



Annexure B Civil & Structural - Project Specifications & Drawings

St Anthony's Primary School

21. Civil Engineering Project Documentation

PORTION 1: GENERAL DESCRIPTION OF THE WORKS

PS 1 GENERAL DESCRIPTION

The project category of this school is listed as storm and flood damages. The project comprises the construction of stormwater infrastructure and related repairs to flood damages.

The construction of new services and upgrading of the existing stormwater infrastructure consists of 20 meters of 450 mm Dia concrete interlocking stormwater pipes with associated inlet structures.

The location is situated in parking areas that result in necessary repair to the existing asphalt services.

The storm water connects to the existing municipal systems.

PS 2 DESCRIPTION OF THE SITE AND ACCESS

PS 2.1 Locality and access

Access to the site is from Market road. This road is in a good condition. Market is also a feeder route. The closest arterial route, M4, is 300 meter from the school and the closest freeway, the N3, is 650 meter from the school.

PS 2.2 Site

The works under this contract will be restricted to the School Access and school boundary.

The Contractor shall make his own assessment of the topography, soil conditions, vegetation etc. on site at the site inspection meeting.

PS 3 NATURE OF GROUND AND SUB SOIL CONDITIONS

A detailed soils investigation was carried out and a copy of the report can be obtained from the Consulting Engineers on request. In general the findings of the report were that in-situ material will form a good roadbed with no foreseeable problems relating to expansive soils, perched ground water or other. The in-situ material is classified as being G9 quality and can therefore be used as fill material or for the construction of the lower selected layer. All other pavement layers need to be imported from commercial sources.

PS 4 DETAILS OF THE CONTRACT

PS 4.1 Project Requirements

PS 4.1.1 Labour Intensive Construction

The intention is to undertake as much work as possible using Labour Intensive Construction Methods. As much work as the Engineer deems possible, shall be executed by labour intensive methods by employing local hand labour approved by the PSC. Suitable sub-contractors from the area shall also be employed where possible.

PS 4.2 Labour Intensive Construction Methods

The portions of the Works to be constructed under this Contract are as follows and shall be executed by utilising Labour Intensive Construction Methods as far as possible, unless otherwise instructed by the Engineer, all in accordance with the further provisions of the relevant sections of the Project Specifications;

- X clearing and grubbing of the Site
- X excavation of pickable material for the excavation of restricted excavations
- X laying and bedding of pipe culverts
- X backfill and compaction of backfill for pipe trenches
- X mixing, transporting, placing and finishing of all concrete for small works
- X all masonry work
- X spoiling of all materials, not exceeding distances of 200 metres

- X transportation of all earthworks for distances not exceeding 200 metres
- X laying of segmented block pavers
- X placing and filling of gabions
- X cleaning and tidying up of the Site

In respect of those portions of works which are not listed above, the construction methods adopted and plant utilised shall be at the discretion of the Contractor, provided always that the construction methods adopted and plant utilised by the Contractor are appropriate in respect of the nature of the Works to be executed and the standards to be achieved in terms of the Contract.

Should to the opinion of the engineer, however, the rate of progress influence the scheduled programme, or prove not to be suitable or un-economically, the Contractor will be instructed to proceed with conventional methods.

PS4.3 Restriction of the Utilisation of Personnel in the Permanent Employment of the Contractor

The Contractor shall limit the utilisation on the Works, of his permanently employed personnel to that of key personnel only, as defined below, and shall execute and complete the Works utilising a Temporary Workforce of local residents, employed directly by the Contractor and/or by his sub-contractors.

The numbers of each category of the Contractor's key personnel, as stated by the Contractor of his Tender, will be strictly controlled during the contract period and any increase in numbers will be subject to the prior approval of the Employer.

"Key personnel" means all contracts managers, site agents, site clerks, materials and survey technicians, quantity surveyors, trainers, supervisors, foremen, skilled plant operators and the like, and all other personnel in the permanent employ of the Contractor or his sub-contractors who possess special skills, and/or who play key roles within the Contractor's or his sub contractor's operations.

The Engineer may at his discretion, upon receipt of a written and fully motivated application from the Contractor, and where he deems the circumstances are so warranted, authorise in writing that the Contractor may utilise in the execution of the Works, workers not being his key personnel but who are in his permanent employ. Without limiting the generality of application of this sub-clause, circumstances which may be considered by the Engineer to warrant the authorisation of the use of the Contractor's permanent employees other than key personnel, include:

- a) The unavailability from local sources of sufficient numbers of temporary workers and/or sub-contractors to execute the Works, provided always that the Contractor has satisfied the Engineer that he has exercised his best endeavours and taken all reasonable actions to recruit sufficient temporary workers and sub-contractors from local sources;
- b) The unavailability within the temporary worker pool and/or from sub-contractor sources available to the Contractor in terms of the Contract, of sufficient skills necessary to execute the Works or specific portions thereof, in situations where the completion period allowed in the Contract is insufficient to facilitate the creation of the necessary skills through the provision of suitable training as contemplated in the Contract.;
- c) Any other circumstances which the Engineer may deem as constituting a warrant.

PS 5 CONSTRUCTION PROGRAMME

The Contractor must set out his proposed construction programme as well as cash flow statement in his tender.

Tenderers shall submit with their tenders their proposed programmes in sufficient detail to prove that they can comply with their proposed construction period. The Tenderer's programme shall clearly indicate the completion date offered and shall make reasonable allowance for delays in obtaining materials from suppliers, delays due to inclement weather and delays which may be expected for any other reason which can be reasonably foreseen at tendering stage. Programmes shall be supported by statements indicating the strength and disposition of labour, plant, equipment and materials.

Within 14 calendar days of award of contract, the Contractor shall submit a detailed comprehensive and realistic programme reflecting activities required up to final completion. The format of the programme shall be to the Engineer's approval.

The programme so submitted and approved shall be held to be binding throughout the contract period.

PS 6 SITE FACILITIES AVAILABLE

PS 6.1 Source of Water Supply.

Water is currently available on site from the existing water reticulation system. The Contractor must make his own arrangements for obtaining water from this system. Payments shall be arranged with the management of the farm at a rate agreed on between the management and the Contractor.

PS 6.2 Source of Power Supply.

No electricity is available at the site of works. The contractor shall make his own arrangements for the provision of power supply in the form of portable generators as required.

PS 6.3 Latrine and Ablution Facilities.

The contractor must allow for the supply and maintenance to his own latrine facilities for the duration of the contract. Facilities must be kept clean and hygienic at all times, and removed in total at the end of construction.

Separate ablution facilities shall be supplied for the use of the Engineer.

PS 6.4 Housing

The Contractor shall make his own arrangements for the housing of his male and female staff. All facilities provided shall conform to the requirements of any Act of Parliament, Ordinance and the Regulations and By-Laws of any local or statutory authority which may be applicable to the works or any temporary works.

The positions of the Contractor's housing and temporary camps shall be determined and agreed upon with the Local Authority.

PS 7 SITE FACILITIES REQUIRED

PS 7.1 Contractor's superintendence and facilities

PS 7.2.1 Camp and depot

The Contractor shall provide, erect, move and re-erect as necessary, maintain and remove on completion, ample temporary sheds for the proper storage of materials and tools and for the use of the workmen and watchmen, including special weatherproof sheds for the storage of cement..

PS 7.2.2 Offices

The Contractor shall provide erect move and re-erect as necessary and remove at completion ample temporary offices for the Contractor's own use.

PS 7.2.3 Sanitation

The Contractor shall provide an adequate number of latrines of a standard acceptable and in accordance with the regulations of the department of public Health and/or other Health Authorities at all depots, camps, offices and points where work is in progress. The Contractor shall pay all charges in connection therewith and maintain facilities in a thoroughly clean and orderly condition. Separate facilities shall be provided for both sexes. The Contractor shall clear away and remove all traces of the latrines and restore the site to its original condition as soon as the latrines are no longer required.

PS 7.2.4 First aid and safety

The Contractor shall provide first aid facilities complying with the requirements of the Machinery and Occupational Safety Act No. 6 of 1983 and Regulations for his own employees and also for the employees of any sub-contractors on site.

PS 7.2.7 Survey equipment

The Contractor shall provide on the instruction of the Engineer a capable survey assistant with the following equipment:

- Dumpy level with tripod and carry case
- 5m telescopic staff
- 50m measuring tape
- Measuring wheel
- Marking chalk
- Droppers and hammer for pegging out of works

Note that the setting out of the works will be the Contractor's responsibility and the utilisation of the survey equipment and survey assistant by the Engineer will only be for checking and measuring of works on the discretion of the Engineer.

PS 8 FEATURES REQUIRING SPECIAL ATTENTION

PS 8.1 Protection of property

The Contractor shall ensure that:

- X Private property is not trespassed without written consent of the respective owner.
- X Property (e.g. plants, crops, fences, gates, pipes, cable, roads) is not damaged.
- X The site is always kept clean and orderly.
- X *Veld* fires are not caused by his operations.
- X Excess excavation material is disposed of at indicated site.

The Contractor will be liable for any damages due to his construction work. The Engineer will have the right to subtract an amount of money, equal to the amount claimed for damages, from the Contractor's fee until the damages caused to the property of the respective owner has been rectified and resolved.

