

CITY OF MERRITT
BYLAW NO.
1187, 1480 & 1523

CITY OF MERRITT
SUBDIVISION AND DEVELOPMENT
SERVICING BYLAW NO. 1187 (1987)

VOLUME 1

(CONSOLIDATED FOR CONVENIENCE ONLY)

Repealed

CITY OF MERRITT
SUBDIVISION AND DEVELOPMENT
SERVICING BYLAW NO. 1187, 1987

Table of Contents

SECTION 1	TITLE	1
SECTION 2	INTERPRETATION	2
SECTION 3	CONDITIONS OF SUBDIVISION	6
SECTION 4	PROVISION OF SERVICING IN SUBDIVISIONS	7
SECTION 5	SERVICING REQUIREMENTS FOR SUBDIVISIONS	9
SECTION 6	SERVICING REQUIREMENTS FOR SUBDIVISIONS UNDER THE CONDOMINIUM ACT OR FOR DEVELOPMENT WITH SUBDIVISIONS	11
SECTION 7	SERVICING REQUIREMENTS FOR HIGHWAYS ABUTTING A SITE BEING SUBDIVIDED OR DEVELOPED	13
SECTION 8	ENACTMENT	14
SECTION 9	ADMINISTRATION AND ENFORCEMENT	15
SCHEDULE A	Service levels	
SCHEDULE B	Highways	
SCHEDULE C	Water Distribution System	
SCHEDULE D	Sanitary Sewer System	
SCHEDULE E	Storm Drainage	
SCHEDULE F	Design and Construction Manual	
SCHEDULE G	General Service Installation Requirements	
SCHEDULE H	Performance Agreement	

CITY OF MERRITT
BYLAW NO.
1187, 1480 & 1523

CITY OF MERRITT
SUBDIVISION AND DEVELOPMENT
SERVICING BYLAW NO. 1187, 1987

Being a bylaw of the City of Merritt to establish servicing requirements for subdivisions and developments within the City of Merritt.

WHEREAS pursuant to Division 7 of Part 29 of the Municipal Act a local government may, by bylaw, regulate and require the provision of works and services in respect of the subdivision or development of land;

NOW THEREFORE the Council of the City of Merritt, in open meeting assembled, ENACTS as follows:

Repealed

CITY OF MERRITT
BYLAW NO.
1187, 1480 & 1523

SECTION 1 - TITLE

This bylaw may be cited as the City of Merritt Subdivision and Development Servicing Bylaw No. 1187.

Repealed

(1.)

SECTION 2 - INTERPRETATION

All words shall have their normal or common meaning except where this is changed, modified or expanded by the definitions set forth in this section. In this Bylaw:

APPLICANT means a person applying for the approval of a subdivision, whether as the owner of the property proposed to be subdivided or as agent of the owner.

APPROVAL means the Approving Officer affixing his signature to the subdivision plan pursuant to the Land Title Act.

APPROVING OFFICER means the person appointed by Council to exercise the jurisdiction conferred on him by the Land Title Act.

BOULEVARD means that portion of a highway between the curb lines or the lateral boundary strips or islands, but does not include curbs, sidewalks, ditches or driveways.

BUILDING REGULATIONS means regulations contained in the Building Bylaw of the City of Merritt.

COMMUNITY SANITARY SEWER SYSTEM means a system of sewerage or sewage disposal works which is owned, operated and maintained by the municipality.

COMMUNITY WATER SYSTEM means a system of waterworks which is owned, operated and maintained by the municipality.

COUNCIL means the elected Council of the City of Merritt.

CUL-DE-SAC means a highway with only one point of intersection with another highway and which terminates in a vehicle turning area, referred to as the "terminus".

DESIGN AND CONSTRUCTION MANUAL means the current City of Merritt standards and specifications for design and construction of subdivision services. This Manual comprises Schedule "F" of this Bylaw.

DEVELOPMENT means affecting a change in the use of land and in the nature of the use of land, including but not limited to the subdivision of land, and the building or placement of structures on land.

FRONTAGE means that length of a parcel boundary which immediately abuts a highway other than a lane or a walkway.

(2.)

HIGHWAY means a public street, road, walkway, bridge, thoroughfare and any other public way.

LANE means a highway more than 3 metres but not greater than 10 metres in width, intended to provide secondary access to parcels of land. A lane is not a partial highway.

LOT means the smallest unit into which land is subdivided as shown on the records of the Land Title Office.

LOT LINE, FRONT means the boundary line of the lot and the street on which the lot abuts. In the case of a corner lot where two lot lines abut streets, the lot line of the shortest length shall be the front lot line. In the case of a through lot, the lot line abutting the two parallel or approximately parallel streets shall both be considered as front lot lines.

LOT LINE SIDE means a lot line marking the boundary between two lots, or between a lot and a lane, or between a lot and public street in the case of a corner lot, of which one or both ends intersect a front lot line.

LOT DEPTH means the shortest horizontal distance between the front and rear lot lines.

LOT WIDTH means the mean horizontal distance between side lot lines measured at right angles to the lot depth.

MEDICAL HEALTH OFFICER means the Medical Health Officer appointed under the Health Act for the territorial jurisdiction of the area in which a subdivision is located.

OWNER means a person registered in the books of the Land Title Office as owner of lot, whether entitled to it in his own right or in a representative capacity or otherwise, and includes the registered holder of the last registered Agreement for Sale and Purchase.

PANHANDLE PARCEL means any parcel which is serviced and gains highway frontage through the use of a narrow strip of land which is an integral part of the parcel (hereinafter called the "Access Strip").

PARCEL means any lot, block or other area in which land is held or subdivided but does not include a highway or portion thereof.

POTABLE WATER means water which is approved for drinking purposes by the Medical Health Officer.

PROFESSIONAL ENGINEER means a person who is registered or duly licensed as such to practice within the Province of British Columbia, under the provisions of the Engineering Profession Act R.S.B.C.

(.3.)

RIGHT-OF-WAY includes land or any interest in lane acquired for the purpose of:

- a) public rights of passage with or without vehicles; or
- b) constructing, maintaining or operating any railway;
- c) erecting and maintaining any pole-line;
- d) laying, placing and maintaining drains, ditches, pipes, transmission lines, or wires for the conveyance, transmission or transportation of water, electric power, communication, or for the disposal of sewage.
- e) the operation and maintenance of vehicular traffic and as registered as a public right-of-way.

ROADWAY means the portion of the highway that is improved, designed or ordinarily used for vehicular traffic.

SERVICE LEVEL means the standard of services required for development of subdivisions.

STREETS include all roads, squares, thoroughfares, and other public ways, but not to include lanes or trails.

STREET, ARTERIAL means a street with a high design volume with a significant portion of its users having their origin and designation outside of the subdivision area.

STREET, COLLECTOR means a street which carried traffic from local streets to arterial streets and includes the principal entrance streets for circulation of traffic within such a subdivision.

STREET, LOCAL means a street designed to permit low speed travel within a neighbourhood and direct access to adjacent properties.

STREET, INDUSTRIAL/COMMERCIAL means a street designed to permit low speed travel within an industrial or commercial designated area and allow direct access to adjacent industrial and commercial properties.

SUBDIVISION means the division of land into two or more parcels, and subdivision shall also be deemed to include a consolidation of two or more parcels into a single parcel.

CITY means the City of Merritt, its Council or a specific section of Merritt as the context may require.

CITY ENGINEER means the person or persons designated from time to time by the City Council to fulfill the duties assigned by this Bylaw.

WATERCOURSE means any natural drainage course or source of water, whether usually containing water or not, includes any lake, river, creek, spring, ravine, swamp, gulch, or source of groundwater.

ZONE means a land use designation created by the Zoning Bylaw of the City of Merritt and all amendments thereto.

(4./5.)

SECTION 3 - CONDITIONS OF SUBDIVISION

1. The subdivision of land in the City of Merritt shall be approved only in compliance with the provisions of this Bylaw.
2. No subdivision shall be approved which:
 - a) is not suited to the configuration of the land being subdivided; or
 - b) is not suited to the use to which it is intended; or
 - c) will make impractical the future subdivision of the land within the proposed subdivision or of any adjacent land.
3. Area, Shape and Dimensions of Lots
 - a) No Subdivision shall be created in any zone so that any lot created by the subdivision has an area in square metres or hectares or a width in metres less than those set out for the zone in which it is located as set out in the City of Merritt Zoning Bylaw No.1157, as amended or replaced from time to time.
 - b) The Approving Officer may exempt a person proposing to subdivide land from any prescribed minimum frontage, or from the limitation provided under Subsection (1) of Section 994 of the Municipal Act.
 - c) The side lines of parcels to be created by the subdivision shall be as close as practical at right angles or radial to street lines, and the Approving Officer shall ensure that the parcels to be created are logical in shape and dimension for the use intended.

SECTION 4 - PROVISION OF SERVICES IN SUBDIVISIONS

Service Levels

1. All subdivisions shall be provided with services as prescribed in Schedule "A" of this Bylaw, and the service levels may be different for different areas of the City in accordance with the provisions of Schedule "A" of this Bylaw.

Subdivisions Where Services Requirements May be Waived

2. Notwithstanding subsection (1), the servicing requirements prescribed in Schedule "A" of this Bylaw may be waived where the parcel created is to be used solely for the unattended equipment necessary for the operation of:
 - a) a community water system;
 - b) a community sewer system;
 - c) a community gas distribution system;
 - d) a community radio or television receiving antenna;
 - e) a radio or television broadcasting antenna;
 - f) a telecommunication relay station;
 - g) an automatic telephone exchange;
 - h) an air or marine navigational aid;
 - i) electrical substations or generating stations; or
 - j) any other similar public service or quasi-public service facility or utility.

Cost of Services

3. Unless otherwise provided in this Bylaw, all works and services required in this Bylaw shall be constructed and installed at the expense of the owner of the land being subdivided.

Excess or Extended Services

4. The City may require that the owner of land that is subdivided or developed provide excess or extended services to provide access to or serve land other than the land being subdivided or developed pursuant to the provisions of Section 990 of the Municipal Act.

Security Agreement for Subdivision Approval
Before Completion of Works and Services

5. All works and services required to be constructed and installed at the expense of the owner of the land being subdivided shall be constructed and installed in accordance with the provisions of this Bylaw before the Approving Officer approves of the subdivision, unless the owner of the land enters into an agreement with the City as provided for in Schedule "H" of this Bylaw to construct and install the required works and services by the date specified in the agreement or forfeit to the City the amount secured by the security bond.

Maintenance Bond

6. Where the owner of land is required to construct and install works and services in accordance with the provisions of this Bylaw, the owner shall provide the City with a maintenance bond as prescribed in Schedule "F" - Design and Construction Manual, of this Bylaw.

Repealed

Section 5 - SERVICING REQUIREMENTS FOR SUBDIVISIONS

Highways

1. All highways created by subdivision plan, including widening of existing highways, shall:
 - a) comply with the dimension, location, alignment and gradient requirements set out in Schedule "B" and Schedule "F" of this Bylaw, and
 - b) be cleared, graded and surfaced in accordance with the standards set out in Schedule "B" and Schedule "F" of this Bylaw.

Sidewalks, Street Lighting and Underground Wiring

2. In subdivisions where highways are created, sidewalks, street lighting and underground wiring shall be provided as required in Schedule "A" of this Bylaw and constructed in accordance with the standards set out in Schedule "B" and Schedule "F".

Water Distribution System

3. In subdivisions where parcels are created, each parcel shall be supplied with a complete water distribution system connected to the community water system, and all system components shall be installed in accordance with the standards set out in Schedule "C" and Schedule "F" of this Bylaw.

Sanitary Sewer

4. In subdivisions where parcels are created each parcel shall be provided with a complete sewage collection system connected to the community sanitary sewer system, and all system components shall be installed in accordance with the standards set out in Schedule "D" and Schedule "F" of this Bylaw.

Drainage System

5. In subdivision where parcels are created, each parcel shall be provided with a complete and fully operative drainage system as required in Schedule "A" of this Bylaw, and constructed in accordance with the standards set out in Schedule "E" and Schedule "F" of this Bylaw.

Design Standards

6. Detailed standards, specifications, and standard drawings pertaining to the design, construction and installation of works and services required in this Bylaw are set out in the Design and Construction Manual which comprises Schedule "F" of this Bylaw. (9.10.)

SECTION 6 - SERVICING REQUIREMENTS FOR SUBDIVISIONS UNDER THE
CONDOMINIUM ACT OR FOR DEVELOPMENT WITH NO SUBDIVISION.

As a condition of the issuance of a building permit on the site being developed, the City of Merritt may require that the owner of the land being developed shall provide works and services which are directly attributable to the development in accordance with a site serving plan prepared by the owner and approved by the City Engineer.

1. Domestic water

The development shall be provided with domestic water service, with connection to the community water system in accordance with the site servicing plan.

2. Sanitary Sewer

For areas delineated in Schedule "A" where community sanitary sewer service is required, the development shall be provided with sanitary sewer service with connection to the community sanitary sewer system in accordance with the site servicing plan.

3. Access Roads and Parking

- a) For developments where on-site parking and/or on-site loading facilities are to be provided, the development shall be provided with vehicle access from a highway or highways in accordance with the site servicing plan.

For a development site fronting on a Controlled Access Highway designated pursuant to the Highway Act, the proposed method of providing access to the site shall also be subject to approval by the Ministry of Transportation and Highways.

- b) All access roads, on-site parking areas and on-site loading areas shall be surfaced by asphaltic concrete paving.

4. Site Drainage

The development shall be provided with site drainage collection and disposal facilities in accordance with the site servicing plan. The drainage component of the site servicing plan shall illustrate the following:

1. site grading - showing existing and post-development contours;
2. method of on-site collection;
3. method of disposal subject to approval by the City of Merritt and, if appropriate, Ministries having jurisdiction such as Highways and Environment may by:
 - connect to municipal storm sewer system, or
 - discharge to surface drainage course, or
 - discharge to natural water course, or
 - on-site disposal to dry wells,

5. Hydro, Telephone and Cablevision Wiring

- a) For developments in areas delineated in Schedule "A" where underground wiring is required, all hydro, telephone and cablevision wiring shall be installed underground.
- b) For developments in areas delineated in Schedule "A" where overhead wiring is permitted, hydro, telephone, and cablevision wiring may be installed overhead or underground.

SECTION 7 - SERVICING REQUIREMENTS FOR HIGHWAYS ABUTTING A SITE BEING SUBDIVIDED OR DEVELOPED

As a condition of the approval of a subdivision or the issuance of a building permit, the City of Merritt may require that the owner of the land being developed provide works and services directly attributable to the development on that portion of a highway immediately adjacent to the site being subdivided or developed, up to the cantor line of the highway, including:

1. Highway improvements - clearing, grading and surfacing, in accordance with the standards set out in Schedule "B" and Schedule "F" of this bylaw:
2. Water System Improvements - construction of water distribution system components in accordance with the standards set out in Schedule "C" and Schedule "F" of this bylaw;
3. Sewer System Improvements - in areas delineated in Schedule "A" where connection to the community sanitary sewer system is required, construction of sewer collection system components in accordance with the standards set out in Schedule "D" and Schedule "F" of this bylaw:
4. Drainage System Improvements - provision of drainage facilities as required in Schedule "A", and construction of specific drainage system improvements in accordance with the standards set out in Schedule "E" and Schedule "F" of this bylaw.

The required works and services on a highway immediately adjacent the site being subdivided or developed shall not include specific works or services that are included in the calculations used to determine the amount of a development cost charge, unless the owner agrees to provide the works or services, in which case the calculation of the development cost will be subject to Section 983(8) of the Municipal Act.

SECTION 8 - ENACTMENT

Repeal of Previous Bylaw

1. Subdivision Control Bylaw No.920, and all amendments thereto, is hereby repealed.

Bylaw Adoption

2. This Bylaw shall take effect upon adoption by the Council of the City of Merritt.

Read a FIRST time this 14th day of April, 1987.

Read a SECOND time this 12th day of May, 1987.

Read a THIRD time this 25th day of August, 1987.

RECONSIDERED AND FINALLY ADOPTED THIS 8th day of September, 1987.

Original Bylaw Signed by:

H. KROEKER

Mayor

L. DEN BOER

Clerk

Certified to be a true and correct
copy of Bylaw No.1187 cited as
Subdivision and Development Servicing
Bylaw No. 1187,1987.

Dated this ___ day of _____, 1987.

Clerk

(14.)

City of Merritt Subdivision and Development
Servicing Bylaw No.1187

Schedule "A" - Service Levels

Within the City of Merritt, different servicing levels will be required for new subdivisions in different areas of the City. Two service levels have been established, and the area to which each service level is to be applied is delineated in Map 1 which forms part of Schedule "A".

Service Level 1

1. The following services shall be provided in all new subdivisions in areas delineated in Map 1 as "Service Level 1".
 - 1.1 Standard 1 Highways as defined in Schedule "B", including:
 - .1 asphaltic concrete paving on roadways, walkways and lanes;
 - .2 curb and gutter;
 - .3 sidewalks as required in Schedule "B";
 - .4 underground hydro, telephone, and cablevision;
 - .5 ornamental street lighting.
 - 1.2 Water distribution system and connection to community water system.
 - 1.3 Sanitary sewer collection system and connection to community sanitary sewer system.
 - 1.4 Storm sewer drainage into existing storm sewer trunk mains or where the City proposes to construct new sewer mains make provisions for future connection. Design storm water drainage in accordance with a drainage plan required in Schedule "F".

Service Level 2

2. The following services shall be provided in all new subdivisions in areas delineated in Map 1 as "Service Level 2".
 - 2.1 The standard of Highway to be constructed depends upon the following criteria:
 - a) Where existing City storm sewer trunk mains are within reasonable proximity of the proposed development, roadways shall be constructed to Highway Standard 1 as defined in Schedule "B" including curb, gutter, sidewalks and a storm sewer drainage system. The storm water drainage system shall be designed in accordance with Schedule "E". "Reasonable Proximity" shall be defined for each subdivision application by the Approving Officer. (A.1)

SECTION 9 - ADMINISTRATION AND ENFORCEMENT

Application Fee

1. An applicant for subdivision approval shall submit with the application a fee as set out in City of Merritt Fees Bylaw No.1160 and amendments thereto.

Authorization to Enter on Lands Being Subdivided

2. The Approving Officer or City Engineer, being officers of the City of Merritt, are authorized to enter, at all reasonable times, upon the lands for which application to subdivide has been made, in order to ascertain whether the provisions of this Bylaw are being adhered to.

Penalty

3. Any persons who violates any of the provisions of this Bylaw shall, on summary conviction, be liable to a penalty not exceeding \$2,000.00 plus the cost of prosecution.

Severability

4. If any section, subsection, sentence, clause or phrase of this Bylaw is for any reason deemed to be invalid by the decision of any court of competent jurisdiction, the invalid portion shall be severed and the decision that it is invalid shall not affect the validity of the remainder of this Bylaw.

Schedules Form Part of Bylaw

5. Schedules "A" through "H" are attached to and form part of this Bylaw.

- b) Where no existing City storm sewer trunk mains are within reasonable proximity of the proposed development, roadways shall be constructed to Highway Standard 2 as defined in Schedule "B".

A surface storm water drainage system for the proposed development shall be designed in accordance with Schedule "E".

- 2.2. Under each development standard outlined in 2.1 above, the following roadway related works shall be constructed:
 - .1 Asphaltic concrete paving on roadways, walkways and lanes.
 - .2 Overhead wiring for hydro, telephone and cablevision.
 - .3 Street lighting.
- 2.3 Water distribution system and connection to community water system for domestic purposes; for industrial water usage, the owner may be required to provide an alternate source of supply.
- 2.4 Sanitary sewer collection system and connection to community sanitary sewer system for domestic purposes; for sewage generated by industrial use, the owner may be required to provide alternate treatment and disposal facilities.

Reserve

- 3. In Map 1, parts of the municipality may be designated as "Reserve". Reserve areas have a zoning description which does not permit the subdivision of land prior to a Zoning Bylaw amendment. The service level for each Reserve area will be established at the time of rezoning.

City of Merritt Subdivision and Development
Servicing Bylaw No. 1187

Schedule "B" - Highways

Schedule "B" consists of standards for the dimensions, locations, alignment, and gradient of highways and standards for the design, construction and installation of works relating to roadways, sidewalks, boulevards, street lighting and underground wiring.

Highway Classifications

1. For the purpose of establishing standards, highways are classified into the following categories:
 - a) arterial streets;
 - b) collector streets;
 - c) industrial streets;
 - d) local streets;
 - e) cul-de-sacs, consisting of two parts - the entrance and the terminus;
 - f) lanes
 - e) walkways.

Highway Standards

2. Different highway standards will be required for different classes of highways and for different service level areas as defined and delineated in Schedule "A" of this Bylaw. The required standards for right-of-way width, pavement width, road lane widths, curb and gutter, sidewalks and shoulders are set out in Table 1 following.

Intersections

3. Standards for intersections are as follows:
 - a) Intersection Spacing - no intersection shall be less than 40 metres from any other intersection or likely future intersection. Measurement shall be made along the centreline of the intersected highway and between centrelines of intersecting streets.
 - b) The intersection approach angle shall be as near as possible to 90 degrees, with a minimum permissible angle of 70 degrees and a maximum of 110 degrees.
 - c) Intersections with more than four legs shall not be approved.
 - d) Intersections shall not be located in or near sharp horizontal curves or near the crest of any vertical curve.

(B.1)

TABLE 1 - STANDARDS FOR VARIOUS ROAD CLASSIFICATIONS

<u>Road Classification</u>	<u>Right-of-way Width</u>	<u>Pavement Width</u>	<u>Lane Widths</u>	<u>Curb & Gutter</u>	<u>Sidewalks</u>	<u>Shoulder Width</u>
<u>Highway Standard 1 - For all Service Level 1 areas delineated in Schedule "A"</u>						
Arterial (4-lane divided)	27.0m	15.0m	3.75m	both sides	2.0m one side	not required
Collector (2-lane)	20.0m	13.0m	3.75m	both sides	1.2m one side	not required
Local (2-lane)	20.0m	11.0m	3.00m	both sides	1.2m one side	not required
Cul-de-sac						
a) Entrance	20.0m	8.5m	3.00m	both sides	1.2m one side	not required
b) Terminus	15m radius	11.5m radius		around bulb	1.2m one side (halfway around bulb)	
Industrial/Commercial (2-lane)	20.0m	11.0m	5.5m	both sides	not required	not required
Lanes	6.0m	6.0m	3.0m	not required	not required	not required
<u>Highway Standard 2 - For all Service Level 2 areas delineated in Schedule "A"</u>						
Arterial (2-lane)	27.0m	8.5m	4.0m	not required	not required	2.0m
Collector	20.0m	8.5m	3.5m	not required	not required	1.5m
Local	20.0m	8.5m	3.5m	not required	not required	1.5m
Cul-de-sac						
a) Entrance	16.0m	7.0m	3.5m	not required	not required	1.5m
b) Terminus	15m radius	11.5m radius				
Industrial/Commercial	20.0m	8.5m	3.5m	not required	not required	1.5m
Lane	6.0m	6.0m	3.0m	not required	not required	1.5m

(B.2)

Intersections (cont'd)

- e) At all intersections, corner cut-offs shall be provided on corner lots. Such corner cut-offs shall be 4.5m. x 4.5m. in dimension in residential areas and 6.0m. x 6.0m. in industrial and commercial areas.

Roadway Design Criteria

- 4. Minimum and maximum grades for roadways, design speeds, minimum radii of curvature, and vertical curves shall be in accordance with the provisions of Schedule "F" - Design and Construction Manual.

Clearing

- 5.
 - a) All streets and lanes shall be cleared the full width of their rights-of-way, grubbed and all refuse completely disposed of, unless by prior arrangement with the municipal engineer desirable natural cover has been allowed to remain.
 - b) Where possible topsoil shall be removed and stored on site for later replacement on lots.
 - c) Individual leaning or dangerous trees or snags outside the clearing area shall be removed.
 - d) Burning shall be carried out in accordance with the advice and the prior approval of the City Fire Chief.

Grading

- 6. Topsoil shall be removed for the full width of the right-of-way and the road, lane and boulevard areas shall be graded to the approved profiles and cross-sections. The completed subgrade profile shall be constructed to a tolerance of 30mm and all soft, spongy, or unstable areas which may exist or develop shall be excavated to a firm base and backfilled to grade with compacted select material. All utility trenches within the subgrade section shall be properly compacted as provided for in Schedule "F" - Design and Construction Manual for the full depth, so that settlement of the road surface, curb and gutter will be eliminated. Embankment and cut slopes shall be neatly trimmed as required in Schedule "F" - Design and Construction Manual.

(B.3)

Lanes and Pedestrian Walkways

7. a) Where service lanes for vehicular traffic are provided in commercially zoned subdivisions, the requirements for subgrade preparation and surfacing of lanes shall be as for street surfacing.
- b) Lanes may be provided where terrain and natural features render vehicular access impractical and where:
- i) They form an extension of any existing system of lanes;
 - ii) They are necessary to provide secondary access in order that reasonable traffic flow can be assured on the main highway.
- c) Where pedestrian walkways are provided in the subdivision, they shall be designed and constructed to standards set out in Schedule "F" - Design and Construction Manual.

Asphaltic Concrete Pavement and Related Works

8. a) All asphaltic concrete pavement for roads and lanes shall be manufactured and laid according to the standards set out in Schedule "F" - Design and Construction Manual and only after all the required services are installed.
- b) Before commencement of the works, the applicant shall prepare a construction schedule satisfactory to the Approving Officer, based upon completing the various phases or parts of the work. During installation and construction, the Applicant's Engineer shall certify that each phase or part is complete and meets all standards and requirements. The Applicant shall not proceed to a subsequent construction phase prior to the inspection of the preceding phase by the Approving Officer. If the Approving Officer is not given proper notice and has not had ample opportunity to carry out the proper inspections, he may take whatever steps he deems necessary including exposing or removal of the works.
- c) Where restoration work is necessitated by reason of construction through a built-up or established area, work shall proceed in such a manner that testing, manhole construction, house service connections, restoration of private easements, boulevards, roads, and general site clean-up are completed no later than thirty (30) days after completion of the works. If the restoration is not completed within this time, the City reserves the right to enter upon the property, carry out or complete the restoration and charge the cost of such work to the applicant.

(B.4)

Street Lighting

9. a) Underground street light wiring and ornamental type street lighting materials and equipment to be incorporated into the system shall be C.S.A. approved and shall conform to Schedule "F" - Design and Construction Manual and the requirements of the Provincial Inspector of Electrical Energy.
- b) The street lighting system shall be laid out in accordance with good engineering design and in accordance with the "Canadian Standard Practice for Street and Highway Lighting". The minimum lighting level shall conform to Schedule "F" - Design and Construction Manual.
- c) The ornamental street lighting systems shall be in accordance with standards set out in Schedule "F" - Design and construction Manual. In addition to the requirements of B.C. Hydro and Power Authority in the installation of the street lighting system, the Applicant shall be responsible to obtain all the electrical permits required and shall pay all fees in connection with these permits.

Private Utility Work

10. a) The Applicant shall be responsible for meeting all the requirements of the utility companies and government agencies concerned in the installation of underground power, cable television, telephone and gas distribution systems. The applicant shall obtain permits which may be required to carry out the system installation. Individual power, cable television, gas and telephone connections shall be provided for each individual lot in the subdivision.
- b) Installation of underground power, gas, telephone, cablevision and any line crossings are to be completed before street surface improvements are constructed.

Boulevards

11. a) Unless otherwise approved, boulevards shall be graded to drain to the curb or ditch with slopes constructed to standards set out in Schedule "F" - Design and Construction Manual.
- b) The boulevard area shall be finished by excavating or filling as required to grade from the top elevation of curb to the property line, as required in Schedule "F" - Design and Construction Manual.

(B.5)

Curb and Gutter

12. Curb and gutter shall conform to specifications set out in Schedule "F" - Design and Construction Manual. Rolled mountable curb is required for local streets. All other streets shall have non-mountable curb and gutter.

Concrete Sidewalks

13. Concrete sidewalks shall conform to specifications set out in Schedule "F" - Design and Construction Manual.

Street Signs

14. The Applicant shall deposit with the City funds equal to the cost of providing and installing street name signs. Signs will be installed by the City when all works are completed by the Applicant.

Street Names

15. Street names shall be assigned to new streets by the City.

City of Merritt Subdivision and Development
Servicing Bylaw - No. 1187

Schedule "C" - Water Distribution System

Schedule "C" consists of standards for the design, construction and installation of works relating to water distribution systems.

Installation of Watermains

1. All materials, including pipe fittings, shall be installed to applicable A.W.W.A. Standards for the installation of the particular type or class of material being used and to any additional requirements as set out by the materials manufacturer. All watermains shall be installed to a minimum depth of 1.8m. clear cover from the crown of the pipe to the finished grade of the street directly above the pipe. All pipe shall be bedded, backfilled and compacted in accordance with Schedule "F" - Design and Construction Manual.

The minimum allowable main size shall be 150 millimetre nominal diameter, except in short cul-de-sacs, where there is no chance of future expansion and where no fire hydrants are required, the mains may be 100 millimetre diameter. 50 millimetre blowoffs shall be provided on dead ends.

Materials

2. All materials to be incorporated in the water distribution system shall conform to the specifications set out in Schedule "F" Design and Construction Manual.

Connection to Existing System

3. Connection of a new system to existing municipal mains, or the turning on of water into new mains shall be carried out by the City. Application for connection must be made to the Approving Officer, providing adequate advance notice for the execution of such works.

Testing and Disinfection

4.
 - a) Each section of water distribution piping installed by the applicant must be tested for pressure and leakage as outlined in Schedule "F" - Design and Construction Manual.
 - b) The applicant shall advise the Approving Officer 24 hours in advance of the leakage test being applied and the Approving Officer may elect to witness the test. All test data and leakage calculations shall be submitted to the Approving Officer.

(C.1)

- c) Disinfection and flushing of the water distribution system shall be carried out by the applicant in accordance with the procedure set out in Schedule "F" - Design and Construction Manual prior to the system being placed in service.

Fire Hydrants

- 5. Fire hydrants shall conform to the specifications set out in Schedule "F" - Design and Construction Manual.

Water Service Connections

- 6.
 - a) All materials to be incorporated in the water services shall conform to Schedule "F" - Design and Construction Manual and the regulations of the B.C. Plumbing Code.
 - b) Each single family dwelling, each dwelling unit of a semi-detached duplex, and each dwelling unit in a row house project shall have an individual copper water service connection at least 19 millimetres (3/4 inch) in diameter.
 - c) Service connections shall be installed to the property line.

Trench

- 7. Water service connections shall be installed in accordance with B.C. Plumbing Code and Schedule "F" - Design and Construction Manual. The pipe subgrade shall be carefully prepared, graded and compacted prior to installation of the service pipe.

Parks and Boulevards

- 8. Water service connections to the size and locations as determined by the Approving Officer shall be provided by the Applicant for land designated for park, green strip or median boulevard use within the subdivision.

City of Merritt Subdivision and Development
Servicing Bylaw No. 1187
Schedule "D" - Sanitary Sewer System

Schedule "D" consists of standards for the design, construction and installation of works relating to sanitary sewer systems.

Installation of Sanitary Sewer Mains

1. Sanitary sewer mains shall be designed and constructed so that no street, boulevard or private property surface drainage can enter the sanitary sewer system. Cross-connection between sanitary sewer mains and any storm drainage works will not be permitted.

Materials

2. All materials to be incorporated in a sanitary sewer system shall conform to the specifications set out in Schedule "F" - Design and Construction Manual and shall be as approved by the Approving Officer.

The minimum pipe diameter for sanitary sewer mains shall be 200 millimetre (8 inch) nominal diameter.

Construction

3.
 - a) All pipe, fittings, manholes, and appurtenant structures shall be installed in accordance with the specifications set out in Schedule "F" - Design and Construction Manual.
 - b) Forcemains shall be installed to the same specifications as watermains and the same test criteria shall apply.
 - c) Where pumphouses or other special structures are required, additional detailed specifications will be required.

Testing

4. At the request of the Approving Officer, the applicant shall provide the necessary labour and materials to test the sanitary sewer works installed in the subdivision. Testing shall be carried out in accordance with Schedule "F" - Design and Construction Manual and to the satisfaction of the Approving Officer.

(D.1)

Service Connections

5.
 - a) All materials to be incorporated in the sanitary sewer services shall conform to the specifications of Schedule "F" - Design and Construction Manual.
 - b) Each single family dwelling, each dwelling unit of a semi-detached duplex, and each dwelling unit in a row house project shall have an individual sanitary sewer connection at least 100 millimetres (4 inch) in diameter.
 - c) Service connections shall be installed to the property line. The method of connection to the main, and the gradient of the pipe shall be in accordance with Schedule "F" - Design and Construction Manual.

Repealed

(D.2)

City of Merritt Subdivision and Development
Servicing Bylaw No. 1887

Schedule "E" - Storm Drainage

Drainage Plan

1. For each new subdivision or development, a drainage plan shall be prepared and approved by the Approving Officer. The drainage plan shall be presented on a contour map at a scale of not less than 1:2500 with contour intervals of not less than 2 metres. The drainage plan will show how storm drainage will be handled within the subdivision, including:
 - a) proposed method of handling surface drainage, including discharge points to natural drainage courses; and
 - b) provisions of drainage right-of-way where required;
 - c) measures to prevent ponding of water on highways and parcels within the subdivision;
 - d) measures to prevent erosion and other forms of property damage.

Natural Drainage Courses

2.
 - a) Where a parcel to be subdivided is traversed by a natural drainage course, there shall be provided either:
 - i) a drainage right-of-way conforming to the general alignment of the drainage course of such width as may be designated by the Approving Officer; or
 - ii) provision made for an alternate drainage system to the satisfaction of the Approving Officer.
 - b) No natural drainage course shall be altered or diverted unless in accordance with a drainage plan pursuant to subsection (i) approved by the Approving Officer.

Areas Requiring Special Consideration

3. Due to high ground water table, basement flooding and/or soil instability problems in some areas of the City, the City will require that a prospective Developer implement special measures in the development of these lands such as those located north of Reid Avenue, Castillou Crescent, Eastwood Place and Boyd Place, to ensure to the City's satisfaction that increased runoff from the developed lands does not contribute to such existing problems.

Storm Drainage System Materials, Construction and Installation

4. Where storm drainage systems are provided, the materials, installation, construction and testing of all pipe, fittings, manholes, outfalls or drainage drywells, and appurtenant structures shall conform with the requirements set out in Schedule "F" - Design and Construction Manual.
(E.1/E.2)

City of Merritt Subdivision and Development
Servicing Bylaw No. 1187

Schedule "F" - Design and Construction Manual

The Design and Construction Manual consists of design standards and standard engineering drawings for the design, construction and installation of works required in this Bylaw and is contained under separate cover for convenience. The Manual contains the following:

- Section 1 - General Requirements
- Section 2 - Road Design
- Section 3 - Curb, Gutter and Sidewalks
- Section 4 - Watermains
- Section 5 - Drainage
- Section 6 - Sanitary Sewer
- Section 7 - Power, Telephone, Cablevision and Street Lighting
- Section 8 - Standard Drawings Index

City of Merritt Subdivision and Development
Servicing Bylaw No. 1187

Schedule "G" - General Service Installation Requirements

Dust Control

1. During construction of works and services within the subdivision, the Applicant shall be responsible for providing and maintaining dust control at all times whatever:
 - a) the operation of any equipment causes dust that becomes a nuisance to property owners and residents in the area.
 - b) bare soil conditions are created in performing work.

Cleanup

2.
 - a) During construction of works and services within the subdivision, the Applicant shall be responsible for ensuring that the construction area shall be maintained free of accumulation of excess of waste material and debris.
 - b) The disposal of waste materials and rubbish by burning or burial on the site will not be permitted. The disposal of volatile wastes such as mineral spirits, oil, gasoline, or paint thinner into storm or sanitary sewer drains will not be permitted.
 - c) During and after construction of works and services, the Applicant shall be responsible for ensuring that all access streets into the subdivision are maintained free of accumulation of excess waste material and debris. The City reserves the right to carry out the maintenance of such access streets and charge the cost of such work to the Applicant, if the Applicant fails to restore the street(s) to normal levels within a week of being notified in writing by the City.

(G.1)

City of Merritt Subdivision and Development
Servicing Bylaw No. 1187

Schedule "H" - Performance Agreement

Schedule "H" consists of a form for an agreement between the City of Merritt and the owner of the land. The agreement is to be used where the owner has requested approval of the development before complete construction and installation of the works required in the Subdivision and Development Servicing Bylaw and is agreeable to entering into a bonding agreement pursuant to Section 991 of the Municipal Act.

Under Section 3 of the Performance Agreement, the security to be provided to the City by the owner shall be in the amount of 120% of the total construction value of works required under this Bylaw as determined by the Professional Engineer representing the owner and approved by the City Engineer. The construction cost estimate shall be submitted to the City Engineer prior to final subdivision approval being granted by the City.

The Performance Agreement will also include as attachments the following:

- .1 Attachment 1 - Plan of Subdivision and Development prepared by the owner and approved by the Approving Officer.
- .2 Attachment 2 - Letter of Credit.

Performance Agreement For the Subdivision and Development
of Land in the City of Merritt

THIS AGREEMENT made this ____ day of _____, 20__.

BETWEEN:

THE CITY OF MERRITT, a Municipality duly incorporated under the laws of the Province of British Columbia, of 2185 Voght Street, in the City of Merritt, in the Province of British Columbia

(hereinafter called the "City")

OF THE FIRST PART

AND:

(hereinafter called the "Owner")

OF THE SECOND PART

WHEREAS the Owner desires to subdivide certain lands within the City and, more particularly known and described as:

(hereinafter called "the Lands")

AND WHEREAS the Owner is required to construct certain highways and other works and services within the Lands and to subdivide the Lands according to a plan of subdivision (hereinafter called the "Development"), a copy of which is hereunto annexed as Attachment 1 of this Agreement;

AND WHEREAS the Owner has requested approval of the Development prior to the construction and installation of the required works and services and is agreeable to entering into this bonding agreement pursuant to Section 991 of the Municipal Act and to deposit the Bond herein specified;

(H.1)-b

NOW THIS AGREEMENT WITNESSETH that in consideration of the premises and in consideration of the Agreement by the City to permit the Development, and in consideration of the approval of the development prior to completion of the construction of the works, the City and the Owner herein covenant and agree as follows:

1. In this agreement unless the context otherwise requires:

"Complete or Completion" or any variation of these words when used with respect to the Development shall mean completion to the satisfaction of the City Engineer when so certified by him in writing.

"Contract" means this Agreement.

"Development" means the work and services to be performed and constructed by the Owner as required by the Subdivision and Development Servicing Bylaw of the City.

2. The Owner shall complete the Development herein specified to the satisfaction of the City Engineer by the ____ day of _____, 20 ____.
3. As security for the due and proper performance of all of the covenants and agreements in this Contract contained and the Development contemplated, the Owner has deposited with the City:
 - a) Cash or a certified cheque in the amount of \$_____ as a Bond within the meaning of Section 991, subsection (a) of the Municipal Act (hereinafter called the "Bond"), OR
 - b) An irrevocable Letter of Credit in the form attached as Attachment 2 in this Agreement in an amount of _____ bearing even date herewith, a copy of which is attached hereto, (hereinafter called the "Bond") to be valid for a period of twelve (12) months from the date hereof, PROVIDED HOWEVER, that the City shall be at liberty to make demand on the said Letter of Credit at any time after the date hereof with the Owner being entitled to renew this Agreement as hereinafter provided if such Letter of Credit shall not have been demanded upon in the manner hereinafter provided and provided and provided also that the amount of such Bond may be reduced at any time with approval of the City in writing over the hand of the Approving Officer of the City.

NOTE: Clause (a) or (b) should be deleted if not applicable.

(H.2)

4. The Owner agrees that if the Development is not completed pursuant to Paragraph 2 hereof, the City may complete it, in which event the Owner shall forfeit the amount secured by the Bond to cover the cost of such completion, and the City shall return to the Owner such balance of the Bond as shall not be required for completion, less any administration fees or costs required. If there is sufficient money on deposit with the City by reason of the Bond, then the Owner will pay such deficiency to the City immediately upon receipt of the City's account for completion. It is understood that the City may do such work either by itself or by contractors employed by the City. If the Development is completed as herein provided, then the Bond shall be returned to the Owner.
5. It is understood and agreed that the intent of this Agreement is that the Owner shall complete the development, and grant all necessary easements as shown in the plans and specifications attached and as approved by the City Engineer on the ____ day of ____, 20___. Construction procedures, including ensuring that all works and services are fully operative and conform to City standards, as well as certification of construction completion, shall be in accordance with the provisions of the City of Merritt Subdivision and Development Servicing Bylaw No. 1187, Schedule "F", Section 1 - General Requirements.
6. The Owner covenants and agrees to comply with the provisions of all Municipal Bylaws throughout the construction of the Development. In the event that any material or debris should be left upon any road after the construction of the Development, the Owner covenants and agrees that the City may forthwith remove such material or debris at the expense of the Owner, the cost of such removal to be determined by the Approving Officer. In the event that any invoice of the City, for the removal of such material or debris, shall remain unpaid after thirty (30) days of receipt of the same by the Owner, the City is authorized to deduct the amount of such invoice from the Bond referred to in paragraph 3 hereof.
7. The Owner shall, at all times in connection with the Development, keep and employ a competent general superintendent with the authority to act on behalf of the Owner and capable of speaking, reading and writing the English language and any explanations, orders, instructions, directions and requests given by the City to such superintendent shall be held to have been given to the Owner.

(H.3)

8. The owner covenants and agrees to provide a Maintenance Bond to the City as required in the City of Merritt Subdivision and Development Servicing Bylaw No. 1187, Schedule "F", Section 1 - General Requirements.
9. The Owner shall submit to the City final as-built drawings as required in the City of Merritt Subdivision and Development Servicing Bylaw No. 1187, Schedule "F", Section 1 - General Requirements.
10. With respect to property taxes on the property herein described:
 - a) The Owner agrees to pay all arrears of taxes outstanding against the property herein described before the formal approval of any subdivision plans.
 - b) The Owner further undertakes to pay all current taxes levied or to be levied on the Lands on the basis and in accordance with the assessment and collector's roll entries.
11. The Owner covenants to save harmless and effectually indemnify the City against:
 - a) All actions and proceedings costs, damages, expenses, claims and demands whatsoever and by whomever brought by reason of the Development.
 - b) All expenses and costs which may be incurred by reason of this Agreement resulting in damage to any property owned in whole or in part by the City or which the City, by duty or custom, is obliged directly or indirectly, in any way or to any degree, to construct, repair or maintain.
 - c) All expenses and costs which may be incurred by reason of liens or non-payment of labour or materials, Workers' Compensation assessment, unemployment insurance, Federal or Provincial Tax or check off.
12. The City hereby covenants and agrees with the Owner to permit the Owner to perform all the said works herein upon the terms and conditions herein contained.
13. The City covenants and agrees that upon satisfactory completion of the Owner of all the covenants and conditions of this Agreement, to provide the Owner with a Final Acceptance Certificate in accordance with the provisions of the City of Merritt Subdivision and Development Servicing Bylaw No. 1187, Schedule "F", Section 1 - General Requirements.

(H.4)

14. It is understood and agreed that the City has made no representations, covenants, warranties, guarantees, promises or agreements with the Owner other than those in this Agreement.
15. The works required to be constructed shall, upon acceptance by the City of the Final Acceptance Certificate, become the property of the City free and clear of any claim by the Owner or any person claiming through the Owner, and the Owner shall save harmless the City from any such claims and agrees that such claims may at the option of the City be paid by and from the Bond.
16. Wherever the singular or the masculine are used in this Indenture, the same shall be construed as meaning the plural of the feminine or body corporate or politic where the context or the parties hereto so require.
17. This Agreement shall inure to the benefit of and be binding upon the parties hereto, their respective heirs, executors, administrators and assigns.
18. It is understood and agreed that before any bond or security required under this Agreement is reduced or released, the Owner shall provide the City with a statutory declaration certifying that all labour, material, Workers' Compensation, and other taxes and costs have been paid.

CITY OF MERRITT
BYLAW NO.
1187, 1480 & 1523

IN WITNESS WHEREOF the parties hereto have hereunto set their hands and seals the day and read first above written

THE CORPORATE SEAL OF THE
CITY OF MERRITT was hereunto
affixed in the presence of:

The amount and form of this Bond and Agreement is approved by the Approving Officer, for the City of Merritt this _____ day of _____, 20____.

Approving Officer

THE CORPORATE SEAL OF THE
OWNER was hereunto affixed
in the presence of:

Renewal

The City and the Owner hereby agree that this Agreement and the Bonding herein is hereby renewed for a further period of twelve (12) months in form identical to this agreement which renewal is approved by the Approving Officer.

THE CORPORATE SEAL OF THE
CITY OF MERRITT was hereunto
affixed in the presence of:

Approving Officer

THE CORPORATE SEAL OF THE
CITY OF MERRITT was hereunto
affixed in the presence of:

DATED in Merritt this _____ day of _____, 20 ____.

(H.6)

City of Merritt
Performance Agreement For The Subdivision
and Development of Land
Attachment 1 - Plan of Subdivision

The attached Plan of Subdivision for the Lands meets the requirements of Subdivision and Development Servicing Bylaw No. 1187, 1987 and has been approved by the Approving Officer.

Repealed

City of Merritt
Performance Agreement For The Subdivision
and Development of Land
Attachment 2 - Letter of Credit

Date: _____
Bank of: _____

Dear Sirs:

At the request of _____ (Owner)
we hereby establish in your favour our irrevocable credit for a sum not exceeding
_____ Dollars (\$_____). This credit shall be available to
you by sight drafts drawn on the Bank of _____, B.C.
(Address)

when supported by your written demand for payment made upon use. This Letter of Credit is
required in connection with an undertaking by the Developer to perform certain works and services
required by you. We specifically undertake not to recognize any notice of dishonour of any sight
draft that you shall present to us for payment under this Letter of Credit. You may make partial
drawings or full drawings at any time. We shall honour your demand without inquiring whether you
have a right as between yourself and our Customer.

If you have not demanded on this Letter of Credit in full by _____ (expiry date), it will
be considered canceled unless other arrangements or a renewal has been made with the Bank prior
to the aforementioned date.

Our reference for this Letter of Credit is the Bank of _____,
_____, B.C., Letter of Credit No. _____.

BANK OF _____

The owner hereby specifically agrees that it shall not take any action to dispute the validity of this
Letter of Credit unless it shall have expired prior to demand. We hereby agree to indemnify the Bank
of _____ against any costs of actions relative to the payment as may be necessary
and debit our account.

OWNER

(H.8)

CITY OF MERRITT
BYLAW NO.
1187, 1480 & 1523

CITY OF MERRITT
SUBDIVISION AND DEVELOPMENT
SERVICING BYLAW NO 1187 (1987)

VOLUME 2
SEPT. 8 1987

Repealed

CITY OF MERRITT
BYLAW NO.
1187, 1480 & 1523

CITY OF MERRITT
SUBDIVISION AND DEVELOPMENT
SERVICING BYLAW NO. 1187, 1987
SCHEDULE F
DESIGN AND CONSTRUCTION MANUAL

Repealed

CITY OF MERRITT
SUBDIVISION AND DEVELOPMENT
SERVICING BYLAW NO 1187, 1987

SCHEDULE F
DESIGN AND CONSTRUCTION MANUAL
TABLE OF CONTENTS

DEFINITIONS		<u>Page</u>
SECTION 1	GENERAL REQUIREMENTS	46
100	Engineering Drawings	
101	Construction Procedures	
102	As-built Drawings and Service Reports	
SECTION 2	ROAD DESIGN	54
200	Road Classification	
201	Road Design Standards	
202	Road Construction Materials	
203	Pedestrian Walkways and Fencing	
SECTION 3	CURB, GUTTER, & SIDEWALKS	63
300	General	
301	Construction Standards	
SECTION 4	WATER MAINS	67
400	General	
401	Design Standards	
402	Materials	
403	Construction Standards	
SECTION 5	DRAINAGE	80
500	General	
501	Design Standards for Storm Drainage	
502	Material	
503	Construction Standards	

CITY OF MERRITT
BYLAW NO.
1187, 1480 & 1523

SECTION 6	SANITARY SEWER	91
600	General	
601	Design Standards for Sanitary Sewer	
602	Materials	
603	Construction Standards	
604	Forcemains	
SECTION 7	POWER, TELEPHONE, CABLEVISION & STREET LIGHTING	100
700	General	
701	Liaison with Power Companies	
702	Design Standards for Street Lighting	
703	Materials and Construction	
SECTION 8	STANDARD DRAWINGS	108

Repealed

DEFINITIONS

Approving Officer	The officer duly authorized by the City Council to administer the Subdivision and Development Servicing Bylaw for the purpose of approving plans.
City Engineer	The person or persons designated from time to time by the City Council to fulfill the duties assigned by the Subdivision and Development Servicing Bylaw.
Developer	The person or persons also referred to as the owner who proposes to and is developing the land.
RTAC	Roads and Transportation Association of Canada
ASTM	American Society for Testing and Materials
CSA	Canadian Standards Association
AWWA	American Water Works Association
kPa	Kilopascal
mPa	Megapascal
mm	Millimeters
m	Metre
m/s	Metres Per Second
HPS	High Pressure Sodium
IES	Illuminating Engineering Society

SECTION 1 - GENERAL REQUIREMENTS

100 ENGINEERING DRAWINGS

100.1 Design Drawing Preparation

All engineering drawings shall be dated and sealed by a Professional Engineer.

100.2 Design Drawing Approval

All engineering drawing shall be approved by the City Engineer before the Owner starts construction of subdivision services.

100.3 General and Legal Information

- .1 Drawings to be completed in ink on standard A-1 size sheets.
- .2 In general, plan and profile drawings shall be to scale:
 Horizontal - 1:500
 Vertical - 1:50
 with the profile above and the plan below on the drawing. Where grades exceed 15% the vertical scale may be 1:100.
- .3 North arrow to face the top or left side.
- .4 The City's Subdivision reference number shall be shown on the title block.
- .5 Consecutive drawings to be joined by matchlines.
- .6 Legal dimensions to be shown on lot lines.
- .7 Lots to show lot and registered plan numbers.
- .8 R/W and easement number to be shown.
- .9 All elevations shall be based on geodetic datums.

(1.)

100.4 Water Service Information

- .1 On plan, show all watermains, hydrants, valves, caps, reducers, standpipes pressure reducing stations and all other appurtenances.
- .2 Show offsets of mains from property lines, pipe sizes, material, and class.
- .3 On plan indicate fitting sizes and joint types.
- .4 On profile show pipe sizes and joint types.
- .5 On plan show water services from main to property line.
- .6 Location of water services to lot corner to be dimensioned.

100.5 Sanitary Sewer and Storm Drainage Information

- .1 On plan show all pipes, manholes, catch basins, drainage drywells, clean-outs, leads, inlets and outfalls, pipe sizes, material, class of pipe and offset from property line.
- .2 On profile show manholes, pipe and sizes, length, material, classes and grades between manholes and pipe invert elevations. Invert elevations of inlets and outfalls must be shown.
- .3 On plan, show all sanitary and storm sewer service from main to property line.
- .4 On plan, dimension location from lot corner to the services and note invert elevation and pipe size.
- .5 Show centreline of drainage ditches with arrows showing direction of flows.
- .6 Sanitary manholes on profile to be coloured with yellow pencil on back of mylar.
- .7 All manholes to have numbering circles on both plan and profile. The manhole numbers shown shall be in accordance with the City numbering system.

100.6 Roadwork Information

- .1 On plan, show all curb lines, sidewalks, sidewalk widths, driveway crossings, edge of asphalt where no curbs exist, offsets to be shown from property line to curb line and centerline.

(2.)

- 100.6 .2 On profile show road centerline profile including vertical curve data and grades.
- .3 The Approving Office may require the owner to prepare and submit a site grading plan showing:
- existing and post-development contours;
 - existing and post-development drainage patterns;
 - driveway grades from property line to future building locations, which grades shall observe the maximum boulevard grade from curblines to property line, of 3%.
- .4 For development through steep hillside areas, the Approving Officer may require as a condition of subdivision approval that certain site grading be carried out to make the lots to be created more buildable. A maximum desirable driveway grade of 10% from property line to the future building line shall be one consideration in this regard.
- 100.7 Public Utilities
- .1 On plan show gas, underground power, cable television and telephone ducts, overhead pole lines. all intermediate and high pressure gas mains are to be noted.
- 100.8 Street Lighting Information
- .1 On plan, show street lights and duct work.
- 100.9 Staging
- .1 On plan and profile clearly show subdivision development staging and the order in which each portion of the project will be developed.
- 100.10 Schools
- .1 On plan show school sites within or adjacent the proposed development, including location, type of school, size and access points.
- 100.11 Water Frontage
- .1 On plan show:
- the boundaries of the high and low water marks;
 - the location of the 200 year flood limit, established by the Water Resources Branch, Ministry of Environment.

(3.)

- 100.11
- spot elevations in new subdivision area for comparison with water level and 2000 year flood elevation;
 - the nature of the shoreline - rocky, treed, sandy, reedy, swampy, stumped, etc.;
 - all public access to the water; existing or to be conveyed;
 - the ownership and boundaries of any water lots in the immediate vicinity.

100.12 Railways

- .1 When a subdivision is proposed adjacent a railway right-of-way, show the following information on the plan:

- spot elevations of the rail bed for comparison with proposed finished subdivision grades;
- all cuts, embankments and bridge abutments;
- the location of the nearest level crossing if within one-half mile;
- rail crossings proposed in a subdivision open for public use and whether there are any restrictions against use of an approved crossing by a greater number of person or vehicles.

100.13 Soils

- .1 On plan show location of test holes, test hole logs, porosity of soils, the depth to ground water and bedrock, areas of soil instability and any other information deemed necessary by the City Engineer.

101 CONSTRUCTION PROCEDURES

101.1 Construction Schedule

Before starting construction of subdivision services, the Owner shall provide the City Engineer with a construction schedule, setting out the sequence and timing of construction activities, including those set out in the Design and Construction manual where approval by the City Engineer is required. If there are delays or variances from the construction schedule, the Owner shall inform the City Engineer.

101.2 Authorization of City Engineer to Enter on Lands

During construction, the City Engineer is authorized to enter, at all reasonable times, upon the lands where services are being constructed to view the construction of services.

(4.)

101.3 Inspection of Works

Construction of the works shall be inspected by the Owner's Engineer, at the Owner's expense, to ensure the works generally conform to specifications and standards approved by the City. The Owner, or his duly appointed agents, shall be responsible for all construction procedures testing and coordination of the works and to ensure all works will be constructed to the satisfaction of the City.

101.4 Trench Cuts Across Existing Roads

Where utility mains or services have to cross existing roadways, the pavement shall be precut with a cutting wheel or jack hammer.

Upon completion of the utility installation, the trench shall be backfilled with competent soils compacted to 95% standard proctor density; the crossing shall be patched with at least 300 mm of pit run gravel sub base and 50 mm of 19 mm crushed gravel base course placed and compacted to 100% standard proctor density, and the crossing patched with at least 50 mm of hot-mix asphalt.

101.5 Location and Protection of Existing Utilities

The existing underground services shown on City of Merritt drawings are not guaranteed to be accurate or complete. It shall be the responsibility of the Developer to find and locate all existing services such as water, sewers, drains and culverts, hydro, telephone and natural gas; and to preserve and protect them from damage during construction.

101.6 Connections to Existing Utilities

All connections to existing utilities shall be undertaken by the City. The Developer shall design the connections, and submit them to the City Engineer for his approval. The City will supply all materials, equipment and labour required to complete the connection. The Developer shall pay all connection costs and coordinate timing of the connection with the City, as well as advise affected consumers of a utility system disruption.

101.7 Public Access and Safety

During construction of the work, all streets shall be kept open for public travel, unless prior arrangements have been made by the Developer with the City Engineer. Barricades, warning lights, traffic signs and all traffic control devices shall be provided and used by the Developer to standards set out by the City Engineer.

(5.)

- 101.7 At no time shall access be cut off completely from any houses or buildings, however private driveways may be cut off temporarily for periods up to twenty-four (24) hours. Before cutting off access to any houses or buildings, the Developer shall give at least right (8) hours notice to the owner of the property.

The Developer shall effectively warn and protect the public from any danger as a result of the work being done.

No material or equipment shall be stored where it will interfere with the free and safe passage of public traffic or in such a manner that it creates a hazard for the public. At the end of each days' work and at other times when work is suspended, the Developer shall remove all equipment and other obstructions from that portion of roadway open for use by traffic.

The Developer shall ensure that fire hydrants, valve boxes, manhole covers, meter boxes, fire or police call boxes, and all other utility controls are accessible at all times.

The Developer shall provide temporary pedestrian bridges across the trench at all street intersections and at access points to houses and buildings unless alternative convenient pedestrian access is available.

101.8 Maintenance and Restoration of Existing Drainage

All existing drainage facilities disturbed by the Developer in carrying out the work shall be promptly restored to their original condition as the work advances. On completion of the work, drainage facilities shall have at least the same flow capacity as before and left in a stable condition to the satisfaction of the City Engineer.

101.9 Construction Completion Certificate

Upon completion of construction, the Professional Engineer representing the Owner shall provide the City with a Construction Completion Certificate on a standard form provided by the City of Merritt, stating that the works as constructed conform to the plans and specifications set out in the approved engineering drawings.

101.10 Acceptance of Construction Completion Certificate by the City

Upon receipt from the Owner's engineer of the Construction Completion Certificate, the City Engineer shall inspect the works and services; upon determining that all deficiencies have been rectified and that the subdivision conforms to the plans and specifications set out in the approved engineering drawings, he shall accept the Construction Completion Certificate. Only the standard certificate form provided by the city shall be used.

(6.)

101.11 Maintenance Bond

Upon acceptance of the Construction Completion Certificate by the City Engineer, the Owner shall provide the City with a maintenance bond or letter of credit acceptable to the City in the amount of 15% of the total construction value as determined by the Professional Engineer representing the Owner and approved by the City Engineer. The term of the maintenance bond shall be from the date of acceptance of the Construction Completion Certificate to the date of acceptance of the Final Acceptance Certificate, but in no case shall the term be less than 12 months.

