PARTICULAR SPECIFICATION

TARPAVING WORKS

Prepared by:
Premises Services
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1.0 GENERAL CONDITIONS

1.1 COMMENCEMENT OF WORK

The Contractor will be held responsible for arranging the date of the commencement of the work with the person in charge of the premises or their representative at least fourteen days in advance and shall give ten days' notice in writing to the Surveying Team Leader of these arrangements.

1.2 SAFETY AND WELFARE OF WORKMAN

The Contractor's attention is particularly drawn to the clause relating to the "Safety and Welfare of Workmen" in the General Conditions and Preliminaries and must allow in his tender for the complying with the regulations as will be required on this contract.

1.3 IMPORTANT NOTES

- The Contractor shall make good any damage caused to the premises by the Contractor or persons servicing the Contractor during the contract at the Contractor's own expense.

- The Contractor and his employees must report to the premises office or reception whenever they are visiting the site to 'book-in', and ensure they 'book-out' when leaving the site on all occasions.

- The Contractor must ensure that all employees working for the Contractor and any persons servicing the Contractor behave in a responsible and respectful manner to all employees of the premises or any persons attending the premises, to include the Surface of suitable and respectable clothing.

- This project is being undertaken on an active County Council site and as such the normal operation of the site should not be interfered with. Co-operation and liaison with the site manager about the schedule and limitations is imperative.

1.4 IDENTITY PASSES

All employees and persons servicing the Contractor are, at the Contractor's expense, to be provided with identification passes which meet the minimum acceptable standards of Shropshire Council. The passes should contain a current photograph of the recipient together with his/her name, also the name of the company by which they are employed and having an authorisation signature, provided by a senior manager/director of that company. The passes should also include DBS Enhanced reference numbers and be encapsulated for protection and be available for inspection by premises staff or representatives of the Surveying Team, at any time while the operative is on site.

1.5 GENERAL HEALTH AND SAFETY

The site is to be maintained as a clean area at all times free of any litter or debris. The Contractor is to ensure that all public areas and pathways are left clear and free of hazards at all times and leave the premises clean and tidy on completion of the work.

Skips will only be permitted on site after consultations with the Contract Administrator and/or the Premise Management.

The Contractor is to provide suitable first aid facilities on site.

The Contractor is to ensure that all personnel are provided with, and instructed to wear, proprietary head protection where and whenever there is a risk of injury.

The Contractor is to provide his own toilet facilities to be located within the compound area, suitably 'plumbed in' to adequate services with the manhole securely boarded over. If the premises management agree to provide in-house toilet facilities, the Contractor is to ensure that such facilities and access to and from them, are maintained with all due care and 'left as found' on completion of the contract.

1.6 LEGISLATION

The Contractor's attention is drawn to the following Health, Safety and Welfare Legislation:

The Health and Safety at Work Act 1974	
Construction and Design Management	Regulations 2015
Construction (Health Safety and Welfare)	Regulations 1996
Lifting Operations	Regulations 2006
Personal and Protective Equipment	Third Edition 2015
The Construction (Lifting Operations)	Regulations 1961
The Construction Head Protection	Regulations 1989
The Health and Safety (First Aid)	Regulations 1981
The Control of Substances Hazardous to Health	Regulations 2002
The Electricity at Work	Regulations 1989
The Fire Precautions Act: 1971	

This is not a complete list of the relevant legislation and is presented only as a guide to assist the Contractor.

1.7 SPECIFIC HEALTH AND SAFETY

The document "Construction and Building Works at Council Premises/Sites" gives specific guidance to the requirements of Shropshire Council.

1.8 RISK ASSESSMENT

The Contractor is to carry out a detailed and recorded "Risk Assessment" for the works and attach two copies to the completed tender documents when returning.

General Principle of Risk Assessment
The risk assessment will identify what measures the Contractor needs to take to comply with the requirements and prohibitions imposed on him by or under the "relevant statutory provisions". This phrase covers the general duties in the Health and Safety at Work Act etc. 1974 and more specific duties in the various Acts and Regulations (including the Management of Health and Safety at Work Regulations) 1992 associated with Health and Safety at Work.

2.0 SCOPE OF WORK

The work consists of: -

Tarpaving Works to Various Council Properties.

2.1 TENDERING

Contractors will be invited to tender through Delta E-Procurement.

2.2 COMMENCEMENT OF WORK

The Contractor will be held responsible for arranging the date of the commencement of the work with the person in charge of the premises at least fourteen days in advance and shall give ten days' notice in writing to Premises Services of these arrangements.

2.3 ADMINISTRATION OF WORK

Prior to awarding of contract the successful contractor is to submit proposals for the :-

a) Administration of work and certification of accounts.
b) Organisations of work this to be carried out by one person covering the entire County.
c) Supervision of work.
d) Assurances as to their capability to handle volume of work during school holidays.

2.4 SAFETY AND WELFARE OF WORKMEN

The Contractor's attention is particularly drawn to the clause relating to the "Safety and Welfare of Workmen" in the General Conditions and Preliminaries and must allow in his tender for complying with the regulations as will be required on this contract.

2.5 GUARANTEE

The Contractor shall guarantee his paving for three years and shall make good all defects in materials or workmanship arising during the period of three years from completion of the contract at his own expense.

3.0 GENERAL WORKS

A **DESCRIPTION OF SITES**

A : 01 The site is as indicated on relevant drawing or as indicated at time of tendering individual projects.

A : 02 Access to the site will be with prior agreement of Site Supervisor with limited and restrictive access. The Contractor shall allow for forming all temporary roads and means of access as required for bringing plant and materials on to the site and shall make good on completion.

A : 03 The Contractor's storage area - space is very restrictive and only a minimum amount of material can be stored on site, therefore quantities of materials will have to be stored off site and brought to the works as and when required.

A ; 04 Storage and work areas are to be fully reinstated upon completion of the contract; the Contractor will be expected to leave tarmac and hard paved areas in the same condition as that pertaining at the start of the contract.

A : 05 The Contractor is advised to visit the various sites before tendering particular jobs in order to ascertain all local conditions and restrictions likely to affect the execution of the works. No claims arising from failure to do so will be considered.

B HEALTH AND SAFETY

Compliance with the management of Health and Safety at Work Regulations and the Construction Design Management Regulations

B : 01 Contractors carrying out building work on Council property must carry out their own risk assessment and submit a Safety Plan prior to works commencing on site, as defined by Construction Design Management Regulations, a safety plan is to be submitted by the Electrical Engineer which you are to include in your Health and Safety Plan.