Excess material may only be dumped at places agreed to by the Engineer. The Contractor's space to work in is confined to the site of the works. Any anticipated work outside these site boundaries must be approved by the property owners or the Engineer in writing

PS 8.2 Safety

The construction has to be done in accordance with the appropriate laws, regulations and requirements of the Local Authority.

It is the responsibility of the Contractor to ensure that, for example, excavations are safe for people and animals. The Contractor shall provide the necessary supports, fencing, barriers, road signs, flash lights and other equipment to prevent accidents, damages and injuries at all times. The free flow and safety of traffic has to be ensured at all times.

The Contractor has to operate strictly in accordance with the Occupational Health and Safety Act (Act No. 85 of 1993) in its entirety and he shall:

- X Ensure the safe operation and safety of all people on site
- X Strive for proper site management in keeping the site clean and safe.
- X Register himself and all sub-contractors in terms of the Compensation for Occupational Injuries and Diseases Act (Act No. 130 of 1993) and to issue a copy thereof to the Employer.

The Employer, his employees or any of his agents shall not accept any responsibility and/or liability of any kind whatsoever in terms of the clauses and/or prescriptions of the Occupational Health and Safety Act for the Works or any part thereof.

If the Employer or the engineer or their representatives stop the work because in their opinion, the site is unsafe, the Contractor shall not have the right to any claims in this regard.

The Contractor is fully responsible and liable for any act or action resulting from his employees or equipment that is used on site.

The Contractor shall appoint in writing a capable person who complies with Regulation 11.1 of the Occupational

Health and Safety Act for this Contract. A copy of such an appointment and the appointed person's acceptance in writing shall be delivered to the Employer.

PS 8.3 Survey and setting out

The setting out of the works according to the Engineer's drawings shall be the sole responsibility of the Contractor. A suitable qualified and experienced person shall set out the works in accordance with the setting out points on the drawings.

Prior to the commencement of construction the Contractor shall notify the Engineer who shall then inspect the setting out points and give written approval to proceed. Any discrepancies regarding the setting out of the works, or insufficient information, shall be brought to the immediate attention of the Engineer.

PS 8.4 Plant, labour and equipment

The Contractor's plant for construction shall be adequate for the purpose required, of modern design and in good condition to carry out the works expeditiously. Should the Engineer be of the opinion that the plant is in anyway unsuitable for carrying out the works in a manner or at a rate commensurate with the requirements of the contract, he shall have the right to call on the Contractor at any time during the progress of the works to provide such additional or improved plant and tools as may be necessary to meet these requirements.

Tenderers should furnish details in the Day work Schedules of all major items or equipment and plant (together with corresponding plant hire details) which they intend employing in the execution of the contract.

All tradesmen employed on the works shall be capable and efficient and must be to the approval of the Engineer. Their work shall at all times be properly supervised and inspected. **Contractors shall give preference to the employment of local job seekers who are currently residing in Greenwood Park area or surrounding areas.** The number of people employed on the works shall be sufficient to carry out the work in an expeditious, well organised and programmed manner. The number of people employed in each particular trade or class of labour shall be sufficient to ensure that there shall be proper organisation of the work and that no section of the work be impeded owing to shortage of labour in any particular class. Should it appear to the Engineer at any time during the execution of the works that progress is being impeded by any such cause, he shall have the right to call upon the Contractor to engage and employ such additional labour of any particular trade or class as may be considered necessary for the purpose of expediting progress. Each trade shall do the necessary jobbing after any other trade and make good upon completion its particular class of work where this has been in any way affected or impaired by any other trades.

No provision is made in this contract for financial assistance by the Employer to the Contractor for the acquisition of plant, machinery and equipment.

PS 8.5 Existing services

Information on known services are shown on the drawings and most services are clearly marked on site. The Contractor is solely responsible for the location, identification, exposure, protection and re-routing where necessary of these services. Any damage to these services will be for the account of the Contractor.

The information as shown on the drawings is not necessarily accurate or comprehensive. This information in no way relieves the Contractor from any of the above responsibilities.

All work shall comply with the requirements of the Local Authority and property owners. Certain authorities may prefer to expose their own services and they should be informed well in advance to prevent delays.

The Contractor shall repair all damaged fences immediately to their original state.

The Contractor shall be responsible for reinstating all canals and natural watercourses should they be damaged or altered. The original canals have to be reinstated and the cost shall be deemed to be included in the rates tendered in the Schedule of Quantities (separate items not specified).

The Contractor will be reimbursed for location and protection of existing services as follows:

- X Hand excavation to locate the services. Excavation which is necessary after the service has been located will not be measured as hand excavation.
- X A sum for each service which is crossed allowing for identification, protection and re-routing if necessary.

The Contractor will only be compensated for the removal and reinstatement of fences if the position of the works (building edge, pipeline, etc.) is nearer than 2,0 m from that particular fence.

The Employer expects the Contractor, his staff or agents to maintain good public relations with the local community, landowners and members of the public at all times.

The Contractor is responsible to ensure that:

- (1) No trespassing takes place on private property without written consent of the owner.
- (2) Roads, gates, cables, pipes, fences, vegetation and crops with private ownership are not damaged due to construction activities.
- (3) The site and servitude is always clean.
- (4) His activities do not cause fires.
- (5) Trees and natural flora are not damaged without the Engineer's approval.
- (6) Inconvenience to the public and authorities in the area is minimised.

The Contractor shall be responsible for any claims due to his construction activities. The Engineer will have the right to deduct any sum of money being claimed from the Contractor's payment until the respective owner has been satisfactorily compensated for his damages.

Materials may only be dumped at locations approved by the Engineer based on approval obtained from the PSC.

The Contractor may lock the gates of the Employer, local authority or other party but he must then use his own locks on the gates, which must always be kept closed and locked. The Contractor may only use such gates with the written approval of the respective owner.

PS 8.6 Quality control

The Contractor shall appoint a person responsible for his own quality control and inspections. Should the Engineer find that this person is incapable of ensuring work of acceptable standard or be in any way negligent, the Engineer has the right to demand a replacement to which the Contractor shall comply.

The tendered rates shall include for all inspections and tests as specified. The Engineer may request additional control tests for which, if successful, an additional payment item is allowed in the Schedule of Quantities.

PS8.7 Payments for Materials on Site

Payment for Materials on Site will only be certified if the Contractor presents the necessary proof that the Materials to be certified for payment, have been fully paid for by the Contractor or if suppliers have renounced their ownership of the materials. This must be filled in and submitted on the form to transfer property rights.

The Contractor shall keep proper records of stock and shall appoint a responsible person to execute proper stock control.

PS8.8 Start of maintenance Period

The maintenance Period will start when the work has been successfully completed and the completion shall only be seen as the date when the Employer accepts the work as completed and where after the Engineer will issue the Completion Certificate. The Client reserves the right to implement completed sections while the contract is still ongoing and to use the services installed without any responsibility as far as maintenance is concerned

PSA - GENERAL (SANS 1200A)

PSA 3 MATERIALS

PSA 3.1 Quality

The Contractor shall be solely responsible for the supply of all materials necessary for the proper execution of the Works and for the quality of materials. All materials used in the Works shall, where such mark has been awarded for a specific type of material, bear the SANS mark. Alternatively, the Contractor shall furnish the Engineer with certificates of compliance of materials, which bear the official mark of the appropriate standard.

PSA 4 PLANT

PSA 4.1 Plant

The Contractor shall utilise plant and equipment in sound working condition able of obtaining the required accuracy and of adequate capacity to execute the Works in accordance with the approved programme. In addition the Contractor shall have adequate standby plant and maintenance personnel readily available to ensure an uninterrupted workflow.

PSA 5 CONSTRUCTION

PSA 5.5 Dealing with water

The area for construction is expected to be free of excessive surface water or seepage water. The Contractor will however make due allowance for the treatment of any such water that may affect the works and shall allow for provision of pumps, drainage channels, temporary cut-off berms, protection of concrete and layerworks or any other works as may be deemed necessary to deal with seepage water and surface runoff water to the works.

PSA 7 TESTING

PSA 7.5 Programme and procedures (new clause)

All test results obtained by the Contractor in the course of his process control of the Works shall be submitted to the Engineer or his Representative prior to requesting inspection of the relevant portions of the Works. Any request for inspection shall be submitted on the prescribed forms.

The Contractor shall make suitable arrangements for process control prior to commencement with the Works. Should he intend using site personnel for this purpose he shall ensure that suitably trained and competent personnel take charge of the necessary test work, and that the necessary equipment is at their disposal prior to commencement of the Works. Failure to comply with these requirements shall be just cause for the Engineer to order suspension of the Works without additional remuneration in terms of the Conditions of Contract, or for him to recommend determination to the Employer.

The Contractor shall deliver to the Engineer, for his consideration, quality assurance programmes (as obtained from all the Contractor's proposed suppliers of pipes, valves and specials) prior to the Contractor's appointment of any suppliers.

PSA 8 MEASUREMENT AND PAYMENT

PSA 8.3.2.2 Facilities for the ContractorSum

The definition of the term "Tools and equipment" used under sub-clause 8.3.2.2 f) and sub-clause 8.4.2.2 f) shall include plant generally required for the purpose of the execution of the Works.