101.12 Final Acceptance Certificate

Within a period of 12 months after the date of acceptance of the Construction Completion Certificate by the City, the Professional Engineer representing the Owner shall provide the City with a Final Acceptance Certificate on a standard form provided by the City of Merritt.

101.13 Acceptance of Final Acceptance Certificate by the City

Upon receipt from the Owner's engineer of the Final Acceptance Certificate, the City Engineer shall inspect the works and services and upon determining that all deficiencies have been rectified to conform to the plans and specifications set out in the approved engineering drawings, shall accept the Final Acceptance Certificate as provided for on the standard certificate form available from the City.

102 "AS-BUILT" DRAWINGS AND SERVICE REPORTS

Upon completion of the works, original "as-built" drawings shall be submitted to the City. The drawings shall conform to City standards and shall include all required inverts, locations, offsets and material types and classes comprising the works. In addition, the drawings shall include:

- .1 All service connections shall be accurately shown on the "as-built" drawings indicating horizontal distance from service location to property corner and an invert elevation at property line for sanitary sewer services. All revisions made during construction shall be made on the "as-built" drawings.

- .2 "As-Built" or "As Constructed" must be clearly marked on the full sized transparency drawings.
- .3 Service reports for each serviced lot shall be submitted along with the "as-built drawings." The reports, to be completed on standard City forms shall include the following information:

Sewer:

- invert of main at connection;
- invert of service at connection;
- invert of service at property lines;
- size and type of service pipe;
- size and type of main;
- type of saddle;
- location of service from lot corner;
- location of main from property line.

Water:

- invert of main at connection;
- top of curb stop at property line;
- size and type of service
- size and type of main
- type of service saddle;
- location of service from lot corner;
- location of main from property line.

SECTION 2 - ROAD DESIGN

200 ROAD CLASSIFICATION

The road classification definitions have been included here for ease in use of the City Design Manual.

- 200.1 Arterial Street - means a street with a high design volume with a significant portion of its users having their origin and destination outside of the subdivision area.
- 200.2 Collector Street - means a street which carries traffic from local streets to arterial streets and includes the principal entrance streets for circulation of traffic within such a subdivision.
- 200.3 Industrial Street - means a street in an area zoned for industrial uses, which is especially designed to carry truck traffic, and having the same function as a Collector Street.
- 200.4 Local Street - means a street designed to permit low speed travel within a neighbourhood and direct access to adjacent properties.
- 200.5 Cul-de-sac - means a highway with only one point of intersection with another highway and which terminates in a vehicle turning area, referred to as the "terminus". Cul-de-sacs shall be no longer than 15 metres to the centre of the bulb.
- 200.6 Lane - means a highway more than 3m but no greater than 10m in width, intended to provide secondary access to parcels of land. A lane is not a partial highway.

201 ROAD DESIGN STANDARDS

201.1 Road Cut and Fill Slopes

- .1 Cut and fill slopes shall encroach no more than 3 metres into private property. When necessary, the Approving Officer may require additional road dedication to cover cut and fill slopes and require the road construction be completed prior to submission of the subdivision plan.

- .2 Unless otherwise approved by the City Engineer, cut and fill slopes shall conform to the following:

- 1 vertical to 3 horizontal for slopes up to 1 metre height;
- 1 vertical to 2 horizontal for slopes 1.0 to 2.0 metre height;
- 1 vertical to 1.5 horizontal for slopes over 2.0 metre height.

The City Engineer may request for embankments greater than 2 metres in height that a geotechnical report be to substantiate the recommended design slopes.

- .3 Rock cuts shall be constructed to 1 vertical to 0.25 horizontal.

201.2 Boulevard Grading

- .1 Boulevards shall be smoothly graded from the back of the curb and/or back of the sidewalk to the property line and restored with 100mm of raked topsoil.
- .2 The grade of the boulevard to the property line shall not exceed 3% unless approved in writing by the City Engineer.

201.3 Design Speed

Roadways shall be designed to R.T.A.C. Geometric Design Standards unless otherwise specified. Design speeds for roads shall be:

Arterials 70 km/h
Collector 60 km/h
Locals 50 km/h

201.4 Cross Section

- .1 All roads shall be designed with a 2% crown unless otherwise approved by the City Engineer. Under certain adverse topographical conditions, offset crowns may be permitted on collector and local roads. The location of the offset crown shall be approximately 2.5 metres from the high curb with a minimum cross slope of 2% and a maximum of 4%.
- .2 Lanes shall be designed with an inverted 2% crown.

201.5 Horizontal Alignment

- .1 The following table provides the minimum required centre line radius for the various roadway classifications: (10.)

TABLE 1

ROADWAY CLASSIFICATION	MINIMUM CENTERLINE HORIZONTAL RADIUS (metres)			
	NORMAL CROWN	SUPERELEVATION (M/M)		
		0.02	0.04	0.06
Arterial	250	225	200	180
Collector	120	110	100	—
Local	65	—	—	—

.2 Spiral transition curves will be required on all Arterial roads. Collector and Local roads shall be designed with ample curves.

.3 Superelevation shall not exceed the maximum shown in Table 1.

201.6 Curb Returns

Table 2 details required curb return radii for the various road classifications. When two intersecting roads have two different road classifications, the higher classification shall govern.

At intersections of roads without curb and gutter, the pavement shall be placed to the same radii as for roads with curb and gutter.

TABLE 2
 ROAD CLASSIFICATION CURB RETURN RADII (meters)

ARTERIAL	
Divided	9
Undivided	9
INDUSTRIAL	9
COLLECTOR	8
LOCAL	6

201.7 Vertical Alignment

.1 Road Grades

Minimum road grades with curb and gutter shall not be less than 0.50 percent. Maximum grades shall not exceed those shown in Table 3 unless it can be justified to the City Engineer that short pitches exceeding the maximums will improve the intersection design.

(11.)

TABLE 3

<u>ROAD CLASSIFICATION</u>	<u>MAXIMUM GRADE</u>
ARTERIAL	8%
COLLECTOR	8%
LOCAL	10%
CUL-DE-SAC	
Entrance	uphill 10% downhill 8%
Terminus	uphill 6% downhill 6%
INDUSTRIAL	10%
LANES	10%

.2 Vertical Curves

Vertical curves are to be designed to provide safe stopping sight distances. Vertical curve lengths are calculated by the following equation $L = KA$

where L = length of vertical curve
 K = a constant related to lines of geometry of a parabolic curve
 A = algebraic difference in grades in percent

Table 4 below specifies minimum K values to be used for vertical curve design.

TABLE 4
 MINIMUM K VALUES (in metres)

<u>ROADWAY CLASSIFICATION</u>	<u>CREST CURVE</u>	<u>SAG CURVE</u>
	<u>MINIMUM DESIRABLE</u>	
ARTERIAL	17	25
COLLECTOR	10	15
LOCAL	7	10

In order to provide proper drainage, a maximum K value of 80 metres for crest curves, and 40 metres for sag curves shall not be exceeded.

(12.)

201.8 Intersection Design

- .1 Unless otherwise indicated, intersection design standards shall conform to the latest edition of R.T.A.C. Geometric Design Standards.
- .2 Intersection grades shall not exceed 75% of the allowable maximum grade of the Intersection street.
- .3 Minimum K values of vertical curves at Intersections shall not exceed those shown in Table 5 below.

TABLE 5

INTERSECTING STREET	MINIMUM K VALUE (in metres)	
	Crest	Sag Curve

Collector	7	6
Local	4	4

- .4 Grades of major roads through intersections shall not exceed 75% of the maximum allowable grade for the following distances from the intersecting road curb line.

Arterial	60 metres
Collector	30 metres
Local	15 metres

201.9 Road Base Design Requirements for Service Level 1 & 2 Roads

- .1 The City Engineer may, in areas where poor soil conditions exist, request a pavement structure design from a Geotechnical Engineer.
- .2 The following minimum road base requirements outlined in Table 6 may be used when the applicant is not requested to submit a pavement structure design.

TABLE 6

ROAD CLASSIFICATION	SUB-BASE THICKNESS	BASE THICKNESS	ASPHALT THICKNESS
Arterial	450 mm	75 mm	100 mm (2-50 mm lifts)
Collector	400 mm	75 mm	75 mm (2 lifts)
Local	300 mm	75 mm	50 mm
Cul-de-sac	300 mm	75 mm	50 mm
Industrial	400 mm	75 mm	75 mm (2 lifts)
Lane	300 mm	75 mm	50 mm

(13.)

202 ROAD CONSTRUCTION MATERIALS

202.1 Earthworks and Compaction

Competent materials as determined by a geotechnical engineer shall be used for destruction of roads. Embankments shall be compacted to at least 95% of standard maximum dry density when tested in accordance with the Standard Proctor method, ASTM Standard D698.

202.2 Road Sub base, Base and Shouldering Materials

- .1 The City Engineer shall have the right to reject any material delivered to the site which has no prior approval. All sampling and testing shall be done in accordance with ASTM or CSA Standards.

.2 Road Sub-Base

The material for the road sub-base course shall be 75 mm minus pit run gravel composed of inert durable materials, free from soft disintegratable particles.

- .3 When tested in accordance with ASTM Standards C136, the material shall meet the gradation requirements and shall be uniformly graded as follows:

<u>Sieve Size</u>	<u>Percent Passing</u>
75 mm	100%
25 mm	50-85
No. 4	30-60
No. 200	2-10 (wet sieving conforming to ASTM C-117)

.4 Road Base for Paved Roads, and Road Surface for Gravel Roads

Granular base course material shall be uniformly graded 19 mm crushed gravel of which not less than 60% of the material retained on the No. 4 sieve is fractured rock. Base course material shall have the following gradation limits:

<u>Sieve Size</u>	<u>Percent Passing</u>	
19 mm	100%	
12.5 mm	60-100	
No. 4	40-80	
No. 8	30-60	
No. 50	15-30	
No. 100	10-15	
No. 200	2-10 (wet sieving)	(14.)

Granular sub-base and the granular base courses shall be laid and compacted to at least 95% Standard Proctor Density.

.5 Shoulders

The material for finishing road shoulders shall be as specified for road base. The shoulder material shall be watered and compacted to 100% of Standard Proctor Density.

202.3 Asphaltic Hot-Mix Concrete

.1 Asphalt Cement

Asphalt cement shall conform to ASTM Standard D946 for asphalt cement used in Pavement Construction. The asphalt cement shall be uniform in character, free of water and shall not foam when heated to 177 degrees C.

.2 Aggregate

All aggregate particles shall be clean, tough, durable, moderately sharp and free from coatings of clay, silt, loam and other deleterious material. Combined aggregates shall be free of clay or silt balls or any other aggregations of fine material.

a) Coarse Aggregate

Coarse aggregate shall be all material retained on a No. 4 sieve and shall conform to the soundness and abrasive requirements in ASTM Designation D692-54.

b) Fine Aggregate

Fine aggregate shall be all material passing the No. 4 and shall conform to ASTM Designation D1073-54.

c) Mineral Filler

The mineral filler shall conform to STM Designation D242 and shall have the following gradation:

No. 4 sieve	100% passing	
No. 100 sieve	90-100% passing	
No. 200 sieve	70-100% passing	(15.)

d) Gradation

The mixed aggregates shall meet the following gradation limitations by wet sieve analysis:

19 mm	100%
12.5 mm	80-100%
9.5 mm	70-90%
No. 4	50-70%
No. 8	35-50%
No. 30	18-30%
No. 50	12-20%
No. 100	7-15%
No. 200	4-8%

.3 Asphalt Primer

Asphalt Primer shall be MC-0, or as specified by the Asphalt Institute.

202.4 Asphalt Mix Design

The mix design shall meet the following specifications:

<u>Characteristic</u>	<u>Requirement</u>
Asphalt cement viscosity grade	AC8
Asphalt cement content (by total wt. of mix)	4.5% - 7.0%
Compaction blows per end of specimen	75
Stability @ 68 degrees C.	545 Kg
Flow	8 - 16
% voids total mix	3 - 5
mixing temperature	143 deg. C - 157 deg. C.
Asphalt Cement temperature	135 deg. C - 149 deg. C.
Aggregate temperature	141 deg. C - 163 deg. C.

202.5 Asphaltic Concrete Surfacing

Asphaltic concrete shall not be placed prior to approval of the base coarse, tack coat or prime coat by the City Engineer. The hot mix temperature shall be between 135 degrees C. and 177 degrees C in the truck at the site.

(16.)

202.6 Compaction of the Mix

After compaction, the finished pavement shall have a density of at least 97% of the Marshall (75 blow) density, ASTM designation D 1559 at a temperature of not less than 70 degrees C.

202.7 Cold-Mix Asphaltic Concrete

Cold-mix asphaltic concrete shall not be permitted, unless approved by the City Engineer.

203 PEDESTRIAN WALKWAYS AND FENCING

- .1 Where pedestrian walkways are required for access to parks, school sites, commercial areas or connection to residential street, the walkways shall be cleared to their full right-of-way width.
- .2 All organic and frost susceptible materials shall be removed from the full right-of-way and the right-of-way graded to provide proper drainage and access to the connecting street.
- .3 A minimum of 100 mm of 19 mm minus crushed granular gravel and 50 mm of asphaltic concrete shall then be place for the full length and width of the walkway right-of-way. All materials used in sub-grade construction and surfacing shall conform to the specifications as outlined for roadways.
- .4 Walkways shall be fenced for their full length on both sides and the height may vary according to individual situations and the height requirements of the Municipal Zoning Bylaw. Fence material shall be 9 gauge 50 mm mesh, galvanized chain link type with 50 mm diameter galvanized posts, in accordance to CSA standards.

(17.)

SECTION 3 - CURB, GUTTER AND SIDEWALKS

300 GENERAL

Non-mountable concrete curbs are required for all arterial and collector roads and in commercial areas. Mountable concrete curbs shall be installed in all other areas. Wheelchair ramps shall be provided at intersections and where requested by the City Engineer. Curbs and sidewalks shall be installed as required under the Subdivision and Development Servicing Bylaw. All curb, gutter and sidewalk sections shall be monolithic.

301 CONSTRUCTION STANDARDS

301.1 Curb Return

Curb return radii shall conform to Table 3.

301.2 Concrete

Concrete shall conform to CSA-A23 and the mix design shall include the following:

- a) Minimum compressive strength - 25 MPa at 28 days.
- b) Maximum aggregate size - 19 mm for hand formed and 9.5 for extruded.
- c) Slump - Maximum 80 mm, minimum 20 mm.
- d) Air entrainment - 5% to 7%.
- e) Other additions may be used only if prior approval is obtained from the City Engineer.

301.3 Base Preparation

- .1 All topsoil, organic soils, frozen materials, roots or other deleterious materials shall be removed to a minimum depth of 0.3 metres below the bottom of the sidewalk and replaced with granular material. All fill material shall be compacted to 100% of the Standard Proctor Density.
- .2 Granular sub-base and base course materials shall conform to Road Base Specifications.

(18.)

- .3 On the prepared sub-grade, a minimum of 150 mm of 75 mm minus pit-run and 50 mm of crushed grave shall be placed and compacted to a minimum of 0.3 m beyond the back edge of the curb or sidewalk.

301.4 CONSTRUCTION JOINTS

Construction joints shall be installed at sidewalk crossings and along the surface of existing structures where the sidewalk butts up to the surface. The material used shall be bituminous fibre, conforming to ASTM-D 545 and shall be installed throughout the entire depth of the sidewalk. The construction joint shall be exposed with a 6 mm radius edger.

301.5 CONTRACTION JOINTS

Contraction joints shall be constructed every 3 m by means of an approved marking tool which has a minimum width of 32 mm and a minimum depth of 6 mm. The edges of the tool shall be rounded off with a 6 mm radius. Contraction joints shall be the full width of and perpendicular to the longitudinal axis of the sidewalk, curb and gutter, invert crossing or median section.

301.6 FINISHING

- .1 When the concrete has partially set up the surface of the concrete shall be worked with wood and steel trowels. Under no circumstances shall water be sprinkled onto the surface of the concrete in order to provide a more workable surface.
- .2 After steel trowelling the surface to a smooth, even finish the sidewalk shall be broomed transversely; curbs, gutters, invert crossings and medians shall be left with a smooth trowel finish. No mortar coat or water shall be used. After brooming, the edges shall be rounded with an edger, having had a minimum width of 32 mm and a minimum depth of 13 m. Invert crossings shall be surface jointed after brooming as shown.

301.7 CURING AND PROTECTION

Freshly deposited concrete shall be protected from premature drying and extreme temperatures. It shall be maintained with a minimal moisture loss at a relatively consistent temperature for a period of time necessary for hydration of the cement and proper curing of the concrete.

Curing and protection of concrete shall conform to Section 21 of CSA Standard CAN3-A23.1-M77. (19.)

301.8 BACKFILLING

After the concrete has cured for a minimum of seven days and prior to any unprotected vehicular crossings of the concrete, the area behind completed curb or sidewalk sections shall be backfilled with competent materials compacted to 95% S.P.D. to provide adequate structural support to the concrete.

(20.)

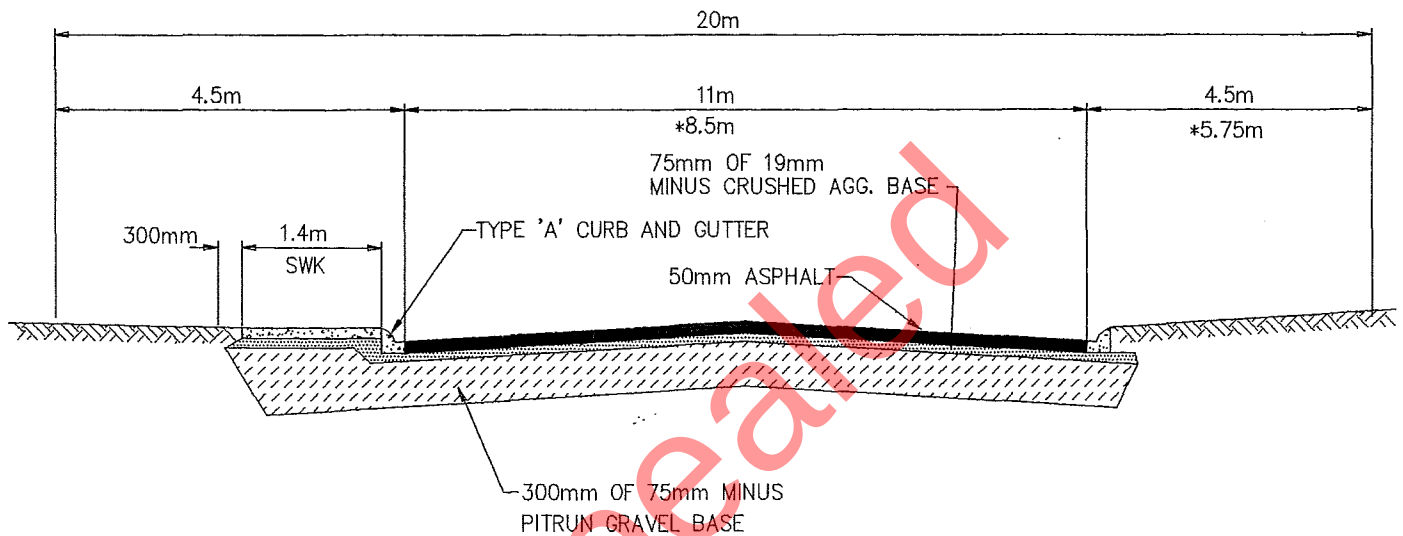
Repealed

ROAD DESIGN

Repealed

PLOT DATE: NOV 22/95

PROJ. CAD FILE No.: C:\PROJ\0521\15\A\DESIGN\R-1.DWG NOV22/95 DMc



NOTE:

- 1.) * FOR CUL DE SAC
- 2.) THE THICKNESS OF GRAVEL SUBBASE MAY CHANGE, DEPENDING ON INTEGRITY OF SUBGRADE SOIL.



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

NOV 95

LATEST REVISION
DATE:

APPROVED BY:

TITLE:

SERVICE LEVEL 1 HIGHWAY
STANDARDS FOR CUL DE SACS
AND LOCAL STREETS

SECTION:

REVISION No.

DWG. No.

R-1

BEDDING & TRENCHING

Repealed

SECTION 4 - WATER MAINS

400 GENERAL

These standards shall apply to all waterworks installations constructed by, for, or in the City of Merritt. All standards not specifically covered in these Standards shall be in accordance with the appropriate AWWA Standards or as directed by the City Engineer.

401 DESIGN STANDARDS

401.1 .1 Generally water systems shall be designed for pressures in the range of 210 KPa to 900 KPa, with 210 KPa measured under peak hourly demand conditions and the 900 KPa measured under static conditions. The minimum pressure shall be measured or calculated at the main floor of the highest proposed house, and an allowance made for pressure loss in the service line to the house wall. Reservoir level shall be assumed at mid-point for calculation of minimum pressure, and full for calculation of maximum static pressure.

.2 Where the maximum static pressure exceeds 590 KPa, the developer shall provide pressure reducing device on each service or on the mains as directed by the City Engineer to reduce the static pressure to users to within specified limits.

.3 The maximum daily demand condition shall be assumed to be:

- a) 8800 lpd per single family dwelling, mobile home, medium density rowhouses, townhouses, or duplex dwelling unit.
- b) 3500 lpd per high density apartment dwelling unit.

.4 Water systems shall also be designed to insure that fire flows as required by the Insurers Advisory Organization (IAO) are available for required durations and within acceptable pressure limits.

401.2 Minimum Pipe Size

Water supply mains in residential areas in all subdivisions shall be a minimum of 150 mm diameter, except in low density cul-de-sacs where a fire hydrant is not required and future waterline extension is not conceivable; the minimum size may be 100 mm diameter. In high density or commercial areas the minimum water main size shall be 200 mm diameter.

(21.)

402

MATERIALS

All materials and equipment utilized shall conform to these Standards and to the latest edition of the pertinent AWWA Standard Specifications for materials and equipment. All material shall be new non-corrosive and of the best quality available. Alternative materials shall be covered by the latest AWWA specifications. All material must be approved by the Provincial Ministry of Health for use in public water supply systems.

.1 Pipe

Pipe sizes 100 mm and larger shall be ductile iron (Ductile), or polyvinyl chloride (P.V.C.) as directed by the City Engineer.

a) Ductile Iron Pipe

Ductile Iron pipe shall conform to AWWA Standard C151/A21.51-81 with particular requirements.

Class: - The pipe wall thickness shall be designed for each application in accordance with AWWA C150/A21.50-81.

Pipe Joints: - Pipe joints shall be a rubber gasket type conforming to AWWA C110/A21.10-82 such as Bell-tite, Tyton or approved equal.

Cast Iron Fitting Hubs: - Hub connections shall be Bell-tite, Tyton, Ter-Mech or approved equal.

Cathodic protection may be required at the discretion of the City Engineer.

b) Polyvinyl Chloride (P.V.C.)

Polyvinyl Chloride pipe shall conform to AWWA Standard C900-81 with the following particular requirements:

Class: - All pipe shall be Class 150 or better.

.2 Main Line Valves

Line valves 150 mm and larger shall be Canada Valve or Terminal City or equivalent gate valves conforming to AWWA Standard C500-80. Valves shall be iron-body, bronze-mounted, solid wedge or double-disc gate, non-rising stem with flanged or hubbed ends to suit. Flanges shall have Class 125 standard drilling. Valve stems shall be fitted with a standard AWWA nut and shall turn clockwise to close.

(22.)

All valves shall have the manufacturer's name and catalogue number moulded as an integral part of the valve body.

On distribution mains throughout the subdivision, valves shall be installed to isolate sections of main no greater than 200 m (650 ft) in length.

Valves shall be flanged directly onto mainline fittings.

.3 Cast Iron Fittings

Cast iron fittings such as bends, tees, crosses, adapters, end caps, etc., shall be flanged or hubbed to suit. Flanges shall be standard Class 125 cast iron flanges.

.4 Fire Hydrants

All hydrants shall be equivalent in all respects to Canada Valve "Century" or Terminal City C71P compression type fire hydrants and shall be equipped with two 64 mm nominal I.D., 8 threads per 25.4mm, conforming to the B.C. Standard hose thread and one 130 mm outside diameter pumper port conforming to American National Fire Hose Coupling Threads.

Fire hydrant spacing shall conform to the latest issue of the Insurers Advisory Organization (IAO) recommendations however, in any case, fire hydrants shall not exceed spacing of 150 metres apart.

Access paths to hydrants shall be graded to all hydrants separated from the road by ditch or as otherwise directed by the City Engineer. The access pad shall generally be at the same grade elevation as the road shoulder with a culvert installed in the ditch.

.5 Valve Boxes

Valve boxes shall be telescopic Robar No. 37-72, Nelson or equivalent.

.6 Service Connections

Service connection pipe up to and including 50 mm diameter shall be Type K soft copper tube conforming to ASTM specification B88. Services shall be continuous with no joints.

Corporation cocks shall be Mueller standard brass.

Curb Stops shall be stop and drain type Mueller brass or equivalent with an inverted key and adjustable service box.

(23.)

Service saddles shall be of the double strap type with bronze body and stainless steel straps.

All bushings, reducers, unions and nipples shall be standard brass.

.7 Coupling Clamps

Upon approval from the City Engineer, joining of two plain end pipes may be made by use of Robar Series 306 stainless steel clamps or equivalent.

.8 Air Release

Provisions for air release shall be provided at all critical high points of the water system. Should air release through fire hydrants and services not be sufficient or non-existent on the designed system, air and vacuum release valves shall be installed.

Air and vacuum release valves shall be installed in a reinforced concrete chamber, designed to withstand H2O loading. The chamber shall be vented, insulated, have an access ladder and be drained to a rock pit.

.9 Pressure Reducing Valves

Individual pressure reducing valves installed on house or building services shall be WATTS No. U5 or equal.

Mainline pressure reducing valve stations shall comprise:

- 2 pilot activated PRV's installed in parallel c/w strainers, isolating valves and pressure gauges with the smaller valve providing normal domestic flows, and the larger responding only to fire flows;
- the complete PRV assembly to be installed in a buried reinforced concrete chamber, manufactured to accommodate H2O loading, providing minimum 2 metres head room, insulated, heated, drainage to a storm sewer or other approved location, aluminum access ladder, and lockable Bilco type access hatch.

403 CONSTRUCTION STANDARDS

403.1 Pipe Bedding Material

- .1 Pipe bedding shall be undertaken in strict accordance with the manufacturer's bedding requirements for the type of pipe utilized. Sand bedding, where required, shall be clean well graded sand with a maximum aggregate size of 6 mm (1/4") with not more than 5% by weight passing the No. 200 sieve.
- .2 Bedding material shall be provided in accordance with the standard drawings attached hereto.

403.2 Service Connections

- .1 Service connections are defined as the installation from the connection at the main up to and including curb stop and service box marked "WATER".
- .2 Service connections shall be installed in accordance with the Standard Drawings and installed wherever possible, in a common trench with the sanitary connection. The water service shall be offset 0.5 metres to the right of the sewer service when facing the lot.
- .3 The minimum depth of bury for services from finished ground elevation to the top of the pipe shall be 1.8 metres.
- .4 The size of service connections will be determined by the City Engineer based on available pressure and estimated demand. The standard house service connection shall be 19 mm diameter unless the length of service line dictates a larger service line is required.

403.3 Horizontal Reaction Blocks

Horizontal reaction blocks shall be placed between undisturbed soil and all fittings whose deflection is greater than 10 degrees. Reaction blocks for each type and size of fitting shall be sized to conform to the bearing areas specified on the standard details. Reaction block concrete shall not be placed over the joints between the fitting and the pipe.

403.4 Vertical Reaction Blocks

Vertical reaction blocks shall be placed above or below vertical fitting deflections of greater than 5 degrees (grade change of 9%).

The quantity of concrete required for each reaction block is calculated from the following formula:

(25.)

$$\text{Concrete Required in sq m} = \frac{2 \times 1000 \text{ HA Sin } 1/2 \times 1.5}{2405}$$

Where:

H = Calculated head at the fitting in metres:

A = Cross-sectional area of the main in square metres;

\ = Deflection angle of the fitting.

403.5 Pipe Anchors

- .1 Pipe anchors shall be placed around water mains, laid at grades of 20% and steeper, and shall be constructed in accordance with the standard details.
- .2 All pipe anchors shall be constructed with 20 MPa concrete and shall project a minimum of 200mm into undisturbed soil at the bottom and sides of the trenches.

403.6 Erosion Protection

Trench backfill on steep sideslopes shall be placed in a manner to eliminate erosion due to surface runoff. Design drawings shall identify the means to be used for erosion protection.

403.7 Watermain Disinfection and Flushing

- .1 Providing the inside of the pipe installed is clean, the water system may be chlorinated in accordance with the AWWA Standard C601-81, Section 7, hypochlorite tablets (with 3-3/4 grams of available chlorine per tablet). The number of tablets required for various sizes of pipe shall conform to the following table:

Length of Pipe Section in metres	Diameter of Pipe (mm)					
	50	100	150	200	250	300
4m	1	1	2	2	3	5
5.5m	1	1	2	3	5	6
6m	1	1	2	3	5	7
9m	1	2	3	5	7	10
12m	1	2	4	5	9	14

- .2 The tablets shall be attached to the top of the main by using a non-toxic waterproof glue.
- .3 If in the City Engineer's opinion the mains were constructed without due cleanliness or should the mains have to be re-chlorinated because of ineffective chlorination with tablets, chlorination shall be undertaken by the continuous feed method (AWWA Standard 601-81) until satisfactory tests have been proved.

(26.)

- .4 After 24 hour chlorination retention time, all mains, services and appurtenances shall be completely flushed of sand, silt, dirt, chlorinated water and other foreign material. The Developer shall insure that flushed water does not create a hazard or nuisance to the public, nor to public and private property. Where practical watermains shall be flushed into storm sewers or where no storm sewers or reasonable drainage areas exist, the Developer shall flush mains into a tanker truck and dispose of it away from the site. The Developer shall take full responsibility for damage to persons or property caused by his flushing operations.
- .5 After the main has been satisfactorily flushed the Developer shall collect water samples from sections of the system as prescribed by the local Health Inspector. The samples shall be submitted to the Ministry of Health for testing with test results reported directly to the City Engineer by the Ministry of Health.

403.8 Watermain Testing

- .1 All water mains shall be pressure tested with water to AWWA Standards at a minimum of 1030 KPa or 1.5 times the working pressure of the main, whichever is greater, for a minimum duration of 1 hour. The system shall be tested in sections which shall be defined as the length of watermain between two consecutive mainline valves including services, hydrants, fittings and all other appurtenances. The working pressure of the test section shall be the normal working pressure of the line at the lowest elevation within the section. Leakage pressure tests may be conducted on more than one section at a time; however, the allowable leakage for the total test length may not exceed the allowable leakage of the shortest test section.
- .2 The City Engineer shall calculate the test pressure and shall determine the leakage rate.
- .3 The allowable leakage shall be determined by the following formula:

$$L = \frac{ND}{65,200} \sqrt{P}$$

Where:

L = allowable leakage in litres per hour
N = number of joints in test section
D = inside diameter of pipe in millimeters
P = test pressure in kilopascals

(27.)

- .4 All leaks shall be repaired and all air pockets removed from the watermain test section and the test continued until the leakage is less than the allowable leakage calculated by the City Engineer.

403.9

Main Offsets From Centre Line and Depth of Bury

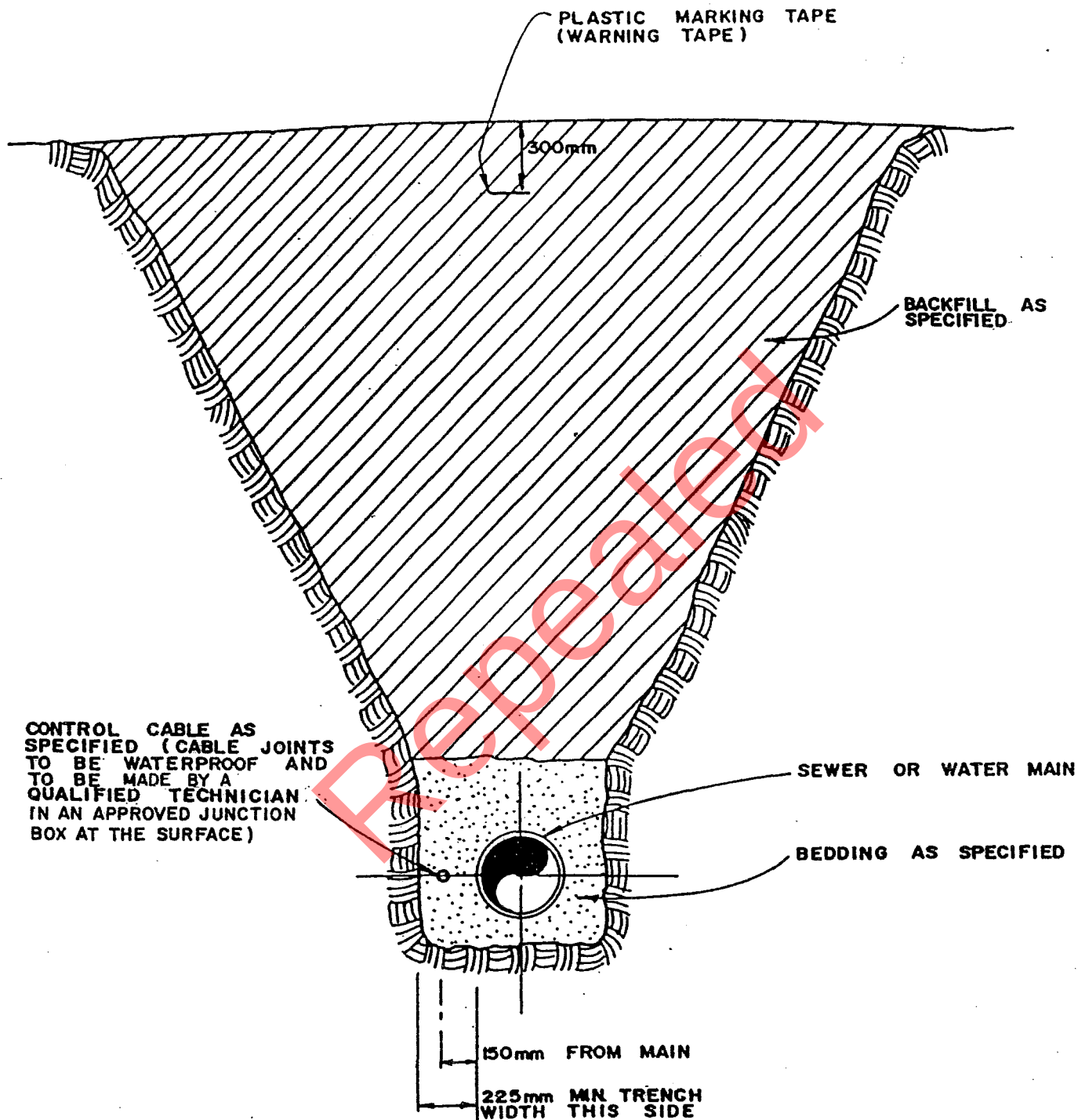
- .1 Water distribution mains shall be installed 3.0 metres from the centerline of road right-of-way on the opposite side from the storm sewer main as shown on standard detail R-6 for each road classification.
- .2 The minimum depth of bury from finished ground elevation to the top of the pipe shall be 1.8 metres.
- .3 The minimum clearance between watermain and sewermain crossings shall be:

Watermain over sewermain	- 450 mm clearance
Watermain under sewermain	- 1000 mm clearance
- .4 Where watermains are installed under the roadway or roadway shoulder, a 1.5 metre diameter asphalt apron shall be placed around all valves and appurtenance structures.

(28.)

WATER MAINS

Repealed



CITY OF MERRITT

CONTROL CABLE
INSTALLED IN COMMON TRENCH

DATE: MARCH 1987

NO. DATE

REVISION

BY APP'D

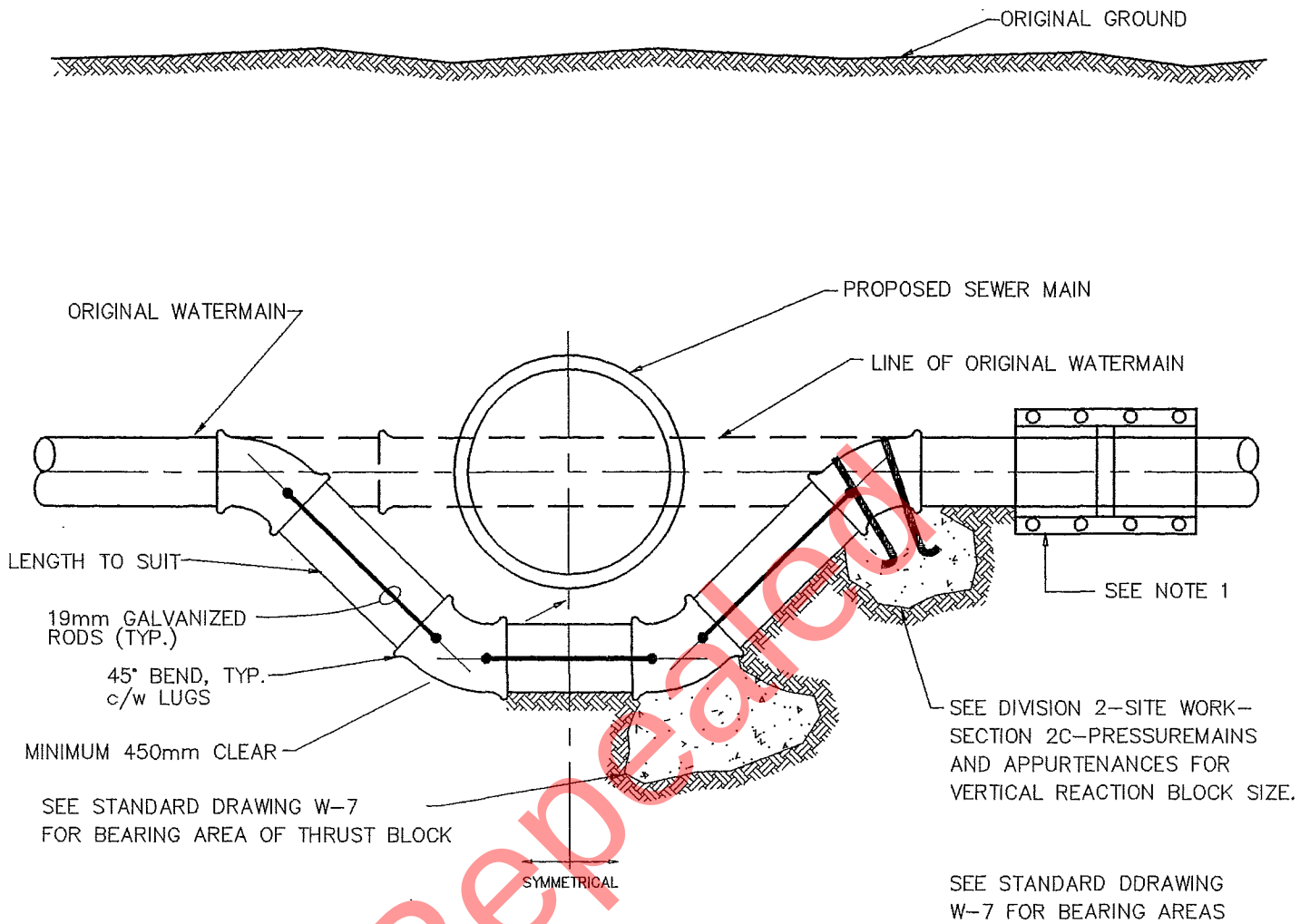
DWN. B. McL.
CHK. M.L.D.

SCALE:
N. T. S.

DWG. NO. W - 1

PLOT DATE: 95/11/22 6:30pm WT

PROJ. CAD FILE No.: C:\PROJ\0521\15\A\DESIGN\W-2.DWG 95/11/22 DMG



NOTES

1. APPROVED STAINLESS STEEL ROBAR REPAIR CLAMPS MAY BE USED TO FACILITATE CONNECTION TO EXISTING WATERMAINS.
2. CONNECTIONS SHALL BE LEFT EXPOSED UNTIL WATERMAIN JOINTS ARE PROVEN DRIP-TIGHT.



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

NOV. 1995

LATEST REVISION
DATE:

APPROVED BY:

TITLE:

WATERMAIN
REALIGNMENT

SECTION:

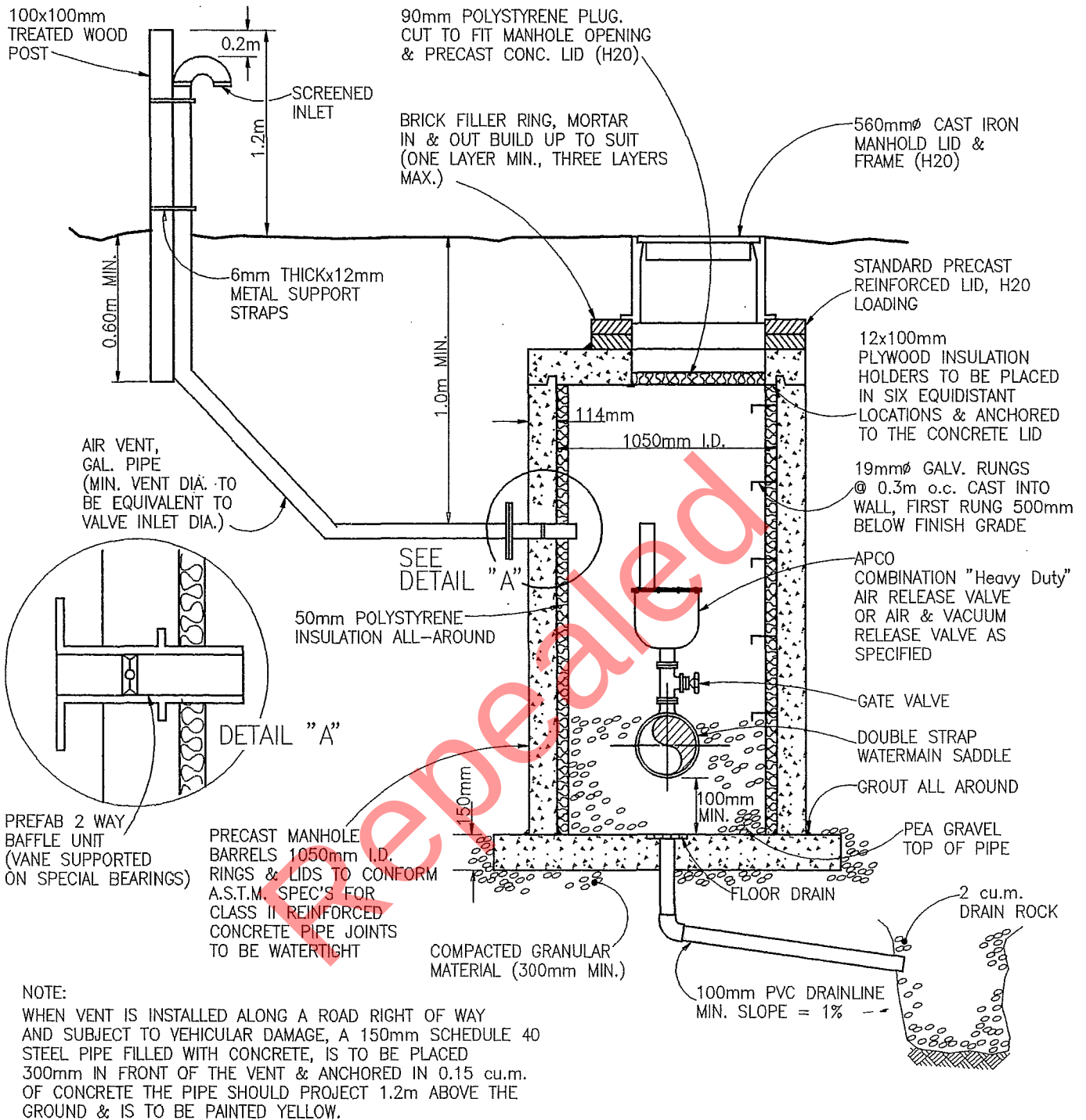
REVISION No.

DWG. No.

W-2

PLOT DATE: 95/11/22 4:10pm WT

PROJ. CAD FILE No.: C:\PROJ\0521\15\A\DESIGN\W-3.DWG 4:10pm WT



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

NOV. 1995

LATEST REVISION DATE:

APPROVED BY:

TITLE:

COMBINATION AIR RELEASE VALVE OR AIR & VACUUM RELEASE VALVE

SECTION:

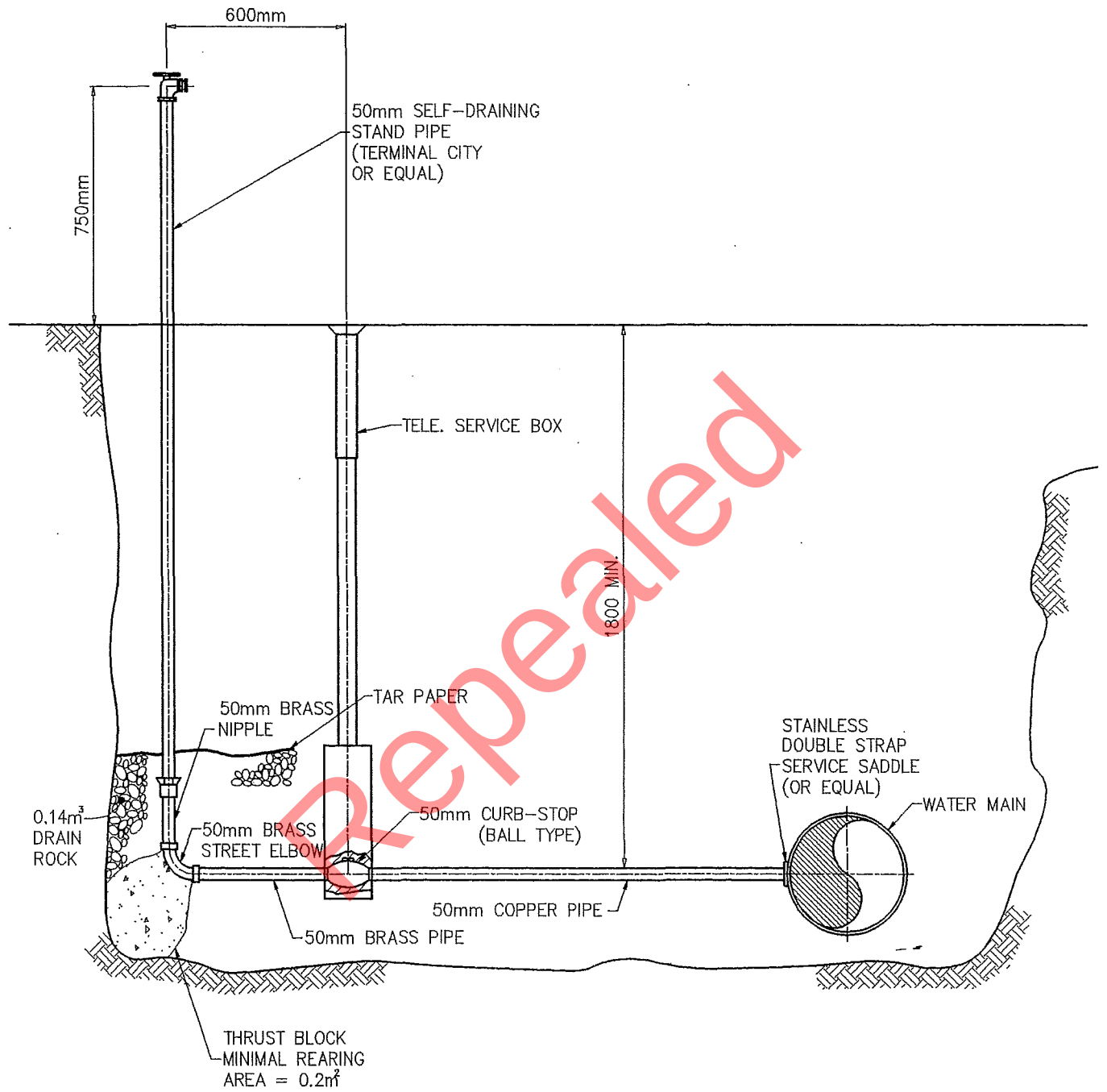
REVISION No.

DWG. No.

W-3

PLOT DATE: NOV 22/95 4:40pm

PROJ. CAD FILE No.: C:\PROJ\0521\15\A\DESIGN\W-4.DWG 95/11/22 WT



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

NOV. 95

LATEST REVISION

DATE:

APPROVED BY:

TITLE:

TYPICAL SELF-DRAIN
STANDPIPE

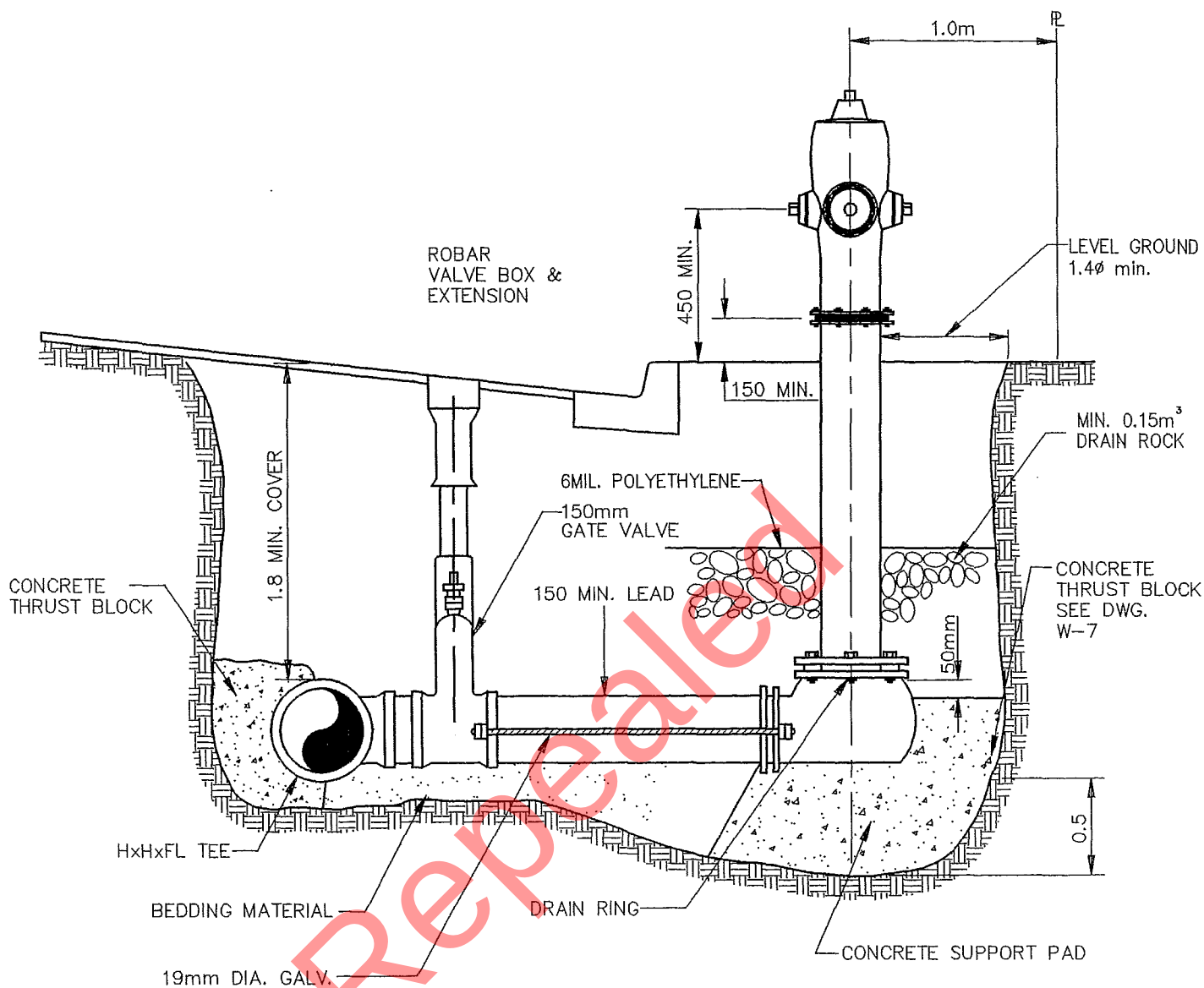
SECTION:

REVISION No.

DWG. No.

W-4

PROJ. CAD FILE No.: C:\PROJ\0521\15\A\DESIGN\W-5.DWG 95/11/22 WT



NOTES:

1. HYDRANTS – COMPRESSION TYPE AS MANUFACTURED BY:
TERMINAL CITYTC71(4.625) , CANADA VALVE 32B
2. HYDRANTS SHALL HAVE 2 – 65mm OUTLETS B.C. STANDARD THREAD
1 – 100mm PUMPER OUTLET, 4 THREADS/INCH 4.938 O.D.
LEFT HAND OPENING B.C. STANDARD THREAD
3. PUMPER OUTLET MUST FACE CURB
4. HYDRANT BOOT SIZED FOR 150mm PIPE
5. HYDRANT BODY COLOUR – YELLOW



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

NOV. 95

LATEST REVISION

DATE:

APPROVED BY:

TITLE:

STANDARD HYDRANT DETAIL

SECTION

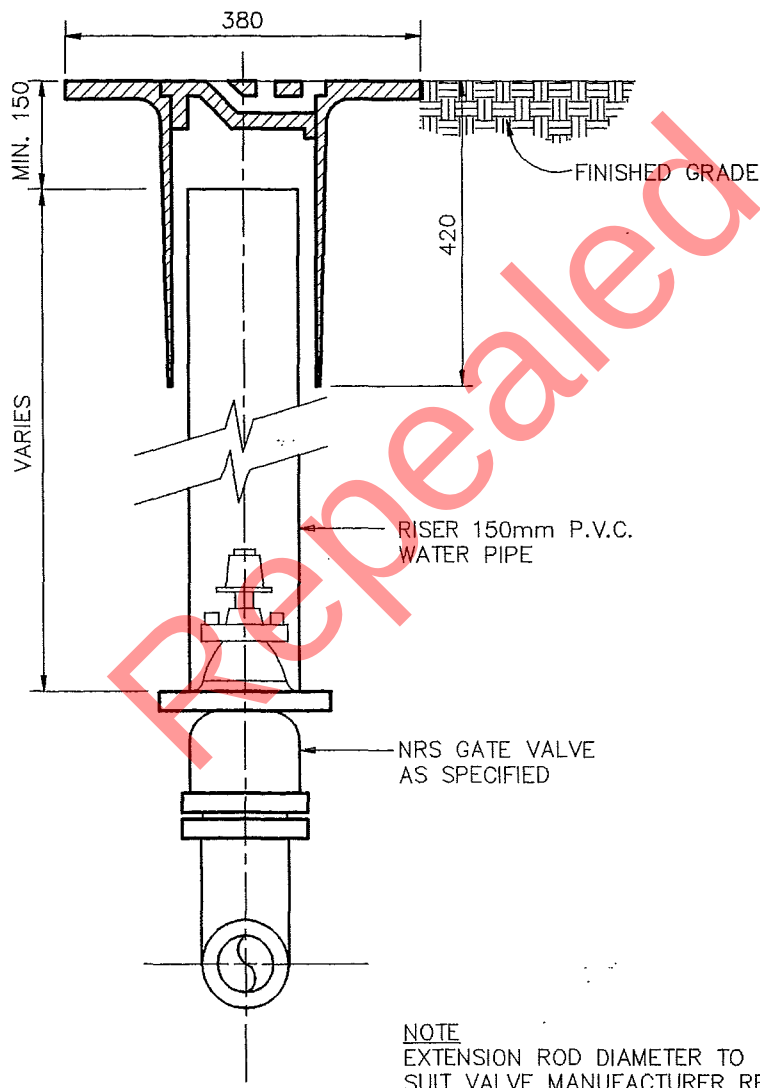
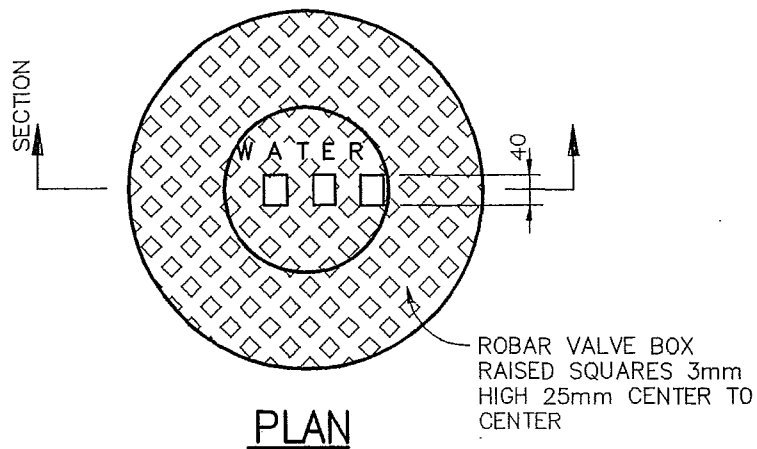
REVISION No.

BWC No.