General principle of risk assessment

B : 02 The risk assessment will identify what measures the Contractor needs to take to comply with the requirements and prohibitions imposed on him by or under the "relevant statutory provisions". This phase covers the general duties in the Health and Safety at Work Act etc. 1974 and more specific duties in the various Acts and regulations (including the Management Regulations) associated with the Health and Safety at Work Act and Construction Design and Management Regulations.

Items to be considered

B : 03 The Contractor shall pay particular attention to the following items that have been identified as posing particular problems related to Health and Safety. The successful Contractor will be required to provide his own written assessment covering all these items.

1. Segregation of working area from staff and general public
2. Use of plant and equipment
3. Use of portable power tools
4. Action to be taken in case of fire
5. Welfare of employees
6. Removal of waste
7. Storage of equipment
8. Underground services
9. Overhead services

C COMMODITIES AND WORKMANSHIP GENERALLY

C : 01 Commodities to be new, unless otherwise specified. Handle, store, assembly and/or fix with care to ensure that they are in perfect condition when incorporated into the works.

C : 02 Handle, store and fix each commodity in accordance with the manufacturer's recommendations. Inform Supervising Officer if these conflict with any other specified requirements. Submit copies of manufacturers' recommendations to Supervising Officer when requested.

C : 04 For commodities specified to a British Standard, obtain certificates of compliance from manufacturers when requested by the Supervising Officer.

C : 05 Where a choice of manufacture is allowed for any particular commodity, obtain the whole quantity required to complete the work from one manufacturer or obtain approval of any change in source of supply. Produce written evidence of source of supply when requested by Supervising Officer.

C : 06 Where approval of commodities is specified, submit samples. Do not confirm orders for commodities until approval has been obtained. Retain approved samples on site for comparison with commodities used in the works. Remove when no longer required.

C : 07 Check all dimensions, both on drawings and site, particularly the correlation between components and the work place.

C : 08 Safeguard the site, the works, materials and plant from vandalism, damage and theft.

C : 09 Take all reasonable precautions to prevent unauthorised access to the site, the works and adjoining property.

C : 10 School playground surfacing may be carried out during term time with the agreement of Site Supervisor, Contractor must allow for taking all necessary precautions to ensure the safety staff, public and pupils.

D WORK AT COMPLETION

D : 01 Clean the works thoroughly, remove all rubbish and surplus materials.

D : 02 Remove all temporary markings, coverings and protective wrappings, unless otherwise instructed.

D : 03 Cleaning materials and methods to be as recommended by the manufacturer of the commodity being cleaned.

PREPARATION, MATERIALS AND WORKMANSHIP

E EXCAVATION AND EARTHWORKS GENERAL

E : 01 Excavate trenches for foundations, drainage and soakaways etc., all to the widths and depths to an approved solid bottom and get out. Where trench bottoms deteriorate, due to water or other cause, excavate further to sound ground immediately before concrete is laid. Bottoms of all trenches, etc. are to be inspected and approved by the Supervising Officer before concrete is laid.

E : 02 Level, well ram and consolidate surface of ground and bottoms of all excavations to receive concrete foundations, beds etc.

E : 03 Should any excavations be made below the level shown or required to obtain a solid bottom, the Contractor must fill up excavation to the proper level with concrete as described later for foundations.

E : 04 Return and fill in selected excavated material around drainage trenches and foundations outside walls up to original ground level, or as required, and carefully ram and consolidate. No filling in shall be executed until the concrete foundations, brick footings, etc., have been inspected by the Supervising Officer.

E : 05 Keep the whole of the excavation free from water arising from rain, drains, flood, springs, or any other cause, by pumping, baling, draining or otherwise.

E : 06 Excavate for foul drain through existing paved area to required depth. Leave trench sides and bottom even and solid and get out. Remove surplus material from site.

E : 07 The material for hardcore shall be chemically inert and possess a physical strength adequate for its purpose. Hardcore for filling over 300mm thick to pass a 150mm ring, but with not more than 50% fines; for filling less than 300mm thick to pass a 100mm ring graded down to and to be retained on a 25mm ring. Suitable materials are well burnt brick, broken paving slabs, stone or quarry waste, course well burnt clinker, broken concrete, coarse gravel or slag. Suitable materials for fines are sand, fine gravel, well burnt ashes, pulverised fuel ash or similar silts.

E : 08 Make up to required levels as shown on the drawings under concrete slabs and behind walls with hardcore laid in layers not exceeding 150mm thick, each layer well consolidated before the next layer is laid.

E : 09 Blind over the Hardcore with approved fines to a consolidated thickness of 25mm.

E : 10 Lay continuous Visqueen polythene waterproof membrane, 1200 Super (300 micron) with joints lapped 150mm, welted and taped with Visqueen self-adhesive tape.

F CONCRETE
MATERIALS

F : 01 The cement is to be Ordinary Portland Cement of British manufacturer, to B.S. 12, Part 2, metric units delivered in the original sealed bags of the manufacturer and shall be stored in such a manner as to avoid deterioration. Cement to be

used sequentially. Rapid hardening cement may not be used without prior approval.

Sulphate resisting cement shall comply with B.S. 4027.

Greek cements shall not be used.

F : 02 Aggregates shall comply with B.S. 882 and to be as follows:-

Sand/fine aggregates - to be washed and graded within the grading zones 1, 2 and 3 of Table 2, B.S. 883. The aggregate shall be damp but on no account shall it be used either saturated with water or perfectly dry.

Coarse aggregate - to comply with Table 1, B.S. 883, and to be of broken stone or gravel consisting of particles practically spherical or cubical in shape, clean and free from dust.

F : 03 Water throughout shall be perfectly clean and fresh obtained from the local piped supply.

MIXING AND PLACING, ETC.

F : 04 The grade of concrete referred to hereafter shall have the following quantities of aggregate per 100 Kg of cement.

	Grade of Concrete		Nominal maximum size of aggregate (mm)			
	Workability Range		Medium 50-100	High 80-170	Medium 25-75	High 65-135
			kg	kg	kg	kg
Blindings	C7.5		1080	920	900	780
Foundations	C10		900	800	770	690
Founds/Slabs	C15	Total	790	690	680	580
Reinforced	C20	Aggregate	660	600	600	530
Work/Slabs	C25		560	510	510	460
'Special' Work	C30		510	460	460	400

F : 05 Materials for concrete shall be measured in approved gauge boxes on a boarded platform. The proportions referred to above are for dry aggregates and due allowance shall be made for the moisture content, to the satisfaction of the Supervising Officer.