PSA 8.5 Sums stated provisionally by the Engineer

PSA 8.5 b) 1) Work to be executed by the Employer or a nominated subcontractorProv.Sum

Sums stated provisionally by the Engineer shall be spent strictly in accordance with the written instructed of the Engineer. Only the Contractor's actual expenditure in accordance with the instruction of the Engineer will be reimbursed under this item. The Employer reserves the right to allow the spending of only part of or none of the funds allowed for under this item.

PSA 8.5 b) 2) Overheads, charges and profit in respect of 1) above. %

The unit of measurement shall be the percentage of actual payments made by the Contractor to the nominated subcontractor in accordance with sub-clause 1) above.

The rate shall cover the cost of appointing the nominated subcontractor, coordinating the subcontractor's (or Employer's) activities, programming the Contractor's own activities to accommodate the subcontractor (or Employer), assisting the

subcontractor (Employer) as may be reasonably expected of the Contractor, paying the subcontractor (Employer) in accordance with the written instruction of the Engineer amounts to be reimbursed separately under sub-clause 1) and any other cost involved in ensuring that the subcontractor's (Employer) work can be executed and that the subcontractor's (Employer) bills are paid timeously.

PSA 8.7 Daywork

Only daywork performed strictly in accordance with the Engineer's written instructions will be measured for payment.

PSA 8.8.4 Existing Services

PSA 8.8.4 c) Careful excavation by hand in soft material to expose the following services:

- 1) electrical cables m³
- 2) water mains m³

The rates tendered for these items shall cover the cost of exposing the mentioned services through careful hand excavation strictly under the Engineer's guidance. Any services damaged during the careful hand excavation activities shall be repaired by the relevant service owner at the Contractor's expense or by the Contractor for his own account as decided upon by the Engineer.

PSA 8.10 Testing of materials as instructed by the Engineer.....PSum

A provisional sum has been allowed in the Schedule of Quantities for the payment of test as instructed by the Engineer. These tests are per the instruction of the Engineer only and does by no means relieve the Contractor from his own quality control testing and no payment will be made to the Contractor for any tests regarded as being part of his own quality control testing, ie payment for the contractor's own quality control tests shall be included in his tendered rates for the relevant items.

Should the Engineer suspect any test results obtained from the Contractor to be inaccurate and this is confirmed by additional testing, the costs of the additional testing shall be for the Contractor's expense.

PSA 8.11 Geotechnical testing & supervision.....PSum

A Provisional sum has been allowed in the Schedule of Quantities for Geotechnical testing and supervision. This amount will be for any additional investigations, testing, profiling, recommendations etc. as may be required during the construction of the works as ordered by the Engineer only.

PSC - SITE CLEARANCE

The clauses in this section refer to sub-clauses in SANS 1200 C

PSC1 Disposal Areas (3.1)

Disposal areas will be designated by the local authority within 2 km of the Works. No extra payment will be made for such disposal of redundant or clearance material.

PSC2 Plant (4)

Add the following paragraphs to the contents of Clause 4 of SANS 1200 C:

Labour Intensive Construction

The Contractor will be requested to utilise Labour Intensive Construction Methods in so far as is economically possible to clear areas by means of hand tools such as saws, picks, shovels, rakes, tampers, sledgehammers etc.

The use of trucks and other motor vehicles in the disposal of the cleared materials will only be permissible in cases where the distance over which the materials are to be transported exceeds 200 metres, provided that no mechanical plant or equipment shall be utilised in the loading of such vehicles.

PSC3 Individual Trees (5.2.3.2)

The Contractor shall pay a penalty of R500-00 for each designated tree removed or damaged by him. Trees so designated will be marked with danger tape to be supplied by the Contractor. Upon completion of the Works, the tape shall be removed. Trees and stumps necessarily removed shall not be burnt but cut and stacked at areas designated by the Engineer for collection and use by local inhabitants.

PSC4 Clearing

After completion of the contract the Site shall be completely cleared of all building rubble and all loose boulders, tree stumps etc. unearthed during the construction period.

PSC5 Areas to be cleared and grubbed (5.3 & 5.4)

The areas and strips to be cleared and grubbed will be indicated and instructed by the Engineer. Should a portion or the whole of the site have been cleared prior to the start of the construction, then no clearing and grubbing will be ordered or no payment made with respect to the applicable portion of the site.

PSC6 Clearing and spoil of redundant material

A 3 metre wide strip shall be cleared all along the routes of the pipelines. All grass, bush, trees, stones, building rubble, all boulders irrespective of size) and rubbish shall be removed and spoiled on a site designated by the Engineer. No transport payment is made for this and all haul shall be deemed to be included in the rate for clearance.

In rocky areas all the available and suitable topsoil shall be separated from the rest of the excavation material and placed on the one side of the strip for use as backfill material. No additional or separate payment will be made for the removal of rocks/stones and it shall be included in the contractors unit rates for site clearance. All loose and exposed rock, or rocks exposed during the clearing operation, is to be removed as part of the clearing operation irrespective of the size of the boulders. All boulders of which more than 50% of the volume are exposed above the ground structure, shall be removed as part of the Clearing and Grubbing operation and the cost for the removal of such boulders shall be included in the unit rates for Site Clearance. This shall not apply in areas deemed as hard rock excavation where no additional clearing will be required.

PSD - EARTHWORKS

The clauses in this section refer to sub-clauses in SANS 1200 D

PSD1 Classes of Excavation (3.1)

Notwithstanding the classification for excavations in five classes as specified in Subclause 3.1 of SANS 1200 D, there will only be two classes of excavation applicable to this Contract, viz:

- (a) Soft excavation
Soft excavation shall be all excavation except excavation classified as hard rock excavation described below including boulders up to 300 mm Ø.
- (b) Hard rock excavation
Hard rock excavation shall be excavation in material as specified in Subclause 3.1.2(c) of SANS 1200 DA.

To utilise labour intensive construction all backfilling will be done by hand regardless of the class of excavation. Payment for these excavation classes is split into 2 different ways of execution:

- (i) Machine excavation and hand backfilling.
- (ii) Hand excavation and hand backfilling.

Machine operations of above classification refer to Conventional Construction Methods used, whereas hand operations refer to Labour Intensive Construction Methods used as specified elsewhere. The type of excavation used will be prescribed by the type of material and the available labour for construction. As much work as possible shall be executed by labour intensive methods. Where insufficient hand labour is available the contractor will be allowed to make use of machine backfill on the approval of the Engineer only.

The Contractor will be requested to dig a few test holes for inspection by the local labour force. The option should be given to the labourers to opt for the labour intensive excavation methods or to request excavation by machine.

PSDB – EARTHWORKS (PIPE TRENCHES) – (SANS 1200 DB)

PSDB 5 CONSTRUCTION

PSDB 5.11 Maximum trench depth

Unless otherwise authorised by the Engineer no trench shall be excavated to a depth deeper than 1,5m. Where pipes are to be installed at depths exceeding 1,5m, all material higher than 1,5m above the required trench bottom shall be removed by means of bulk excavation with a 3m base width and 1:2 side slopes.

Alternatively shoring may be installed in trenches in order to limit excavations. The cost for shoring shall however be included in the rate for excavations and no additional payment for shoring of trenches will be made.

The Contractor shall at all times take full responsibility in ensuring the safety of workmen working in trenches or near vertical open excavations. No work in trenches or near open vertical excavations shall be carried out if it is deemed unsafe by the Engineer until proven to the contrary or until precautionary measures are taken in ensuring the safety of the excavation.

PSLB - BEDDING (PIPES)

The clauses in this section refers to the sub-clauses in SANS 1200 LB

PSLB1 Selected fill material (3.2)

Granular material shall be selected from excavations and shall be to the satisfaction of the Engineer.

PSLB2 Bedding (3.3)

Bedding for rigid pipes shall be according to Class B as shown on Drawing LB-1 of SANS 1200 LB (c) and Drawing LB-2 (a) and LB-3 (d) for flexible pipes.

PSLB3 Compaction (5.2)

Compaction of the bedding cradle and blanket fill layer shall take place at optimum moisture content to the specified densities. Where water for moistening of bedding and fill material is not freely available alongside pipe trenches, water shall be imported by the contractor by means of water tankers and the contractor shall provide the necessary access roads to import water. The cost for importing of water and access to the site shall be in the unit rates for pipe laying. The finished layers shall be compacted to the same density as the in-situ surrounding material or 90 % mod AASHTO, whichever is the greatest.

PSLB4 Free Haul (8.1.6)

Payment of haul for all bedding must be included for in the laying of pipes within a haul distance of 2km. Suitable bedding will be indicated by the Engineer within a free haul distance of 2 km.

A free haul distance of 200m will be applicable to all hand backfill operations. Where no suitable bedding material is available within 20m distance the Contractor shall, with the approval of the Engineer, resolve to machine backfill up to a freehaul distance of 2.0km.

PSLB5 Import of bedding for haul distances exceeding 2 km

The rate shall include the loosening, loading and transportation of suitable material (m³ km). This must be agreed with the Engineer's Representative on site prior to importation.

