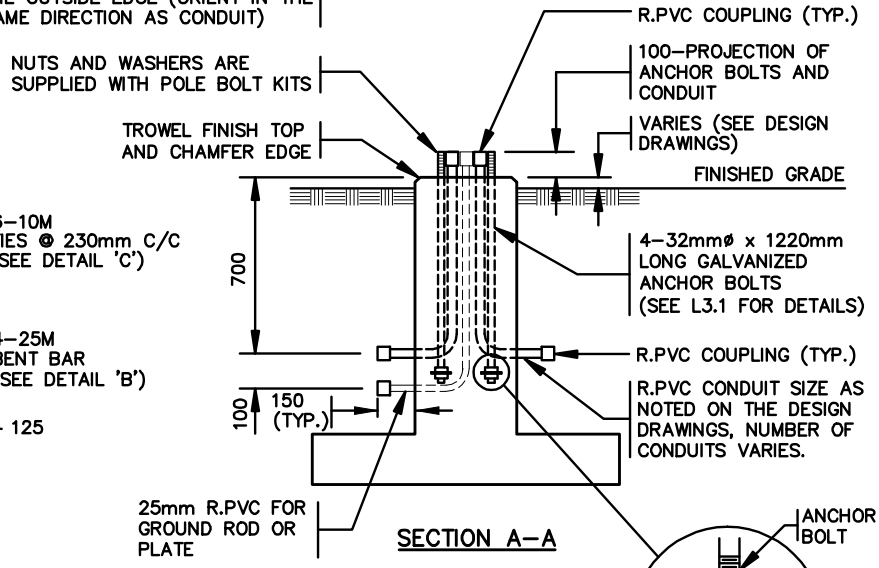


PLAN

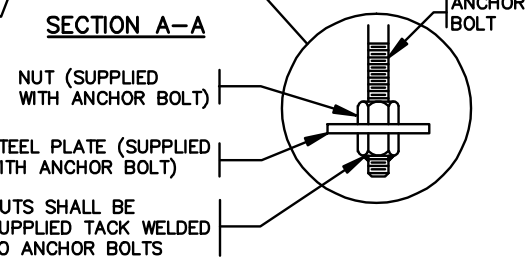
'V' GROOVE DRAIN TO START AT ZERO DEPTH AND WIDTH IN THE CENTRE OF THE BASE AND EXTEND TO A 10mm DEPTH AND WIDTH AT THE OUTSIDE EDGE (ORIENT IN THE SAME DIRECTION AS CONDUIT)

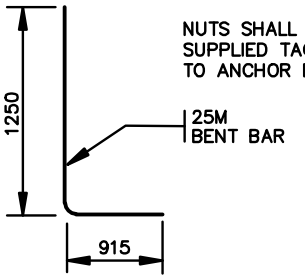


ELEVATION

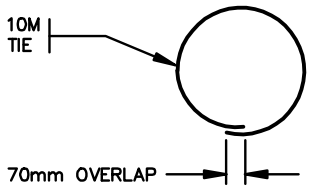


SECTION A–A





DETAIL 'B'



DETAIL 'C'

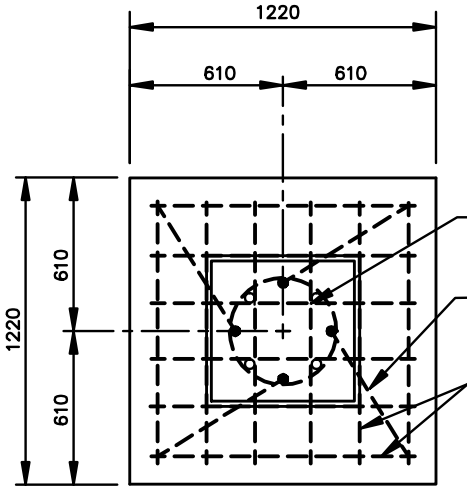
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. ALL HARDWARE SHALL BE GALVANIZED.
3. APPLY LUBRIPLATE OR OTHER SUITABLE GREASE TO EXPOSED PORTION OF ANCHOR BOLTS AND NUTS.
4. CONCRETE SHALL HAVE A MINIMUM STRENGTH OF 30 MPa AT 28 DAYS.
5. YIELD STRENGTH OF REBAR SHALL BE MIN. 400 MPa.
6. REINFORCING STEEL SHALL HAVE MIN. 40mm COVER UNLESS OTHERWISE NOTED.
7. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

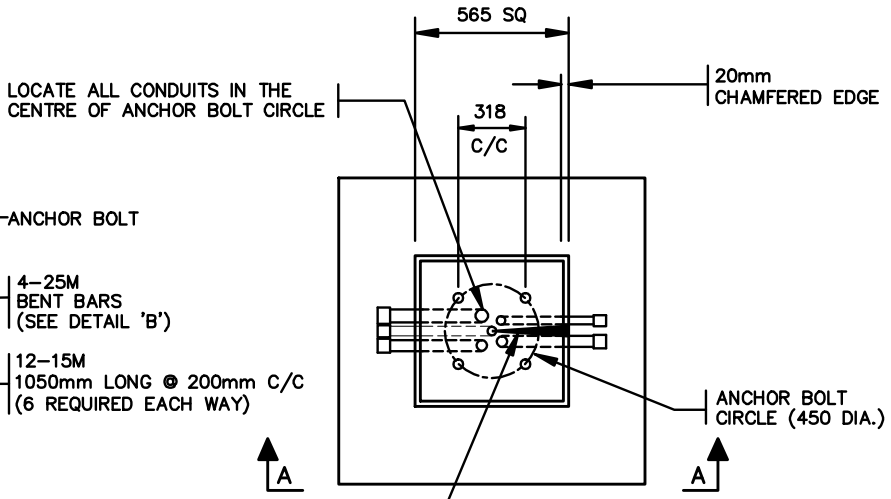
Richmond

TYPE P4 PEDESTAL CONCRETE BASE

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L1.4
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1

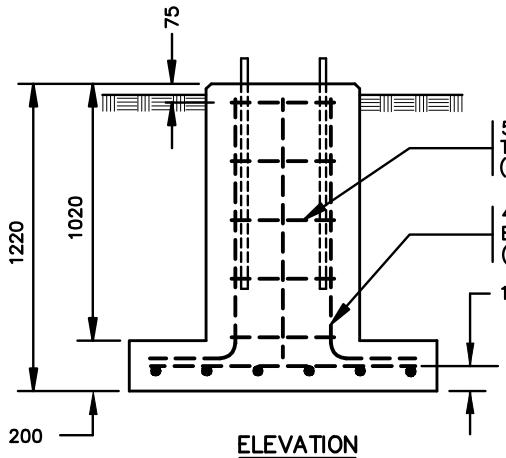


PLAN

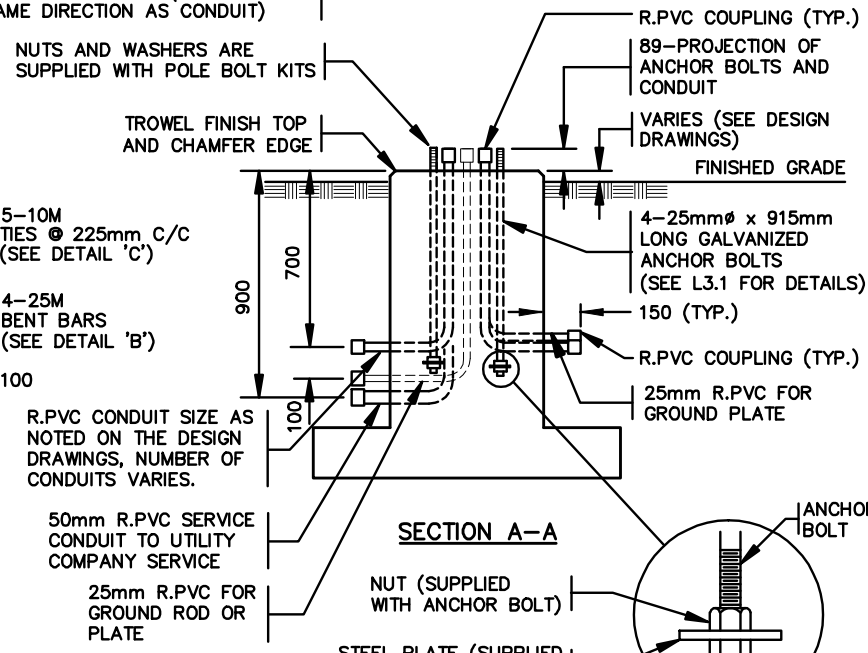


PLAN

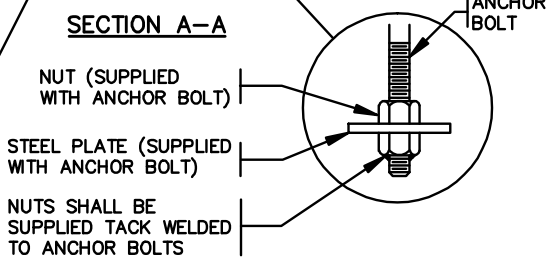
NOTE:
BASES ARE TO BE SQUARE AND NOT ROUND

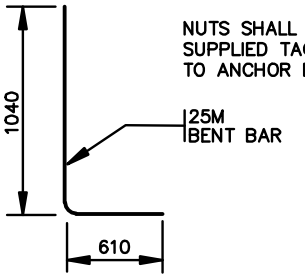


ELEVATION

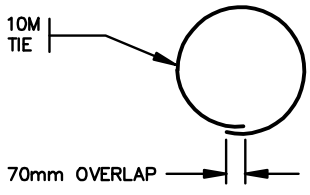


SECTION A–A





DETAIL 'B'



DETAIL 'C'

NOTES

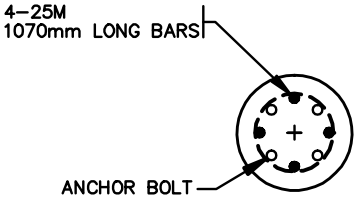
1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. ALL HARDWARE SHALL BE GALVANIZED.
3. APPLY LUBRIPLATE OR OTHER SUITABLE GREASE TO EXPOSED PORTION OF ANCHOR BOLTS AND NUTS.
4. CONCRETE SHALL HAVE A MINIMUM STRENGTH OF 30 MPa AT 28 DAYS.
5. YIELD STRENGTH OF REBAR SHALL BE MIN. 400 MPa.
6. REINFORCING STEEL SHALL HAVE MIN. 40mm COVER UNLESS OTHERWISE NOTED.
7. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

Richmond

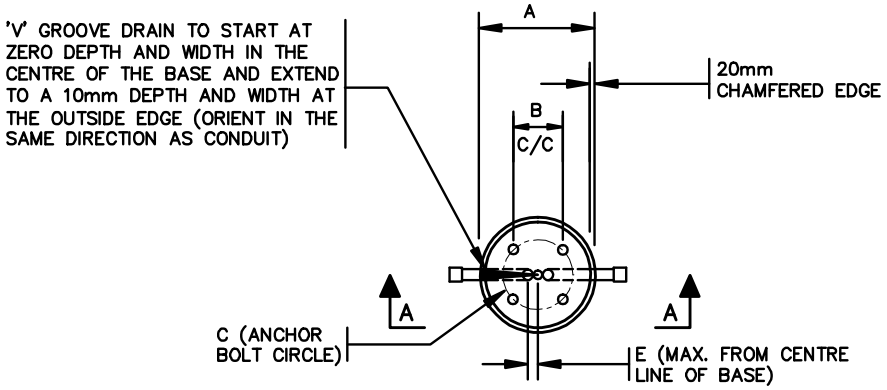
TYPE P7 PEDESTAL CONCRETE BASE

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L1.5
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1

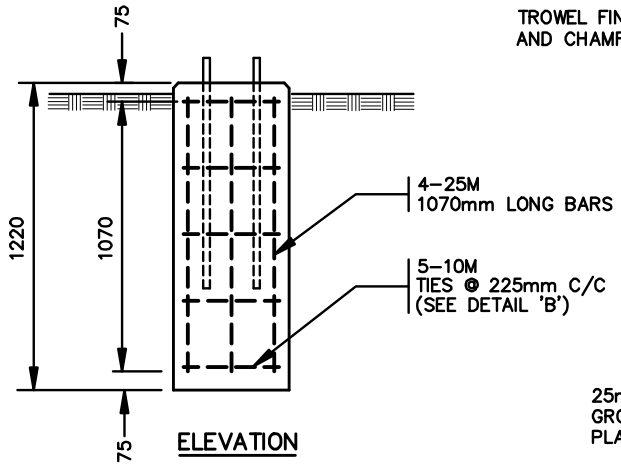
NOTE:
TYPE S2, S7 AND S8 BASES ARE TO BE ROUND AND NOT SQUARE



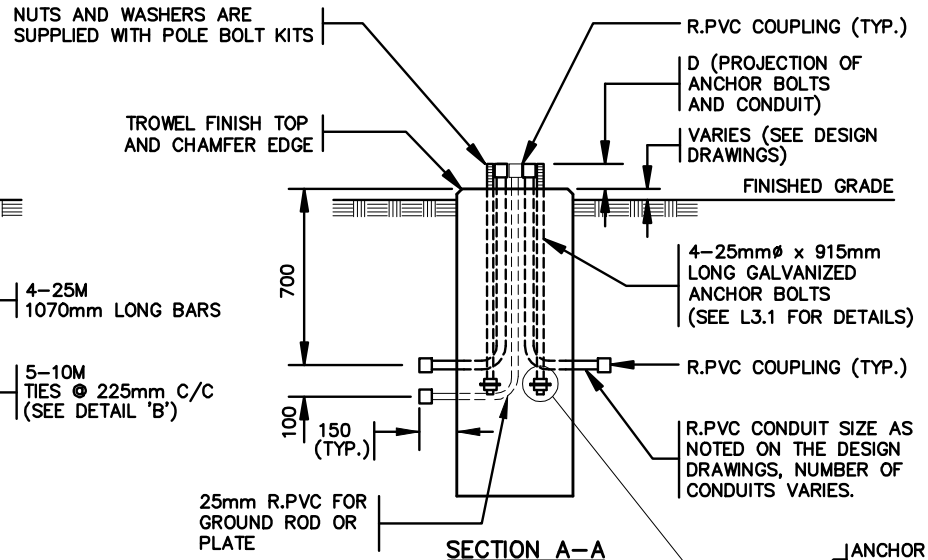
PLAN



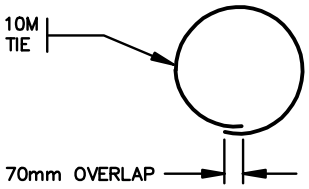
PLAN



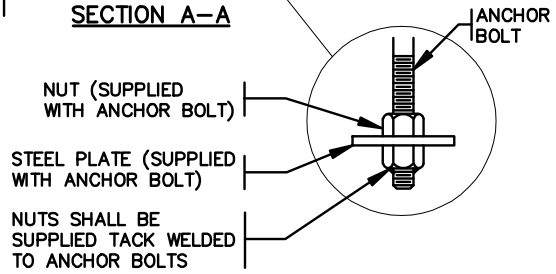
ELEVATION



SECTION A–A



DETAIL 'B'



NOTES

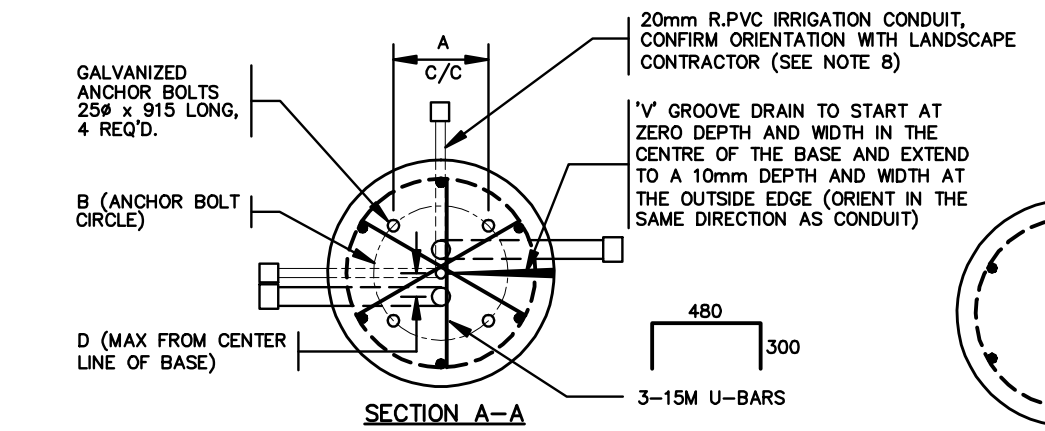
1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. ALL HARDWARE SHALL BE GALVANIZED.
3. APPLY LUBRIPLATE OR OTHER SUITABLE GREASE TO EXPOSED PORTION OF ANCHOR BOLTS AND NUTS.
4. CONCRETE SHALL HAVE A MINIMUM STRENGTH OF 30 MPa AT 28 DAYS.
5. YIELD STRENGTH OF REBAR SHALL BE MIN. 400 MPa.
6. REINFORCING STEEL SHALL HAVE MIN. 40mm COVER UNLESS OTHERWISE NOTED.
7. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

BASE TYPE	POLE TYPE	A	B	C	D	E
S1	4.57m PATHWAY SIDE MOUNTED LUMINAIRE POLE	400	179	254	100	40
	5.79m LANEWAY SIDE MOUNTED LUMINAIRE POLE					
	4.5m POST TOP LUMINAIRE POLE					
	6.09m POST TOP LUMINAIRE POLE					
S2	4.88m STEVESTON TYPE LUMINAIRE POLE	400	179	254	89	32
S7	4.57m TYPE 1 DECORATIVE LUMINAIRE POLE	600	269	381	89	40
S8	4.82m TYPE 5 DECORATIVE LUMINAIRE POLE	510	197	279	100	40

Richmond

TYPE S1, S2, S7 AND S8 SONOTUBE CONCRETE BASE

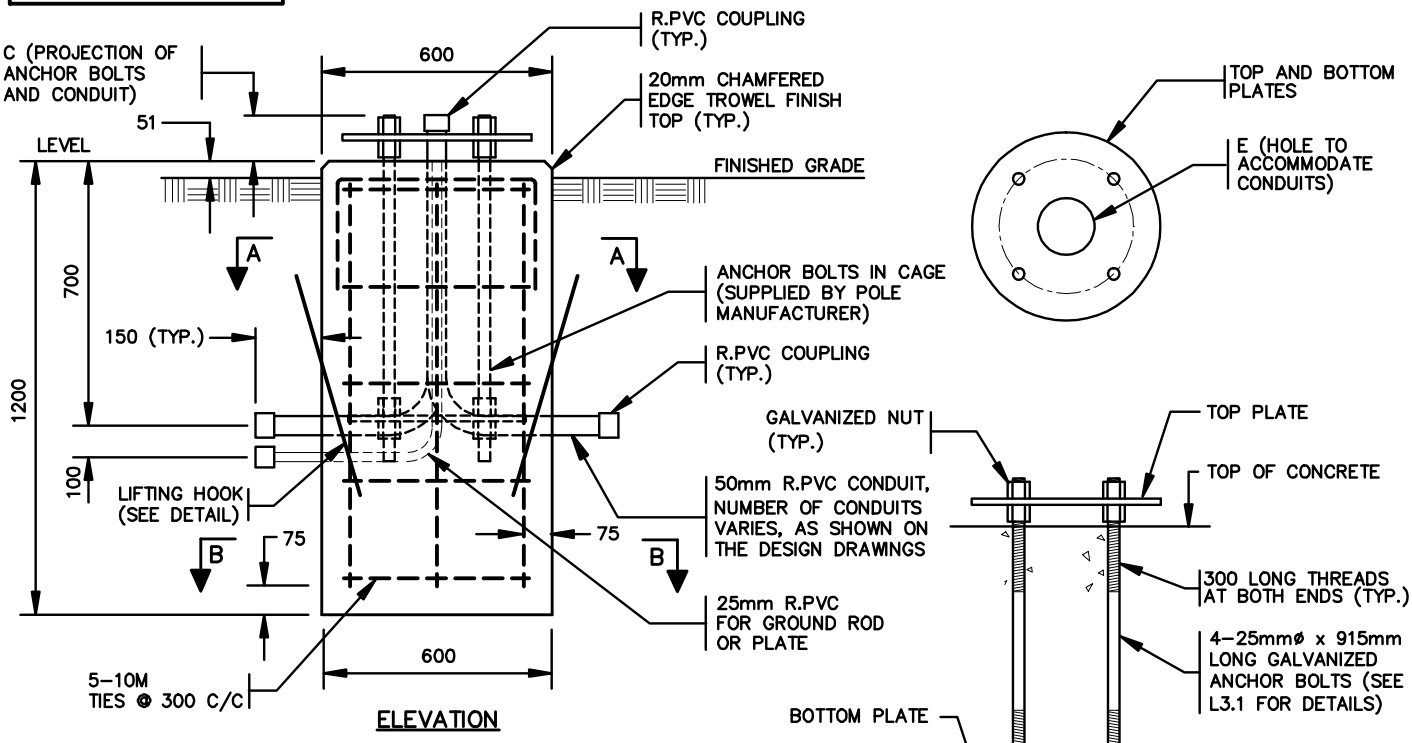
TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L2.1
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



SECTION A-A

SECTION B-B

NOTE
BASES ARE TO BE ROUND AND NOT SQUARE

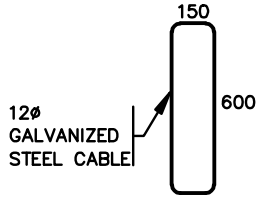


ELEVATION

ANCHOR BOLT CAGE DETAIL

NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. ALL HARDWARE SHALL BE GALVANIZED.
3. APPLY LUBRIPLATE OR OTHER SUITABLE GREASE TO EXPOSED PORTION OF ANCHOR BOLTS AND NUTS.
4. CONCRETE SHALL HAVE A MINIMUM STRENGTH OF 30 MPa AT 28 DAYS.
5. YIELD STRENGTH OF REBAR SHALL BE MIN. 400 MPa.
6. REINFORCING STEEL SHALL HAVE MIN. 40mm COVER UNLESS OTHERWISE NOTED.
7. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.



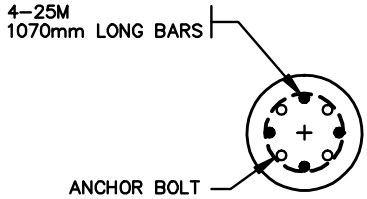
LIFTING HOOK DETAIL

BASE TYPE	POLE TYPE	A	B	C	D	E
S3	CITY CENTRE TYPE LANEWAY/ PEDESTRIAN LUMINAIRE POLE	216	305	120	40	150
S9	TYPE 8 DECORATIVE LUMINAIRE POLE	197	279	100	40	171

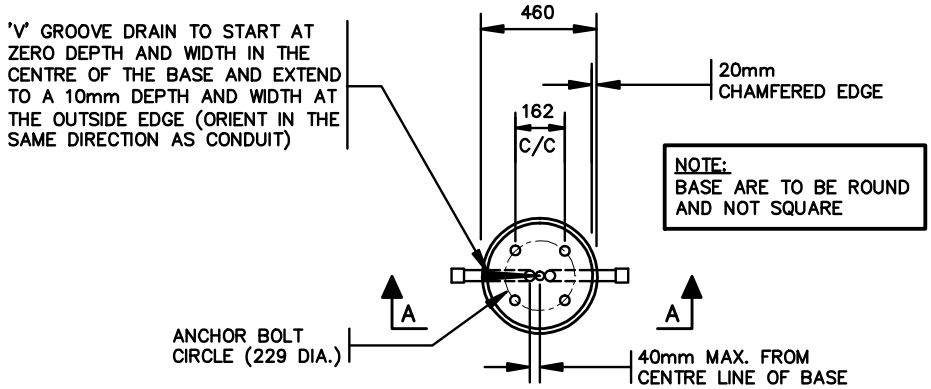
Richmond

TYPE S3 AND S9 SONOTUBE CONCRETE BASE

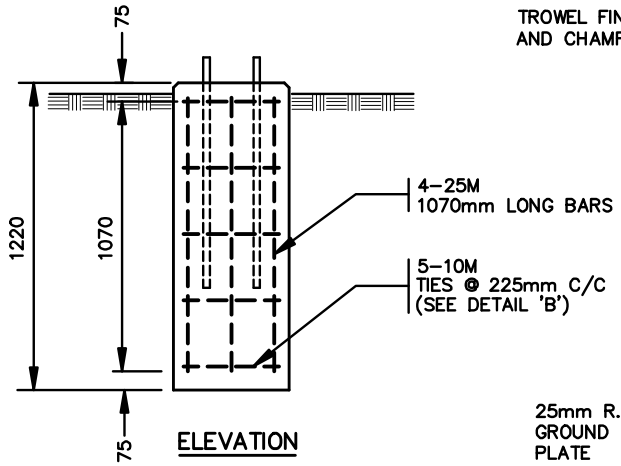
TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L2.2
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



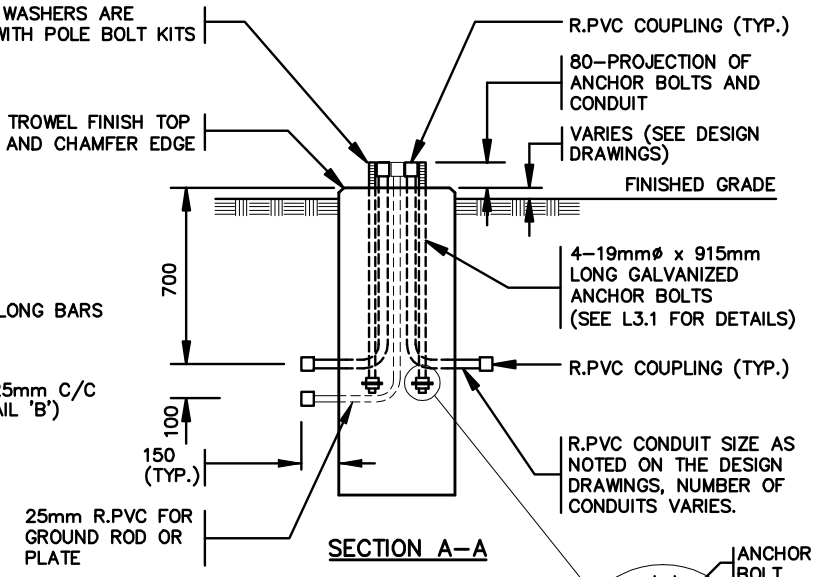
PLAN



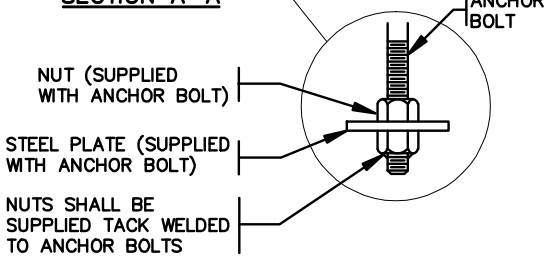
PLAN



ELEVATION

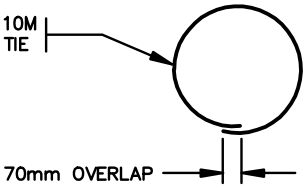


SECTION A–A



NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. ALL HARDWARE SHALL BE GALVANIZED.
3. APPLY LUBRIPLATE OR OTHER SUITABLE GREASE TO EXPOSED PORTION OF ANCHOR BOLTS AND NUTS.
4. CONCRETE SHALL HAVE A MINIMUM STRENGTH OF 30 MPa AT 28 DAYS.
5. YIELD STRENGTH OF REBAR SHALL BE MIN. 400 MPa.
6. REINFORCING STEEL SHALL HAVE MIN. 40mm COVER UNLESS OTHERWISE NOTED.
7. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

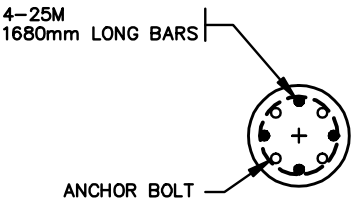


DETAIL 'B'

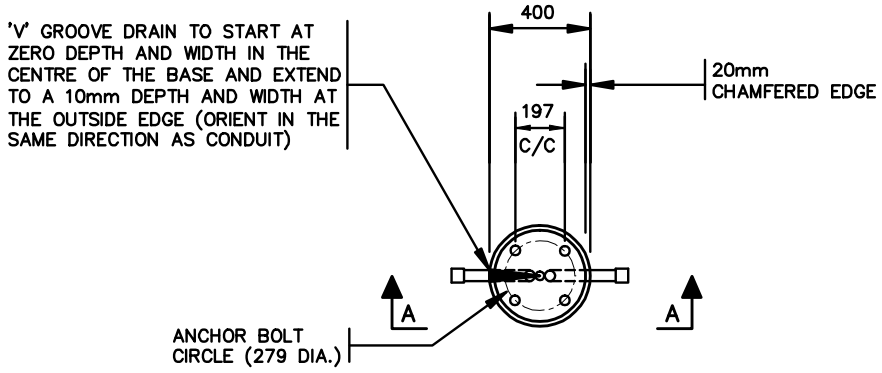
Richmond

TYPE S4 SONOTUBE CONCRETE BASE

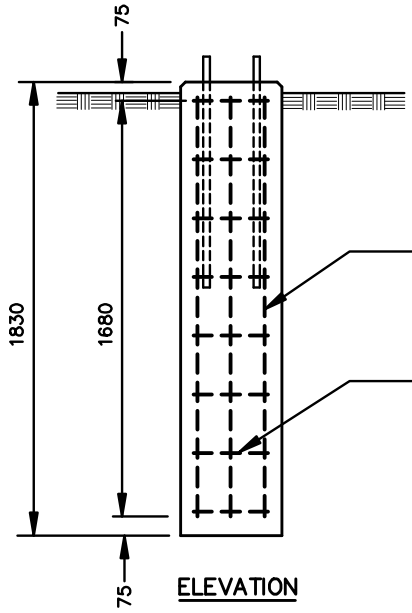
TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L2.3
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



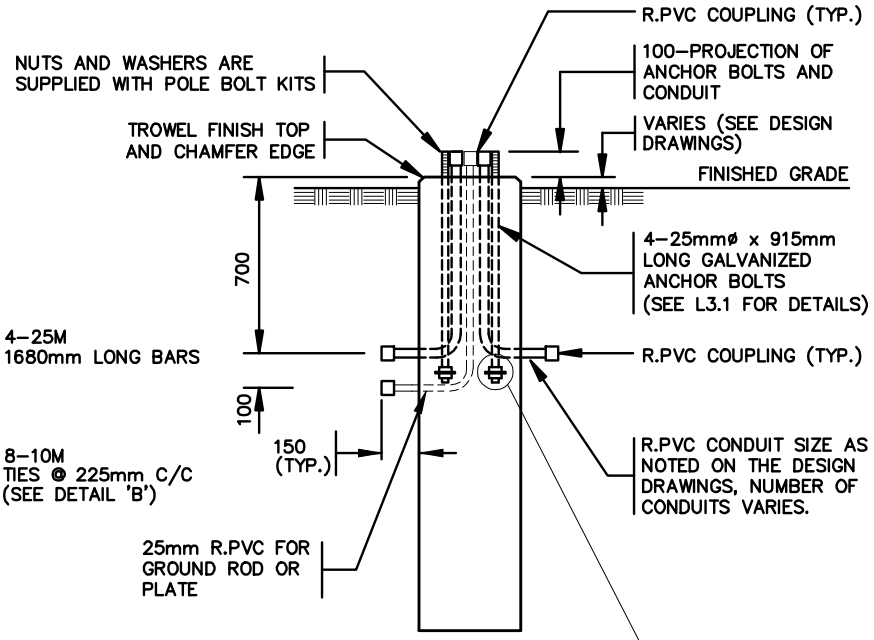
PLAN



PLAN

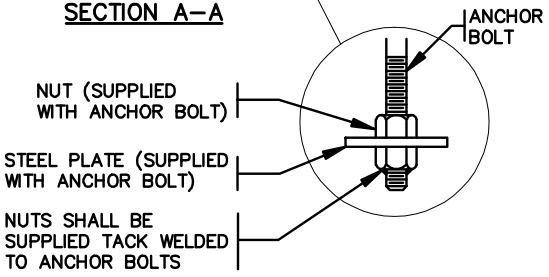


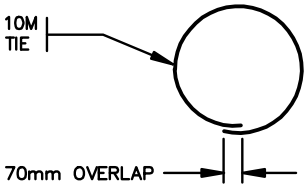
ELEVATION



SECTION A–A

FOR USE BY PERMISSION OF THE CITY OF RICHMOND ONLY





DETAIL 'B'

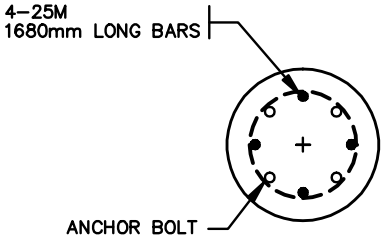
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. ALL HARDWARE SHALL BE GALVANIZED.
3. APPLY LUBRIPLATE OR OTHER SUITABLE GREASE TO EXPOSED PORTION OF ANCHOR BOLTS AND NUTS.
4. CONCRETE SHALL HAVE A MINIMUM STRENGTH OF 30 MPa AT 28 DAYS.
5. YIELD STRENGTH OF REBAR SHALL BE MIN. 400 MPa.
6. REINFORCING STEEL SHALL HAVE MIN. 40mm COVER UNLESS OTHERWISE NOTED.
7. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

Richmond

TYPE S5 SONOTUBE CONCRETE BASE

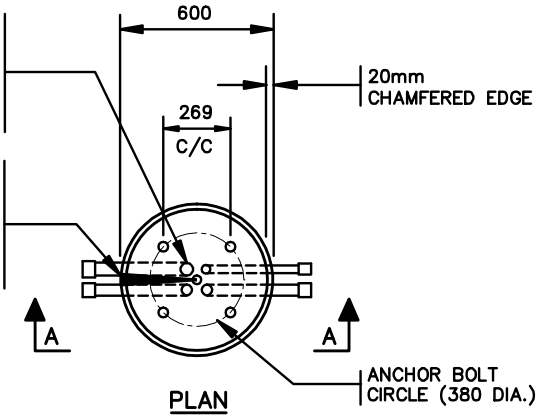
TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L2.4
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



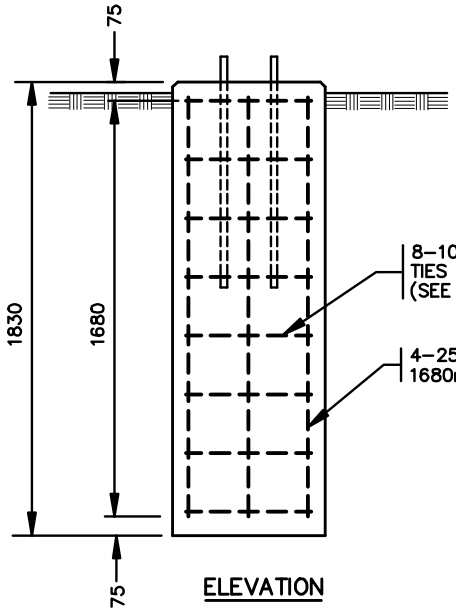
PLAN

LOCATE ALL CONDUITS, EXCEPT THE SERVICE CONDUIT IN THE CENTRE OF ANCHOR BOLT CIRCLE. LOCATE SERVICE CONDUIT TO SUIT ENTRANCE KNOCKOUT IN SERVICE PANEL

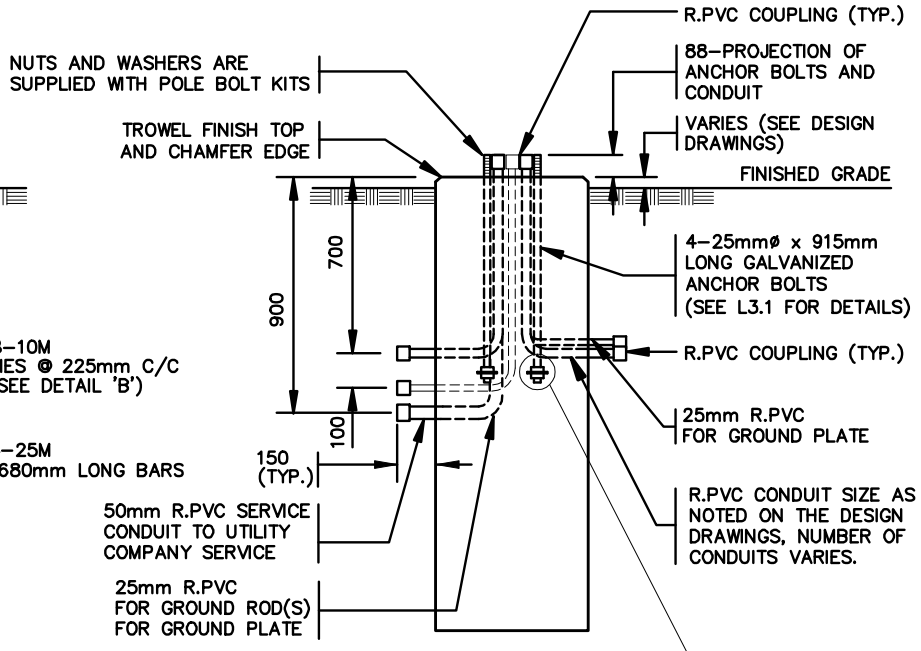
'V' GROOVE DRAIN TO START AT ZERO DEPTH AND WIDTH IN THE CENTRE OF THE BASE AND EXTEND TO A 10mm DEPTH AND WIDTH AT THE OUTSIDE EDGE (ORIENT IN THE SAME DIRECTION AS CONDUIT)



PLAN

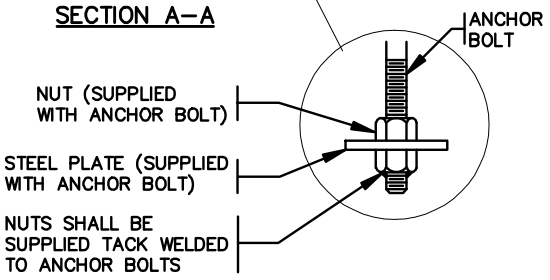


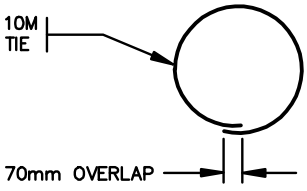
ELEVATION



SECTION A–A

FOR USE BY PERMISSION OF THE CITY OF RICHMOND ONLY





DETAIL 'B'

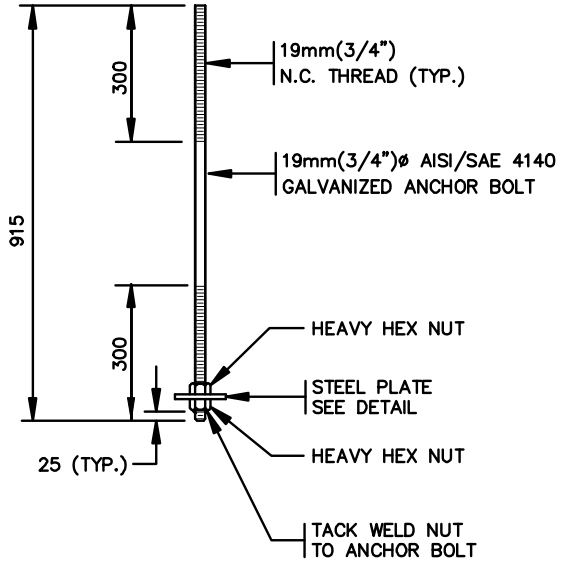
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. ALL HARDWARE SHALL BE GALVANIZED.
3. APPLY LUBRIPLATE OR OTHER SUITABLE GREASE TO EXPOSED PORTION OF ANCHOR BOLTS AND NUTS.
4. CONCRETE SHALL HAVE A MINIMUM STRENGTH OF 30 MPa AT 28 DAYS.
5. YIELD STRENGTH OF REBAR SHALL BE MIN. 400 MPa.
6. REINFORCING STEEL SHALL HAVE MIN. 40mm COVER UNLESS OTHERWISE NOTED.
7. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

Richmond

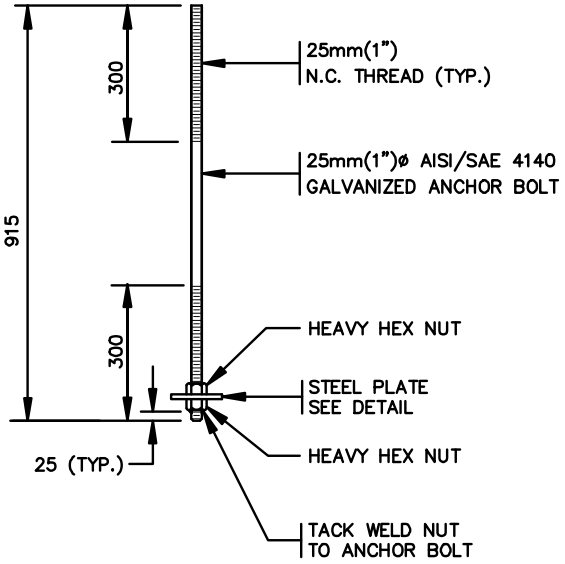
TYPE S6 SERVICE SONOTUBE CONCRETE BASE

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L2.5
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



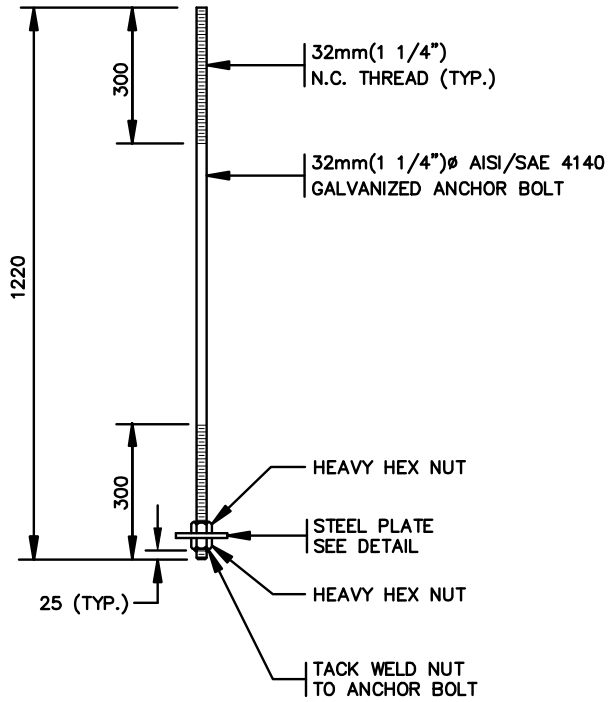
TYPE 1 ANCHOR BOLT

4 PER SET



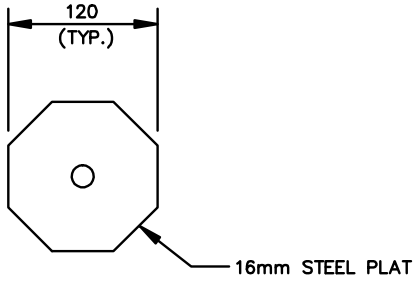
TYPE 2 ANCHOR BOLT

4 PER SET



TYPE 3 ANCHOR BOLT

4 PER SET



STEEL PLATE DETAIL

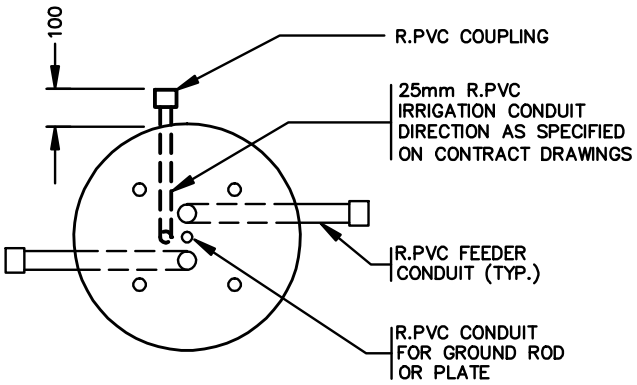
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. ALL HARDWARE SHALL BE GALVANIZED.
3. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

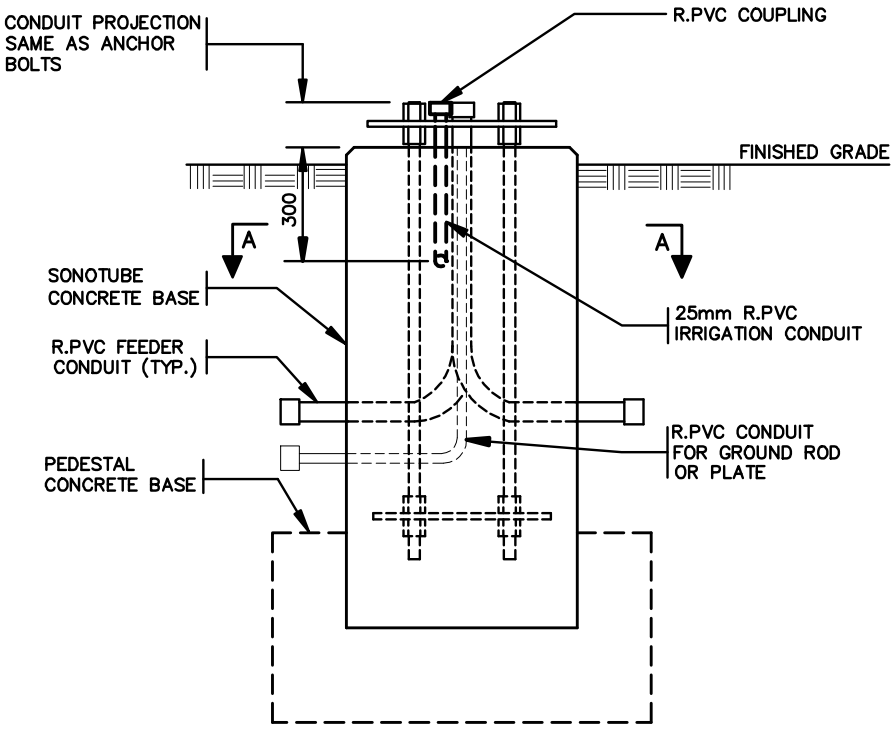
Richmond

TYPE 1, 2 AND 3 ANCHOR BOLTS

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L3.1
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



SECTION A–A



ELEVATION

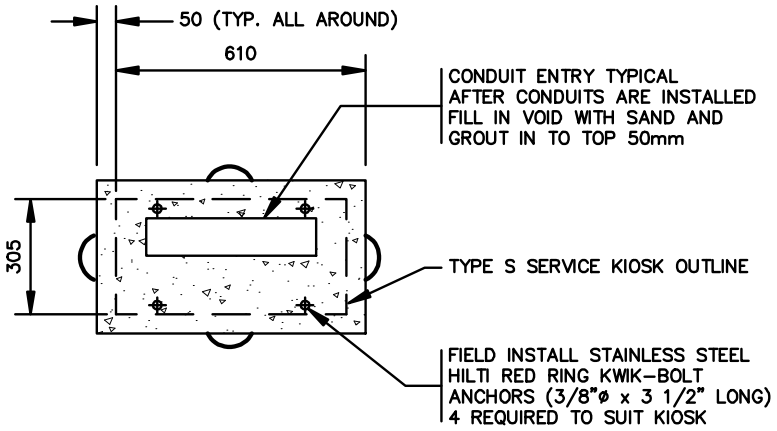
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

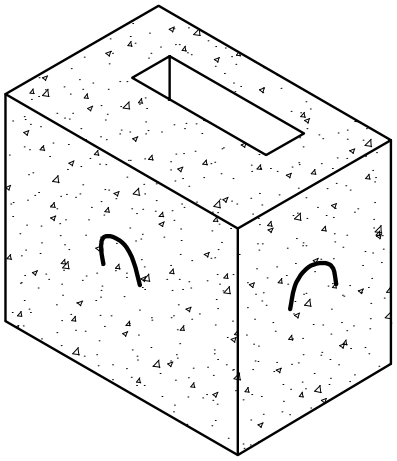
Richmond

CONCRETE BASE
IRRIGATION CONDUIT

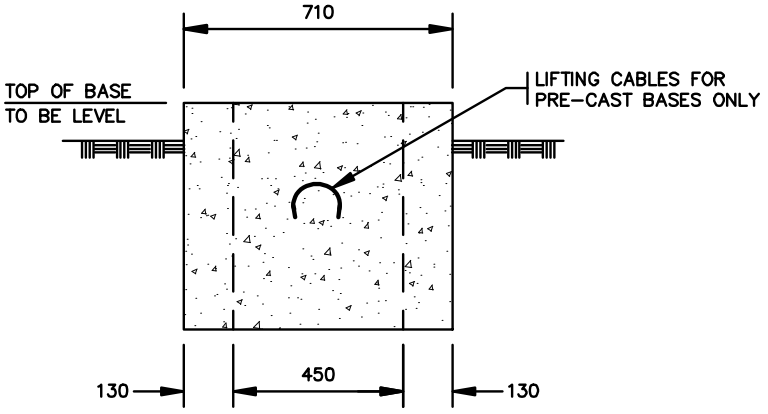
TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L3.2
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



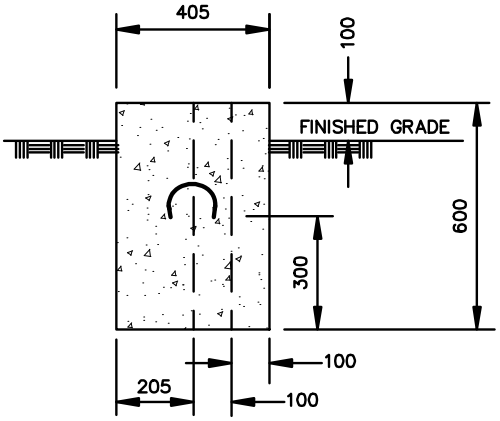
TOP VIEW



PICTORIAL VIEW



FRONT VIEW



SIDE VIEW

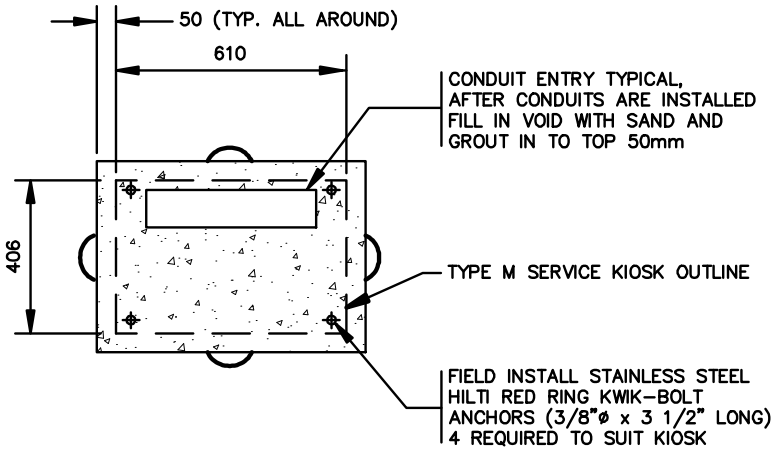
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. CONCRETE SHALL HAVE A MINIMUM STRENGTH OF 30 MPa AT 28 DAYS.
3. BASES TO BE PRE-CAST OR CAST-IN-PLACE.
4. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

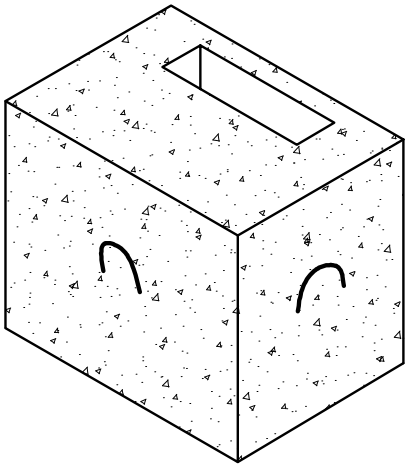
Richmond

TYPE S SERVICE KIOSK CONCRETE BASE

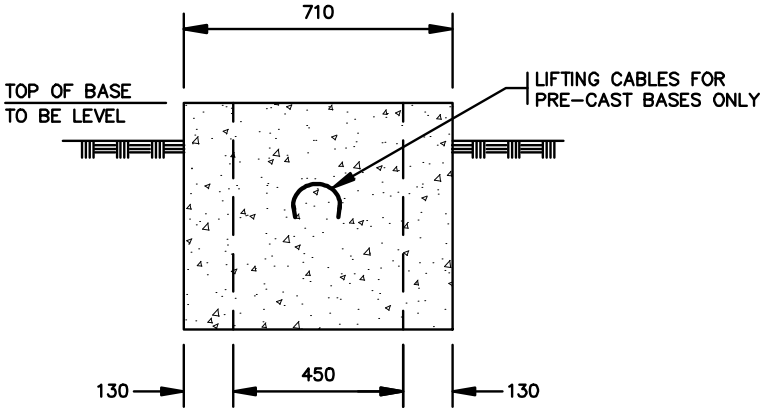
TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L4.1
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



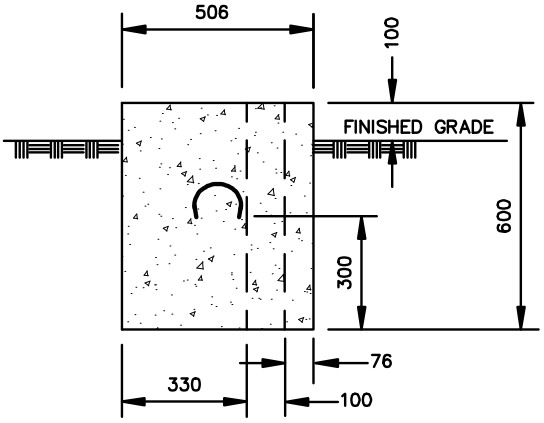
TOP VIEW



PICTORIAL VIEW



FRONT VIEW



SIDE VIEW

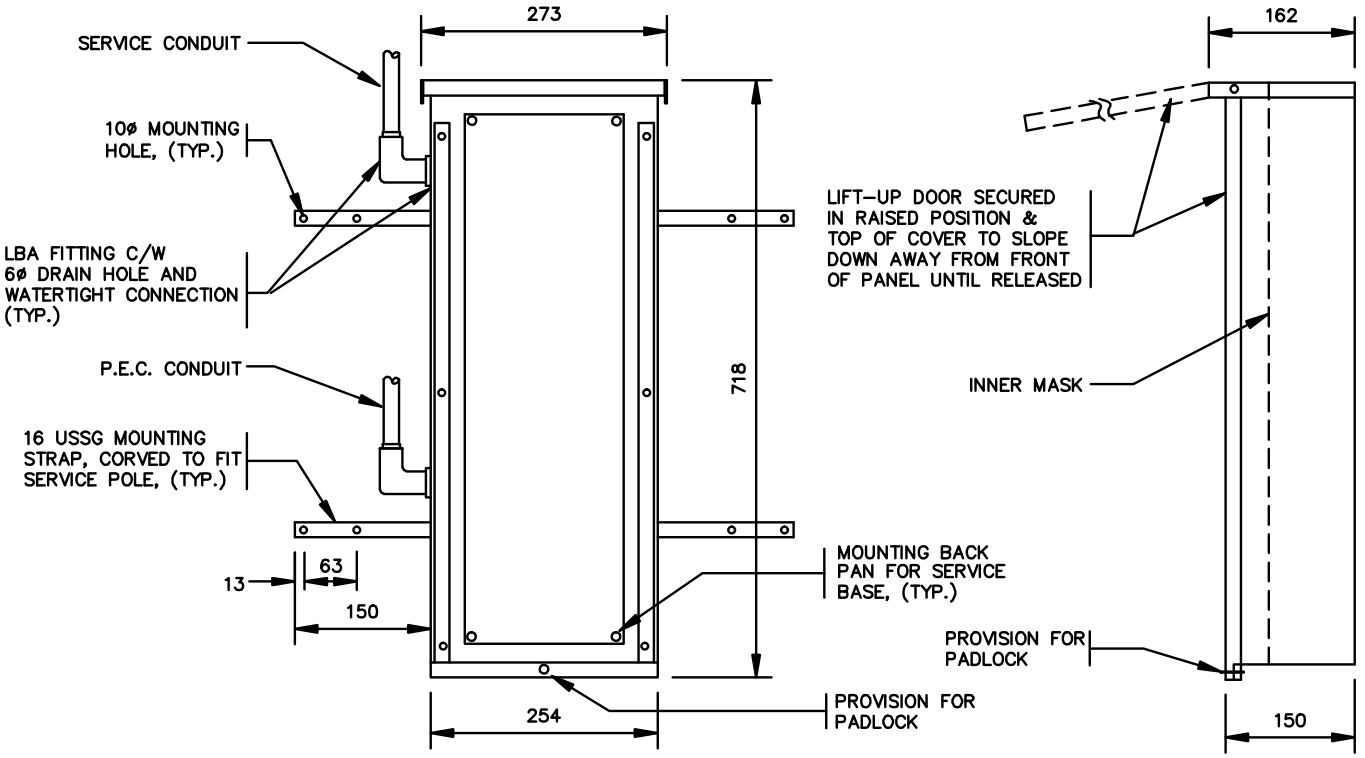
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. CONCRETE SHALL HAVE A MINIMUM STRENGTH OF 30 MPa AT 28 DAYS.
3. BASES TO BE PRE-CAST OR CAST-IN-PLACE.
4. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

Richmond

TYPE M SERVICE KIOSK CONCRETE BASE

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L4.2
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



FRONT VIEW

SIDE VIEW

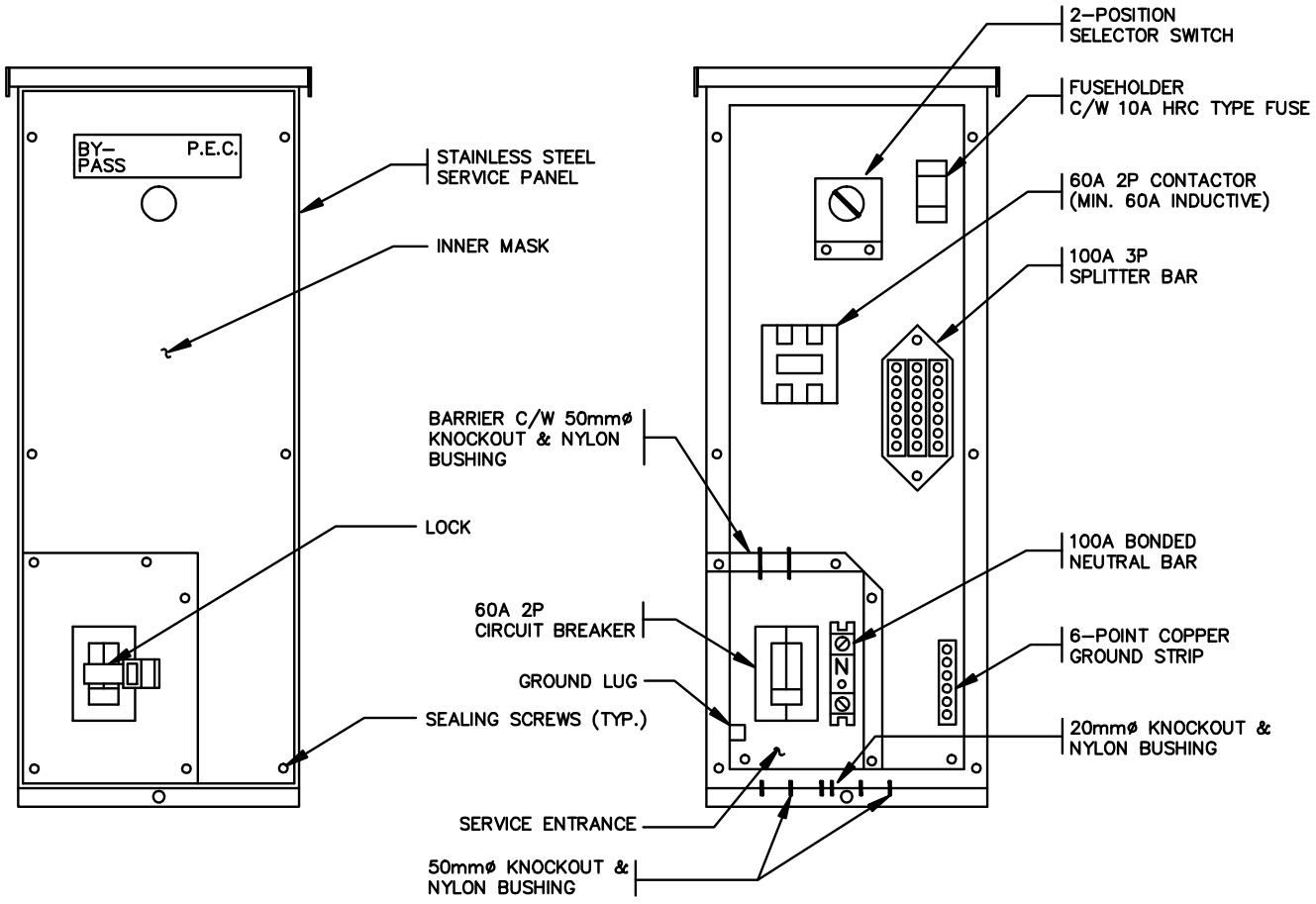
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. SERVICE PANEL TO BE FABRICATED OUT OF 12 GA. STAINLESS STEEL.
3. LBA FITTINGS, STRAIN RELIEF CONNECTOR AND MOUNTING STRAPS TO BE INSTALLED FOR UTILITY POLE MOUNTED PANEL ONLY.
4. CONTRACTOR TO OBTAIN SPECIAL PERMISSION FROM UTILITY COMPANY TO INSTALL SERVICE PANEL ON THEIR POLE.
6. SERVICE PANEL SHALL MEET THE APPROVAL OF THE PROVINCIAL ELECTRICAL INSPECTOR AND SHALL BEAR A 'PROVINCIAL INSPECTION' STICKER.
5. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

Richmond

SERVICE PANEL – POLE MOUNTED

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L5.1
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



FRONT VIEW
(COVER REMOVED)

FRONT VIEW
(COVER & MASK REMOVED)

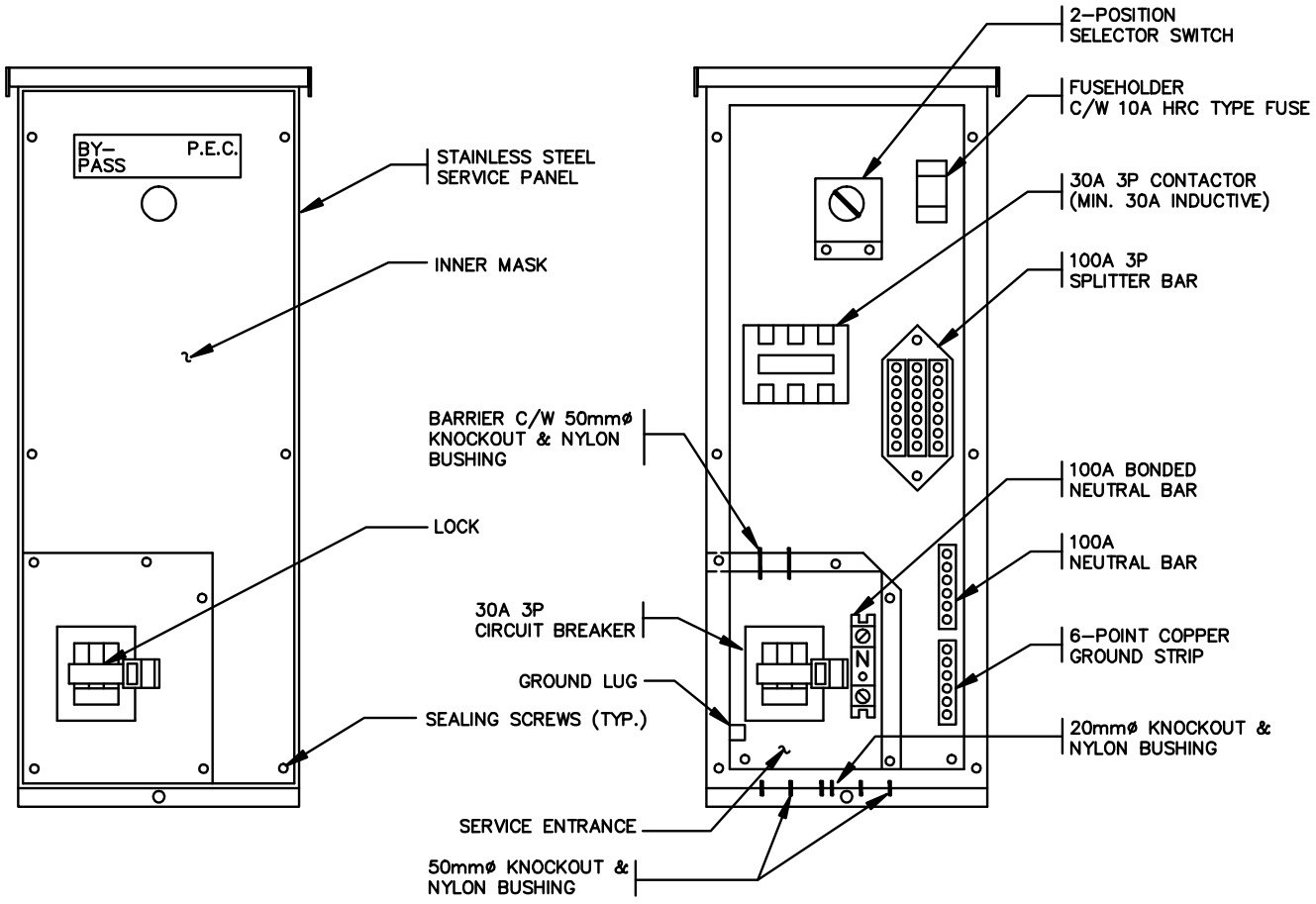
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. ALL EQUIPMENT SHALL BE RATED AT A MINIMUM OF 600 VOLTS.
3. ALL BREAKERS SHALL BE RATED AT A MINIMUM OF 18,000 AIC.
4. SERVICE PANEL SHALL MEET THE APPROVAL OF THE PROVINCIAL ELECTRICAL INSPECTOR AND SHALL BEAR A 'PROVINCIAL INSPECTION' STICKER.
5. SERVICE PANEL SHALL HAVE LAMICOID NAME PLATES INDICATING VOLTAGES & LABELING ALL EQUIPMENT.
6. SEE DRAWINGS L5.1, L5.6 & L5.8 FOR ADDITIONAL DETAILS.

Richmond

SERVICE BASE MOUNTED SERVICE PANEL 120/240 VOLT

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L5.2
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



FRONT VIEW
(COVER REMOVED)

FRONT VIEW
(COVER & MASK REMOVED)

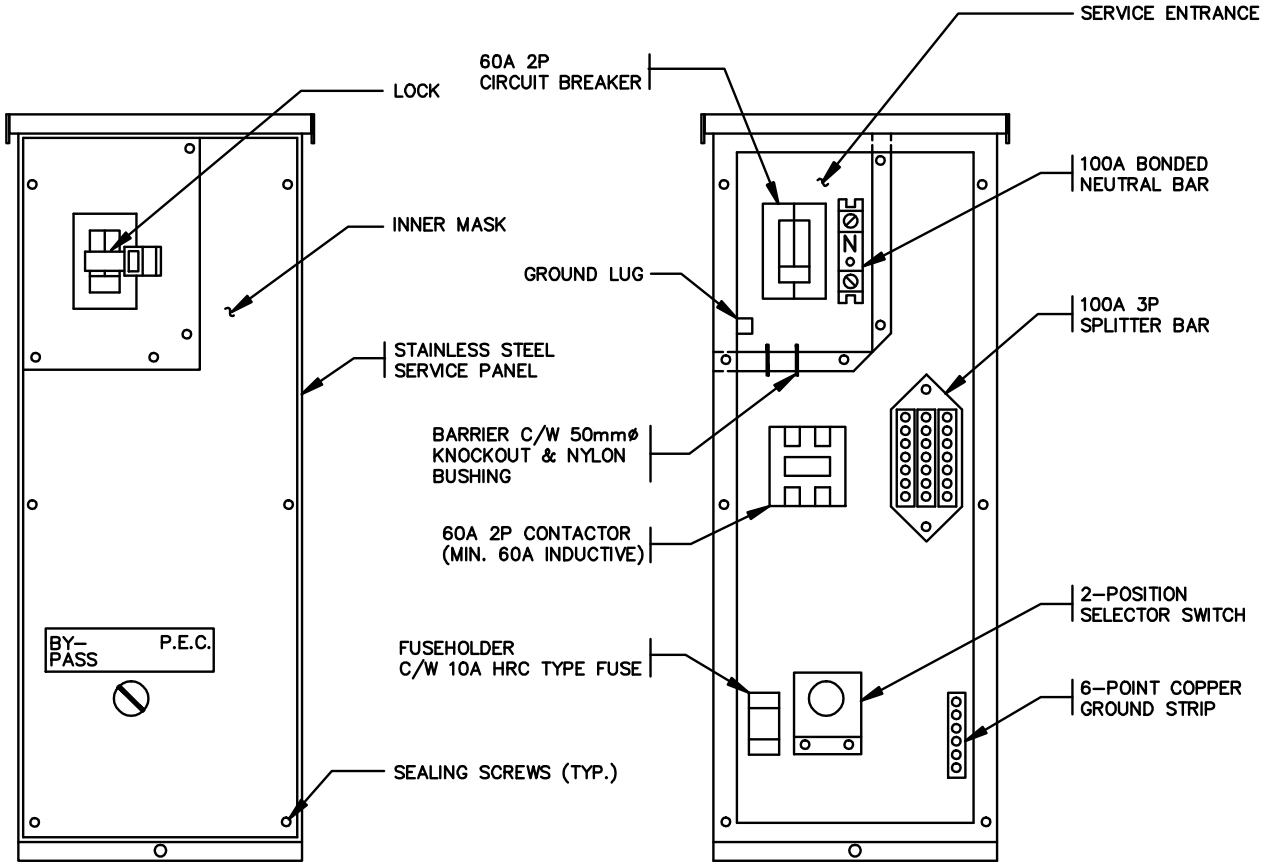
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. ALL EQUIPMENT SHALL BE RATED AT A MINIMUM OF 600 VOLTS.
3. ALL BREAKERS SHALL BE RATED AT A MINIMUM OF 18,000 AIC.
4. SERVICE PANEL SHALL MEET THE APPROVAL OF THE PROVINCIAL ELECTRICAL INSPECTOR AND SHALL BEAR A 'PROVINCIAL INSPECTION' STICKER.
5. SERVICE PANEL SHALL HAVE LAMICOID NAME PLATES INDICATING VOLTAGES & LABELING ALL EQUIPMENT.
6. SEE DRAWINGS L5.1, L5.7 & L5.8 FOR ADDITIONAL DETAILS.

Richmond

SERVICE BASE MOUNTED SERVICE PANEL 347/600 VOLT 3ø

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L5.3
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



FRONT VIEW
(COVER REMOVED)

FRONT VIEW
(COVER & MASK REMOVED)

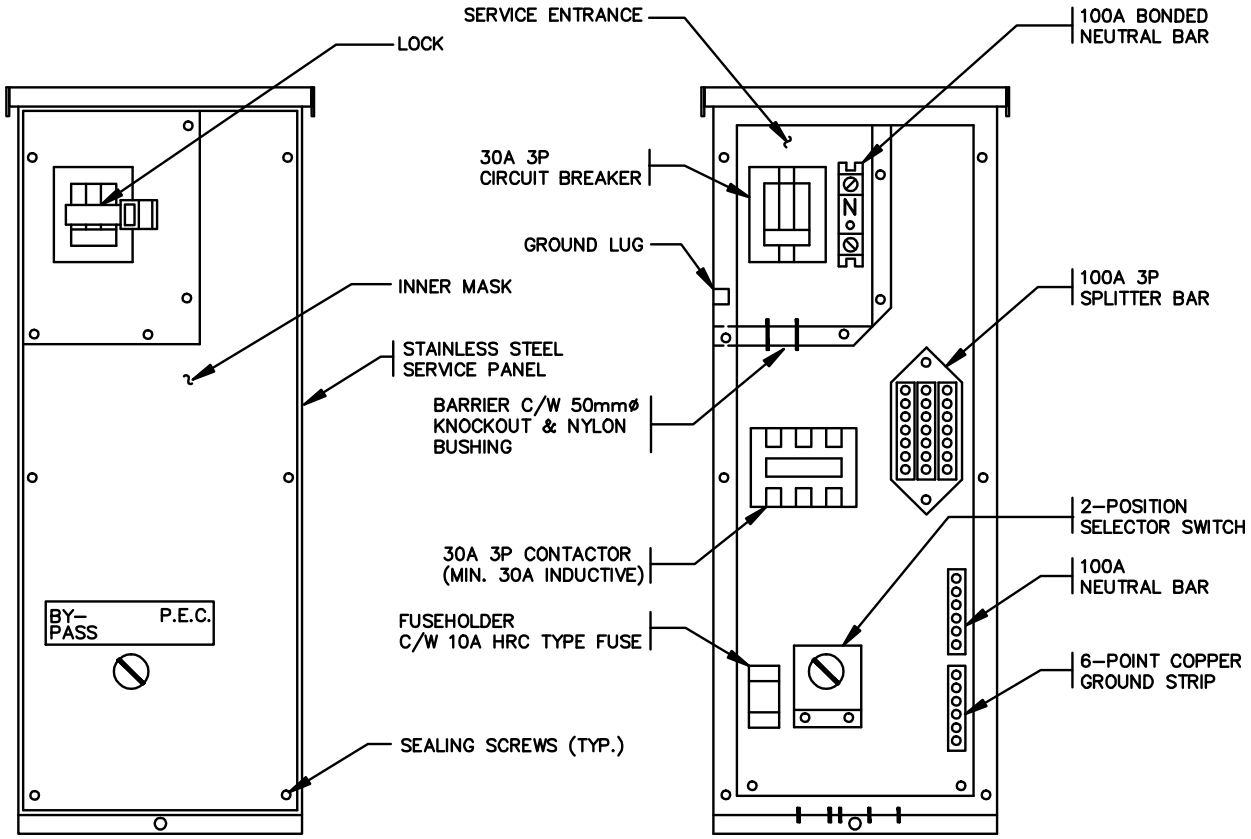
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. ALL EQUIPMENT SHALL BE RATED AT A MINIMUM OF 600 VOLTS.
3. ALL BREAKERS SHALL BE RATED AT A MINIMUM OF 18,000 AIC.
4. SERVICE PANEL SHALL MEET THE APPROVAL OF THE PROVINCIAL ELECTRICAL INSPECTOR AND SHALL BEAR A 'PROVINCIAL INSPECTION' STICKER.
5. SERVICE PANEL SHALL HAVE LAMICOID NAME PLATES INDICATING VOLTAGES & LABELING ALL EQUIPMENT.
6. SEE DRAWINGS L5.1, L5.6 & L5.9 FOR ADDITIONAL DETAILS.
7. CONDUIT ENTRY AT SERVICE PANEL TO BE PROVIDED BY CONTRACTOR.