W-5

PLOT DATE: 95/11/22 DMC

PROJ. CAD FILE No.: C:\PROJ\0521\15\A\DESIGN\W-6.DWG NOV 22/95 DMC



SECTION



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

NOV. 1995

LATEST REVISION
DATE:

APPROVED BY:

TITLE:

ROBAR VALVE BOX & RISER

SECTION:

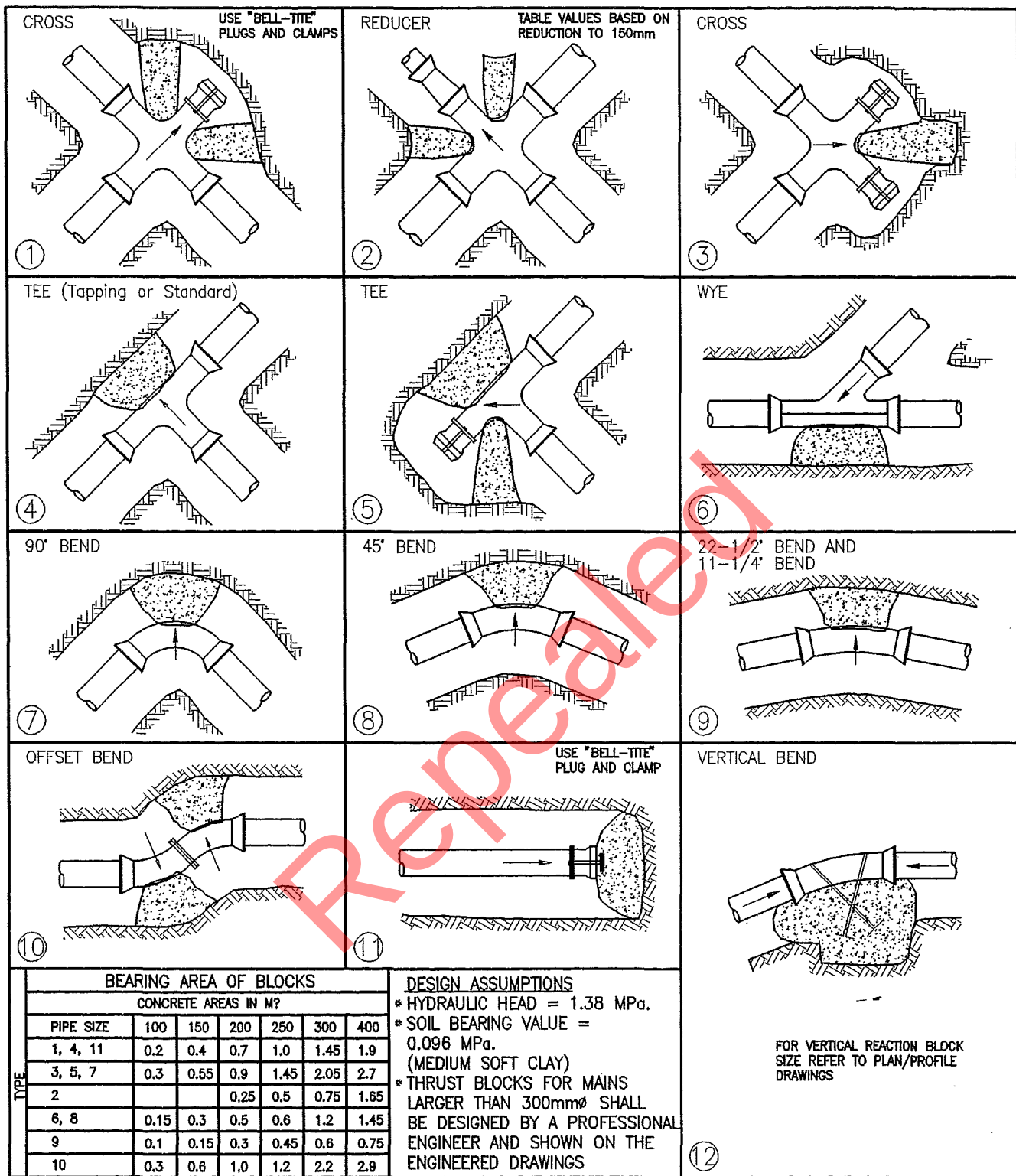
REVISION No.

DWG. No.

W-6

PLOT DATE: 95/11/07 4:30pm

PROJ. CAD FILE No.: C:\PROJ\0521\15\A\DESIGN\W-7.DWG 95/11/22 4:35pm



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

NOV. 1995

APPROVED BY:

LATEST REVISION

DATE:

TITLE:

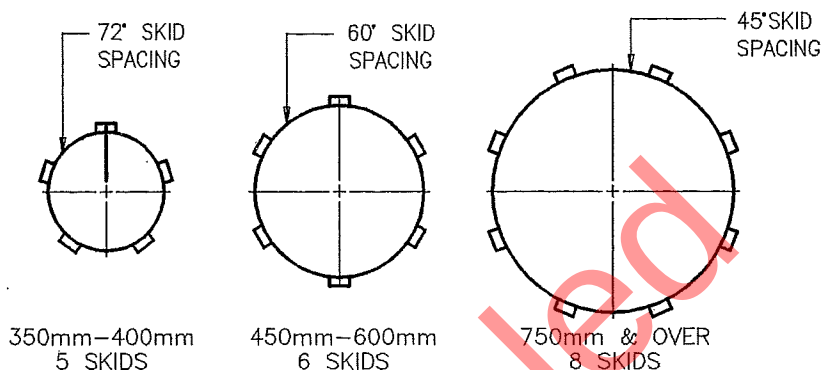
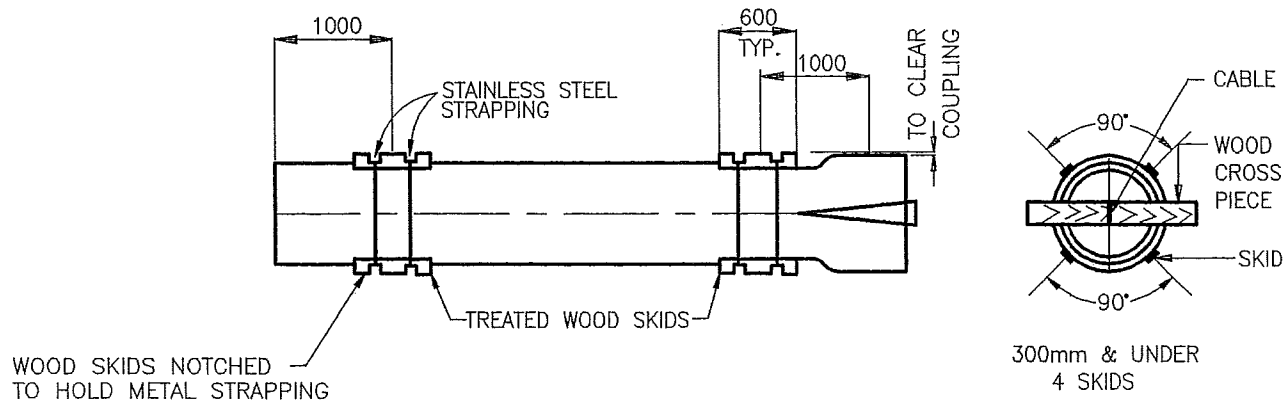
PRESSURE MAIN
THRUST BLOCK

SECTION:

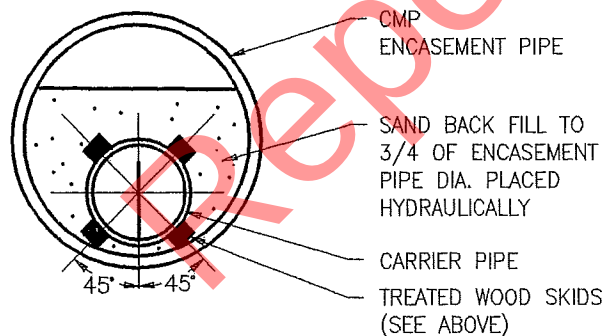
REVISION No.

DWG. No.

W-7



SKID ARRANGEMENT FOR VARIOUS PIPE SIZES



NOTES

1. CARRIER PIPE JOINTS SHALL BE SET 1000mm BEYOND THE ENDS OF THE ENCASEMENT PIPE.
2. 200mm P.V.C. PIPE ILLUSTRATED

SECTION

NOTE

FOR SMOOTH WALL ENCASEMENT PIPE, SPACERS SHALL BE "RACI SPACERS" AS MANUFACTURED BY RECON P.V.C. INC.



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

NOV. 1995

LATEST REVISION

DATE:

APPROVED BY:

TITLE:

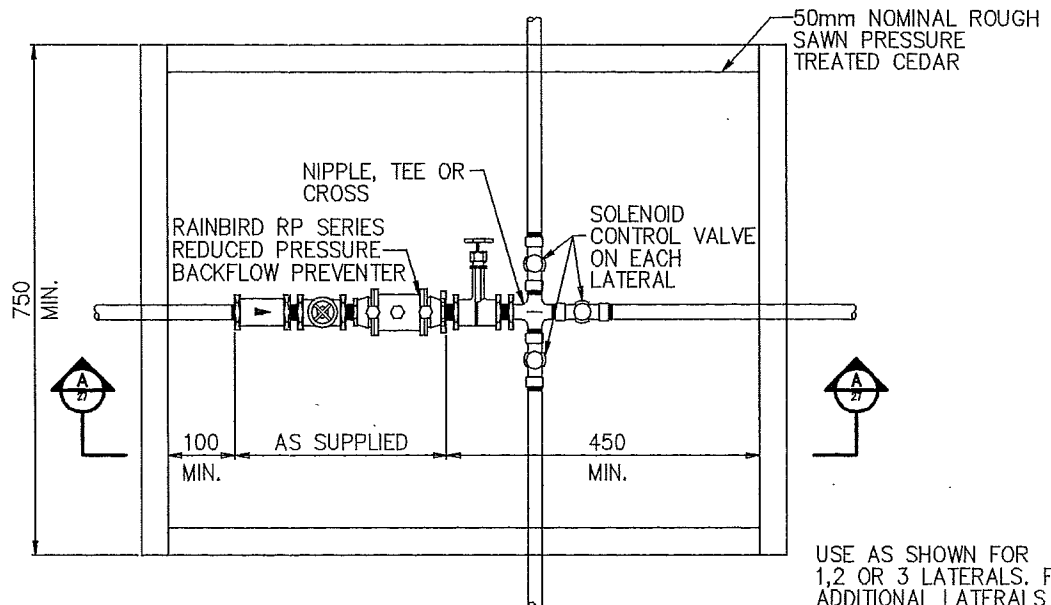
CARRIER PIPE DETAIL
FOR CMP
ENCASEMENT PIPE

SECTION:

REVISION No.

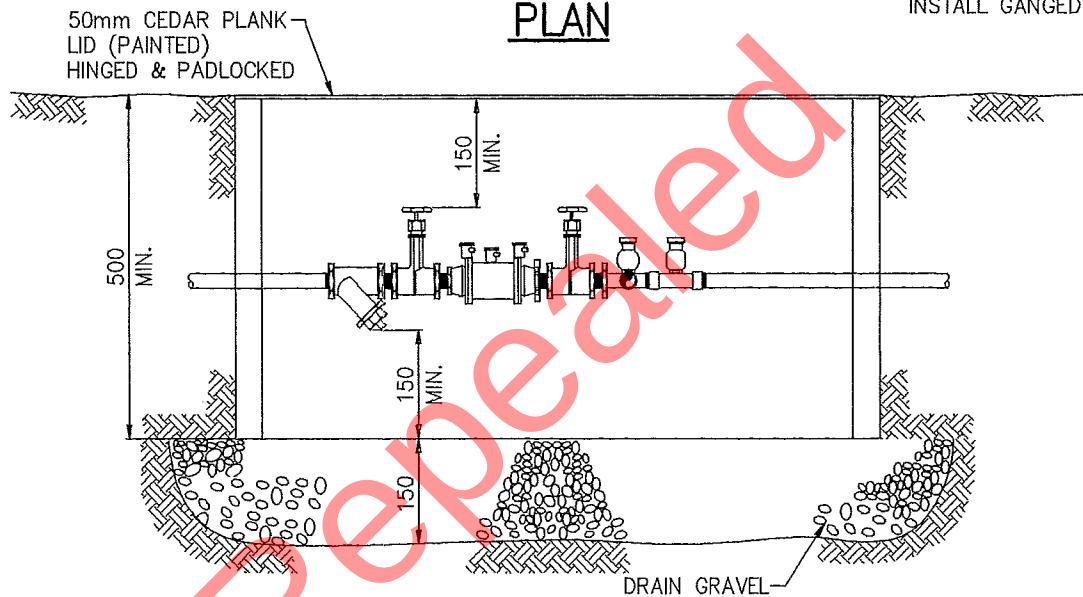
DWG. No.

M-1

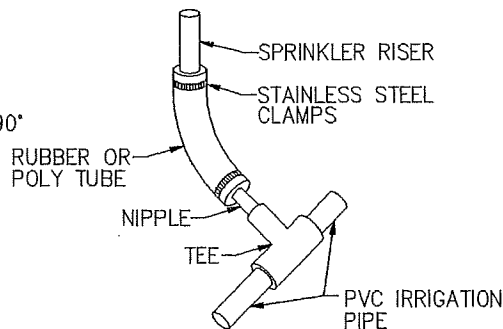
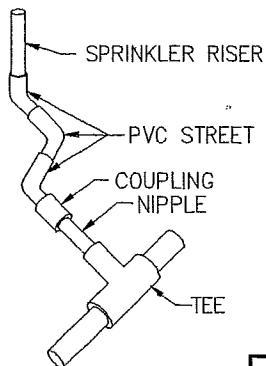


USE AS SHOWN FOR 1,2 OR 3 LATERALS. FOR ADDITIONAL LATERALS INSTALL GANGED CROSSES.

PLAN



SECTION A-A



FLEX JOINTS

NOTES:

- 1: CURB STOP BETWEEN MAIN & STRAINER WITH ACCESS TO SURFACE.
- 2: CONTROLLER TO BE AC OR DC 9 VOLT
- 3: LINES TO BE DRAINABLE 1/2 TO 3/4 IPT FOR COMPRESSOR CONNECTION.



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

LATEST REVISION
DATE:

APPROVED BY:

TITLE:

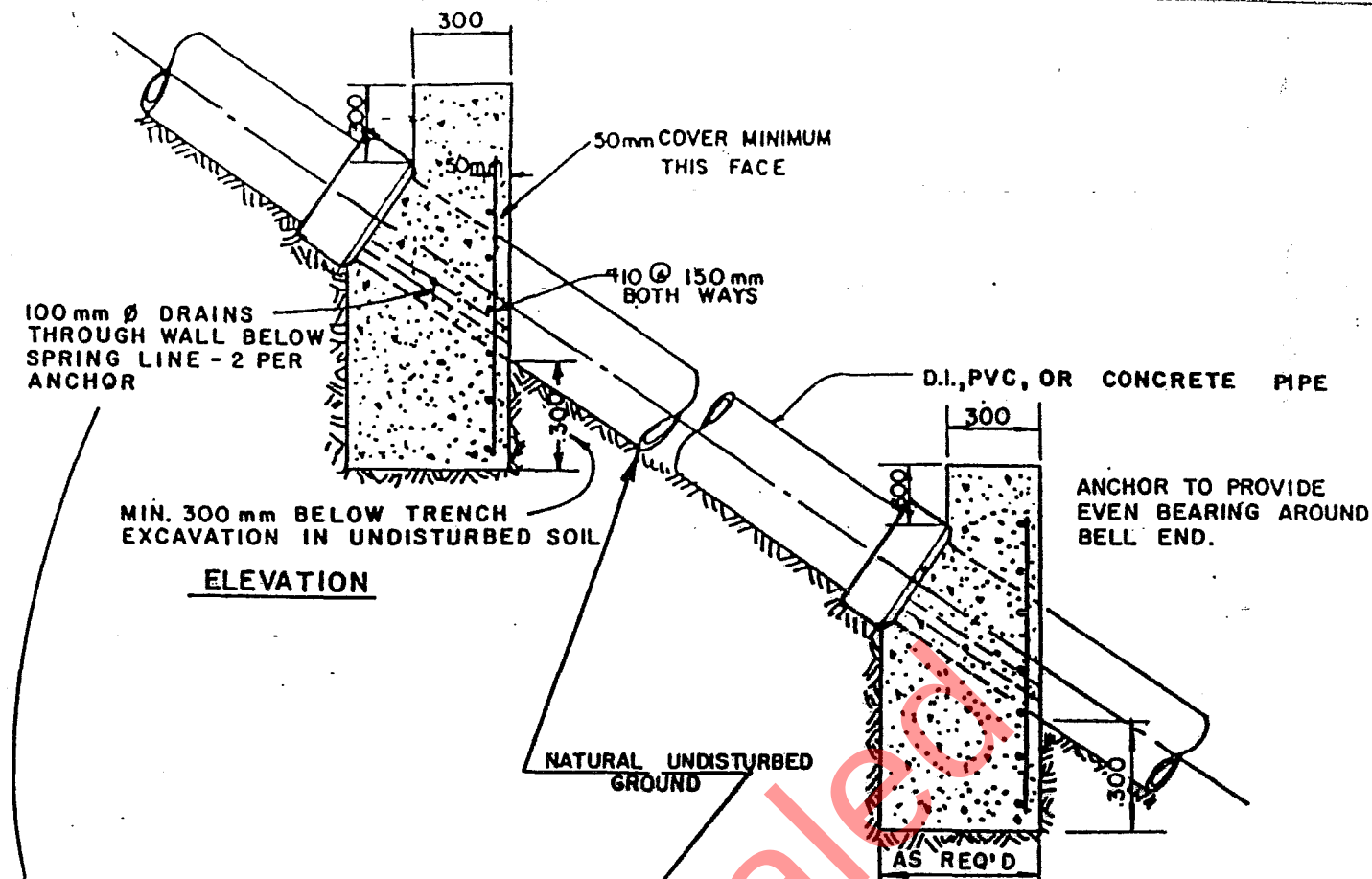
**MEDIAN IRRIGATION
DETAILS**

SECTION:

REVISION No.

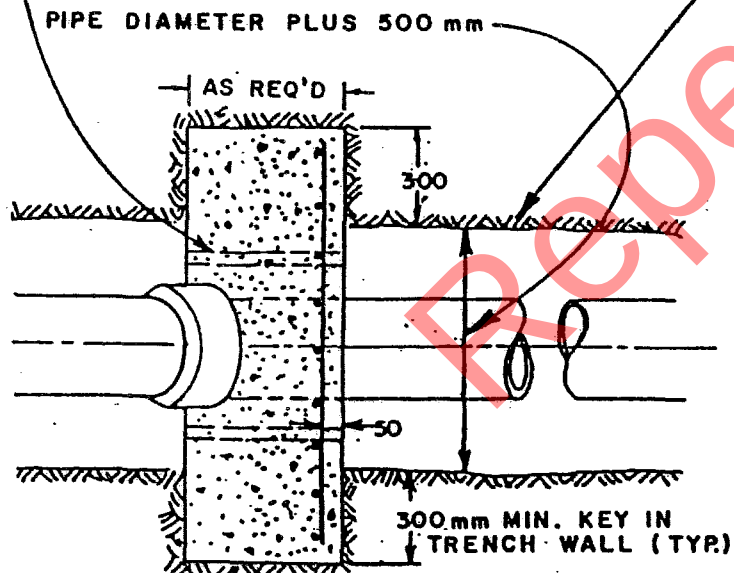
DWG. No.

M-2



NOTES

1. CONCRETE SHALL BE 20. M P a. 28 DAY STRENGTH.
2. ANCHORAGE REQUIRED WHERE SLOPE EXCEEDS
 20 - 35 % Locate every 11 m
 35 - 50 % " " 7.3 m
 greater than 50 % Locate every 5m.
3. NO REBAR IS TO BE PLACED WITHIN 150 mm OF MAINS.
4. ANCHORS ARE TO BE PLACED AGAINST AND ON THE DOWNHILL SIDE OF THE BELL OF THE PIPE, BUT MUST NOT SURROUND IT.
5. DOWNHILL FACE OF ANCHORS TO BE BEARING ON UNDISTURBED SOIL.



PLAN



CITY OF MERRITT

WATERMAIN AND
SEWERMAIN ANCHORS

DATE: MARCH 1987

NO. DATE

REVISION

BY

APP'D

DWN B. McL.
CHK. M. L. O.

SCALE:
N. T. S.

DWG. NO.

M-3



CITY OF MERRITT

RECORD OF LEAKAGE — PRESSURE TESTS
ON PRESSURE MAINS

JOB No. _____

PROJECT _____ UTILITY _____
OWNER _____ DATE _____, 19 ____
CONTRACTOR _____
LOCATION _____
BETWEEN _____ AND _____

A. CALCULATIONS

MAINLINE WORKING PRESSURE (AT LOW POINT) _____ k Pa.

1.5 TIMES WORKING PRESSURE _____ k Pa.

TEST PRESSURE TO NEAREST ALLOWABLE INCREMENT _____ k Pa.

NOMINAL LENGTH OF PIPE SECTIONS _____ METRES.

SIZE	TYPE	CLASS	LENGTH	MAIN JOINTS	FITTING & SERVICE JOINTS	TOTAL JOINTS	ALLOW. RATE $L = \frac{NO. J}{65200}$	ALLOWABLE LEAKAGE

CUMULATIVE ALLOWABLE LEAKAGE _____ LITRES/HR.

RESERVOIR _____ CALIBRATED AT _____ mm/LITRE.

ALLOWABLE RESERVOIR WATER LEVEL DROP _____ mm/HR.

B. TEST (Min. Duration of Two Hours)

DATE	TIME	RESERVOIR MEASURE	DIFFERENCE	LEAKAGE	COMMENT

C. ACCEPTANCE

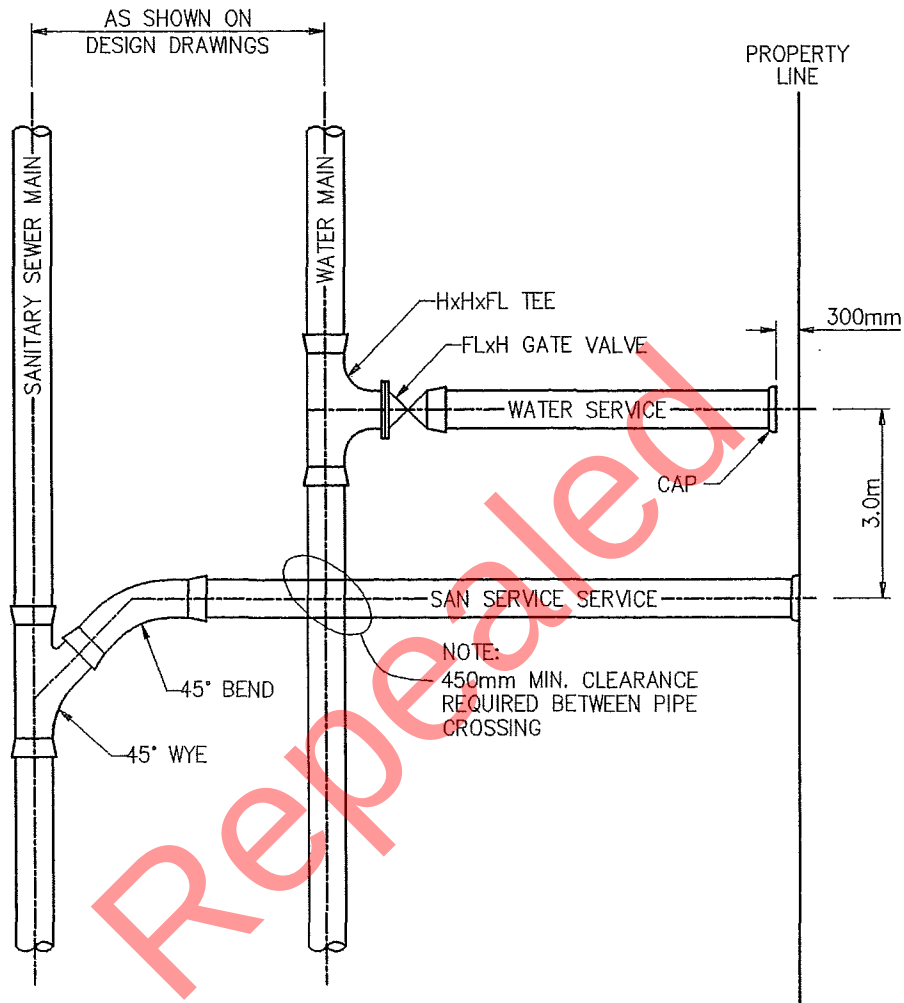
THE AFOREMENTIONED PRESSURE MAIN HAS BEEN TESTED AND FOUND TO CONFORM TO AWWA STANDARDS.

DATE _____, 19 ____

WITNESSED BY _____ FOR CITY OF MERRITT

_____ FOR CONTRACTOR.

_____ FOR _____



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

NOV. 1995

LATEST REVISION

DATE:

APPROVED BY:

TITLE:

LARGE DIAMETER
SEWER & WATER SERVICES

SECTION

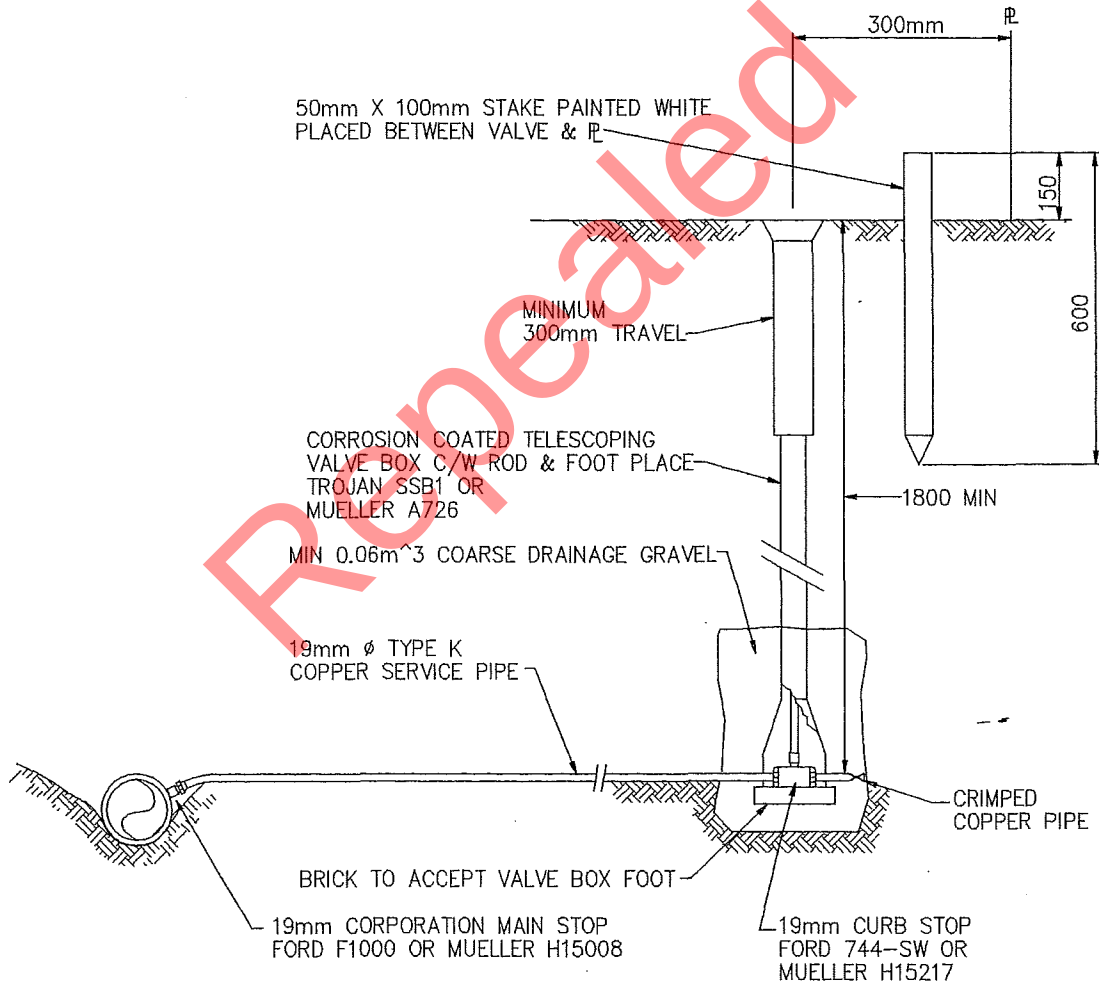
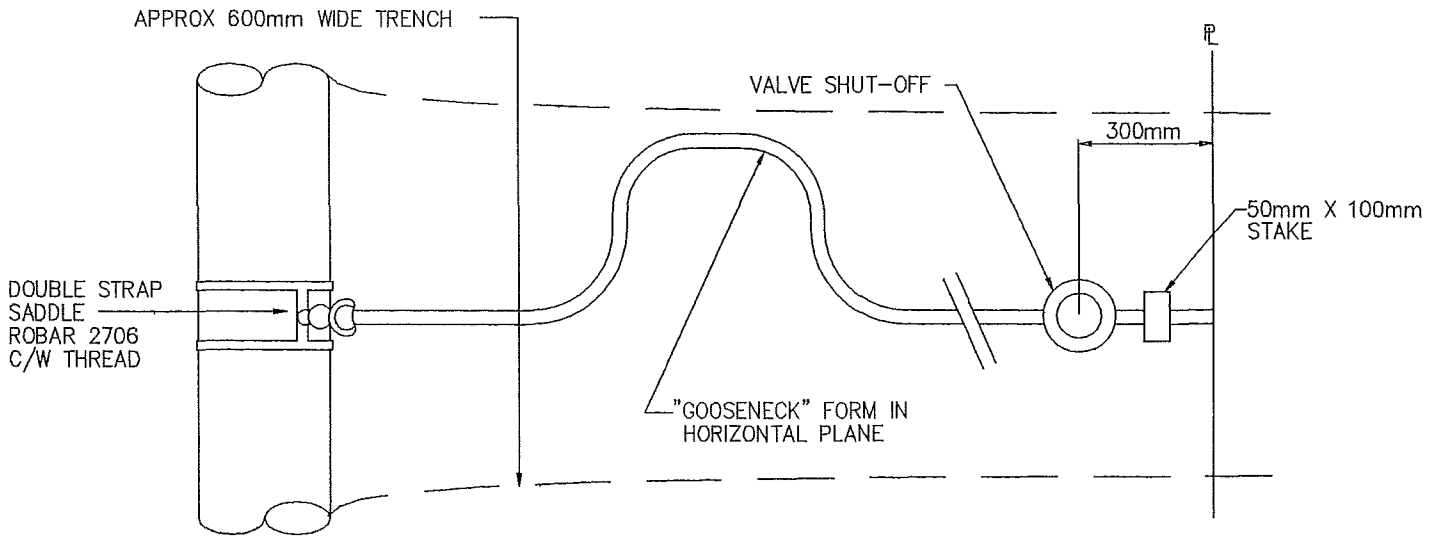
REVISION No.

DWG. No.

S-1

PLOT DATE: NOV22/95

PROJ. CAD FILE No.: C:\PROJ\0521\15\A\DESIGN\S-2.DWG NOV22/95 DMC



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

NOV 95

LATEST REVISION DATE:

APPROVED BY:

TITLE:

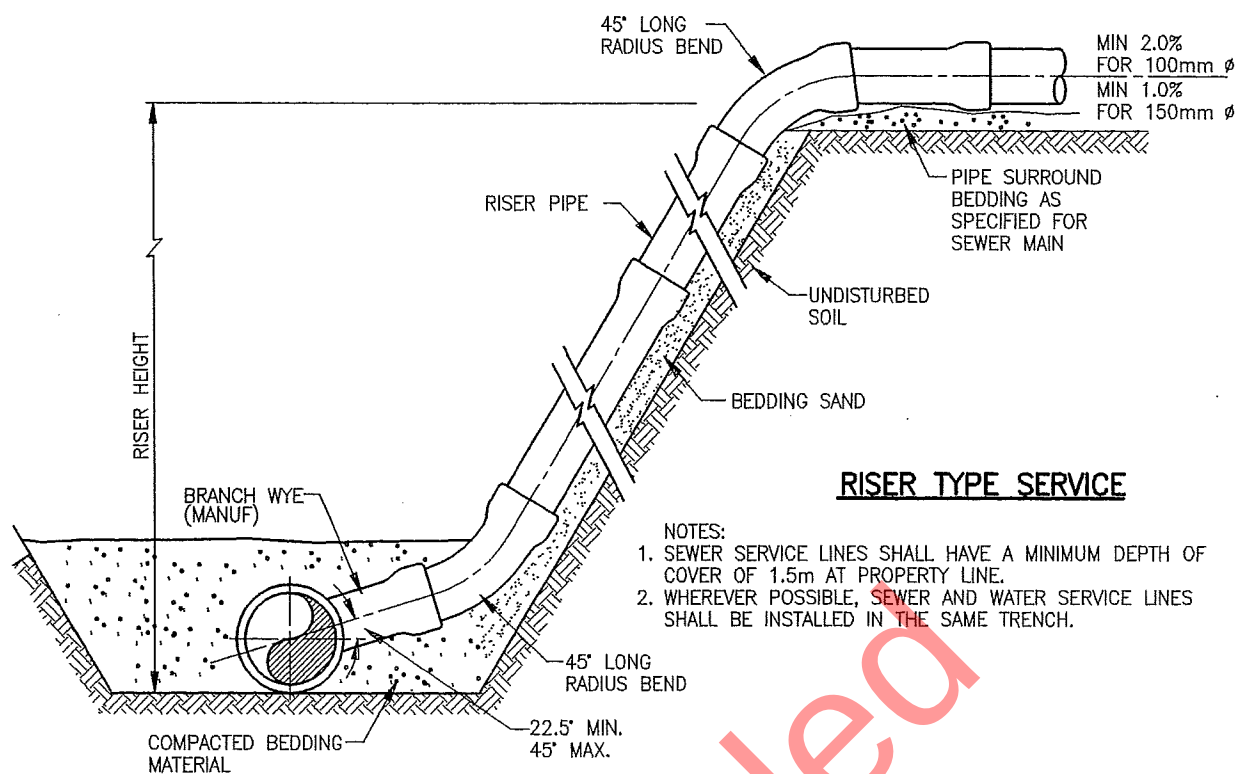
TYPICAL 19mm WATER SERVICE CONNECTION

SECTION:

REVISION No.

DWG No.

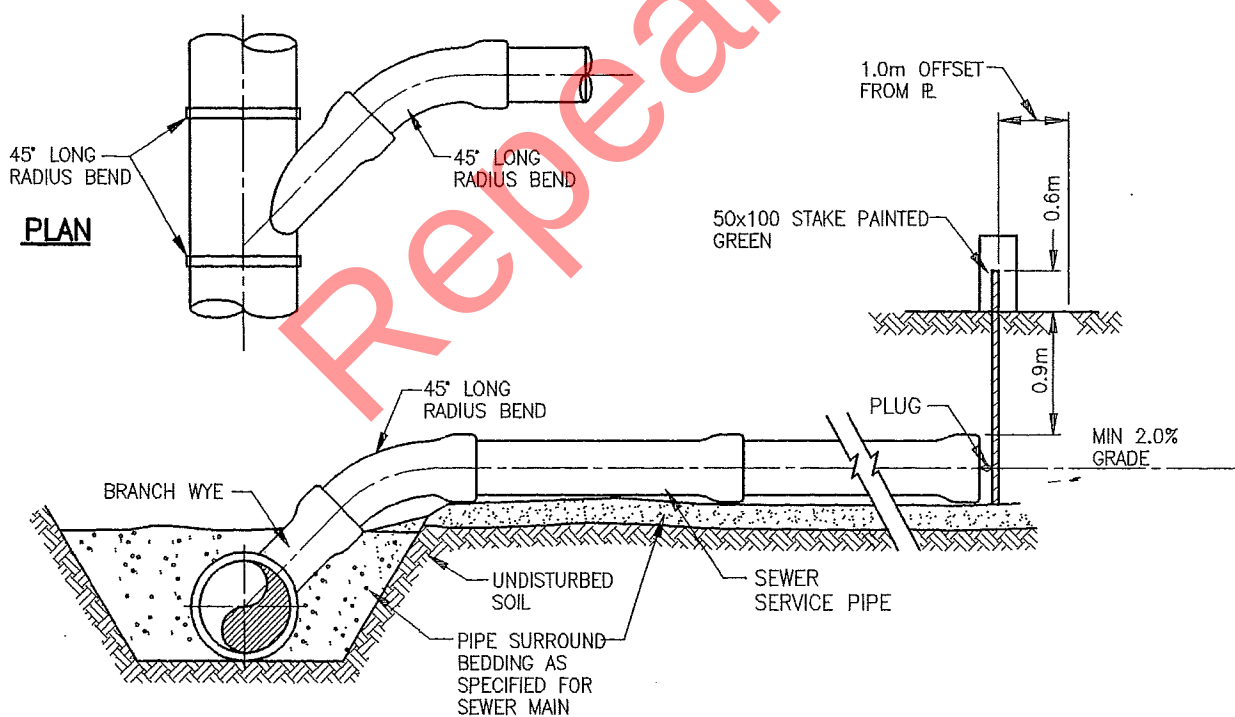
S-2



RISER TYPE SERVICE

NOTES:

1. SEWER SERVICE LINES SHALL HAVE A MINIMUM DEPTH OF COVER OF 1.5m AT PROPERTY LINE.
2. WHEREVER POSSIBLE, SEWER AND WATER SERVICE LINES SHALL BE INSTALLED IN THE SAME TRENCH.



NON-RISER TYPE SERVICE



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

NOV. 1995

APPROVED BY:

TITLE:

TYPICAL SEWER SERVICE CONNECTION

SECTION

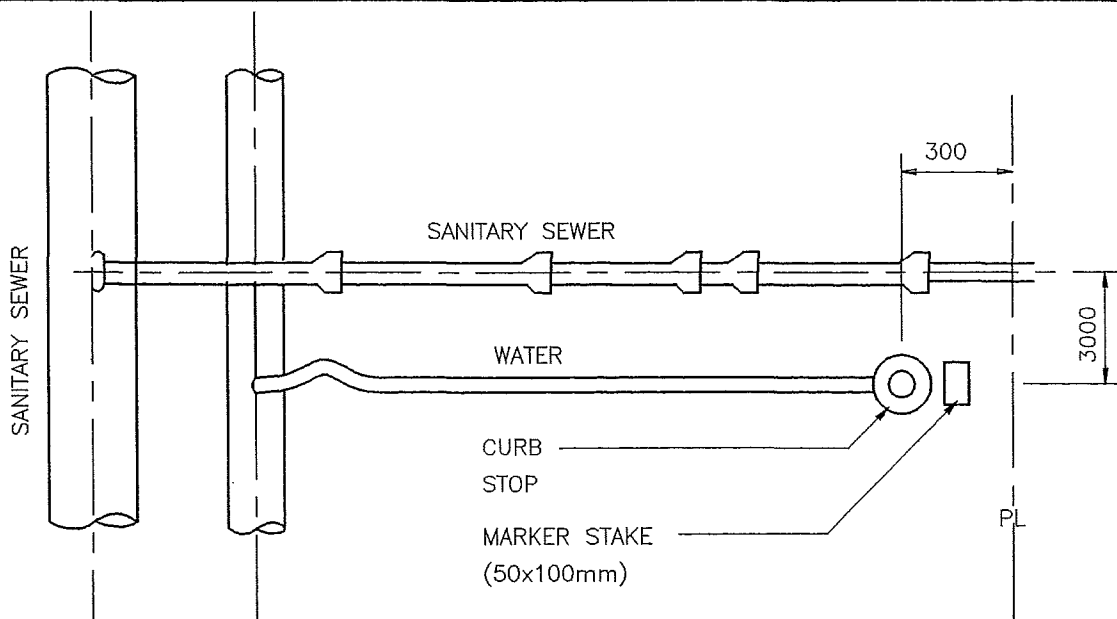
REVISION No.

DWG No.

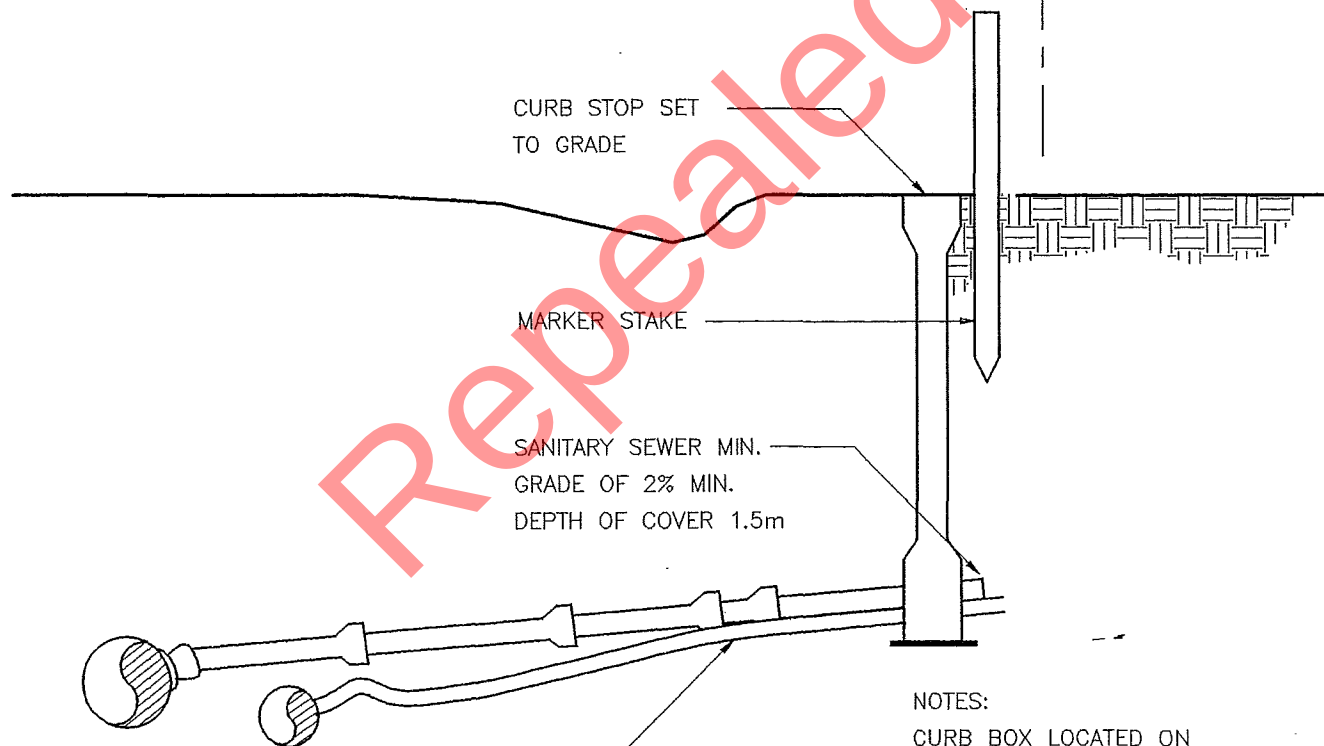
S-3

PLOT DATE: 95/11/22 4:05pm

PROJ. CAD FILE No.: C:\PROJ\0521\15\A\DESIGN\S-4.DWG 4:00pm WT



PLAN



ELEVATION

NOTES:

CURB BOX LOCATED ON
CENTRE LINE OF LOT UNLESS
SPECIFIED OTHERWISE.
VIEWING THE TRENCH FROM
THE ROAD, THE SANITARY
SEWER SERVICE IS LOCATED
TO THE LEFT OF THE CURB BOX.



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

NOV. 1995

LATEST REVISION
DATE:

APPROVED BY:

TITLE:

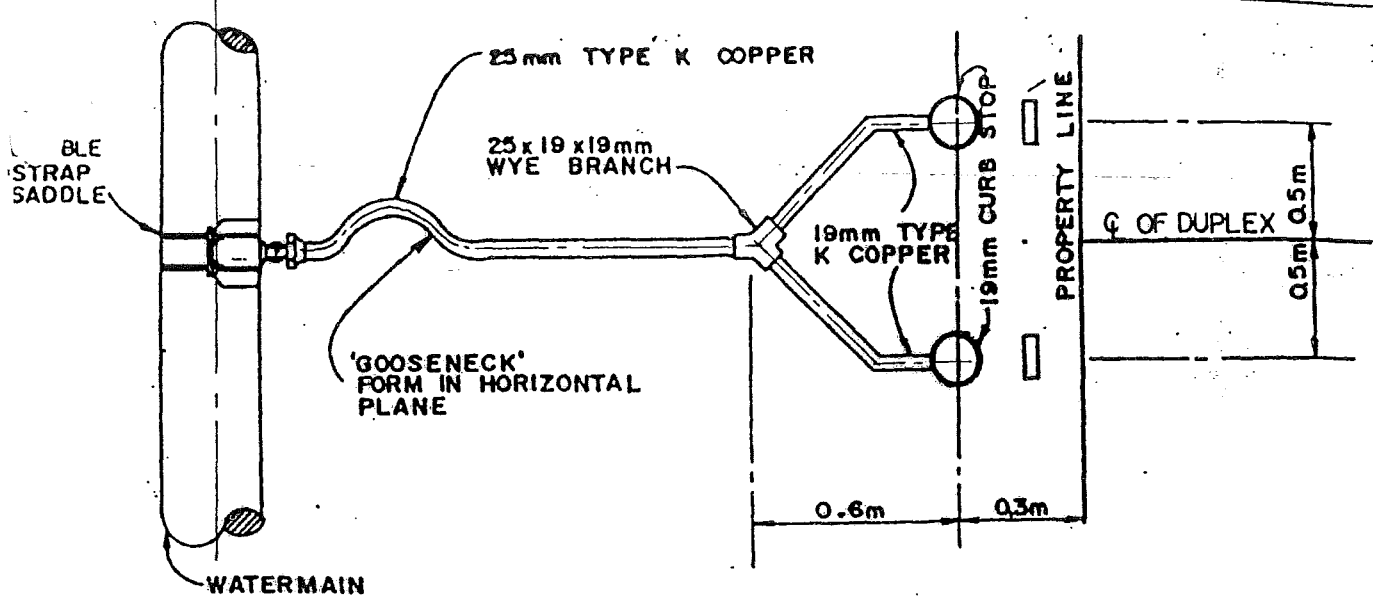
SEWER AND WATER
SERVICE INSTALLATION

SECTION:

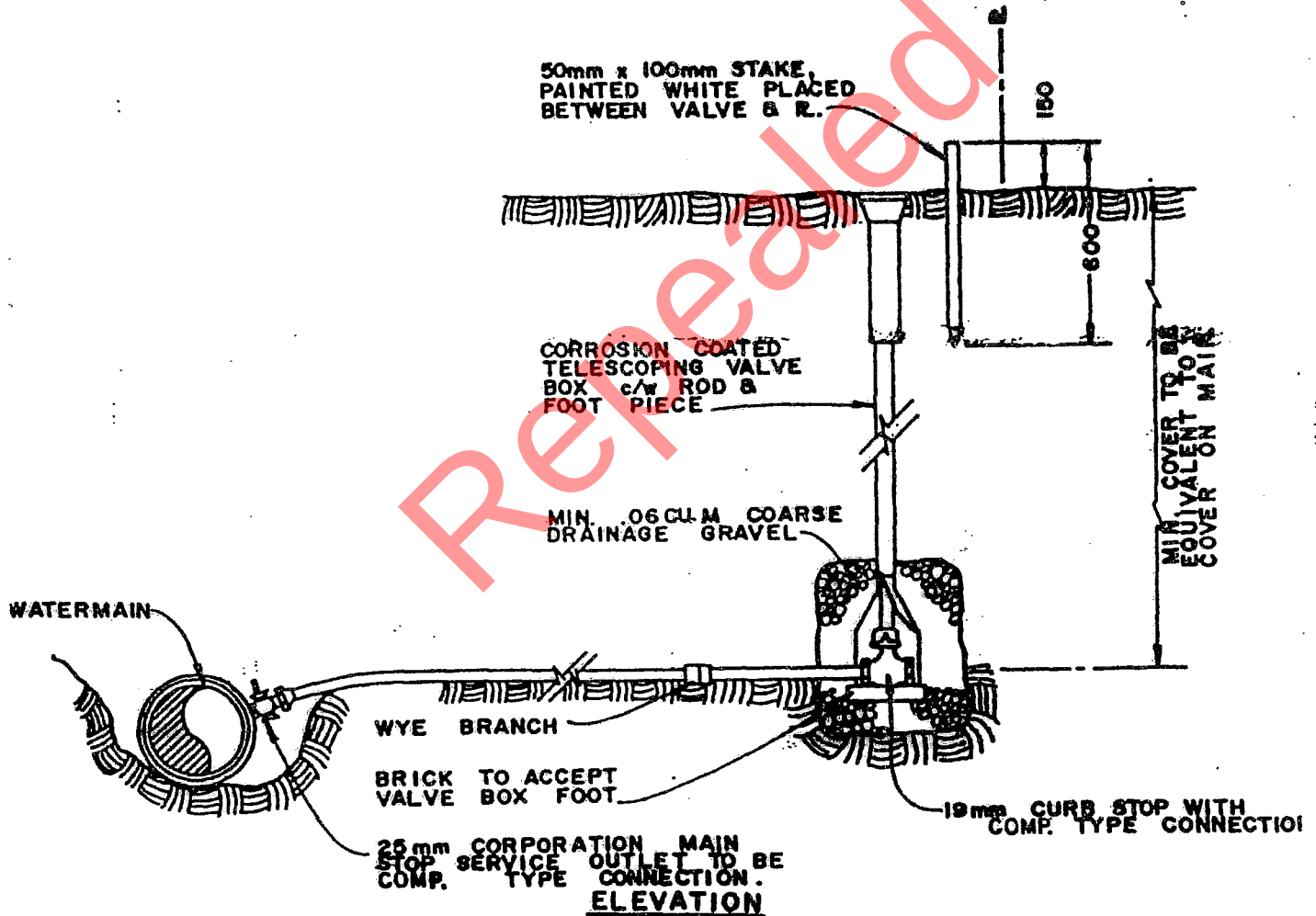
REVISION No.

DWG No.

S-4



PLAN



ELEVATION



CITY OF MERRITT

DATE: MARCH 1987

NO. DATE

REVISION

BY APP'D

DWN. B. McL.
CHK. M.L.D.

SCALE:
N.T.S.

DWN. NO.
S-5

DOUBLE WATER
SERVICE CONNECTION
TO DUPLEXES

CITY OF MERRITT
BYLAW NO.
1187, 1480 & 1523

CITY OF MERRITT
CONSTRUCTION COMPLETION CERTIFICATE

1.0 PROJECT DESCRIPTION

Project _____ Developer _____ Engineer _____ Contractor _____
Description _____

2.0 FIRST SUBMISSION

2.1 By Consulting Engineer

I _____ P. Eng. of the firm _____ hereby certify that the works described above have been installed according to the plans and specifications approved pursuant to Subdivision and Development Servicing Bylaw No. 1187, 1987 and are now complete and may be used for the purpose intended. I hereby recommend this project be approved and a Construction Completion Certificate be issued.

Inspector

Project Engineer

Signing Officer

P. Eng. Seal

Date

2.2 By City of Merritt

Approval granted on _____, 20_

Approving Officer

Approval rejected on _____, 20_

Approving Officer

Deficiencies to be rectified before approval is granted and this Construction Completion Certificate issued:

3.0 FINAL SUBMISSION

3.1 By Consulting Engineer

I hereby certify that the deficiency items listed on this certificate have now been corrected and that as-constructed drawings have been prepared, finalized and submitted to the City Engineer.

Inspector

Project Engineer

Signing Officer

P. Eng. Seal

Date

3.2 By City of Merritt

Construction of the above described project is now complete and this Construction Completion Certificate is hereby issued.

Approved on _____, 20_

Approving Officer

Maintenance Period Expiry Date _____, 20_

CITY OF MERRITT
FINAL ACCEPTANCE CERTIFICATE

1.0 PROJECT DESCRIPTION

Project _____ Developer _____ Engineer _____
Contractor _____
Description _____
Date of Construction Completion Certificate _____, 20__.
Maintenance Period Expiry _____, 20__.

2.0 FIRST SUBMISSION

2.1 By Consulting Engineer

The maintenance period is about to expire and I _____ P. Eng. of the firm _____ hereby certify that the works described above are in good order and recommend a Final Acceptance Certificate for this project be approved and Issued by the City of Merritt.

Project Engineer

Signing Officer

Date

P. Eng. Seal

2.2 By City of Merritt

Approval granted on _____, 20__

Approving Officer

Approval rejected on _____, 20__

Approving Officer

Deficiencies to be rectified before approval is granted and this Final Acceptance Certificate issued:

3.0 FINAL SUBMISSION

3.1 By Consulting Engineer

I hereby certify that the deficiency items listed on this certificate have now been corrected and that a Final Acceptance Certificate be approved by the City of Merritt.

Inspector

Project Engineer

Signing Officer

Date

P. Eng. Seal

3.2 By City of Merritt

The above described project is now complete and this Final Acceptance Certificate is hereby issued.

Approved on _____, 20__

Approving Officer

ROLL NUMBER							
LEGAL DESCRIPTION							
LOT	BLK	D.L.	1/4	SEC.	T.P.	PLAN	



CITY OF MERRITT

ADDRESS OF PROPERTY

Municipal Services Record

MASTER LEGAL MAP

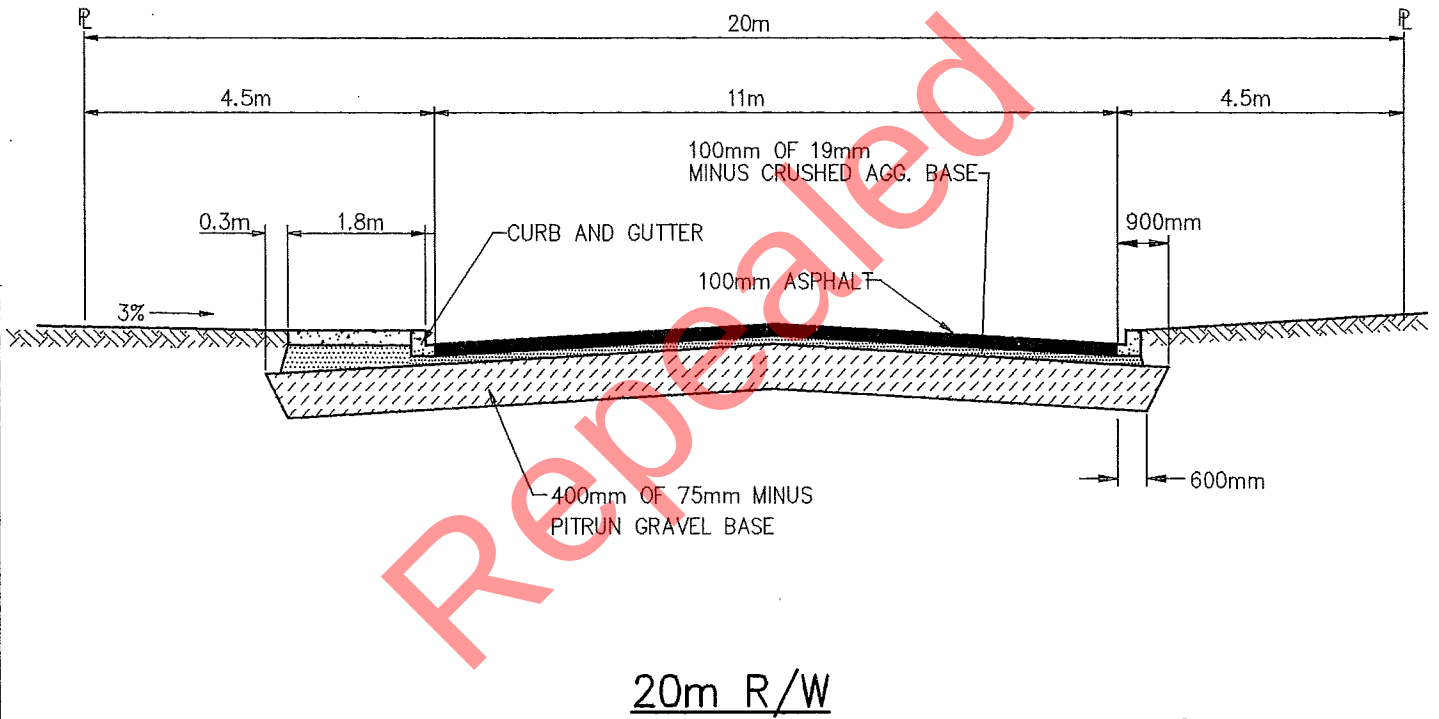
	WATER	SANITARY SEWER	STORM SEWER	CONNECTION LOCATIONS SKETCH
DATE OF APPLICATION				WATER ____ SANITARY ____ STORM 
PERMIT NUMBER				
INSTALLATION DATE				
SIZE OF SERVICE				
LOCATION AT P.L.				
INVERT AT P.L.				
LENGTH OF CONNECTION				
METER SIZE & TYPE				
DEPTH OF MAIN				
DIST. FROM WYE TO M.H.				
MEASURED FROM M.H. No.				
RISER				
TYPE OF PIPE				
CULVERT INSTALLATIONS				
DATE	PERMIT No.	SIZE/TYPE	FOOTAGE	

NOTE:

THIS IS A REDUCTION OF A RECORD CARD. FOR AS BUILT PURPOSES, FULL SIZED CARDS CAN BE OBTAINED FROM THE APPROVING OFFICER.

PLOT DATE: 95/11/22 5:40pm WT

PROJ. CAD FILE No.: C:\PROJ\0521\15\A\DESIGN\R-2.DWG 95/11/22 WT



NOTE:
SIDEWALK REQUIRED FOR COMMERCIAL ONLY.