PSLB6 Suitable material from Trench excavations (3.4.1)

The Contractor shall use selective methods of excavation in soft material for the purpose of providing and conserving suitable excavated material as granular material for bedding cradle and selected fill material for blanket fill above pipes.

PSLB7 Approval of granular material for bedding cradle and fill for blanket fill material (5.1.3)

No bedding cradle material may be imported or placed in a pipe trench before the pipe trench excavation and the material destined for the bedding cradle has been approved in writing by the Engineer's Representative. No blanket fill material may be imported or placed in a pipe trench before the bedding cradle in the trench and the material destined as blanket fill, has been approved by the Engineer's representative.

PSLB8 Payment for bedding- and blanket fill material

For all bedding cradle- and blanket fill material imported from pipe trench excavations or borrow areas within 200 m from where the bedding- or fill material is required, haul will not be paid for separately and the cost for this shall be included in the unit rates for pipe laying or the supply and laying of pipes as the site activities may be scheduled.

Bedding cradle- and blanket fill material imported further than 200 m up to 2 km away from position where required will be paid for per m³ compacted imported material with no overhaul.

Overhaul will be paid separately for the transport of all bedding and blanket fill material from a point further than 2 km from where it is required. Separate items are listed for bedding cradle- and blanket fill material.

PS LE – STORMWATER DRAINAGE

The clauses in this section refers to the sub-clauses in SANS 1200 LE

PS LE (8) Measurement and Payment

PS LE (8.2.14) Break into existing manholes and repair benching

Add the above payment item with description as follows:

The rate shall cover the cost, as applicable, of providing the concrete, formwork and pipes, and excavating, jointing, backfilling and testing.

PS LF – ERF CONNECTIONS (WATER)

The clauses in this section refers to the sub-clauses in SANS 1200 LF

PS LF (8) Measurement and Payment

PS LF (8.2.1) Provide Erf Connections Complete

Amend the last paragraph under this payment item to read as follows:

The rate shall cover the cost, as applicable, of providing the pipes, saddles, ferrules, stop taps, meters, surface boxes, marker posts, and excavating, connecting to the water main, laying in light sandy material, jointing, backfilling, testing, but excluding completing the service connection, which is to be liaised with the local authority.

22. Structural Engineering Project Documentation

APPLICABLE DOCUMENTATION:

- The Civil Engineering Contract between the client and the main contractor;
- The Bill of Quantities;
- The standardised specification for civil engineering construction (SANS 1200);
- Standard amendments issued by the South African Bureau of Standards (SABS);
- Project specification amendments to the standard specifications;
- The Civil Engineering Drawings.

DISCREPANCIES:

If there is any discrepancy or conflict between any of the between any of the documentation mentioned above, or a dispute as to which documentation is the ruling documentation, the CONTRACTOR must advise the ENGINEER immediately of the conflict. The ENGINEER will then take a decision as to the status of the ruling documentation, which will then be final.

STANDARD SPECIFICATION (SANS 1200)

For the purpose of this Contract, the following specifications shall apply:

- i. SANS 1200 AA General (Small Works)
- ii. SANS 1200 AH General (Structural)
- iii. SANS 1200 G Concrete (Structural)
- iv. SANS 1200 GA Concrete (Small Works)
- v. SANS 1200 GB Concrete (Ordinary Buildings)
- vi. SANS 1200 GE Precast Concrete (Structural)
- vii. SANS 1200 H Structural Steelwork
- viii. SANS 1200 HA Structural Steelwork (Sundry Items)
- ix. SANS 1200 HC Corrosion protection of structural steelwork

All other standard specification documents (the ones not mentioned above) under SANS 1200 will be applicable to this project. Also note, the SANS standard specification was previously referred to as the SABS standard specification, and older documents may still have the SABS standard specification name.

GENERAL

Description of works

To summarize the civil works required, the works measured in the Bill of Quantities include the following:

- Maintenance and construction of new stormwater system.
 - Construction of field inlet structures.
 - Construction of kerb inlet structures
 - Connection to existing stormwater system.

Note that the scope of work may change slightly and that the above list shall only be regarded as indicative of the work to be involved under this contract. The contract drawings and schedule of quantities will provide a more comprehensive indication of the work involved.

PROJECT SPECIFICATION AMENDMENTS TO THE STANDARD SPECIFICATIONS

For the purpose of this Contract, the standard specifications and codes of practice for Civil Engineering construction as approved by the South African Bureau of Standards (SABS), as issued at the date of tender, shall apply.

Amendments and additions to the standard specification will use the prefix "PS" (particular specification),

with the standard specification clause number shown in brackets.

For example:

- For SANS 1200 A specifications, the clauses are lettered PS A.

Refer to the particular specification amendments overleaf.

PSG – CONCRETE (STRUCTURAL) - (SABS 1200 G)

PSG 4 PLANT

PSG 4.5.2 FORMED CONCRETE FINISHES

Concrete against which earth will be backfilled shall be finished rough. All exposed concrete surfaces shall be finished smooth.

PSG 5 CONSTRUCTION

PSG 5.1.3 Cover

Cover over reinforcement will in no case be less than 40 mm.

PSG 5.2.5 Removal of Formwork

Formwork shall be removed after the concrete has attained sufficient strength to support its own weight and any other imposed loads after which the concrete will be cured. Removal of formwork is subjected to the Engineer's approval.

PSG 5.5.7 Construction Joints

Add clause “PSG 5.5.7.4 Construction Joint Maintenance and Repair,” which reads as follows:

- a) *“Repairing and maintaining the construction joints of apron slabs, stormwater channels, etc, using cementitious grout:*

Where he is required to repair existing construction joints using cementitious grout, the Contractor shall first prepare the relevant concrete surfaces by scabbling and cleaning them. The mortar grout shall consist of three portions plaster sand and one portion cement, and shall be so rammed into each joint that all voids and pockets are completely filled for the entire length of the joint and that the grout projects beyond the joint surface. After the void has been completely filled, the edges of the mortar grout shall be trimmed at an angle of 45 outward and the trimmed edge wood-floated to a neat finish.

- b) *Creating Controlled slip joints:*

Crack control, repair and/ or prevention, where deemed necessary by the Engineer, will be undertaken by means of creating controlled slip joints via the following methods to be confirmed by the Engineer:

- (1) *The affected area shall be cut to straight edge and relevant surfaces prepared by scabbling and cleaning them. Hardboard shall be newly inserted or replaced at the interface at which the slip joint is to be constructed. A mortar grout of three portions plaster sand and one portion cement shall be mixed, and shall be so rammed into each joint that all voids and pockets are completely filled for the entire length of the joint and that the grout projects beyond the joint surface. After the void has been completely filled back towards the hardboard, the edges of the mortar grout shall be trimmed to level and given a finish similar to the existing.”*
- (2) *Saw cutting*

PSG 5.5.8 Curing and Protection

All concrete shall be cured and protected from contamination and loss of moisture with an approved curing compound to the manufacturer's instructions, or a method to be approved by the Engineer.

PSG 5.5.16 Chamfers and grooves

All exposed concrete edges shall be ended off with a 25x25mm chamfer.

PSG 5.6 Apron Slabs

Add clause *PSG 5.6 Apron Slabs*, which reads as follows:

“Apron slabs shall be no less than 1m wide and 75 mm thick, sloping away from the wall by 1:100 (or minimum 20mm fall), and constructed of unreinforced concrete of strength 30 MPa. Each and every other apron slab is to be cast, the formwork stripped after one day, and the remaining apron slabs then cast, such that a construction joint will exist every 3 m. Slabs are to be wood-floated and exposed edges are to be rounded using a nosing tool.”

PSG 8 MEASUREMENT AND PAYMENT

PSG 8.1.3 Concrete

In addition to the provisions made in clause 8.1.3.3, the unit rates for concrete shall also cover the cost of forming chamfers.

PSG 8.3.1 Steel Bars

The unit of measurement shall be kg, not tonnes.

PSGA - CONCRETE (SMALL WORKS)

PSGA1 Cement (3.2.1)

Only the use of Ordinary Portland Cement to SABS 471 will be permitted.

PSGA2 Concrete Finishes (4.4.2)

Concrete against which earth will be backfilled shall be finished rough. All exposed concrete surfaces shall be finished smooth to a Degree of Accuracy II.

PSGA3 Steel cover (5.1.3)

Cover over reinforcement will in no case be less than 40 mm.

PSGA5 Removal of Form work (5.2.3)

Form work shall be removed after the concrete has attained sufficient strength to support its own weight and any other imposed loads after which the concrete will be cured. Removal of form work is subjected to the Engineer's approval.

PSGA6 Curing and Protection (5.4.7)

All concrete shall be cured and protected from contamination and loss of moisture with an approved curing compound to the manufacturers instructions, or a method to be approved by the Engineer.

PSGA7 Concrete surfaces (5.4.8)

All exposed concrete surfaces will be treated as specified in the sub-clause.

PSGA8 Measurement and Payment (8.1.4)

The rate per m³ for concrete anchor, thrust blocks and pipe encasing must include for form work and fixing of reinforcement.

