City of Pittsburgh Specifications for Materials and Testing
Concrete Pavement and Base Course
Fine and Coarse Aggregates for Bituminous Mixtures
Painting of Bridges and Various Steel Structures
Standards for Construction

Pittsburgh, PA

HWY22MH003

(242 pages)

CITY OF PITTSBURGH

SPECIFICATIONS FOR MATERIALS AND CONSTRUCTION

1. CONCRETE PAVEMENT AND BASE COURSE

2. FINE AND COARSE AGGREGATES FOR BITUMINOUS MIXTURES

3. PAINTING OF BRIDGES AND VARIOUS STEEL STRUCTURES

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CITY OF PITTSBURGH
SPECIFICATIONS
FOR
CONCRETE PAVEMENT AND BASE COURSE

[REVISED MARCH - 1978]

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CITY OF PITTSBURGH
SPECIFICATIONS
FOR
CONCRETE PAVEMENT AND BASE COURSE

[REVISED MARCH - 1978]

1. DESCRIPTION

This item shall consist of plain or reinforced concrete pavement or base course constructed on a prepared subgrade, in accordance with these specifications, Standard Details for Street Pavements M-158-163, Revised December, 1970, and lines, grades, thicknesses, and typical cross-sections as indicated on the plans.

GENERAL REQUIREMENTS

2. MATERIALS

A. - GENERAL

The contractor shall furnish the Director, promptly after the award of the contract, a complete source of supply stating the origin, composition, and manufacture of all materials to be used in the construction of the project. All materials shall comply with the requirements of this specification, or with the special provisions or supplemental specifications made a part of the contract.

The source of supply for all materials shall be approved by the Director before delivery is started. Representative preliminary samples of the kind and quality of the various materials to be used in the construction project shall be submitted for examination or test when directed.

Representative samples of any materials requiring laboratory tests shall be submitted to the Bureau of Tests, 4501 Centre Avenue, Pittsburgh, Pennsylvania, and such material shall be used only after approval has been received from the laboratory or its representative and only so long as said materials comply with the requirements of the pertinent specification. If it is found that materials from previously approved sources of supply do not produce specified and desired results, the contractor shall furnish material from another source.

Materials which have not been accepted by the laboratory shall not be unloaded at the project site and incorporated with materials previously accepted as meeting specifications.

When the quality of the material arriving at the job site does not conform to specification requirements or is of lesser quality than the preliminary samples submitted by the contractor, the Director reserves the right to reject them at the site of the work.

Any material rejected by the Director shall be promptly removed from the job site at the expense of the contractor.

All materials shall be carefully handled to preserve their quality and fitness for the work. Any material showing evidence of improper handling or damage from improper storage so that its fitness for the work might be impaired, is subject to rejection by the Director. All packaged material which has been approved by the Bureau of Tests shall be delivered to the project site in unopened packages or cartons. Cartons which are opened and the material does not contain proper identification, shall be rejected.

The contractor shall furnish all necessary assistance to the inspector in obtaining representative samples as required. The contractor shall furnish or arrange with producers or manufacturers to furnish all necessary material, labor, tools, and equipment for such inspection.

The acceptance of material by the Director in no way lessens the responsibility of the contractor to supply quality material which is in all respects suitable for the use intended.

ASTM SPECIFICATIONS

Where reference is made to ASTM Specifications it shall mean the specifications of the American Society for Testing and Materials and shall refer to the latest revision of each designated specification adopted by the Society as a Standard or Tentative Standard.

Concrete and bituminous material shipments shall, of necessity, be limited as to the source of supply to those batch plants currently approved by the Bureau of Tests. Should a contractor choose as a source of supply a batch plant at which a materials inspector is not normally stationed, it shall be his responsibility to notify the Bureau of Tests the day preceding shipment of material.

Should it be necessary for an inspector to leave the confines of Allegheny County to inspect material other than that stated above, all expenses incurred in such inspections shall be paid by the contractor.

B. - CEMENT

All Portland Cement used shall conform to one of the following ASTM (American Society for Testing and Materials) Specifications, unless otherwise specified:

(1) Portland Cement. ASTM Designation C-150, Type I or Type III, with all the latest amendments and additions thereto by said Society, unless otherwise specified by the Director.

(2) Air-Entraining Portland Cement. ASTM Designation C-175, Type IA or Type IIIA, with all the latest amendments and additions thereto by said Society, unless otherwise specified by the Director.

(3) Portland Blast Furnace Slag Cement. ASTM Designation C-205, Type IS and Type ISA with all the latest amendments and additions thereto by said society, unless otherwise specified by the Director.

Portland Blast Furnace Slag Cement, ASTM Designation C-205, Type ISA may be used in lieu of ASTM C-175, Type IA, when specified in the contract plans or in the specifications.

(4) Inspection. Every facility shall be provided for sampling and inspect either at the mill or the batch plant. The City of Pittsburgh reserves the right to inspect the manufacture of the cement and further reserves the right to take check samples for the determination of quality.

C. - AGGREGATES

(1) Fine aggregates suitable for use in cement concrete mortar and grout shall consist of:

(a) Natural sand resulting from glacial or water action.

(b) Manufactured sand resulting from the mechanical break-down of conglomerate rock.

Fine aggregates shall be divided into two classes:

(a) Fine aggregates suitable for concrete.

(b) Fine aggregates suitable for mortar and grout.

Fine aggregates suitable for mortar and grout shall meet the following requirements:

SIEVE NUMBER	TOTAL PERCENT PASSING
4	100
8	95 to 100
100	25 Max.
200	10 Max.
Fineness Modulus	1.6 to 2.5

Aggregates for masonry mortar shall meet the physical requirements of ASTM C-144.

Fine Aggregates suitable for concrete shall meet the following requirements:

SIEVE NUMBER	TOTAL PERCENT PASSING
100	1-8
50	10-30
30	30-65
16	50-80
8	70-92
4	90-100
3/8	100
Fineness Modulus	2.50 to 3.15

Organic Material..... 3% Maximum
Strength Ratio.....90% Minimum
Soundness Test.....10% Maximum

Fine aggregates shall contain not more than 1.0% friable particles when tested according to method ASTM C-142.

Fine aggregates shall contain not more than 1.0% coal or lignite when tested according to method ASTM C-123.

The minimum strength ratio shall be determined by preparing a mortar consisting of 1 part of cement by volume and 3 parts of the fine aggregate by volume. When compared with a mortar of identical proportions made of the same cement and Standard Ottawa Sand, the strength ratio shall be not less than 90%. This test shall be made in accordance with ASTM method C-109.

The soundness test shall be conducted according to ASTM Designation C-88 and the average corrected loss through 5 cycles shall not be greater than 10% when sodium sulfate is used or 15% when magnesium sulfate is used.

(2) Coarse aggregates for cement concrete may be stone, slag, or crushed gravel and shall meet the following requirements:

Sieve Sizes	% Passing P.D.H. No. 2	P.D.H. No. 2B	P.D.H. No. 3A
No. 8	0- 5	0- 5	
4	0- 10	0- 10	
3/8	20- 55		
1/2		25- 60	
3/4	90-100		0- 5
1"	100	90-100	
1-1/2"		100	0- 15
2"			35- 70
2-1/2"			90-100
			100

Dried slag, when tested according to methods of ASTM C-29 shall weigh not less than 70 pounds per cubic foot. Blast furnace slag shall contain not more than 2% iron by weight.

Crushed gravel shall contain not less than 45% of crushed pieces by weight. This shall be defined as a gravel particle having at least one fracture resulting from artificial crushing. It shall consist of tough durable pieces of high resistance to abrasion, and shall be free of shale, clay or coatings of any character. The amount of coal and lignite shall not exceed 1% by weight when tested according to ASTM - Method C-123.

Coarse aggregate shall contain not more than 2% of friable and fragile pieces by weight.

Crushed gravel shall contain not more than 10% flat and elongated pieces, as determined on a sample representing materials retained on a 1" square sieve. Any fragments where the greatest thickness or depth is less than one-quarter of the greatest dimension, shall be considered flat and elongated.

The percent by weight of thin and elongated pieces shall be calculated on the basis of the entire sample representing the aggregate being tested, including any portion that may pass the 1" square sieve.

Aggregate soundness shall be determined by the sodium sulfate test. Maximum allowable weight loss shall be 12% when tested according to ASTM Designation C-38.

Coarse aggregate when tested for abrasion by use of the Los Angeles Rattler in accordance with ASTM Designation C-131, shall show a maximum allowable weight loss at 500 revolutions of the following percentages by weight:

Crushed Gravel	(500 Revolutions)	.....38%
Crushed Slag	" "	.....40%
Crushed Stone	" "	.....38%

D. - CEMENT CONCRETE

(1) General. All concrete, unless otherwise specified, shall be air-entrained. It shall have an air-content of 6±1% by volume. The air-entraining properties may be obtained by the use of an air-entraining cement or an approved air-entraining agent, or a combination of both added by means of an approved automatic dispenser.

Unit weights of materials, except admixtures, to be used in proportioning cement concrete are as follows:

Water	62.4 lb./cubic ft.
Cement	94.0 lb./cubic ft.
Fine Aggregate	Based on Bulk Specific Gravity
Coarse Aggregate	Based on Bulk Specific Gravity

Water used in proportioning concrete shall be clean and potable from an acceptable municipal water supply.

Cement concrete shall be designed for the various items of construction on the basis of Section 3A of this specification. The mix proportions shall, whenever necessary, be adjusted as specified or required to provide for satisfactory workability and maximum density at all times. Adjustments shall be made without exceeding the specified water cement ratio or the slump designed within specified range. At no time shall less than the specified volume of cement per cubic yard be used.

Aggregates shall be batched by weight on a saturated surface dry basis. The individual aggregates shall be within 2% of the required weight and the total of the aggregates shall be within 1% of the required weight.

When No. 2B and 3A coarse aggregates are used in combination, they shall be the same type of material from the same source.

(2) Class P Concrete. All concrete street pavements shall be Class P with air-entrained characteristics. A blend of #3A and #2B may be use for pavements 8" thick or greater. For pavements less than 8" thick, 2B shall be used.

All concrete used in curbs, sidewalks, steps, and platforms shall be Class P Concrete, unless otherwise specified on contract plans or supplemental specifications.

For reinforced concrete structures where Class P Concrete is specified and there are at least four (4) inches between adjacent bars and 2-inch clearance between bars and forms, a combination of 2B and 3A coarse aggregates may be used.

Class P Concrete shall be designed with an air content of 6% ± 1% and have a maximum allowable slump of four (4) inches, except for street pavements and curbs. (See Sec. 3, Paragraph C)

Proportions. Class P Concrete shall meet the requirement of a minimum of 588 pounds (6.253 sacks) of cement with a maximum of 34.40 gallons of water - (5.5 gal./sack) with sufficient fine and coarse aggregate to yield one cubic yard of concrete. (See Section 2, Paragraph B-1 - for Cement Specifications.)

The above weights include all free water in the aggregates.

Where High Early Strength is required the proportions shall be as set forth except that the cements shall be ASTM C-150, Type III, or ASTM-C 175, Type IIIA. The resultant mix shall be designated as Class "PP" Concrete.

(3) Class "A" Concrete. For concrete structures, base course and other construction as may be indicated on drawings, or specified.

A combination of 2B and 3A may be used provided the design indicates the reinforcement to be placed not less than 2-inches from the face of the concrete and 4-inches or more from adjacent reinforcing members.

Class A Concrete shall be designed with an air content of 6%±1%. The maximum allowable slump shall be 4-inches.

Proportioning. Class A Concrete shall meet the requirements of a minimum of 564# (6.0 sacks) of cement and a maximum of 33.6 gallons of water (5.6 gal./sack) with sufficient fine and coarse aggregates to yield one cubic yard of concrete. (See Section 2, Paragraph B-1 - for Cement Specifications.)

When High Early Strength is required the resultant mix shall be designated as Class "AA".

(4) Class "B" Concrete. For miscellaneous construction as may be indicated on drawings or specified. Class B Concrete may be a combination of 2B and 3A coarse aggregate where construction design permits.

Class B Concrete shall be designed with an air content of 6%±1. The maximum allowable slump shall be 4-inches.

Proportioning. Class B Concrete Shall meet the requirements of a minimum of 470# (5.0 sacks) of cement and a maximum of 33.0 gallons of water (6.6 gal/sack) with sufficient fine and coarse aggregates to yield one cubic yard of concrete. (See Section 2, Paragraph B-1 - for Cement Specifications.)

When High Early Strength is required the resultant mix shall be designated as Class "BB".

(5) Strength Requirements. The average compressive and flexural strength of concrete as determined by laboratory tests shall not be less than the values shown in the following table:

(Table on following sheet)

CONCRETE CLASS	FLEXURAL		COMPRESSIVE	
	7 days	28 days	7 days	28 days
P & PP	450	550	2700	4000
A & AA	450	550	2300	3400
B & BB	375	450	1900	2800

The adequacy of the mix design is confirmed if at least 80% of all strength-test results of specimens molded in accordance with Section 7 (a) and 7 (b) of ASTM-C3 shall be equal or greater than the values shown in the above table. The average of any five consecutive tests shall be equal to or greater than the values shown, except that no specimen shall be more than 10% below the specified strengths.

E. REINFORCEMENT STEEL

(1) Unless otherwise specified in contract plans or supplemental specifications, all reinforcement steel shall be a minimum grade 40, and shall satisfy one of the following specifications:

(a) Deformed Billet-Steel Bars for concrete reinforcement (ASTM A-615)

(b) Rail-Steel Deformed Bars for concrete reinforcement (ASTM A-616)

(c) Axel-Steel Deformed Bars for concrete reinforcement (ASTM A-617)

All reinforcement steel, unless otherwise specified, shall be of the yield point required by the project specifications and shall conform to these specifications.

(2) Bar and Rod Mats. Bar and rod mats for concrete construction shall be of the size required and shall conform to "Specifications for Steel Bar or Rod Mats for Concrete Construction" (ASTM A-184) Clips for bar mats used in manual assembly shall be manufactured from No. 12 gauge spring steel wire of high elastic limit.

(3) Welded Wire Fabric. Welded wire fabric shall be electrically-welded wire fabric of cold drawn wire of gage and mesh size as required, and shall conform to "Specifications for Welded Steel Wire Fabric for Concrete Reinforcement (ASTM A-185)

F. - AIR-ENTRAINING ADMIXTURES FOR CONCRETE

Air-entraining admixtures shall be an approved type from an approved source and shall not contain chlorides. At the request of the Director, the manufacturer shall certify that the air-entraining admixture supplied for use in the work is essentially identical to the air-entraining admixture tested under ASTM Specification C-260.

G. - CURING MATERIALS

(1) Curing and Protecting Covers. Waterproof paper for curing concrete shall consist of two sheets of Kraft paper cemented together with bituminous materials in which are embedded cords or strands of fibre running in both directions of the paper not more than 1-1/4 inch apart. The paper shall be light in color and free of visible defects.

Each sheet of paper shall have a burst strength of 30# when tested on The Mullen Tester. The paper shall have a wet tensile strength of 30# per inch of width when tested in the machine direction and 15# per inch of width when tested on the cross-section. Tensile strength shall be run according to ASTM method (ASTM - Designation D-289).

Moisture Retention. Moisture loss in test specimens at the time of application of the paper shall be restricted to not more than 0.055 gm. per sq. cm. when tested according to ASTM Designation C-156.

(2) Polyehtylene Sheeting. White or clear polyethlene sheeting shall consist of a film 0.004 inches thick, manufactured from virgin resin with no scrap or additives. It shall be furnished in rolls and shall be free of visible defects.

(a) Permeability. When tested in accordance with ASTM Designation E-96, Procedure BW, the moisture loss shall not be greater than 0.055 gm/sq. centimeter.

(b) Tensile Strength The tensile strength shall be not less than 70#/sq. inches when tested in the machine direction according to ASTM Designation D-828.

(3) Burlap. Burlap shall be made from jute or hemp and at the time of using shall be in good condition, free from holes, dirt, clay, or any other substance which intereferes with its absorbing qualities. It shall not contain any substance which would have a deleterious effect on the concrete. Burlap shall be of such quality that it will absorb water readily and shall weigh not less than 7 oz./sq. yd. when clean and dry.

(4) Bituminous Liquid Membrane-Forming Curing Compounds of emulsified asphalt or cut-back asphalt shall meet the performance requirements of ASTM C-309 for Type 4, Black.

H. - JOINTS

(1) Premolded Expansion Joint Filler. Premolded expansion joint filler shall be of the thickness indicated on the drawings and of the type required by the project specifications, and shall be included in the cost of payment. Expansion Joint Material shall conform to one of the following specifications:

(a) Specifications for Performed Expansion Joint Filler for Concrete (Bituminous Type) (ASTM D-994).

(b) Specifications for Performed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types) (ASTM D-1751).

(c) Specifications for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Non-Bituminous Types) (ASTM D-1752).

(2) Load Transfer Units. Load transfer units shall conform to the types indicated on the Standard Details of Construction for Street Pavements. Dowels and supporting members shall be structural grade steel conforming to the requirements of Section 2.E (1).

(3) Dowel Shield Joint Material shall consist of suitable metal shape sheet (not galvanized or painted) and shall conform to the design and cross-section indicate on the Standard Details of Construction for Street Pavement.

(4) Bar Dowels shall be of the design and dimensions indicated on the Stand Details of Construction for Street Pavement.

(5) Graphite Lubricant

Graphite Paste

	% by Weight
Flake Graphite.....	55-65
Vehicle.....	35-45

(The vehicle shall be oil and have a non-volatile of 52.0%.)

Premixed Graphite Lubricant for Dowel Bars

	% by Weight
Flake Graphite.....	39.3-46.4
Vehicle.....	53.0-60.7
Non-Volatile Vehicle.....	24.3

(6) Joint Sealing Compounds

(a) Concrete Joint Sealer - Cold Application Type

This specification covers concrete joint sealer of the cold application, single or multiple component type intended for use in sealing joints having a minimum width of 1/2" in concrete pavements, bridges, and other structures. The materi shall pour or extrude readily at a temperature of 70° F.immediately after preparation for use and shall remain in a condition suitable for use for at least one hour. The material shall satisfy all the requirements of ASTM Specification Designation D-1850. Some materials meeting the requirements of this specification may need protection from traffic during their curing period. To provide this a sheet of heavy paper should be used to cover the joint immediately after the application of the sealing compound and left in place until worn away by traffic.

(b) Concrete Joint Sealer - Hot Poured Elastic Type

The Joint Sealer shall be composed of a mixture of materials that will effectively seal joint in concrete. The material shall be capable of being brought to a uniform consistency suitable for completely filling the joints without inclusion of large air holes or discontinuities and without damage to the material. The material shall meet all requirements of ASTM Designation D-1190.

(c) Precaution on Use and Application of Concrete Joint Sealer - Hot-Poured Elastic Type

Some, if not all, of the known materials conforming to these specifications may be damaged by heating to too high a temperature or by heating for too long a time. Care should be exercised to secure equipment for heating that is suitable for the purpose. The material should be heated in a kettle or tank constructed as a double boiler, with the space between the inner and outer shells filled with oil, asphalt, or other material for heat transfer. Positive temperature control and mechanical agitation should be provided. Other methods of indirect heating satisfactory to the engineer might be used. Direct heating must not be used. Control of the treatment of the material may be effected through flow tests made on specimens prepared from the material as applied to the joint. At least twice daily, or at such times as the engineer may direct, specimens for the flow test should be prepared and tested. The flow should not exceed 2.0 cm..

When this material is used to reseal joints which previously contained a dissimilar material, it is recommended that the joint be broomed thoroughly and all loose material blown out. The sides of the concrete at the joint should then be swabbed with naphtha or other highly volatile type of solvent.

I. - SCALING DETERRENT - (SPRAY MATERIAL)

For use on newly-placed, exposed concrete.

(1) General

The spray material shall consist of a homogeneous mixture of 1-part by volume of Boiled Linseed Oil, ASTM D-260, Type I, regular boiled, and 1-part by volume of Keroseneconforming to City of Pittsburgh Specification 4.1 - Kerosene - Lantern Grade. The kerosene shall have a minimum flash point of 115°F. and a maximum end point of 560°F..

Samples of one quart each of the regular boiled Linseed Oil and of the Kerosene shall be submitted to the Bureau of Tests, 4501 Centre Avenue, Pittsburgh, Pennsylvania 15213, for testing before the oils are combined. The finished product (Spray Material) shall be delivered ready for use, to the site of work. A sample from each drum of spray material shall be procured by a representative from the Bureau of Tests after delivery and prior to its use.

3. CONCRETE

A. - PROPORTIONING -

(1) General

The following are guide lines for designing mixes for the various classes of concrete. Contractor or his agent shall be responsible for the design of concrete mixes to satisfy the specified requirements of the project involved. All mix designs shall be approved by the Bureau of Tests.

(2) Slag Concrete

When slag is used it shall be tested daily at the Batch Plant to determine its loose struck weight and bulk specific gravity.

The following batch weights are on a compacted saturated surface-dry basis and predicated on the following specific gravities:

2B only.....2.26
2B and 3A.....2.25
Sand.....2.61

Class P Slag - 1 yard proportions (6.255 bags)

Cement	Water	Sand	2B	3A	AEA (Derex)
588#	287#	1247#	1488#	--	9.34 ounces
588	287	1090	920	757#	9.34

Proportions by Volume:

	2B only	2B and 3A
Cement	3.00 cu. ft.	3.00 cu. ft.
Water	4.60 cu. ft.	4.60 cu. ft.
Air	1.62	1.62
Slag	10.33	11.41
Sand	7.65	6.69
U/Weight	133.9#	133.4#

Class A Slag - 1 yard proportions (6.0 bags)

Cement	Water	Sand	2B	3A	AEA (Derex)
564#	280#	1288#	1488#	--	9.00 ounces
564	280	1128	920	757#	9.00

Proportions by Volume:

	2B only	2B and 3A
Cement	2.87 cu. ft.	2.87 cu. ft.
Water	4.48	4.48
Air	1.62	1.62
Sand	7.90	6.92
Slag	10.33	11.41
U/Weight	134.9#	135.0#

Class B Slag - 1 yard proportions (5.0 bags)

Cement	Water	Sand	2B	3A	AEA (Derex)
470#	275#	1377#	1488#	--	7.5 ounces
470	275	1201	920	757#	7.5

Proportions by Volume:

	2B only	2B and 3A
Cement	2.39 cu. ft.	2.39 cu. ft.
Water	4.41	4.41
Air	1.62	1.62
Sand	8.45	7.37
Slag	10.33	11.41
U/Weight	132.8#	135.2#

(3) Crushed Gravel Concrete

The following batch weights are on a saturated surface dry-basis and predicated on the following specific gravities:

2B only.....2.59
2B and 3A.....2.59
Sand.....2.64

Class P Gravel - 1 yard proportions (6.255 bags)

Cement	Water	Sand	2B	3A	AEA (Derex)
588#	235#	1100#	1930#	--	6.25 ounces
588	220	930	1120	920#	6.25 ounces

Proportions by Volume:

	2B only	2B and 3A
Cement	2.99 cu. ft.	2.99 cu. ft.
Water	3.77	3.53
Air	1.62	1.62
Gravel	11.92	12.64
Sand	6.70	6.22
U/Weight	142.7#	139.9#

Class A Gravel - 1 yard Proportions (6.0 bags)

Cement	Water	Sand	2B	3A-	AEA (Derex)
564#	240#	1110#	1930#	--	6.0 ounces
564	230	1060	1110	900#	6.0 ounces

Proportions by Volume:

	2B only	2B and 3A
Cement	2.87 cu. ft.	2.87 cu. ft.
Water	3.85	3.67
Air	1.62	1.62
Gravel	11.94	12.43
Sand	6.72	6.41
U/Weight	142.0#	143.1#

Class B Gravel - 1 yard proportions (5.0 bags)

Cement	Water	Sand	2B	3A	AEA (Derex)
470#	230#	1220#	1940#	--	5.0 ounces
470#	215#	1130#	1130#	930#	5.0 ounces

Proportions by Volume:

	2B only	2B and 3A
Cement	2.39 cu. ft.	2.39 cu. ft.
Water	3.67	3.45
Air	1.62	1.62
Gravel	11.98	12.70
Sand	7.34	6.84
U/Weight	142.9#	143.5#

B. - MIXING

(1) General

All concrete shall be shipped from an approved source. All plants furnishing concrete shall have a current NRMCA (National Ready Mixed Concrete Association) "Certificate of Compliance". Concrete shall be mixed in an approved mechanical mixer. All equipment necessary for mixing, transporting, placing and finishing concrete shall be available, inspected and approved by the Director before paving operations are started. Paving equipment will not be permitted to operate on the prepared subgrade without written permission of the Director.

(2) Cold Weather

Any concrete placed in cold weather is done at the contractor's risk and any damaged concrete shall be removed and replaced at the contractor's expense. No concrete shall be placed on frozen subgrade. Concreting shall cease when a descending air temperature reaches 40° F. Concreting may be resumed when an ascending air temperature reaches 35°F. Concrete shall not be placed when air temperature is less than 35° without permission of Director. In such cases the mixing water and/or aggregates shall be heated to not less than 60°F nor more than 120°F in order that the temperature of the concrete shall not be less than 50°F nor more than 70°F. The pavement shall be protected in such a manner that a minimum concrete temperature of 50°F will be maintained for five (5) days when Class P Concrete is used and for three (3) days with Class PP Concrete. All material necessary for the protection of the concrete in cold weather shall be at the paving site before the concrete will be released from the batch plant.

(3) Hot Weather

In hot weather the temperature of the mixed concrete shall not exceed 0°F. The ingredients shall be cooled before mixing, if necessary, to maintain this temperature. When necessary, arrangements for installation of wind-breaks, shading, fog spraying, sprinkling, ponding, or wet covering of a light color shall be made in advance of placement and such protective measures shall be taken as quickly as concrete hardening and finishing operations allow. This shall be done to prevent rapid surface drying with plastic shrinkage cracking.

(4) Ready-mixed Concrete

It shall be proportioned at a central plant and mixed enroute or transported in a transit mixer and mixed at the paving site. Such vehicles, when loaded to their rated capacities, shall be capable of combining the ingredients of the concrete within the specified time into a thoroughly mixed and uniform mass and of discharging the concrete with the proper slump and without segregation. Failure of any truck to produce acceptable concrete will be cause for eliminating the truck.

Water-measuring tanks mounted on truck mixers shall be readily adjustable and have an accuracy, when stationary and level, of 1% of the total water-carrying capacity of the tank. Measuring tanks shall be equipped with outside taps and valves to provide for the checking and calibration of the measuring device. All truck mixers shall be equipped with wash-water tanks.

Agitator or mixing blades shall be replaced when any part or section thereof is worn to 20% or more below the original height shown on the manufacturer's design.

All vehicles shall be equipped with revolution counters for recording the number of revolutions required for mixing and agitating. The vehicles shall be maintained in good mechanical condition. The drum and water lines shall be kept clean and free from accumulations of hardened concrete and other material. The drum, charging doors and discharging doors shall contain no leaks. The manufacturer shall attach to each truck mixer and truck agitator a metal plate on which is stated the capacities in terms of volume of mixed concrete for the various uses to which the equipment is applicable. When used for truck mixing or agitating, the capacity of the truck mixers shall be in accordance with the manufacturer's rating.

Transit-mixed concrete may be mixed in transit, except when it becomes necessary to obtain proper control, in which case the additions of water and the mixing shall be done at the paving site. When concrete is mixed in transit the ingredients shall be properly charged into the drum. Mixing shall begin immediately following the charging of the drum with all the ingredients, including the mixing water, and continue for not less than 70, nor more than 100 revolutions of the drum, at a speed of not less than 4, nor more than 12 revolutions per minute.

When the final portion of the total batched water is added at the site of the work the mixing drum shall be rotated at mixing speed for at least 20 revolutions per minute. When the concrete is mixed at the site of the work, the ingredients shall be charged into the drum in a manner to preserve their fitness and quality during transit. Not more than one-half of the total batched water shall be included in the batched ingredients during transportation. Immediately following the addition of the remainder of the accurately measured batch water, mixing shall begin and continue for not less than 70, nor more than 100 revolutions of the drum, at a speed not less than 4, nor more than 12 revolutions per minute. Any further mixing shall be done at agitating speeds (2 to 6 RPM). The elapsed time between the proportioning of the materials, including initial mixing water and the placing of the concrete in its final position, shall not exceed 1-1/2 hours, and when the air temperature is 85°F, or above, the elapsed time shall not exceed one hour.

Mixed or agitated concrete which has remained in the drum of the truck for more than 30 minutes without mechanical agitation, shall not be used.

The interval between load shall be controlled in order that concrete in place will not become partially hardened prior to placing succeeding batches, and in no case shall it exceed 20 minutes.

The method and time of delivery shall be controlled by plant slips issued to the driver and signed by the authorized representative of the Director of the plant. The slip shall contain the name and location of the plant, water contents in mix, time of loading, and the recording of the revolution counter. Upon arrival the slip shall be delivered to the authorized representative of the Director at the paving site.

(5) Paver-Mixed Concrete

When dual-drum mixers with a rated capacity of one cubic yard or more are used, the mixing time shall be between 50 and 90 seconds for Class P and 70 seconds for Class PP. The time for transfer of the materials from one drum to the other shall be considered as a part of the mixing time. The entire contents shall be removed from the drum before material for the following batch is placed therein. No concrete which has remained in the drum for more than 10 minutes without mechanical agitation shall be used. If, at any time, more than one batch of material is placed in the mixer skip, the batches shall be rejected. The mixer shall operate at the drum speed shown on the manufacturer's name plate.

(6) Central Plant Mixed Concrete

Mixing time shall not be less than 50 seconds. Mixing time shall be measured from the time all materials, except water, are in the drum, until the discharge chute opens. The contents of the drum shall be discharged before a succeeding batch is entered therein.

The mixer shall be operated at the drum speed shown on the manufacturer's name plate. Any concrete mixed less than the specified time shall be rejected at the Contractor's expense.

The throat of the drum shall be kept free of accumulations that may restrict the free flow of materials into the drum.

Central mixed concrete shall be transported in truck mixers, truck agitators, or non-agitating trucks having special bodies. When concrete is transported in non-agitating trucks no more than 30 minutes shall elapse from the time water is added to the mix until the concrete is deposited in place at the paving site. In agitating trucks, the time limit shall be 90 minutes.

C. - CONSISTENCY

The mixed concrete shall be of uniform consistency. The allowable slump for exposed concrete street pavement and curbs designated Class P or Class PP shall be a maximum of 3-1/2", as determined by ASTM C-143. The allowable slump for concrete base course shall be 4". The Contractor shall provide assistance and the approved equipment for performing the slump tests.

D. - CONCRETE REINFORCEMENT

(1) Steel reinforcement, where required, shall consist of welded wire fabric or bar mats, in accordance with Section 2-E of these specifications. Reinforcing steel

shall be free from dirt, scale, or other foreign matter, and rust of such a degree that will impair the bond of the steel with the concrete.

All steel reinforcement shall be of sufficient size to be lapped and placed in accordance with the Standard Drawings.

(2) Reinforcement shall be placed by either of the following methods:

(a) Where an approved mechanical mesh placer is used, the concrete shall be placed to its full depth in one layer. The reinforcement shall be placed on the surface of the concrete and pressed down to a point at least 2-inches below the finished surface of the pavement.

(b) Where a mesh placer is not used, the concrete shall be placed in two layers. The first layer shall be uniformly struck off by means of an approved mechanical strike-off or otherwise directed, at a depth not less than 2-inches nor more than 3-inches below the finished surface of the pavement. The reinforcement shall then be placed parallel to the finished surface. The concrete shall be struck off to the entire width of the lane and of sufficient length to permit a full sheet of reinforcement to be placed thereon. The balance of the concrete shall be placed on the reinforcement.

4. FORMS

All forms for concrete pavements shall be made of steel, except as otherwise specified herein. The depth of the forms shall be equal to the depth of the pavement. The forms shall not deviate more than 1/8" in 10' from the true plane of the face or top.

The steel form sections shall have a minimum length of 10', except that on curves having a radius of less than 150' but greater than 100' the length shall be not more than 6'. For radius less than 100', use curved form. The width of the bases of steel forms shall be not less than 8". Steel forms with bases less than 8" may be used with permission of the Director. There shall be at least three (3) stake pockets per length of form. Each stake pocket shall be equipped with positive non-detachable wedge or wedges. Forms shall be placed by using at least 3 steel pins. They shall be equipped with positive locking devices which will permit neat, tight joints which will not deform under impact, vibration, or thrust.

Wooden forms may be used for curves having a radius of less than 300'. All wooden forms shall be braced at least 2' with steel pins. Wooden forms shall be not less than 2" thick, composed of two 1-inch boards spiked together.

Pins for staking forms shall be made of steel at least 7/8" in diameter and 30" in length. Pins of a shorter length to meet job conditions may be used with the permission of the Director.

The forms shall be thoroughly cleaned and oiled each time they are used before concrete is placed against them. The subgrade or sub-base under the forms shall be firm and cut true to grade in order that each form, when set, will be firmly in contact for its entire length and width, and accurately set to line and grade. Any subgrade for sub-base which at the form line is below the required grade shall be filled to grade for a distance of 24" on each side of the base of the form and thoroughly re-rolled.

5. PLACING AND FINISHING CONCRETE FOR STREET PAVEMENT

A. - PLACING

The concrete shall be distributed to such a depth that when consolidated and finished the specified slab thickness will be obtained. The concrete shall be deposited on the dampened subgrade in such a manner as to require as little re-handling as possible, preferably with an approved mechanical spreader. As soon as placed the concrete shall be accurately struck off and screeded with approved mechanical equipment or hand equipment, when approved by the Director, to the crown and cross-section shown on the plans. It shall be thoroughly consolidated against and along the faces of all forms with a vibrator inserted in the concrete. Necessary spreading shall be done with shovels, not with rakes. Workmen shall not be allowed to walk in the concrete with boots or shoes covered with earth or other foreign substances.

The ingredients of the concrete shall not become separated during the process of placing in the work. Concrete shall be conveyed to the point of deposit so that it will not be thrown or fall more than 4 feet. Concrete shall not be moved laterally within forms more than 5 feet.

Chuting of concrete will not be permitted with the exception of a maximum length of 12' from the center of the mixer door.

Pavement 30' wide or less may be constructed either to its full width in a single operation or in lanes, unless otherwise directed. Longitudinal joints shall be incorporated in accordance with the Standard Details of Construction for Street Pavement. Pavement more than 30' in width shall not be constructed in a single operation.

B. - JOINTS

Concrete shall be deposited on the subgrade as near to expansion and contraction joints as possible without disturbing them. Concrete shall be shoveled against both sides of the expansion joint simultaneously. It shall not be dumped onto a joint assembly. Concrete adjacent to construction or contraction joints shall be compacted on both sides of the joints for their entire lengths with a vibrator inserted a maximum of 6" beyond the end of load transfer bars. Vibrators shall not be permitted to come into contact with the joint assembly subgrade or side forms.

Immediately after all finishing operations have been completed and before the concrete has taken its initial set, it shall be edged adjacent to all joints as required. Care shall be taken to remove any concrete which may be over the pre-molded expansion joint material. Hand finishing of joints and surface irregularities shall be done from an approved bridge.

After removal of side forms the ends of the premolded expansion joint material shall be exposed for the full depth of the slab. Any concrete that has been deposited over the end shall be removed, care being taken not to damage the ends of the joint. ...

C. - FINISHING

The sequence of operations shall be the strike-off and consolidation, floating, if necessary, straight edging and final surface finish. The pavement shall be struck-off and consolidated with a mechanical finishing machine, vibrating screed or hand methods when approved by the Director.

The machine or machines shall go over each area of the pavement as many times and at such intervals as necessary to give the proper compaction and to leave a surface of uniform texture, true to grade and crown. Excessive operation over a given area shall be avoided. The tops of the forms shall be kept free from an accumulation of concrete.

During the first pass of the finishing machine a uniform roll of concrete shall be maintained ahead of the front screed for its entire length.

After the concrete has been struck off and consolidated it shall be scraped with a 10' straight edge. Soft concrete, laitance, and excess water shall be removed from the surface of the pavement. The straight edge shall be operated parallel to the center line of the pavement and shall be moved forward one-half its length after each pass. Irregularities shall be corrected by adding or removing concrete. All disturbed places shall again be straight edged. In general, adding water to the surface of the concrete shall not be permitted. If it is permitted it shall be applied as a fog spray with approved equipment. The above procedure is not necessary if mechanical finishing machine is used and proper compaction and finishing is obtained.

The final finish of the pavement shall be done by brooming or burlap, as directed. The broom finish shall be accomplished with an approved steel or fiber broom not less than 18" wide. Brooming shall be perpendicular to the center line of the pavement and so executed that the corrugations thus produced will be uniform in character and width, not more than 1/8" deep. Brooming is also required on concrete base courses.

The Contractor shall lay the concrete roadway sections from the top of the grade downward or from bottom of grade upward, as ordered by the Director in the field.

6. PLACING & FINISHING CONCRETE FOR CURBS

A. - PLACING

The concrete shall be in forms and spaded sufficiently to eliminate all voids. Spading along back form and face form should advance with placing of concrete. An approved vibrator may be used when permitted by the Director. Shaping of plastic concrete on top of curb should follow these operations.

B. - CURB MACHINE

Concrete curb may be placed with approved self-propelled machine consisting of a hopper, power-driven screw or screws and a metering device.

Concrete shall be uniformly fed to the machine, and after extrusion the concrete will maintain the shape of the section without slumping.

The finished curb shall have a surface free from voids and honeycomb. Any additional surface finishing required shall be performed immediately after extrusion.

Concrete shall be class P concrete, except that the use of pea gravel for coarse aggregate is permitted.

C. - JOINTS

Curb joints shall coincide with transverse joints in pavement or base and shall not exceed 10' lengths. Joints may be formed by using 1/4" premolded expansion joint filler or metal plate, except that at expansion joint they shall conform to the width of the expansion joint. If metal plate is used joint shall be sealed with an approved joint sealer after removal of plate, applied by caulking gun.

Joints in extruded curbs shall be saw-cut to a depth of not more than 2" as soon as the concrete has hardened sufficiently to permit sawing without damage by blade action to the curb surface in concrete adjacent to the joint. Joint shall be sealed with an approved joint sealer applied by caulking gun.

D. - FINISHING

Concrete for curbs should be dry enough so that forms shall be removed within a reasonable time so that the surface can readily be finished without deformation by means of wood floats and steel trowels.

As soon as the concrete has set sufficiently to sustain its own weight the face form should be removed and all of the exposed concrete floated, edged and troweled to a smooth, true surface. This means the concrete must be worked with the proper hand tools and not finished with a brush. As soon as the water glaze disappears and initial set has taken place, the surface shall be brushed lightly with a damp whitewash brush. The surface shall not be plastered.

7. JOINTS

A. - GENERAL

(1) All longitudinal and transverse joints shall meet the requirements of Section 2-H and conform to the details and positions shown on the Standard Details of Construction for Street Pavement.

(2) All transverse joints shall be constructed in line for the full width of the pavement.

(3) All joints shall be constructed true to line and perpendicular to the surface of the pavement. Joints shall not vary more than 1/4" from a true line r from their designated position.

(4) The surface of the pavement adjacent to all joints shall be finish to a straight line across all joints and shall be edged to a radius of 1/4", or as otherwise shown on the plans. The surface across the joints shall be tested with a 10' straight edge as the joints are finished and any irregularities in excess of 1/8" shall be corrected before the concrete has hardened.

(5) Keyways, when required, shall be accurately formed with wood or metal templates.

B. - LONGITUDINAL JOINTS

(1) Longitudinal construction joints (joints between separately placed slabs) shall be formed by the use of Standard Steel Side Forms with a Keyway. Provisions shall be made for the installation of tie bars or hook bolts. The side of the concrete at these joints shall be heavily coated with bituminous material, PDH Class A.

(2) Longitudinal construction joints shall consist of planes of weaknes created by forming or cutting grooves in the surface of the pavement.

(a) Saw-cutting of longitudinal joints shall begin as soon as the concrete has hardened sufficiently to permit sawing without excessive raveling and the grooves shall be equal to at least one-fourth (1/4) the depth of the slab plus 1/4" and have a minimum width of 1/4".

(b) Forming of groove shall be made by means of a suitable tooling device. The groove shall extend vertically downward to at least one-fourth (1/4) the depth of the slab plus 1/4" and shall be 3/8" wide at the top and 1/4" wide at the bottom. (This method can be used as an alternate to saw-cutting.)

(3) Tie bars shall be of the size and spacing as shown in Table A. They shall be held in a position approximately parallel to the transverse axis of the slab. Tie bars may be bent at right angles against the form at longitudinal constructi joints. Approved hook bolts may be used. The hook bolt and coupling shall be provided with an approved fastener for attachment to the pavement form to maintain them in the correct position during placement of the concrete. Provide tie bars in accordance with Standard Details of Construction for Street Pavement.

(TIE BAR SIZES - TABLE "A" - ON FOLLOWING PAGE)

TIE BAR SIZES (TABLE A - STANDARD DETAILS OF CONSTRUCTION FOR STREET PAVEMENT)

ROADWAY WIDTH	PAVEMENT DEPTH	TIE BAR SIZE	TIE BAR SPACING
48'	7"	5/8"x37"	30"
	8"	5/8"x37"	30"
	9"	3/4"x44"	30"
	10"	3/4"x44"	30"
40'	7"	5/8"x37"	30"
	8"	5/8"x37"	30"
	9"	5/8"x37"	30"
	10"	3/4"x44"	30"
36" and less	7"	5/8"x37"	30"
	8"	5/8"x37"	30"
	9"	5/8"x37"	30"
	10"	5/8"x37"	30"

C. - TRANSVERSE JOINTS

(1) Transverse contraction joints shall consist of planes of weakness cre by sawing grooves or forming in the surface of the pavement, as shown in the Standard Details of Construction for Street Pavement. Approved load transfer devices shall be required at all transverse construction joints. Load transfer units shall not be required on concrete base course. The size and spacing of the load transfer devices shall be in accordance with Table B.

DOWEL BAR SIZES FOR LOAD TRANSFER UNITS (TABLE B)

PAVEMENT DEPTH	DIAMETER	LENGTH	SPACING
7"	1-1/4"	14"	12" c/c
8"	1-1/4"	14"	"
9"	1-1/4"	16"	"
10"	1-1/4"	18"	"

Sawing of the transverse contraction joints shall begin as soon as the concrete has hardened sufficiently to permit sawing without excessive raveling, usually 4 to 12 hours. All joints shall be sawed before uncontrolled shrinkage occurs. If necessary, the sawing shall be carried out both day and night, regardless of weather conditions. A standby saw shall be available in the event of a breakdown. The sawing of any joint shall be omitted if a crack occurs at or near a joint location before sawing. Sawing shall be discontinued if a crack develops ahead of the saw. Immediately after sawing the saw-cut shall be thoroughly cleaned.

-) Transverse Expansion Joints

Transverse Expansion Joints shall be placed in accordance with the Standard Details of Construction for Street Pavement at locations indicated on the plan and shall be not less than 3/4" wide. Expansion joints shall be formed about all structures and features projecting through into or against the pavement. Transverse expansion joints shall be formed by securely staking in place an approved load transfer device consisting of an assembly of dowels, supporting and spacing means, and 3/4" thick, premolded expansion joint filler. The bottom edge of the filler shall extend downward to c. slightly below the bottom edge of the slab. The top edge shall be held 1/2" below the pavement surface. The top edge of the filler shall be protected while concrete is being placed by a metal channel cap of at least 1/8" material having flanges not less than 1-1/2" deep. The cap shall be cleaned but not oiled after each use. The premolded joint filler shall be appropriately punched to the exact diameter and at the location of the dowels. It shall be furnished in lengths equal to the width of the slab. No plugs of concrete shall occupy the expansion space.

(3) Load Transfer Units

Load transfer units shall be of an approved type. Dowel sizes shall conform to Table B, Section 7C (1). Dowels shall be placed at the middle of the slab depth and held rigidly in proper horizontal and vertical alignment by an approved dowel assembly to be left permanently in place. The dowels shall be parallel to the finished pavement surface. One-half the length of each dowel shall be rendered bondless with a 1/16" coating of graphite lubricant. The free ends of the dowels in expansion joints shall be provided with a metal cap conforming to the dimensions shown on the Standard Drawings. The load transfer units shall be set immediately after the final testing of the subgrade. The unit shall be set to the proper line and grade and shall be securely staked to prevent movement during placing or finishing of the pavement. Dowel bars shall be checked for exact position and alignment as soon as the joint is staked in place on the subgrade. The unit shall be tested to determine whether it is firmly supported. Any unit not firmly supported shall be re-set. The entire assembly shall be protected against damage. Damaged or repaired assemblies shall not be used until approved by the Director.

D. - JOINTS IN CONCRETE BASE COURSE

When plain concrete base course is built a keyed construction joint shall be place at the end of a days work. It shall be removed when the work is resumed and the joint sprayed with water before placing concrete.

Longitudinal joints in concrete base course shall conform to Section 7-B, except that in full width construction sawing will not be required.

E. - JOINT SEALING

(1) Prior to opening any section to traffic, including construction equipment, all joints shall be thoroughly cleaned and dried. They shall then be sealed with an approved joint-sealing material. Prior to placing of sealing detterent, the sealant shall be prepared and placed in accordance with the manufacturer's recommendations. Sealing will be done in such a manner that the material will not be spilled on the pavement. Any excess material spilled on the pavement shall be removed immediately and the pavement cleaned. The sealer shall be in accordance with Section 2H (6) of these Specifications.

8. MANHOLES AND RELATED FACILITIES

Manhole castings, water valve boxes, inlet grates, and other similar structu in the paved portion of concrete streets and sidewalks shall be built integrally into the pavement or sidewalk. Prior to placing any concrete the casting shall be set to the proper grade. The casting shall be wrapped with 1/4" approved expansion material as directed. The top of the casting shall be protected to prevent build-up of grout or concrete from the paving operation.

When the edge of a casting falls less than 2' from a transverse joint, that joint shall be moved so that it falls through the edge of the casting.

Wire mesh, when required, shall extend to within 3" of the casting on all sid (See Detail Sheet #6, Standard Details of Construction for Street Pavement for Addition Reinforcement.)

Inlays shall not be used, except by permission of the Director. Where permit inlays shall be constructed after the concrete pavement or base is completed.

When inlays are approved, forms for inlays shall be constructed of 2" plank or standard metal forms. Tops of the forms shall be set to the grade of the finished pavement. The forms shall be set and checked prior to placement of roadway concrete. The opening shall be rectangular with sides parallel and normal to the center line of the street. A minimum clearance of 3" shall be maintained between the form and the casting. If one side of the inlay becomes a part of a transverse expansion joint it shall be located to provide sufficient clearance between the casting and the dowels of the load transfer unit. When a transverse expansion joint is less than 2' from the normal side of an inlay, the inlay shall be extended to the transverse expansion joint. A keyway shall be provided on all sides of the inlay. Tie bar, load transfer units, or disturbed steel will not be required in inlays.

When the concrete pavement or concrete base has cured sufficiently to permit removal of the inlay forms, the casting shall be set to the proper grade. The concrete shall be placed in inlay and finished and cured in the same manner as the surrounding concrete. All edges of the inlays, other than longitudinal and transverse joints, shall be tooled with a 1/4" radius edger.

All concrete in inlays shall be high early strength concrete, Class PP.

9. CURING AND PROTECTION

A. - GENERAL

All classes of traffic and hauling equipment shall be excluded from the pavement for a period of at least seven days for Class P Concrete Pavement, or three days for Class PP Concrete Pavement, and in either case until the pavement has developed the required minimum flexural strength of 500 P.S.I. and/or minimum compressive strength of 3,000 P.S.I..

Concrete shall be protected against loss of moisture, rapid temperature changes, and mechanical injury for at least ninety-six (96) hours. Moist curing, waterproof paper, or white polyethylene sheeting may be used. After finishing operations have been completed the entire surface of the pavement shall be covered by the curing medium. The edges of the concrete slab exposed by the removal of side forms shall be protected immediately in the same manner as the pavement surface. Side forms shall remain in place for a minimum of 12 hours.

The contractor shall have the equipment needed for adequate curing on the job site and ready to install before actual concrete placement begins.

B. - MOIST CURING

Moist curing shall be accomplished by a covering of burlap or other approved fabric mat. Curing mats shall be thoroughly wet when applied and kept continuously wet and in intimate contact with the concrete surface for the required 7-day for Class P or Class A curing period, or 3 days for Class PP or Class AA curing period.

C. - WATERPROOF PAPER OR WHITE OR CLEAR POLYETHYLENE

Waterproof paper or white or clear polyethylene sheets shall be in pieces large enough to cover the entire width and edges of the slab and shall be lapped 12". The covering shall be adequately weighted to prevent displacement or billowing due to the wind, and material folded down over the side of the pavement edges shall be secured by a continuous bank of earth. Tears or holes appearing in the covering during the curing period shall be immediately repaired. Concrete surface shall be kept continuously wet for the required 7 days for Class P Concrete or Class A Concrete, and 3 days for Class PP Concrete or Class AA Concrete.

D. - COLD WEATHER

When concrete is placed in cold weather and the temperature may be expected to reach 35°F., straw, hay, insulated curing blankets or other suitable material shall be provided along the line of work. Whenever the air temperature may be expected to reach the freezing point during the day or night, the material shall be spread on the concrete deep enough to maintain a temperature on the pavement surface of 50°F.. It shall remain in place for five days when Class P Concrete is used, or three days when Class PP Concrete is used.

E. - PLAIN CONCRETE BASE COURSE

A bituminous liquid membrane may be used provided the concrete base course will not be used by traffic until the surface is placed.

10. PROTECTIVE COATING FOR CONCRETE PAVEMENT

A. - GENERAL

This item shall consist of two (2) applications of boiled linseed oil diluted with an equal volume of kerosene, herein called scaling deterrent, as stipulated in Section 2, Paragraph I-1, applied to concrete pavement, curb, sidewalk, and miscellaneous concrete as directed.

B. - PREPARATION OF SURFACE

The concrete surface shall be clean and thoroughly dry. Silt, clay, sand or other debris shall be broomed from the surface. Flushing may be necessary. Spray material shall be applied after normal moist curing has been completed and the surface has then dried sufficiently to permit proper absorption.

C. - APPLICATION

The curing shall be applied by an approved mechanical sprayer, hand spraying or brushing as directed by the Director, to give complete and uniform coverage. Hand spraying should be done from a height of 8" to 12" from the surface. Spraying shall not be done unless the air and concrete temperature is between 50°F. and 100°F.. New concrete shall receive two treatments of spray material, with a minimum elapsed time of 24 hours between applications. The first treatment shall be applied so as to yield not more than 40 square yards of coverage per gallon. The second treatment shall be applied so as to yield not more than 50 square yards of coverage per gallon. Treated pavement shall be closed to traffic for a minimum of six hours after the second coat, or longer if necessary, until penetration is completed and all tackiness disappears.

D. - SAFETY PRECAUTIONS

Kerosene vapor is flammable. Normal safety precautions should be exercised to safeguard against injury to personnel.

E. - BASIS OF PAYMENT

The price of this item for new concrete shall be included in the unit price for the concrete to be treated. Where required on existing concrete it shall be paid for at the contract unit price per square yard, complete in place as specified.

11. TESTS

A. - GENERAL

The contractor shall furnish the concrete necessary for casting test beams, the performance of air tests, slump tests, and any other tests thay may be required. He shall also provide a working platform for performing the tests, a standard slump cone and rod, stainless steel beam molds, and sufficient labor to assist the engineer in the performance of the tests.

B. - STRENGTH

The strength of the concrete pavement shall be determined by flexural and compression tests. Two 6" x 6" x 22" beams shall be molded each morning and afternoon of placing concrete pavement. Additional beams shall be molded for each additional 1,000 square yards of pavement placed in either the morning or afternoon of the same day. These beams shall have a daily average flexural strength of 500 P.S.I. @ 7 days before opening to traffic. Beams shall be tested in accordance with ASTM C-78. Cylinders shall be molded in accordance with ASTM C-31 and tested in accordance with ASTM C-39.

C. - ENTRAINED AIR

The air content shall be measured by the pressure method with stone and gravel aggregate and by the volumetric method with slag aggregate. A minimum of one test shall be made each day. Air test with chase air indicators shall be made each time cylinders are made. The air content shall be 6% ± 1%.

D. - THICKNESS

One core measurement shall be made in each traffic lane at locations determined by the Director and shall represent not more than 1,000 square yards of pavement.

The City shall not be liable for payment for any excess in depth of concrete pavement or concrete base course.

Pavement which is not more than 1/4" less in thickness than that required by the typical cross-section shown on the plans will be accepted and paid for at the contract unit price.

Payment will not be made for pavement which is found to be deficient in thickness of 1/4" or more, except as provided for below.. Such pavement shall be removed and replaced at the contractor's expense. The removal and replacement of concrete pavement where deficiencies exist shall extend the full width between longitudinal joints and a minimum length of 10-feet.

The unit price for pavement, the average thickness of which is less than the thickness shown on the plans by more than 1/4" and not more than 1/2" may be adjusted by the Director if requested by the Contractor.

The adjusted unit price shall be according to the following:

DEFICIENCY IN DEPTH	% OF CONTRACT UNIT PRICES
0.00-0.25"	100%
0.26-0.30"	95%
0.31-0.35"	85%
0.36-0.40"	75%
0.41-0.45"	50%
0.46-0.50"	25%

When a test core is drilled which shows a deficiency more than 1/4", two additional test cores shall be drilled 5' distant in each longitudinal direction. If these cores show more than 1/4" deficiency the next hole shall be drilled 10' from the last hole in a longitudinal direction. If these holes continue to show more than 1/4" deficiency, the next hole shall be drilled 25' from the preceding hole. Additional cores shall be drilled at 25' intervals until the required depth of concrete is shown to exist.

Initial test cores shall be drilled by the City and replaced by the City. All test cores drilled by the City to determine the extent of any deficiency in concrete pavement or base shall be at the expense of the contractor at the rate of $10.00 per core, and such expense shall be deducted from payment due the contractor.

The removal and replacement of concrete shall start at the determined point of deficiency and proceed in all directions longitudinally and transversely. However, the minimum length of pavement removed and replaced shall not be less than 10'. The removal and replacement shall extend transversely the full width of all traffic lanes in which the deficiencies are found.

The length of drilled cores shall be determined according to ASTM C-174.

c. MISPLACED STEEL

Where steel reinforcement for concrete street pavement is placed above or below the required location the concrete pavement shall be removed and replaced with new pavement having the steel reinforcement at the required depth.

The removal and replacement of the concrete pavements, where the steel is misplaced, shall extend the full width between longitudinal joints and the full length between transverse joints.

Test cores shall be drilled in accordance with Section 11- D of this Specification.

The unit price for pavement where the steel is misplaced may be adjusted by the Director if requested by the contractor.

The adjusted price shall be according to the following:

DISTANCE BELOW NORMAL POSITION (2")	AMOUNT TO BE DEDUCTED PER SQUARE YARD OF PAVEMENT
0-1"	Nothing
1"-2"	5%
2"-3"	10%
3"-4"	15%
+4"	20%

DISTANCE ABOVE NORMAL POSITION (2")	
0-1"	25%
Above-1"	Removed

12. BASIS OF PAYMENT

Plain concrete street pavement or reinforced concrete street pavement shall be paid for at the contract unit price per square yard, complete and in place as specified.

CITY OF PITTSBURGH CONCRETE SPECIFICATIONS

READY MIXED CONCRETE BATCH PLANTS

October, 1981

All concrete shall be shipped from an approved source. Each batching plant shall meet the requirements of AASHTO Designation M 157, except as modified in PennDOT Form 408 Specifications.

All concrete batch plants shall be equipped for fully automatic batching and proportioning of all cement, aggregates, water, and automatic insertion of admixtures. Each plant shall be equipped with an accurate digital recorder capable of reproducing the scale reading to within ± 0.1% of scale capacity which will automatically and accurately record the quantity of each aggregate, the cement, and the water, and which will identify and record the addition of the required admixtures. This will provide an accurate, permanent, and continuous record of the batching operations for each truck load.

A licensed concrete technician, under the employ of that concrete company will be continuously available for the express purpose of monitoring and maintaining the quality control of the concrete for the duration of shipments each day. The plant concrete technician will make any tests necessary at the plant to insure the shipment of quality concrete, which meets City of Pittsburgh specifications. This technician will make these test results readily available to City of Pittsburgh personnel who will institute or approve any changes in the concrete mix. The plant technician will also identify each batch and accurately record the quantities of each material batched from the batch scales in the event of equipment failure.

SUB-BASE FOR CONCRETE PAVEMENT

[REVISED DECEMBER - 1970]

1. DESCRIPTION

This item shall consist of a layer or layers of aggregate constructed where required on prepared subgrade in accordance with the design and dimensions shown on the plans and cross-sections, as specified.

2. MATERIALS

Material for the sub-base shall consist of aggregate from approved sources and meeting the gradation and physical requirements herein specified. A change in the source may be made only with the approval of the Director.

(1) GRADATION

Sieve Size	% Passing
2"	100
3/4"	52 - 100
3/8"	36 - 70
#4	24 - 50
#16	10 - 30
#100	2 - 10

(2) PHYSICAL REQUIREMENTS

The quality of the material shall conform to the physical requirements of PDH Type C aggregate with the following exeptions:

TABLE A

Sodium Sulphate Test - Maximum % loss at 5 cycles by weight.
ASTM C-88 (except pans used instead of sieves).....20
Loss by washing - % by weight - maximum, ASTM C-117
(except that a #100 sieve shall be used and the samples tested shall weigh between 50 and 100 pounds, depending upon size of aggregate tested).....12

TABLE B

Soft fragments - % by weight (maximum).....10
Shale - % by weight (maximum).....10
The sum of all percentages of deleterious substances, exclusive of glassy particles and iron, shall not exceed 10% for Type C.

(3) GRANULATED SLAG

Approved granulated blast-furnace slag will be acceptable for sub-base.

3. CONSTRUCTION METHODS

Sub-base shall be constructed at locations indicated on the drawings and cross-sections, or where directed by the Director. Sub-base material shall not be placed on soft, muddy, or frozen subgrade until all irregularities in the prepared subgrade and soft areas in the foundation have been satisfactorily corrected.

(1) PLACING

The sub-base material shall be uniformly spread in an approved manner on the prepared subgrade without segregation. Sub-base shall be constructed in layers of uniform depth that shall not exceed 6" in compacted depth.

Sub-base shall be completed at least 24" beyond the edge of the pavement thereon to provide for continuously compacted sub-base, when instructed.

Unstable sub-base conditions, including soft foundation areas which develop ahead of the paving operation, shall be satisfactorily corrected.

Material required to replace unsuitable material for stabilization of sub-grade shall be granulated slag, except where drainage of sub-grade is required, in which case the composition and method of compaction shall conform to the specifications for sub-base treatment, and payment for furnishing and placing the materials will be made under the item "Crushed Slag".

(2) MIXING

Any mixing or blending of materials shall be done prior to delivery at the site.

(3) COMPACTION

The uniformly spread material shall be compacted by means of approved equipment to not less than 95% of maximum dry weight density (AASHO T-99) as determined by ASSHO T-191. Compaction shall progress gradually from the sides to the center with each succeeding pass uniformly overlapping the previous pass, and shall continue until the entire area is satisfactorily shaped and compacted to the required lines and grades. One density determination will be made for each 2500 square yards or less of compacted sub-base. A minimum two tests per project will be taken.

(4) BASIS OF PAYMENT

This item will be paid for at the contract unit price per ton of sub-base, complete and in place as specified, which price will include all materials, equipment, tools, labor, and work incidental thereto. The pay area will be based on the widths indicated on the cross-sections. No compensation will be made for the 24" width sub-base required for support of the forms at locations where sub-base does not extend beyond the curb or outlet through the shoulder area.

CITY OF PITTSBURGH
DEPT OF PUBLIC WORKS — BUREAU OF ENGINEERING

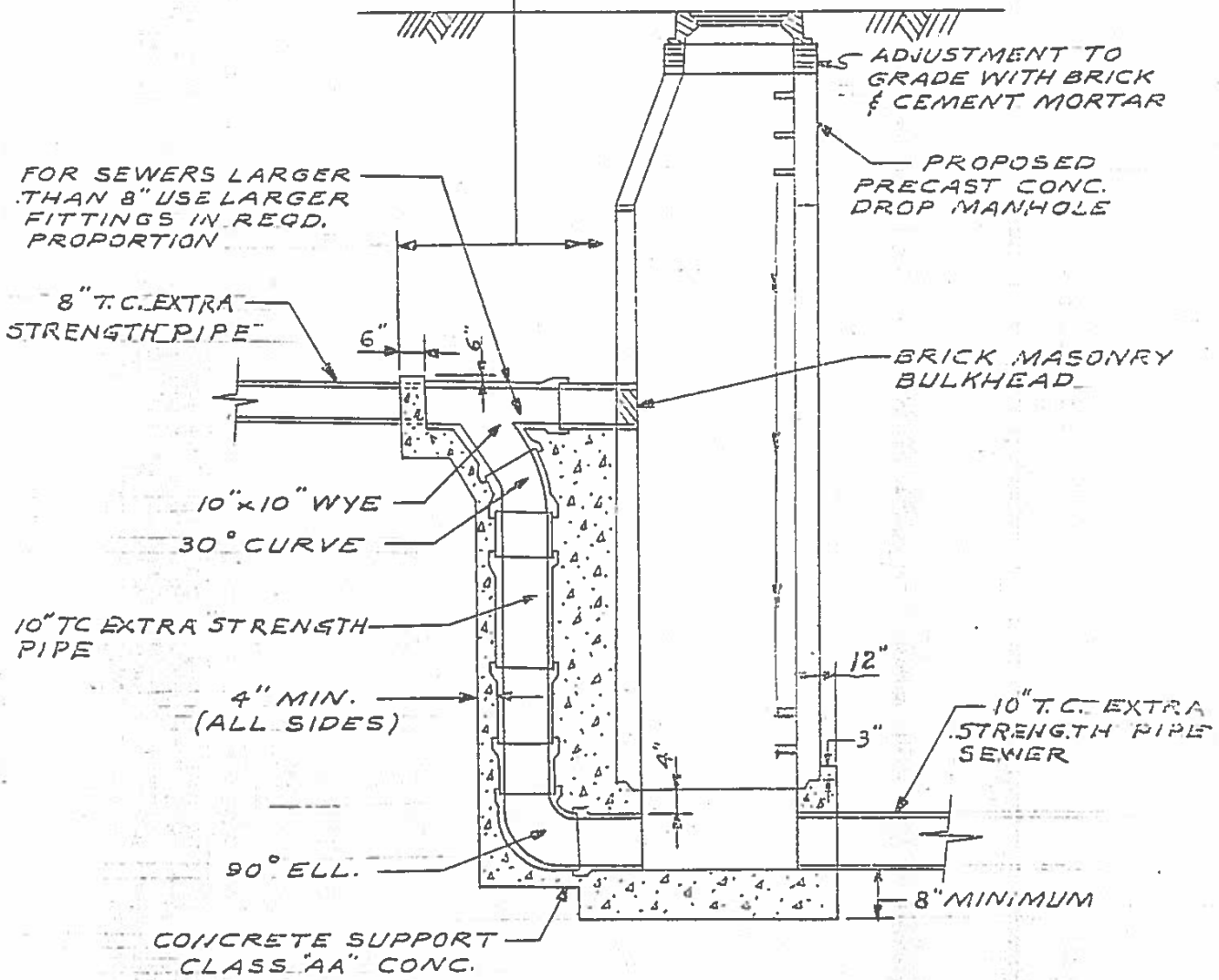
DETAIL PRECAST CONC DROP MANHOLE

APPROVED 3-21-67 — Anthony J Tarasi — DES DIV ENGR

APPROVED 4-28-67 — ACTING CITY ENGR

APPROVED 4/27/67 — DIRECTOR

DWG NO. ML-193 FOL. M-16 GOVERNING PRECAST CONC. MANHOLE SHALL APPLY. LUMP SUM PAYMENT FOR RRECAST "DROP MANHOLE" SHALL INCLUDE COMPENSATION FOR FURNISHING AND INSTALLING ALL DROP PIPE AND FITTINGS WITH CONCRETE REINFORCING



DWN: A. PERELLA 3-8-67

ACCESSION NO. ML-210-A

SHEET 2 OF 2 FOLDER NO. M-16

CITY OF PITTSBURGH
DEPT OF PUBLIC WORKS BUREAU OF ENGINEERING
PRE-CAST "T" SECTION MANHOLE & BASE

APPROVED 5-13-70 Anthony J. Tarasi DESIGN DIV. ENGR.