The amount of mixing water shall be sufficient to give a good workable mix, but in no case shall the slump, as measured in accordance with B.S. 1881: Part 2, exceed 50 mm.

The mixing, unless otherwise approved, shall be carried out in an approved mechanical batch mixer. Mixing shall continue until there is a uniform distribution of materials and the mass is uniform in colour and consistency.

F : 06 Concrete shall be moved as quickly as possible from the mixer to its final position in the structure. No concrete shall be placed more than 30 minutes after mixing.

After depositing, the concrete shall be well rammed or otherwise consolidated so that the finished concrete shall be a solid mass, free from air pockets and voids. If vibrating consolidation is used, the type of vibrator must be approved by the Supervising Officer prior to its use.

CONCRETING IN COLD WEATHER

F : 07 With normal protective measures only, no concreting will be allowed below 1 degree Celsius on a rising thermometer, or 3 degrees Celsius on a falling thermometer.

Concrete below 1 degree Celsius on a rising thermometer, or 3 degrees Celsius on a falling thermometer, will be allowed only if the most stringent precautions are taken, including pre-heating of water and aggregates, defrosting of formwork and reinforcement and screening in conjunction with space heating.

F : 08 Ready-mixed concrete may be used, subject to the Supervising Officer's PRIOR approval.

The concrete works shall comply with this specification except that the preliminary strength tests may be waived at the Supervising Officer's discretion.

The supply and delivery of ready-mixed concrete shall comply with the recommendations of B.S. 1926. For plant mixed concrete, the delivery note for each batch shall state the time at which the concrete was mixed.

TESTING OF CONCRETE

F : 09 The strength of the concrete shall be determined by compression tests in accordance with B.S. 1881, on standard cubes which shall be cast in specially prepared metal mounds.

F : 10 Samples of concrete may be taken from each element of the works whenever concreting is taking place, the actual number being agreed with the Supervising Officer.

F : 11 All cubes shall be marked with a serial number and the Contractor shall maintain a register of the cubes and shall arrange with the testing laboratory for the compression tests to be made at the ages required. One copy of the test report shall be sent direct by the laboratory to the Supervising Officer within seven days of testing.

F : 12 ACAS approved testing laboratories to be used.

F :13 Notwithstanding the requirement for cube testing the Contractor shall keep a standard slump cone available on site. Slump tests in accordance with B.S. 1881 are to be carried out daily and whenever a change is made in the materials or water/cement ratio. For concrete in slabs the slump shall not exceed 50 mm.

F : 14 The removal and replacement of defective work is to be carried out as the Supervising Officer directs. Any such removal and replacement of defective work is to be carried out at the Contractor's own expense.

G BRICK AND BLOCKWORK

GENERALLY

G : 01 All bricks must be the best of their respective kinds, hard, square, sound, well burnt and even in size and texture. Samples of each type of brick taken at random shall be deposited with and approved by the Supervising Officer BEFORE being used in the works, and all subsequent bricks shall be generally up to the standard of the approved samples.

G : 02 Common bricks shall be special quality common bricks as Stourbridge Class 6 common wire-cut bricks obtained from Redland Bricks, Tansey Green Road, Kingswinford, West Midlands, DY6 7LS, or similar if equal and approved by the Supervising Officer.

G : 03 Precast concrete blocks shall be obtained from an approved manufacturer and shall be in accordance with B.S. 6073, Parts 1 and 2, and solid, and have an average compressive strength of 7 N/mm². All blocks shall be in a dry and properly cured state when delivered to site.

MORTARS, ETC.

G : 04 The cement shall be as 4.011.

G : 05 The lime for cement/lime mortar shall comply with B.S. 890, Part 2, semi-hydraulic, type 1, 2 or 2 and shall be used directly from the bag.

Masonry cement shall be one of the following:-

"Crown" - The Rugby Portland Cement Co. Ltd.
"Masonry Walcrete" - The Cement Marketing Co. Ltd.

G : 06 Mortar plasticisers shall comply with B.S. 4887 and shall only be used with the prior approval of the Supervising Officer and selected from the following approved list:-

"Barrolin C" - Expamdite Ltd.
"Evode" - Evode Ltd.
"Febmix-Admix" - F.E.B. (Great Britain) Ltd.
"Plaz" - Sealocrete Products Ltd.

G : 07 The sand for mortar generally to be clean, sharp, coarse, washed sand, free from all impurities and conforming in all respects with B.S. 1200.

G : 08 The mortar for use below damp-proof course shall be composed of one part by volume of masonry cement to three parts of sand.

N.B. Use sulphate resisting cement in manholes.

G : 09 The mortar for use above damp-proof course shall be gauged mortar composed either of:-

(i) One part by volume of Portland cement, one part of lime to six parts

sand, OR

(ii) One part by volume of Portland cement to five parts of sand with the addition of a plasticiser listed at 5.024, OR

(iii) One part by volume of masonry cement as listed at 5.023 to five parts sand.

G : 10 The mortar for use for wall rendering shall be either gauged mortar composed of one part by volume of Portland cement, one part of lime to six parts of sand, OR mortar composed of one part by volume of masonry cement to three parts of sand.

BONDING

G : 11 Brickwork generally shall be built up in stretcher bond.

LAYING

G : 12 All brickwork and blockwork shall be set out and built to the respective dimensions, thicknesses and heights shown upon the drawings.

In dry weather the suction rate of all clay bricks shall be adjusted by wetting before being used and the tops of walls left off shall be wetted before work is commenced.

Sand-lime and concrete bricks shall not be wetted.

G : 13 All bricks and blocks shall be laid frog uppermost and be well buttered with mortar before being used and the tops of walls left off shall be wetted before work proceeds.

Brickwork or blockwork shall be carried up in a uniform manner, no one portion being raised more than 1000mm above another at any one time. All perpends, quoins, etc. shall be kept strictly true and square and the whole properly bonded together and levelled round at each floor.

G : 14 No brickwork or blockwork shall be carried out in frosty weather, except with the written permission of the Supervising Officer when such precautions as may be directed shall be adhered to.