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

NOV. 95

LATEST REVISION
DATE:

APPROVED BY:

TITLE:

INDUSTRIAL STREET
LEVEL OF SERVICE 1

SECTION:

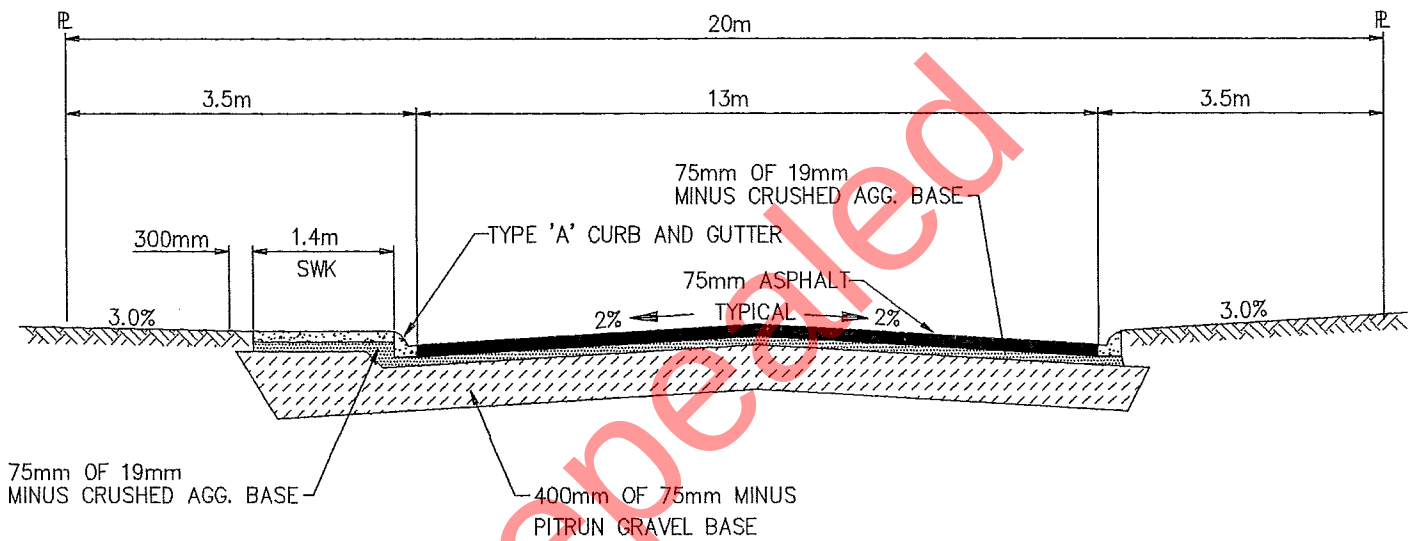
REVISION No.

DWG. No.

R-2

PLOT DATE: NOV 22/95

PROJ. CAD FILE No.: C:\PROJ\0521\15\A\DESIGN\R-3.DWG NOV22/95 DMc



20m R/W

THE THICKNESS OF GRAVEL SUBBASE MAY CHANGE,
DEPENDING ON THE INTEGRITY OF SUBGRADE SOIL.



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

LATEST REVISION
DATE:

APPROVED BY:

TITLE:

COLLECTOR
STREET
LEVEL OF SERVICE 1

SECTION

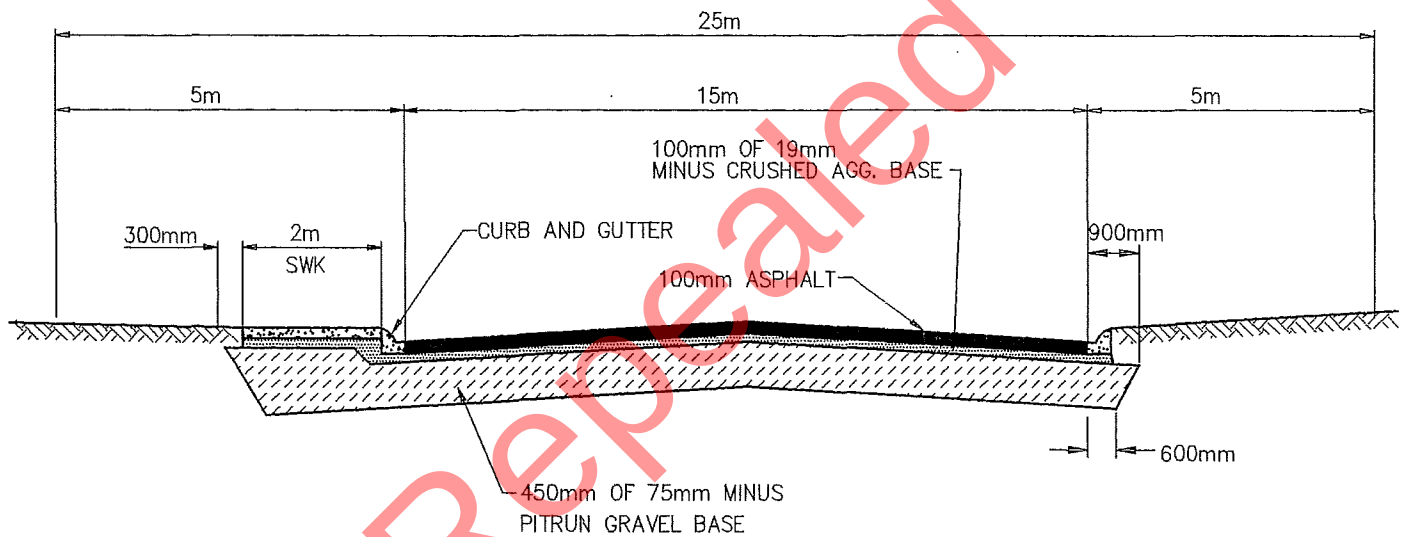
REVISION No.

DWG No.

R-3

PLOT DATE: 95/11/22 5:30pm WT

PROJ. CAD FILE No.: C:\PROJ\0521\15\A\DESIGN\R-4.DWG 95/11/22 WT



25m R/W

NOTE:

THE THICKNESS OF GRAVEL SUBBASE MAY CHANGE,
DEPENDING ON THE INTEGRITY OF SUBGRADE SOIL.



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

NOV. 95

LATEST REVISION
DATE:

APPROVED BY:

TITLE:

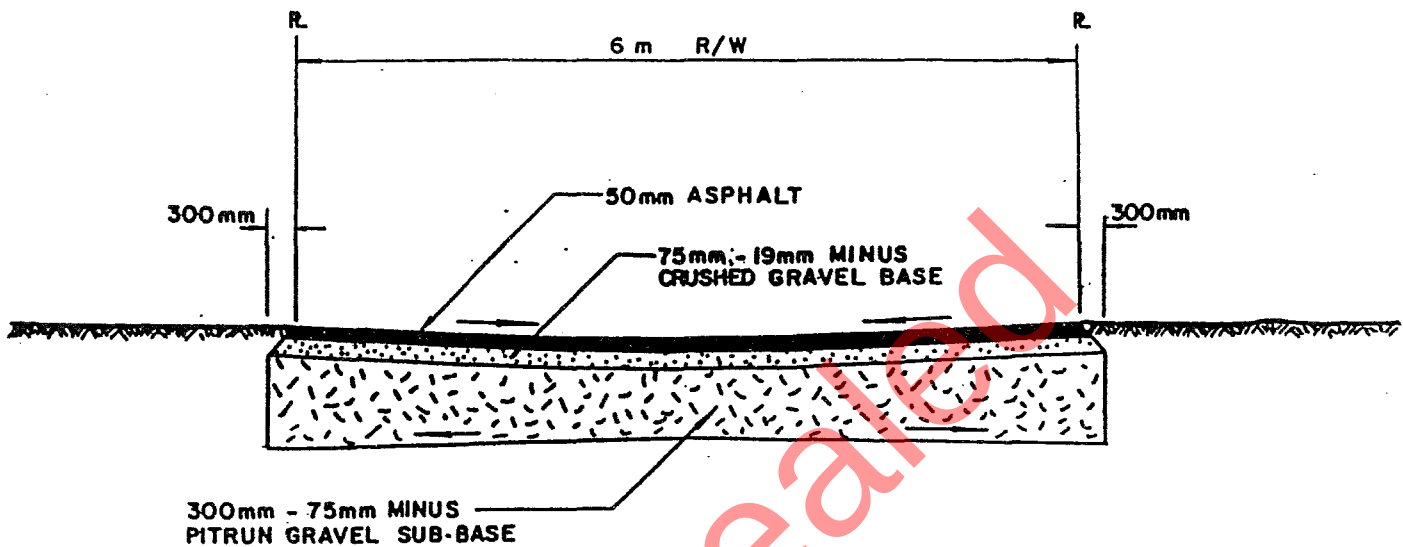
SERVICE LEVEL 1 HIGHWAY
STANDARDS FOR UNDIVIDED
ARTERIAL STREET 25m R/W

SECTION:

REVISION No.

DWG No.

R-4



1. ROAD SURFACE TO BE 2% INVERTED CROWN.
2. ALL CATCH BASINS ARE TO BE PLACED ON CROWN LINE (LOW POINT). CROWN LINE OFFSET MAY BE MOVED TO ANY POINT ON THE ROAD SURFACE IN ORDER TO FACILITATE EASE OF INSTALLATION AND REDUCE INTERFERENCE WITH OTHER EXISTING OR PROPOSED SERVICES.
3. SUBGRADE TO BE CROWNED AT 2%.
4. THE THICKNESS OF GRAVEL SUBBASE MAY CHANGE, DEPENDING ON THE INTEGRITY OF SUBGRADE SOIL.



CITY OF MERRITT

SERVICE LEVEL 1 & 2 HIGHWAY
STANDARDS FOR
PAVED LANE

DATE: MARCH 1987

NO. DATE

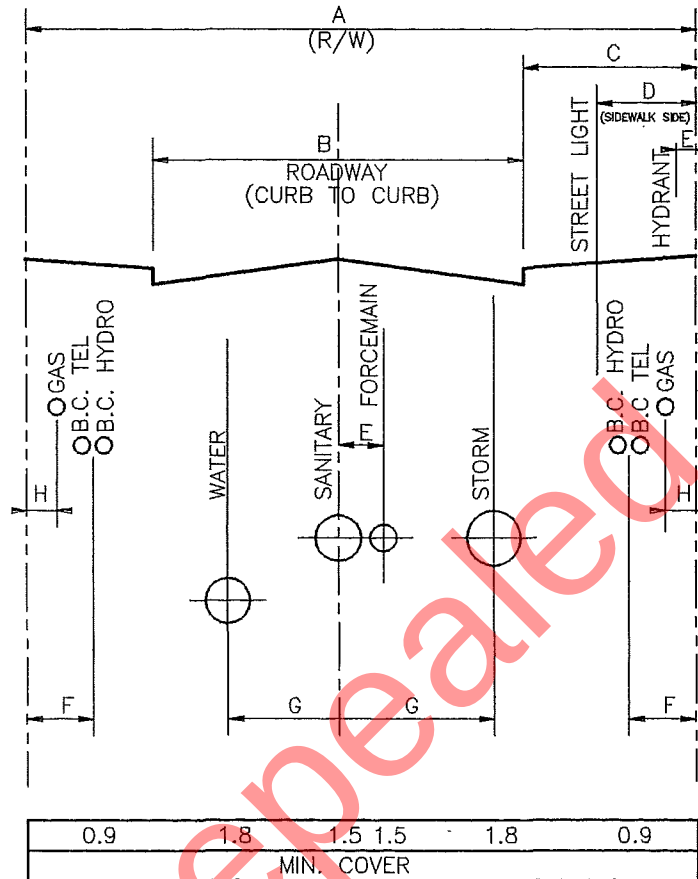
REVISION

BY APP'D

OWN. B. McL.
CHK. M.L.D.

SCALE:
N.T.S.

DWG. NO. R-5



OFFSETS IN METRES								
ROAD CLASSIFICATION	A	B	C	D	E	F	G	H
ARTERIAL	27	15	6	3.5	0.6	1.8	3.0	0.8
COLLECTOR	20	13	3.5	1.8	0.6	1.8	3.0	0.8
INDUSTRIAL	20	11	4.5	3.7	0.6	1.8	3.0	0.8
CUL-DE-SAC								
ENTRANCE	20	8.5	5.75	3.9	0.6	1.8	3.0	0.8
TERMINUS								
LOCAL	20	11	4.5	2.7	0.6	1.8	3.0	0.8



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

NOV. 1995

LATEST REVISION
DATE:

APPROVED BY:

TITLE:

UNDERGROUND
UTILITY LOCATIONS

SECTION:

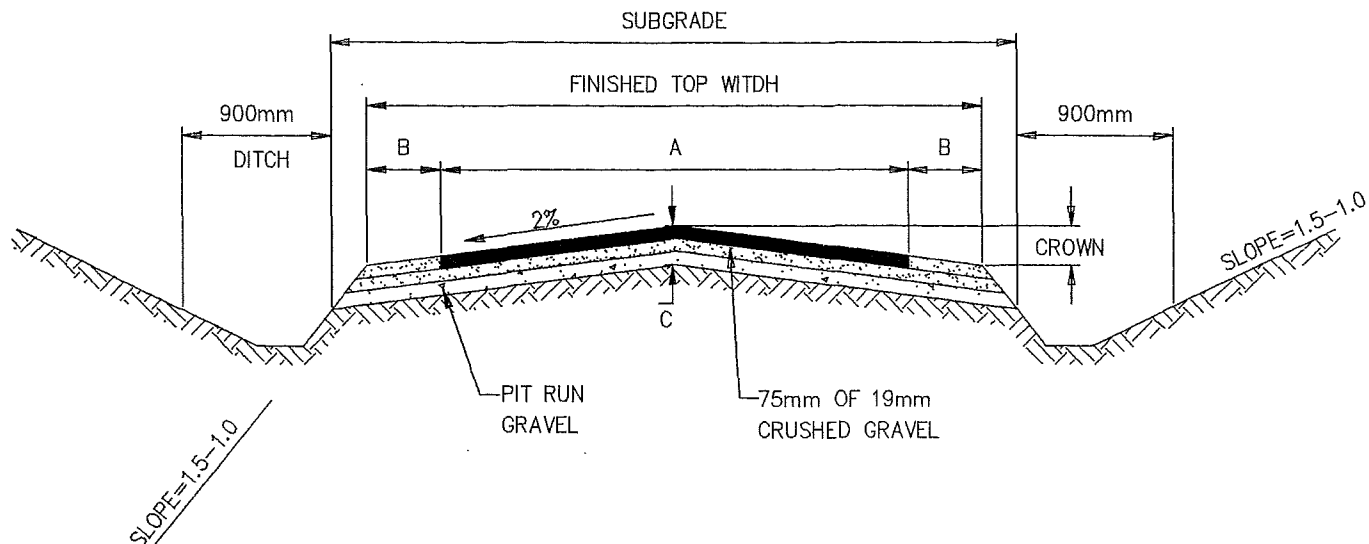
REVISION No.

DWG. No.

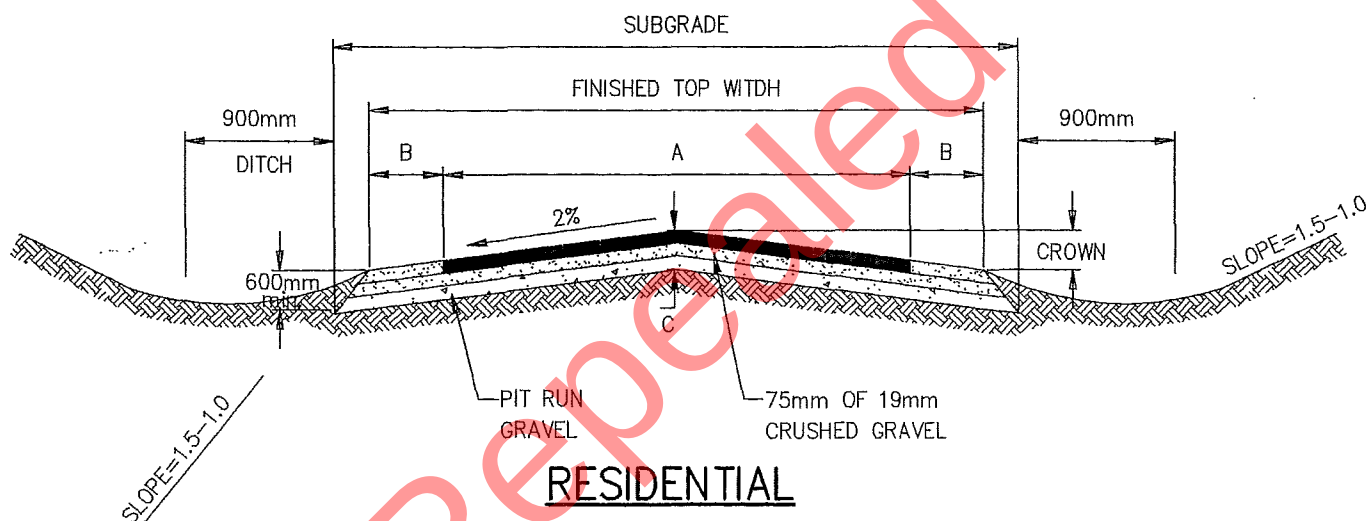
R-6

PLOT DATE: NOV 22/95

PROJ. CAD FILE No.: C:\PROJ\0521\15\A\DESIGN\R-7.DWG NOV 22/95 DMC



COLLECTOR, ARTERIAL, INDUSTRIAL & COMMERCIAL



RESIDENTIAL

- THE THICKNESS OF GRAVEL SUBBASE MAY CHANGE, DEPENDING ON THE INTEGRITY OF SUBGRADE SOIL.
- APPLICABLE UNDERGROUND UTILITY OFFSETS REMAIN THE SAME AS SERVICING LEVEL 1 STANDARDS

STREET CLASSIFICATION	ROAD WIDTH 'A'	SHOULDER WIDTH 'B'	EXCAVATION DEPTH 'C'	ASPHALT THICKNESS HOT MIX
LOCAL/CUL DE SAC	8.5m/7.0m	1.0m	425mm	50mm
COLLECTOR	11.0m-12.2m	1.5m	425mm	50mm
ARTERIAL	12.2m-13.4m	2.0m	625mm	100mm IN TWO LIFTS
INDUSTRIAL	9.8m-13.4m	1.5m	550mm	75mm IN TWO LIFTS



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

NOV 95

LATEST REVISION DATE:

APPROVED BY:

TITLE:

SERVICE LEVEL 2
HIGHWAY STANDARDS

SECTION:

REVISION No.

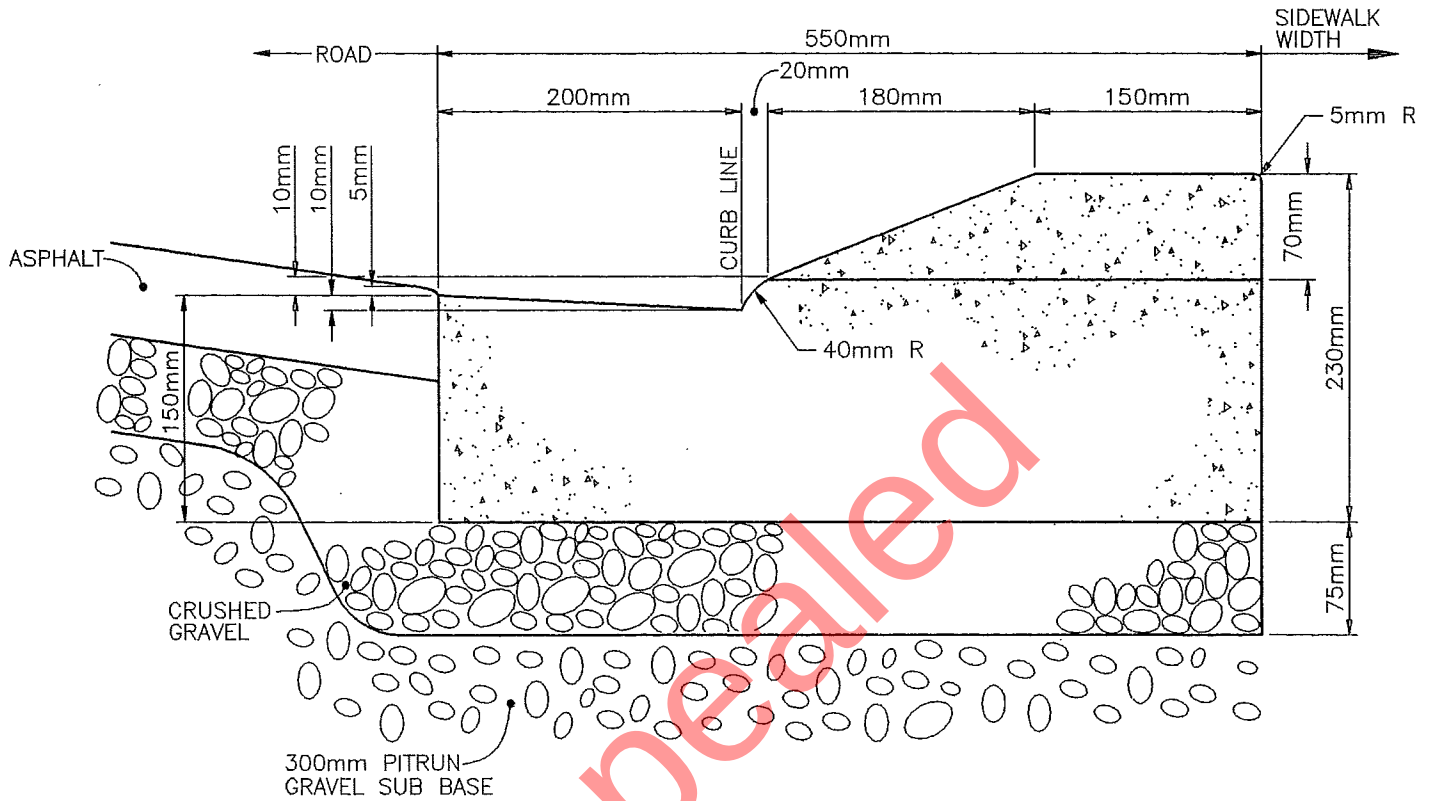
DWG No.

R-7

PROJ. CAD FILE No.: C:\PROJ\0521\15\A\DESIGN\MER-DT5.DWG 95/11/02 3:

WT

PLOT DATE: 95/11/22 3:40pm



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

NOV. 1995

LATEST REVISION
DATE:

APPROVED BY:

TITLE:

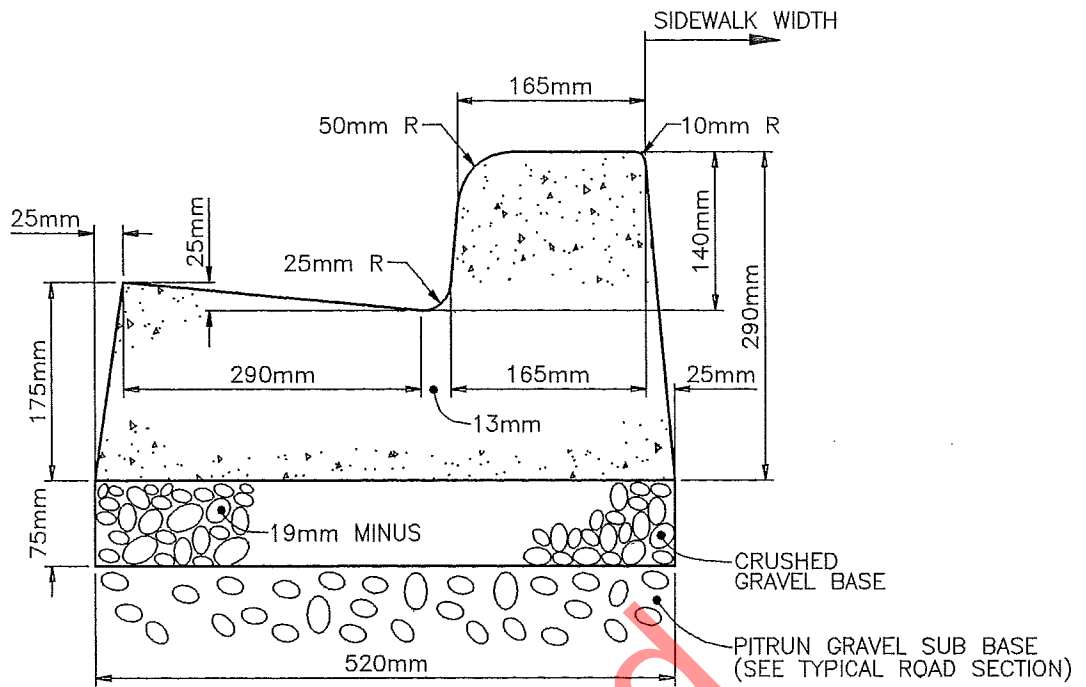
MOUNTABLE
CURB & GUTTER

SECTION:

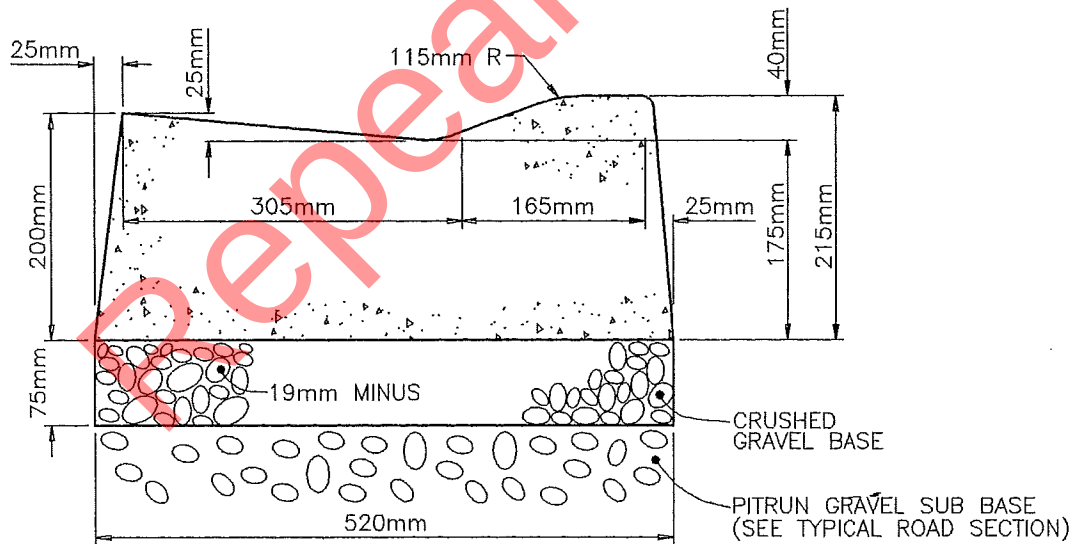
REVISION No.

DWG No.

R-8



CURB & GUTTER



CURB & GUTTER CROSSING

NOTE:

REFER TO SCHEDULE F,
 SECTION 301.8 FOR
 BACKFILLING REQUIREMENTS
 FOR CURB, GUTTER & SIDEWALK.



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

NOV. 1995

LATEST REVISION

DATE:

APPROVED BY:

TITLE:

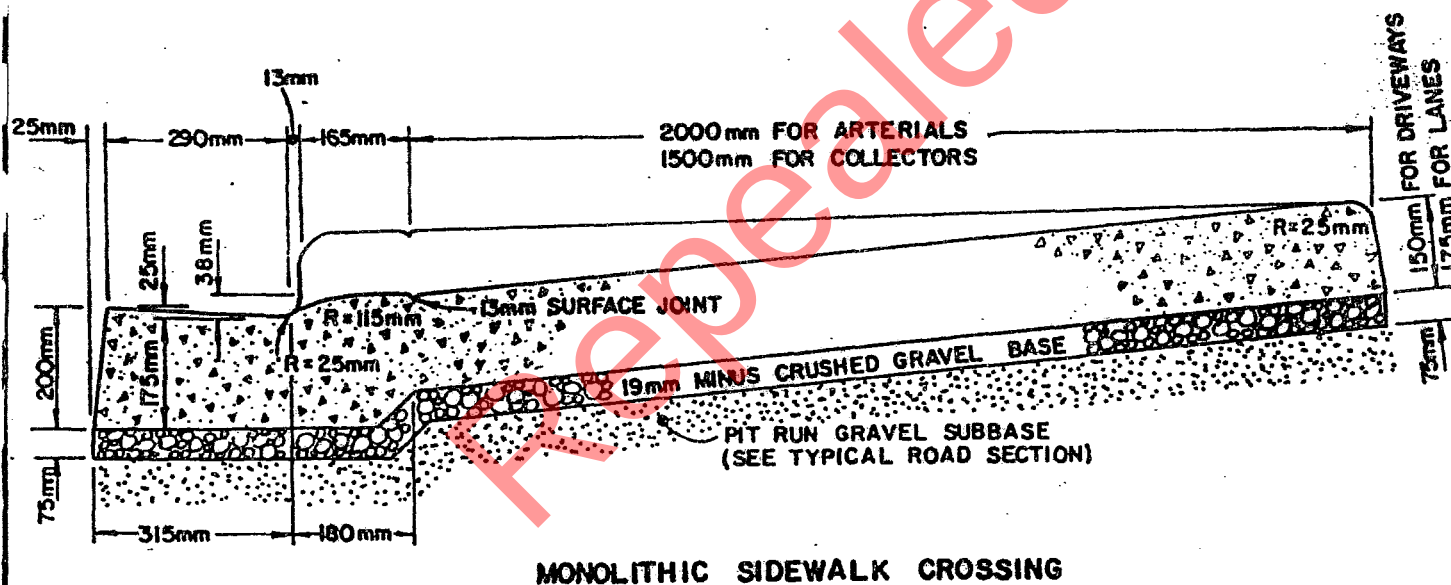
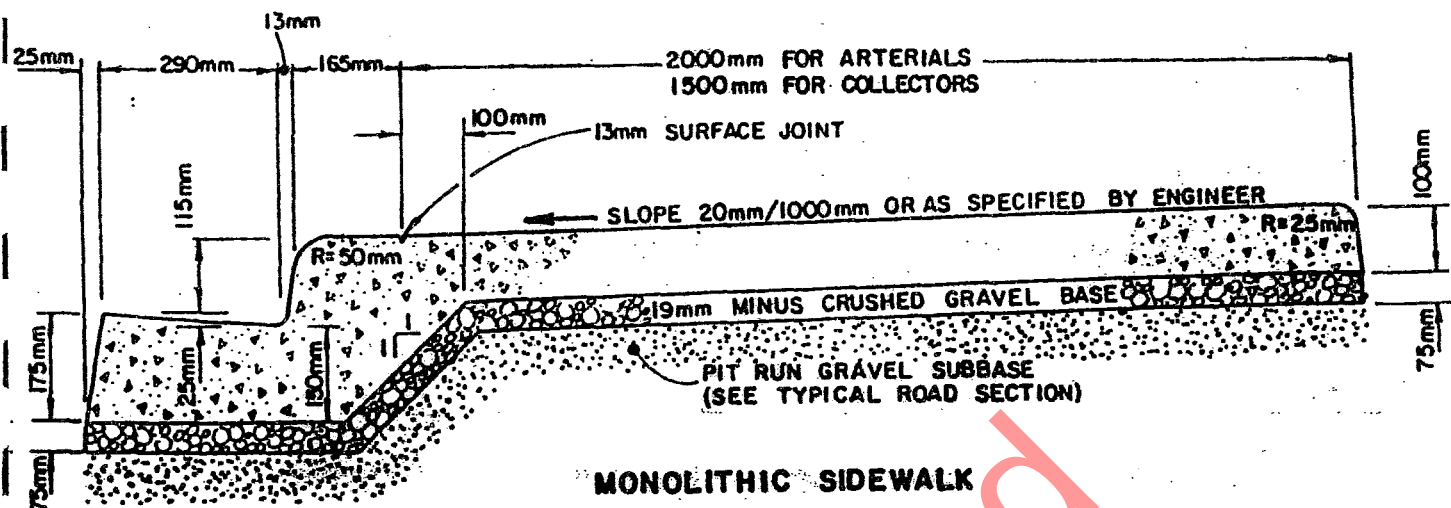
NON-MOUNTABLE
 CURB AND GUTTER

SECTION

REVISION No.

DWG No.

R-9



NOTE:

REFER TO SCHEDULE F,
SECTION 301.8 FOR
BACKFILLING REQUIREMENTS
FOR CURB, GUTTER & SIDEWALK.



CITY OF MERRITT

**NON-MOUNTABLE MONOLITHIC
CURB, GUTTER & SIDEWALK**

DATE: MARCH 1987

NO. DATE

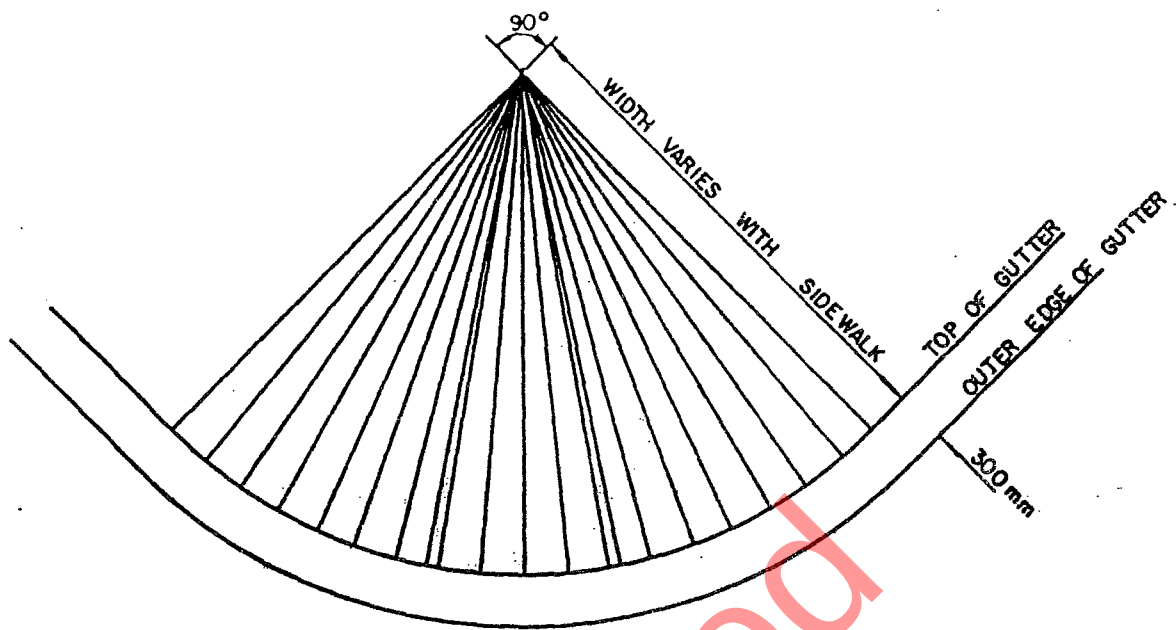
REVISION

BY APP'D

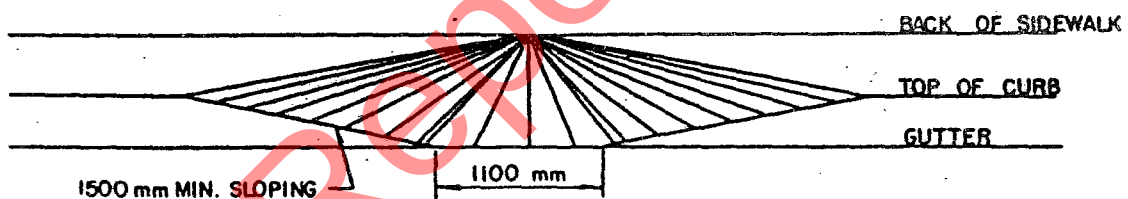
OWN. S.M.C.L.
CHK. M.L.D.

SCALE:
N.T.S.

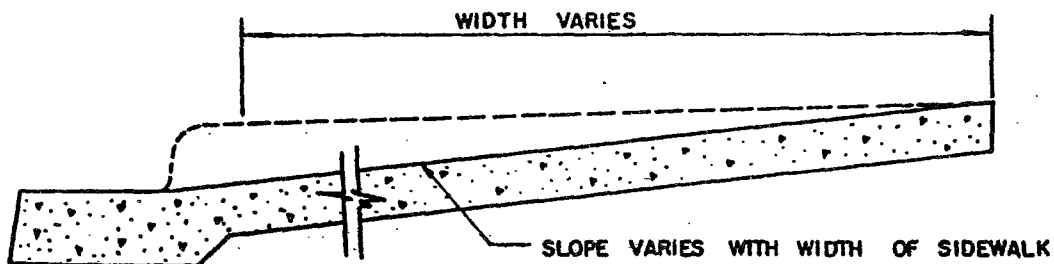
DEPT. NO. R-10



PLAN



FRONT ELEVATION



SECTION



CITY OF MERRITT

STANDARD WHEELCHAIR RAMP
FOR NON-MOUNTABLE CURB,
GUTTER & SIDEWALK

DATE: MARCH 1987

NO. DATE

REVISION

BY APP'D

OWN B. McL.
CHK. M. L. D.

SCALE:
N. T. S.

DWG. NO.

R-12

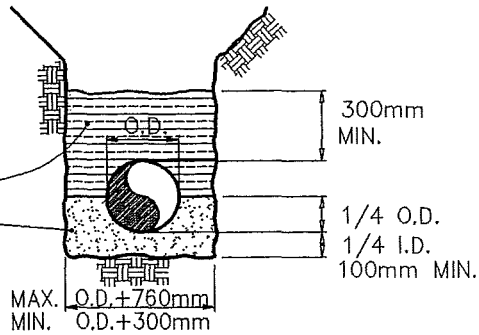
Repealed

BEDDING AND TRENCHING

CLASS "A" BEDDING

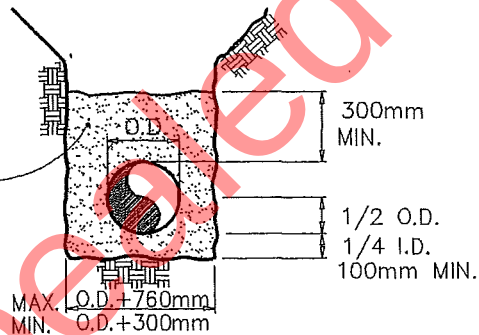
SELECT EXCAVATED OR IMPORTED GRANULAR MATERIAL PLACE IN MAXIMUM 100mm LIFTS. COMPACT TO 95% S.P.D.

CONCRETE - 20MPa.
IN ALKALI SOILS, SULFATE RESISTANT CEMENT SHALL BE USED.



CLASS "B" BEDDING

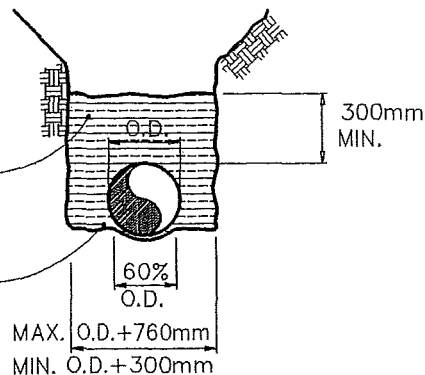
FINE GRANULAR MATERIAL PLACE IN MAXIMUM 100mm LIFT. COMPACT TO 95% S.P.D.



CLASS "C" BEDDING

SELECT EXCAVATED OR IMPORTED GRANULAR MATERIAL PLACE IN MAXIMUM 150mm LIFT. COMPACT TO 95% S.P.D.

BOTTOM OF TRENCH SHAPED TO ACCEPT LOWER EXTERIOR OF PIPE



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

NOV 95

LATEST REVISION DATE:

APPROVED BY:

TITLE:

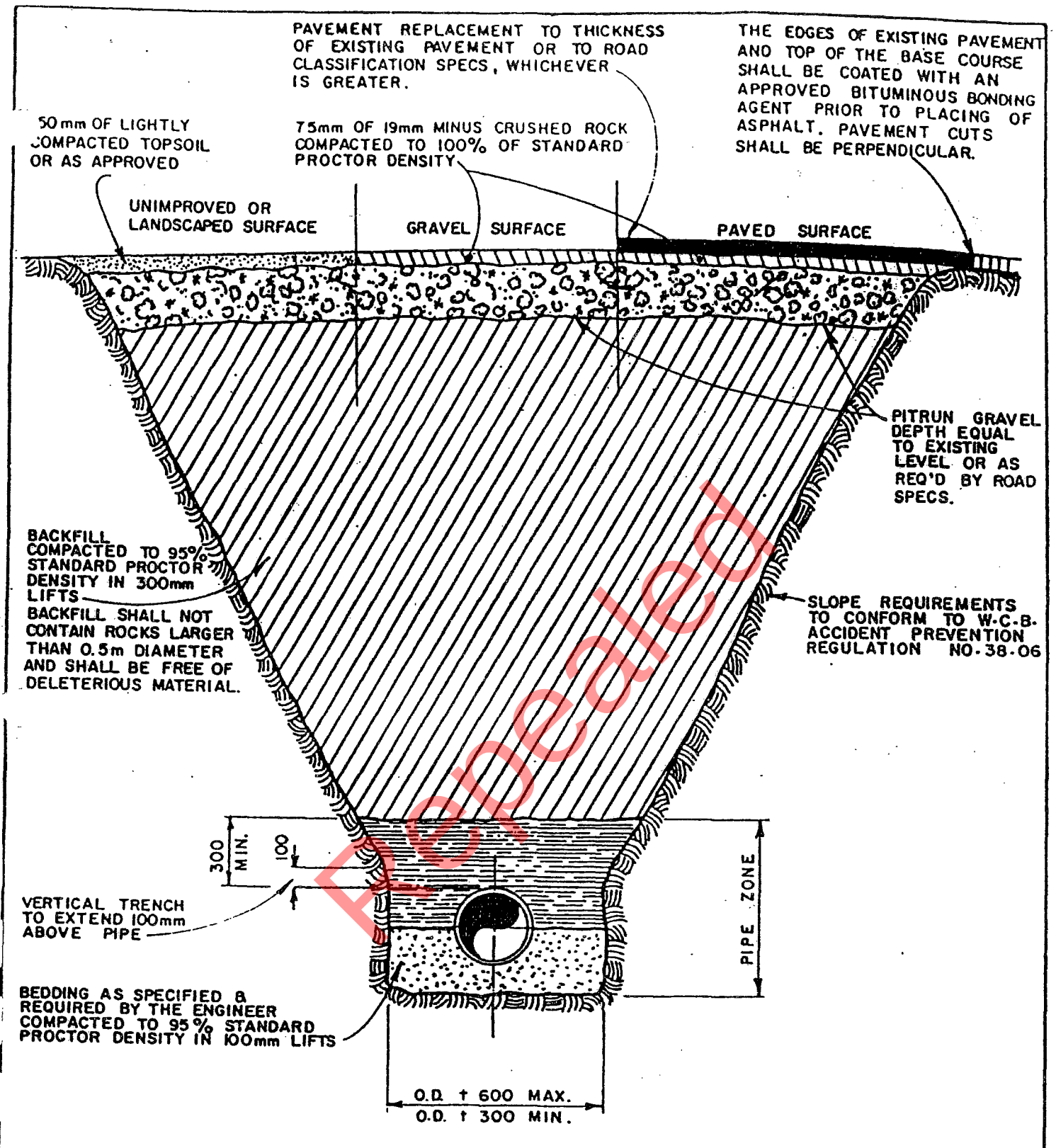
STANDARD CLASSES
OF PIPE BEDDING & BACKFILL
WITHIN THE PIPE ZONE

SECTION:

REVISION No.

DWG No.

B-1



CITY OF MERRITT

TRENCH DETAIL

DATE: MARCH 1987

NO DATE

REVISION

BY

APP'D

OWN B McL
CHK M L D

SCALE
N T S

DWG. NO. T-1

AFTER BACKFILLING TRENCH AND PRIOR TO PATCHING, CUT EXISTING ASPHALT IN NEAT STRAIGHT LINE WITH CUTTING WHEEL, SAW OR JACKHAMMER A MIN. 0.5m FROM EDGE OF TRENCH

PRIOR TO EXCAVATION OF TRENCH CUT EXISTING ASPHALT WITH CUTTING WHEEL, SAW OR JACKHAMMER

COAT WITH BITUMINOUS AGENT (ALL AROUND)

0.5 TYP.

MIN. 50mm HOT MIX ASPHALTIC CONCRETE

0.5 TYP.

EXISTING BASE
EXISTING SUBBASE

MIN. 75mm - 19mm CRUSHED GRAVEL BASE COMPACTION TO 100% S.P.D.

NATIVE BACKFILL MATERIAL COMPACTION TO 95% S.P.D. IF NATIVE MATERIAL NOT COMPETENT, IMPORT AND COMPACT TO 95% S.P.D. 75mm MINUS PIT RUN GRAVEL

MIN. 300mm - 75mm PIT RUN GRAVEL BASE COMPACTION TO 100% S.P.D.

PIPE & PIPE ZONE REFER TO DWG. B-1



CITY OF MERRITT

TYPICAL
PAVEMENT PATCHING
FOR UTILITY
TRENCH CROSSING

DATE: MARCH 1987

NO DATE

REVISION

BY APP'D

OWN D S
CHK M L D

SCALE
N T S.

DWG. NO T-2

CITY OF MERRITT
BYLAW NO.
1187, 1480 & 1523

CITY OF MERRITT
SUBDIVISION AND DEVELOPMENT
SERVICING BYLAW NO. 1187 (1987)

VOLUME 3
SEPTEMBER 8, 1987

Repealed

CITY OF MERRITT
BYLAW NO.
1187, 1480 & 1523

CITY OF MERRITT
SUBDIVISION AND DEVELOPMENT
SERVICING BYLAW NO. 1187 (1987)
SCHEDULE F
DESIGN AND CONSTRUCTION MANUAL

Repealed

SECTION 5 - DRAINAGE

500 GENERAL

These standards shall apply to and govern drainage systems installed in the City.

501 DESIGN STANDARDS FOR STORM DRAINAGE

.1 Design Flow

- a) The design flow at any point in a storm water collection system shall be calculated by the Rational Formula:

$Q = C \times I \times A$ in which,

Q = Design Flow

C = Run-off Coefficient

I = Rainfall Intensity

A = Area drained

- b) Residential systems shall be designed for rainfall intensities which are expected to return on the average once every two years (Return Period - 2 years). Commercial systems shall be designed for a Return Period of 5 years. The rainfall intensity shall be derived from the intensity curves included in the Standard Drawings.

.2 Time of Concentration

The time of concentration shall be the estimated time required for rain falling on the farthest point in the drainage area to reach a point in the sewer system under design. The inlet time for rain to reach catch basins shall be assumed to be 10 minutes in residential subdivisions and commercial areas.

.3 Run-Off Coefficient

- a) Run-off coefficients for storm sewer design shall be assumed to be not less than the values given in the following tabulation:

(29.)

<u>Description of Area</u>	<u>Run-Off Coefficient</u>
Commercial-downtown	0.80
Residential-single family	0.35
Residential-multi-family	0.60
Apartment Areas	0.70
Parks and Playgrounds	0.25
Unimproved Areas including hillsides	0.30

- b) The derivation of run-off coefficients to be used for storm sewer design shall include consideration of relative areas of roofs and pavement.
- c) Ground slope and soil permeability shall also be considered, however, the run-off coefficients shall in no case be less than the values outlined in these standards.

.4 Main Offsets and Depth of Bury

- .1 Storm sewer mains shall be installed 3.0 metres from the centerline of the road right-of-way or the opposite side from the watermain as shown on standard drawing R-6.
- .2 The minimum depth of bury from finished ground elevation to the top of pipe for mains shall be 1.5 metres. Minimum cover for catch basin leads shall be determined by the sump requirements and pipe diameter but under no circumstances shall be less than 1.0 metres.

.5 Minimum Pipe Size Velocity and Grade

- .1 Minimum velocity for pipes flowing full or half full shall be 0.75 m/s. Minimum grades for various sizes of pipe are as follows:

100 mm	1.50%	375 mm	0.23%
150 mm	1.00%	400 mm	0.20%
200 mm	0.60%	450 mm	0.18%
250 mm	0.40%	525 mm	0.15%
300 mm	0.32%	600 mm	0.12%
350 mm	0.28%		

- .2 Minimum pipe sizes shall be:

Mains	250 mm
Catch basin leads	200 mm

(30.)

.6 Manholes

- a) Manholes shall be installed at the end of each line; at all changes in grade, size or alignment; at all intersections; and at distances not greater than 120 metres for sewers 375 mm or less.
- b) Standard manholes shall be 1050 mm inside diameter.
- c) Wherever possible, pipe grades shall be designed so that pipe crowns are at the same elevation at the manhole.
- d) Manholes in roadways or roadway shoulders shall have a 1.5 metre diameter asphalt apron placed around them.

.7 Anchoring

- a) Storm sewer mains installed at grades steeper than 20% shall be anchored in accordance with the standard detail drawings.
- b) All pipe anchors shall be constructed with 20 MPa concrete and shall project a minimum of 200 mm into undisturbed soil at the bottom and sides of tranches.

.8 Overland Flow

In no case shall the overland flow distance for storm water within the storm sewer design area exceed 150 metres. Storm water contributions from natural drainage features including hillsides shall be collected by inlet structures at the point where the natural drainage features enters the subdivision. The ditching of drainage from hillside drainage features through residential or other proposed lots to storm facilities on roadways will not be permitted.

.9 Outfalls

Outfalls shall be located and designed such that the outfalled storm water will not cause or present the potential of erosion of Crown, private, or municipal property. Energy dissipation measures shall be implemented if deemed necessary by the City Engineer.

.10 Culverts

Minimum 400 mm diameter 1.6 mm gauge CMP culverts may be used for driveway and roadway crossings in rural areas. Cement/sand bag end structures in accordance with the standard detail drawings shall be installed on the ends of each culvert. (31.)

.11 Drainage Drywell

- .1 Where drainage drywells are used as a means for disposal, drainage drywell wall surface areas shall be sized using Darcy's empirical law:

$$Q = A K i$$

where Q = rate of flow
 A = cross-sectional area of soil through which flow taken place
 K = coefficient of permeability
 i = gradient or headloss over a given flow distance

Coefficients of Permeability (K)

Typical Soil	Value of K cm/sec*	Relative Permeability
Coarse gravel	over 1 x 10 ⁻	Very permeable
Sand, fine sand	1 x 10 ⁻ to 1 x 10 ⁻	Medium permeability
Silty sand, dirty sand	1 x 10 ⁻ to 1 x 10 ⁻	Low permeability
Silt	1 x 10 ⁻ to 1 x 10 ⁻	Very low permeability
Clay	Less than 1 x 10 ⁻	Practically impervious

*to convert to feet per minute, multiply above values by 1.97; to convert to feet per day, multiply by 2.88 x 10⁴

Upon determination of permeability factor, a safety factor of 2 shall be applied.

Hydraulic Gradient (i) $i = \frac{h}{L}$

where: h = average available head
 L = flow distance.

- .2 Drainage drywells shall, unless otherwise approved by the City Engineer be located in the road boulevard or in other lands dedicated to the City for the purpose of drainage disposal.
- .3 Drainage drywells shall be constructed of precast 1200 mm diameter concrete sections with 75 mm x 150 mm holes spaced 150 mm c/c vertically and 200 mm c/c horizontally in accordance with the standard drawings. One length of solid walled pipe shall form a sump for deposition of silts.
- .4 The depth of the drywell will vary in accordance with the requirements derived from Darcy's law. (32.)

502 MATERIALS

502.1 Pipe

The following types of pipe will be acceptable for storm sewer mains:

a) Concrete Pipe

Concrete storm sewer pipe shall be Class III or better conforming to ASTM Standard C76 for Reinforced Concrete Culvert. Rubber O-ring gaskets for concrete sewer pipe shall conform to ASTM C-361 and ASTM C-443.

b) Polyvinyl Chloride (PVC) Pipe

For 150 mm to 375 mm sizes, the pipe and fittings shall conform to ASTM D3034-73, and shall have a minimum SDR of 35. For diameters greater than 375 mm, the pipe shall conform to ASTM F-679 and have a minimum SDR of 35. 100 mm storm sewer services shall have a minimum SDR of 28. Sealing rings shall conform to ASTM F477.

502.2 Precast Manhole Sections

- a) Precast concrete manhole sections shall be 1050 mm inside diameter with 115 mm wall thickness, reinforced concrete pipe of at least Class II in accordance with ASTM Standard C76 with tongue and groove joints. Manhole sections shall have 19 mm galvanized steel steps cast in the concrete as shown on the drawings.
- b) Joints shall be made water tight by grouting or the use of water proofing agents.
- c) Cover slabs for manholes shall be reinforced to withstand H20 highway loading conditions.

502.3 Precast Catchbasin Sections

Catch basin sections shall be 750 mm inside diameter precast reinforced concrete pipe Class III conforming to ASTM C-76.

502.4 Cast Iron Manhole Frames and Covers

Covers and frames shall be cast iron of an approved pattern to withstand H-20 loading. The clear opening of the frame shall be 500 cm in diameter. The cover shall have a weight of 66 kg. The frame shall be of the round base pattern having a weight of 84 kg. Bearing faces of the cover to frame shall be machined for a non-rocking fit.

(33.)

Covers shall have 2 only 22 mm diameter lifting holes with bolt plug assembly as shown on the drawings. Frames shall have 3 only 22 mm diameter leveling holes. Covers and frames shall be Dobney Foundry Pattern C20, or approved equal. The wording "STORM SEWER" shall be permanently embossed on each cover.

502.5 Concrete

Poured in place concrete shall have 28 day strength of 20 MPa.

502.6 Catch Basin Frames and Covers

Catch basin frames and covers shall be as specified on the standard drawings and shall be cast iron construction.

503 CONSTRUCTION STANDARDS

503.1 Storm Sewer Service Connections

- .1 Storm sewer services, where required, shall be installed to the property line in accordance with the Standard Drawings. The service shall be installed wherever possible in a common trench with the water and sanitary services. The storm service shall be offset 0.5 metres to the left of the water service when facing the lot and be located at the centre of the lot unless topographical constraints prohibit. Deviation from the required location for the sewer service may be permitted in instances where topographic features dictate a more desirable location of the service connection.
- .2 100 mm storm sewer services shall be the minimum size installed for standard residential lots where such services are required, however, the size of service shall be individually designed by a professional engineer for large residential lots/houses and commercial and industrial lots/buildings.
- .3 Service connections shall be made with an approved branch wye or saddle and be installed in a straight line and at uniform grade from the terminus at property line to the 45 degree long radius bend at the main.
- .4 The terminus of service connections shall be not more than 300 mm short of property line. The ends of all service connections shall be sealed with watertight plugs or caps and marked with 50 mm x 100 mm stakes placed vertically with one end in the bottom of the trench and in contact with the watertight plug or cap and the other end protruding at least 0.6 metres above ground level. The depth of service pipe invert below the top of the marker stake shall be marked on the stake. (34.)

- .5 When the sewer main is 3.6 metres or more in depth, service risers may be installed at the main when service depth is not critical.

503.2 Infiltration Air and Exfiltration Tests

.1 Infiltration Test

Where the surface level of existing ground water in the backfilled trench is one (1) meter or more above the top of the pipe over the entire test section, an infiltration test shall be used to determine leakage into the pipe.

Copies of the test results shall be submitted to the City Engineer on the City's standard test forms.

.2 Air Test

Where the ground water surface level is less than one (1) meter above the top of the pipe at the lowest point in the test section, or where ground water at the time of testing is not apparent, low pressure air test shall be carried out. Air pressure tests shall be the minimum time allowed for the pressure within a sewermain section to drop from 20.7 KPa to 17.2 KPa. The minimum time-air pressure loss for various diameters of pipe are as follows:

<u>Pipe Diameter</u>	<u>Minimum Time For Air Pressure To Drop From 20.7 KPa to 17.2 KPa</u>
100mm	2 minutes, 32 seconds
150mm	3 minutes, 50 seconds
200mm	5 minutes, 6 seconds
250mm	6 minutes, 22 seconds
300mm	7 minutes, 39 seconds
350mm	8 minutes, 56 seconds

Copies of the test results shall be submitted to the City Engineer on the City's standard test forms.

.3 Exfiltration Test

Where the groundwater level is below the invert of the pipe throughout the test section, an exfiltration test may be used. The test section shall be sealed at its lower extremity by means of a watertight plug. The test section shall be filled with water such that a minimum hydrostatic head of 600 mm is placed on the pipe at its upper extremity. The head of water on the pipe shall be taken as the distance from the top of the pipe to water surface at the point of measurement. The test pressure shall be maintained above the 600 mm minimum head for a period of not less than one hour. (35.)

The rate of exfiltration shall be calculated from the amount of water which must be added to maintain the original water level at the upper end.

The maximum allowable infiltration/exfiltration rate shall be 4.6 litres/mm of pipe diameter/24 hours/kilometre of sewermain. Copies of the test results shall be submitted to the City Engineer on the City's standard test forms.

- .4 Manholes shall be tested with water to prove they are completely water tight.
- .5 If leakage is detected, the leak or leaks shall be found and repaired by approved measures. Testing shall be repeated on faceted sections until leakage is within acceptable limits.

503.3 Cleaning and Flushing

All storm sewer mains, manholes, catchbasins and services installed shall be flushed of all deposits of silt, sand, gravel debris and other objectionable materials. All mains shall be flushed clean and a suitably sized plug passed through the test section to ensure no obstructions exist. The City Engineer shall witness all flushing and plug-pulling operations and visually inspect all mains, manholes and catchbasins. Mains other than those laid on curves shall be straight and have clear visibility between manholes.

503.4 Video Inspections

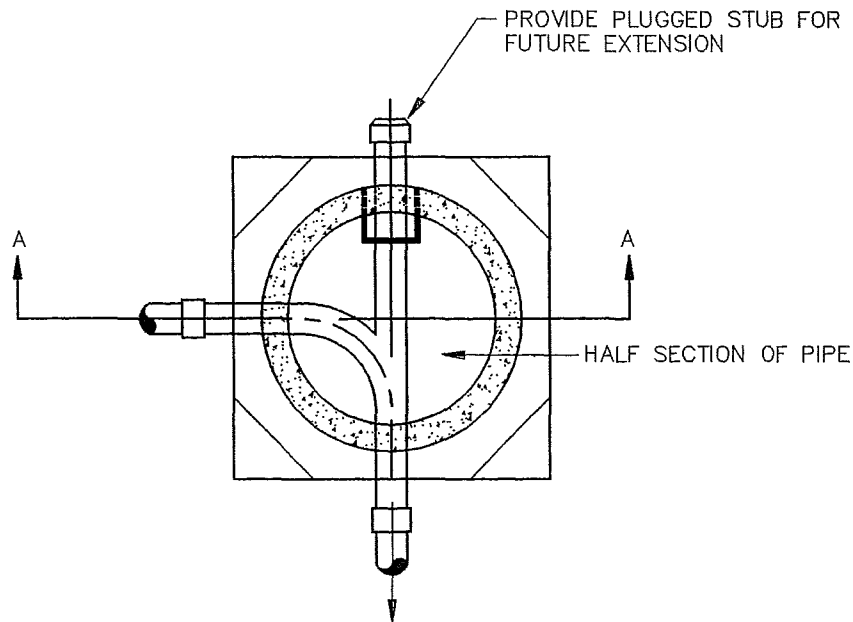
The City Engineer may require a video inspection report be submitted where conventional testing indicates the section may not conform to specifications or for sections which can not be adequately tested by conventional means.