PSGA9 Degree of Accuracy (6.4)

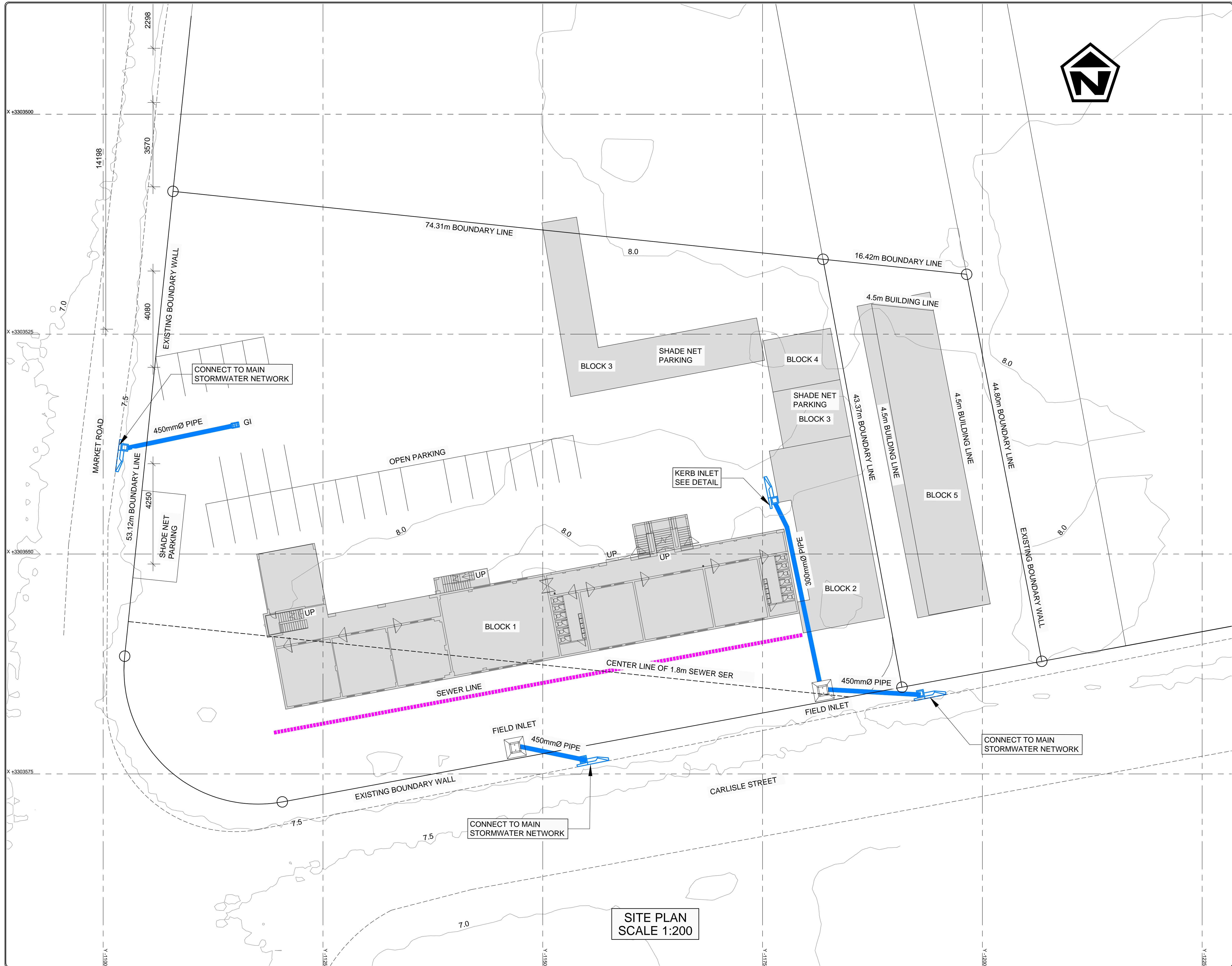
Structural concrete work will be done to a Degree of Accuracy II.

PSH – STRUCTURAL STEELWORK

PSH 8.3.3 Erection on Site

Change the final paragraph to read:

“The rate shall cover the cost of offloading the steelwork from vehicles on Site, stacking in designated area, moving from such area, assembly, erection, aligning, provision of erection equipment, temporary supports, safety measures, and on site corrosion protection as specified by the Engineer.”



| REVISIONS | | | |
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| GENERAL NOTES | |
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| LEGEND | |
| | STORMWATER NETWORK |
| | EXISTING SEWER NETWORK |
| | GRID INLET |
| | KERB INLET |

NOTES

DETAIL OF PIPE TRENCHES AND BEDDING:
REFER TO DRAWING L0826-00-D-01A02-00

DETAIL OF PROPOSED WATER DETAILS: FIRE HYDRANTS:
REFER TO DRAWING L0826-00-D-01A03-00

DETAIL OF RSV WATER VALVE AND BOX DETAILS:
REFER TO DRAWING L0826-00-D-01A04-00

DETAIL OF SEWER CONNECTION AND MANHOLE COVERS:
REFER TO DRAWING L0826-00-D-01A06-00

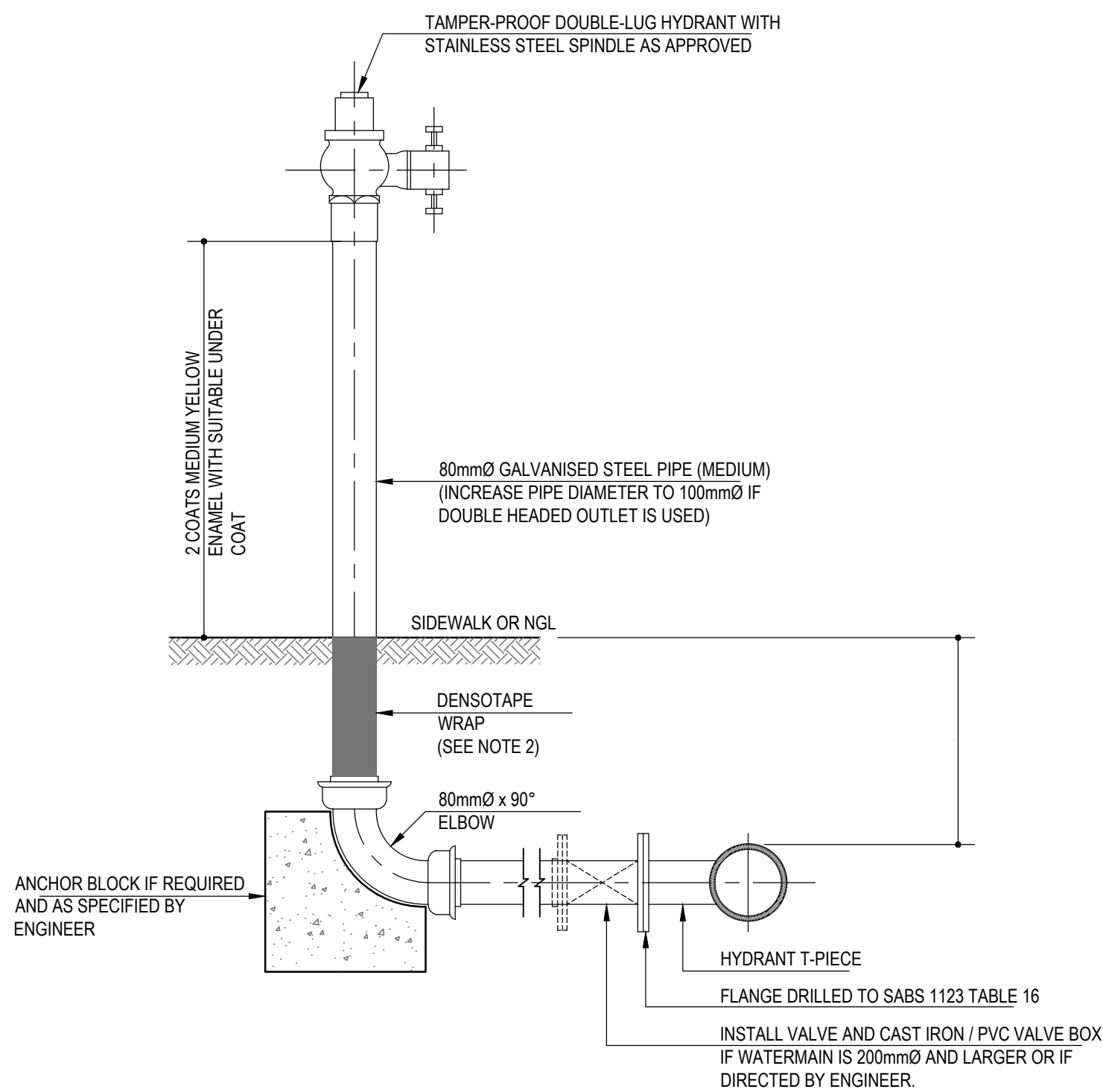
DETAIL OF MANHOLE COVER, KERB AND FIELD INLET:
REFER TO DRAWING L0826-00-D-01A07-00