APPROVED 5-14-70 William K. Adams CITY ENGR. D.P.W.

APPROVED E. E. Smith DIRECTOR

City of Pittsburgh
Frame-Casting No.26
Cover-Casting No.25

½" Coat of Cement Mortar

Adjust to Grade With Brick and Cement Mortar

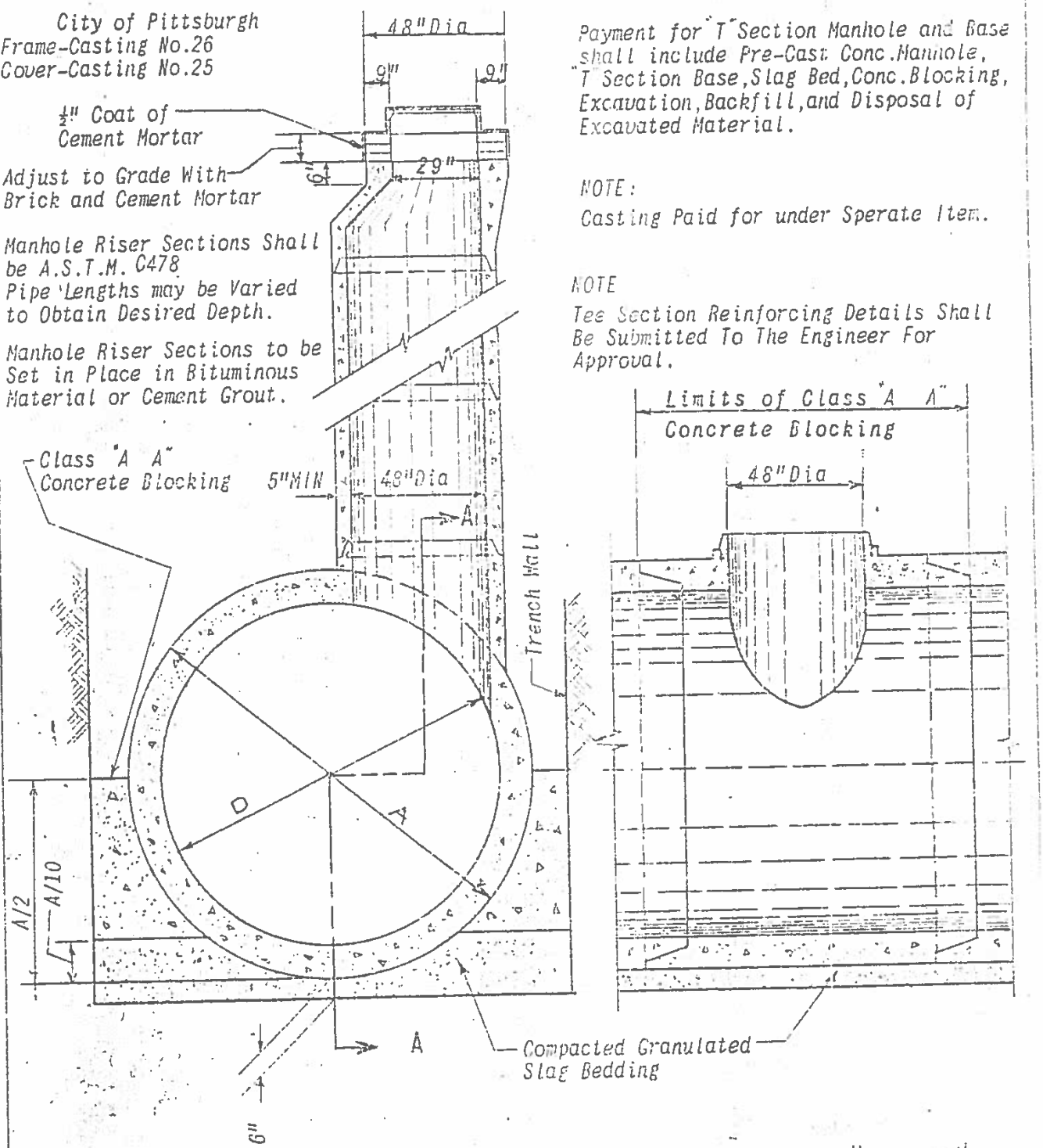
Manhole Riser Sections Shall be A.S.T.M. C478
Pipe Lengths may be Varied to Obtain Desired Depth.

Manhole Riser Sections to be Set in Place in Bituminous Material or Cement Grout.

Payment for "T" Section Manhole and Base shall include Pre-Cast Conc. Manhole, "T" Section Base, Slag Bed, Conc. Blocking, Excavation, Backfill, and Disposal of Excavated Material.

NOTE:
Casting Paid for under Sperate Item.

NOTE
Tee Section Reinforcing Details Shall Be Submitted To The Engineer For Approval.



CROSS SECTION

SECTION "A--A"

Accession No. AL-218
Folder N-17

CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS BUREAU OF ENGINEERING

CATCH BASIN TYPES 11 & 12

APPROVED 5-13-70 Anthony J Tarasi DESIGN DIV ENGR.

APPROVED 5-13-70 Samuel Mark CITY ENGR. D.P.W.

APPROVED 5-13-70 William K Deeds DEPUTY DIRECTOR

Revised -5-7-70

NOTE: Hood must be sealed to C.B. wall with approved bitumastic sealer

NOTE: All Reinf. Bars are #6 Vert Bars are 12" C.C.

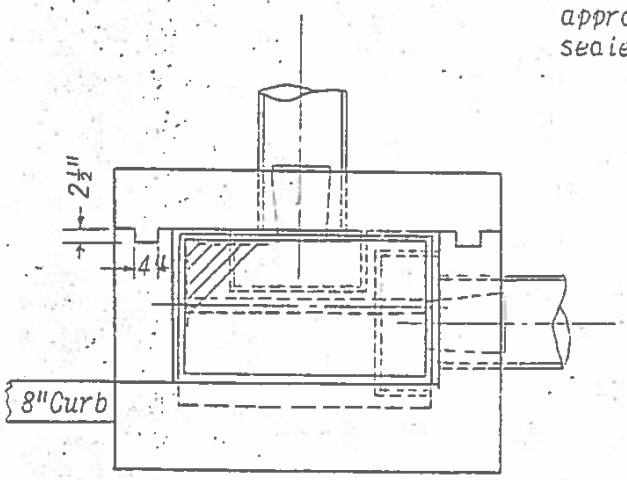
See Specifications for excavation, construction and backfilling with slag cement mixture.

All concrete shall be class "A A"

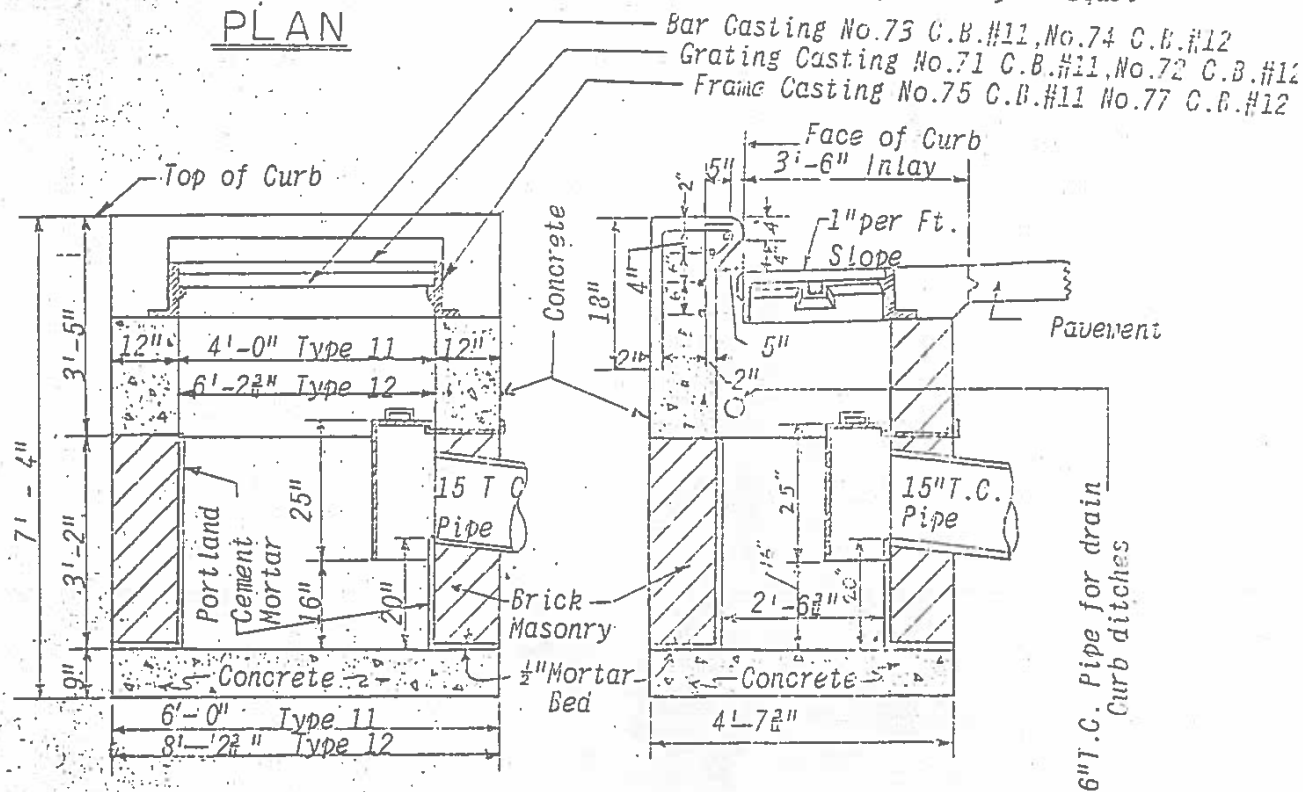
All outside joints to be struck flush.

Trap Pattern No.402-15 Allegheny Foundry or Equal

Hook Pattern No.404 Allegheny Foundry or Equal



PLAN



LONGITUDINAL SECTION CROSS SECTION

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS — BUREAU OF ENGINEERING

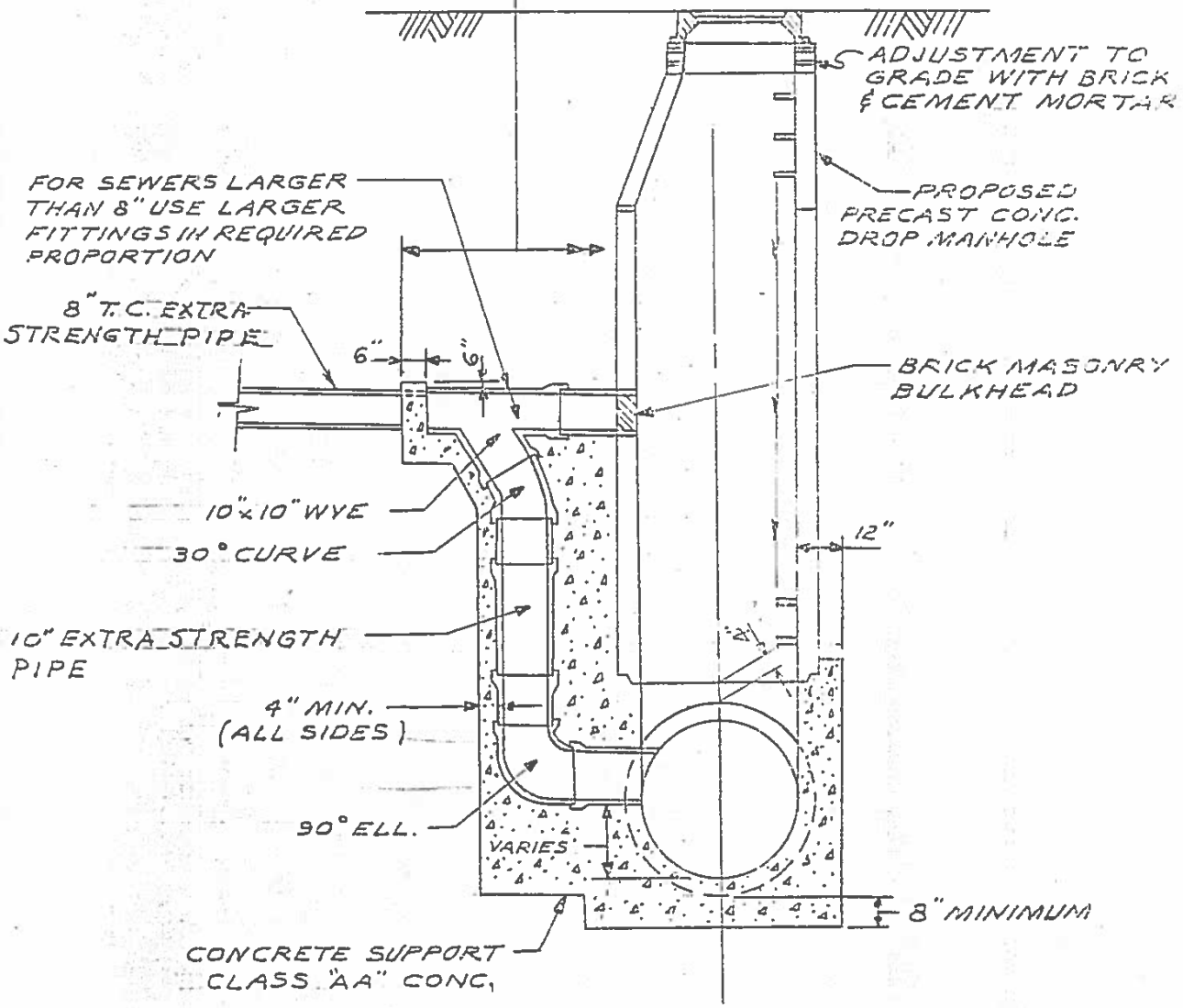
DETAIL PRECAST CONC DROP MANHOLE

APPROVED 3-21-67 — Anthony J. Tarasi, DES. CIV. ENGR.

APPROVED 4-V8-67 — ACTING CITY ENGR.

APPROVED 4/28/67 — DIRECTOR

DWG NO. ML-193 FOL M-16 GOVERNING PRECAST CONC. MANHOLE SHALL APPLY. LUMP SUM PAYMENT FOR PRECAST "DROP" MANHOLE" SHALL INCLUDE COMPENSATION FOR FURNISHING AND INSTALLING ALL DROP PIPE AND FITTINGS WITH CONCRETE REINFORCING



DWN: A. PERELLA 3-6-67

SHEET 1 OF 2

ACCESSION NO. ML-210
FOLDER NO. M-16

42

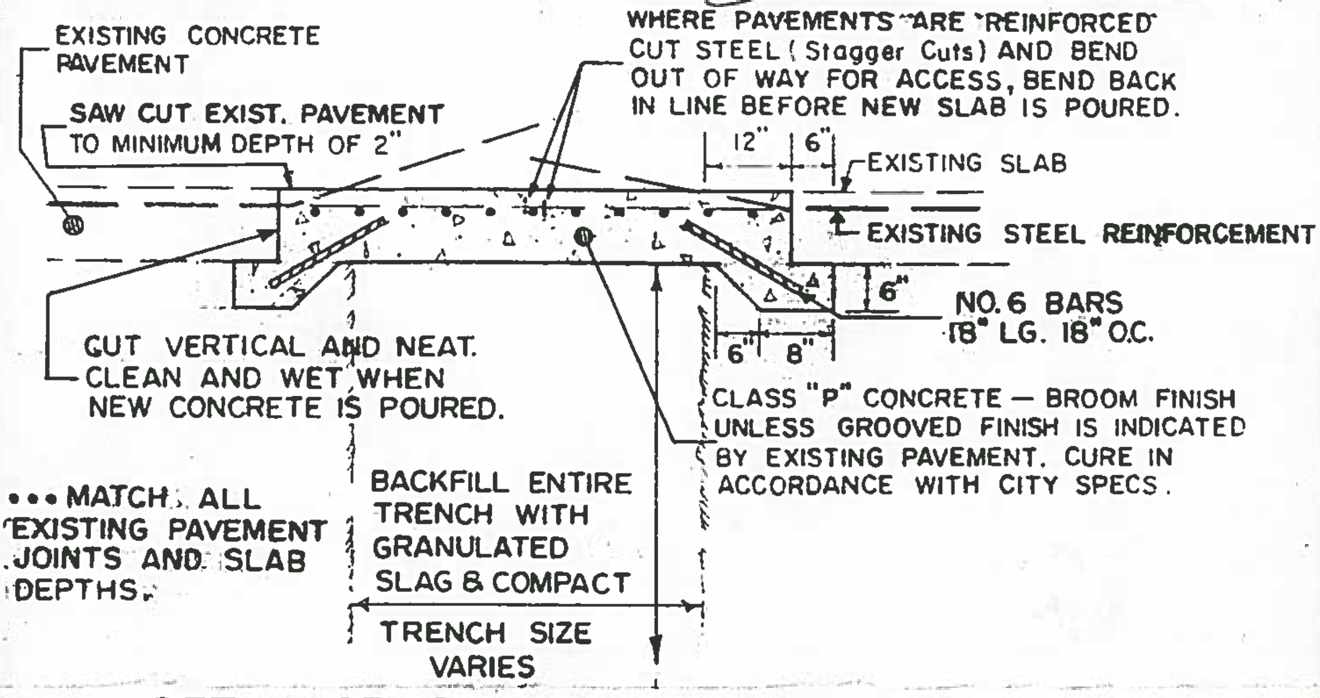
CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS

BUREAU OF ENGINEERING

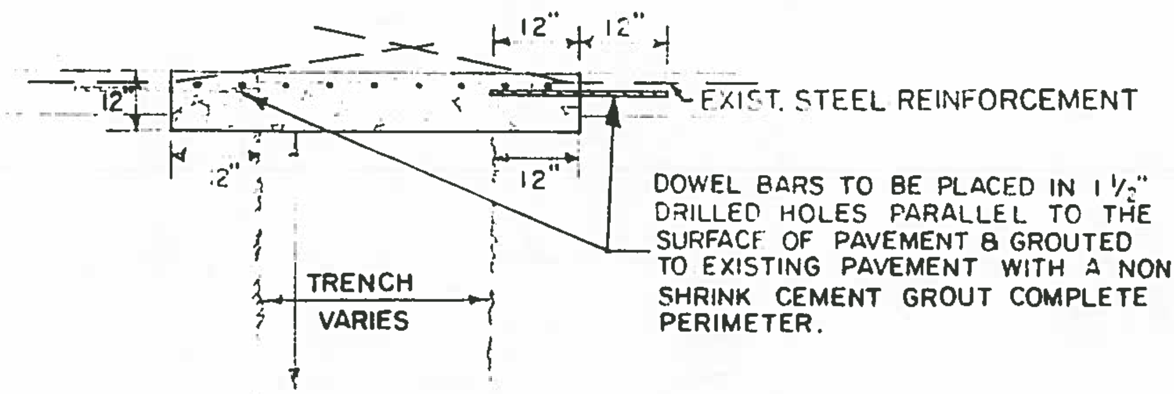
CONCRETE SREET TRENCH REPAVING

Donald Waldorf	7-7-81	Frank L. Pline	7-7-81
DESIGN DIV. ENGR	APP'D.	CITY ENGR.	APP'D.
[signature]	7/7/81	[signature]	7-7-81
STREET DIV. ENGR.	APP'D.	DIRECTOR	APP'D.



DETAIL OF TRENCH REPAVING

- The underpinning method should not be used if it will interfere with subbase drainage.
- Excavation made to greater dimensions than those shown for underpinning shall be replaced with concrete, and backfilling with other material will not be permitted.



ALTERNATE DETAIL

TOTAL SLAB REPLACEMENT REQ'D. ON ALL CONCRETE STREETS.

47

CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS — BUREAU OF ENGINEERING

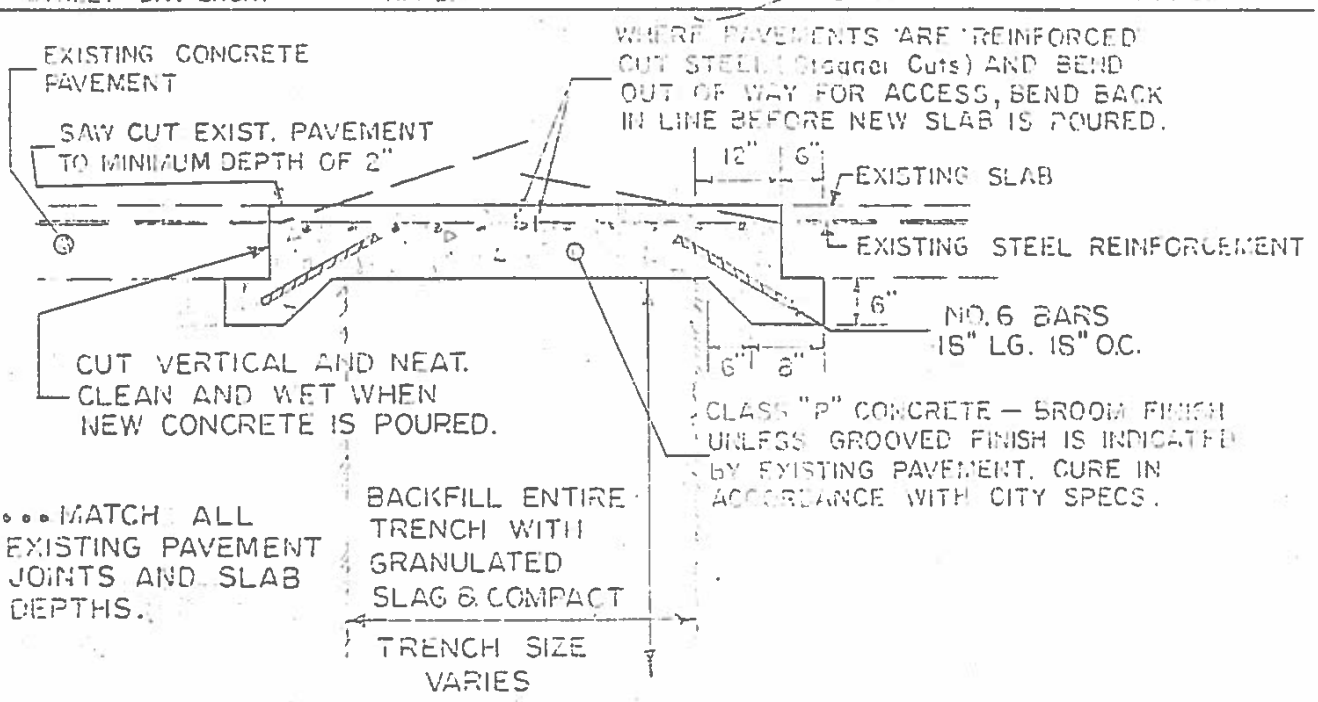
CONCRETE STREET TRENCH REPAVING

Daniel Widland — 7-7-81
DESIGN DIV. ENGR — APP'D.

Frank J. Flinn — 7-7-81
CITY ENGR. — APP'D.

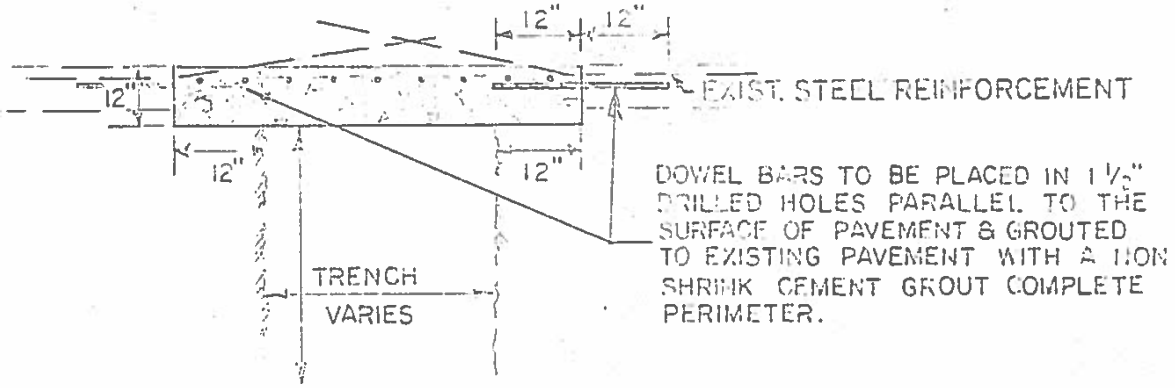
D J Tarasi — 7/7/81
STREET DIV. ENGR. — APP'D.

DIRECTOR — 7-7-81 — APP'D.



DETAIL OF TRENCH REPAVING

- The underpinning method should not be used if it will interfere with subbase drainage.
- Excavation made to greater dimensions than those shown for underpinning shall be replaced with concrete, and backfilling with other material will not be permitted.



ALTERNATE DETAIL

TOTAL SLAB REPLACEMENT [illegible] ON ALL CONCRETE STREETS.

ACCESSION NO. MIL-243 Fol. M-18

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS · BUREAU OF ENGINEERING

CORR. METAL PIPE SEWER ANCHOR

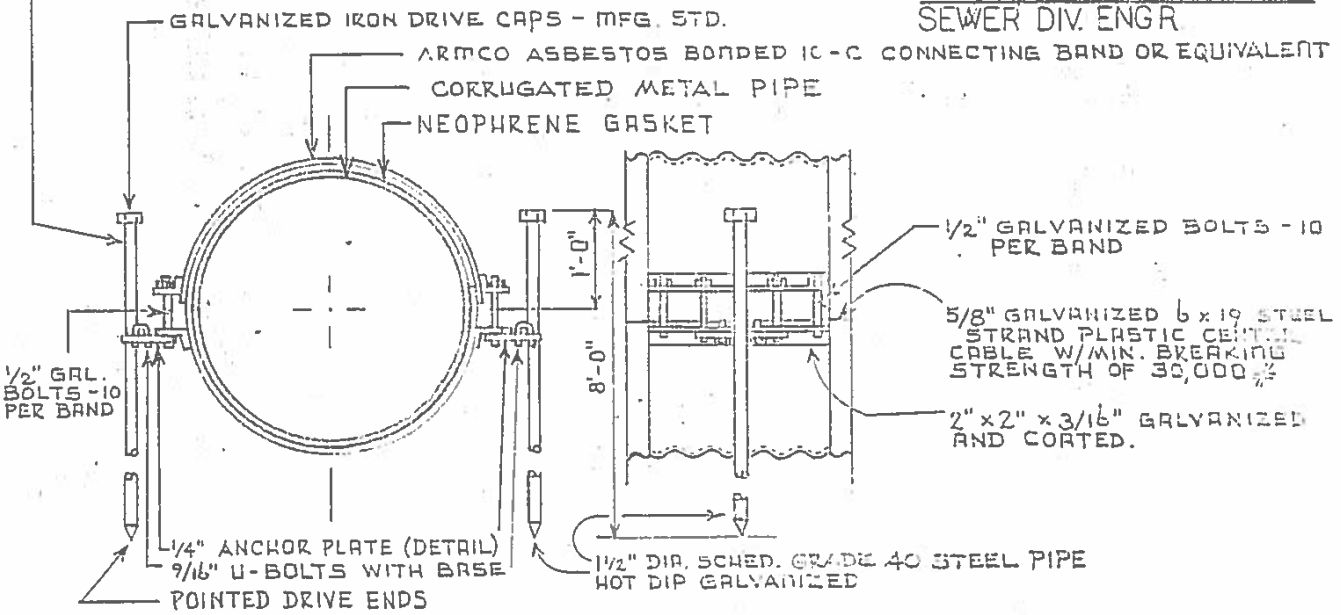
APPROVED 1-19-81 — DIVISION ENGR. DESIGN

APPROVED — CITY ENGINEER

APPROVED 1/19/81 — DIRECTOR D.P.W.

APPROVED — SEWER DIV. ENGR

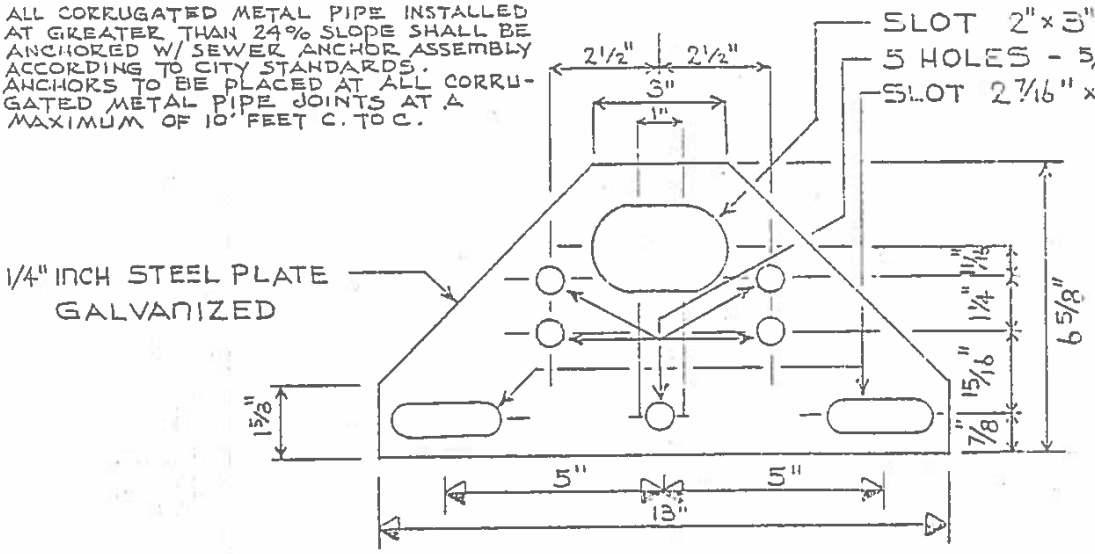
NOTE: ANCHOR ASSEMBLY TO BE FIELD COATED W/ BITUMINOID MATERIAL



SECTION — ELEVATION

STORM SEWER ANCHOR ASSEMBLY

ALL CORRUGATED METAL PIPE INSTALLED AT GREATER THAN 24% SLOPE SHALL BE ANCHORED W/ SEWER ANCHOR ASSEMBLY ACCORDING TO CITY STANDARDS. ANCHORS TO BE PLACED AT ALL CORRUGATED METAL PIPE JOINTS AT A MAXIMUM OF 10' FEET C. TO C.



ANCHOR PLATE DETAIL

NO SCALE

ML-242 FOL. M-1

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS — TYPE NO. 3 — BUREAU OF ENGINEERING

STANDARD STEEL PIPE WELDED RAILING

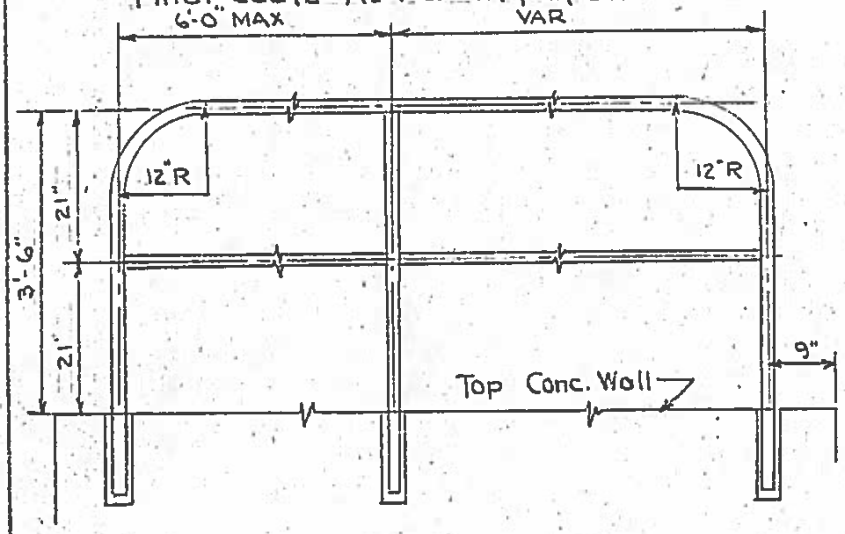
Approved 7-28-1965 — John K Rozzi — ASST CHIEF ENGR.

Approved 7-28-65 — L. H. Barnett — CHIEF ENGR D.P.W.

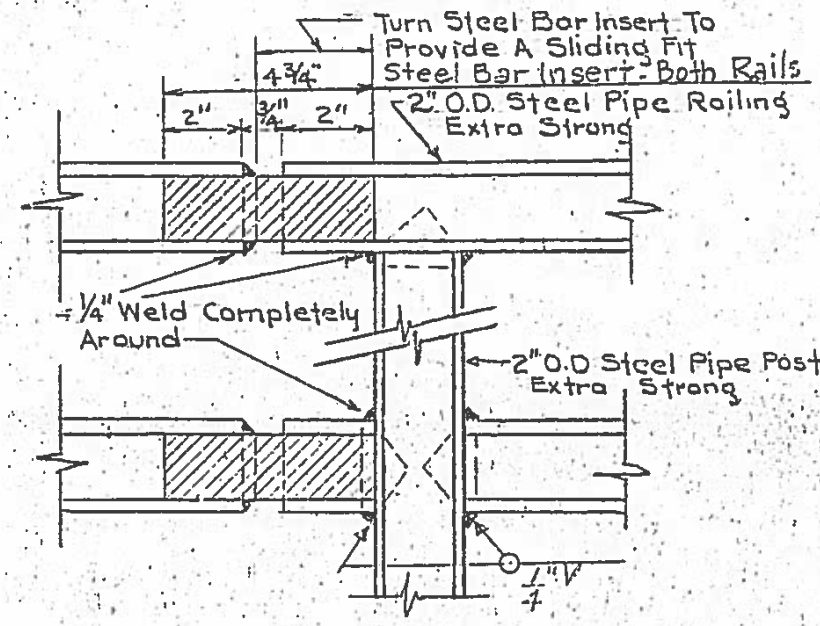
Approved _____ — DIRECTOR D.P.W

Approved 7-27-65 — A. J. Tarasi — DIV ENGR.-DESIGN

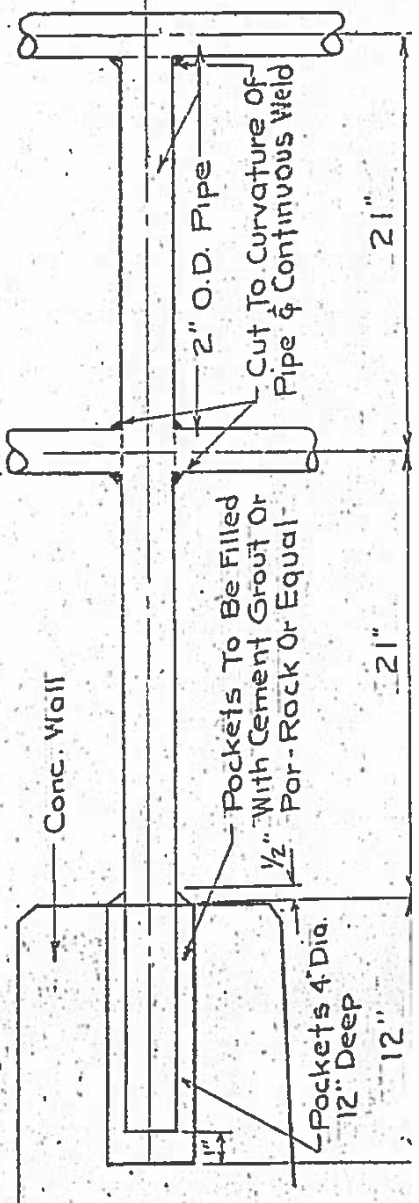
NOTE
All Welds To Be Ground Smooth
Shop Coat - One Coat Red Lead
Final Coats - As Per City Specs.



ELEVATION



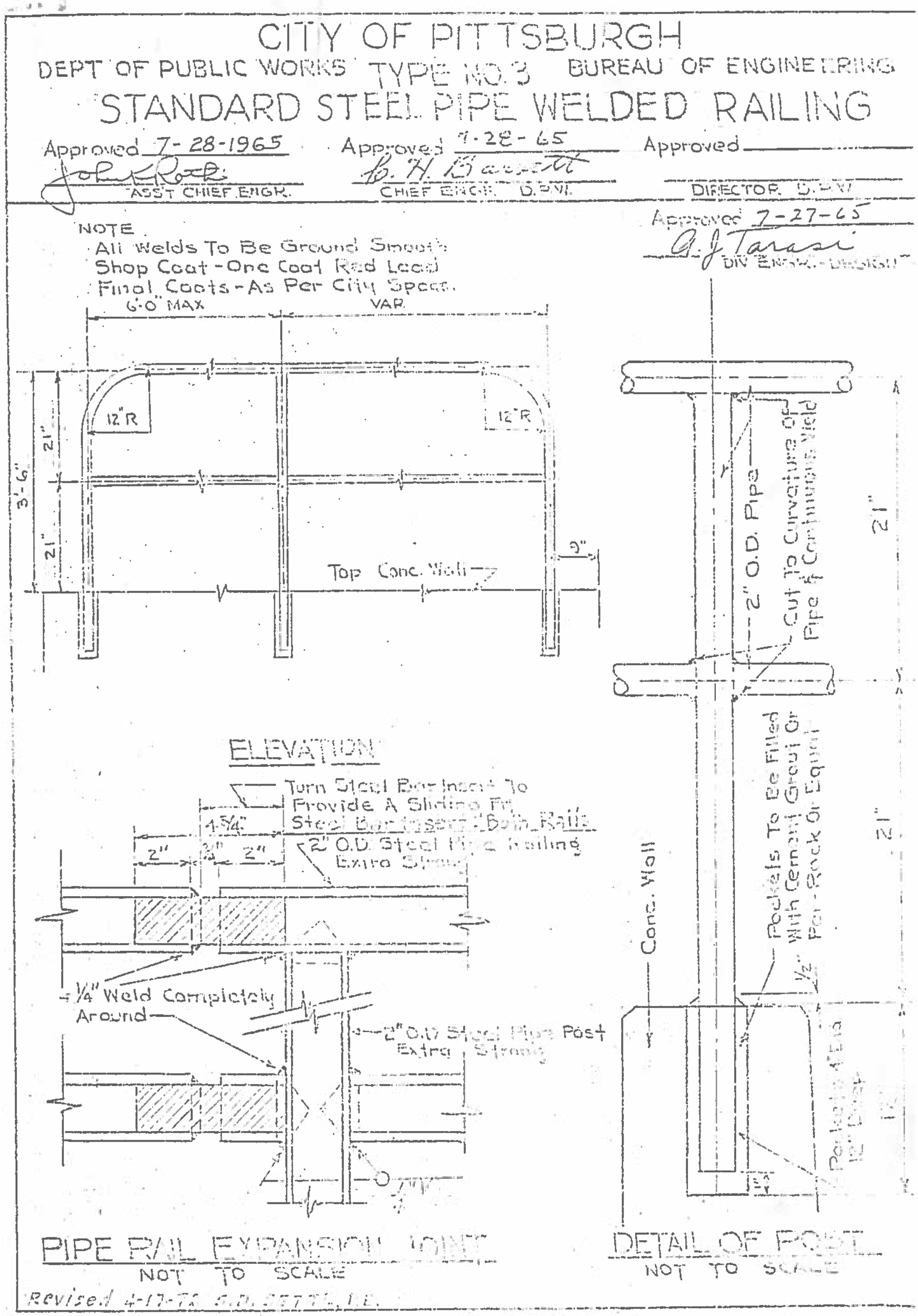
PIPE RAIL EXPANSION JOINT
NOT TO SCALE



DETAIL OF POST
NOT TO SCALE

Revised 4-17-72 S.D. SETTE, P.E.

ACCESSION No. ML-205
FOLDER No. M-16


CITY OF PITTSBURGH
DEPT OF PUBLIC WORKS
TYPE NO. 3
BUREAU OF ENGINEERING
STANDARD STEEL PIPE WELDED RAILING
Approved 7-28-1965
ASST CHIEF ENGR.
Approved 7-28-65
CHIEF ENGR. D.P.W.
Approved
DIRECTOR D.P.W.
Approved 7-27-65
NOTE
All Welds To Be Ground Smooth
Shop Coat - One Coat Red Lead
Final Coats - As Per City Specs.
6'-0" MAX
VAR.
12" R
21"
3'-6"
Top Conc. Wall
ELEVATION
Turn Steel Bar Insert To Provide A Sliding Fit
2" O.D. Steel Pipe Railing Extra Strong
1/4" Weld Completely Around
2" O.D. Steel Pipe Post Extra Strong
PIPE RAIL EXPANSION JOINT
NOT TO SCALE
2" O.D. Pipe
Cut To Curvature Of Pipe & Continuous Weld
Pockets To Be Filled With Cement Grout Or Per-Rock Or Equal
Conc. Wall
DETAIL OF POST
NOT TO SCALE

CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS — **TYPE 2** — **BUREAU OF ENGINEERING**

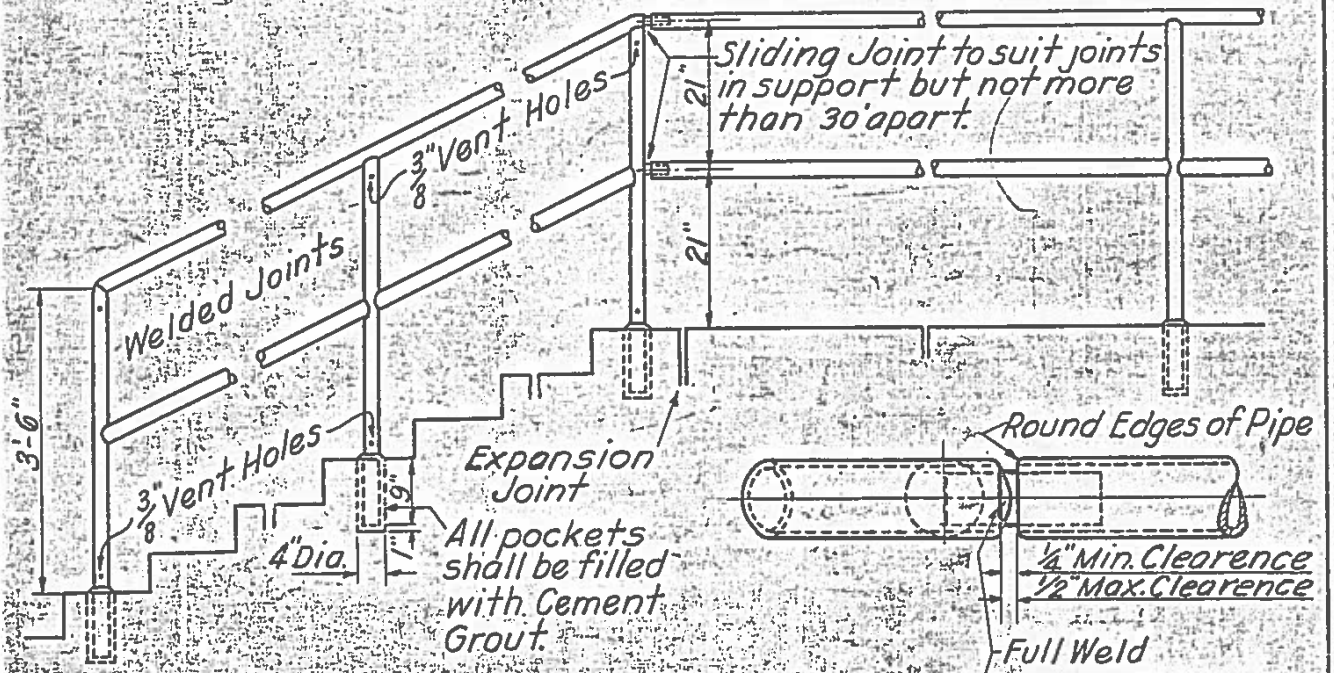
STANDARD IRON PIPE HAND RAILING

APPROVED Nov. 29, 1940 — Carl M. Vetter — CHIEF ENGR. B. OF E.

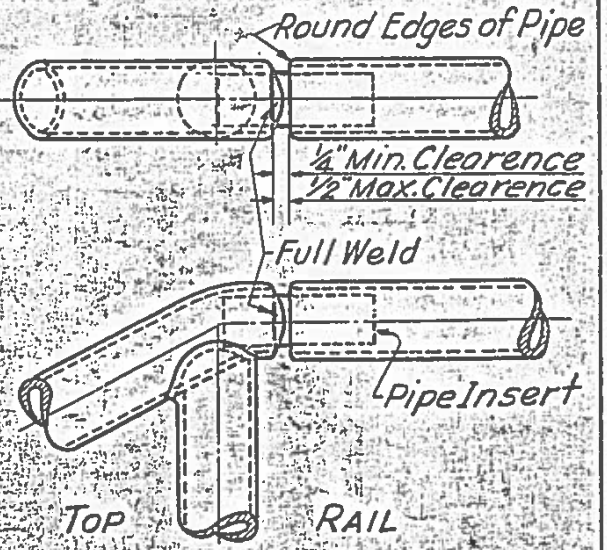
APPROVED 11-29-40 — John P. Conroy — CHIEF ENGR. D.P.W.

APPROVED 11/29/40 — DIRECTOR

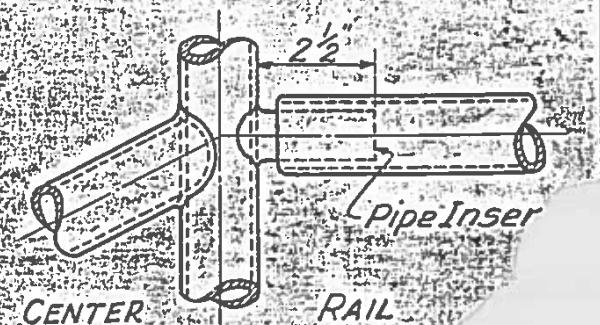
APPROVED 11-27-40 — B. T. Gordon — DIVISION ENGR.



ELEVATION



All rail posts to be set vertical
All Posts and Railings shall be Extra strong Steel Pipe of size specified and pointed in accordance with the Standard Specifications. Omit paint on bottom 9" of Posts.
All Welds shall be ground smooth.
Detail of Joints not shown to be approved by the Director.



DETAIL OF SLIP JOINT

ACCESSION No. ML-176
FOLDER No. M-15

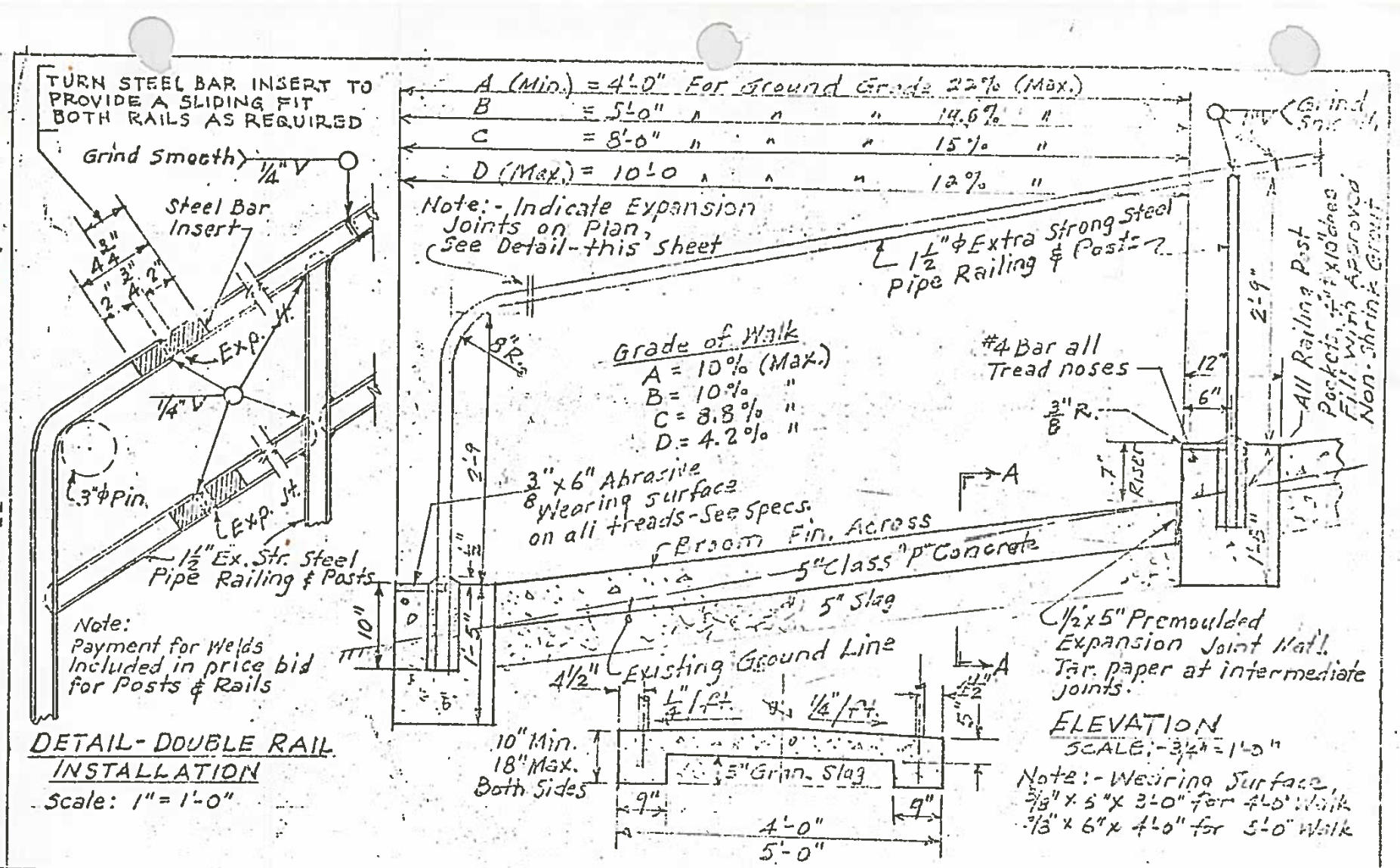
CITY OF PITTSBURGH
DEPARTMENT OF PUBLIC WORKS
BUREAU OF ENGINEERING

STANDARDS FOR CONSTRUCTION

Sheet No.	Description
4	Catch Basin Layout and Gutter Sumps
5	Catch Basin, Type 1 (Large Orifice)
6	Catch Basin, Type 3 (Small Orifice)
7	Catch Basin and Storm Inlet, Type 4 (Gutter Grating)
8	Catch Basin and Storm Inlet, Type 5 (Basket Grating)
9	Catch Basin, Type 6 (Open Mouth with Grating)
10	Storm Inlet, Type 1 (Large Orifice)
11	Storm Inlet, Type 2 (Large Orifice with extension for future Stench Cha
11-A	Storm Inlet, Type 2 - Method of Constructing Slot in Brick Work
12	Storm Inlet, Type 3 (Small Orifice)
13	Storm Inlet, Type 6 (Open Mouth with Grating)
14	Storm Inlet, Type 7 (Small Basket Grating)
15	House Laterals
16	Concrete Reinforcement for Sewers
17	Excavation Lines and Trench Repaving for Sewer Construction
18	Manholes over Terra Cotta Pipe Sewers
19	Manholes over Concrete Pipe Sewers
20	Brick Sewers and Manholes over Brick Sewers
26	Wooden Steps
27	Wood Fence and Wood Barrier
33	Sidewalk Pavements. Arrangement and Construction
34	Detail of Drop Manhole
35	Pre-Cast Concrete Manhole
36	Sewer Casting Schedule
37	Jumper Walk
38	Storm Inlet - Type 9 and 10
39	Storm Inlet - Type 11 and 12
40	Catch Basin - Type 9 and 10
41	Granite Curbs & Private Driveways
42	Pre-cast Concrete Drop Manhole
43	Pre-cast Concrete Drop Manhole
44	Pre-cast "T" Section Manhole and Base
45	Catch Basin with Hood & Trap - Type 11 & 12
46	Handicap Sidewalk Ramp
47	Concrete street Trench Repaving
48	Corr. Metal Pipe Sewer Anchor

ACCESSION N°. M1-2
FOLDER M-17

ITEM	FRAME			LID			GRATING			WEIR			STENCH			TOTAL WT. PER UNIT
	WT.	CAST. NO.	ACC. NO.	WT.	CAST. NO.	ACC. NO.	WT.	CAST. NO.	ACC. NO.	WT.	CAST. NO.	ACC. NO.	WT.	CAST. NO.	ACC. NO.	
C.B. TYPE 1-STRAIGHT	604	48	M-84	104	47	M-84				133	8	M-84	294	17	M-74	1135
C.B. TYPE 1-6' RAD.	589	49	M-85	104	47	M-84				158	9	M-85	294	17	M-74	1145
C.B. TYPE 1-12' RAD.	592	50	M-85	104	47	M-84				142	51	M-85	294	17	"	1132
C.B. TYPE 3-STRAIGHT	328	11	M-73	81	2	M-72				96	12	M-73	294	17	"	799
C.B. TYPE 4-STRAIGHT	713	19	M-75				244	20	M-75				294	17	"	1251
C.B. TYPE 5 STRAIGHT	433	69	M-125				149	68	M-125				294	17	"	876
C.B. TYPE 6 STRAIGHT	724	60-66	M-86				244	42	M-75				294	17	"	1262
C.B. TYPE 8 STRAIGHT	250	Allghy. Foundry Cast No FRAME 160 LID 161											294	17	"	544
C.B. TYPE 9 (4FT.) STR.	670	76	M-125	BAR 85	73	M-125	327	71	M-125				280	79	M-125	1362
C.B. TYPE 10 (6FT.) STR.	892	78	"	BAR 126	74	"	500	72	"				280	79	M-125	1798
C.B. TYPE 11 (4FT.) STR.	600	75	"	BAR 85	73	"	327	71	"	90° REINF. BARS IN CURB			294	17	M-74	1396
C.B. TYPE 12 (6FT.) STR.	792	77	"	BAR 126	74	"	500	72	"	120° REINF. BARS IN CURB			294	17	M-74	1832
S.I. TYPE 1-STRAIGHT	604	48	M-84	104	47	M-84				133	8	M-84				841
S.I. TYPE 1-6' RAD.	589	49	M-85	104	47	"				158	9	M-85				851
S.I. TYPE 1-12' RAD.	592	50	M-85	104	47	"				142	51	M-85				838
S.I. TYPE 2-STRAIGHT	604	48	M-84	104	47	"				133	8	M-84				841
S.I. TYPE 2-6' RAD.	589	49	M-85	104	47	"				158	9	M-85				851
S.I. TYPE 2-12' RAD.	592	50	M-85	104	47	"				142	51	M-85				838
S.I. TYPE 5-STRAIGHT	433	69	M-125				149	68	M-125							582
S.I. TYPE 6-STRAIGHT	724	60-66	M-85				244	42	M-75							968
S.I. TYPE 9 (4FT.) STR.	670	76	"	BAR 85	73	M-125	327	71	M-125							1082
S.I. TYPE 10 (6FT.) STR.	892	78	"	BAR 126	74	"	500	72	"							1518
S.I. TYPE 11 (4FT.) STR.	600	75	"	BAR 85	73	"	327	71	"	90° REINF. BARS IN CURB						1102
S.I. TYPE 12 (6FT.) STR.	792	77	"	BAR 126	74	"	500	72	"	120° REINF. BARS IN CURB						1538
MANHOLE-6" FRAME	283	65	M-76	216	25	M-76										499
MANHOLE-9" FRAME	571	26	M-76	216	25	M-76										788
MANHOLE-13" FRAME	744	23	M-76	216	25	M-76										960
8' Depth-MANHOLE STEPS	13/Step	64	M-74	6 STEPS												78
10 " " "	"	"	"	8 STEPS												104
15 " " "	"	"	"	12 STEPS												156
20 " " "	"	"	"	16 STEPS												208
C.B. Type 11													Hook No. 404 Trap No. 402-15 Allghy Fdry. or Eq. Wt. 145 lbs.			1250
C.B. Type 12																1686



APPROVED — DATE

Anthony J. Tarasi — DESIGN DIV. ENGR. — 4-6-72

John R. Martini — CITY ENGR. - D.P.W. — 4-6-72

DIRECTOR — 4-6-72

SUPERSEDES DWG. NO. L-355

REVISED [illegible] SCALES: AS NOTED FILE NO. [illegible]

CITY OF PITTSBURGH
DEPARTMENT OF PUBLIC WORKS
BUREAU OF ENGINEERING

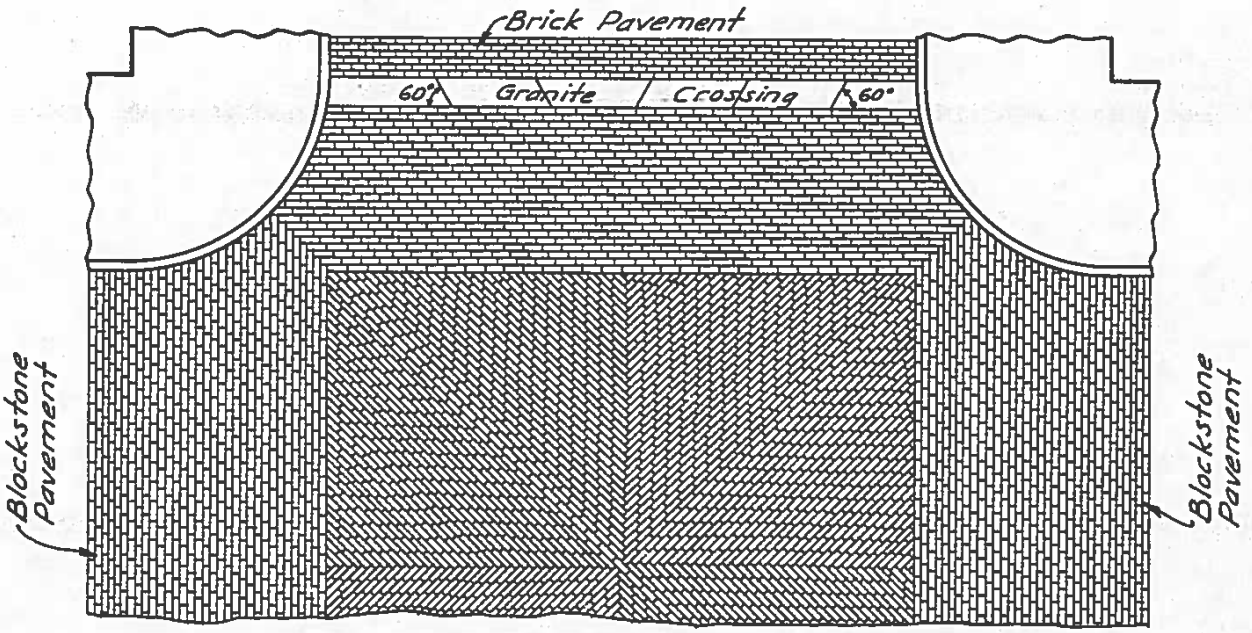
STANDARD - JUMPER WALK

DWG. NO. L-355-A

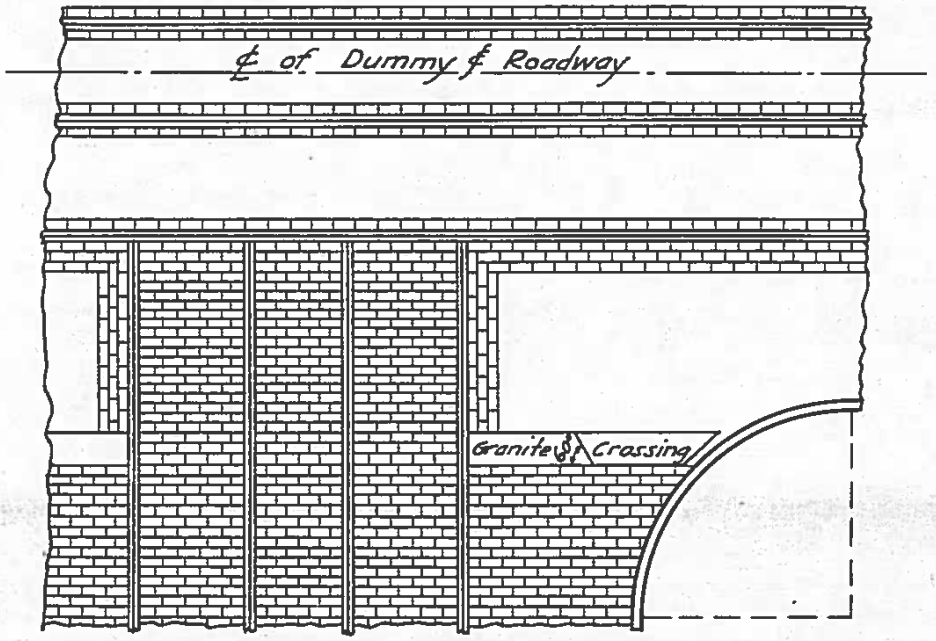
CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS — BUREAU OF ENGINEERING

PAVING DETAILS AT STREET INTERSECTIONS



PLAN FOR PAVING STREET INTERSECTIONS
WITH BLOCKSTONE AND VITRIFIED BRICK PAVEMENTS
Scale:- 0 1 2 3 4 5 6 7 8



PLAN OF STREET INTERSECTION WITH CAR TRACKS
SHOWING ASPHALT AND BLOCKSTONE PAVEMENT
Scale:- 1/8"=1'-0"

Approved 7-29-30
DIVISION ENGR.

Approved 8-8-30
CHIEF ENGR.- B. of E.

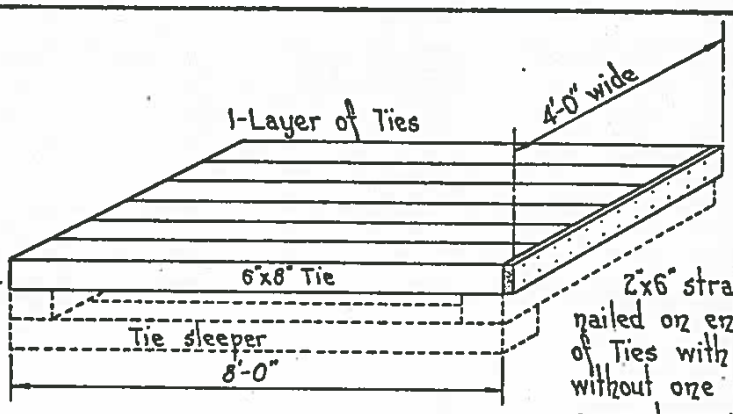
Approved 9-26-30
CHIEF ENGR.- D. P. W.