DRAINAGE AND SANITARY SEWER

Repealed

PLOT DATE: 95/11/22 6:15pm WT

PROJ. CAD FILE No.: C:\PROJ\0521\15\A\DESIGN\DS-1.DWG 95/11/07 DMc



PLAN

PRECAST CONCRETE RINGS OR BRICK FILLER RING, MORTAR IN AND OUT TO SUIT GRADE, ONE LAYER MINIMUM, THREE LAYERS MAXIMUM

ENTRANCE TUBE AND LADDER TO BE PLACED OVER MAIN CHANNEL ON UPSTREAM SIDE.

MANHOLE FRAME AND COVER TILT TO MATCH GRADE AND CROWN OF ROAD

PRECAST CONCRETE LIDS REINFORCED TO H-20 HWY LOADING

PRECAST REINFORCED CONCRETE BARREL 1050mm MINIMUM

RUNGS AT 300 o/c CAST IN WALL OF BARREL SECTION. FIRST RUNG 500mm FROM FINISHED GRADE

JOINTS TO BE WATERTIGHT USE BITUMASTIC SEALANT

FIBREGlass LINER "GU" OR EQUAL

PLAN

GROUT ALL AROUND

100mm

25 MPA CONCRETE BASE

GRANULAR BASE

SECTION 'A-A'

WHERE MANHOLE BASE EXCAVATION EXTENDS BEYOND BASE DIMENSIONS THE OVEREXCAVATION SHALL BE FILLED WITH CONCRETE 100mm BELOW THE BOTTOM OF THE PIPE AND THE WIDTH OF THE TRENCH. ALL POURED IN PLACE CONCRETE TO BE 25 MPA

UNDISTURBED SOIL

NOTE:
WATERSTOPS IN MANHOLE WALL TO BE PROVIDED FOR PVC PIPE.



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

NOV. 1995

LATEST REVISION DATE:

APPROVED BY:

TITLE:

TYPICAL MANHOLE &
BASE DETAILS FOR SEWER
UP TO 400mm DIA.

SECTION:

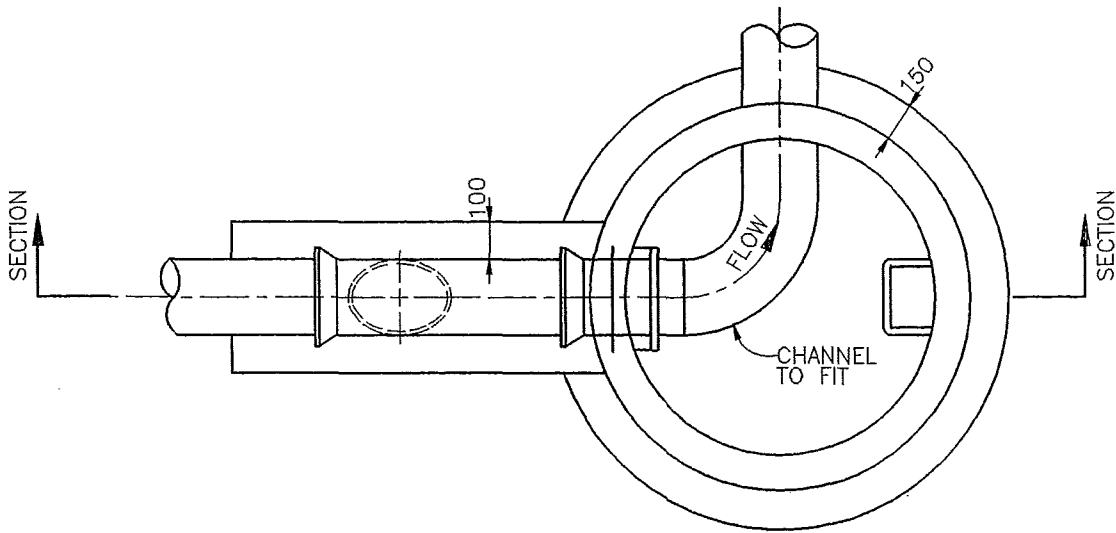
REVISION No.

DWG No.

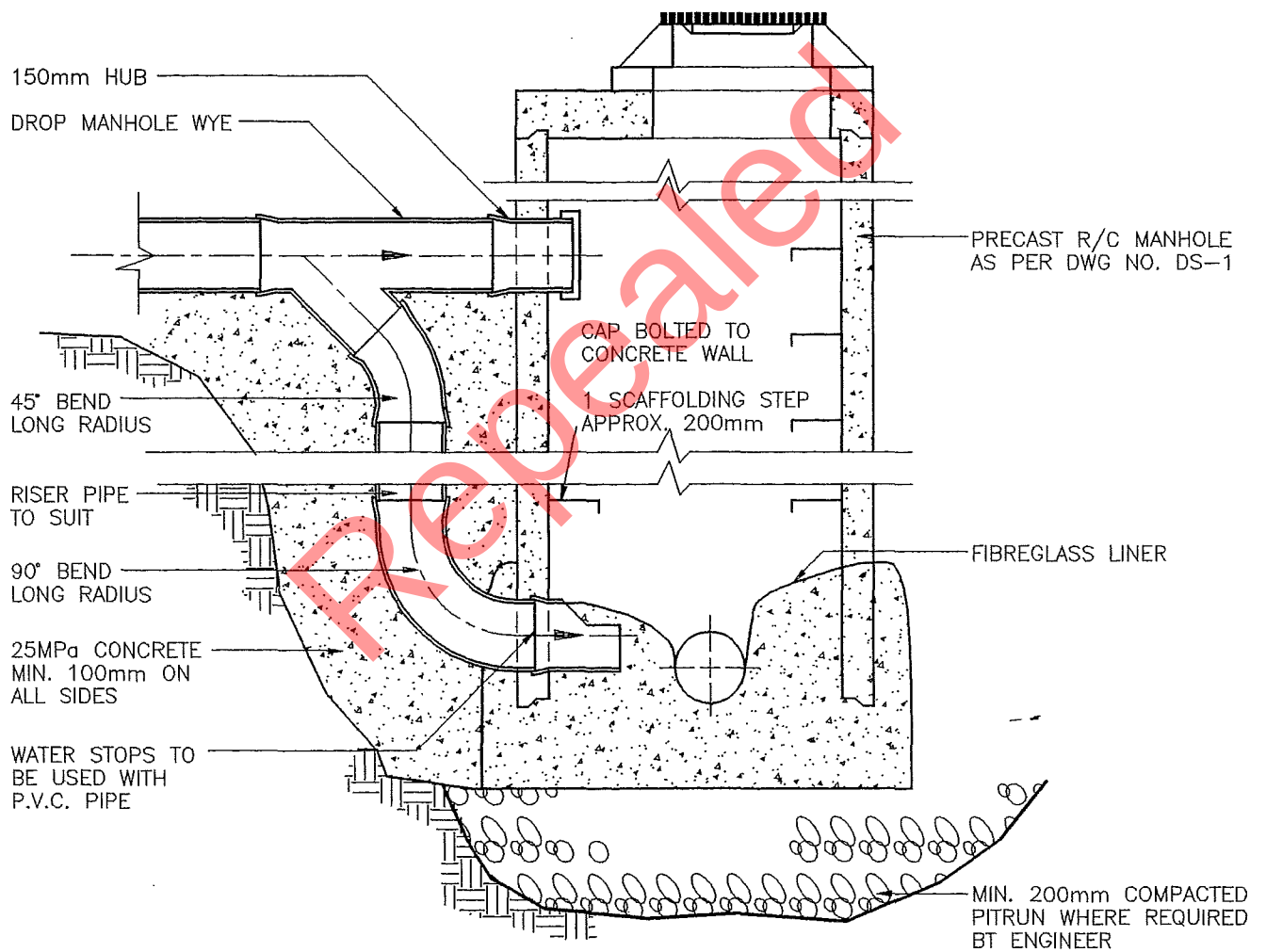
DS-1

PLOT DATE: 95/11/22 DMC

PROJ. CAD FILE No.: C:\PROJ\0521\15\A\DESIGN\DS-2.DWG



PLAN



SECTION



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

NOV. 1995

LATEST REVISION DATE:

APPROVED BY:

TITLE:

EXTERIOR DROP MANHOLE

SECTION:

REVISION No.

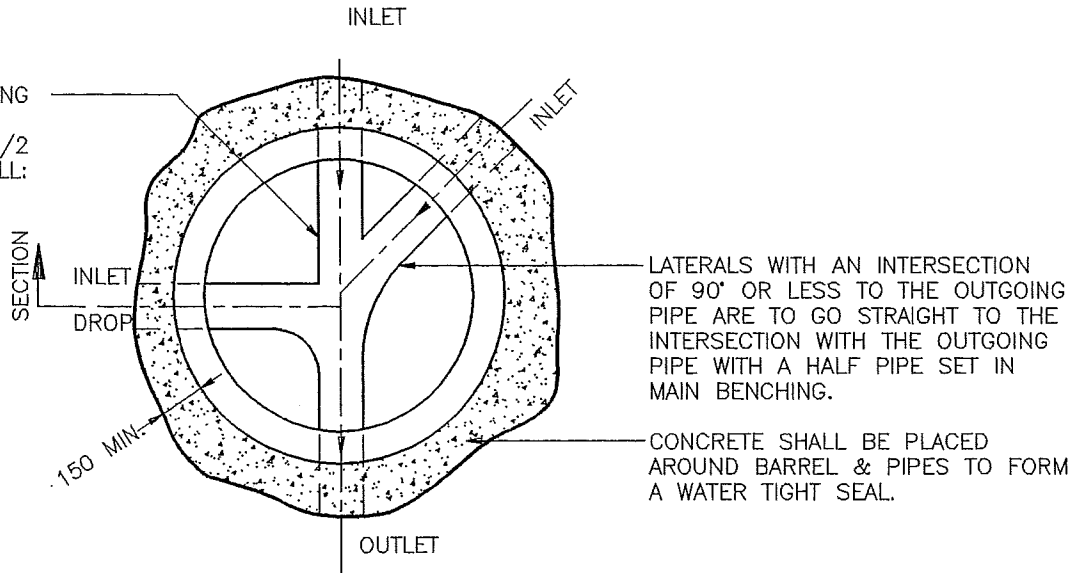
DWG No.

DS-2

PLOT DATE: 95/11/22 4:30pm WT

PROJ. CAD FILE No.: C:\PROJ\0521\15\A\DESIGN\DS-3.DWG 95/11/22 4:30pm

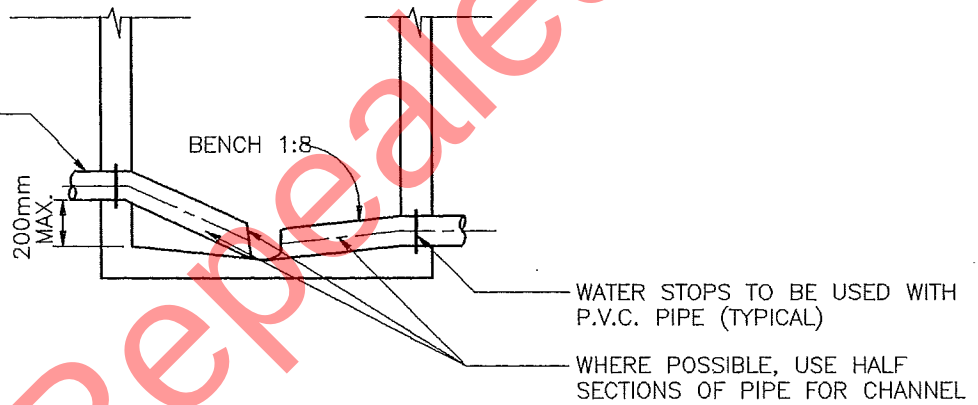
IN ALL CASES, OUTGOING PIPE TO GO STRAIGHT THROUGH M.H. WITH 1/2 PIPE TO OPPOSITE WALL: INCLUDING DEAD END MANHOLES



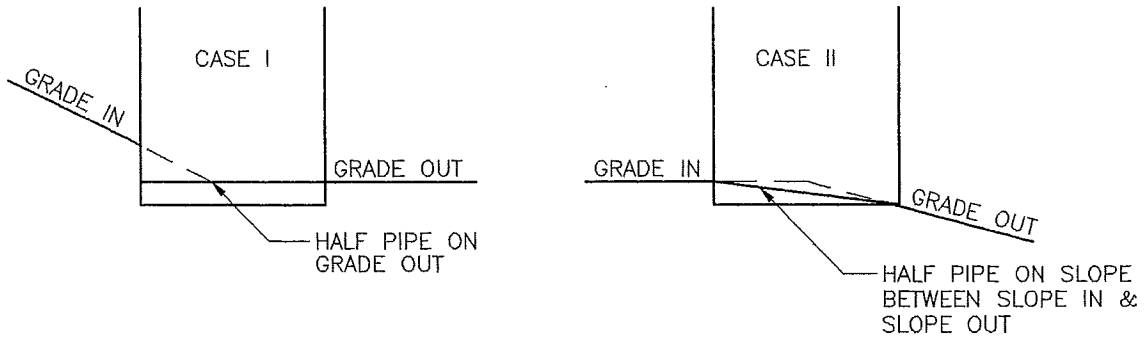
PLAN OF MANHOLE

INLET FLOW DROPS INTO MAIN BENCHING

NOTE:
DROPS BETWEEN 200mm AND 600mm ARE TO BE AVOIDED BY ADJUSTING GRADES. DROPS OF 600mm OR GREATER SHALL BE BY AN EXTERNAL DROP STRUCTURE.



SECTION THROUGH MANHOLE



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

NOV. 1995

APPROVED BY:

LATEST REVISION

DATE:

TITLE:

MANHOLE BENCHING &
CHANNELLING

SECTION:

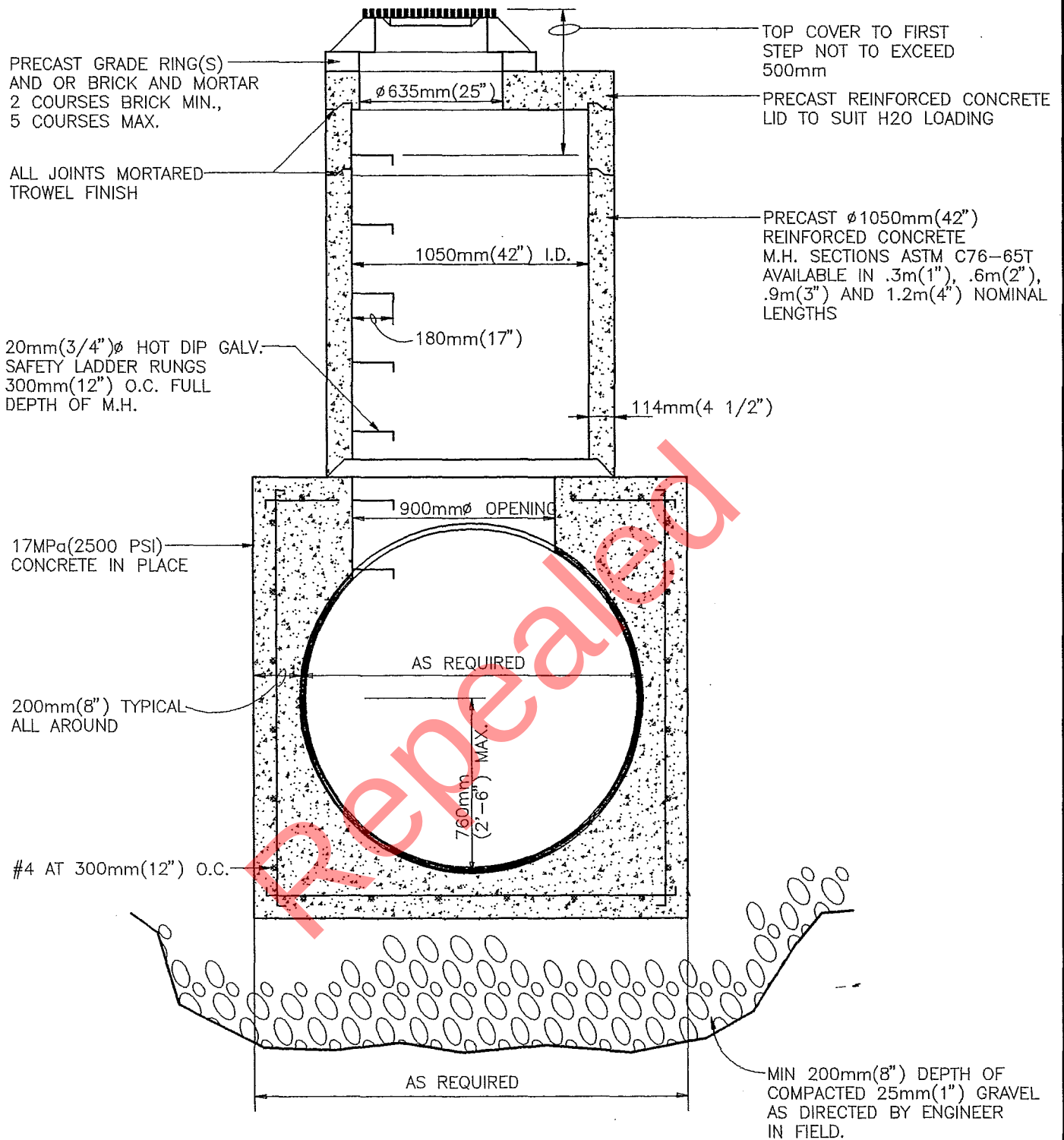
REVISION No.

DWG No.

DS-3

PLOT DATE: 95/11/22 4:25pm WT

PROJ. CAD FILE No.: c:\PROJ\0521\15\A\DESIGN\DS-4.DWG 95/11/22 4:25pm.



NOTE:
FOR SEWERS LARGER THAN Ø380mm(15")



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

NOV. 1995

LATEST REVISION

DATE:

APPROVED BY:

TITLE:

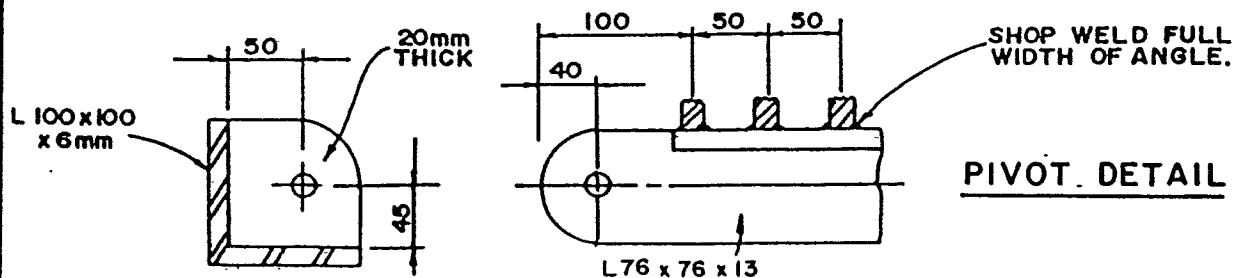
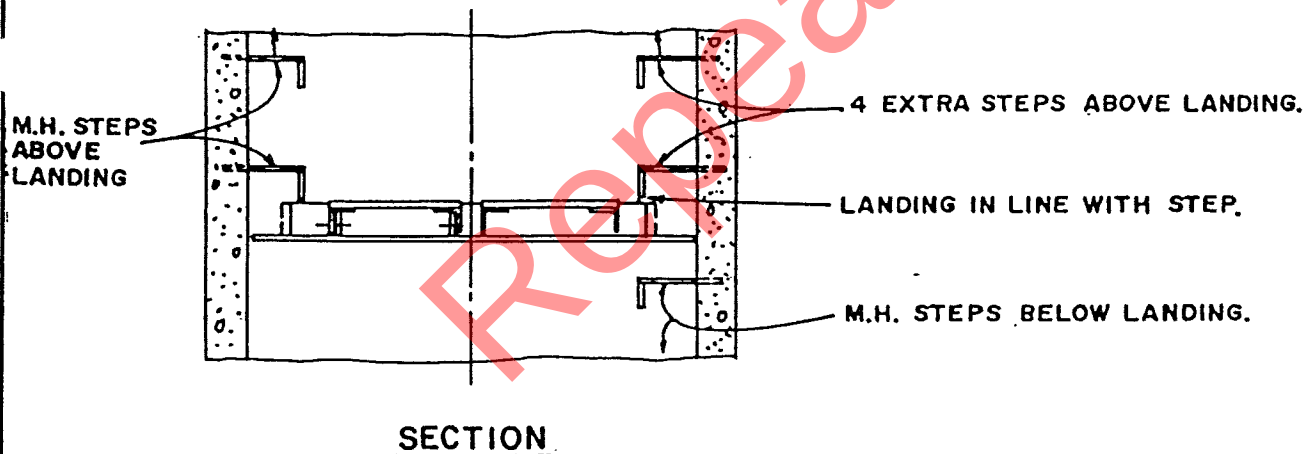
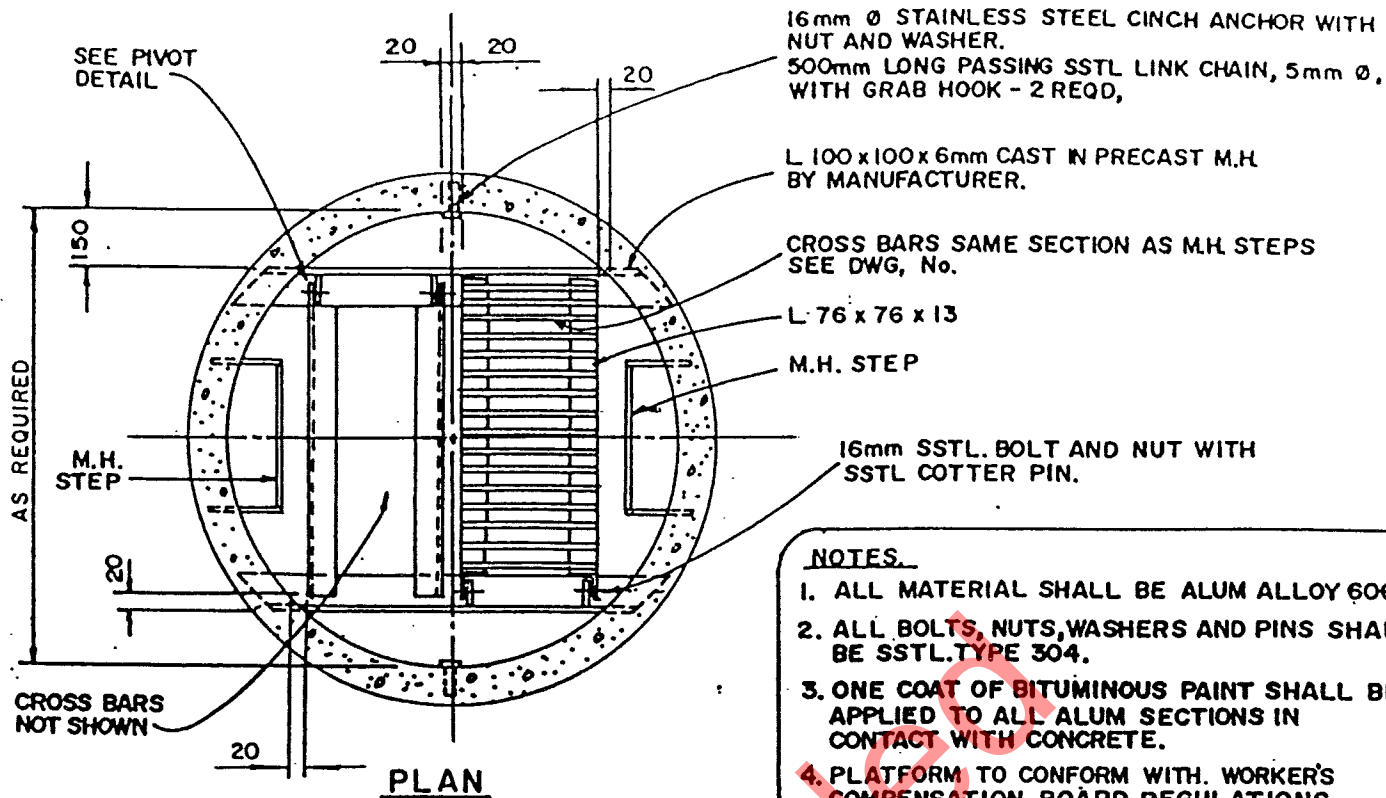
MANHOLE FOR
LARGE DIAMETER SEWERS

SECTION:

REVISION No.

DWG No.

DS-4



CITY OF MERRITT

LANDING FOR
DEEP MANHOLE

DATE: MARCH 1987

NO. DATE

REVISION

BY APP'D

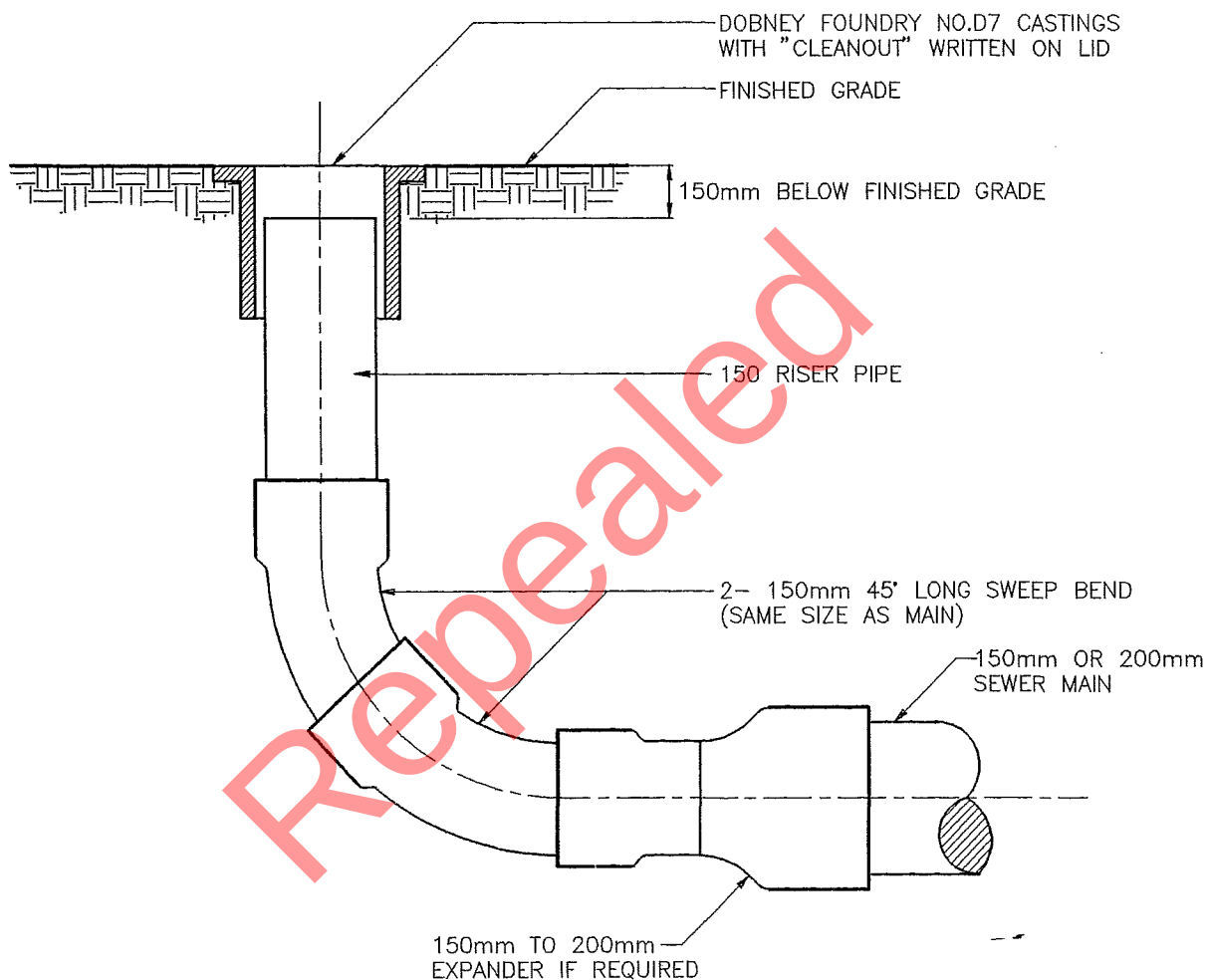
OWN. B. McL.
CHK. M. L. D.

SCALE:
N. T. S.

DWG. NO. DS-5

PROJ. CAD FILE No.: C:\PROJ\0521\15\A\DESIGN\DS-6.DWG 95/11/22 4:00pm

PLOT DATE: 95/11/22 4:00pm



NOTE:
ALL PIPE MATERIALS SHALL
BE P.V.C.



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

NOV. 1995

LATEST REVISION

DATE:

APPROVED BY:

TITLE:

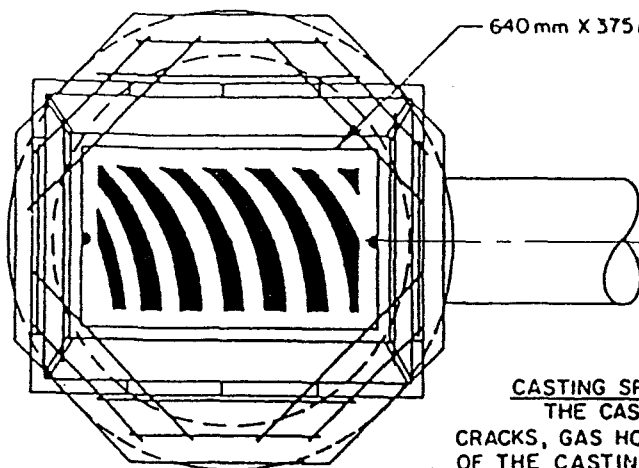
SEWER CLEANOUT FOR
150mm & 200mm SANITARY
SEWER TERMINALS

SECTION:

REVISION No.

DWG No.

DS-6



— PLAN —

640 mm X 375 mm (25 1/4" X 14 3/4") CATCH BASIN FRAME AND GRATE

APPROVED PATTERNS

1. PEACH CITY FOUNDRY, PENTICTON, B.C.
2. MAINLAND FOUNDRY AND ENGINEERING LTD. VANCOUVER B.C.
3. DOBNEY FOUNDRY CO. LTD. NEW WESTMINSTER, B.C.

NOTES:

1. MIN. WT. GRATE 68 kg (150 LBS)
FRAME 86 kg (190 LBS)
2. GRATES AVAILABLE IN BOTH LEFT AND RIGHT HAND

CASTING SPECIFICATIONS

THE CASTINGS SHALL BE TRUE TO PATTERN AND FREE FROM CRACKS, GAS HOLES, FLAWS, AND EXCESSIVE SHRINKAGE. SURFACES OF THE CASTINGS SHALL BE FREE FROM BURNT ON SAND AND SHALL BE REASONABLY SMOOTH. RUNNERS, RISERS, FINIS, AND OTHER CAST ON PIECES SHALL BE REMOVED. IN OTHER RESPECTS THE CASTINGS SHALL CONFORM TO WHATEVER POINTS MAY BE SPECIALLY AGREED UPON BETWEEN THE MANUFACTURER AND THE ENGINEER.

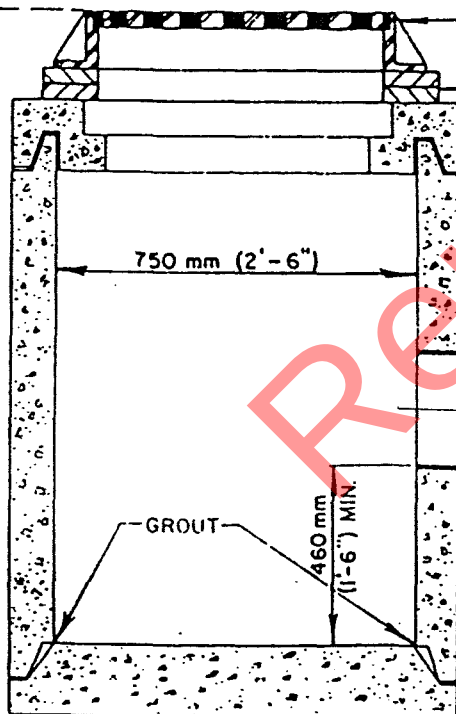
FRAME MATERIAL SPECIFICATION

CAST IRON A.S.T.M. A48-64 CLASS 20

GRATE MATERIAL SPECIFICATION

DUCTILE IRON A.S.T.M. A-445-63 T OR CAST STEEL - GRADE 60-90 (TABLE II A.S.T.M. DESIGNATION A-148-46 T)

FINISHED GRADE



— SECTION —

640 mm X 375 mm (25 1/4" X 14 3/4") CATCH BASIN FRAME AND GRATE

BRICKWORK MIN. 1 ROW, MAX. 3 ROWS

150 mm (6") REINFORCED SLAB-OCTAGON (VALLEY CONCO) TO SUIT H-20 LOADING

750 mm (2'-6")

LENGTH OF 750 mm (30") PRECAST CONCRETE CLASS II A.S.T.M. C76-65T PIPE

MIN. 2% GRADE

GROUT

460 mm (1'-6") MIN.

C.B. LEADS TO BE 200 mm

150 mm (6") REINFORCED PRECAST SLAB (VALLEY CONCO)



CITY OF MERRITT

TYPICAL
STORM SEWER CATCH BASIN
TYPE I

DATE: MARCH 1987

NO. DATE

REVISION

BY APP'D

DWN. B. McL.
CHK. M. L. D.

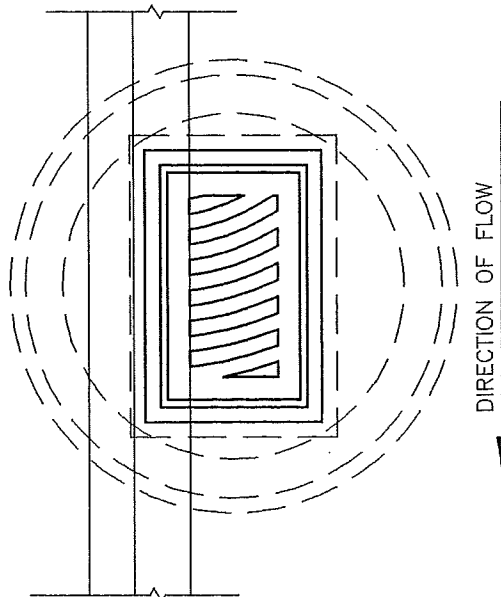
SCALE:
N. T. S.

DWG. NO.

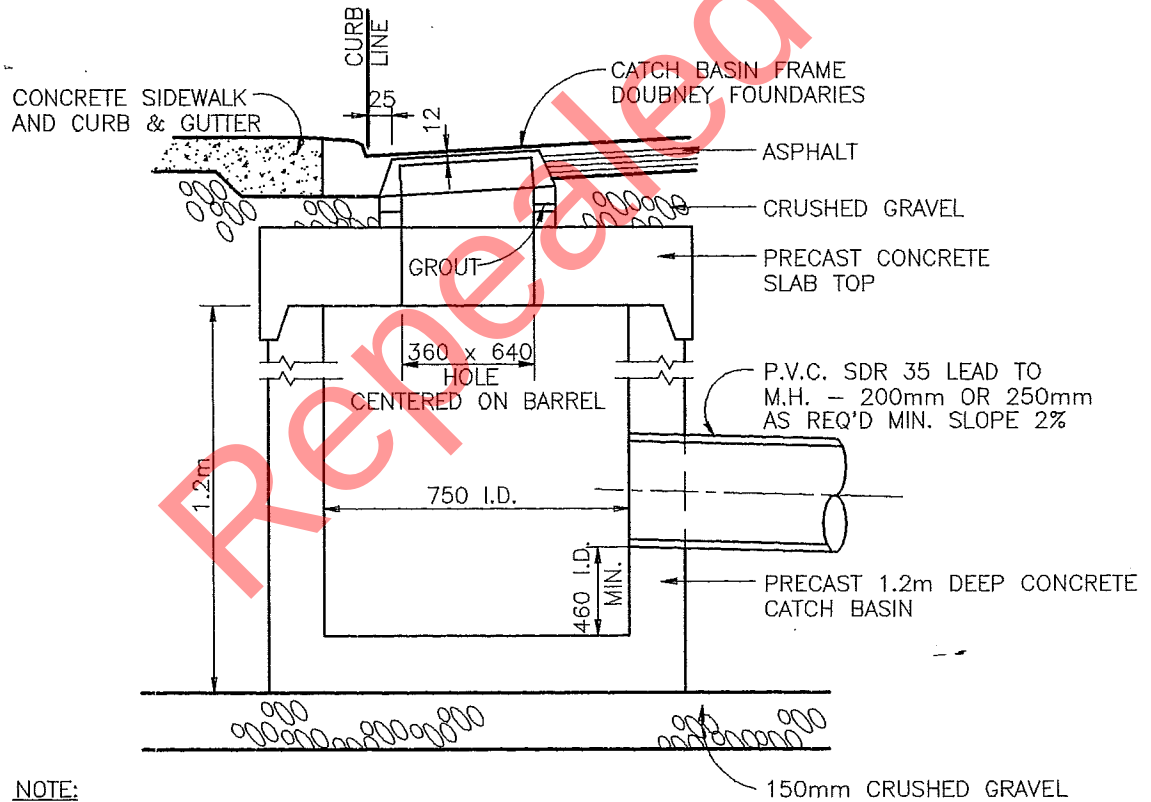
DS-7

PLOT DATE: 95/11/22

PROJ. CAD FILE No.: C:\PROJ\0521\15\A\DESIGN\DS-8.DWG NOV 22/95 DMC



PLAN



NOTE:
A FLEXIBLE JOINT IS REQ'D
ON ALL SEWER LEADS, MAX.
500mm FROM CATCH BASIN

SECTION



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

NOV. 1995

LATEST REVISION

DATE:

APPROVED BY:

TITLE:

**STANDARD CATCH BASIN
DETAIL FOR
MOUNTABLE CURBS**

SECTION:

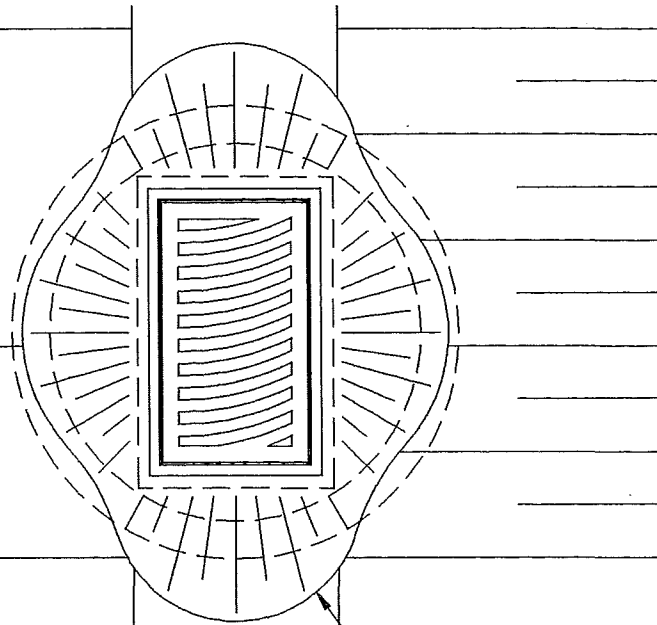
REVISION No.

DWG No.

DS-8

640x375 CATCH BASIN FRAME
& GRATE

APPROVED PATTERNS
DOBNEY FOUNDRY



PLAN

FILL CONCRETE

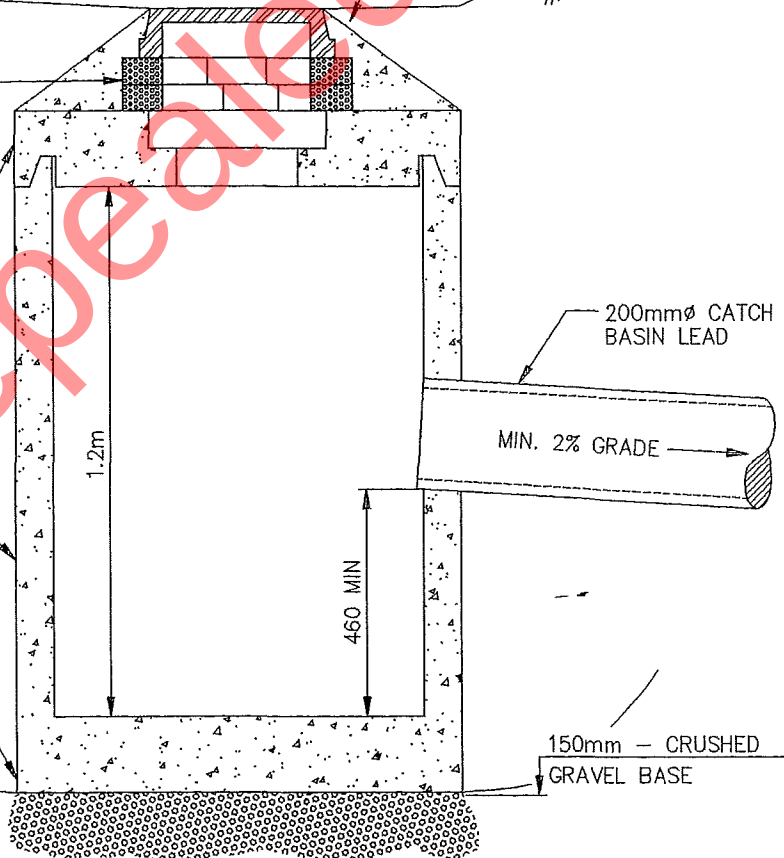
BRICKWORK VARIABLE FOR
ADJUSTMENT MIN. 1 ROW,
MAX. 3 ROWS

150mm REINFORCED SLAB--
OCTAGON TO SUIT H-20 LOADING

1.2m PRECAST CONCRETE
CATCH BASIN KONKAST 801
OR KEMP XXX

PRECAST 150mm
REINFORCED SLAB

NOTE: A FLEXIBLE JOINT IS
REQUIRED ON ALL SEWER
LEADS, MAX 0.5m FROM
BATCH BASIN



SECTION A-A



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

LATEST REVISION
DATE:

APPROVED BY:

TITLE:

CATCH BASIN PLACED
IN AN OPEN DITCH

SECTION:

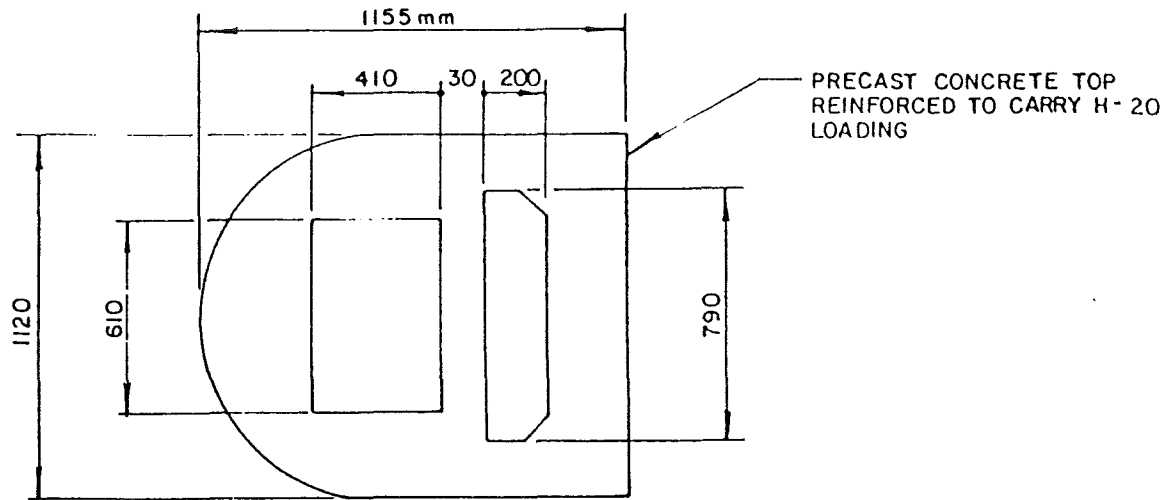
REVISION No.

DWG. No.

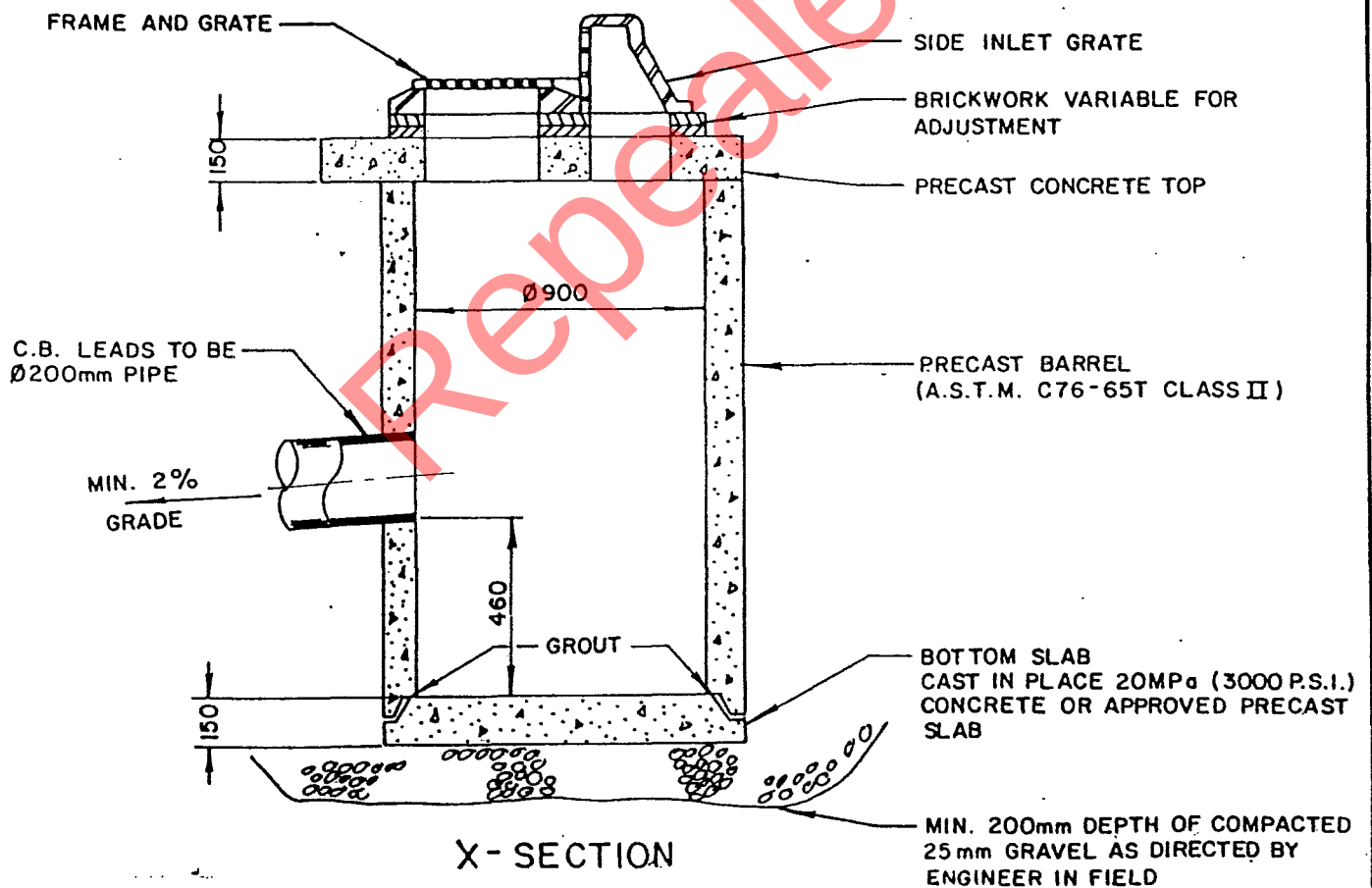
DS-9

PLOT DATE: NOV22/95

PROJ. CAD FILE No.: C:\PROJ\0521\15\A\DESIGN\DS-9.DWG NOV22/95 DMC



CONCRETE TOP PLAN



X- SECTION



CITY OF MERRITT

STANDARD CATCHBASIN
DETAIL
TYPE II

DATE: MARCH 1987

NO. DATE

REVISION

BY APP'D

OWN. B. McL.
CHK. M.L.D.

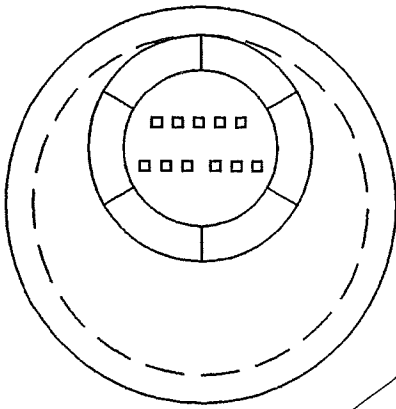
SCALE:
N. T. S.

DWG. NO. DS-10

PLOT DATE: NOV 22/95

Mc

PROJ. CAD FILE No.: C:\PROJ\0521\15\A\DESIGN\DS-11.DWG 95/11/02 6:00

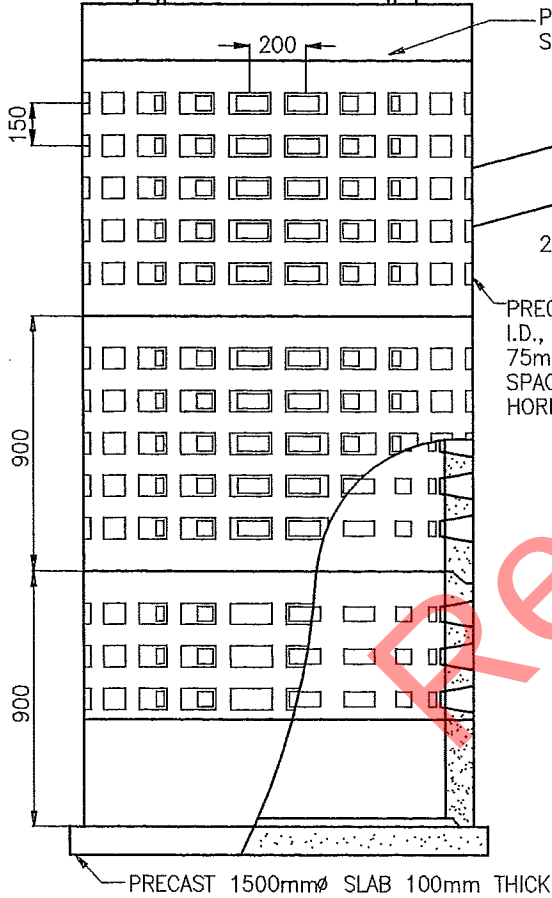


PLAN

STANDARD CAST IRON
MANHOLE FRAME AND
COVER

PRECAST GRADE RING(S) AND/OR
BRICK AND MORTAR 2 COURSES
BRICK MIN. 3 COURSES MAX.

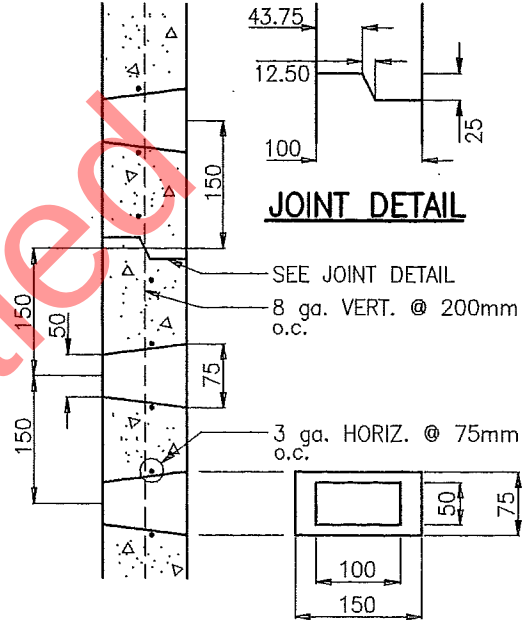
PRECAST REINFORCED
SLAB



ELEVATION

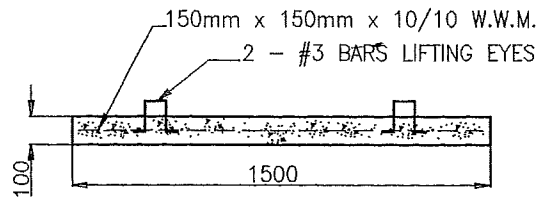
NOTE

1. WHERE DRYWELL FORMS PART OF CITY STORM
SEWER SYSTEM:
A) MANHOLE RUNGS SHALL BE INSTALLED
B) NUMBER OF SECTIONS TO BE CONFIRMED
BY A HYDROGEOLOGIST
2. FOR INSTALLATION DETAILS SEE STD. _____



JOINT DETAIL

SECTION - BARREL



SECTION - BOTTOM SLAB



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

NOV. 1995

LATEST REVISION

DATE:

APPROVED BY:

TITLE:

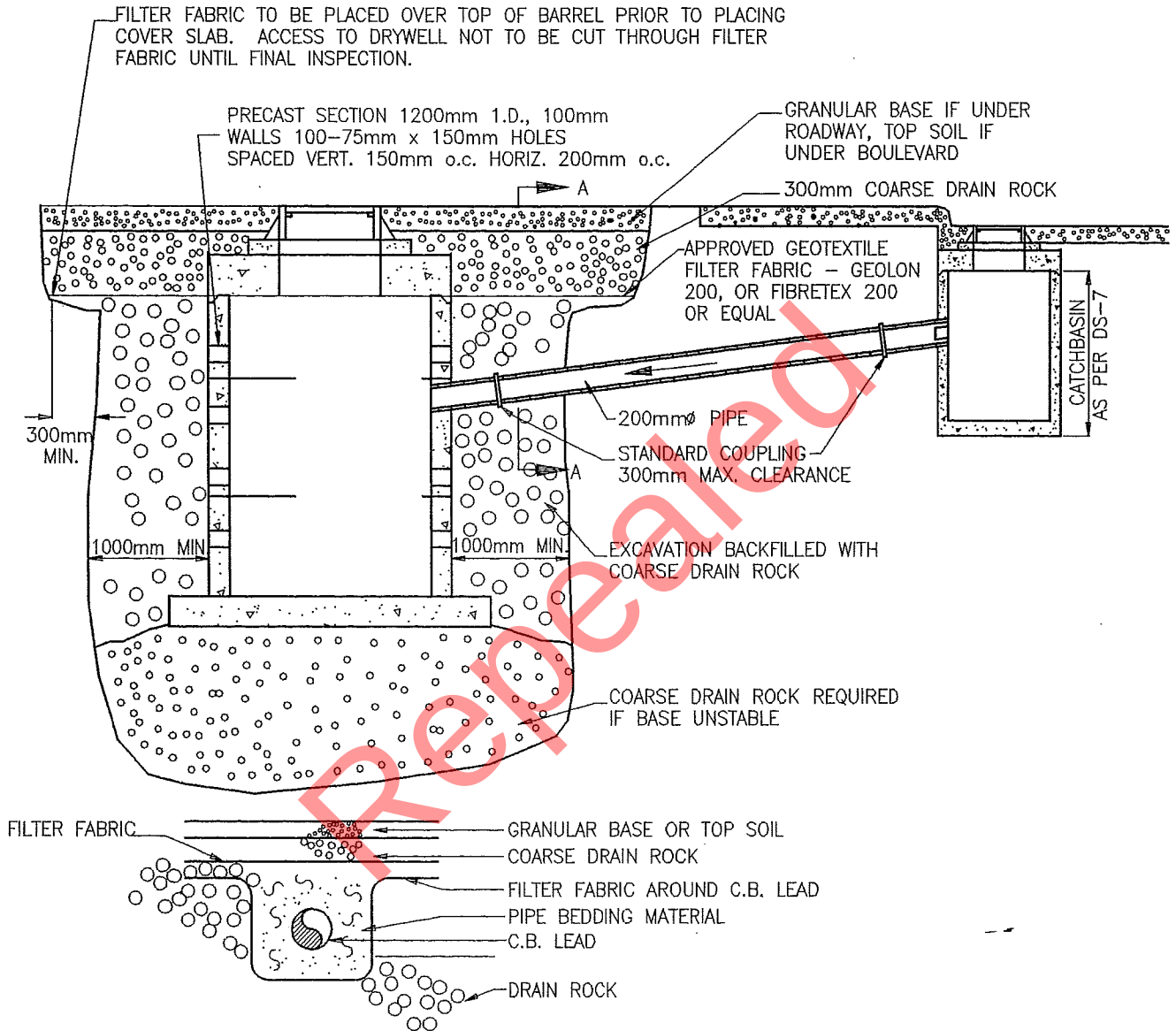
**DRAINAGE
DRYWELL**

SECTION:

REVISION No.

DWG. No.