Richmond

SERVICE POLE MOUNTED SERVICE PANEL 120/240 VOLT

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L5.4
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



FRONT VIEW
(COVER REMOVED)

FRONT VIEW
(COVER & MASK REMOVED)

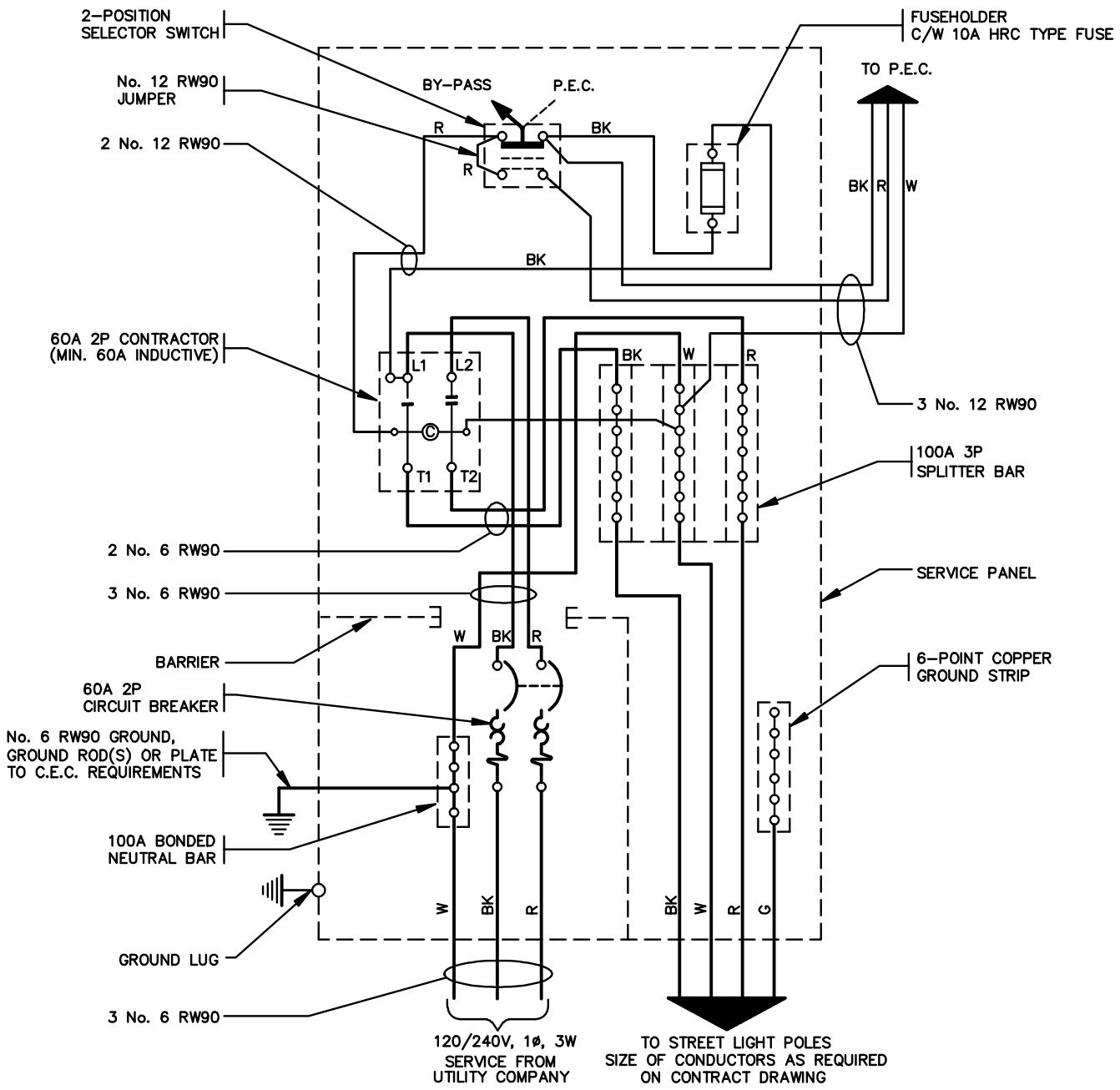
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. ALL EQUIPMENT SHALL BE RATED AT A MINIMUM OF 600 VOLTS.
3. ALL BREAKERS SHALL BE RATED AT A MINIMUM OF 18,000 AIC.
4. SERVICE PANEL SHALL MEET THE APPROVAL OF THE PROVINCIAL ELECTRICAL INSPECTOR AND SHALL BEAR A 'PROVINCIAL INSPECTION' STICKER.
5. SERVICE PANEL SHALL HAVE LAMICOID NAME PLATES INDICATING VOLTAGES & LABELING ALL EQUIPMENT.
6. SEE DRAWINGS L5.1, L5.7 & L5.9 FOR ADDITIONAL DETAILS.
7. CONDUIT ENTRY AT SERVICE PANEL TO BE PROVIDED BY CONTRACTOR.

Richmond

SERVICE POLE MOUNTED
SERVICE PANEL 347/600 VOLT 3ø

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L5.5
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



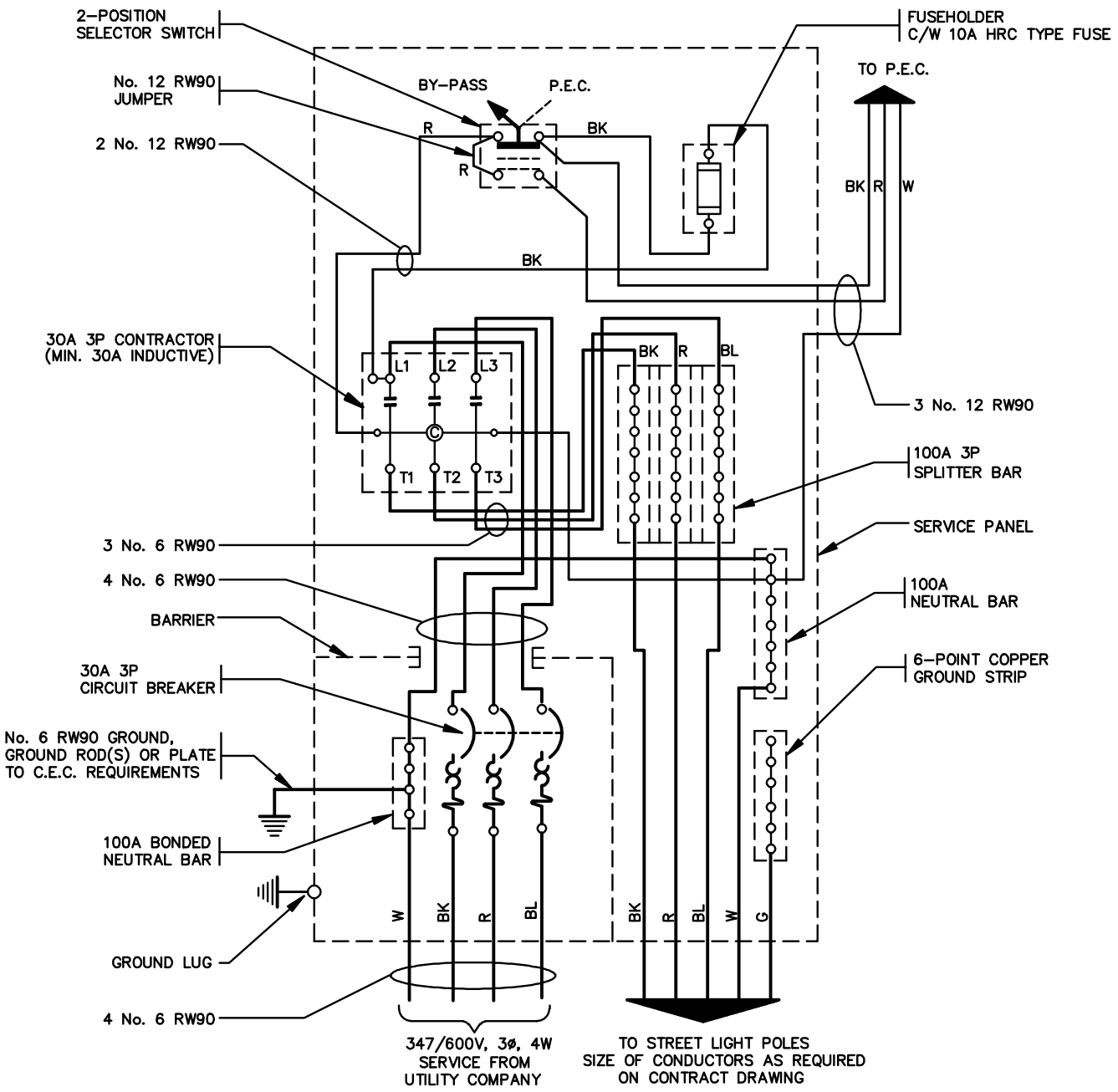
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. SERVICE BASE MOUNTED PANEL WIRING DIAGRAM SHOWN. UTILITY POLE MOUNTED PANEL WIRING IS SAME AS ABOVE, EXCEPT FOR LOCATION OF EQUIPMENT, BARRIER AND UTILITY COMPANY SERVICE.
3. ALL EQUIPMENT SHALL BE RATED AT A MINIMUM OF 600 VOLTS.
4. ALL BREAKERS SHALL BE RATED AT A MINIMUM OF 18,000 AIC.
5. SERVICE PANEL SHALL MEET THE APPROVAL OF THE PROVINCIAL ELECTRICAL INSPECTOR AND SHALL BEAR A 'PROVINCIAL INSPECTION' STICKER.
6. SEE DRAWINGS L5.1, L5.2 & L5.4 FOR ADDITIONAL DETAILS.

Richmond

SERVICE PANEL
WIRING DIAGRAM 120/240 VOLT
(FOR STANDARD LIGHTING)

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L5.6
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



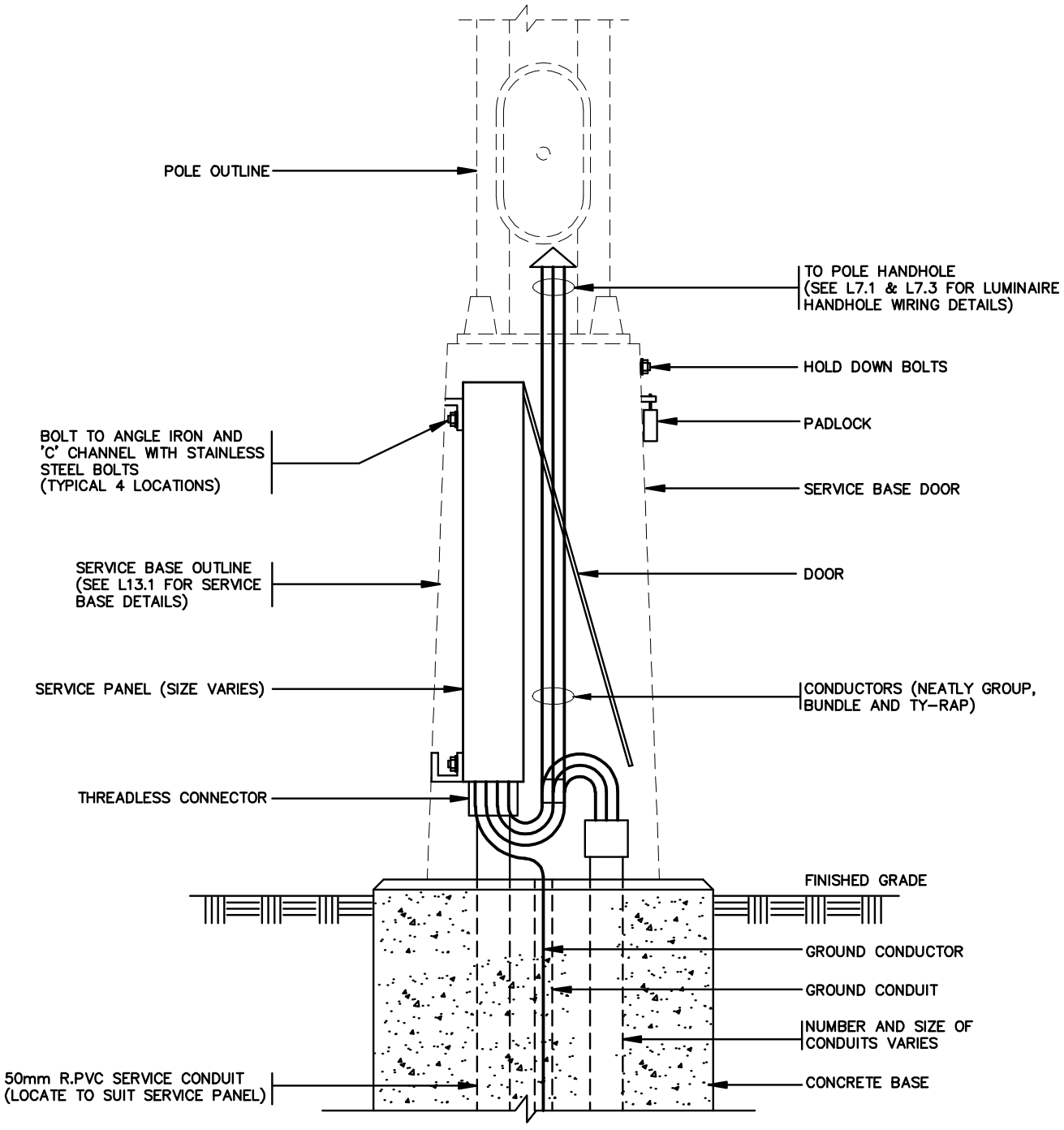
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. SERVICE BASE MOUNTED PANEL WIRING DIAGRAM SHOWN. UTILITY POLE MOUNTED PANEL WIRING IS SAME AS ABOVE, EXCEPT FOR LOCATION OF EQUIPMENT, BARRIER AND UTILITY COMPANY SERVICE.
3. ALL EQUIPMENT SHALL BE RATED AT A MINIMUM OF 600 VOLTS.
4. ALL BREAKERS SHALL BE RATED AT A MINIMUM OF 18,000 AIC.
5. SERVICE PANEL SHALL MEET THE APPROVAL OF THE PROVINCIAL ELECTRICAL INSPECTOR AND SHALL BEAR A 'PROVINCIAL INSPECTION' STICKER.
6. SEE DRAWINGS L5.1, L5.3 & L5.5 FOR ADDITIONAL DETAILS.

Richmond

SERVICE PANEL
WIRING DIAGRAM 347/600 VOLT 3ø
(FOR STANDARD LIGHTING)

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L5.7
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



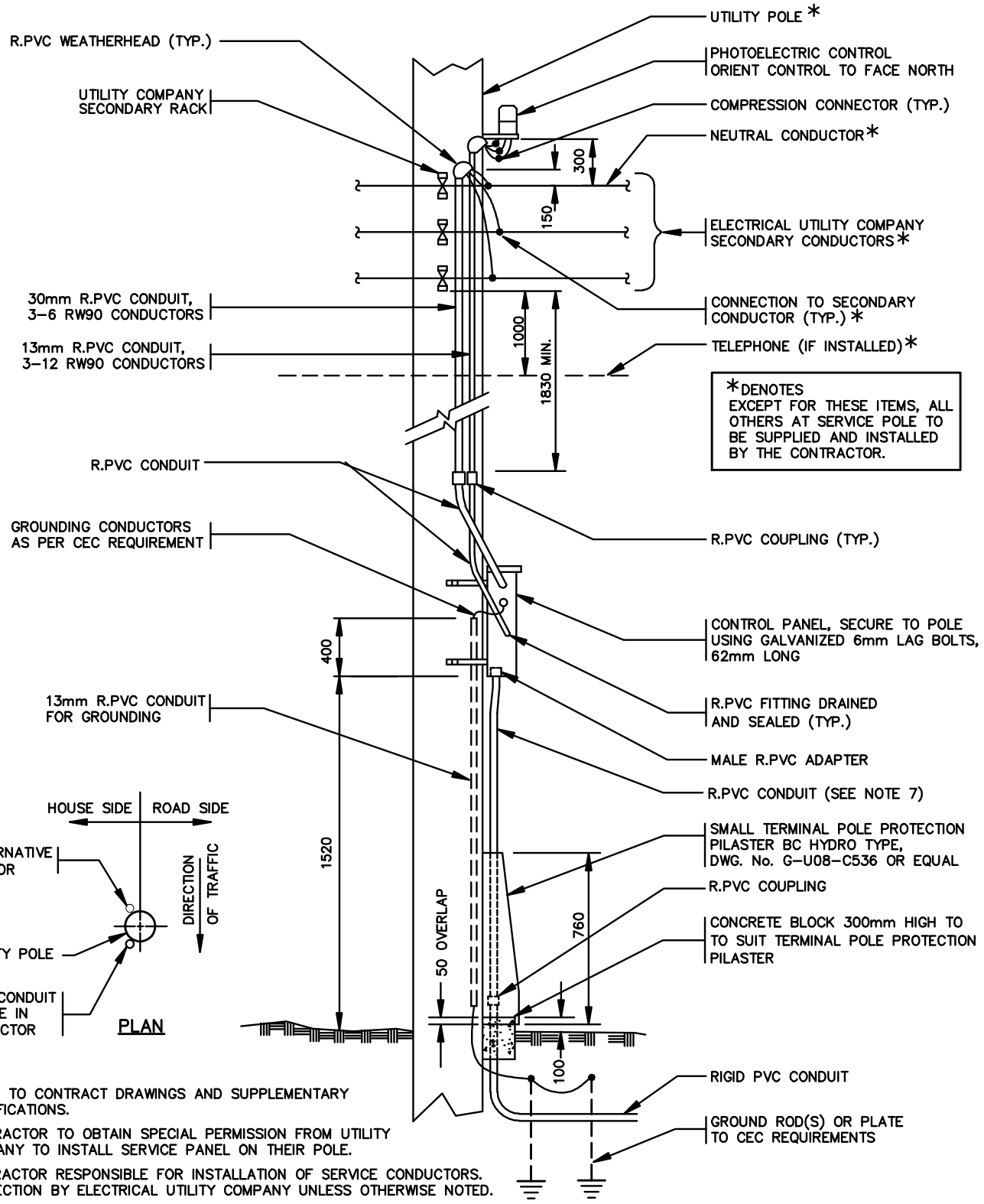
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.

Richmond

SERVICE PANEL IN SERVICE BASE

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L5.8
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



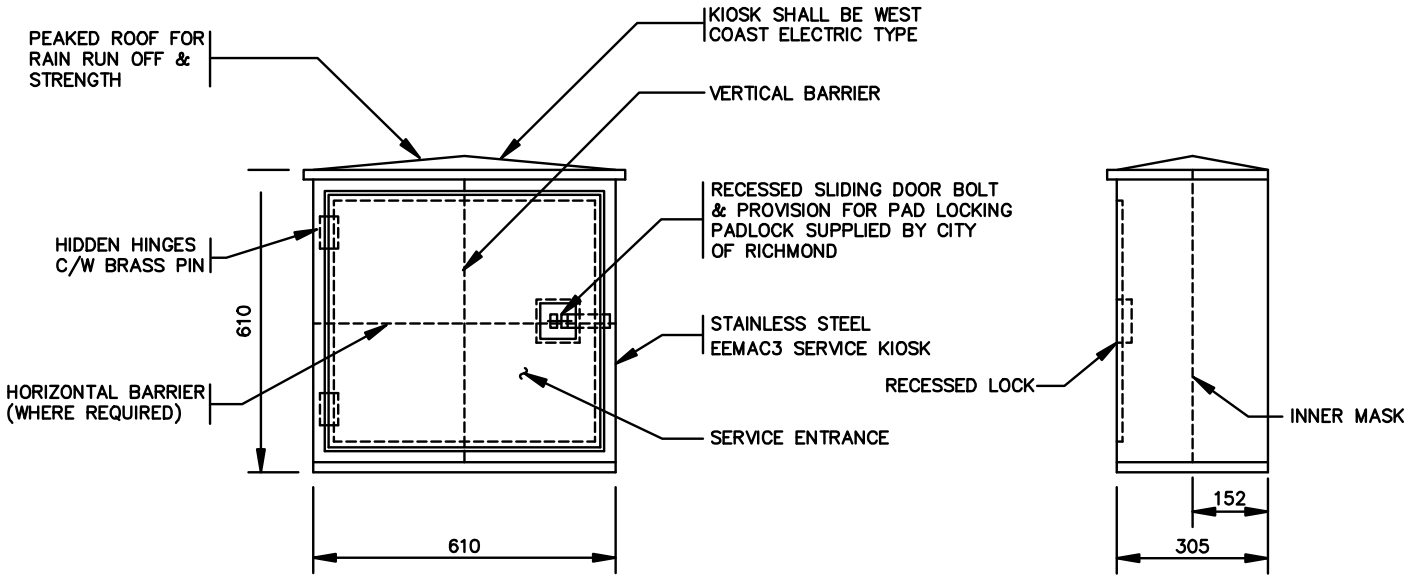
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. CONTRACTOR TO OBTAIN SPECIAL PERMISSION FROM UTILITY COMPANY TO INSTALL SERVICE PANEL ON THEIR POLE.
3. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF SERVICE CONDUCTORS. CONNECTION BY ELECTRICAL UTILITY COMPANY UNLESS OTHERWISE NOTED.
4. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
5. MOUNT CONDUIT ON CONCRETE POLE WITH 3/4" STAINLESS STEEL BANDING.
6. SERVICE CONDUCTORS AS DETAILED ON CONTRACT DRAWINGS.
7. CONDUIT UP POLE TO SUIT SERVICE CONDUCTORS (MINIMUM 30mmø).

Richmond

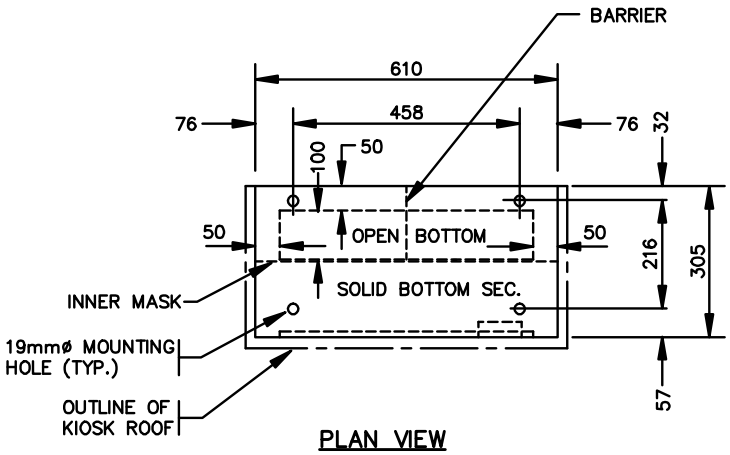
POLE MOUNTED SERVICE PANEL ON ELECTRICAL UTILITY POLE

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L5.9
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



FRONT VIEW

SIDE VIEW



PLAN VIEW

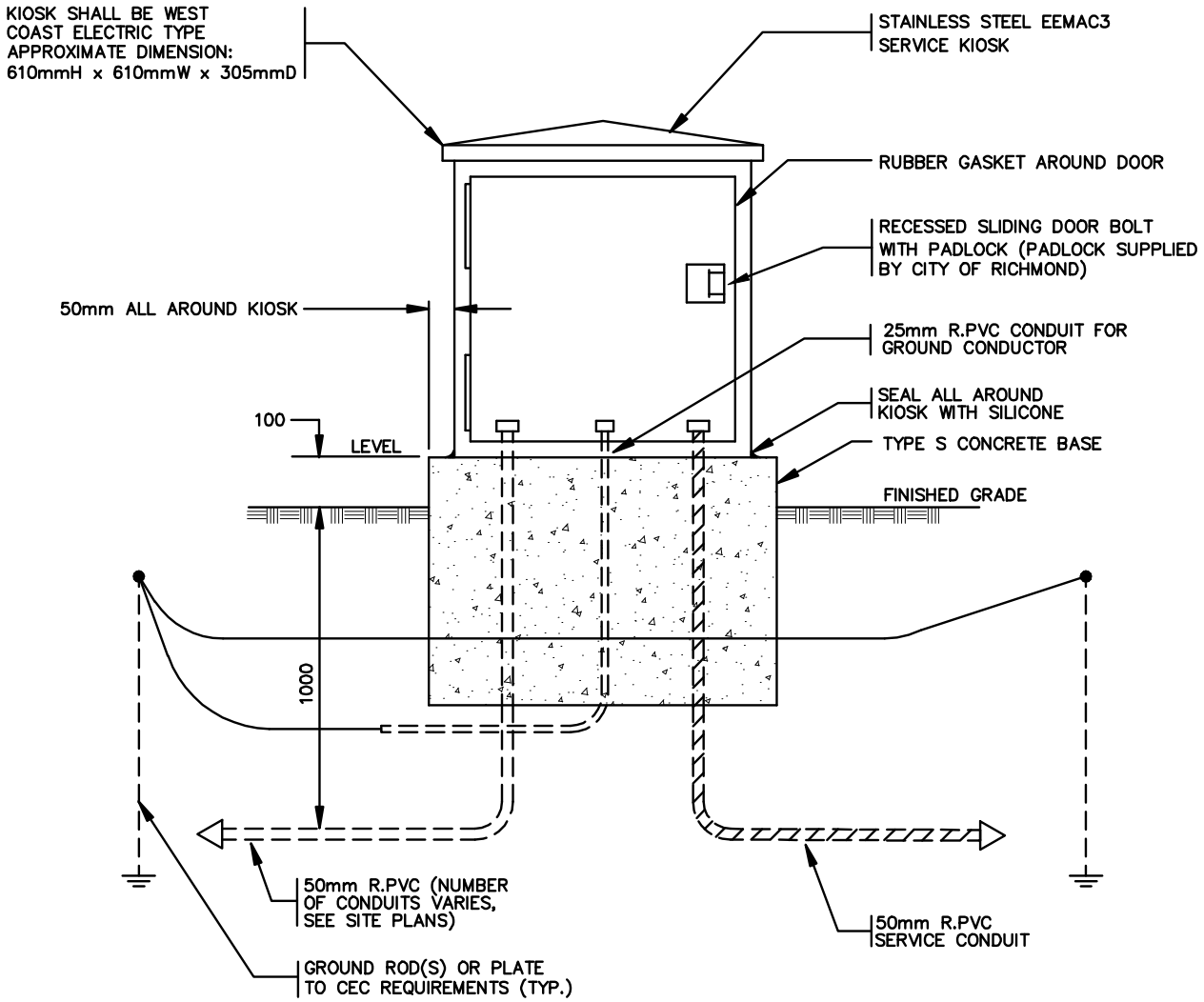
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. CONTRACTOR SHALL SUPPLY SHOP DRAWINGS FOR APPROVAL PRIOR TO MANUFACTURING.
3. KIOSK TO BE FABRICATED OUT OF 12 GA. STAINLESS STEEL.
4. KIOSK DOOR TO HAVE 6mm NEOPRENE GASKET ALL AROUND.
5. SERVICE PANEL SHALL HAVE LAMICOID NAME PLATES INDICATING VOLTAGES & LABELING ALL EQUIPMENT.
6. KIOSK SHALL MEET THE APPROVAL OF THE PROVINCIAL ELECTRICAL INSPECTOR AND SHALL BEAR A 'PROVINCIAL INSPECTION' STICKER.
7. A TYPE WRITTEN PANEL DIRECTORY SHALL BE LOCATED ON THE INSIDE OF THE PANEL DOOR.
8. KIOSK SHALL BE PAINTED IN COLOUR SPECIFIED BY CITY OF RICHMOND.
9. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

Richmond

TYPE S SERVICE KIOSK (FOR DECORATIVE LIGHTING)

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L6.1
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



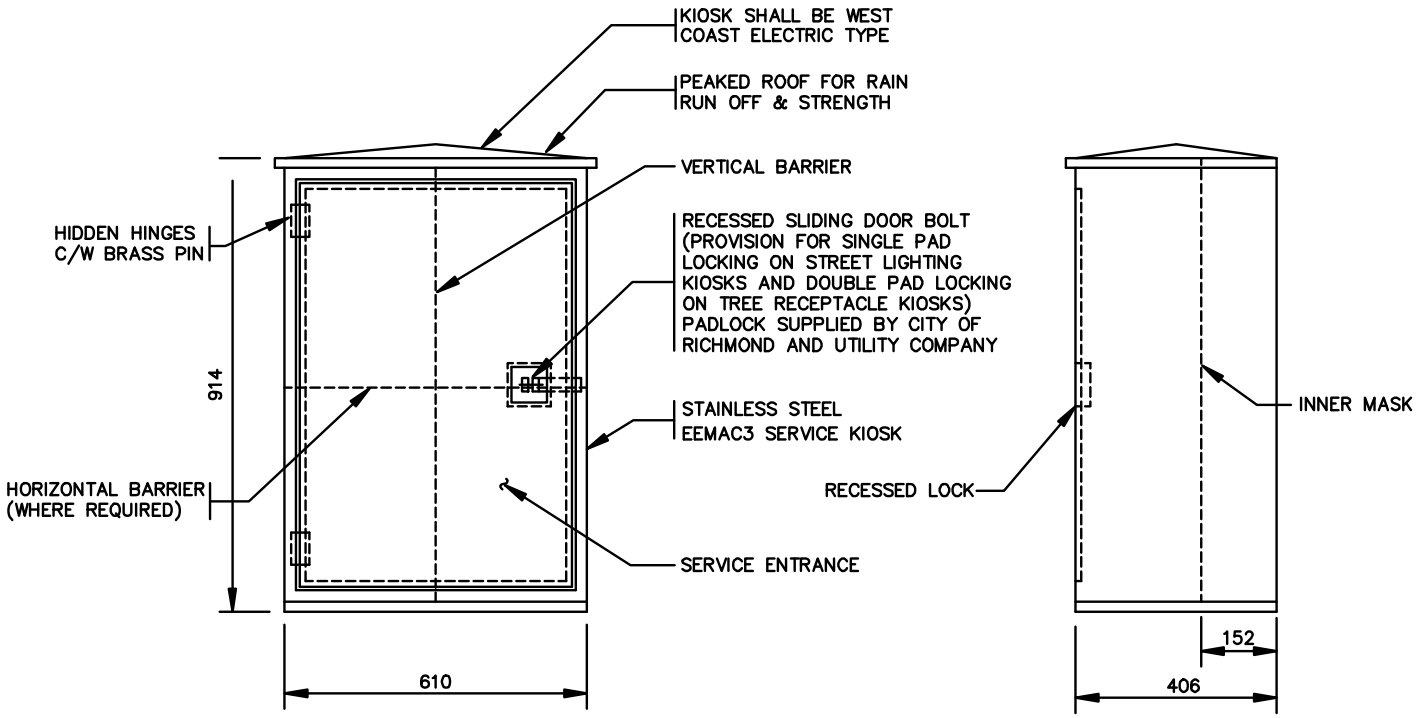
NOTES

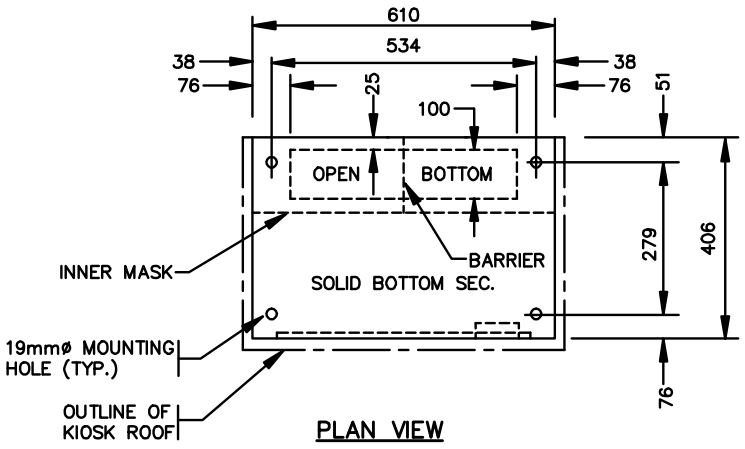
1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. CONTRACTOR SHALL SUPPLY KIOSK SHOP DRAWINGS FOR APPROVAL PRIOR TO MANUFACTURING.
3. KIOSK SHALL BE SECURED TO CONCRETE BASE WITH A MINIMUM OF CONCRETE INSERTS.
4. LOCATE CONDUIT IN CONCRETE BASE TO SUIT KIOSK EQUIPMENT.
5. KIOSK SHALL MEET THE APPROVAL OF THE PROVINCIAL ELECTRICAL INSPECTOR AND SHALL BEAR A 'PROVINCIAL INSPECTION' STICKER.
6. SERVICE PANEL SHALL HAVE LAMICOID NAME PLATES INDICATING VOLTAGES & LABELING ALL EQUIPMENT.
7. A TYPE WRITTEN PANEL DIRECTORY SHALL BE LOCATED ON THE INSIDE OF THE PANEL DOOR.
8. KIOSK SHALL BE PAINTED IN COLOUR SPECIFIED BY CITY OF RICHMOND.
9. ALL BREAKERS SHALL BE RATED AT A MINIMUM OF 18,000 AIC.
10. ALL EQUIPMENT SHALL BE RATED AT A MINIMUM OF 600 VOLTS.
11. SEE DRAWINGS L4.1 & L6.1 FOR ADDITIONAL DETAILS.
12. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

Richmond

TYPE S SERVICE KIOSK & INSTALLATION DETAIL (FOR DECORATIVE LIGHTING)

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L6.2
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1





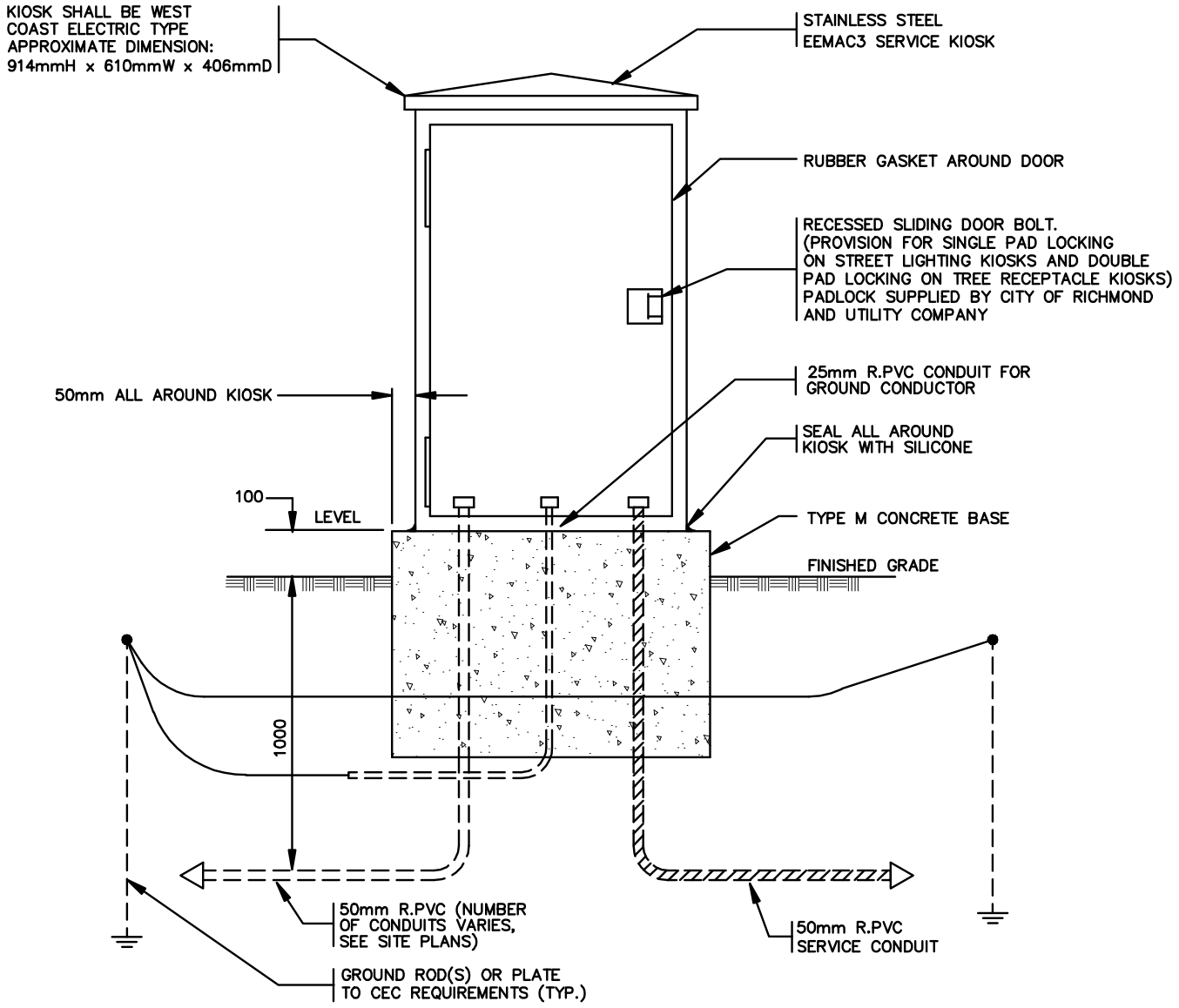
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. CONTRACTOR SHALL SUPPLY SHOP DRAWINGS FOR APPROVAL PRIOR TO MANUFACTURING.
3. KIOSK TO BE FABRICATED OUT OF 12 GA. STAINLESS STEEL.
4. KIOSK DOOR TO HAVE 6mm NEOPRENE GASKET ALL AROUND.
5. SERVICE PANEL SHALL HAVE LAMICOID NAME PLATES INDICATING VOLTAGES & LABELING ALL EQUIPMENT.
6. KIOSK SHALL MEET THE APPROVAL OF THE PROVINCIAL ELECTRICAL INSPECTOR AND SHALL BEAR A 'PROVINCIAL INSPECTION' STICKER.
7. A TYPE WRITTEN PANEL DIRECTORY SHALL BE LOCATED ON THE INSIDE OF THE PANEL DOOR.
8. KIOSK SHALL BE PAINTED IN COLOUR SPECIFIED BY CITY OF RICHMOND.
9. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

Richmond

TYPE M SERVICE KIOSK
(FOR CITY CENTRE LIGHTING & TREE RECEPTACLES)

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L6.3
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



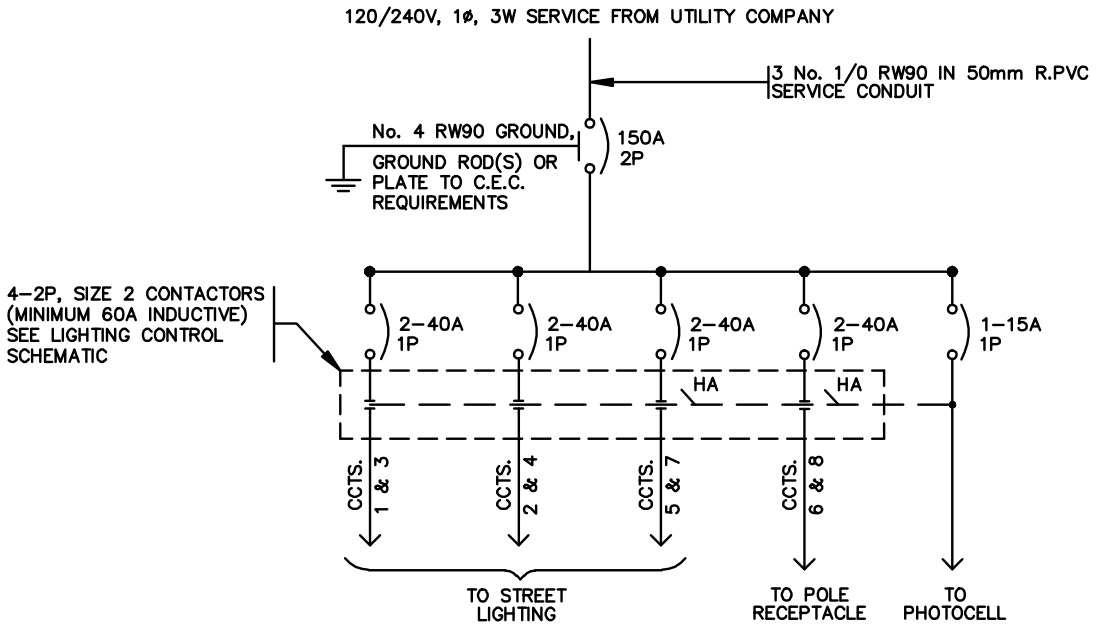
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. CONTRACTOR SHALL SUPPLY KIOSK SHOP DRAWINGS FOR APPROVAL PRIOR TO MANUFACTURING.
3. KIOSK SHALL BE SECURED TO CONCRETE BASE WITH A MINIMUM OF 4 CONCRETE INSERTS.
4. LOCATE CONDUIT IN CONCRETE BASE TO SUIT KIOSK EQUIPMENT.
5. KIOSK SHALL MEET THE APPROVAL OF THE PROVINCIAL ELECTRICAL INSPECTOR AND SHALL BEAR A 'PROVINCIAL INSPECTION' STICKER.
6. SERVICE PANEL SHALL HAVE LAMICOID NAME PLATES INDICATING VOLTAGES & LABELING ALL EQUIPMENT.
7. A TYPE WRITTEN PANEL DIRECTORY SHALL BE LOCATED ON THE INSIDE OF THE PANEL DOOR.
8. KIOSK SHALL BE PAINTED IN COLOUR SPECIFIED BY CITY OF RICHMOND.
9. ALL BREAKERS SHALL BE RATED AT A MINIMUM OF 18,000 AIC.
10. ALL EQUIPMENT SHALL BE RATED AT A MINIMUM OF 600 VOLTS.
11. SEE DRAWINGS L4.2 & L6.3 FOR ADDITIONAL DETAILS.
12. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

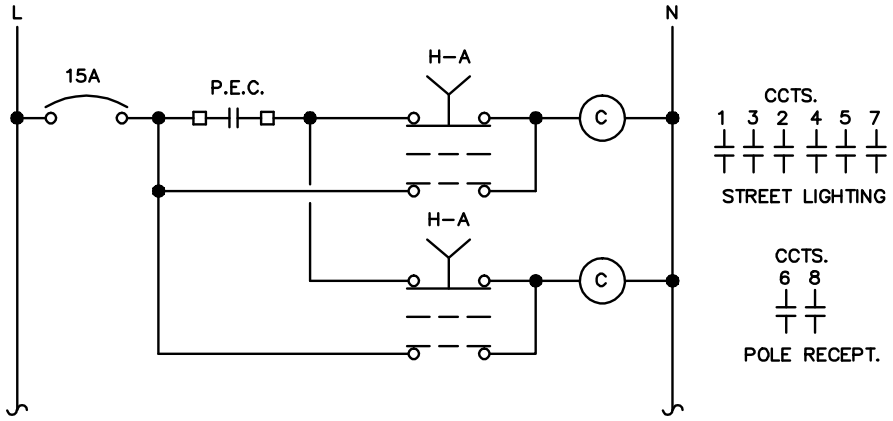
Richmond

TYPE M SERVICE KIOSK & INSTALLATION DETAIL
(FOR CITY CENTRE LIGHTING & TREE RECEPTACLES)

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L6.4
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



SINGLE LINE DIAGRAM
(STREET LIGHTING KIOSK)



LIGHTING CONTROL SCHEMATIC
(STREET LIGHTING KIOSK)

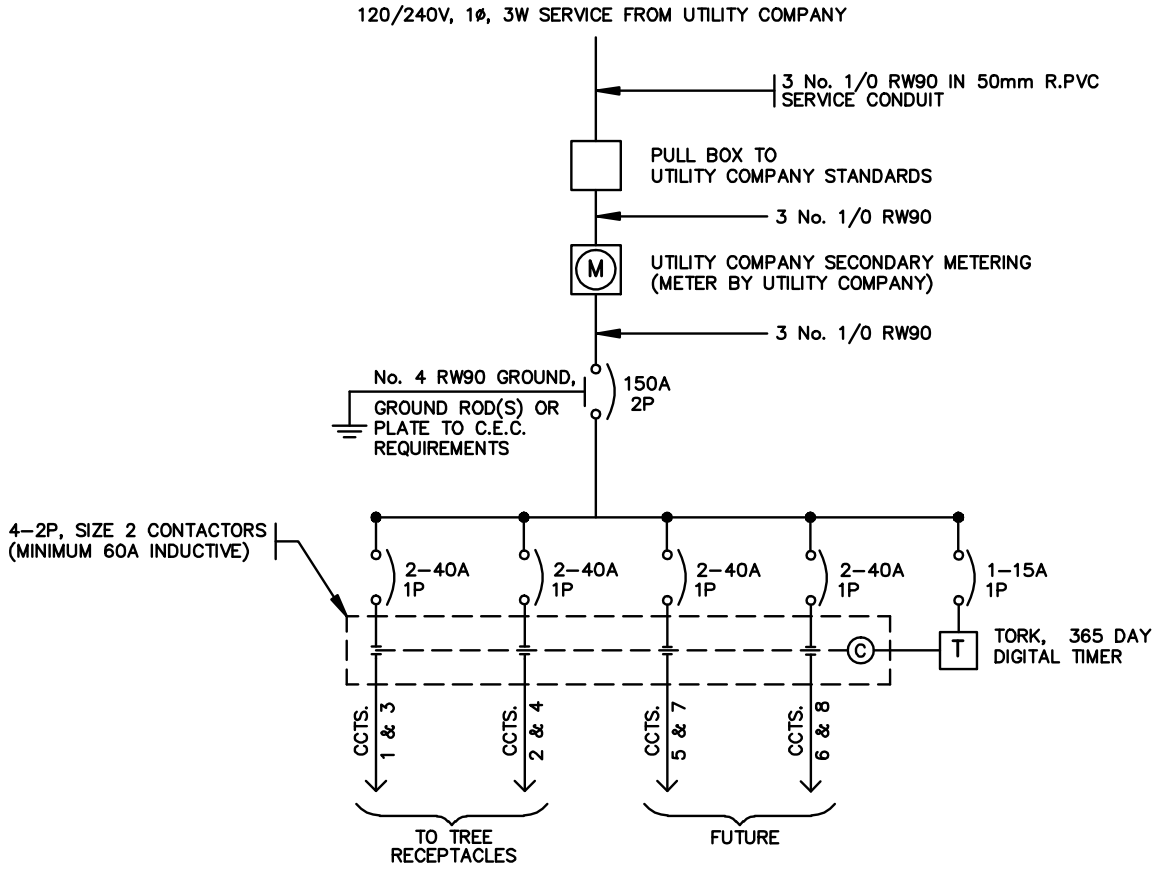
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. ALL EQUIPMENT SHALL BE RATED AT A MINIMUM OF 600 VOLTS.
3. ALL BREAKERS SHALL BE RATED AT A MINIMUM OF 18,000 AIC.
4. SERVICE PANEL SHALL MEET THE APPROVAL OF THE PROVINCIAL ELECTRICAL INSPECTOR AND SHALL BEAR A 'PROVINCIAL INSPECTION' STICKER.
5. INSTALL IN A TYPE M SERVICE KIOSK, SEE DRAWINGS L6.3 & L6.4 FOR ADDITIONAL DETAILS.
6. CONTRACTOR SHALL SUPPLY KIOSK SHOP DRAWINGS FOR APPROVAL PRIOR TO MANUFACTURING.
7. TO BE MANUFACTURED WITH TYPE S OR TYPE M SERVICE KIOSK.

Richmond

SERVICE KIOSK
SINGLE LINE DIAGRAM 120/240 VOLT
(FOR CITY CENTRE LIGHTING)

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L6.5
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE :	SHEET No. : 1 OF 1



SINGLE LINE DIAGRAM
(TREE RECEPTACLE KIOSK)

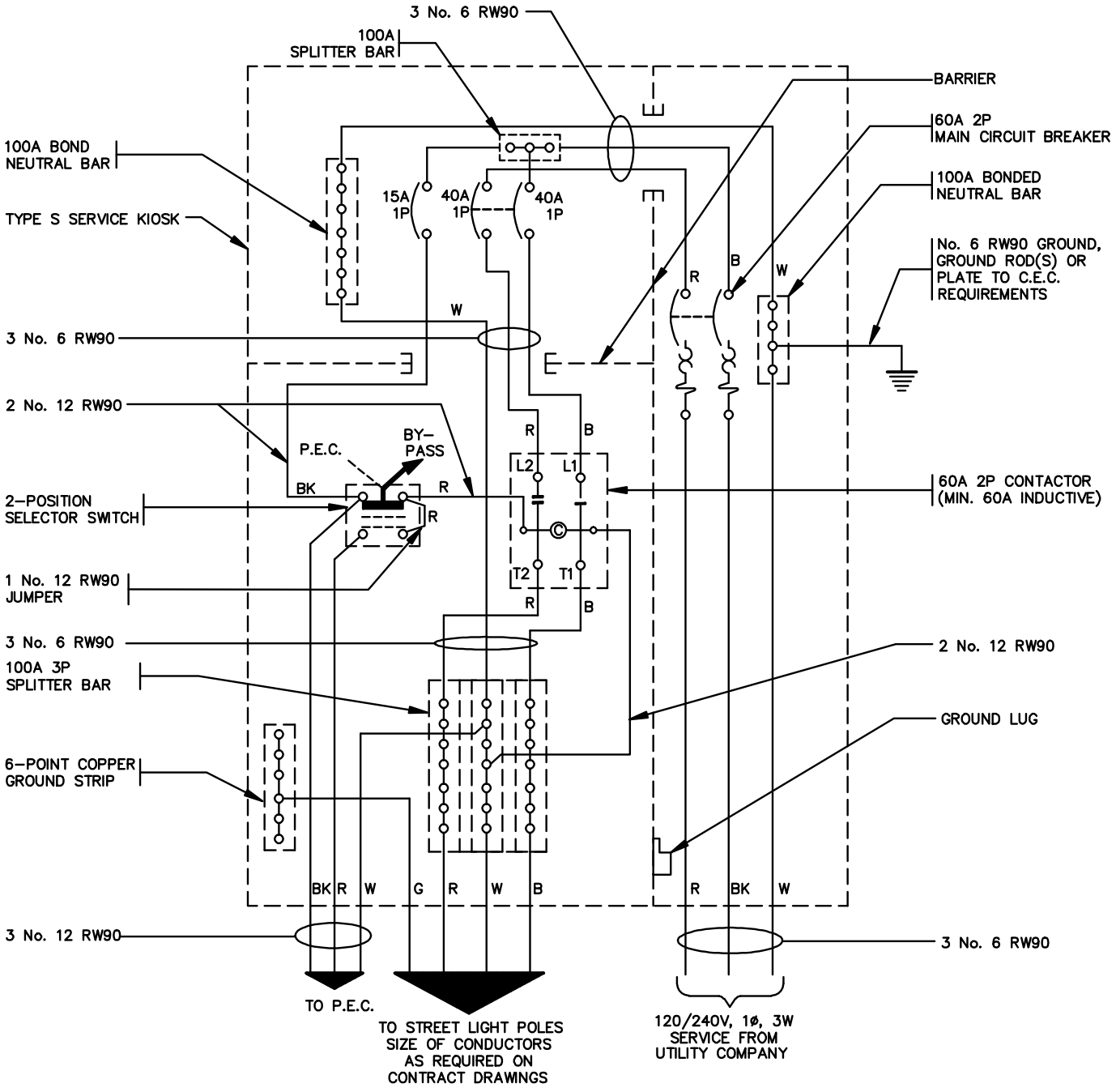
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. ALL EQUIPMENT SHALL BE RATED AT A MINIMUM OF 600 VOLTS.
3. ALL BREAKERS SHALL BE RATED AT A MINIMUM OF 18,000 AIC.
4. SERVICE PANEL SHALL MEET THE APPROVAL OF THE PROVINCIAL ELECTRICAL INSPECTOR AND SHALL BEAR A 'PROVINCIAL INSPECTION' STICKER.
5. INSTALL IN A TYPE M SERVICE KIOSK, SEE DRAWINGS L6.3 & L6.4 FOR ADDITIONAL DETAILS.
6. CONTRACTOR SHALL SUPPLY KIOSK SHOP DRAWINGS FOR APPROVAL PRIOR TO MANUFACTURING.
7. TO BE MANUFACTURED WITH TYPE M SERVICE KIOSK.

Richmond

SERVICE KIOSK
SINGLE LINE DIAGRAM 120/240 VOLT
(FOR TREE RECEPTACLES)

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L6.6
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



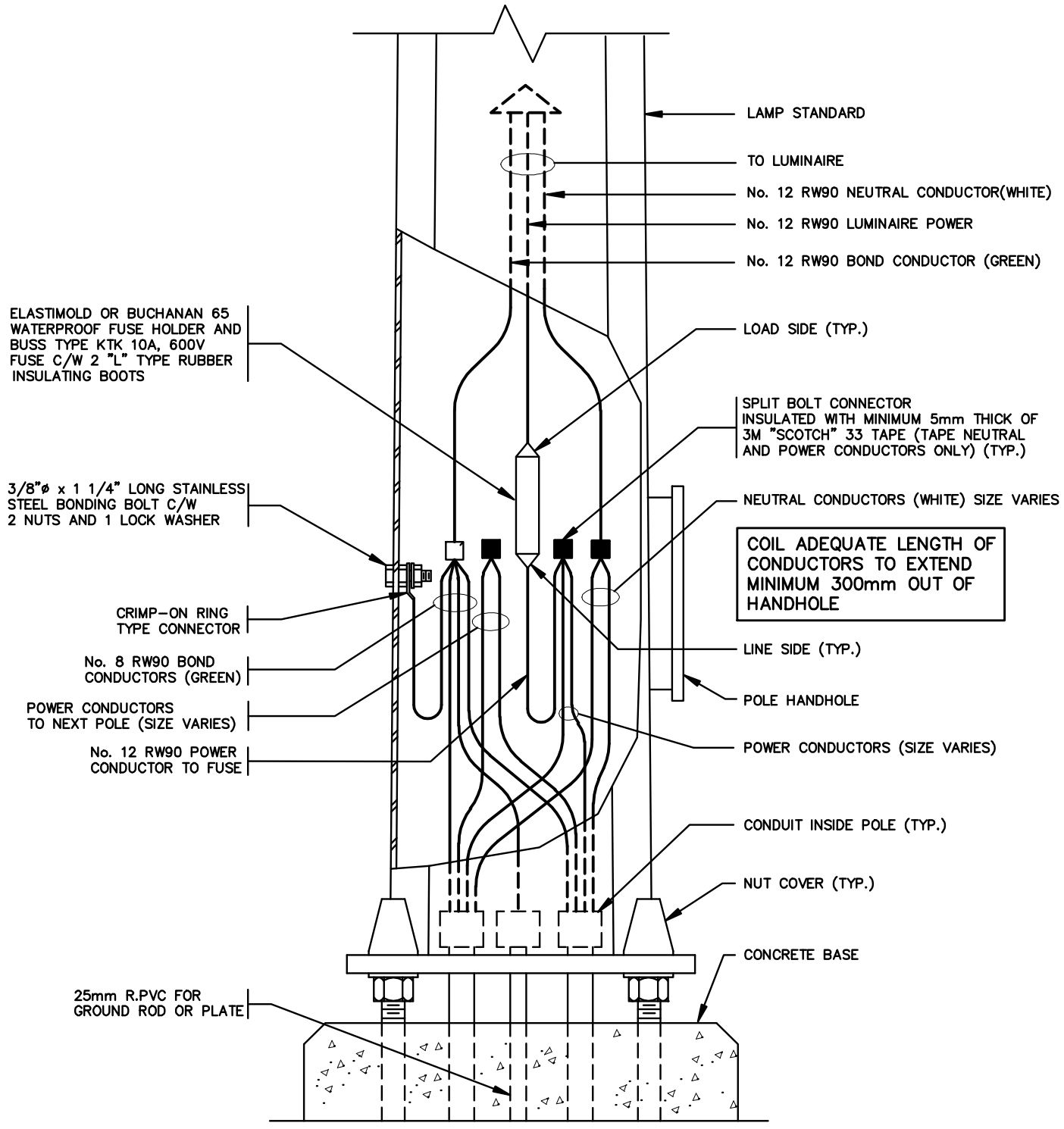
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. ALL EQUIPMENT SHALL BE RATED AT A MINIMUM OF 600 VOLTS.
3. ALL BREAKERS SHALL BE RATED AT A MINIMUM OF 18,000 AIC.
4. SERVICE PANEL SHALL MEET THE APPROVAL OF THE PROVINCIAL ELECTRICAL INSPECTOR AND SHALL BEAR A 'PROVINCIAL INSPECTION' STICKER.
5. INSTALL IN A TYPE S SERVICE KIOSK, SEE DRAWINGS L6.1 & L6.2 FOR ADDITIONAL DETAILS.
6. CONTRACTOR SHALL SUPPLY KIOSK SHOP DRAWINGS FOR APPROVAL PRIOR TO MANUFACTURING.
7. TO BE MANUFACTURED WITH TYPE S SERVICE KIOSK.

Richmond

SERVICE KIOSK
WIRING DIAGRAM 120/240 VOLT
(FOR DECORATIVE LIGHTING)

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L6.7
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



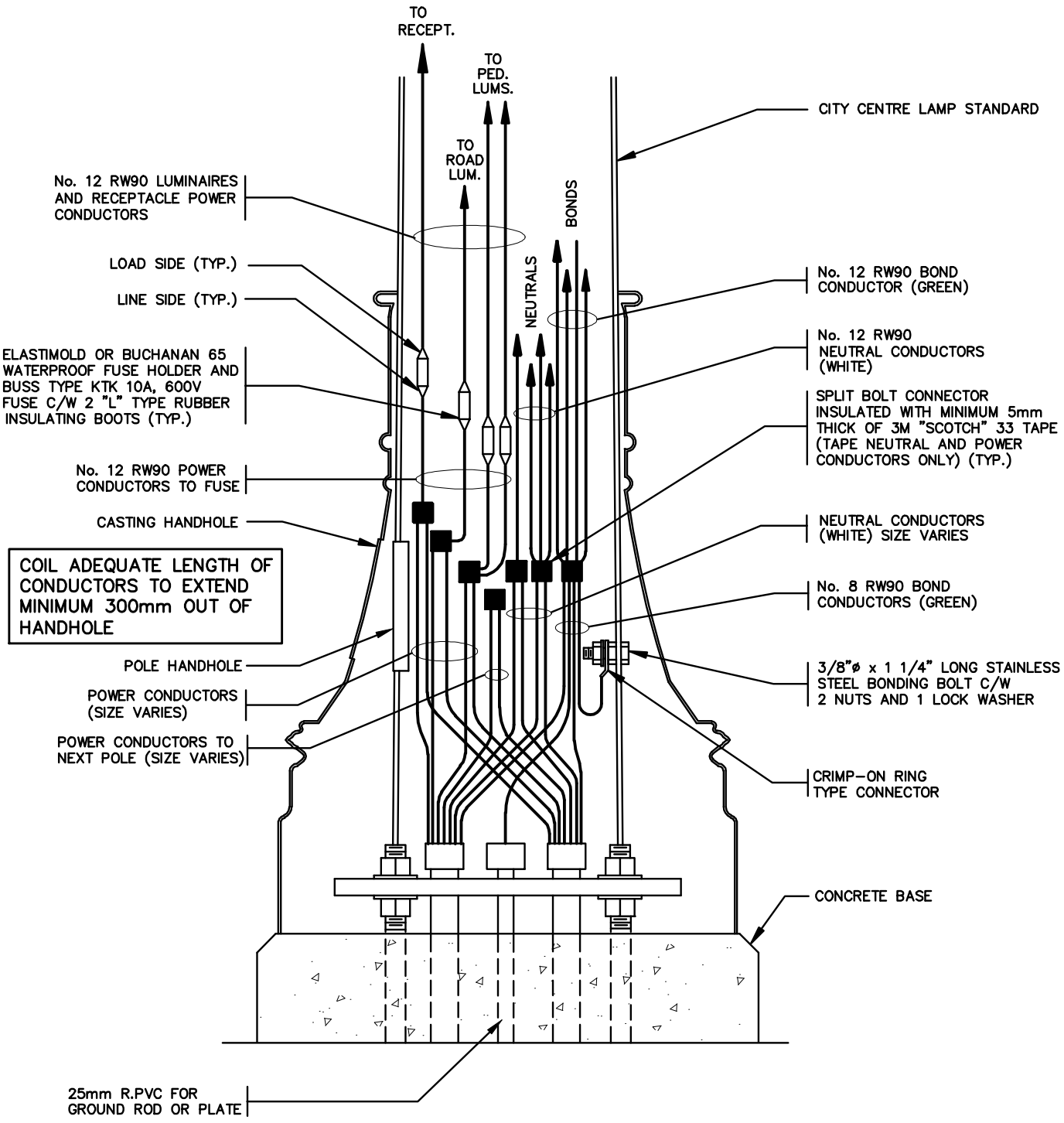
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. FOR POLES WITH DOUBLE DAVIT ARMS ADD A SECOND FUSEHOLDER(S) AND ASSOCIATED WIRING AS SHOWN.
3. SECURE CONDUCTOR SPLICES WITH SPLIT BOLT TYPE CONNECTORS ONLY. LOOPING OF CONDUCTORS WITH "T" TAPS WILL NOT BE ACCEPTED.

Richmond

120/240 VOLT
POLE HANDHOLE WIRING DETAIL

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L7.1
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



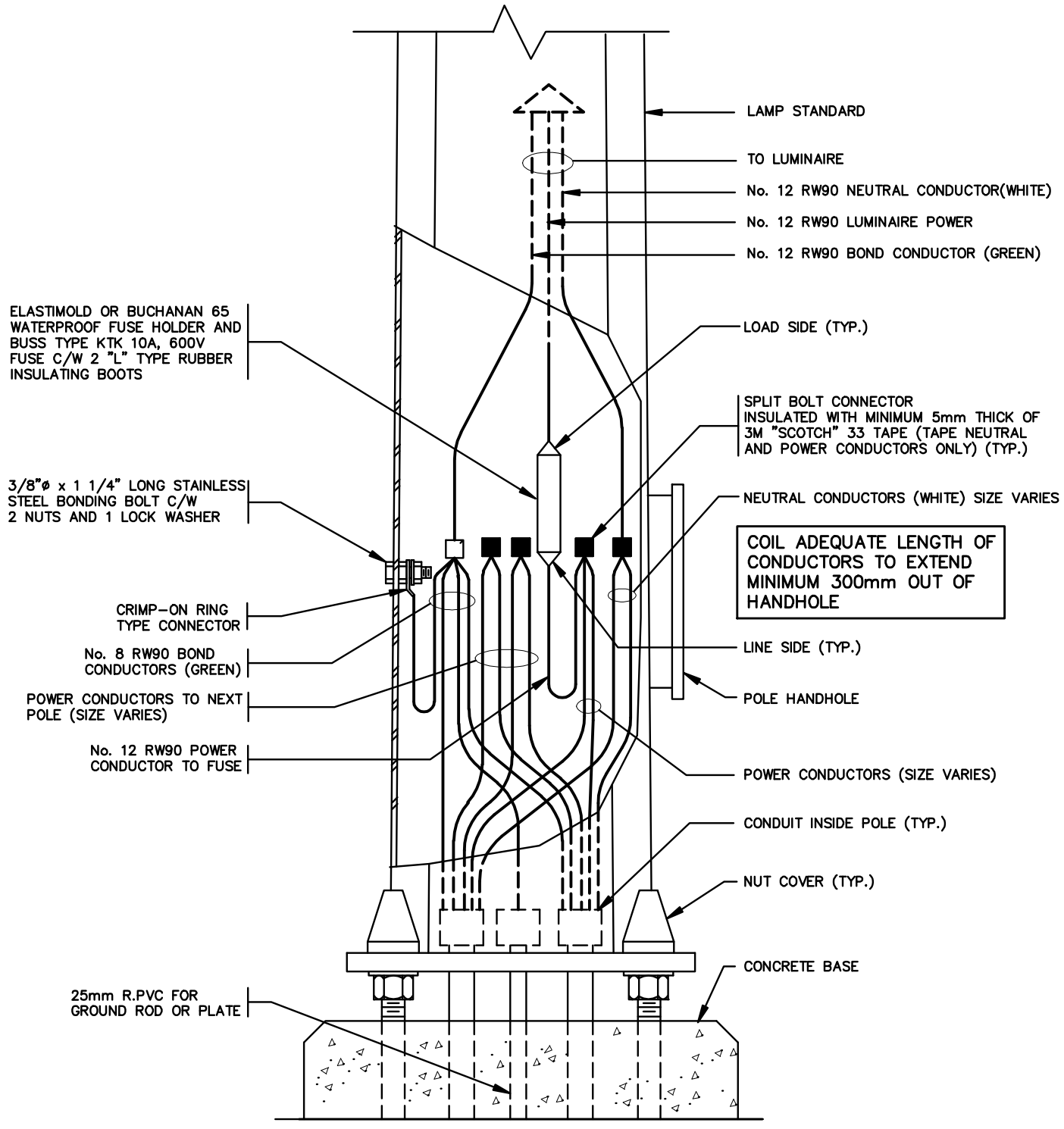
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. SECURE CONDUCTOR SPLICES WITH SPLIT BOLT TYPE CONNECTORS ONLY. LOOPING OF CONDUCTORS WITH "T" TAPS WILL NOT BE ACCEPTED.

Richmond

120/240 VOLT
POLE HANDHOLE WIRING DETAIL
(FOR CITY CENTRE LIGHTING ONLY)

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L7.2
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



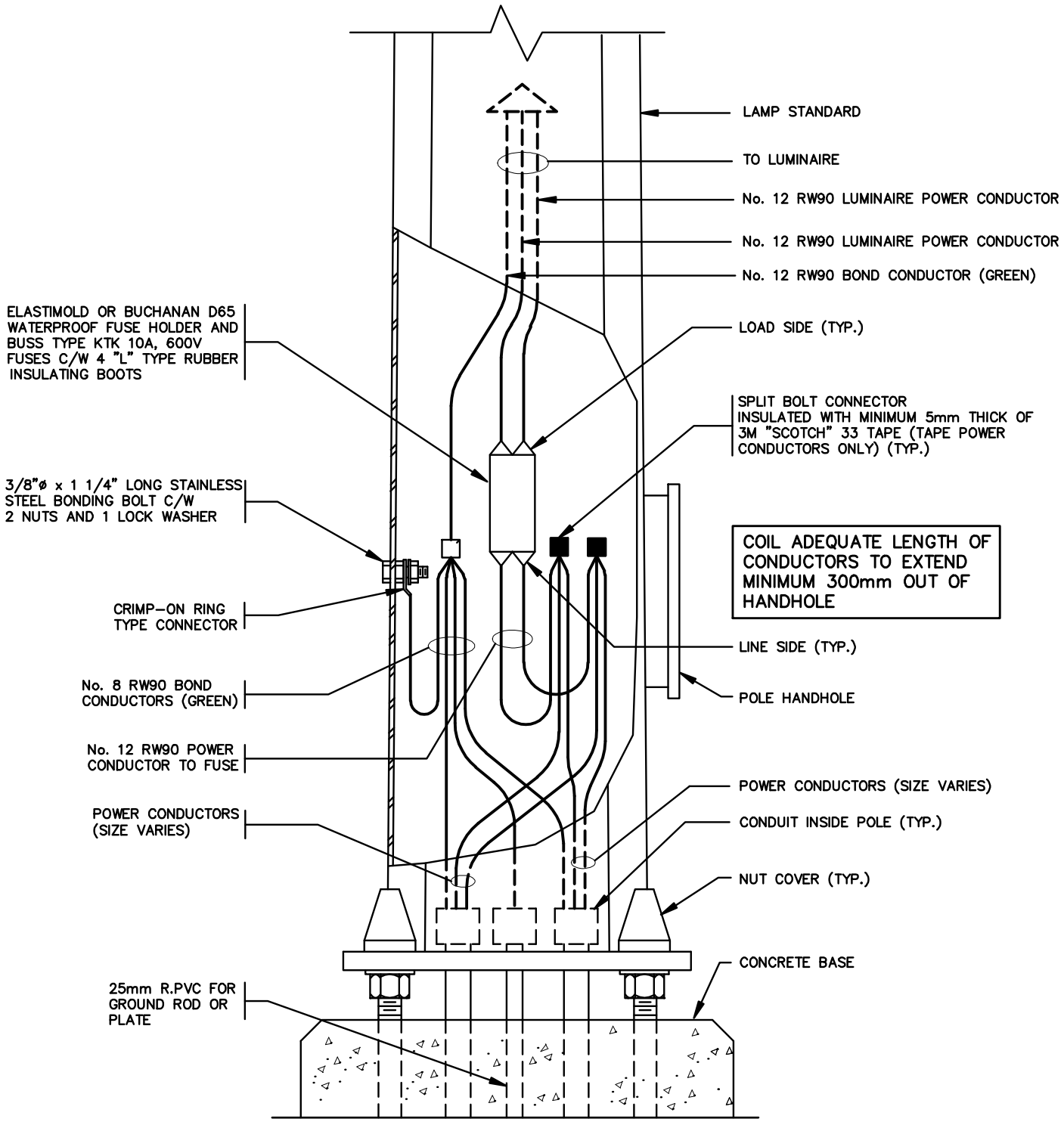
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. FOR POLES WITH DOUBLE DAVIT ARMS ADD A SECOND FUSEHOLDER(S) AND ASSOCIATED WIRING AS SHOWN.
3. SECURE CONDUCTOR SPLICES WITH SPLIT BOLT TYPE CONNECTORS ONLY. LOOPING OF CONDUCTORS WITH "T" TAPS WILL NOT BE ACCEPTED.

Richmond

347/600 VOLT 3ø
POLE HANDHOLE WIRING DETAIL

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L7.3
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



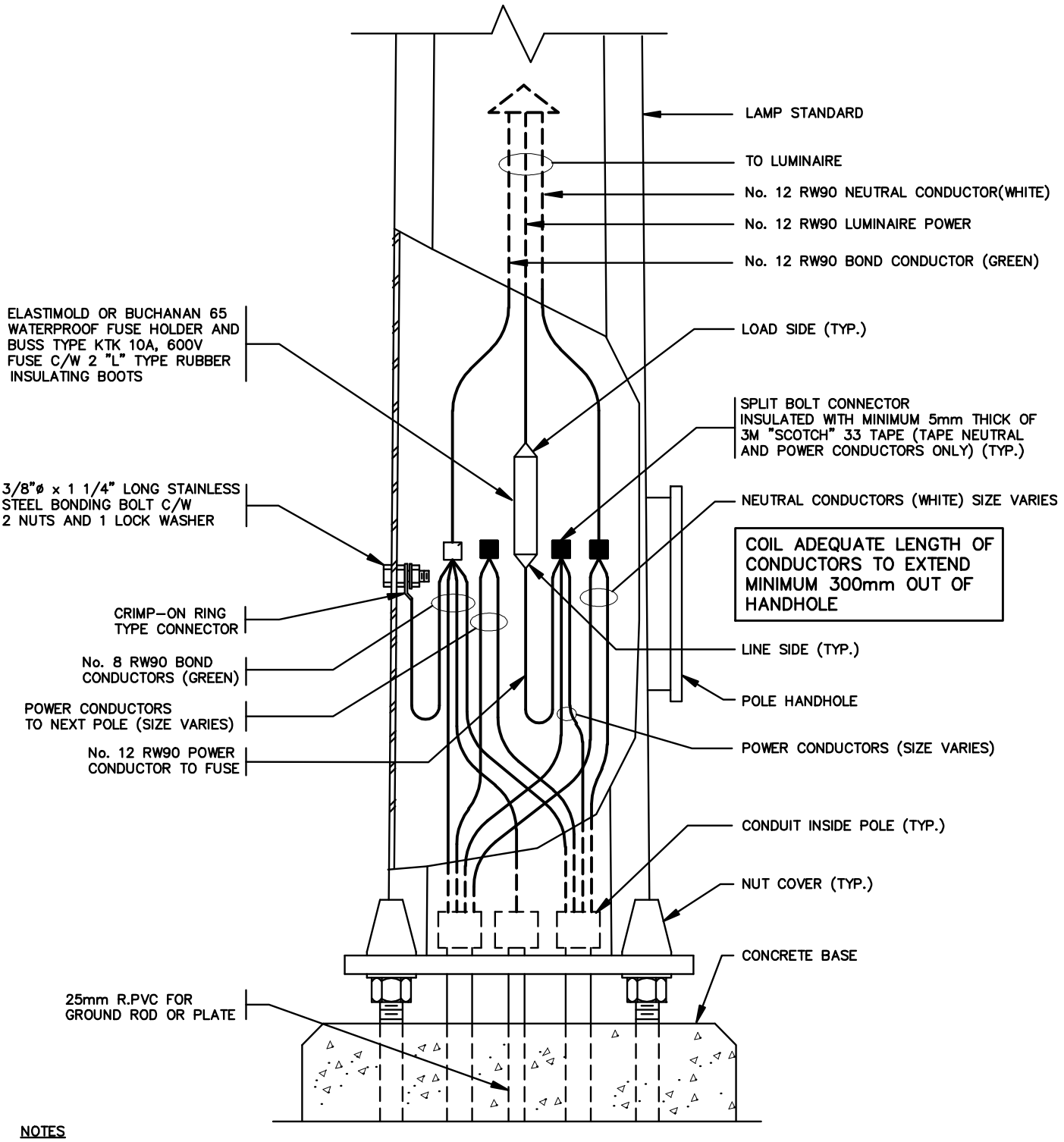
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. FOR POLES WITH DOUBLE DAVIT ARMS ADD A SECOND FUSEHOLDER(S) AND ASSOCIATED WIRING AS SHOWN.
3. SECURE CONDUCTOR SPLICES WITH SPLIT BOLT TYPE CONNECTORS ONLY. LOOPING OF CONDUCTORS WITH "T" TAPS WILL NOT BE ACCEPTED.

Richmond

240 VOLT
POLE HANDHOLE WIRING DETAIL
(FOR EXTENSION OF EXISTING SYSTEMS ONLY)

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L7.4
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. FOR POLES WITH DOUBLE DAVIT ARMS ADD A SECOND FUSEHOLDER(S) AND ASSOCIATED WIRING AS SHOWN.
3. SECURE CONDUCTOR SPLICES WITH SPLIT BOLT TYPE CONNECTORS ONLY. LOOPING OF CONDUCTORS WITH "T" TAPS WILL NOT BE ACCEPTED.