RESIDENTIAL | COMMERCIAL | INDUSTRIAL

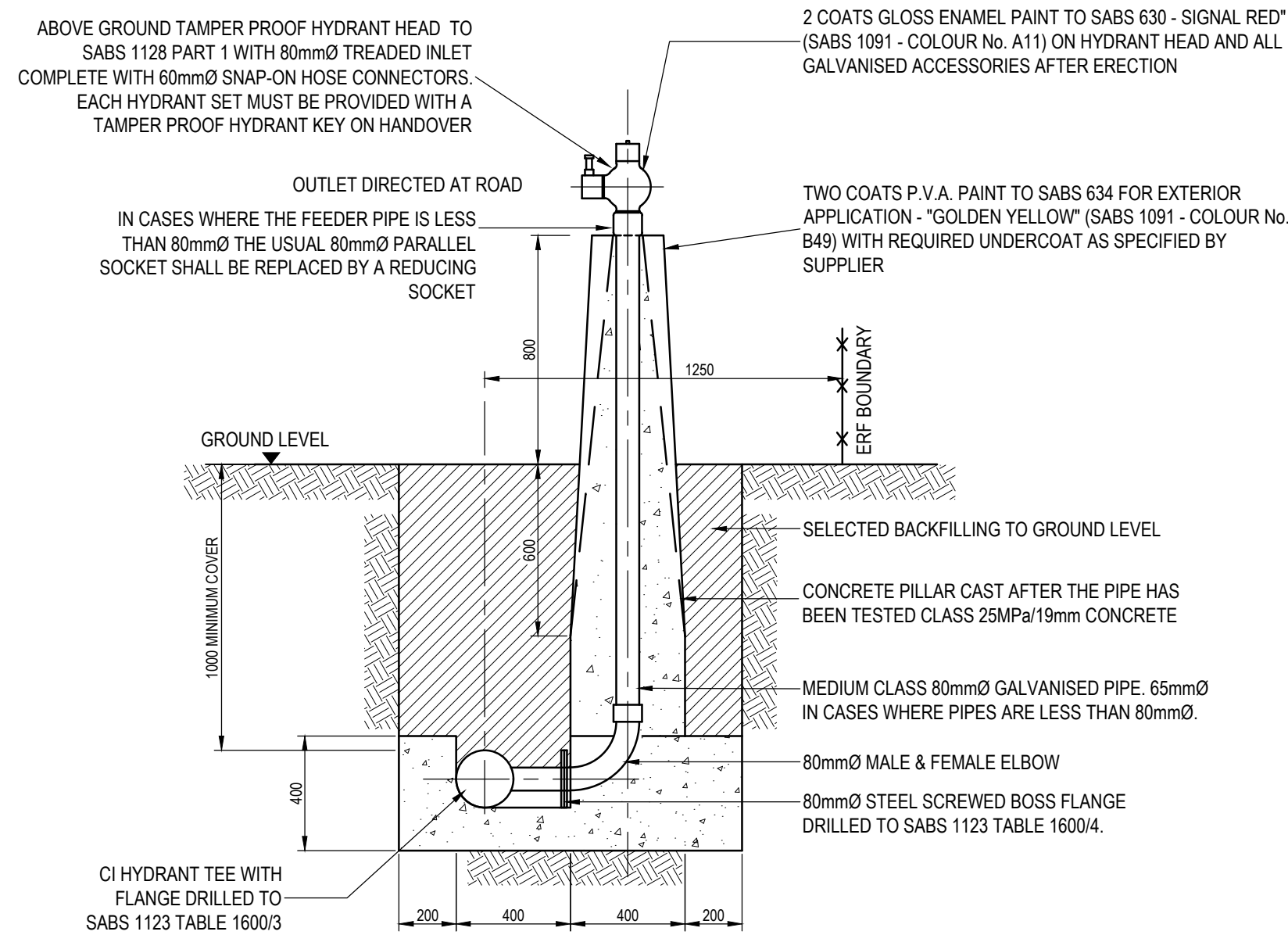
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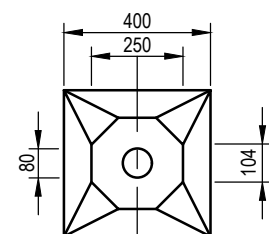
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FIRE HYDRANT TYPE 1
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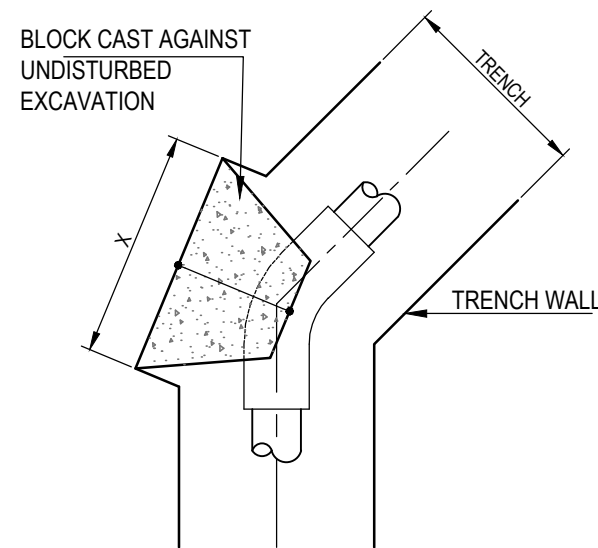


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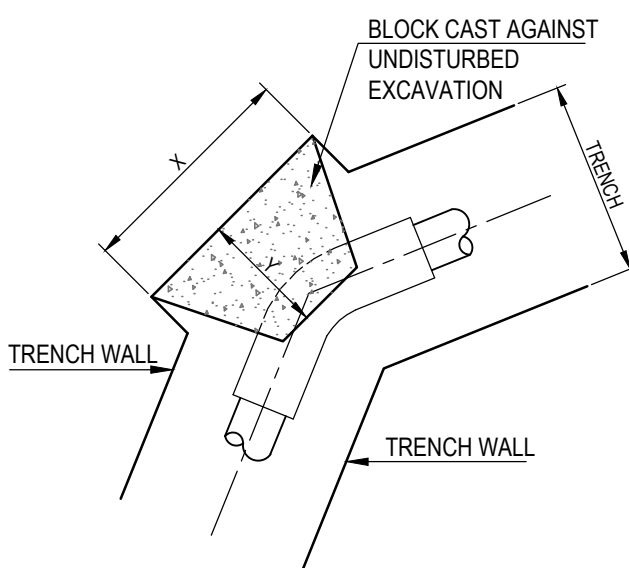
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FIRE HYDRANT TYPE 2
SCALE 1:20



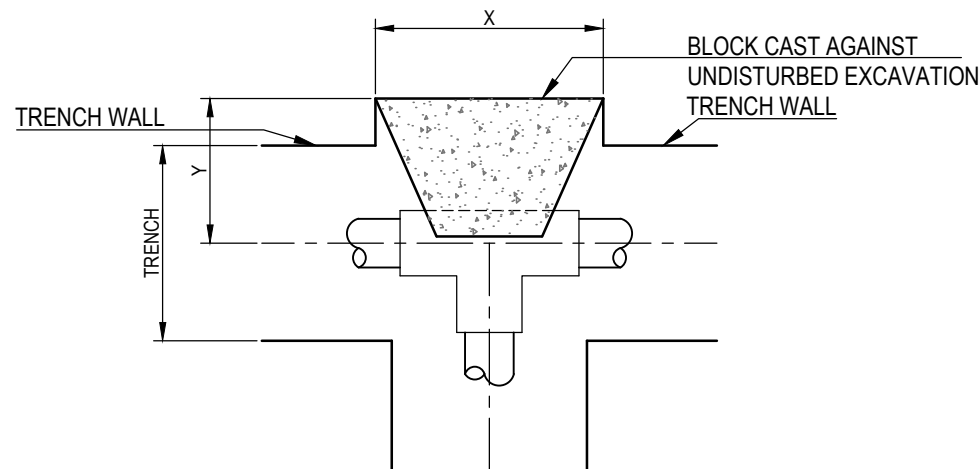
THRUST BLOCK FOR 45° BEND
SCALE 1:30

| NOMINAL PIPE DIAMETER ø (mm) | AREA REQUIRED m² | DIMENSIONS (mm) | | | | AREA PROVIDED m² | VOL (m³) |
|---------------------------------|---------------------|-----------------|-----|------|------|---------------------|----------|
| | | D | Z | X | Y | | |
| 75 | 0.061 | 800 | 400 | 450 | 225 | 0.180 | 0.040 |
| 100 | 0.109 | 1 000 | 500 | 500 | 250 | 0.250 | 0.060 |
| 150 | 0.245 | 1 000 | 500 | 1000 | 500 | 0.500 | 0.250 |
| 200 | 0.435 | 1 200 | 600 | 1400 | 700 | 0.840 | 0.590 |
| 250 | 0.680 | 1 300 | 650 | 2000 | 1000 | 1.300 | 1.300 |
| 300 | 0.979 | 1 400 | 700 | 2600 | 1300 | 1.820 | 2.370 |
| 300+ | SEE NOTE 5 | | | | | | |