G : 15 Where drainage pipes penetrate brickwork below ground level 100 x 100 R.C. lintels are to be "built-in" over to each skin, and void filling with Rockwool insulation.

SUNDRIES

G : 16 Wall ties to be stainless steel to B.S. 1243: 1978.

H KERB/EDGING

H : 01 **Precast Concrete:**
To BS 7263: Part 1.
Method of manufacture: Wet press process.
Manufacturer and reference: Marshalls Mono Ltd, Southowram, Halifax, West Yorkshire HX3 9SY
Tel No 01422 366666 Fax 01422 330185
Type/size: 150 x 50 flat top edging REF EF, 225 x125 half battered kerb REF HB2, 225 x 178 half battered drop kerb handed right/left REF 17, 178 x 153 centre stone drop REF 20.
Finish/colour: natural
Joints: dry butt

H : 02 **Envirokerb:**
Method of manufacture: Recycled plastic.
Manufacturer and reference: Pipeline & Drainage Systems PLC, Sales and Distrubtion Centre, 12a Flanshaw Way, Flanshaw, Wakefield, WF2 9LP
Tel No. 01870 7541200 Fax 01870 7541201
Type/size: 250 x 125 half battered kerb, 250/ 150 x 125 half battered drop kerb, 150 x 125 centre stone drop, radius kerb.
Finish/colour: natural
Joints: dry butt

H : 03 **Laying Generally:**
Where necessary cut units neatly and accurately with a masonry saw and without spalling to give neat junctions.
Bed units in mortar, true to line and level along top and front faces, on accurately cast foundations and secure with a continuous haunching of concrete. Allow bedding to set before placing haunching.
Keep exposed faces of units clean and free from concrete and mortar droppings.

H : 04 **Concrete for Foundations & Haunching:**
To BS 5328, Designated mix not less than C15, very low workability.

H : 05 **Mortar Bedding:**
As previously described.
Mix: 1:3 Portland cement, class 42.5: BS 882 sand, grading M or F.
Bed thickness: 10 mm minimum to 40 mm maximum.

H : 06 **Haunching Dowels:**
Steel bar to BS 4482, 12 mm diameter x 150 mm long.
Insert dowels vertically into foundation while concrete is still plastic, at 450 mm centres, 50 mm from back face of kerb and with 75 mm projecting.
Haunching to be rectangular cross section, cast against formwork, so as to fully enclose and protect dowels.

H : 07 **Accuracy:**
Maximum deviations:~Level: +/-6 mm; Horizontal and vertical alignment: 3 mm in 3 m.

H : 08 **Narrow Mortar Joints:**
Butter ends of units with bedding mortar as laying proceeds to completely fill joints. Tightly butt to a thickness of 3 mm and clean off surplus mortar immediately.

H : 09 **Tooled Mortar Joints:**
Butter ends of units with bedding mortar as laying proceeds to completely fill joints to a thickness of 6 mm. Tool to a neat flush profile.

J DRAINAGE BELOW GROUND

GENERALLY

J : 01 **Existing Drains:**
Before starting work, check invert levels and positions of existing drains, sewers, inspection chambers and manholes against information shown on drawings and report any discrepancies to Supervising Officer.
Adequately protect existing drains and maintain normal operation during construction.

TYPE(S) OF PIPELINE

J : 02 **Clay Pipelines:**
Pipes, bends and junctions, terminal/access fittings:
Vitrified clay to BS EN 295-1, with flexible joints, Kitemark certified.
Manufacturer: Hepworth Building Products. Hazlehead, Stocksbridge, Sheffield. S30 5HG
Tel: 01226 763561.
Reference: 'Supersleve' or equal and approved upon application. Strength: [40 Kn/m]

J : 03 **Plastics Pipelines:**
Pipes, bends and junctions: PVC-U to BS 4660 or BS 5481, with flexible joints, Kitemark certified.

EXCAVATING/BACKFILLING

J : 04 **Excavated Material:**
Unless otherwise specified, set aside, turf, topsoil, hardcore, etc. for use in reinstatement.

J : 05 **Lower Part of Trench:**
From bottom up to 300 mm above crown of pipe the trench must have vertical sides and be of a width as small as practicable but not less than external diameter of pipe plus 300 mm or larger dimension if specified.

J : 06 **Assumed Type of Subsoil:**
Where the type of subsoil at the level of the crown of the pipe differs from that stated for the type of pipeline, obtain instructions before proceeding.

J : 07 **Formation for Beds Generally:**
Excavate to formation immediately before laying beds or pipes.
Remove mud, rock projections, boulders and hard spots and replace with consolidated bedding material.
Harden local soft spots by tamping in bedding material.
Inform Supervising Officer in advance to give him reasonable opportunity to inspect excavated formation for each section of the work.

J : 08 **Backfilling to Pipelines Generally:**
Unless specified otherwise, backfill from top of specified surround or protective

cushion with material excavated from the trench, compacted in layers not exceeding 300 mm thick. Do not use heavy compactors before there is 600 mm of material over pipes.

J : 09 **Backfilling Under Roads & Pavings:**
Backfill from top of specified surround or protective cushion up to formation level with Granular Subbase Material Type 1 to DOT Specification for Highway Works, Clause 803, laid and compacted in 150 mm layers.

BEDDING/JOINTING

J : 10 **Installation Generally:**
Obtain pipes and fittings for each pipeline from the same manufacturer unless otherwise specified. Joint differing pipes and fittings with adaptors recommended by pipe manufacturer.
Lay pipes to true line and regular gradient on an even bed for the full length of the barrel with sockets (if any) facing up the gradient.
Joint using recommended lubricants, leaving recommended gaps at ends of spigots to allow for movement.
Adequately protect pipelines from damage and ingress of debris. Seal all exposed ends during construction.
Arrange the work so as to minimise time between laying and testing. Backfill after successful testing.

J : 11 **Class S Full Depth Granular Support:**
Granular material: To BS 882:

Pipe size (DN)	Nominal single size (mm)
100 & 150	10
225 & 300	10 or 20

Lay and compact to a thickness not less than 100 mm over full width of trench. Scoop out locally at couplings/sockets and lay pipes digging slightly into bed and resting uniformly on their barrels. Adjust to line and gradient.
After initial testing, lay and compact by hand more granular material to 100mm above crown of pipe.
Backfill with a protective cushion of selected fill, free from vegetable matter, rubbish, frozen soil and material retained on a 40 mm sieve. Compact by hand in 100 mm layers to 300 mm above crown of pipe. (100 mm of granular material may be used in lieu).