Richmond

240/480 VOLT
POLE HANDHOLE WIRING DETAIL
(FOR EXTENSION OF EXISTING SYSTEMS ONLY)

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L7.5
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1

I.D. TAG DESIGNATION	COLOUR CODE			
LUM. CCTS. RECEPT. CCTS.	LUMINAIRE CIRCUITS RECEPTACLE CIRCUITS	1ø CIRCUITS	A	RED
			B	BLACK
			1	RED
			2	RED
			3	BLACK
			4	BLACK
			5	RED
			6	RED
			7	BLACK
			8	BLACK
		3ø CIRCUITS	A	RED
			B	BLACK
			C	BLUE
P.E.C.	PHOTOELECTRIC CELL	(LOAD)	RED	
		(LINE)	BLACK	
——	NEUTRAL	WHITE		
——	GROUND/BOND	GREEN		

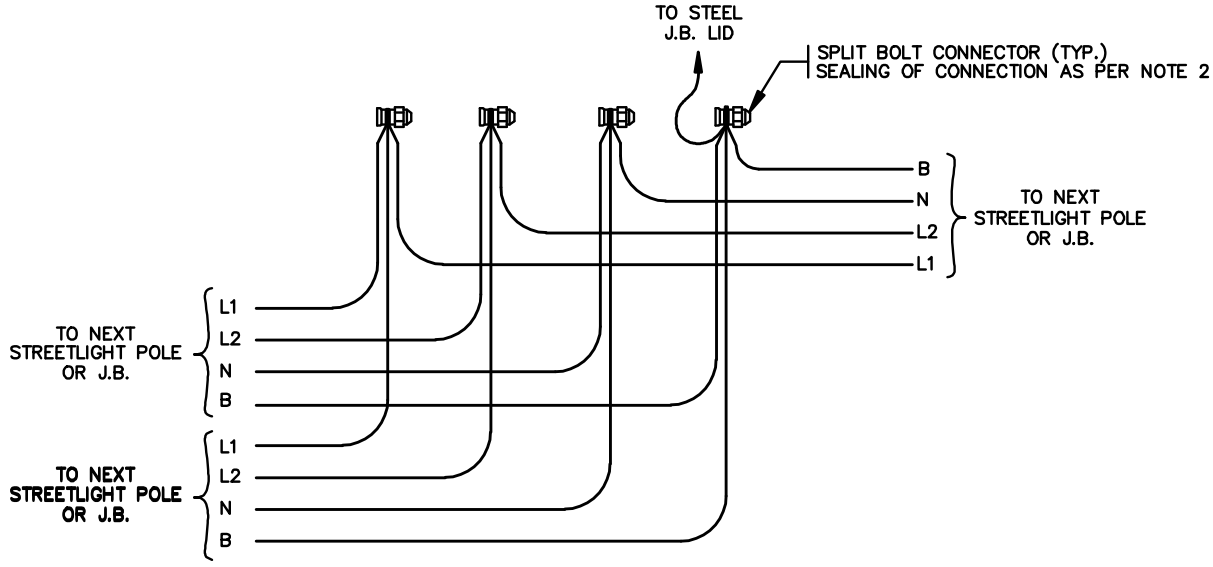
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. CONDUCTORS SHALL BE IDENTIFIED IN ALL POLE HANDHOLES, J.B.'S AND ALL ACCESS POINTS. IDENTIFICATION SHALL BE MADE USING TY-RAP IDENTIFICATION TAGS (TY5532M OR APPROVED EQUAL) WITH I.D. TAG DESIGNATIONS CLEARLY MARKED USING A BLACK INDELIBLE MARKER PEN.

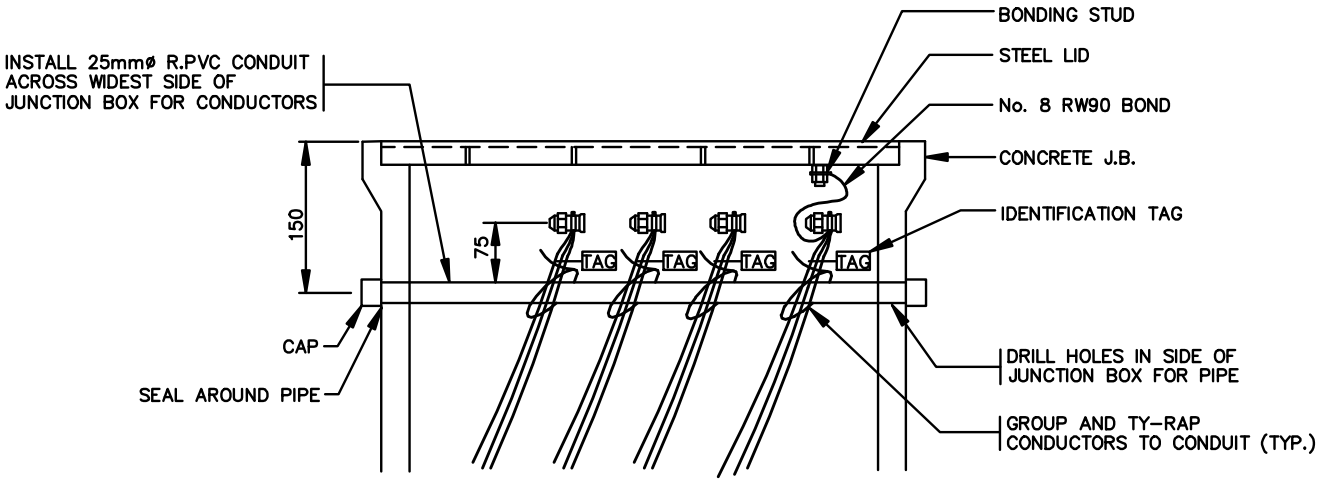
Richmond

CONDUCTOR COLOUR CODE

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L7.6
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



TYPICAL STREETLIGHT/POLE RECEPTACLE
SPLICING DETAIL IN J.B.



TYPICAL CONDUCTOR ARRANGEMENT IN
JUNCTION BOX

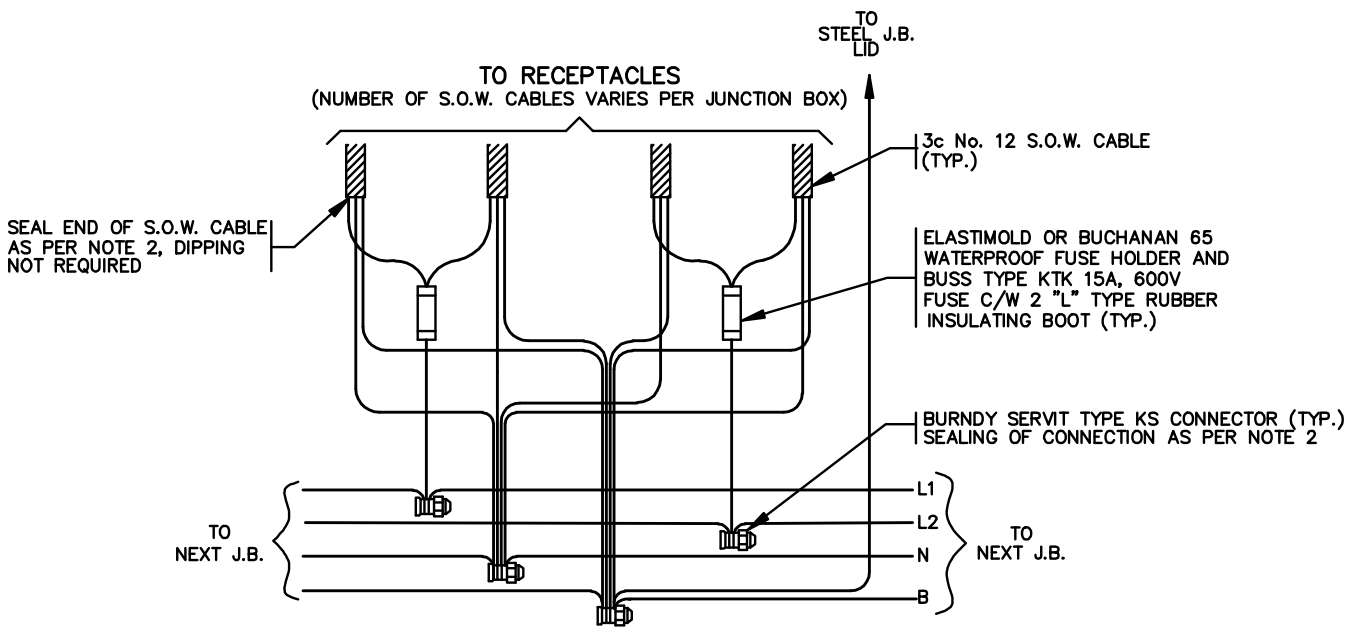
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. SEALING OF THE CONNECTIONS SHALL BE DOUBLE DIPPED WITH 3M SCOTCHCOTE AND THEN TAPED WITH BISHOP BI-SEAL, PHILLIPS ROTUNDA OR 3M SELF HOLDING TAPE OR APPROVED EQUAL, WRAP TAPE IN BETWEEN THE CONDUCTORS TO FURTHER PREVENT WATER ENTERING AND COVER WITH PVC TAPE (MINIMUM 6 LAYERS OF EACH).
3. SECURE CONDUCTOR SPLICES WITH SPLIT BOLT TYPE CONNECTORS ONLY. LOOPING OF CONDUCTORS WITH "T" TAPS WILL NOT BE ACCEPTED.
4. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

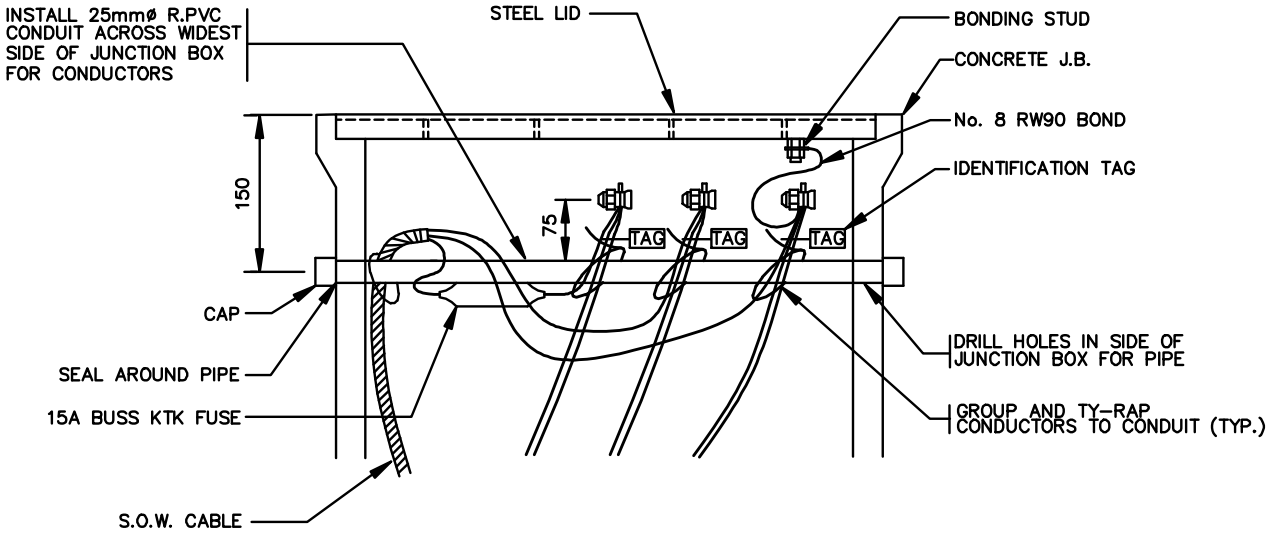
Richmond

STREET LIGHT WIRING
INSIDE CONCRETE JUNCTION BOX

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L8.1
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



TYPICAL TREE RECEPTACLE SPLICING DETAIL IN J.B.



TYPICAL CONDUCTOR ARRANGEMENT IN JUNCTION BOX

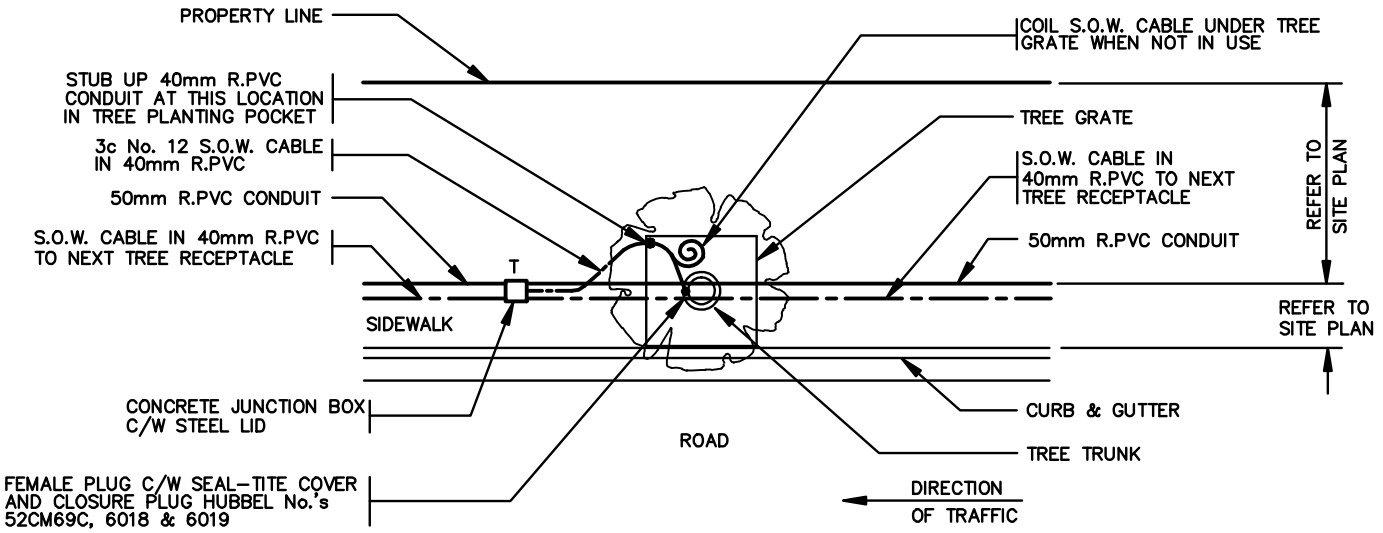
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. SEALING OF THE CONNECTIONS SHALL BE DOUBLE DIPPED WITH 3M SCOTCHCOTE AND THEN TAPED WITH BISHOP BI-SEAL, PHILLIPS ROTUNDA OR 3M SELF HOLDING TAPE OR APPROVED EQUAL, WRAP TAPE IN BETWEEN THE CONDUCTORS TO FURTHER PREVENT WATER ENTERING AND COVER WITH PVC TAPE (MINIMUM 6 LAYERS OF EACH).
3. SECURE CONDUCTOR SPLICES WITH SPLIT BOLT TYPE CONNECTORS ONLY. LOOPING OF CONDUCTORS WITH "T" TAPS WILL NOT BE ACCEPTED.
4. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

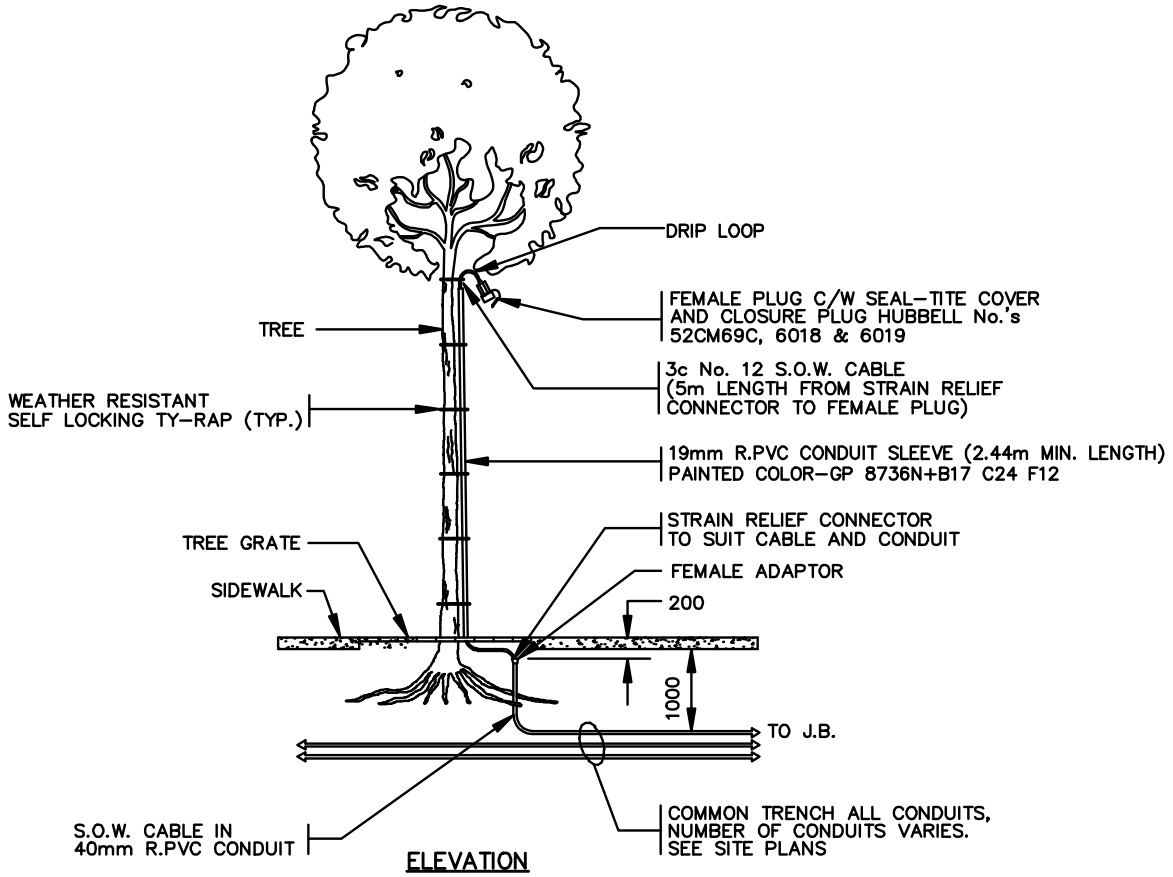
Richmond

TREE RECEPTACLE WIRING INSIDE CONCRETE JUNCTION BOX

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L8.2
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



PLAN



ELEVATION

TREE RECEPTACLE/ST. LTG. CONDUITS, S.O.W. CABLE AND JUNCTION BOX LAYOUT

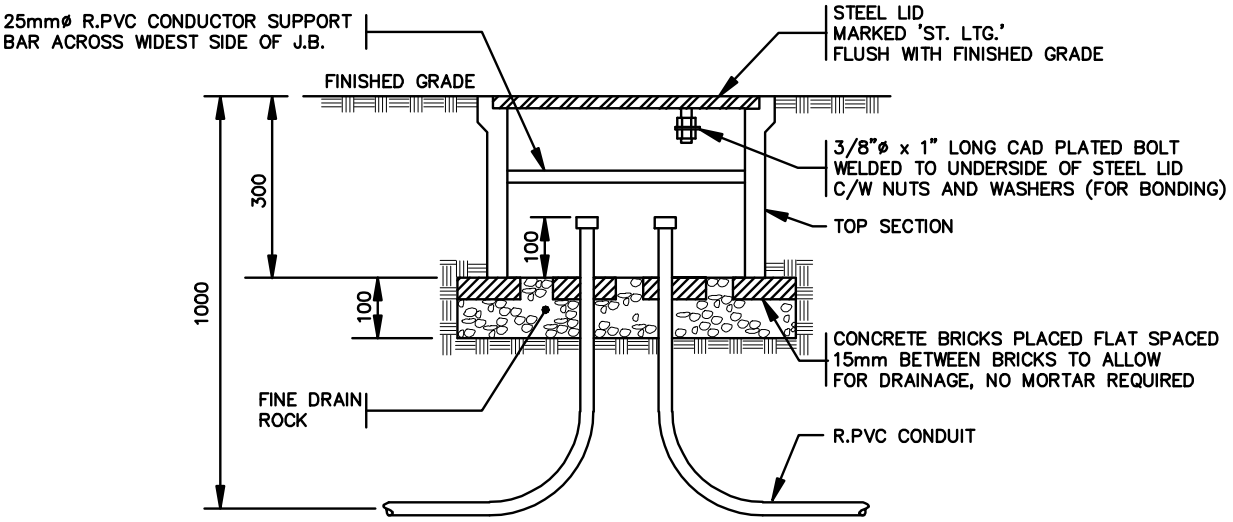
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. ALL DIMENSIONS ARE IN MILLIMTERS UNLESS OTHERWISE NOTED.

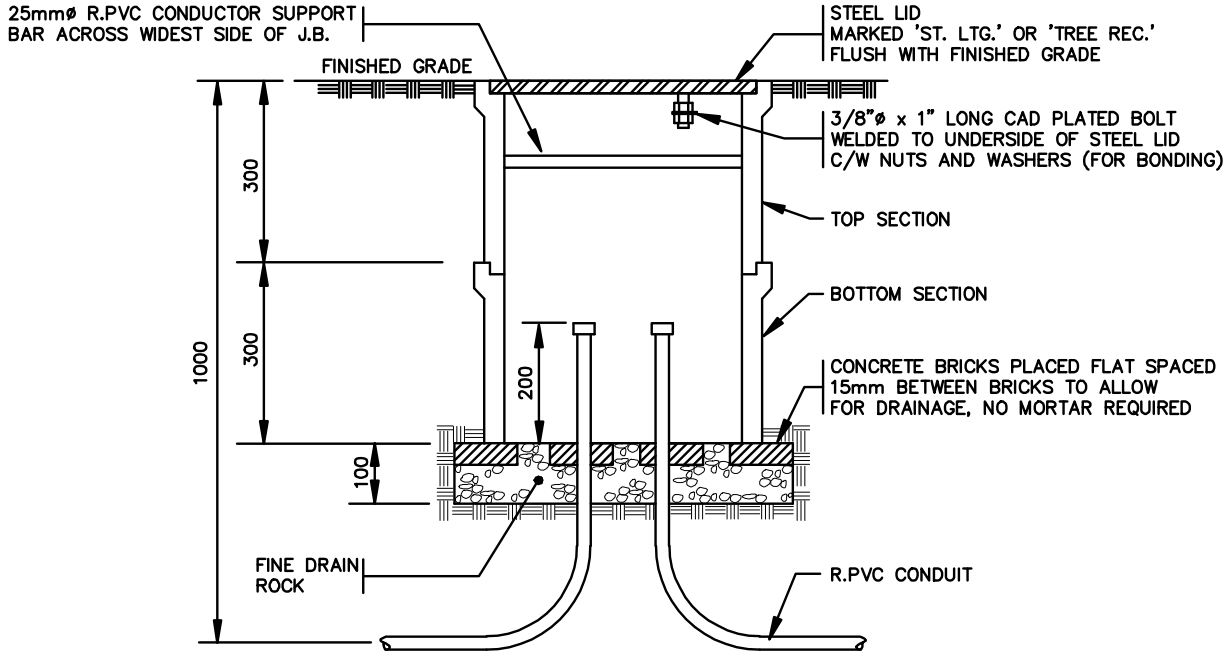
Richmond

TREE RECEPTACLE INSTALLATION DETAIL

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L9.1
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



STREET LIGHTING
CONCRETE JUNCTION BOX



STREET LIGHTING AND TREE RECEPTACLE
CONCRETE JUNCTION BOX

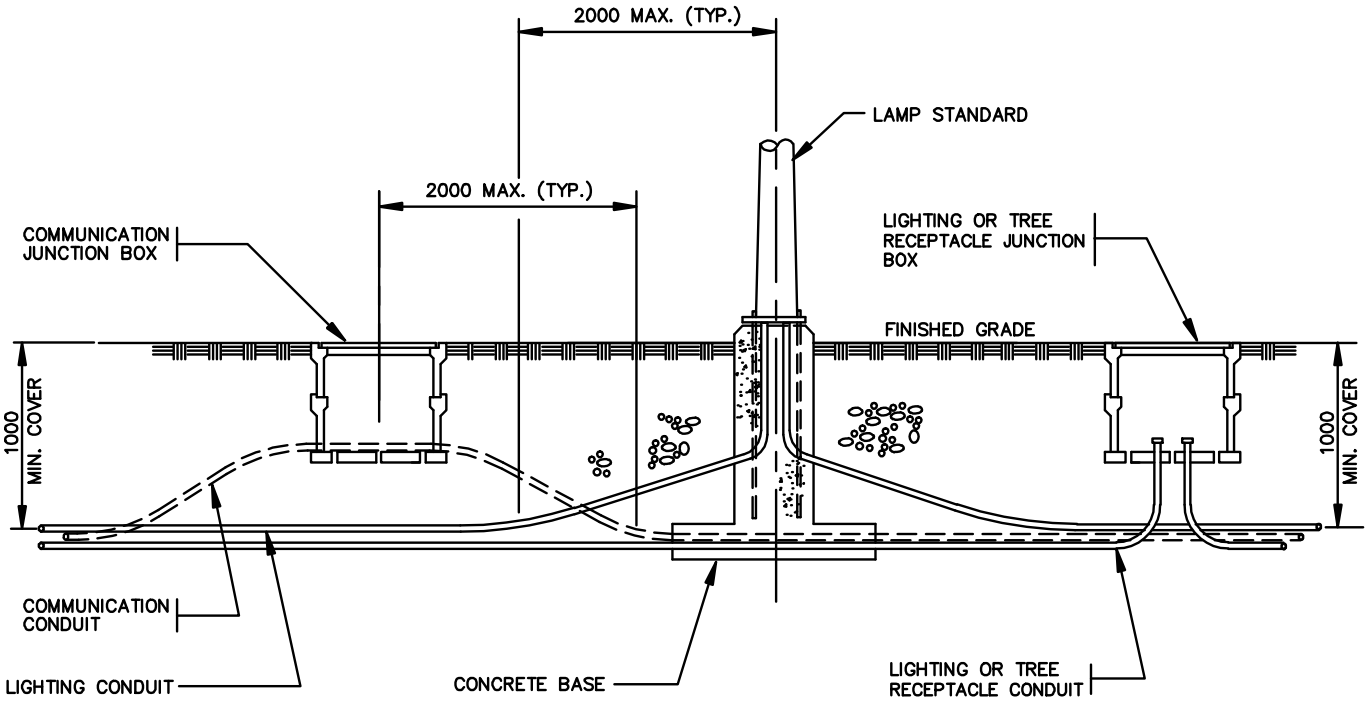
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. JUNCTION BOXES SHALL BE A.E. CONCRETE No. 37 OR No.66 TYPE OR APPROVED EQUAL.
3. BEDDING AND BACKFILL MATERIAL SHALL BE PLACED IN LAYERS NOT EXCEEDING 300mm COMPACTED THICKNESS, AND SHALL BE COMPACTED USING A PNEUMATIC OR VIBRATING MECHANICAL COMPACTOR, TO 95% OF THE LABORATORY DENSITY (MODIFIED PROCTOR DENSITY) AS DETERMINED BY TEST BCH–1–14 (ASTM DESIGNATION D698) METHOD 'D'.
4. ADD BOTTOM SECTION TO JUNCTION BOX AS REQUIRED.
5. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

Richmond

JUNCTION BOX INSTALLATION DETAILS

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L9.2
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



TYPICAL STREET LIGHTING, TREE RECEPTACLE
AND TRAFFIC COMMUNICATION CONDUIT BURY DETAIL

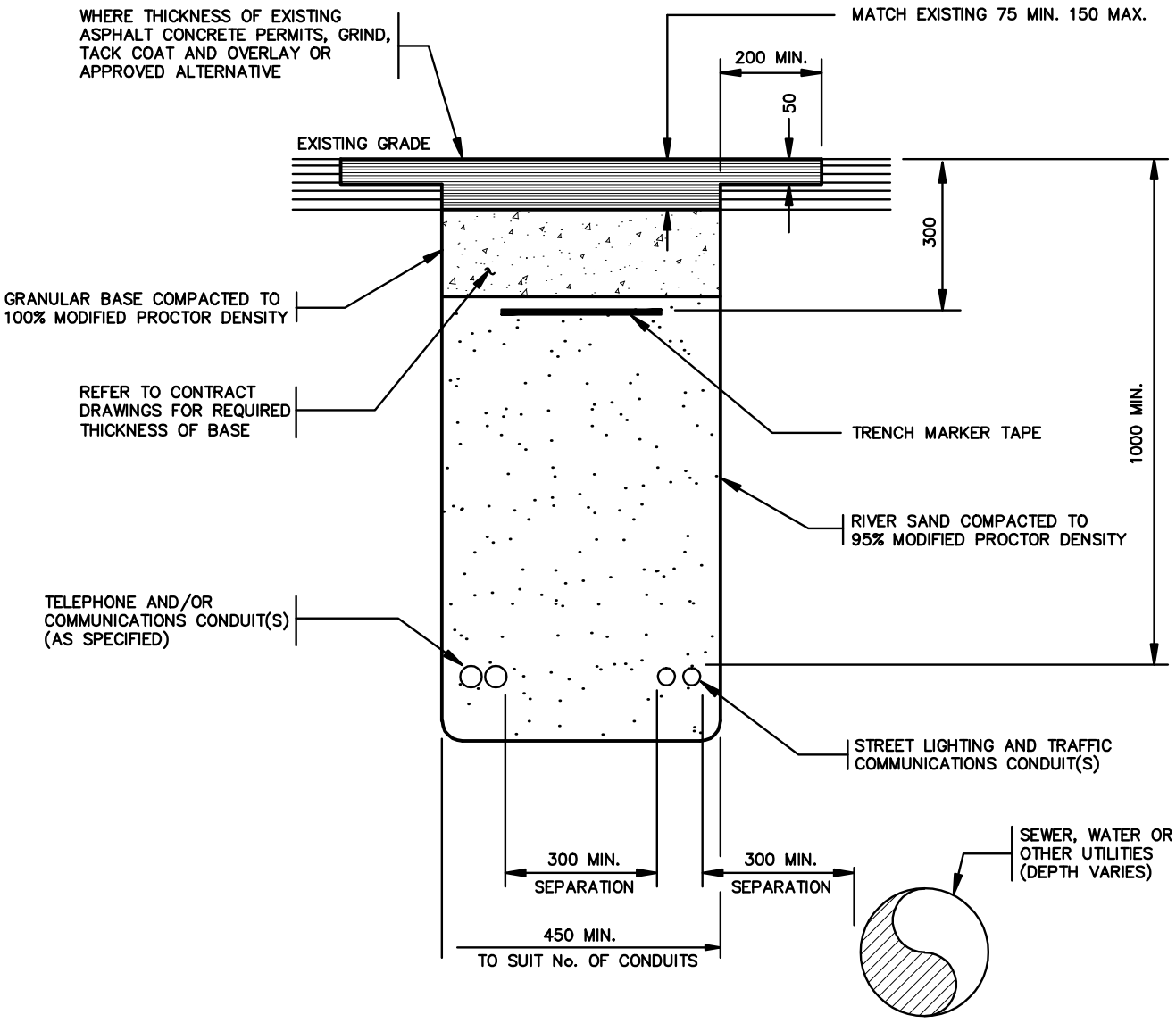
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. ALL CONDUITS SHALL BE BURIED A MINIMUM 1000mm DEEP AND EMBEDDED IN SAND 75mm ABOVE AND 75mm BELOW AND BURIED CONDUIT MARKER TAPE SHALL BE INSTALLED IN ALL TRENCHES.
3. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

Richmond

CONDUIT BURY DETAIL

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L9.3
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



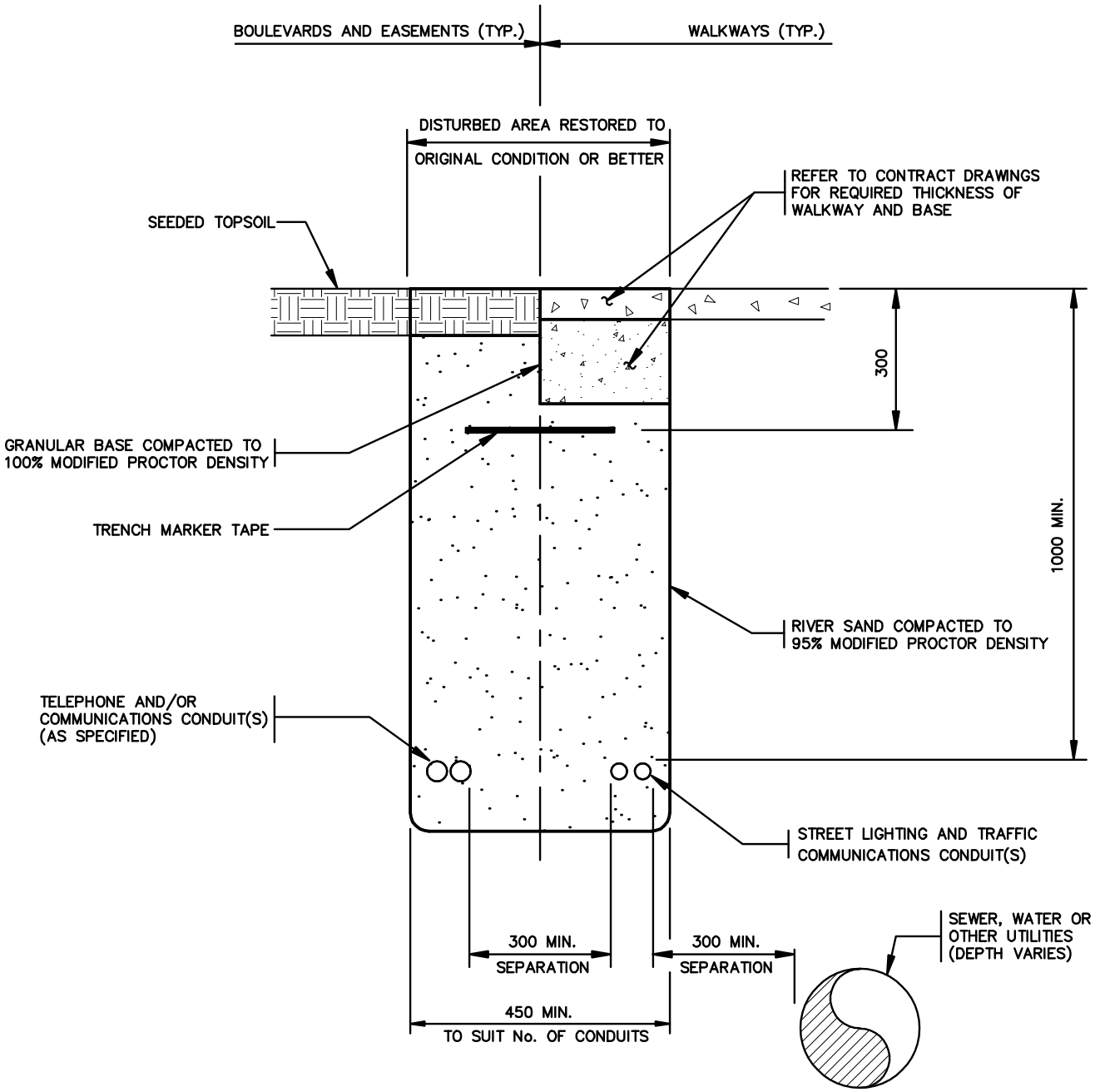
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. ALL CONDUITS SHALL BE BURIED A MINIMUM 1000mm DEEP AND EMBEDDED IN SAND 75mm ABOVE AND 75mm BELOW AND BURIED CONDUIT MARKER TAPE SHALL BE INSTALLED IN ALL TRENCHES.
3. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

Richmond

UNDERGROUND CONDUIT IN PAVED AREAS

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L10.1
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



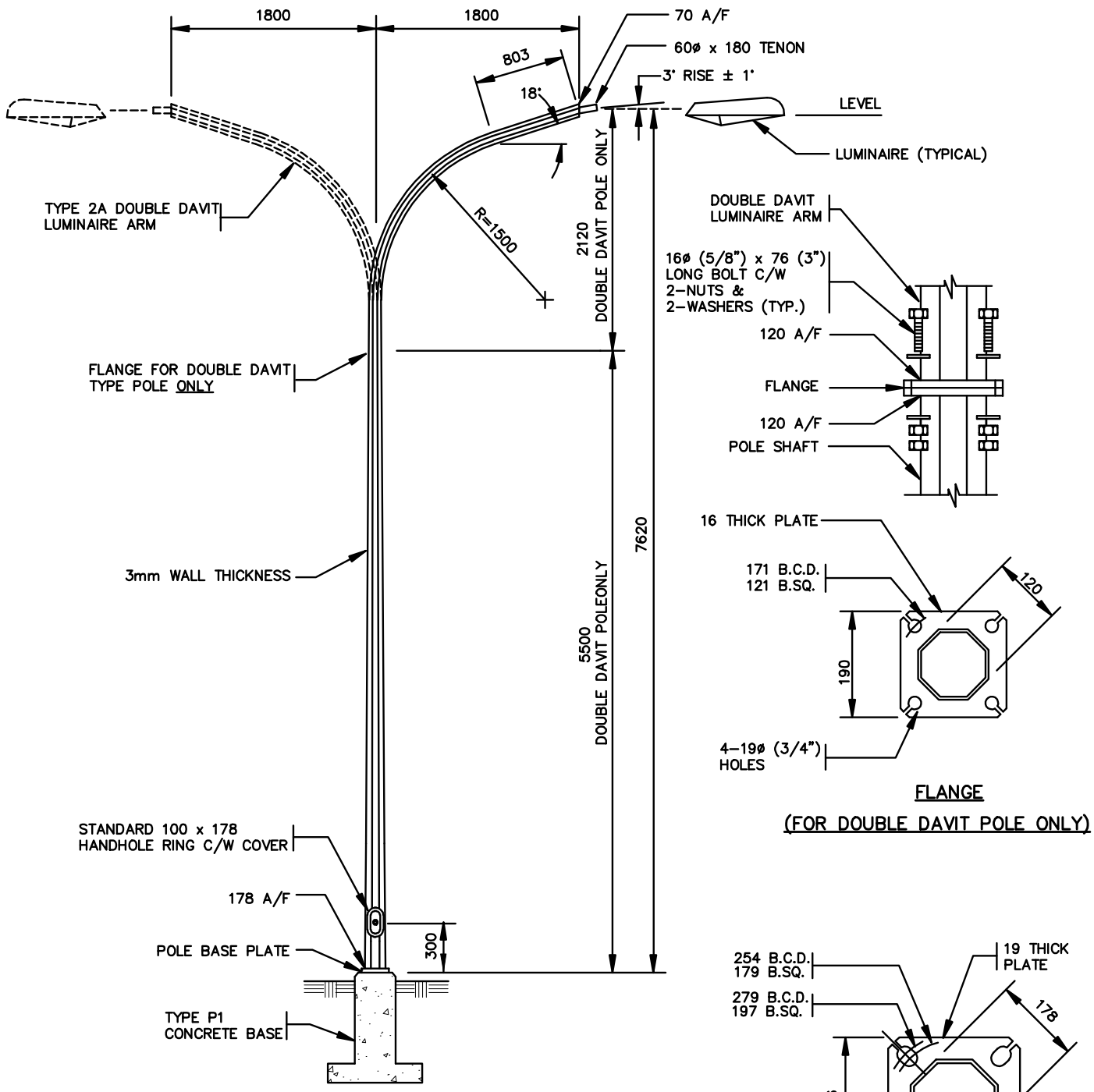
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. ALL CONDUITS SHALL BE BURIED A MINIMUM 1000mm DEEP AND EMBEDDED IN SAND 75mm ABOVE AND 75mm BELOW AND BURIED CONDUIT MARKER TAPE SHALL BE INSTALLED IN ALL TRENCHES.
3. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

Richmond

UNDERGROUND CONDUIT IN NON-PAVED AREAS

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L10.2
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



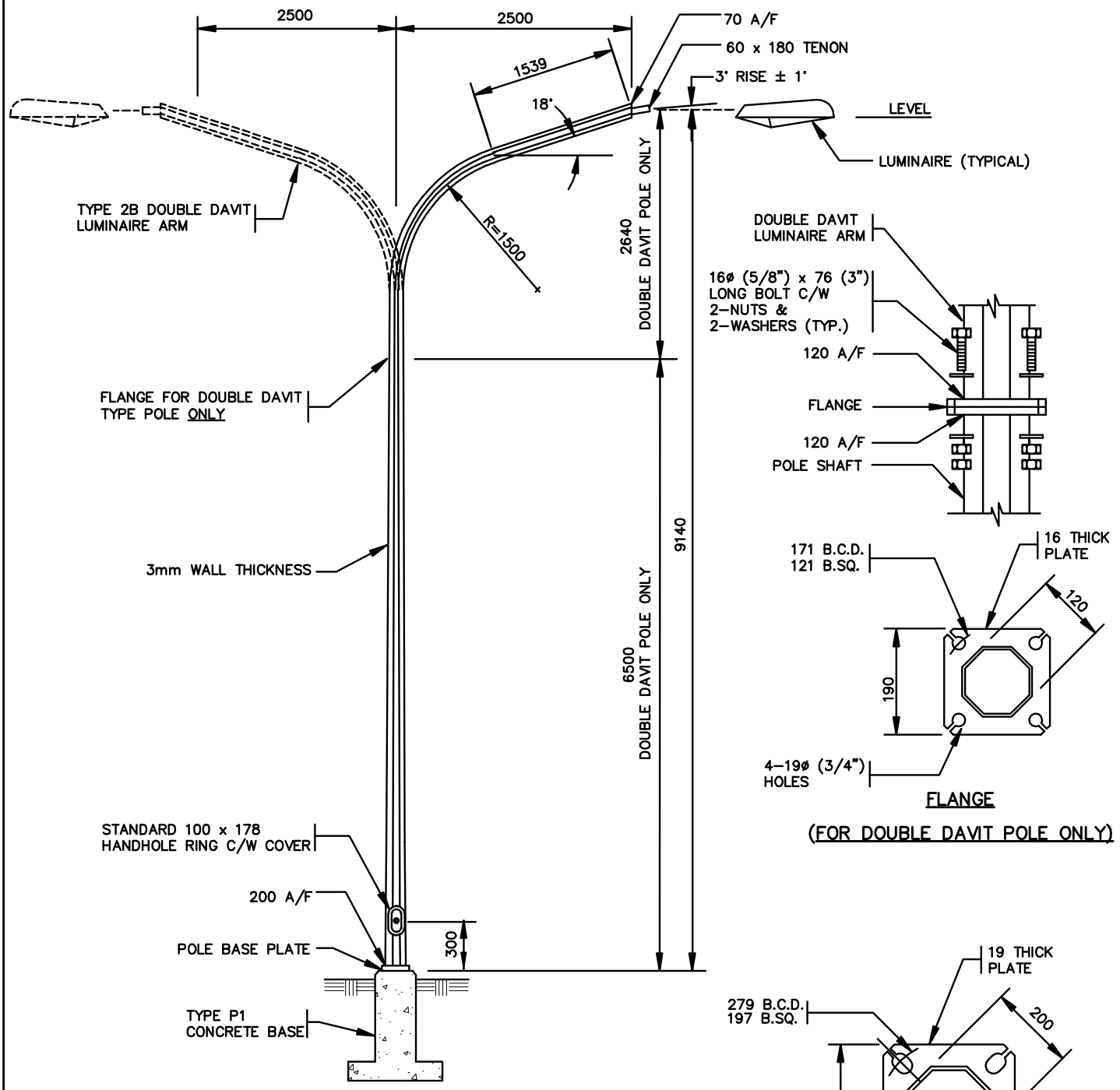
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. SEE DRAWINGS L13.2 & L13.3 FOR ADDITIONAL DETAILS.
3. CONTRACTOR SHALL SUPPLY SHOP DRAWINGS FOR APPROVAL PRIOR TO MANUFACTURING.
4. POLES TO BE SUPPLIED WITH GALVANIZED FINISH, UNLESS OTHERWISE NOTED.
5. TOUCH UP ANY SCRATCHES IN GALVANIZED SURFACES WITH COLD GALVANIZING COMPOUND.
6. POLE TO BE SUPPLIED 0.9m SHORTER WHEN INSTALLED ON SERVICE BASE.
7. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

Richmond

7.62m DAVIT LUMINAIRE POLES

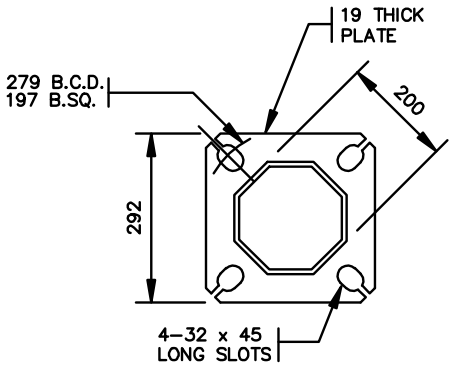
TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L11.1
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



9.14m DAVIT POLE

FLANGE

(FOR DOUBLE DAVIT POLE ONLY)



POLE BASE PLATE

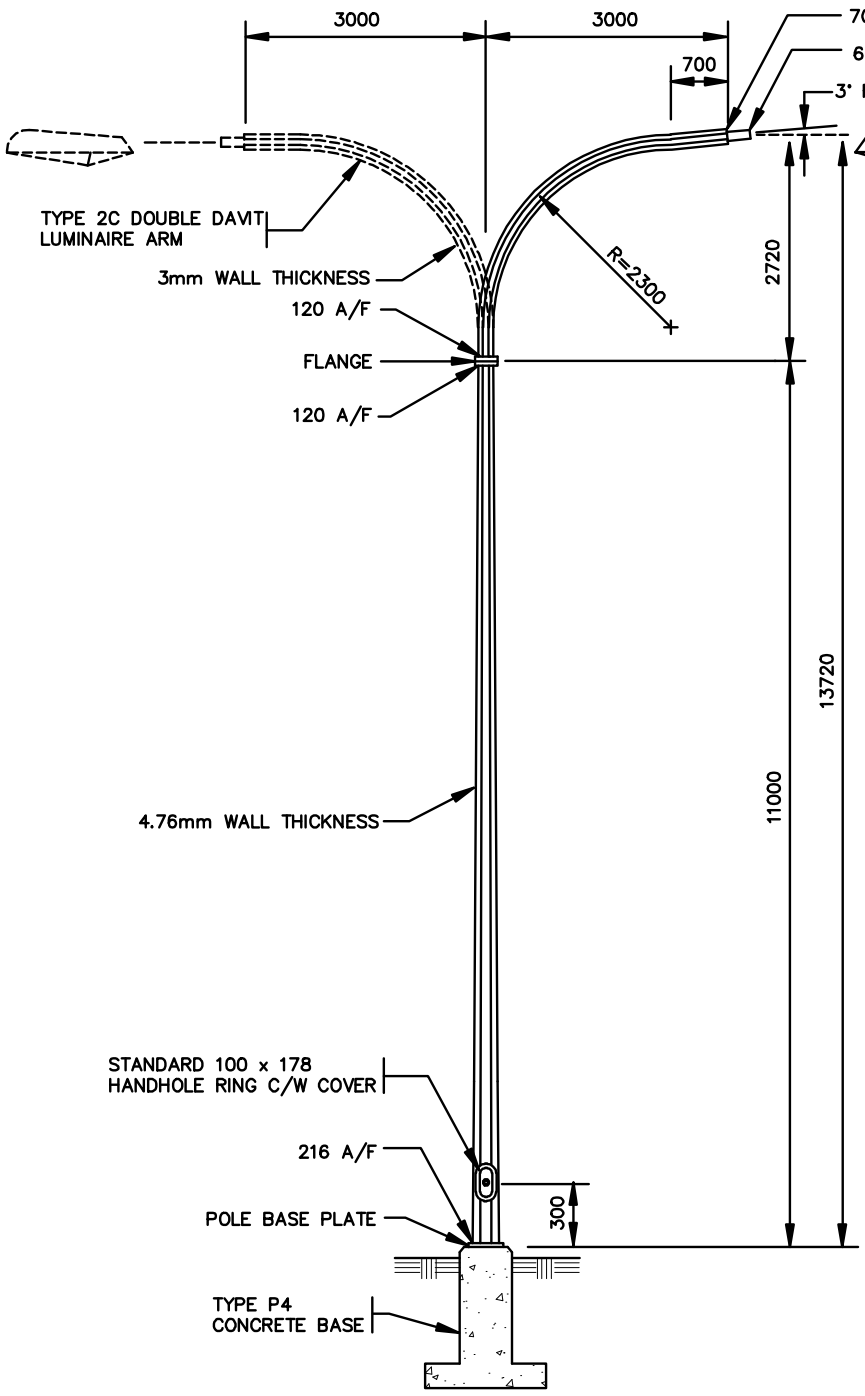
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. SEE DRAWINGS L13.2 & L13.3 FOR ADDITIONAL DETAILS.
3. CONTRACTOR SHALL SUPPLY SHOP DRAWINGS FOR APPROVAL PRIOR TO MANUFACTURING.
4. POLES TO BE SUPPLIED WITH GALVANIZED FINISH, UNLESS OTHERWISE NOTED.
5. TOUCH UP ANY SCRATCHES IN GALVANIZED SURFACES WITH COLD GALVANIZING COMPOUND.
6. POLE TO BE SUPPLIED 0.9m SHORTER WHEN INSTALLED ON SERVICE BASE.
7. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

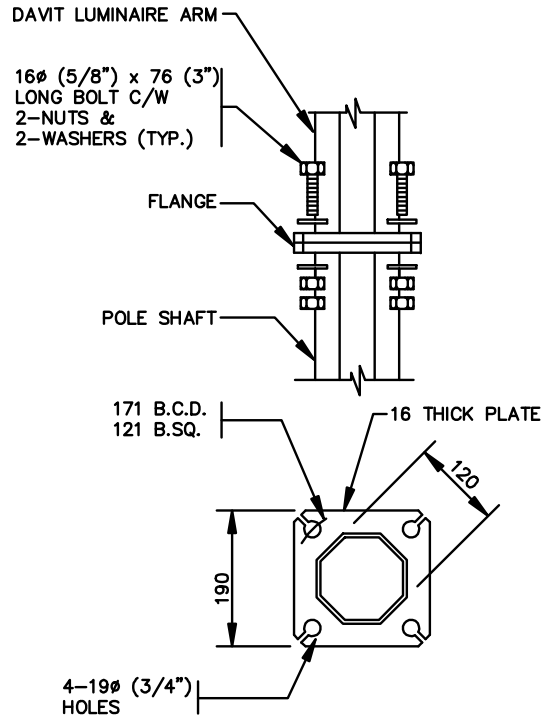
Richmond

9.14m DAVIT LUMINAIRE POLES

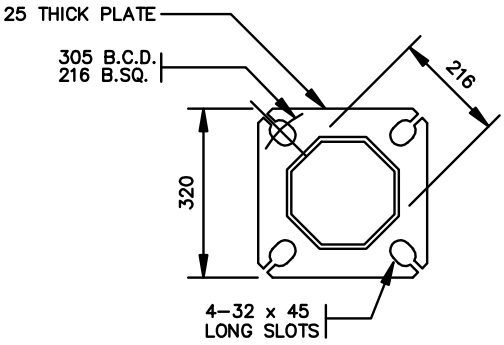
TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L11.2
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



13.72m DAVIT POLE



FLANGE



POLE BASE PLATE

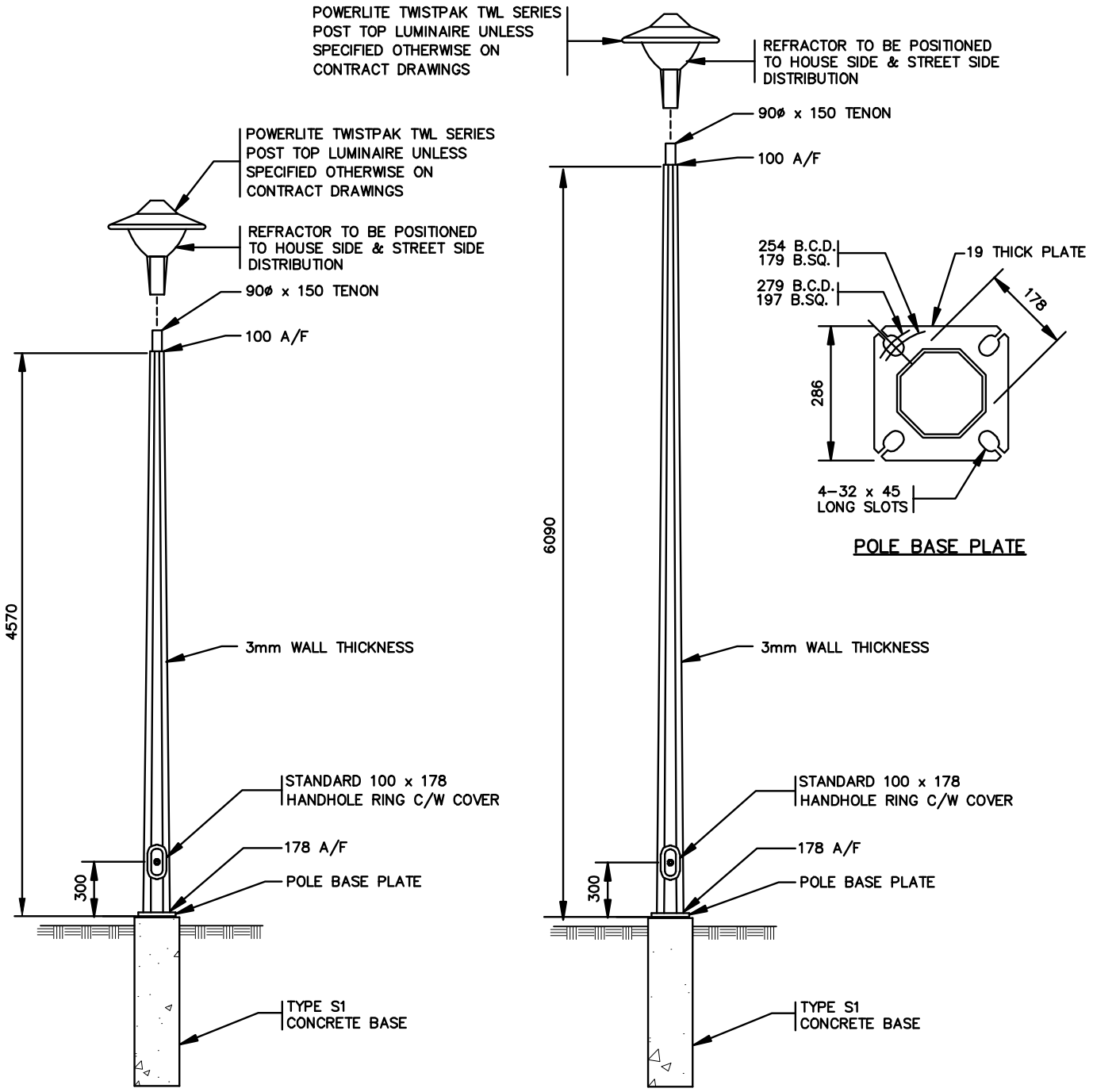
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. SEE DRAWINGS L13.2 & L13.3 FOR ADDITIONAL DETAILS.
3. CONTRACTOR SHALL SUPPLY SHOP DRAWINGS FOR APPROVAL PRIOR TO MANUFACTURING.
4. POLES TO BE SUPPLIED WITH GALVANIZED FINISH, UNLESS OTHERWISE NOTED.
5. TOUCH UP ANY SCRATCHES IN GALVANIZED SURFACES WITH COLD GALVANIZING COMPOUND.
6. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

Richmond

13.72m DAVIT LUMINAIRE POLES

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L11.3
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



4.57m POST TOP POLE

6.09m POST TOP POLE

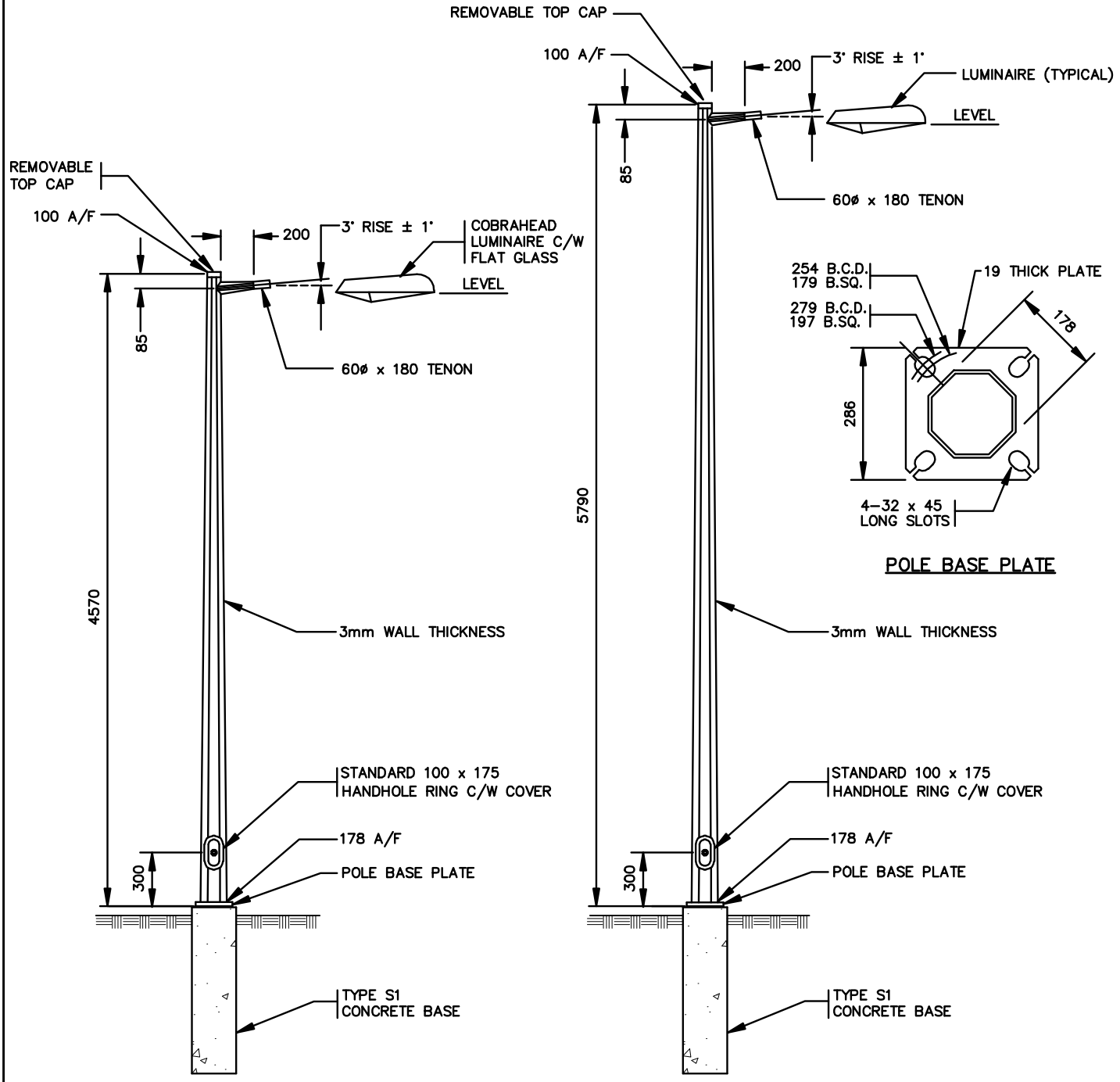
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. SEE DRAWINGS L13.2 & L13.3 FOR ADDITIONAL DETAILS.
3. CONTRACTOR SHALL SUPPLY SHOP DRAWINGS FOR APPROVAL PRIOR TO MANUFACTURING.
4. POLES TO BE SUPPLIED WITH GALVANIZED FINISH, UNLESS OTHERWISE NOTED.
5. TOUCH UP ANY SCRATCHES IN GALVANIZED SURFACES WITH COLD GALVANIZING COMPOUND.
6. POLE TO BE SUPPLIED 0.9m SHORTER WHEN INSTALLED ON SERVICE BASE.
7. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

Richmond

POST TOP LUMINAIRE POLES

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L11.4
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



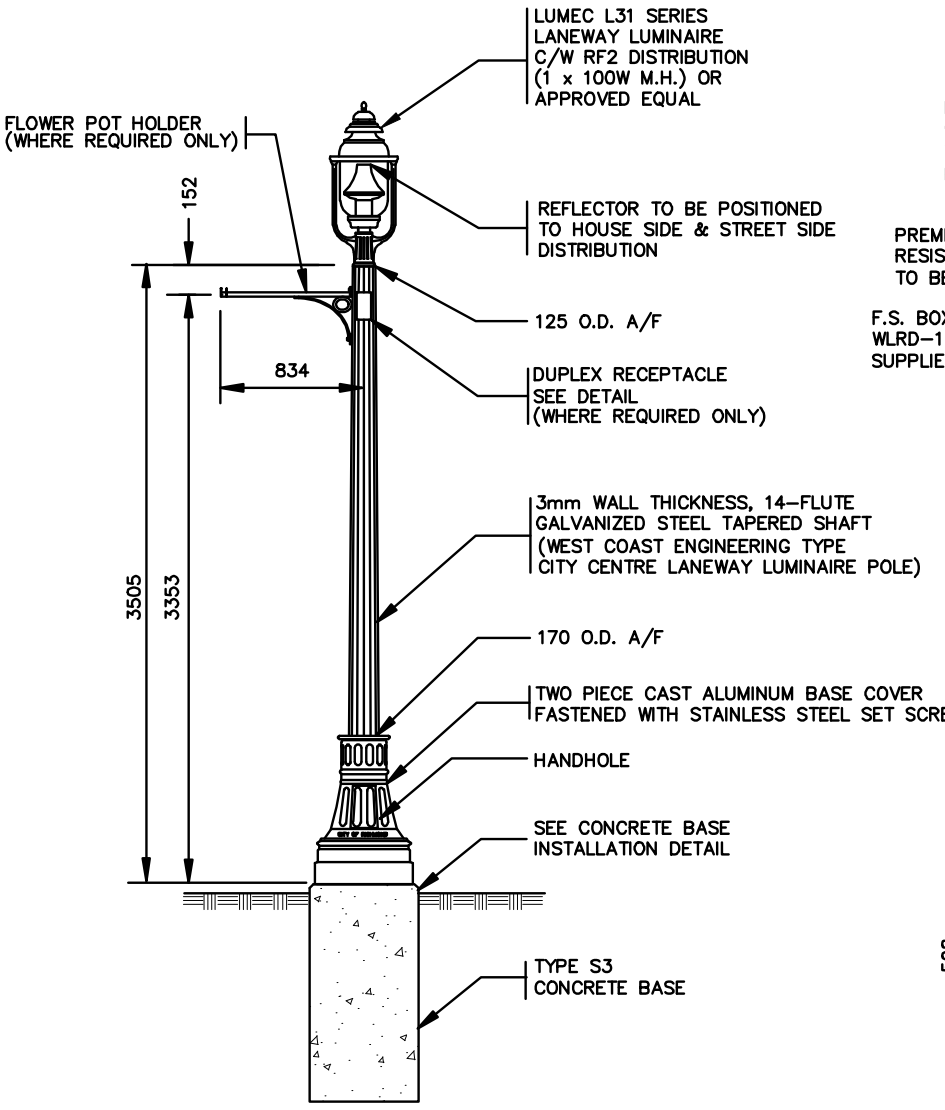
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. SEE DRAWINGS L13.2 & L13.3 FOR ADDITIONAL DETAILS.
3. CONTRACTOR SHALL SUPPLY SHOP DRAWINGS FOR APPROVAL PRIOR TO MANUFACTURING.
4. POLES TO BE SUPPLIED WITH GALVANIZED FINISH, UNLESS OTHERWISE NOTED.
5. TOUCH UP ANY SCRATCHES IN GALVANIZED SURFACES WITH COLD GALVANIZING COMPOUND.
6. POLE TO BE SUPPLIED 0.9m SHORTER WHEN INSTALLED ON SERVICE BASE.
7. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

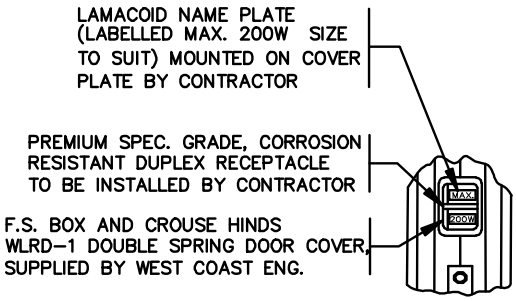
Richmond

PATHWAY AND LANEWAY SIDE MOUNTED LUMINAIRE POLES

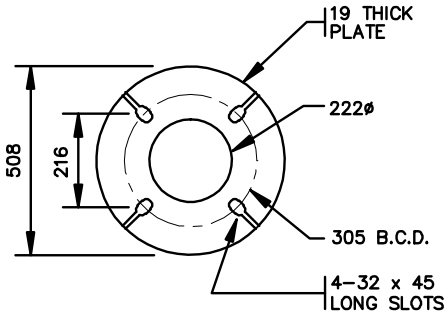
TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L11.5
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



ELEVATION



DUPLEX RECEPTACLE



POLE BASE PLATE

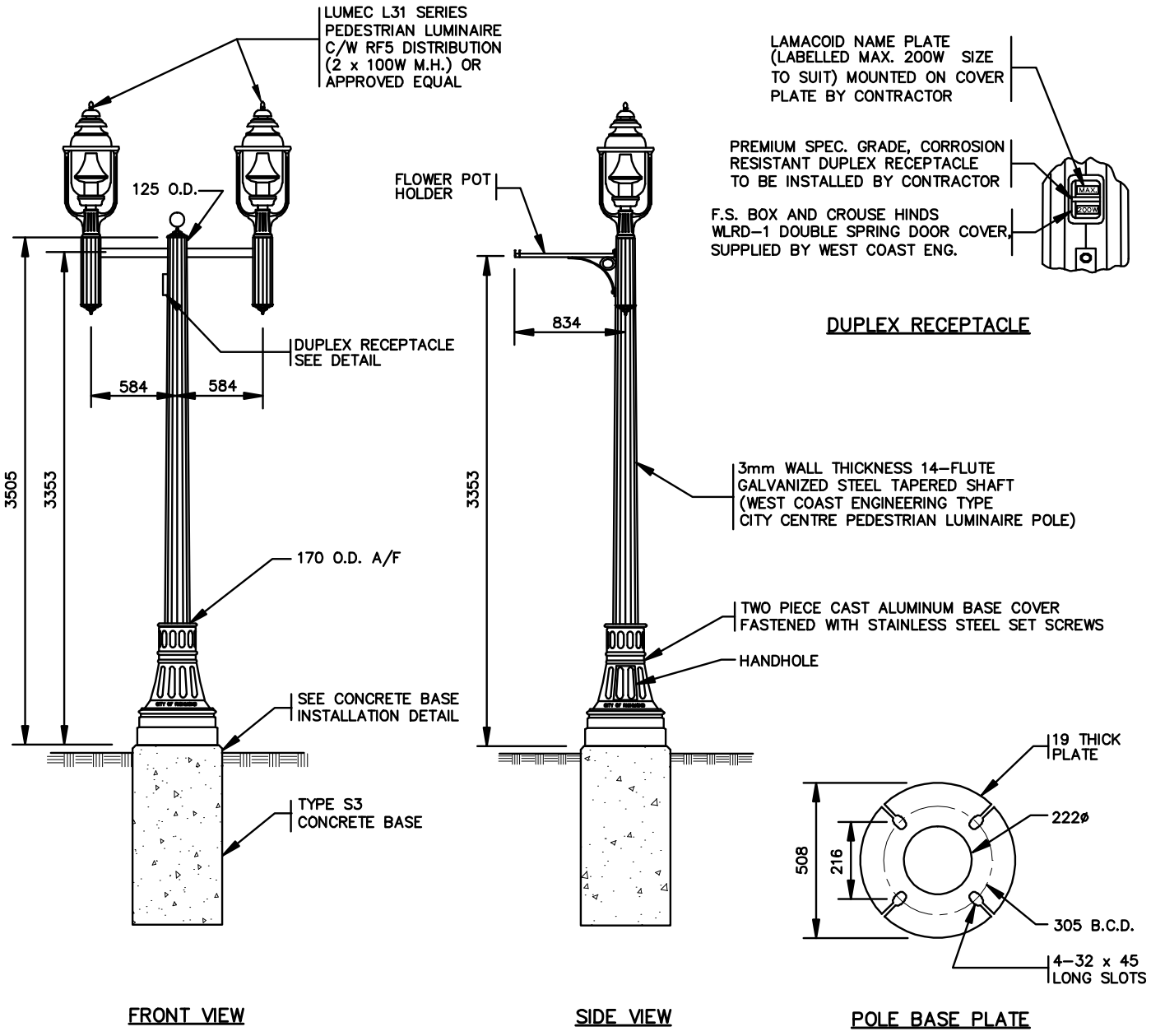
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. SEE DRAWING L13.3 FOR ADDITIONAL DETAILS.
3. CONTRACTOR SHALL SUPPLY SHOP DRAWINGS FOR APPROVAL PRIOR TO MANUFACTURING.
4. POLES SHALL BE GALVANIZED, UNLESS OTHERWISE NOTED.
5. POLES & LUMINAIRES SHALL BE POWDER COAT FINISHED, IN COLOUR SPECIFIED BY CITY OF RICHMOND.
6. POLES SHALL BE CITY CENTRE TYPE AS MANUFACTURED BY WEST COAST ENGINEERING FOR THE CITY OF RICHMOND OR APPROVED EQUAL.
7. LUMINAIRES SHALL BE L31 SERIES AS MANUFACTURED BY LUMEC FOR THE CITY OF RICHMOND OR APPROVED EQUAL.
8. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
9. FLOWER POT HOLDER TO ACCOMMODATE IRRIGATION SYSTEM (WHERE REQUIRED ONLY).

Richmond

CITY CENTRE TYPE
LANEWAY LUMINAIRE POLE

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L12.1
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



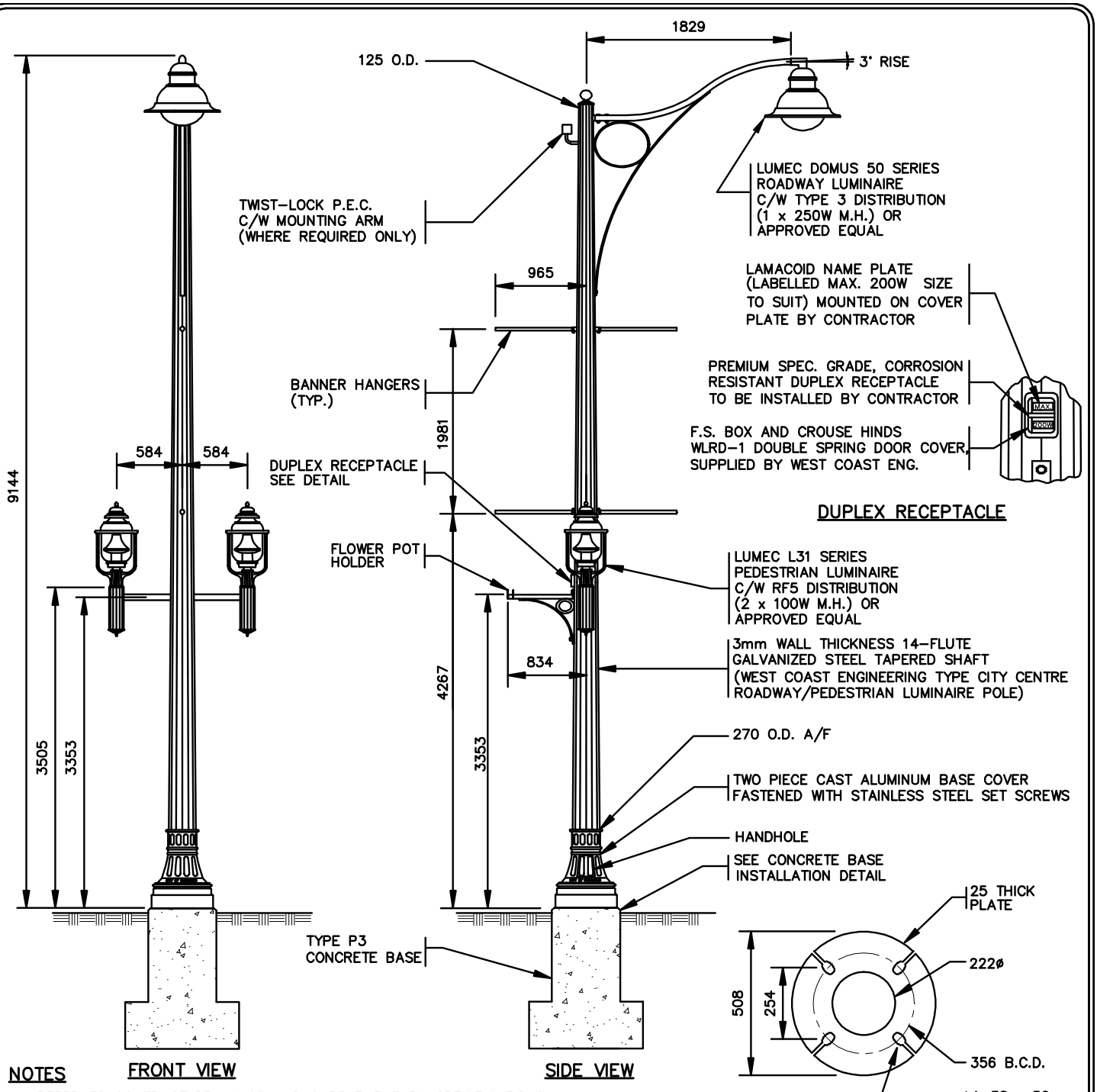
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. SEE DRAWING L13.3 FOR ADDITIONAL DETAILS.
3. CONTRACTOR SHALL SUPPLY SHOP DRAWINGS FOR APPROVAL PRIOR TO MANUFACTURING.
4. POLES SHALL BE GALVANIZED, UNLESS OTHERWISE NOTED.
5. POLES & LUMINAIRES SHALL BE POWDER COAT FINISHED, IN COLOUR SPECIFIED BY CITY OF RICHMOND.
6. POLES SHALL BE CITY CENTRE TYPE AS MANUFACTURED BY WEST COAST ENGINEERING FOR THE CITY OF RICHMOND OR APPROVED EQUAL.
7. LUMINAIRES SHALL BE L31 SERIES AS MANUFACTURED BY LUMEC FOR THE CITY OF RICHMOND OR APPROVED EQUAL.
8. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
9. FLOWER POT HOLDER TO ACCOMMODATE IRRIGATION SYSTEM (WHERE REQUIRED ONLY).