Approved 9-26-30
DIRECTOR

CITY OF PITTSBURGH

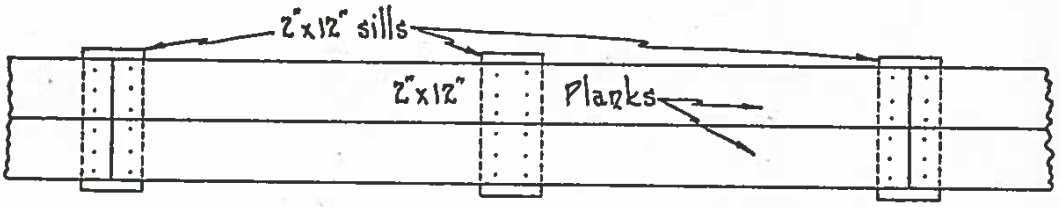
DEPT. OF PUBLIC WORKS — BUREAU OF ENGINEERING

TEMPORARY LOADING PLATFORMS
CROSS AND SIDE FOOT WALKS



LOADING PLATFORM

2"x6" strap nailed on ends of Ties with or without one or more layers of sleepers.



PLAN

Additional sills or sleepers to be supplied where required to provide proper elevation.

ELEVATION

CROSS AND SIDE FOOT WALKS

For Residences – not under 24" wide.
For Business and Institutional Establishments 3' or more wide as indicated on plans.

Approved 4-30-31
DIVISION ENGR.

Approved 5-9-31
CHIEF ENGR. B. OF E.

Approved 5-9-31
CHIEF ENGR. D.P.W.

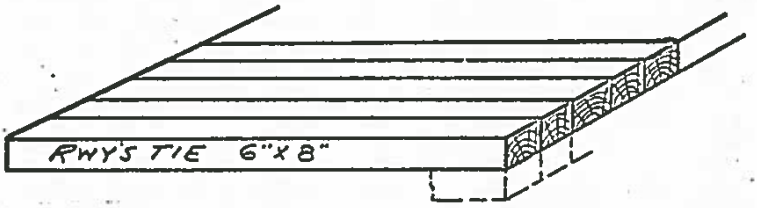
Approved 5-9-31
DIRECTOR.

Folder No. M1-9

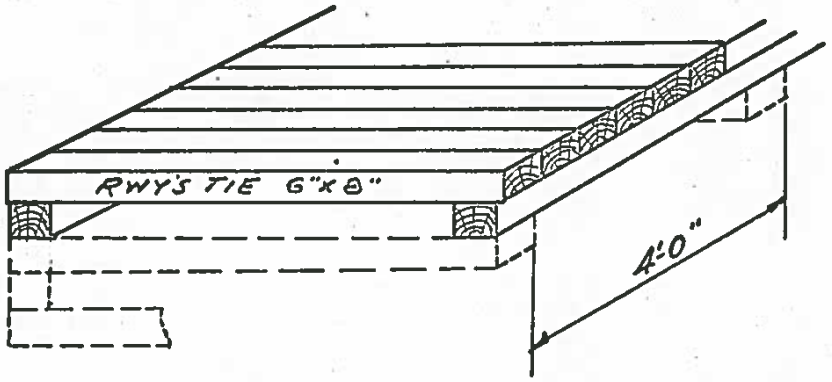
CITY OF PITTSBURGH

DEP'T OF PUBLIC WORKS BUREAU OF ENGINEERING

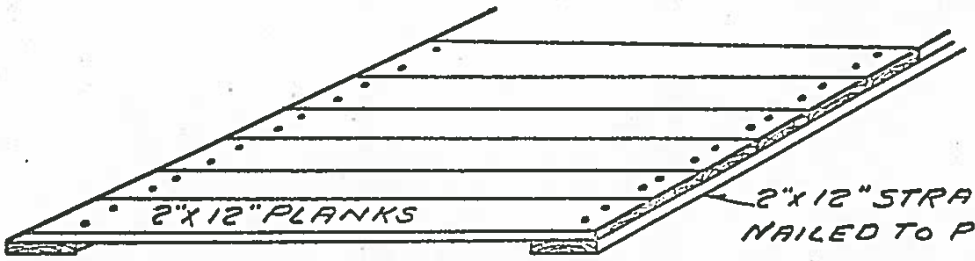
TEMPORARY ROADWAY CROSSINGS STREET, WAYS AND DRIVEWAYS



ONE OR MORE LAYER OF TIES



ONE LAYER OF TIES
WITH
ONE OR MORE LAYERS OF TIE SLEEPERS



ONE LAYER OF PLANKING
(MAY BE ERECTED ON ONE OR MORE
LAYERS OF TIE SLEEPERS)

APPROVED 4-30-31

DIVISION ENG'R [signature]

APPROVED 5-9-31
[signature]
CHIEF ENGINEER - B.O.F.E.

APPROVED 5-9-31
[signature]
CHIEF ENG'R D.P.W.

APPROVED 5-9-31
[signature]
DIRECTOR

Folder No. M-9
Sheet No. ML-84

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS — BUREAU OF ENGINEERING

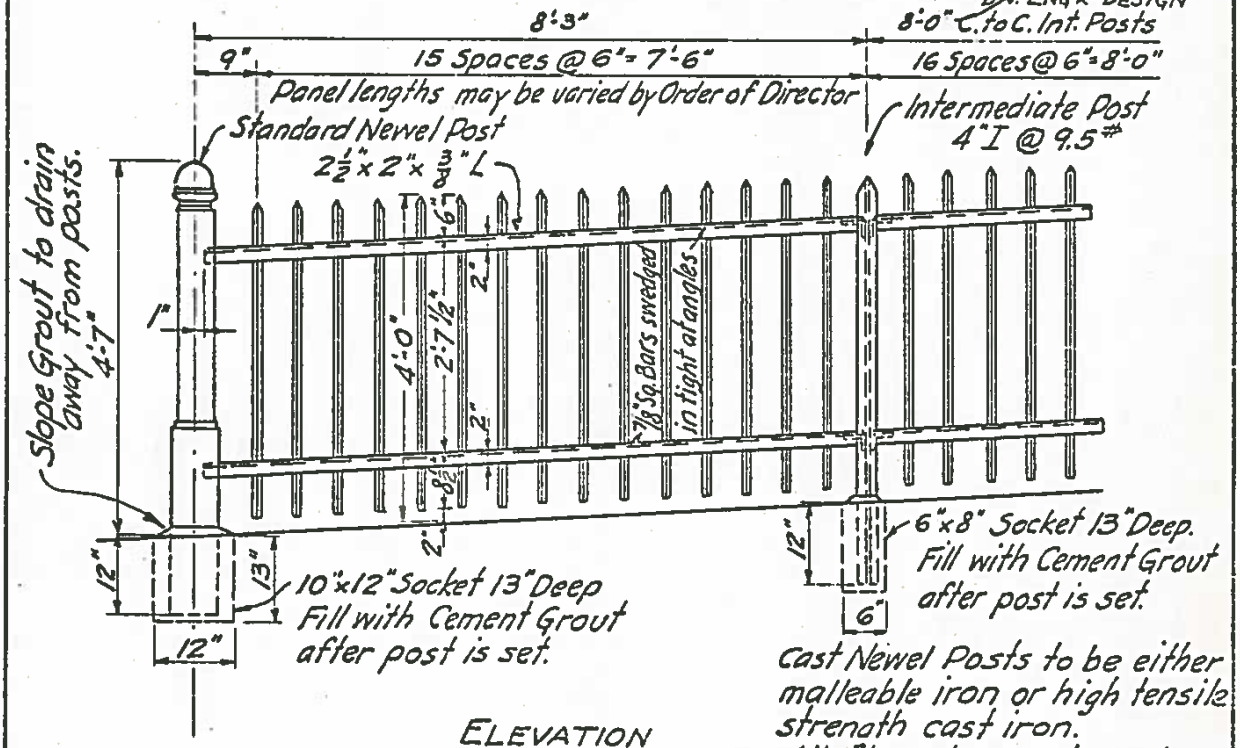
IRON FENCE TYPE 2 -ASSEMBLY

Approved 6-22-38 — John M. Stevenson, CHIEF ENGR B of E.

Approved 6-22-38 — Arthur J. Croft, CHIEF ENGR D.P.W.

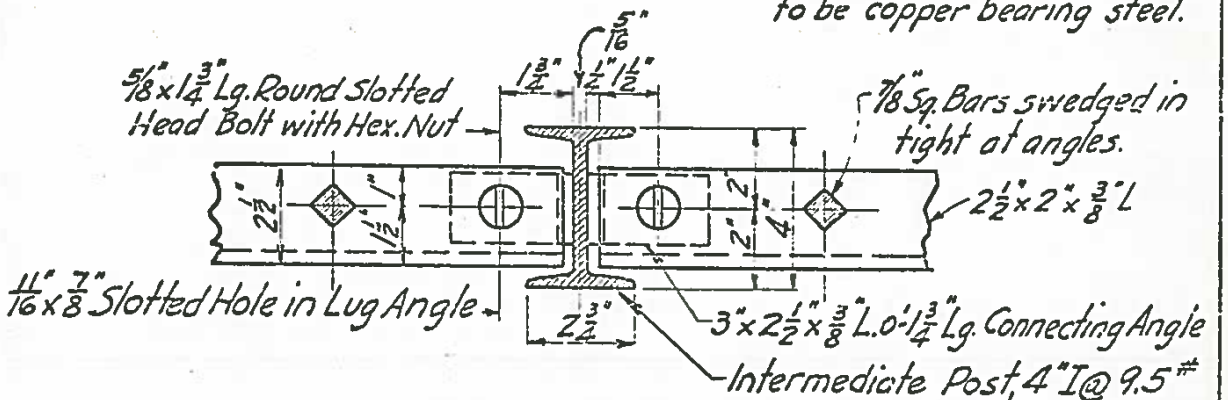
Approved 6/23/38 — DIRECTOR

Approved 6-22-38 — B. J. Gordon, DIV. ENG'R DESIGN



ELEVATION

Cast Newel Posts to be either malleable iron or high tensile strength cast iron. All other structural members to be copper bearing steel.



PLAN OF RAIL AT INTERMEDIATE POST

Sheet No. M-10

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS — BUREAU OF ENGINEERING

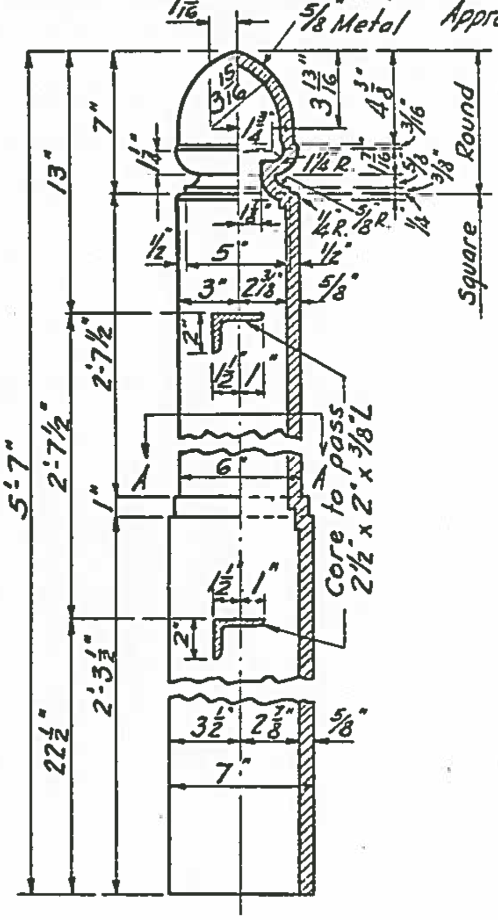
STANDARD NEWEL POST FOR IRON FENCE TYPE 2

Approved 6-22-38 — John B. Stevenson, CHIEF ENGR B. OF E.

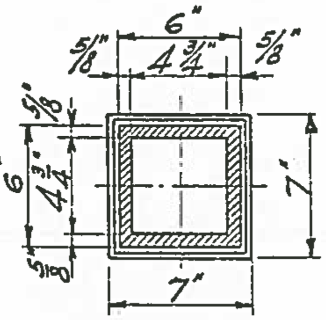
Approved 6-22-38 — John J. Brook, CHIEF ENGR D.P.W.

Approved 6-23-38 — [signature], DIRECTOR

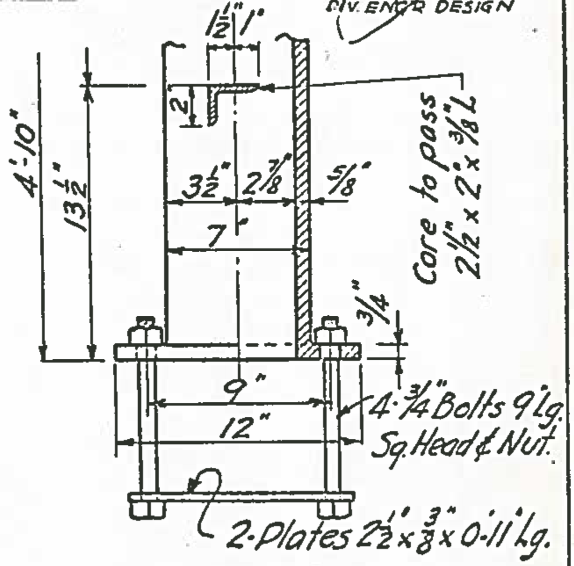
Approved 6-22-38 — B. J. Gordon, DIV. ENGR DESIGN



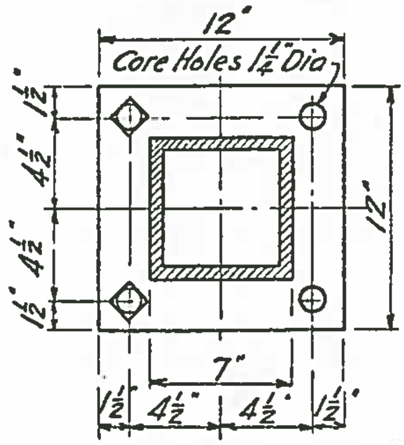
STANDARD NEWEL POST



SECTION A-A



BASE SECTION



BASE PLAN

NEWEL POST BASE AND ANCHORAGE
To be used only for replacements.

Cast Newell Posts to be either malleable iron or high tensile strength cast iron.

Folder No. M-10

CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS — BUREAU OF ENGINEERING

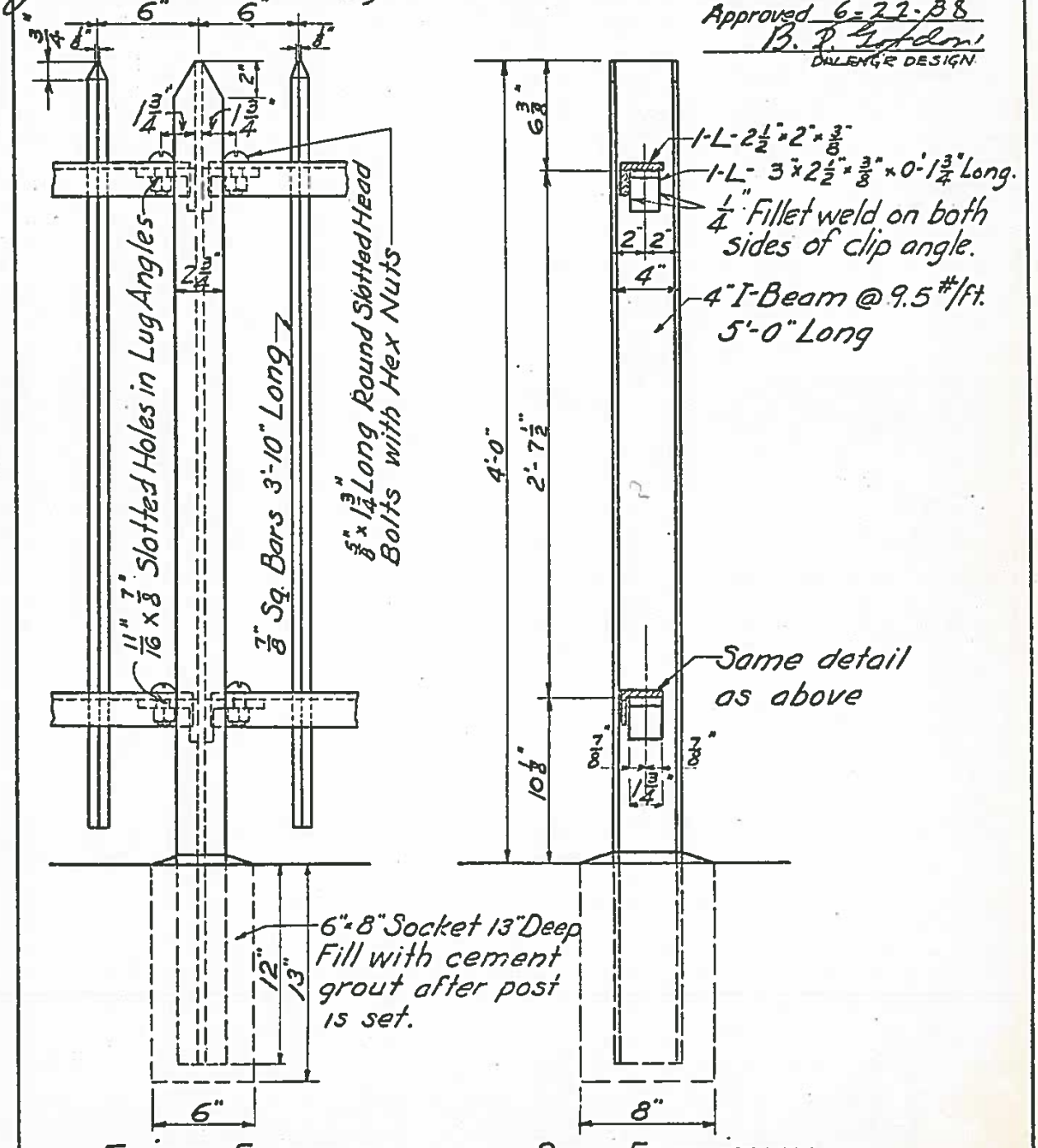
IRON FENCE TYPE 2 - INTERMEDIATE POST

Approved 6-22-38 — CHIEF ENGR B. of E.

Approved 6-22-38 — CHIEF ENGR D.P.W.

Approved 6/23/38 — DIRECTOR

Approved 6-22-38 — B. P. Gordon, CHIEF ENGR DESIGN



Assi No. ML-96
Folder No. M-10

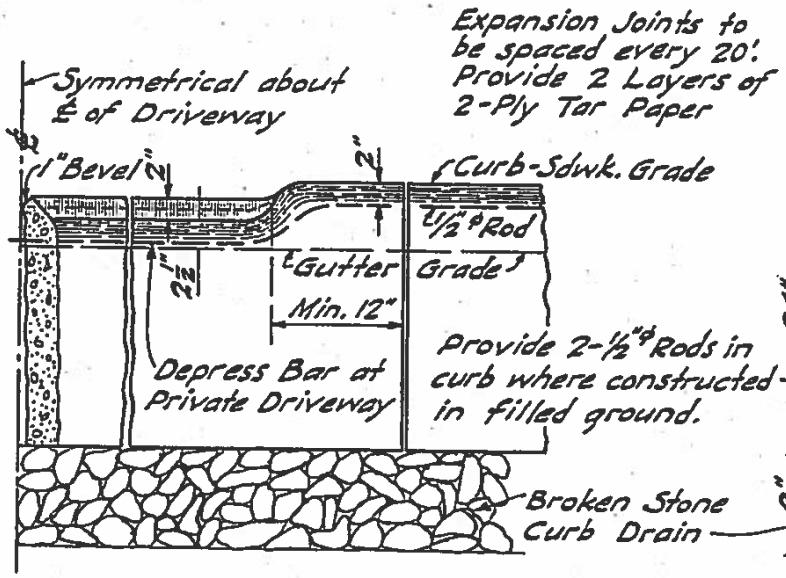
30

Sheet 3 of 3

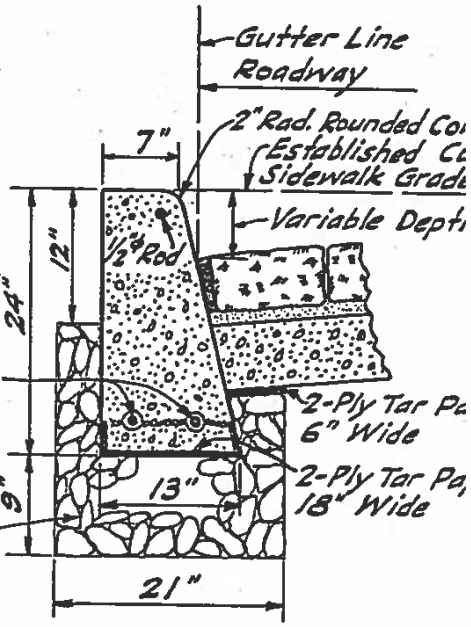
CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS — BUREAU OF ENGINEERING

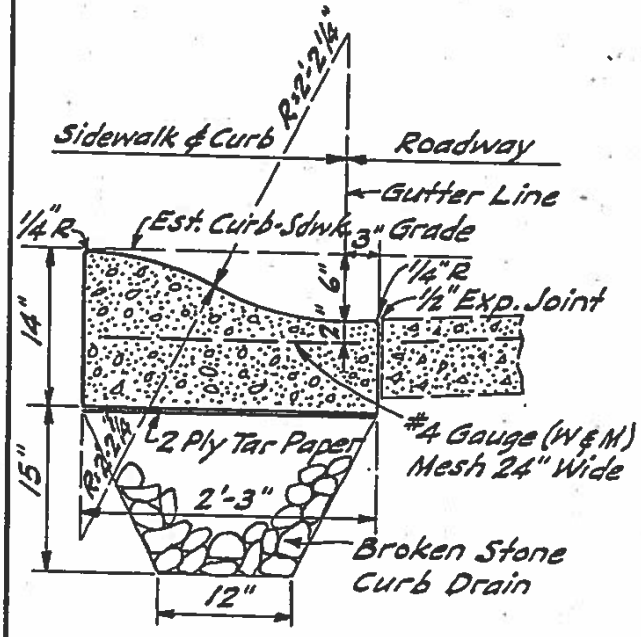
PLAIN CONCRETE CURBS AND PRIVATE DRIVEWAYS



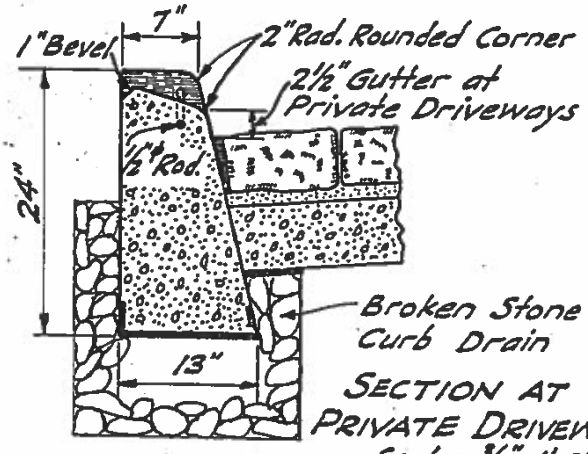
ELEVATION AT PRIVATE DRIVEWAY
Scale:- ¾" = 1'-0"



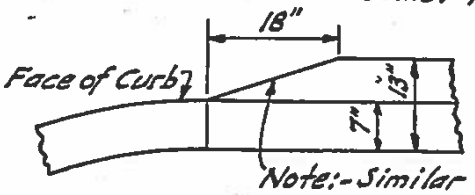
SECTION
Scale:- ¾" = 1'-0"



DETAIL OF COMBINED CURB AND GUTTER
Scale:- ¾" = 1'-0"



SECTION AT PRIVATE DRIVEWA
Scale:- ¾" = 1'-0"



Note:- Similar treatme
of bevel shall apply at e
of curb adjoining C. B.

EVOLUTION PLAN INTO RADIUS CURB WITH VERTICAL FACE
Scale:- ½" = 1'-0"

Approved 7-28-30
John J. Croak
DIVISION ENGR.

Approved 8-8-30
Jas. M. Paul
CHIEF ENGR. - B. OF E.

Approved 9-26-30
Chas. M. Reppert
CHIEF ENGR. - D.P.W.

Approved 9-26-30
Edward H. Lan
DIRECTOR.

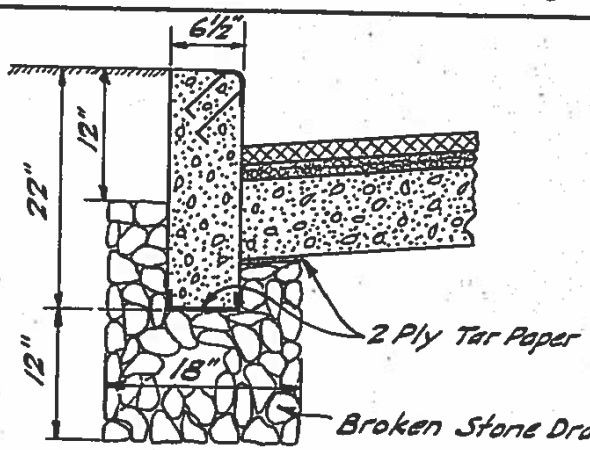
SHEET No. 12

ACCE No. ML-124
FOL No. M-12

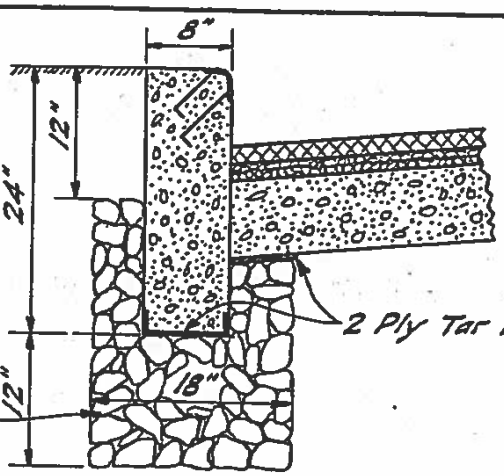
CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS — BUREAU OF ENGINEERING

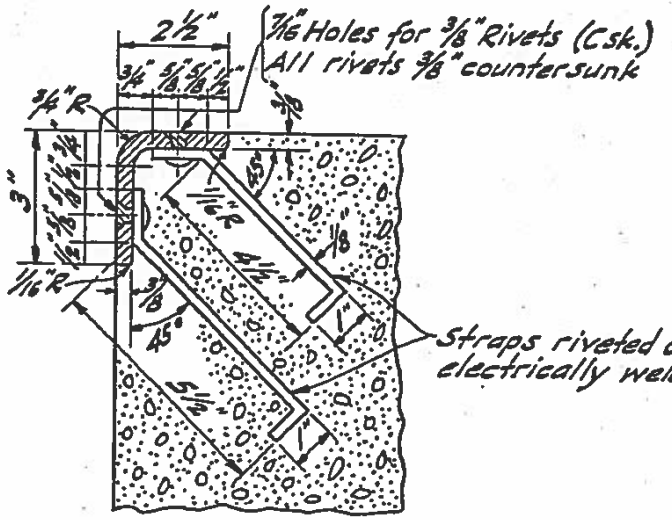
PROTECTED CONCRETE CURBS AND PRIVATE RETURNS



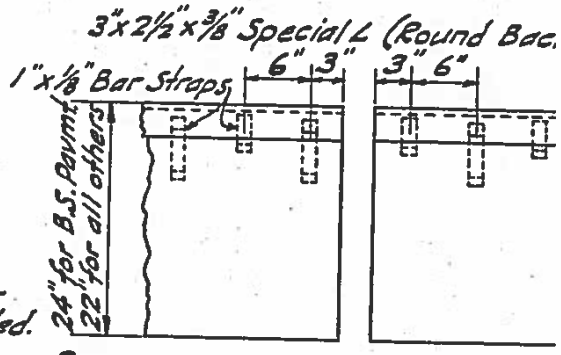
PROTECTED CONCRETE CURB, TYPE 1
Scale:- ¾"=1'-0"



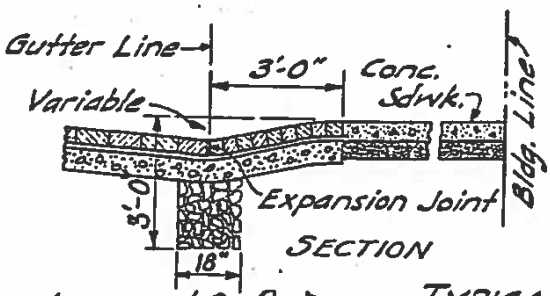
PROTECTED CONCRETE CURB, TYPE 2
Scale:- ¾"=1'-0"



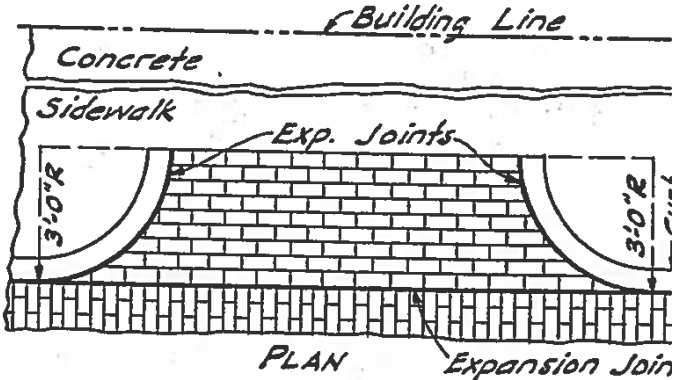
DETAIL OF ANGLE & STRAPS..
Scale:- 3"=1'-0"



PROTECTED CONCRETE CURB ELEVATION
Scale:- ¾"=1'-0"



SECTION



TYPICAL DETAIL OF PAVING AT PRIVATE RETURNS
Scale:- ¼"=1'-0"

Approved 8-8-30
DIVISION ENGR.

Approved 8-8-30
CHIEF ENGR.- B. OF E.

Approved 9-26-30
CHIEF ENGR.- D.P.W.

Approved 9-26-30
DIRECTOR

SHEET No 13

ACC No. ML-125
FOL No. M-12

CITY OF PITTSBURGH

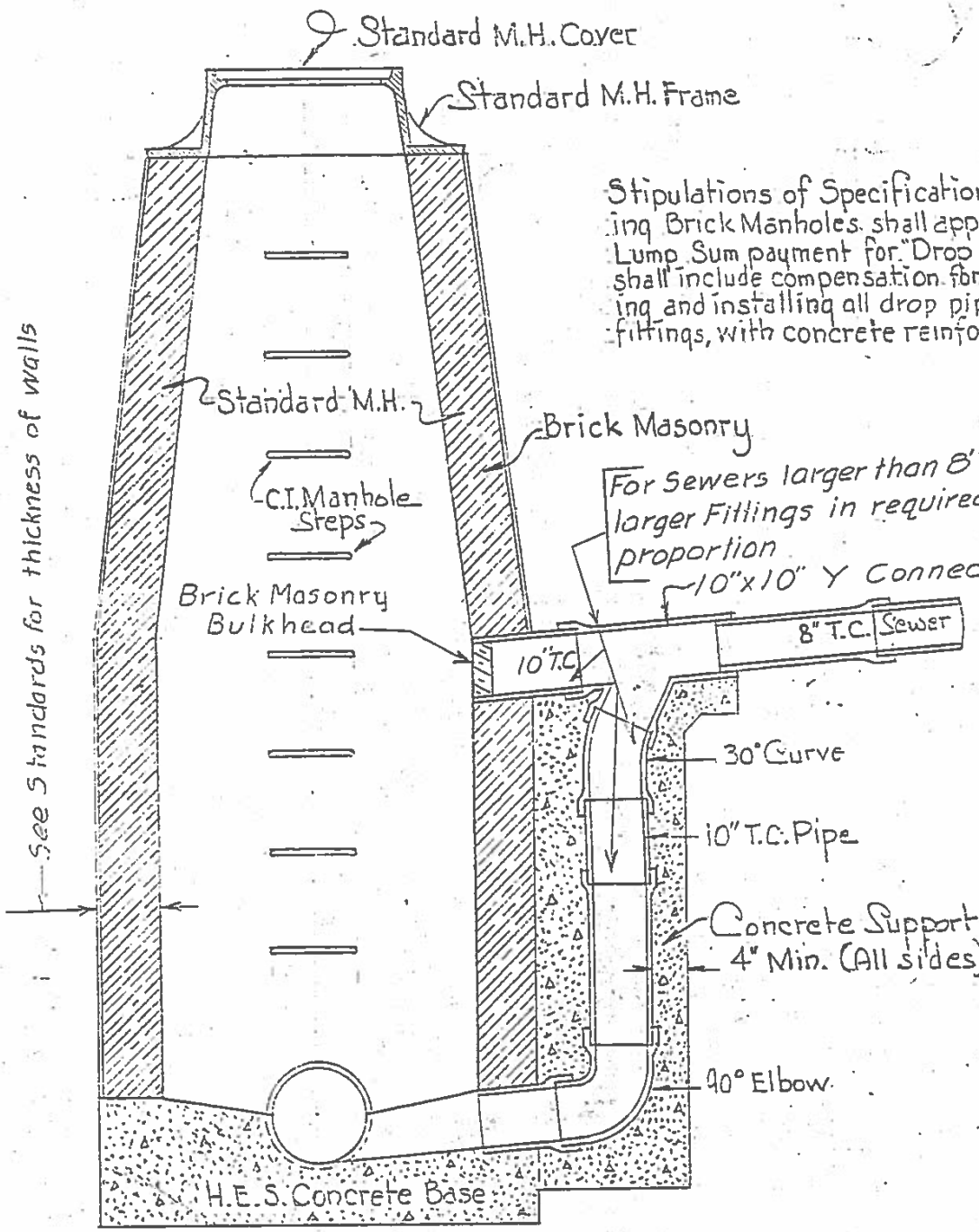
DEPT. OF PUBLIC WORKS — BUREAU OF ENGINEERING

DETAIL OF DROP MANHOLE

Approved 3-18-44 — DESIGNING ENGINEER

Approved 3-18-44 — ASST. CHIEF ENGR. D.P.W.

Approved _____ — DIRECTOR



ACCESSION NO. ML-183
FOLDER NO. M-16

REVISED 7-13-53

3" = 1'

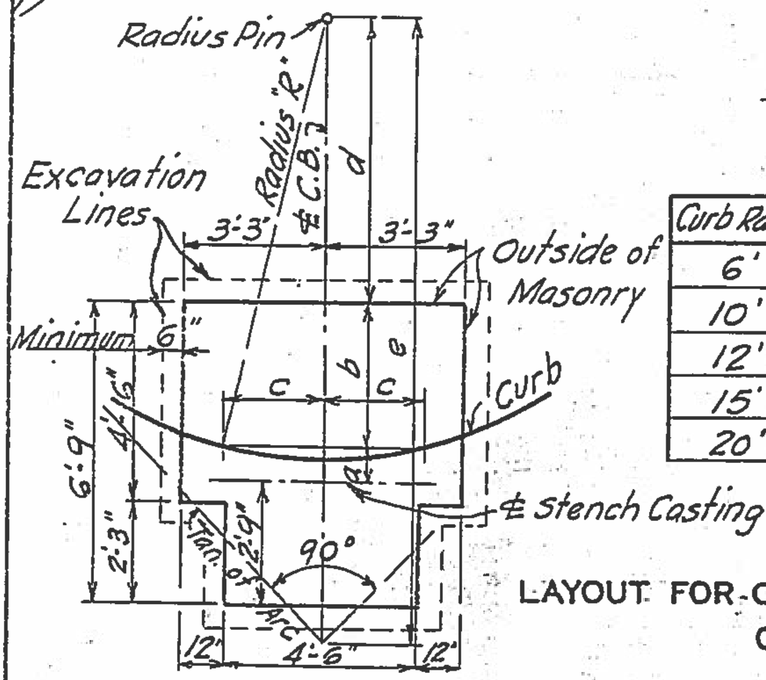
CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS **BUREAU OF ENGINEERING**

CATCH BASIN LAYOUTS AND GUTTER SUMPS

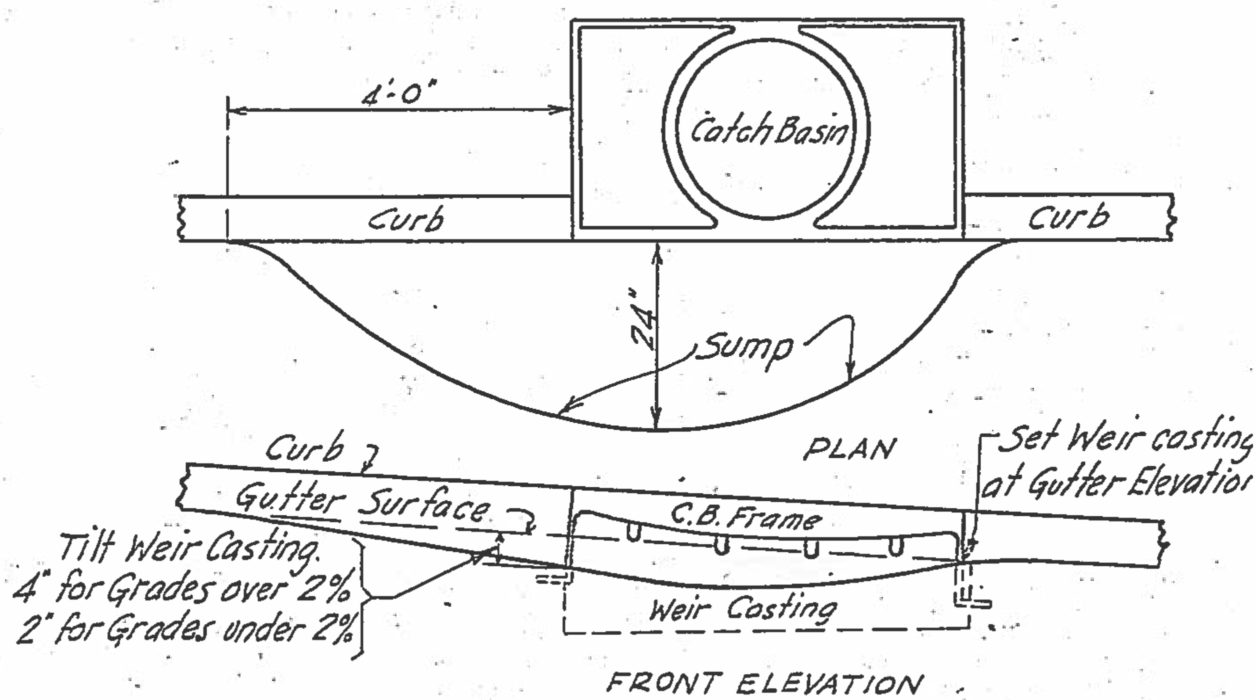
Approved Jan. 6 '37 — Engr in Charge E. of E.
Approved June 8 1937 — Chief Engr D.P.W.
Approved — Director

Approved Jan. 6, 1937
Carl M. Vetter
Designing Engr



Curb Rad.	a	b	c	d	e
6'	12 5/8"	2'-11 3/8"	2'-6"	2'-6"	8'-5 3/4"
10'	8 7/8"	3'-3 1/8"	2'-4 3/4"	6'-6"	14'-1 3/4"
12'	8 7/8"	3'-3 1/8"	2'-4 3/4"	8'-6"	16'-11 3/4"
15'	8 7/8"	3'-3 1/8"	2'-4 3/4"	11'-6"	21'-2 1/2"
20'	6"	3'-6"	2'-3"	16'-4 1/2"	28'-3 3/8"

LAYOUT FOR CATCH BASIN CONSTRUCTION ON CURVES



WEIR AND GUTTER SUMP ARRANGEMENT

At intersection of two descending grades, set ends of weir casting 2" below normal gutter grades and provide sump 9 Ft. long and 18 inches maximum width at ℄ of Catch Basin

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS — BUREAU OF ENGINEERING

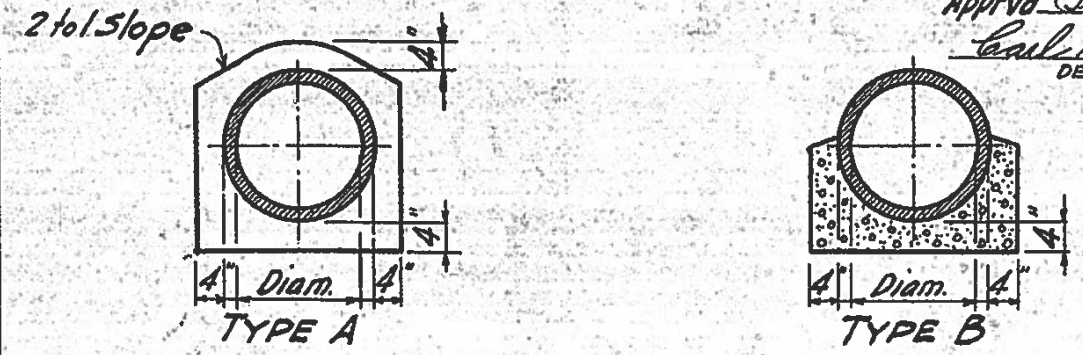
CONCRETE REINFORCEMENT FOR SEWERS

Approved Jan. 6, '37 — ENGR IN CHARGE BOFE

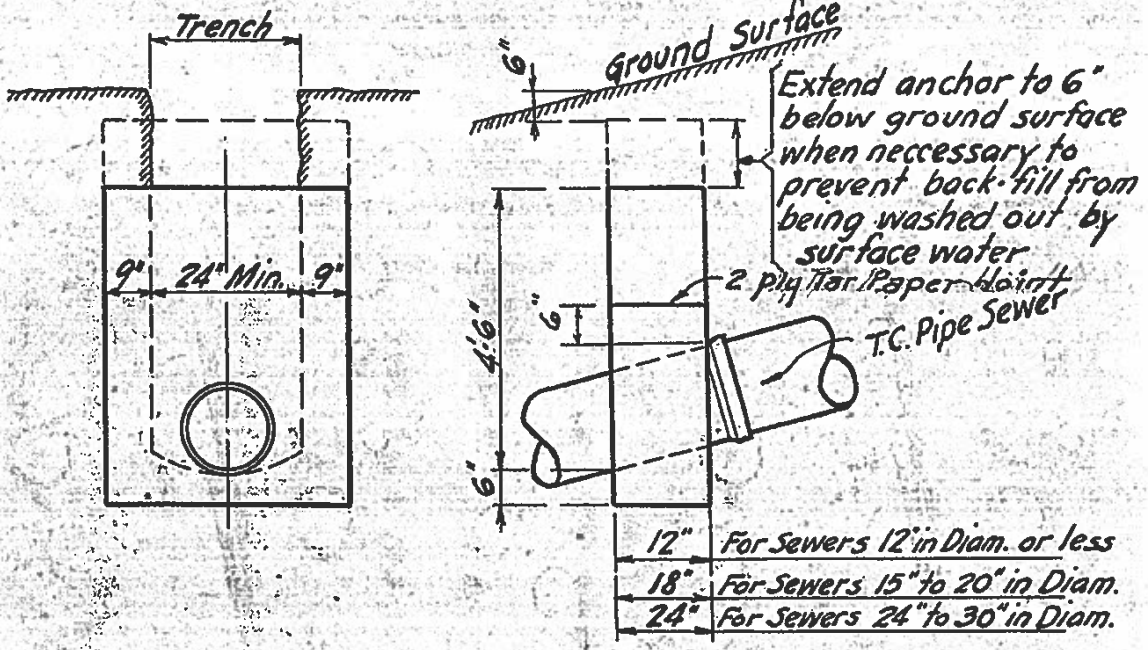
Approved Jan. 8, '37. — CHIEF ENGR D.P.W.

Approved Jan. 9, '37 — DIRECTOR

Apprvd Jan. 6 1937
Carl M. Vetter
DESIGNING ENGR



DETAILS OF CONCRETE REINFORCEMENT FOR PIPE SEWERS



CONCRETE ANCHORS FOR SEWERS ON STEEP GRADES

Provide no anchors on grades less than 24%
Provide anchors 36' C. to C. on grades between 24% and 34%
Provide anchors 24' C. to C. on grades between 34% and 50%
Provide anchors 16' C. to C. on grades between 50% and 70%
For Conditions other than shown hereon anchors shall be provided as required by the Contract Plans or ordered in the field by the Director.

ACCESSION No. ML-163
FOLDER No. M-14

16

CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS — BUREAU OF ENGINEERING

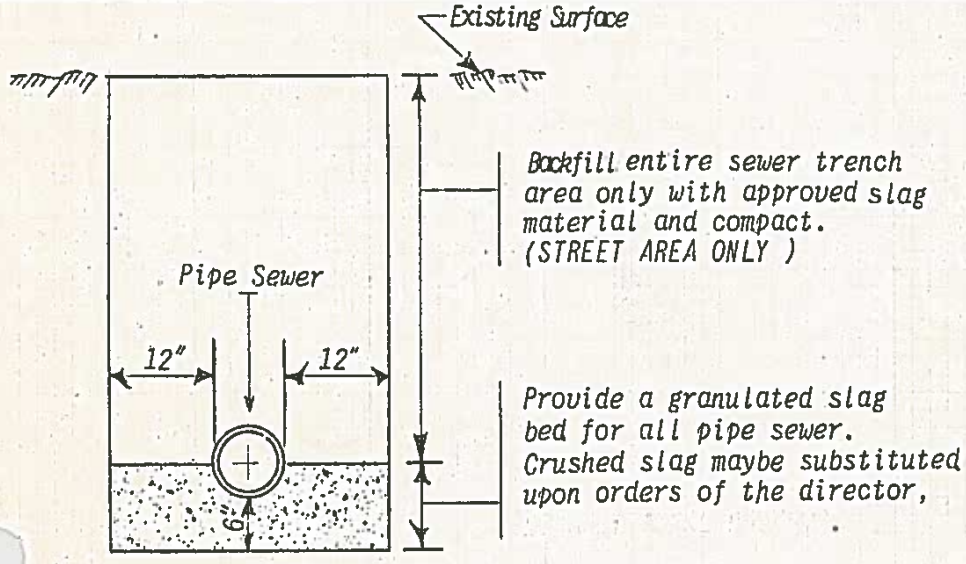
EXCAVATION LINES AND TRENCH REPAVING FOR SEWER CONSTRUCTION

Donald Eikelder — DESIGN DIV. ENGR. — 2-2-82 APP'D

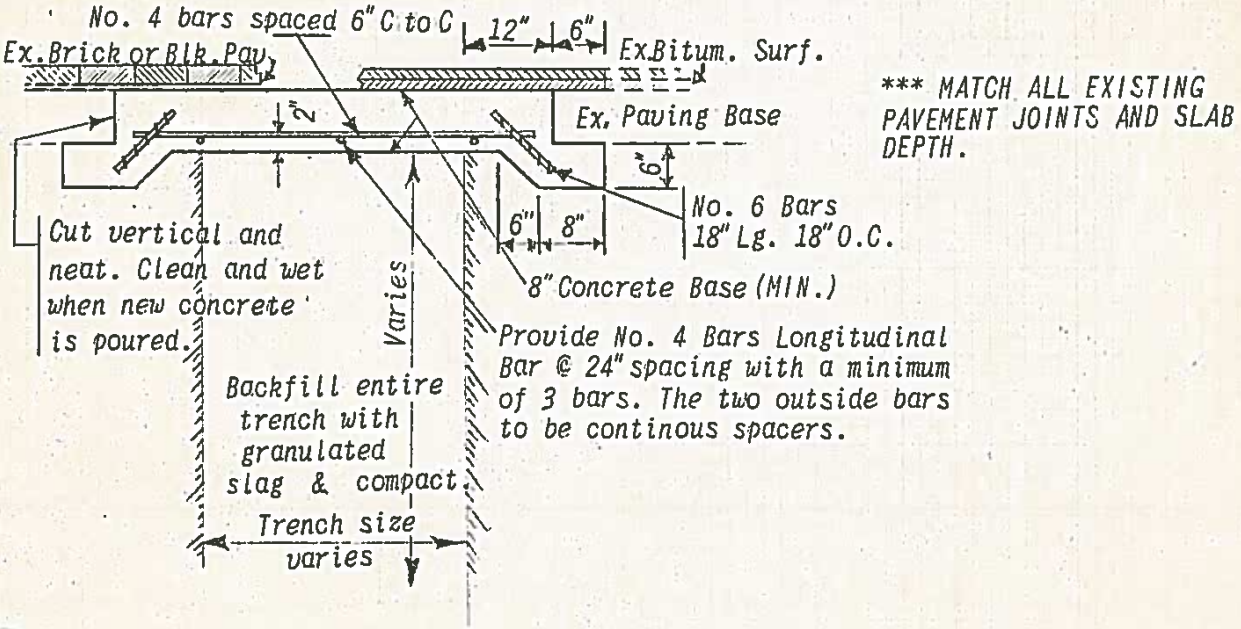
Frank L. Kline — CITY ENGR. — 2/3/82 APP'D

SEWER DIV. ENGR. — 2-3-82 APP'D

DIRECTOR — 2/3/82 APP'D



SEWER TRENCH DETAIL



*** MATCH ALL EXISTING PAVEMENT JOINTS AND SLAB DEPTH.

*The underpinning method should not be used if it will interfere with sub-base drainage.

*Excavation made to greater dimensions than those shown for underpinning shall be replaced with concrete; backfilling with other material will not be permitted.

17

ML-164-A M14

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS — BUREAU OF ENGINEERING

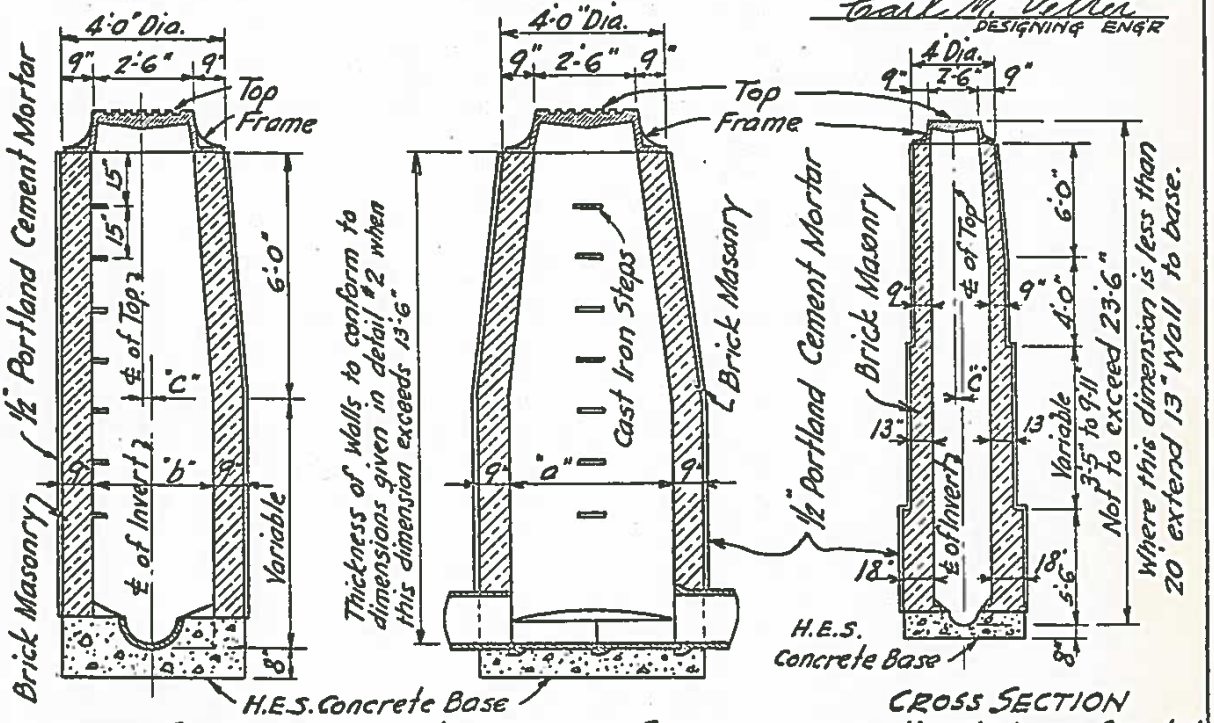
MANHOLES OVER TERRA COTTA PIPE SEWERS

Approved _____ ENGR IN CHARGE B. of E.

Approved Jan. 6, 1937 _____ CHIEF ENGR D.P.W.

Approved _____ DIRECTOR

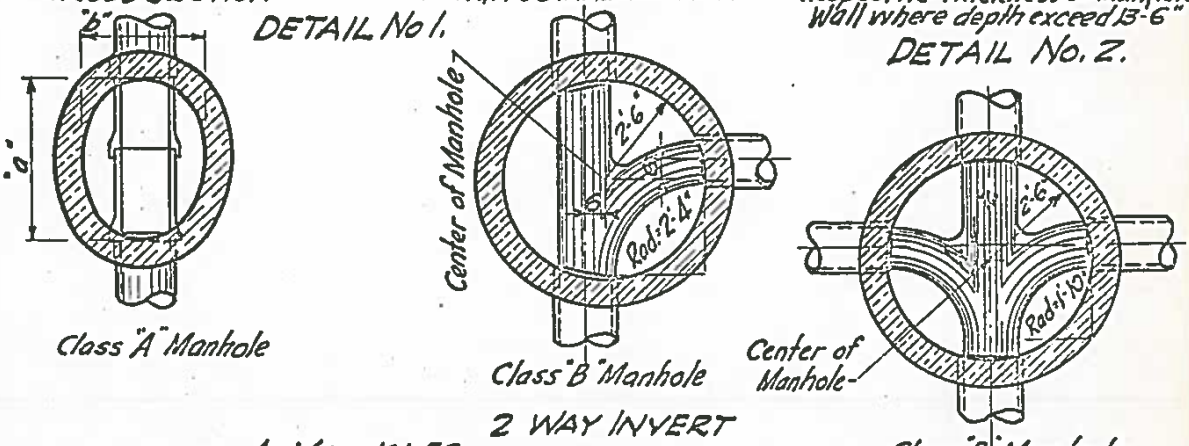
Approved Jan. 6, 1937
Earl M. Vetter
DESIGNING ENGR



CROSS SECTION — LONGITUDINAL SECTION — CROSS SECTION

Respective thickness of Manhole Wall where depth exceed 13'-6"

DETAIL No. 1. — DETAIL No. 2.



Class "A" Manhole — Class "B" Manhole 2 WAY INVERT — Class "B" Manhole 3 WAY INVERT

CLASS A MANHOLES

INSIDE BASE DIMENSIONS											
Size of Sewer	6"	8"	9"	10"	12"	15"	18"	20"	24"	30"	36"
"a" Length	4'-0"	4'-0"	4'-0"	4'-0"	4'-0"	4'-0"	4'-0"	4'-0"	4'-0"	4'-6"	4'-6"
"b" Width	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-3"	3'-6"	3'-9"	4'-0"	4'-6"
"c" Offset	3"	3"	3"	3"	3"	3"	4½"	6"	7½"	9"	12"

Class A Manholes are 1 Way with invert formed with Split pipe embedded in concrete. Class B Manholes are 2 or 3 way with invert moulded in concrete base.

18

ASSY. No. ML-165
FOLDER No. M-14

CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS BUREAU OF ENGINEERING

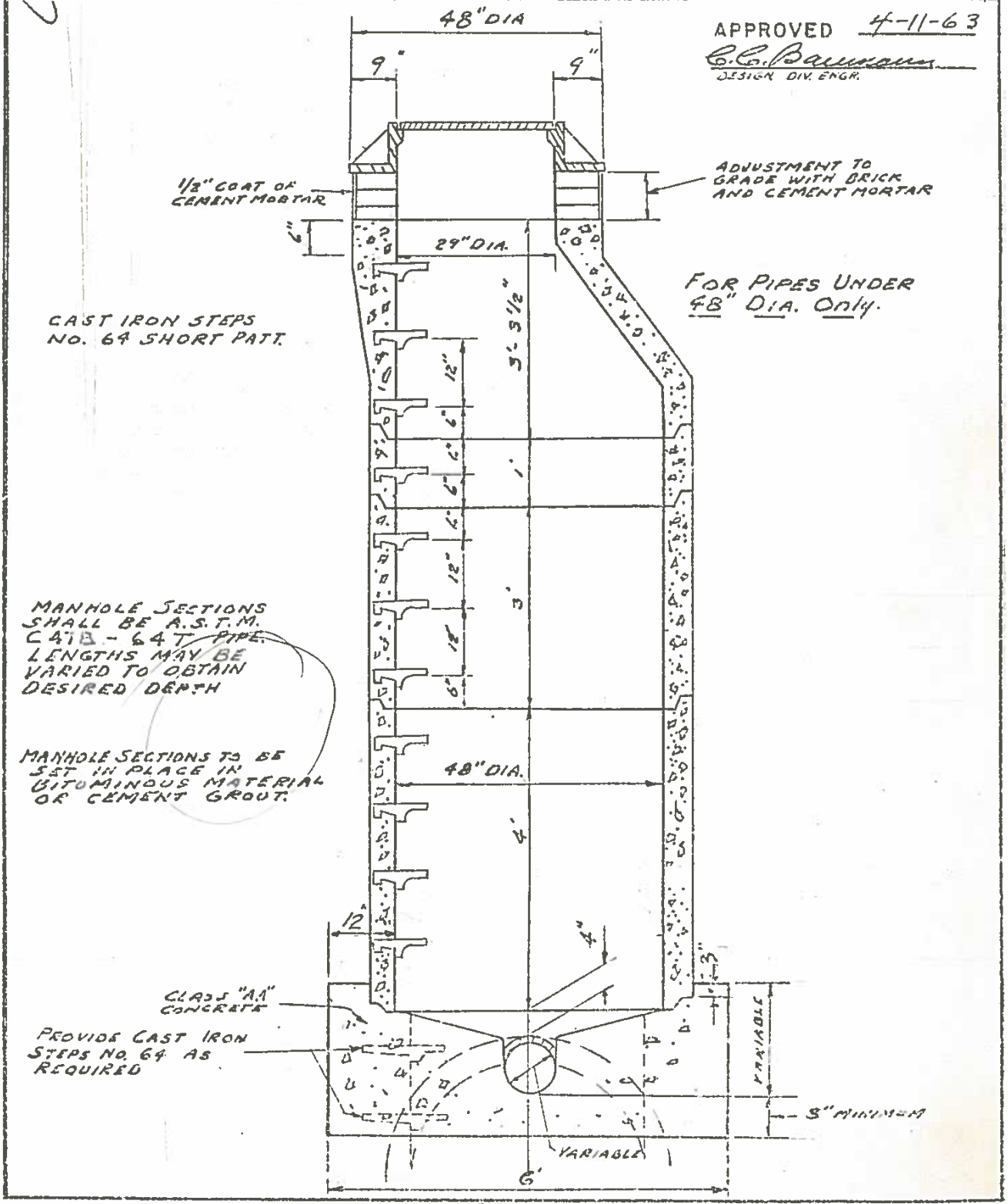
PRE-CAST CONCRETE MANHOLE

APPROVED 4-11-63 — ASST. CHIEF ENGR. D.P.W.

APPROVED 4-11-63 — CHIEF ENGR. D.P.W.

APPROVED — DIRECTOR

APPROVED 4-11-63
C.C. Bauman
DESIGN DIV. ENGR.



AC-SSION No. M1-193
OLDER M-16

35

CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS — BUREAU OF ENGINEERING

STANDARD SIDEWALK PAVEMENTS

ARRANGEMENT AND CONSTRUCTION

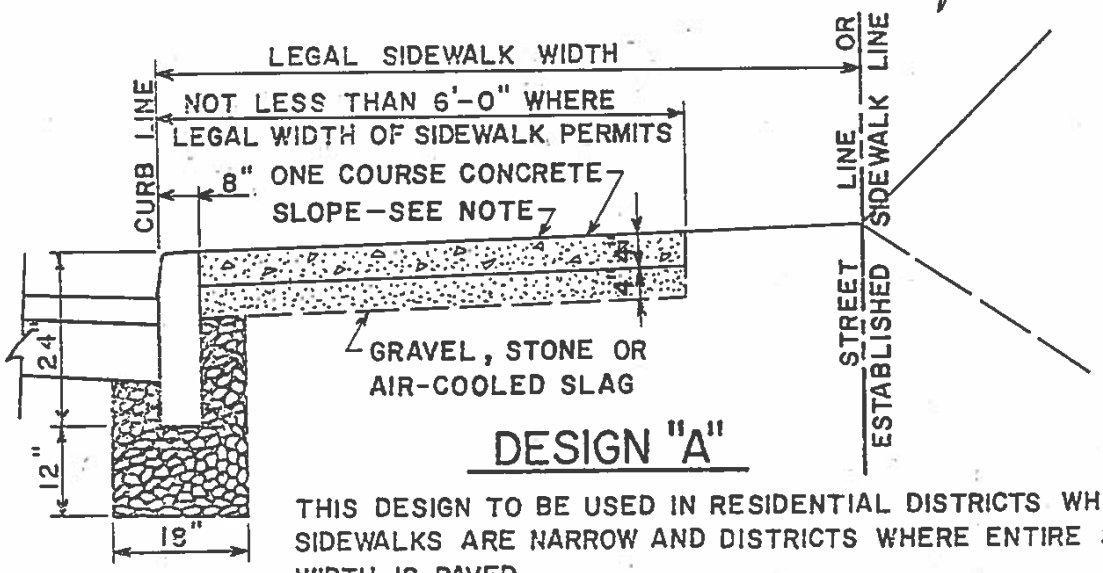
Approved 9-11-78 — DIVISION ENGR. DESIGN

Approved 9-11-78 — DIRECTOR OF ENGR. D.P.W.

Approved — DIRECTOR

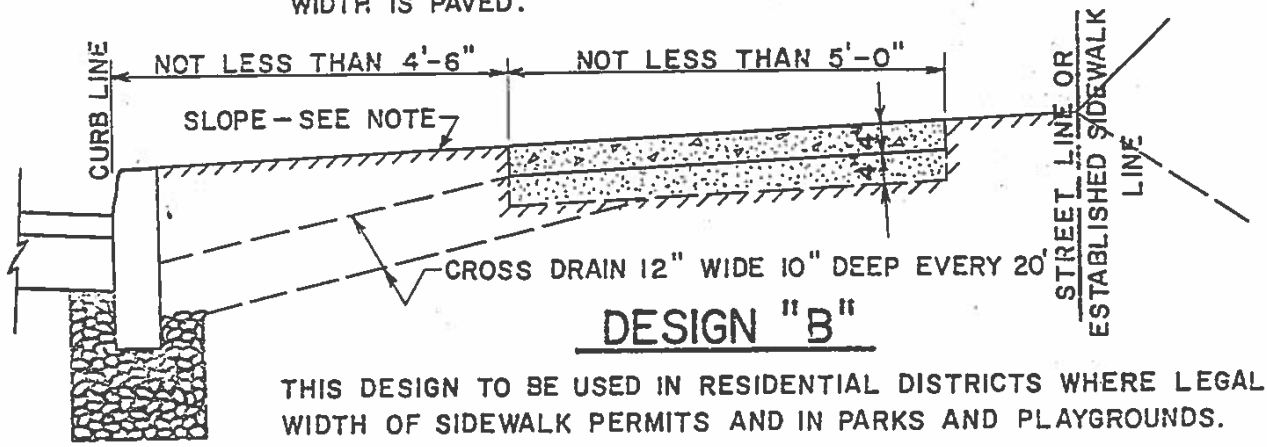
Approved 9/11/78 — DIVISION ENGR. STREETS

NOTE: THIS DRAWING SUPERSEDES 1938 5" DEPTH ON SIDEWALK SPECIFICATIONS



DESIGN "A"

THIS DESIGN TO BE USED IN RESIDENTIAL DISTRICTS WHERE SIDEWALKS ARE NARROW AND DISTRICTS WHERE ENTIRE SIDEWALK WIDTH IS PAVED.