J : 12 **Concrete Surround for Shallow Pipes under Buildings:**
Where crown of pipe is less than 300 mm below underside of slab, encase pipe in concrete of same mix as slab and cast integrally with the slab. Extend length of concrete surround to within 150 mm of next nearest flexible joint.
Excavate trench after hardcore has been laid and compacted.
Lay concrete blinding, 25 mm thick over full width of trench and allow to set.
Lay pipes on blinding on folding wedges of compressible board not less than 100 mm above blinding. Anchor the pipeline or fill with water, if necessary, to prevent flotation.

J : 13 **Concrete Surround for Pipes General:**
Concrete mix as C10.
Lay concrete blinding, 25 mm thick over full width of trench and allow to set.
Lay pipes on blinding on folded wedges of compressible board not less than 100 mm above blinding.
Form vertical construction joints in surround at face of flexible pipe joints using 18 mm thick compressible board precut to profile of pipe. Fill any gap between

spigot and socket with resilient material to prevent entry of concrete.
After initial testing, place and compact more concrete for full width of trench to encase pipe to 150 mm above crown or to other height as specified or shown on drawings.

J : 14 **Trenches less than one metre from Foundations:**
Where bottom of trench is lower than bottom of foundation, use (J : 13) concrete surround. Top of concrete to be not lower than bottom of foundation.

J : 15 **Trenches more than one metre from Foundations:**
Where bottom of drainage trench is below a critical level, (defined below), use (J : 13) concrete surround is to be used, the top of the concrete being not lower than the critical level.
For the purpose of this clause the critical level is D mm lower than level of foundation bottom, D mm being equal to the horizontal distance of the near side of the trench from the foundation, minus 150 mm.

J : 16 **Pipelines passing through Structures:**
Where pipelines must be cast in or fixed to structures (including manholes, catchpits and inspection chambers) provide short length or rocker pipes near each external face, with flexible joint at each end:

Pipe size (DN)	Distance to first joint	Short length (mm) from structure (mm)
100 & 150	150	600
225	225	600

Where pipelines need not be cast in or fixed to structures (e.g. walls to footings) provide either:- short length or rocker pipes as specified above, or
- openings in the structures to give 50 mm minimum clearance around the pipeline and closely fit a rigid sheet to each side of opening to prevent ingress of fill or vermin.

J : 17 **Bends at base of Soil Stacks:**
Unless specified otherwise, use a 90 degrees nominal rest bend with a minimum radius of 200 mm to centreline of the pipe.
Invert of horizontal drain at base of stack to be not less than 450 mm below centreline of lowest branch pipe.
Stabilize bend(s) by bedding in concrete without impairing the flexibility of couplings.

J : 18 **Rigid Backdrop Pipes:**
Outside the manhole wall: Encase with not less than 150 mm of concrete as specified under 'Generally'. All excavation beneath the backdrop pipe and its surround must be replaced with concrete.

J : 19 **Flexible Couplings:**
To BS EN 295-4, WIS 4-41-01, or Agrement certified.
Manufacturer and reference(s): [Contractor's choice to match pipe selected at Clause J 02.] Ensure that the ends of pipes to be joined are cleanly cut and square. Ensure that outer surfaces of pipes to be joined are clean and smooth. Where necessary, e.g. on concrete or iron pipes, smooth out mould lines and/or apply a cement grout over the sealing area.

GULLIES/TERMINATION

J : 20 **Rainwater Pipe - External:**
Set into 'rear' vertical inlet of Hepworth SH31 hopper, set square to building, with ISI lockable hinged grating set in 'front' inlet set over SBR1 rest bend set on and

surrounded in concrete as Clause J : 12.

J : 21 **Rainwater Pipe to Shoe – Horizontal Inlet:**
Pipe set into Hepworth SA6,7 or 8 adaptor over Hepworth SBR1 rest bend connected to cut straight pipe connected to Hepworth SPA1 access pipe with appropriate lockable sealing plate and frame. Use Hepworth SPR raising pieces as necessary to suit paving/ground levels.

J : 22 **Paving Gulley – Pedestrian Areas:**
Set, where appropriate, into centre of paving slabs, square grating in Hepworth RRS2/2 (or 3 or 4) square raising piece finished with in-situ concrete dished gulley top, set over Hepworth RGN5 square gulley connected to drain pipe.
Bed and surround in concrete as J : 13.

J : 23 **Paving Gulley – Light Vehicle Areas:**
Hepworth type IHG3/GB-325 road gulley grating set over two courses of Class B engineering bricks set over type MGP1/1 polypropylene road gulley set on and surrounded in concrete as Clause J : 13.

J : 24 **Rodding Points:**
[Hepworth SRP1/1 rodding point set over cut straight pipe connected to SB2/1 45 degree bend connected to drain run. Set rodding point in concrete or paved area.]

J : 25 **Gullies:**
Road gullies, 300 mm. dia. x 600 mm. deep concrete road gullies to B.S. 556 outlet dia. 100 mm. complete with cast iron grating straight bar, hinged, dished, medium duty pattern 300 x 300 mm. over gate and 100 mm. deep, surrounded in C20 mix concrete.

J : 26 Mud gully 285 x 285 x 450 mm. deep to B.S. 556 with 100 mm. diameter outlets complete with cast iron hinged grating 300 mm. x 300 mm. and surround in C20 mix concrete.

J : 27 **Drainage Channel:**
Manufacture and reference – ACO Technologies plc, ACO Business Park, Hitchen Road, Shefford, Bedfordshire, SG17 5TE Tel No. 01462 816666 Fax 01462 815895
ACO Multidrain MD system 150mm wide incorporating 0.6% slope, plastic slotted grating and bedded on concrete C20 100mm thick full width and haunched both sides. Multidrain MD system 150mm wide sump unit, bedded on concrete C20 100mm thick full width and haunched both sides and connected to 100mm as previously described.

J : 28 Excavate for and provide and lay 305 x 90 mm. dished concrete channels set on C20 mix concrete base 450 x 100 mm. haunched both sides.