Richmond

CITY CENTRE TYPE
PEDESTRIAN LUMINAIRE POLE

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L12.2
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



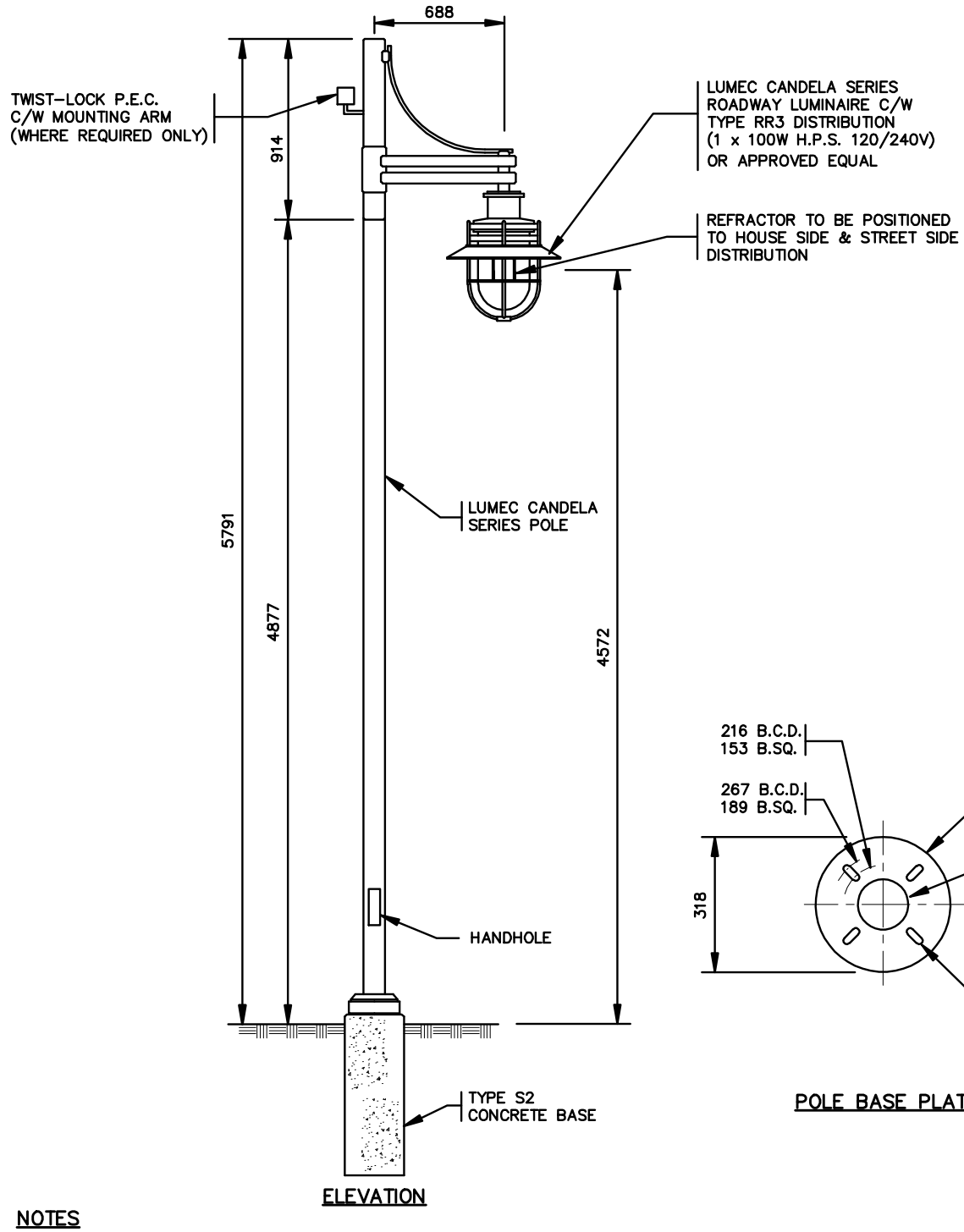
NOTES

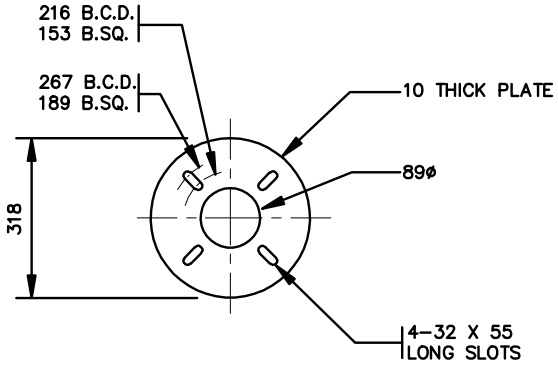
1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. SEE DRAWING L13.3 FOR ADDITIONAL DETAILS.
3. CONTRACTOR SHALL SUPPLY SHOP DRAWINGS FOR APPROVAL PRIOR TO MANUFACTURING.
4. POLES SHALL BE GALVANIZED, UNLESS OTHERWISE NOTED.
5. POLES & LUMINAIRES SHALL BE POWDER COAT FINISHED, IN COLOUR SPECIFIED BY CITY OF RICHMOND.
6. POLES SHALL BE CITY CENTRE TYPE AS MANUFACTURED BY WEST COAST ENGINEERING FOR THE CITY OF RICHMOND OR APPROVED EQUAL.
7. LUMINAIRES SHALL BE DOMUS 50 SERIES FOR ROADWAY LUMINAIRES AND L31 SERIES FOR PEDESTRIAN LUMINAIRES AS MANUFACTURED BY LUMEC FOR THE CITY OF RICHMOND OR APPROVED EQUAL.
8. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
9. FLOWER POT HOLDER TO ACCOMODATE IRRIGATION SYSTEM (WHERE REQUIRED ONLY).

Richmond

CITY CENTRE TYPE
ROADWAY/PEDESTRIAN LUMINAIRE POLE

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L12.3
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1





POLE BASE PLATE

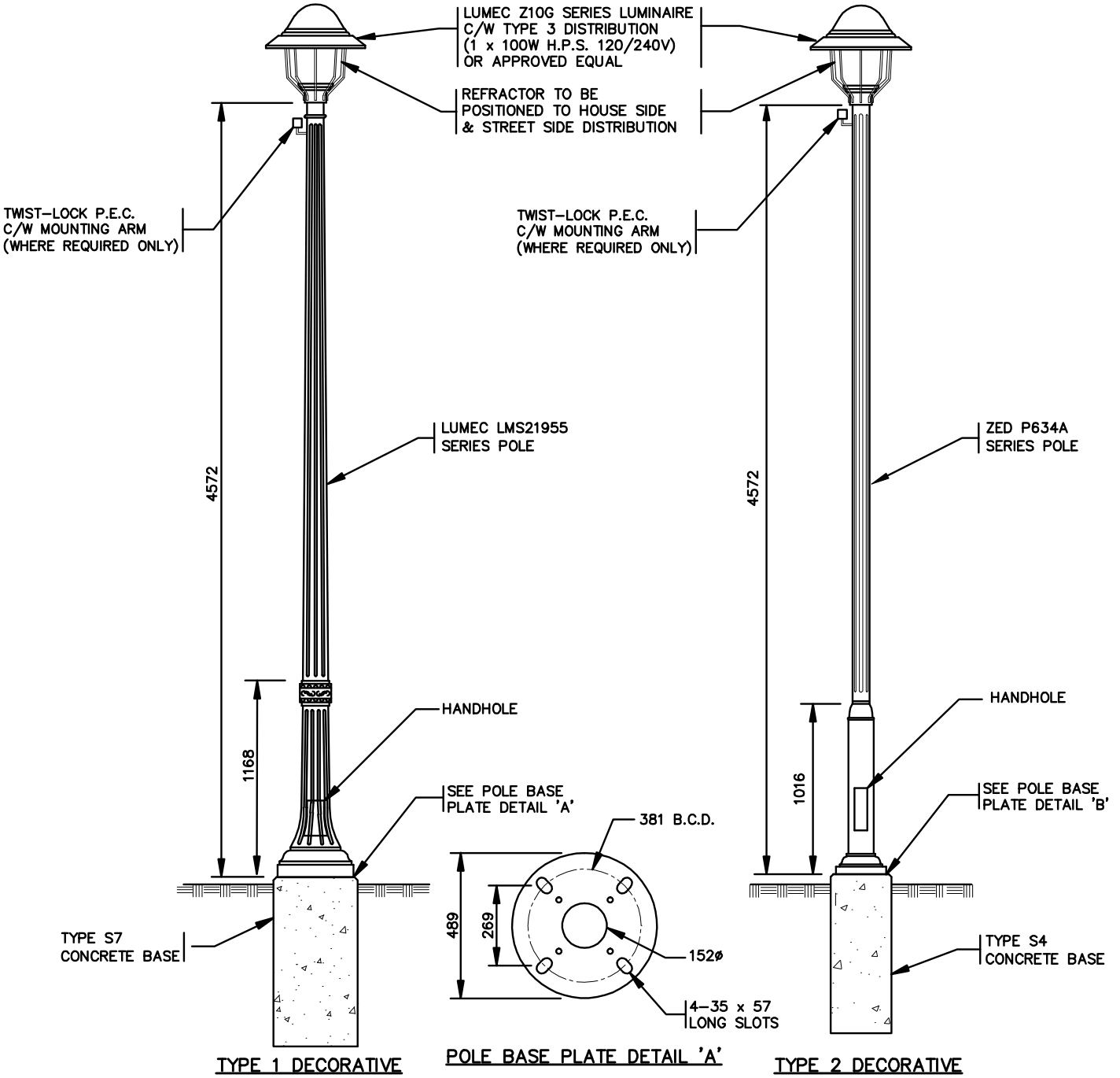
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. SEE DRAWING L13.3 FOR ADDITIONAL DETAILS.
3. CONTRACTOR SHALL SUPPLY SHOP DRAWINGS FOR APPROVAL PRIOR TO MANUFACTURING.
4. POLES & LUMINAIRES SHALL BE POWDER COAT TEXTURED FINISH, IN COLOUR SPECIFIED BY CITY OF RICHMOND.
5. POLE TO BE SUPPLIED 0.9m SHORTER WHEN INSTALLED ON A SERVICE BASE.
6. POLES & LUMINAIRES SHALL BE CANDELA SERIES AS MANUFACTURED BY LUMEC FOR THE CITY OF RICHMOND OR APPROVED EQUAL.
7. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

Richmond

STEVESTON TYPE LUMINAIRE POLE

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L12.4
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



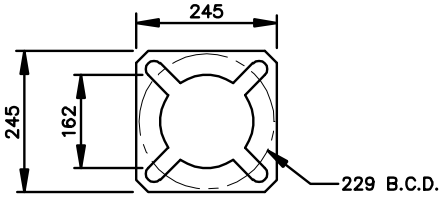
TYPE 1 DECORATIVE LUMINAIRE POLE

POLE BASE PLATE DETAIL 'A'

TYPE 2 DECORATIVE LUMINAIRE POLE

NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. SEE DRAWING L13.4 FOR ADDITIONAL DETAILS.
3. CONTRACTOR SHALL SUPPLY SHOP DRAWINGS FOR APPROVAL PRIOR TO MANUFACTURING.
4. POLES & LUMINAIRSE SHALL BE POWDER COAT TEXTURED FINISH, IN COLOUR SPECIFIED BY CITY OF RICHMOND.
5. POLE TO BE SUPPLIED 0.9m SHORTER WHEN INSTALLED ON A SERVICE BASE.
6. TYPE 1 POLE SHALL BE LMS21955 SERIES AND LUMINAIRE SHALL BE Z10G SERIES AS MANUFACTURED BY LUMEC FOR THE CITY OF RICHMOND OR APPROVED EQUAL.
   TYPE 2 POLE SHALL BE ZED P634A SERIES AND LUMINAIRES SHALL BE Z10G SERIES AS MANUFACTURED BY LUMEC FOR THE CITY OF RICHMOND OR APPROVED EQUAL.
7. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

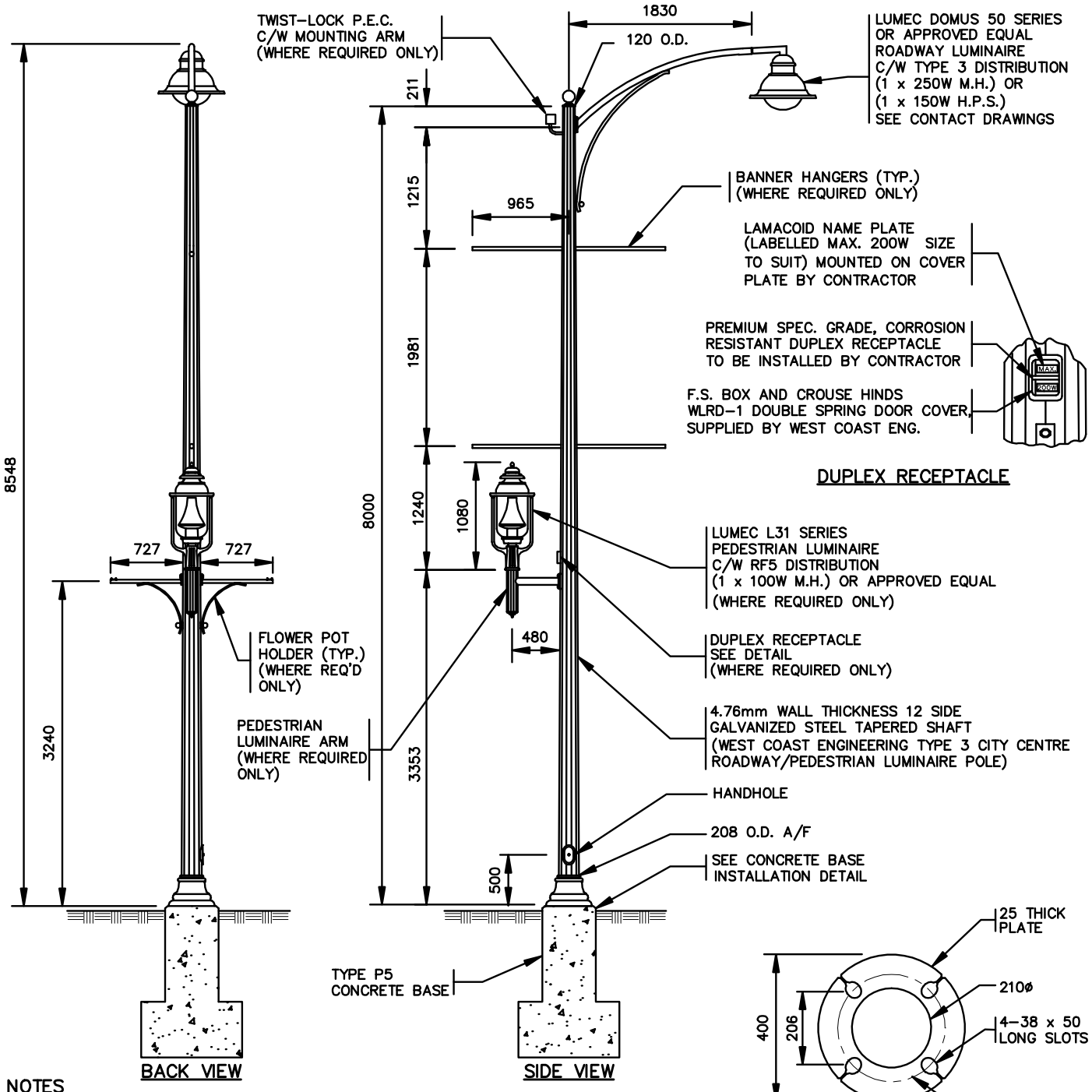


POLE BASE PLATE DETAIL 'B'

Richmond

TYPE 1 AND 2 DECORATIVE LUMINAIRE POLES

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L12.5
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



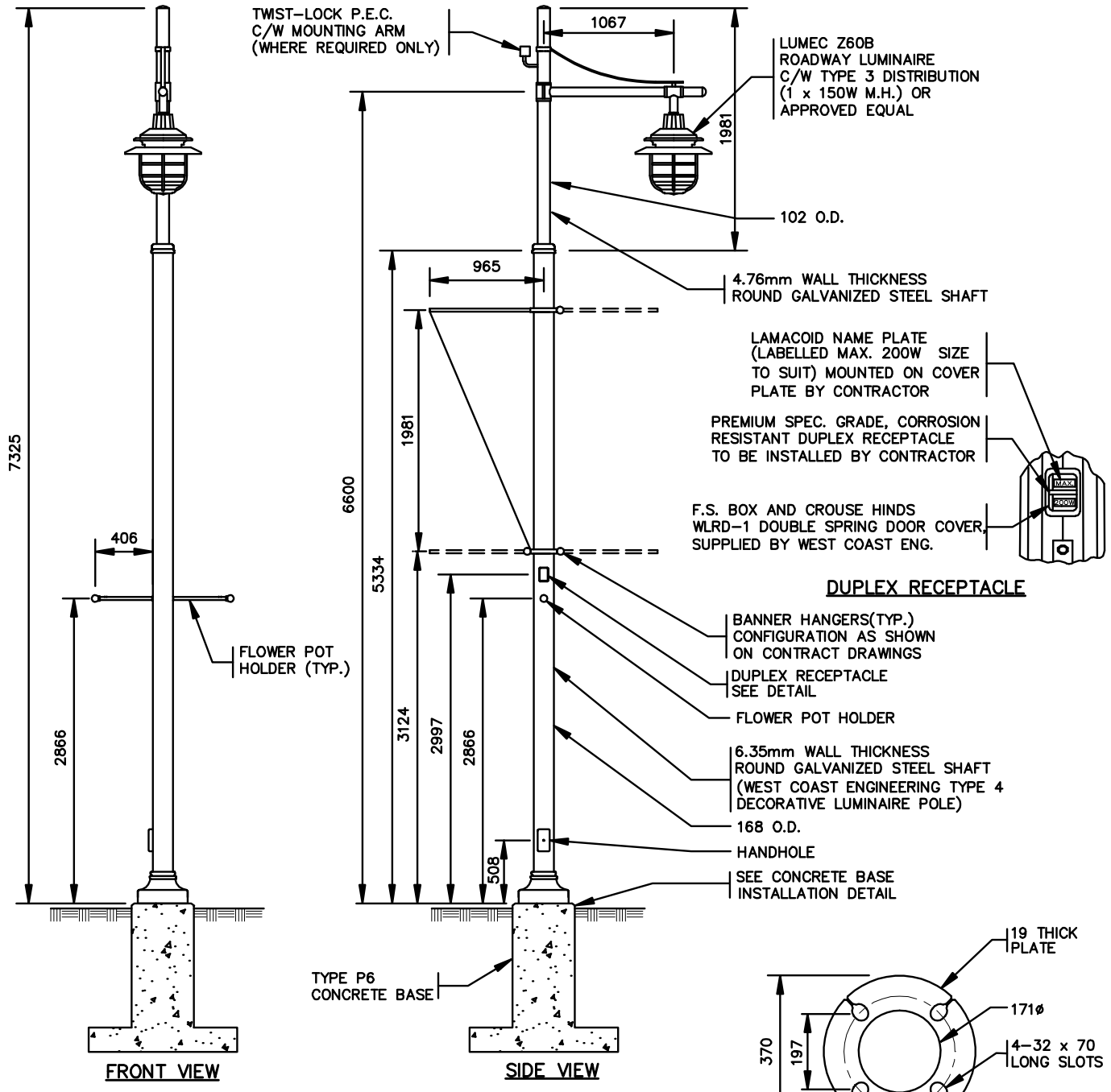
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. SEE DRAWING L13.4 FOR ADDITIONAL DETAILS.
3. CONTRACTOR SHALL SUPPLY SHOP DRAWINGS FOR APPROVAL PRIOR TO MANUFACTURING.
4. POLES SHALL BE GALVANIZED, UNLESS OTHERWISE NOTED.
5. POLES & LUMINAIRES SHALL BE POWDER COAT FINISHED, IN COLOUR SPECIFIED BY CITY OF RICHMOND.
6. POLES SHALL BE TYPE 3 AS MANUFACTURED BY WEST COAST ENGINEERING FOR THE CITY OF RICHMOND OR APPROVED EQUAL.
7. LUMINAIRES SHALL BE DOMUS 50 SERIES FOR ROADWAY LUMINAIRES AND L31 SERIES FOR PEDESTRIAN LUMINAIRES AS MANUFACTURED BY LUMEC FOR THE CITY OF RICHMOND OR APPROVED EQUAL.
8. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
9. FLOWER POT HOLDER TO ACCOMODATE IRRIGATION SYSTEM (WHERE REQUIRED ONLY).

Richmond

TYPE 3 DECORATIVE LUMINAIRE POLE

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L12.6
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



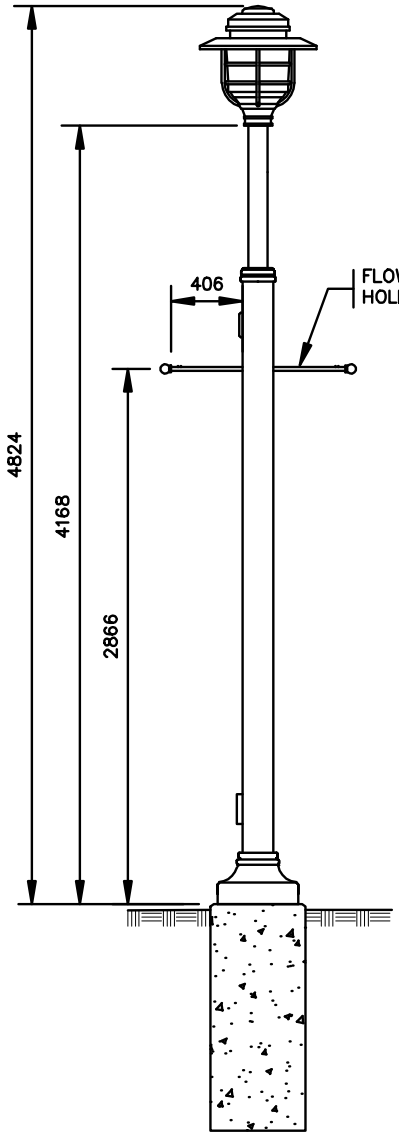
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. SEE DRAWING L13.5 FOR ADDITIONAL DETAILS.
3. CONTRACTOR SHALL SUPPLY SHOP DRAWINGS FOR APPROVAL PRIOR TO MANUFACTURING.
4. POLES SHALL BE GALVANIZED, UNLESS OTHERWISE NOTED.
5. POLES & LUMINAIRES SHALL BE POWDER COAT FINISHED, IN COLOUR SPECIFIED BY CITY OF RICHMOND.
6. POLES SHALL BE TYPE 4 AS MANUFACTURED BY WEST COAST ENGINEERING FOR THE CITY OF RICHMOND OR APPROVED EQUAL.
7. LUMINAIRES SHALL BE Z60B AS MANUFACTURED BY LUMEC FOR THE CITY OF RICHMOND OR APPROVED EQUAL.
8. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
9. FLOWER POT HOLDER TO ACCOMODATE IRRIGATION SYSTEM (WHERE REQUIRED ONLY).

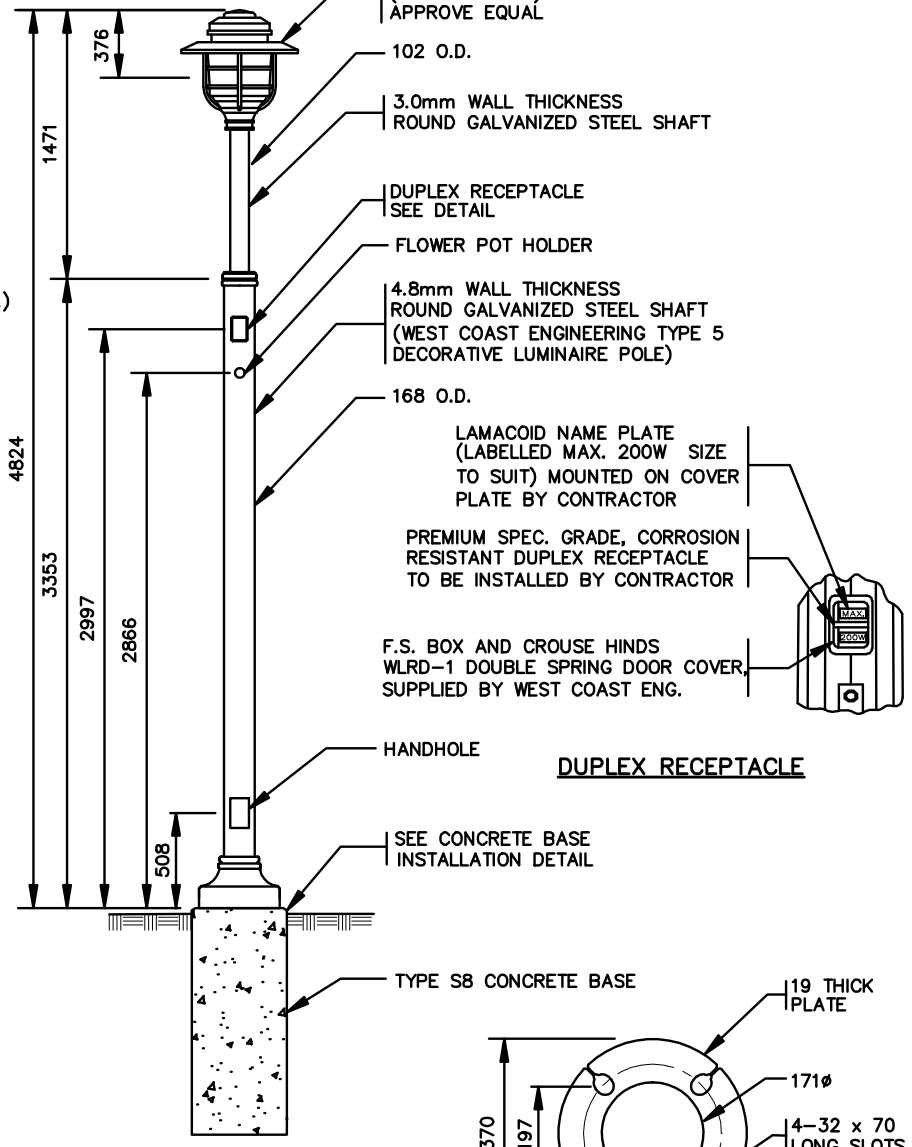
Richmond

TYPE 4 DECORATIVE LUMINAIRE POLE

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L12.7
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1

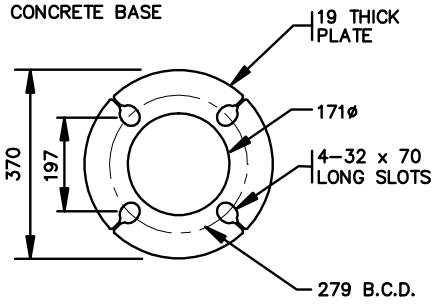


FRONT VIEW



SIDE VIEW

DUPLEX RECEPTACLE



POLE BASE PLATE

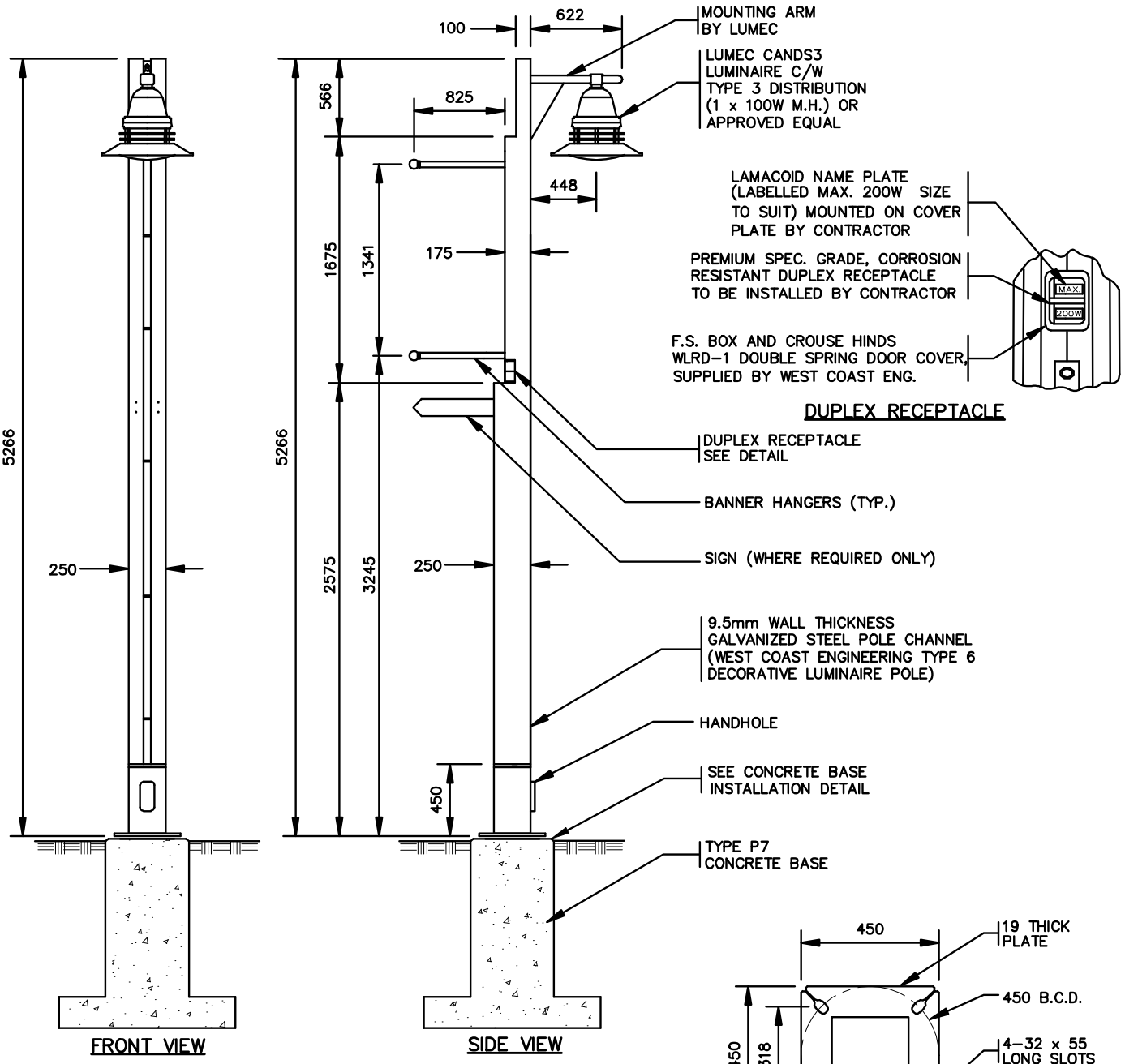
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. SEE DRAWING L13.5 FOR ADDITIONAL DETAILS.
3. CONTRACTOR SHALL SUPPLY SHOP DRAWINGS FOR APPROVAL PRIOR TO MANUFACTURING.
4. POLES SHALL BE GALVANIZED, UNLESS OTHERWISE NOTED.
5. POLES & LUMINAIRES SHALL BE POWDER COAT FINISHED, IN COLOUR SPECIFIED BY CITY OF RICHMOND.
6. POLES SHALL BE TYPE 5 AS MANUFACTURED BY WEST COAST ENGINEERING FOR THE CITY OF RICHMOND OR APPROVAL EQUAL.
7. LUMINAIRES SHALL BE Z61B AS MANUFACTURED BY LUMEC FOR THE CITY OF RICHMOND OR APPROVAL EQUAL.
8. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
9. FLOWER POT HOLDER TO ACCOMODATE IRRIGATION SYSTEM (WHERE REQUIRED ONLY).

Richmond

TYPE 5 DECORATIVE LUMINAIRE POLE

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L12.8
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



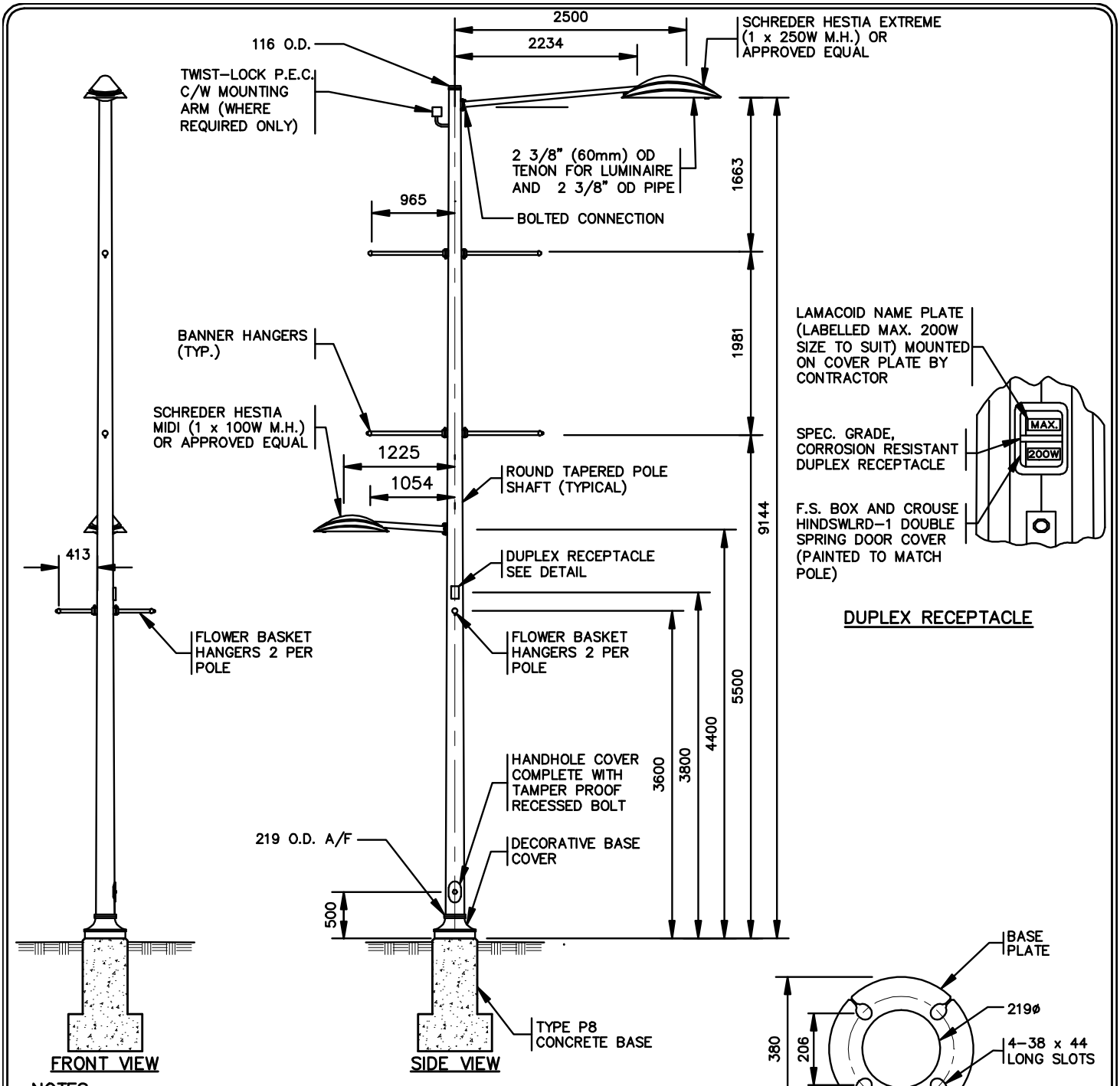
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. SEE DRAWING L13.5 FOR ADDITIONAL DETAILS.
3. CONTRACTOR SHALL SUPPLY SHOP DRAWINGS FOR APPROVAL PRIOR TO MANUFACTURING.
4. POLES SHALL BE GALVANIZED, UNLESS OTHERWISE NOTED.
5. POLES & LUMINAIRES SHALL BE POWDER COAT FINISHED, IN COLOUR SPECIFIED BY CITY OF RICHMOND.
6. POLES SHALL BE TYPE 6 AS MANUFACTURED BY WEST COAST ENGINEERING FOR THE CITY OF RICHMOND OR APPROVAL EQUAL.
7. LUMINAIRES SHALL BE CANDS3 AS MANUFACTURED BY LUMEC FOR THE CITY OF RICHMOND OR APPROVAL EQUAL.
8. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

Richmond

TYPE 6 DECORATIVE LUMINAIRE POLE

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L12.9
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



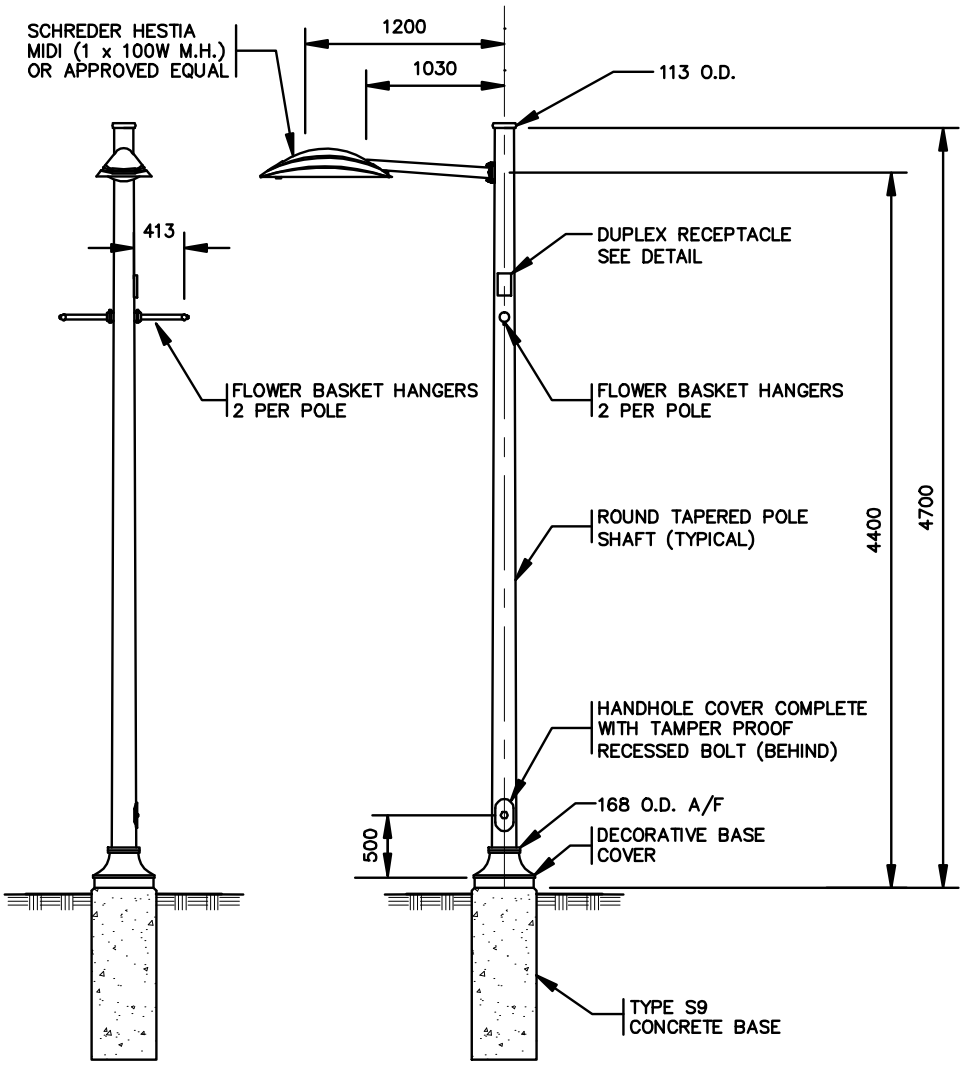
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. SEE DRAWING L13.5 FOR ADDITIONAL DETAILS.
3. CONTRACTOR SHALL SUPPLY SHOP DRAWINGS FOR APPROVAL PRIOR TO MANUFACTURING.
4. POLES SHALL BE GALVANIZED, UNLESS OTHERWISE NOTED.
5. POLES & LUMINAIRES SHALL BE POWDER COAT FINISHED, IN COLOUR SPECIFIED BY CITY OF RICHMOND.
6. POLES SHALL BE TYPE 7 AS MANUFACTURED BY WEST COAST ENGINEERING FOR THE CITY OF RICHMOND OR APPROVAL EQUAL.
7. LUMINAIRES SHALL BE HESTIA EXTREME FOR ROADWAY LUMINAIRES AND HESTIA MIDI FOR PEDESTRIAN LUMINAIRES AS MANUFACTURED BY SCHREDER FOR THE CITY OF RICHMOND OR APPROVAL EQUAL.
8. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
9. FLOWER POT HOLDER TO ACCOMODATE IRRIGATION SYSTEM (WHERE REQUIRED ONLY).

Richmond

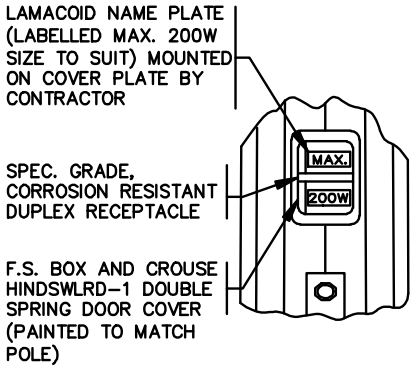
TYPE 7 DECORATIVE LUMINAIRE POLE

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L12.10
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1

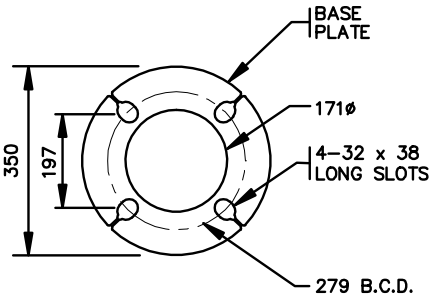


FRONT VIEW

SIDE VIEW



DUPLEX RECEPTACLE



POLE BASE PLATE

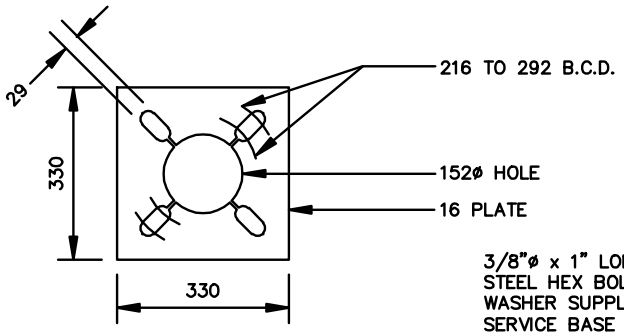
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. SEE DRAWING L13.5 FOR ADDITIONAL DETAILS.
3. CONTRACTOR SHALL SUPPLY SHOP DRAWINGS FOR APPROVAL PRIOR TO MANUFACTURING.
4. POLES SHALL BE GALVANIZED, UNLESS OTHERWISE NOTED.
5. POLES & LUMINAIRES SHALL BE POWDER COAT FINISHED, IN COLOUR SPECIFIED BY CITY OF RICHMOND.
6. POLES SHALL BE TYPE 8 AS MANUFACTURED BY WEST COAST ENGINEERING FOR THE CITY OF RICHMOND OR APPROVAL EQUAL.
7. LUMINAIRES SHALL BE HESTIA MIDI AS MANUFACTURED BY SCHREDER FOR THE CITY OF RICHMOND OR APPROVAL EQUAL.
8. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
9. FLOWER POT HOLDER TO ACCOMODATE IRRIGATION SYSTEM (WHERE REQUIRED ONLY).

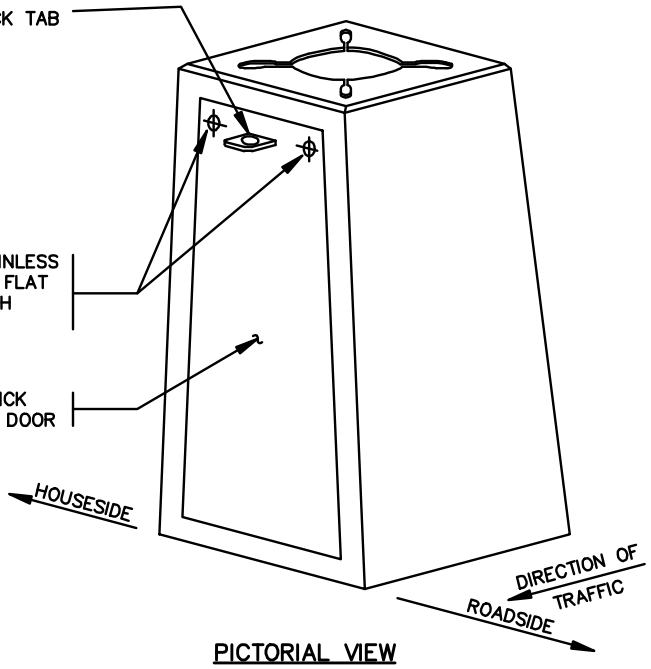
Richmond

TYPE 8 DECORATIVE PEDESTRIAN LUMINAIRE POLE

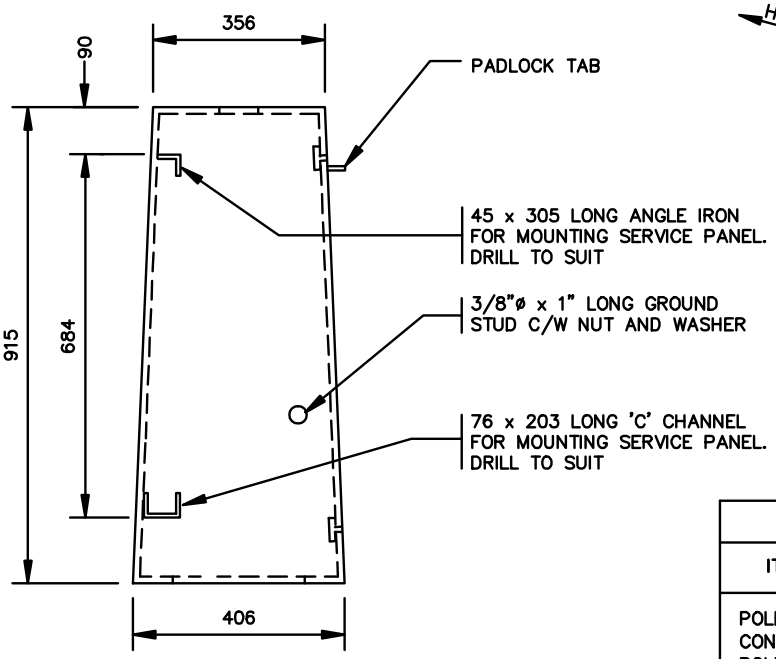
TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L12.11
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



TOP VIEW

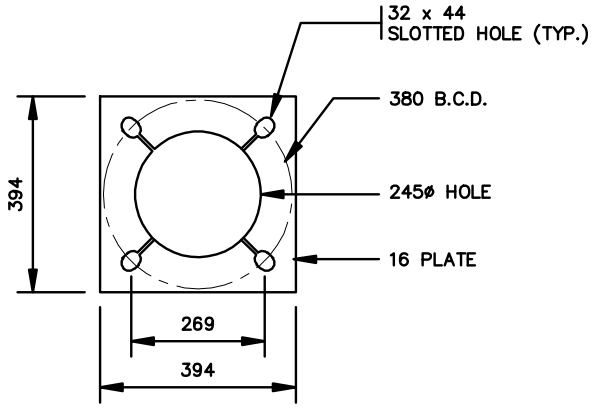


PICTORIAL VIEW



ELEVATION

SERVICE BASE BOLT KIT		
ITEM	QUANTITY	DESCRIPTION
POLE CONNECTION BOLTS	4	1"ø x 3" LONG GALVANIZED SAE GRADE 5 BOLT, NUT AND 2 WASHERS



BOTTOM VIEW

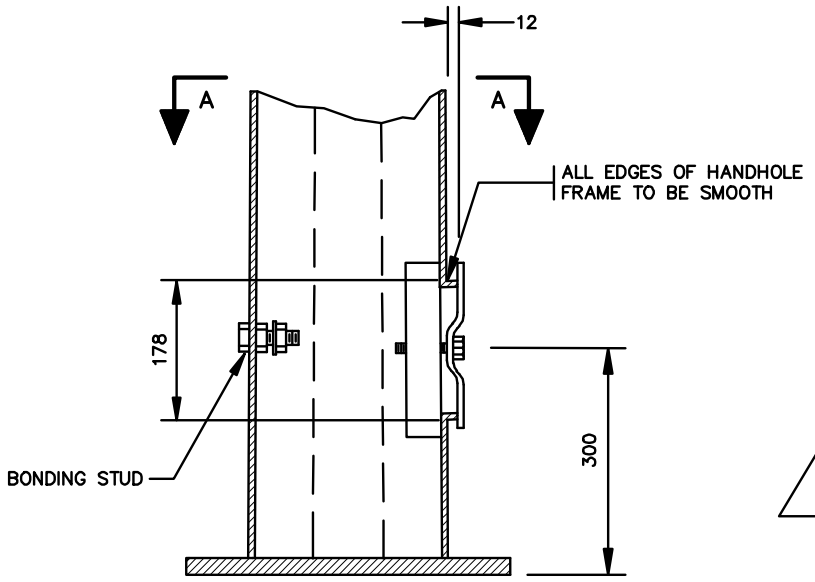
NOTES

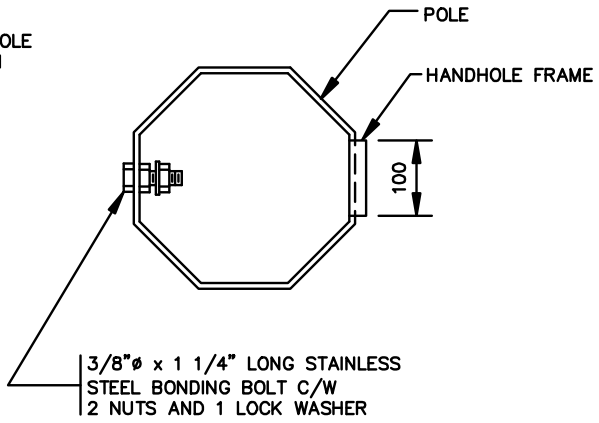
1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. SERVICE BASE FABRICATION TO MEET THE REQUIREMENTS OF THE MINISTRY OF TRANSPORTATION AND HIGHWAYS MATERIAL STANDARDS SECTION 301–TRAFFIC SIGNAL, LUMINAIRE AND SIGN POLES.
3. SERVICE BASE TO BE HOT DIP GALVANIZED AFTER FABRICATION.
4. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
5. STREET LIGHT POLES ON SERVICE BASE TO BE SHORTENED 0.9m.
6. CONTRACTOR SHALL SUPPLY SHOP DRAWINGS FOR APPROVAL PRIOR TO MANUFACTURING.

Richmond

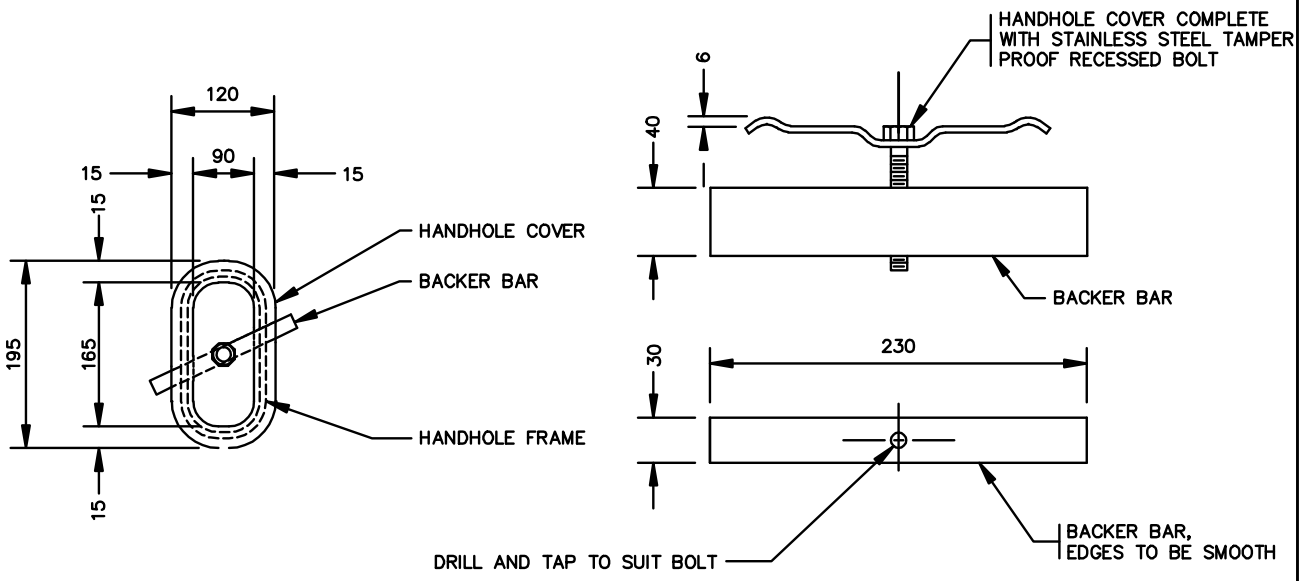
SERVICE BASE

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L13.1
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1





SECTION A–A



HANDHOLE AND COVER DETAIL

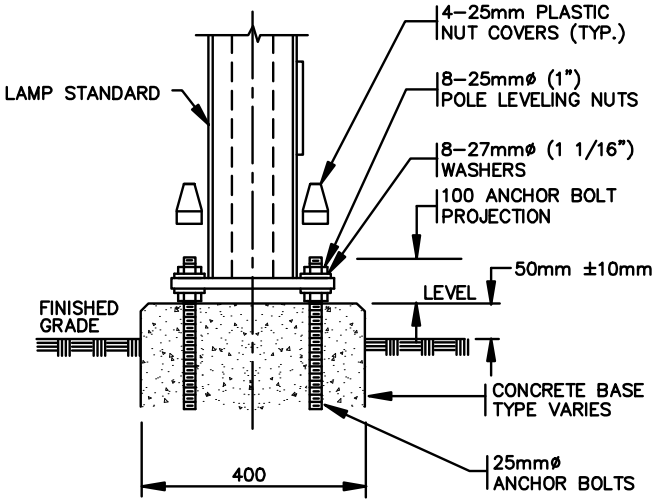
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. ALL HARDWARE SHALL BE GALVANIZED UNLESS OTHERWISE NOTED.
3. TOUCH UP ANY SCRATCHES IN GALVANIZED SURFACES WITH COLD GALVANIZING COMPOUND.
2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

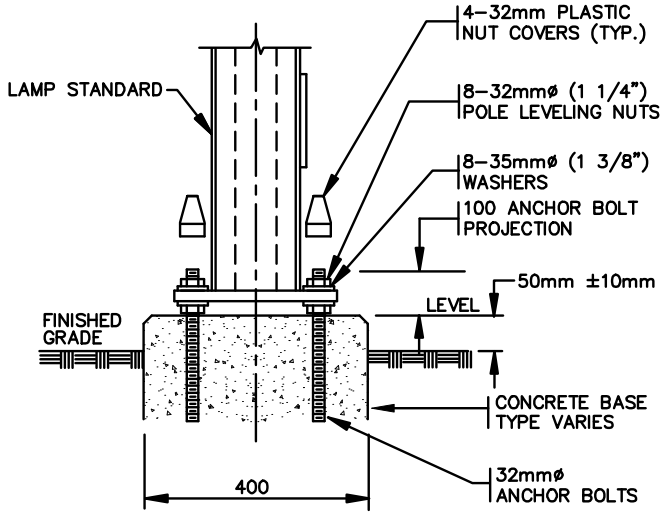
Richmond

POLE HANDHOLE AND COVER DETAIL

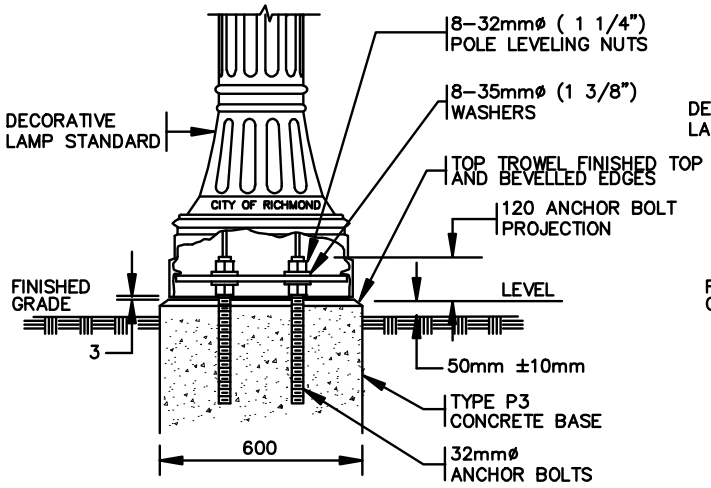
TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L13.2
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



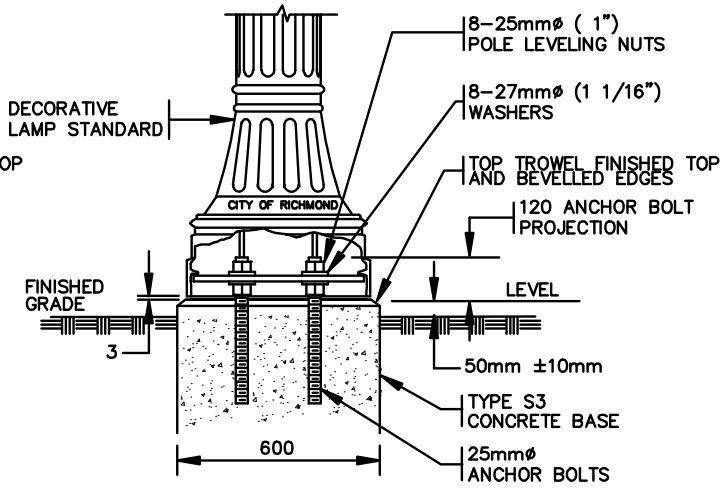
4.57m–9.14m OCTAGONAL GALVANIZED
STEEL TYPE POLE



13.72m DAVIT OCTAGONAL GALVANIZED
STEEL TYPE POLE



CITY CENTRE TYPE
ROADWAY/PEDESTRIAN POLE



CITY CENTRE TYPE
PEDESTRIAN/LANEWAY POLE

NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. POLES ARE TO BE INSTALLED PLUMB.
3. APPLY LUBRIPLATE OR OTHER SUITABLE GREASE TO EXPOSED PORTION OF ANCHOR BOLTS AND NUTS.
4. ALL HARDWARE SHALL BE GALVANIZED.
5. TOUCH UP ANY SCRATCHES IN GALVANIZED SURFACES WITH COLD GALVANIZING COMPOUND AND PAINTED SURFACES WITH TOUCH UP PAINT, COLOR AS SPECIFIED BY CITY OF RICHMOND.
6. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

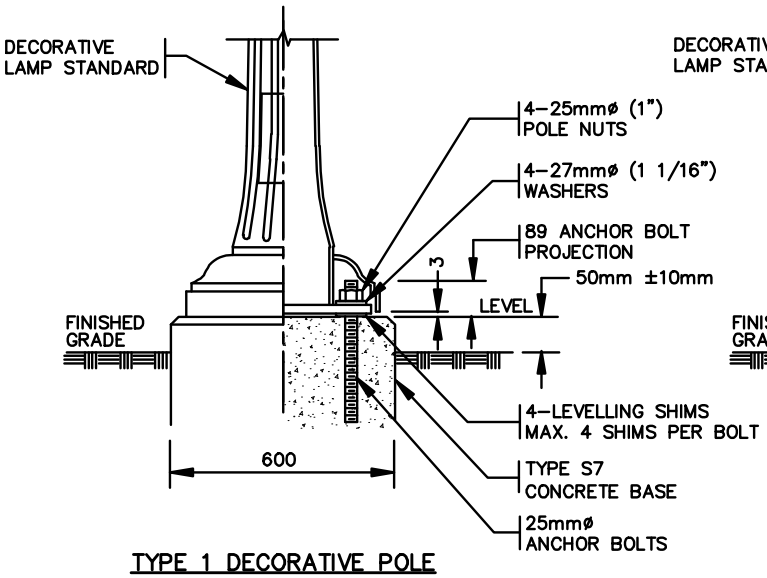
NOTE

IF THE TOP OF THE CONCRETE BASE IS NOT LEVEL OR IF THE CONCRETE BASE IS NOT WITHIN ±10mm OF THE SPECIFIED HEIGHT ABOVE FINISHED GRADE THEN THE TOP 75mm OF THE PEDESTAL SHALL BE BROKEN OFF BY HAND AND REFORMED AS DIRECTED BY THE ENGINEER.

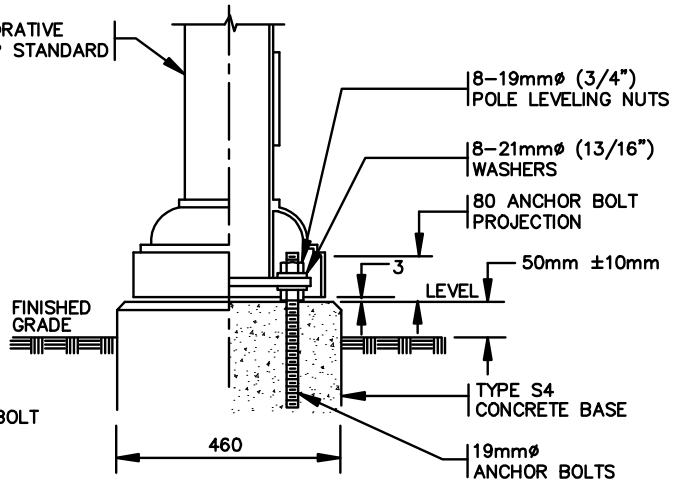
Richmond

POLE AND CONCRETE BASE INSTALLATION DETAILS–1

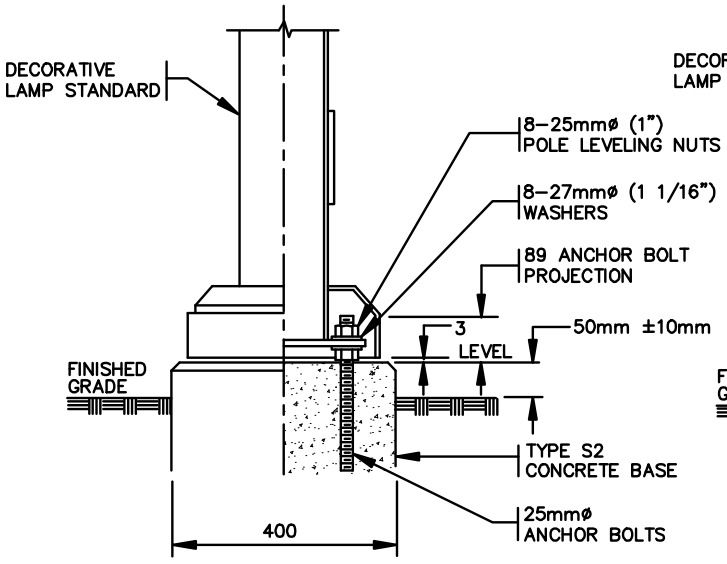
TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L13.3
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



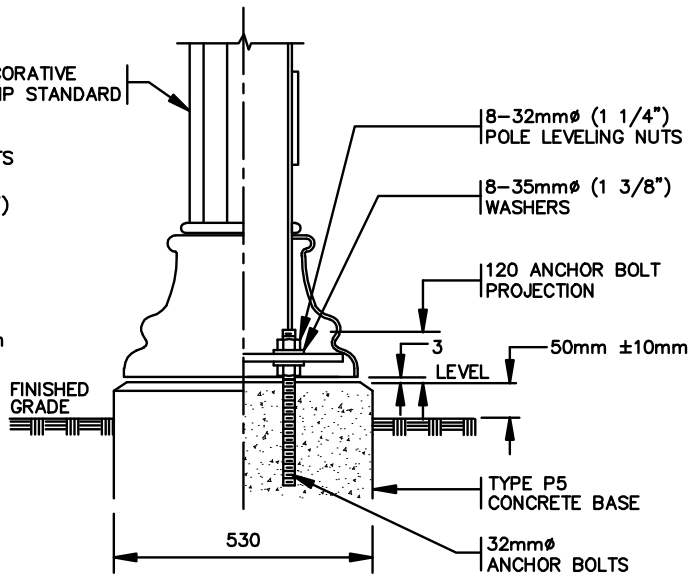
TYPE 1 DECORATIVE POLE



TYPE 2 DECORATIVE POLE



STEVESTON TYPE POLE



TYPE 3 DECORATIVE POLE

NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. POLES ARE TO BE INSTALLED PLUMB.
3. APPLY LUBRIPLATE OR OTHER SUITABLE GREASE TO EXPOSED PORTION OF ANCHOR BOLTS AND NUTS.
4. ALL HARDWARE SHALL BE GALVANIZED.
5. TOUCH UP ANY SCRATCHES IN GALVANIZED SURFACES WITH COLD GALVANIZING COMPOUND AND PAINTED SURFACES WITH TOUCH UP PAINT, COLOR AS SPECIFIED BY CITY OF RICHMOND.
6. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

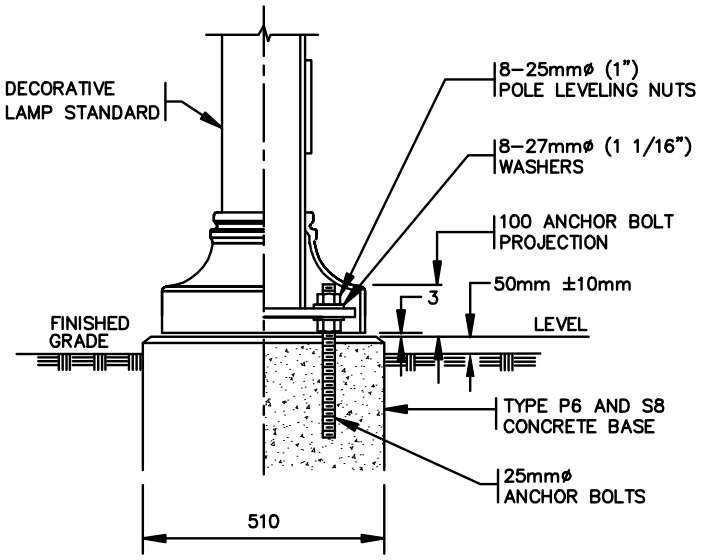
NOTE

IF THE TOP OF THE CONCRETE BASE IS NOT LEVEL OR IF THE CONCRETE BASE IS NOT WITHIN ±10mm OF THE SPECIFIED HEIGHT ABOVE FINISHED GRADE THEN THE TOP 75mm OF THE PEDESTAL SHALL BE BROKEN OFF BY HAND AND REFORMED AS DIRECTED BY THE ENGINEER.

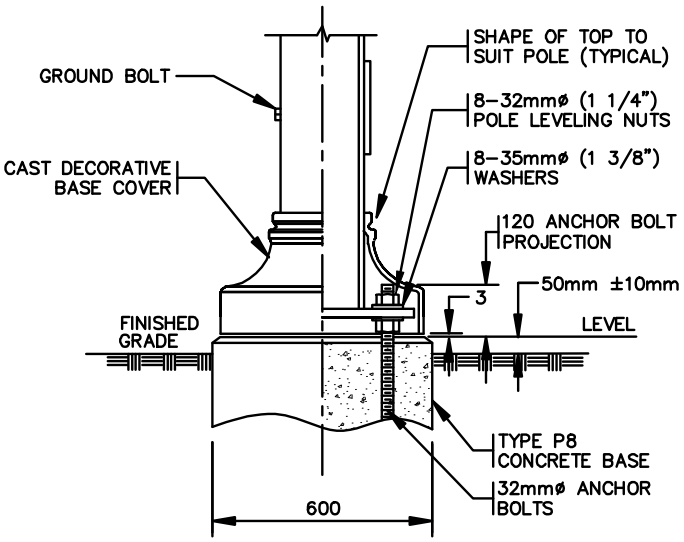
Richmond

POLE AND CONCRETE BASE INSTALLATION DETAILS–2

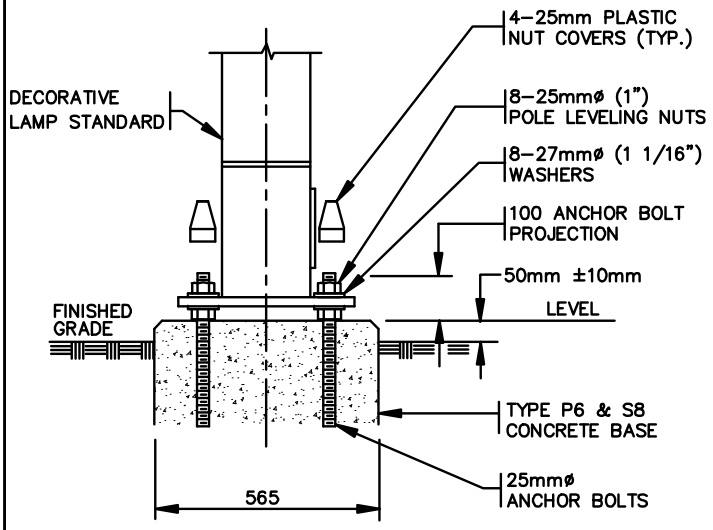
TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L13.4
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



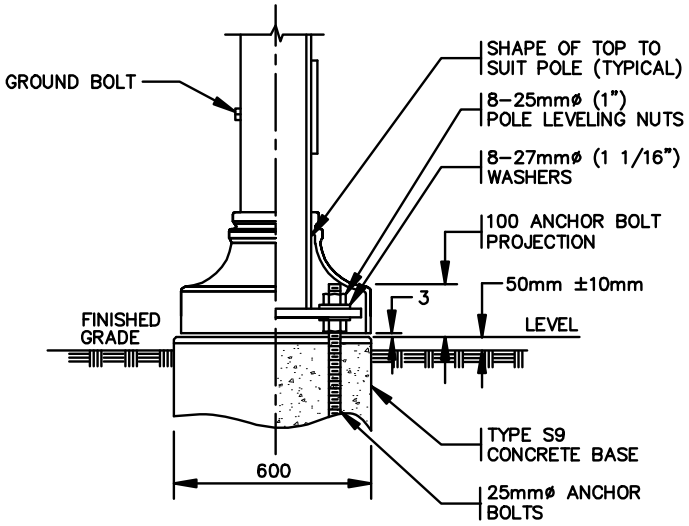
TYPE 4 AND 5 DECORATIVE POLE



TYPE 7 DECORATIVE POLE



TYPE 6 DECORATIVE POLE



TYPE 8 DECORATIVE POLE

NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. POLES ARE TO BE INSTALLED PLUMB.
3. APPLY LUBRIPLATE OR OTHER SUITABLE GREASE TO EXPOSED PORTION OF ANCHOR BOLTS AND NUTS.
4. ALL HARDWARE SHALL BE GALVANIZED.
5. TOUCH UP ANY SCRATCHES IN GALVANIZED SURFACES WITH COLD GALVANIZING COMPOUND AND PAINTED SURFACES WITH TOUCH UP PAINT, COLOR AS SPECIFIED BY CITY OF RICHMOND.
6. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

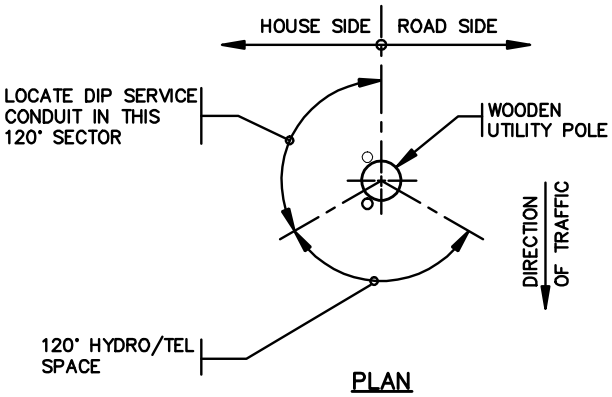
NOTE

IF THE TOP OF THE CONCRETE BASE IS NOT LEVEL OR IF THE CONCRETE BASE IS NOT WITHIN ±10mm OF THE SPECIFIED HEIGHT ABOVE FINISHED GRADE THEN THE TOP 75mm OF THE PEDESTAL SHALL BE BROKEN OFF BY HAND AND REFORMED AS DIRECTED BY THE ENGINEER.

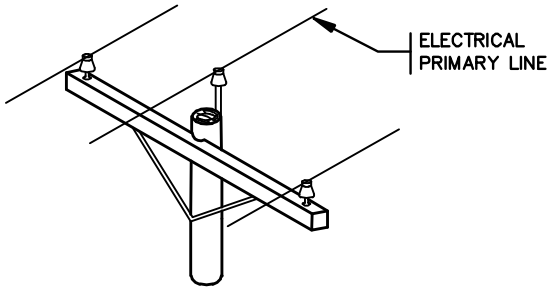
Richmond

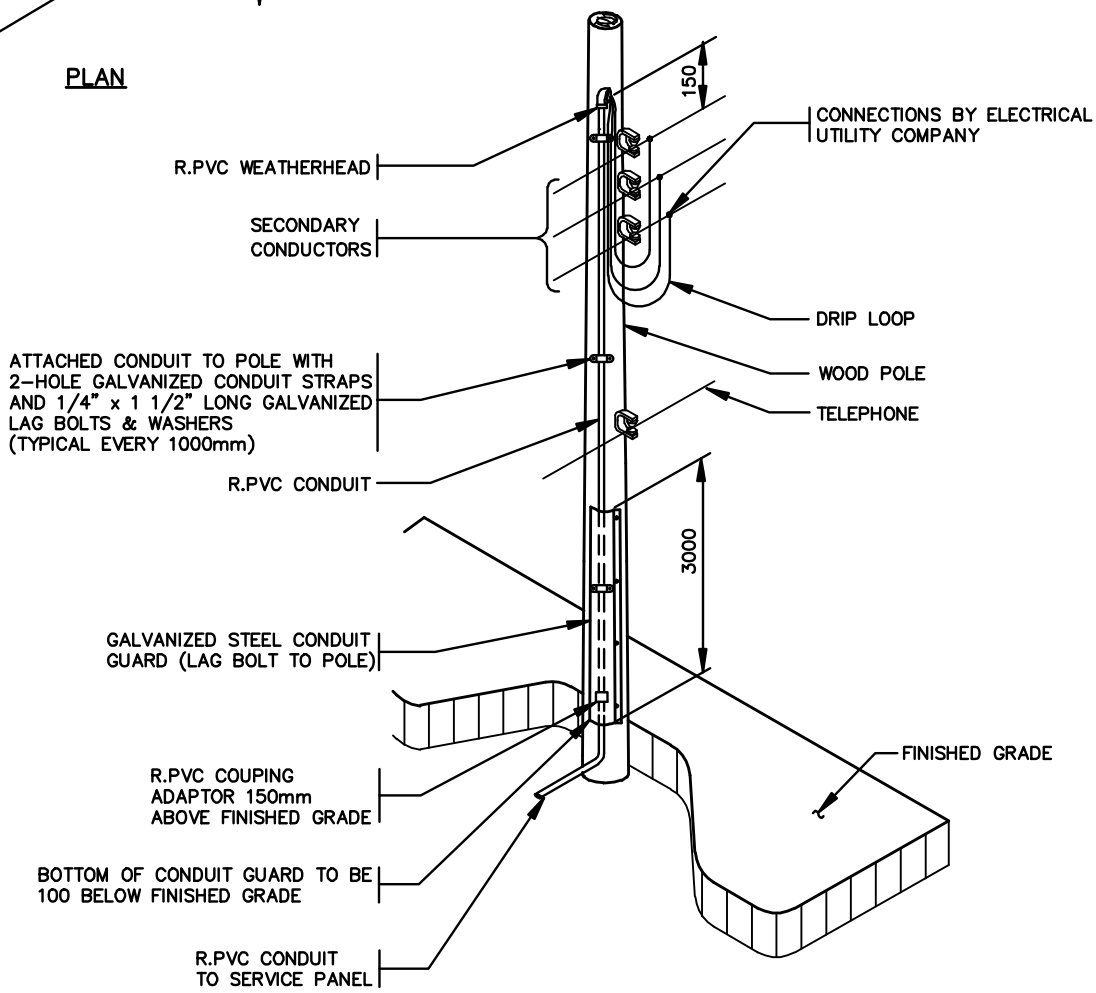
POLE AND CONCRETE BASE INSTALLATION DETAILS–3

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L13.5
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



PLAN





NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF SERVICE CONDUCTORS. CONNECTION BY ELECTRICAL UTILITY COMPANY UNLESS OTHERWISE NOTED.
3. CONTRACTOR TO OBTAIN PERMISSION FROM UTILITY COMPANY PRIOR TO INSTALLING CONDUIT ON THEIR POLE.
4. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
5. SERVICE CONDUCTORS AS DETAILED ON CONTRACT DRAWINGS.
6. MOUNT CONDUIT ON CONCRETE POLE WITH 3/4" STAINLESS STEEL BANDING.
7. ALL HARDWARE SHALL BE GALVANIZED UNLESS OTHERWISE NOTED.
8. CONDUIT UP POLE TO SUIT SERVICE CONDUCTORS (MINIMUM 50mm).