DS-11



SECTION A-A



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

NOV. 1995

LATEST REVISION

DATE:

APPROVED BY:

TITLE:

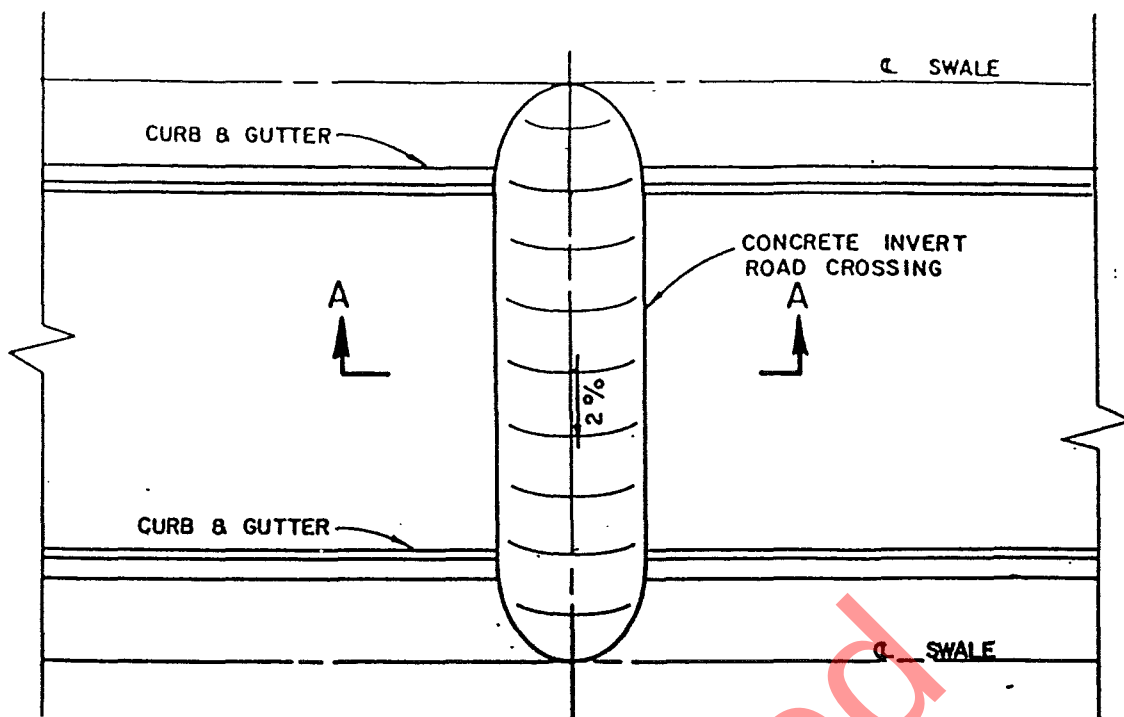
DRAINAGE
DRYWELL
INSTALLATION REQUIREMENTS

SECTION

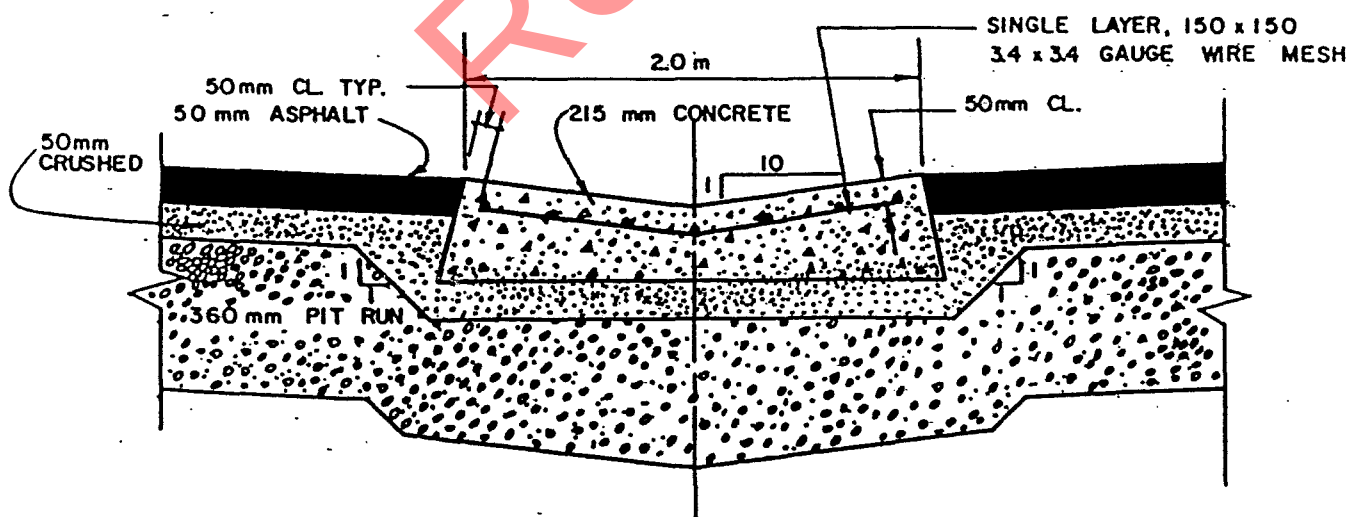
REVISION No.

DWG No.

DS-12



X - SECTION A-A



CITY OF MERRITT

TYPICAL
CONCRETE INVERT
ROAD CROSSING

DATE: MARCH 1987

NO. DATE

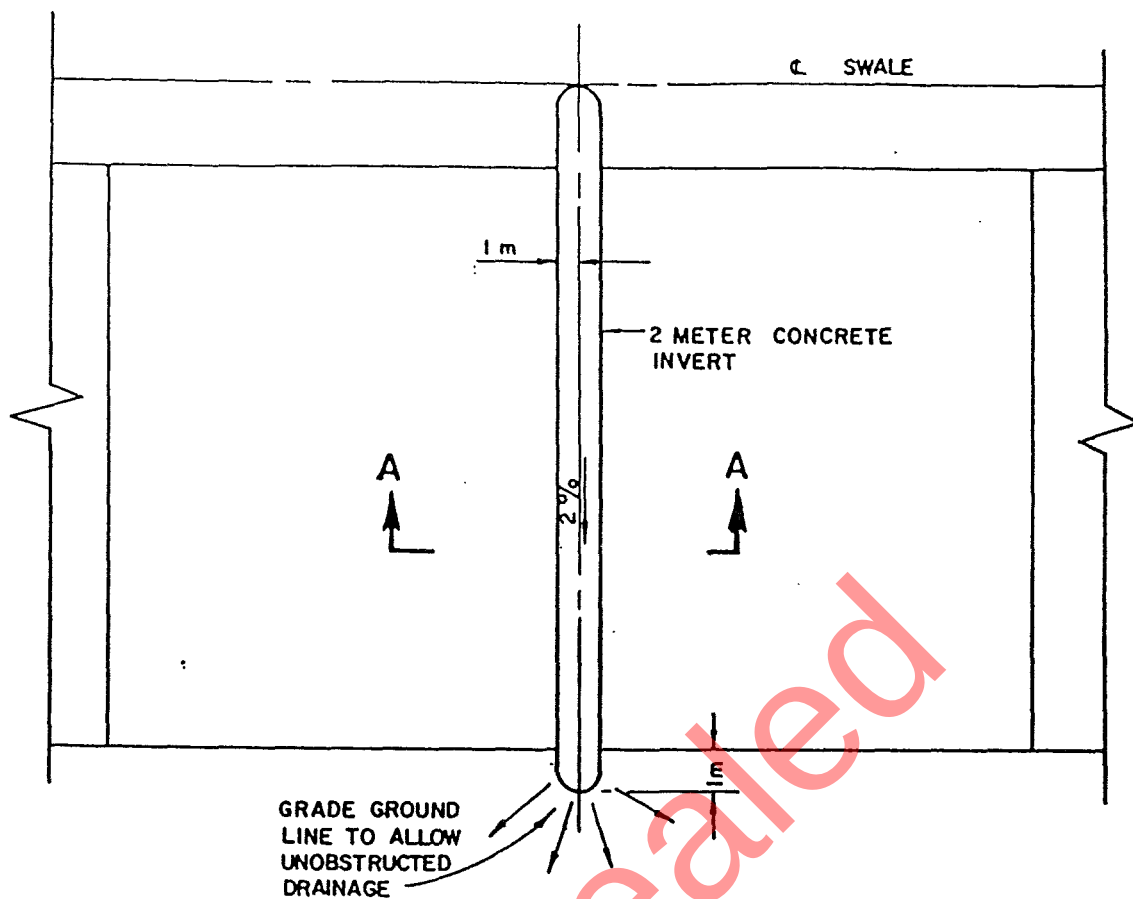
REVISION

BY APP'D

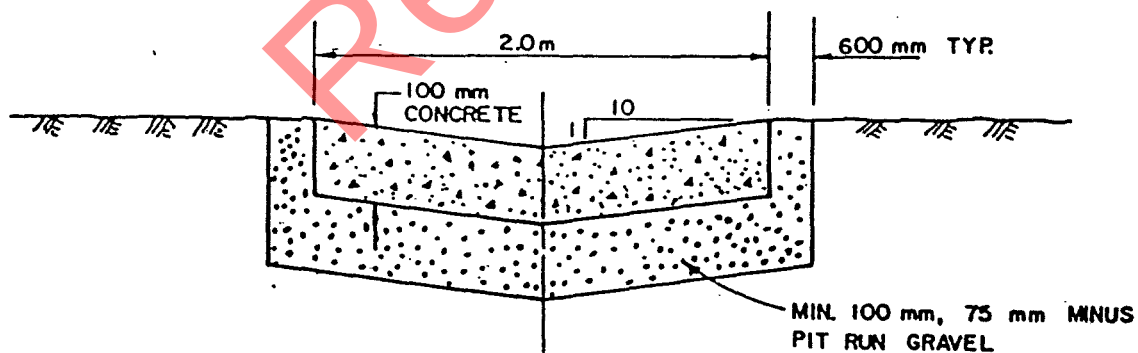
DWN. B. McL.
CHK. M. L. D.

SCALE:
N. T. S.

DWG. NO. DS-13



X-SECTION A-A



NOTE:

- 1) SUBBASE SHALL BE COMPACTED TO 95 % STANDARD PROCTOR DENSITY.
- 2) BASE SHALL BE PIT RUN GRAVEL COMPACTED TO 100 % STANDARD PROCTOR DENSITY
- 3) CONCRETE SHALL BE 20 MP_a AND CONFORM TO CSA 23.1



CITY OF MERRITT

**CONCRETE INVERT
THROUGH EASEMENT**

DATE: MARCH 1987

NO. DATE

REVISION

BY

APP'D

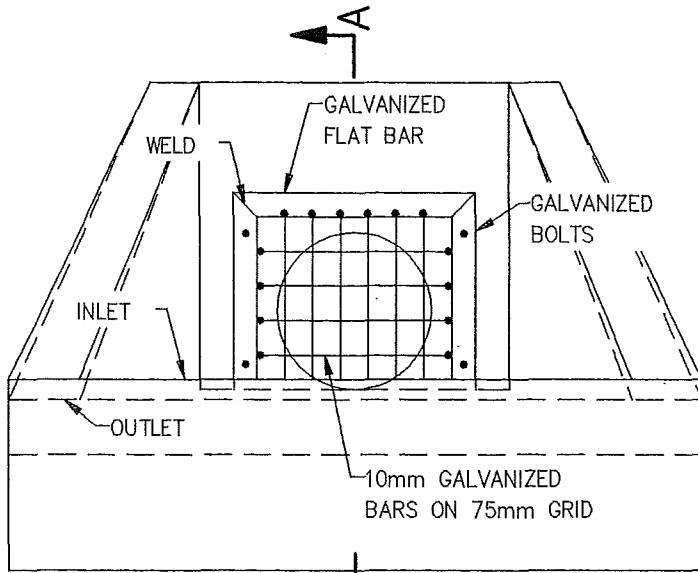
DWN. B. McL.
CHK. M. L. D.

SCALE:
N. T. S.

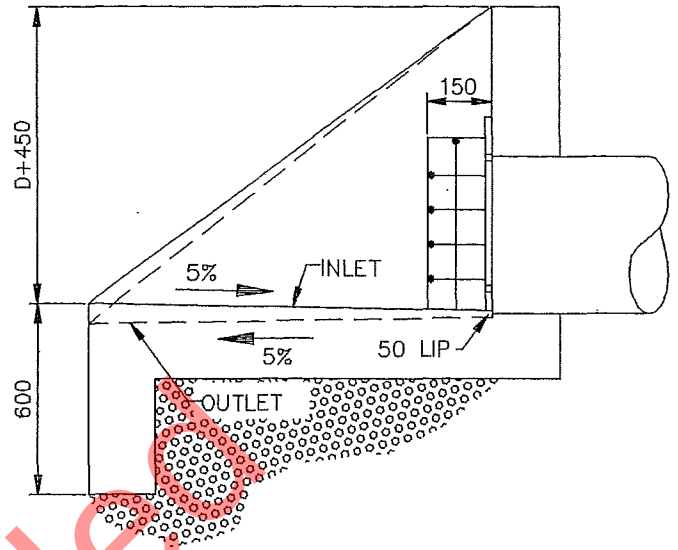
DWG. NO. DS-14

PLOT DATE: NOV 22/95

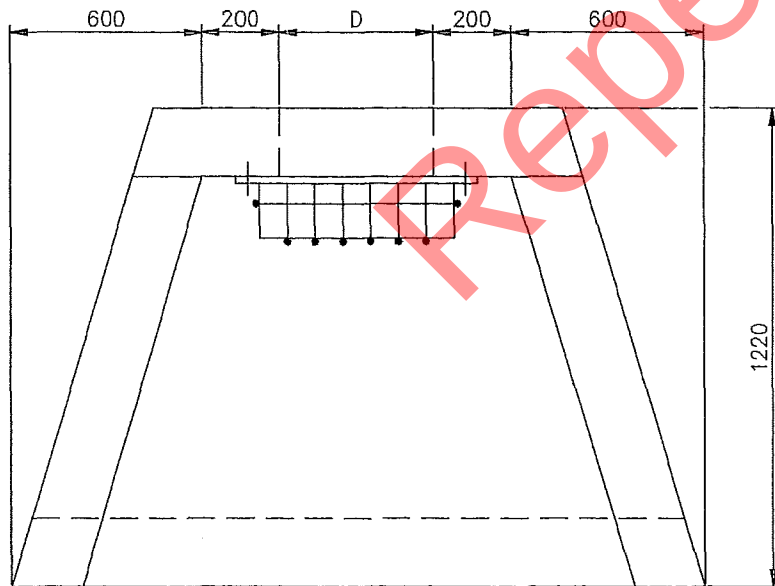
PROJ. CAD FILE No.: C:\PROJ\0521\15\A\DESIGN\DS-15.DWG NOV 22/95 DM



ELEVATION



SECTION A-A



PLAN

NOTES:

1. ALL WALLS & SLABS 200mm
2. CONCRETE MIN. 25 MPa
3. BASE SHALL BE 150mm
COMPACTED PIT RUN
4. REINFORCING WALL SHALL BE
15M @300 EACH WAY. EACH
WALL & SLAB. MIN. BOND
LENGTH ON CORNER BARS 460mm
5. PLACE CONCRETE RIP RAP
300mm THICK FOR 5m FROM
INLET & OUTLET STRUCTURE



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

LATEST REVISION
DATE:

APPROVED BY:

TITLE:

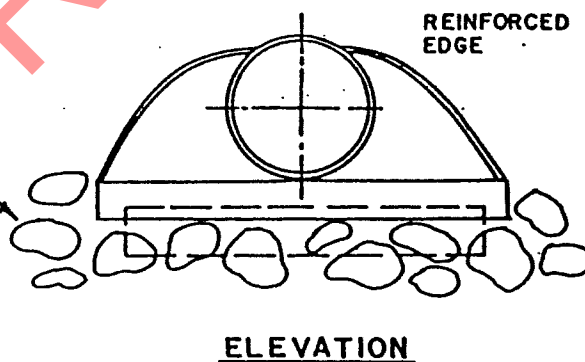
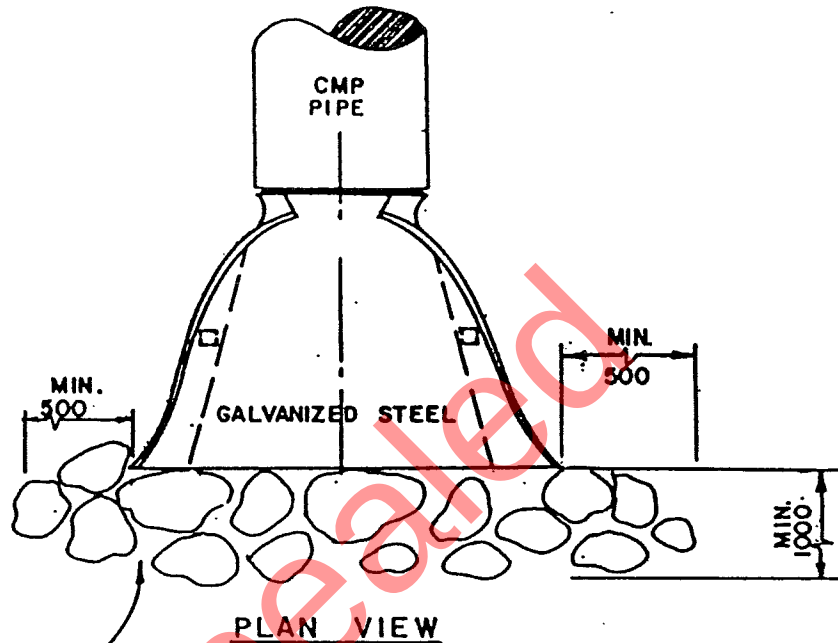
CONCRETE OUTLET
AND
INLET STRUCTURE

SECTION:

REVISION No.

DWG No.

DS-15



NOTE: END SECTIONS SHALL BE AS FABRICATED BY CMP PIPE MANUFACTURERS.



CITY OF MERRITT

TYPICAL MANUFACTURED
END SECTIONS
FOR CULVERTS

DATE: MARCH 1987

NO. DATE

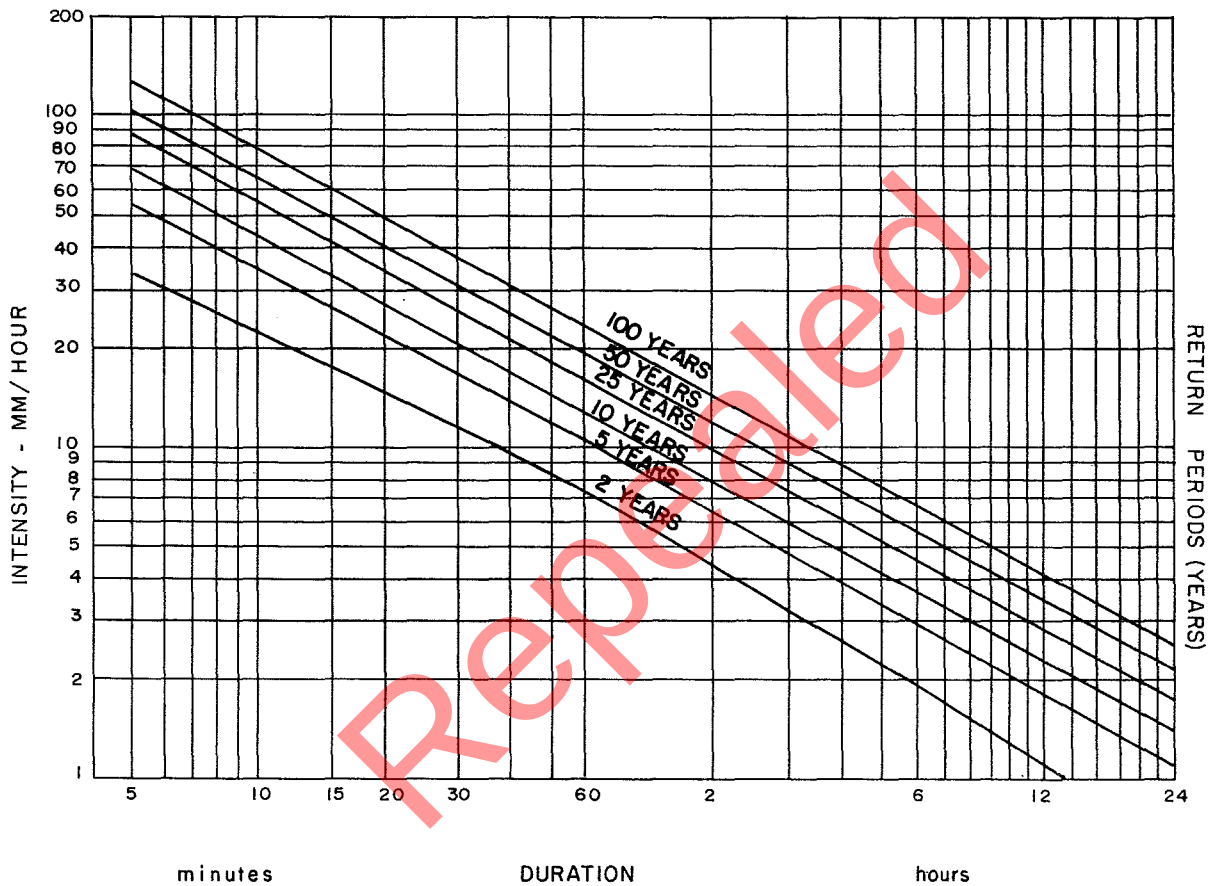
REVISION

BY APP'D

DWN. B. McL.
CHK. M. L. D.

SCALE:
N. T. S.

DWG. NO. DS-16



NOTE

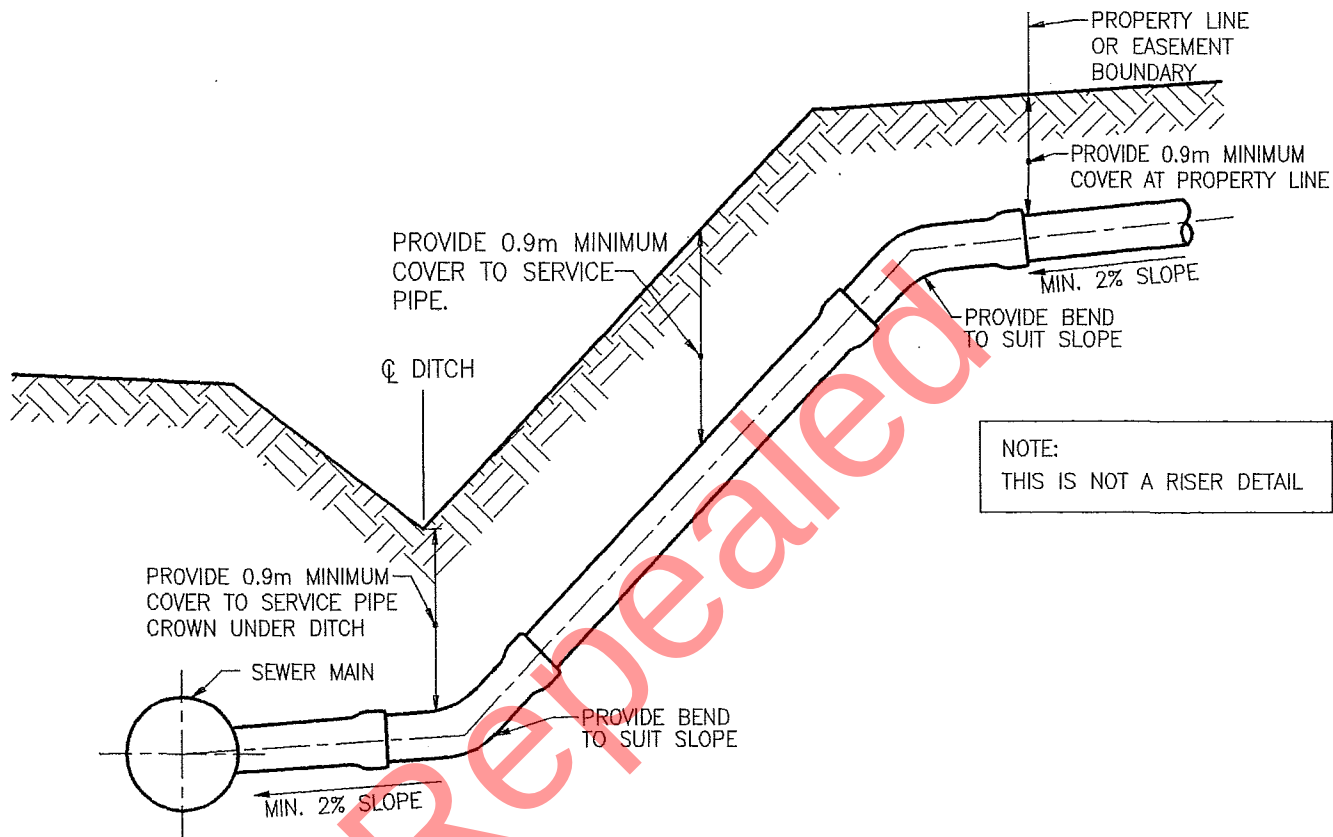
CURVES DEVELOPED FROM CITY OF KAMLOOPS,
DAYTON AND KNIGHT "GUERIN CREEK MASTER DRAINAGE PLAN."

 CITY OF MERRITT					RAINFALL INTENSITY CURVES	
DATE DRAWN: OCTOBER, 1985	NO. DATE	REVISION	BY APPD	DWN. B. McL CHK. M. L. D.	SCALE: N. T. S.	DWS. NO. DS-17

PROJ. CAD FILE No.: C:\PROJ\0521\15\A\DESIGN\MER-DT1.DWG 95/11/22 3:30pm

WT

95/11/22 3:30



**SERVICE CONNECTIONS
ON SLOPES**
NOT TO SCALE



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

NOV. 1995

LATEST REVISION
DATE:

APPROVED BY:

TITLE:

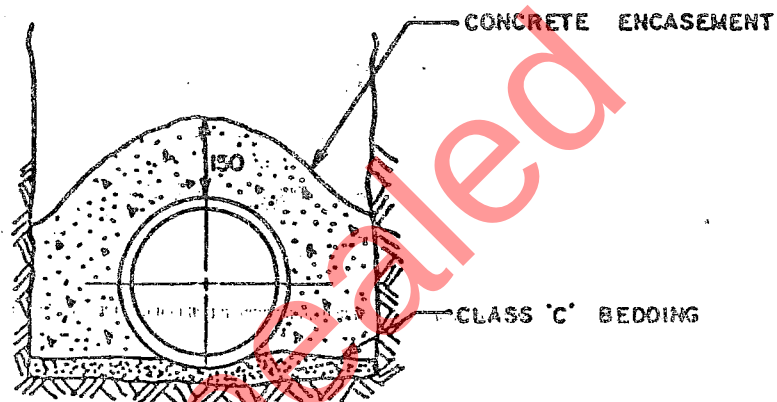
**SANITARY SEWER
SERVICE**

SECTION:

REVISION No.

DWG No.

DS-18



NOTES:

1. THE PLACEMENT OF THE CONCRETE ENCASEMENT NEED NOT BE DONE BY FORMING.
2. MIN. THICKNESS OF THE CONCRETE ENCASEMENT TO BE 150 mm.
3. CONCRETE ENCASEMENT TO BE CONTINUOUS FOR DUCTILE IRON PIPE
4. ENCASEMENT ON PVC AND AC SEWERS TO STOP 0.3 m EACH WAY OF COUPLING.



CITY OF MERRITT

CONCRETE ENCASEMENT
DETAIL

DATE: MARCH 1987

NO. DATE

REVISION

BY

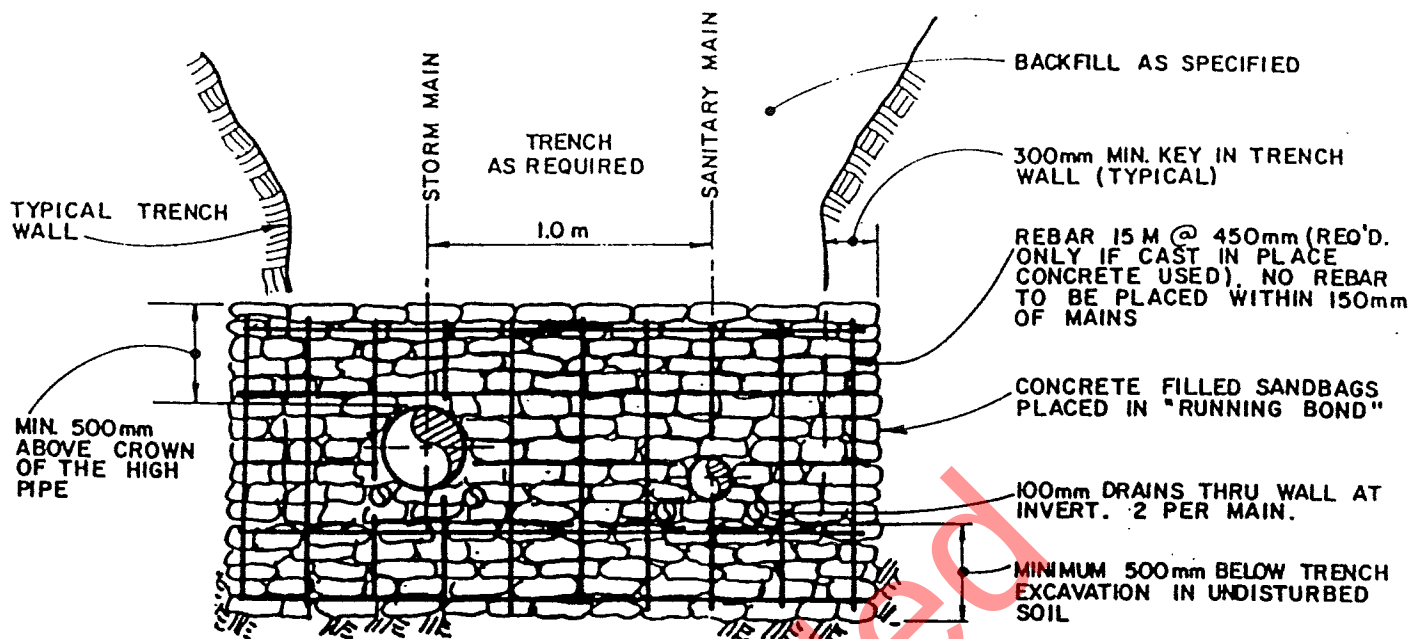
APP'D

DWR B. McL.
CHR. M.L.D.

SCALE:
N.T.S.

DWG. NO.

M-1



NOTES:

1. THE CONTRACTOR MAY REPLACE CONCRETE SANDBAGS WITH CAST IN PLACE CONCRETE, WITH WALL THICKNESS TO BE 300mm MINIMUM.
2. THE CONTRACTOR SHALL CONSTRUCT THE BULKHEAD TO A MINIMUM THICKNESS OF 60% OF HEIGHT IF CONCRETE SANDBAGS USED.
3. PLACE AS NOTED ON PROFILE.
4. FOR SINGLE PIPE REDUCE LENGTH TO SUIT TRENCH.
5. BULKHEADS TO BE PLACED DOWNHILL SIDE OF, AND AGAINST, BUT MUST NOT SURROUND BELL OF PIPE.



CITY OF MERRITT

BULKHEAD DETAIL

DATE: MARCH 1987

NO. DATE

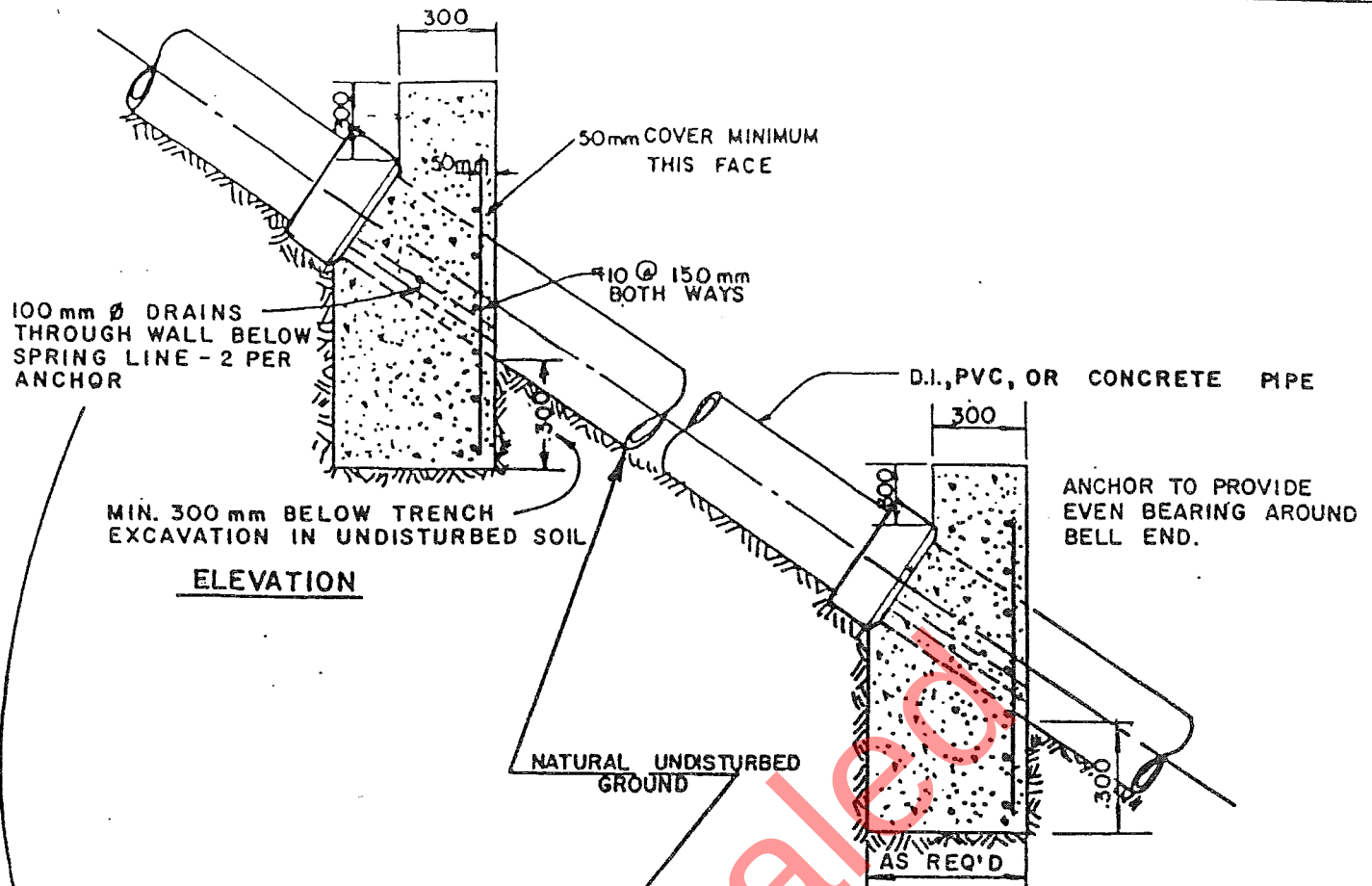
REVISION

BY APP'D

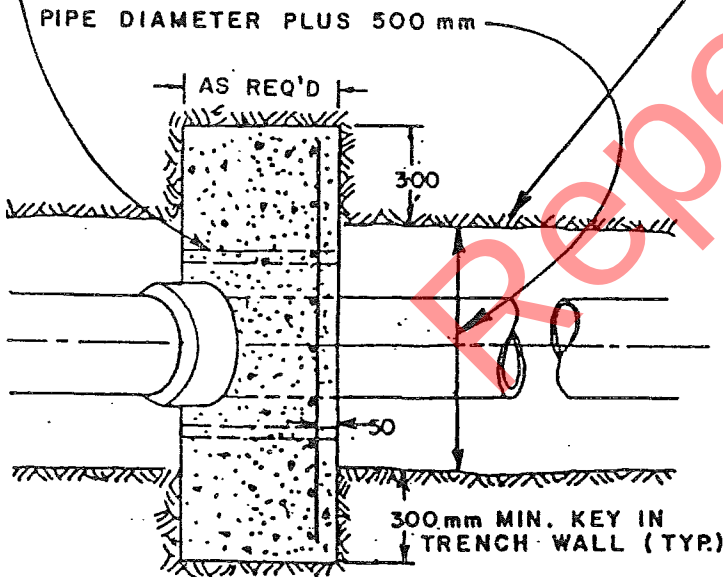
DWN. B. McL.
CHK. M. L. D.

SCALE:
N. T. S.

DWG. NO. M-2



ELEVATION



PLAN

NOTES

1. CONCRETE SHALL BE 20. M P.d. 28 DAY STRENGTH.
2. ANCHORAGE REQUIRED WHERE SLOPE EXCEEDS
 20 - 35 % Locate every 11 m
 35 - 50 % " " 7.3 m
 greater than 50 % Locate every 5m.
3. NO REBAR IS TO BE PLACED WITHIN 150 mm OF MAINS.
4. ANCHORS ARE TO BE PLACED AGAINST AND ON THE DOWNHILL SIDE OF THE BELL OF THE PIPE, BUT MUST NOT SURROUND IT.
5. DOWNHILL FACE OF ANCHORS TO BE BEARING ON UNDISTURBED SOIL.



CITY OF MERRITT

WATERMAIN AND
SEWERMAIN ANCHORS

DATE: MARCH 1987

NO. DATE

REVISION

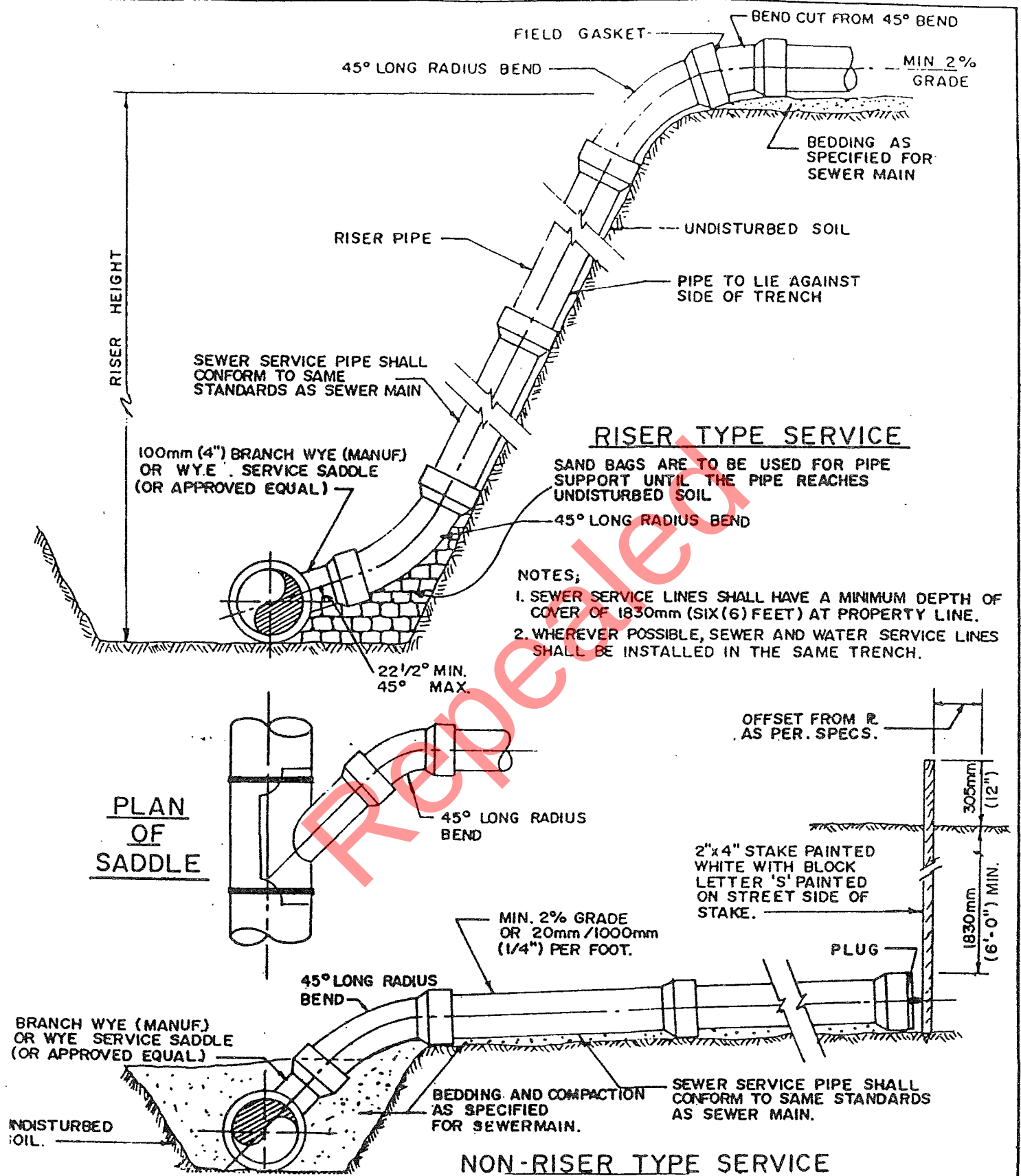
BY APP'D

DWN. B. McL.
CHK. M. L. D.

SCALE:
N. T. S.

DWG. NO.

M-3



CITY OF MERRITT

TYPICAL
SEWER SERVICE CONNECTIONS

DATE: MARCH 1987

NO. DATE

REVISION

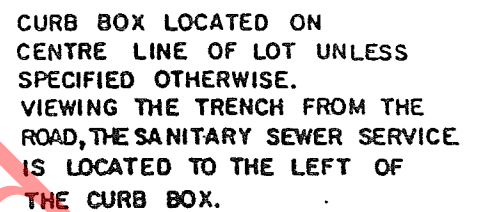
BY APP'D

DWN. B. MCL.
CHK. M. L. D.

SCALE:
N. T. S.

DWG. NO.

S-3



MARKER STAKE



DWG. NO. S-4

CITY OF MERRITT
BYLAW NO.
1187, 1480 & 1523

CITY OF MERRITT
CONSTRUCTION COMPLETION CERTIFICATE

1.0 PROJECT DESCRIPTION

Project _____ Developer _____ Engineer _____ Contractor _____
Description _____

2.0 FIRST SUBMISSION

2.1 By Consulting Engineer

I _____ P. Eng. of the firm _____ hereby certify that the works described above have been installed according to the plans and specifications approved pursuant to Subdivision and Development Servicing Bylaw No. 1187, 1987 and are now complete and may be used for the purpose intended. I hereby recommend this project be approved and a Construction Completion Certificate be issued.

Inspector

Project Engineer

Signing Officer

P. Eng. Seal

Date

2.2 By City of Merritt

Approval granted on _____, 20__

Approving Officer

Approval rejected on _____, 20__

Approving Officer

Deficiencies to be rectified before approval is granted and this Construction Completion Certificate issued:

3.0 FINAL SUBMISSION

3.1 By Consulting Engineer

I hereby certify that the deficiency items listed on this certificate have now been corrected and that as-constructed drawings have been prepared, finalized and submitted to the City Engineer.

Inspector

Project Engineer

Signing Officer

P. Eng. Seal

Date

3.2 By City of Merritt

Construction of the above described project is now complete and this Construction Completion Certificate is hereby issued.

Approved on _____, 20__

Approving Officer

Maintenance Period Expiry Date _____, 20__

CITY OF MERRITT
FINAL ACCEPTANCE CERTIFICATE

1.0 PROJECT DESCRIPTION

Project _____ Developer _____ Engineer _____
Contractor _____
Description _____
Date of Construction Completion Certificate _____, 20__
Maintenance Period Expiry _____, 20__

2.0 FIRST SUBMISSION

2.1 By Consulting Engineer

The maintenance period is about to expire and I _____ P. Eng. of the firm _____ hereby certify that the works described above are in good order and recommend a Final Acceptance Certificate for this project be approved and Issued by the City of Merritt.

P. Eng. Seal

Project Engineer

Signing Officer

Date

2.2 By City of Merritt

Approval granted on _____, 20__

Approving Officer

Approval rejected on _____, 20__

Approving Officer

Deficiencies to be rectified before approval is granted and this Final Acceptance Certificate issued:

3.0 FINAL SUBMISSION

3.1 By Consulting Engineer

I hereby certify that the deficiency items listed on this certificate have now been corrected and that a Final Acceptance Certificate be approved by the City of Merritt.

P. Eng. Seal

Inspector

Project Engineer

Signing Officer

Date

3.2 By City of Merritt

The above described project is now complete and this Final Acceptance Certificate is hereby issued.

Approved on _____, 20__

Approving Officer

SECTION 6 - SANITARY SEWER

600 GENERAL

These standards shall apply to and govern sanitary sewerage systems installed in the City. The design of the systems shall comply with the design principles of the Waste Management Branch as defined in a publication entitled "Guidelines for Assessing Sewerage Works".

601 DESIGN STANDARDS FOR SANITARY SEWER

.1 Design Flow

- a) The design flow for sanitary sewer in the City shall be calculated on the basis of Section 602 above and the following criteria:

Average Daily Flow 365 litres/capita/day
Infiltration Allowance 5180 litres/hectare/day

- b) The ratio of Peak Flow divided by the average daily flow shall be known as the Peak Factor. The Peak Factor shall be calculated by using the Harmon Formula as follows:

$$\text{Peak Factor} = \frac{18 + P}{4 + P} \quad \text{where P is the service population in thousands}$$

.2 Minimum Pipe Sizes, Velocity and Grade

- .1 Minimum velocity for sanitary sewer mains flowing full or half full shall be 0.75 m/s. Minimum grades for various sizes of pipe are as follows:

100mm	1.25%	375mm	0.15%
150mm	0.60%	400mm	0.14%
200mm	0.40%	450mm	0.12%
250mm	0.28%	525mm	0.10%
300mm	0.22%	600mm	0.08%
350mm	0.17%		

- .2 Minimum pipe sizes shall be:

Mains	- 200 mm
Service Connections	- 100 mm

(37.)

Where a sanitary sewer main extension in low density residential areas is not conceivable, the final 300 metres of main may be 150 mm diameter.

.3 Depth of Mains

- a) Mains shall be designed to connect all possible basements on the assumption that the service pipe leaves the building at the closest point to the sewer at a pipe crown elevation 0.45 metres below the basement floor level and runs at a slope of not less than 2.0% to connect to the crown of the sanitary sewer main. Notwithstanding the requirement for sufficient depth to service all hase basements the minimum depth of bury shall be 1.5 metres in traveled areas and 0.9 metres elsewhere.

.4 Main Offsets from Centre Line

- a) Sanitary Sewer mains shall be installed down the centreline of the road as specified on standard drawing R-6.

.5 Sanitary Sewer Manholes

- a) Manholes shall be installed at the end of each line where cleanouts are not provided at all changes in grade, size or alignment; at all intersections; and at distances not greater than 120 metres for sewers 375 mm or less.
- b) Standard manholes shall be 1050mm inside diameter.
- c) The maximum drop between pipe inverts shall be 200 mm. Where drops greater than 200 mm occur, exterior drop structures shall be installed.
- d) Manholes in roadways or roadway shoulders shall have a 1.5 metre diametre apron placed around them.

.6 Anchoring

- a) Sanitary sewer mains installed at grades steeper than 20% shall be anchored in accordance with the standard detail drawings.
- b) 20 MPa Concrete shall be used for anchor construction.

(38.)

602 MATERIALS

602.1 Pipe

- .1 The following types of pipe will be acceptable for sanitary sewer mains and services:

a) Concrete Pipe

Concrete storm sewer pipe shall be Class III or better conforming to ASTM Standard C786 for Reinforced Concrete Culvert. rubber O-ring gaskets for concrete sewer pipe shall conform to STM C-361 and ASTM C-443.

b) Polyvinyl Chloride (PVC) Pipe

For 150mm to 375mm sizes, the pipe and fittings shall conform to ASTM D3034-73, and shall have a minimum SDR of 35. For diameters greater than 375mm, the pipe shall conform to ASTM F679 and have a minimum SDR of 35. 100mm and 150mm sanitary sewer services shall have a minimum SDR of 28. Sealing rings shall conform to ASTM F477.

.2 Precast Manhole Sections

- a) Precast concrete manhole sections shall be 1050mm inside diameter with 115mm wall thickness, reinforced concrete pipe of at least Class II in accordance with ASTM Standard C76 with tongue and groove joints. Manhole sections shall have 19mm galvanized steel steps cast in the concrete as shown on the drawings.
- b) Joints shall be made water tight by grouting or the use of water proofing agents.
- c) Cover slabs for manholes shall be reinforced to withstand H20 highway loading conditions.

.3 Cast Iron Manhole Frames and Covers

Covers and frames shall be cast iron of an approved pattern to withstand H-20 loading. The clear opening of the frame shall be 500cm in diameter. The cover shall have a weight of 66 Kg. The frame shall be of the round base pattern having a weight of 84 Kg. Bearing faces of the cover to frame shall be machined for a nonrocking fit. Covers shall have 2 only 22mm diameter lifting holes with bolt plug assembly as shown on the drawings. Frames shall have 3 only 22mm diameter leveling holes. Covers and frames shall be Dobney

(39.)

Foundry Pattern C20, or approved equal. The wording "SANITARY SEWER" shall be embossed on each cover.

.4 Concrete

Poured in place concrete shall have 28 day strength of 20 MPa.

603 CONSTRUCTION STANDARDS

603.1 Sanitary Sewer Service Connections

- .1 Sewer services shall be installed to the property line in accordance with the Standard Drawings. The service shall be installed wherever possible in a common trench with the water service. The sewer service shall be offset 0.5 metres to the left of the water service when facing the lot and be located at the centre of the lot unless topographical constraints prohibit. Deviation from the required location for the sewer service may be permitted in instances where topographic features dictate a more desirable location of the service connection.
- .2 Service connections shall be made with an approved branch wye or saddle and be installed in a straight line and at uniform grade from the terminus at property line to the 45 degree long radius bend at the main.
- .3 The terminus of service connections shall be not more than 300mm short of property line. The ends of all service connections shall be sealed with watertight plugs or caps and marked with 50mm x 100mm stakes placed vertically with one end in the bottom of the trench and in contact with the watertight plug or cap and the other end protruding at least 0.6 meters above ground level. The depth of service pipe invert below the top of the marker stake shall be marked on the stake.
- .4 When the sewer main is 3.0 meters or more in depth, service risers may be installed at the main when service depth is not critical.

603.2 Infiltration Air and Exfiltration Tests

.1 Infiltration Test

Where the surface level of existing groundwater in the backfilled trench is one (1) metre or more above the top of the pipe throughout the entire test section, an infiltration test shall be used to determine leakage into the pipe.

Copies of the test results shall be submitted to the City Engineer on the City's Standard test forms. (40.)

.2 Air Test

Where the groundwater surface level is less than one (1) metre above the top of the pipe at the lowest point in the test section, or where groundwater at the time of testing is not apparent, a low pressure air test shall be carried out. Air pressure tests shall be the minimum time allowed for the pressure within a sewermain section to drop from 20.7 KPa to 17.2 KPa. The minimum time-air pressure loss for various diameters of pipe are as follows:

<u>Pipe Diameter</u>	<u>Minimum time For Air Pressure To Drop From 20.7 KPa to 17.2 KPa</u>
100 mm	2 minutes, 32 seconds
150 mm	3 minutes, 50 seconds
200 mm	5 minutes, 6 seconds
250 mm	6 minutes, 22 seconds
300 mm	7 minutes, 39 seconds
350 mm	8 minutes, 56 seconds

Copies of the test results shall be submitted to the City Engineer on the City's Standard test forms.

.3 Exfiltration Test

Where the groundwater level is below the pipe invert throughout the test section, an exfiltration test may be used. The test section shall be sealed at its lower extremity by means of a watertight plug. The test section shall be filled with water such that a minimum hydrostatic head of 600mm is placed on the pipe at its upper extremity. The head of water on the pipe shall be taken as the distance from the top of the pipe to water surface at the point of measurement. The test pressure shall be maintained above the 600mm minimum head for a period of not less than one hour.

The rate of exfiltration shall be circulated from the amount of water which must be added to maintain the original water level at the upper end.

The maximum allowable infiltration/exfiltration rate shall be 4.6 litres/mm of pipe diameter/24 hours/kilometer of sewermain.

Copies of the test results shall be submitted to the City Engineer on the City's Standard test forms.

.4 Manholes shall be tested with water to prove they are completely water tight.

(41.)

- .5 If leakage is detected, the leak or leaks shall be found and repaired by approved measures. The testing shall be repeated on these sections until leakage is within acceptable limits.

603.3 Cleaning and Flushing

All sewer mains, manholes, and services installed shall be flushed of all deposits of silt, sand, gravel, debris and other objectionable materials. All sewer mains shall be flushed clean and a suitably size plug passed through each test section to ensure no obstructions exist. The District Engineer shall witness all flushing operations. Mains other than those laid on curves shall be straight, and have clear visibility between manholes.

603.4 Video Inspections

The City Engineer may require a video inspection report be submitted where conventional testing indicates the section may not conform to specifications or for sections which can not be adequately tested by conventional means.

604 FORCEMAINS

.1 Pipe

Pipe sizes 100mm and larger shall be polyvinyl chloride (PVC) or Ductile Iron (D.I.).

a) Polyvinyl Chloride (P.V.C.)

Polyvinyl Chloride class and series pipe shall conform to AWWA C900 or ASTM D2241.

b) Ductile Iron Pipe (D.I.)

Ductile Iron Pipe shall conform to AWWA C151.

Cathodic protection may be required at the discretion of the City Engineer.

.2 Fittings

Cast iron fittings shall conform to watermain specifications.

.3 Pipe Bedding Material

Pipe bedding material and installation shall be in accordance with the watermain specification. (42.)

.4 Reaction Blocks

Reaction blocks shall be placed in accordance with the watermain specifications.

.5 Pipe Anchors

Pipe anchors shall be placed in accordance with the watermain specifications.

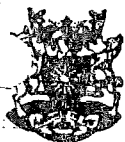
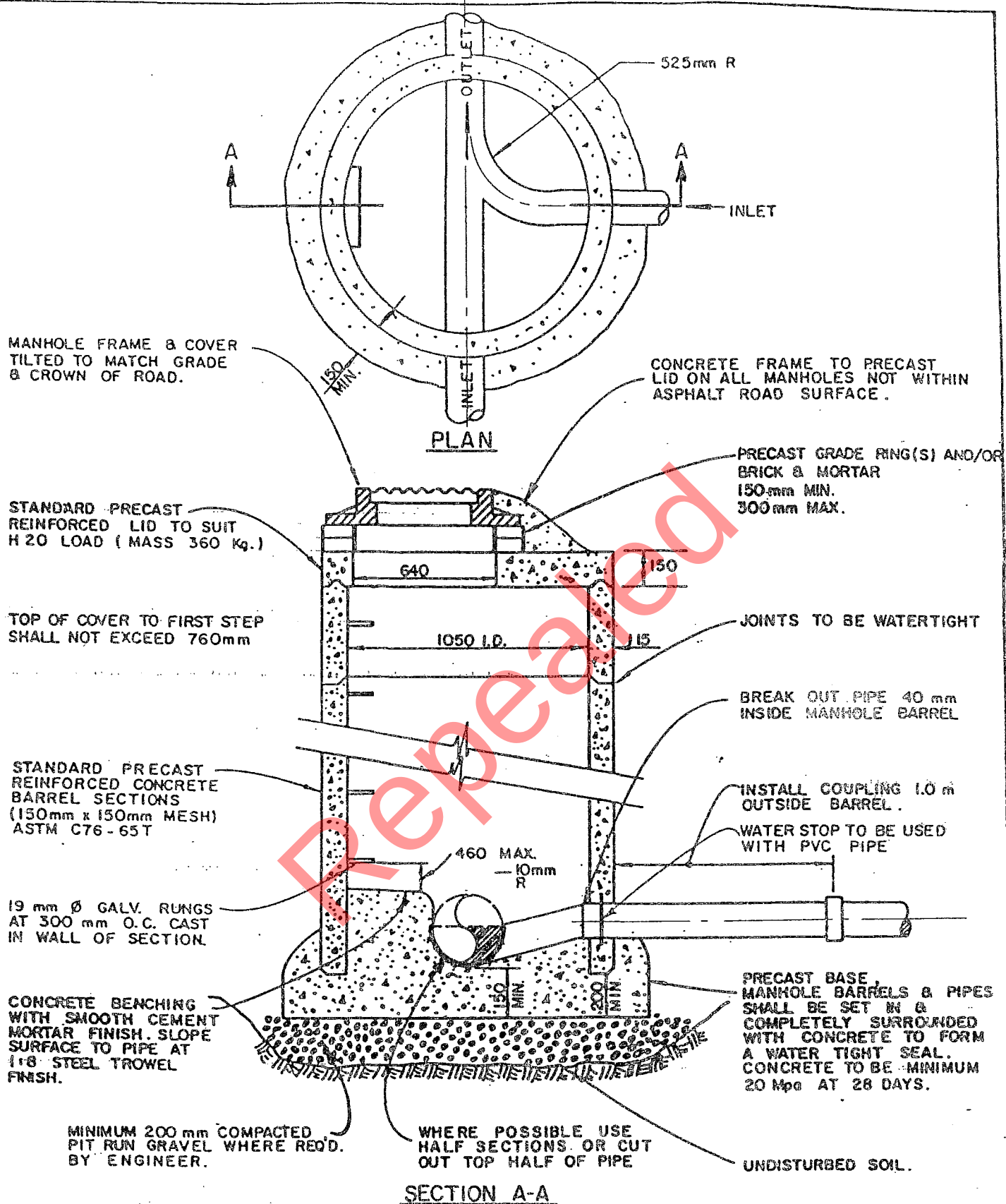
.6 Testing

Forcemains shall be tested to AWWA standard at 1.5 times the working pressure for a duration of 1 hour. The allowable leakage shall be calculated by the AWWA formulae noted in the watermain specifications.

Copies of the test results shall be submitted to the City Engineer on the City's Standard test forms.

.7 Depth of Bury

The minimum depth of bury from finished ground elevation to the top of the pipe shall be 1.8 metres unless otherwise approved by the City Engineer.