DESIGN "B"

THIS DESIGN TO BE USED IN RESIDENTIAL DISTRICTS WHERE LEGAL WIDTH OF SIDEWALK PERMITS AND IN PARKS AND PLAYGROUNDS.

SLOPE OF SIDEWALKS

ON GRADES UP TO 2 PERCENT 1/2" IN 1 FT.
ON GRADES ABOVE 2 TO 7 PERCENT 3/8" IN 1 FT.
ON GRADES ABOVE 7 PERCENT 1/4" IN 1 FT.

THE ABOVE DESIGNS SHALL BE USED WHERE PRACTICAL AND WITH DUE CONSIDERATION TO EXISTING CONSTRUCTION AND CHARACTER OF IMPROVEMENTS IN THE COMMUNITY AFFECTED.

AROUND ALL POLES, FIRE HYDRANTS, OR OTHER STRUCTURES, PROVIDE A FULL DEPTH CONSTRUCTION JOINT IN THE SIDEWALK 6" CLEAR OF THE POLE OR STRUCTURE.

FOLDER NO. M-15

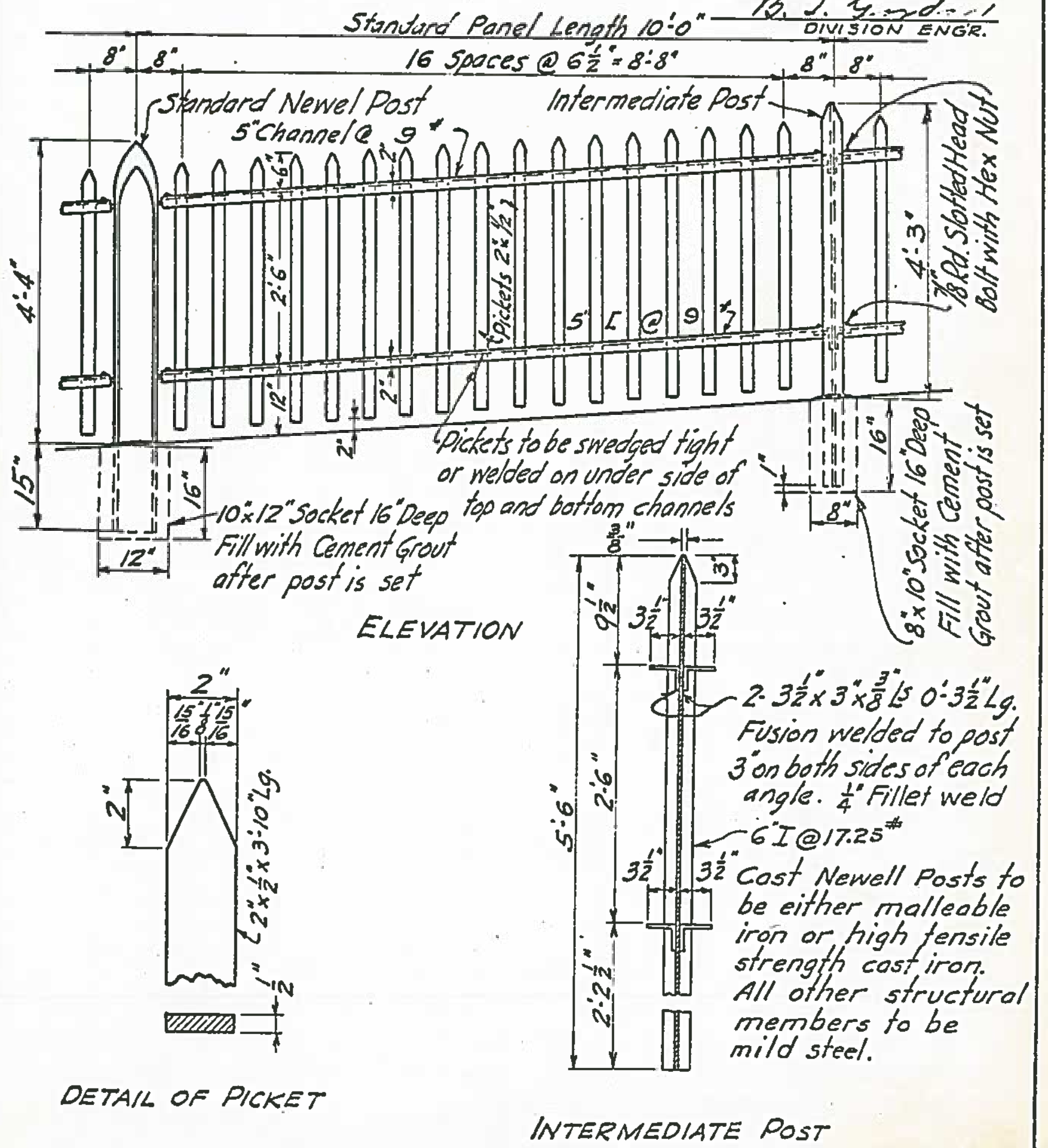
CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS BUREAU OF ENGINEERING

IRON FENCE TYPE 3 - ASSEMBLY

Approved 9-28-38 — CHIEF ENG'R. B. of E.
Approved 9-29-38 — John J. Crook, CHIEF ENGR D.P.W.
Approved 10/11/38 — DIRECTOR

Approved 9-27-38 — B. J. ... DIVISION ENGR.



Revised 1-27-49
" 4-11-5?

ACCESSION No. ML-168
FOLDER No. M-15

21

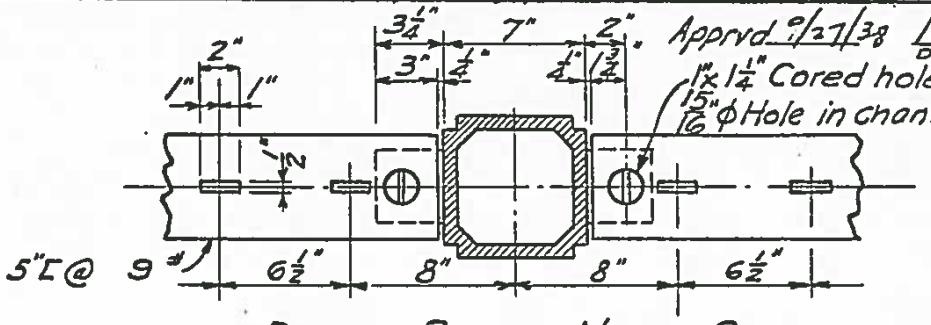
CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS — BUREAU OF ENGINEERING

IRON FENCE TYPE 3
DETAILS OF CONNECTIONS

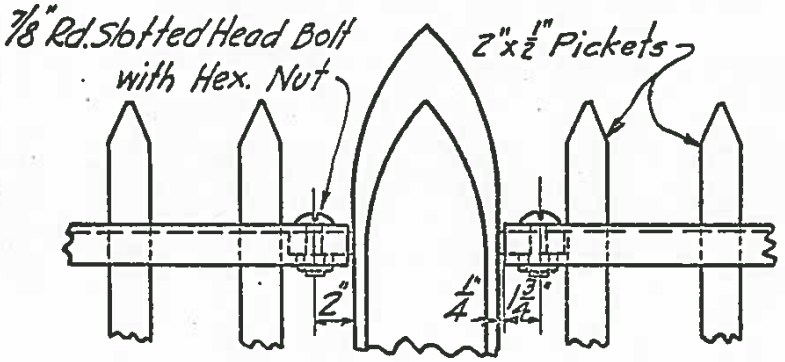
Approved 9-28-38 — CHIEF ENG'R. B.O.E.
Approved 9-29-38 — CHIEF ENG'R D.P.W.
Approved 10/11/38 — DIRECTOR

Approvd 9/27/38 — DIVISION ENGR.



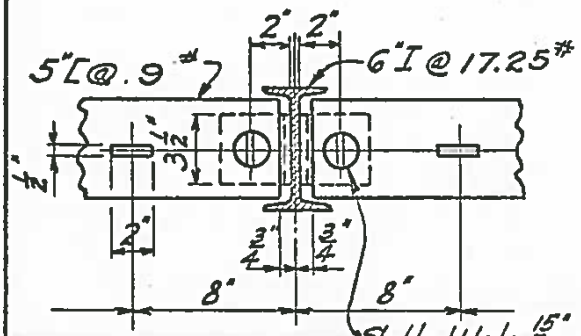
PLAN OF RAIL AT NEWEL POST

Cast Newell Posts to be either malleable iron or high tensile strength cast iron. All other structural members to be mild steel.

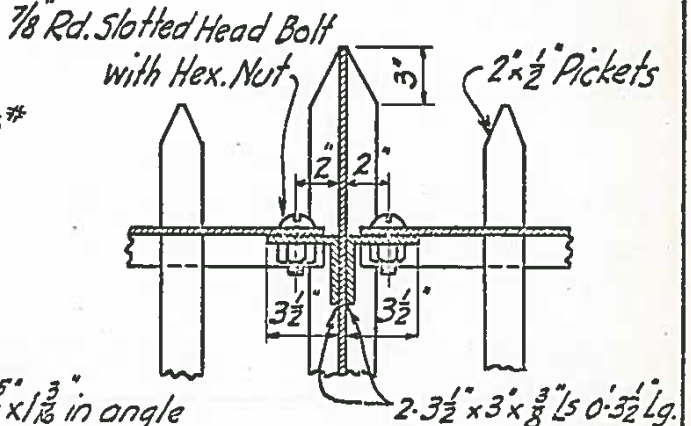


FRONT ELEVATION AT NEWEL POST

Revised 9-27-41
9-14-55



PLAN OF RAIL AT INTERMEDIATE POST



SECTIONAL ELEVATION

ACCESSION No. ML-169
FOLDER No. M-15

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS — BUREAU OF ENGINEERING

STANDARD NEWEL POST FOR IRON FENCES TYPES 3 AND 4

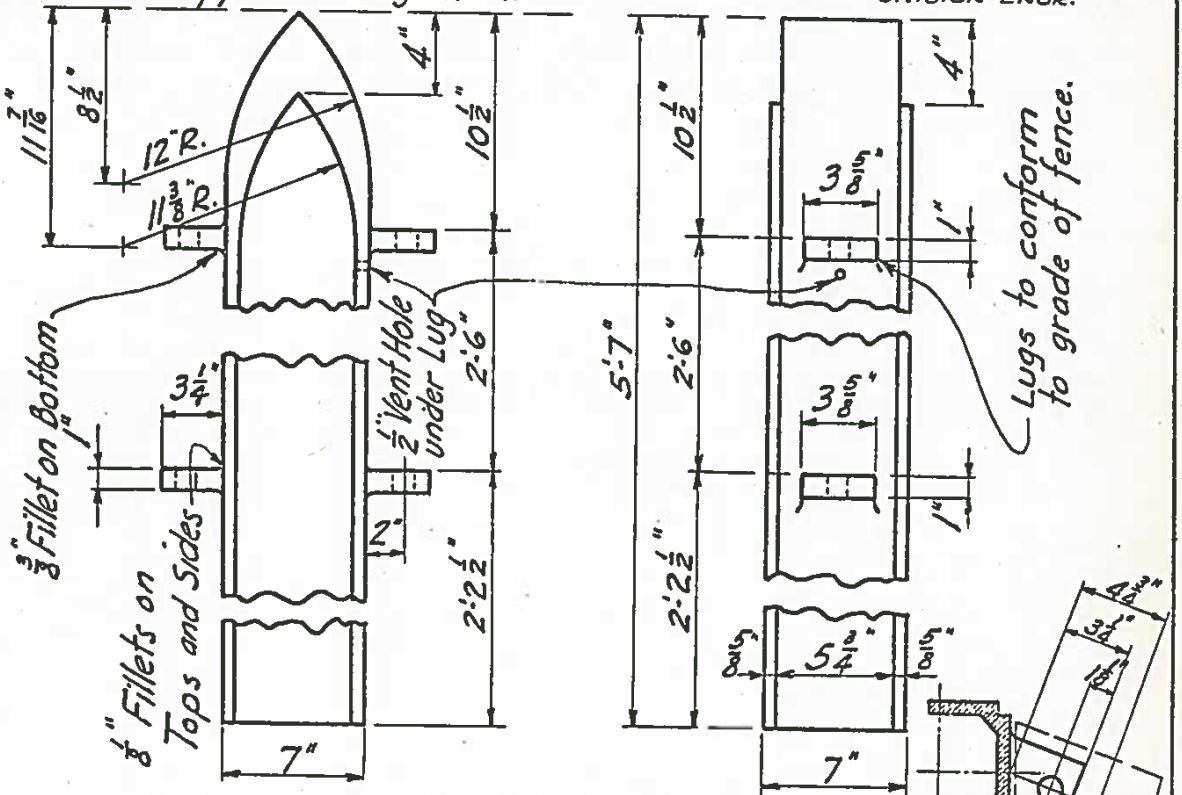
Approved 9-2-38 — CHIEF ENG'R. BOFE

Approved 9-29-38 — CHIEF ENGR DPW

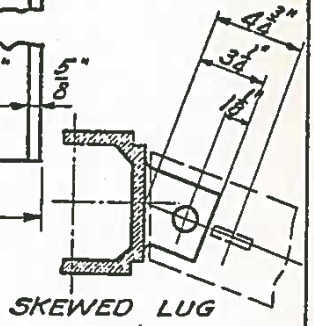
Approved 10/12/38 — DIRECTOR

Cast Newell Posts to be either malleable iron or high tensile strength cast iron. Bolts to be copper bearing steel.

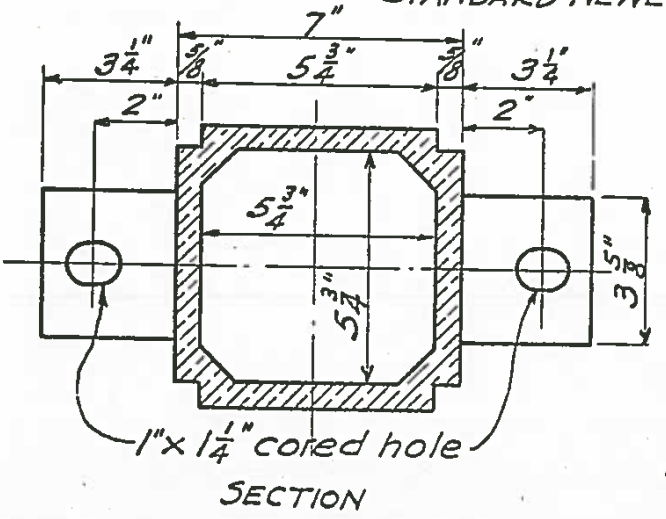
Approved 9-27-38 — DIVISION ENGR.



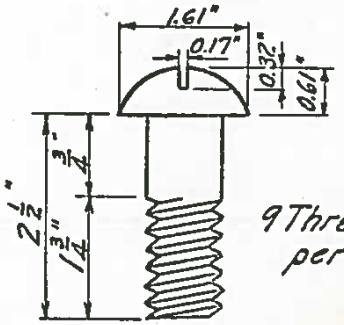
STANDARD NEWEL POST



SKEWED LUG



SECTION



DETAIL OF ROUND HEAD BOLT

ACCESSION No. ML-170
FOLDER No. M-15

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS . BUREAU OF ENGINEERING

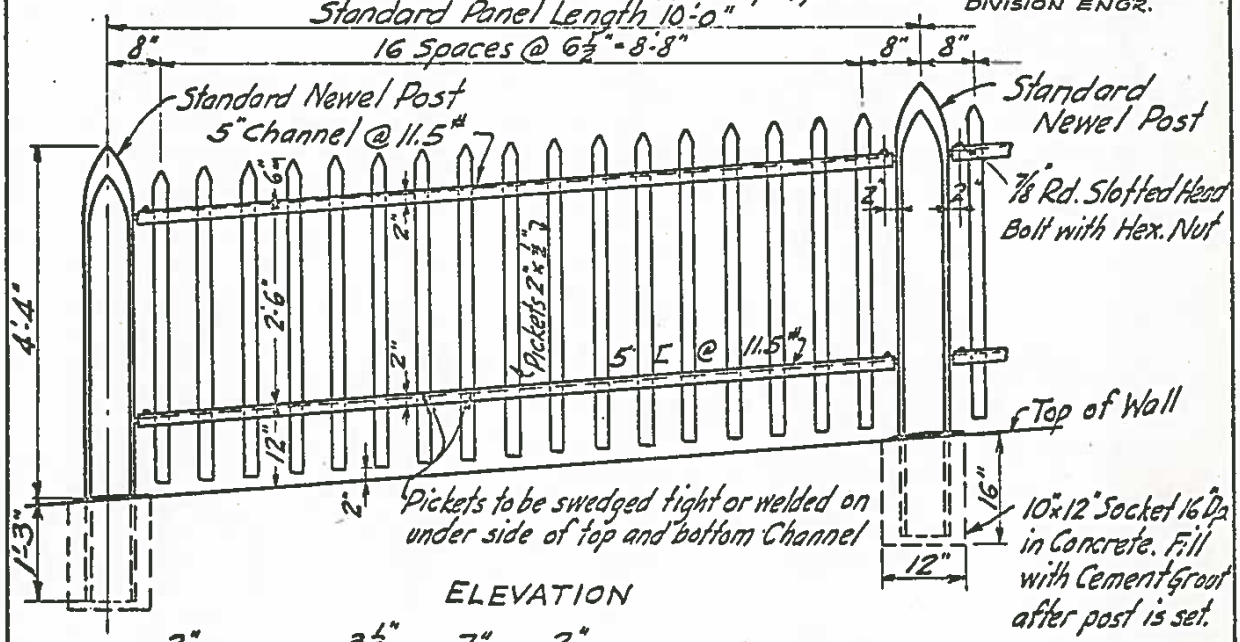
IRON FENCE TYPE 4 - ASSEMBLY

Approved 7-28-38 Earl M. Kelly CHIEF ENG'R. B of E.

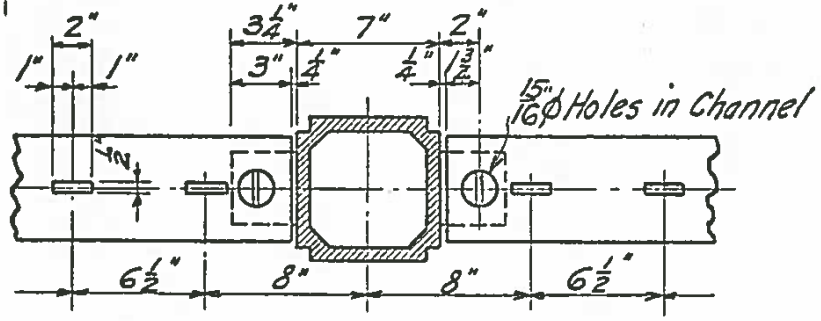
Approved 10-11-38 John J. Grow CHIEF ENGR D.P.W.

Approved 10/11/38 [illegible] DIRECTOR

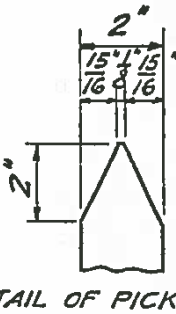
Apprvd 9/27/38 B. J. Golden DIVISION ENGR.



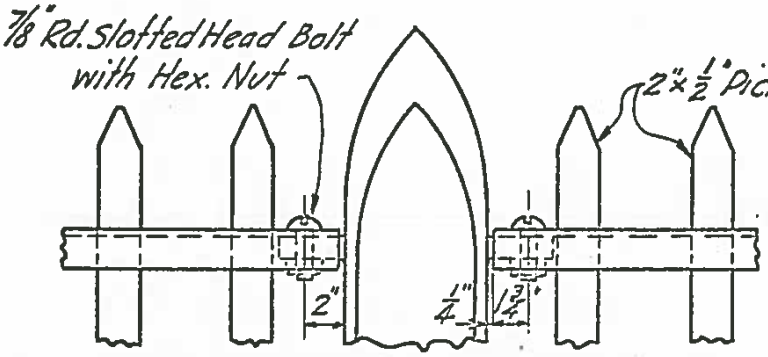
ELEVATION



PLAN OF RAIL AT NEWEL POST



DETAIL OF PICKET



FRONT ELEVATION AT NEWEL POST

Cast Newell Posts to be either malleable iron or high tensile strength cast iron.
All other structural members to be copper bearing steel.

CCE. ION No. ML-171
FOLDER No. M-15

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS — TYPE I — BUREAU OF ENGINEERING

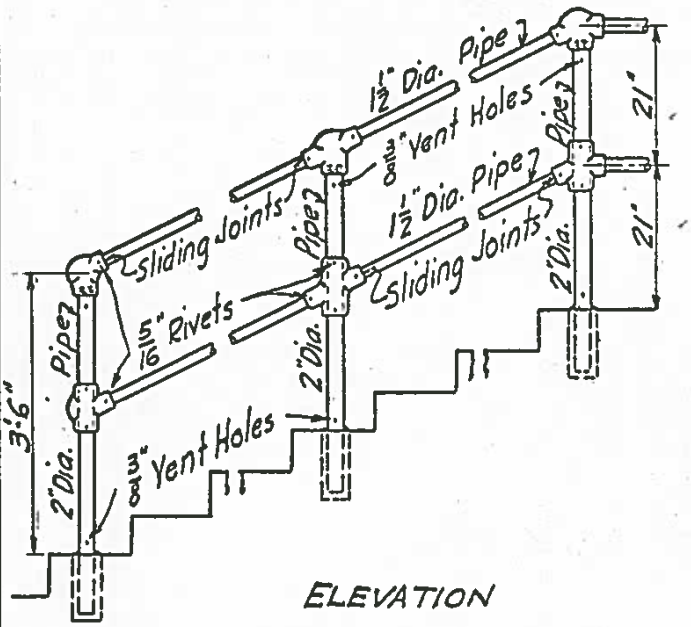
STANDARD IRON PIPE HAND RAILING

Approved 9/28-38 — Chief Eng'r. Dept. E.

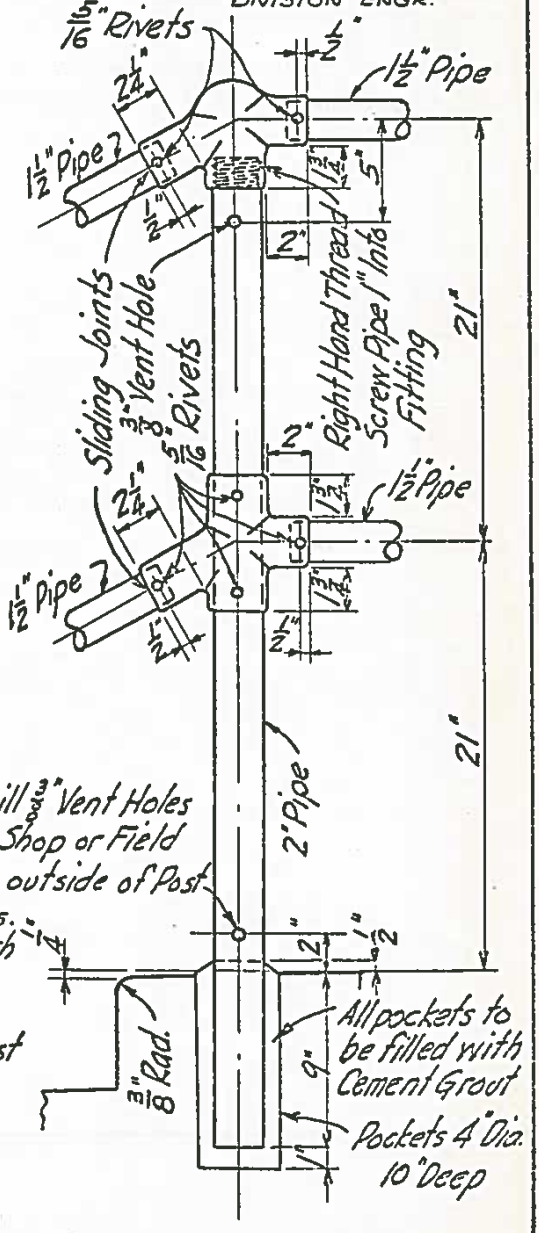
Approved 10-11-38 — Chief Eng'r. D.P.W.

Approved 10/11/38 — Director

Approved 9-27-38 — Division Engr.



ELEVATION



DETAIL OF HANDRAIL

(Dimensions shown are Typical for all Fittings required)

All posts - 2" Dia. Extra Strong W.I. Pipe (Black)
All rails - 1½" Dia. Standard W.I. Pipe (Black)
All pipe fittings Malleable Iron or High Tensile Strength Cast Iron-Ball Type-Std. Thickness.
End of pipe to project into fitting at least ¼ inch
All rail posts to be set vertical
Shop paint - One coat Red Lead
Omit shop paint on bottom 9 inches of post
Rivet Holes for rails to be drilled in field
Rivets to be Soft Steel 5/16" Dia. Flatten heads to ⅛"
Rivets to be ½ inch from end of fittings

Division No. ML-172
Folder No. M-15

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS — BUREAU OF ENGINEERING

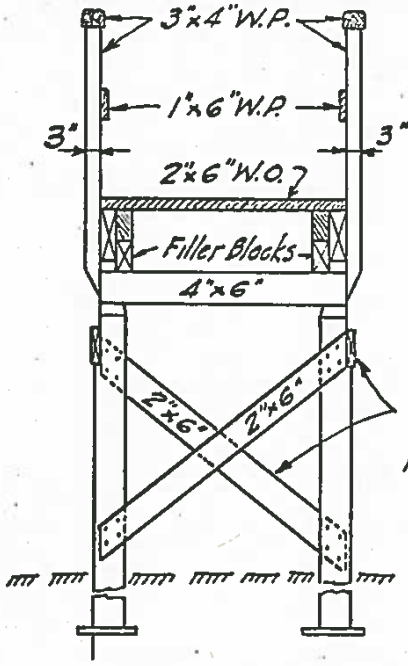
STANDARD WOODEN STEPS

Approved 9-28-38 — Chief Engr. B. of E.

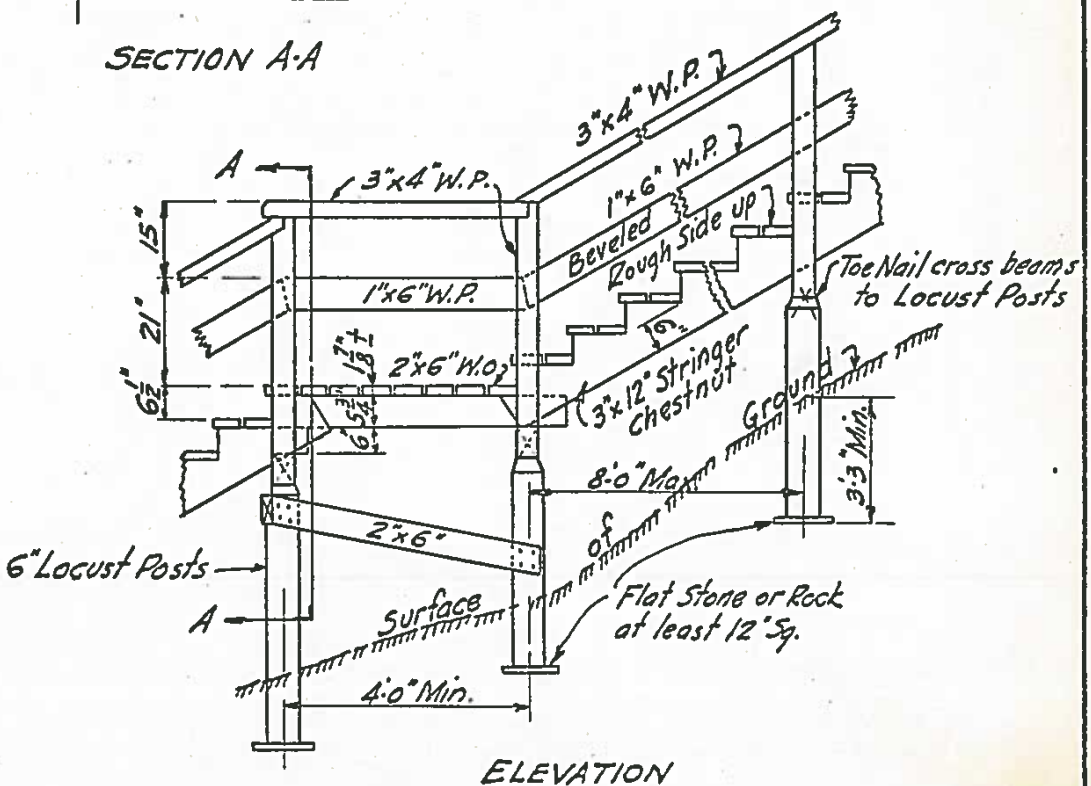
Approved 10-11-38 — Chief Engr. D.P.W.

Approved 10/11/38 — Director

Approved 9-27-38 — Division Engr.



SECTION A-A



ELEVATION

CES' IN No. ML-173
FOLDER No. M-15

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS — BUREAU OF ENGINEERING

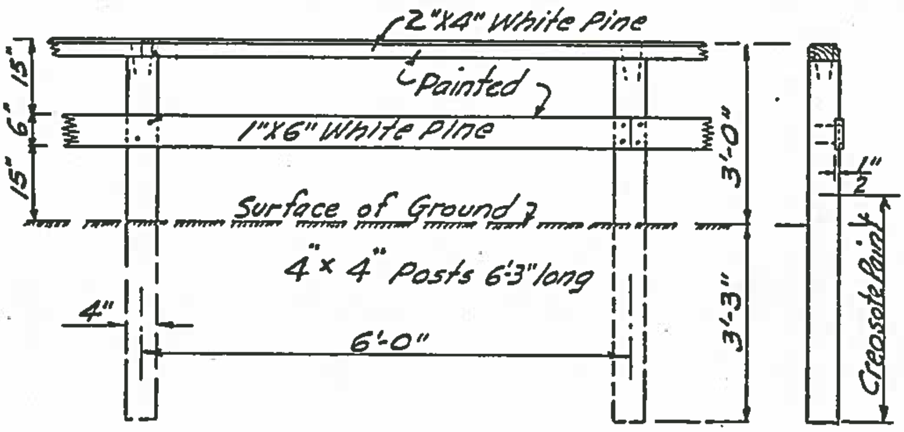
STANDARD WOODEN FENCE AND WOODEN BARRIER

Approved 9-28-38 Carl M. Vetter, CHIEF ENG'R. B of E.

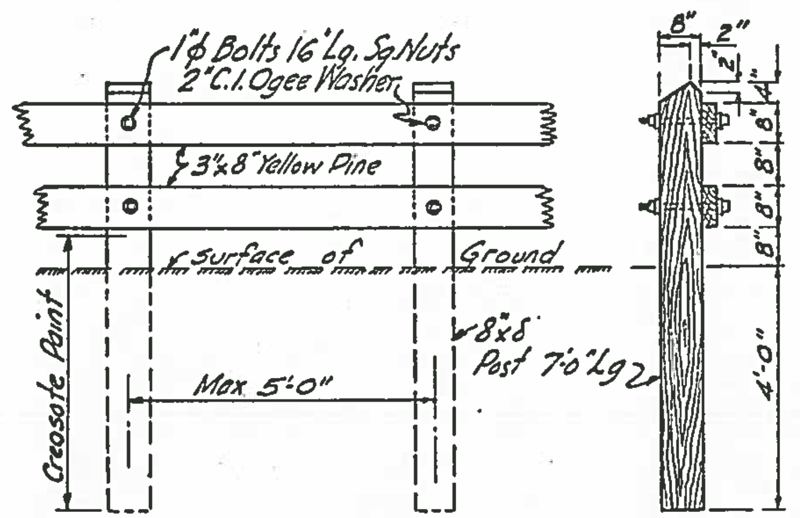
Approved 10-4-38 John J. Crook, CHIEF ENG'R D.P.W.

Approved 10/11/38 [signature], DIRECTOR

Approved 9-27-38 B. J. Gordon, DIVISION ENGR.



DETAIL OF WOODEN FENCE



DETAIL OF WOODEN BARRIER

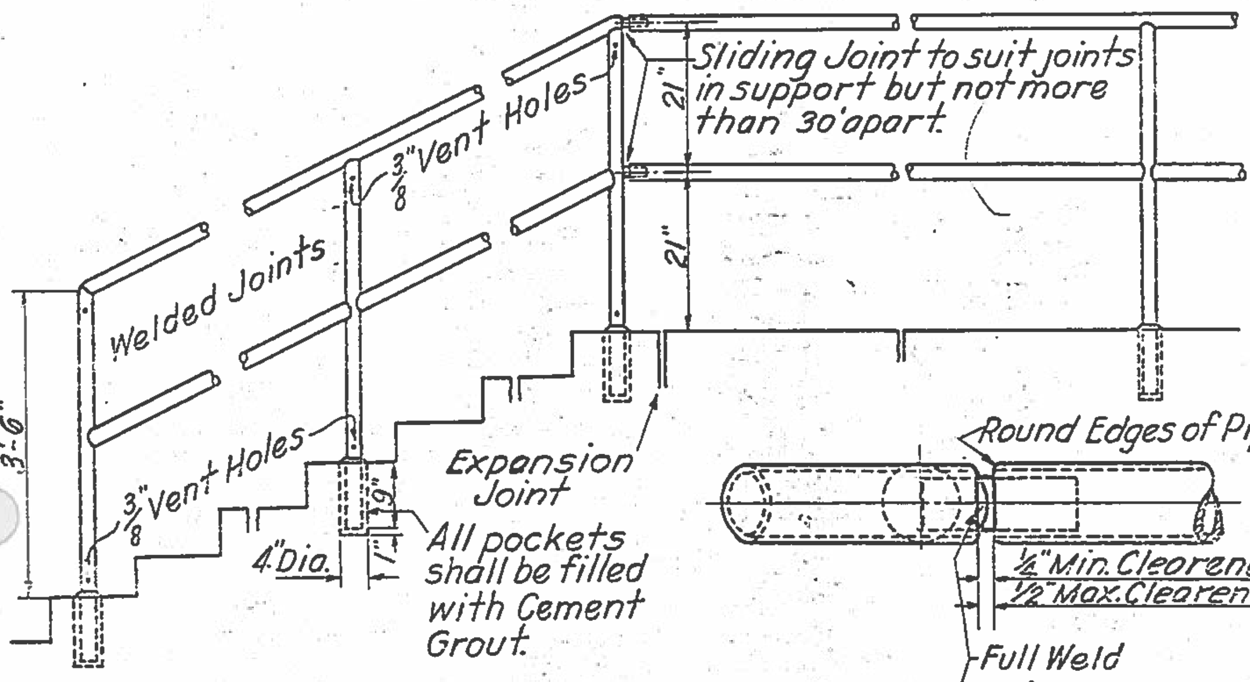
CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS **TYPE 2** **BUREAU OF ENGINEERING**

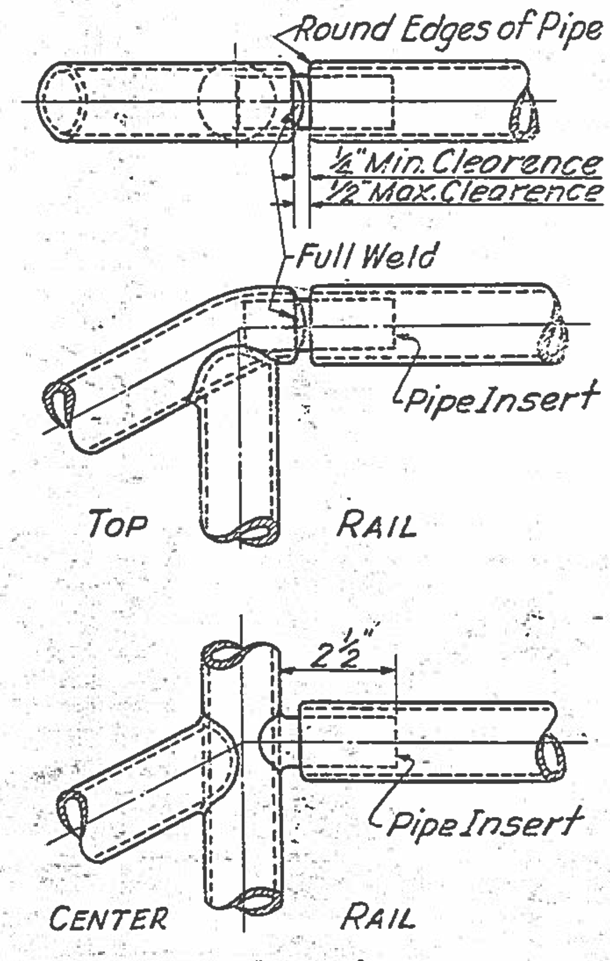
STANDARD IRON PIPE HAND RAILING

APPROVED Nov. 27, 1940 — CHIEF ENGR. B. OF E.
APPROVED 11-27-40 — CHIEF ENGR. D.P.W.
APPROVED — DIRECTOR

APPROVED — DIVISION ENGR.



ELEVATION



DETAIL OF SLIP JOINTS

All rail posts to be set vertical
All Posts and Railings shall be Extra strong Steel Pipe of size specified and painted in accordance with the Standard Specifications. Omit paint on bottom 9" of Posts.
All Welds shall be ground smooth.
Detail of Joints not shown to be approved by the Director.

No. M-15

CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS BUREAU OF ENGINEERING

CATCH BASIN TYPES 9 & 10

Approved ______ ASST. CHIEF ENGR. D.B.R.

Approved ______ CHIEF ENGR. D.B.R.

Approved ______ DIRECTOR

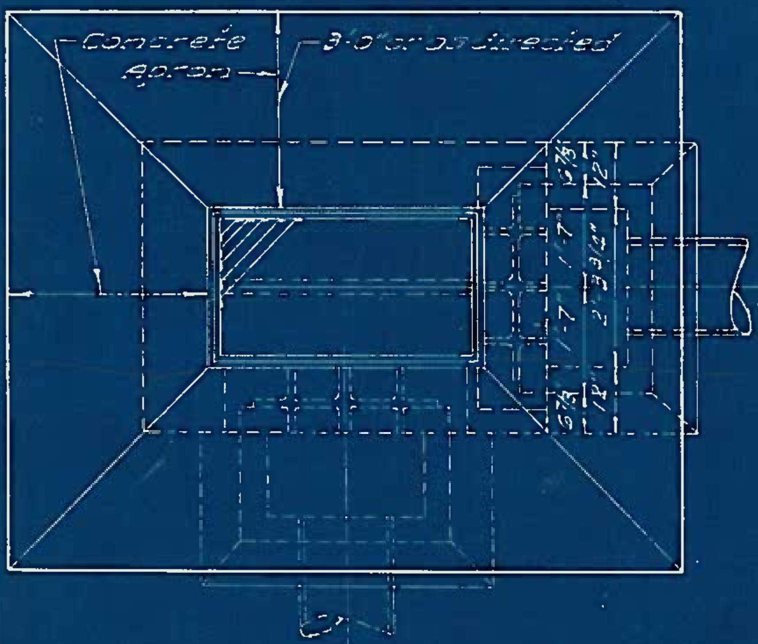
Approved ______ SENIOR ENGR. DESIGN

See specifications for excavation, construction and backfilling with slag cement mixture.

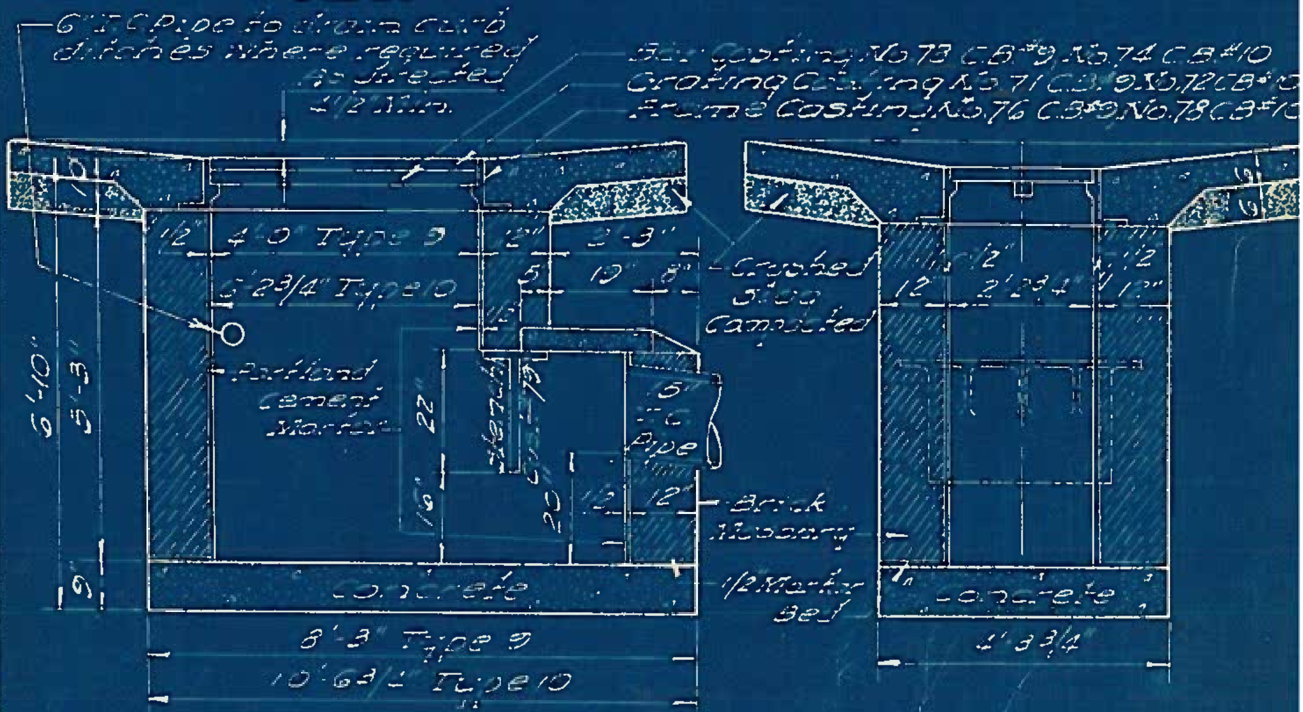
Concrete for catch basin base and stench chamber top shall be class A and shall be mixed with high early strength special cement.

Cast stench chamber slabs in two pieces, 24"x4"x19 each, reinforced with wire mesh not less than 0.8 lbs. per sq. ft. set in mortar bed.

All outside joints to be struck flush.



PLAN



LONGITUDINAL SECTION CROSS SECTION

Rev. 4-8-55

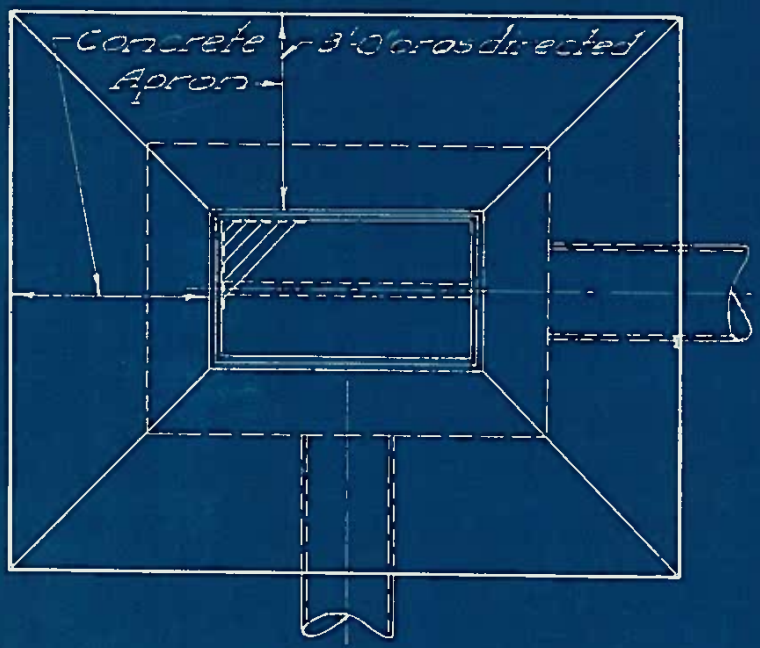
CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS BUREAU OF ENGINEERING

STORM INLET TYPES 9 & 10

Approved _____ Approved _____ Approved _____

Approved _____

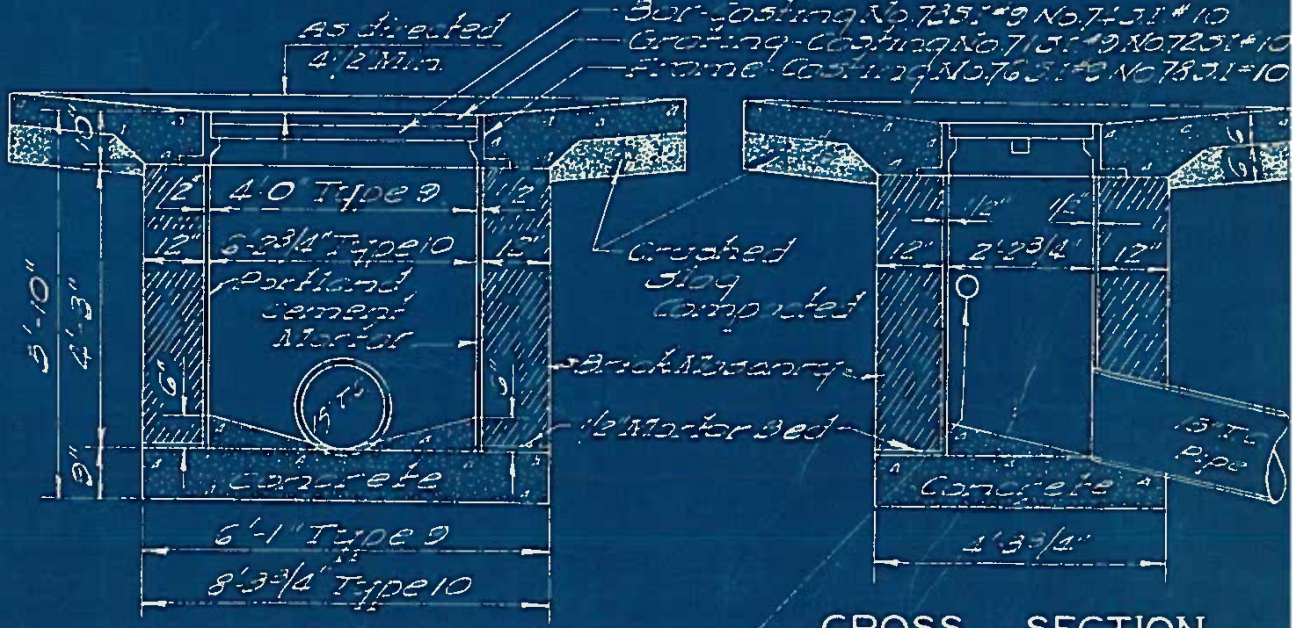


PLAN

See Specifications for excavation, construction and backfilling with slag cement mixture.

Concrete for storm inlet base shall be class A and shall be mixed with high early strength special cement.

All outside joints to be struck flush.



LONGITUDINAL SECTION

CROSS SECTION

6" Pipe to drain curb grates where required

Rev. 1-8-55

CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS BUREAU OF ENGINEERING

STORM INLET TYPES 11 & 12

APPROVED 11/23/54 ... APPROVED 11-24-54 ... APPROVED ... 1954

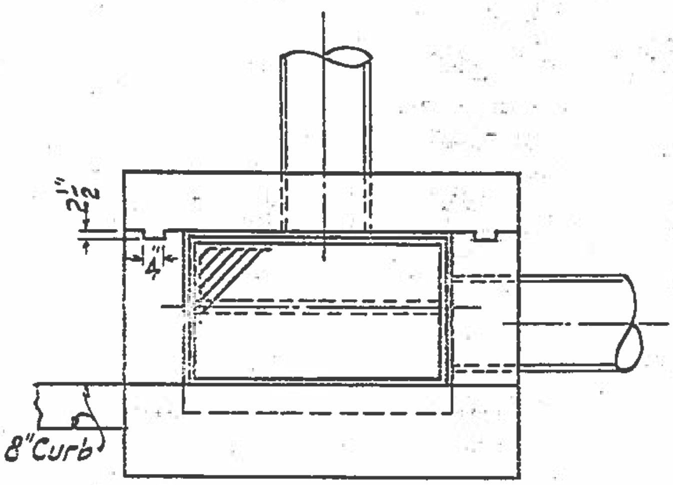
SR. DES. ENGR. DESIGN — C. H. Barrett, CHIEF ENGR. D.P.W. — Jas. L. Drohan, DIRECTOR

REVISED 9-8-55

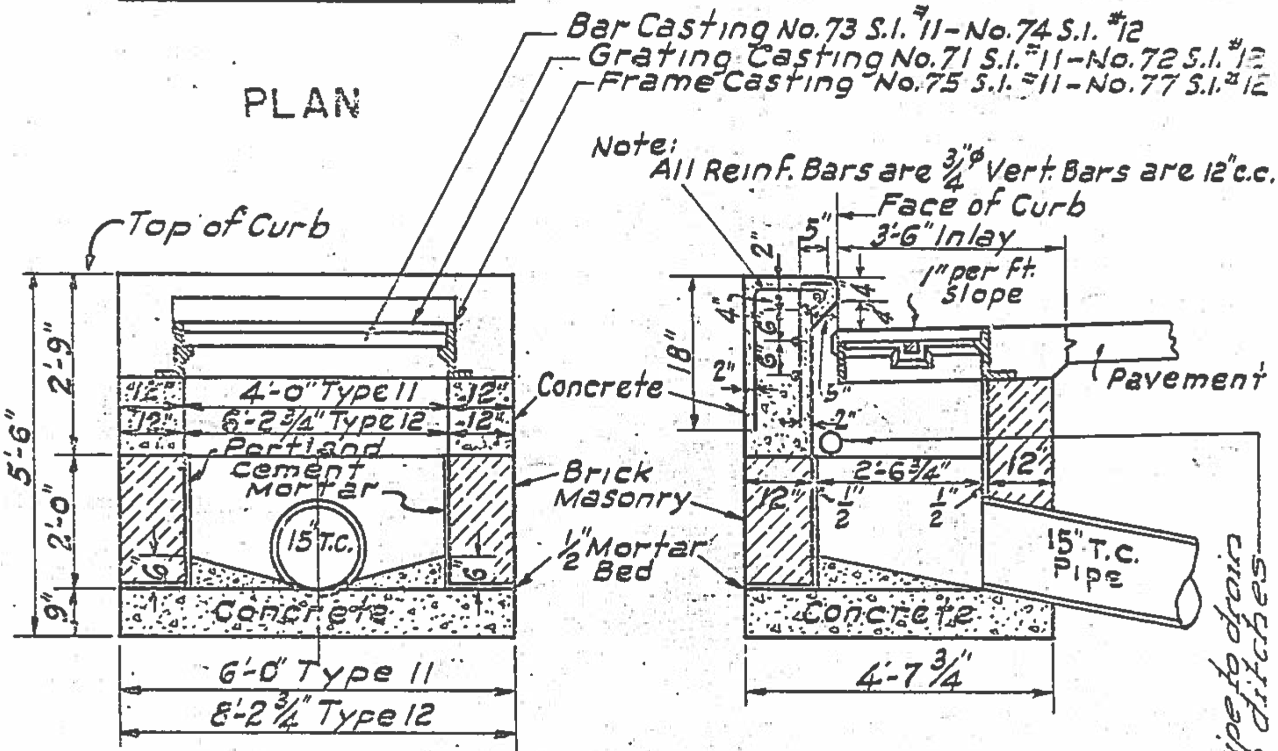
See Specifications for excavation, construction and backfilling with Slag Cement mixture.

All concrete shall be Class A and shall be mixed with high early strength special cement.

All outside joints to be struck flush.



PLAN



LONGITUDINAL SECTION CROSS SECTION

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS TYPE NO. 3 BUREAU OF ENGINEERING

STANDARD STEEL PIPE WELDED RAILING

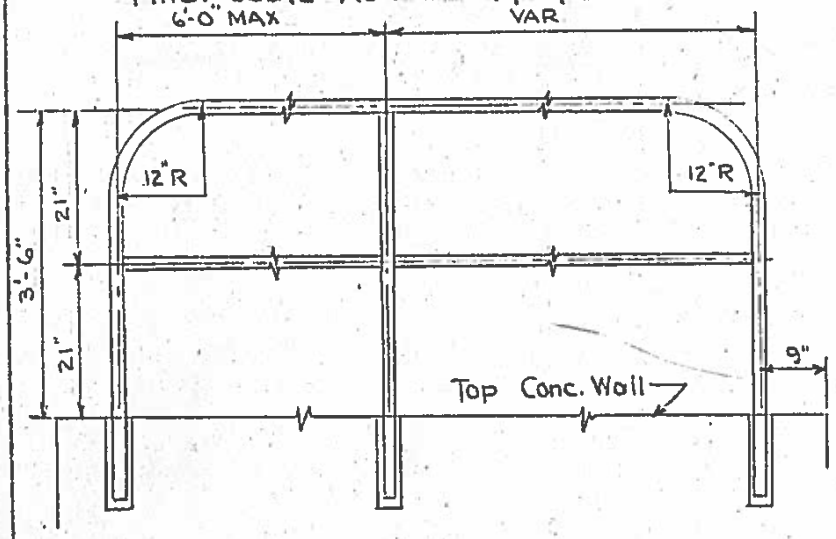
Approved 7-28-1965
John Roehr
ASST CHIEF ENGR

Approved 7-28-65
L. H. Barrett
CHIEF ENGR D.P.W.

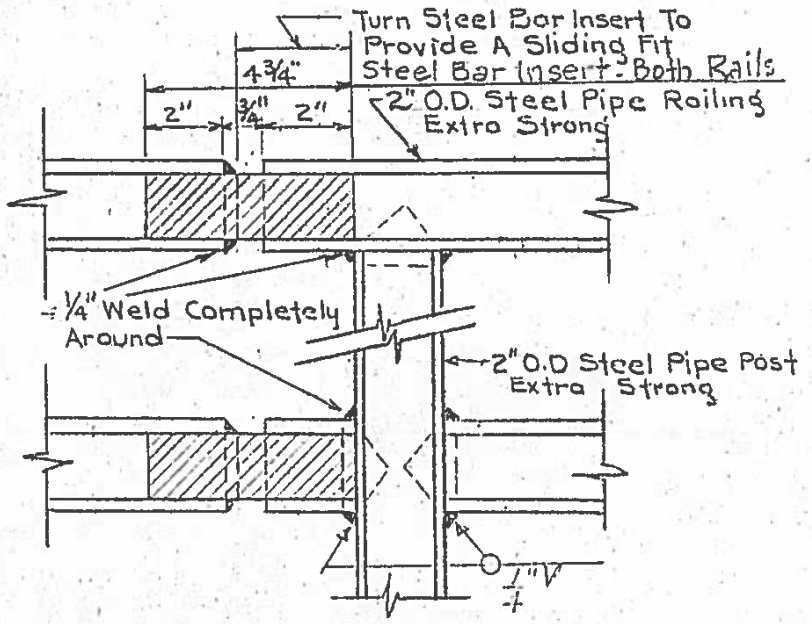
Approved _____
DIRECTOR D.P.W.

Approved 7-27-65
G. J. Tarasi
DIV ENGR.-DESIGN

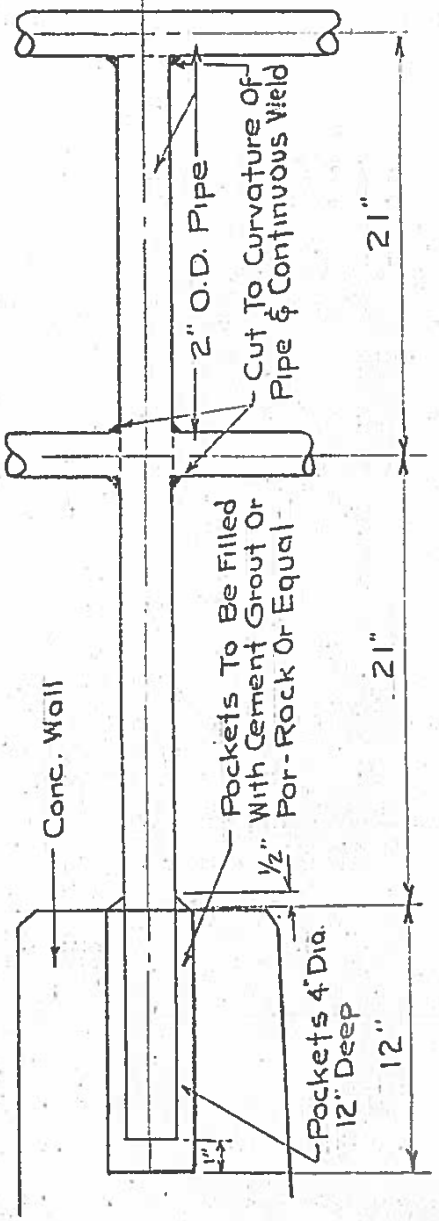
NOTE
All Welds To Be Ground Smooth
Shop Coat - One Coat Red Lead
Final Coats - As Per City Specs.



ELEVATION



PIPE RAIL EXPANSION JOINT
NOT TO SCALE



DETAIL OF POST
NOT TO SCALE

Revised 4-17-72 S.D. SETTE, P.E.

ACCESSION No. ML-205
ORDER No. M-16

CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS — DIVISION OF PUBLIC UTILITIES

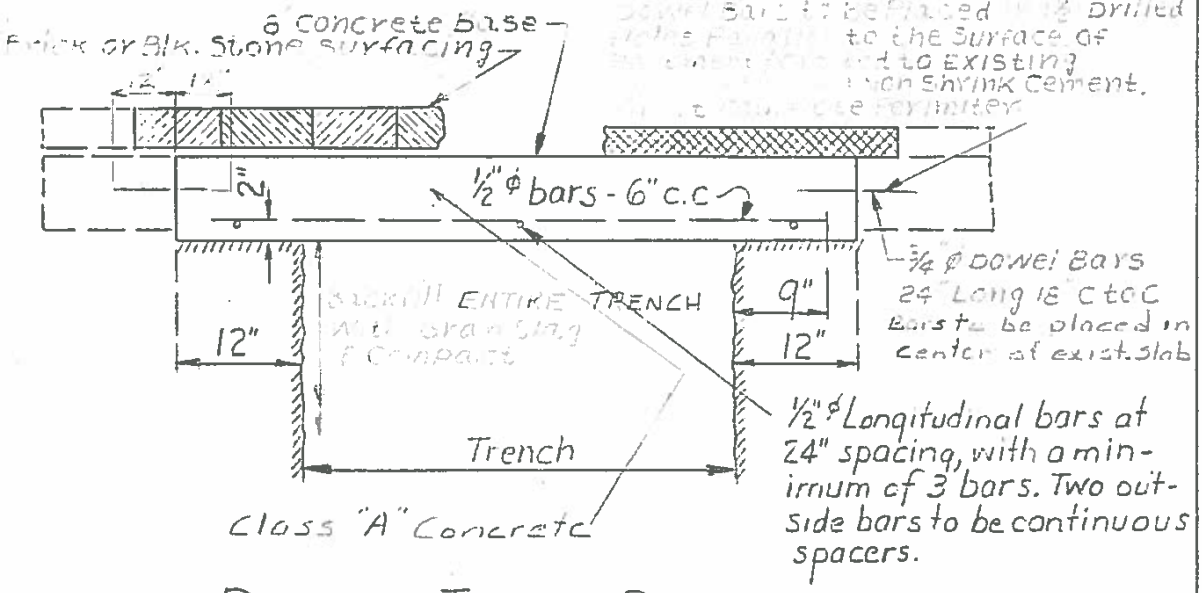
REPAIRS TO CUTS IN PAVED ROADWAYS

Approved 12-8-6

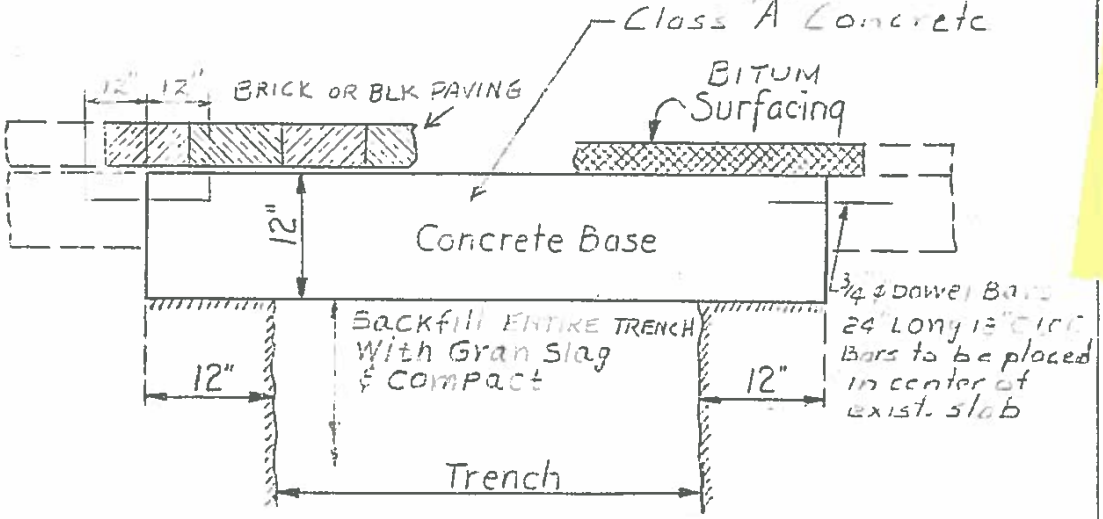
Director

Asst. Chief Engr.