Richmond

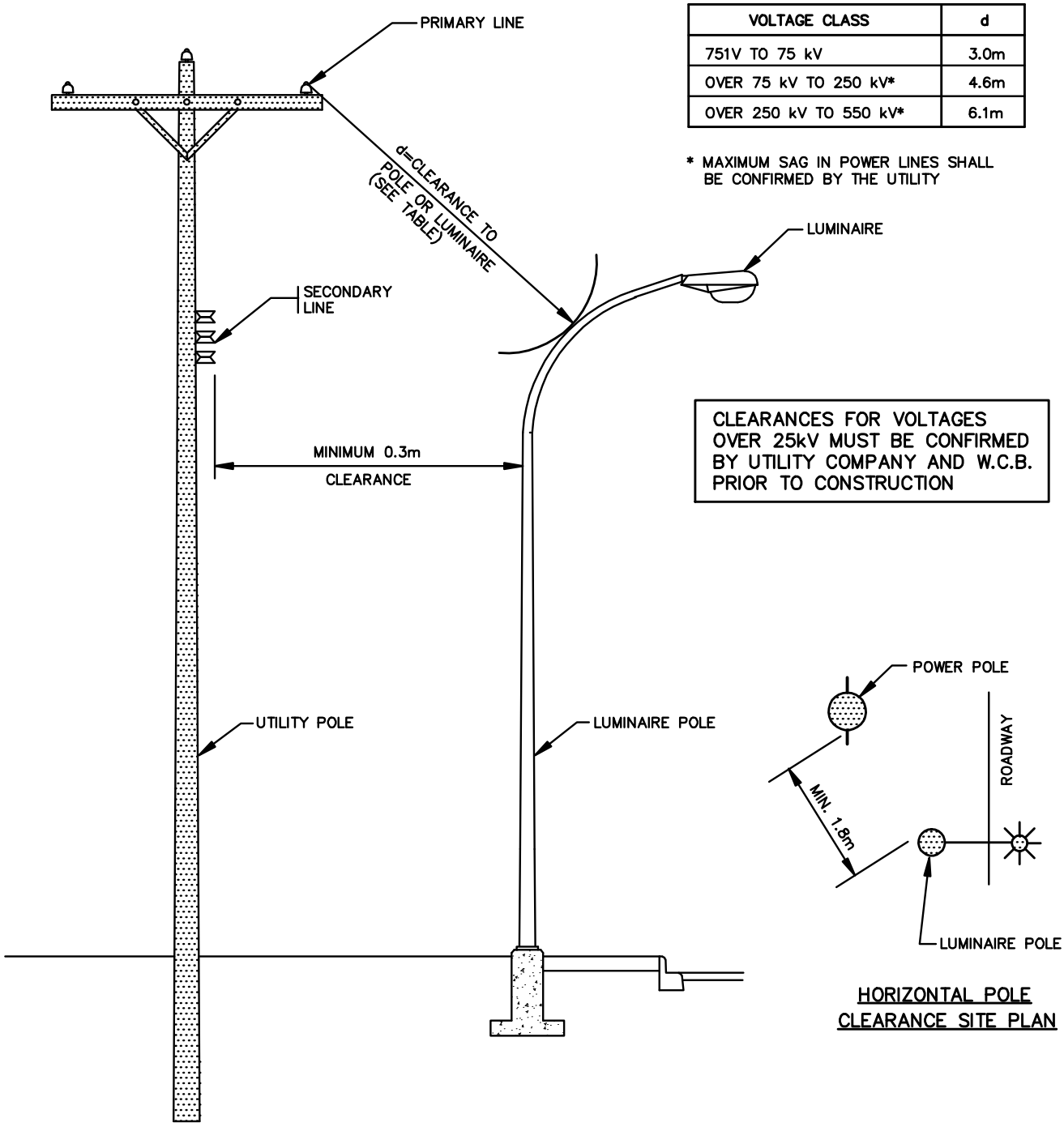
UNDERGROUND DIP SERVICE CONNECTION DETAILS

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L14.1
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1

PRIMARY LINE CLEARANCE TABLE

VOLTAGE CLASS	d
751V TO 75 kV	3.0m
OVER 75 kV TO 250 kV*	4.6m
OVER 250 kV TO 550 kV*	6.1m

* MAXIMUM SAG IN POWER LINES SHALL BE CONFIRMED BY THE UTILITY



CLEARANCES FOR VOLTAGES OVER 25kV MUST BE CONFIRMED BY UTILITY COMPANY AND W.C.B. PRIOR TO CONSTRUCTION

HORIZONTAL POLE CLEARANCE SITE PLAN

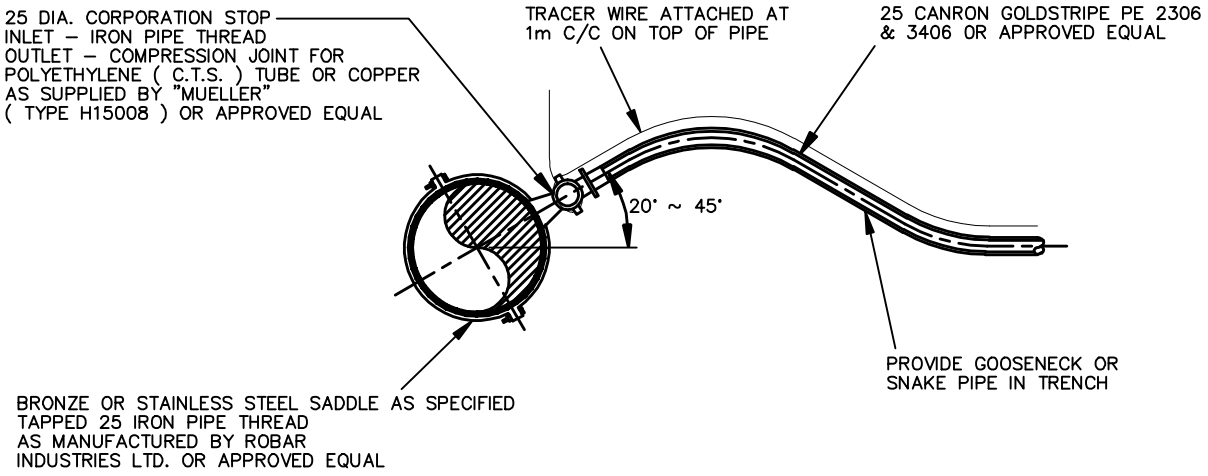
NOTES

1. REFER TO CONTRACT DRAWINGS AND SUPPLEMENTARY SPECIFICATIONS.
2. CLEARANCES LISTED ABOVE TO BE USED AS A GUIDELINE ONLY. EXACT REQUIRED CLEARANCES MAY VARY AND MUST BE CONFIRMED BY CONTRACTOR PRIOR TO CONSTRUCTION.
3. FOR CLEARANCES LESS THAN 3.0m FROM PRIMARY LINES CONTRACTOR TO OBTAIN APPROVAL FROM UTILITY COMPANY AND WORKERS COMPENSATION BOARD PRIOR TO INSTALLATION.

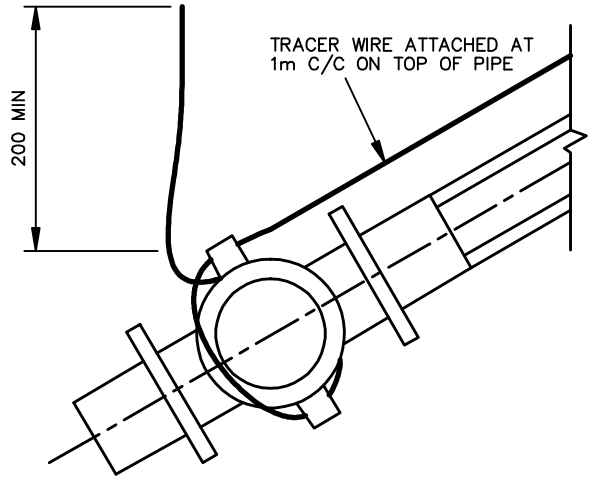
Richmond

MINIMUM CLEARANCES TO OVERHEAD POWERLINES

TECH. : P. DISCUSSO	SCALE : NTS	DRAWING NUMBER : L14.2
DR. : C. YEUNG	DATE : JAN. 1998	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



SERVICE CONNECTION

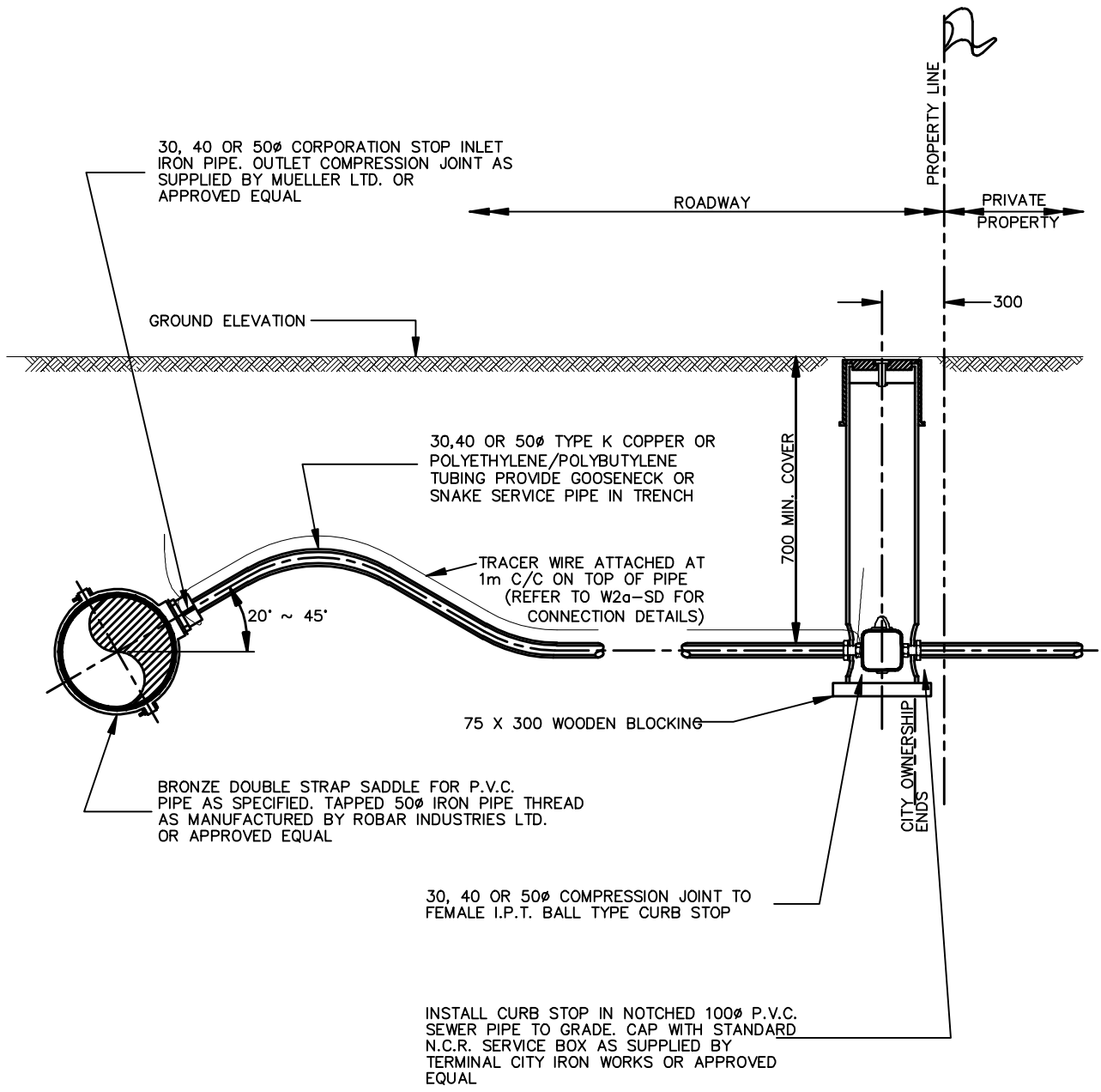


TRACER WIRE CONNECTION DETAIL

Richmond

STANDARD 25mm DIA. SERVICE CONNECTION

TECH. :	SCALE : NTS	DRAWING NUMBER : W2a–SD
DR. :	DATE : NOV. 2009	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1

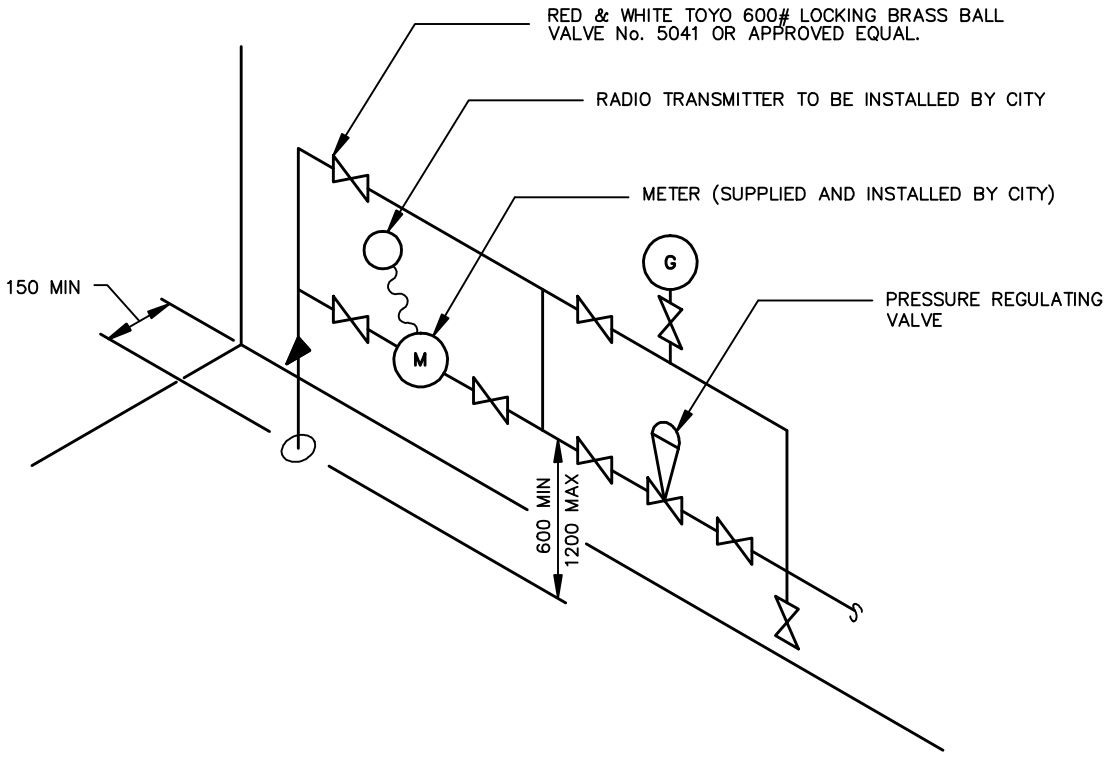


ELEVATION

Richmond

STANDARD 30mm, 40mm & 50mm SERVICE CONNECTIONS

TECH. :	SCALE : NTS	DRAWING NUMBER : W2b–SD
DR. :	DATE : NOV. 2009	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



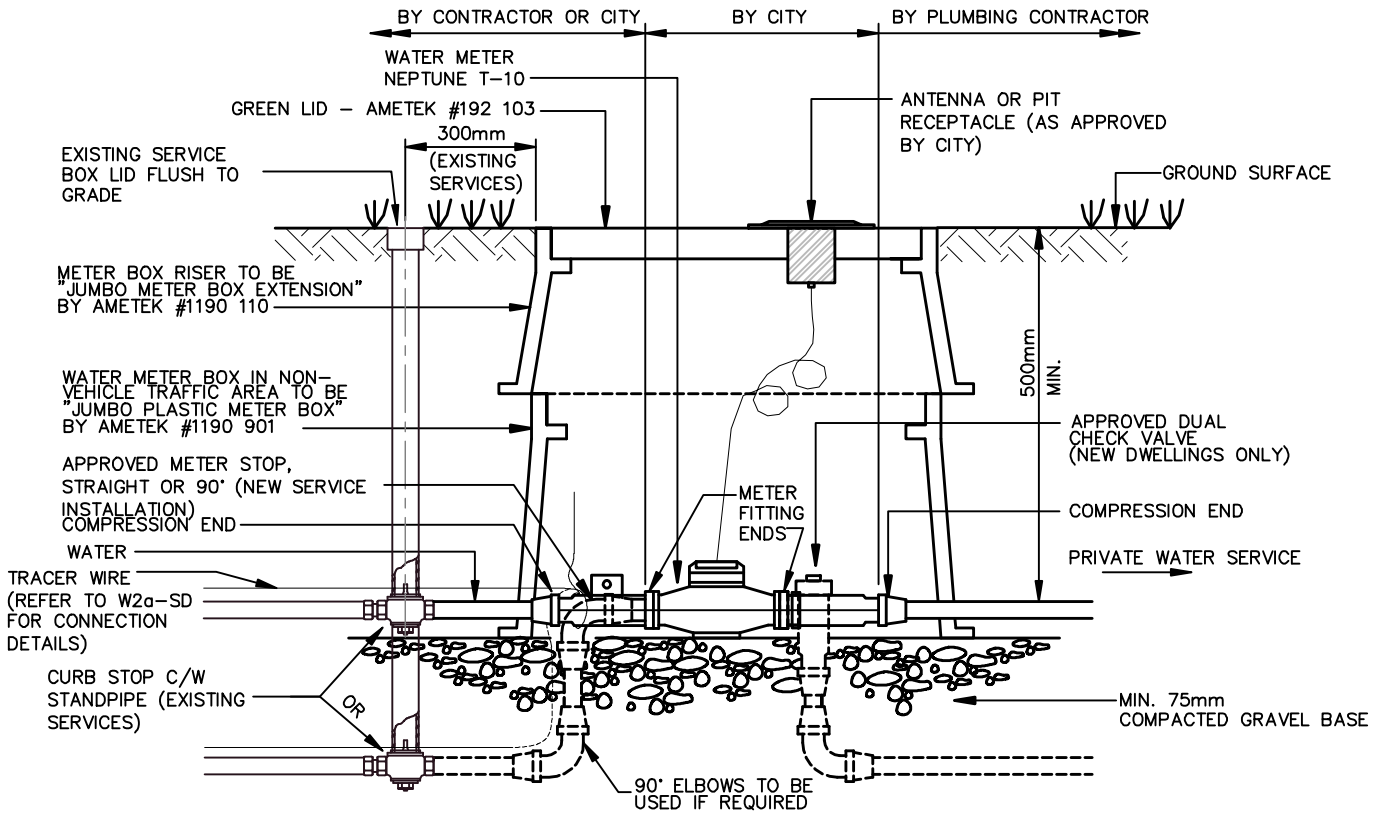
NOTES:

1. REFER TO PERMITS & LICENCE DEPT. DWG. DR. NO. P – 106 FOR SIZES.
2. REMOTE READER TO BE SITUATED ON AN ACCESSIBLE OUTSIDE WALL.
3. 900 CLEARANCE REQUIRED IN FRONT FOR SERVICE.

Richmond

TYPICAL COMMERCIAL METER INSTALLATION

TECH. :	SCALE : NTS	DRAWING NUMBER : W2f–SD
DR. :	DATE : NOV. 2009	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



WATER METER BOX

NOTES:

1. ALL METER CHAMBERS TO BE LOCATED CLEAR OF DRIVEWAY.
2. MATERIALS AND CONSTRUCTION SHALL CONFORM TO THE B.C. PLUMBING CODE.
3. CONNECTION SIZE RANGE 19mm-50mm.
4. RETROFITTING METERS ON EXISTING WATER CONNECTIONS, THAT CAN NOT BE RELOCATED OUT OF DRIVEWAYS, SHALL USE A.E. CONCRETE T266 SERVICE BOX C/W STEEL LID.
5. METER ASSEMBLIES SHALL BE INSTALLED CENTERED AND ALIGNED WITHIN METER BOXES.
6. FOR EXISTING SERVICES, METER TO BE INSTALLED IMMEDIATELY DOWNSTREAM OF EXISTING CURB-STOP. STANDPIPE TO REMAIN INTACT.
7. 19 mm (3/4") WATER METER TO BE INSTALLED ON ALL RESIDENTIAL APPLICATIONS.
8. WHERE DEPTH OF EXISTING WATER SERVICE CANNOT ACCOMMODATE 90° FITTINGS (i.e. SHALLOW SERVICE <500 mm DEPTH), STRAIGHT METER FITTINGS ARE TO BE USED. METER TO BE PLUMBED AT DEPTH OF EXISTING SERVICE. INSTALLATION WHERE METER BASE IS <400 mm TO BE DOCUMENTED AND EXISTING WATER SERVICE DEPTH NOTED.

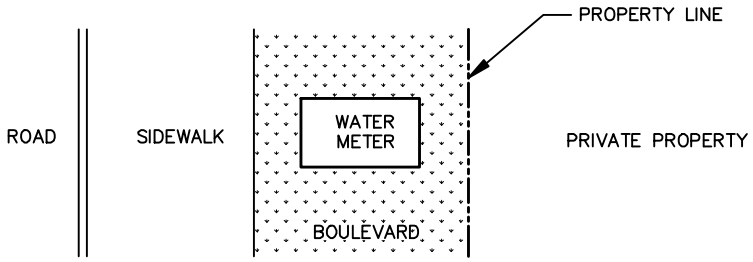
Richmond

SINGLE FAMILY DWELLING

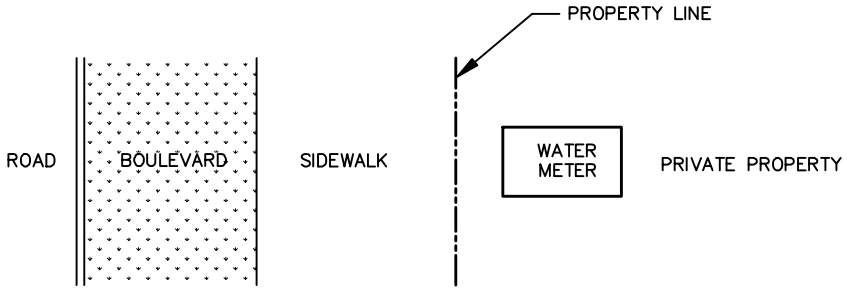
WATER METER AND METER BOX INSTALLATION

50mmø & UNDER FOR DOMESTIC USE ONLY

TECH. :	SCALE : NTS	DRAWING NUMBER : W2g-SD
DR. :	DATE : NOV. 2009	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 2



LOCATION OF METER INSTALLATION–OPTION 1



LOCATION OF METER INSTALLATION–OPTION 2

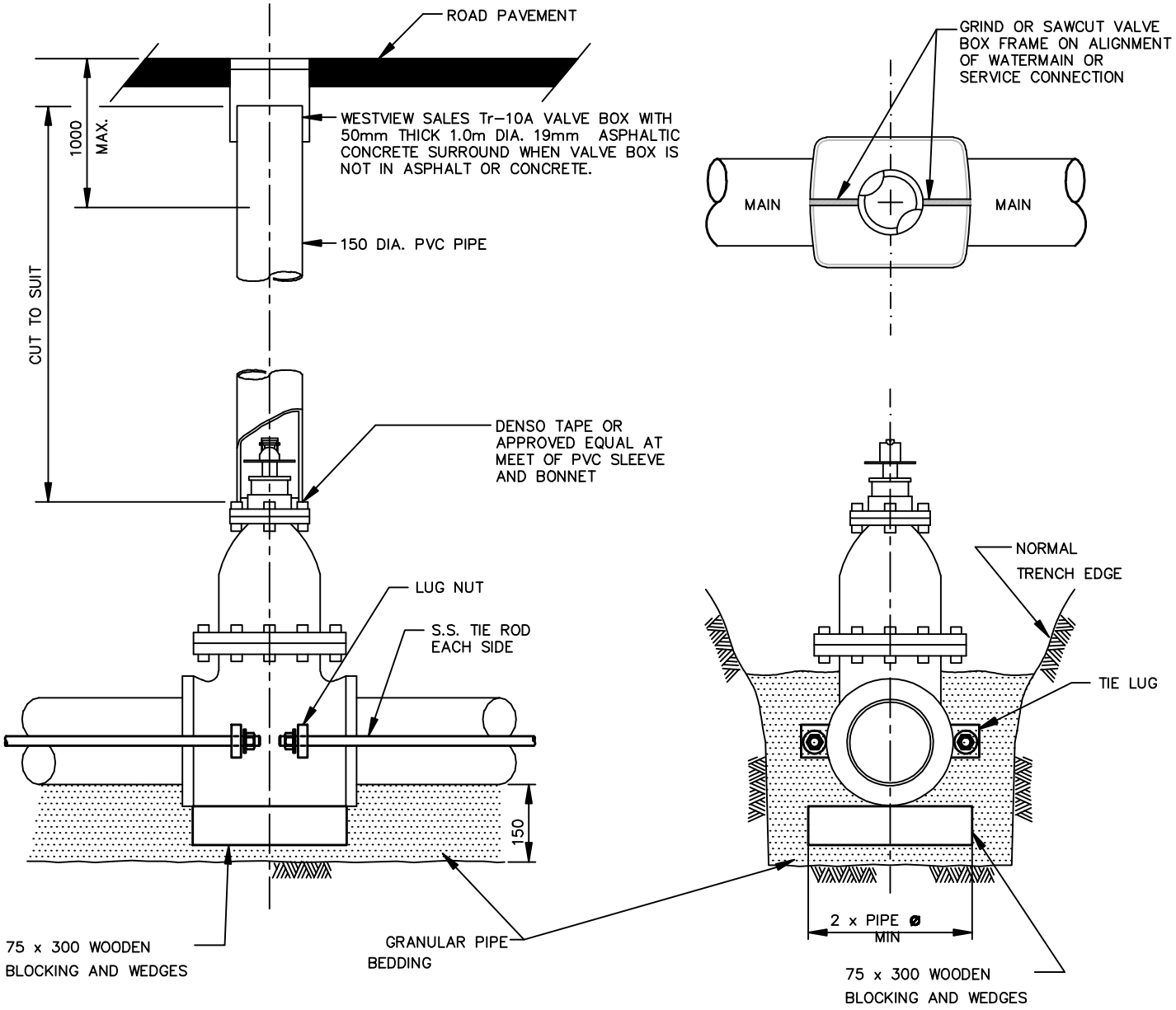
Richmond

SINGLE FAMILY DWELLING

WATER METER AND METER BOX LOCATION

50mmø & UNDER FOR DOMESTIC USE ONLY

TECH. :	SCALE : NTS	DRAWING NUMBER : W2g–SD
DR. :	DATE : NOV. 2009	
ENG. :	REV. DATE : NOV/10	SHEET No. : 2 OF 2

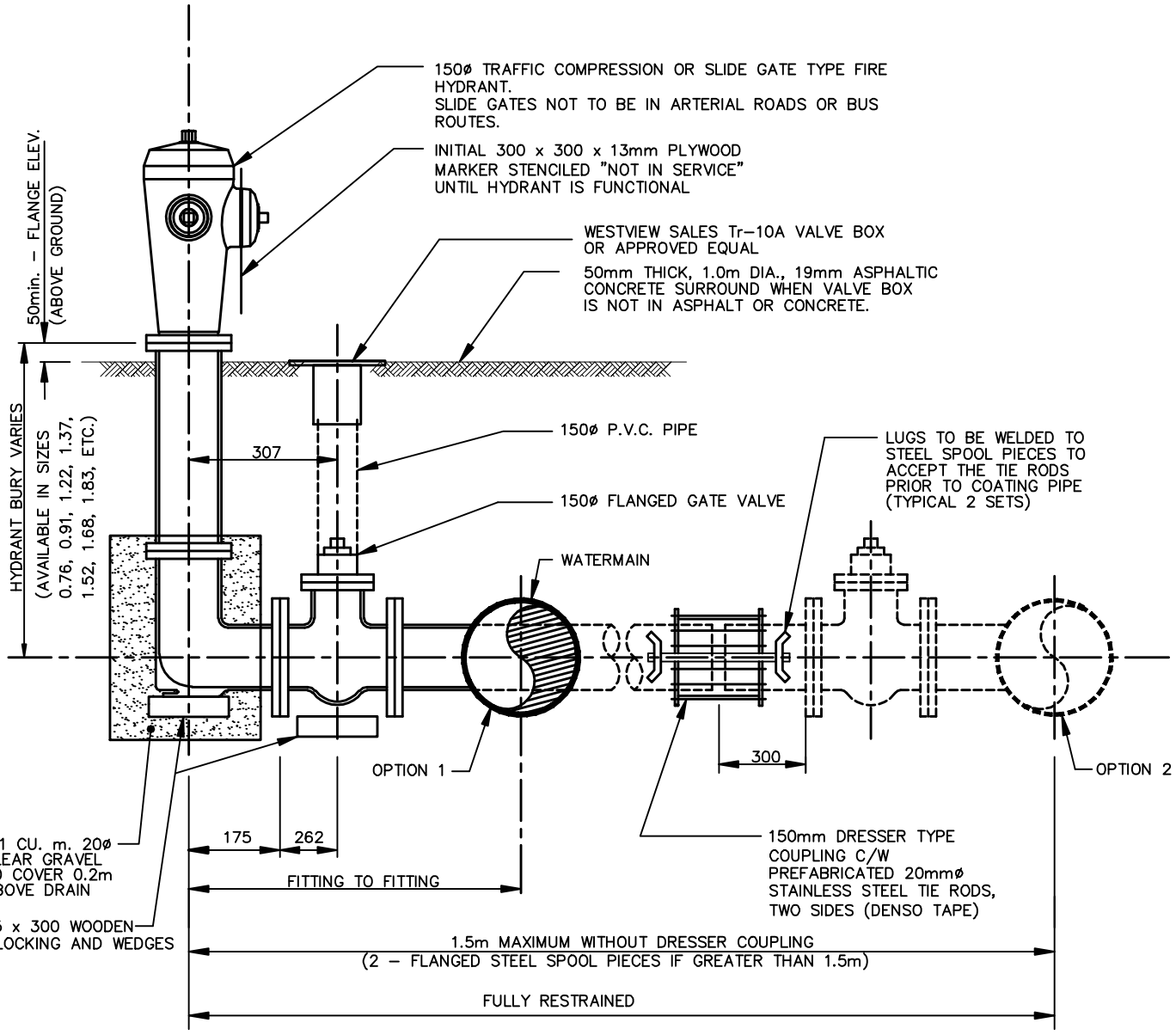


NOTES:
REFER TO CONTRACT DRAWINGS AND SECTION 33 11 01 FOR DETAILED SPECIFICATIONS.

Richmond

BELL GATE VALVE INSTALLATION

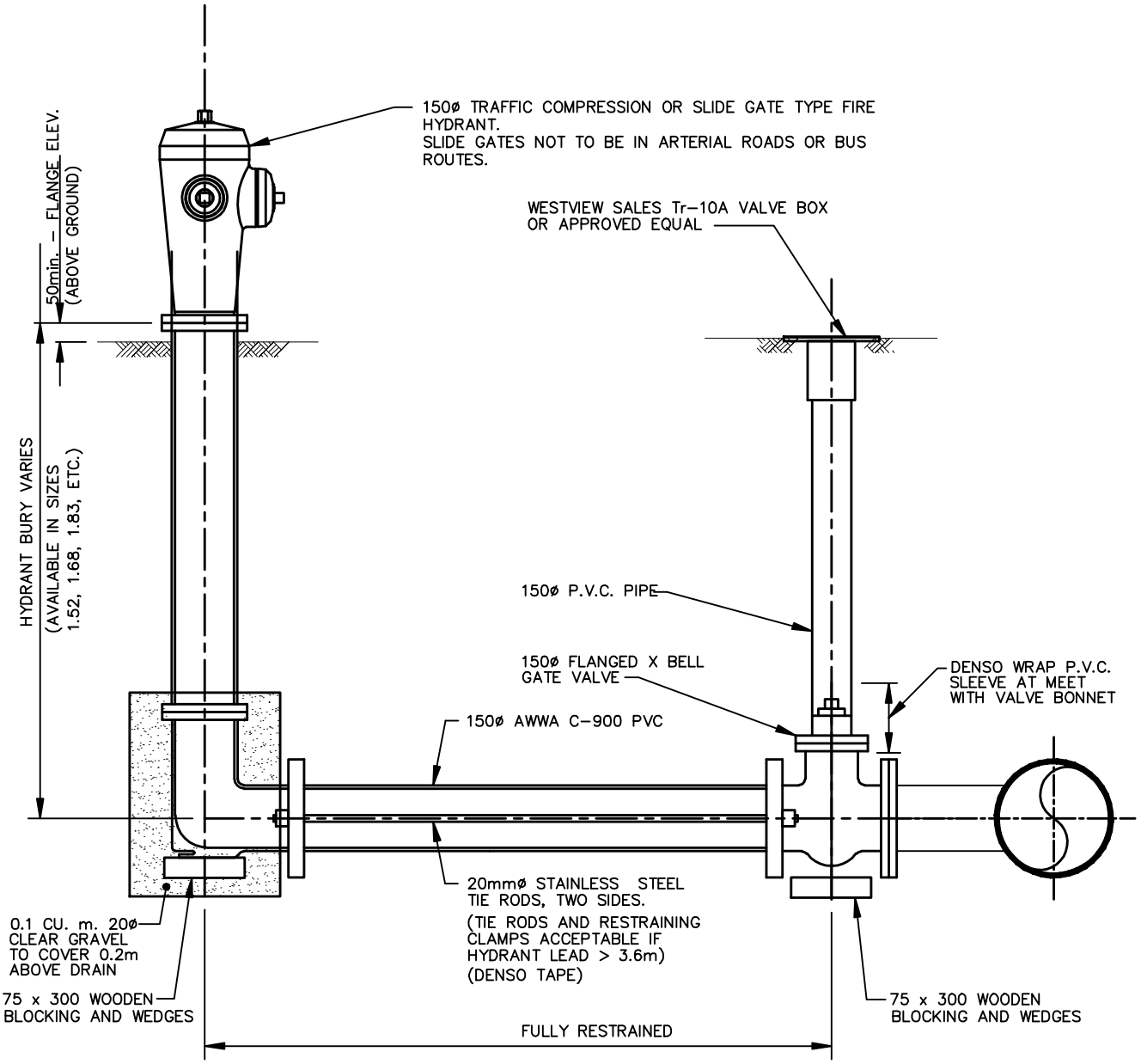
TECH. :	SCALE : NTS	DRAWING NUMBER : W3a-SD
DR. :	DATE : NOV. 2009	
ENG. :	REV. DATE : NOV/10	SHEET No. : 1 OF 1



Richmond

FIRE HYDRANT INSTALLATION (FLANGED)

TECH. :	SCALE : NTS	DRAWING NUMBER : W4a-SD
DR. :	DATE : NOV. 2009	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



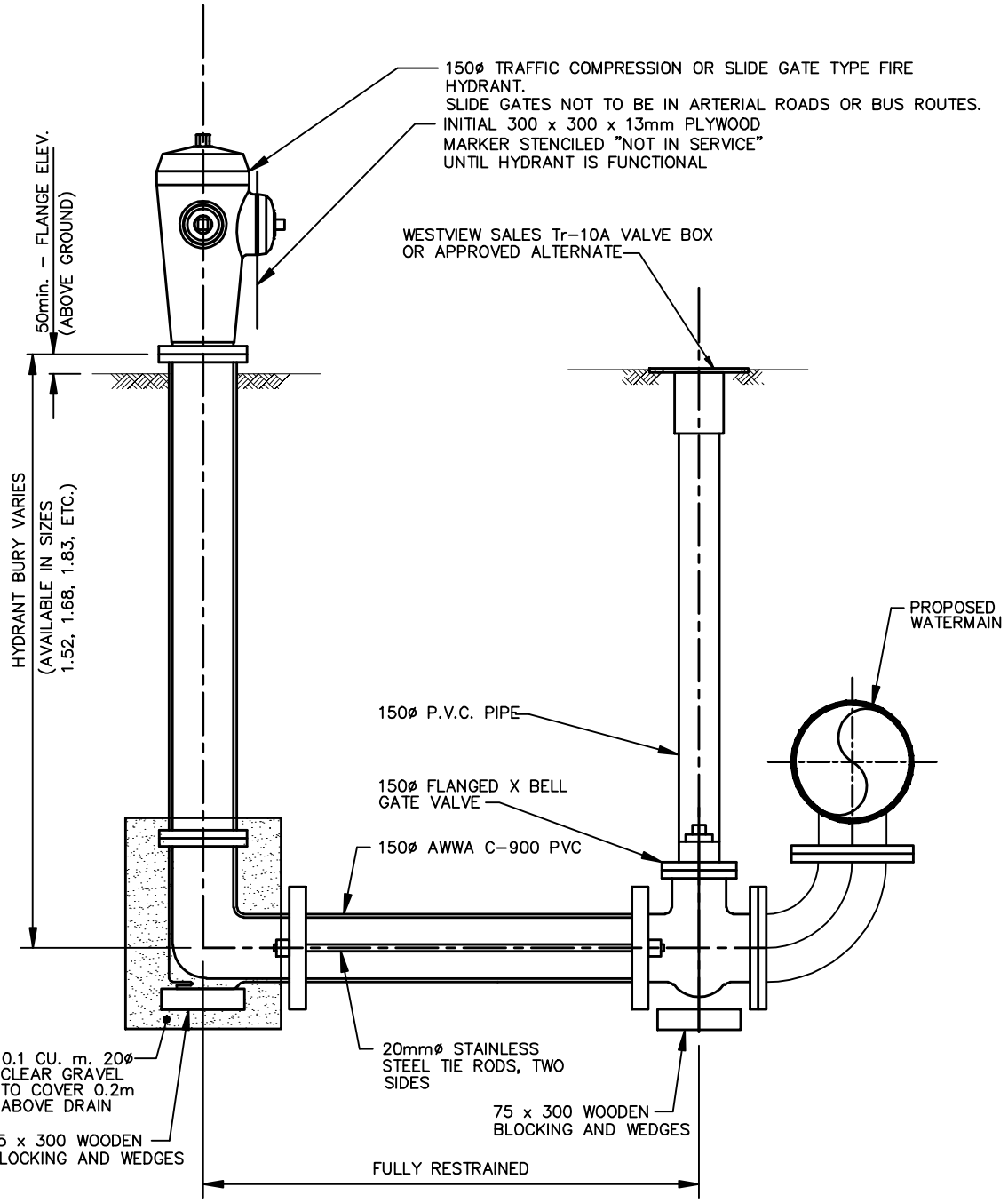
NOTES:

IF OFFSET IS REQUIRED, 0.9m MINIMUM COVER MUST BE MAINTAINED, OTHERWISE STEEL MUST BE USED. IF PVC IS USED ALL JOINTS ON LEAD MUST BE JOINT RESTRAINED.

Richmond

FIRE HYDRANT INSTALLATION (PVC LEAD)

TECH. :	SCALE : NTS	DRAWING NUMBER : W4b-SD
DR. :	DATE : NOV. 2009	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



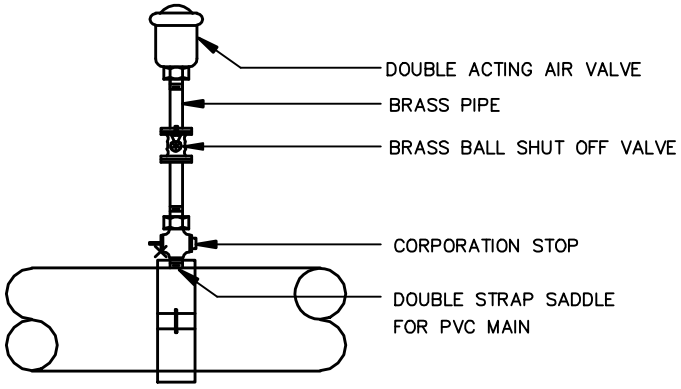
NOTES:

IF OFFSET IS REQUIRED, 0.9m MINIMUM COVER MUST BE MAINTAINED, OTHERWISE STEEL MUST BE USED. IF PVC IS USED ALL JOINTS ON LEAD MUST BE JOINT RESTRAINED.

Richmond

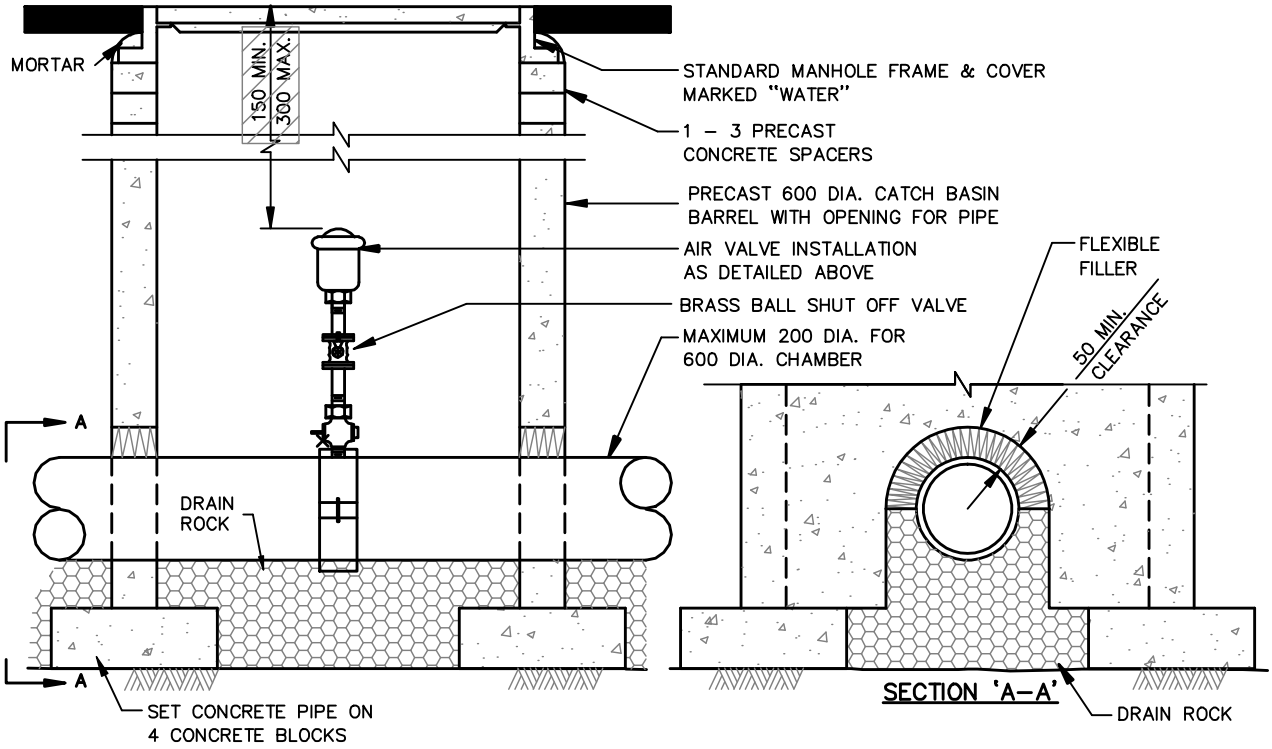
FIRE HYDRANT INSTALLATION (BOTTOM DRAW)

TECH. :	SCALE : NTS	DRAWING NUMBER : W4c-SD
DR. :	DATE : NOV. 2009	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



AIR VALVE SIZE	CORPORATION STOP SIZE
25	25
50	40

AIR VALVE ASSEMBLY DETAIL



CHAMBER DETAIL

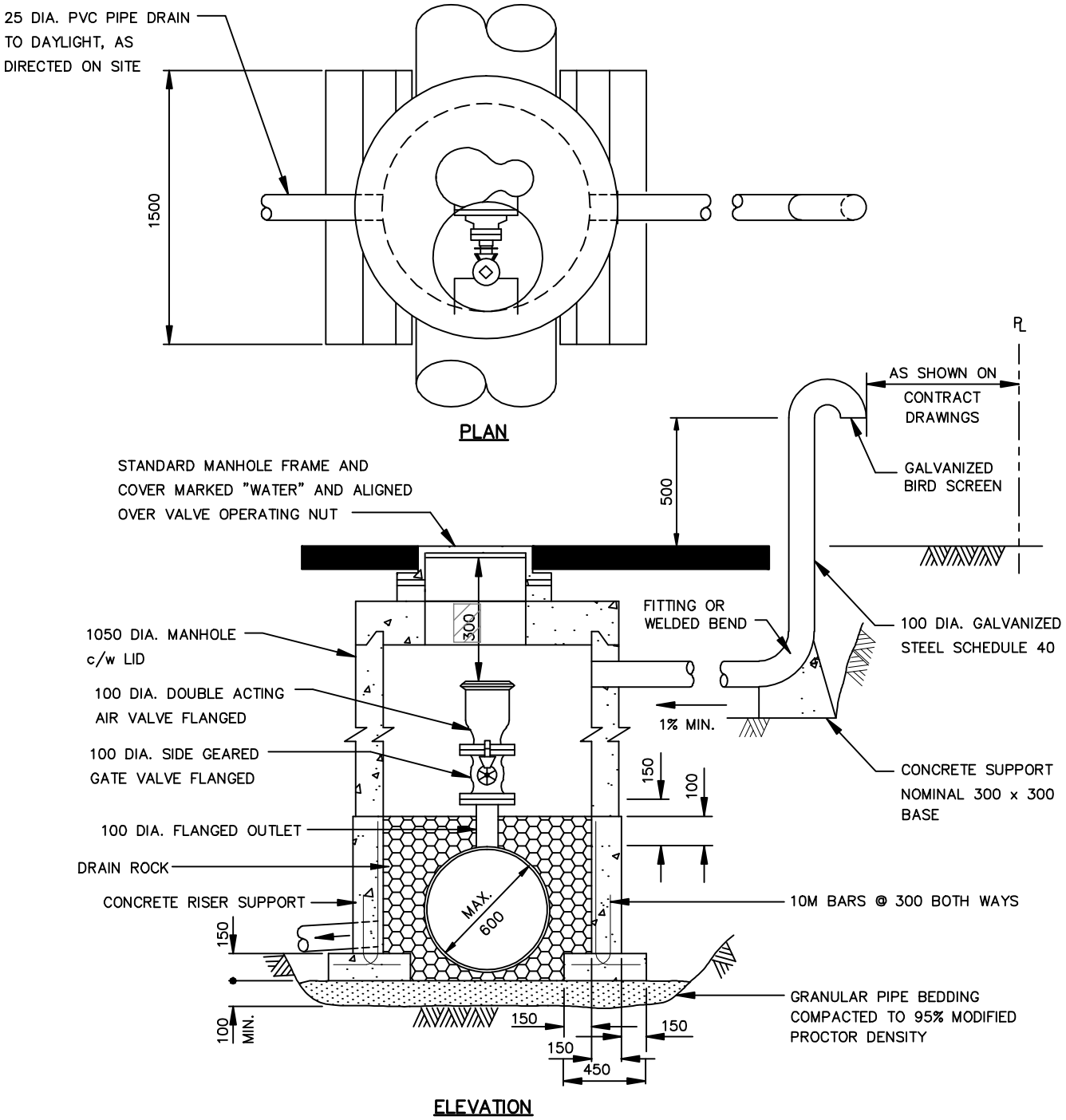
NOTES:

1. FOR 25mm AND 50mm AIR VALVES
2. REFER TO CONTRACT DRAWINGS AND SECTION 33 11 01 FOR DETAILED SPECIFICATIONS

Richmond

AIR VALVE ASSEMBLIES– 25mm AND 50mm VALVES

TECH. :	SCALE : NTS	DRAWING NUMBER : W6–SD
DR. :	DATE : NOV. 2009	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



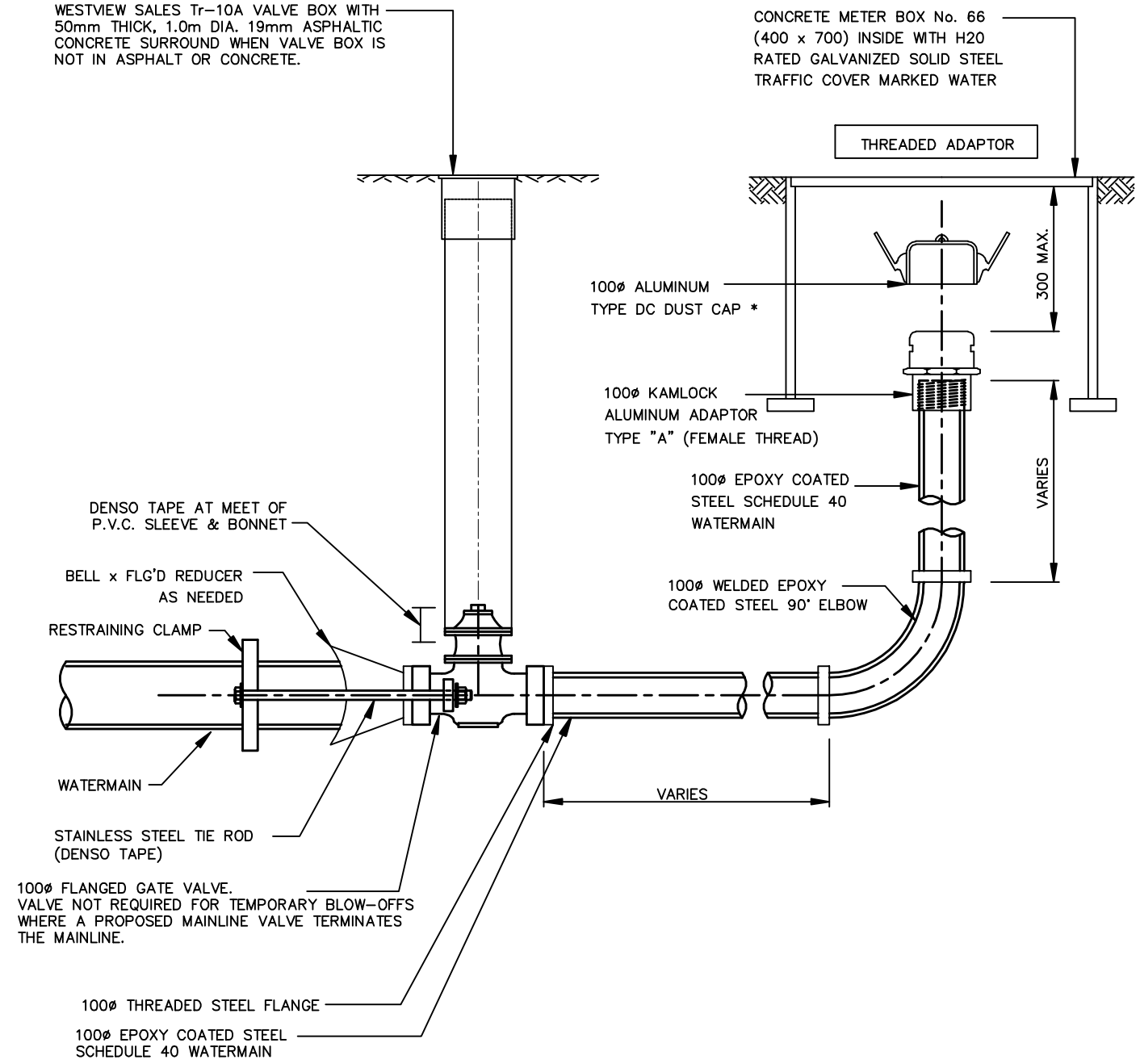
NOTES:

1. REFER TO CONTRACT DRAWINGS AND SECTION 33 11 01 FOR DETAILED SPECIFICATIONS

Richmond

AIR VALVE ASSEMBLY–100mm VALVE

TECH. :	SCALE : NTS	DRAWING NUMBER : W7–SD
DR. :	DATE : NOV. 2009	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



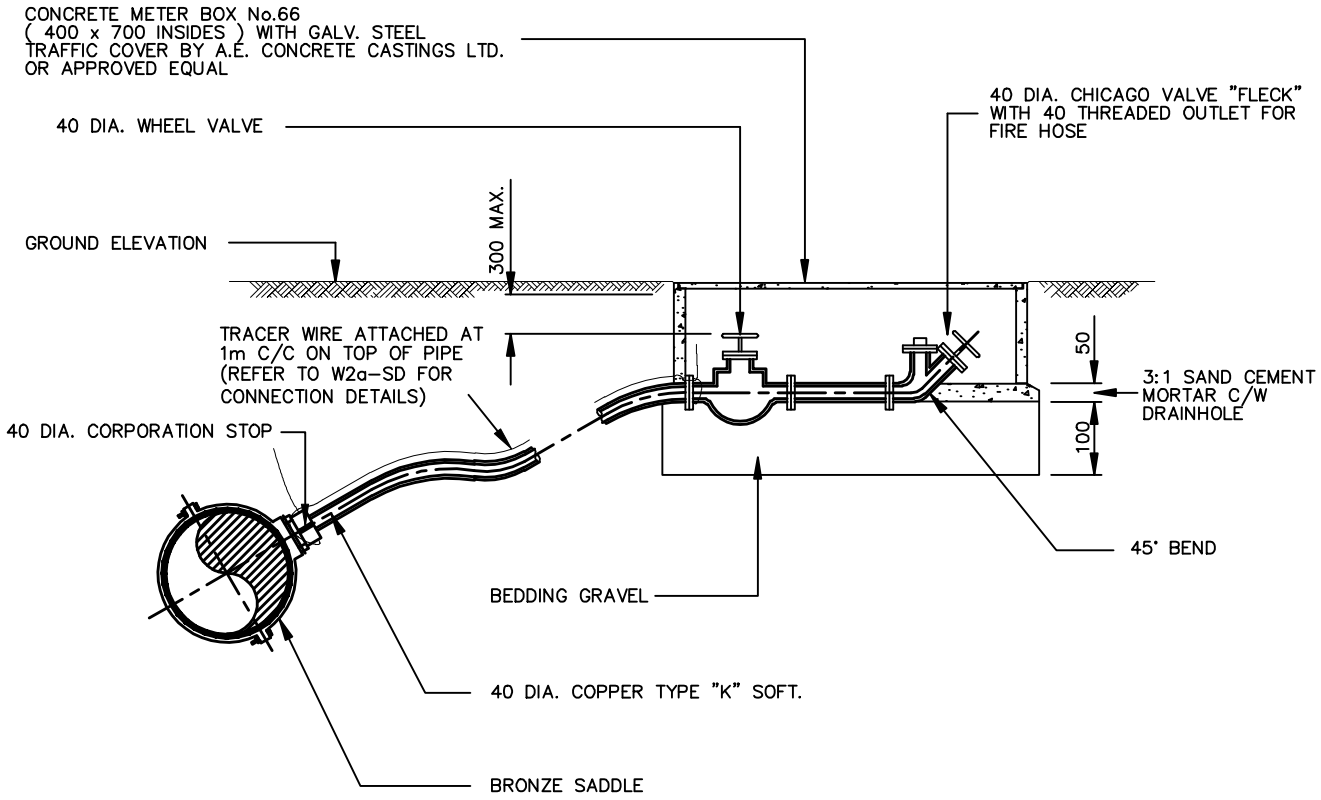
NOTES:

*** – KAMLOCK, EVERTITE OR APPROVED EQUAL**
(ASSEMBLY TO BE ACCOMMODATED IN PRECAST CONC. BOX BEHIND ROAD CURB AND SIDEWALK)

Richmond

100mm CAPPED END & BLOW–OFF

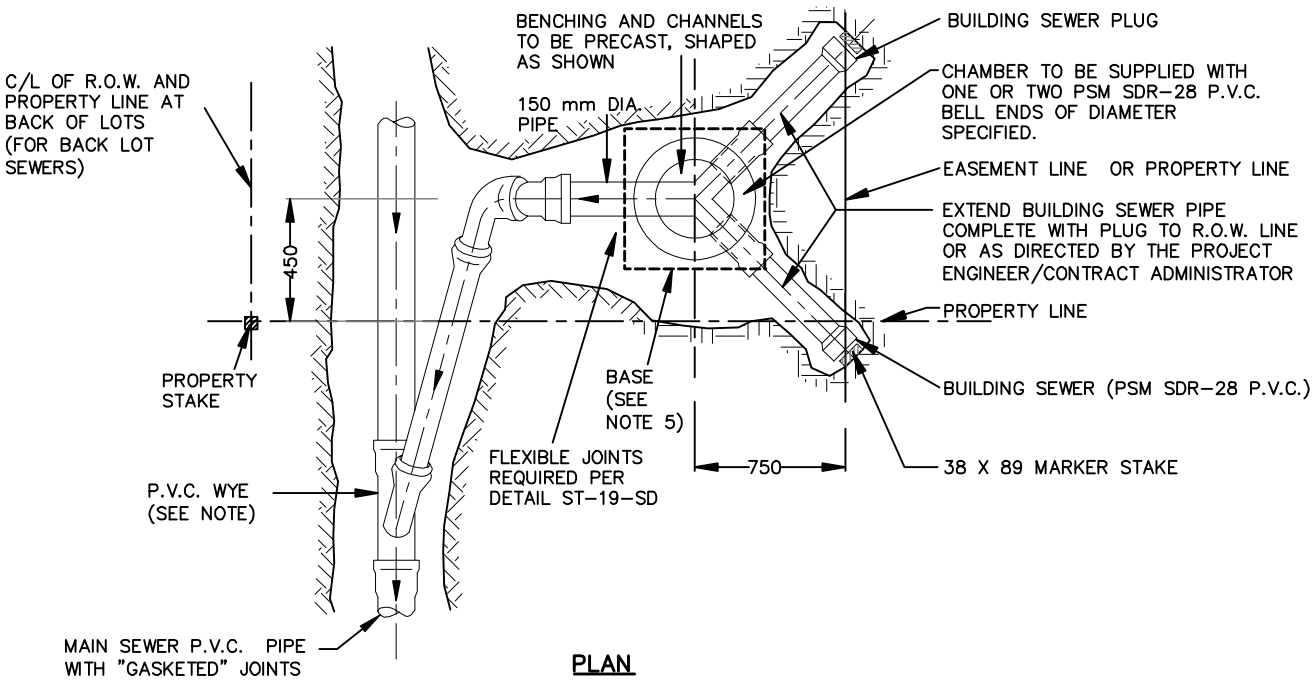
TECH. :	SCALE : NTS	DRAWING NUMBER : W8–SD
DR. :	DATE : NOV. 2009	
ENG. :	REV. DATE : DEC/10	SHEET No. : 1 OF 1



Richmond

STANDPIPE DETAIL FOR SANITARY SEWER PUMP STATION

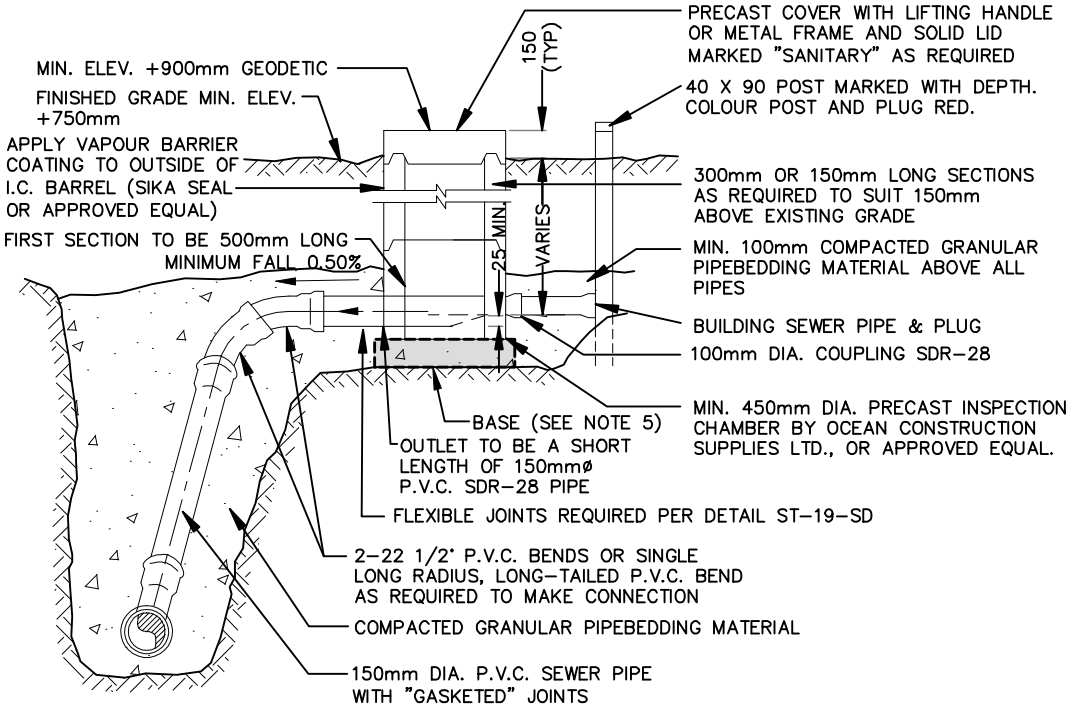
TECH. :	SCALE : NTS	DRAWING NUMBER : W11-SD
DR. :	DATE : NOV. 2009	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



PLAN

NOTES:

1. BRANCH SEWER CONNECTION PIPE TO BE 150 mm DIA. P.V.C. SDR-28 SEWER PIPE WITH "GASKETED" JOINTS. ALL FITTINGS TO BE INJECTION MOULDED IN P.V.C. MATERIALS WITH "GASKETED" JOINTS ON BELL ENDS.
2. WYES OF OTHER SIZES TO BE FABRICATED FROM P.V.C. SDR-28 MATERIALS REINFORCED WITH LAYERS OF FIBREGLASS WRAPPINGS AT JOINTS. WYES TO HAVE "GASKETED" JOINTS AT BELL ENDS.
3. SURFACE OF ALL P.V.C. PIPE TO BE ENCASED IN CONCRETE SHALL BE SAND COATED BY PIPE MANUFACTURER BEFORE INSERTION IN INSPECTION CHAMBER WALL.
4. FOR BRANCH SEWER CONNECTIONS UNDER EXISTING OR PROPOSED ROADS, BACKFILL SHALL BE PIT RUN SAND OR GRAVEL MATERIAL COMPACTED IN 225mm LAYERS TO 90% MAX. DENSITY.
5. FOR IC'S INSTALLED WHERE H20 LOADING IS REQUIRED,
   - 450mm IC REQUIRES 900mm x 900mm x 150mm BASE.
   - 600mm IC REQUIRES 1200mm x 1200mm x 100mm BASE.
6. DUAL CONNECTIONS TO BE MIN 450mm DIA. PRECAST INSPECTION CHAMBER OR APPROVED EQUAL.
7. SINGLE CONNECTIONS CAN BE 450mm DIA. PRECAST INSPECTION CHAMBER OR AS PER MMCD S9 OR APPROVED EQUAL.
8. 600mm DIA. WITH SINGLE CONNECTION FOR MULTI FAMILY, COMMERCIAL, INDUSTRIAL OR INSTITUTIONAL.



SECTION

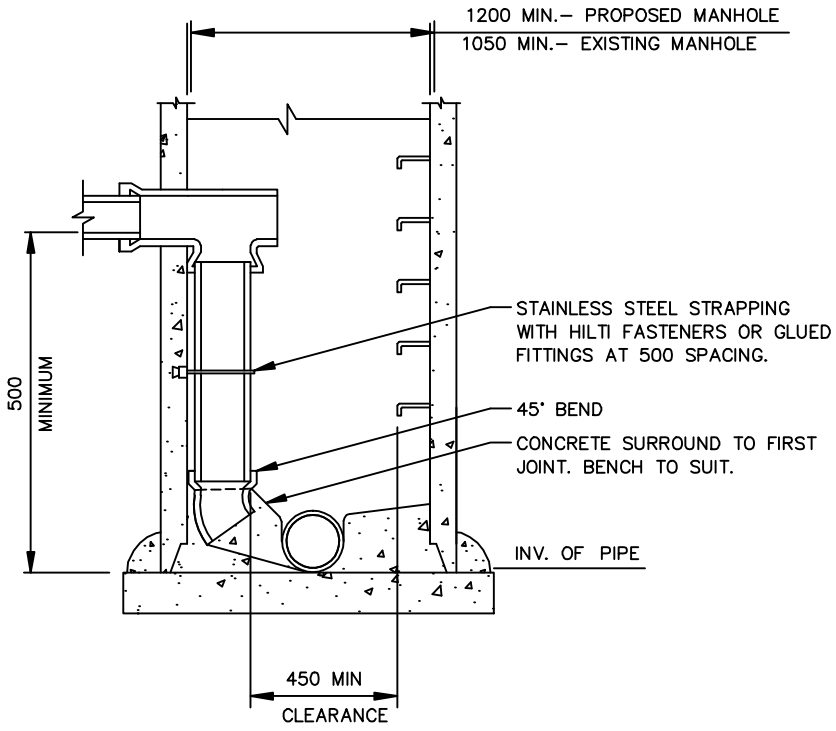
BRANCH SEWER CONNECTIONS
(COMPLETE CONNECTION)

ALL DIMENSIONS SHOWN IN MILLIMETRES

Richmond

STANDARD CONSTRUCTION DETAILS FOR PVC SANITARY SEWER INSTALLATIONS

TECH. :	SCALE : NTS	DRAWING NUMBER : SA-3-SD
DR. :	DATE : OCT. 2003	
ENG. :	REV. DATE : DEC/10	SHEET No. : 1 OF 1



INSIDE DROP TYPE

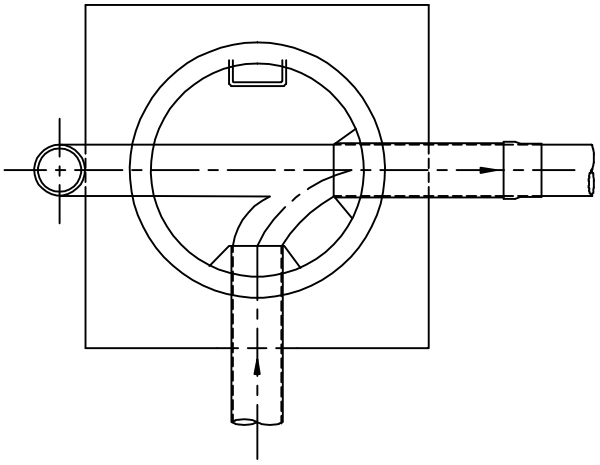
NOTES:

1. INSIDE DROP TO BE USED ONLY WHERE SPECIFIED BY CONTRACT ADMINISTRATOR.
2. ALL INSIDE PIPE AND FITTINGS PVC DR 28/35
3. THIS DRAWING SHOWS INSIDE DROP ONLY. SEE DRAWING S1 FOR ALL OTHER DETAILS PERTAINING TO MANHOLE REQUIREMENTS.
4. REFER TO CONTRACT DRAWINGS AND SECTION 33 44 01 FOR DETAILED SPECIFICATIONS

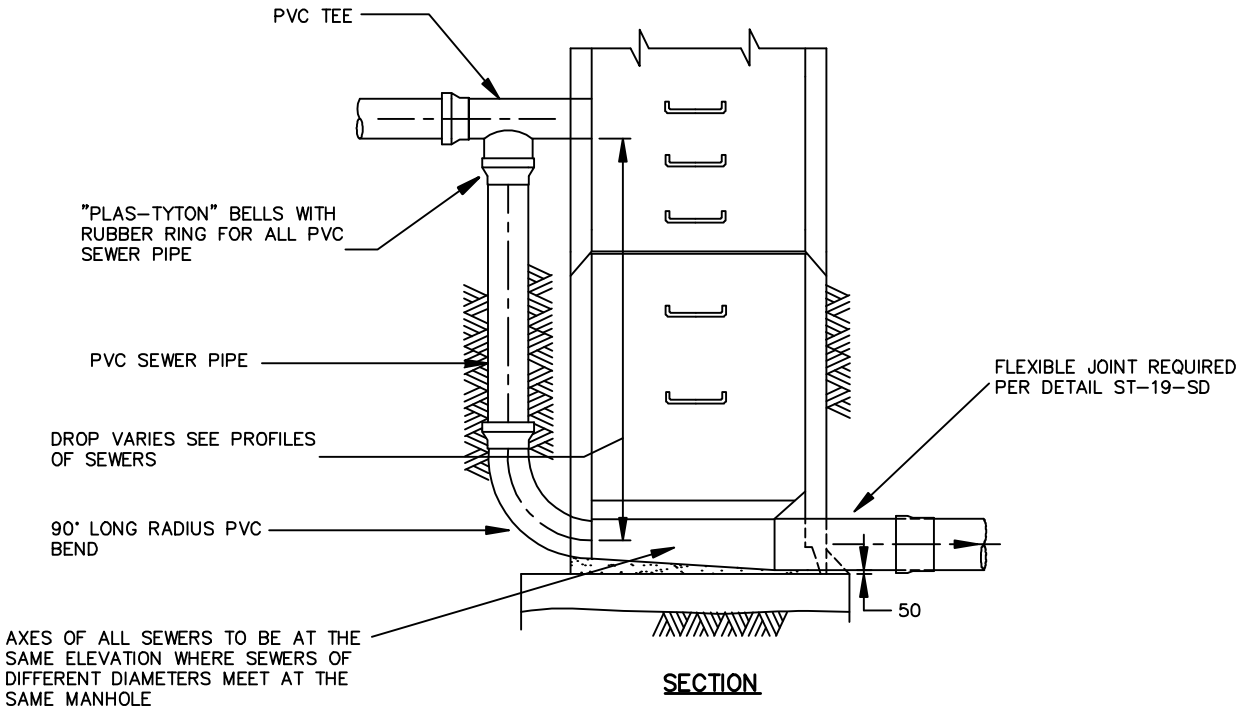
Richmond

INSIDE DROP MANHOLE

TECH. :	SCALE : NTS	DRAWING NUMBER : SA–4–SD
DR. :	DATE : OCT. 2003	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



PLAN



SECTION

(SECTION SHOWN ON 150mm DIA. SEWER OTHER BACKDROP SIZES SIMILAR)

TYPICAL BACKDROP DETAILS FOR SEWERS

NOTES:

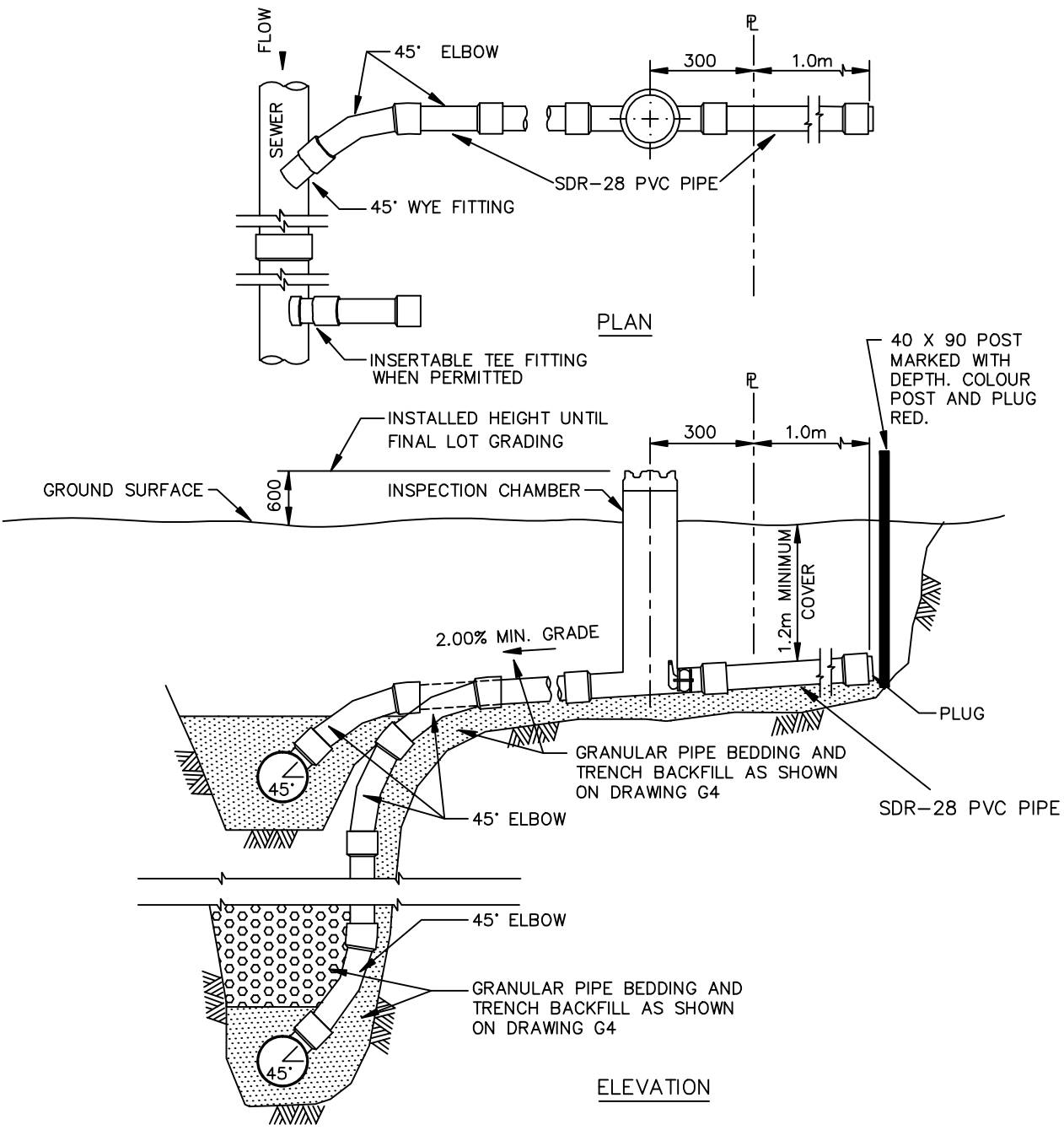
PVC PIPE INSTALLATION

BACKDROPS MAY BE PRE-FABRICATED BY PIPE MANUFACTURER IN PVC MATERIAL BROUGHT TO SITE AS A COMPLETE UNIT

Richmond

OUTSIDE DROP MANHOLE

TECH. :	SCALE : NTS	DRAWING NUMBER : SA-6-SD
DR. :	DATE : OCT. 2003	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1

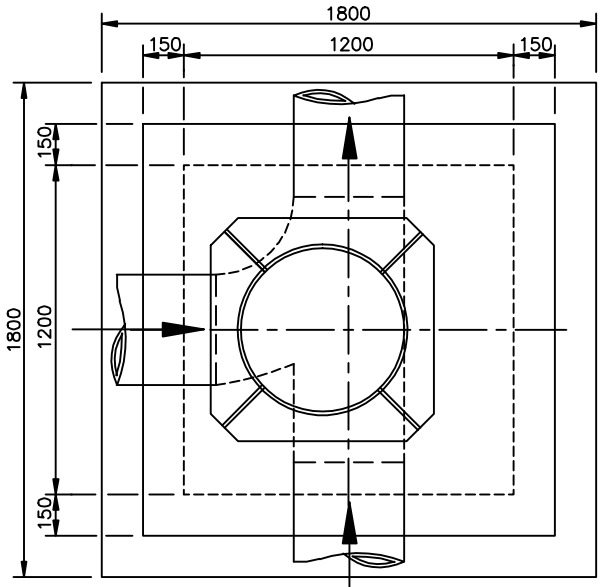


NOTE:
1. CONNECTIONS TO BE 100 OR AS SPECIFIED ON CONTRACT DRAWINGS.
2. RISER TYPE SERVICE TO BE USED ONLY WHEN SERVICE IS MORE THAN 2.4m ABOVE WYE INVERT OR AS DIRECTED BY CONTRACT ADMINISTRATOR.
3. LOCATION OF SERVICE AND MARKER AS SHOWN ON CONTRACT DRAWINGS.
4. SEE DRAWING S9 FOR DETAILS OF INSPECTION CHAMBER AND INSTALLATION REQUIREMENTS.
5. FOR SINGLE FAMILY RESIDENTIAL USE ONLY (SINGLE CONNECTION).