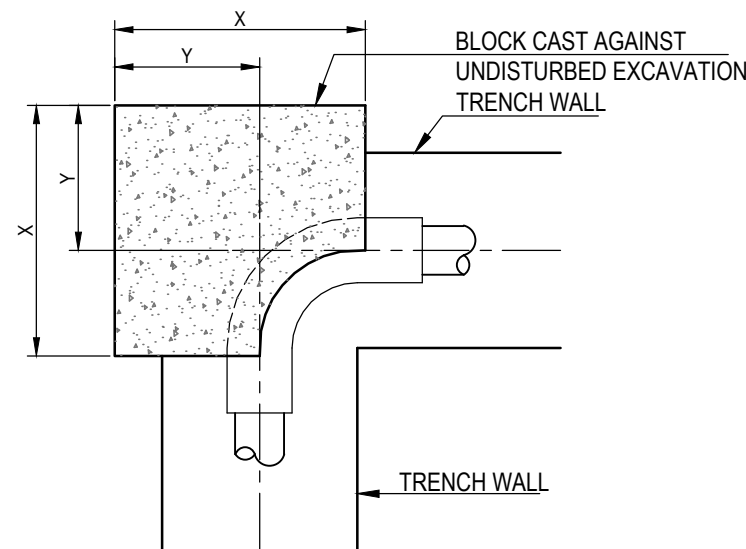
THRUST BLOCK FOR 22½° BEND
SCALE 1:10

| NOMINAL PIPE DIAMETER ø (mm) | AREA REQUIRED m² | DIMENSIONS (mm) | | | | AREA PROVIDED m² | VOL (m³) |
|---------------------------------|---------------------|-----------------|-----|-----|-----|---------------------|----------|
| | | D | Z | X | Y | | |
| 75 | 0.031 | 800 | 400 | 400 | 200 | 0.1600 | 0.032 |
| 100 | 0.055 | 1 000 | 500 | 500 | 250 | 0.2500 | 0.063 |
| 150 | 0.124 | 1 000 | 500 | 500 | 250 | 0.2500 | 0.063 |
| 200 | 0.220 | 1 200 | 600 | 600 | 300 | 0.3600 | 0.108 |
| 250 | 0.344 | 1 300 | 650 | 650 | 325 | 0.4225 | 0.137 |
| 300 | 0.496 | 1 400 | 700 | 800 | 400 | 0.5600 | 0.224 |
| 300+ | SEE NOTE 5 | | | | | | |



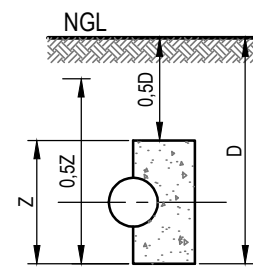
THRUST BLOCK FOR TEE-PIECE
SCALE 1:30

| NOMINAL PIPE DIAMETER ø (mm) | AREA REQUIRED m² | DIMENSIONS (mm) | | | | AREA PROVIDED m² | VOL (m³) |
|---------------------------------|---------------------|-----------------|-----|------|-----|---------------------|----------|
| | | D | Z | X | Y | | |
| 75 | 0.080 | 800 | 400 | 400 | 200 | 0.160 | 0.032 |
| 100 | 0.141 | 1 000 | 500 | 500 | 250 | 0.250 | 0.063 |
| 150 | 0.318 | 1 000 | 500 | 700 | 350 | 0.350 | 0.123 |
| 200 | 0.565 | 1 200 | 600 | 1000 | 500 | 0.600 | 0.300 |
| 250 | 0.883 | 1 300 | 650 | 1400 | 700 | 0.910 | 0.637 |
| 300 | 1.272 | 1 400 | 700 | 1900 | 950 | 1.330 | 1.264 |
| 300+ | SEE NOTE 5 | | | | | | |



THRUST BLOCK FOR 90° BEND
SCALE 1:30

| NOMINAL PIPE DIAMETER ø (mm) | AREA REQUIRED m² | DIMENSIONS (mm) | | | | AREA PROVIDED m² | VOL (m³) |
|---------------------------------|---------------------|-----------------|-----|-------|-------|---------------------|----------|
| | | D | Z | X | Y | | |
| 75 | 0.113 | 800 | 400 | 450 | 225 | 0.18 | 0.065 |
| 100 | 0.201 | 1 000 | 500 | 500 | 250 | 0.25 | 0.100 |
| 150 | 0.451 | 1 000 | 500 | 1 000 | 500 | 0.50 | 0.402 |
| 200 | 0.803 | 1 200 | 600 | 1 400 | 700 | 0.84 | 0.945 |
| 250 | 1.254 | 1 300 | 650 | 2 000 | 1000 | 1.30 | 2.089 |
| 300 | 1.806 | 1 400 | 700 | 2 600 | 1 300 | 1.82 | 3.803 |
| 300+ | SEE NOTE 5 | | | | | | |



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GENERAL NOTES



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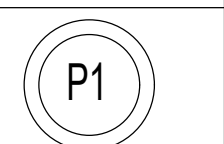
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STANDARD DETAILS
KZN SCHOOLS UPGRADE

OWNERS SIGNATURE

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PROPOSED WATER DETAILS:
FIRE HYDRANT DETAILS



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BENDING SCHEDULE

ONLY TO BE USED FOR :

- MAINTENANCE
- WITHIN ROADWAY (CI ONLY)
- FIRE HYDRANT CONNECTIONS
LARGER THAN 200mmØ
- OR IF SPECIFIED BY ENGINEER

PLAN

TYPE A

CAST IRON/PVC VALVE BOX

SCALE 1:10



TYPE B

TYPICAL VALVE CHAMBER FOR PIPES 500Ø>D<3000Ø

SCALE 1:20

GENERAL NOTES

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PROJECT TITLE

STANDARD DETAILS
KZN SCHOOLS UPGRADE

OWNER'S SIGNATURE

DRAWING TITLE

PROJECT PRIORITY RATING

RSV WATER VALVE
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TYPICAL DETAILS