Director



DETAIL OF TRENCH REPAVING



ALTERNATE DETAIL OF REPAVING

MAY BE USED IN LIEU OF REINFORCED CONCRETE BASE FOR SHORT MISCELLANEOUS TRENCHES LESS THAN 36" WIDE

REVISED 10/27/80

ACCESSION NO. ML-205
FOLDER NO M-17

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS — BUREAU OF ENGINEERING

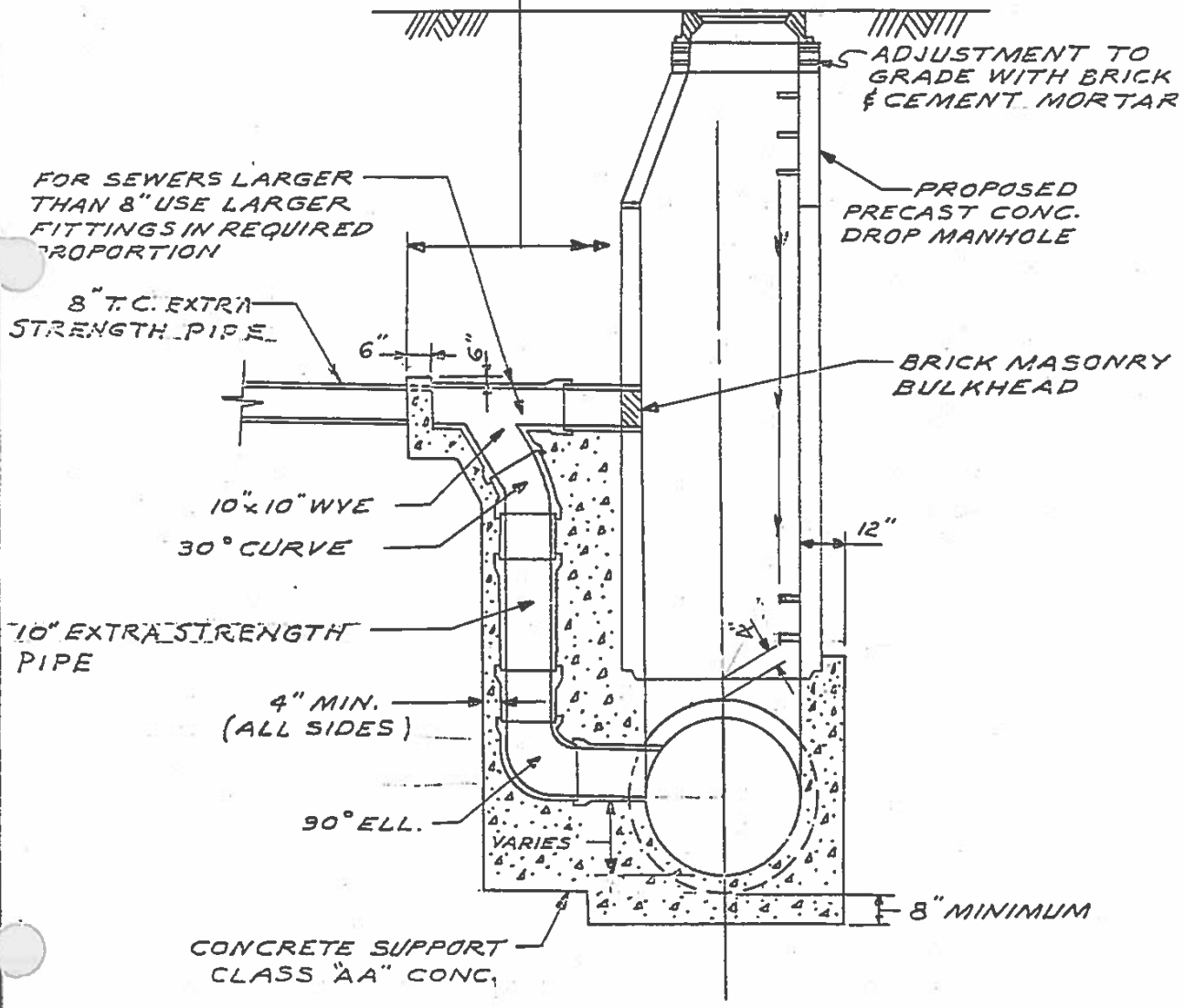
DETAIL PRECAST CONC DROP MANHOLE

APPROVED 3-21-67 — DES. CIV. ENGR. Anthony J. Tarasi

APPROVED 4-18-67 — ACTING CITY ENGR. [signature]

APPROVED 4/28/67 — DIRECTOR [signature]

DWG NO. ML-193 FOL M-16 GOVERNING PRECAST CONC. MANHOLE SHALL APPLY. LUMP SUM PAYMENT FOR PRECAST "DROP" MANHOLE" SHALL INCLUDE COMPENSATION FOR FURNISHING AND INSTALLING ALL DROP PIPE AND FITTINGS WITH CONCRETE REINFORCING



DWN: A. PERELLA 3-6-67

SHEET 1 OF 2

ACCESSION NO. ML-210
FOLDER NO. M-16

CITY OF PITTSBURGH
DEPT OF PUBLIC WORKS — BUREAU OF ENGINEERING

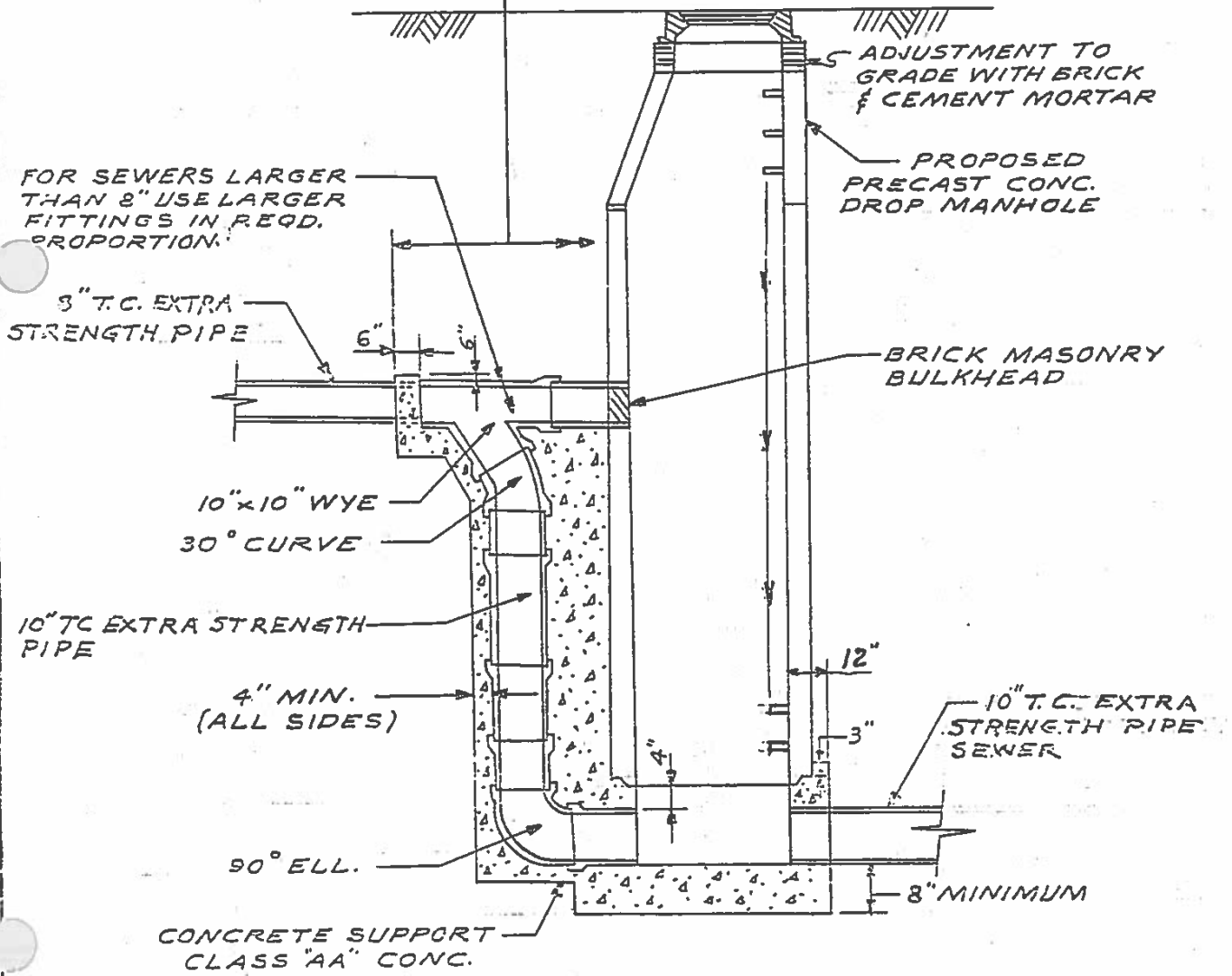
DETAIL PRECAST CONC DROP MANHOLE

APPROVED 3-21-67 — DES DIV ENGR

APPROVED 4-28-67 — ACTING CITY ENGR

APPROVED [illegible] — DIRECTOR

DWG NO. ML-193 FOL. M-16 GOVERNING PRECAST CONC. MANHOLE SHALL APPLY. LUMP SUM PAYMENT FOR PRECAST "DROP MANHOLE" SHALL INCLUDE COMPENSATION FOR FURNISHING AND INSTALLING ALL DROP PIPE AND FITTINGS WITH CONCRETE REINFORCING



DWN: A. PERELLA 3-8-67

ACCESSION NO. ML-210-A

SHEET 2 OF 2 FOLDER NO. M-16

CITY OF PITTSBURGH

DEPT: OF PUBLIC WORKS BUREAU OF ENGINEERING

CATCH BASIN TYPES 11 & 12

APPROVED 5-13-70 Anthony Tarsi DESIGN CIVIL ENGR.

APPROVED 5-13-70 Samuel A Marsh CITY ENGR. D.P.W.

APPROVED 5-13-70 William K Davis DEPUTY DIRECTOR

Revised -5-7-70

NOTE: Hood must be sealed to C.B. wall with approved bitumastic sealer

NOTE: All Reinf. Bars are #6 Vert Bars are 12" C.C.

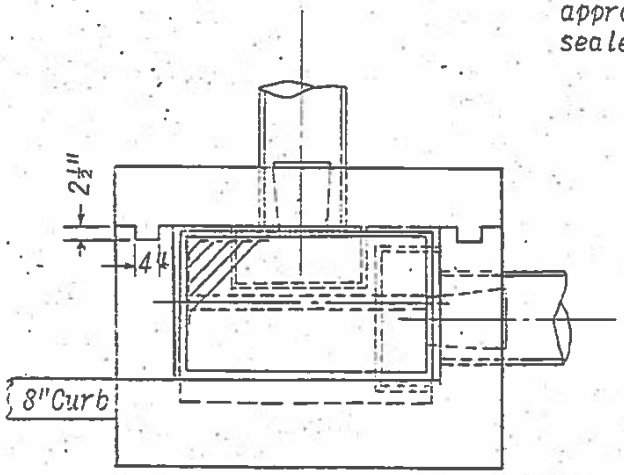
See Specifications for excavation, construction and backfilling with slag cement mixture.

All concrete shall be class "A A"

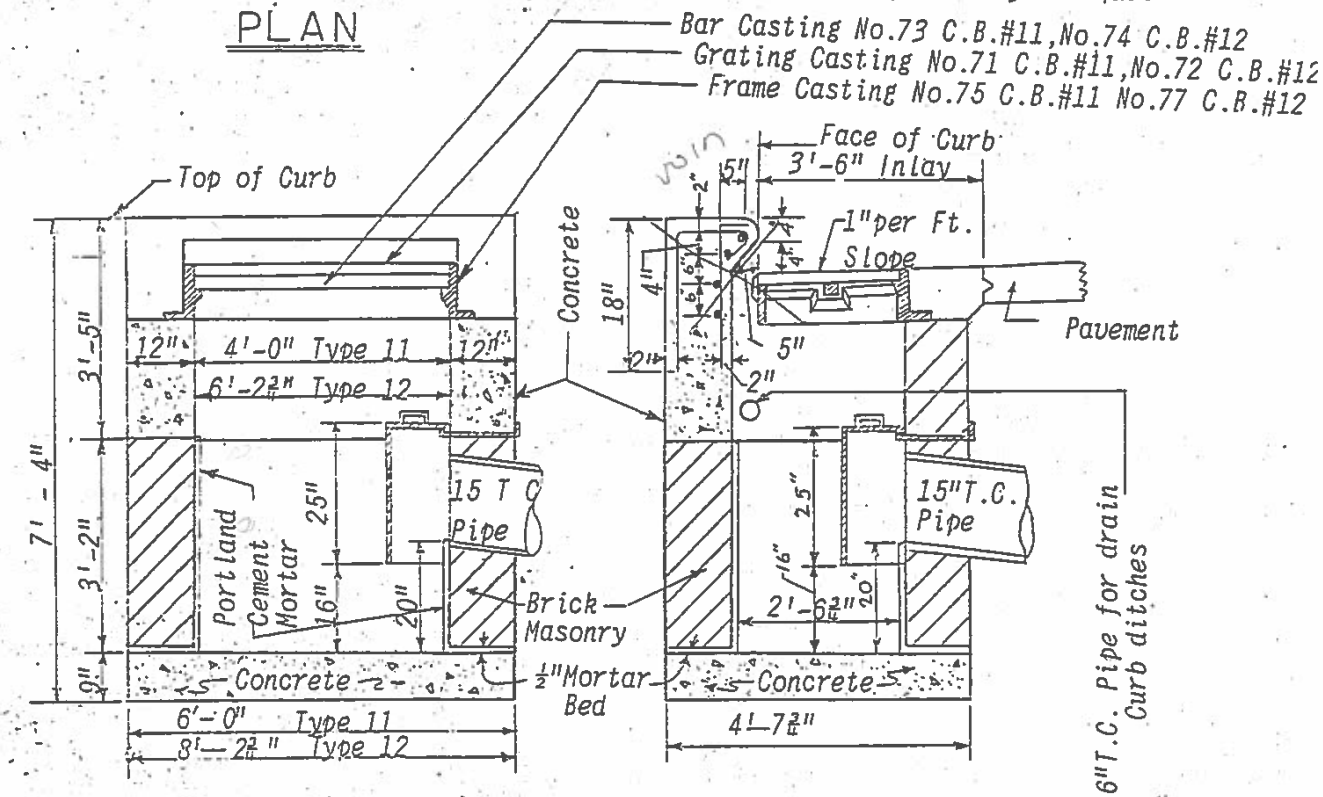
All outside joints to be struck flush.

Trap Pattern No.402-15 Allegheny Foundry or Equal

Hook Pattern No.404 Allegheny Foundry or Equal



PLAN



LONGITUDINAL SECTION CROSS SECTION

Accession No. NL-217 Folder M-17

CITY OF PITTSBURGH
DEPT OF PUBLIC WORKS BUREAU OF ENGINEERING
PRE-CAST "T" SECTION MANHOLE & BASE

APPROVED 5-13-70 Anthony J. Tarasi DESIGN & DIV. ENGR.

APPROVED 5-14-70 William K. Davis CITY ENGR. D.P.W.

APPROVED C. D. Smith DIRECTOR

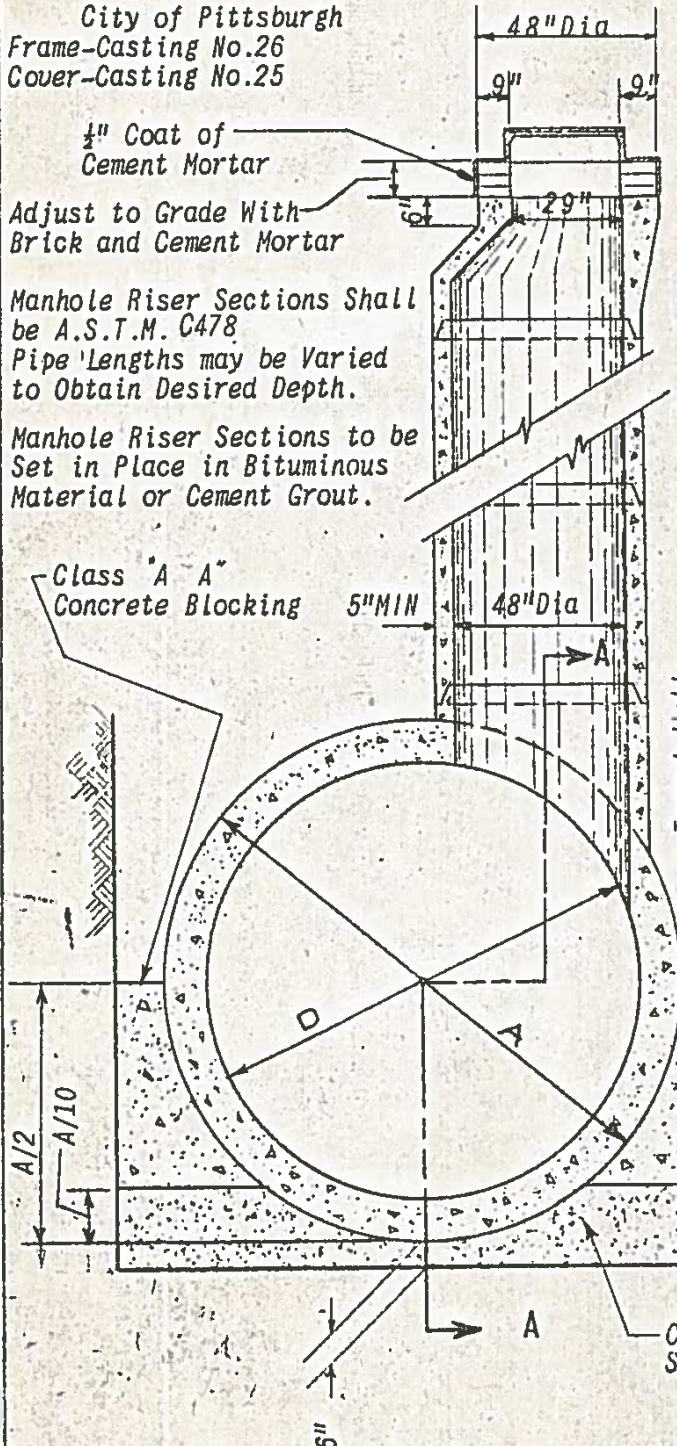
City of Pittsburgh
Frame-Casting No.26
Cover-Casting No.25

½" Coat of Cement Mortar

Adjust to Grade With Brick and Cement Mortar

Manhole Riser Sections Shall be A.S.T.M. C478
Pipe Lengths may be Varied to Obtain Desired Depth.

Manhole Riser Sections to be Set in Place in Bituminous Material or Cement Grout.

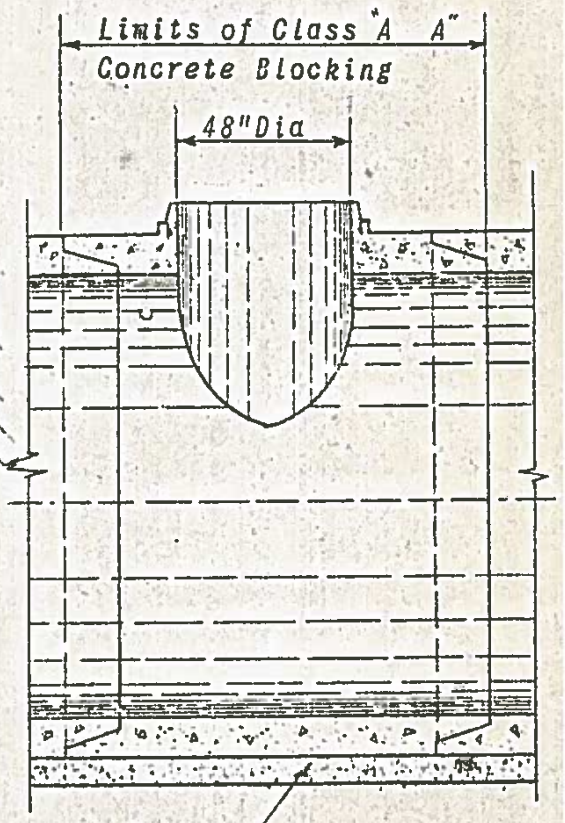


CROSS SECTION

Payment for "T" Section Manhole and Base shall include Pre-Cast Conc. Manhole, "T" Section Base, Slag Bed, Conc. Blocking, Excavation, Backfill, and Disposal of Excavated Material.

NOTE:
Casting Paid for under Sperate Item.

NOTE
Tee Section Reinforcing Details Shall Be Submitted To The Engineer For Approval.



SECTION "A-A"

Accession No. ML-218
Folder M-17

CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS — BUREAU OF ENGINEERING

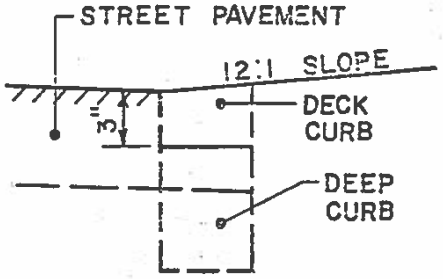
HANDICAP SIDEWALK RAMP

Approved 9-11-78 — DIVISION ENGR. DESIGN

Approved 9-11-78 — DIRECTOR OF ENGR. D.P.W.

Approved — DIRECTOR

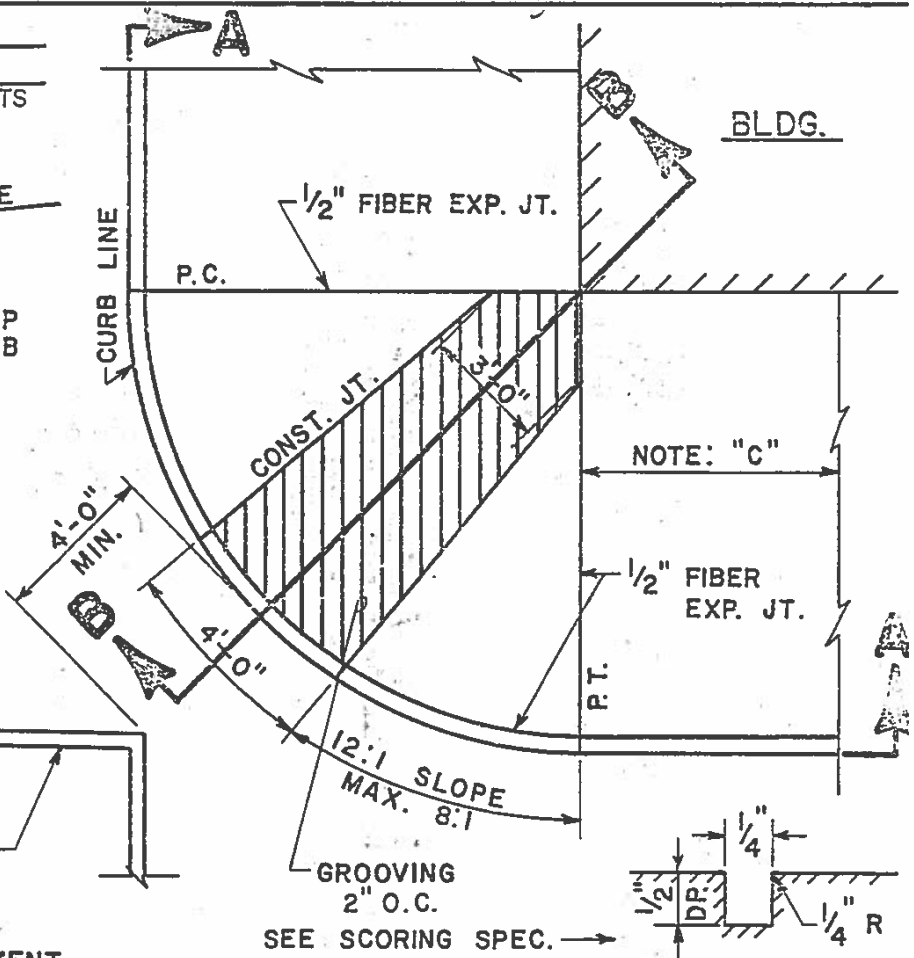
Approved 9/11/78 — DIVISION ENGR. STREETS



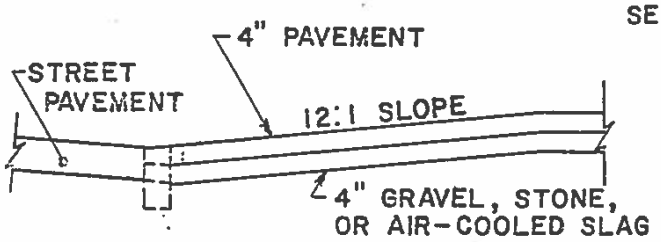
CURB DETAIL

"CAUTION"

NO CITY MONUMENTS ARE TO BE REMOVED OR DESTROYED DURING CONSTRUCTION.



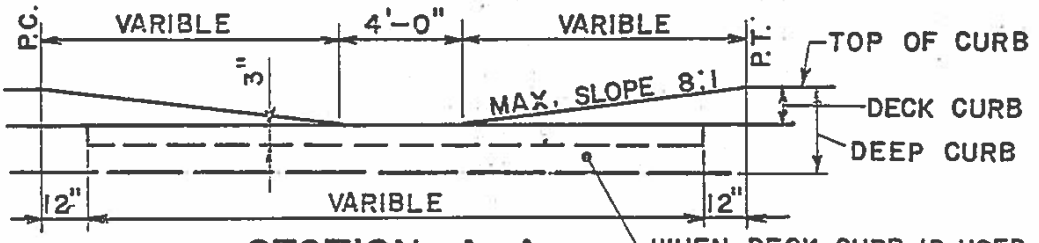
GROOVE DETAIL



SECTION B-B

NOTE "C"

WHEN THIS DISTANCE IS 18" OR LESS IT SHOULD BE ELIMINATED BY INCREASING SLOPE ON RADIUS. BUT IN NO CASE SHOULD ANY SLOPE EXCEED 8:1



SECTION A-A

ACCESSION NO. ML-2220
FOLDER M-17

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS · BUREAU OF ENGINEERING

CORR. METAL PIPE SEWER ANCHOR

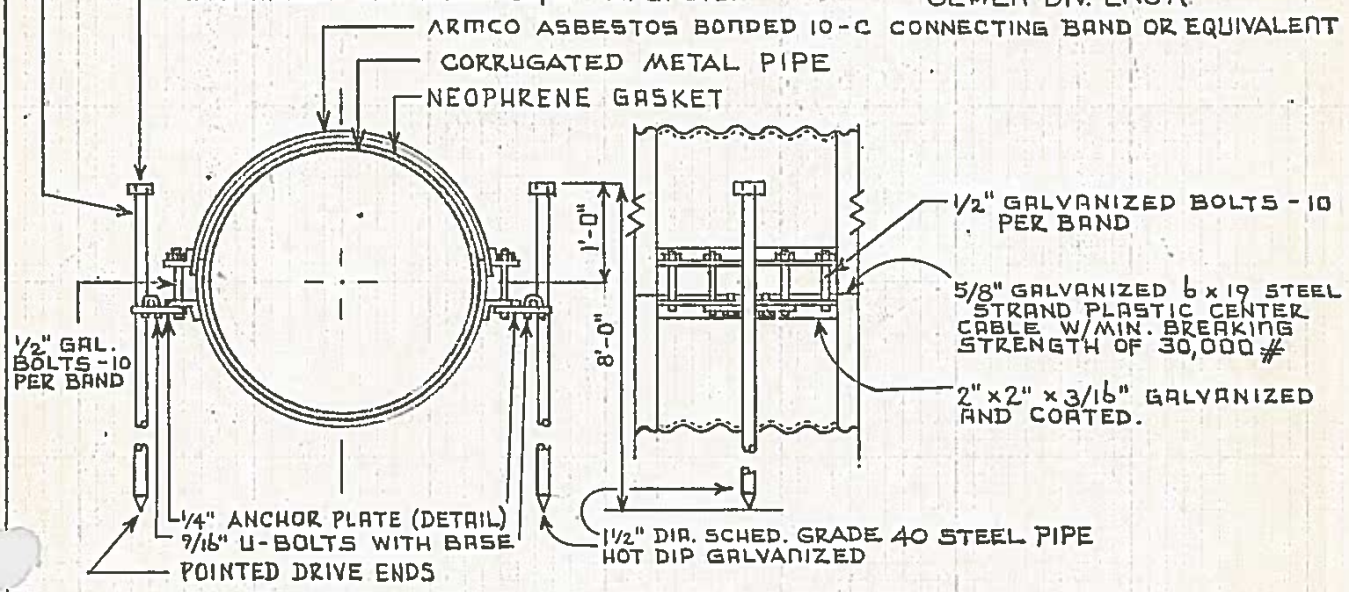
APPROVED 1-19-81 — DIVISION ENGR. DESIGN

APPROVED — CITY ENGINEER

APPROVED 1/19/81 — DIRECTOR D.P.W.

APPROVED — SEWER DIV. ENGR.

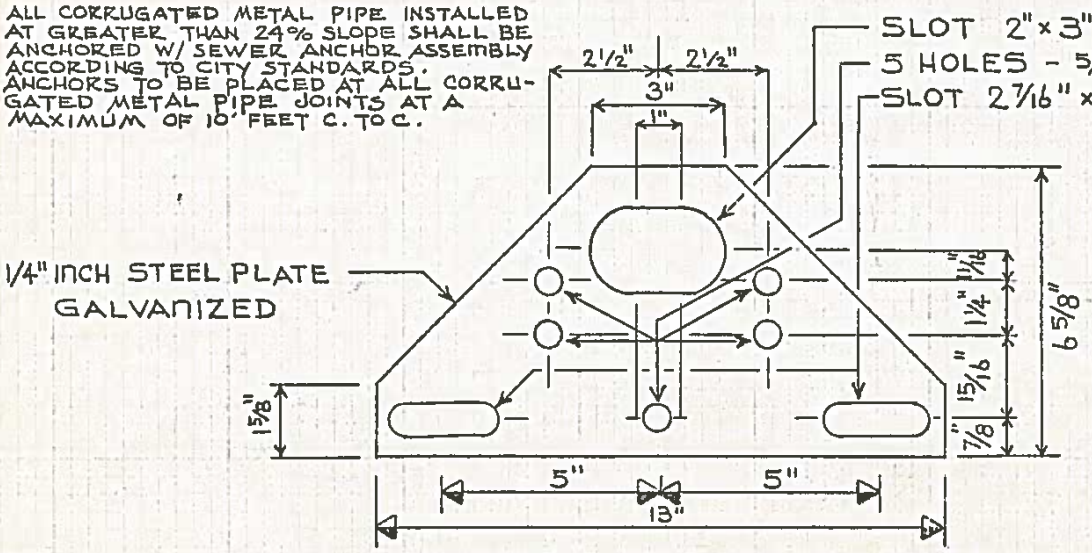
NOTE: ANCHOR ASSEMBLY TO BE FIELD COATED W/ BITUMINOID MATERIAL



SECTION ELEVATION

STORM SEWER ANCHOR ASSEMBLY

ALL CORRUGATED METAL PIPE INSTALLED AT GREATER THAN 24% SLOPE SHALL BE ANCHORED W/ SEWER ANCHOR ASSEMBLY ACCORDING TO CITY STANDARDS. ANCHORS TO BE PLACED AT ALL CORRUGATED METAL PIPE JOINTS AT A MAXIMUM OF 10' FEET C. TO C.



ANCHOR PLATE DETAIL

NO SCALE

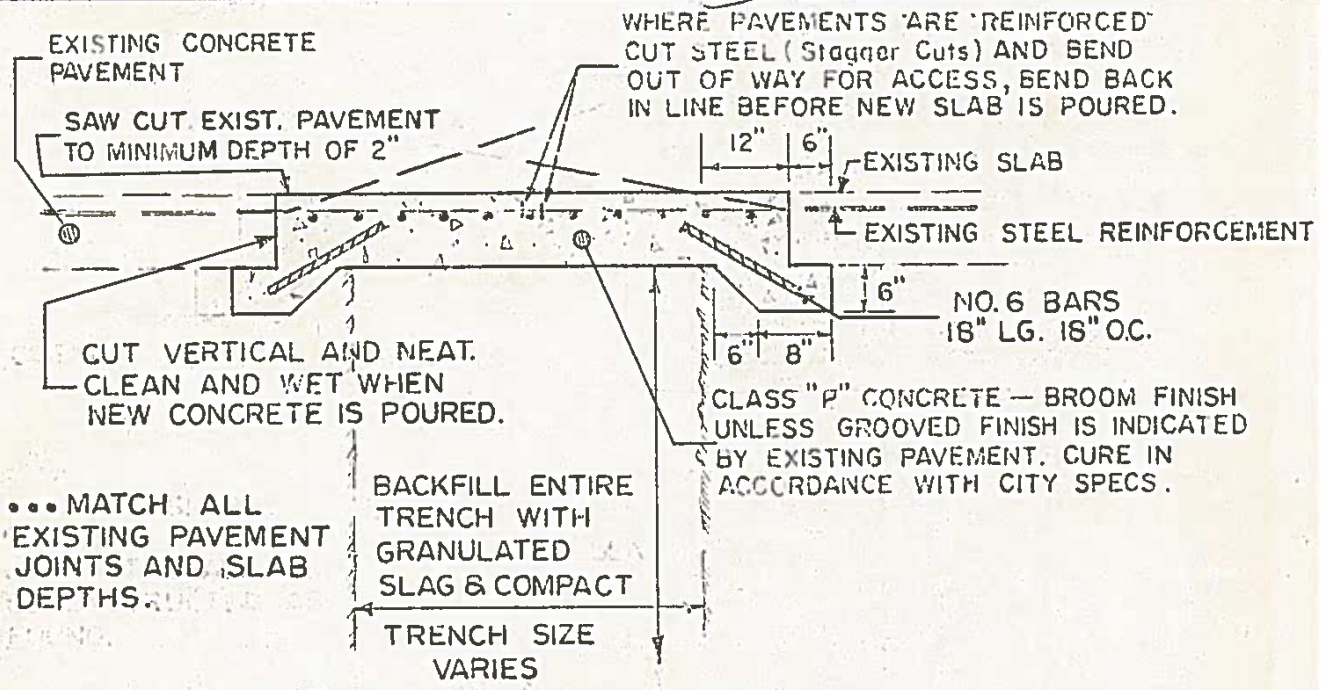
ML-242 FOL. M-18

CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS — BUREAU OF ENGINEERING

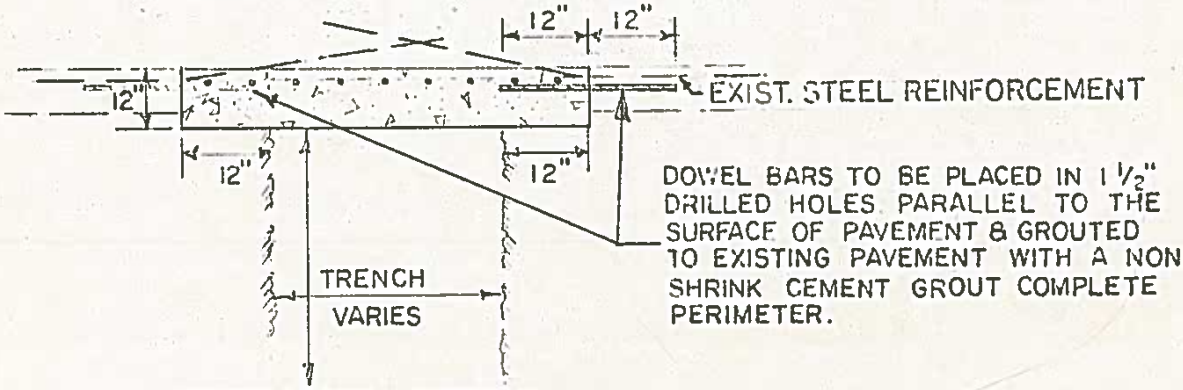
CONCRETE STREET TRENCH REPAVING

Donald Waldorf — DESIGN DIV. ENGR — 7-7-81 APP'D.
P.J. Tarasi — STREET DIV. ENGR. — 7/7/81 APP'D.
Frank J. Pline — CITY ENGR. — 7-7-81 APP'D.
DIRECTOR — 7-7-81 APP'D.



DETAIL OF TRENCH REPAVING

- The underpinning method should not be used if it will interfere with subbase drainage.
- Excavation made to greater dimensions than those shown for underpinning shall be replaced with concrete, and backfilling with other material will not be permitted.



ALTERNATE DETAIL

TOTAL SLAB REPLACEMENT REQ'D. ON ALL CONCRETE STREETS.

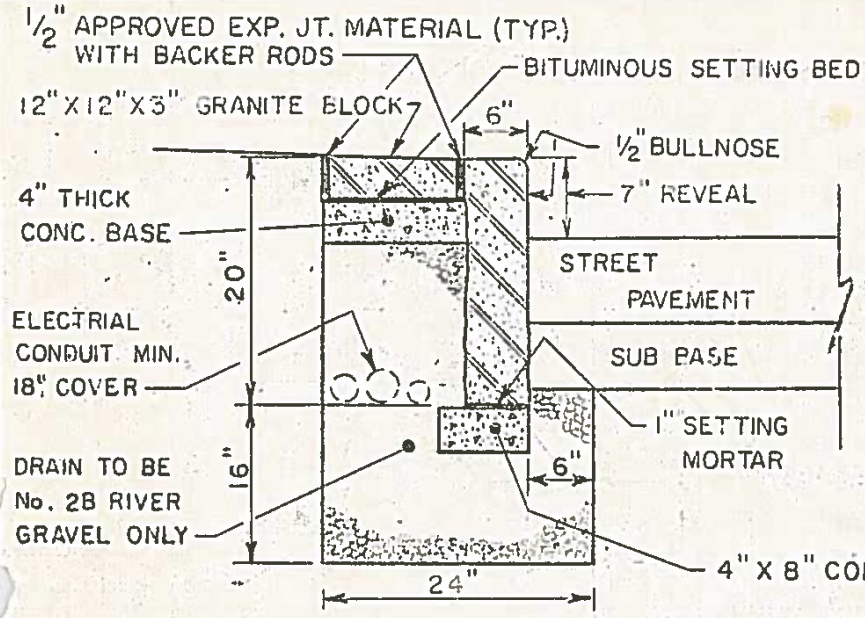
ACCESSION NO. ML-243 FOL. M-18

CITY OF PITTSBURGH

DEPARTMENT OF PUBLIC WORKS — BUREAU OF ENGINEERING

GRANITE CURBS AND PRIVATE DRIVEWAYS

Don Waldorf — DESIGN DIV. ENGR.	2-5-82 APPROVED	Frank L. Cline — CITY ENGR.	2-5-82 APPROVED
A J Tarasi — STREET DIV. ENGR.	2-5-82 APPROVED	DIRECTOR	2-5-82 APPROVED



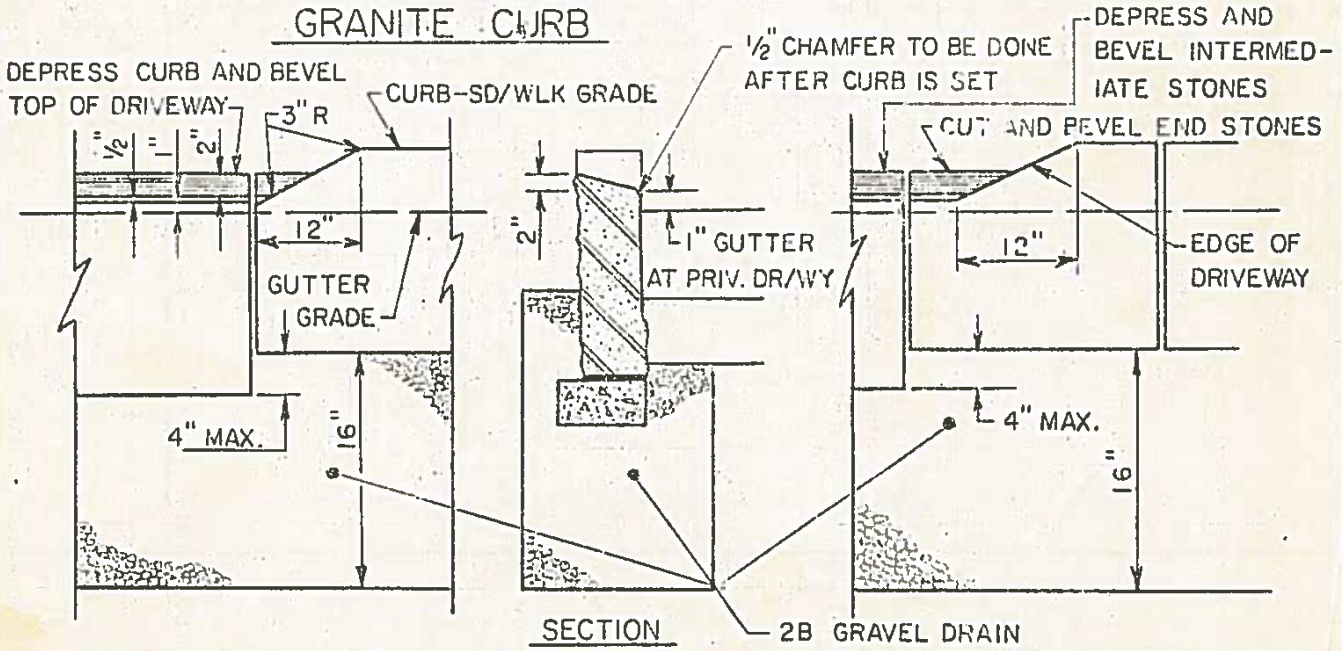
NOTE:

ALL GRANITE CURBS AND UTILITY ACCESS BLOCKS ARE TO BE WHITE UNIFORM IN COLOR WITH MEDIUM FINE GRAIN.

GRANITE CURBS TO BE SAWED AND ALL EXPOSED SURFACES TO HAVE FLAME FINISH.

UTILITY ACCESS BLOCKS MAY BE DELETED AT PRIVATE DRIVEWAY LOCATIONS AND ADJUSTED IN THICKNESS WHERE VAULTS INTERFERE

GRANITE CURB



ELEV. WHERE EDGE OF DRIVEWAY OCCURS AT JOINT OF CURB

ELEV. WHERE EDGE OF DRIVEWAY DOES NOT OCCUR AT JOINT OF CURB

CONSTRUCTION FOR PRIVATE DRIVEWAY WITH GRANITE CURB

REVISED 12-20-82 — 41 — ML-244 FOL. M-18

DEPARTMENT OF PUBLIC WORKS

BUREAU OF ENGINEERING

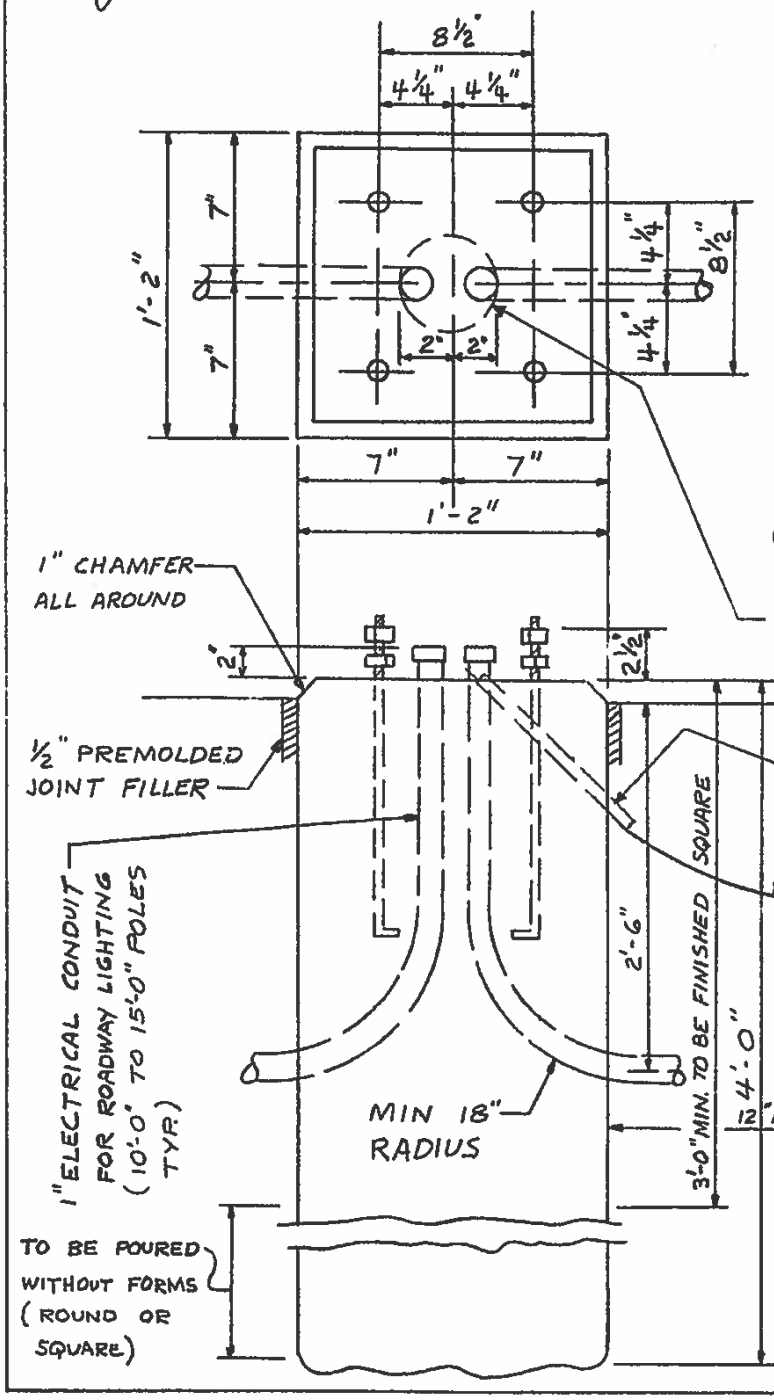
LIGHT POLE FOUNDATION FOR 10'-0" TO 15'-0" POLES

STREET LIGHTING ENGR — APPROVED 10-25-82

ASST DIRECTOR ENGR — APPROVED 10-27-82

CITY ENGR — APPROVED 10/28/82

DIRECTOR — APPROVED 10/27/82



NOTE: CONTRACTOR SHALL VERIFY ANCHOR BOLT SPACING WHEN ORDERING LIGHT POLES.

ANCHOR BOLTS (4-1" Ø X 1'-6")

ANCHOR BOLTS SHALL HAVE A 50,000 P.S.I. MIN. YIELD STRENGTH, EACH BOLT SHALL HAVE 8" OF THREAD AND HOT DIPPED GALVANIZED. EACH BOLT SHALL HAVE TWO (2) GALVANIZED HEX NUTS, ONE (1) FOR LEVELING BELOW THE BASE PLATE AND ONE (1) FOR SECURING THE POLE ABOVE THE BASE PLATE. EACH SET OF FOUR (4) ANCHOR BOLTS SHALL INCLUDE ONE METAL TEMPLATE.

CONDUIT MUST BE CENTERED IN A 4" Ø AREA INDICATED.

℄ EXIT. SURFACE

1" PLASTIC TUBE IMBEDDED IN FOUNDATION

GROUND WIRE #6 SOLID HARD DRAWN COPPER.

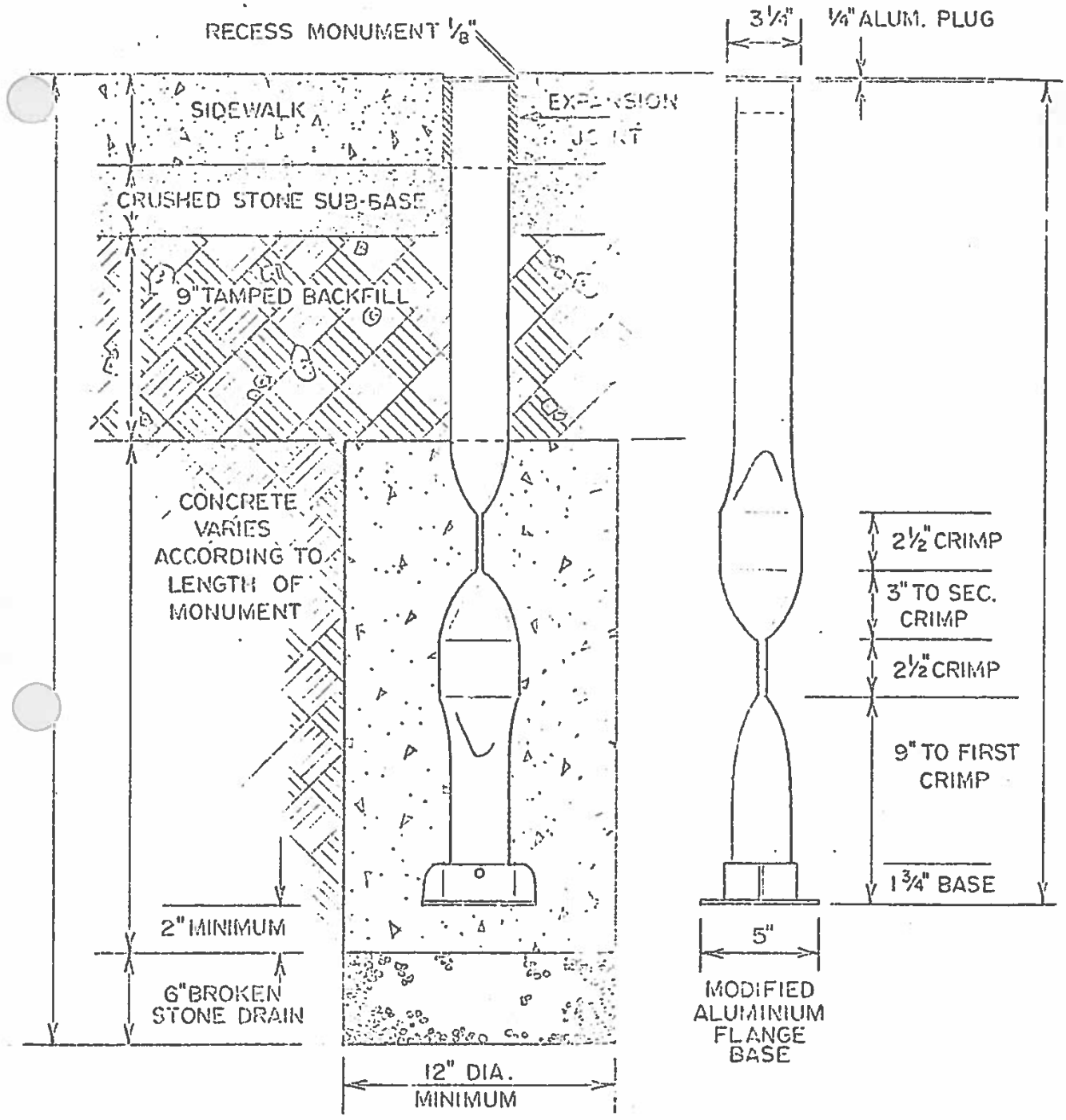
COPPERWELD GROUND ROD 5/8" Ø 7'-0"

FOUNDATION TO BE CITY STANDARDS CLASS "A" CONCRETE.

NO SCALE

REVISION
6-15-83
4-9-84

ML-245 FOL. M-18



D.P.W.
BUREAU OF ENGINEERING
DIVISION OF SURVEYS
PITTSBURGH, PENNSYLVANIA

PROPER PLACEMENT OF MONUMENT

SCALE 2"=1'0" MAY 11, 1983

CITY STANDARD DWG. NO. ML 247
FOLDED M-17

SPECIFICATIONS FOR MONUMENTS
DEPARTMENT OF PUBLIC WORKS
BUREAU OF ENGINEERING
DIVISION OF SURVEYS

Monuments shall be of aluminum tubing, thirty three (33") inches in length, ± three (3") inches. Top will be 3½" in diameter, aluminum dome. Base will be webbed aluminum flange with a base diameter of five (5") inches.

MONUMENT PLACEMENT

Monument must be placed in a manner that will align center of monument with either the property line or specified point, as required.

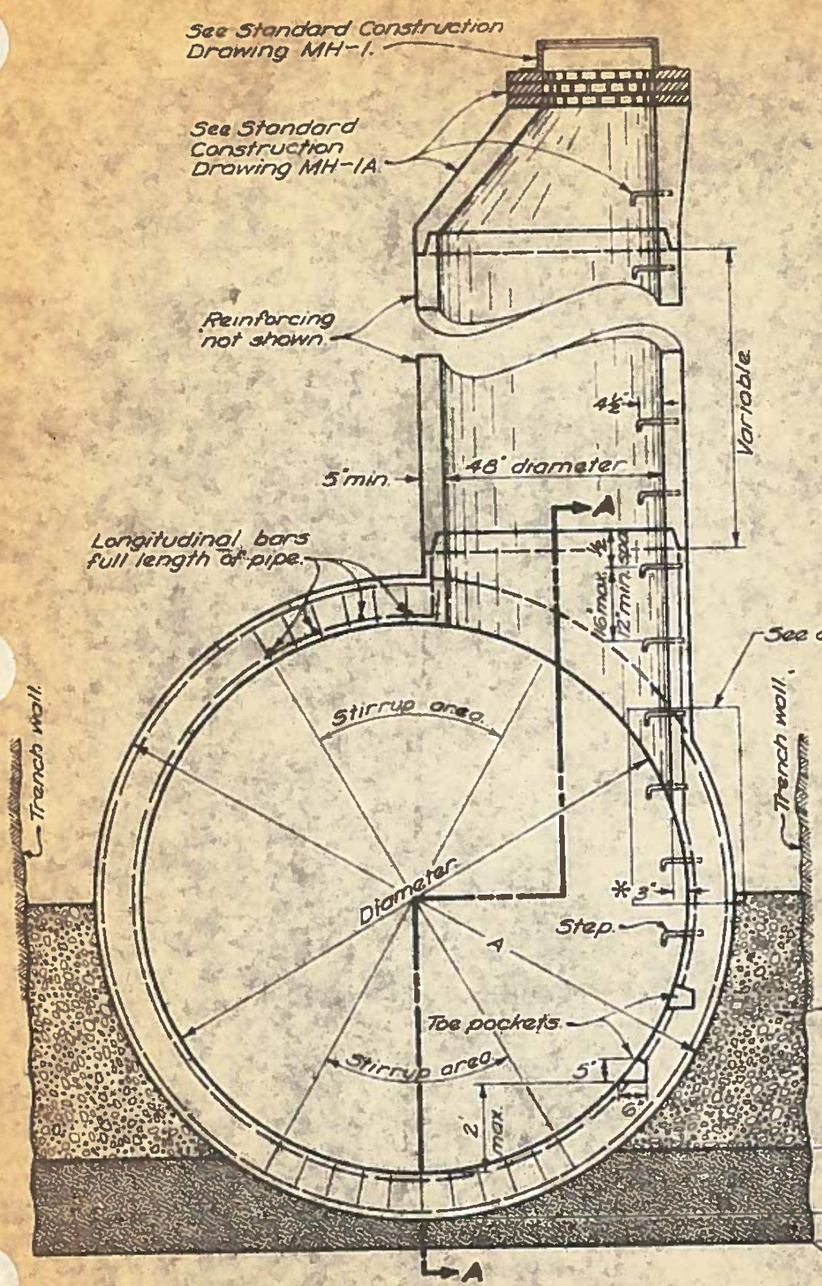
Monument site should be augered to eight (8") inches with an appropriate depth to insure compliance with placement specifications. Monument will be placed on a base consisting of six inches of broken stone.

Bottom fifteen (15") inches of monument will be encased in concrete.

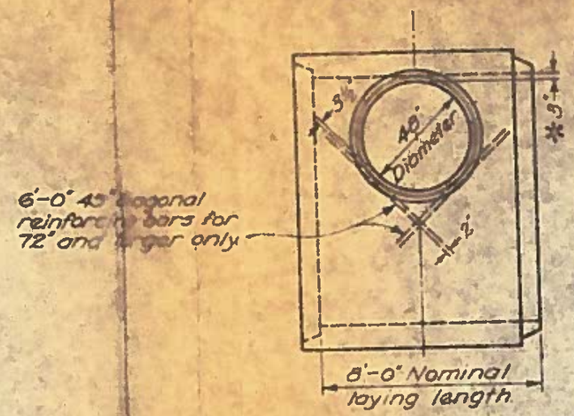
Nine (9") inches of backfill will then be compacted around monument base, followed by three (3") inches of sidewalk base fill.

Expansion material will be placed around neck of monument flush with sidewalk base fill.

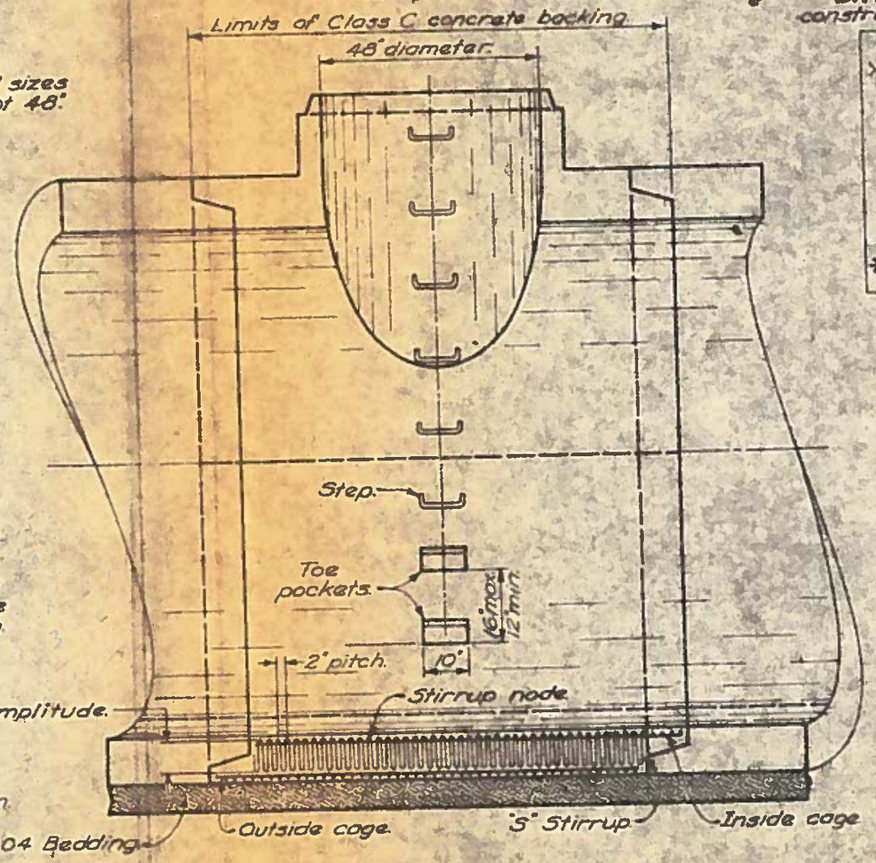
When sidewalk has been placed, monument must rest approximately 1/8" to 1/4" inch below finished sidewalk.



ELEVATION



PLAN VIEW



SECTION A-A
(Showing stirrup detail)

NOTES

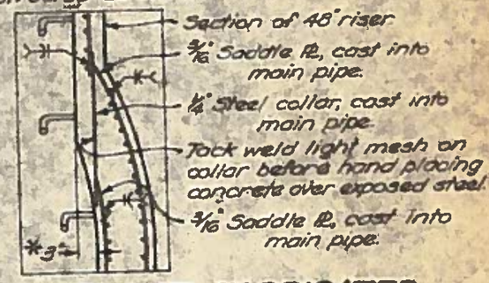
GENERAL Unless otherwise required by the ... cast reinforced concrete ... and herein may be used in lieu ... shown on Standard Drawings ... and MH-2.

MATERIALS Precast manhole base shall have ... rials and designs as set forth in the ... provisions and specifications. Precast ... tapers, adjusting rings and steps shall ... the requirements of MH-1A. Frames ... covers shall be as specified on ...

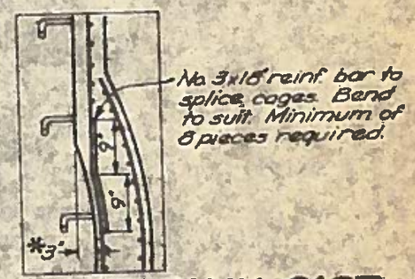
PAYMENT for No. 2A manhole shall include ... of the eccentric spur, additional ... ring, concrete backing, steps, toe ... riser sections, rings, castings and ... and no deductions will be made ... of the pipe lines.

BEDDING for No. 2A manhole shall be the same as is used under the adjoining conduits.

DROP PIPES when required shall be constructed as shown on MH-2.



PLANT FABRICATED



INTEGRALLY CAST

BUREAU OF LOCATION AND DESIGN
OHIO DEPARTMENT OF HIGHWAYS

STANDARD MANHOLE

STANDARD CONSTRUCTION DRAWING MH-2A

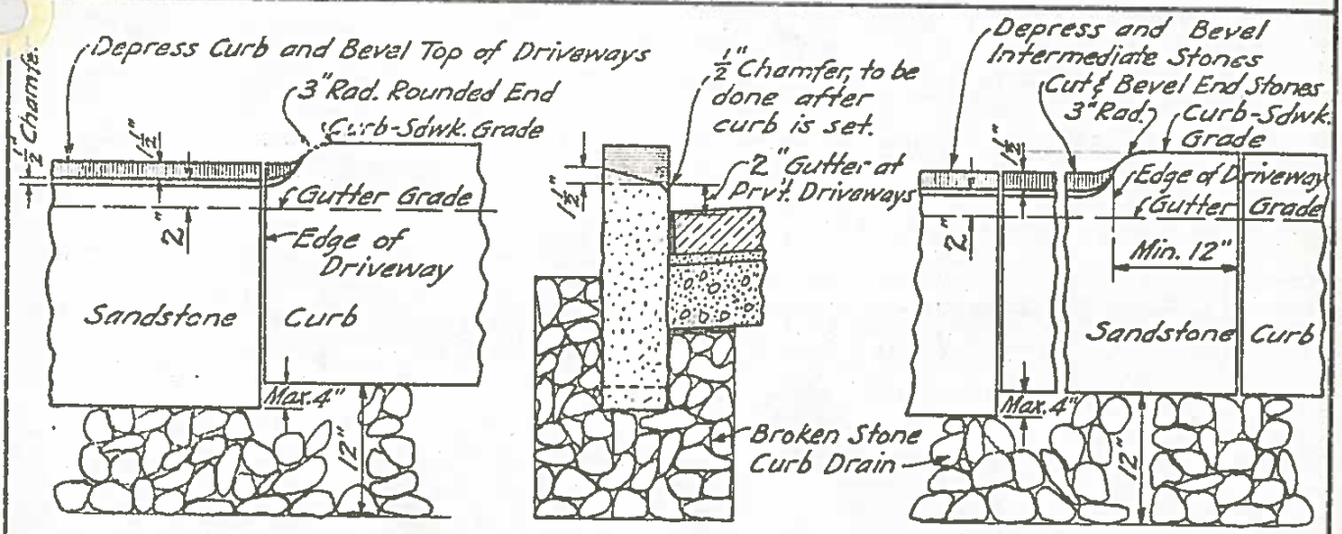
APPROVED: ... ENGR, L. & B.