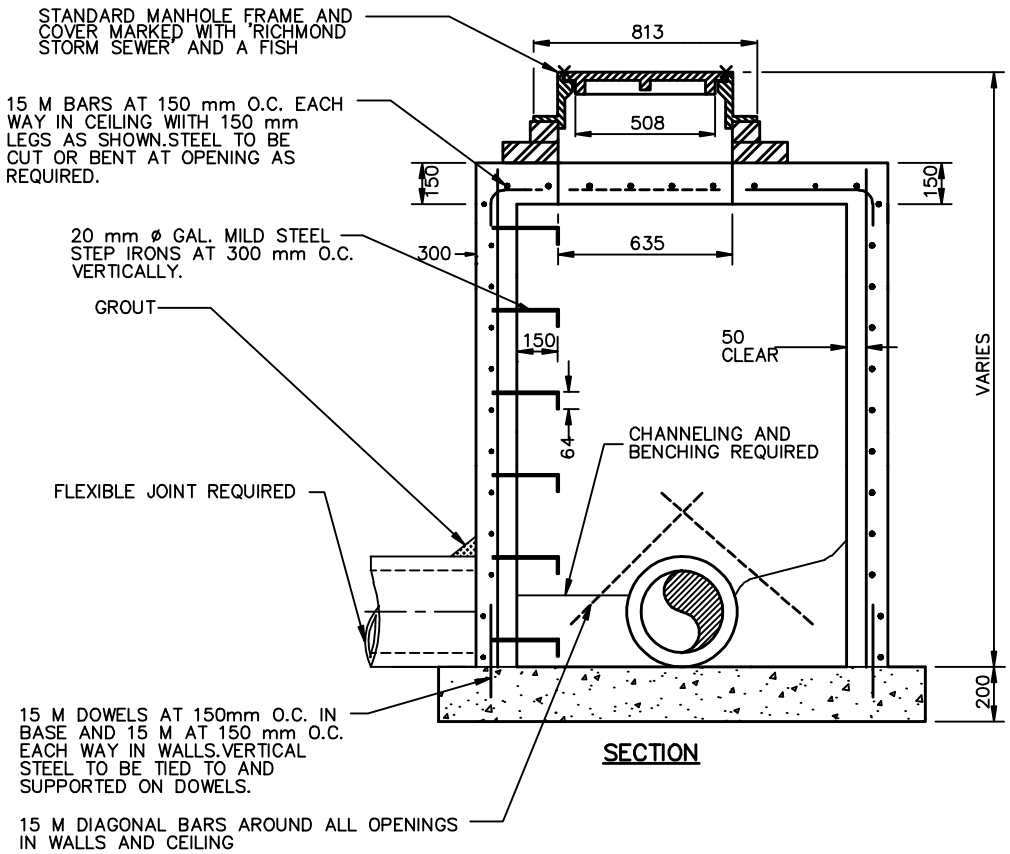
Richmond

SANITARY SEWER SERVICE CONNECTION

TECH. :	SCALE : NTS	DRAWING NUMBER : SA-7-SD
DR. :	DATE : OCT. 2003	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



PLAN

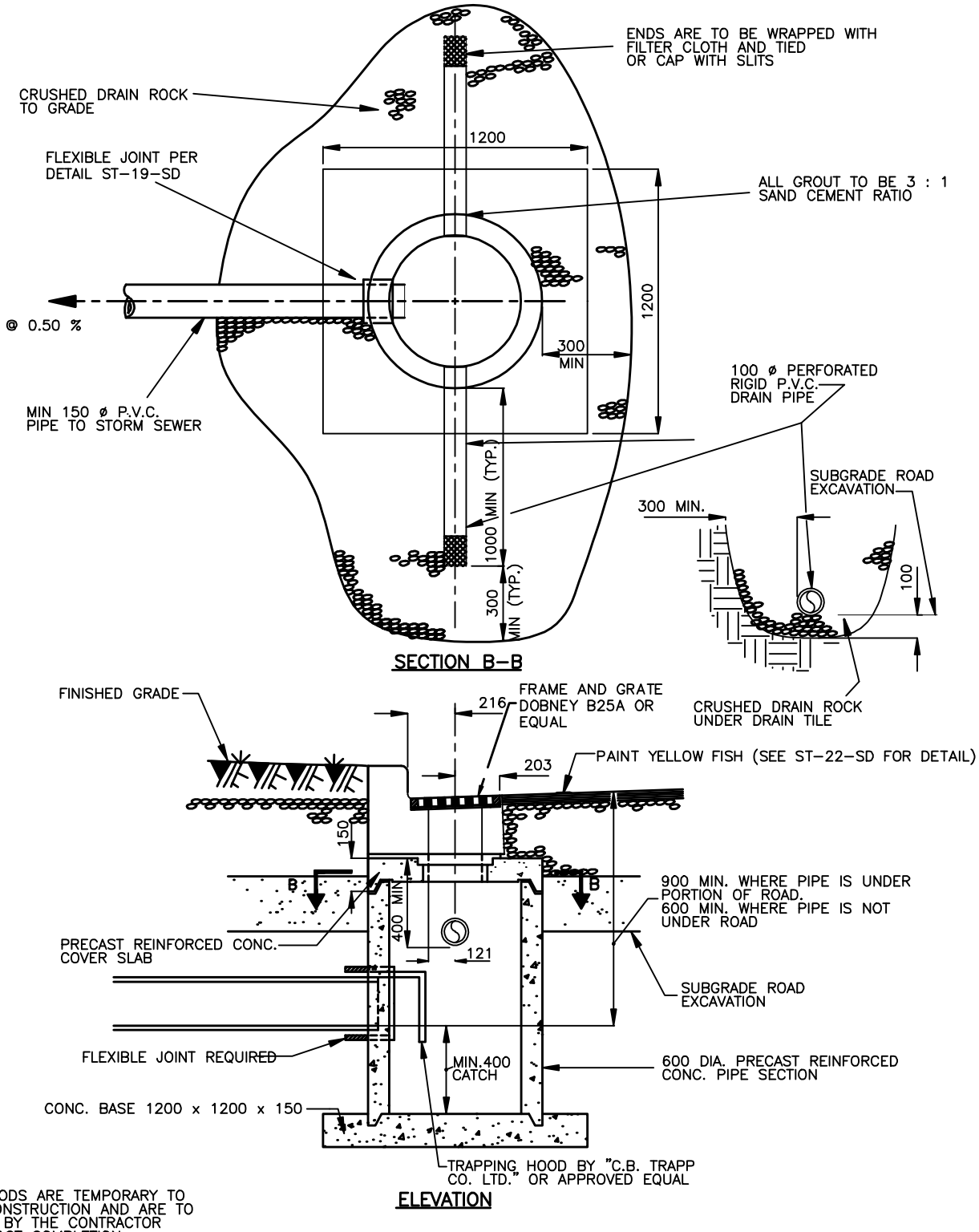


SECTION

Richmond

TYPICAL 1.20m x 1.20m CAST-IN-SITU MANHOLE

TECH. :	SCALE : NTS	DRAWING NUMBER : ST-3-SD
DR. :	DATE : JAN. 2000	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



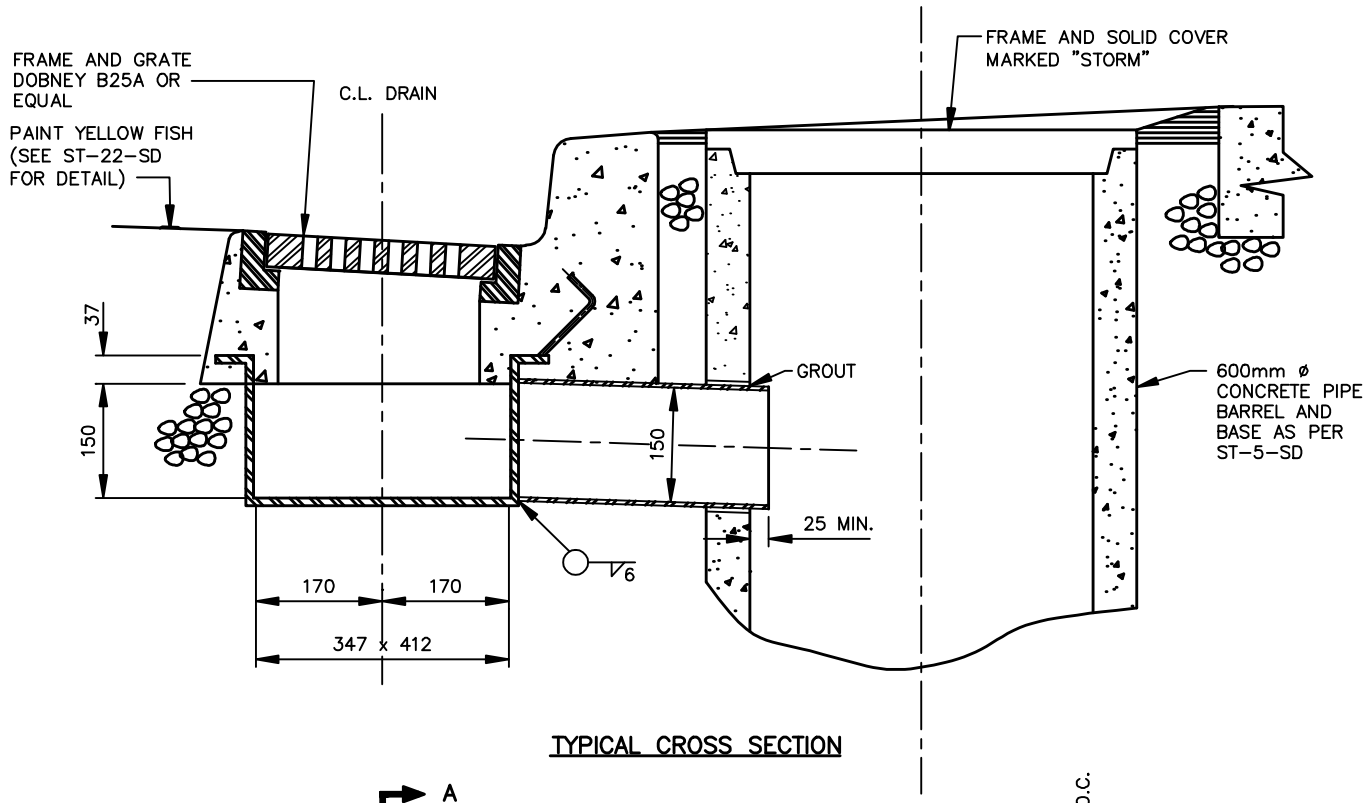
NOTES:

TRAPPING HOODS ARE TEMPORARY TO FACILITATE CONSTRUCTION AND ARE TO BE REMOVED BY THE CONTRACTOR UPON CONTRACT COMPLETION.

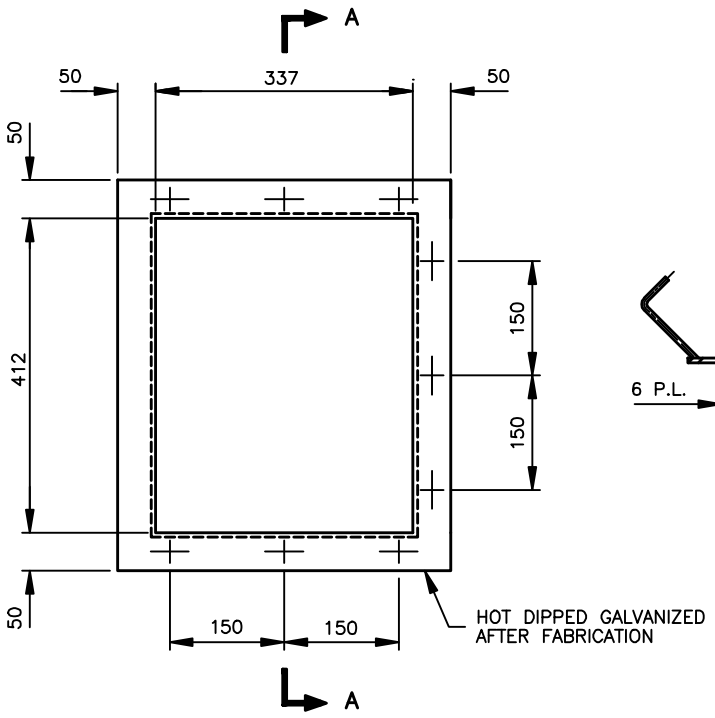
Richmond

600mm ø REINFORCED CONCRETE CATCHBASIN

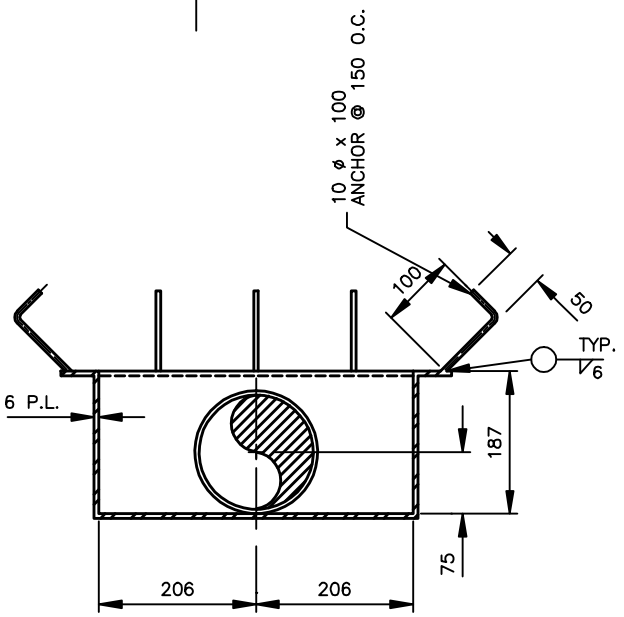
TECH. :	SCALE : NTS	DRAWING NUMBER : ST-5-SD
DR. :	DATE : JAN. 2000	
ENG. :	REV. DATE : DEC/10	SHEET No. : 1 OF 1



TYPICAL CROSS SECTION



PLAN OF CATCHBASIN TRAP



SECTION A-A

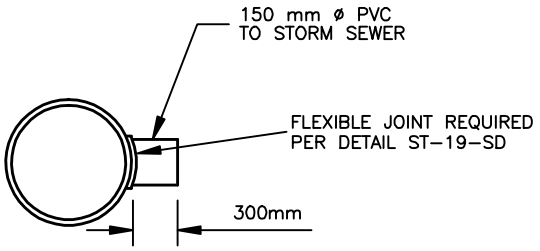
NOTES:

1) ALL WELDS PERFORMED AFTER FABRICATION TO BE PAINTED WITH GALV-COTE.
2) 100ø CONNECTIONS TO BE PROVIDED FROM I.C. FOR DRAINAGE OF CURB BASE MATERIAL. FOR DETAIL SEE ST-5.

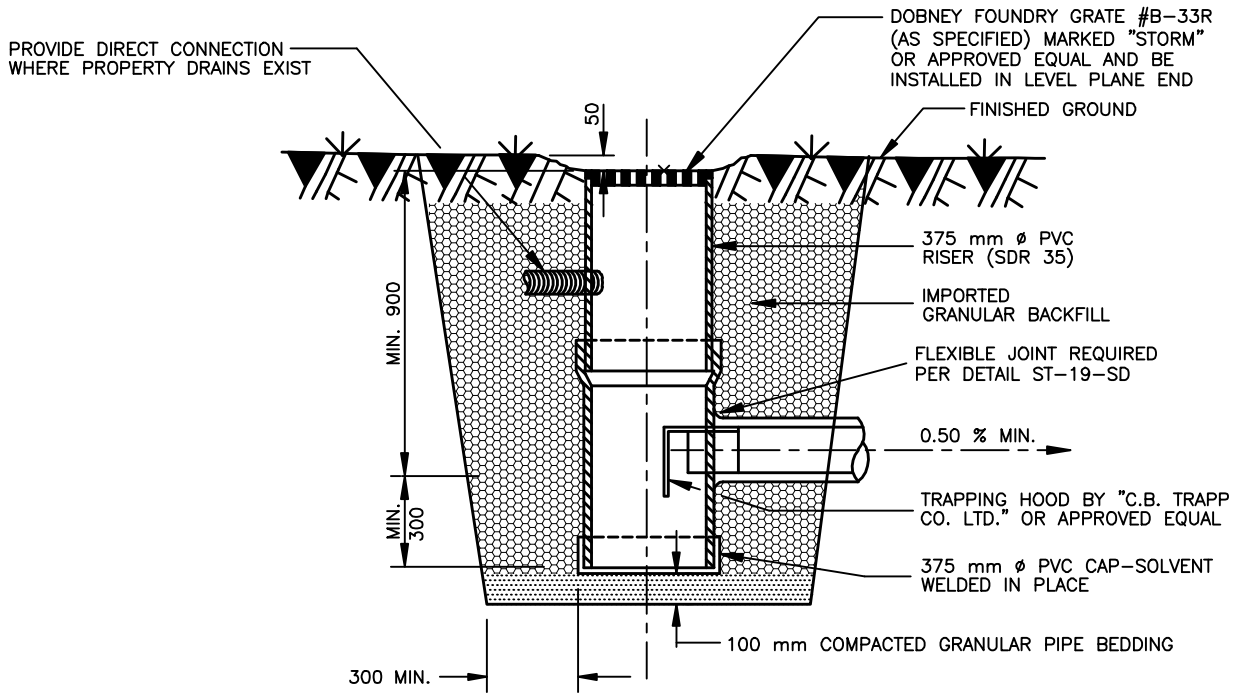
Richmond

PREFABRICATED PAN CATCHBASIN

TECH. :	SCALE : NTS	DRAWING NUMBER : ST-6-SD
DR. :	DATE : JAN. 2000	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



PLAN



SECTION

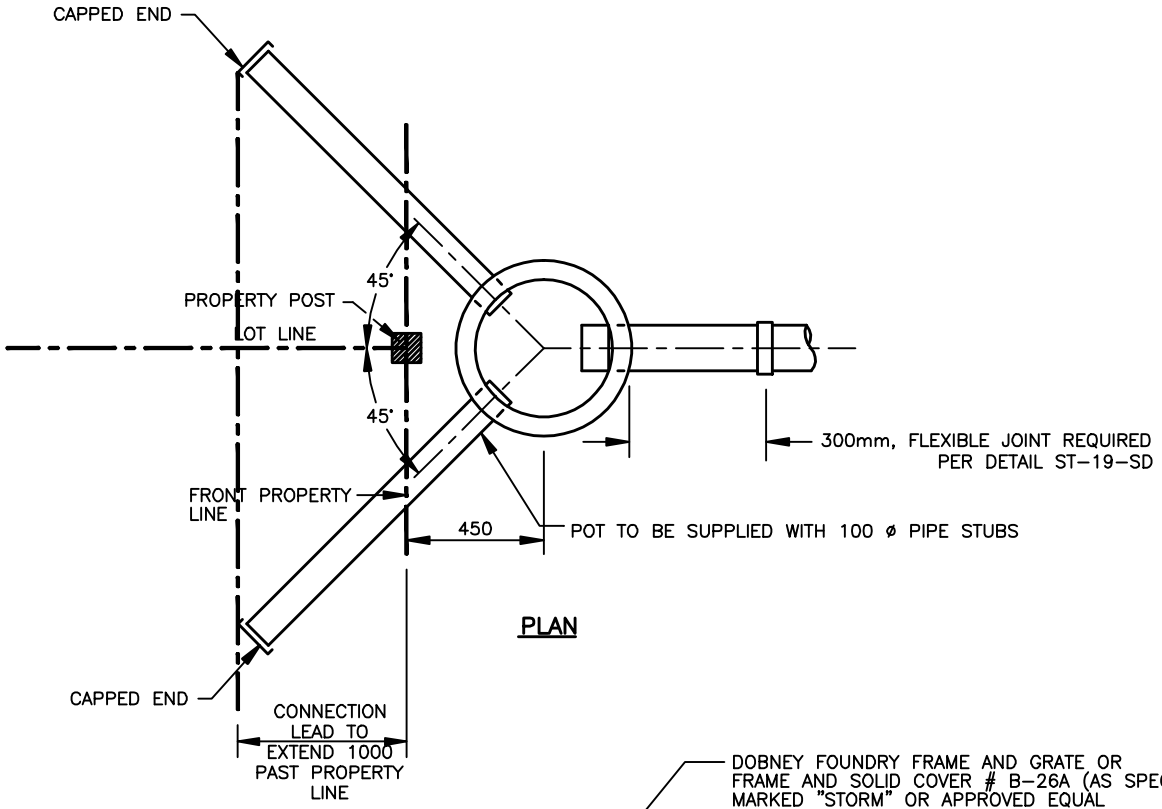
NOTES:

TRAPPING HOODS ARE TEMPORARY TO FACILITATE CONSTRUCTION AND ARE TO BE REMOVED BY THE CONTRACTOR UPON CONTRACT COMPLETION.

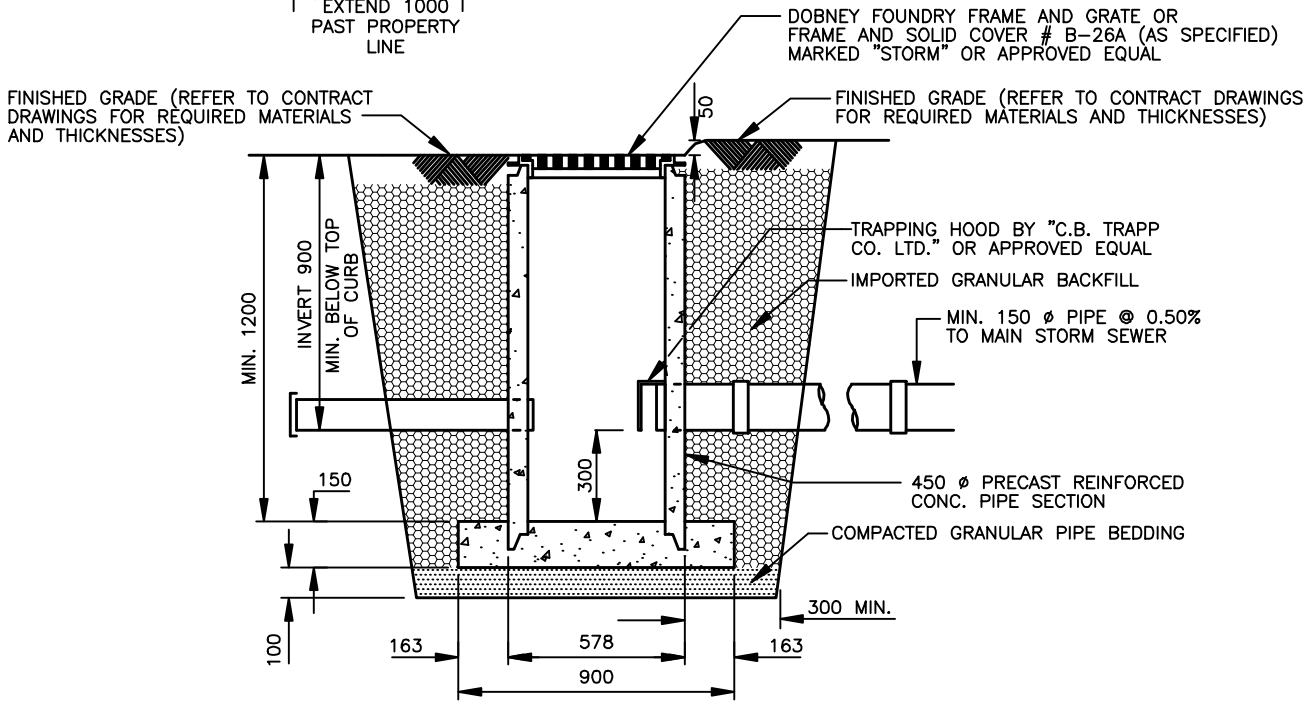
Richmond

PVC INSPECTION CHAMBER/LAWN DRAIN TYPE 1A

TECH. :	SCALE : NTS	DRAWING NUMBER : ST–7–SD
DR. :	DATE : JAN. 2000	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



PLAN



SECTION

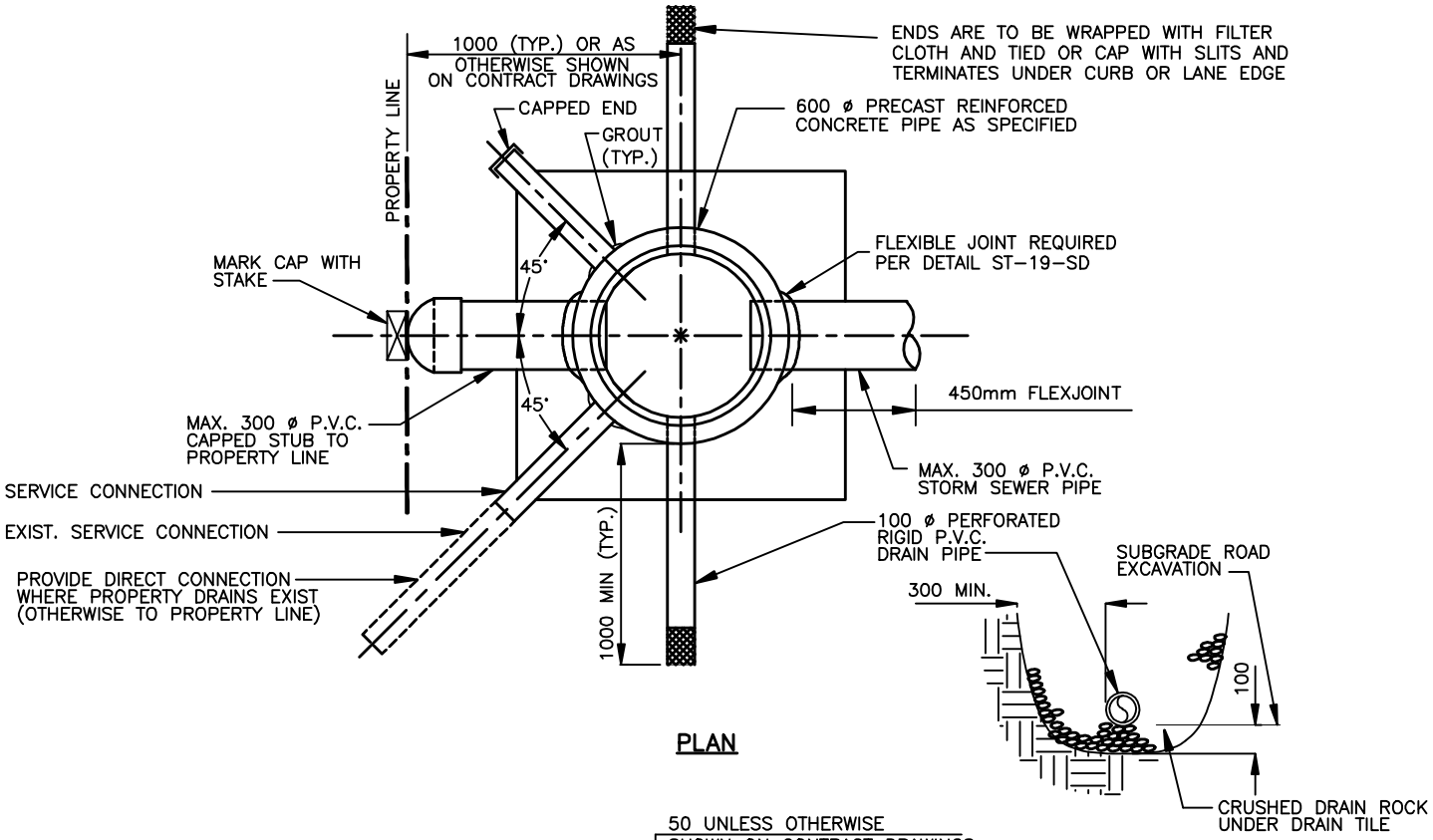
NOTES:

TRAPPING HOODS ARE TEMPORARY TO FACILITATE CONSTRUCTION AND ARE TO BE REMOVED BY THE CONTRACTOR UPON CONTRACT COMPLETION.

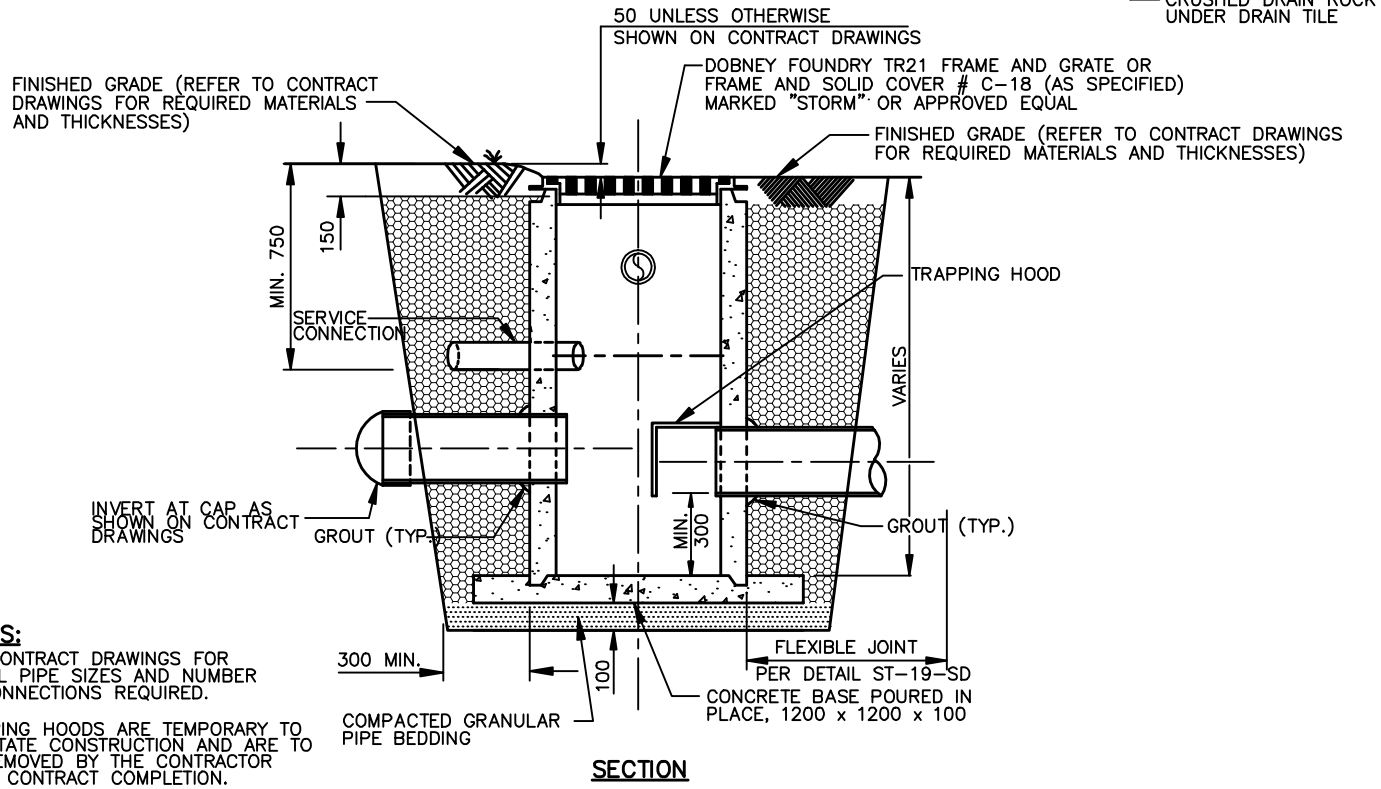
Richmond

INSPECTION CHAMBER TYPE 2

TECH. :	SCALE : NTS	DRAWING NUMBER : ST-8-SD
DR. :	DATE : JAN. 2000	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



PLAN



SECTION

NOTES:

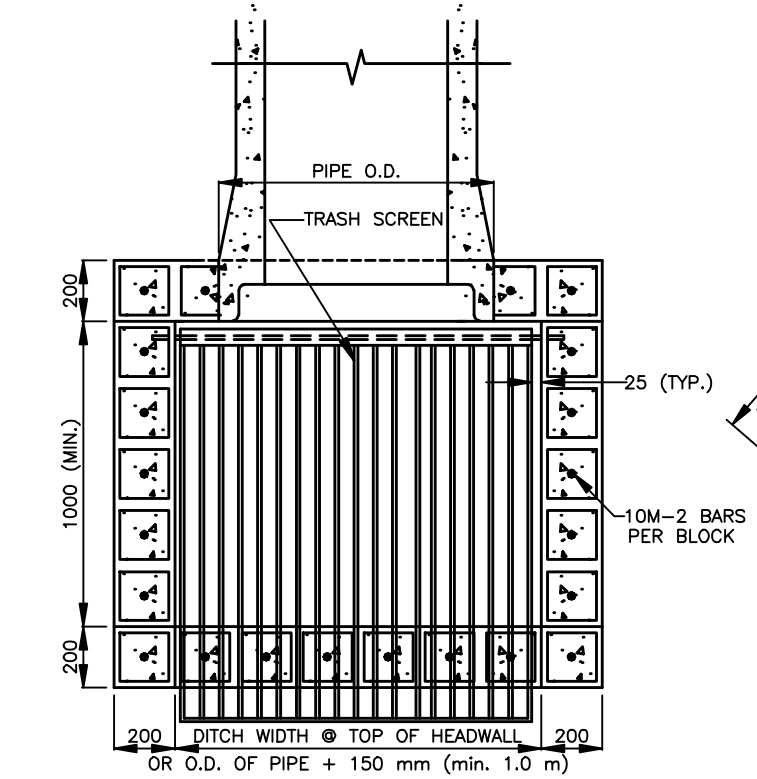
SEE CONTRACT DRAWINGS FOR ACTUAL PIPE SIZES AND NUMBER OF CONNECTIONS REQUIRED.

TRAPPING HOODS ARE TEMPORARY TO FACILITATE CONSTRUCTION AND ARE TO BE REMOVED BY THE CONTRACTOR UPON CONTRACT COMPLETION.

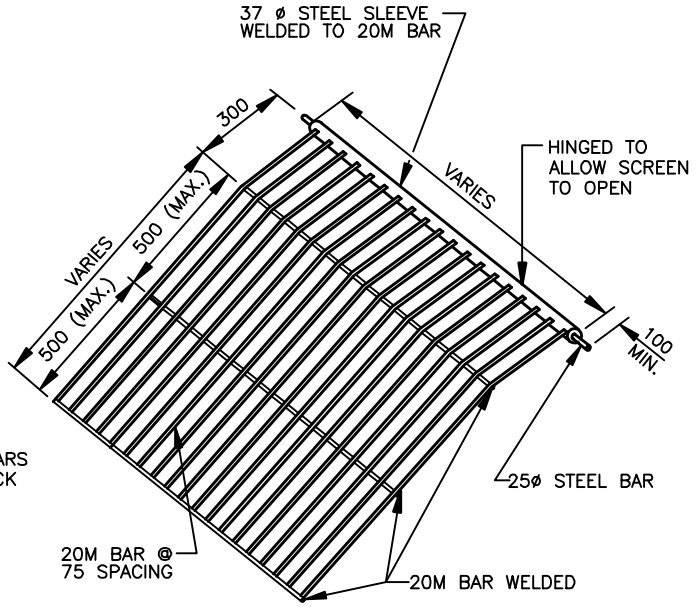
Richmond

INSPECTION CHAMBER TYPE 3

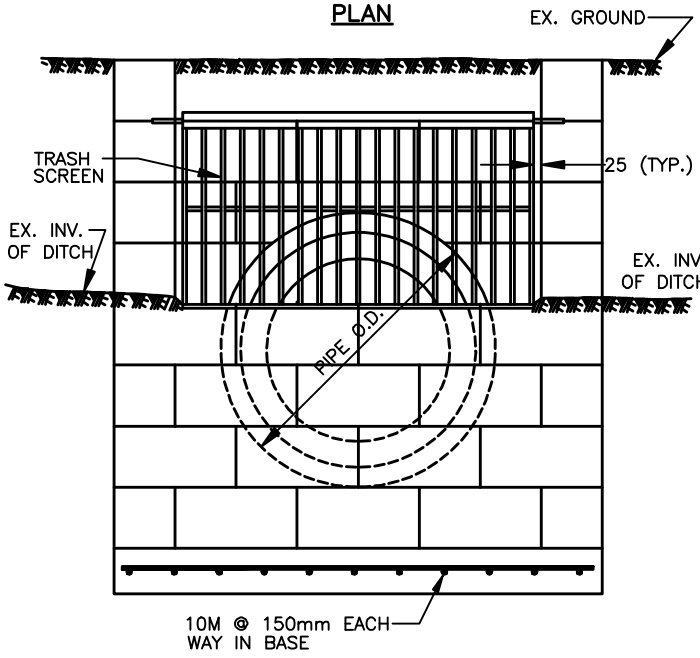
TECH. :	SCALE : NTS	DRAWING NUMBER : ST-9-SD
DR. :	DATE : JAN. 2000	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



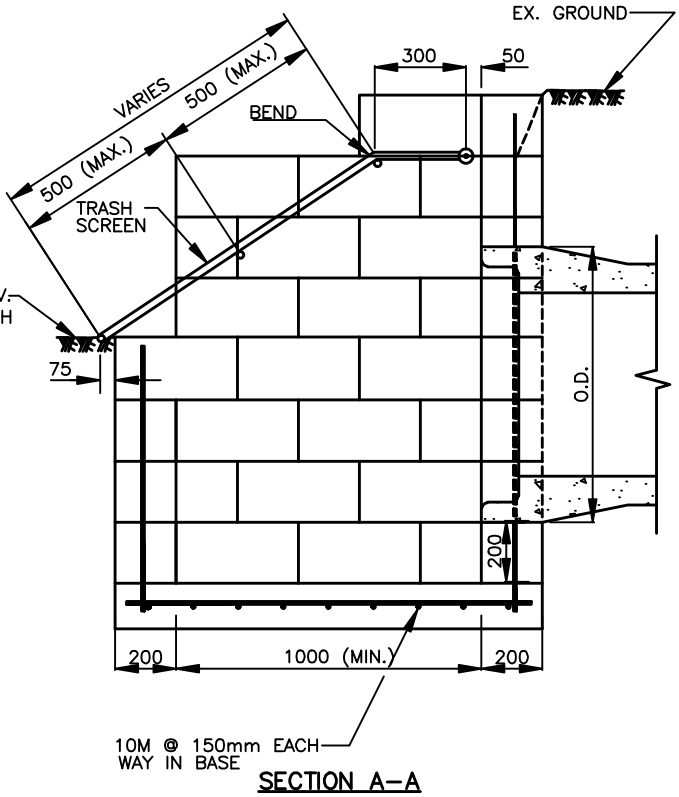
PLAN



TRASH SCREEN



ELEVATION



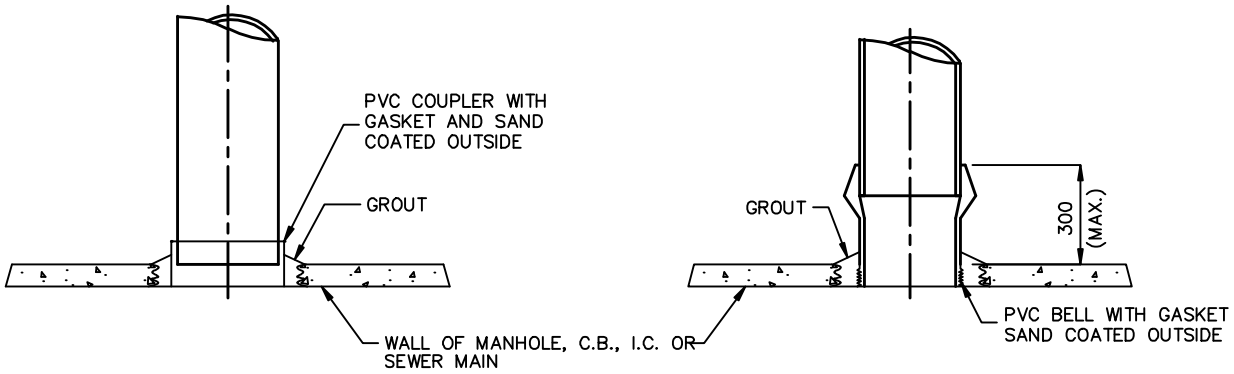
SECTION A-A

Richmond

STORM SEWER INLET WITH SAFETY GRILLAGE

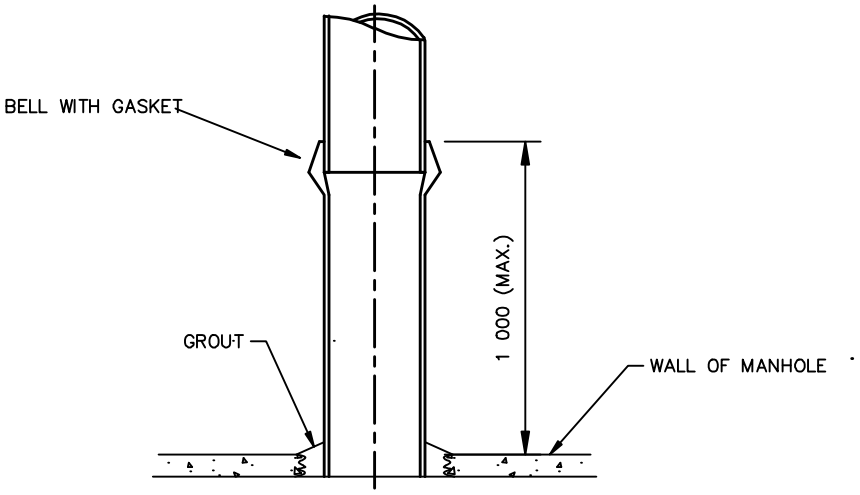
TECH. :	SCALE : NTS	DRAWING NUMBER : ST-10c-SD
DR. :	DATE : JAN. 2000	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1

(A) P.V.C. PIPE



(B) CONCRETE PIPE

375 mm ø OR LESS



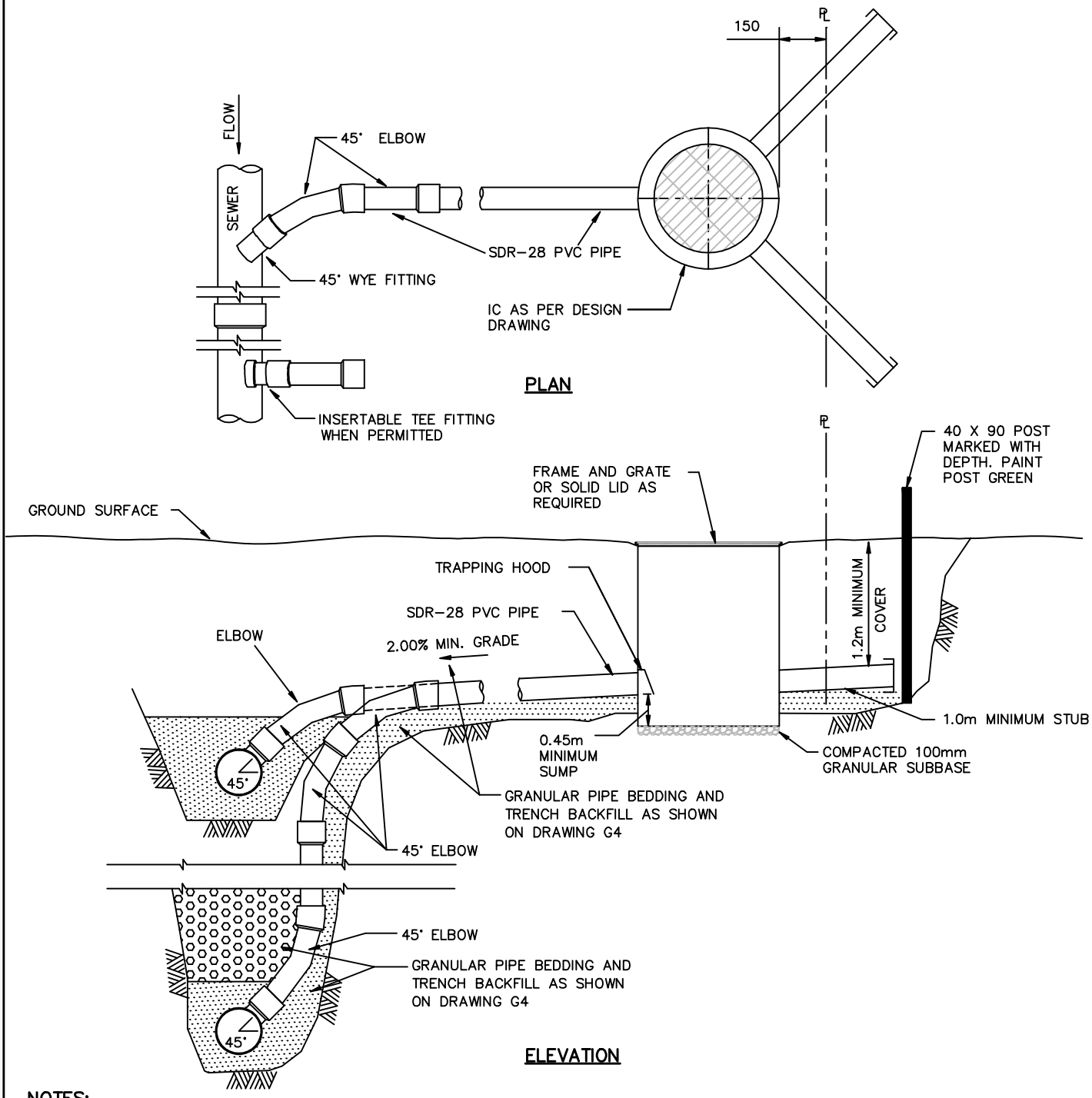
NOTES:

NO FLEXIBLE JOINT REQUIRED FOR ANY CONCRETE PIPE LARGER THAN 375mm ø.

Richmond

TYPICAL CONSTRUCTION DETAILS OF FLEXIBLE JOINTS FOR SEWER INSTALLATIONS

TECH. :	SCALE : NTS	DRAWING NUMBER : ST–19–SD
DR. :	DATE : JAN. 2000	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



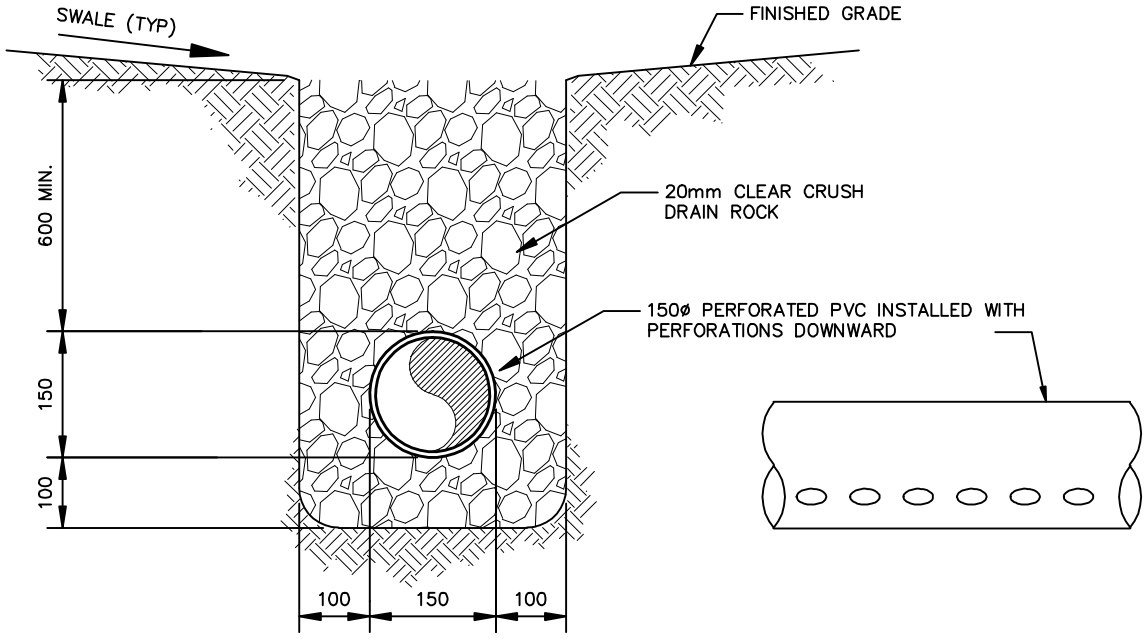
NOTES:

1. CONCRETE STORM SEWER PIPES TO BE PROVIDED WITH SUPPLIER INSTALLED PVC STUB.
2. CONNECTIONS TO BE 100 MINIMUM OR LARGER AS SPECIFIED ON CONTRACT DRAWINGS.
3. RISER TYPE SERVICE TO BE USED ONLY WHEN SERVICE IS MORE THAT 2.4m ABOVE WYE INVERT OR AS DIRECTED BY CONTRACT ADMINISTRATOR.
4. LOCATION OF SERVICE AND MARKER AS SHOWN ON CONTRACT DRAWINGS.

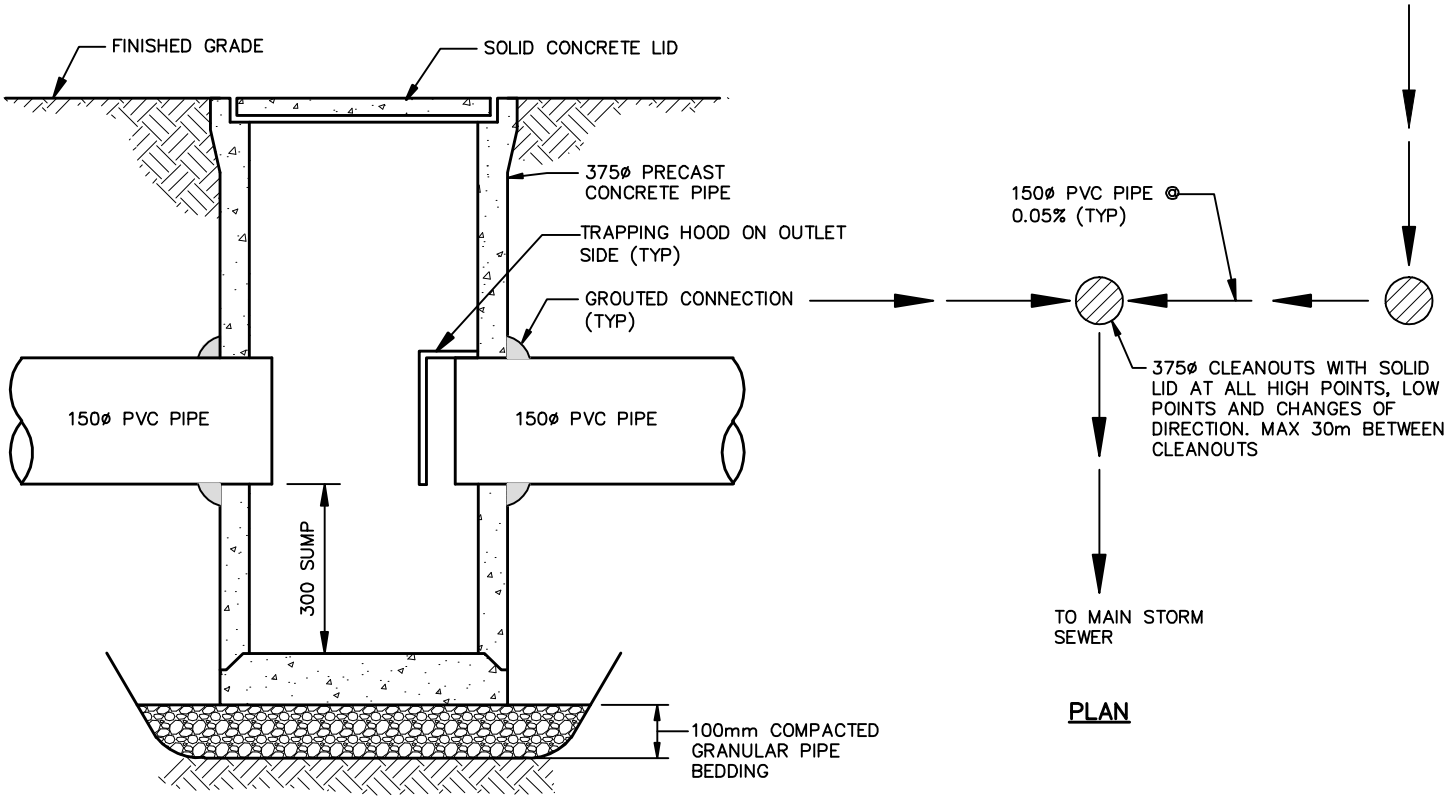
Richmond

STORM SEWER SERVICE CONNECTION

TECH. :	SCALE : NTS	DRAWING NUMBER : ST–20–SD
DR. :	DATE : JAN. 2000	
ENG. :	REV. DATE : NOV/10	SHEET No. : 1 OF 1



PERFORATED DRAINAGE TRENCH DETAIL



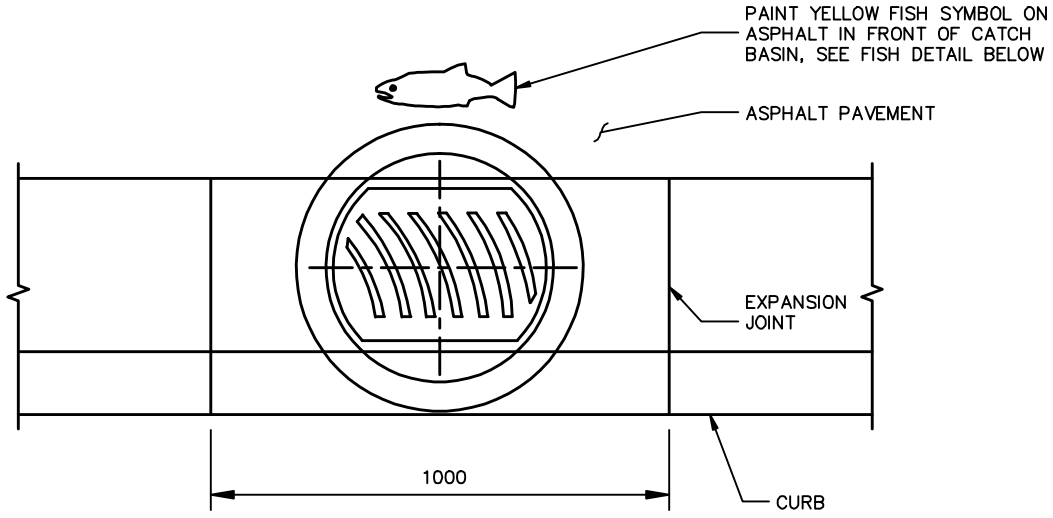
CONCRETE CLEANOUT WITH SOLID LID

PLAN

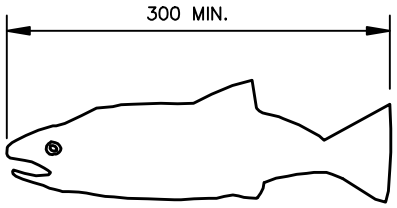
Richmond

PERFORATED DRAINAGE TRENCH DETAIL

TECH. : R. KEATING	SCALE : NTS	DRAWING NUMBER : ST-21-SD
DR. :	DATE : NOV. 2010	
ENG. :	REV. DATE :	SHEET No. : 1 OF 1



PLAN



FISH DETAIL

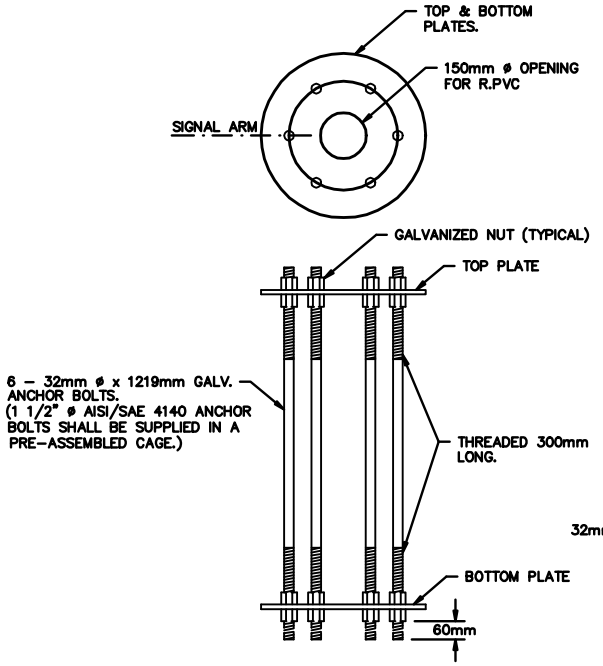
NOTES:

1. ALL STORM DRAINS TO BE MARKED WITH PAINTED YELLOW FISH OR DECAL
2. ENSURE AREA IS CLEAN AND DRY BEFORE APPLYING PAINT OR DECAL
3. PLACE DECAL ON ASPHALT (NOT ON CURB OR SIDEWALK)
4. FISH IS UPRIGHT WHEN VIEWED FROM SIDEWALK AND 50–100MM FROM DRAIN
5. STENCIL OR DECAL TO MATCH DETAIL.
6. YELLOW PAINT TO BE ROAD PAINT QUALITY

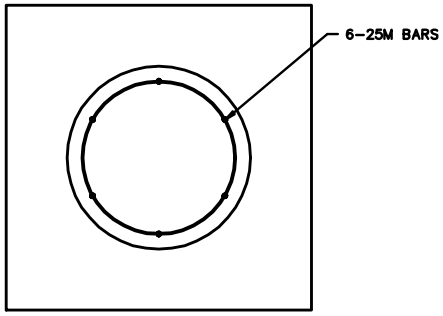
Richmond

STORM – PAINTED FISH DETAILS

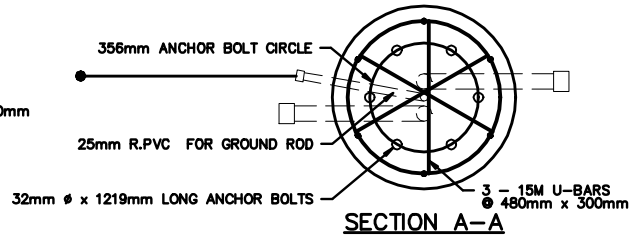
TECH. :	SCALE : NTS	DRAWING NUMBER : ST–22–SD
DR. :	DATE : NOV. 2010	
ENG. :	REV. DATE :	SHEET No. : 1 OF 1



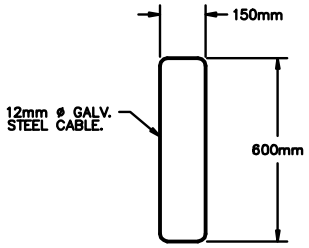
ANCHOR BOLT CAGE DETAIL



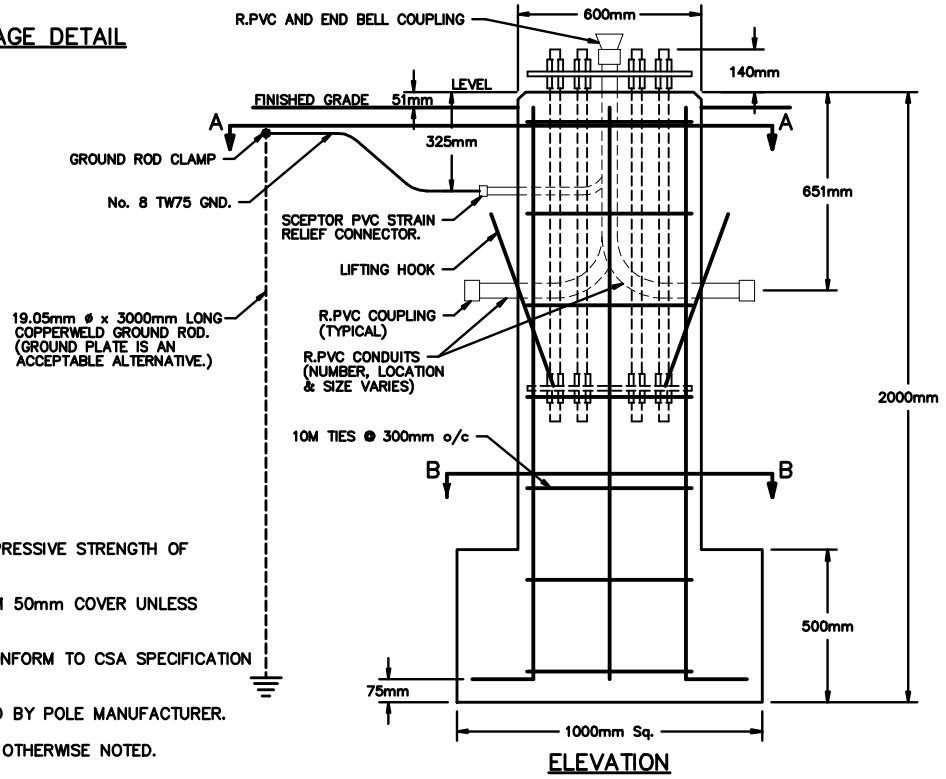
SECTION B–B



SECTION A–A



LIFTING HOOK DETAIL



ELEVATION

CONCRETE BASE NOTES:

1. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 30MPa AT 28 DAYS.
2. REINFORCING STEEL SHALL HAVE MINIMUM 50mm COVER UNLESS OTHERWISE NOTED.
3. DEFORMED REINFORCING STEEL SHALL CONFORM TO CSA SPECIFICATION G30.12M – GRADE 400.
4. ANCHOR BOLTS IN CAGE TO BE SUPPLIED BY POLE MANUFACTURER.
5. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED.

Richmond

TYPE A4 CONCRETE BASE & ANCHOR BOLT CAGE DETAILS

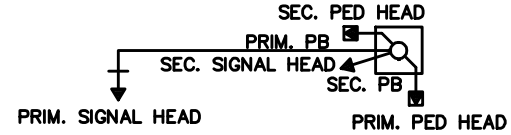
TECH. : S. MATHESON	SCALE : 1 : 25	DRAWING NUMBER : SD_A4–BASE
DR. :	DATE : JAN. 2003	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1

COLOUR CODING (MULTICONDUCTOR SIGNAL CABLE)

25 CONDUCTOR No. 14, CSA SPEC. No.C21.1 CABLE IN CONDUIT

CONDUCTOR No.	SIGNAL ASSIGNMENT	LETTERING	CONDUCTOR COLOUR	SINGLE CONDUCTOR COLOUR IN POLE
1	NEUTRAL	WHITE ONE	WHITE	WHITE
2	PRIM. PB RETURN	WHITE TWO	WHITE	BLACK
3	PRIM. PB	--	BLACK	BLACK
4	SEC. PB	--	ORANGE	BLACK (RED TT)
5	PRIM. RED	RED ONE	RED	RED
6	SEC. RED	RED TWO	RED	RED
7	SEC. PB RETURN	RED THREE	RED	BLACK (RED TT)
8	PRIM. PED DW	RED FOUR	RED	YELLOW or BROWN
9	SEC. PED DW	RED FIVE	RED	YELLOW or BROWN
10	PRIM. AMBER	AMBER ONE	YELLOW	YELLOW or BROWN
11	SEC. AMBER	AMBER TWO	YELLOW	YELLOW or BROWN
12	PRIM. LT AMBER	AMBER THREE	YELLOW	YELLOW or BROWN
13	SEC. LT AMBER	AMBER FOUR	YELLOW	YELLOW or BROWN
14	SEC. PED WALK	AMBER FIVE	YELLOW	BLUE
15	PRIM. GREEN	GREEN ONE	BLUE	BLUE
16	SEC. GREEN	GREEN TWO	BLUE	BLUE
17	PRIM. LT GREEN	GREEN THREE	BLUE	BLUE
18	SEC. LT GREEN	GREEN FOUR	BLUE	BLUE
19	PRIM. PED WALK	GREEN FIVE	BLUE	BLUE
20	SPARE	RED SIX	RED	--
21	SPARE	RED SEVEN	RED	--
22	SPARE	AMBER SIX	YELLOW	--
23	SPARE	AMBER SEVEN	YELLOW	--
24	SPARE	GREEN SIX	BLUE	--
25	SPARE	GREEN SEVEN	BLUE	--

LT – LEFT TURN SIGNAL
DW – DON'T WALK
PB – PEDESTRIAN PUSHBUTTON
TT – TRACER TAPE
* YELLOW or BROWN DESIGNATIONS – YELLOW (N/B & S/B) BROWN – (E/B & W/B)



WRAPPING OF CONDUCTORS INSIDE THE HAND HOLE SHALL BE AS FOLLOWS:

BLACK TAPE FOR PRIMARY THROUGH SIGNALS, PEDESTRIAN SIGNALS AND PUSHBUTTONS.

WHITE TAPE FOR PRIMARY LEFT TURN SIGNALS.

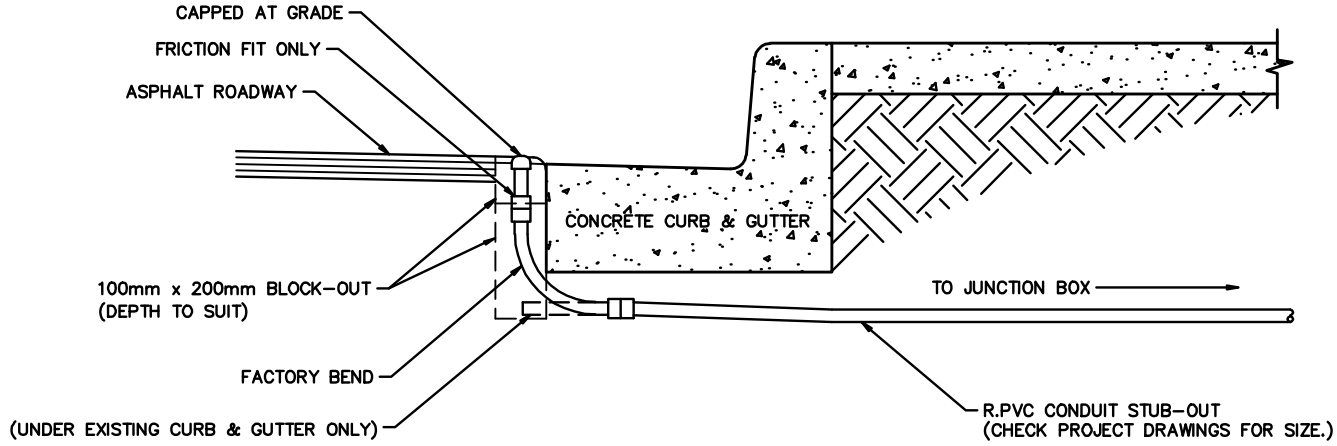
RED TAPE FOR SECONDARY THROUGH SIGNALS, PEDESTRIAN SIGNALS AND PUSHBUTTONS.

RED & WHITE TAPE FOR SECONDARY LEFT TURN SIGNALS.

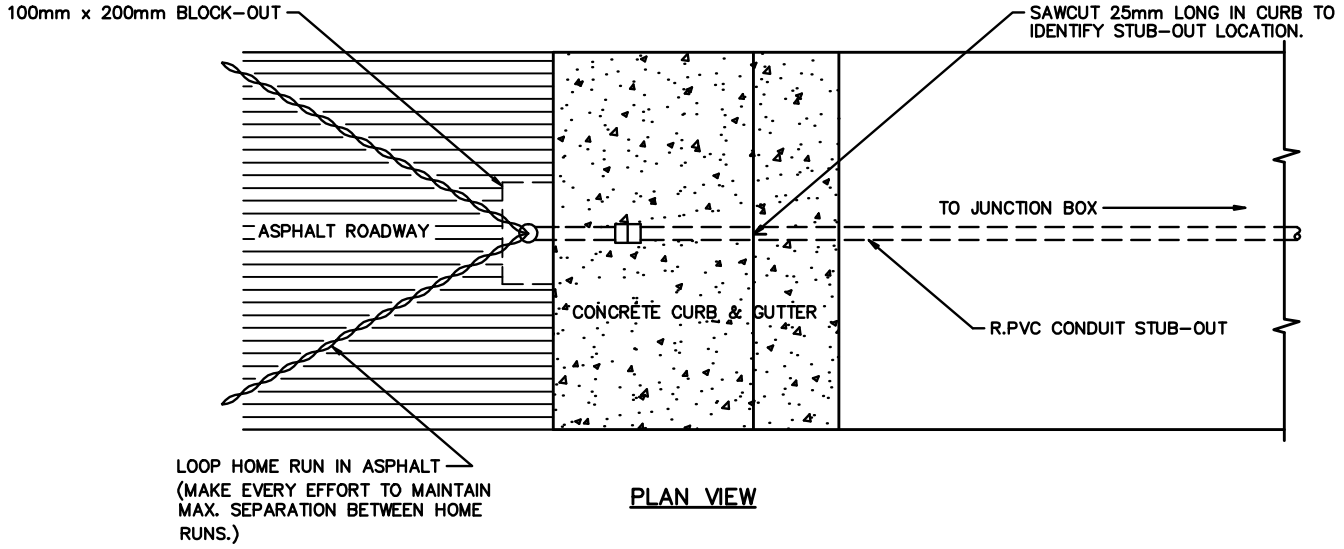
Richmond

SIGNAL CABLE COLOUR CODING & ASSIGNMENTS.

TECH. : S. MATHESON	SCALE :	DRAWING NUMBER : SD_CABLE-CC
DR. :	DATE : JAN. 2003	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



ELEVATION



PLAN VIEW

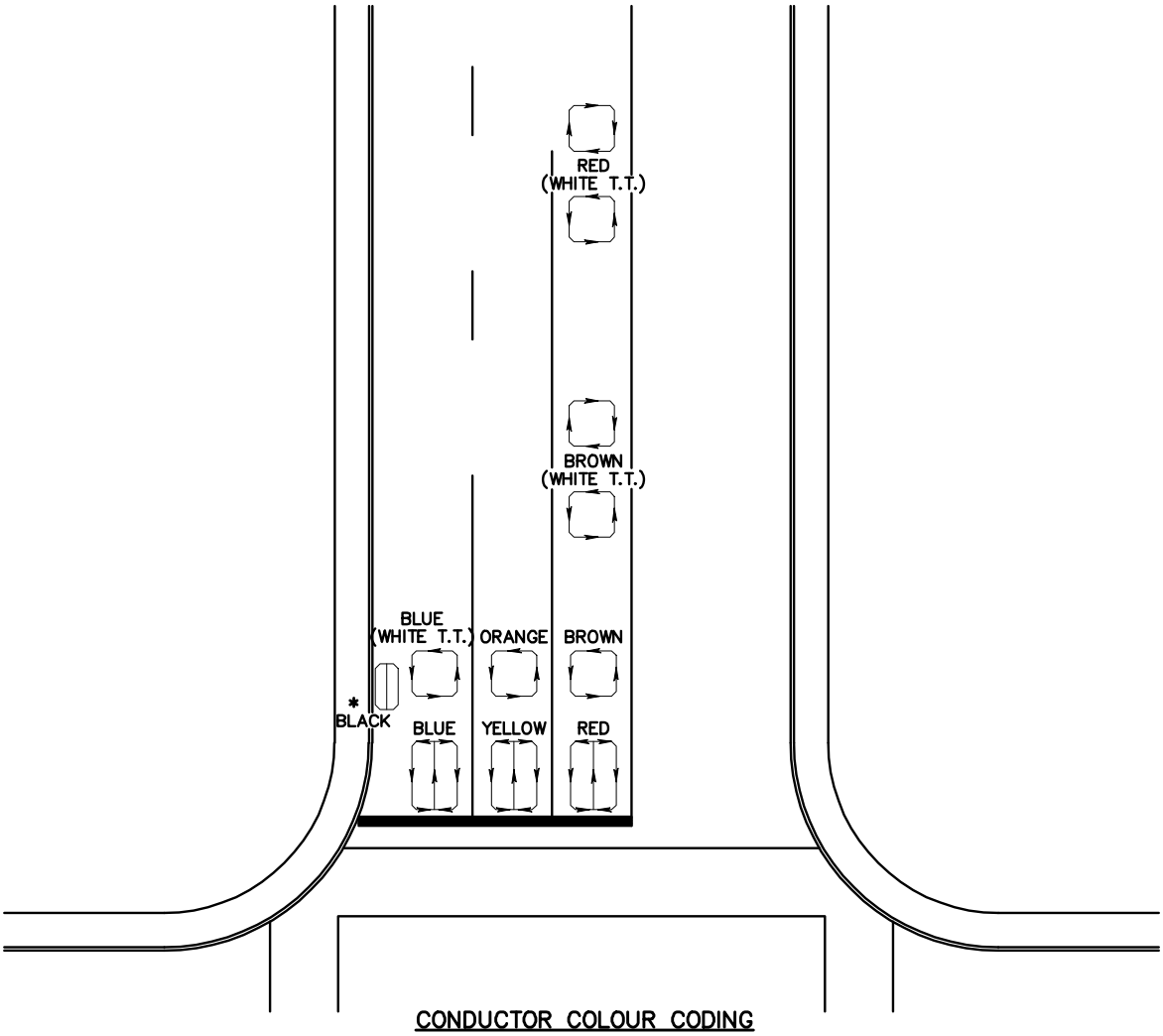
NOTES:

1. THE SOFT SPOT CREATED TO GAIN ACCESS TO THE CONDUIT UNDER THE PAVEMENT MUST BE FILLED WITH INSTANT ASPHALT PATCH & ASPHALTIC JOINT SEALER. (STUFF FIBRE GLASS AROUND WIRES IN CONDUIT TO AVOID SEEPAGE OF ASPHALT PATCH.)
2. UNDER NEW CONSTRCUTION ONLY – THE CAPPED SECTION OF R.PVC SHALL BE REMOVED DURING DETECTOR LOOP INSTALLATION. ALL R.PVC JOINTS SHALL BE GLUED EXCEPT THE SECTION BETWEEN CAP AND THE FIRST COUPLING DIRECTLY BELOW.
3. UNDER EXISTING CONSTRUCTION ONLY – THE R.PVC STUB-OUT SHALL EXTEND STRAIGHT OUT UNDER THE ASPHALT ROADWAY.
4. A 25mm LONG SAWCUT SHALL BE MADE IN THE CONCRETE CURB TO IDENTIFY THE LOCATION OF THE CONDUIT STUB-OUT FOR FUTURE USE.