CITY OF MERRITT

TYPICAL MANHOLE
FOR 200mm - 460mm DIA. MAINS

DATE: MARCH 1987

NO. DATE

REVISION

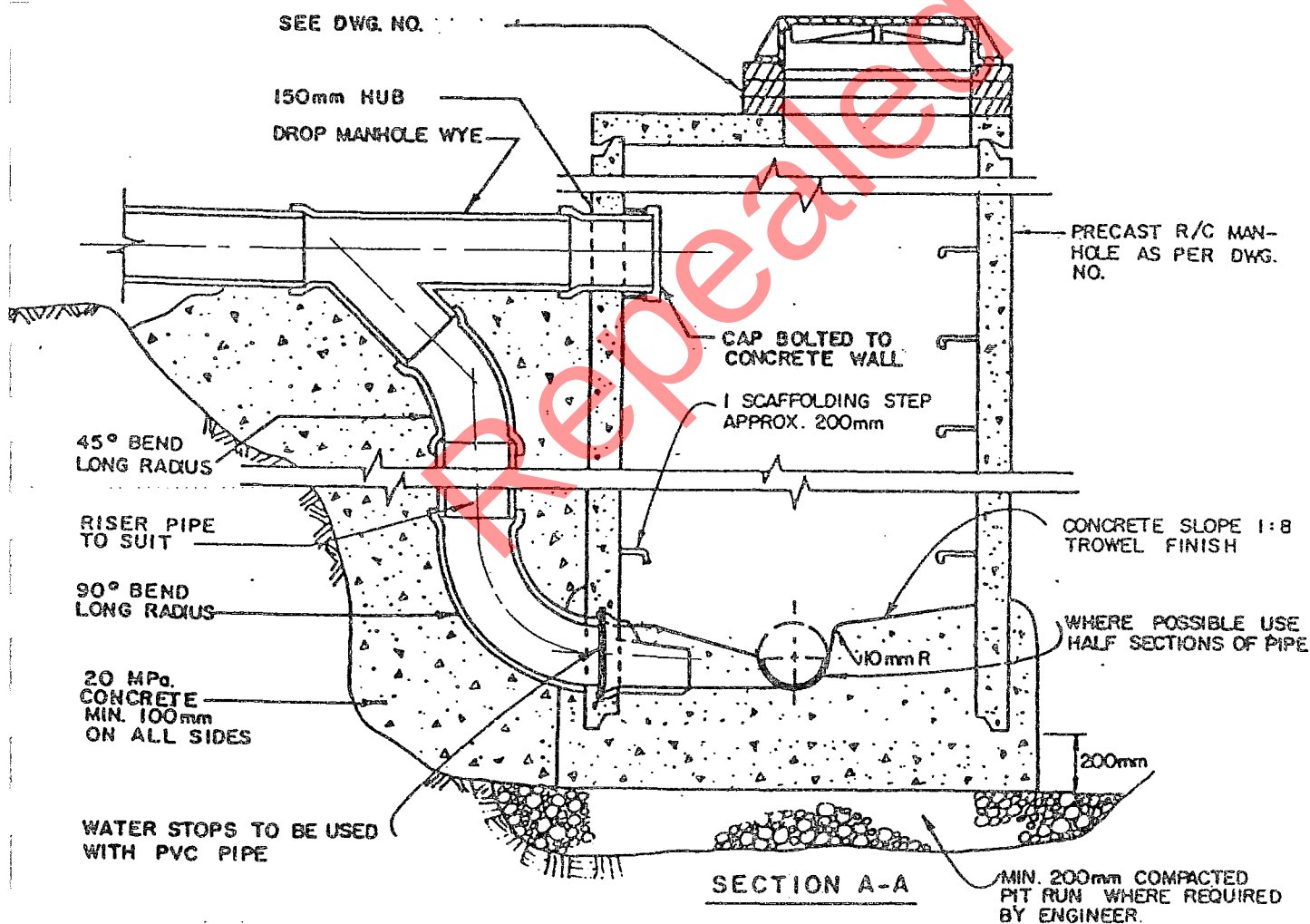
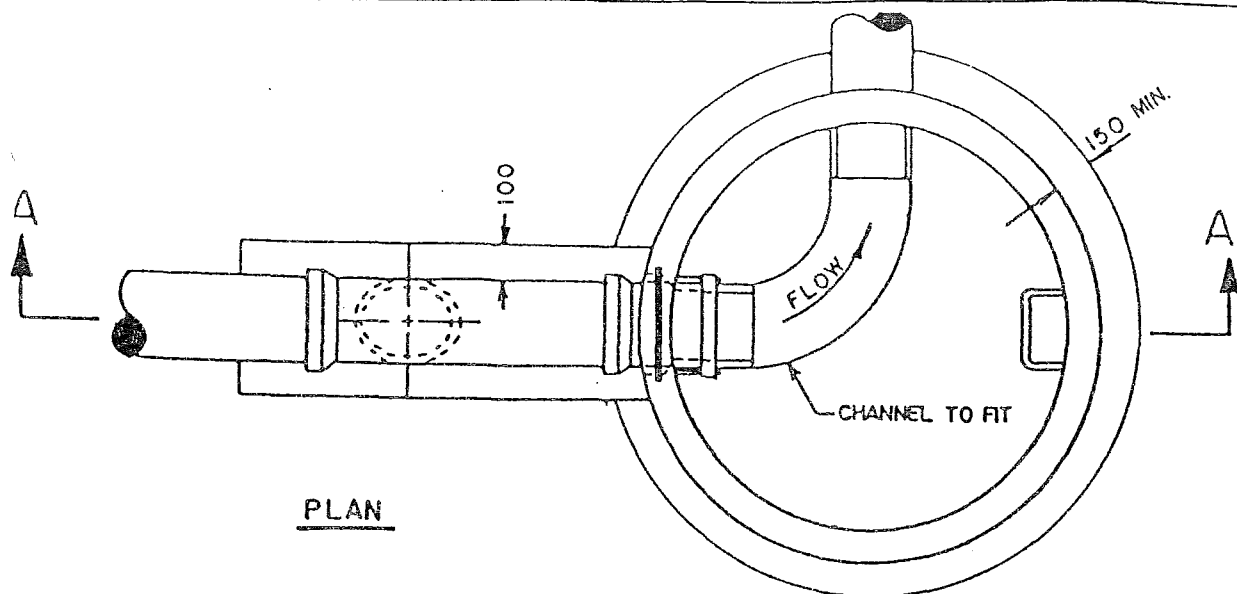
BY APP'D

DRN. B. McL.
CHK. M.L.D.

SCALE:
N.T.S.

DWG. NO.

DS - 1



CITY OF MERRITT

EXTERIOR DROP MANHOLE

DATE: MARCH 1987

NO. DATE

REVISION

BY APP'D

DWN. B. MCL.
CHK. M. L. D.

SCALE:
N. T. S.

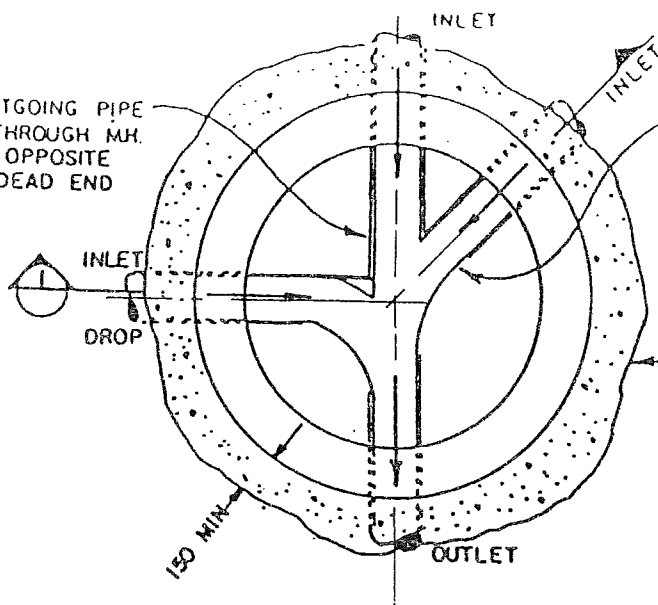
DWG. NO.

DS-2

IN ALL CASES, OUTGOING PIPE TO GO STRAIGHT THROUGH MH. WITH 1/2 PIPE TO OPPOSITE WALL; INCLUDING DEAD END MANHOLES

LATERALS WITH AN INTERSECTION OF 90° OR LESS TO THE OUTGOING PIPE ARE TO GO STRAIGHT TO THE INTERSECTION WITH THE OUTGOING PIPE WITH A HALF PIPE SET IN MAIN BENCHING.

CONCRETE SHALL BE PLACED AROUND BARREL & PIPES TO FORM A WATER TIGHT SEAL.



PLAN OF MANHOLE

INLET FLOW DROPS INTO MAIN BENCHING

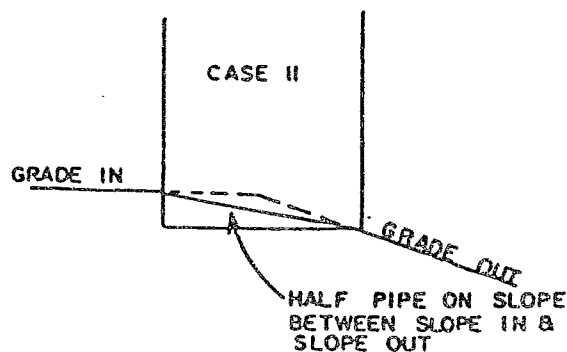
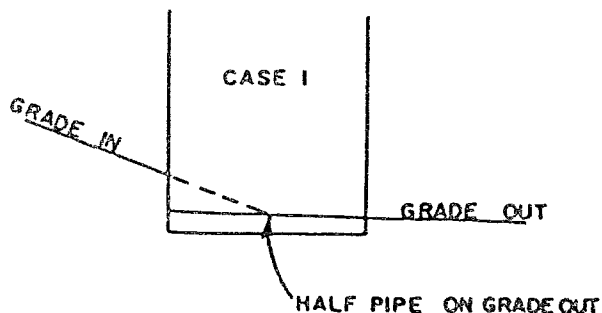
BENCH 1:8
200mm MAX.

WHERE POSSIBLE USE HALF SECTIONS OF PIPE FOR CHANNEL

DROPS BETWEEN 200mm AND 600mm ARE TO BE AVOIDED BY ADJUSTING GRADES. DROPS OF 600mm OR GREATER SHALL BE BY AN EXTERNAL DROP STRUCTURE.

WATER STOPS TO BE USED WITH PVC PIPE (TYPICAL)

SECTION THROUGH MANHOLE



CITY OF MERRITT

MANHOLE BENCHING & CHANNELLING

DATE: MARCH 1987

NO. DATE

REVISION

BY APP'D

DWN. B. McL.
CHK. M.L.D.

SCALE:
N.T.S.

DWG. NO.

DS-3

PRECAST GRADE RING(S)
AND/OR BRICK AND MORTAR
2 COURSES BRICK MIN.,
5 COURSES MAX.

ALL JOINTS MORTARED
TROWEL FINISH

20mm (3/4") Ø HOT DIP GALV.
SAFETY LADDER RUNGS
300mm (12") O.C. FULL
DEPTH OF M.H.

17 MPa. (2500 PSI)
CONCRETE IN PLACE

200mm (8")
TYPICAL ALL AROUND

#4 AT 300mm (12") O.C.

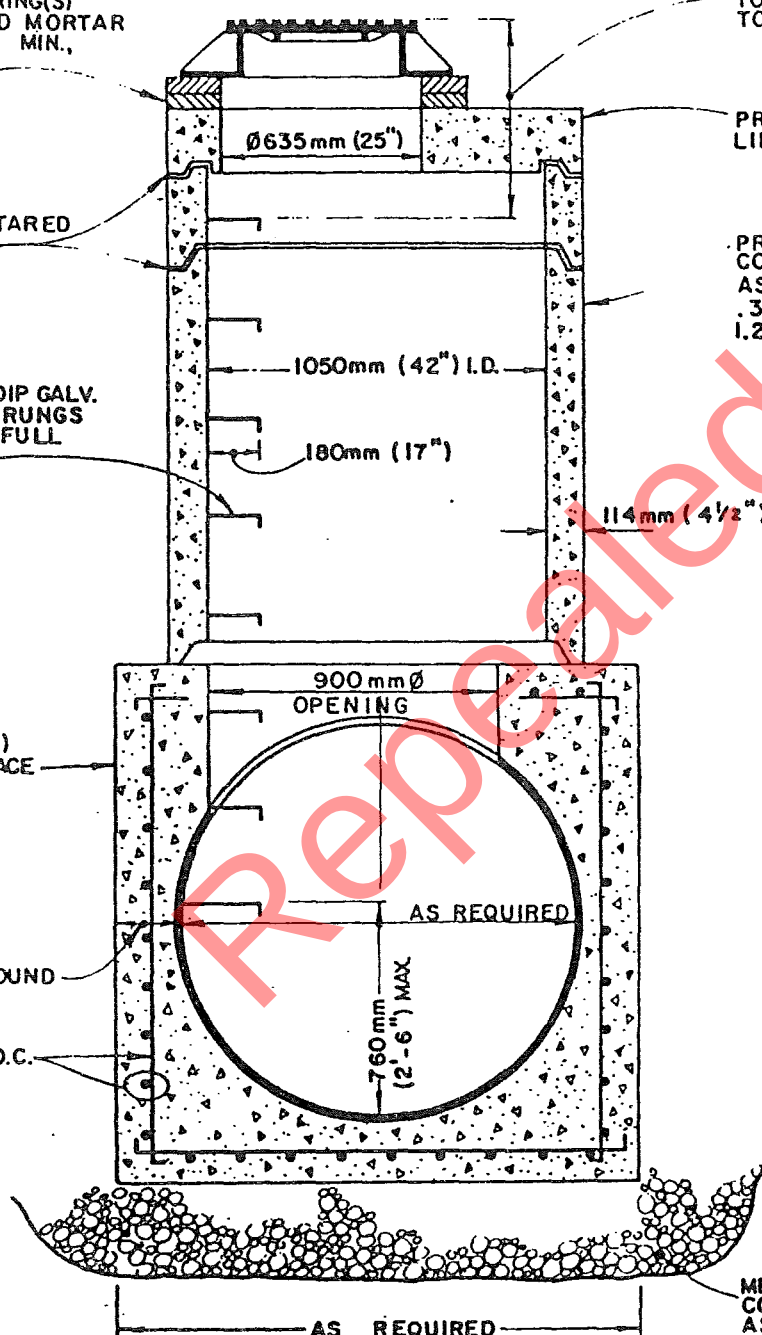
NOTE:

FOR SEWERS LARGER THAN Ø380mm (15")

TOP COVER TO FIRST STEP NOT
TO EXCEED 600mm (2 FEET)

PRECAST REINFORCED CONCRETE
LID TO SUIT H2O LOADING

PRECAST Ø1050mm (42") REINFORCED
CONCRETE M.H. SECTIONS
ASTM C 76- 65T AVAILABLE IN
.3m (1"), .6m (2"), .9m (3") AND
1.2m (4") NOMINAL LENGTHS



MIN. 200mm (8") DEPTH OF
COMPACTED 25mm (1") GRAVEL
AS DIRECTED BY ENGINEER
IN FIELD



CITY OF MERRITT

MAN HOLE FOR
LARGE DIAMETER SEWERS

DATE: MARCH 1987

NO. DATE

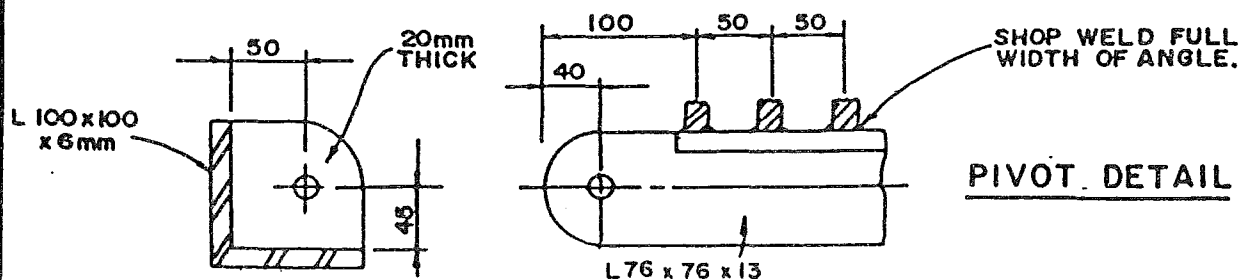
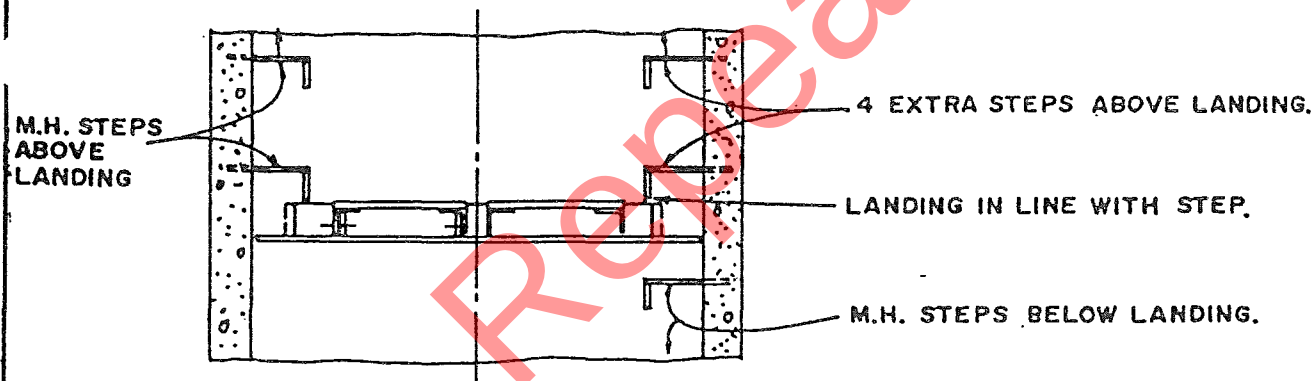
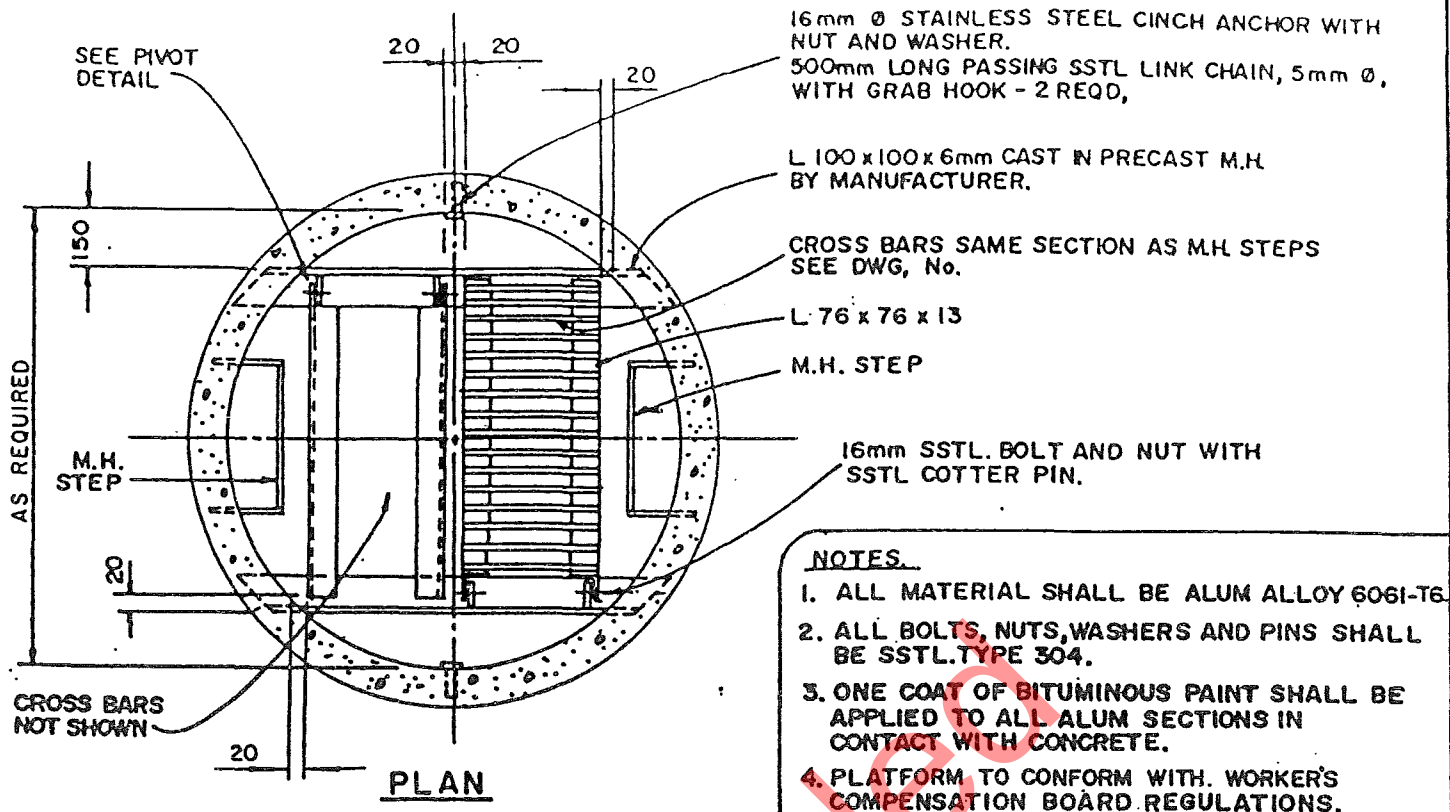
REVISION

BY APP'D

DWN. B. McL.
CHK. M.L.D.

SCALE:
N. T. S.

DWG. NO. DS-4



CITY OF MERRITT

LANDING FOR
DEEP MANHOLE

DATE: MARCH 1987

NO. DATE

REVISION

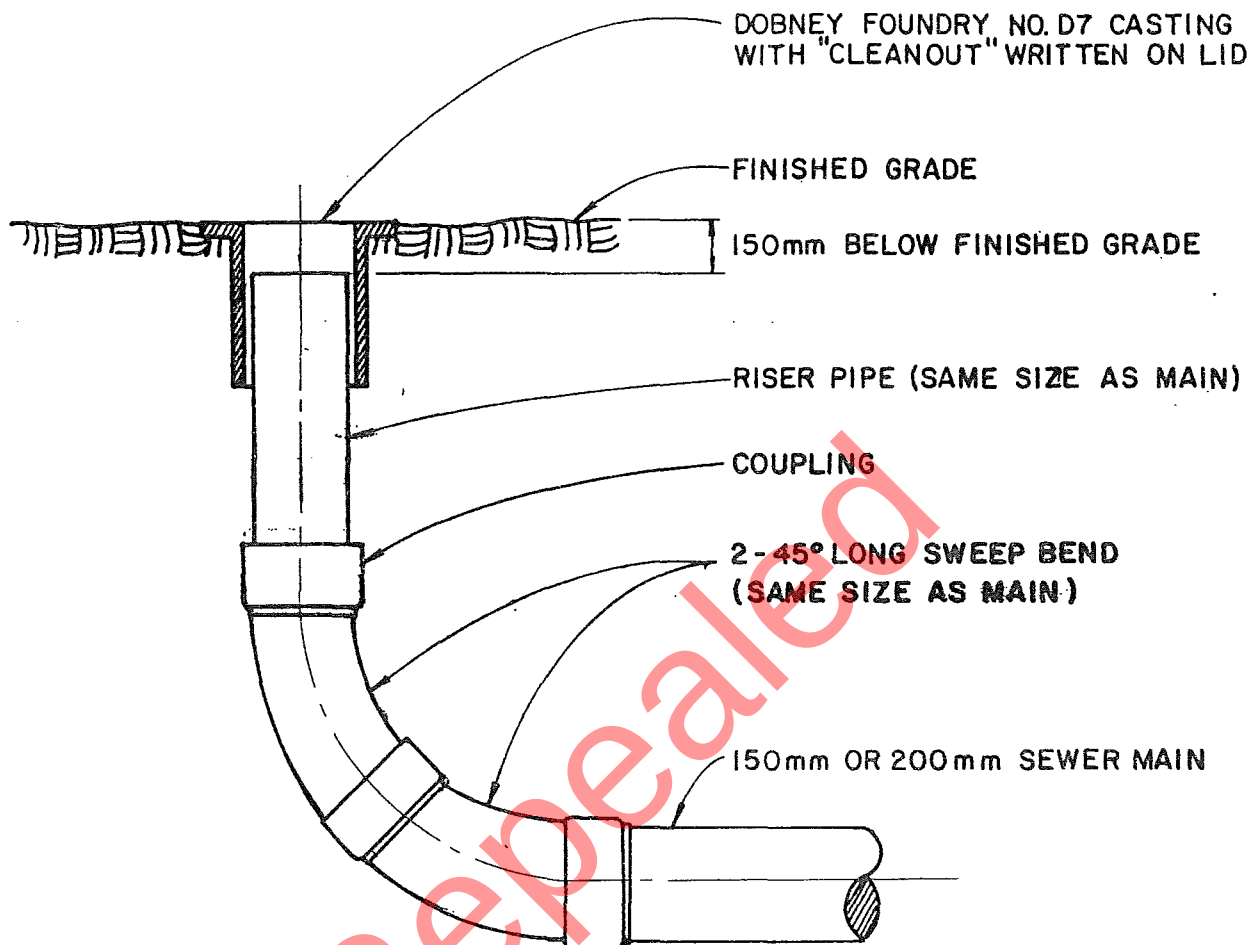
BY APP'D

DWN. B. McL.
CHK. M.L.D.

SCALE:
N. T. S.

DWG. NO.

DS-5



NOTE:
ALL PIPE MATERIALS SHALL
BE P.V.C.



CITY OF MERRITT

SEWER CLEANOUT
FOR 150mm & 200mm SANITARY
SEWER TERMINALS

DATE: MARCH 1987

NO. DATE

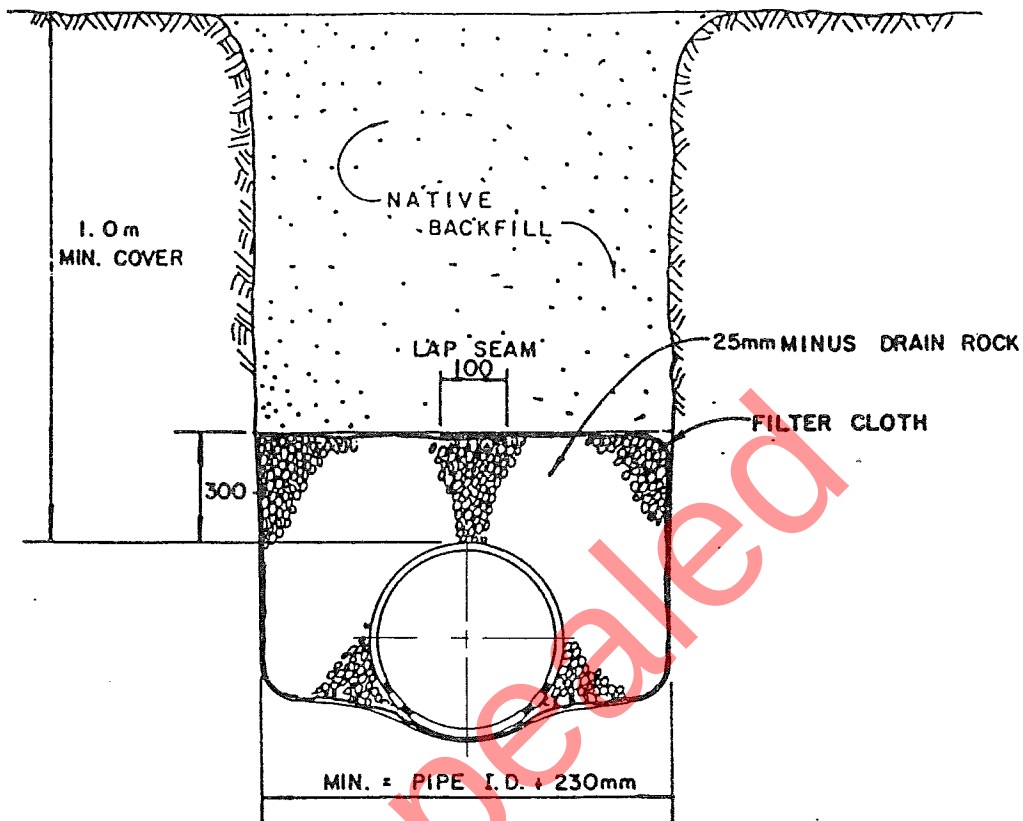
REVISION

BY APP'D

OWN. B. McL.
CHK. M.L.D.

SCALE:
N. T. S.

DWG. NO. DS-6



NOTES

1. PIPE SHALL BE Ø100 PERFORATED PVC SDR 28 UNLESS OTHERWISE NOTED.
2. IN EXTREME CASES, "NATIVE BACKFILL" SHALL BE REPLACED WITH CLEAN (LESS THAN 5% PASSING #200 SIEVE) PIT RUN GRAVEL, AS DIRECTED BY ENGINEER.



CITY OF MERRITT

TYPICAL
PERFORATED DRAIN INSTALLATION
FOR LOWERING GROUNDWATER TABLE

DATE: MARCH 1987

NO. DATE

REVISION

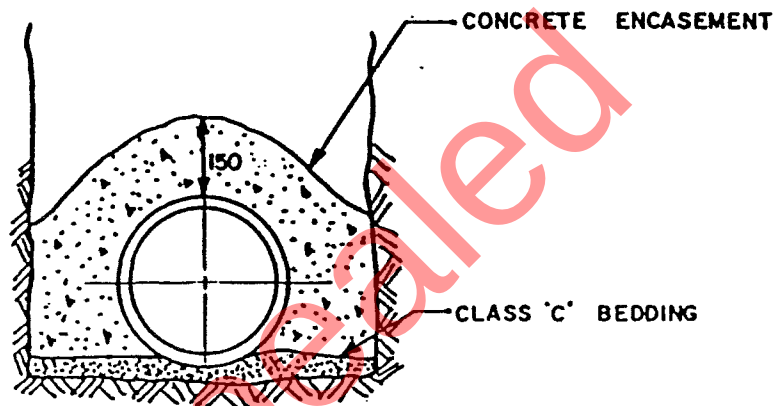
BY APP'D

DWN. B. McL.
CHK. M. L. D.

SCALE:
N. T. S.

DWS. NO.

DS-12



NOTES:

1. THE PLACEMENT OF THE CONCRETE ENCASEMENT NEED NOT BE DONE BY FORMING.
2. MIN. THICKNESS OF THE CONCRETE ENCASEMENT TO BE 150 mm.
3. CONCRETE ENCASEMENT TO BE CONTINUOUS FOR DUCTILE IRON PIPE
4. ENCASEMENT ON PVC AND AC SEWERS TO STOP 0.3 m EACH WAY OF COUPLING.



CITY OF MERRITT

CONCRETE ENCASEMENT
DETAIL

DATE: MARCH 1987

NO. DATE

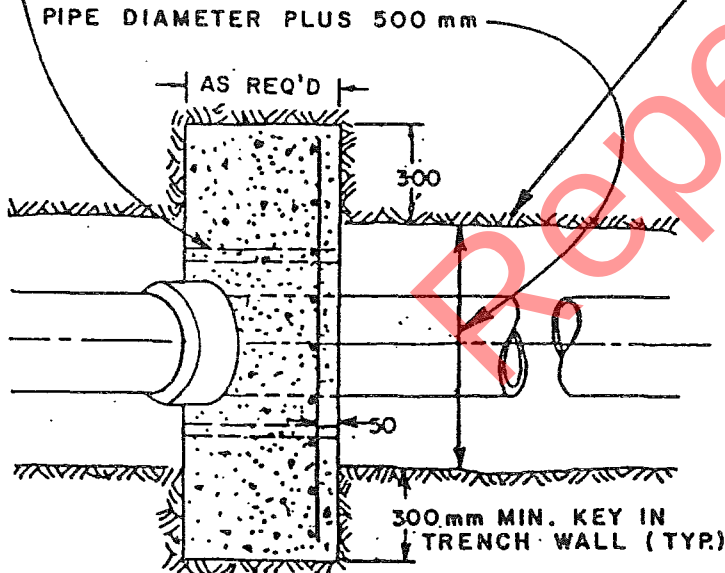
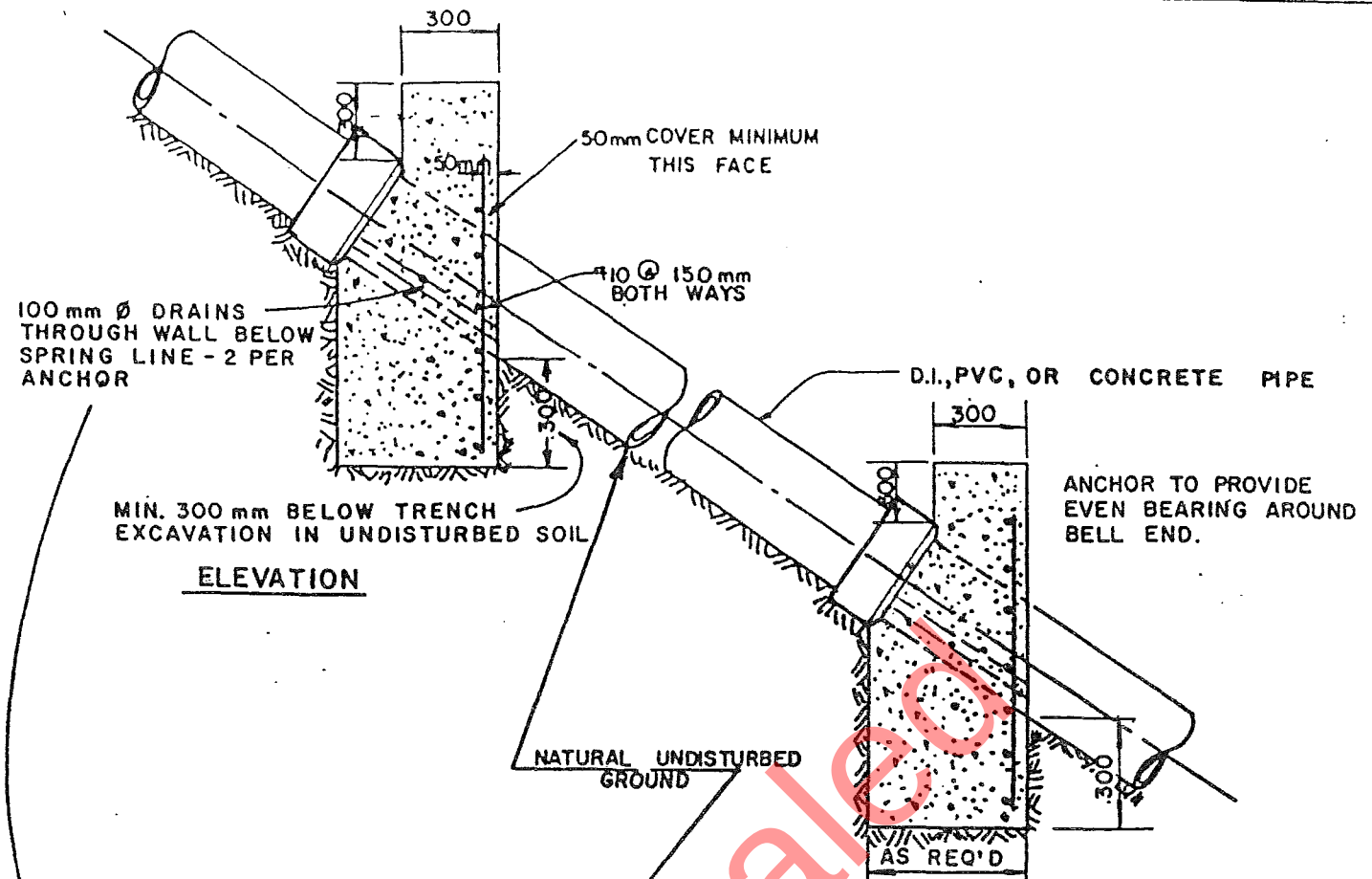
REVISION

BY APP'D

DWN. B.MCL.
CHK. M.L.D.

SCALE:
N. T. S.

DWG. NO. M-1



NOTES

1. CONCRETE SHALL BE 20. M Pa. 28 DAY STRENGTH.
2. ANCHORAGE REQUIRED WHERE SLOPE EXCEEDS
 20 - 35 % Locate every 11 m
 35 - 50 % " " 7.3 m
 greater than 50 % Locate every 5m.
3. NO REBAR IS TO BE PLACED WITHIN 150 mm OF MAINS.
4. ANCHORS ARE TO BE PLACED AGAINST AND ON THE DOWNHILL SIDE OF THE BELL OF THE PIPE, BUT MUST NOT SURROUND IT.
5. DOWNHILL FACE OF ANCHORS TO BE BEARING ON UNDISTURBED SOIL.



CITY OF MERRITT

WATERMAIN AND SEWERMAIN ANCHORS

DATE: MARCH 1987

NO. DATE

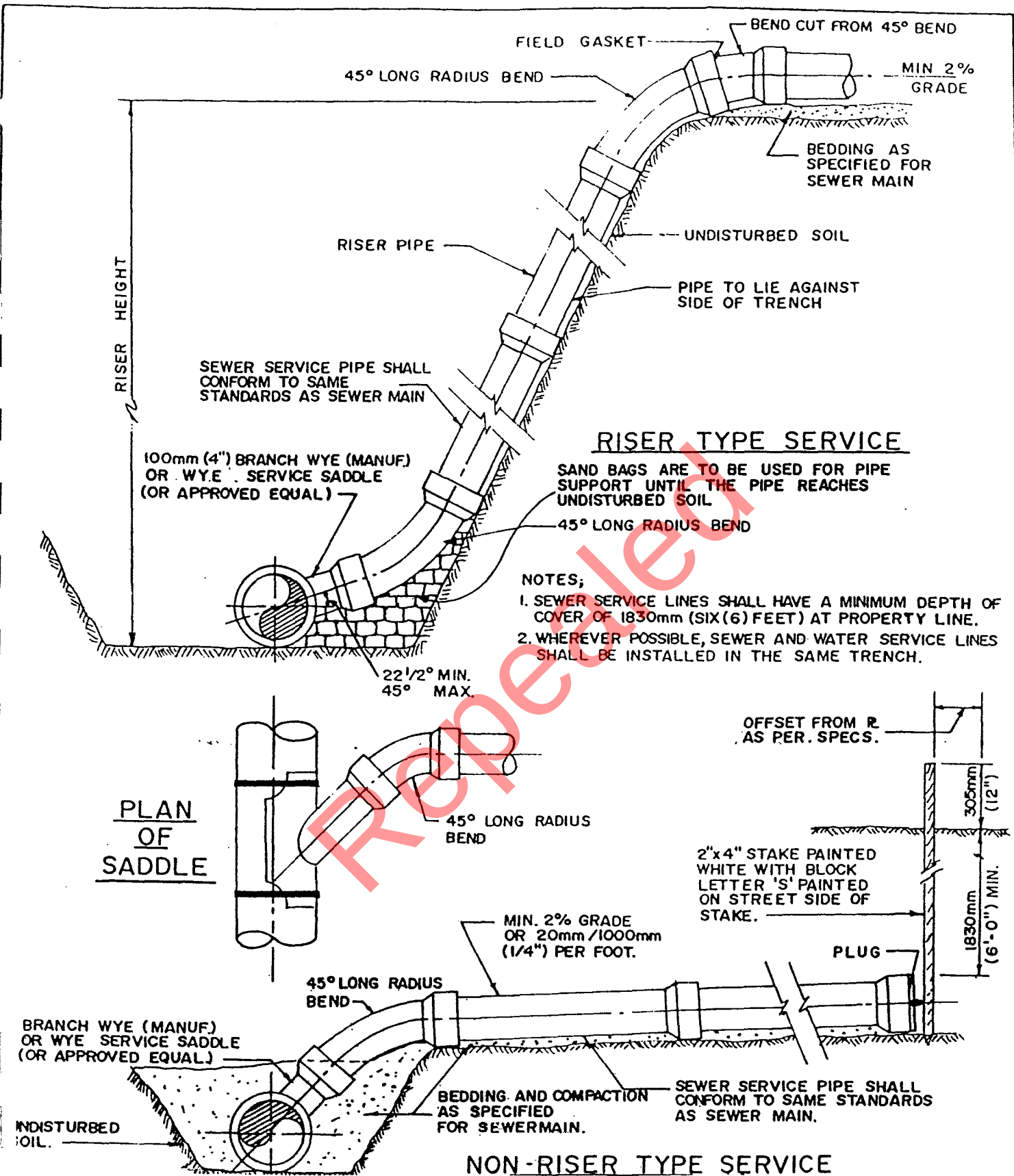
REVISION

BY APP'D

DWN B. McL.
CHK. M. L. D.

SCALE:
N. T. S.

DWG. NO. M-3



CITY OF MERRITT

TYPICAL
SEWER SERVICE CONNECTIONS

DATE: MARCH 1987

NO. DATE

REVISION

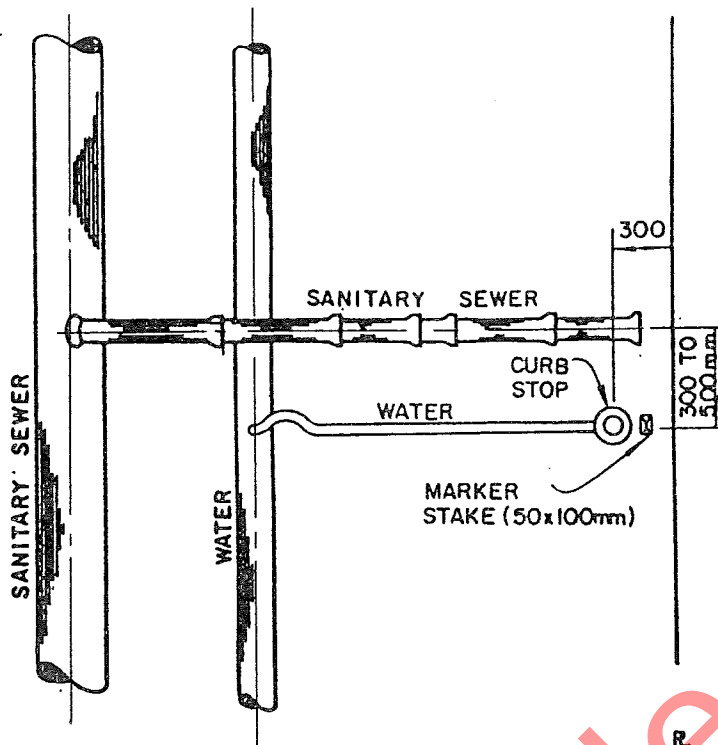
BY APP'D

DWN. B. McL.
CHK. M.L.D.

SCALE:
N. T. S.

DWG. NO.

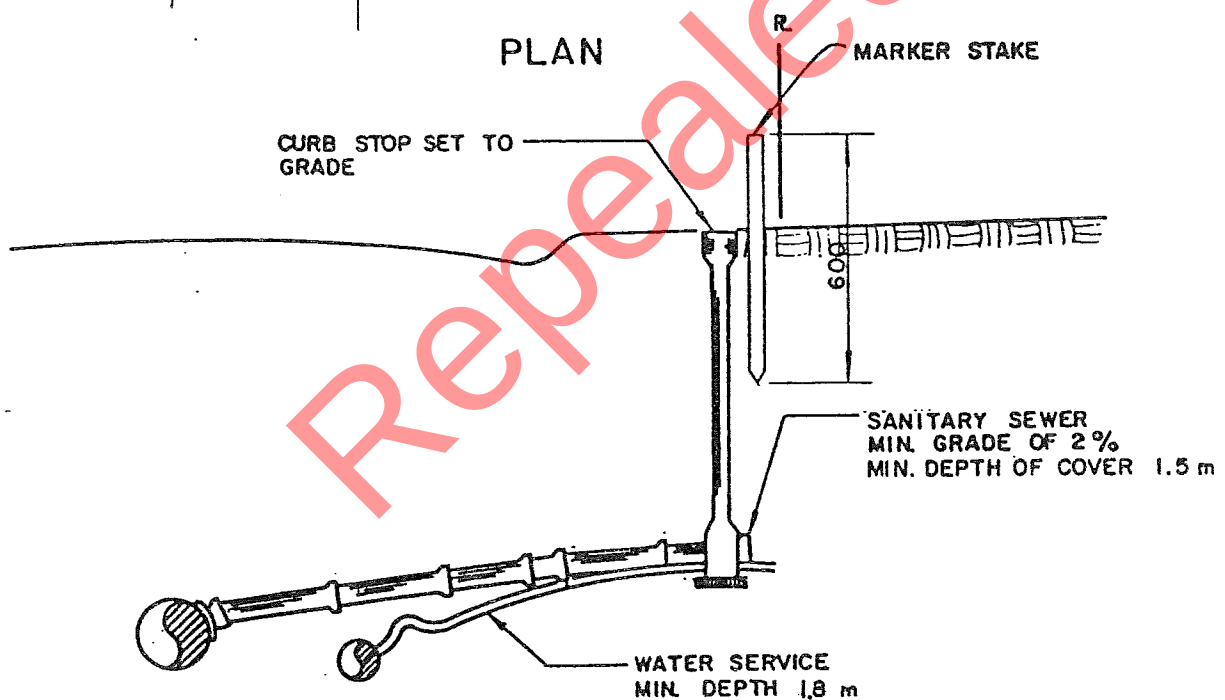
S-3



NOTES

CURB BOX LOCATED ON CENTRE LINE OF LOT UNLESS SPECIFIED OTHERWISE.
VIEWING THE TRENCH FROM THE ROAD, THE SANITARY SEWER SERVICE IS LOCATED TO THE LEFT OF THE CURB BOX.

PLAN



ELEVATION



CITY OF MERRITT

SEWER AND WATER SERVICES COMMON TRENCH INSTALLATION

DATE: MARCH 1987

NO. DATE

REVISION

BY APP'D

DWN. B. MCL.
CHK. M. L. D.

SCALE:
N. T. S.

DWG. NO. S-4

CITY OF MERRITT
BYLAW NO.
1187, 1480 & 1523

CITY OF MERRITT
CONSTRUCTION COMPLETION CERTIFICATE

1.0 PROJECT DESCRIPTION

Project _____ Developer _____ Engineer _____ Contractor _____
_____ Description

2.0 FIRST SUBMISSION

2.1 By Consulting Engineer

I _____ P. Eng. of the firm _____ hereby certify that the works described above have been installed according to the plans and specifications approved pursuant to Subdivision and Development Servicing Bylaw No. 1187, 1987 and are now complete and may be sued for the purpose intended. I hereby recommend this project be approved and a Construction Completion Certificate be issued.

Inspector

Project Engineer

Signing Officer

P. Eng. Seal

Date

2.2 By City of Merritt

Approval granted on _____, 20_

Approving Officer

Approval rejected on _____, 20_

Approving Officer

Deficiencies to be rectified before approval is granted and this Construction Completion Certificate issued:

3.0 FINAL SUBMISSION

3.1 By Consulting Engineer

I hereby certify that the deficiency items listed on this certificate have now been corrected and that as-constructed drawings have been prepared, finalized and submitted to the City Engineer.

Inspector

Project Engineer

Signing Officer

P. Eng. Seal

Date

3.2 By City of Merritt

Construction of the above described project is now complete and this Construction Completion Certificate is hereby issued.

Approved on _____, 20_

Approving Officer

Maintenance Period Expiry Date _____, 20_

CITY OF MERRITT
FINAL ACCEPTANCE CERTIFICATE

1.0 PROJECT DESCRIPTION

Project _____ Developer _____ Engineer _____
Contractor _____
Description _____
Date of Construction Completion Certificate _____, 20__
Maintenance Period Expiry _____, 20__

2.0 FIRST SUBMISSION

2.1 By Consulting Engineer

The maintenance period is about to expire and I _____ P. Eng. of the firm _____ hereby certify that the works described above are in good order and recommend a Final Acceptance Certificate for this project be approved and Issued by the City of Merritt.

P. Eng. Seal

Project Engineer

Signing Officer

Date

2.2 By City of Merritt

Approval granted on _____, 20__

Approving Officer

Approval rejected on _____, 20__

Approving Officer

Deficiencies to be rectified before approval is granted and this Final Acceptance Certificate issued:

3.0 FINAL SUBMISSION

3.1 By Consulting Engineer

I hereby certify that the deficiency items listed on this certificate have now been corrected and that a Final Acceptance Certificate be approved by the City of Merritt.

P. Eng. Seal

Inspector

Project Engineer

Signing Officer

Date

3.2 By City of Merritt

The above described project is now complete and this Final Acceptance Certificate is hereby issued.

Approved on _____, 20__

Approving Officer

SECTION 7 - POWER, TELEPHONE, CABLEVISION AND STREET LIGHTING

700 GENERAL

- .1 Where the installation of underground power, telephone and cablevision distribution systems is required, the developer shall be responsible for meeting all the requirements of the utility companies and government agencies concerned. Design drawings prepared by the utility companies shall be submitted for approval together with all other required plans for the subdivision.
- .2 Where underground electrical power is to be provided, ornamental street lighting shall be provided on all streets within the subdivision, perimeter roads, and pedestrian pathways through parks or in instances where total separation between vehicular and pedestrian traffic has been provided. Provision shall also be made for providing power for future lighting in parks by installing the necessary ducts across highways to the parks property lines as required by the City Engineer.
- .3 Where overhead electrical power is to be provided, installation of street lights on the poles will be permitted.

701 LIAISON WITH POWER COMPANIES

- .1 It is the responsibility of the developer to carry out liaison and obtain approvals from Power Company for street lighting. Where underground electrical power is to be installed, the developer shall submit to the City Engineer drawings approved by the Power Company of the street light layout together with all other required plans of the subdivision.
- .2 Where overhead power is to be provided, it is the responsibility of the Developer to conduct liaison with the Power Company prior to the submission of the subdivision drawings to the City Engineer to ensure that pole locations will not conflict with other underground utilities. Further, the developer shall provide written evidence from the Power Authority that complete street lighting services can be provided from power poles.

702 DESIGN STANDARDS FOR STREET LIGHTING

- 702.1 Recommended Average Horizontal Illumination*
(From IES Roadway Lighting Practice)

AREA CLASSIFICATION

Roadway and Walkway Classification	Commercial		Residential	
	Foot Candle	Lux	Foot Candle	Lux
Arterial	2.0	22	1.0	11
Collector	1.2	13	0.6	6
Local	1.2	13	0.4	4
Lanes	0.6	6	0.4	4
Pedestrian Walkways & Sidewalks	0.9	10	0.2	2
Pedestrian Ways	--	--	0.5	5

*The levels recommended represent average illumination on the roadway, when the light source is at its lowest output and when the luminary is in its dirtiest condition.

702.2 Recommended Uniformity Ratio

- 3:1 Average to minimum (lowest footcandle value at any point on the roadway) except:
- 6:1 Average to minimum is acceptable for residential areas.

703 MATERIALS AND CONSTRUCTION

703.1 General

All materials supplied shall be in accordance with the design drawings, standard drawings and these specifications. Materials shall meet or exceed the Canadian Electrical Code Requirements and CSA (Canadian Standard Association) standards and are subject to the approval of Provincial Electrical Inspector.

703.2 Conduit

- .1 Underground conduits shall be rigid unplasticized polyvinyl chloride (Scepter Manufacturing Co. Ltd. or approved equal).
- .2 Conduit shall be sized to accommodate conductors and have a 30% conduit fill or conform to the requirements of the Local Governing Authority.
- .3 Couplings, adaptor and bends shall be P.V.C. and be installed in strict accordance with the manufacturers recommendations using C.S.A. certified cement. (45.)

- .4 Trenching and backfilling for conduits shall provide 100 mm of bedding sand above and below the conduit compacted to 95% Standard Proctor Density.
- .5 The alignment and grade of the conduit shall be as noted on the design drawings or standard drawings and shall not deviate by more than 150 mm from the horizontal alignment or by more than 50 mm in grade.
- .6 All conduits shall be capped when work is not in progress to prevent entry of dirt, water and debris. Only manufactured, close fitting caps shall be used.

703.3 Street Light Anchor Bases

- .1 Precast trapezoidal bases shall be installed on all davit arm pole installations. Cast-in-place trapezoidal bases may be used subject to approval by the engineer.
- .2 Trapezoidal bases shall be 460 mm square at the top, 810 mm square at the bottom and be 1500 mm in height. The top 150 mm of the base shall be trowel finished.
- .3 Anchor bolts, ground rod and conduit installation shall be made based on dimensions indicated on the standard drawings.
- .4 Cast-in-place sono-tube bases may be permitted with the approval of the local approving authority for post-top installations. Trapezoidal bases will be required where soil conditions prohibit proper compaction.
- .5 Concrete shall be 30 MPa strength at 28 days as per CSA A23.1.
- .6 Foundations for bases shall be firm and unyielding. Any soft organic, or frost susceptible material shall be removed and replaced with sound, clean, granular material and compacted to provide the required bearing capacity as dictated by street light stability requirements.
- .7 At all service base locations, a 19 mm x 3.0 m copper weld ground rod shall be driven the full length prior to the concrete base being poured around it.

703.4 Street Light Standards

- .1 General Standards shall be designed to sustain loads produced by wind velocities up to and including 160 km/hr, acting upon the total effective projected area of the structure, luminaries and fittings. All design criteria, materials,

(46.)

welding, assembly, surface finishing and grounding shall conform to CSA specifications pertaining to these items. Street light standard requirements are generally summarized on Table 1 - Summary of Luminaire, Standards, Anchoring and Finishing Requirements.

- .2 The Contractor at the request of the engineer shall provide proof that all poles used for this contract have CSA approval.
- .3 Type A & B Arterial and Commercial Street Light Standards
- a) Type A street light standards as shown on standard drawing L-1 shall conform to the following specifications:
 - . manufactured from 11 gauge octagonal mild steel;
 - . single 2.5 metre davit;
 - . 8.0 metres high;
 - . accept 25 mm diameter anchor bolts on a 290 mm diameter bolt circle or 205 mm bolt square.
 - b) Type B street light standards as shown on standard drawing L-2 shall conform to the following specifications:
 - . manufactured from 11 gauge octagonal mild steel;
 - . single 2.5 metre davit;
 - . 7.1 metres high;
 - . accept 25 mm diameter anchor bolts on a 290 mm bolt circle or 205 mm bolt square;
 - . 0.9 metre high service base with 25 mm bolts on top to accept the 7.1 metre high standard and a base capable to accepting 32mm diameter anchor bolts on a 380mm diameter bolt circle or 269mm bolt square.
- .4 Type C & D Residential Street Light Standards
- a) Type C street light standards as shown on standard drawing L-2 shall conform to the following specifications:
 - . manufactured from 11 gauge octagonal mild steel;
 - . post-top style;
 - . 6.1 metres high;
 - . accept 25 mm diameter bolts on a 241 mm diameter bolt circle or 171 mm bolt square.
 - b) Type D street light standards as shown on standard drawing L-3 shall conform to the following specifications:
- (47.)

- . manufactured from 11 gauge octagonal mild steel;
- . post-top style;
- . 5.2 metres high;
- . accept 25 mm diameter bolts or a 251 mm diameter bolt circle or 171 mm bolt square;
- . 0.9 metre high service base with 25mm bolts on top to accept the 5.2 metre high standard with a base capable of accepting 32mm diameter anchor bolts on a 380mm diameter bolt circle or 269mm bolt square.

.5 Type E & F Double Davitted Street Light Standard

- a) Type E street light standards as shown on standard drawing L-3 shall conform to the following specifications:
- . manufactured from 11 gauge octagonal mild steel;
 - . two 2.5 metre davits;
 - . 8.0 metres high;
 - . accept a 25 mm diameter anchor bolt on a 290 mm diameter bolt circle or a 205 mm bolt square.
- b) Type F street light standards as shown on standard drawing L-4 shall conform to the following specifications:
- . manufactured from 11 gauge octagonal mild steel;
 - . two 2.5 metre davits;
 - . 7.1 metres high;
 - . accept a 25mm diameter anchor bolt on a 290mm diameter bolt circle or 205mm bolt square;
 - . 0.9 metre high service base with 25mm diameter anchor bolts to accept the 7.1 m high standard with a base capable of accepting 32mm diameter anchor bolts on a 380 mm diameter bolt circle or 269 mm bolt square.

.6 Service Bases

Service bases shall be 0.91 metres high and have a minimum clear opening of 200 mm x 460 mm and shall be equipped with a door and a padlock hasp at the top.

.7 Handhold Requirements

All poles shall have a minimum hand hold opening of 175 x 100 mm located near the base of the pole. The hand hole shall be complete with cover plate and any required locking devised. (48.)

.8 Lamp Standard Installation Requirements

- a) Davitted lamp standards shall be installed at the offset from the property line shown on standard drawing R-6:
 - . perpendicular to the roadway/property alignment on straight road sections;
 - . in line with the radius point on curves
- b) Standards shall be shimmed as required to stand in a true vertical position.
- c) Standards shall be in good appearance, free of dents, scratches, paint runs and defects.
- d) Lamp standards installed adjacent roadways without curb and gutter shall have fringible bases.

.9 Painting

Standards shall be zinc chromate painted at the factory and painted after erection with one coat of tree Tarn Clad paint.

703.5 Luminaries

- .1 All luminaries shall be 150 watt or 100 watt high pressure sodium, (HPS) as applicable, colour corrected, deluxe coated. Luminants shall be as specified on Table 1 - Summary of Luminaire, Standards, Anchoring and Finishing Requirements.
- .2 Luminaries shall be a complete lighting unit consisting of the lamp, lamp holder, refractor, housing, lens, relay-type photocell unit, photocell receptacle, wiring and ballast, unless specified otherwise.

703.6 Conductors

- .1 All conductors shall be type TWU-40 or RWU conforming to -40 degrees celsius rating unless specified otherwise.
- .2 Conductors will be sized as required and specified on the design drawings.
- .3 Conductors in the standard shall be #12 Solid RWU 90XL.

(49.)

703.7 Ground

- .1 Each standard shall be grounded by means of a continuous #8 x-link green conductor installed in the conduit and connected to a 19 mm x 3 metre ground rod installed at each service base. This grounding system shall be in accordance with the Provincial Electrical Code.