J : 29 **Conventional Channel(s), Branches & Benching:**
Bed main channel solid in 1:3 cement:sand mortar. Connect branches to channel, preferably at half channel level, so that discharge flows smoothly in direction of main flow. Where the connecting angle is more than 45 degrees to direction of flow use three-quarter section channel bends.
Form benching in concrete, as Section E10.101, to rise vertically from top of main channel to a level not lower than soffit of outlet pipe, then slope upwards at 10% to walls. Within 3 hours float with coat of 1:3 cement:sand mortar and finish smooth with steel trowel.

J : 30 **Manufacture:**
Obtain each complete assembly of fittings, traps, etc., including appropriate couplings, from the same manufacturer, and check compatibility of components with each other and with the pipe system.

J : 31 **Installation of Fittings:**
Set fittings square with and tightly jointed to adjacent construction as appropriate. If open to doubt obtain instructions.
Bed and surround fittings, traps, etc. in concrete, 150 mm thick, mix as specified under 'Generally'.
Permissible deviation in level of gully gratings to be +0 to -10mm,
Fit purpose made temporary caps over exposed openings in fittings and protect from site traffic.

MANHOLES/CHAMBERS/SOAKAWAYS/TANKS

J : 32 **Brick Manholes/Inspection Chambers:**
Construct a manhole 1.20 x 0.75m., internal dimension, constructed one brick thick in English bond. Foundation shall be 150mm thick concrete C20 and extend out 150mm beyond external site of brickwork, 100mm dia standard. Clayware channels shall be provided to B.S. 65/540. Concrete C20 shall be placed around channels to form benching with falls not less than 30 to channels. The Contractor shall include for halting the flow through the manhole until any work has cured. The manhole shall have a 150mm thick reinforced concrete cover slab C20 extending the full width of brickwork, bedded in mortar. The cover slab shall be provided with a single seal solid top medium heavy duty cover and frame 600mm x 450mm to B.S. 497/76 Grade B. Backfilling of excavation with selected hardcore.

J : 33 **Plastics Inspection Chambers:**
Inspection chambers: To BS 7158.
Bedding: on 150mm thick concrete C20 and extend out 150mm beyond external.
Backfilling: 150mm granular surround Concrete collar C20 150mm thick The cover slab shall be provided with a single seal solid top medium heavy duty cover and frame 600mm x 450mm to B.S. 497/76 Grade B.
Remove temporary caps as necessary and make pipework connections. Fit caps to unused branches. Backfilling of excavation with selected hardcore.

J : 34 **Silt Pit:**
Silt pit consisting of precast concrete sections set on 150mm C20 concrete base internal size 600 x 750 x 1200mm. The silt pit shall have a 150mm thick reinforced C20 concrete cover slab extending the full width of concrete sections, bedded in mortar. The cover slab to be provided with a single seal solid top medium heavy duty cover and from 600mm x 450mm to B.S. 4977/76 Grade B. Backfilling of excavation with selected hardcore.

J : 35 **Granular Fill Soakaway(s):**
Form soak pit constructed of precast concrete chamber ring sections with ogee joints complying with B.S. 5911. Construct strip concrete (C20) foundation for the concrete rings 200m wide by 100m deep. The 900mm deep soakaway section shall be placed centrally and rapped with Terram 70 and surrounded with average 500mm selected rubble or clean hardcore backfill on the strip foundation average 300mm selected rubble or clean hardcore backfill. Terram 70 shall be placed inside on the bottom of the soakaway with 150mm depth of clean 10mm. gravel placed on top. Build up the chamber with concrete ring sections and fit

heavy duty reinforced concrete cover slab with 600mm dia. off set access hole positioned over step irons, including 3 No. courses of Class 'B' engineering bricks laid on top of cover to achieve correct cover level. The cover shall be provided with a single seal bolt down solid top medium heavy duty cover and frame 600 mm x 450 mm Grade B.

J : 36 **Connections to Sewers:**
Connect new pipework to existing adopted sewer(s) to the requirements of the Sewerage Authority or its agent.

CLEANING/TESTING/INSPECTION

J : 37 **Cleaning:**
Flush out the whole of the installation with water to remove all silt and debris before final testing, before CCTV inspection if specified and immediately before handover.
Safely dispose of washings and any detritus without discharging them into sewers or watercourses.

J : 38 **Testing/Inspection Generally:**
Give Supervising Officer advance notice to allow the opportunity to attend all tests and inspections.
Give the Statutory Authority appropriate notice to enable pipelines to be inspected and tested as required.
Provide water, assistance and apparatus as required.
All lengths of drain, manholes and inspection chambers must pass the tests specified. If permitted test loss or infiltration is exceeded, remedy defect(s) before retesting after an appropriate period.

J : 39 **Water/Air Testing of Gravity Drains up to DN 300:**
To ensure that pipelines are sound and properly installed, air test short lengths to BS 8301, paragraph 25.6.3 immediately after completion of bedding/surround.
For final checking and statutory authority approval, water test to BS 8301, paragraph 25.6.2 all lengths of pipeline from terminals and connections to manholes/chambers and between manholes/chambers.

J : 40 **CCTV Inspection:**
Immediately before completion and handover to the Client and when all other inspections and testing have been satisfactorily carried out, the General Contractor may be required to arrange for, carry out and record an internal inspection of the completed drainage installation with CCTV equipment by a specialist contractor, providing all necessary equipment for lifting covers etc; suitable covered accommodation for viewing monitor screen. Ensure that adequate intensity of illumination within pipe(s) is maintained.
Provide for continual position recording, still photographs and stopping movement of the camera at any point requested by Supervising Officer. Provide a written report and colour VHS video recording of the inspection to the Supervising Officer.
Obtain instructions from Supervising Officer on remedying any defects which may be revealed and arrange for a further CCTV inspection, the cost of which will be borne by the Contractor.

K <u>COATED MACADAM/ASPHALT ROADS/PAVINGS</u>

K : 01 **Coated Macadam Paving (to Vehicular Areas Generally):**
Materials and workmanship to BS 4987.

Surface course: Thickness [20] mm
Material: [6mm size medium grade macadam.]
Binder Course: Thickness [50] mm
Material: [20mm size medium grade macadam.]
Granular sub-base as specified, thickness [225] mm.