Richmond

DETECTOR LOOPS

TECH. : S. MATHESON	SCALE : 1 : 15	DRAWING NUMBER : SD_DET
DR. :	DATE : JAN. 2003	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 2



CONDUCTOR COLOUR CODING

NOTES:

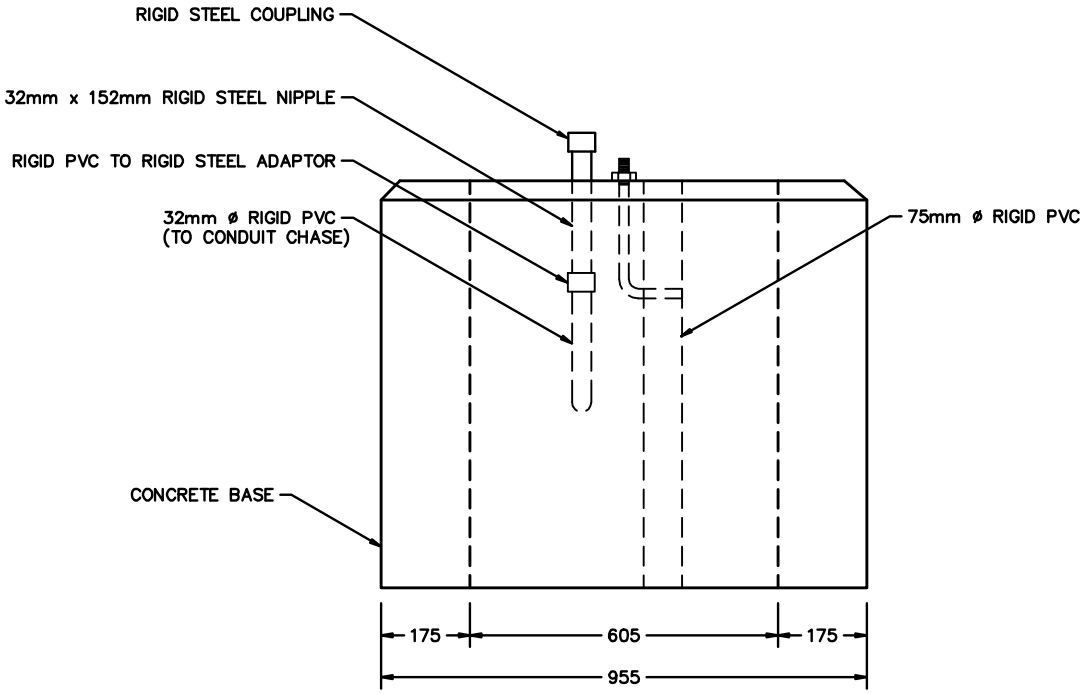
1. COLOUR CODING DOES NOT CHANGE FOR DIFFERENT TYPES OR SIZES OF DETECTOR LOOPS.
2. CURB LANE WILL UTILIZE THE COLOUR BLUE EXCLUSIVELY.
3. THROUGH LANE WILL UTILIZE THE CLOURS YELLOW AND ORANGE EXCLUSIVELY. (IF A SECOND THROUGH LANE IS PRESENT THEN THESE COLOURS SHALL BE UTILIZED WITH WHITE TRACER TAPE.)
4. THROUGH/LEFT TURN AND LEFT TURN ONLY LANES SHALL UTILIZE THE COLOURS RED AND BROWN EXCLUSIVELY. (aDVANCED PHASE CALLING LOOPS WILL UTILIZE THESE COLOURS WITH WHITE TRACER TAPE.)
5. ALL CONDUCTORS SHALL BE #14 RW90 STRANDED COPPER c/w COLOURED INSULATION.
6. SHIELDED CABLES SHALL BE MARKED FOR IDENTIFICATION WITH ELECTROVERT TYPE "Z" NO. 623 AND LABELLED WITH APPROPRIATE LOOP NUMBERS AS SHOWN ON PROJECT DRAWINGS.

*7. BICYCLE DETECTORS SHALL USE THE COLOUR BLACK EXCLUSIVELY.

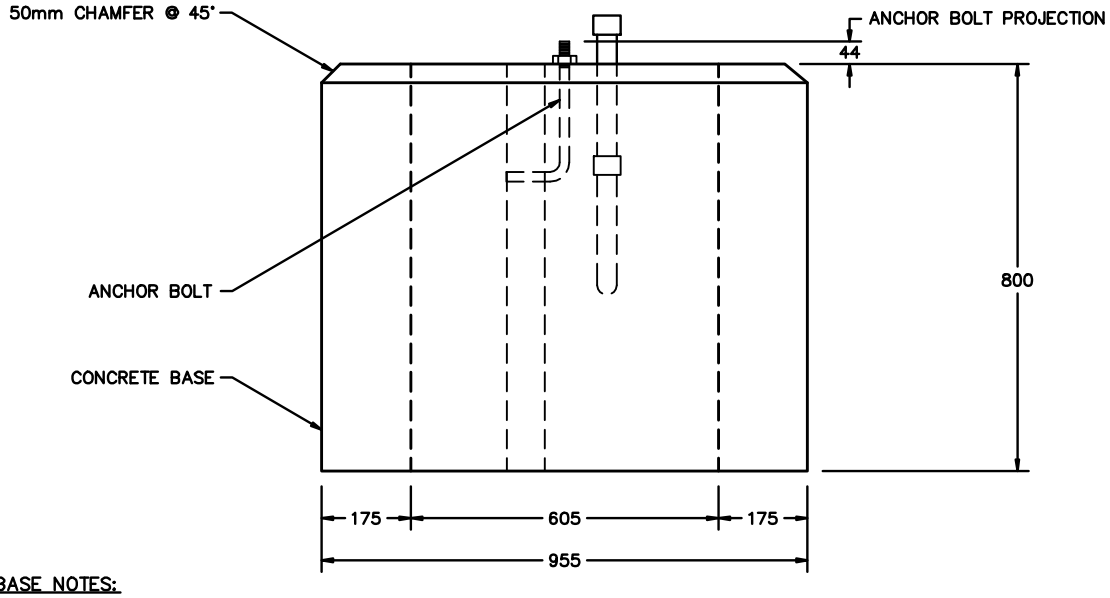
Richmond

DETECTOR LOOPS

TECH. : S. MATHESON	SCALE : N.T.S.	DRAWING NUMBER : SD_DET
DR. :	DATE : JAN. 2003	
ENG. :	REV. DATE : JULY/10	SHEET No. : 2 OF 2



REAR VIEW



FRONT VIEW

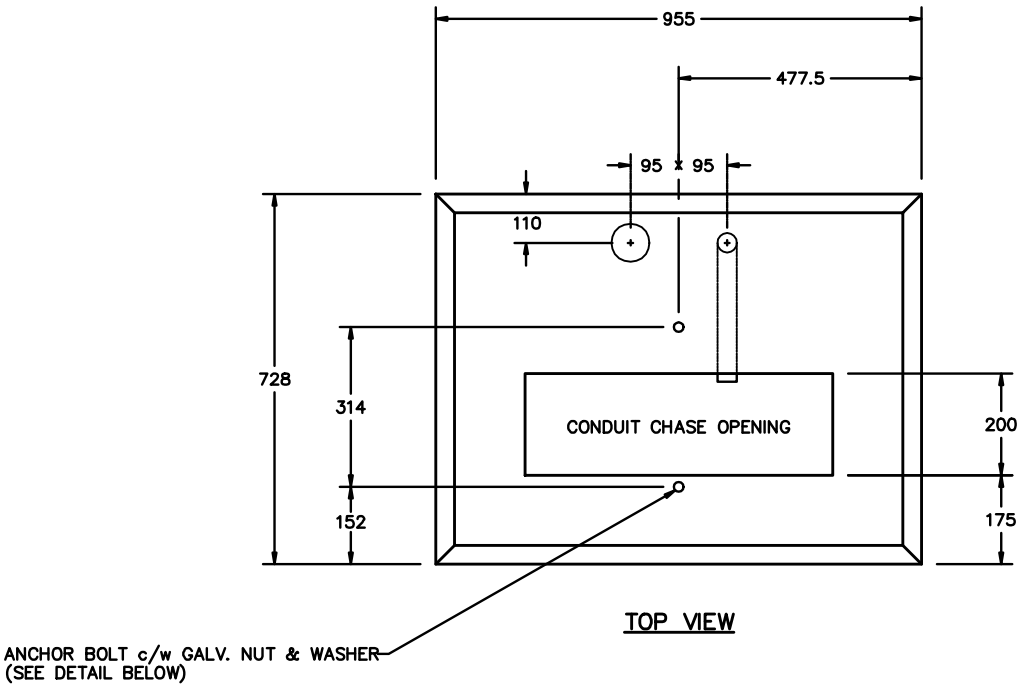
CONCRETE BASE NOTES:

1. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 30MPa AT 28 DAYS.
2. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED.

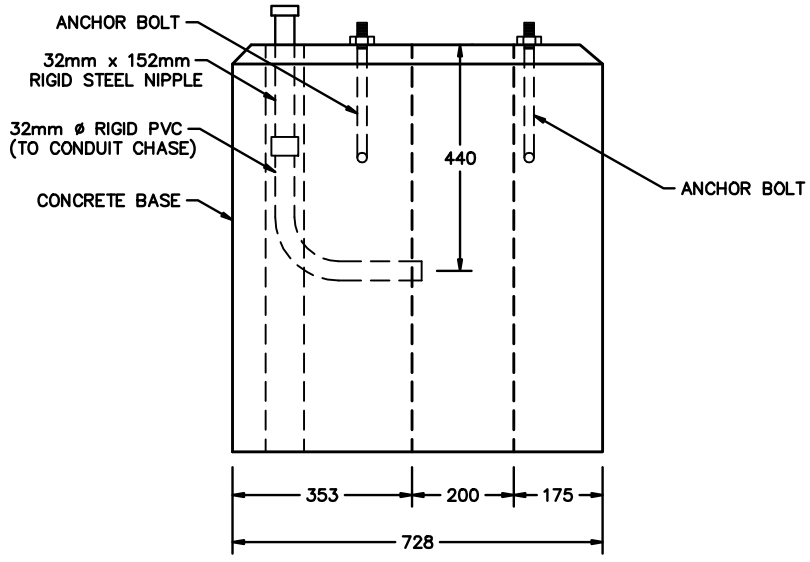
Richmond

TYPE M (NEMA CABINET) CONCRETE CONTROLLER BASE

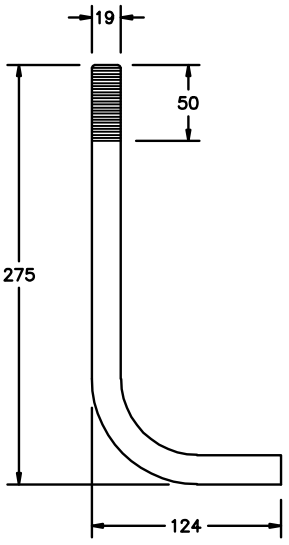
TECH. : S. MATHESON	SCALE : 1 : 15	DRAWING NUMBER : SD_M-BASE
DR. :	DATE : JAN. 2003	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 2



TOP VIEW



LEFT SIDE VIEW



ANCHOR BOLT DETAIL
N.T.S.

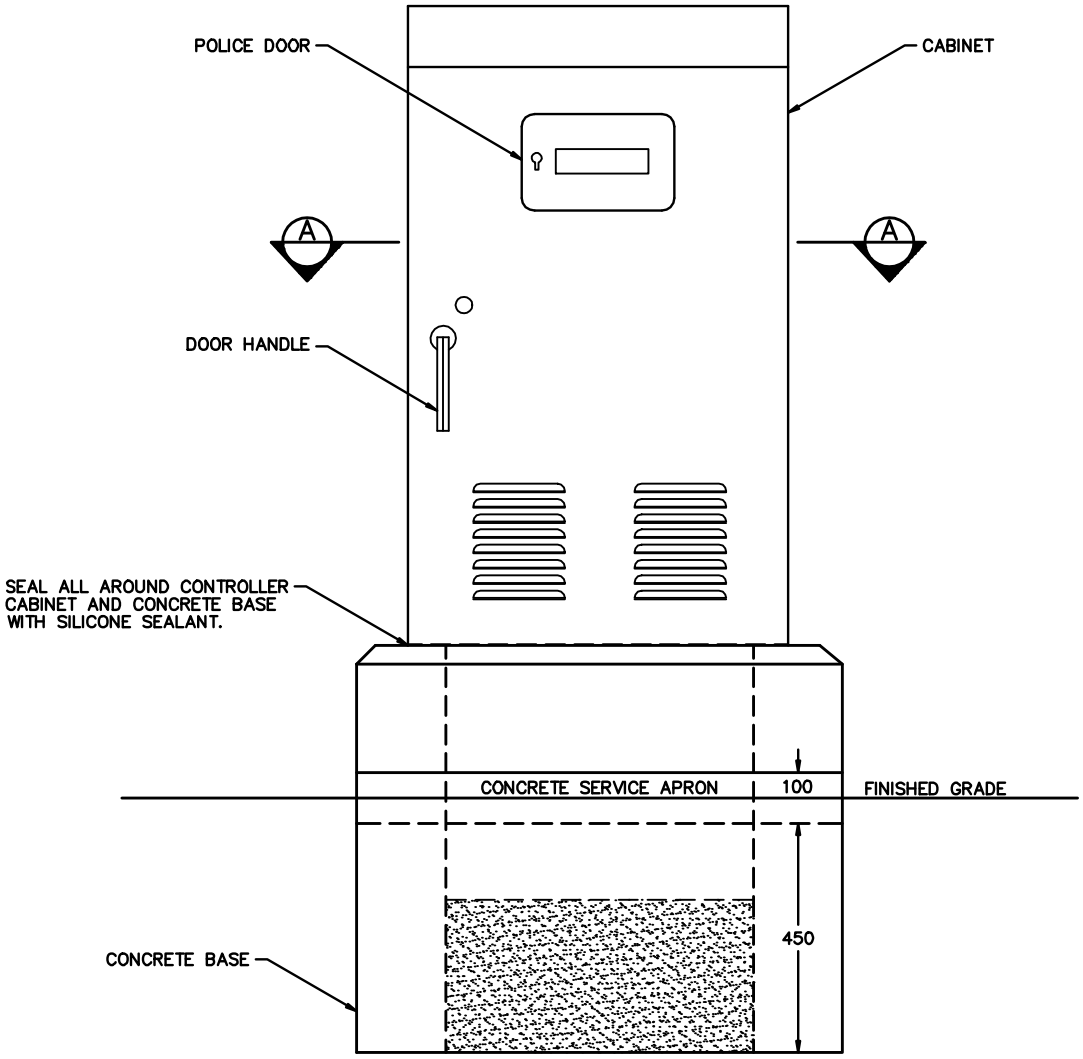
CONCRETE BASE NOTES:

1. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 30MPa AT 28 DAYS.
2. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED.

Richmond

TYPE M (NEMA CABINET) CONCRETE CONTROLLER BASE

TECH. : S. MATHESON	SCALE : 1 : 15	DRAWING NUMBER : SD_M-BASE
DR. :	DATE : JAN. 2003	
ENG. :	REV. DATE : JULY/10	SHEET No. : 2 OF 2



FRONT VIEW

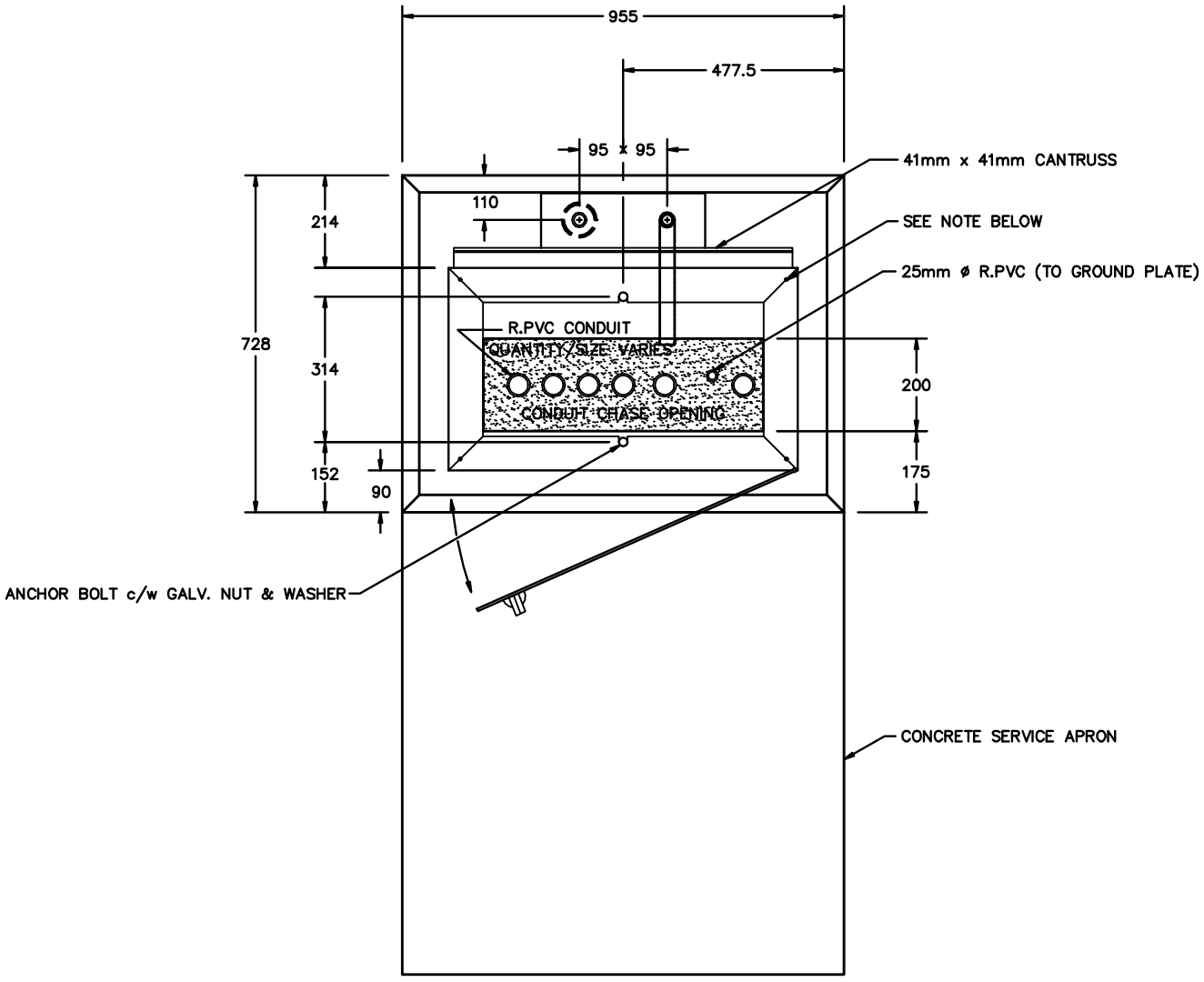
CONCRETE BASE NOTES:

1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED.

Richmond

TYPE M CONTROLLER CABINET & SERVICE PANEL INSTALLATION DETAILS

TECH. : S. MATHESON	SCALE : 1 : 15	DRAWING NUMBER :
DR. :	DATE : JAN. 2003	SD_MCAB-PANEL
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 4



SECTION (A)

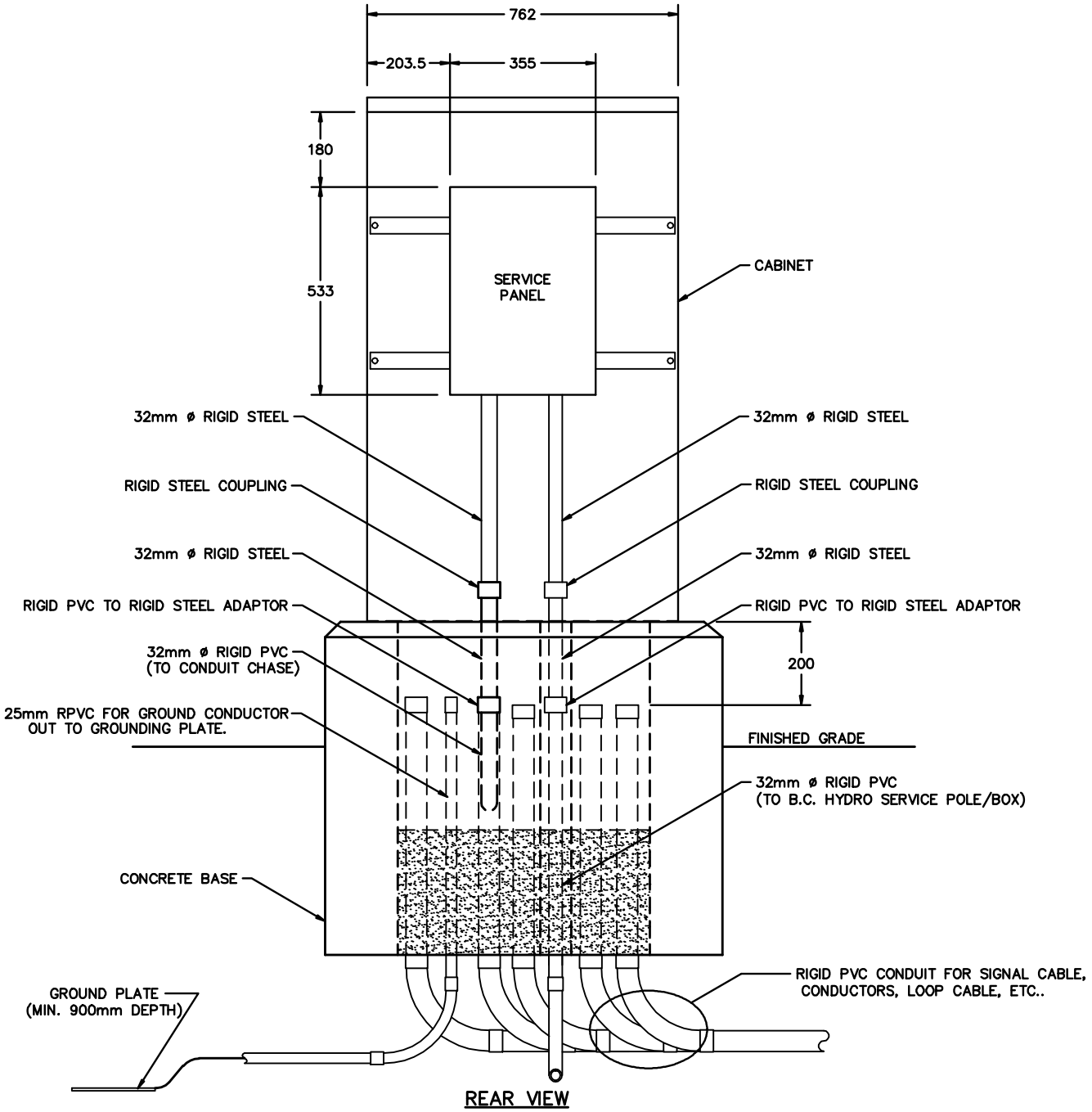
CONCRETE BASE NOTES:

1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED.
2. INSTALL 4 – #90–371 'CINCH' LEAD ANCHORS IN CONCRETE BASE. MOUNT CABINET & INSTALL 4 – 9.52mm BRASS BOLTS c/w BRASS PLATE WASHERS AND BRASS LOCK WASHERS. BOLTS SHALL BE 'HEXAGON HEAD' TYPE.

Richmond

TYPE M CONTROLLER CABINET & SERVICE PANEL INSTALLATION DETAILS

TECH. : S. MATHESON	SCALE : 1:15	DRAWING NUMBER : SD_MCAB–PANEL
DR. :	DATE : JAN. 2003	
ENG. :	REV. DATE : JULY/10	SHEET No. : 2 OF 4



REAR VIEW

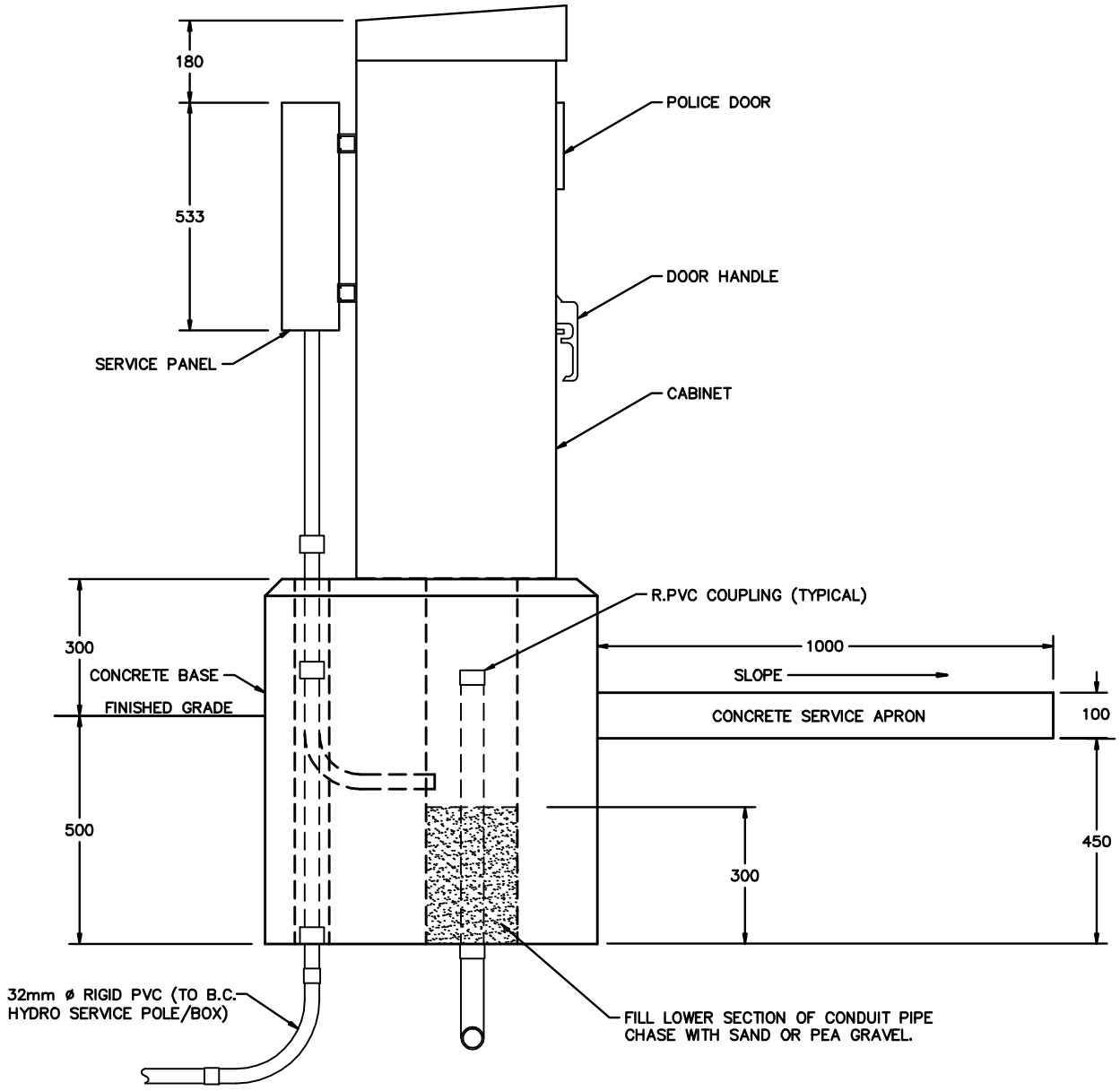
CONCRETE BASE NOTES:

1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED.

Richmond

TYPE M CONTROLLER CABINET & SERVICE PANEL INSTALLATION DETAILS

TECH. : S. MATHESON	SCALE : 1:15	DRAWING NUMBER : SD_MCAB-PANEL
DR. :	DATE : JAN. 2003	
ENG. :	REV. DATE : JULY/10	SHEET No. : 3 OF 4



LEFT SIDE VIEW

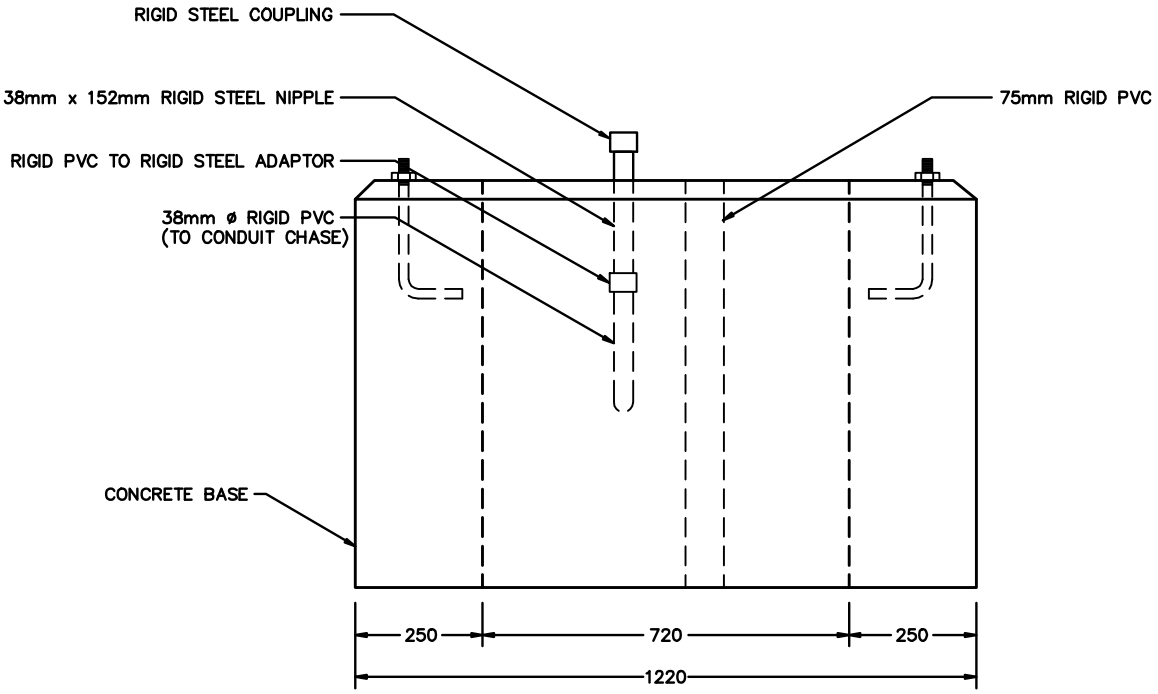
CONCRETE BASE NOTES:

1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED.

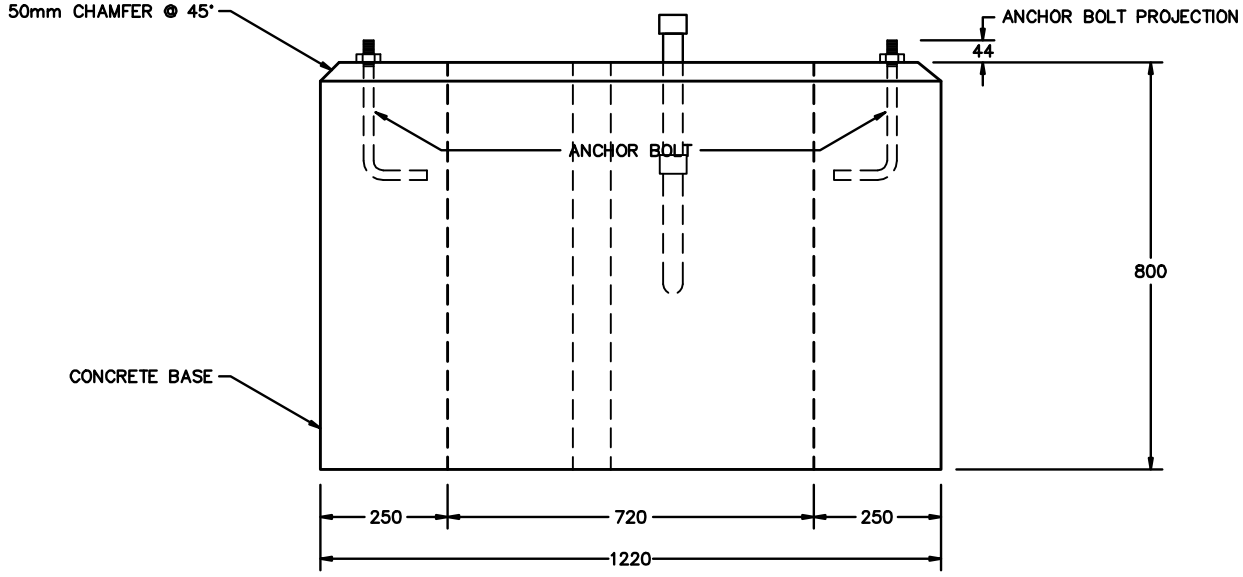
Richmond

TYPE M CONTROLLER CABINET & SERVICE PANEL INSTALLATION DETAILS

TECH. : S. MATHESON	SCALE : 1:15	DRAWING NUMBER : SD_MCAB-PANEL
DR. :	DATE : JAN. 2003	
ENG. :	REV. DATE : JULY/10	SHEET No. : 4 OF 4



REAR VIEW



FRONT VIEW

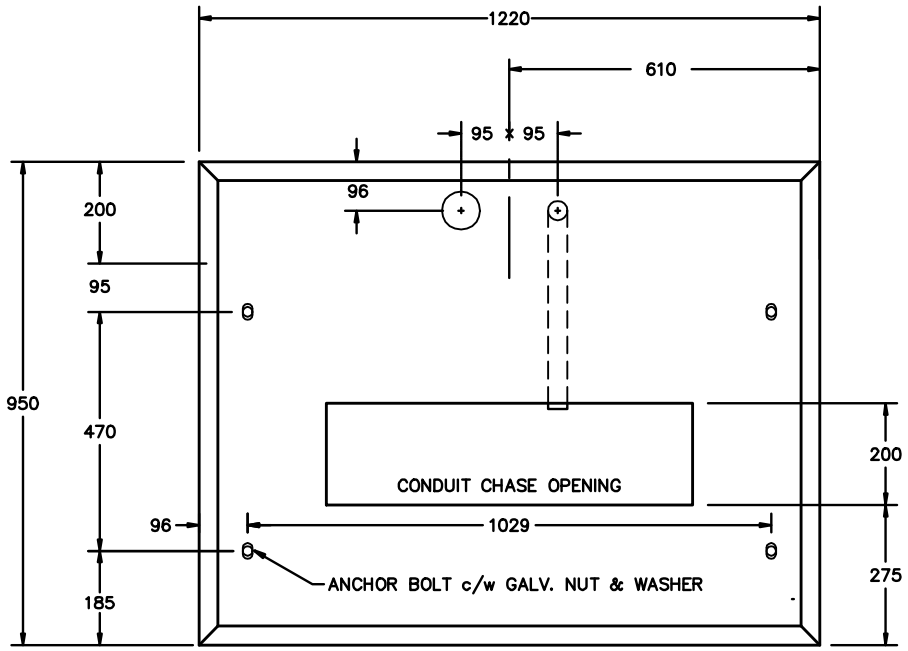
CONCRETE BASE NOTES:

1. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 30MPa AT 28 DAYS.
2. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED.

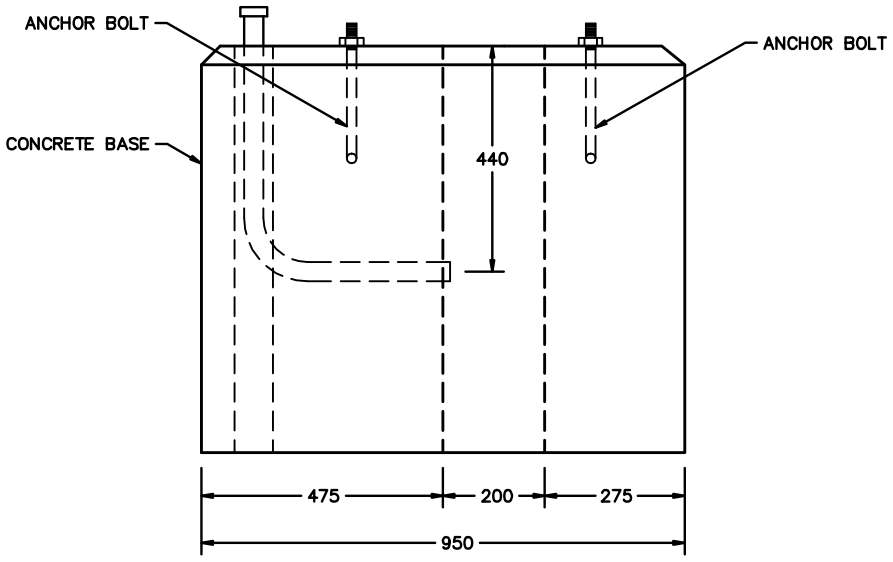
Richmond

TYPE P (NEMA CABINET) CONCRETE CONTROLLER BASE

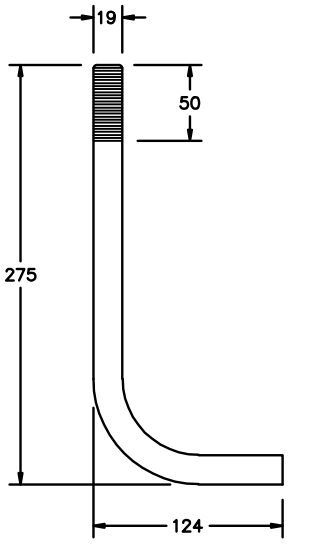
TECH. : S. MATHESON	SCALE : 1 : 15	DRAWING NUMBER : SD_P-BASE
DR. :	DATE : JAN. 2003	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 2



TOP VIEW



LEFT SIDE VIEW



ANCHOR BOLT DETAIL
N.T.S.

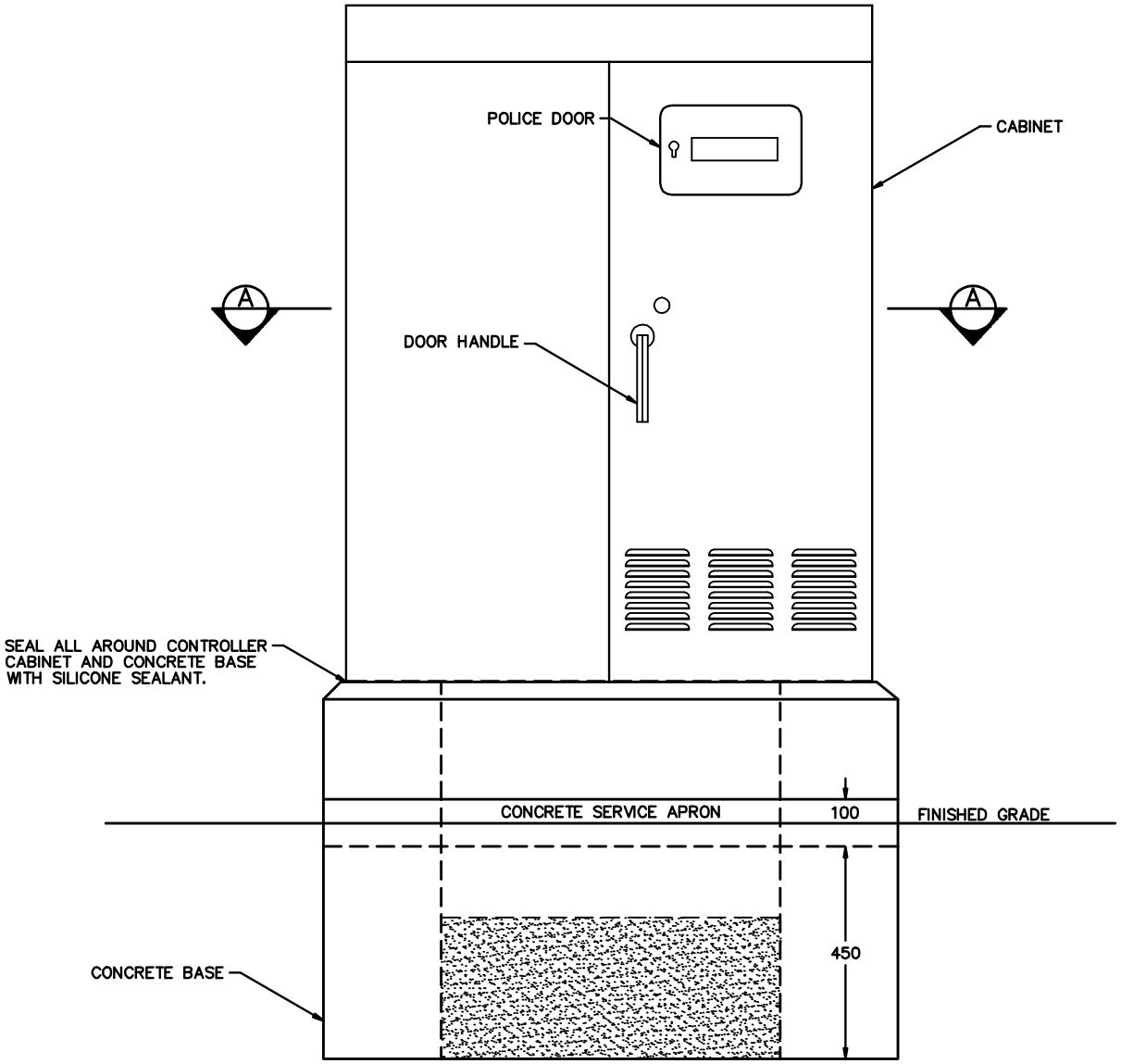
CONCRETE BASE NOTES:

1. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 30MPa AT 28 DAYS.
2. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED.

Richmond

TYPE P (NEMA CABINET) CONCRETE CONTROLLER BASE

TECH. : S. MATHESON	SCALE : N.T.S.	DRAWING NUMBER : SD_P-BASE
DR. :	DATE : JAN. 2003	
ENG. :	REV. DATE : JULY/10	SHEET No. : 2 OF 2



FRONT VIEW

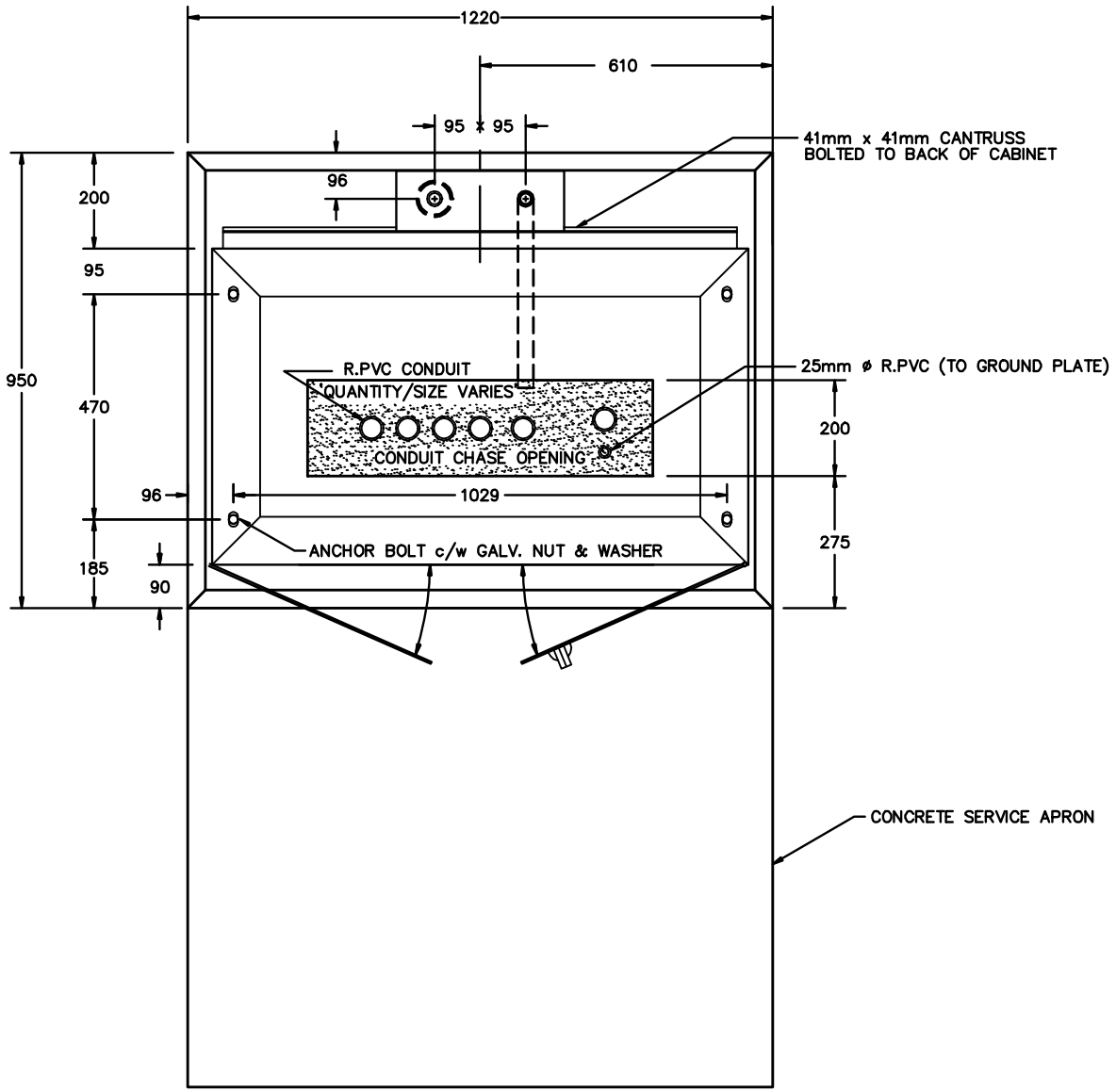
CONCRETE BASE NOTES:

1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED.

Richmond

TYPE P CONTROLLER CABINET & SERVICE PANEL INSTALLATION DETAILS

TECH. : S. MATHESON	SCALE : 1 : 15	DRAWING NUMBER :
DR. :	DATE : JAN. 2003	SD_PCAB-PANEL
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 4



SECTION A

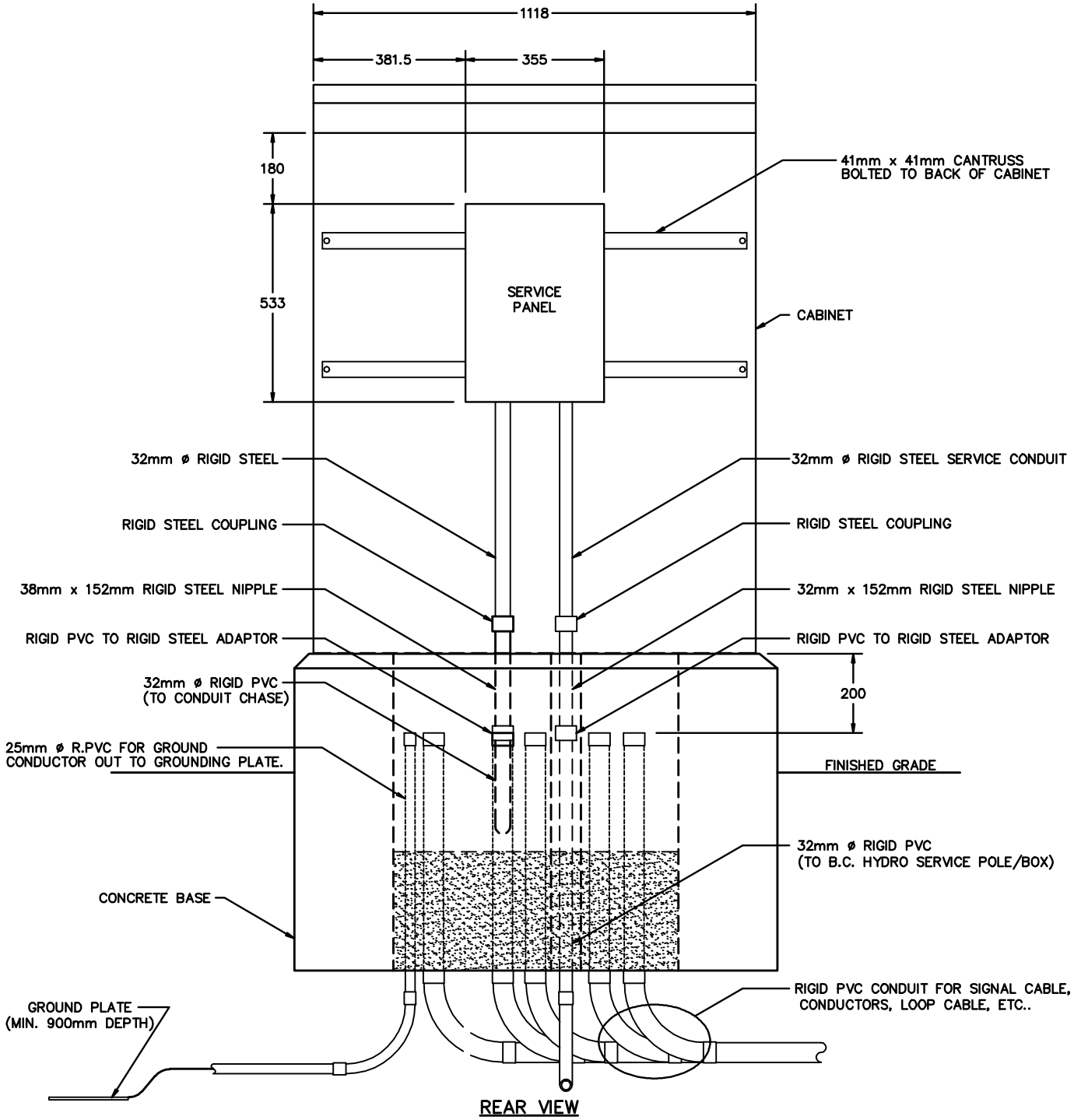
CONCRETE BASE NOTES:

1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED.

Richmond

TYPE P CONTROLLER CABINET & SERVICE PANEL INSTALLATION DETAILS

TECH. : S. MATHESON	SCALE : 1:15	DRAWING NUMBER :
DR. :	DATE : JAN. 2003	SD_PCAB-PANEL
ENG. :	REV. DATE : JULY/10	SHEET No. : 2 OF 4



REAR VIEW

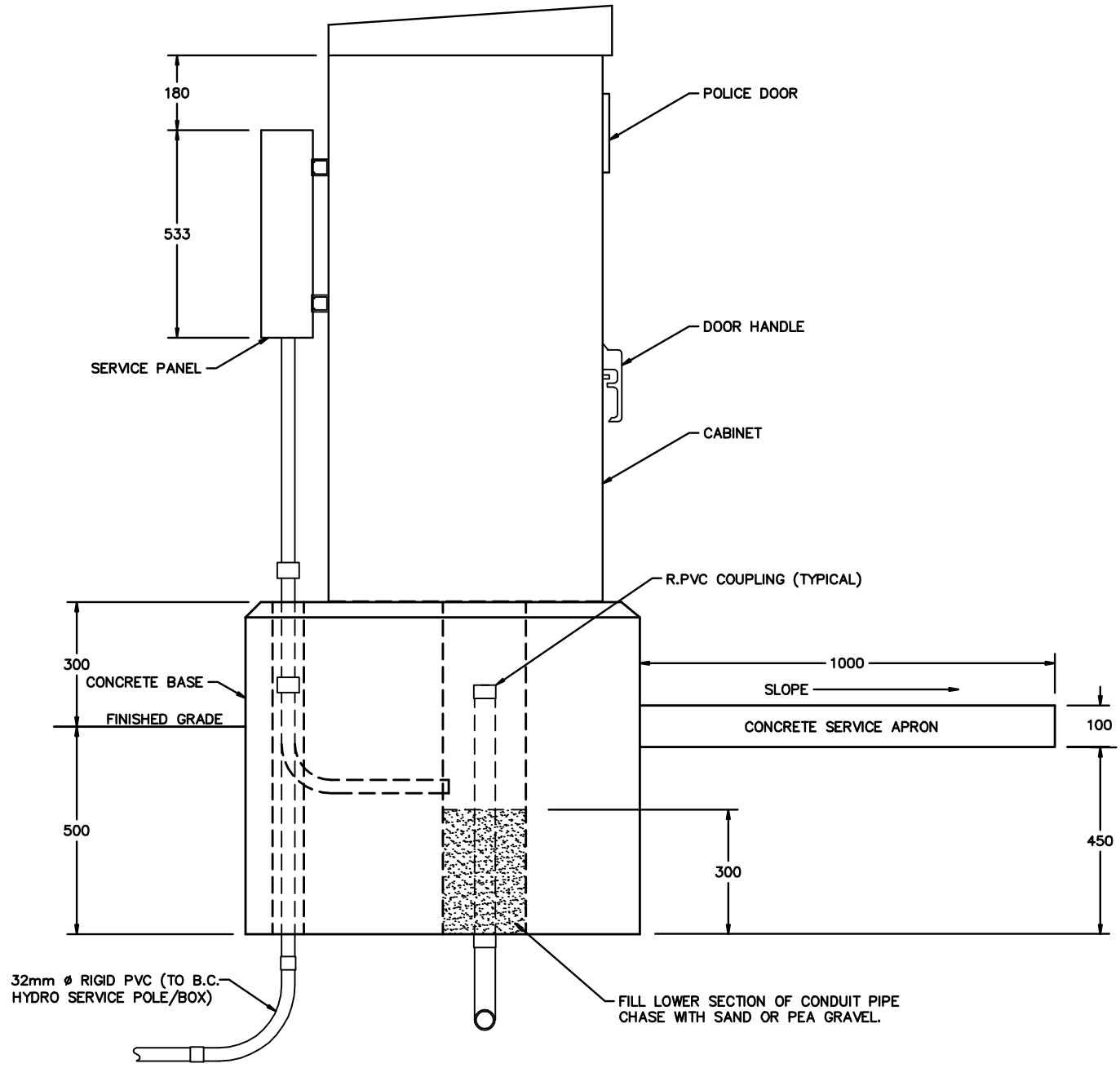
CONCRETE BASE NOTES:

1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED.

Richmond

TYPE P CONTROLLER CABINET & SERVICE PANEL INSTALLATION DETAILS

TECH. : S. MATHESON	SCALE : 1:15	DRAWING NUMBER :
DR. :	DATE : JAN. 2003	SD_PCAB-PANEL
ENG. :	REV. DATE : JULY/10	SHEET No. : 3 OF 4



LEFT SIDE VIEW

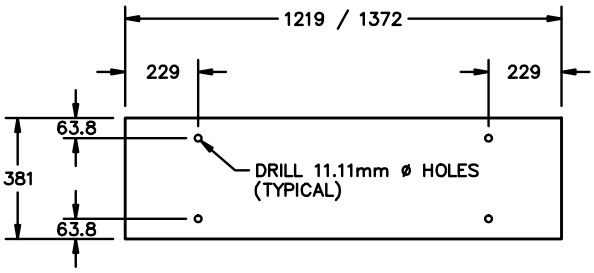
CONCRETE BASE NOTES:

1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED.

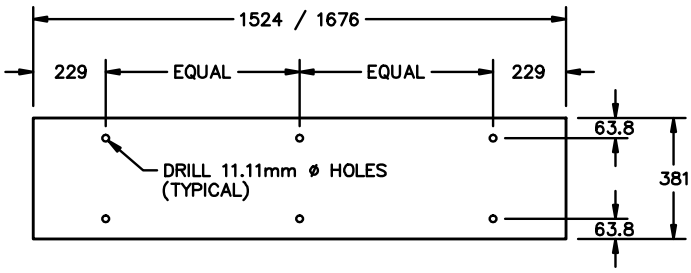
Richmond

TYPE P CONTROLLER CABINET & SERVICE PANEL INSTALLATION DETAILS

TECH. : S. MATHESON	SCALE : 1:15	DRAWING NUMBER :
DR. :	DATE : JAN. 2003	SD_PCAB-PANEL
ENG. :	REV. DATE : JULY/10	SHEET No. : 4 OF 4

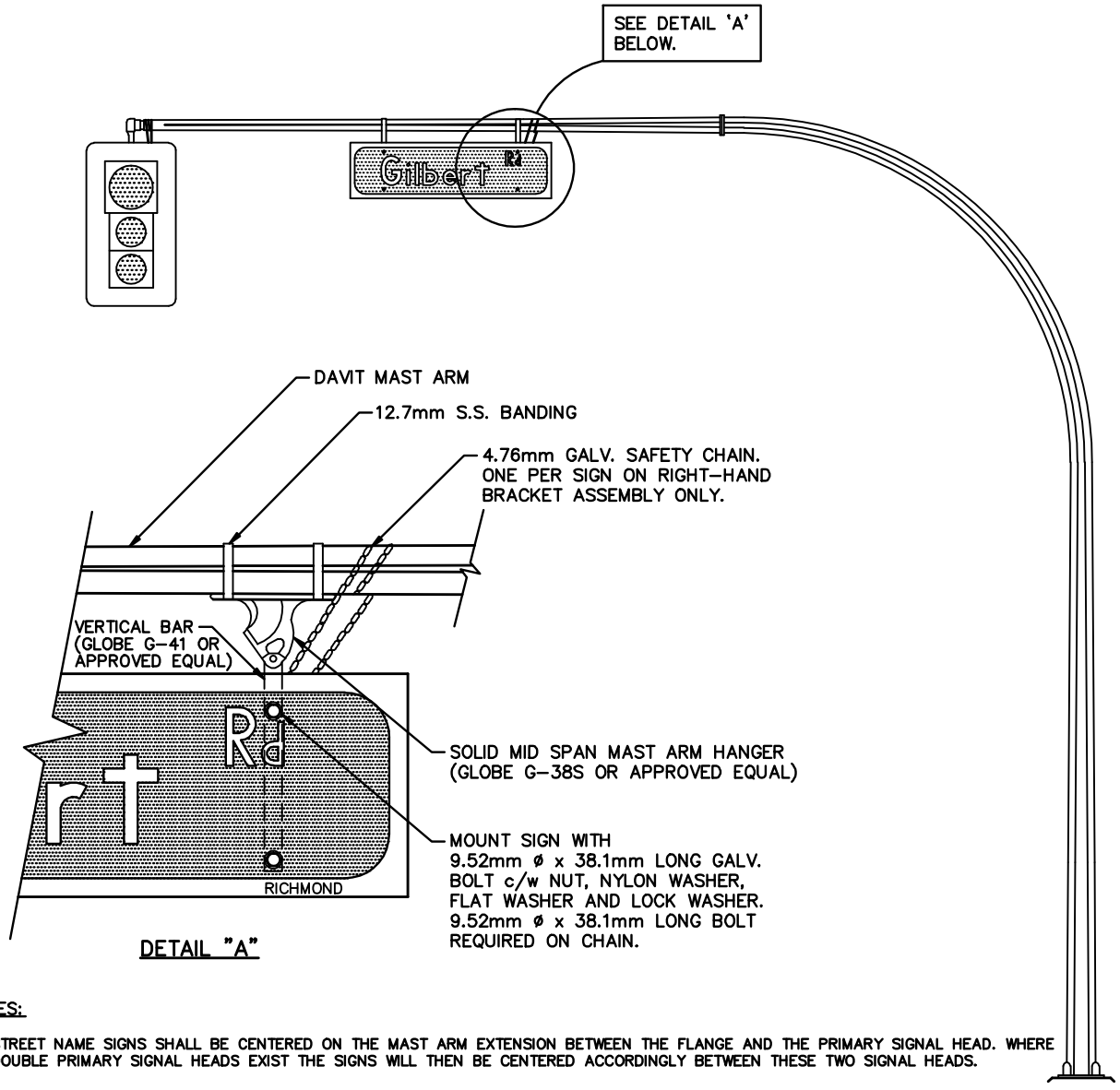


CASE 'A' (1219 / 1372 SIGN BLADE)



CASE 'B' (1524 / 1676 SIGN BLADE)

SIGN BLADE SIZE & HOLE CONFIGURATIONS



DETAIL "A"

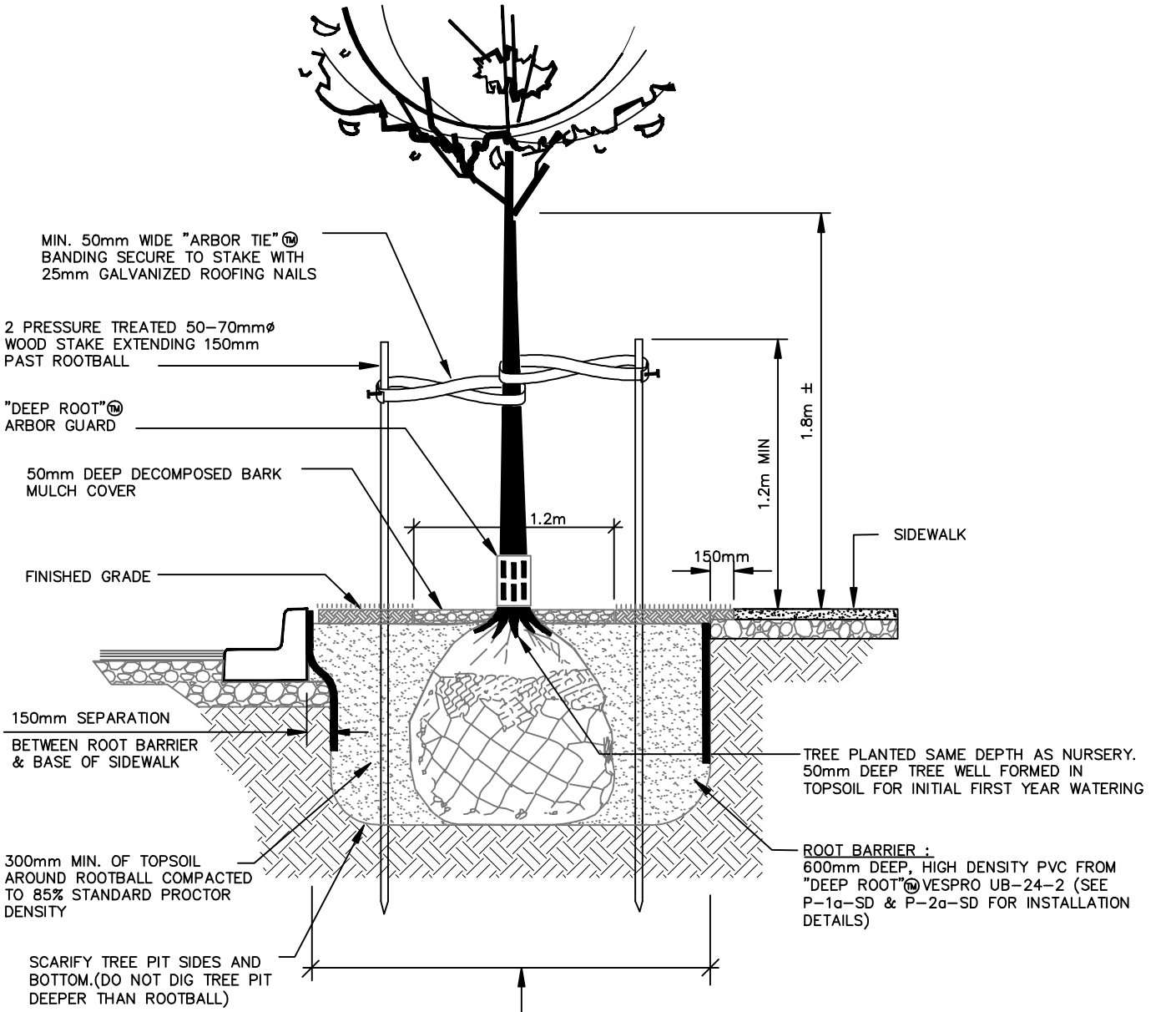
NOTES:

1. STREET NAME SIGNS SHALL BE CENTERED ON THE MAST ARM EXTENSION BETWEEN THE FLANGE AND THE PRIMARY SIGNAL HEAD. WHERE DOUBLE PRIMARY SIGNAL HEADS EXIST THE SIGNS WILL THEN BE CENTERED ACCORDINGLY BETWEEN THESE TWO SIGNAL HEADS.

Richmond

OVERHEAD STREET NAME SIGN MOUNTING DETAILS

TECH. : S. MATHESON	SCALE : N.T.S.	DRAWING NUMBER : SD_ST-NAME
DR. :	DATE : JAN. 2003	
ENG. :	REV. DATE : JULY/10	SHEET No. : 1 OF 1



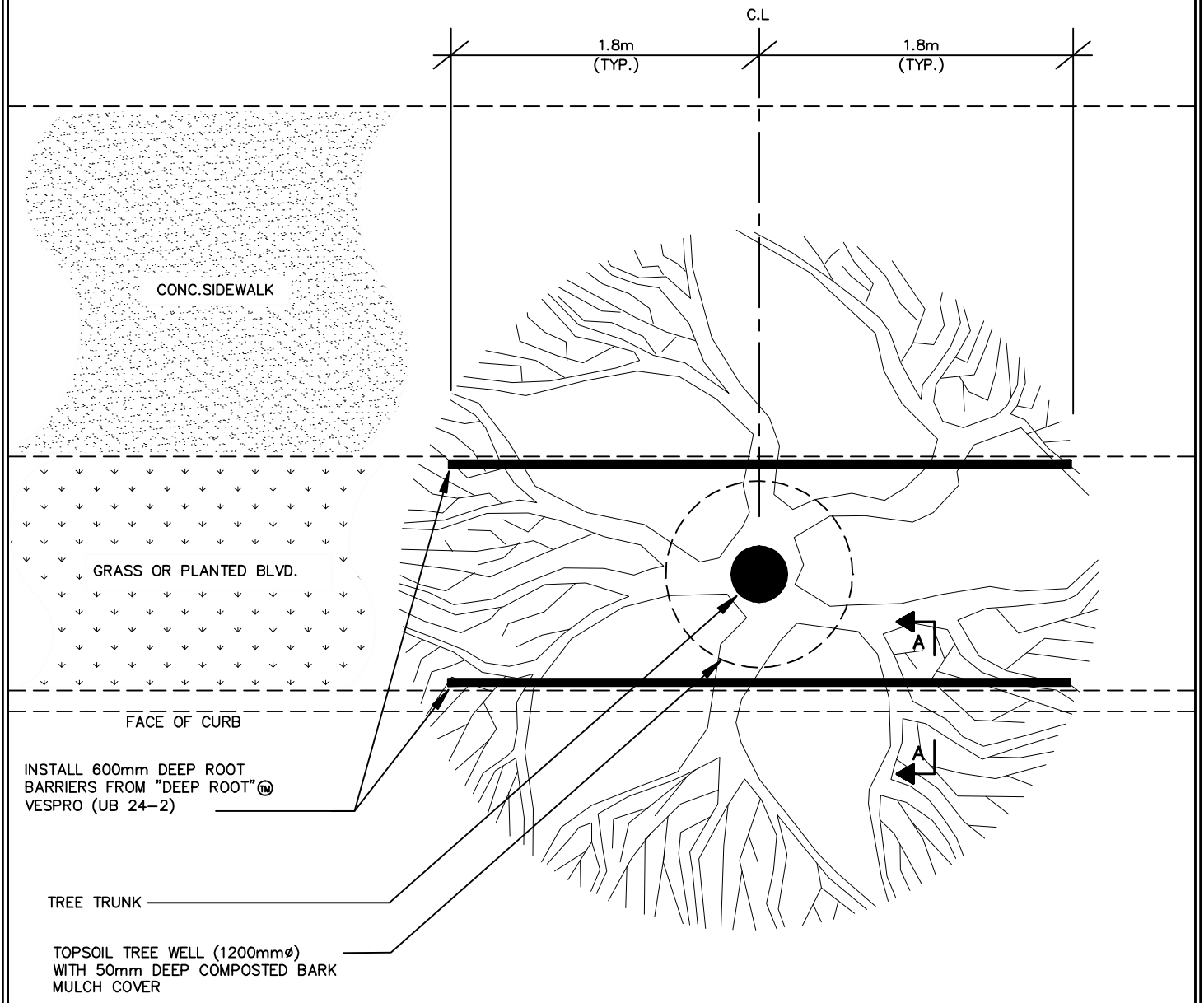
NOTES:

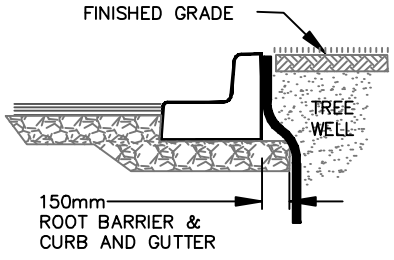
ENSURE TOP OF ROOTBALL IS AT OR SLIGHTLY ABOVE FINISHED GRADE. BURLAP TO BE UNTREATED AND TWINE TO DECOMPOSE WITHIN 6 MONTHS.

Richmond

TREE PLANTING DETAIL – PROFILE (DETACHED SIDEWALK)

TECH. : F. CHOE	SCALE : NTS	DRAWING NUMBER : P–1–SD
DR. : F. CHOE	DATE : APR. 2010	
ENG. :	REV. : SEPT. 2010	SHEET No. : 1 OF 1





DETAIL: A-A

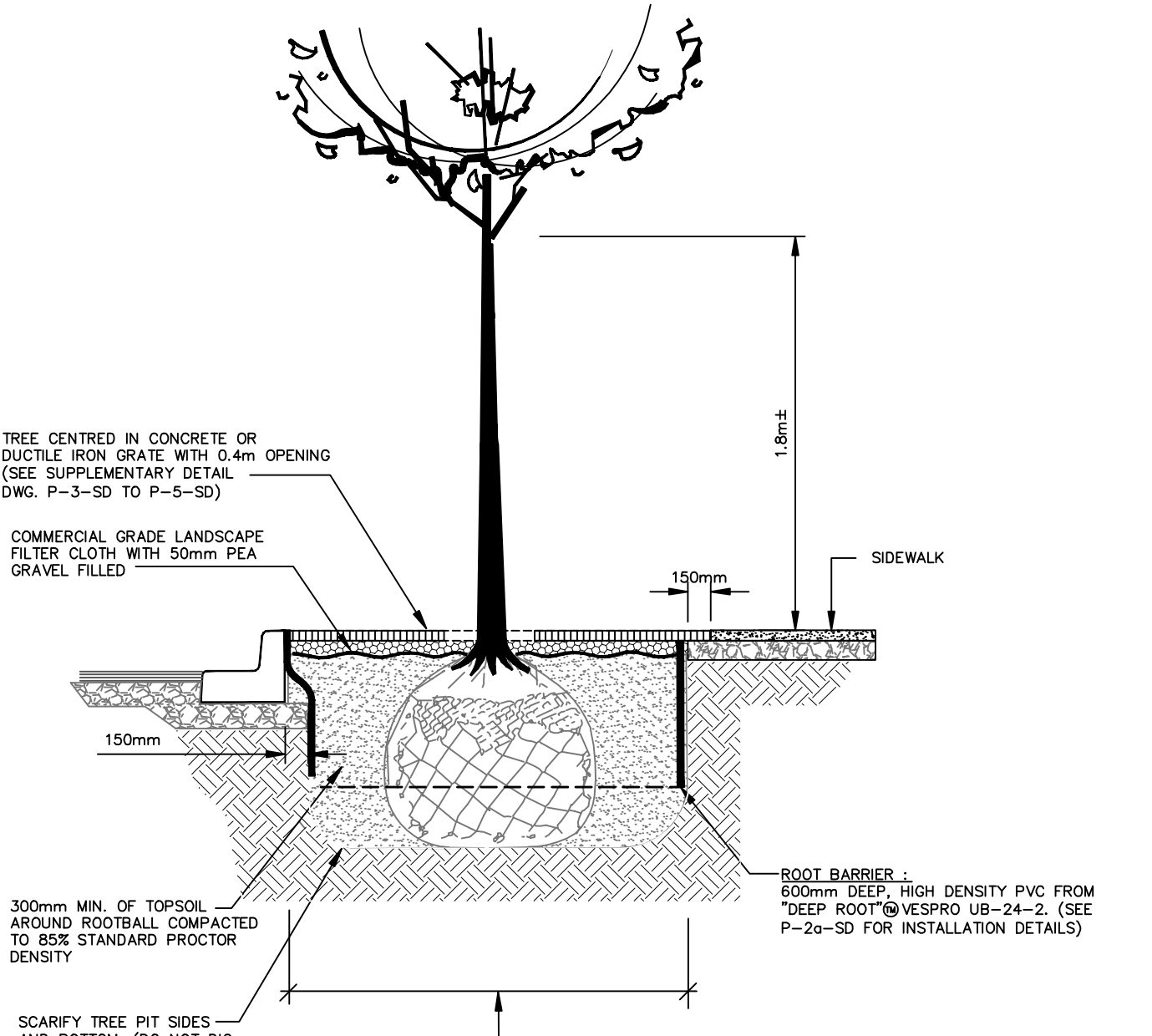
NOTES:

1. ROOT BARRIERS SHALL BE REQUIRED FOR ALL TREES PLANTED WITHIN 2.0m OF HARDSCAPE. (MEASURED FROM CENTRE OF TREE TRUNK)
2. 600mm DEEP ROOT BARRIER SHALL BE HIGH DENSITY & HIGH IMPACT PLASTIC AS AVAILABLE FROM "DEEP ROOT"™ VESPRO. INC. OR EQUAL AS APPROVED BY CITY OF RICHMOND PARKS DEPARTMENT.
3. TOP OF ROOT BARRIER SHALL BE SET 25mm ABOVE FINISHED GRADE OF SOIL. HOWEVER UNDER NO CIRCUMSTANCES SHALL THE TOP OF ROOT BARRIER EXTEND ABOVE ADJACENT CURB, SIDEWALK OR OTHER SURFACING.