703.8 Testing

- .1 Upon completion, the street lighting system shall be energized for inspection purposes. After completion of the inspection by the City Engineer and correction of remaining deficiencies, the local approving authorities will make application to B.C. Hydro to energize the system. (49.+)

Repealed

TABLE 1

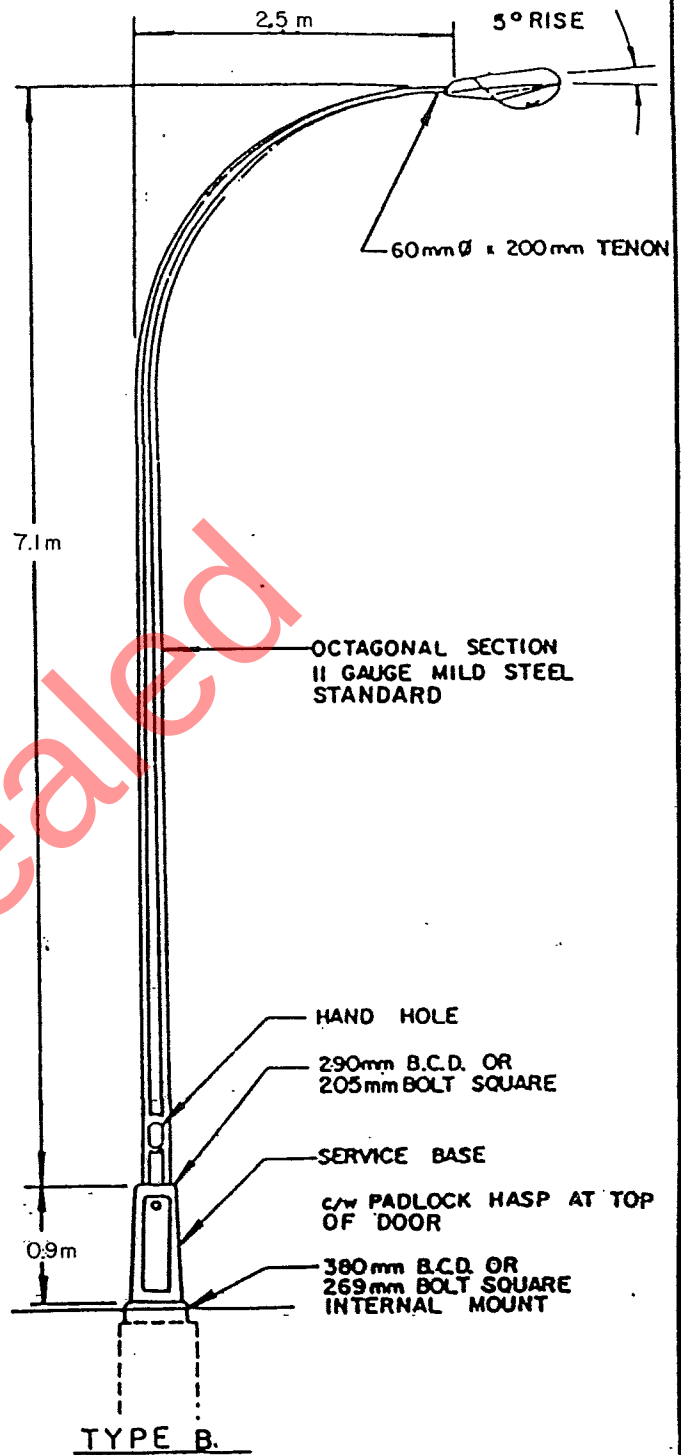
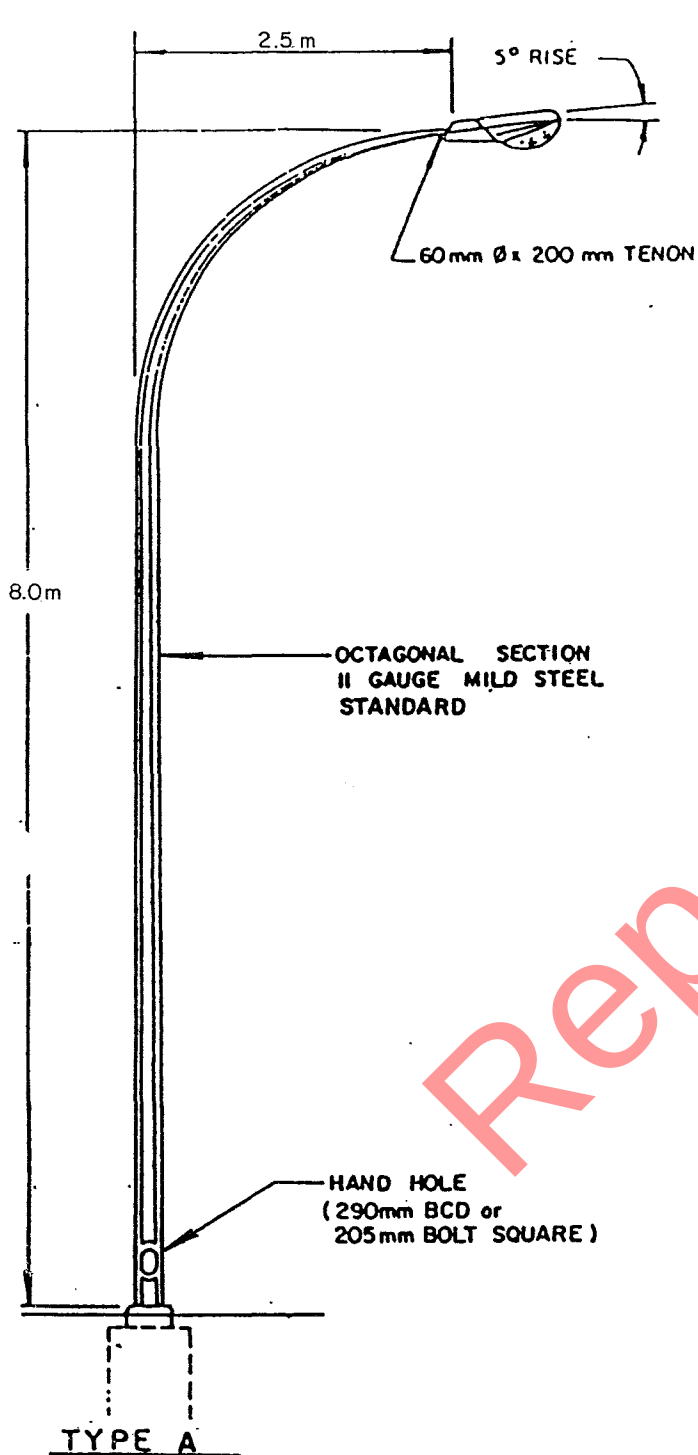
Summary of Luminaire, Standard, Anchoring and Finishing Requirements

TYPE & STANDARD DRAWING REFERENCE	LUMINAIRE	STANDARD	BASE	FINISHING
A & B Std. Drwg. L-1	Sylvania LXBC2227S-150 c/w Sylvania LU150/55/D Delux coated lamp, photo- electric cell fisher	Height - 8.0m Davit - 2.5m Octagonal Section 11 Guage Steel	Cast-in Place Trapazoidal with 25 mm dia. anchor bolts on a 290mm BCD	All steel poles and service bases to be sinc chromate paint ed after erection with one coat of green trem clad paint.
OR	100x/120v NPS Sylvania LXBC2227S-100 c/w Sylvania LU100/D Delux Coated Lamp and Fisher Pierce 6690L Photoelectric cell		Cast-in Place Trapazoidal with 25 mm dia. anchor bolts on a 290mm BCD.	
C & D	100s/120v HPS Westinghouse 'Promenode" Type III Luminaire c/w Fisher Pierce 6690L photoelectric cell and Opaqu Shield on house side	Height - 6.1 m Post-top Octagonal Section 11 Guage Steel	Cast-in Place Sono with 25 mm dia. anchor bolts on a 290 mm BCD.	
E & F Std. Drwg. & L-4	150w/120v HPS Sylvania LXBC2227S-150 c/w Sylvania Lu/150/55/D Deluxe Coated Lamp and Fisher Pierce 6690L Photoelectric cell	Height - 8.0 m Dbl Davit - 2.5m Octagonal Section 11 Guage Steel	Cast-in Place Trapazoidal with 25 mm dia. anchor bolts on a 290 mm BCD.	

(50.)

POWER, TELEPHONE & LIGHTING

Repealed



NOTES:

1. POLES AND SERVICE BASES TO BE ZINC CHROMATE PRIMED AT FACTORY AND PAINTED AFTER ERECTION WITH ONE COAT OF GREEN TREM CLAD.
2. BASE BOLT COVERS TO BE USED ON TYPE 'B' POLES ONLY.



CITY OF MERRITT

**ARTERIAL & COLLECTOR STREET
LIGHT STANDARDS
TYPE 'A' & TYPE 'B'**

DATE: MARCH 1987

NO. DATE

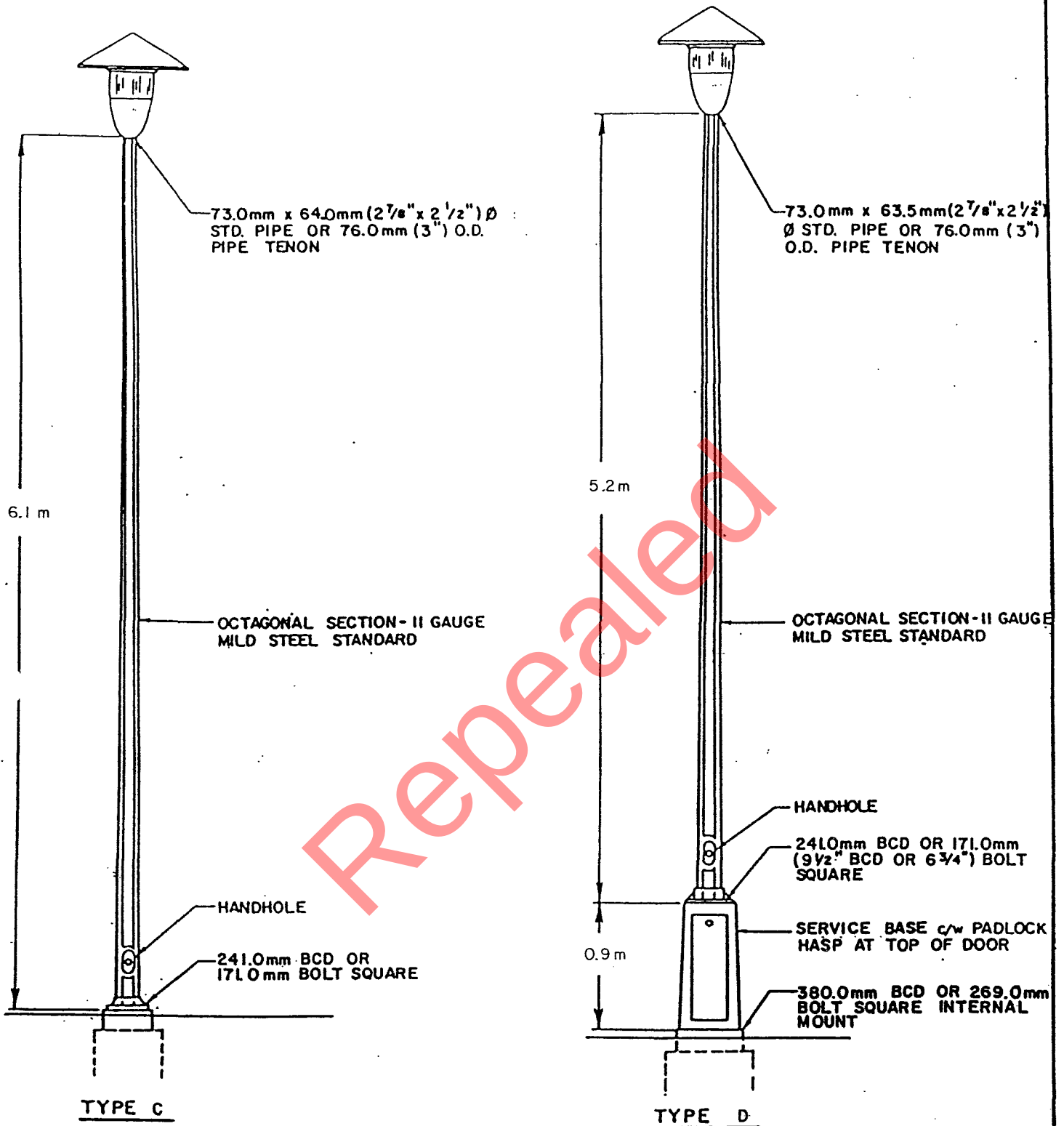
REVISION

BY APP'D

DWN. B. McL.
CHK. M.L.D.

SCALE:
N.T.S.

DWG. NO. L-1



NOTES:

1. POLES AND SERVICE BASES TO BE ZINC CHROMATE PRIMED AT FACTORY AND PAINTED AFTER ERECTION WITH ONE COAT OF GREEN TREM CLAD.
2. INSTALLATION OF POST-TOP STREET LIGHTING REQUIRES APPROVAL IN ADVANCE



CITY OF MERRITT

RESIDENTIAL STREET LIGHT
STANDARDS
TYPE C & D

DATE: MARCH 1987

NO. DATE

REVISION

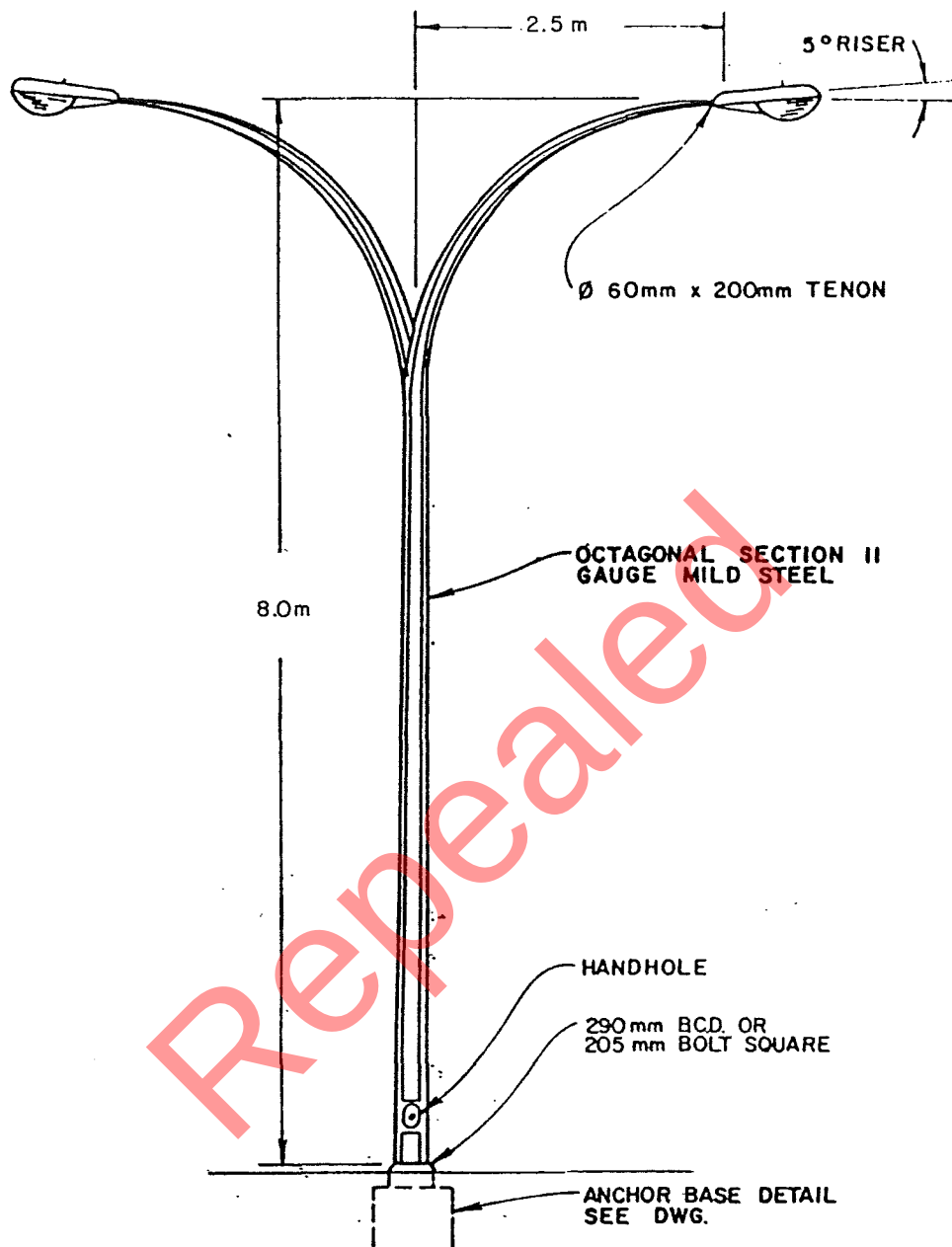
BY APP'D

DWN B. McL.
CHK. M. L. D.

SCALE:
N. T. S.

DWG. NO.

L-2



1. POLES AND SERVICE BASES TO BE ZINC CHROMATE PRIMED AT FACTORY AND PAINTED AFTER ERECTION WITH ONE COAT OF GREEN TREM CLAD
2. BASE BOLT COVERS TO BE USED ON TYPE 'H' POLE ONLY.



CITY OF MERRITT

DOUBLE DAVIT STREET LIGHT
STANDARD
TYPE 'E'

DATE: MARCH 1987

NO. DATE

REVISION

BY

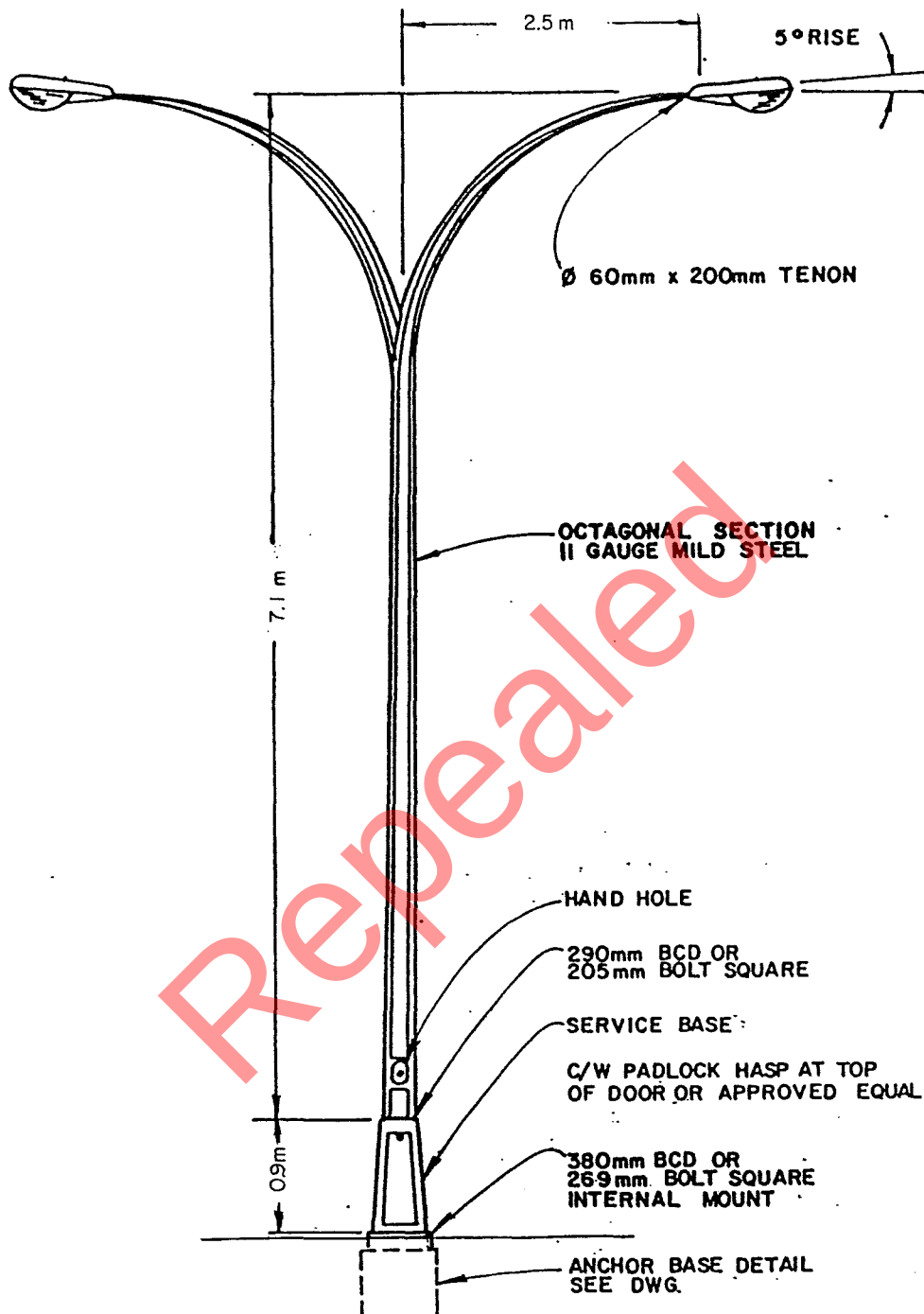
APP'D

DWN. B. McL.
CHK. M. L. D.

SCALE:
N. T. S.

DWS. NO.

L - 3



1. POLES AND SERVICE BASES TO BE ZINC CHROMATE PRIMED AT FACTORY AND PAINTED AFTER ERECTION WITH ONE COAT OF GREEN TREM CLAD
2. BASE BOLT COVERS TO BE USED ON TYPE 'H' POLE ONLY.



CITY OF MERRITT

DOUBLE DAVIT STREET LIGHT
STANDARD
TYPE 'F'

DATE: MARCH 1987

NO. DATE

REVISION

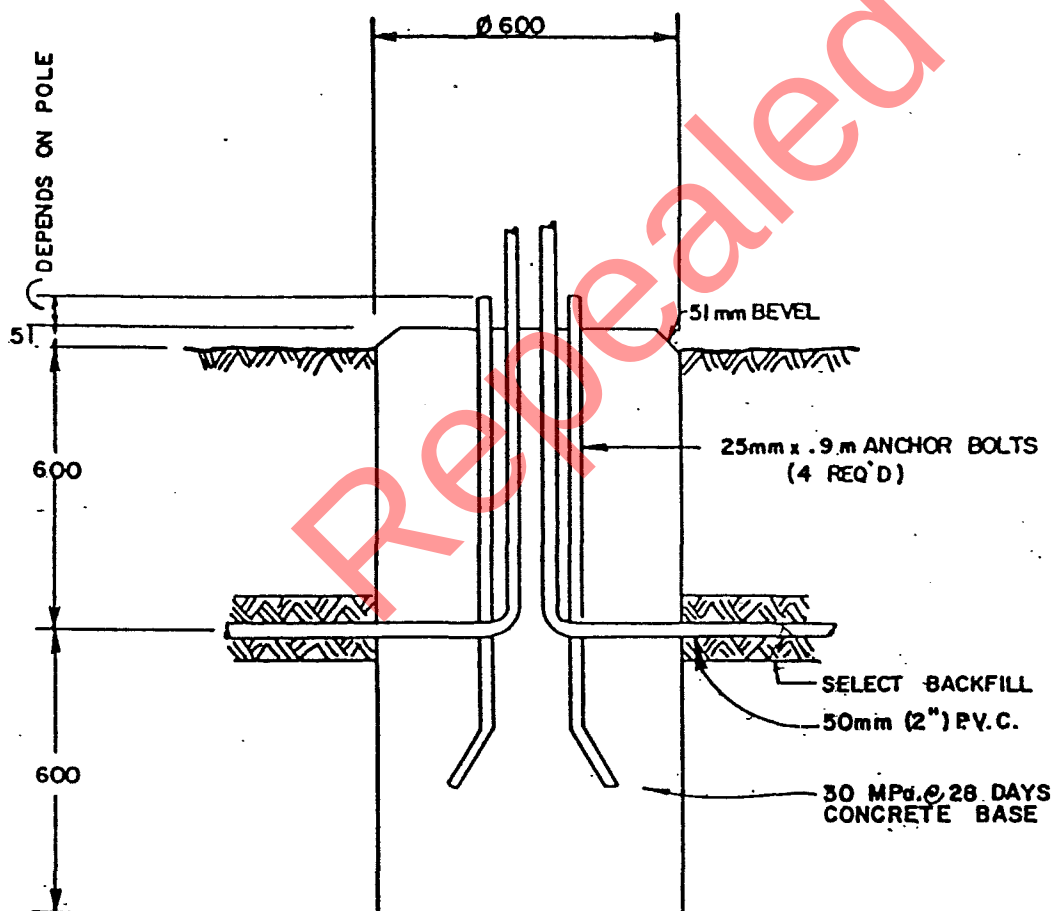
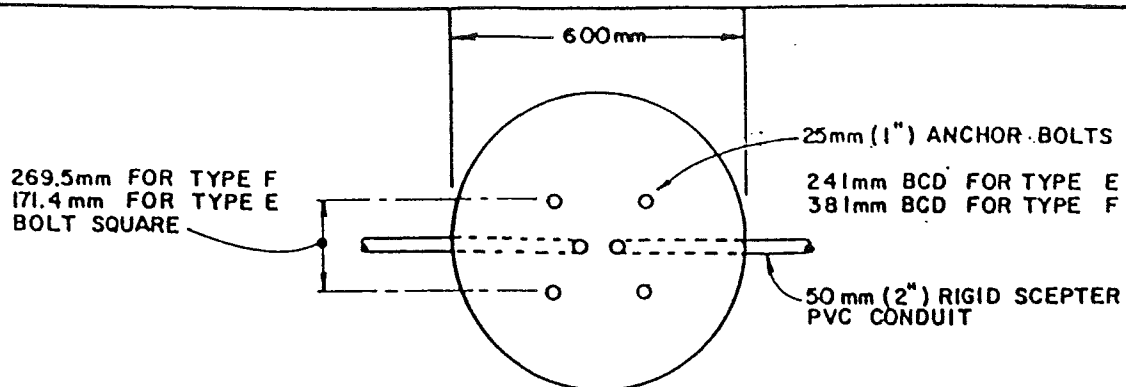
BY APP'D

DWN. B. McL.
CHK. M. L. D.

SCALE:
N. T. S.

DWG. NO.

L-4



CITY OF MERRITT

TYPICAL CYLINDRICAL ANCHOR
BASE FOR TYPE C & D LIGHT
STANDARDS

DATE: MARCH 1987

NO. DATE

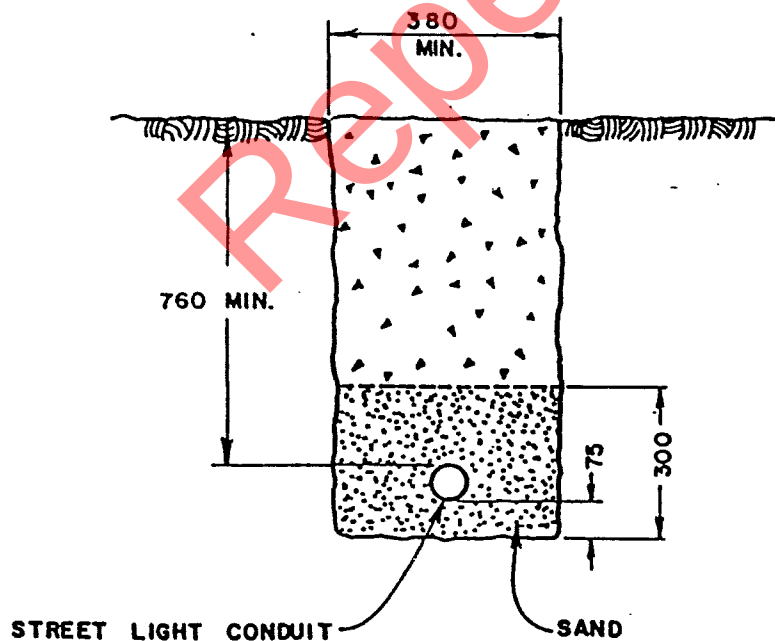
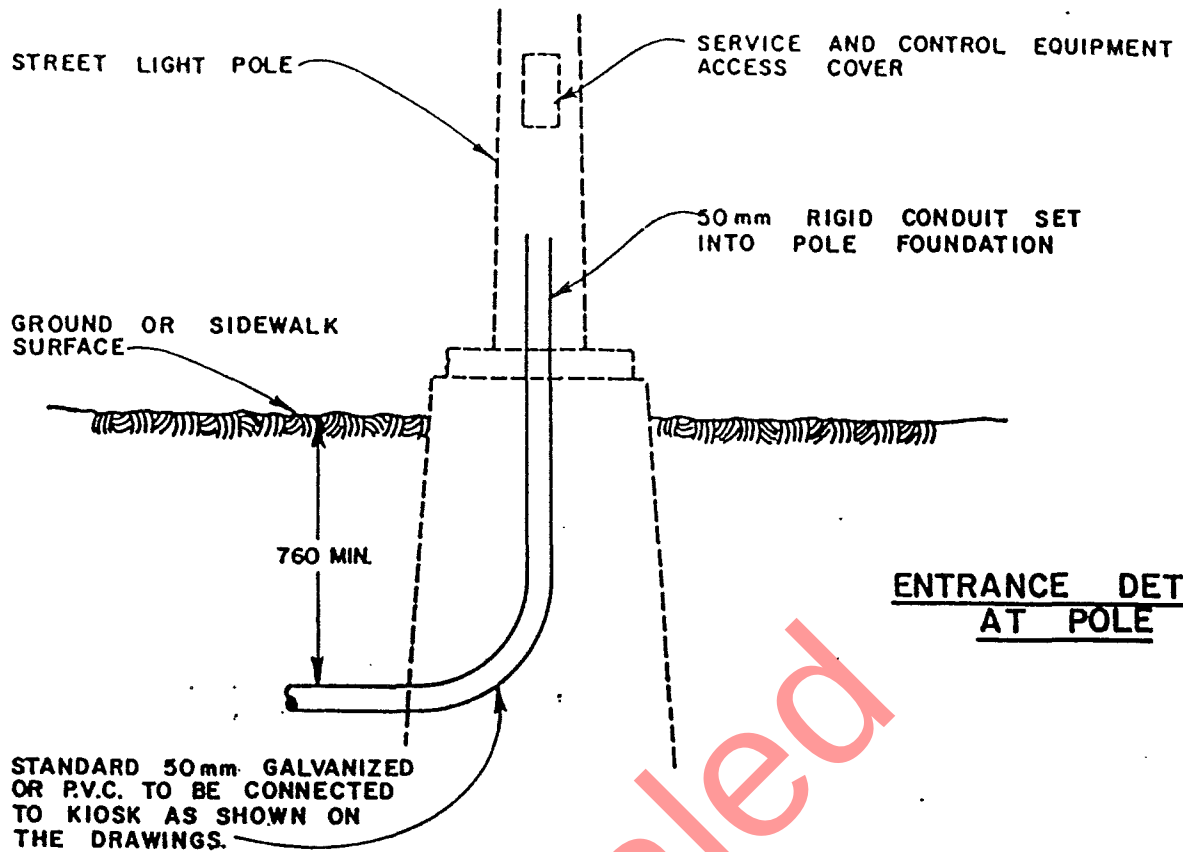
REVISION

BY APP'D

DWN. B. McL.
CHK. M.L.D.

SCALE:
N. T. S.

DWG. NO. L - 7



B.C. HYDRO NO. ES 43U I.2-50



CITY OF MERRITT

STREET LIGHT UNDERGROUND
CONDUIT INSTALLATION AND
HYDRO CONNECTION

DATE: MARCH 1987

NO. DATE

REVISION

BY

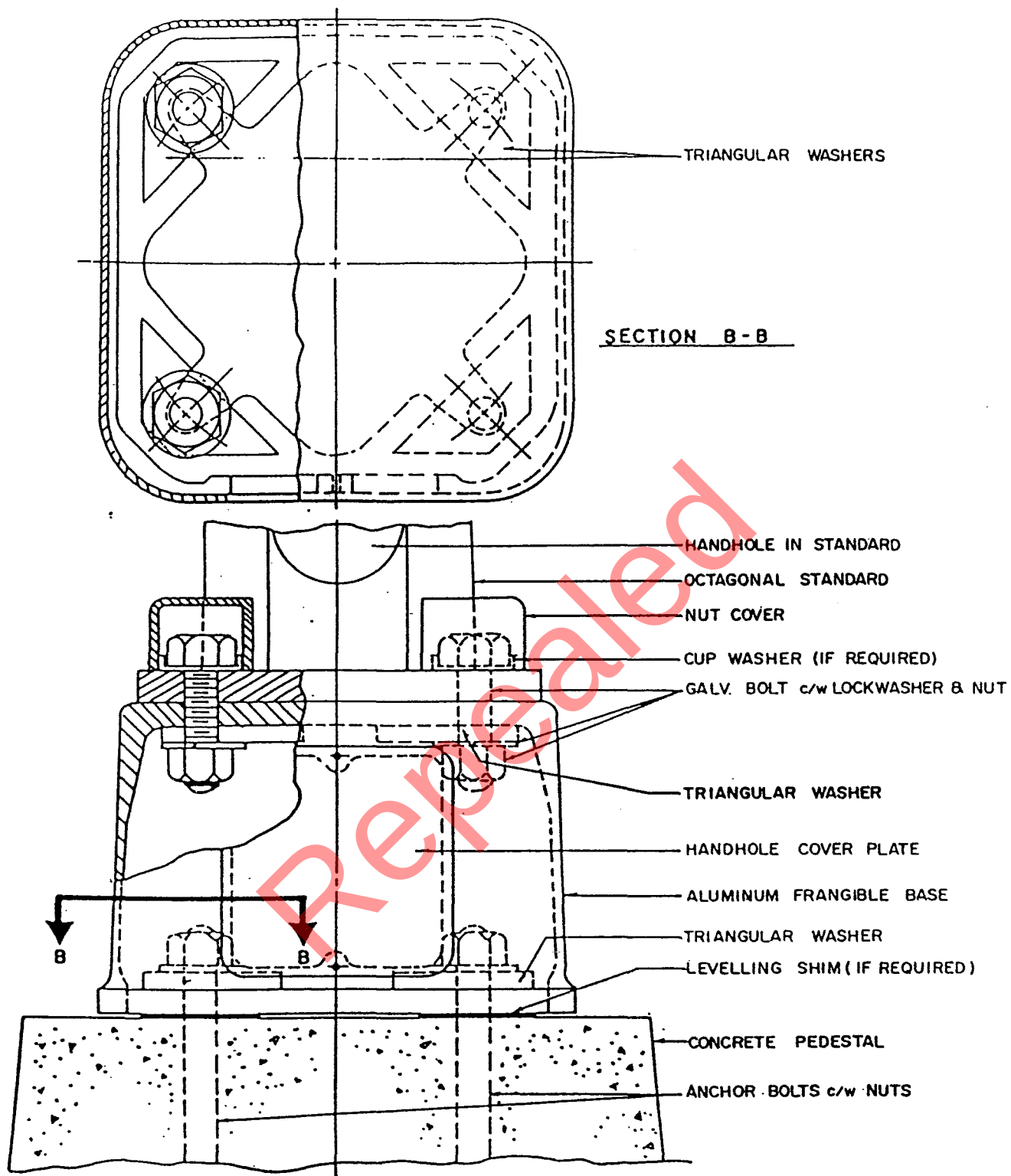
APP'D

OWN. B.McL.
CHK. M.L.D.

SCALE:
N. T. S.

DWS. NO.

L - 8



NOTE -

USE LUBRIPLATE OR OTHER SUITABLE GREASE
ON ALL THREADS.



CITY OF MERRITT

**FRANGIBLE BASE
DETAILS**

DATE: MARCH 1987

NO. DATE

REVISION

BY APP'D

OWN B. McL.
CHK. M.L.D.

SCALE:
N. T. S.

DWG. NO. L-9

PLOT DATE: 95/11/22 3:45pm

WT

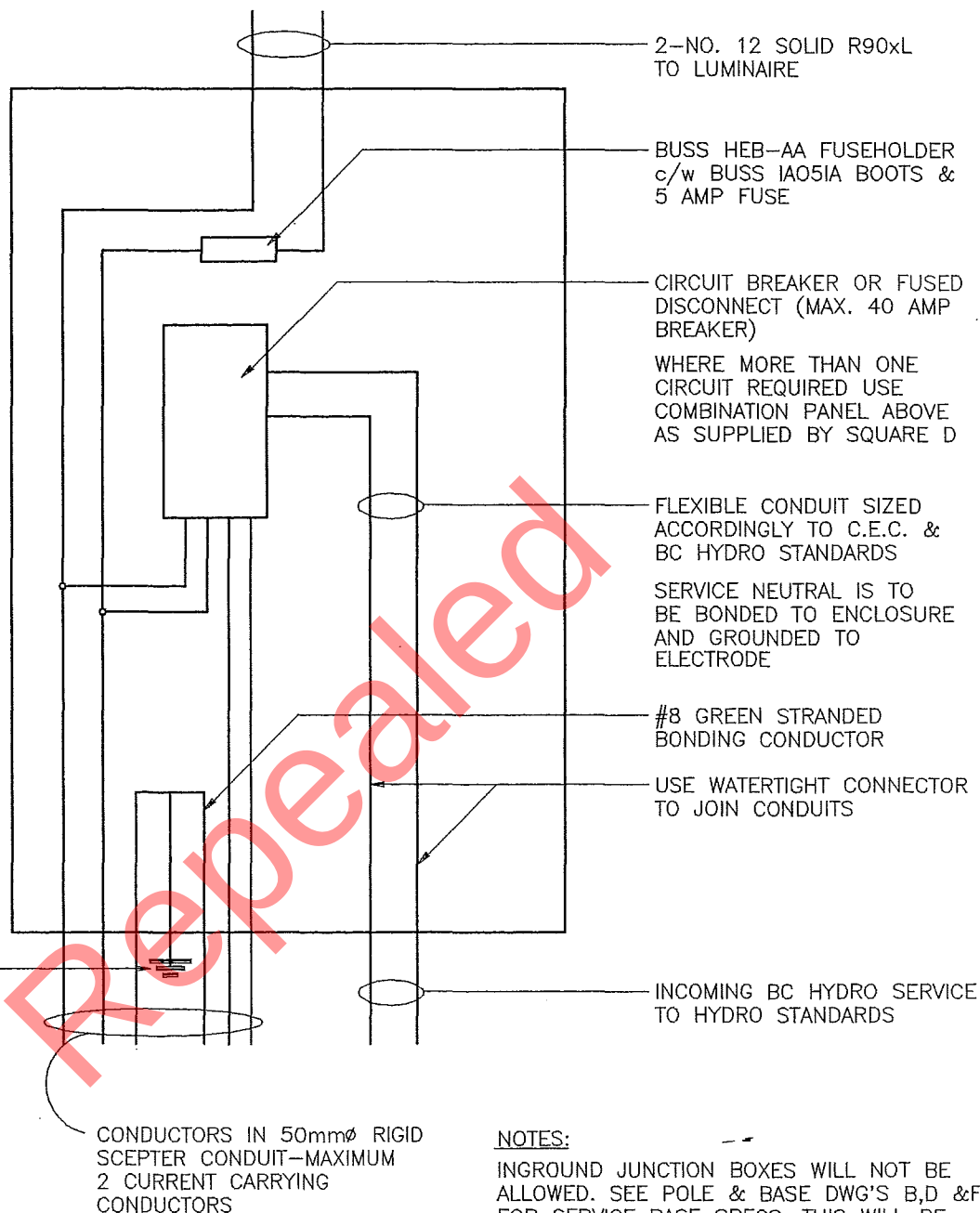
PROJ. CAD FILE No.: C:\PROJ\0521\15\A\DESIGN\MER-DTB.DWG 95/11/22 3:45pm

910mm HIGH DISTRIBUTION
BASE c/w PADLOCK HASP
AT TOP OF DOOR

POLE SYSTEM CAT.
NO. TBH 4191

OPEN WIRING PERMITTED

NO.6 SOLID GROUNDWIRE
TO A COPPERWELD PLATE
ELECTRODE HAVING NOT
LESS THAN 0.2m² OF
SURFACE AREA & SHALL
BE NOT LESS THAN 1.5mm
THICKNESS



NOTES:

INGROUND JUNCTION BOXES WILL NOT BE
ALLOWED. SEE POLE & BASE DWG'S B,D &F
FOR SERVICE BASE SPECS. THIS WILL BE
NECESSARY WHEN MORE THEN 2 CONDUITS
ENTER A POLE.

CONDUCTORS BETWEEN POLES TO BE RW90

CONDUCTORS TO BE COPPER AND SIZED
ACCORDING TO CANADIAN ELECTRICAL
CODE. (MINIMUM #8)



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

NOV. 1995

LATEST REVISION
DATE:

APPROVED BY:

TITLE:

SERVICE BASE
SCHEMATIC FOR
120V STREET LIGHT

SECTION:

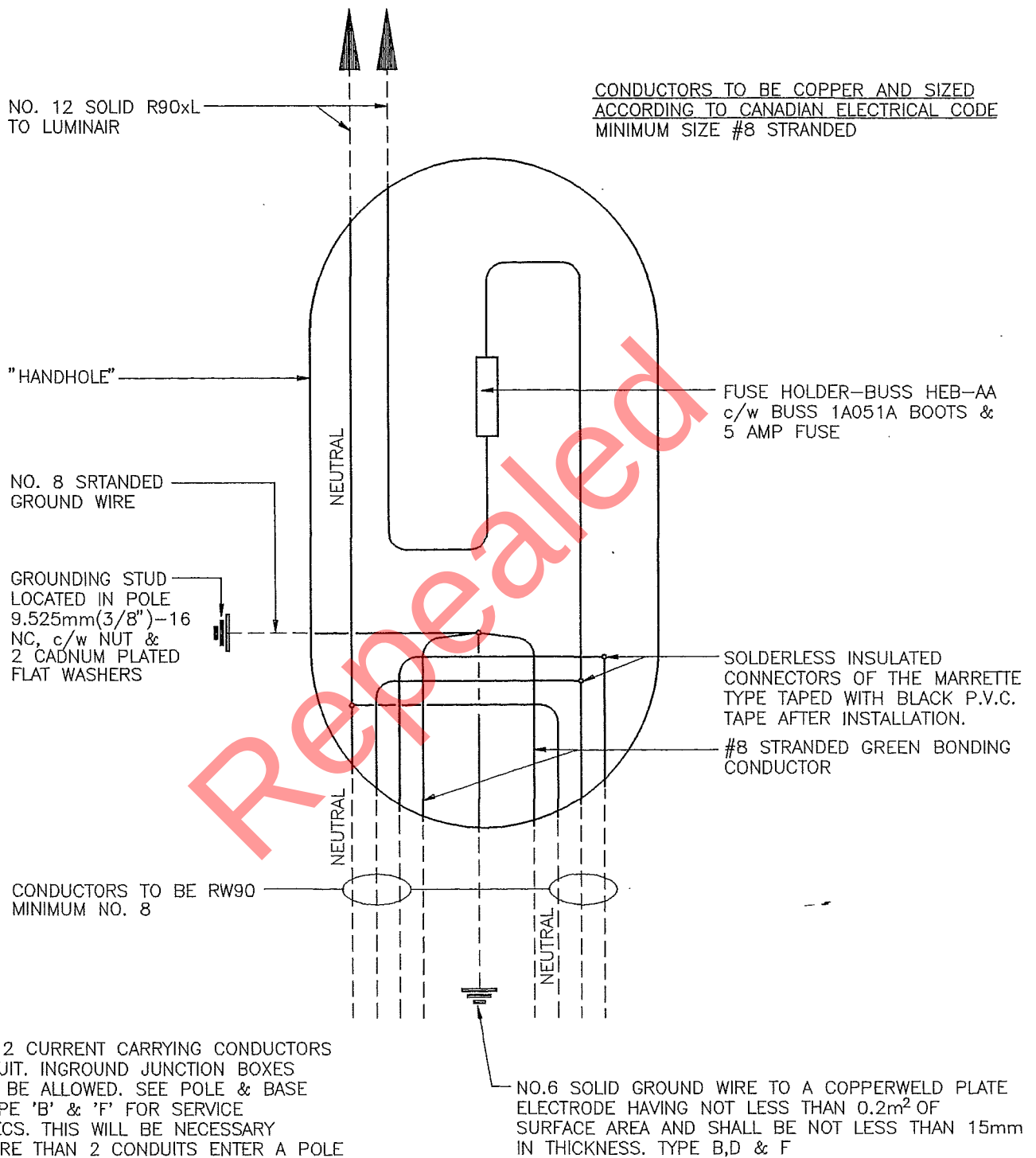
REVISION No.

DWG No.

L-10

PLOT DATE: 95/11/22 3:50pm

PROJ. CAD FILE No.: C:\PROJ\0521\15\A\DESIGN\L-11.DWG 95/11/22 3:50p



MAXIMUM 2 CURRENT CARRYING CONDUCTORS
ON CONDUIT. INGROUND JUNCTION BOXES
WILL NOT BE ALLOWED. SEE POLE & BASE
DWGS. TYPE 'B' & 'F' FOR SERVICE
BASE SPECS. THIS WILL BE NECESSARY
WHEN MORE THAN 2 CONDUITS ENTER A POLE



CITY OF MERRITT

SCALE:

NOT TO SCALE

DATE DRAWN:

NOV. 1995

LATEST REVISION
DATE:

APPROVED BY:

TITLE:

HANDHOLE WIRING
SCHEMATIC FOR
120V STREET LIGHT

SECTION:

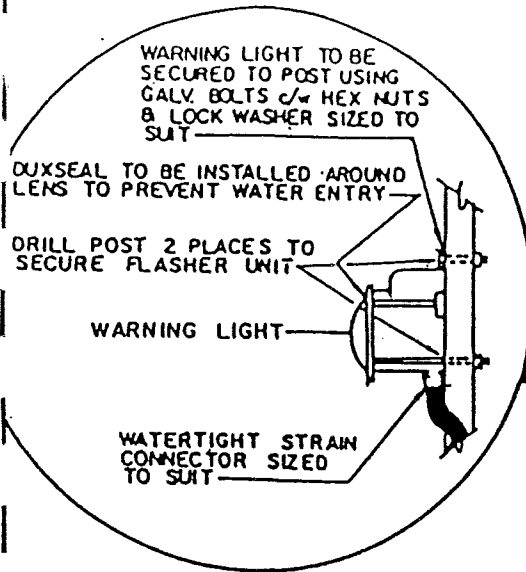
REVISION No.

DWG. No.

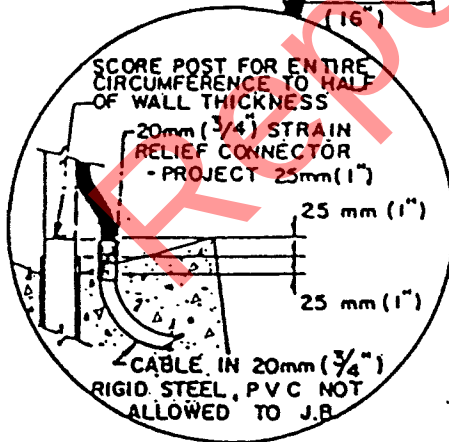
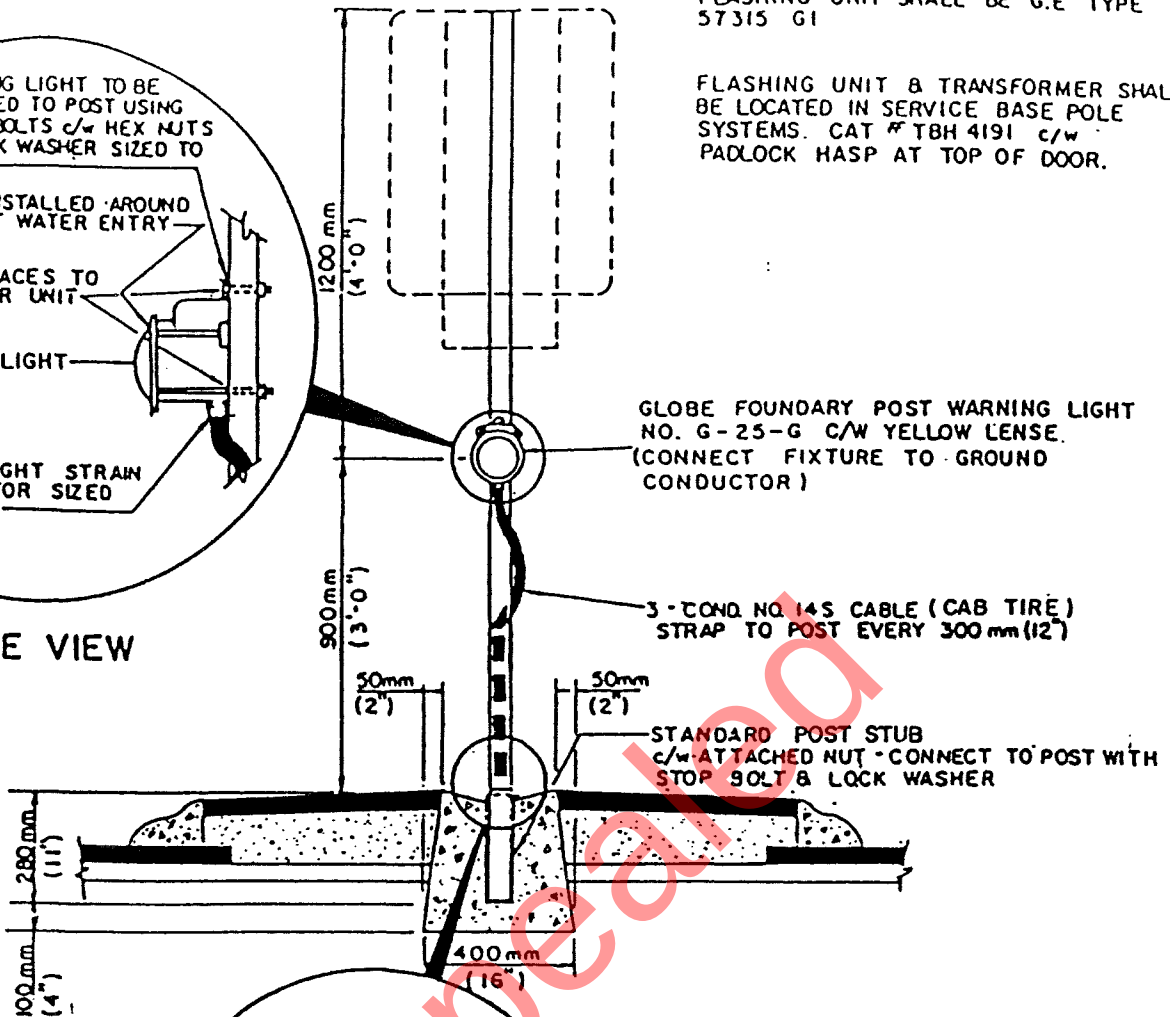
L-11

FLASHING UNIT SHALL BE G.E TYPE
57315 G1

FLASHING UNIT & TRANSFORMER SHALL
BE LOCATED IN SERVICE BASE POLE
SYSTEMS. CAT # TBH 4191 c/w
PADLOCK HASP AT TOP OF DOOR.



SIDE VIEW



SIDE VIEW

NOTE:

1. MEDIAN WARNING LIGHT TO BE INSTALLED 2m (6'-6") FROM END OF ISLAND
2. JUNCTION BOX TO BE LOCATED WITHIN 2 m OF WARNING LIGHT



CITY OF MERRITT

**MEDIAN WARNING LIGHT
MOUNTING DETAIL**

DATE: MARCH 1987

NO. DATE

REVISION

BY APP'D

DWN. B. McL.
CHK. M. L. D.

SCALE:
N. T. S.

DWG. NO. L-12

CITY OF MERRITT
BYLAW NO.
1187, 1480 & 1523

CITY OF MERRITT
CONSTRUCTION COMPLETION CERTIFICATE

1.0 PROJECT DESCRIPTION

Project _____ Developer _____ Engineer _____ Contractor _____
Description _____

2.0 FIRST SUBMISSION

2.1 By Consulting Engineer

I _____ P. Eng. of the firm _____ hereby certify that the works described above have been installed according to the plans and specifications approved pursuant to Subdivision and Development Servicing Bylaw No. 1187, 1987 and are now complete and may be sued for the purpose intended. I hereby recommend this project be approved and a Construction Completion Certificate be issued.

Inspector

Project Engineer

Signing Officer

P. Eng. Seal

Date

2.2 By City of Merritt

Approval granted on _____, 20_

Approving Officer

Approval rejected on _____, 20_

Approving Officer

Deficiencies to be rectified before approval is granted and this Construction Completion Certificate issued:

3.0 FINAL SUBMISSION

3.1 By Consulting Engineer

I hereby certify that the deficiency items listed on this certificate have now been corrected and that as-constructed drawings have been prepared, finalized and submitted to the City Engineer.

Inspector

Project Engineer

Signing Officer

P. Eng. Seal

Date

3.2 By City of Merritt

Construction of the above described project is now complete and this Construction Completion Certificate is hereby issued.

Approved on _____, 20

Approving Officer

Maintenance Period Expiry Date _____, 20_

CITY OF MERRITT
FINAL ACCEPTANCE CERTIFICATE

1.0 PROJECT DESCRIPTION

Project _____ Developer _____ Engineer _____
Contractor _____
Description _____
Date of Construction Completion Certificate _____, 20__
Maintenance Period Expiry _____, 20__

2.0 FIRST SUBMISSION

2.1 By Consulting Engineer

The maintenance period is about to expire and I _____ P. Eng. of the firm _____ hereby certify that the works described above are in good order and recommend a Final Acceptance Certificate for this project be approved and Issued by the City of Merritt.

Project Engineer

Signing Officer

Date

P. Eng. Seal

2.2 By City of Merritt

Approval granted on _____, 20__

Approving Officer

Approval rejected on _____, 20__

Approving Officer

Deficiencies to be rectified before approval is granted and this Final Acceptance Certificate issued:

3.0 FINAL SUBMISSION

3.1 By Consulting Engineer

I hereby certify that the deficiency items listed on this certificate have now been corrected and that a Final Acceptance Certificate be approved by the City of Merritt.

Inspector

Project Engineer

Signing Officer

Date

P. Eng. Seal

3.2 By City of Merritt

The above described project is now complete and this Final Acceptance Certificate is hereby issued.

Approved on _____, 20__

Approving Officer

SECTION 8 - STANDARD DRAWINGS

ROADS

- R-1 Service Level 1 Highway Standards - Cul-de-Sacs & Local Street
- R-2 Service Level 1 Highway Standards - Industrial/Commercial Streets
- R-3 Service Level 1 Highway Standards - Collector Streets
- R-4 Service Level 1 Highway Standards - Undivided Arterial Street
- R-5 Service Level 1 & 2 Highway Standards - Paved Lane
- R-6 Underground Utility Location
- R-7 Service Level 2 Highway Standards
- R-8 Mountable Monolithic - Curbs, Gutter and Sidewalk
- R-9 Non-mountable Curb and Gutter
- R-10 Non-mountable Monolithic Curb, Gutter and Sidewalk
- R-11 Sidewalk Crossing for Non-Mountable Curbs
- R-12 Standard Wheelchair Ramp for Non-Mountable Curb, Gutter & Sidewalk
- R-13 Standard Wheelchair Ramp for Mountable Curb, Gutter & Sidewalk

BEDDING & TRENCHES

- B-1 Standard Classes of Pipe Bedding and Backfill within the Pipe Zone
- T-1 Trench Detail
- T-2 Typical Pavement Patching for Utility Trench Crossing

WATERMAINS

- W-1 Control Cable installed in Common Trench
- W-2 Standard Watermain Realignment
- W-3 Combination Air Release Valve or Air & Vacuum Release Valve
- W-4 Typical Self-Draining Standpipe (TCD)
- W-5 Fire Hydrant Assembly
- W-6 Robar Valve Box & Riser/Nelson type Valve Box & Riser
- W-7 Pressure Main Thrust Blocks

DRAINAGE AND SANITARY SEWER

- DS-01 Typical Manhole for 200 mm - 460 mm Diameter Mains
- DS-02 Exterior Drop Manhole
- DS-03 Manhole Benching & Channelling
- DS-04 Manhole for Large Diameter Sewers
- DS-05 Landing for Deep Manhole
- DS-06 Sewer Cleanout for 150 mm and 200 mm Sanitary Sewer Terminals
- DS-07 Typical Storm Sewer Catch Basin Type

(51.)

- DS-08 Standard Catch Basin Detail for Mountable Curbs
- DS-09 Catch Basin Placed in an Open Ditch
- DS-10 Standard Catchbasin Detail Type 11
- DS-11 Drainage Drywell
- DS-12 Typical Perforated Drain Installation for Lowering Groundwater Table
- DS-13 Typical Concrete Invert Road Crossing
- DS-14 Concrete Invert through Easement
- DS-15 Concrete Outlet and Inlet Structure
- DS-16 Typical Manufactured End Sections for Culverts
- DS-17 Rainfall Intensity Curves

SERVICES

- S-1 Large Diameter Sewer & Water Services
- S-2 Typical 19 mm Water Service Connections
- S-3 Typical Sewer Service Connections
- S-4 Sewer and Water Services - Common Trench Installation
- S-5 Double Water Service Connection to Duplexes
- Municipal Services Record

POWER, TELEPHONE & LIGHTING

- L-1 Arterial & Collector Street Light Standards Type 'A' & 'B'
- L-2 Residential Street Light Standards Type 'C' & 'D'
- L-3 Double Davit Street Light Standard Type 'E'
- L-4 Double Davit Street Light Standard Type 'F'
- L-5 Typical Anchor Base for Type B, D & F Light Standards
- L-6 Typical Anchor Base for Type A, C & E Light Standards
- L-7 Typical Cylindrical Anchor Base for Type C & D Light Standards
- L-8 Street Light Underground Conduit Installation and Hydro Connection
- L-9 Frangible Base Details
- L-10 Service Base Wiring Schematic for 120 Volt Street Light
- L-11 Handhole Wiring Schematic for 120 Volt Street Light
- L-12 Median Warning Light Mounting Detail

MISCELLANEOUS

- M-1 Concrete Encasement Detail
- M-2 Bulkhead Detail
- M-3 Watermain and Sewermain Anchors
 - Record of Infiltration Tests for Sewers
 - Record of Leakage - Pressure Tests on Pressure Mains
 - Construction Completion Certificate
 - Final Acceptance Certificate

(52.)



CITY OF MERRITT

MAP 1
SERVICE LEVEL MAP

SUBDIVISION AND DEVELOPMENT
SERVICING BYLAW No. 1187