DATE

CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS — BUREAU OF ENGINEERING

SANDSTONE AND GRANITE CURBS
PRIVATE DRIVEWAYS

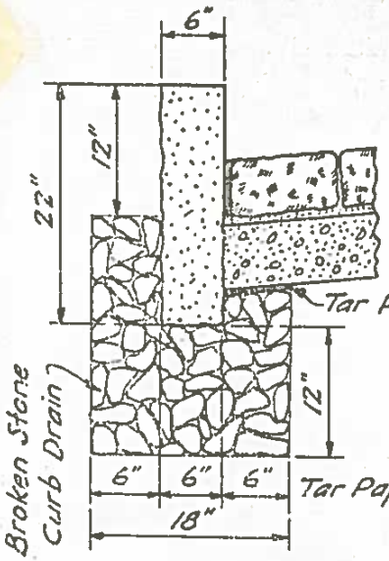


ELEV. WHERE EDGE OF DRIVEWAY OCCURS AT JOINT IN CURB

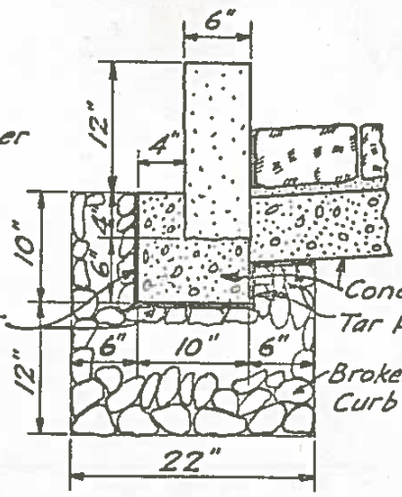
SECTION

ELEV. WHERE EDGE OF DRIVEWAY DOES NOT OCCUR AT JOINT IN CURB

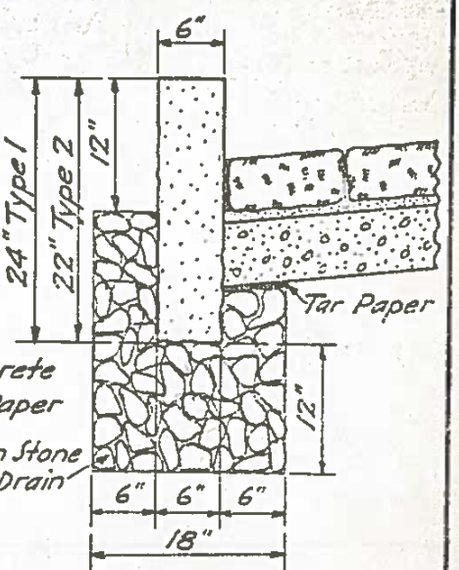
CONSTRUCTION FOR PRIVATE DRIVEWAYS WITH SANDSTONE CURB



SANDSTONE CURB
TYPES 1, 2 & 3



SANDSTONE CURB
TYPE 1
ALTERNATIVE DESIGN
Scales:- ¾" = 1'-0"



GRANITE CURB
TYPES 1 & 2

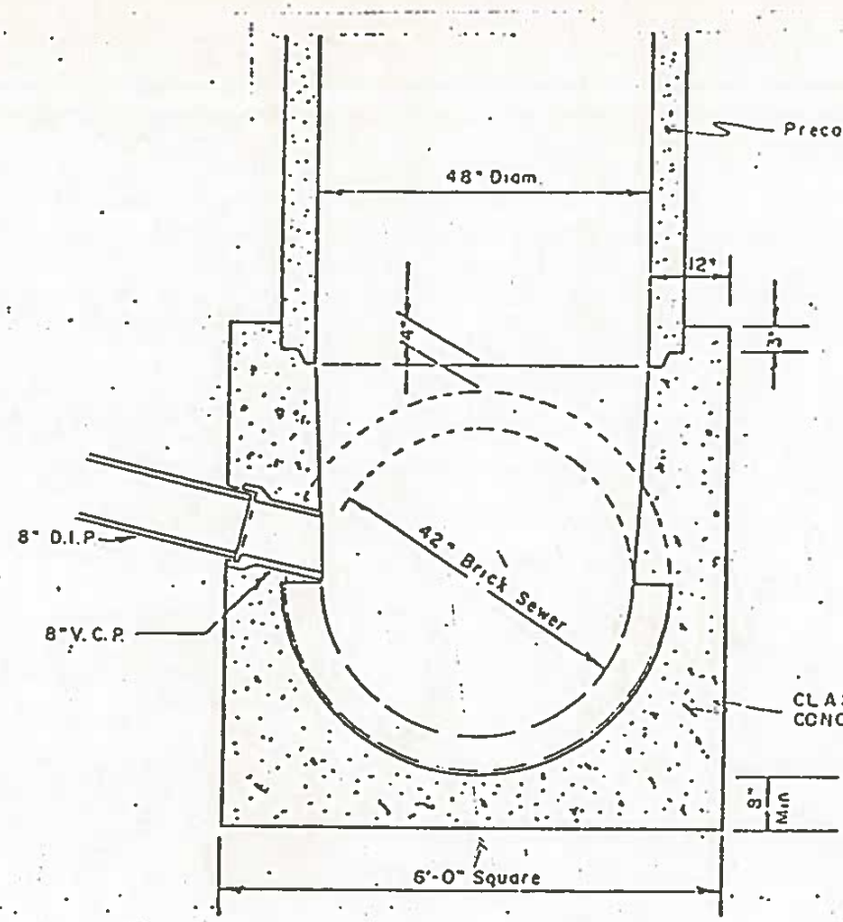
Approved _____
DIVISION ENGR.

Approved _____
CHIEF ENGINEER-B. OF E.

Approved 9/12/30
CHIEF ENGINEER-D.P.W.

Approved 9-26-30
DIRECTOR

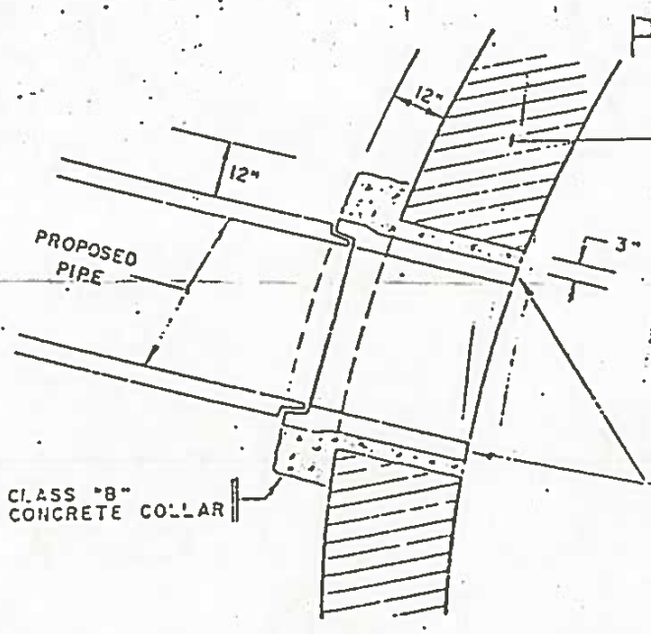
SHEET No. 11.



DETAIL - MANHOLE 1

No Scale

proper installation for break-in connections



Hole in existing sewer pipe is to be Mechanically Drilled

CONCRETE COLLAR DETAIL

USE WHEN CONNECTING A PROPOSED SEWER INTO AN EXISTING BRICK STRUCTURE. INCLUDE WITH PRICE OF PIPE.

City of Pittsburgh

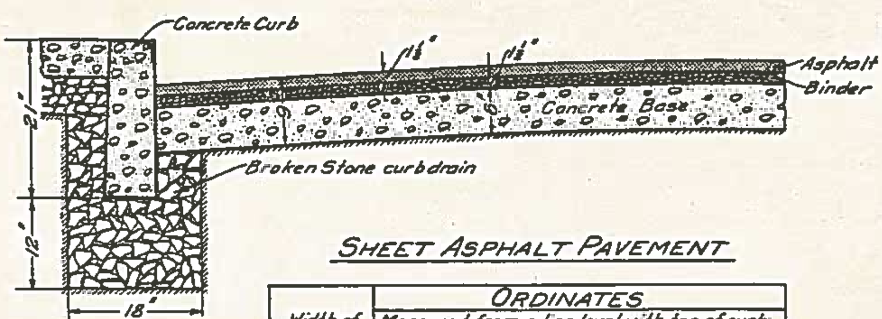
Department of Public Works — Bureau of Engineering

Typical Cross Sections of Streets Showing Construction of Pavements

Approved April 20, 1916 — Chas. M. Reppert, Division Engineer

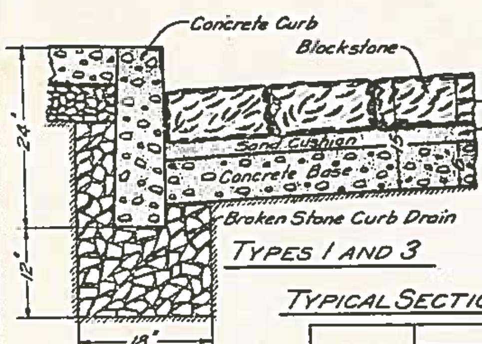
Approved April 20, 1916 — N. S. [illegible], Chief Engineer

Approved April 20, 1916 — Robt. Swan, Director

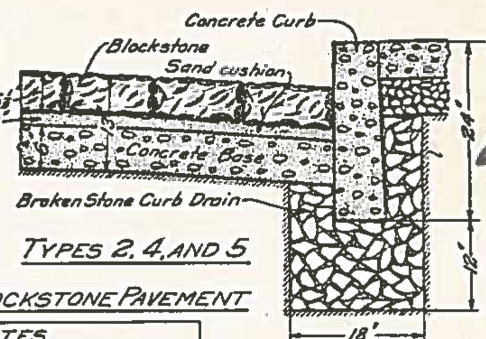


Sheet Asphalt Pavement

Width of Roadway Curb to Curb	Ordinates — Measured from a line level with top of curb to surface of completed pavement						
	Horizontal distance from Curb						
	0'	3'	6'	9'	12'	15'	Center
36'	6"	4[illegible]"	2[illegible]"	1[illegible]"	[illegible]"	[illegible]"	0"
30'	6"	4[illegible]"	2[illegible]"	1[illegible]"	1[illegible]"		1"
22'	6"	4[illegible]"	2[illegible]"	2[illegible]"			2"
14'	6"	4"	3[illegible]"				3"



Types 1 and 3



Types 2, 4, and 5

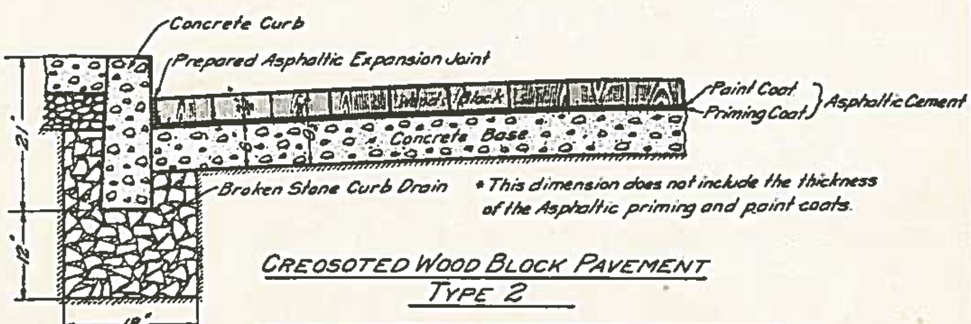
Typical Sections of Blockstone Pavement

Type 1 - Selected limestone blocks
Type 3 - Common

Width of Roadway Curb to Curb	Ordinates — Measured from a line level with top of curb to surface of completed pavement						
	Horizontal distance from Curb						
	0	3'	6'	9'	12'	15'	Center
36'	6"	3[illegible]"	2[illegible]"	[illegible]"	[illegible] above*	[illegible] above*	1 above*
30'	6"	3[illegible]"	2[illegible]"	[illegible]"	[illegible]"	0"	0"
22'	6"	3[illegible]"	1[illegible]"	[illegible]"			[illegible]"
14'	6"	4"	3[illegible]"				3"

*Surface of Completed Pavement is above a line level with top of Curb

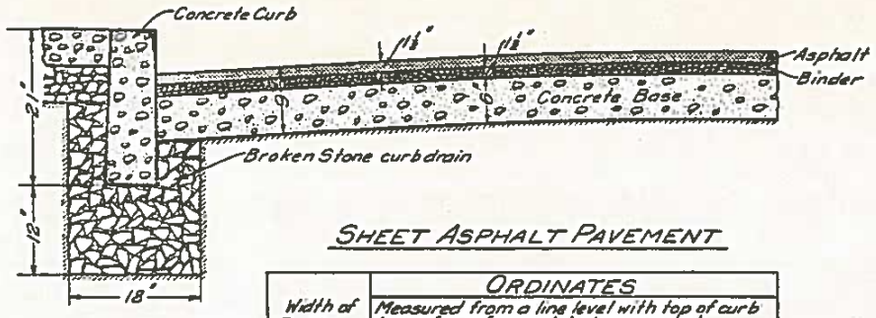
Type 2 - Selected limestone blocks
Type 4 - Common " "
Type 5 - Granite blocks



*This dimension does not include the thickness of the Asphaltic priming and paint coats.

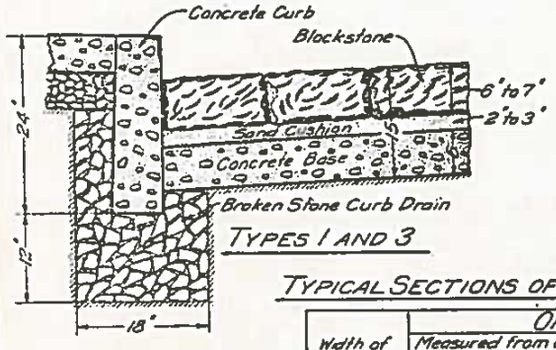
Creosoted Wood Block Pavement
Type 2

Width of Roadway Curb to Curb	Ordinates — Measured from a line level with top of curb to surface of completed pavement						
	Horizontal distance from Curb						
	0'	3'	6'	9'	12'	15'	Center
36'	6"	4[illegible]"	3[illegible]"	3"	2[illegible]"	2[illegible]"	2"
30'	6"	4[illegible]"	3[illegible]"	3[illegible]"	2[illegible]"	2[illegible]"	2[illegible]"
22'	6"	4[illegible]"	3[illegible]"	3[illegible]"			3"
14'	6"	4[illegible]"	4[illegible]"				4"

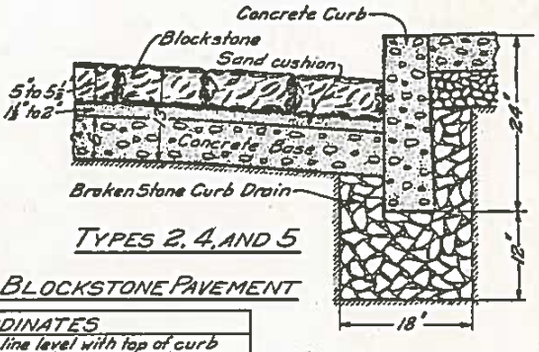


SHEET ASPHALT PAVEMENT

Width of Roadway Curb to Curb	ORDINATES Measured from a line level with top of curb to surface of completed pavement — Horizontal distance from Curb						
	0'	3'	6'	9'	12'	15'	Center
36'	6"	4¾"	2¼"	1/4"	1/4"	1/4"	0"
30'	6"	4¾"	2¾"	1/4"	1/4"		1"
22'	6"	4¾"	2¼"	2¼"			2"
14'	6"	4"	3¼"				3"



TYPES 1 AND 3



TYPES 2, 4, AND 5

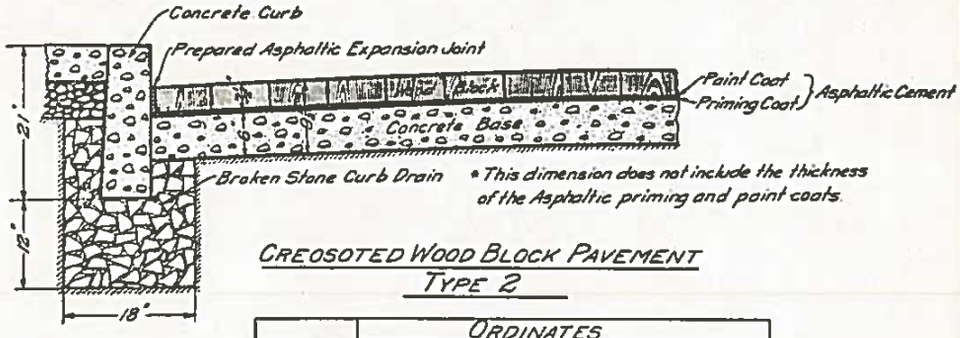
TYPICAL SECTIONS OF BLOCKSTONE PAVEMENT

Width of Roadway Curb to Curb	ORDINATES Measured from a line level with top of curb to surface of completed pavement — Horizontal distance from Curb						
	0	3'	6'	9'	12'	15'	Center
36'	6"	3¼"	2¼"	1/4"	¼ above*	¼ above*	¼ above*
30'	6"	3¼"	2¼"	1/4"	1"	0"	0"
22'	6"	3¾"	1¾"	1/4"			1/4"
14'	6"	4"	3¼"				3"

*Surface of Completed Pavement is above a line level with top of Curb

Type 1 - Selected limestone blocks
Type 3 - Common

Type 2 - Selected limestone blocks
Type 4 - Common
Type 5 - Granite blocks



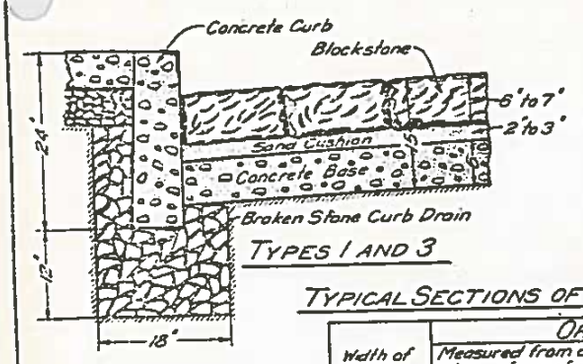
* This dimension does not include the thickness of the Asphaltic priming and paint coats.

CREOSOTED WOOD BLOCK PAVEMENT
TYPE 2

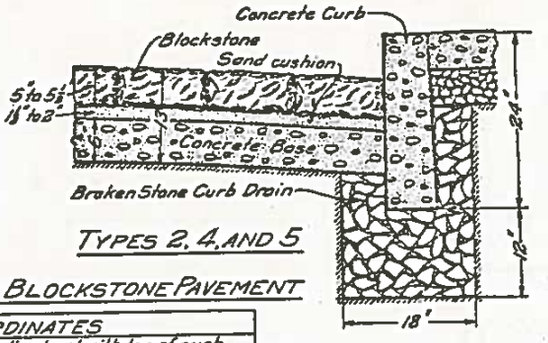
Width of Roadway Curb to Curb	ORDINATES Measured from a line level with top of curb to surface of completed pavement — Horizontal distance from Curb						
	0'	3'	6'	9'	12'	15'	Center
36'	6"	4¼"	3¼"	3"	2¾"	2¼"	2"
30'	6"	4¼"	3¼"	3¼"	2¾"	2¼"	2¼"
22'	6"	4¼"	3¼"	3¼"			3"
14'	6"	4¼"	4¼"				4"

18"

Width of Roadway Curb to Curb	ORDINATES Measured from a line level with top of curb to surface completed pavement — Horizontal distance from Curb						
	0'	3'	6'	9'	12'	15'	Center
36'	6"	4¼"	2¾"	1¼"	¼"	¼"	0"
30'	6"	4¼"	2¾"	1¼"	1¼"		1"
22'	6"	4¼"	2¾"	2¼"			2"
14'	6"	4"	3¼"				3"



TYPES 1 AND 3



TYPES 2, 4, AND 5

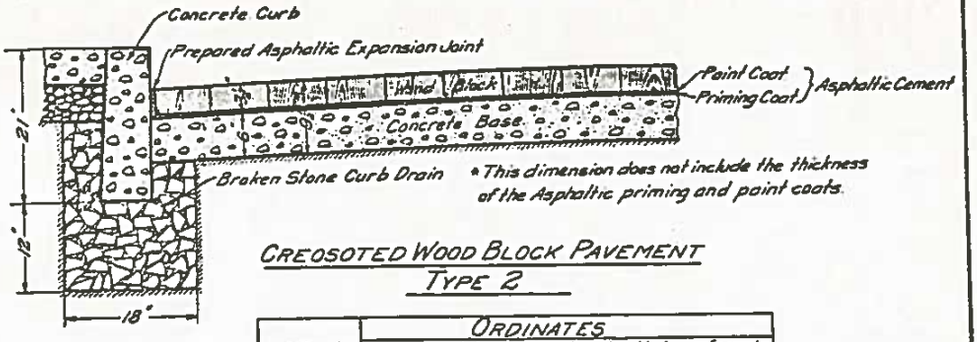
TYPICAL SECTIONS OF BLOCKSTONE PAVEMENT

Width of Roadway Curb to Curb	ORDINATES Measured from a line level with top of curb to surface of completed pavement — Horizontal distance from Curb						
	0	3'	6'	9'	12'	15'	Center
36'	6"	3¼"	2¼"	¼" above*	¼" above*	¼" above*	¼" above*
30'	6"	3¼"	2¾"	¾"	¾"	0"	0"
22'	6"	3¾"	1¾"	¾"			1"
14'	6"	4"	3¼"				3"

*Surface of Completed Pavement is above a line level with top of Curb

Type 1 - Selected limestone blocks
Type 3 - Common

Type 2:- Selected limestone blocks
Type 4:- Common
Type 5:- Granite blocks



*This dimension does not include the thickness of the Asphaltic priming and paint coats.

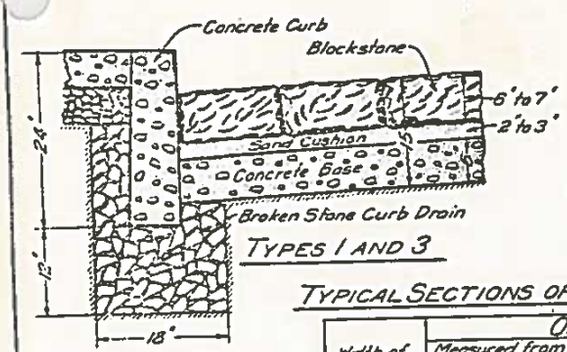
CREOSOTED WOOD BLOCK PAVEMENT
TYPE 2

Width of Roadway Curb to Curb	ORDINATES Measured from a line level with top of curb to surface of completed pavement — Horizontal distance from Curb						
	0'	3'	6'	9'	12'	15'	Center
36'	6"	4¼"	3¼"	3"	2¼"	2¼"	2"
30'	6"	4¼"	3¼"	3¼"	2¼"	2¼"	2¼"
22'	6"	4¼"	3¼"	3¼"			3"
14'	6"	4¼"	4¼"				4"

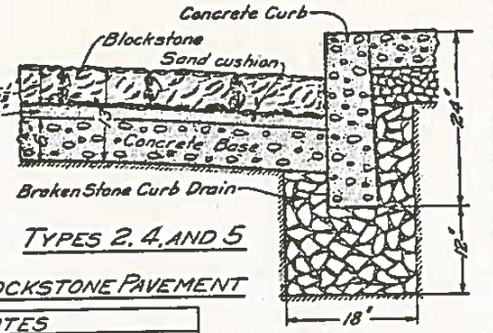
SHEET NO. 2

18"

Width of Roadway Curb to Curb	ORDINATES Measured from a line level with top of curb to surface of completed pavement — Horizontal distance from Curb						
	0'	3'	6'	9'	12'	15'	Center
36'	6"	4½"	2½"	1"	⅜"	⅛"	0"
30'	6"	4⅜"	2⅜"	1⅛"	1⅛"		1"
22'	6"	4⅛"	2⅛"	2⅛"			2"
14'	6"	4"	3½"				3"



TYPES 1 AND 3



TYPES 2, 4, AND 5

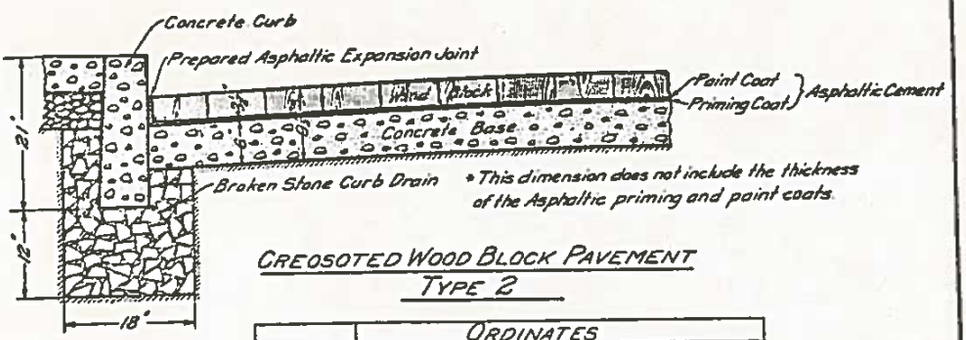
TYPICAL SECTIONS OF BLOCKSTONE PAVEMENT

Width of Roadway Curb to Curb	ORDINATES Measured from a line level with top of curb to surface of completed pavement — Horizontal distance from Curb						
	0	3'	6'	9'	12'	15'	Center
36'	6"	3½"	2½"	⅜"	⅛" above*	⅜ above*	⅛ above*
30'	6"	3⅜"	2⅜"	⅜"	⅛"	0"	0"
22'	6"	3⅛"	1⅞"	¼"			⅛"
14'	6"	4"	3½"				3"

*Surface of Completed Pavement is above a line level with top of Curb

Type 1 - Selected limestone blocks
Type 3 - Common

Type 2 - Selected limestone blocks
Type 4 - Common
Type 5 - Granite blocks



* This dimension does not include the thickness of the Asphaltic priming and paint coats.

CREOSOTED WOOD BLOCK PAVEMENT
TYPE 2

Width of Roadway Curb to Curb	ORDINATES Measured from a line level with top of curb to surface of completed pavement — Horizontal distance from Curb						
	0'	3'	6'	9'	12'	15'	Center
36'	6"	4⅛"	3⅜"	3"	2⅜"	2⅛"	2"
30'	6"	4⅛"	3⅜"	3⅛"	2⅛"	2⅛"	2⅛"
22'	6"	4⅛"	3⅛"	3⅛"			3"
14'	6"	4⅛"	4⅛"				4"

SHEET NO. 2

Bell Telephone Compauy Symbol's

C.W.D - Creosoted Wood Duct

C.I.B - Cast Iron Bend

T.C.M. - Terra Cotta Multiple Tile

W.I.P.B - Wrought Iron Pipe

SPD - Split Duct

Tubular Steel, Lattice or Ornamental Steel Pole - 100 % D.L.Co. (Size Indicated Same as Wood Poles)

30' Cedar Pole
35' " "
40' " "
45' " "
50' " "
55' " "
60' " "
65' " "
} 100 % D.L.Co. Wood Poles Indicating Heights

Joint Pole - D.L.Co. Title - (With B.T.Co. Only)

* Joint Pole - D.L.Co. Title - (Foreign Co. Indicated By Letter)

Joint Pole - B.T.Co. Title - (With D.L.Co. Only)

* Joint Pole - Foreign Co. Title (Company Indicated By Letter.)

Anchor - 100 % D.L.Co.

Joint Anchor - D.L.Co. Title - (With B.T.Co. Only)

Joint Anchor - B.T.Co. Title - (With D.L.Co Only)

Stanchion Guy - 100% D.L.Co.

Joint Stanchion Guy - D.L.Co. Title (With B.T.Co. Only)

Joint Stanchion Guy - B.T.Co. Title (With D.L.Co. Only)

Tower

Push Brace - 100% D.L.Co.

Joint Push Brace - D.L.Co. Title (With B.T.Co. Only)

Joint Push Brace - B.T.Co. Title (With D.L.Co. Only)

Push Brace - 100% B.T.Co. (Within D.L.Co. Pole Line)

Foreign Owned Pole

Customers Pole On Private Property

22163 D.L.Co. Pole Number

(2874) D.L.Co. Pole Showing File Number - Div. Letter Omitted.

[2874] File Number In Brackets Indicates Pending Joint Agrmt

*128 Joint Agreement Number.

* Foreign Status Symbols

A	Amer. Tel. & Tel. Co.	R	Pgh. Rwys. Co.
C	Carnegie Ill. Steel Co.	S	So. W. Penna. Pipe Line Co.
E	Equit. Gas Co.	W	West. Union Tel. Co.
B	B.T.Co. on 3 way Jt. or more.	P.N.G	Peoples Natural Gas Co.

DRAWN	DATE	REVISIONS
M.G.O. 1-19-44	5/4/2	Added "P.N.G." m.g.o.
Checked H.J.H. - 3-14-44	5/12/47	Rem. "F" Added "B" Changed O Foreign Pole m.g.o.

Pole Record Map Symbols

Duquesne Light Co.
Dist. Dept.

D-10013 X
Sheet 1 of 2

L.C. 1314 Central Division Rental Application Number on B.T. Co. Poles. Same For Other Divisions Using Proper Division Letter in Foregoing.

L. 1314 License By D. L. Co. to B.T. Co. to Use D.L.Co. Poles.

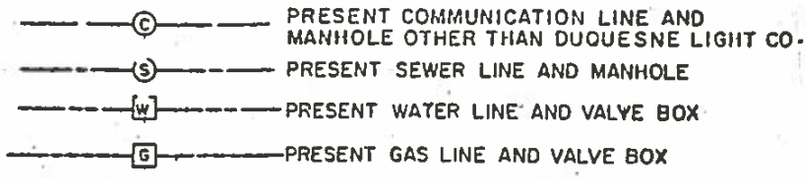
o #236 Foreign Owned Pole. D.L.Co. Agreement (or Attach.) No.

DWN. BY:-	DATE	REVISIONS
mqo. 6-17-46 Checked H.J.H.	8/7/47	Foreign Owned Pole (Attach)

POLE RECORD MAP SYMBOLS

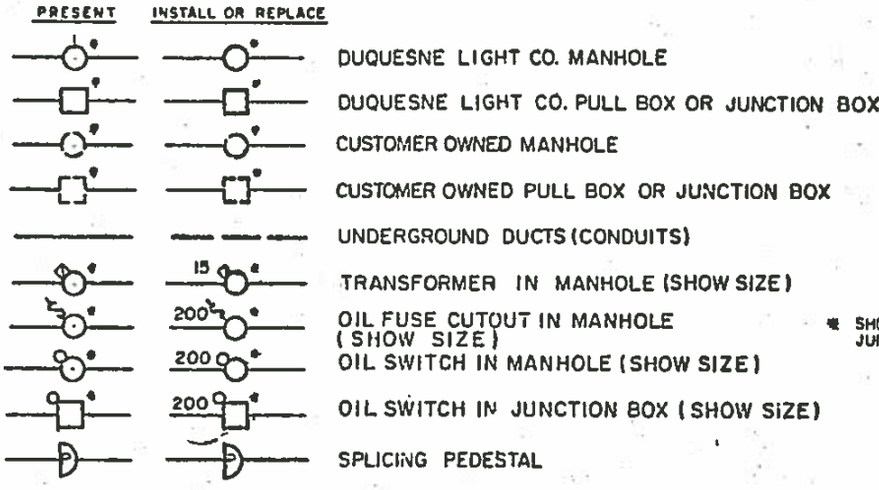
Duquesne Light Co. Dist. Dept.

D-10013X Sheet 2 of 2



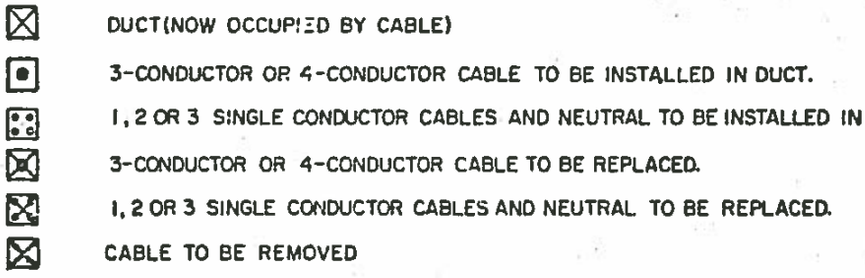
SYMBOLS FOR FOREIGN UTILITIES FOR UNDERGROUND CONSTRUCTION DRAWINGS

DETAIL 5-6-A



SYMBOLS FOR UNDERGROUND CONSTRUCTION DRAWINGS AND DUCT SHEETS

DETAIL 5-6-B



SYMBOLS FOR CABLE PULLING PLAN

DETAIL 5-6-C

INTERIM STANDARD ISSUED 3-17-47

STANDARD FOR T.&D. DESIGN & CONSTRUCTION
DRAWN
APPROVED

DUQUESNE LIGHT CO STANDARDS FOR T. & D. DESIGN & CONSTRUCTION

SYMBOLS FOR UNDERGROUND CONSTRUCTION DRAWINGS, DUCT SHEETS AND AND CABLE PULLING PLANS

Duct Line - (Use B5 Lettering Pen)

Street line or property line

Manhole with 2'-6" lid and number (3/8" dia.)

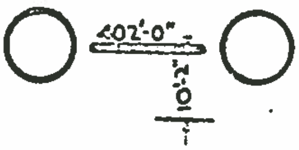
Manhole with 2'-0" lid and number (3/8" dia)

Manhole with square lid and number (3/8" x 3/8")

Shallow handhole or S.L. box (1/4" x 1/4")

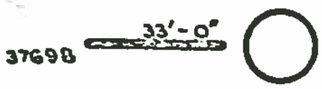
Manhole contains fuses, switching apparatus or transformer.

Horizontal direction of obstruction in manhole which interferes with training cables from duct face to duct face.



One figure indicates distance between centers of manhole lids. Other figure indicates distance from center of nearest manhole to property line unless otherwise indicated.

Distance from top of ducts to street level



Duct terminal at pole, pole number and length of ducts from center of manhole lid to base of pole.

DWN.	TRCD.	CHKD.	INSPD.	SAFETY	DIV. APP.	DIV. APP.	SCALE		
GAS [illegible]	[illegible]	[illegible]						KIND	DUCT SHEET SYMBOLS
								SUBJECT	WITH EXPLANATORY NOTES
								LOCTN.	
								CO.	DUQUESNE LIGHT CO. DIST. DEPT.

NO.	[illegible]	REVISIONS	CHKD.	INSPD.	DIV. APP.	DIV. APP.
1	[illegible]	Chang'd Switch. Elim. Ck. Lgt. Duct		12-11-52		
2						

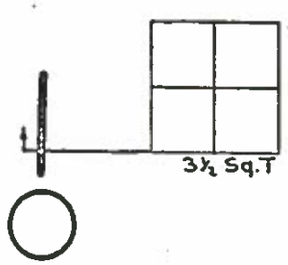
APPROVED		
DATE	INITLS.	FUNCT.
NUMBER		
D-10017 1 of 4		

PITTSBURGH

1 of 4

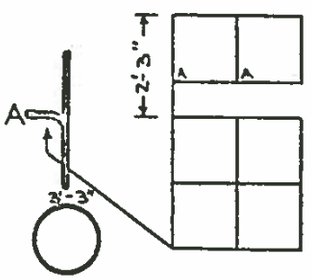
Arrowhead indicates change from duct line to aerial cable. Number indicates pole. Show no more than ½" of aerial cable and direction in which it extends.

Street lamp outlet.

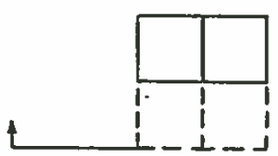


Duct section looking out of manhole in direction of arrow. (Section indicates number and relative position of ducts.) Figure indicates size of ducts. Letter indicates kind of material. (Ducts are round except where noted: Sq.=Square)

F = Fibre Stl.= Steel T= Terra Cotta
I = Iron Tr.= Transite R.T.= Rubber Tile



Lateral out of same face as main duct line. (Use any letter except D to indicate.) Dimension on duct section indicates distance from top of lateral to top of main duct section. (2'-3" + 3'-3" = 5'-6" Distance from street level to top of main ducts.)



Dotted portion of duct section indicates ducts going through manhole but not open.

Abandoned individual duct.

Street railways loading platform. (3/16" × 9/16")

DWN.	TRCD.	CHKD.	INSPD.	SAFETY	DIV.APP.	DIV.APP.	SCALE
G.A.S. 12/8/42	H.K.S. 12/5/42						

NO.	DATE	REVISIONS	CHKD.	INSPD.	DIV.APP.	DIV.APP.
1				12-11-42		
2						

KIND
SUBJCT.
LOCTN.
CO.

DUCT SHEET SYMBOLS
WITH EXPLANATORY NOTES

DUQUESNE LIGHT CO.
DIST. DEPT.

APPROVED		
DATE	INITLS.	FUNCT.

NUMBER
D-10017
2 of 4

PITTSBURGH

As of Jan 1, 1943 duct sheets will show all Duquesne Light Co. duct lines as solid lines. The only exception to this rule will be foreign owned duct lines, which will be represented by a dashed line. In the past it has been the practice to show a duct line as a dashed line when such a line goes under another duct line, under a railroad or such other conditions. This practice will be discontinued and as the duct sheet are redrawn they will follow the above instructions.

Symbols of foreign owned ducts, used or maintained by Duquesne Light Co.

————	Duct line
◯	Manhole 2'-6" lid (3/8" dia)
◡	Manhole 2'-0" lid (3/8" dia)
▭	Manhole square lid (3/8" x 3/8")
⌜⌝	Shallow handhole or S.L. box (1/4" x 1/4")

Abbreviations

L.T. Low tension
P.W. Parkway
L.C. Lead coverd
R.C. Rubber covered
P.S. Protected sheath
D. Dead cable
P.P. Private property
C.L. Curb line
℄ Center line
℞ Property line
℔ Building line

DWN.	TRCD.	CHKD.	INSPD.	SAFETY	DIV. APP.	DIV. APP.	SCALE
G.D.S. 12/5/42	H.V.S. 12/14/42						

NO.	INIT.	REVISIONS	CHKD.	INSPD.	DIV. APP.	DIV. APP.
1				12-11-42		
2						

KIND: DUCT SHEET SYMBOLS
SUBCT.: WITH EXPLANATORY NOTES
LOCTN.:
CO: DUQUESNE LIGHT CO. DIST. DEPT.

APPROVED: DATE | INITLS. | FUNCT.

NUMBER: D-10017 3 of 4

PITTSBURGH

In showing 3/c-22,000 and 10,000 circuits the 3/c is dropped. Example: 3/c-22,006-350 m.c.m. becomes 22,006-350. This applies only to the 10,000 and 22,000 series.

Numbers at right angles to property line indicate house numbers; numbers parallel to property line indicate pole numbers.

Allow ¾" between duct section and property line, except when space on revised sheets does not permit.

Show all services 4kv. or over.

DWN.	TRCD.	CHAD.	INSPD.	SAFSTY	DIV. APP.	DIV. APP.	SCALE
G.E.S. 12/4/42	U.P.S. 12/3/42						

NO.	DATE	REVISIONS	CHKD.	INSPD.	DIV. APP.	DIV. APP.
1					12-1	-42
2						

KIND

SUBCT. DUCT SHEET SYMBOLS WITH EXPLANATORY NOTES

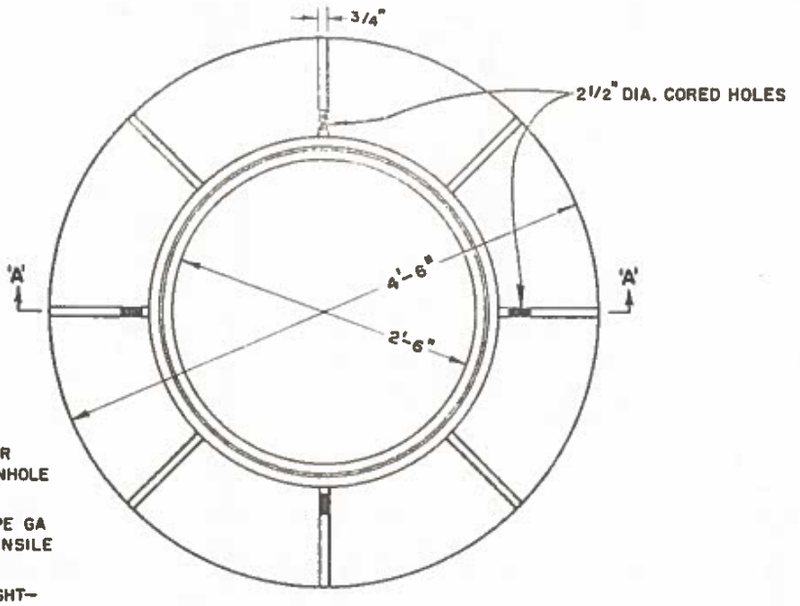
LOCTN.

CO. DUQUESNE LIGHT CO. DIST. DEPT.

APPROVED		
DATE	INITLS.	FUNCT.

NUMBER D-10017 4 of 4

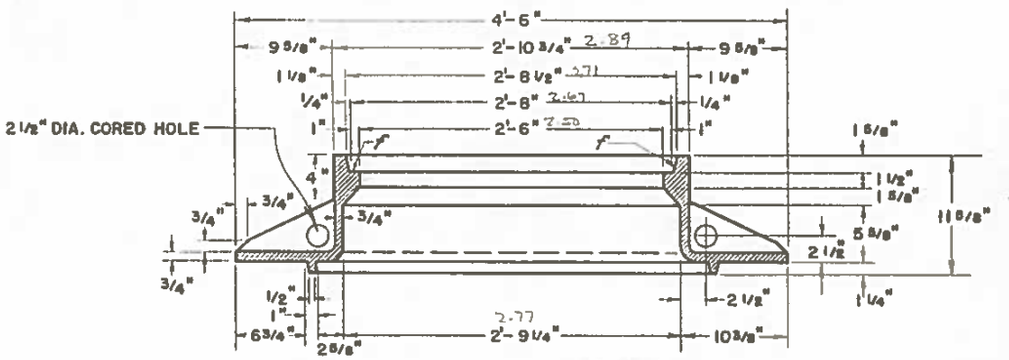
PITTSBURGH



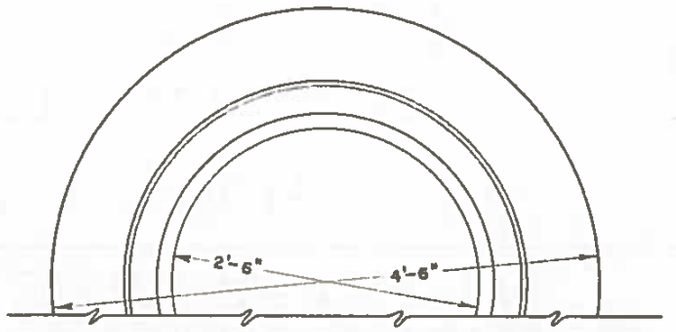
NOTE:

1. USE MANHOLE COVER # 24441 WITH THIS MANHOLE FRAME. SEE UG-10-6
2. CASTING TO BE TYPE GA MEEHANITE METAL (TENSILE 50,000 PSI)
3. APPROXIMATE WEIGHT- 680 LBS.

TOP VIEW
30" MANHOLE FRAME # 24440



SECTION A-A



BOTTOM VIEW

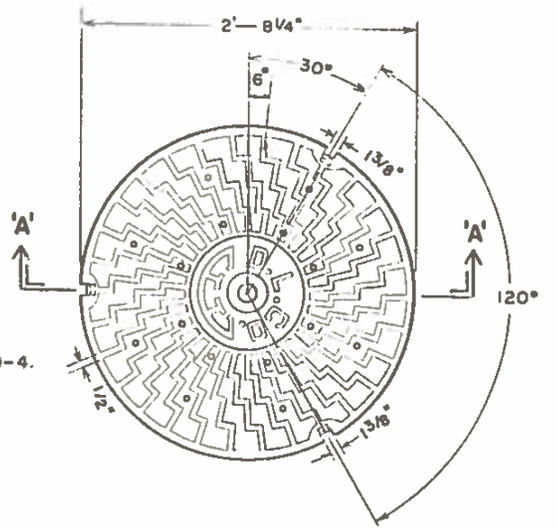
DUQUESNE LIGHT CO. STANDARDS
FOR T & D. DESIGN & CONSTRUCTION

Rosedale Foundry

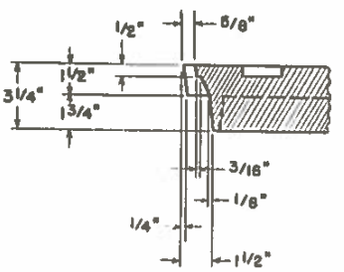
30" MANHOLE FRAME
(STREET LOADING)

NOTE:

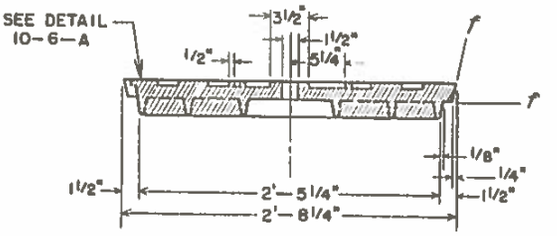
1. USE THIS MANHOLE COVER WITH MANHOLE FRAMES # 24440 & #24442, SEE UG-10-3 & UG-10-4.
2. CASTING TO BE TYPE GA MEEHANITE METAL (TENSILE 50,000 PSI)
3. APPROXIMATE WEIGHT—320 LBS.



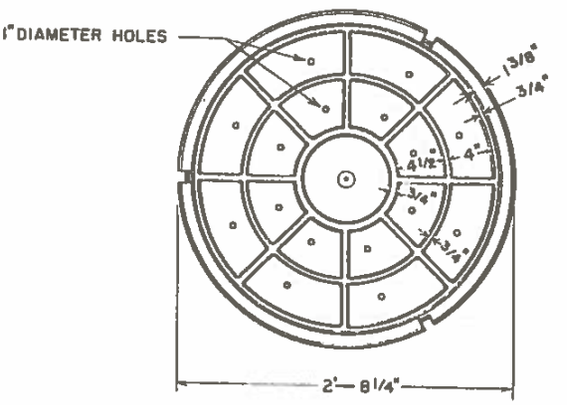
TOP VIEW
30" MANHOLE COVER # 24441



ENLARGED SECTION
DETAIL 10-6-A



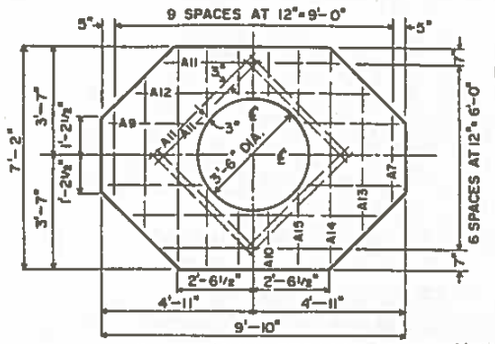
SECTION A—A



BOTTOM VIEW

DUQUESNE LIGHT CO. STANDARDS
FOR T. & D. DESIGN & CONSTRUCTION.

30" MANHOLE COVER (STREET LOADING)



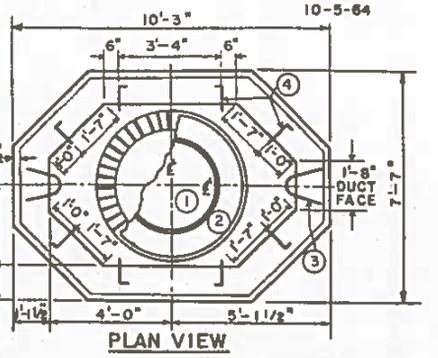
TOP STEEL OF ROOF (SYMMETRICAL ABOUT ℄'S)

DETAIL 3-1-A

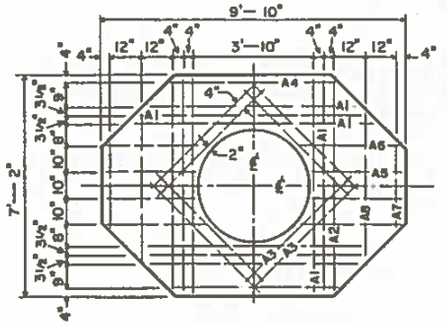
ROOF AND FLOOR REINFORCING BAR SCHEDULE

#6 STRAIGHT		
MARK	REQ'D	LENGTH
A 1	10	5'-10"
A 2	2	6'-6"
A 3	8	5'-0"
A 16	8	7'-7"
A 17	2	7'-3"
A 18	2	6'-4"
A 19	2	5'-1"
A 20	2	4'-6"
A 21	2	3'-7"
A 22	2	2'-8"
A 23	3	3'-3"

#4 STRAIGHT		
A 4	2	5'-9"
A 5	4	2'-10"
A 6	4	3'-2"
A 7	4	2'-8"
A 8	2	4'-8"
A 9	4	3'-0"
A 10	4	1'-6"
A 11	10	5'-10"
A 12	2	7'-10"
A 13	2	4'-9"
A 14	2	6'-8"
A 15	4	2'-3"
A 25	6	10'-3"
A 26	2	9'-4"
A 27	1	8'-4"
A 28	2	7'-4"
A 29	2	6'-4"
A 30	2	5'-4"
A 31	1	3'-4"



PLAN VIEW



BOTTOM STEEL OF ROOF (SYMMETRICAL ABOUT ℄'S)

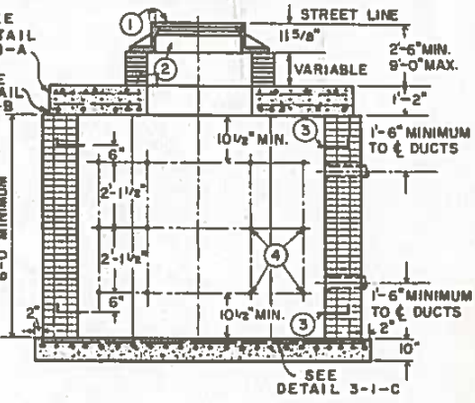
DETAIL 3-1-B

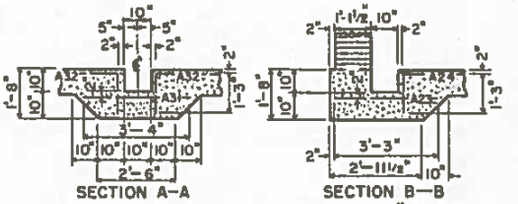
#6 BENT		
MARK	REQ'D	LENGTH
A 24	3	1'-3"+5'-5"=6'-8"

#4 BENT		
MARK	REQ'D	LENGTH
A 32	2	1'-3"+3'-7"=4'-10"

TOTAL ROOF STEEL
#6 - 196 LBS.
#4 - 122 LBS.

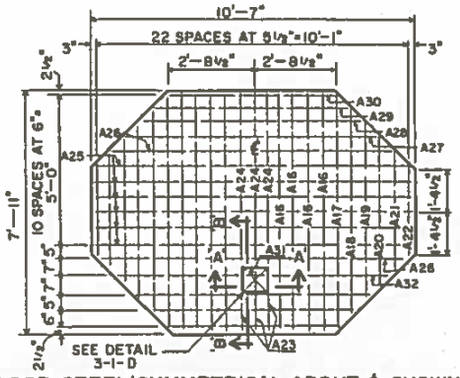
TOTAL FLOOR STEEL
#6 - 225 LBS.
#4 - 94 LBS.





TYPICAL FLOOR SUMP SECTIONS - 10" SLAB

DETAIL 3-1-D



FLOOR STEEL (SYMMETRICAL ABOUT ℄ SHOWN)

DETAIL 3-1-C

MATERIAL LIST

ITEM	DESCRIPTION	DETAIL REFERENCE	STOCK NO.
1	30" MANHOLE COVER	UG-10-6	24441
2	30" MANHOLE FRAME	UG-10-3	24440
3	EYE, PULLING	10-8-A	24345
4	ANCHOR, BOLT, ⅝" X 6"	10-8-B	42126
5	LADDER, VARIOUS LENGTHS		46235-

GENERAL NOTES

1. CONCRETE TO WITHSTAND 3000# COMPRESSION IN 28 DAYS. THE METHOD OF CURING AND THE PROTECTION OF CONCRETE SHALL BE IN ACCORDANCE WITH A.C.I. SPECIFICATION 318 AS AMENDED TO DATE.

2. CONCRETE REINFORCING STEEL SHALL BE OPEN HEARTH, BILLET STEEL, INTERMEDIATE GRADE, IN ACCORDANCE WITH A.S.T.M. SPEC. A-15, AS AMENDED TO DATE.

3. REINFORCING RODS TO HAVE AT LEAST 2" OF COVER.

4. WHERE REINFORCING RODS ARE SPLICED, LAPS SHALL BE 24 DIAMETERS OR MORE.

5. ROOF DESIGNED TO WITHSTAND A WHEEL LOAD OF 16000#.

6. BRICK TO BE COMMON HARD BURNED RED BRICK.

7. MORTAR TO CONSIST OF ONE PART PORTLAND CEMENT, 0 TO 1/4 PARTS HYDRATED LIME AND 2 1/4 TO 3 PARTS OF MORTAR SAND.

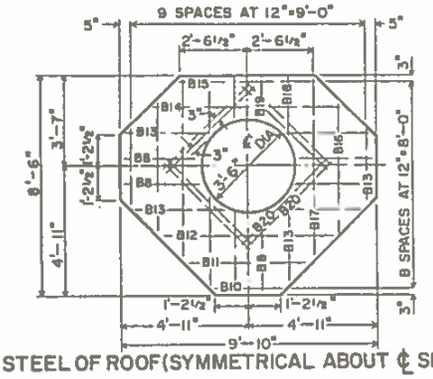
8. ROOF SHALL ALWAYS BE SEPARATE FROM STREET BASE.

9. SUB-GRADE UNDER FLOOR TO BE TAMPED FIRM.

10. DUQUESNE LIGHT CO. WILL SUPPLY MATERIALS AS PER MATERIAL LIST ONLY TO CONTRACTOR FOR DUQUESNE LIGHT CO. MATERIALS LISTED WILL NOT BE SUPPLIED FOR WORK BY OTHERS.

DUQUESNE LIGHT CO. STANDARDS
FOR T. & D. DESIGN & CONSTRUCTION.

8'X5'-4" TWO-WAY MANHOLE



TOP STEEL OF ROOF (SYMMETRICAL ABOUT ℄ SHOWN)

DETAIL 3-2-A

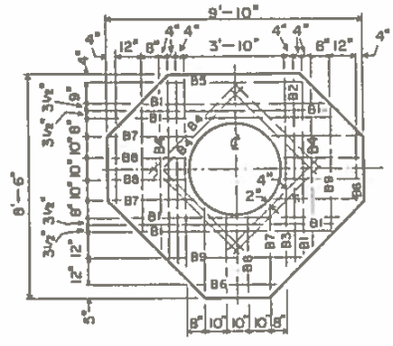
ROOF AND FLOOR REINFORCING BAR SCHEDULE

#4 STRAIGHT

MARK	REQ'D	LENGTH
B 5	1	3'-4"
B 6	3	2'-8"
B 7	6	3'-2"
B 8	12	2'-10"
B 9	3	4'-8"
B 10	1	2'-6"
B 11	1	4'-6"
B 12	1	6'-6"
B 13	8	3'-0"
B 14	1	7'-2"
B 15	1	5'-2"
B 16	2	3'-10"
B 17	2	6'-10"
B 18	2	2'-2"
B 19	2	1'-6"
B 20	8	6'-0"

#6 STRAIGHT

MARK	REQ'D	LENGTH
B 1	8	6'-6"
B 2	2	7'-0"
B 3	2	7'-4"
B 4	10	5'-10"
B 21	4	8'-11"
B 22	2	8'-6"
B 23	2	8'-1"
B 24	2	7'-8"
B 25	2	7'-0"
B 26	2	6'-3"
B 27	2	5'-4"
B 28	2	4'-6"
B 29	2	3'-8"
B 30	2	2'-10"
B 31	5	10'-4"
B 32	1	9'-8"
B 33	1	9'-0"
B 34	1	8'-0"
B 35	1	7'-0"
B 36	1	6'-0"
B 37	1	5'-0"
B 38	1	4'-0"
B 39	1	3'-0"
B 40	3	1'-3"
B 41	2	3'-4"
B 42	1	10'-0"
B 43	1	6'-7"
B 44	1	5'-7"



BOTTOM STEEL OF ROOF (SYMMETRICAL ABOUT ℄ SHOWN)

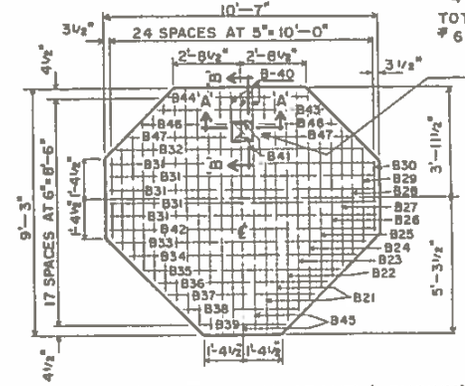
DETAIL 3-2-B

#6 BENT

MARK	REQ'D	LENGTH
B 45	3	6'-9"+1'-3"+8'-0"
B 46	2	3'-2"+1'-3"+4'-5"
B 47	2	3'-8"+1'-3"+4'-11"

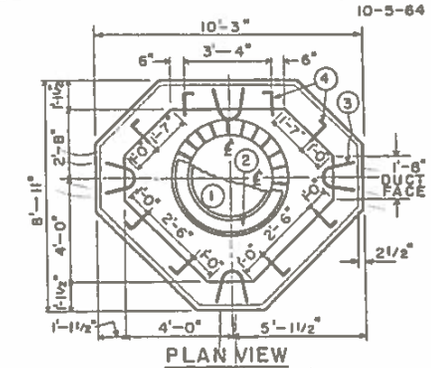
TOTAL ROOF STEEL
#6-212 LBS.
#4-154 LBS.

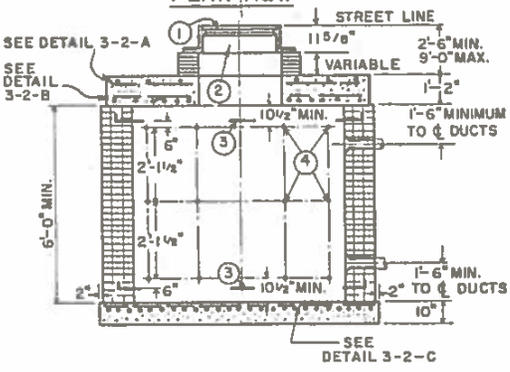
TOTAL FLOOR STEEL
#6-480LBS.

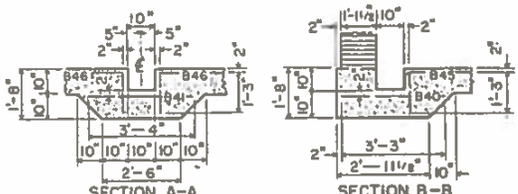


FLOOR STEEL (SYMMETRICAL ABOUT ℄ SHOWN)

DETAIL 3-2-C







TYPICAL FLOOR SUMP SECTIONS-10" SLAB

DETAIL 3-2-D

GENERAL NOTES

1. CONCRETE TO WITHSTAND 3000# COMPRESSION IN 28 DAYS. THE METHOD OF CURING AND THE PROTECTION OF CONCRETE SHALL BE IN ACCORDANCE WITH A.C.I. SPECIFICATION 318 AS AMENDED TO DATE.

2. CONCRETE REINFORCING STEEL SHALL BE OPEN HEARTH, BILLET STEEL, INTERMEDIATE GRADE, IN ACCORDANCE WITH A.S.T.M. SPEC. A-15, AS AMENDED TO DATE.

3. REINFORCING RODS TO HAVE AT LEAST 2" OF COVER.

4. WHERE REINFORCING RODS ARE SPLICED, LAPS SHALL BE 24 DIAMETERS OR MORE.

5. ROOF DESIGNED TO WITHSTAND A WHEEL LOAD OF 16,000#.

6. BRICK TO BE COMMON HARD BURNED RED BRICK.

7. MORTAR TO CONSIST OF ONE PART PORTLAND CEMENT, 0 TO 1/4 PARTS HYDRATED LIME AND 2 1/4 TO 3 PARTS OF MORTAR SAND.

8. ROOF SHALL ALWAYS BE SEPARATE FROM STREET BASE.

9. SUB-GRADE UNDER FLOOR TO BE TAMPED FIRM.

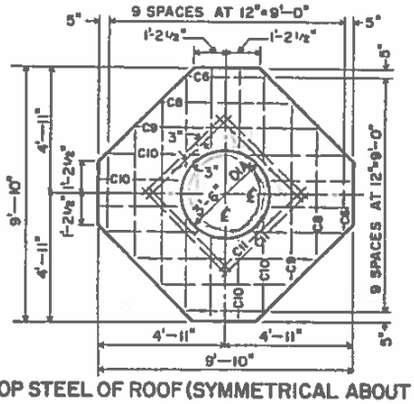
10. DUQUESNE LIGHT CO. WILL SUPPLY MATERIALS AS PER MATERIAL LIST ONLY TO CONTRACTOR FOR DUQUESNE LIGHT CO. MATERIALS LISTED WILL NOT BE SUPPLIED FOR WORK BY OTHERS.

MATERIAL LIST

ITEM	DESCRIPTION	DETAIL REFERENCE	STOCK NO.
1	30" MANHOLE COVER	UG-10-6	24441
2	30" MANHOLE FRAME	UG-10-3	24440
3	EYE, PULLING	10-8-A	24345
4	ANCHOR, BOLT, 5/8" X 6"	10-8-B	42125
5	LADDER, VARIOUS LENGTHS		46235-

DUQUESNE LIGHT CO. STANDARDS
FORT. & D. DESIGN & CONSTRUCTION

8'X 6'-8" THREE-WAY MANHOLE



TOP STEEL OF ROOF (SYMMETRICAL ABOUT ℄'S)

DETAIL 3-3-A

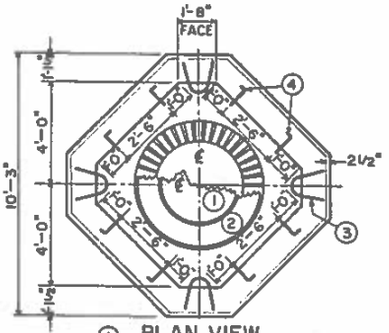
ROOF AND FLOOR REINFORCING BAR SCHEDULE

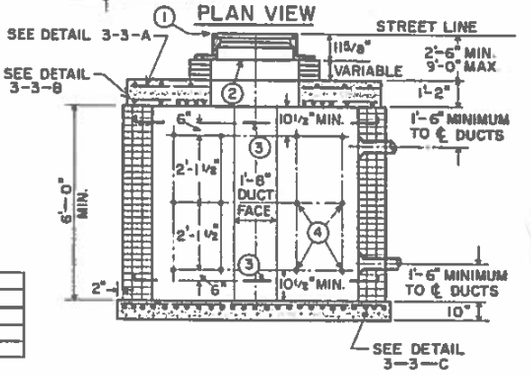
#4 STRAIGHT		
MARK	REQ'D	LENGTH
C 5	4	2'-8"
C 6	12	2'-10"
C 7	8	3'-2"
C 8	8	4'-8"
C 9	4	6'-8"
C 10	16	3'-0"
C 11	8	7'-0"

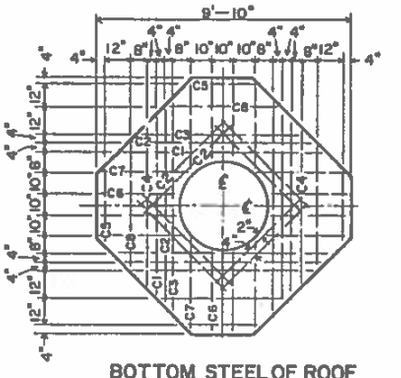
#6 STRAIGHT		
MARK	REQ'D	LENGTH
C 1	4	7'-10"
C 2	12	7'-3"
C 3	4	6'-8"
C 4	2	6'-0"
C 12	11	10'-3"
C 13	4	9'-5"
C 14	4	8'-7"
C 15	4	7'-9"
C 16	4	6'-11"
C 17	3	6'-1"
C 18	3	5'-3"
C 19	4	4'-5"
C 20	4	3'-7"
C 21	4	2'-9"
C 22	3	3'-3"
C 23	2	3'-4"

#6 BENT		
MARK	REQ'D	LENGTH
C 24	3	8'-3"+1'-3"=9'-6"
C 25	2	2'-5"+1'-3"=3'-8"
C 26	2	2'-0"+1'-3"=3'-3"

TOTAL ROOF STEEL
#6-239 LBS.
#4-159 LBS.
TOTAL FLOOR STEEL
#6-570 LBS.