Richmond

ROOT BARRIER DETAIL – PLAN (DETACHED SIDEWALK)

TECH. : F. CHOE	SCALE : NTS	DRAWING NUMBER : P-1a-SD
DR. : F. CHOE	DATE : APR. 2010	
ENG. :	REV. : SEPT. 2010	SHEET No. : 1 OF 1



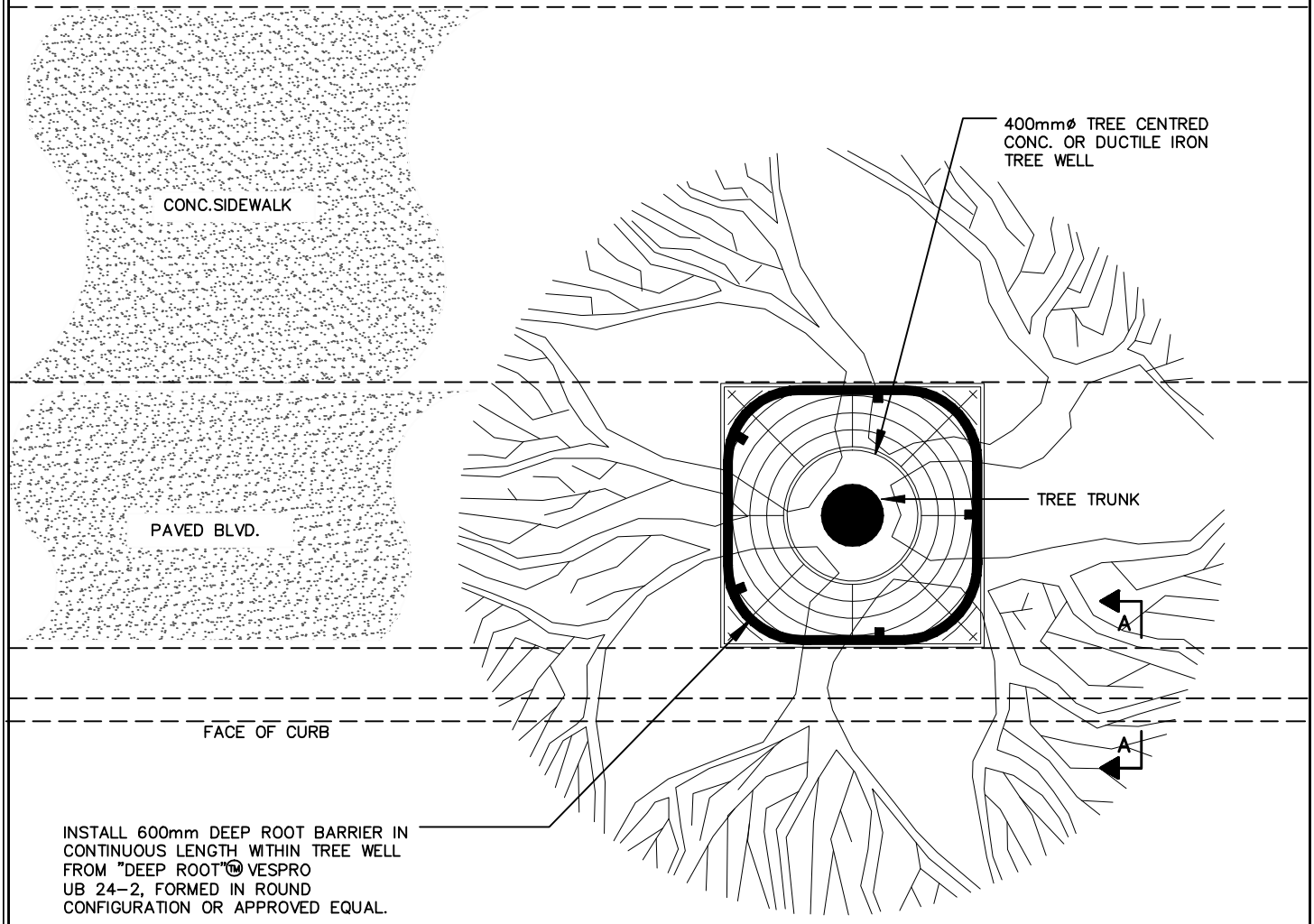
NOTES:

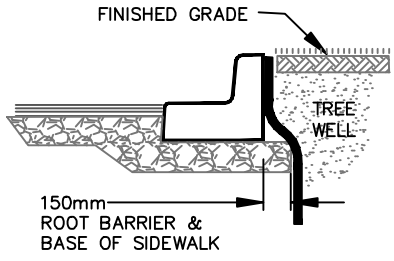
ENSURE TOP OF ROOTBALL IS AT OR SLIGHTLY ABOVE FINISHED GRADE. BURLAP TO BE UNTREATED AND TWINE TO DECOMPOSE WITHIN 6 MONTHS.

Richmond

TREE PLANTING DETAIL – PROFILE (PAVED BLVD/SIDEWALK)

TECH. : F. CHOE	SCALE : NTS	DRAWING NUMBER : P-2-SD	
DR. : F. CHOE	DATE : APR. 2010		
ENG. :	REV. : SEPT. 2010	SHEET No. : 1 OF 1	





DETAIL: A–A

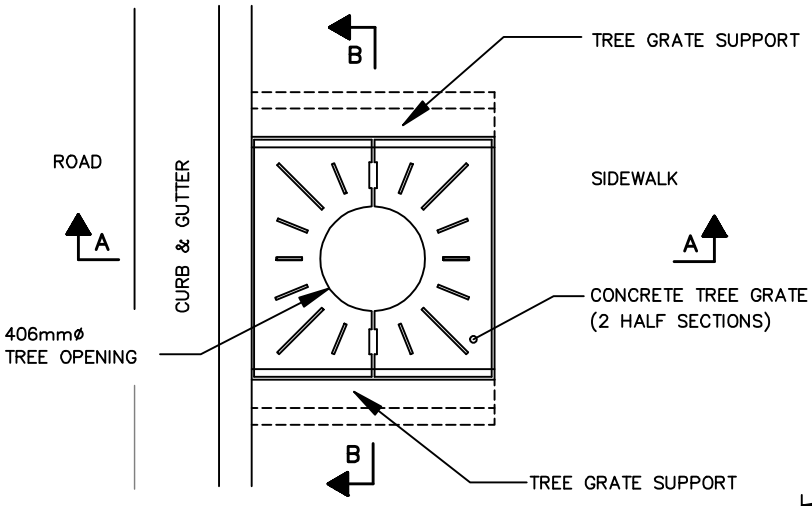
NOTES:

1. 600mm ROOT BARRIER SHALL BE HIGH DENSITY & HIGH IMPACT PLASTIC AS AVAILABLE FROM "DEEP ROOT"™ VESPRO. INC. OR APPROVED EQUAL.
2. TOP OF ROOT BARRIER SHALL BE SET 25mm ABOVE FINISHED GRADE OF SOIL. HOWEVER UNDER NO CIRCUMSTANCES SHALL THE TOP OF ROOT BARRIER EXTEND ABOVE ADJACENT CURB, SIDEWALK OR OR OTHER SURFACING.

Richmond

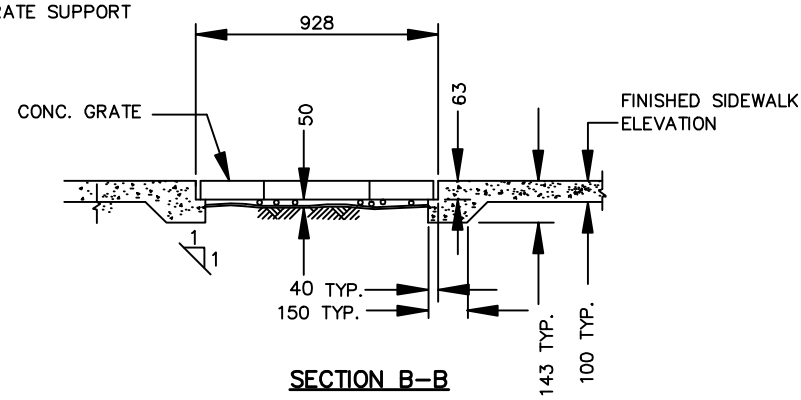
ROOT BARRIER DETAIL – PLAN (PAVED BLVD/SIDEWALK)

TECH. : F. CHOE	SCALE : NTS	DRAWING NUMBER : P–2a–SD
DR. : F. CHOE	DATE : APR. 2010	
ENG. :	REV. : SEPT. 2010	SHEET No. : 1 OF 1

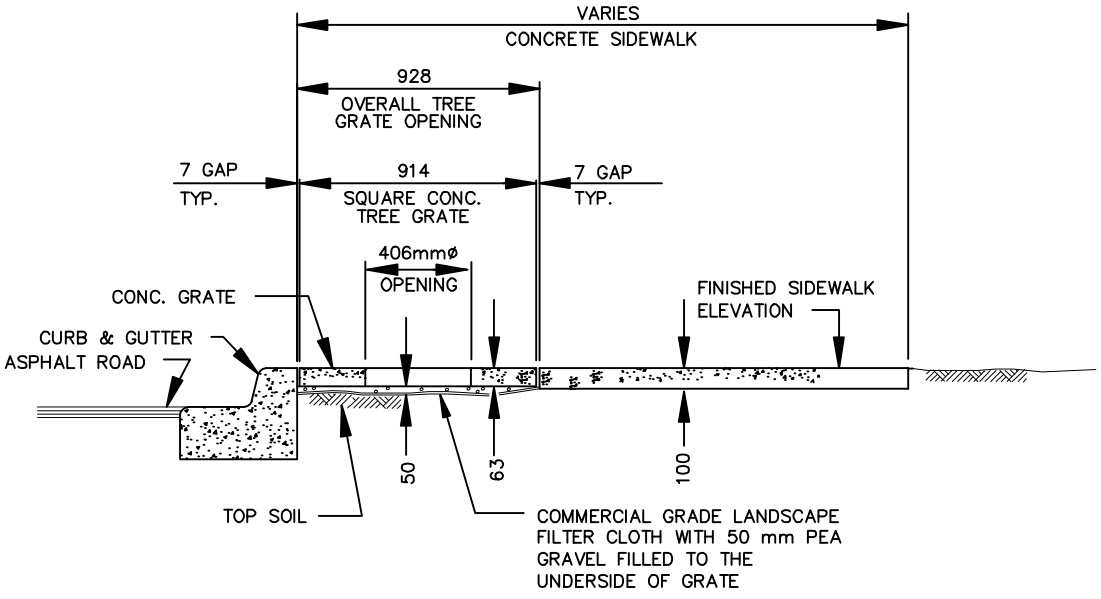


TREE GRATE DETAIL

(TREE IN WALKWAY C/W GRATE)



SECTION B–B

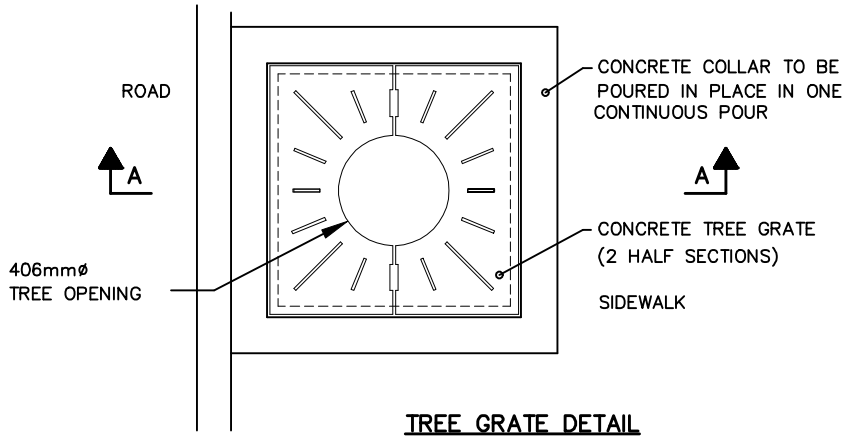


SECTION A–A

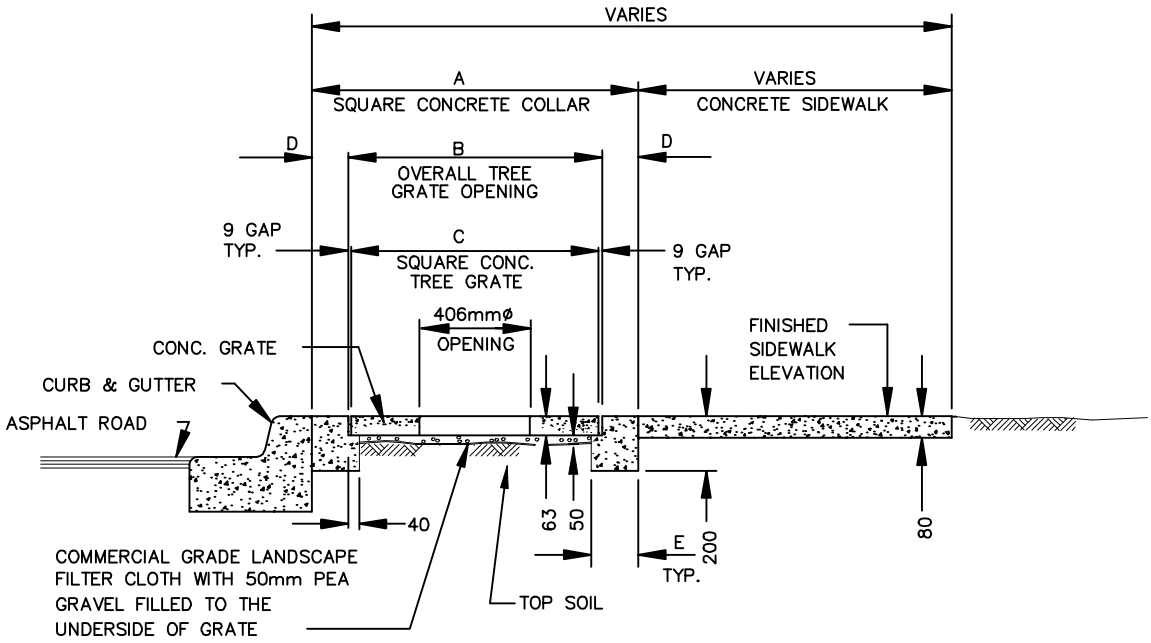
Richmond

CONCRETE TREE GRATE (WITH TREE GRATE SUPPORT)

TECH. : F. CHOE	SCALE : NTS	DRAWING NUMBER : P–3–SD
DR. : F. CHOE	DATE : APR. 2010	
ENG. :	REV. : SEPT. 2010	SHEET No. : 1 OF 1



TREE GRATE DETAIL



SECTION A–A

NOTES:

1. OVERALL TREE GRATE COLLAR SHALL BE SQUARE.
2. OVERALL TREE GRATE OPENING SHALL BE SQUARE.
3. LEDGE AND OPENING DIMENSIONS TO BE CONSTRUCTED WITHIN 5mm±.
4. TREE GRATES AND CONSTRUCTION SHALL BE PEDESTRIAN FRIENDLY, SAFE AND TO WITHSTAND MAXIMUM PEDESTRIAN LOADING.
5. CONCRETE TREE GRATE COVERS SHALL BE SUPPLIED IN TWO HALF SECTIONS.
6. FOR OVERALL TREE GRATE DIMENSIONS AND THICKNESS SEE TABLE 'A'.

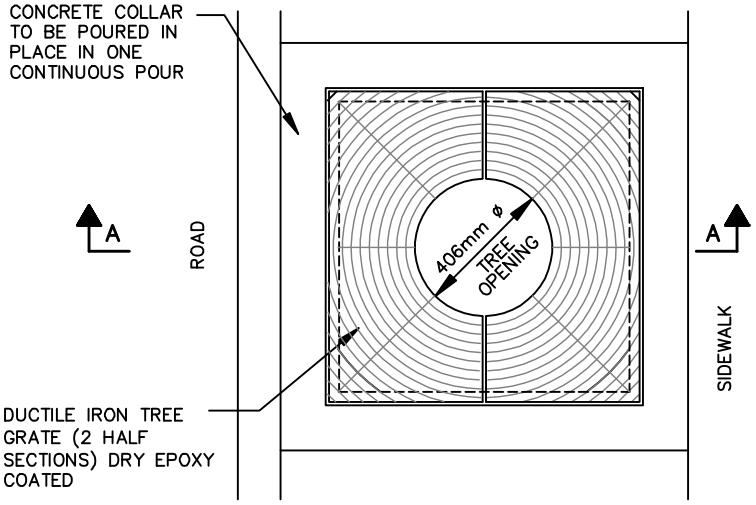
DESCRIPTION (COLLAR)	DIMENSION				
	A	B	C	D	E
1200mm SQUARE	1200	932	914	134	174
1500mm SQUARE	1500	1237	1219	132	172

TABLE 'A'

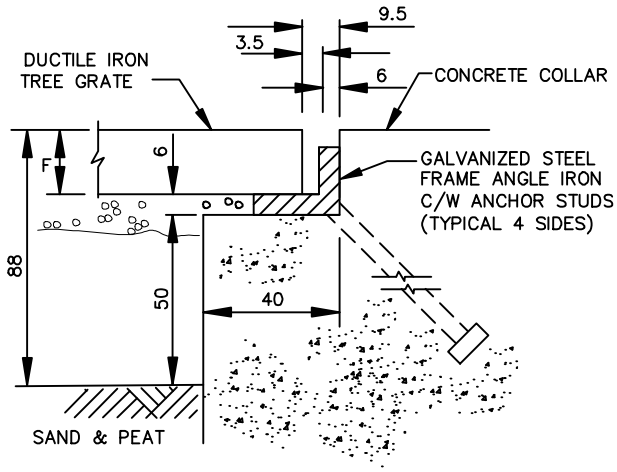
Richmond

CONCRETE TREE GRATE (WITH CONCRETE COLLAR)

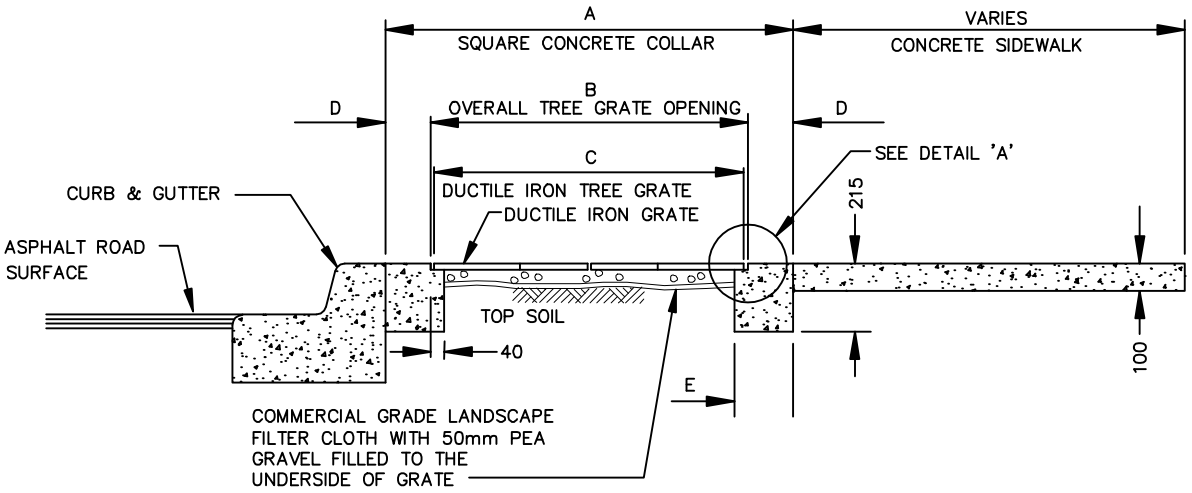
TECH. : F. CHOE	SCALE : NTS	DRAWING NUMBER : P–4–SD
DR. : F. CHOE	DATE : APR. 2010	
ENG. :	REV. : SEPT. 2010	SHEET No. : 1 OF 1



TREE GRATE DETAIL



DETAIL 'A'



SECTION A–A

NOTES:

1. OVERALL TREE GRATE COLLAR SHALL BE SQUARE.
2. DUCTILE IRON TREE GRATE COVERS SHALL BE NYE'S FOUNDRY OR APPROVED EQUAL. (NYE PAT. No. 798)
3. DUCTILE IRON TREE GRATES SHALL BE IN TWO HALF SECTIONS WITH A 406mm TREE OPENING AT CENTRE OF GRATE THAT IS EXPANDABLE. OUTER EDGE IS SUPPORTED BY A RECESSED CURB ANGLE IRON.
4. STEEL TRIM/FRAME OR CURB ANGLE IRON SHALL BE 25 x 25 x 6mm. COMPLETE WITH 13mmø ANCHOR BOLTS SPACED AT 300mm O/C CAST INTO PLACE, AND BE COMPATIBLE WITH GRATE.
5. FRAMES MUST BE POSITIONED BEFORE CONCRETE IS POURED AND MUST BE LEVELED TO PREVENT ANY ROCKING OF TREE GRATES.
6. OVERALL TREE GRATE DIMENSIONS AND THICKNESS SEE TABLE 'A'.
7. LEDGE AND OPENING DIMENSIONS TO BE CONSTRUCTED WITHIN 5mm±.
8. TREE GRATES AND CONSTRUCTION SHALL BE PEDESTRIAN FRIENDLY, SAFE AND TO WITHSTAND MAXIMUM PEDESTRIAN LOADING.

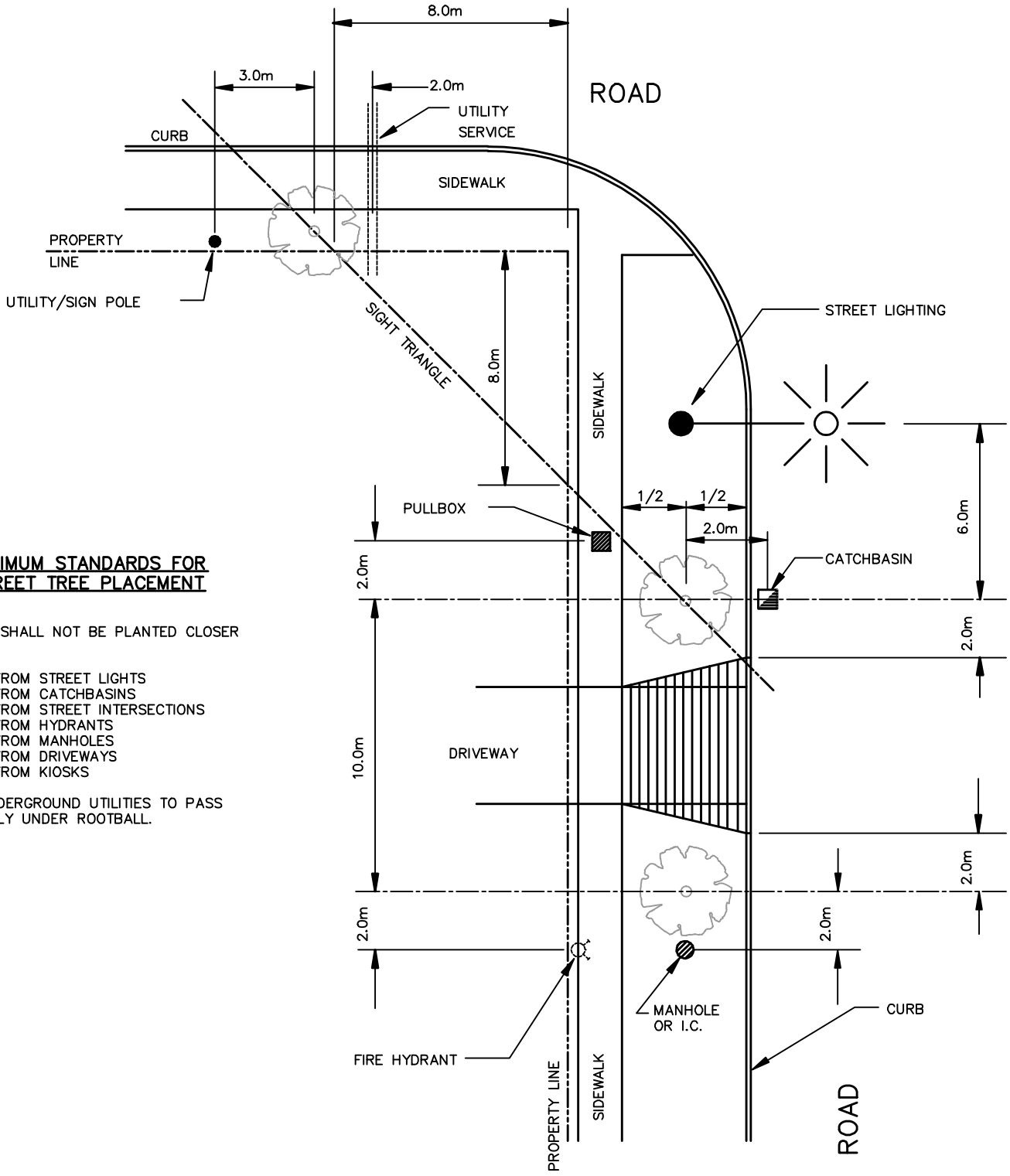
DESCRIPTION (COLLAR)	DIMENSION					
	A	B	C	D	E	F
1200mm SQUARE	1200	932	914	134	174	20
1500mm SQUARE	1500	1238	1219	131	171	32

TABLE 'A'

Richmond

DUCTILE IRON TREE GRATE (WITH CONCRETE COLLAR)

TECH. : F. CHOE	SCALE : NTS	DRAWING NUMBER : P–5–SD
DR. : F. CHOE	DATE : APR. 2010	
ENG. :	REV. : SEPT. 2010	SHEET No. : 1 OF 1



MINIMUM STANDARDS FOR STREET TREE PLACEMENT

TREES SHALL NOT BE PLANTED CLOSER THAN:

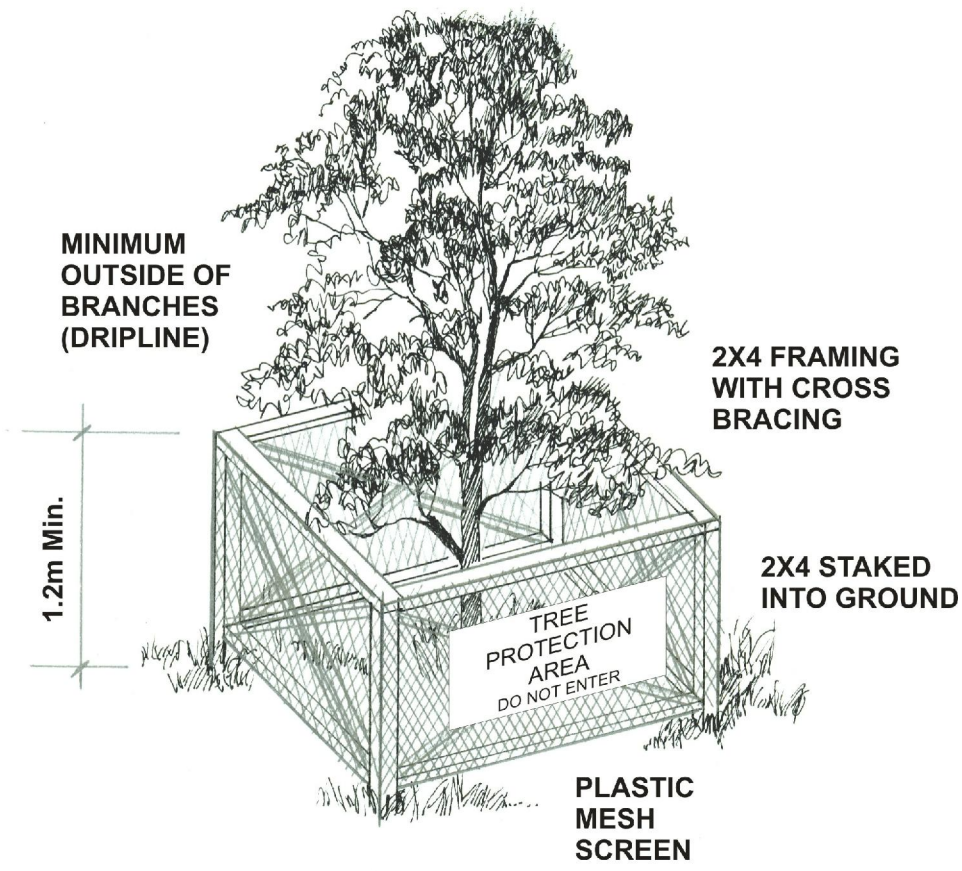
6.0m FROM STREET LIGHTS
2.0m FROM CATCHBASINS
8.0m FROM STREET INTERSECTIONS
2.0m FROM HYDRANTS
2.0m FROM MANHOLES
2.0m FROM DRIVEWAYS
2.0m FROM KIOSKS

NO UNDERGROUND UTILITIES TO PASS DIRECTLY UNDER ROOTBALL.

Richmond

TREE PLANTING DISTANCES

TECH. : F. CHOE	SCALE : NTS	DRAWING NUMBER : P-6-SD
DR. : F. CHOE	DATE : APR. 2010	
ENG. :	REV. : SEPT. 2010	SHEET No. : 1 OF 1



NOTE:

WOOD FRAME CONSTRUCTION STAKED INTO THE GROUND IS REQUIRED.
(METAL FRAMING DOES NOT MEET CITY STANDARDS).

TREE TRUNK DIAMETER			DISTANCE FROM TRUNK		TOTAL DIAMETER	
cm	inches	feet	m	feet	m	feet
20	8	0.6	**1.2**	3.9	**2.60**	8.5
25	10	0.8	**1.5**	4.9	**3.25**	10.7
30	12	1.0	**1.8**	5.9	**3.90**	12.8
35	14	1.2	**2.1**	6.9	**4.55**	14.9
40	16	1.3	**2.4**	7.9	**5.20**	17.1
45	18	1.5	**2.7**	8.9	**5.85**	19.2
50	20	1.7	**3.0**	9.8	**6.50**	21.3
55	22	1.8	**3.3**	10.8	**7.15**	23.5
60	24	2.0	**3.6**	11.8	**7.80**	29.6
75	26	2.5	**4.5**	14.8	**9.75**	32.0
90	32	3.0	**5.0**	16.4	**10.90**	35.8
100	36	3.3	**6.0**	19.7	**13.00**	42.7

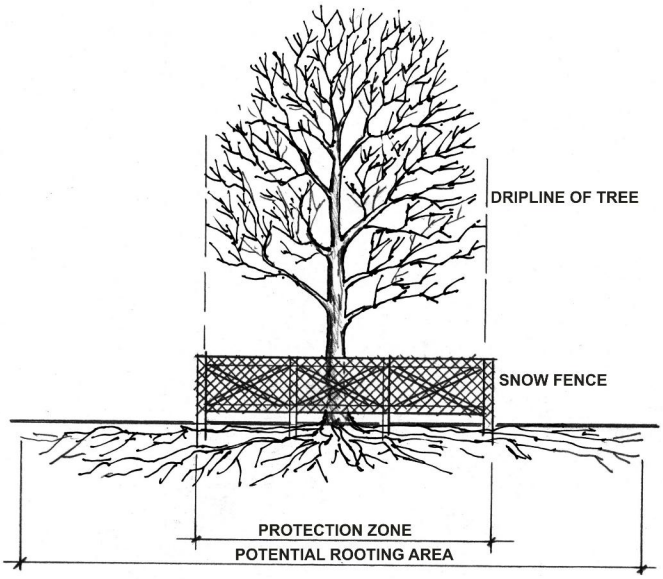
TREE PROTECTION TABLE

MINIMUM PROTECTION REQUIRED AROUND TREE

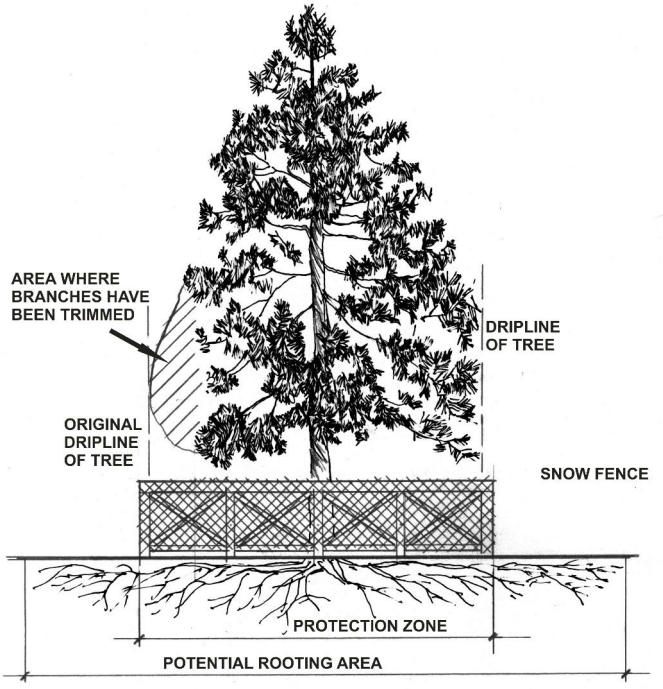
Richmond

TREE PROTECTION AND TREE PROTECTION DISTANCE TABLE

TECH. :	SCALE : NTS	DRAWING NUMBER : P-7a-SD
DR. :	DATE : DEC. 2010	
ENG. :	REV. :	SHEET No. : 1 OF 1



TYPICAL DRIP LINE ON A TREE

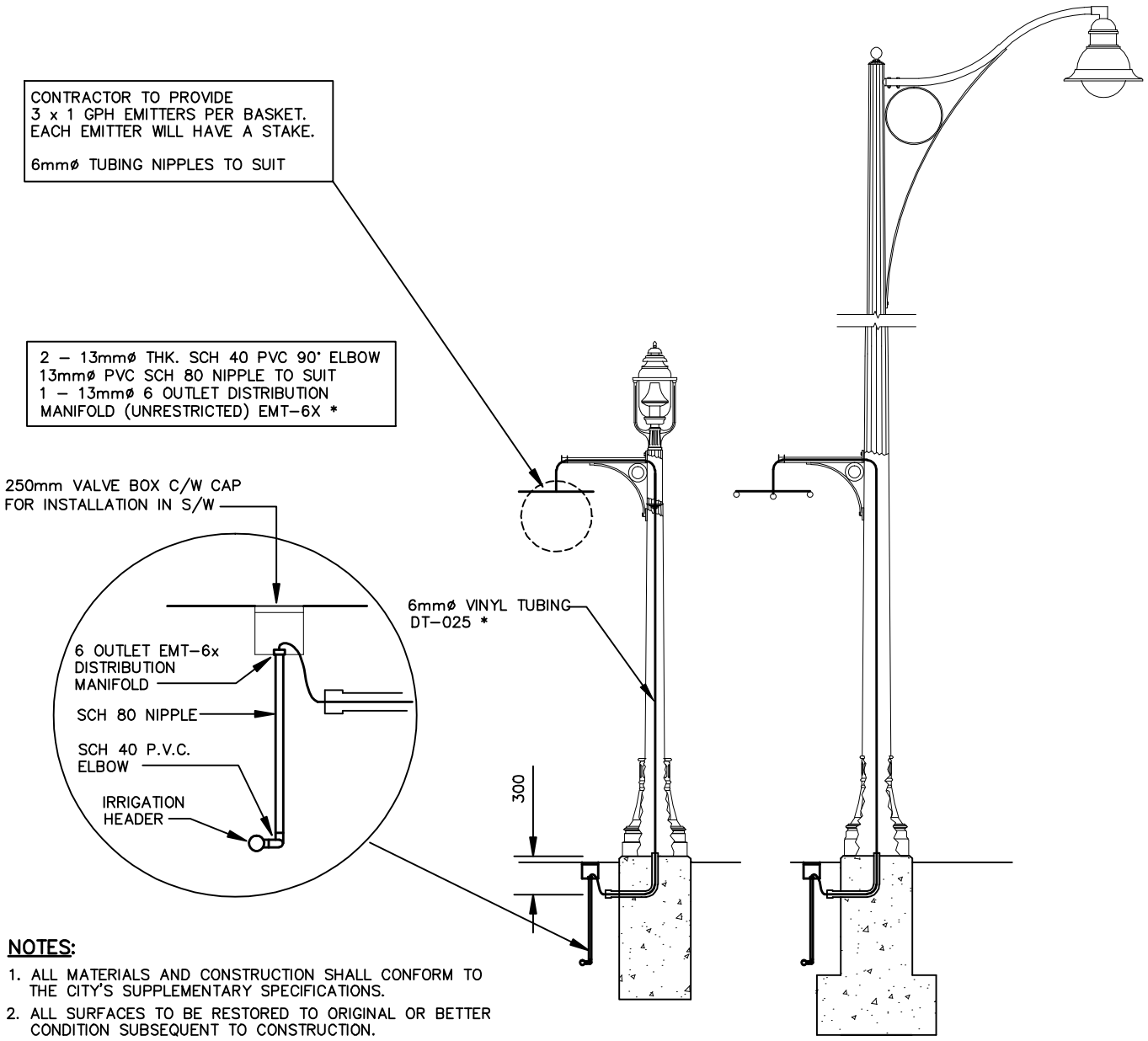


TYPICAL DRIP LINE ON A TREE WITH ONE SIDE PRUNED

Richmond

TYPICAL DRIPLINE OF A TREE

TECH. :	SCALE : NTS	DRAWING NUMBER : P-7b-SD
DR. :	DATE : DEC. 2010	
ENG. :	REV. :	SHEET No. : 1 OF 1



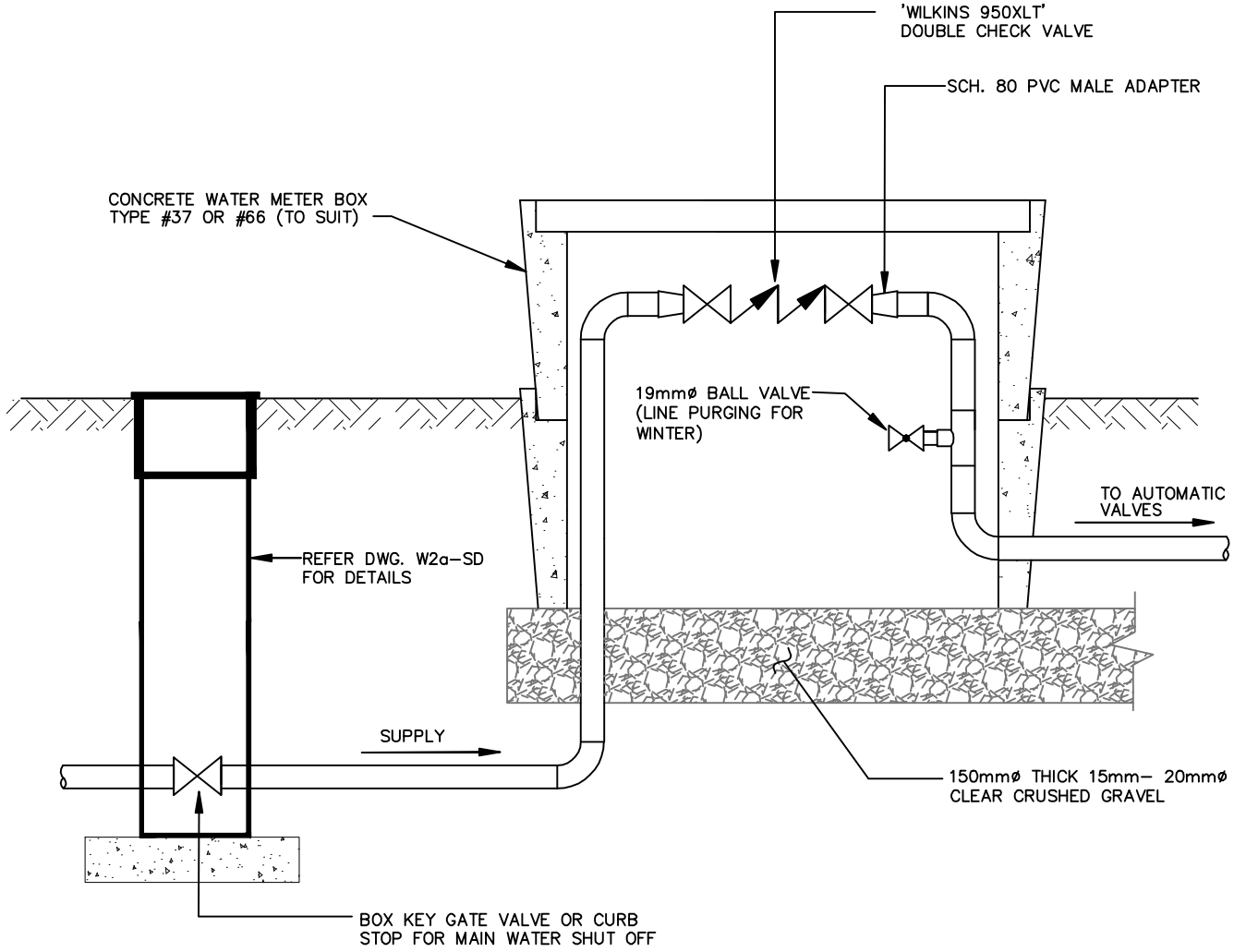
NOTES:

1. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO THE CITY'S SUPPLEMENTARY SPECIFICATIONS.
2. ALL SURFACES TO BE RESTORED TO ORIGINAL OR BETTER CONDITION SUBSEQUENT TO CONSTRUCTION.
3. ALL PIPE DOWNSTREAM OF THE DOUBLE CHECK VALVE TO BE CLASS 200 P.V.C PIPE AND FITTING TO BE SCHEDULE 40 P.V.C UNLESS OTHERWISE NOTED ON THE PLAN OR INSTALLED UNDER ROADWAYS OR CONCRETE
5. ALL PIPES INSTALLED FOR DRIP OR HANGING BASKET IRRIGATION COVERED BY CONCRETE OR ROADWAYS MUST BE SCHEDULE 40 P.V.C. PIPE
6. THE LAST POLE ON A DRIP STATION (END OF THE LINE) WILL REQUIRE A 20mm VALVE FOR WINTERIZING

Richmond

BASKET IRRIGATION DETAIL ON CITY CENTRE LIGHTING POLE

TECH. : F. CHOE	SCALE : NTS	DRAWING NUMBER : IR–B–1
DR. : F. CHOE	DATE : APR. 2010	
ENG. :	REV. : SEPT. 2010	SHEET No. : 1 OF 1



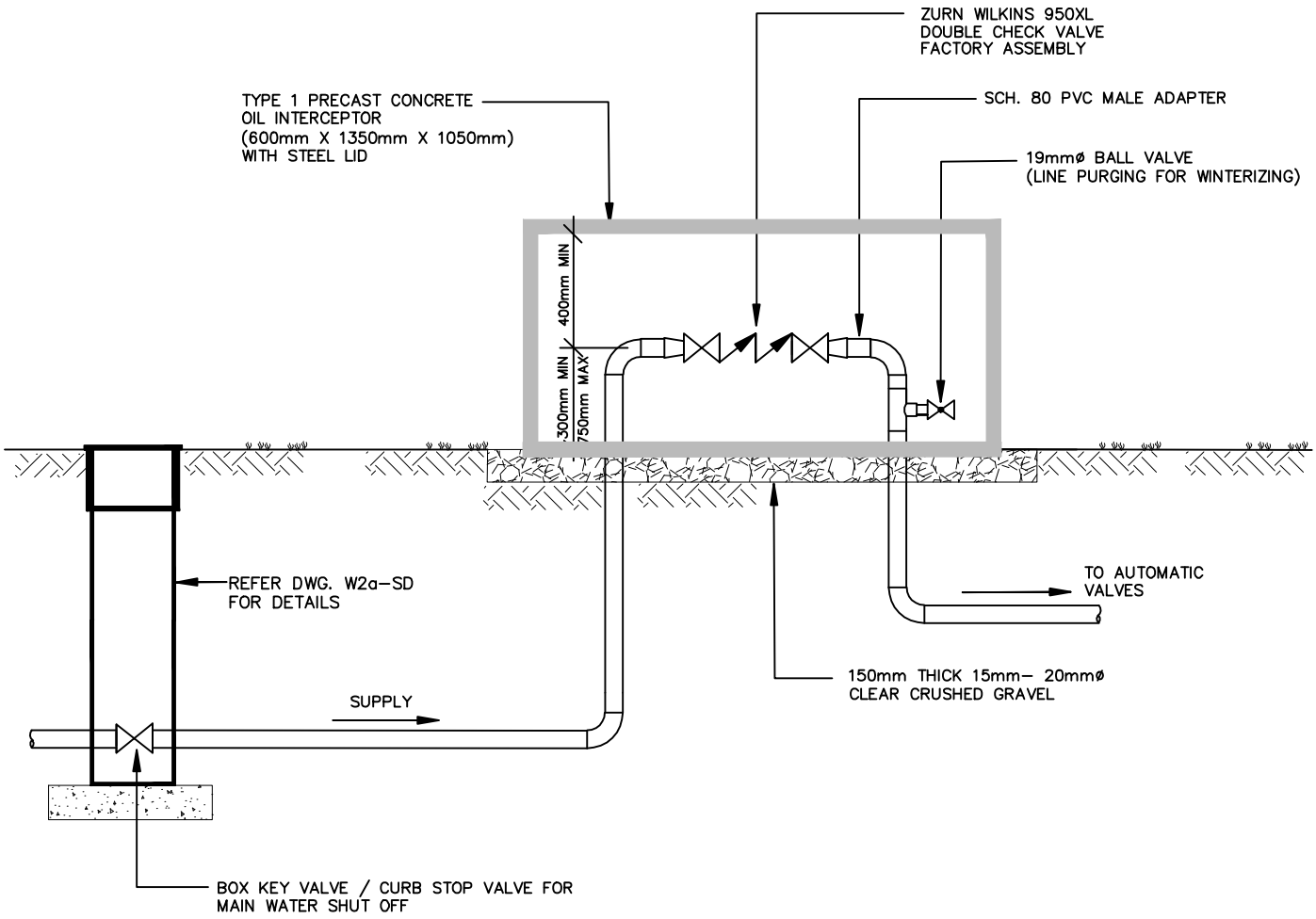
NOTES:

1. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO THE CITY'S SUPPLEMENTARY SPECIFICATIONS.
2. ALL SURFACES TO BE RESTORED TO ORIGINAL OR BETTER CONDITION SUBSEQUENT TO CONSTRUCTION.
3. ALL PIPE UPSTREAM OF THE DOUBLE CHECK VALVE SIZED 2" OR LESS TO BE CSA APPROVED SCHEDULE 40 P.V.C PIPE & THE FITTINGS SCHEDULE 80 P.V.C.
   ALL PIPE UPSTREAM OF THE DOUBLE CHECK VALVE SIZED 2½" OR GREATER TO BE CSA APPROVED SCHEDULE 80 P.V.C PIPE & THE FITTINGS SCHEDULE 80 P.V.C.
4. ALL PIPE DOWNSTREAM OF THE DOUBLE CHECK VALVE TO BE CLASS 200 P.V.C PIPE & THE FITTINGS SCHEDULE 40 P.V.C UNLESS OTHERWISE NOTED ON THE PLAN
5. DOUBLE CHECK VALVES(DCV) ARE TO BE FACTORY ASSEMBLED 'ZURN WILKINS 950XLT'.
6. ALL GLUE AND PRIMER MUST BE C.S.A. APPROVED

Richmond

ABOVE GROUND CHAMBER FOR DOUBLE CHECK VALVE ASSEMBLIES 38mm TO 19mm ($1\frac{1}{2}$" TO $\frac{3}{4}$")

TECH. : F. CHOE	SCALE : NTS	DRAWING NUMBER : IR–C–1
DR. : F. CHOE	DATE : APR. 2010	
ENG. :	REV. : SEPT. 2010	SHEET No. : 1 OF 1



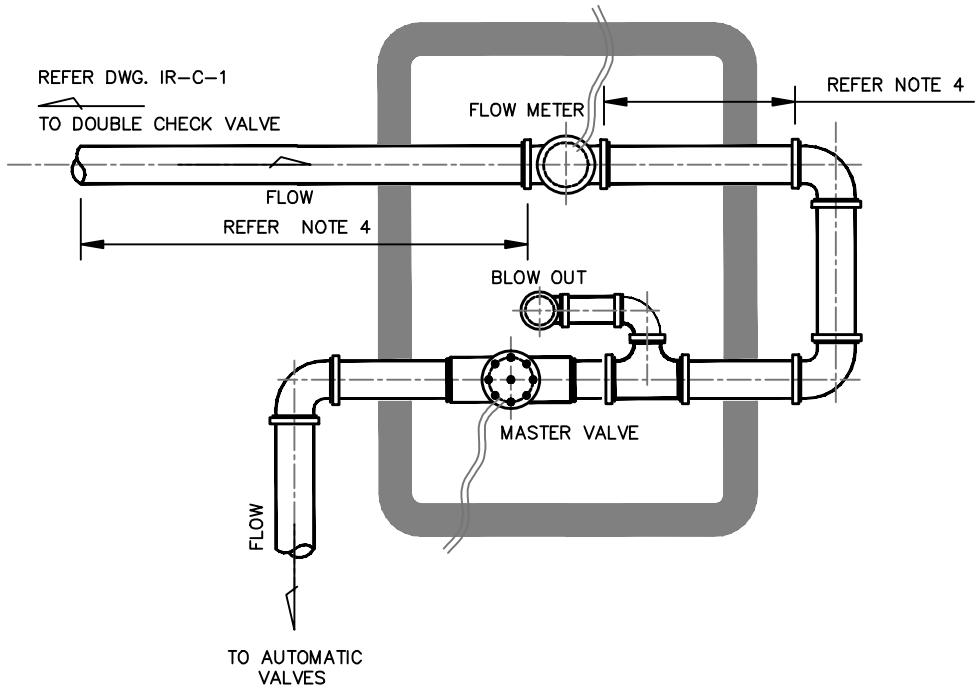
NOTES:

1. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO THE CITY'S SUPPLEMENTARY SPECIFICATIONS.
2. ALL SURFACES TO BE RESTORED TO ORIGINAL OR BETTER CONDITION SUBSEQUENT TO CONSTRUCTION.
3. ALL PIPE UPSTREAM OF THE DOUBLE CHECK VALVE SIZED 2" OR LESS TO BE CSA APPROVED SCHEDULE 40 P.V.C PIPE & THE FITTINGS SCHEDULE 80 P.V.C.
   ALL PIPE UPSTREAM OF THE DOUBLE CHECK VALVE SIZED 2½" OR GREATER TO BE CSA APPROVED SCHEDULE 80 P.V.C PIPE & THE FITTINGS SCHEDULE 80 P.V.C.
4. ALL PIPE DOWNSTREAM OF THE DOUBLE CHECK VALVE TO BE CLASS 200 P.V.C PIPE & THE FITTINGS SCHEDULE 40 P.V.C UNLESS OTHERWISE NOTED ON THE PLAN
5. DOUBLE CHECK VALVES(DCV) ARE TO BE FACTORY ASSEMBLED 'ZURN WILKINS 950XLT'.
6. ALL GLUE AND PRIMER MUST BE C.S.A. APPROVED

Richmond

ABOVE GROUND CHAMBER FOR DOUBLE CHECK VALVE ASSEMBLIES (50mmø OR GREATER)

TECH. : F. CHOE	SCALE : NTS	DRAWING NUMBER : IR-C-2
DR. : F. CHOE	DATE : APR. 2010	
ENG. :	REV. : SEPT. 2010	SHEET No. : 1 OF 1



PLAN

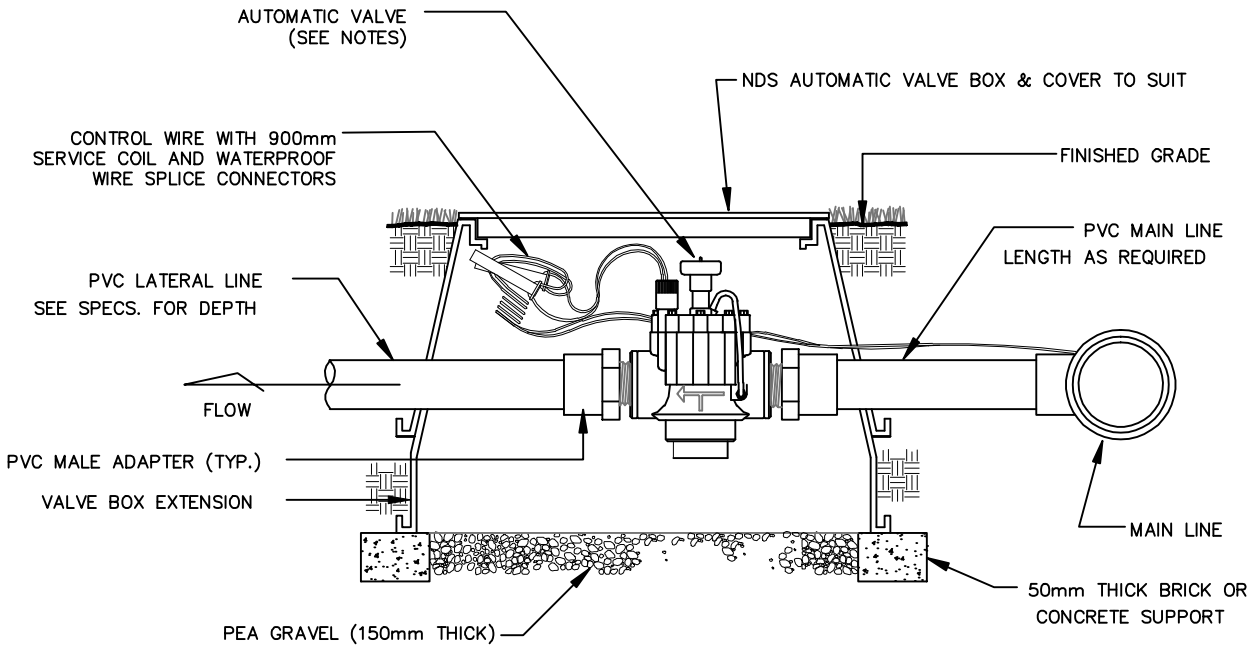
NOTES:

1. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO THE CITY'S SUPPLEMENTARY SPECIFICATIONS.
2. ALL SURFACE TO BE RESTORED TO ORIGINAL OR BETTER CONDITION SUBSEQUENT TO CONSTRUCTION.
3. FLOW METER MODEL IS DATA INDUSTRIAL SERIES 228PV PLASTIC TEE FLOW SENSOR
4. INSTALL ALONG THE PIPE WHERE TEN (10) PIPE DIAMETERS UPSTREAM AND FIVE (5) PIPE DIAMETERS DOWNSTREAM OF THE SENSOR PROVIDE NO FLOW RESTRICTIONS OR DISTURBANCE. PIPE BENDS, VALVES, OTHER FITTINGS, PIPE ENLARGEMENTS OR REDUCTIONS WILL NOT BE PRESENT IN THIS LENGTH OF PIPE. (EXAMPLE : 50mm (2") FLOW SENSOR REQUIRES A MINIMUM OF 500mm (20") BEFORE AND 250mm (10") AFTER SENSOR)
5. FLOW METER TO BE DISASSEMBLED (REMOVED) PRIOR TO GLUING PIPING.

Richmond

TYPICAL MASTER VALVE & FLOW METER DETAIL

TECH. : F. CHOE	SCALE : NTS	DRAWING NUMBER : IR–C–3
DR. : F. CHOE	DATE : APR. 2010	
ENG. :	REV. : SEPT. 2010	SHEET No. : 1 OF 1



SECTION/ELEVATION

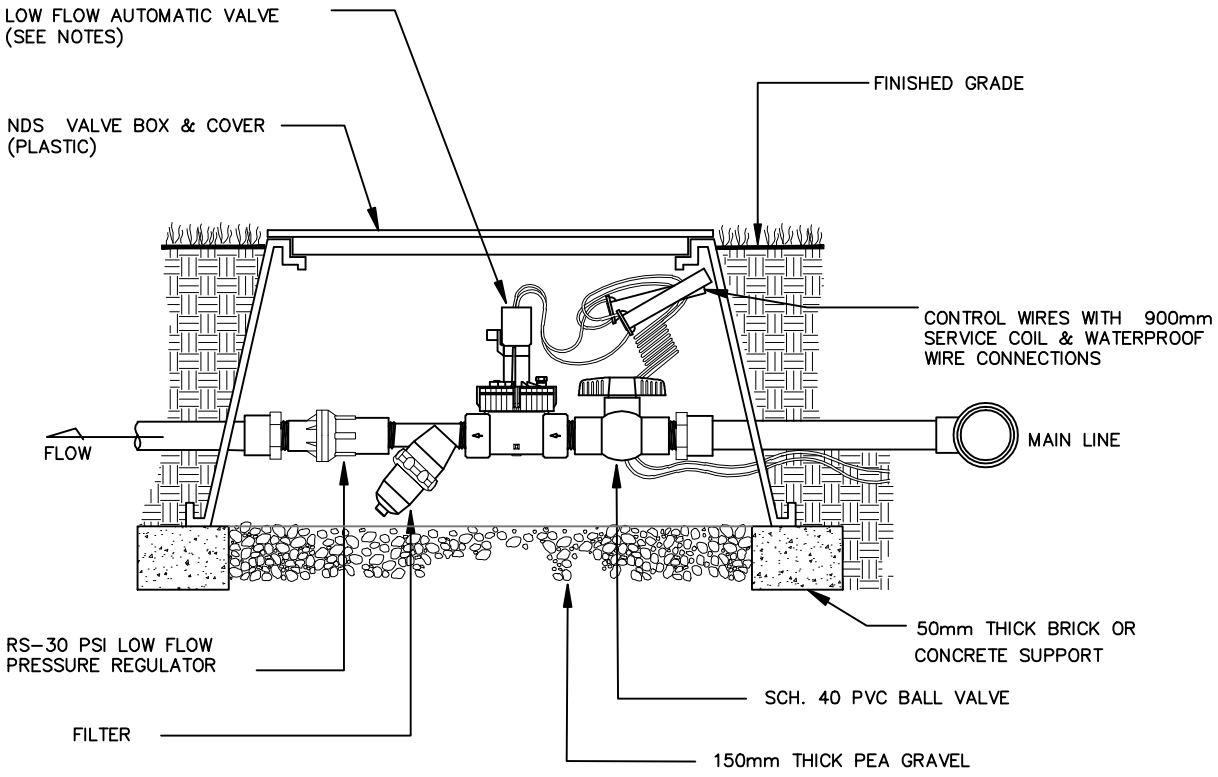
NOTES:

1. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO THE CITY'S SUPPLEMENTARY SPECIFICATIONS.
2. ALL SURFACES TO BE RESTORED TO ORIGINAL OR BETTER CONDITION SUBSEQUENT TO CONSTRUCTION.
3. 24 VAC SYSTEMS: 'RAIN BIRD PEB' OR 'TORO P220' VALVES.
4. 9 V BATTERY OPERATED SYSTEMS: 'RAIN BIRD 9 V' LATCHING SOLENOIDS WITH CITY APPROVED 'RAIN BIRD' VALVES.
5. LOW FLOW DRIP STATIONS USE 'RAIN BIRD XCZ–LF–100–PRF' OR 'TORO 53750' INLINE VALVE KIT.
6. ALL PIPE DOWNSTREAM OF THE DOUBLE CHECK VALVE TO BE CLASS 200 PVC AND FITTINGS TO BE SCHEDULE 40 PVC UNLESS OTHERWISE NOTED ON THE PLAN.

Richmond

AUTOMATIVE VALVE BOX DETAIL

TECH. : F. CHOE	SCALE : NTS	DRAWING NUMBER : IR–C–4
DR. : F. CHOE	DATE : APR. 2010	
ENG. :	REV. : SEPT. 2010	SHEET No. : 1 OF 1



SECTION/ELEVATION

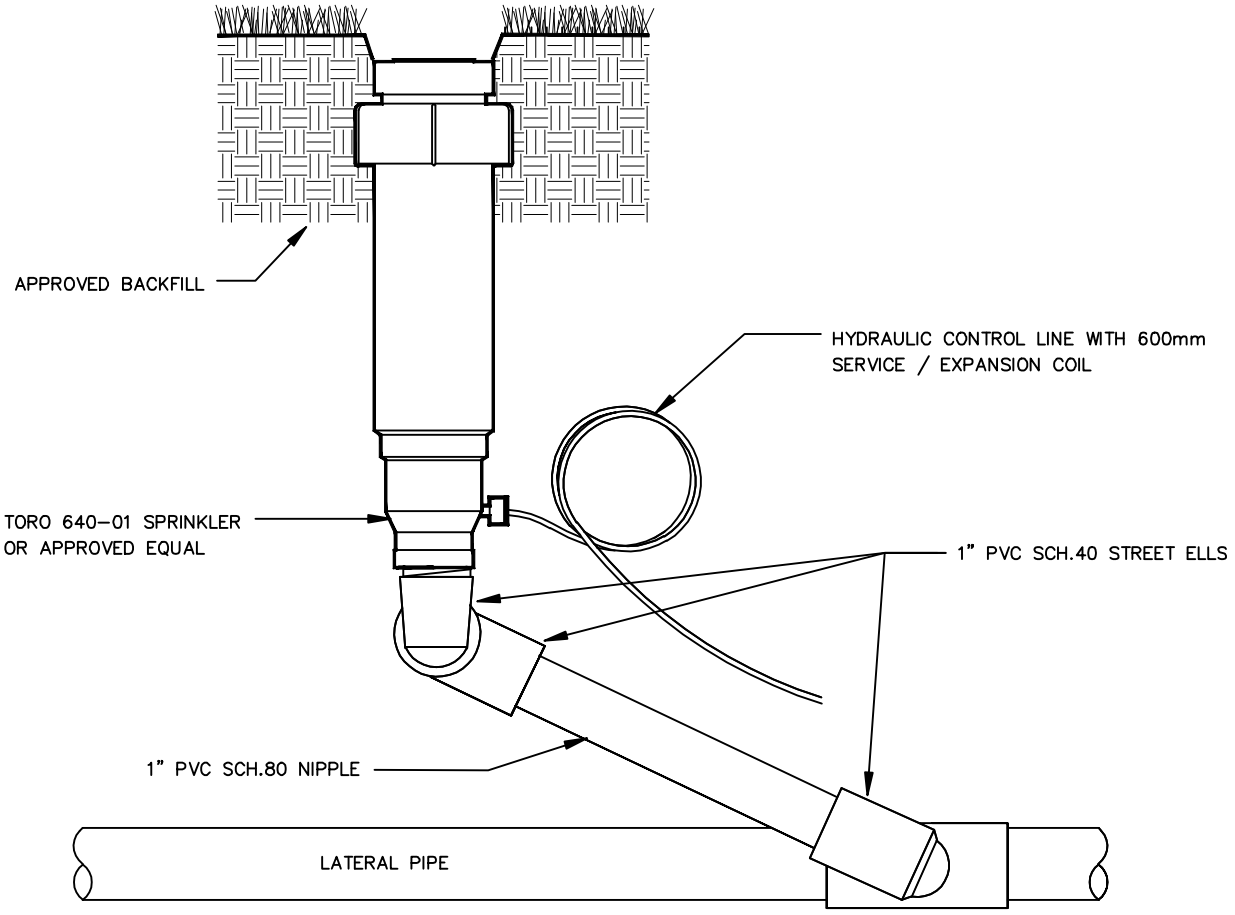
NOTES:

1. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO THE CITY'S SUPPLEMENTARY SPECIFICATIONS.
2. ALL SURFACES TO BE RESTORED TO ORIGINAL OR BETTER CONDITION SUBSEQUENT TO CONSTRUCTION.
3. 24 VAC SYSTEMS USE 'RAIN BIRD PEB' OR 'TORO P220' VALVES.
4. 9 V BATTERY OPERATED SYSTEMS USE 'RAIN BIRD 9 V' LATCHING SOLENOIDS WITH CITY APPROVED 'RAIN BIRD' VALVES.
5. LOW FLOW DRIP STATIONS USE 'RAIN BIRD XCZ-LF-100-PRF' OR 'TORO 53750' INLINE VALVE KIT.
6. ALL PIPE DOWNSTREAM OF THE DOUBLE CHECK VALVE TO BE CLASS 200 PVC AND FITTINGS TO BE SCHEDULE 40 PVC UNLESS OTHERWISE NOTED ON THE PLAN.

Richmond

LOW FLOW AUTOMATIC VALVE FILTER & PRESSURE REGULATOR DETAIL

TECH. : F. CHOE	SCALE : NTS	DRAWING NUMBER : IR-C-5
DR. : F. CHOE	DATE : APR. 2010	
ENG. :	REV. : SEPT. 2010	SHEET No. : 1 OF 1



SECTION/ELEVATION

NOTES:

1. ALL SURFACES TO BE RESTORED TO ORIGINAL OR BETTER CONDITION SUBSEQUENT TO CONSTRUCTION

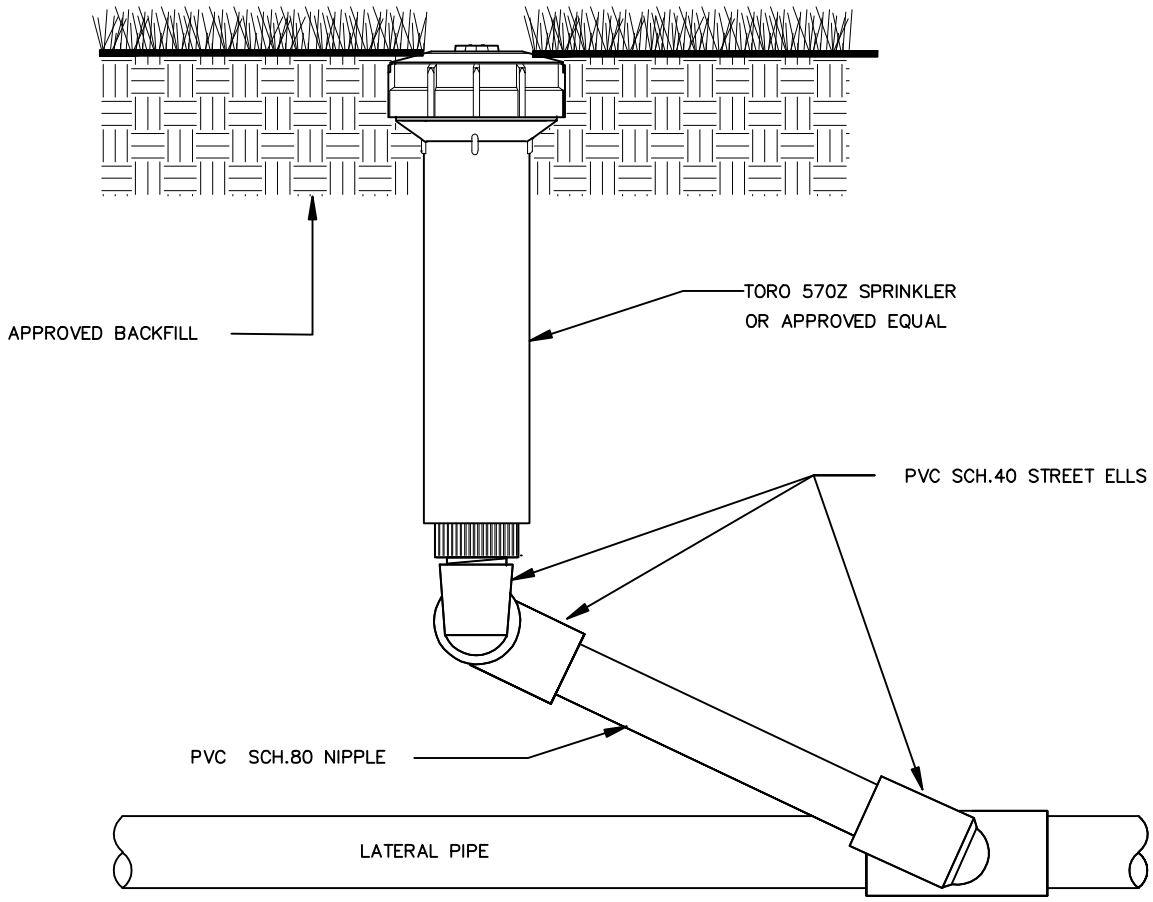
2. ALL PVC IRRIGATION PIPE TO BE CLASS 200 & FITTINGS TO BE SCHEDULE 40 PVC (ALL EXCEPT FOR SPRINKLER SWING JOINTS WHICH SHALL BE 3 SCHEDULE 40 STREET ELLS AND 1 SCHEDULE 80 NIPPLE)

3. ALL THREADED FITTINGS REQUIRE TEFLON

Richmond

SPORTS FIELD/LARGE PARK
HYDRAULIC ROTER SPRINKLER DETAIL

TECH. : F. CHOE	SCALE : NTS	DRAWING NUMBER : IR-S-1
DR. : F. CHOE	DATE : APR. 2010	
ENG. :	REV. : SEPT. 2010	SHEET No. : 1 OF 1



SECTION/ELEVATION

NOTES:

1. ALL SURFACES TO BE RESTORED TO ORIGINAL OR BETTER CONDITION SUBSEQUENT TO CONSTRUCTION

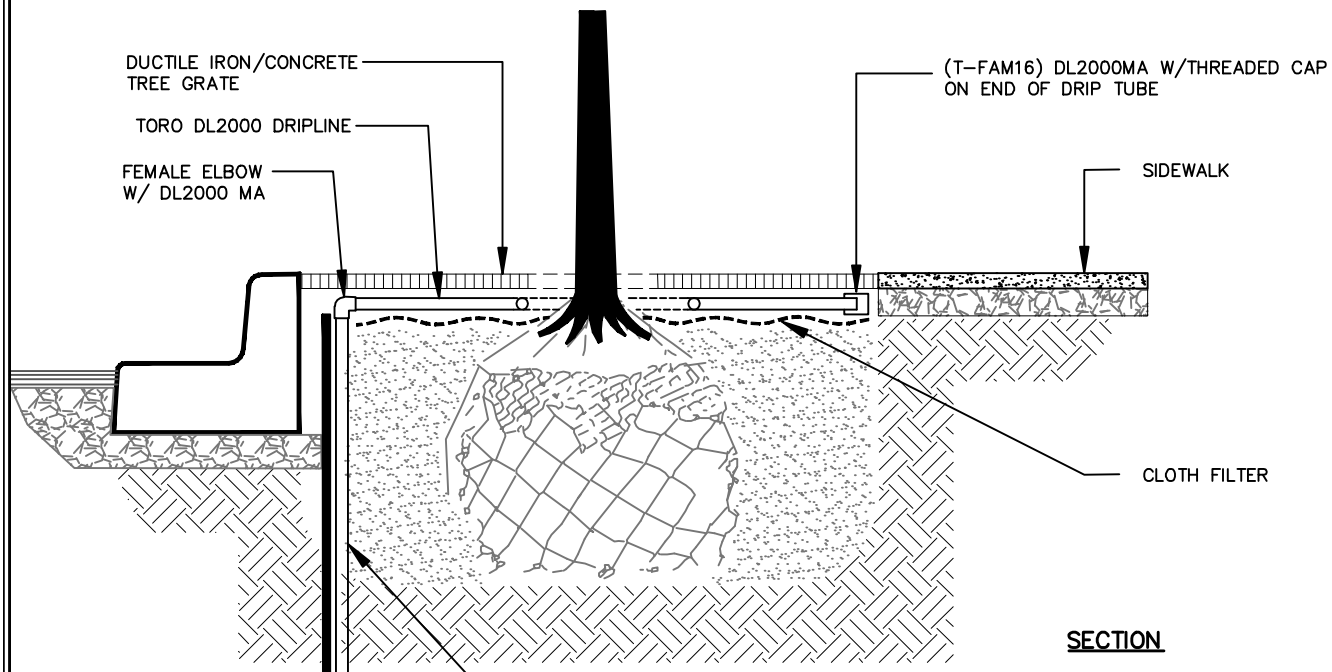
2. ALL PVC IRRIGATION PIPE TO BE CLASS 200 & FITTINGS TO BE SCHEDULE 40 PVC (ALL EXCEPT FOR SPRINKLER SWING JOINTS WHICH SHALL BE 3 SCHEDULE 40 STREET ELLS AND 1 SCHEDULE 80 NIPPLE)

3. ALL THREADED FITTINGS REQUIRE TEFLON

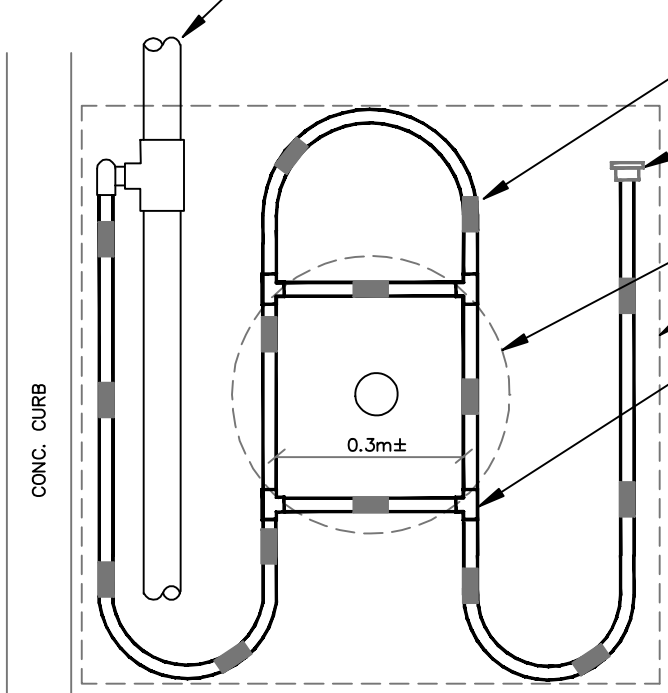
Richmond

MEDIAN/BOULEVARD IRRIGATION SPRINKLER DETAIL

TECH. : F. CHOE	SCALE : NTS	DRAWING NUMBER : IR-S-2
DR. : F. CHOE	DATE : APR. 2010	
ENG. :	REV. : SEPT. 2010	SHEET No. : 1 OF 1



SECTION



PLAN

NOTES:

1. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO THE CITY'S SUPPLEMENTARY SPECIFICATIONS.
2. ALL SURFACES TO BE RESTORED TO ORIGINAL OR BETTER CONDITION SUBSEQUENT TO CONSTRUCTION.
3. IF SPACE IS INADEQUATE TO INSTALL THE DL2000 DRIPLINE AS SHOWN (I.E. APPROVED PATTERN), AN ALTERNATIVE CONCENTRIC LOOP DESIGN MAY BE CONSIDERED BY PARKS.

Richmond

IRRIGATION DETAIL
BOULEVARD TREE WITH GRATE

TECH. : F. CHOE	SCALE : NTS	DRAWING NUMBER : IR-S-3
DR. : F. CHOE	DATE : APR. 2010	
ENG. :	REV. : SEPT. 2010	SHEET No. : 1 OF 1