K : 02 **Proprietary Paving (to Hardplay Areas) Limestone:**
Surface course: Thickness [20]mm.
Material to Contractors option, either:
Manufacturer and reference: [Tarmac Ltd, Reference: 'Patamac' compacted with a roller not exceeding 4 tonnes.
Lafarge Aggregates Ltd, Reference ‘Leisurephalt’
Ennstone Johnstone Ltd, Reference ‘Playmac’
Bardon Aggregates, Reference ‘Leisuretex’
Binder Course: Thickness [50]mm.
Material: [20mm open graded macadam] to BS 4987:Part 1.
Lay and compact Binder Course/roadbase materials to BS 4987:Part 2.
Granular sub-base as specification, thickness [150]mm.

K : 03 **Proprietary Paving [to Hardplay areas] Hardstone:**
Surface course: Thickness [25]mm
Material to contractors option, either:
Manufacturer and reference – Tarmac Ltd, reference ‘Playmaster’
Lafarge Aggregates Ltd, Reference ‘Leisurephalt’
Ennstone Johnstone Ltd, Reference ‘Playmac’
Bardon Aggregates, Reference ‘Leisuretex’
Compacted with a roller not exceeding 4 tonnes
Binder Course: Thickness [50]mm
Material: [20mm open graded macadam] to BS 4987:Part 1
Lay and compact Binder Course/roadbase materials to BS 4987:Part 2
Granular sub-base as specification, thickness [150]mm

K : 04 **Proprietary Paving (to Tennis Courts):**
Surface course: Thickness [20]mm.
Material to Contractors option, either:
Manufacturer and reference: [Tarmac Ltd,Reference: 'Playmatt', compacted with a roller not exceeding 4 tonnes.
Lafarge Aggregates Ltd, Reference ‘Leisurephalt’
Ennstone Johnstone Ltd, Reference ‘Playmac’
Bardon Aggregates, Reference ‘Leisuretex’]
Binder Course: Thickness [50]mm.
Material: [20mm open graded macadam] to BS 4987:Part 1.
Lay and compact Binder Course/roadbase materials to BS 4987:Part 2.
Granular sub-base as specification, thickness [150]mm.

K : 05 **Coated Macadam Paving (to Footpaths):**
Materials and workmanship to BS 4987.
Surface course: Thickness [20]mm.
Material: [6mm size medium grade macadam.]
Binder Course: Thickness [50]mm.
Material: [20mm size medium grade macadam.]
Granular sub-base as specification, thickness [100]mm.

K : 06 **Coated Macadam Paving (to Car Parks):**
Materials and workmanship to BS 4987.
Surface course: Thickness [20]mm.

Material: [10mm size close graded 100-200 PEN.]
Binder Course: Thickness [75]mm.
Material: [28mm size dense macadam.]
Granular sub-base as specification, thickness [225]mm.

K : 07 **Coated Macadam Paving (to Fire Stations):**
Materials and workmanship to BS 4987.
Surface course: Thickness [30]mm.
Material: [10mm size Transco, medium temperature 50 % stone content as manufactured by Tarmac Quaries.]
Binder Course: Thickness [75]mm.
Material: [28mm size dense macadam.]
Granular sub-base as specification, thickness [225]mm.

K : 08 **Surface Treating to Existing Paving:**
Preparation: SURFACE TREATMENT TO EXISTING PAVING:
Preparation: Thoroughly clean off all dirt, debris etc. Cracks and depressions to be cut out and filled with basecouse as specified to general existing level. Thoroughly clean off the existing surface and apply bituminous tack coat at an approximate coverage of 10-12 sq.metres per 5 litres.
Before applying dressing ensure that the existing surface is clean and dry and all patching work is complete.

PREPARATORY WORK/REQUIREMENTS

K : 09 **Materials Generally:**
Not less than 2 weeks before starting work submit to the Supervising Officer the name(s) of all supplier(s) of bituminous material.
At the time of delivery submit to the Supervising Officer a test certificate for each manufacturing batch of bituminous material, certifying compliance with this specification and the relevant British Standard and giving complete information on the composition of each mix.

LAYING

K : 10 **Laying Generally:**
Remove all loose material, foreign matter and standing water from surfaces to receive paving materials.
Clean edges of and prevent damage to, adjacent junctions with existing coated macadam surfaces, manholes, kerbs and other abutments and paint with a thin uniform coating of bitumen.
Keep clean all channels, kerbs, inspection covers etc.
Keep new paving free from traffic until it has cooled to prevailing atmospheric temperature. Do not allow rollers to stand on paving at any time.
Do not use pavings as a building platform or for storing, mixing or preparing materials.
Lines and levels of finished surface to be smooth and even, with regular falls to prevent ponding.
Finished surface of paving to have an even overall texture. Leave in a clean state on completion.

K : 11 **Cold Weather:**
Do not use frozen materials or lay paving on frozen or ice covered surfaces. Do not lay coated macadam if the temperature of the laying surface is below 2 degC (or -1 degC on a rising thermometer).

Do not lay rolled asphalt if the temperature of the laying surface is below 5 degC or the air temperature is below 0 degC.

K : 12 **Levels:**
Levels of finished surface to be within +/-6 mm of required levels (+6 mm -0 mm adjacent to gullies and manholes) and minimum 150 mm below D.P.M.

K : 13 **Pavement Marking:**
Paint: To BS 6044, Type A.
Colour: as requested
Reflectorisation: Uniformly apply solid glass beads to Class B of BS 6088 on wet paint film at rate of 400-500 g/sq m.
Surfaces to receive markings must be clean and dry. Remove all loose material and apply paint uniformly with no streaks or ragged edges. Use thinners in accordance with paint manufacturer's instructions.

L SLAB PAVINGS

L : 01 **Concrete Slab Paving:**
Slabs: To BS 7263: Part 1.
Method of manufacturer: Wet press process.
Manufacturer and reference: Marshalls Mono Ltd, Southowram, Halifax, West Yorkshire HX3 9SY
Tel No 01422 366666 Fax 01422 330185]
Colour/finish: Natural
Nominal size(s): 900 x 600 x 50 mm or 600 x 600 x 50 mm
Bedding method: Solid
Nominal thickness 50 mm
Mortar: As pervasively described.
Mix: 1:3-4 lime: sand, or 1:4-5 cement: sand
Sand to BS 882, grading limit M or F.
Joints: Tight but jointed

L : 02 **Laying Pavings:**
Cut paving units neatly and accurately with a masonry saw to give neat junctions with edgings and adjoining finishes.
Lines and levels of finished surface to be smooth and even with regular falls to prevent ponding.
Bed paving units on solid bed firmly so that rocking does not occur or develop.
Lay paving units upwards from the bottom of slopes where creep may occur.
Finished paving to have an even overall appearance with even joint widths and free of mortar and sand stains.