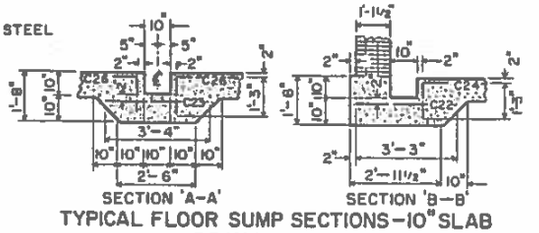






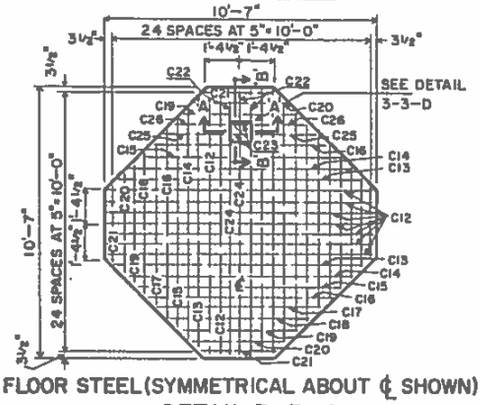
BOTTOM STEEL OF ROOF
(SYMMETRICAL ABOUT ℄'S)

DETAIL 3-3-B



TYPICAL FLOOR SUMP SECTIONS—10" SLAB

DETAIL 3-3-D



FLOOR STEEL (SYMMETRICAL ABOUT ℄ SHOWN)

DETAIL 3-3-C

GENERAL NOTES

1. CONCRETE TO WITHSTAND 3000# COMPRESSION IN 28 DAYS. THE METHOD OF CURING AND THE PROTECTION OF CONCRETE SHALL BE IN ACCORDANCE WITH A.C.I. SPECIFICATION 318 AS AMENDED TO DATE.

2. CONCRETE REINFORCING STEEL SHALL BE OPEN HEARTH, BILLET STEEL, INTERMEDIATE GRADE, IN ACCORDANCE WITH A.S.T.M. SPEC. A-15, AS AMENDED TO DATE.

3. REINFORCING RODS TO HAVE AT LEAST 2" OF COVER.

4. WHERE REINFORCING RODS ARE SPLICED, LAPS SHALL BE 24 DIAMETERS, OR MORE.

5. ROOF DESIGNED TO WITHSTAND A WHEEL LOAD OF 16,000#

6. BRICK TO BE COMMON HARD BURNED RED BRICK.

7. MORTAR TO CONSIST OF ONE PART PORTLAND CEMENT, 0 TO 1/4 PARTS HYDRATED LIME AND 2¼ TO 3 PARTS OF MORTAR SAND.

8. ROOF SHALL ALWAYS BE SEPARATE FROM STREET BASE.

9. SUB-GRADE UNDER FLOOR TO BE TAMPED FIRM.

10. DUQUESNE LIGHT CO. WILL SUPPLY MATERIALS AS PER MATERIAL LIST ONLY TO CONTRACTOR FOR DUQUESNE LIGHT CO. MATERIALS LISTED WILL NOT BE SUPPLIED FOR WORK BY OTHERS.

MATERIAL LIST

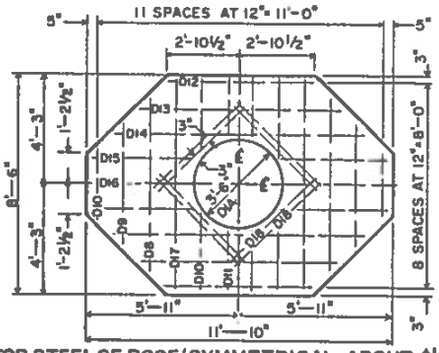
ITEM	DESCRIPTION	DETAIL REFERENCE	STOCK NO.
1	30" MANHOLE COVER	UG-10-6	24441
2	30" MANHOLE FRAME	UG-10-3	24440
3	EYE, PULLING	10-8-A	24345
4	ANCHOR BOLT, ⅝"X6"	10-8-B	42125
5	LADDER, VARIOUS LENGTHS		46235-

DUQUESNE LIGHT CO. STANDARDS
FOR T. & D. DESIGN & CONSTRUCTION

8'X8' FOUR-WAY MANHOLE

SECTION 3 - MANHOLES

UG-3-4
10-5-64



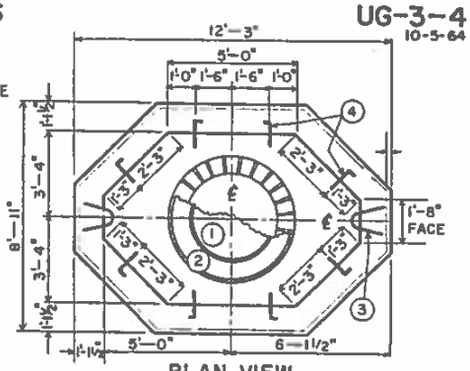
TOP STEEL OF ROOF (SYMMETRICAL ABOUT ℄'S)

DETAIL 3-4-A

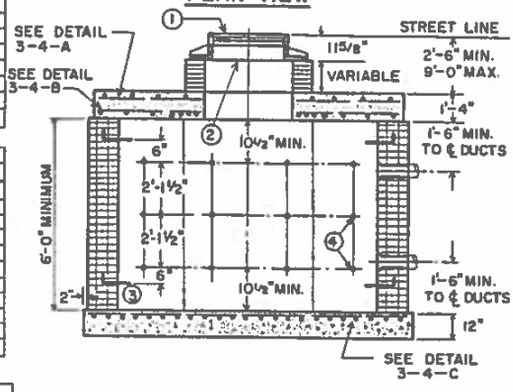
ROOF AND FLOOR REINFORCING BAR SCHEDULE

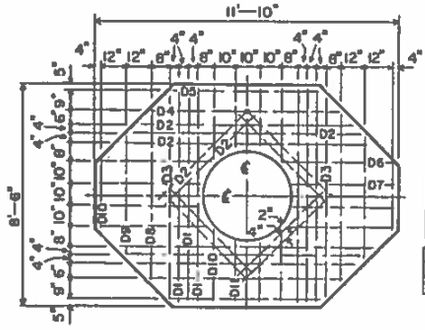
#4 STRAIGHT		
MARK	REQ'D	LENGTH
D 4	2	7'-4"
D 5	2	6'-0"
D 6	4	4'-2"
D 7	4	3'-10"
D 8	4	6'-8"
D 9	4	4'-8"
D 10	12	2'-8"
D 11	8	2'-3"
D 12	2	5'-8"
D 13	2	7'-8"
D 14	2	9'-8"
D 15	4	4'-0"
D 16	2	3'-6"
D 17	4	8'-2"
D 18	8	7'-0"
D 28	5	12'-3"
D 29	2	11'-6"
D 30	2	10'-5"
D 31	1	9'-4"
D 32	1	8'-3"
D 33	2	7'-2"
D 34	2	6'-1"
D 35	2	4'-0"

#7 STRAIGHT		
MARK	REQ'D	LENGTH
D 1	6	8'-2"
D 2	6	8'-8"
D 3	2	8'-0"
D 19	10	8'-11"
D 20	2	8'-4"
D 21	2	7'-3"
D 22	10	6'-2"
D 23	2	5'-1"
D 24	2	4'-0"
D 25	2	2'-11"
D 26	1	3'-5"



PLAN VIEW





BOTTOM STEEL OF ROOF (SYMMETRICAL ABOUT ℄'S)

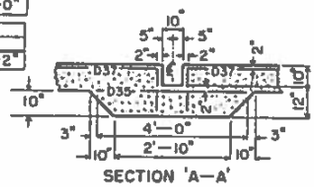
DETAIL 3-4-B

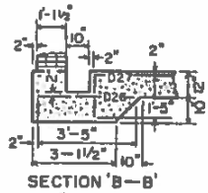
#4 BENT		
MARK	REQ'D	LENGTH
D 36	2	4'-1"+1'-5"+5'-6"
D 37	2	3'-7"+1'-5"+5'-0"

#7 BENT		
MARK	REQ'D	LENGTH
D 27	1	6'-9"+1'-5"+8'-2"

TOTAL ROOF STEEL
#7 - 340 LBS.
#4 - 203 LBS.

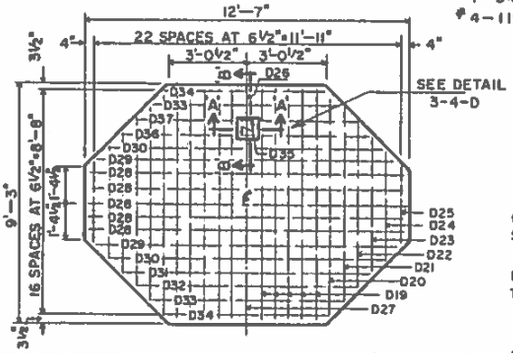
TOTAL FLOOR STEEL
#7 - 344 LBS.
#4 - 119 LBS.





TYPICAL FLOOR SUMP SECTIONS - 12" SLAB

DETAIL 3-4-D



FLOOR STEEL (SYMMETRICAL ABOUT ℄ SHOWN)

DETAIL 3-4-C

MATERIAL LIST

ITEM	DESCRIPTION	DETAIL REFERENCE	STOCK NO.
1	30" MANHOLE COVER	UG-10-6	24441
2	30" MANHOLE FRAME	UG-10-3	24440
3	EYE, PULLING	10-8-A	24345
4	ANCHOR BOLT, 3/8" X 6"	10-8-B	42125
5	LADDER, VARIOUS LENGTHS		46235-

GENERAL NOTES

1. CONCRETE TO WITHSTAND 3000# COMPRESSION IN 28 DAYS. THE METHOD OF CURING AND THE PROTECTION OF CONCRETE SHALL BE IN ACCORDANCE WITH A.C.I. SPECIFICATION 318 AS AMENDED TO DATE.

2. CONCRETE REINFORCING STEEL SHALL BE OPEN HEARTH, BILLET STEEL, INTERMEDIATE GRADE, IN ACCORDANCE WITH A.S.T.M. SPEC. A-15, AS AMENDED TO DATE.

3. REINFORCING RODS TO HAVE AT LEAST 2" OF COVER.

4. WHERE REINFORCING RODS ARE SPLICED, LAPS SHALL BE 24 DIAMETERS, OR MORE.

5. ROOF DESIGNED TO WITHSTAND A WHEEL LOAD OF 16,000#.

6. BRICK TO BE COMMON HARD BURNED RED BRICK.

7. MORTAR TO CONSIST OF ONE PART PORTLAND CEMENT, 0 TO ¼ PARTS HYDRATED LIME AND 2¼ TO 3 PARTS OF MORTAR SAND.

8. ROOF SHALL ALWAYS BE SEPARATE FROM STREET BASE.

9. SUB-GRADE UNDER FLOOR TO BE TAMPED FIRM.

10. DUQUESNE LIGHT CO. WILL SUPPLY MATERIALS AS PER MATERIAL LIST ONLY TO CONTRACTOR FOR DUQUESNE LIGHT CO. MATERIALS LISTED WILL NOT BE SUPPLIED FOR WORK BY OTHERS.

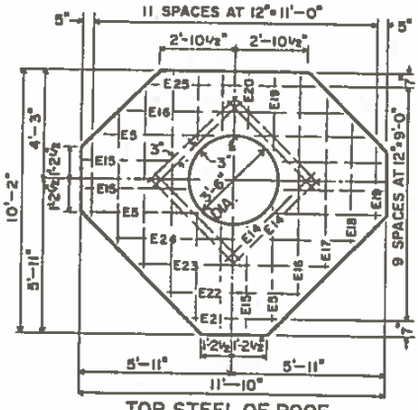
DUQUESNE LIGHT CO. STANDARDS
FOR T. & D. DESIGN & CONSTRUCTION

10'X6'-8" TWO-WAY MANHOLE

SECTION 3 – MANHOLES

UG-3-5

10-5-64

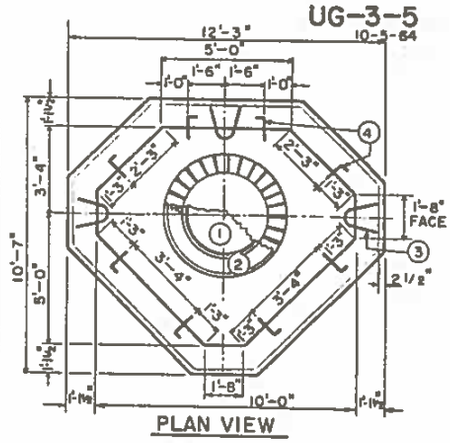


TOP STEEL OF ROOF
(SYMMETRICAL ABOUT ℄ SHOWN)
DETAIL 3-5-A

ROOF AND FLOOR
REINFORCING BAR SCHEDULE

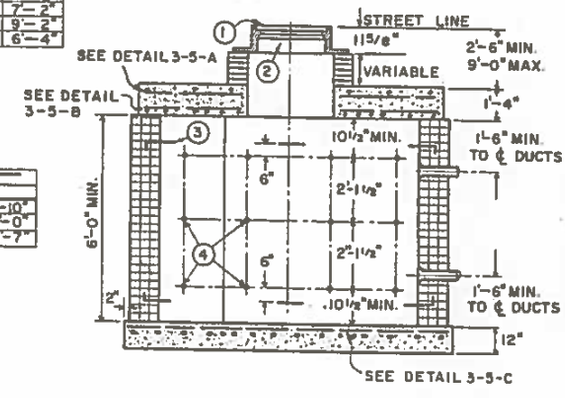
#7 STRAIGHT		
MARK	REQ'D	LENGTH
E 1	2	8'-4"
E 2	8	8'-8"
E 3	2	9'-0"
E 4	10	7'-0"
E 26	4	10'-7"
E 27	2	10'-3"
E 28	2	9'-9"
E 29	2	9'-3"
E 30	2	8'-7"
E 31	2	7'-8"
E 32	2	6'-8"
E 33	2	5'-9"
E 34	2	4'-10"
E 35	2	3'-9"
E 36	2	2'-10"
E 37	2	6'-0"
E 38	2	7'-2"
E 39	1	8'-4"
E 40	1	9'-6"
E 41	2	10'-8"
E 42	2	11'-10"
E 43	4	12'-3"
E 44	1	4'-10"
E 45	1	3'-8"
E 46	1	2'-6"
E 47	2	3'-5"
E 48	2	4'-0"

#4 STRAIGHT		
MARK	REQ'D	LENGTH
E 5	12	4'-2"
E 6	6	3'-10"
E 7	3	6'-6"
E 8	3	4'-6"
E 9	3	2'-8"
E 10	1	7'-6"
E 11	1	6'-0"
E 12	2	2'-6"
E 13	2	2'-2"
E 14	8	7'-0"
E 15	6	3'-8"
E 16	3	8'-4"
E 17	2	6'-9"
E 18	2	4'-9"
E 19	4	2'-9"
E 20	2	2'-0"
E 21	1	3'-2"
E 22	1	5'-2"
E 23	1	7'-2"
E 24	1	9'-2"
E 25	1	6'-4"

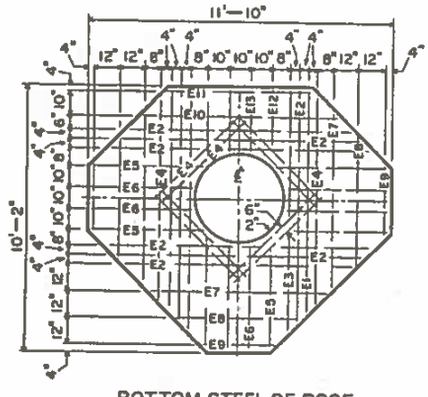


PLAN VIEW

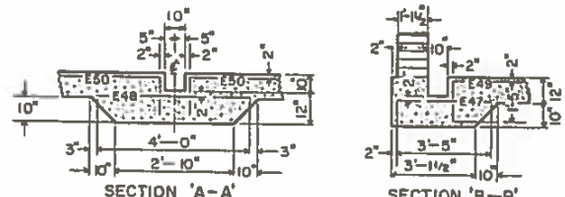
#7 BENT		
MARK	REQ'D	LENGTH
E 49	2	8'-5"+1-5"+9'-10"
E 50	2	3'-7"+1-3"+5'-0"
E 51	2	4'-2"+1-5"+5'-7"



TOTAL ROOF STEEL
#7 – 355 LBS.
#4 – 205 LBS.
TOTAL FLOOR STEEL
#7 – 789 LBS.



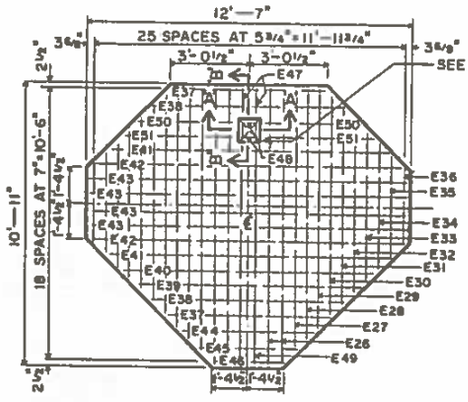
BOTTOM STEEL OF ROOF
(SYMMETRICAL ABOUT ℄ SHOWN)
DETAIL 3-5-B



TYPICAL FLOOR SUMP SECTIONS – 12" SLAB
DETAIL 3-5-D

MATERIAL LIST

ITEM	DESCRIPTION	DETAIL REFERENCE	STOCK NO.
1	30" MANHOLE COVER	UG-10-6	24441
2	30" MANHOLE FRAME	UG-10-3	24440
3	EYE, PULLING	10-8-A	24345
4	ANCHOR, BOLT, ⅝" X 6"	10-8-B	42125
5	LADDER, VARIOUS SIZES		46235–



FLOOR STEEL
(SYMMETRICAL ABOUT ℄ SHOWN)
DETAIL 3-5-C

DUQUESNE LIGHT CO. STANDARDS
FOR T.&D. DESIGN & CONSTRUCTION.

GENERAL NOTES

1. CONCRETE TO WITHSTAND 3000# COMPRESSION IN 28 DAYS. THE METHOD OF CURING AND THE PROTECTION OF CONCRETE SHALL BE IN ACCORDACE WITH A.C.I. SPECIFICATION 318 AS AMENDED TO DATE.

2. CONCRETE REINFORCING STEEL SHALL BE OPEN HEARTH, BILLET STEEL, INTERMEDIATE GRADE, IN ACCORDANCE WITH A.S.T.M. SPEC. A-15, AS AMENDED TO DATE.

3. REINFORCING RODS TO HAVE AT LEAST 2" OF COVER.

4. WHERE REINFORCING RODS ARE SPLICED, LAPS SHALL BE 24 DIAMETERS OR MORE.

5. ROOF DESIGNED TO WITHSTAND A WHEEL LOAD OF 16000#.

6. BRICK TO BE COMMON HARD BURNED RED BRICK.

7. MORTAR TO CONSIST OF ONE PART PORTLAND CEMENT, 0 TO 1/4 PARTS HYDRATED LIME AND 2¼ TO 3 PARTS OF MORTAR SAND.

8. ROOF SHALL ALWAYS BE SEPARATE FROM STREET BASE.

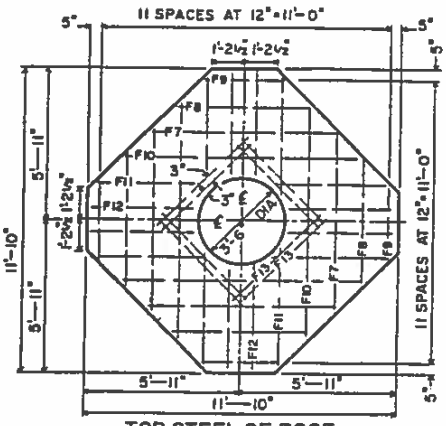
9. SUB-GRADE UNDER FLOOR TO BE TAMPED FIRM.

10. DUQUESNE LIGHT CO. WILL SUPPLY MATERIALS AS PER MATERIAL LIST ONLY TO CONTRACTOR FOR DUQUESNE LIGHT CO. MATERIALS LISTED WILL NOT BE SUPPLIED FOR WORK BY OTHERS.

10'X8'-4" THREE-WAY MANHOLE

SECTION 3 – MANHOLES

UG-3-6
10-5-64



TOP STEEL OF ROOF
(SYMMETRICAL ABOUT ℄'S)
DETAIL 3-6-A

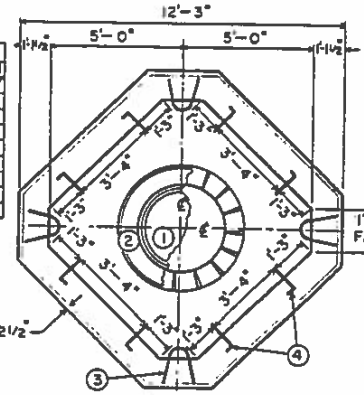
ROOF AND FLOOR
REINFORCING BAR SCHEDULE

#7 STRAIGHT		
MARK	REQ'D.	LENGTH
F 1	4	9'-11"
F 2	4	9'-2"
F 3	4	8'-6"
F 4	10	8'-0"
F 14	7	12'-3"
F 15	4	12'-1"
F 16	4	11'-2"
F 17	4	10'-3"
F 18	4	9'-4"
F 19	4	8'-5"
F 20	4	7'-6"
F 21	3	6'-7"
F 22	3	5'-8"
F 23	3	4'-9"
F 24	4	3'-10"
F 25	4	2'-11"
F 26	3	3'-5"
F 27	3	4'-0"

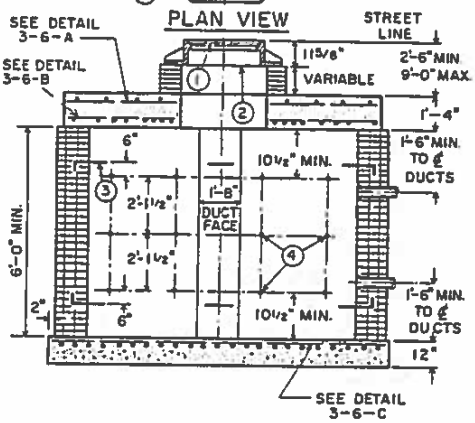
#4 STRAIGHT		
MARK	REQ'D.	LENGTH
F 5	8	3'-10"
F 6	8	4'-2"
F 7	8	6'-3"
F 8	8	4'-6"
F 9	8	2'-8"
F 10	4	8'-8"
F 11	8	4'-0"
F 12	8	3'-9"
F 13	8	7'-8"

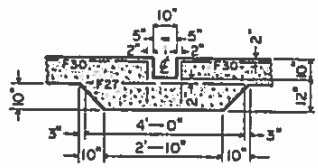
TOTAL ROOF STEEL
#7-389 LBS.
#4-220 LBS.
TOTAL FLOOR STEEL
#7-976 LBS.

#7 BENT		
MARK	REQ'D	LENGTH
F 28	3	10'-1"+1'-5"+11'-6"
F 29	2	1'-9"+1'-5"+3'-2"
F 30	2	2'-3"+1'-5"+3'-8"
F 31	2	2'-8"+1'-5"+4'-1"

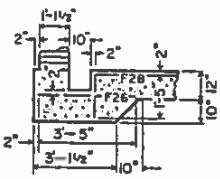


PLAN VIEW



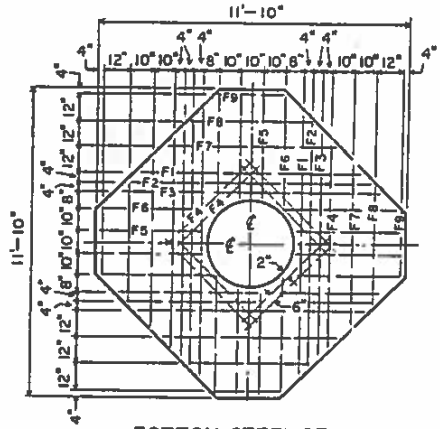


SECTION 'A–A'



SECTION 'B–B'

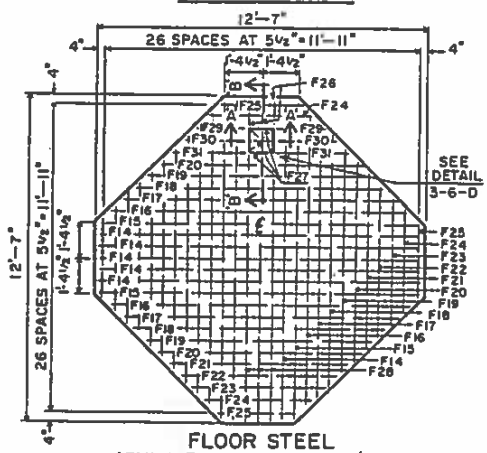
TYPICAL FLOOR
SUMP SECTIONS
12"–SLAB
DETAIL 3-6-D



BOTTOM STEEL OF ROOF
(SYMMETRICAL ABOUT ℄'S)
DETAIL 3-6-B

MATERIAL LIST

ITEM	DESCRIPTION	DETAIL REFERENCE	STOCK NO.
1	30" MANHOLE COVER	UG-10-6	24441
2	30" MANHOLE FRAME	UG-10-3	24440
3	EYE, PULLING	10-8-A	24345
4	ANCHOR BOLT, ⅝" X 6"	10-8-B	42125
5	LADDER, VARIOUS LENGTHS		46235-



FLOOR STEEL
(SYMMETRICAL ABOUT ℄ SHOWN)
DETAIL 3-6-C

GENERAL NOTES

1. CONCRETE TO WITHSTAND 3000# COMPRESSION IN 28 DAYS. THE METHOD OF CURING AND THE PROTECTION OF CONCRETE SHALL BE IN ACCORDANCE WITH A.C.I. SPECIFICATION 318 AS AMENDED TO DATE.
2. CONCRETE REINFORCING STEEL SHALL BE OPEN HEARTH, BILLET STEEL, INTERMEDIATE GRADE, IN ACCORDANCE WITH A.S.T.M. SPEC. A-15, AS AMENDED TO DATE.
3. REINFORCING RODS TO HAVE AT LEAST 2" OF COVER.
4. WHERE REINFORCING RODS ARE SPLICED, LAPS SHALL BE 24 DIAMETERS OR MORE.
5. ROOF DESIGNED TO WITHSTAND A WHEEL LOAD OF 16,000#
6. BRICK TO BE COMMON HARD BURNED RED BRICK.
7. MORTAR TO CONSIST OF ONE PART PORTLAND CEMENT, 0 TO 1/4 PARTS HYDRATED LIME AND 2¼ TO 3 PARTS OF MORTAR SAND.
8. ROOF SHALL ALWAYS BE SEPARATE FROM STREET BASE.
9. SUB-GRADE UNDER FLOOR TO BE TAMPED FIRM.
10. DUQUESNE LIGHT CO. WILL SUPPLY MATERIALS AS PER MATERIAL LIST ONLY TO CONTRACTOR FOR DUQUESNE LIGHT CO. MATERIALS LISTED WILL NOT BE SUPPLIED FOR WORK BY OTHERS.

DUQUESNE LIGHT CO. STANDARDS
FOR T. & D. DESIGN & CONSTRUCTION

10' X 10' FOUR-WAY MANHOLE

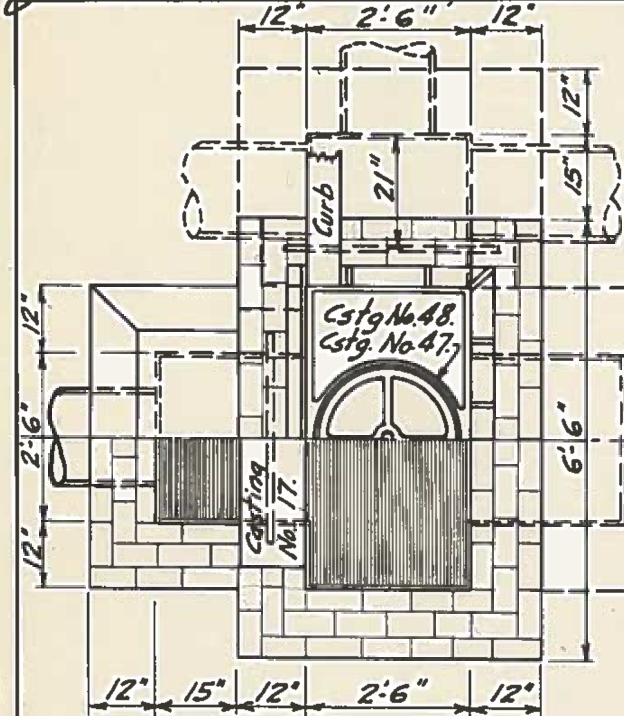
CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS — BUREAU OF ENGINEERING

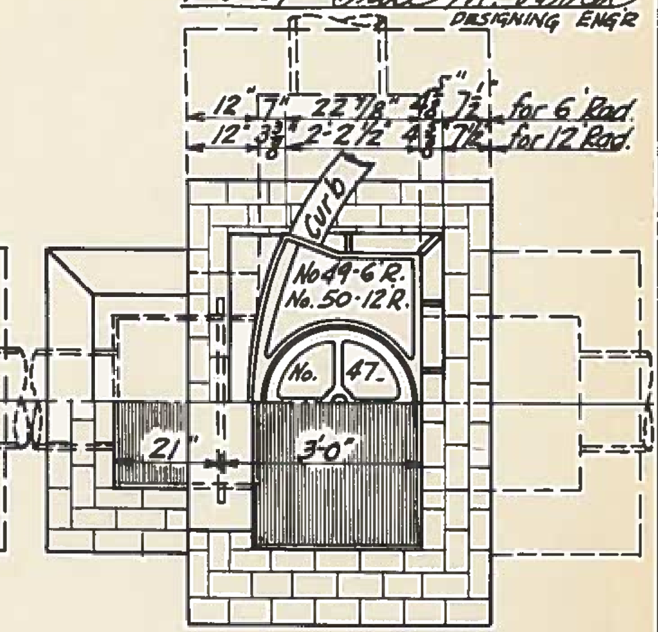
CATCH BASIN TYPE I.

Approved Jan. 6, 37 — ENGR IN CHARGE B. OF E.
Approved Jan 8 1937 — CHIEF ENGR D.P.W.
Approved Jan 9 - 37 — DIRECTOR

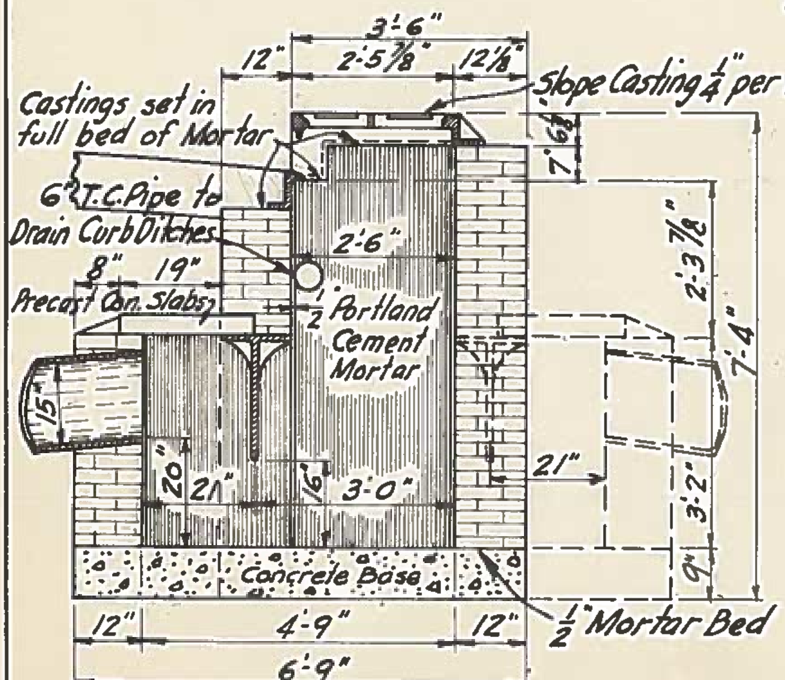
1-6-37 Carl M. Vetter — DESIGNING ENG'R



SECTIONAL PLAN - STRAIGHT CURB



SECTIONAL PLAN FOR 6' AND 12' RADIUS CURB



SECTIONAL ELEVATION

Use Weir Plate Casting No. 8 for Straight Curb
No. 9 for 6' Radius Curb and No. 51 for 12' Radius Curb.

See Specifications for excavation, construction and back-filling with Slag-Cement Mixture.

Concrete for Catch Basins shall be Class A and shall be mixed with high early strenght special cement.

Cast Stench Chamber Slabs in two pieces 24"x 19"x 4" each reinforced with wire mesh not less than 0.8 lbs. per sq. ft. and set in mortar bed.

All outside joints shall be struck flush.

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS — **BUREAU OF ENGINEERING**

CATCH BASIN TYPE 3.

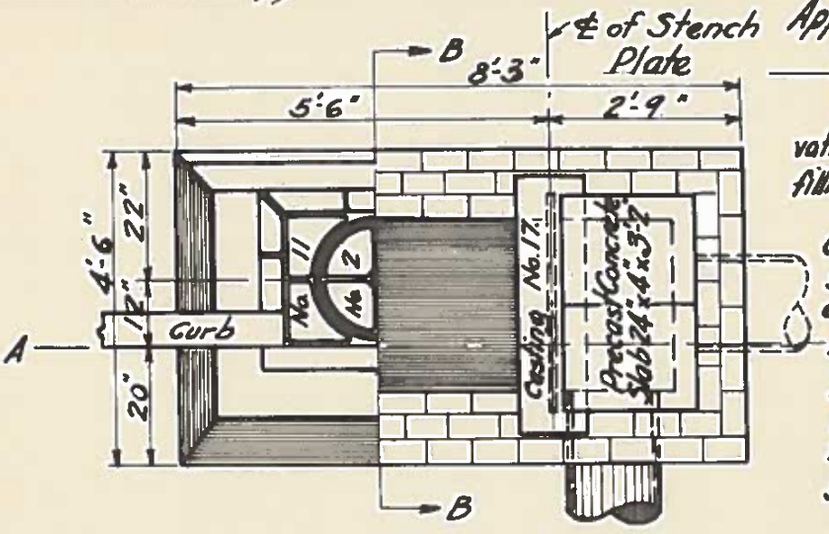
Approved Jan. 6, 37 — ENGR IN CHARGE B&F

Approved Jan 8, 1937 — CHIEF ENGR. D.P.W.

Approved Jan 9 /37 — DIRECTOR

Approved Jan. 6, 1937

Earl M. Vetter — DESIGNING ENG'R



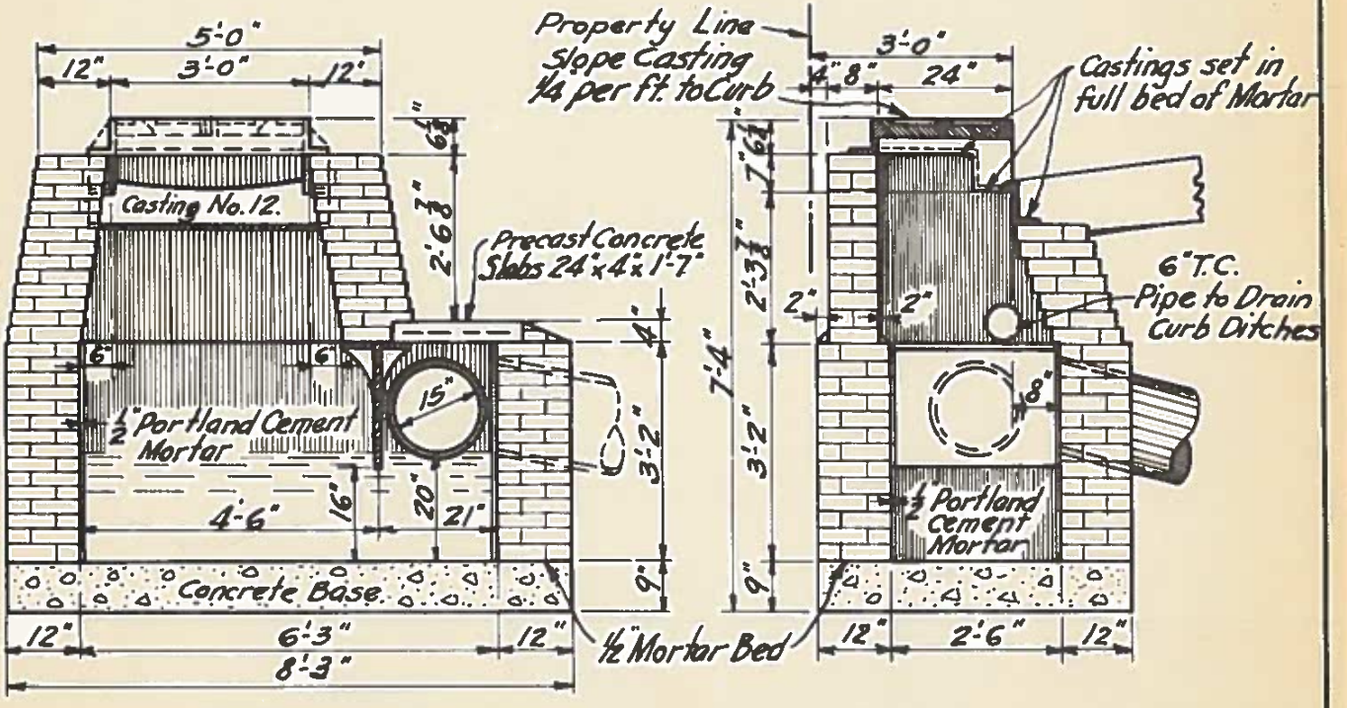
SECTIONAL PLAN

See Specifications for excavation, construction and backfilling with slag-cement Mixture

Concrete for base of C.B and Stench Chamber top shall be mixed with high early strength special cement.

A Cast Stench Chamber slabs in two pieces 24" x 4"x1'-7" each, reinforced with wire mesh not less than 0.8 lbs per sq. ft. set in Mortar Bed.

All outside joints shall be struck flush.



SECTION A-A

SECTION B-B

Note: Type 3 Catch Basin designed for use on 3 foot sidewalks

CITY OF PITTSBURGH

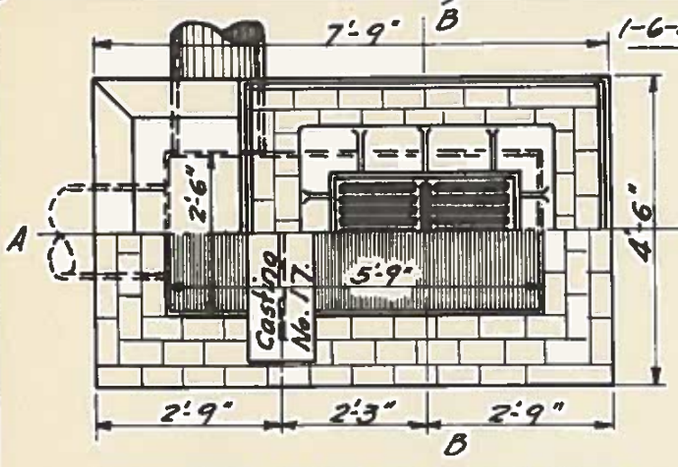
DEPT OF PUBLIC WORKS — BUREAU OF ENGINEERING

CATCH BASIN AND STORM INLET TYPE 4.

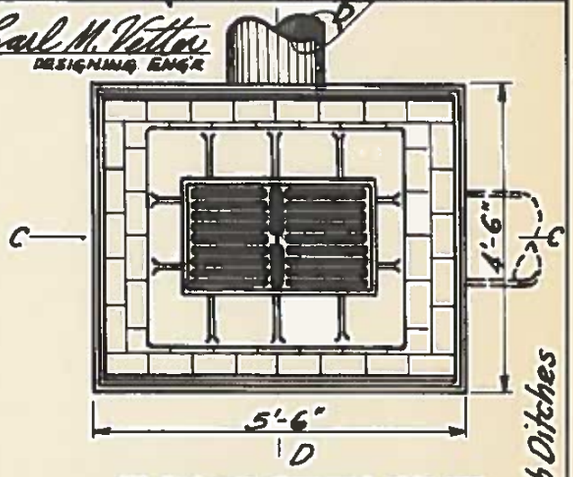
Approved Jan 6 '37 — Approved June 8, 1937 — Approved Jan 9 '37

ENGR IN CHARGE B of E. — CHIEF ENG'R D.P.W. — DIRECTOR

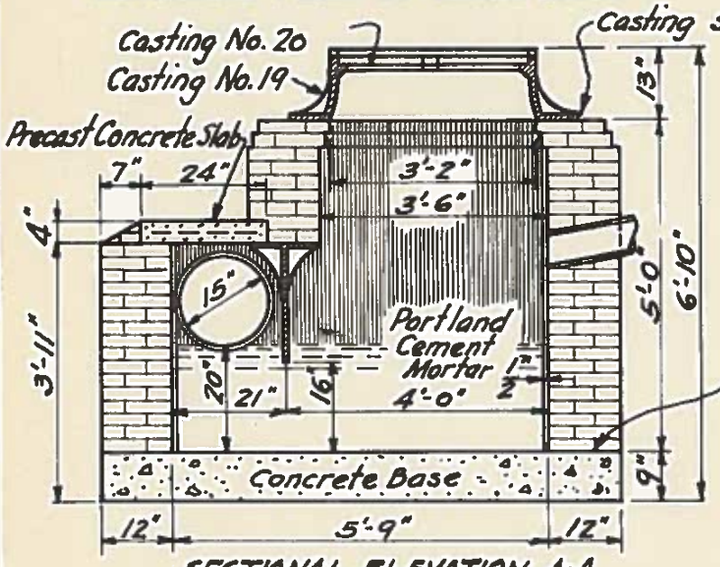
1-6-37 Earl M. Vetter, DESIGNING ENG'R



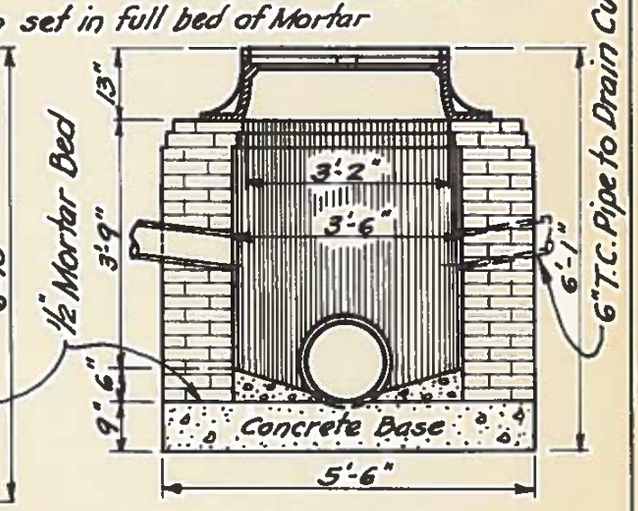
SECTIONAL PLAN OF CATCH BASIN



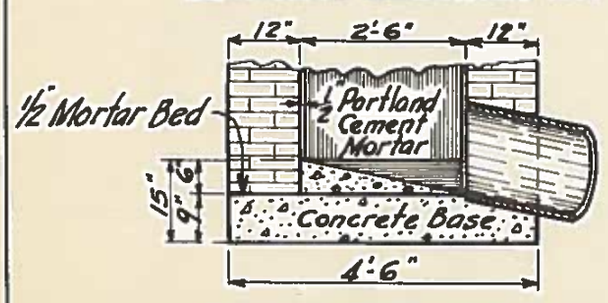
PLAN OF STORM INLET



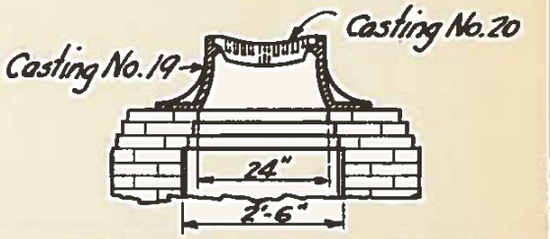
SECTIONAL ELEVATION A-A



SECTIONAL ELEVATION C-C



BOTTOM SECTION D-D



TOP SECTION B-B AND D-D

All outside joints struck flush.

See Specifications for excavation, construction and back-filling with slag-cement Mixture. Concrete for Catch Basin and Storm Inlet Base and Stench Chamber Top shall be Class A and shall be mixed with High Early Strength special Cement. Cast Stench Chamber Slabs in two pieces 24"x4"x19" each reinforced with wire Mesh not less than 0.8 lbs per Sq. Ft. set in Mortar Bed.

CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS — BUREAU OF ENGINEERING

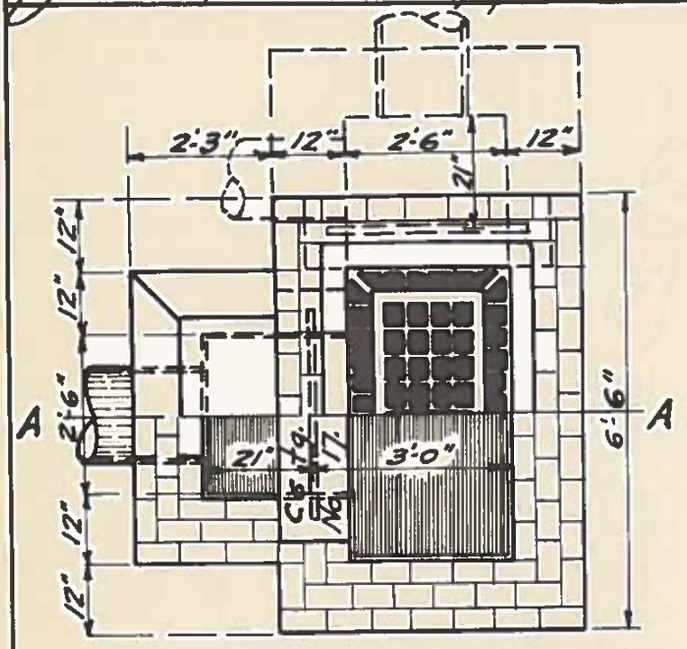
CATCH BASIN AND STORM INLET TYPE 5.

Approved Jan 6 37 — ENGR IN CHARGE B. of E.

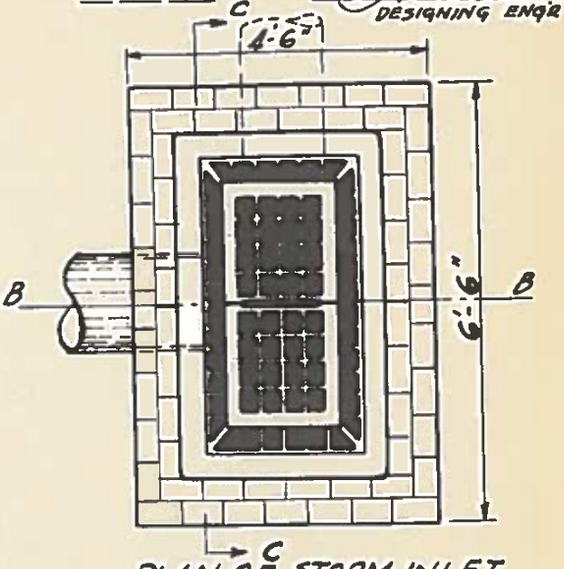
Approved Jan. 8, 1937 — CHIEF ENGR D.P.W.

Approved Jan. 9/37 — DIRECTOR

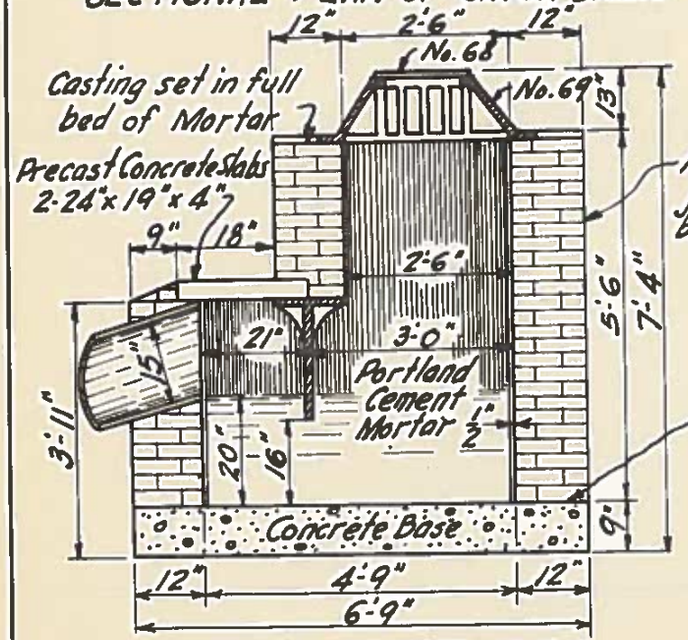
1-6-37 Carl M. Vetter — DESIGNING ENGR



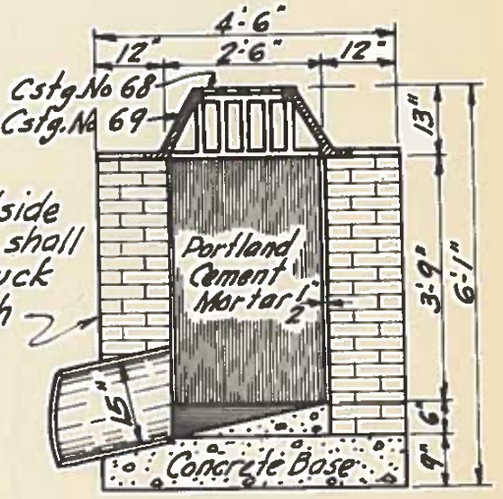
SECTIONAL PLAN OF CATCH BASIN



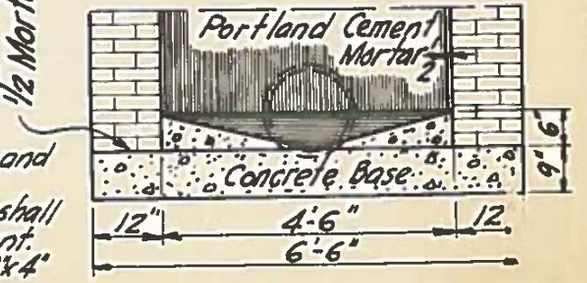
PLAN OF STORM INLET



SECTIONAL ELEVATION A-A



SECTIONAL ELEVATION B-B



BOTTOM SECTION C-C

See Specifications for excavation, Construction and Back-filling with Slag-Cement Mixture.

Concrete for Catch Basins shall be Class A and shall be mixed with High Early Strength Special Cement.

Cast Stench Chamber Slabs in two pieces 24"x19"x4" each reinforced with not less than 0.8 lbs per Sq. Ft. and set in Mortar Bed.

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS — BUREAU OF ENGINEERING

CATCH BASIN TYPE 6

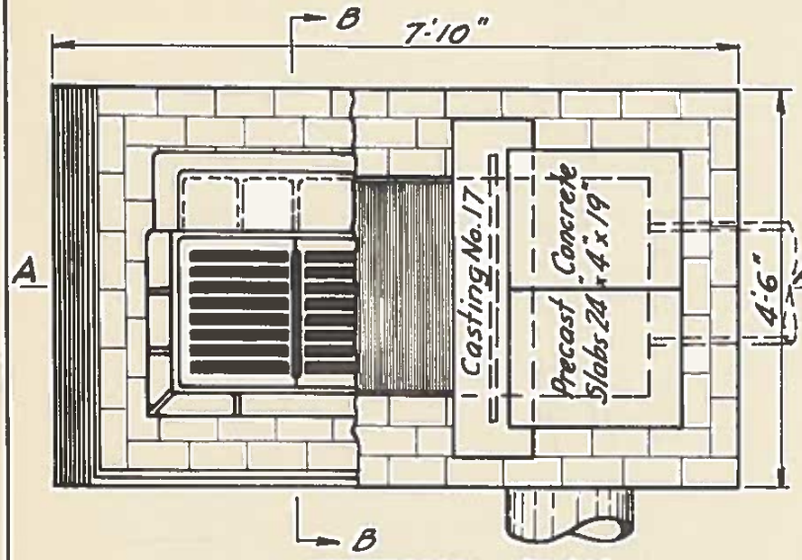
Approved Jan. 6, '37 — John M. Stevenson, ENGR. IN CHG. B. OF E.

Approved June 8, 1937 — John J. Croak, CHIEF ENGR. D.P.W.

Approved Jan. 9/37 — [illegible], DIRECTOR

Approved 9-28-36

Earl M. Vetter, DESIGNING ENGR.



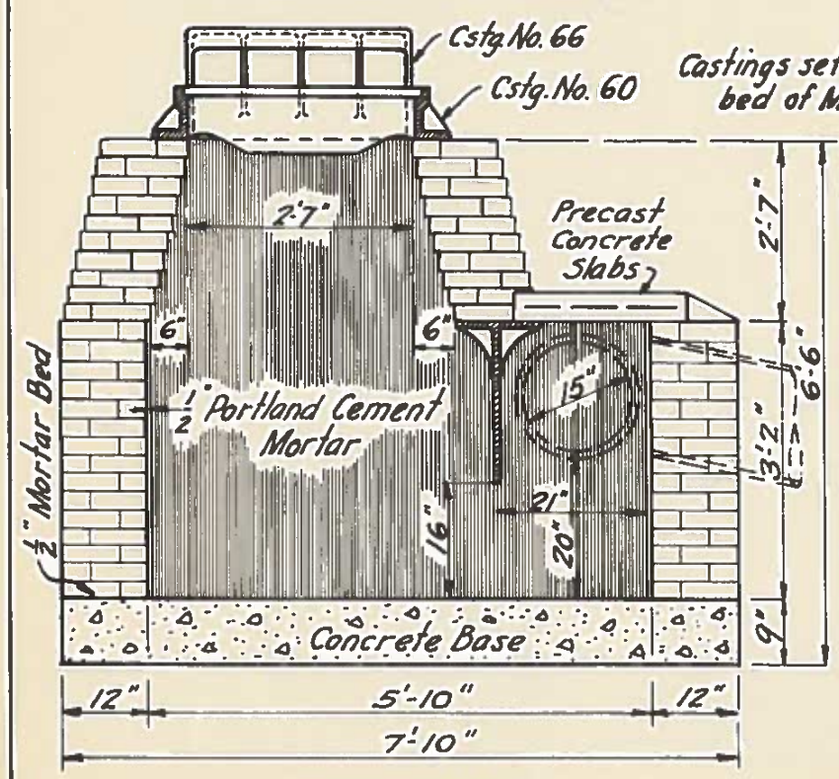
SECTIONAL PLAN

See Specifications for excavation, construction and back-filling with slag cement mixture.

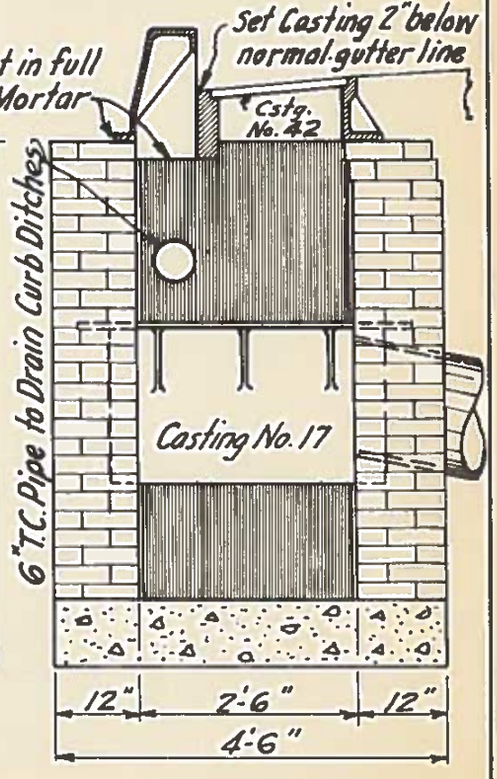
Concrete for Catch Basins shall be Class A and shall be mixed with High Early Strength Special Cement

Cast Stench Chamber Slabs in two pieces 24"x4"x19" each reinforced with wire mesh not less than 0.8lbs. per Sq. Ft., and set in mortar bed.

All outside joints shall be struck flush.



SECTION A-A



SECTION B-B

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS — BUREAU OF ENGINEERING

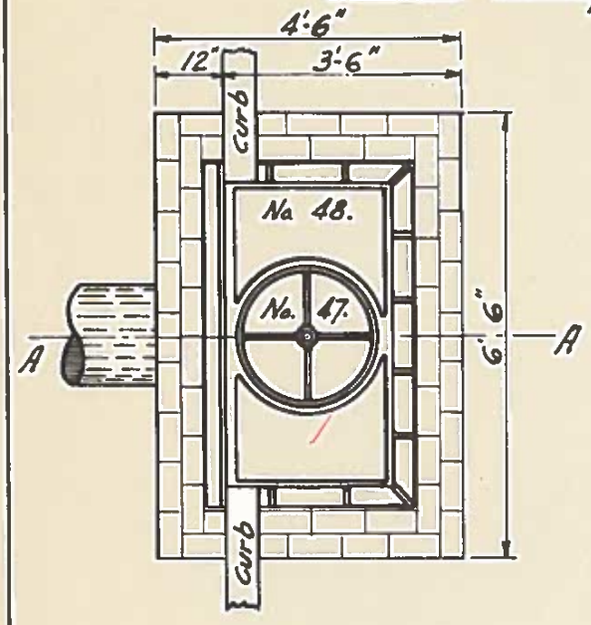
STORM INLET TYPE I.

Approved Jan 6 '37 — ENG'R IN CHARGE B. OF E.

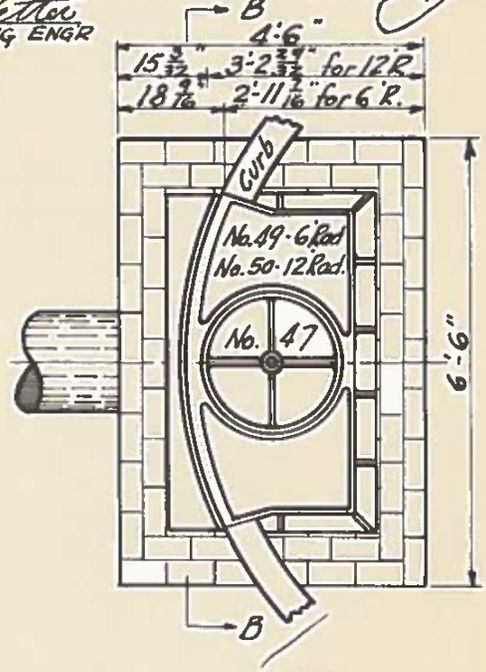
Approved Jan. 8, 1937 — CHIEF ENGR D.P.W.

Approved Jan. 9/37 — DIRECTOR

1-6-37 Earl M. Vetter — DESIGNING ENGR



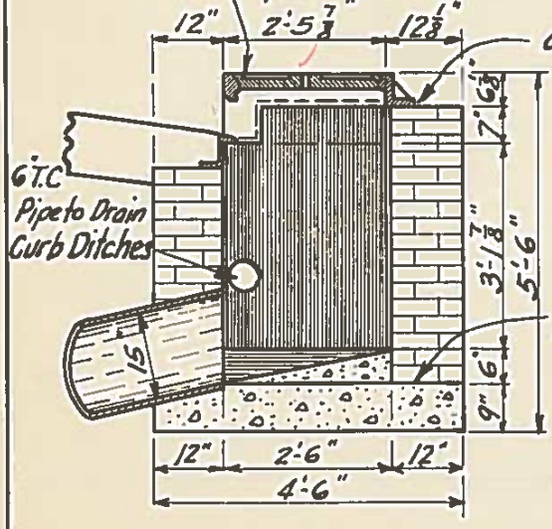
PLAN



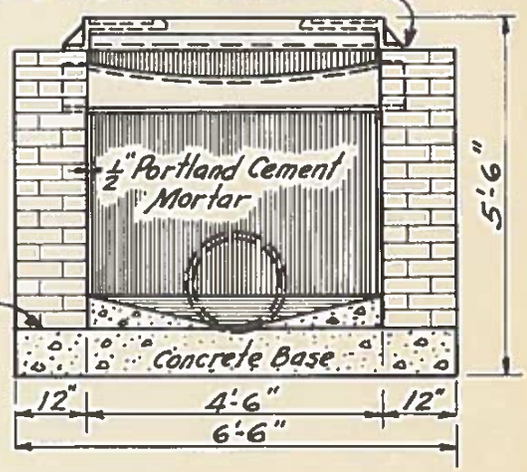
PLAN

Slope Casting 1/4" per ft. to Curb

Use Weir Casting No. 8 for Straight Curb, No. 9 for 6' Radius Curb and No. 51 for 12' Radius Curb



SECTIONAL ELEVATION A-A



SECTIONAL ELEVATION B-B

See Specifications for excavation, construction and back-filling with Slag-cement Mixture.
Concrete for Base of Storm Inlet shall be Class A and shall be mixed of High Early Strength Special Cement.
All outside joints shall be struck flush.

CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS — BUREAU OF ENGINEERING

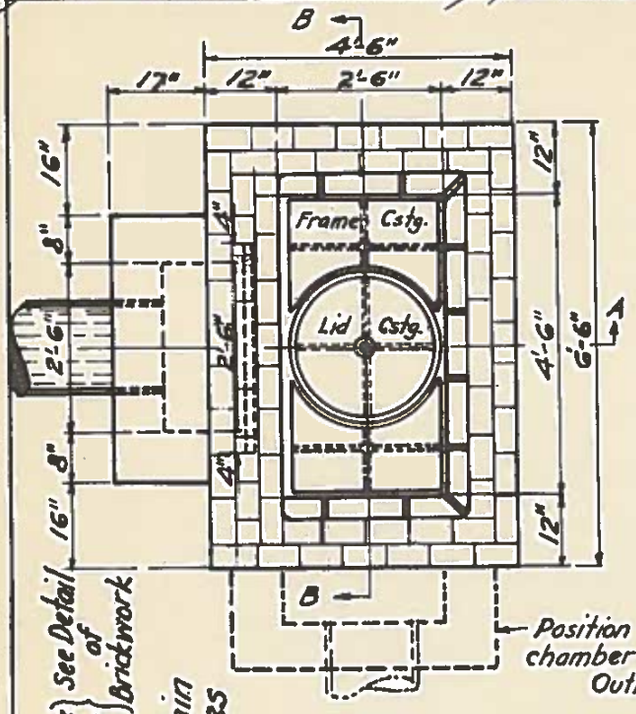
STORM INLET TYPE 2

Approved Jan 6, 37 — ENGR IN CHARGE B.O.E.

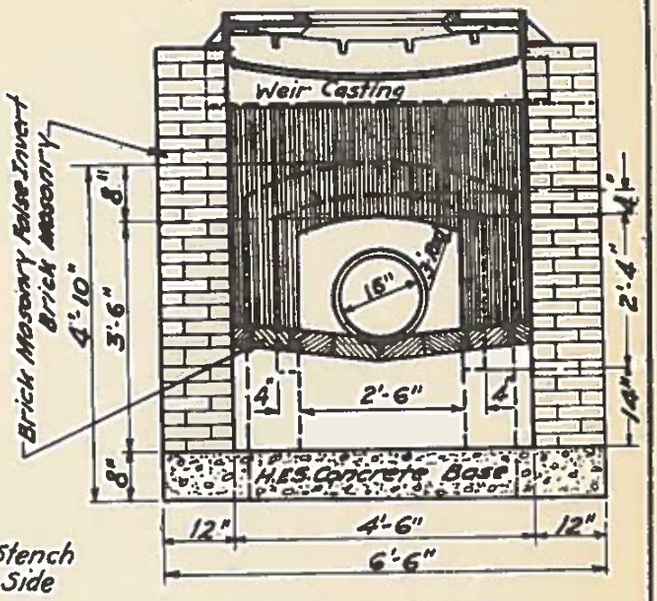
Approved Jan. 8, 1937 — CHIEF ENGR. D.P.W.