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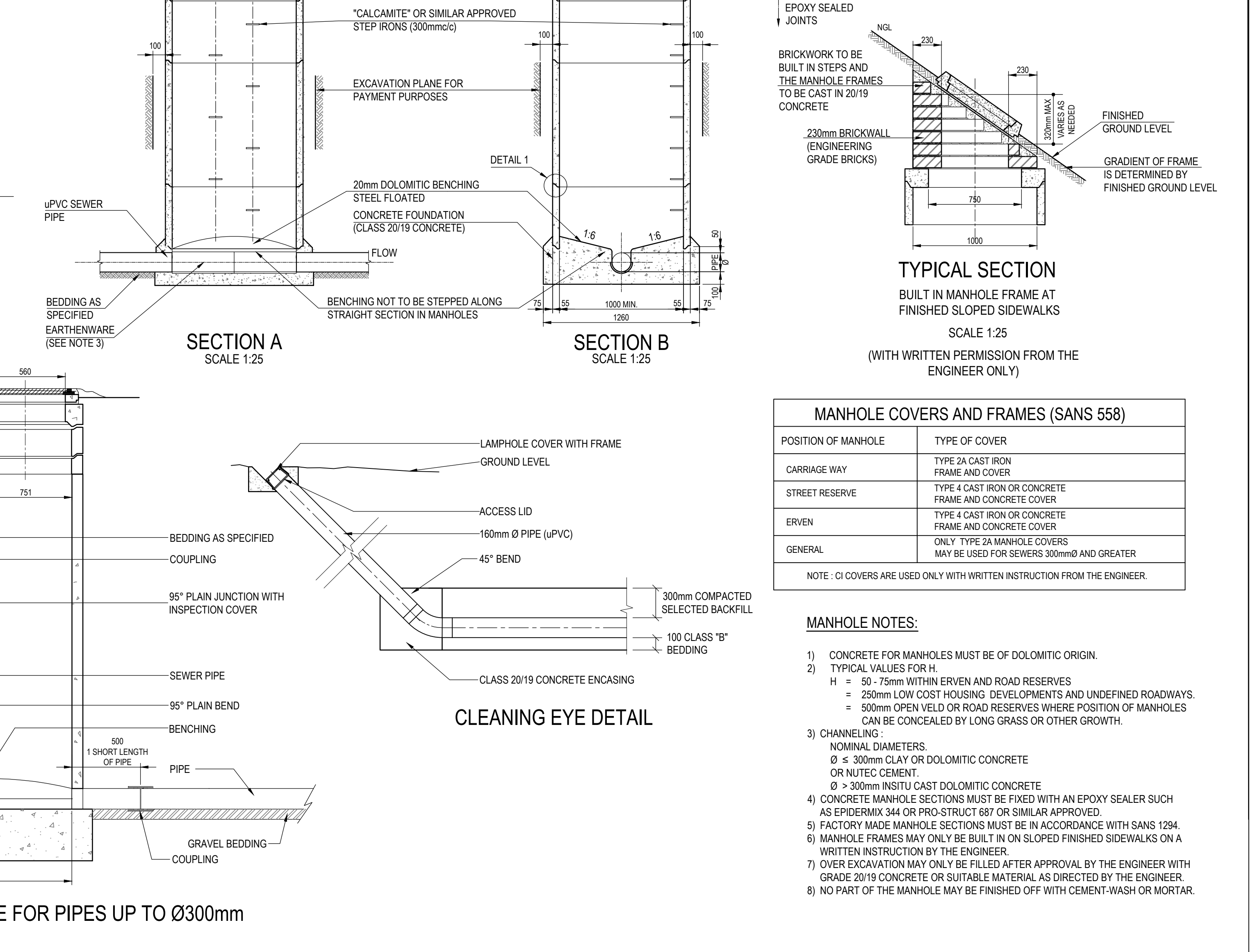
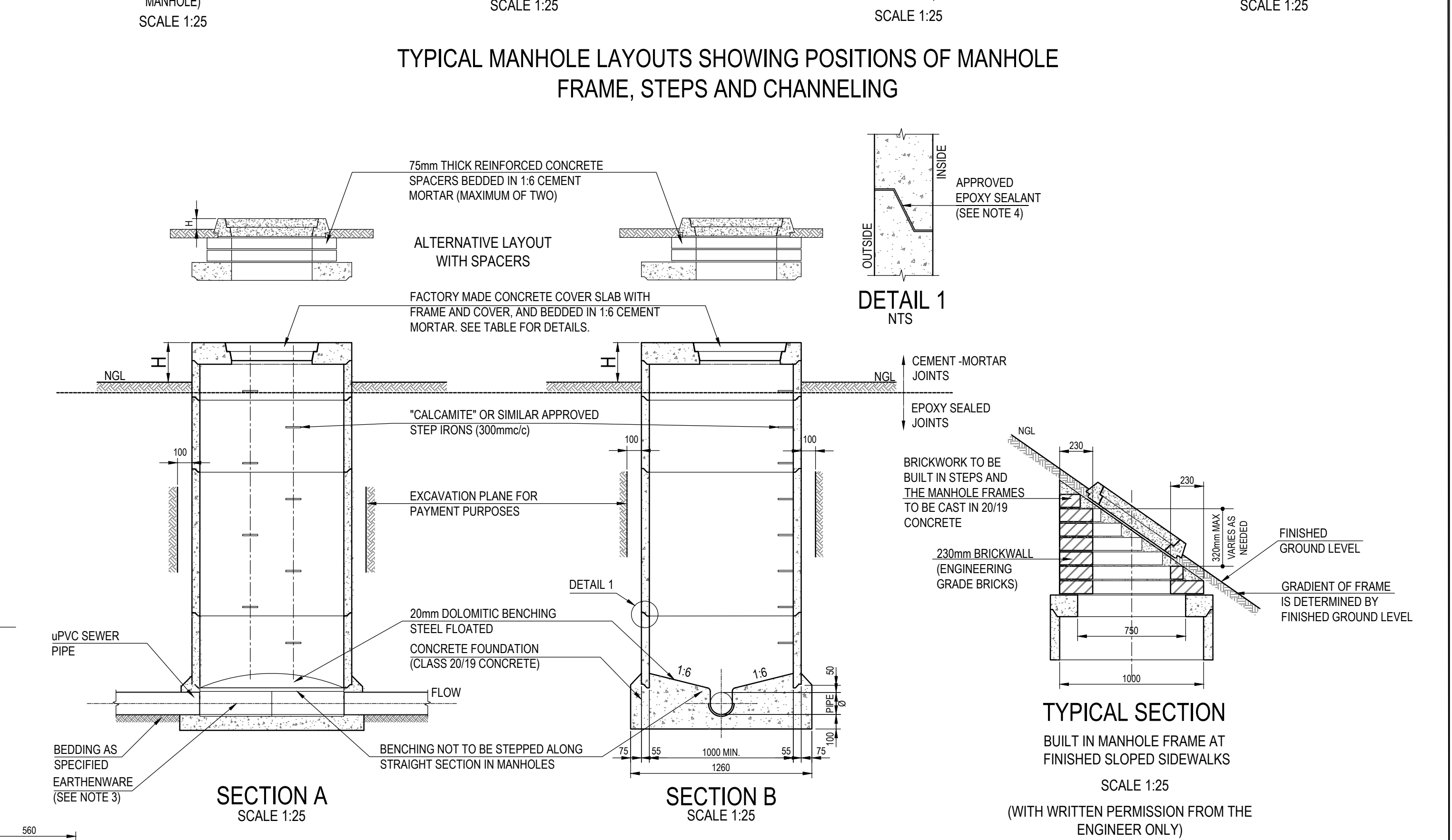
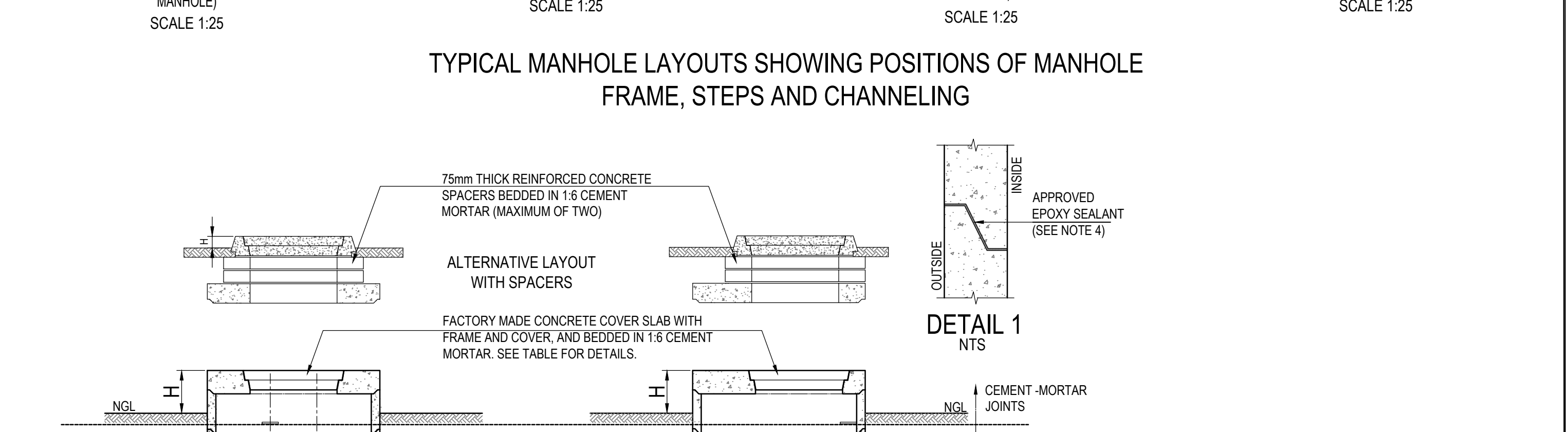
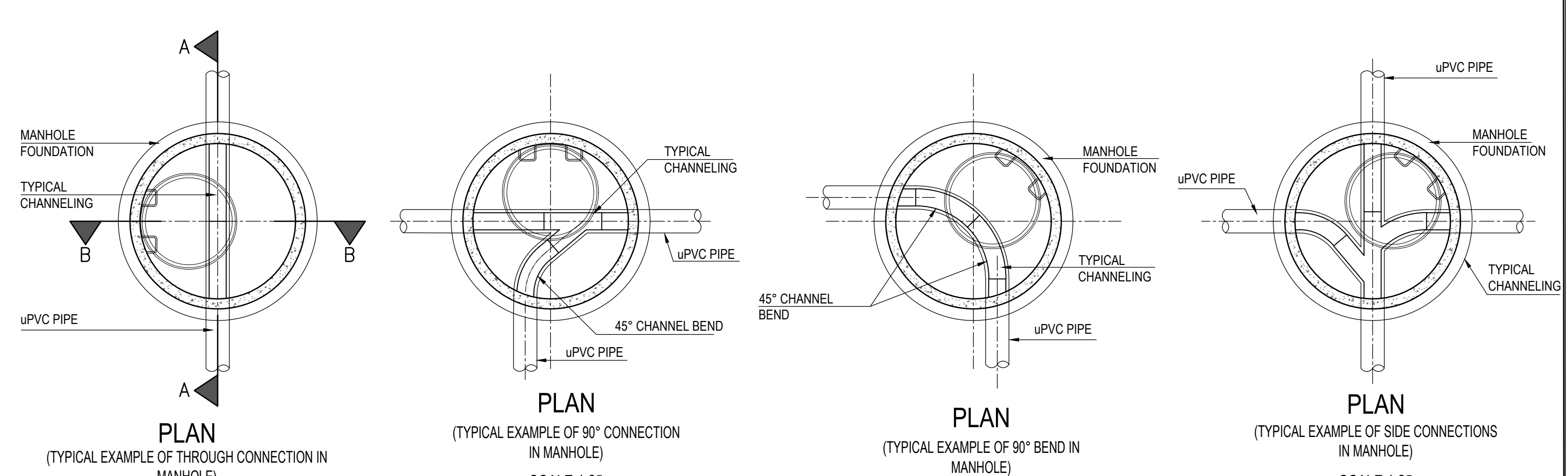
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GENERAL NOTES

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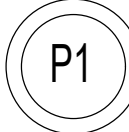
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PROJECT TITLE

STANDARD DETAILS

KZN SCHOOLS UPGRADE

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GENERAL NOTES

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