L : 03 **Full Mortar Bedding:**
Mortar: As Section C
Mix: 1:3-4 lime:sand, or 1:4-5 cement:sand.
Sand: To BS 882, grading limit M or F.
Spread and level mortar to give the specified average nominal thickness after bedding of slabs.
Lay slabs on a full mortar bed and bed down to line and level with a maul.

L : 04 **Levels of Paving:**
Permissible deviation from specified levels to be ± 6 mm generally. Set paving 6-10 mm above gullies, 3-6 mm above surface drainage channels and 3 mm above kerbs to allow for settlement.

L : 05 **Protection:**
Keep paving clean and free from mortar droppings, oil and other materials likely

to cause staining.
Do not overload pavings with stacks of materials.
Handle pavings with care to avoid damage to corners and arises, and to previously laid paving.
Pavings bedded on mortar must be kept free from pedestrian traffic for 4 days and vehicular traffic for 10 days after laying.
Restrict access to paved areas as necessary to prevent damage from site traffic and plant.

M BRICK PAVING

M : 01 **Sand for Bedding:**
Naturally occurring clean sharp sand from the quaternary geological series or sea dredged, graded as for laying course sand to BS 7533:Part 3, Free from deleterious salts, contaminants and cement.
Obtain from only one source and ensure that all sand supplied has consistent grading.
Maintain at an even moisture content which will give maximum compaction. Sand squeezed in the hand should show no free water and bind together when pressure is released.

M : 02 **Brick Paving:**
Granular sub-base: As previously described, bedding: 50 mm sand as M : 01
Bricks:
Manufacturer and reference: Blockley's Paviours, Blockleys Brick Limited, Sommerfield Road, Trench Lock, Telford.
Tel 01952 251933
Size(s): 105 x 210 mm.
Bond: Herring-bone
Compacted: by vibrating plate
Pointing: Dry sand

M : 03 **Brick Perimeter Paving:**
Granular sub-base: As previously described, bedding: C15 concrete 200 mm thick
Bricks:
Manufacturer and reference: Blockley's Paviours, Blockleys Brick Limited, Sommerfield Road, Trench Lock, Telford.
Tel 01952 251933
Size(s): 105 x 210 mm.
Bond: Double course stretcher
Compacted: by vibrating plate
Pointing: Dry sand

M : 04 **Laying Pavings:**
Cut paving units neatly and accurately with a masonry saw to give neat junctions with edgings and adjoining finishes.
Lines and levels of finished surface to be smooth and even with regular falls to prevent ponding.
Bed paving units on solid bed firmly so that rocking does not occur or develop.
Lay paving units upwards from the bottom of slopes where creep may occur.
Finished paving to have an even overall appearance with even joint widths and free of mortar and sand stains.

M : 05 **Levels of Paving:**
Permissible deviation from specified levels to be ± 6 mm generally. Set paving 6-

10 mm above gullies, 3-6 mm above surface drainage channels and 3 mm above kerbs to allow for settlement.

M : 06 **Protection:**

Keep paving clean and free from mortar droppings, oil and other materials likely to cause staining.
Do not overload pavings with stacks of materials.
Handle pavings with care to avoid damage to corners and arises, and to previously laid paving.
Pavings bedded on mortar must be kept free from pedestrian traffic for 4 days and vehicular traffic for 10 days after laying.
Restrict access to paved areas as necessary to prevent damage from site traffic and plant.

N RESIN BASED HIGH SKID RESISTANT SURFACE TREATMENT

N : 01 **Surface Treatment:**

High skid resistant surface treatment, made with resin-based binders and aggregate of high polishing resistance, shall consist of a film of binder applied to a sound substrate and covered with aggregate to provide a textured matrix of high skid resistance.

N : 02 **Binder:**

The binder shall contain an epoxy or other approved resin component.

N : 03 **Aggregate:**

The aggregate shall be calcined bauxite or equivalent which has, when determined in accordance with BS 812: Part 114, minimum polished stone value described in Appendix 7/1. The grading of the aggregate shall be such that not more that 5% is retained on a 3.35 mm BS sieve and not more than 5% passes a 1.18 mm BS sieve. The aggregate shall be clean and free from foreign matter.

N : 04 **Surface Preparation:**

The surface shall be vigorously brushed to remove dust, laitance and other loose. Any oil visible on the surface shall be removed by washing and scrubbing with a detergent solution followed by flushing with clean water or by other equivalent method. The surface shall be allowed to dry before application of the binder. Unless otherwise directed by the Supervising Officer, existing surface markings, and ironwork shall be suitably masked. For newly laid Surface courses and Surface course that has been trafficked for less than 6 months the Contractor shall provide a written undertaking that the resin based high skid resistant surface treatment chosen is fit for the purpose intended.

N : 05 **Batch Mixing of Binder:**

The components shall be batched and mixed in accordance with the manufacture's instructions. The components shall be accurately proportioned by weight or by volume and shall be thoroughly mixed using a mechanical mixer.

N : 06 **Continuous Mixing of Binder:**

The binder shall be mixed by a metered machine that accurately and continuously batches together the components of the binder and intimately mixes them before discharge. A control mechanism shall maintain each component within 5% by mass of the normal proportion specified by the resin manufacture and a calibrated flow meter or equivalent device shall be provided for each component. The vessels containing the components shall each be provided with an approved method of measuring the volume of material used.

N : 07 **Application:**

The binder shall be applied by spray, brush or squeegee onto a dry surface at a rate which will vary according to the texture and porosity of the surface. On a smooth close textured surface the amount of binder shall be not less than 1.35 kg/m/2 or such rate specified by the resin manufacturer; on a more rugosus surface a greater rate of spread may be required. The temperature of binder components heated to facilitate mixing and application shall be measured using a temperature gauge accurate to +/- 2 o/c and shall not exceed the maximum temperature recommended by the resin manufacturer. Heating binders shall be allowed to cool before application of the aggregate.

Following application of the binder, aggregate shall be broadcast to cover the binder uniformly and to excess, in accordance with the manufacturer's instructions. Rolling of the aggregate is not permitted.

Hand application of resin binder formulated for continuous mixing and spray application will be permitted provided the proposed methods of batching, mixing and application of the binder are in accordance with the manufacturer's instructions and approved by the Supervising Officer.