Approved Jan 9/37 — DIRECTOR

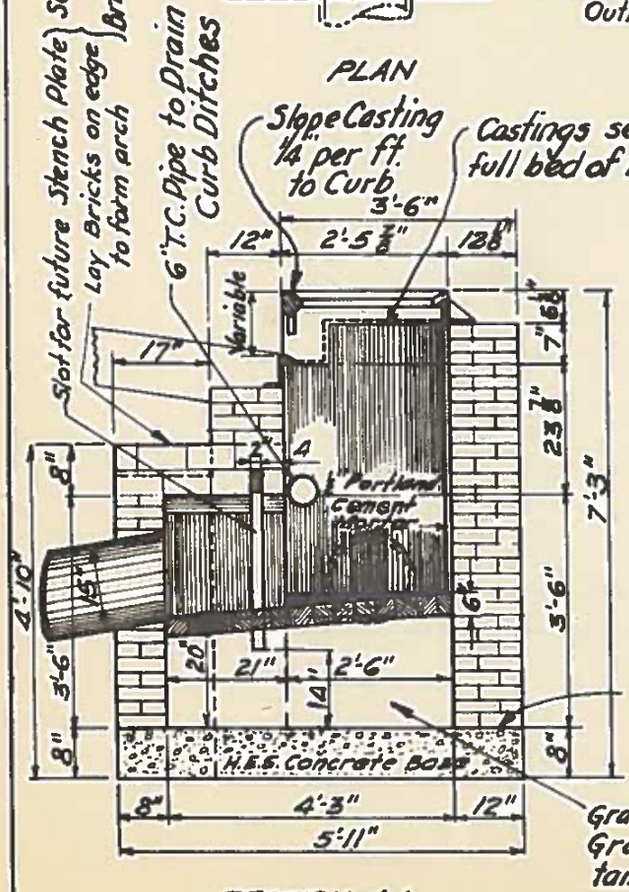
Carl M. Vetter 3/17/36 — DESIGNING ENGR



PLAN



SECTION-B-B



SECTION-A-A

CASTING ASSEMBLY

	STRAIGHT	6' RADIUS	12' RADIUS
FRAME	48	49	50
LID	47	47	47
WEIR	8	9	51

The above Storm Inlet is designed for delivery of water into combined sewers.

Provide slot for future mortaring in of Number 67 Stench Casting to give 4" water seal after removal of false brick invert and supporting fill.

Back-fill in accordance with the specifications.

Concrete for base of Storm Inlet shall be mixed of High Early Strength Special Cement

11

335

CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS — BUREAU OF ENGINEERING

STORM INLET TYPE 2

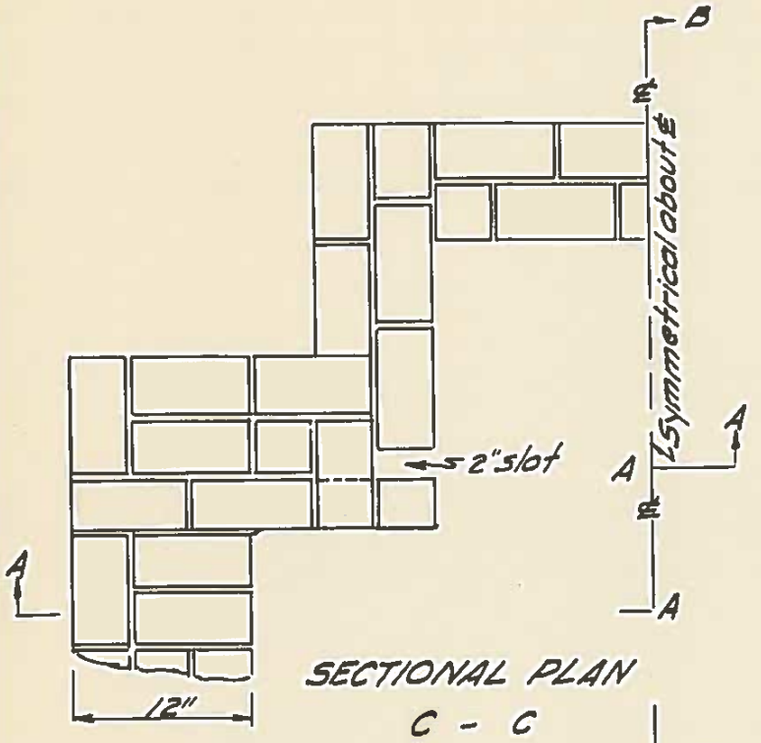
METHOD OF CONSTRUCTING SLOT IN BRICK WORK

Approved Jan 6 '37 — ENGR IN CHARGE B.O.F.E.

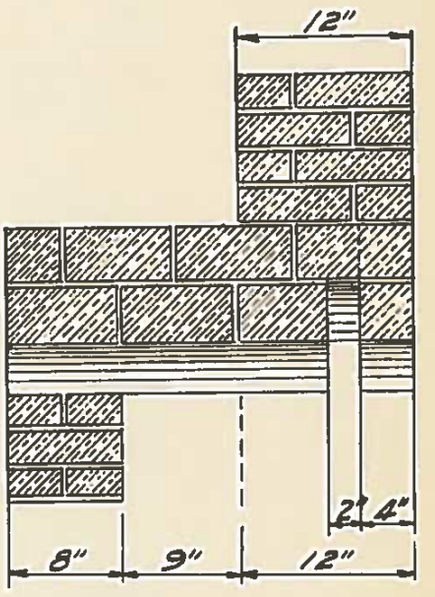
Approved Jan. 8, 1937 — CHIEF ENGR D.P.W.

Approved Jan 9 '37 — DIRECTOR

Approved Jan. 6, 1937
Earl M. Vetter
DESIGNING ENGR.

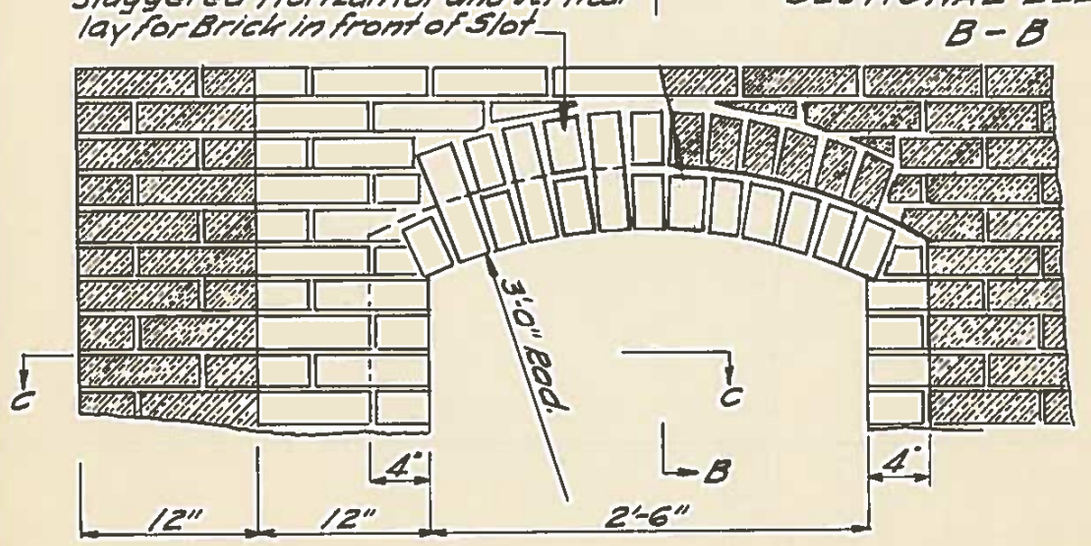


SECTIONAL PLAN
C - C



SECTIONAL ELEVATION
B - B

Staggered Horizontal and Vertical lay for Brick in front of Slot



HALF ELEVATION - HALF SECTION THROUGH SLOT
ON LINE A-A-A-A

11 A

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS — BUREAU OF ENGINEERING

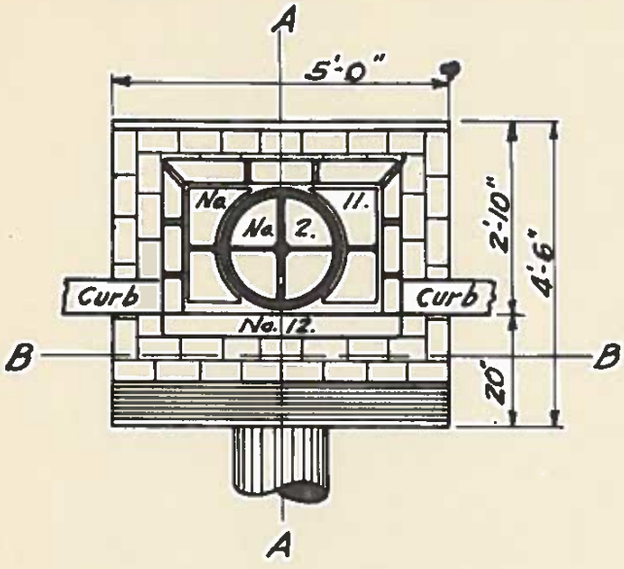
STORM INLET TYPE 3.

Approved Jan. 6, '37 — ENGR IN CHARGE O. of E.

Approved Jan. 8, 1937 — CHIEF ENGR D.P.W.

Approved Jan. 9/37 — DIRECTOR

Approved Jan. 6, 1937
Carl M. Vetter
DESIGNING ENG'R

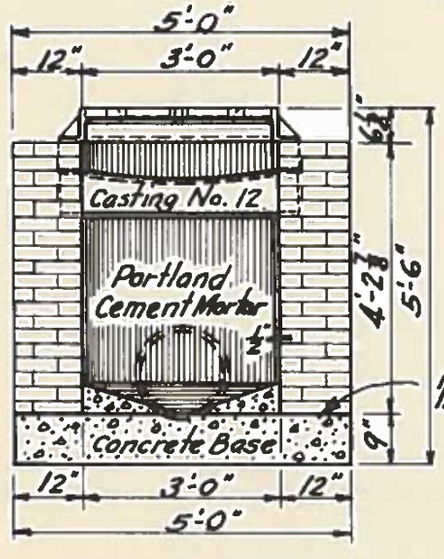


PLAN

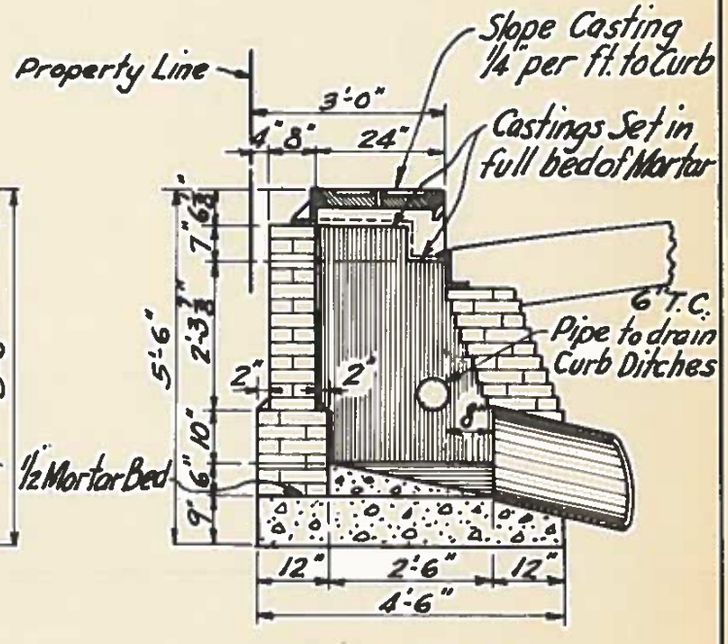
See Specifications for excavation, construction and back-filling with Slag-cement Mixture.

Concrete for base of Storm Inlet shall be Class A and shall be mixed of High Early Strength Special Cement.

All outside joints shall be struck flush.



SECTION B-B



SECTION A-A

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS — **BUREAU OF ENGINEERING**

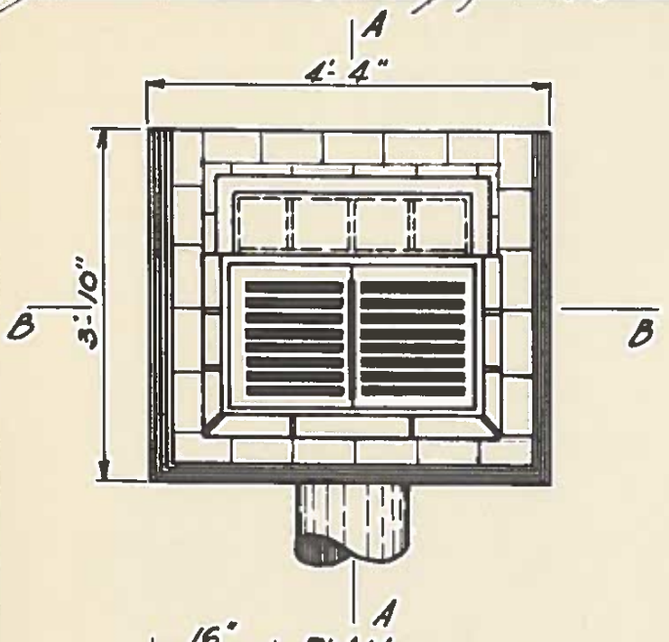
STORM INLET TYPE 6

Approved Jan. 6 '37 — ENGR IN CHARGE B.O.F.E.

Approved Jan. 8, 1937 — CHIEF ENGR D.P.W.

Approved Jan. 4 '37 — DIRECTOR

Approved Jan. 6, 1937
Earl M. Vetter
DESIGNING ENGR

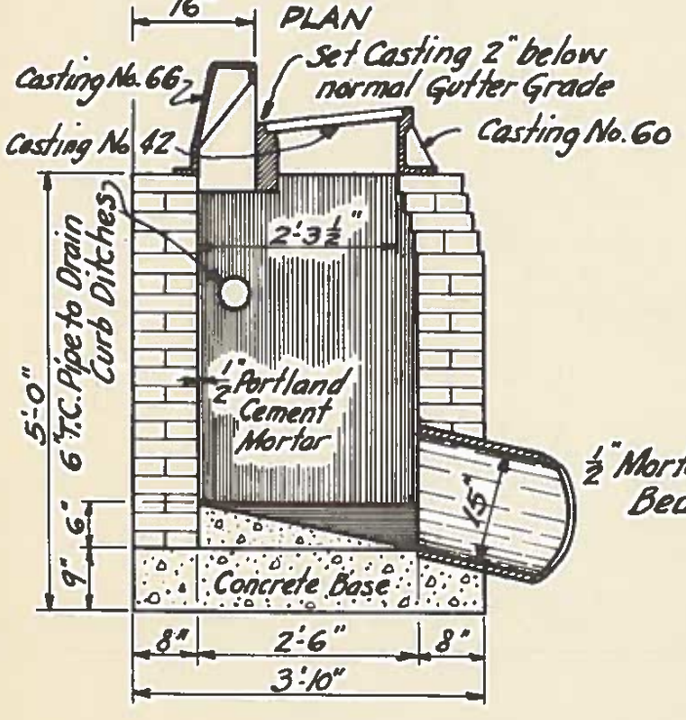


PLAN

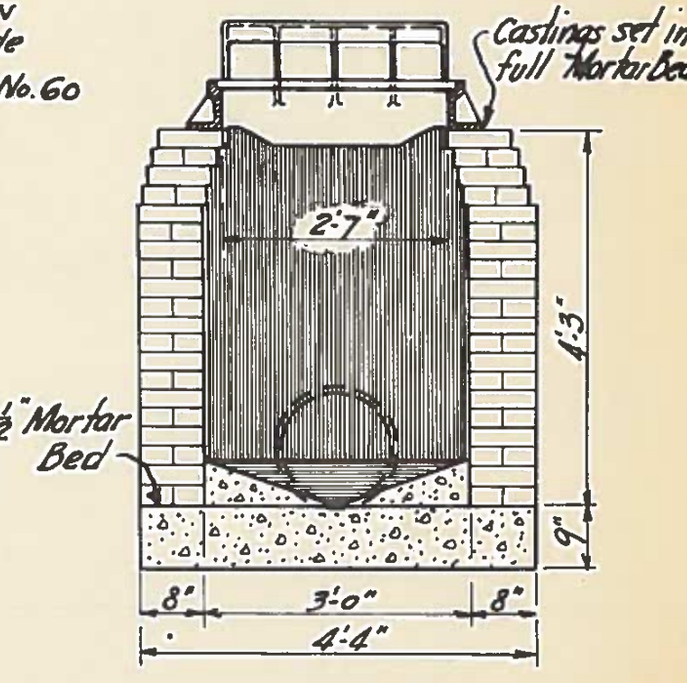
See Specifications for excavation, construction and back-filling with Slag-cement Mixture.

Concrete for Base of Inlet shall be Class A and shall be mixed of High Early Strength Special Cement.

All outside joints shall be struck flush.



SECTION A-A



SECTION B-B

CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS — BUREAU OF ENGINEERING

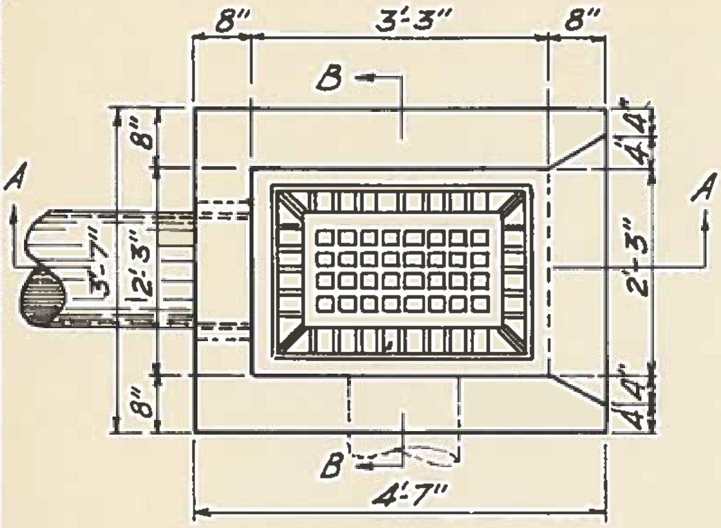
STORM INLET TYPE 7.

Approved Jan. 6, '37 — ENGR IN CHARGE B. of E.

Approved Jan. 8, 1937 — CHIEF ENGR D.R.W.

Approved Jan 9/37 — DIRECTOR

Approved 7-24-36
Carl M. Vetter
DESIGNING ENGR.

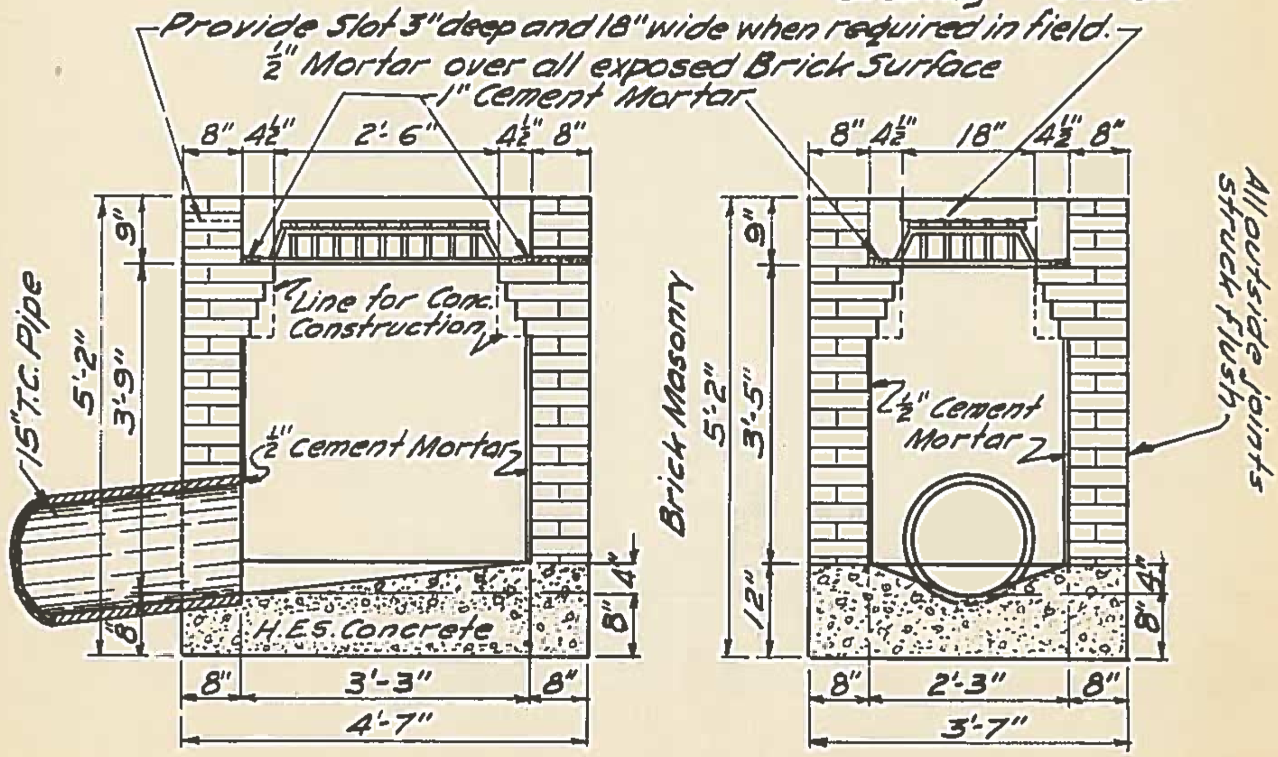


PLAN

See Specifications for Excavation, Construction and Backfilling with Slag Cement.
Contractor has option of constructing entire Inlet with H.E.S. Cement.
Provide 1" beveled edges on exposed corners for Concrete Construction.

Castings Required

Frame	No. 63
Grating	No. 62



SECTION A-A

SECTION B-B

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS — BUREAU OF ENGINEERING

HOUSE LATERALS

Approved Jan 6, 37 — ENGR. IN CHARGE B. of E.

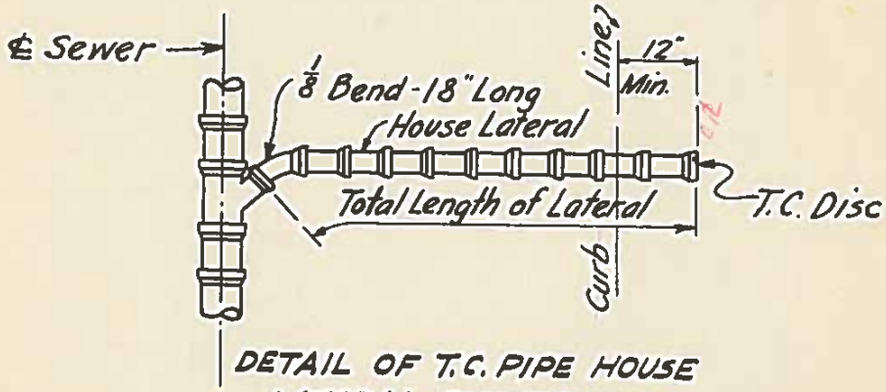
Approved Jan. 8, 1937 — CHIEF ENGR D.P.W.

Approved Jan 9/37 — DIRECTOR

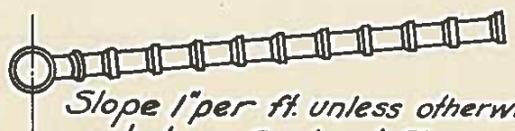
Approved Jan. 6, 1937
Earl M. Vetter
DESIGNING ENGR

BILL OF MATERIAL FOR HOUSE LATERAL CONNECTIONS

Lin. Ft. ℄ Sewer to Curb	Total Length Lateral for 15"x9"-15"x8" 12"x6"-10"x6"-8"x6"Y	Pieces Straight Pipe 2'-0" Long 8" Pipe	6" Pipe	Extension Inside Curb Line 15"x9"Y 15"x8"Y	12"x6"Y	10"x6"Y	8"x6"Y
4	5'-6"	2	2	2'-5"	2'-3"	2'-2"	2'-0"
5	5'-6"	2	2	1'-5"	1'-3"	1'-2"	1'-0"
6	7'-6"	3	3	2'-5"	2'-3"	2'-2"	2'-0"
7	7'-6"	3	3	1'-5"	1'-3"	1'-2"	1'-0"
8	9'-6"	4	4	2'-5"	2'-3"	2'-2"	2'-0"
9	9'-6"	4	4	1'-5"	1'-3"	1'-2"	1'-0"
10	11'-6"	5	5	2'-5"	2'-3"	2'-2"	2'-0"
11	11'-6"	5	5	1'-5"	1'-3"	1'-2"	1'-0"
12	13'-6"	6	6	2'-5"	2'-3"	2'-2"	2'-0"
13	13'-6"	6	6	1'-5"	1'-3"	1'-2"	1'-0"
14	15'-6"	7	7	2'-5"	2'-3"	2'-2"	2'-0"
15	15'-6"	7	7	1'-5"	1'-3"	1'-2"	1'-0"



DETAIL OF T.C. PIPE HOUSE LATERAL CONNECTION



Slope 1" per ft. unless otherwise noted on Contract Plans

PROFILE OF HOUSE LATERALS ALL SIZES

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS — **BUREAU OF ENGINEERING**

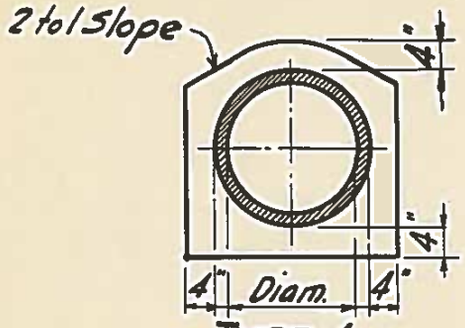
CONCRETE REINFORCEMENT FOR SEWERS

Approved Jan 6 '37 — ENGR IN CHARGE BOFE

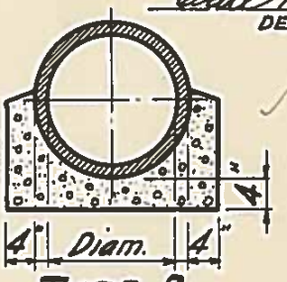
Approved Jan. 8, 1937. — CHIEF ENGR D.P.W.

Approved Jan 9/37 — DIRECTOR

Apprvd Jan 6/1937
Carl M. Vetter
DESIGNING ENGR

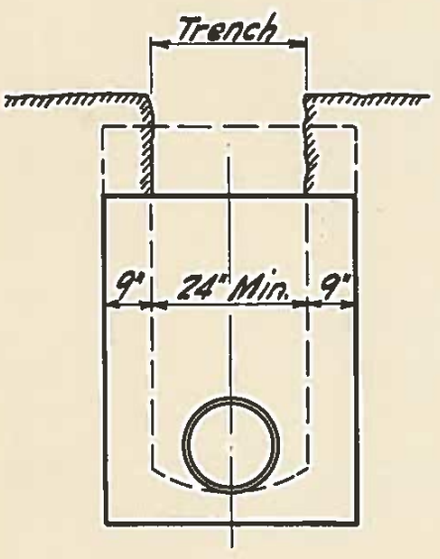


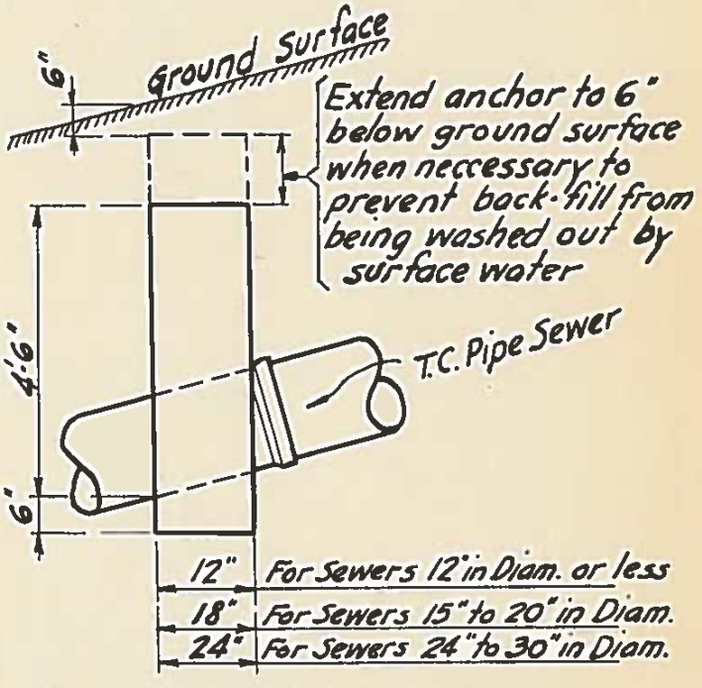
TYPE A



TYPE B

DETAILS OF CONCRETE REINFORCEMENT FOR PIPE SEWERS





CONCRETE ANCHORS FOR SEWERS ON STEEP GRADES

Provide no anchors on grades less than 24%
Provide anchors 36' C. to C. on grades between 24% and 34%
Provide anchors 24' C. to C. on grades between 34% and 50%
Provide anchors 16' C. to C. on grades between 50% and 70%
For Conditions other than shown hereon anchors shall be provided as required by the Contract Plans or ordered in the field by the Director.

CITY OF PITTSBURGH

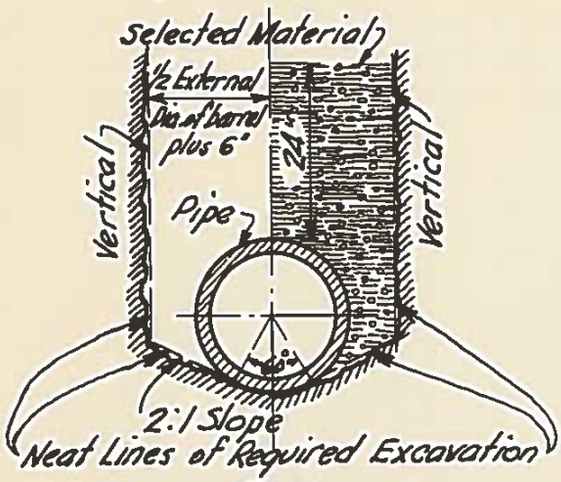
DEPT OF PUBLIC WORKS — BUREAU OF ENGINEERING

EXCAVATION LINES AND TRENCH REPAVING FOR SEWER CONSTRUCTION

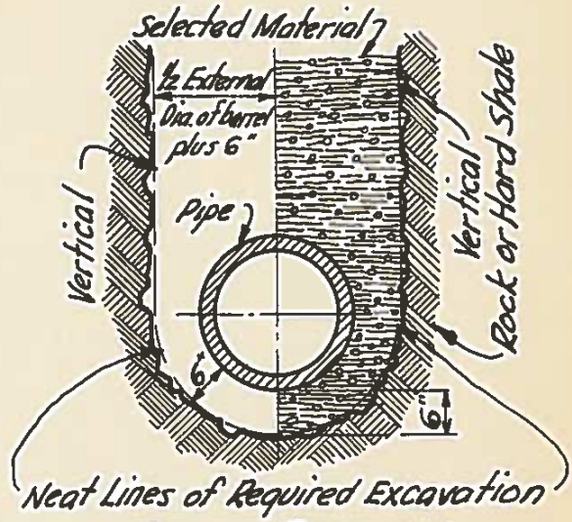
Approved Jan 6 37 — ENGR IN CHARGE B OF E.
Approved Jan 8, 1937. — CHIEF ENGR D.P.W.
Approved Jan 9/37 — DIRECTOR

4" Depth Slag Bed Up to 18"
6" Depth Slag Bed Beyond 18"

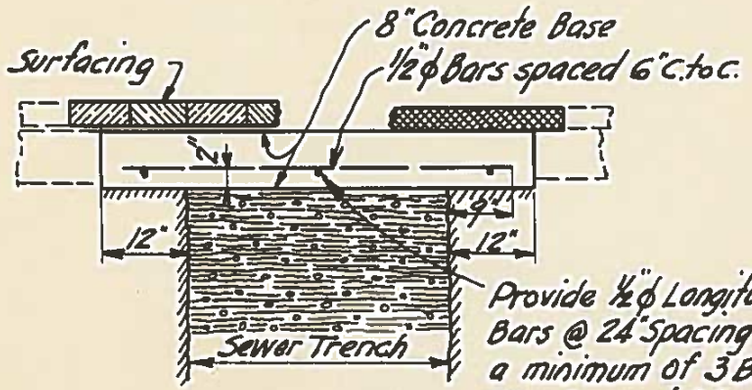
Approved Jan. 6, 1937
Earl M. Vetter
DESIGNING ENGR



CROSS SECTION
PIPE SEWER IN FIRM AND SOLID GROUND



CROSS SECTION
PIPE SEWER IN SHALE OR ROCK



DETAIL OF TRENCH REPAVING

CROSS SECTION
TYPICAL SECTION OF BRICK SEWER

Alternate Design for short miscellaneous ditches and for sewers under 24" in dia. Eliminate steel and provide concrete base 12" deep.

CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS — **BUREAU OF ENGINEERING**

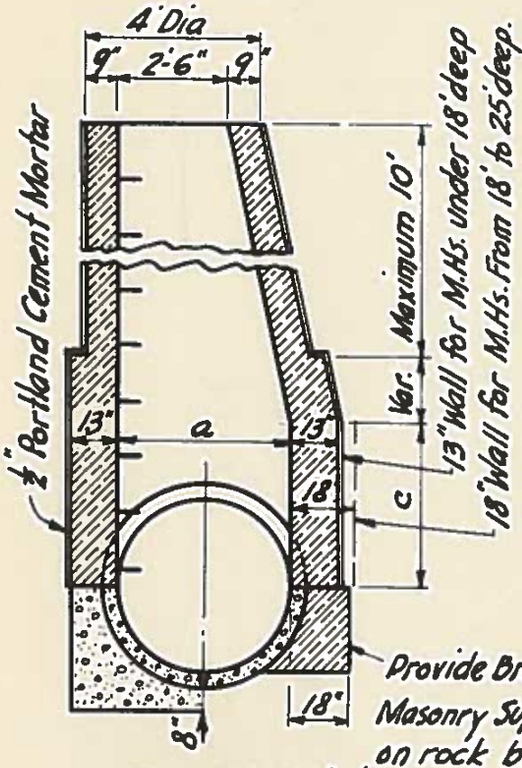
MANHOLES OVER CONCRETE PIPE SEWERS

Approved Jan 6 '37 — ENGR IN CHARGE B. OF E.

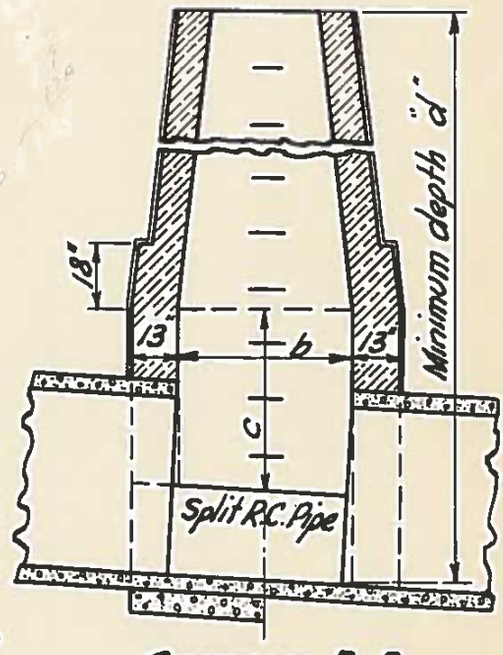
Approved Jan. 8 1937 — CHIEF ENGR D.P.W.

Approved Jan 9 '37 — DIRECTOR

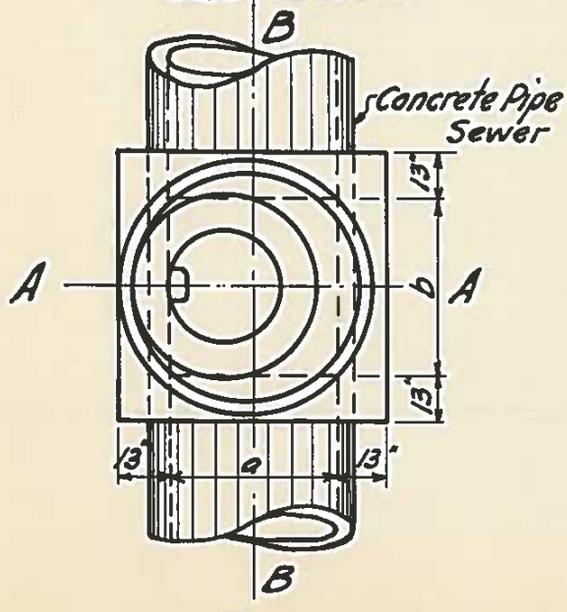
Approved Feb. 6 1937
Paul M. Vetter
DESIGNING ENG'R



SECTION A-A



SECTION B-B



PLAN

Size of Sewer	a	b	c	d
24"	3'-0"	4'-0"	1'-8"	3'-8"
27"	3'-0"	4'-0"	1'-10"	4'-0"
30"	3'-1"	4'-0"	2'-0"	4'-5"
33"	3'-4½"	4'-0"	2'-1"	5'-3"
36"	3'-0"	4'-0"	2'-3"	5'-9"
42"	3'-6"	4'-0"	2'-7"	6'-3"
48"	4'-0"	4'-0"	2'-10"	7'-10"
54"	4'-6"	4'-0"	3'-2"	9'-5"
60"	5'-0"	4'-0"	3'-5"	10'-11"
66"	5'-6"	4'-6"	3'-9"	12'-6"
72"	6'-0"	5'-0"	4'-0"	14'-0"

Note:- Where M.Hs. are shallower than the minimum depth "d" special construction must be provided.

CITY OF PITTSBURGH

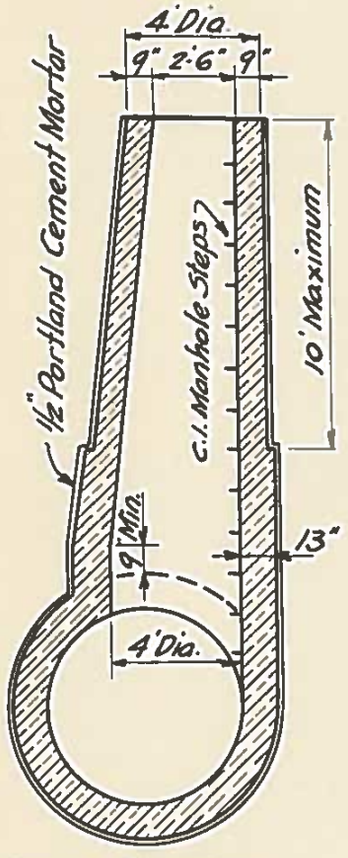
DEPT OF PUBLIC WORKS — **BUREAU OF ENGINEERING**

BRICK SEWERS AND MANHOLES OVER BRICK SEWERS

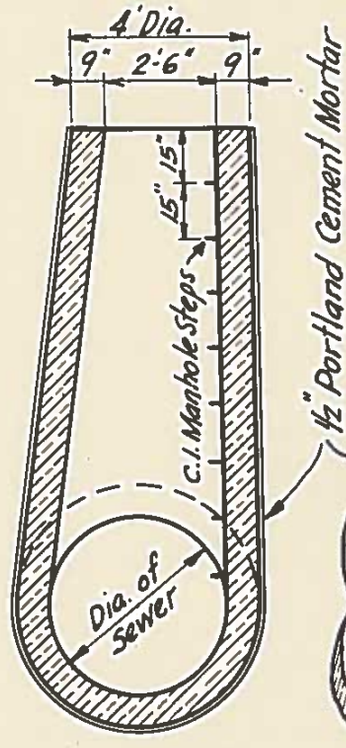
Approved Jan 6 37 — Approved Jan. 8, 1937. — Approved Jan 9/37

ENGR IN CHARGE B.O.F.E. — CHIEF ENGR D.P.W. — DIRECTOR

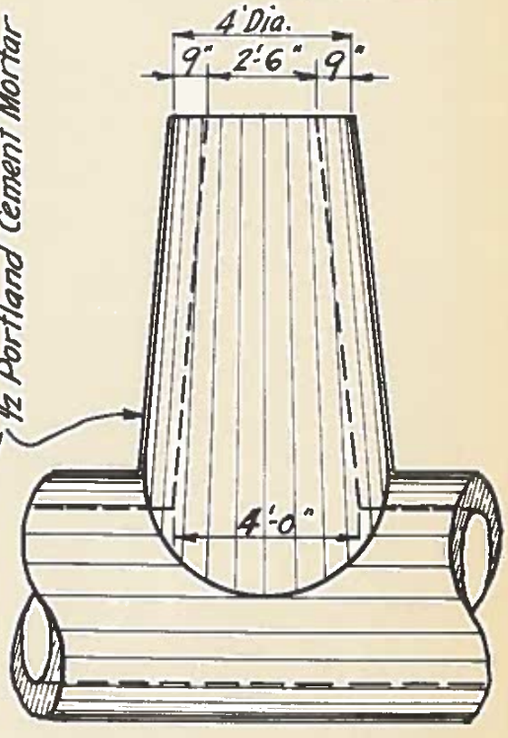
Approved Jan. 6, 1937
Earl M. Vetter
DESIGNING ENGR



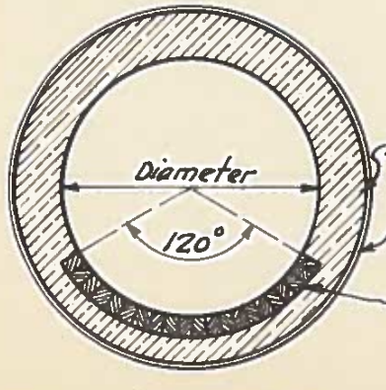
CROSS SECTION
BRICK MANHOLE
ON SEWER OVER 48" IN DIA.



CROSS SECTION
BRICK MANHOLE OVER BRICK SEWERS
36" TO 48" IN DIAMETER



Construct Brick Manhole of Walls with thickness as stipulated on Standard for Manholes over Terra Cotta Pipe Sewers.



BRICK SEWER SECTION

CITY OF PITTSBURGH

SPECIFICATIONS

FOR

FINE AND COARSE AGGREGATES FOR BITUMINOUS MIXTURES

BITUMINOUS CONCRETE MIXTURES

MANUFACTURE OF PRE-MIX BITUMINOUS MATERIALS

and

PAVING WITH PRE-MIX BITUMINOUS MATERIALS

DSBT-R3

1978

THESE SPECIFICATIONS SUPERSEDE AND REPLACE THE EDITIONS, REVISIONS, AND AMENDMENTS OF 1941, 1950, 1954, 1958, 1974

Written and Compiled

by the

BUREAU OF TESTS

DEPARTMENT OF SUPPLIES

TABLE OF CONTENTS

****

The moisture content of the heated and dried aggregate shall not exceed 0.5 percent.

C. Screening

Aggregates shall be screened into sizes such that they may be recombined into a gradation meeting the requirements of the job-mix formula.

D. Hot Aggregate Storage

Hot screened aggregate storage shall be accomplished in such a manner as to minimize segregation and loss of temperature of the aggregate.

E. Proportioning and Mixing

The coating of aggregate paving mix shall be composed of mineral aggregate and asphalt cement thoroughly mixed, in a plant meeting the requirements of these Specifications, until the aggregate particles are 100% coated with asphalt.

F. Temperature of Asphalt Cement and Completed Batch

To aid in determining the proper temperature of the completed batch, current viscosity data shall be provided by the Contractor and shall be available at the plant at all times. With information relative to the viscosity of the particular asphalt being used, the temperature of the completed mix at the plant and at the paver shall be designated by the Director after discussing with the Contractor the hauling and placing conditions, but will always be within the ranges as noted in Section 1-A of these Specifications.

G. Control of Mixing Time

The dry mixing period is the interval of time between the opening of the weigh box gauge and the application of the asphalt. The wet mixing period is the interval of time between the application of all asphalt and the opening of the mixer gate for discharge. When it is applied by a spray system, the wet mixing time shall begin with the start of the asphalt spray.

The Director will designate the length of time of both the dry and wet mixing period to insure a uniformly and completely coated mix. Mixing period time shall not be altered unless so ordered by the Director. A dry mixing period of not less than five seconds shall precede the addition of the asphalt to the mix. Excess wet mixing shall be avoided. Wet mixing shall continue as long as is necessary to obtain a thoroughly blended mix, but shall not exceed 75 seconds nor be less than 30 seconds.

H. Transportation of Mix

The mix shall be transported to the job site in vehicles cleaned of all foreign material which may affect the mix. The truck beds shall be painted or sprayed with a lime water, soap, or detergent solution at least once a day or as often as required. After this operation the truck bed shall be elevated and thoroughly drained; not excess solution shall be permitted. The dispatching of the vehicles shall be so scheduled that all material delivered may be placed in daylight, unless the Director approves artificial light. Delivery of material to the paver shall be at a uniform rate and in an amount well within the capacity of the paving and compacting equipment.

CITY OF PITTSBURGH
SPECIFICATIONS
FOR
PAVING WITH PRE-MIX BITUMINOUS MATERIALS

1. GENERAL EQUIPMENT REQUIREMENTS

All equipment furnished by the Contractor shall meet the requirements of this section and shall be maintained in its best mechanical condition. Equipment shall be serviced and lubricated away from the repaving site; units that drip fuel, oil and grease shall be removed from the project until such leakage is corrected.

2. PAVERS AND SIDE FORMS

The mixture shall be spread and struck off by approved mechanical finishing equipment between suitable side forms or equivalents as hereinafter specified.

If permanent side supports such as curbs, headers, or gutters are not in place, approved steel side forms of suitable depth shall be placed and rigidly supported so as to carry and positively control the elevation of the screed to insure the placing of the paving mixture to the correct elevation and cross-section given. Where desired, a strip of surface mixture not less than eight (8) inches in width, laid and compacted to exact grade, may be used in lieu of one of the side forms. When approved mechanical spreading and finishing equipment is provided with a screed assembly, one end of which is carried on and, as to elevation, is controlled by the side form, or by a bituminous strip of pavement as hereinbefore specified, and is provided with as approved leveling device by which the operator can positively and precisely control the other end of the screed assembly and maintain it accurately level and in conformity with the controlled end at all times, the opposite form may be of any design that will satisfactorily prevent displacement of the mixture under the roller.

Steel side forms to control the elevation may be waived where the pavement is being placed on a base which is parallel to the proposed finished surface of the course being laid and has been finished to the same surface tolerance as is required for such course, provided that the finishing machine in use has a longitudinal wheel-base of approximately ten (10) feet or more in length measured parallel to the direction of advance when in operation and that such wheel-base or support, except as otherwise permitted below, is in contact with such finished base surface and advances along it so as to provide continuous and positive mechanical control of the screed or strike-off assembly, and so as to strike-off the mixture to the exact grade and elevation intended without the aid of manual adjustment during operation.

Machines, otherwise meeting all requirements and having the forward supports riding on and in contact with such finished base surface, may have the rear supports arranged to ride on the newly struck surface, if in practice it is found that such method of support does not introduce or add any element of non-conformity or inaccuracy, and does not result in injury to the pavement due to sudden or severe application of power to such means of support riding on the newly struck course.

All spreading and finishing machines shall have a floating screed assembly arranged to ride directly upon the side forms or to be controlled as to

elevation of strike-off directly by the forms, and shall be self-powered and propelled. Blade graders or drags shall not be used. Equipment which leaves tracks or indented areas which are not corrected by the scheduled operations, or produces other permanent blemishes, will not be approved.

The term "screed" includes any cutting, crowding or other practical action which is effective in the mixture at the workability specified and obtainable, without tearing, shoving or gouging, and which produces a finished surface of evenness and texture specified.

3. ROLLING EQUIPMENT

Rolling equipment shall consist of steel-wheeled rollers and pneumatic-tired rollers described as follows:

A. Steel Wheel Rollers

Steel-wheeled rollers may be of an approved tandem power type weighing not less than ten (10) tons; a three-wheel power roller weighing not less than twelve (12) tons may be used if approved by the Director. Motor power rollers shall have two (2) or more cylinders and under working conditions shall develop contact pressures under the compression rolls of 250 to 350 pounds per inch of width. Rollers shall be in good working condition and shall be equipped with a reversing clutch. Rollers shall be equipped with adjustable scrappers to keep the wheel surfaces clean and with efficient means of keeping them wet to prevent mixes from sticking. These surfaces shall have no flat areas, openings or projections which will mar the surface of the pavement.

The three-axle tandem rollers shall be so constructed that when locked in position for all treads to be in one plane, the roller wheels are held with such rigidity that if either front or center wheel is unsupported the other two wheels will not vary from the plane more than 1/4 inch.

B. Pneumatic Tired Rollers

Pneumatic-tired rollers shall be equipped with pneumatic tires of equal size and diameter which are capable of exerting average contact pressures varying from 40 psi to 110 psi by adjusting the ballast and/or tire inflation pressures. The wheels of the roller shall be so spaced that one pass will accomplish one complete coverage equal to the rolling width of the machine. The roller shall be so constructed that the contact pressure shall be uniform for all wheels, and the tire pressure of the several tires shall not vary more than five pounds per square inch. Pneumatic-tired rollers shall be constructed with enough ballast space to provide uniform wheel loadings as may be required. The total operating weight and tire pressure of the roller may be varied by order of the Director to obtain contact pressures that will result in the required density.

4. DISTRIBUTORS

When a pressure distributor is used for application of tack coats, it shall distribute the required amount of asphaltic material at the specified temperature and in a uniform spray, without automatization. The distributor shall be equipped with pneumatic tires of such size and number that the surface being sprayed will not be rutted or otherwise disturbed. It shall have a bitumeter with a dial visible to the truck driver for maintaining the constant speed required for application at the specified rate.

The pump shall have a tachometer with a dial readily visible to the operator registering gallons per minute passing through the nozzles.

The distributor shall be designed so that the normal width of application shall be not less than twelve feet, with provision for the application of lessor or greater width when necessary.

The distributor shall be equipped and operated so that the asphaltic material shall be circulated or agitated throughout the entire heating process. Means for accurately indicating at all times the temperature of the asphaltic material shall be provided. The thermometer well shall be so placed as not to be in contact with the heating tube.

5. HAUL TRUCKS

Bituminous surfacing material shall be hauled to the site of the work in tight vehicles, previously cleaned of all foreign materials and covered with an approved waterproof cover of sufficient size to protect the entire load. The Contractor shall provide a sufficient number of trucks to guarantee continuous operation on the job at normal operating speed under any or all conditions. The trucks shall be of the insulated type. All trucks shall be of sufficient capacity for delivering at least a ten ton legal load of paving material. A smaller truck may be used for the last load on the job.

6. HAND TOOLS

Only lutes or rakes with covered teeth shall be used during the spreading operation and when finished by hand.

Tamping irons used to consolidate the edges of the pavement courses shall be of sufficient weight to compact the edges to the same degree as the body of the pavement. Irons shall be designed to form an edge as nearly vertical as possible. Irons which seal the material by heat alone shall not be used. Tamping irons used to consolidate the material along curbs, gutters and other structures inaccessible to the roller shall weigh no less than twenty-five (25) pounds and shall have a bearing area not exceeding forty-eight (48) square inches. Mechanical compaction equipment, approved by the Director, may be used instead of tamping irons.

Straight edges, ten feet and sixteen feet in length, shall be provided to test the finished surface.

7. TACK COATING OF EXISTING SURFACES

Prior to the arrival of the binder course mixture the base shall be dry and shall be cleaned of all loose and foreign materials prior to paving.

The vertical surface of curbs and structures, for a height of one inch above the finished wearing course, gutters and existing paving in contact with bituminous mixtures shall be painted with a thick uniform coating of A.C. 2000 asphalt cement. (City of Pittsburgh Specifications dated June, 1971, attached.)

A tack coat consisting of a thin application of ASSHO Grade RSI Emulsified Asphalt (City of Pittsburgh Specifications dated March, 1969, attached) shall be applied to all existing pavements prior to the placing of the binder course.

A tack coat shall be applied to the binder course when in the opinion of the Engineer or his representative the condition of the surface is unsatisfactory for the direct placement of the wearing course.

8. SEALING OF GUTTERS

When the wearing course is placed adjacent to curbs to form an asphalt gutter, it shall be sealed with asphalt for a distance of twelve (12) inches from the curb. The seal shall be evenly applied to the surface by means of hot irons or squeegees so that the surface voids are completely filled and no excess asphalt remains on the surface. When necessary to do this in areas carrying traffic, the Engineer may direct that the surface be lightly dusted. Where the grade is slight, gutters shall be checked with a straightedge and tested with running water to insure drainage to the desired outlet.

9. SPREADING AND FINISHING

A. Mechanical Pavers

The base and surface courses shall be spread and struck-off with a mechanical paving machine meeting the requirements of Section 2 of these Specifications. The paving machine shall be operated so that material does not accumulate and remain along the sides of the receiving hopper.

Equipment which leaves tracks or indented areas which cannot be corrected in normal operation, or which produces flushing of asphalt or other permanent blemishes or fails to produce a satisfactory surface, shall not be used.

The finished pavement shall conform in all respects with lines, grades, dimensions and typical cross sections shown on the project plans or otherwise described in the Technical Specifications.

B. Longitudinal Joints

Longitudinal joints and edges shall be constructed to true line markings. Lines for the paver to follow in placing individual lanes will be established by the Director parallel to the centerline of the proposed roadway. The paver shall be positioned and operated to follow closely the established line. When using pavers in echelon, the first paver shall follow the marks or line, and the second paver shall follow the edge of the material placed by the first paver. In order to assure a hot joint and obtain proper compaction, the pavers shall work as close together as possible and in no case shall they be more than one hundred (100) feet apart. In backing trucks against the paver, care shall be taken not to jar it out of its proper alignment.

As soon as the first load of material has been spread, the texture of the unrolled surface shall be checked to determine its uniformity. Segregation of

materials shall not be permitted. If segregation occurs, the spreading operation shall be immediately suspended until the cause is determined and corrected.

C. Traverse Joints

Traverse joints in succeeding courses shall be offset at least two (2) feet. Longitudinal joints shall be offset at least six (6) inches.

Any irregularities in alignment left by the paver shall be corrected by trimming directly behind the machine. Immediately after trimming, the edges of the course shall be thoroughly compacted by tamping. Distortion of the pavement during this operation shall be avoided.

Edges against which additional pavement is to be placed shall be straight and approximately vertical. A lute or covered rake shall be used immediately behind the paver, when required, to obtain a true line and vertical edge. Any irregularities in the surface of the pavement course shall be corrected directly behind the paver. Excess material forming high spots shall be removed by a shovel or lute. Indented areas shall be filled with hot mix and smoothed with the back of a shovel being pulled over the surface. Fanning of material over such areas shall not be permitted.

D. Hand Spreading.

In small areas where the use of mechanical finishing equipment is not practical, the mix may be spread and finished by hand if so directed by the Engineer. Wood or steel forms, approved by the Engineer, rigidly supported to assure correct grade and cross section, may be used. In such instances, measuring blocks and intermediate strips shall be used to aid in obtaining the required cross section. Placing by hand shall be performed carefully; the material shall be distributed uniformly to avoid segregation of the coarse and fine aggregate. Broadcasting of material shall not be permitted. During the spreading operation, all material shall be thoroughly loosened and uniformly distributed by lutes or covered rakes. Material that has formed into lumps and does not break down readily shall be rejected. Following placing and before rolling, the surface shall be checked with templates and straightedges and all irregularities corrected.

E. Heating Equipment.

Heating equipment used for keeping hand tools free from asphalt shall be provided. Caution shall be exercised to prevent high heating temperatures which may burn the material. The temperature of the tools when used shall not be greater than the temperature of the mix being placed. Heat only will be employed to clean hand tools; petroleum oils or solvents will not be permitted.

F. Adjustments to abutting Pavement.

For the purpose of a smooth transition from the elevation of the new resurfacing to the elevation of an existing pavement at street intersections, the Contractor shall remove and dispose of existing pavement within the limits of the resurfacing work and to the extent directed by the Director as required to produce a satisfactory easement. Care shall be taken not to produce a drainage problem.

10. COMPACTION OF ROADWAYS - GENERAL

Rolling equipment for use in compacting mixes shall meet the requirements of Section 3 of these Specifications. At least two rollers shall be used for the paving of roadways. In instances where the Director or his authorized representative deem it necessary, three rollers will be used to achieve the specified pavement density.

During rolling, the roller wheels shall be kept moist with only sufficient water to avoid picking up the material.

After the longitudinal joints and edges have been compacted, rolling shall start longitudinally at the sides and gradually progress toward the center of the pavement, overlapping on successive trips by at least one-half the width of tandem rollers and uniformly lapping each preceding track or covering the entire surface with the rear wheels when three-wheeled rollers are used. The rollers shall move at a slow but uniform speed with the drive roll or wheel nearest the paver. The speed shall not exceed three m.p.h. for steel wheeled rollers or five m.p.h. for pneumatic-tired rollers.

The line of rolling shall not be changed suddenly or the direction of rolling reversed suddenly. If rolling causes displacement of the material, the affected areas shall be loosened at once with lutes or shovels and restored to the original grade of the loose material before being rerolled. Heavy equipment or rollers shall not be permitted to stand on the finished surface before it has been compacted and has thoroughly cooled.

When paving in single width, the first lane placed shall be rolled in the following order:

(a) Transverse joints

(b) Outside edge

(c) Initial or breakdown rolling, beginning on the low side and progressing toward the high side.

(d) Second rolling, same procedure as (c)

(e) Finish rolling

When paving in echelon, or abutting a previously placed lane, the longitudinal joint rolling shall follow the transverse joint rolling.

When paving in echelon, two or three inches of the edge which the second paver is following shall be left unrolled, and rolled when the joint between the lanes is rolled. Edges shall not be exposed more than fifteen minutes without being rolled. Particular attention shall be given to the construction of transverse and longitudinal joints in all courses.

In laying a surface mix adjacent to any finished area, it shall be placed sufficiently high so that, when compacted, the finished surface will be true and uniform.

A. Transverse Joints

Transverse joints shall be carefully constructed and thoroughly compacted to provide a smooth riding surface. Joints shall be straightedged and stringlined to assure smoothness and true alignment. If the joint is formed with a bulkhead, such as a board, to provide a straight line and vertical face, it shall be checked with a straightedge before fresh material is placed against it to complete the joint. If a bulkhead is not used to form the joint and the roller is permitted to roll over the end of the new material, the line of joint shall be located back of the rounded edge a sufficient distance to provide a true surface and cross-section. If the joint has been distorted by traffic or by other means, it shall be trimmed to line. In either case, the joint face shall be painted with a thin coating of asphalt before the fresh material is placed against it.

To obtain thorough compaction of these joints, the material placed against the joint shall be tightly crowded against the vertical face of the joint. To accomplish this, the paving machine shall be positioned so that the material shall overlap the edge of the joint one-inch to two-inches. The depth of the overlapping material shall be kept uniform. The coarse aggregate in the overlapped material that has dislodged through raking or luting shall be removed from the pavement surface and discarded.

If a three-wheeled roller is used, it shall be placed on the previously compacted material transversely so that not more than six-inches of the rear rolling wheel rides on the edge of the joint. The roller shall be operated to pinch and press the mix into place at the transverse joint. The roller shall continue to roll along this line, shifting its position gradually across the joint, in six to eight-inch increments until the joint has been rolled with the entire width of the roller wheel. Rolling shall be continued until a thoroughly compacted, neat joint is obtained. If only tandem rollers are available, they shall be similarly operated to complete the joint.

Transverse joints shall be held to a minimum. When paving single width and maintaining traffic, one lane shall be taken no further than one-half the total paving day. At the end of the paving day all lanes shall be completed to approximately the same station. When paving in echelon, the lanes shall be as nearly even as practical.

B. Longitudinal Joints

Longitudinal joints shall be rolled directly behind the paving operation. The first lane placed shall be true to line and grade and have an approximately vertical face. The material being placed in the abutting lane shall then be tightly crowded against the face of the previously placed lane. The paver shall be positioned so that in spreading the material overlaps the edge of the lane previously placed lane. The paver shall be positioned so that in spreading the material overlaps the edge of the lane previously placed by one-inch to two-inches. The width and depth of the overlapped material shall be kept uniform at all times. The paver shall closely follow the line or markings placed along the joint for alignment purposes. Before rolling, the coarse aggregate in the material overlapping the joint shall be carefully removed with a rake or lute and discarded.

When rolling is accomplished with a three-wheeled roller, it shall be shifted over on to the previously placed lane so that not more than six-inches

of the rear roller wheel rides on the edges of the newly laid lane. The rollers shall then be operated to pinch and press the lines gradually across the joint. Rolling shall be continued until a thoroughly compacted, neat joint is obtained. If only tandem rollers are available, they shall be similarly operated to complete the joint. When the abutting lane is not placed in the same day, or the joint is distorted during the day's work by traffic or by other means, the edge of the lane shall be carefully trimmed to line and painted with a very thin coating of asphalt before the abutting lane is placed.

C. Edges

The edges of the pavement shall be rolled concurrently with or immediately after rolling the longitudinal joint.

Care shall be exercised in consolidating the course along the entire length of the edges. Before it is compacted, the material along the unsupported edges shall be slightly elevated with a tamping tool or lute. This will permit the full weight of the roller wheel to bear on the material to the extreme edges of the mat. In rolling pavement edges, roller wheels shall extend two-inches to four-inches beyond the pavement edge.

D. Breakdown Rolling

Breakdown rolling shall immediately follow the rolling of the longitudinal joint and edges. Rollers shall be operated as close to the paver as necessary to obtain adequate density without causing undue displacement. The breakdown roller shall be operated with the drive roll or wheel nearest the finishing machine. Exceptions may be made by the Engineer with working on steep slopes or super-elevated curves. When both three-wheeled rollers and tandem rollers are used, the three-wheeled rollers shall work directly behind the paver followed by the tandem rollers. Only experienced roller operators shall be used for this work.

E. Second Rolling

Pneumatic-tired rollers or tandem rollers, as described in Section 3, shall be used for the second rolling. The second rolling shall follow the breakdown rolling as closely as possible and while the paving mix is still of a temperature that will result in maximum density from this operation.

Pneumatic-tired rolling shall be continuous (at least three complete coverages) after the initial rolling until all of the mix placed has been thoroughly compacted. Turning of pneumatic-tired rollers on the hot paving mix which causes undue displacement shall not be permitted.

F. Finish Rolling

The finish rolling shall be accomplished with two-axle tandems or three-axle tandems while the material is still warm enough for the removal of roller marks. If necessary to obtain the desired surface finish, the Engineer shall specify the use of pneumatic-tired rollers.

All rolling operations shall be conducted in close sequence.

Hand tamping, manual or mechanical, may be used in areas inaccessible for the operation of standard rollers as specified if it is proved to the

Engineer that such operations will give the desired density.

11. COMPACTION -- PLAY AREAS AND WALKWAYS

A. Compaction Requirements

The number and type of rolling or compacting equipment for use in compacting bituminous mixes used on play areas or walkways will be as specified in the individual contract. In the event that no precise specification is made, the Department Director or his authorized representative will decide the types and number required to compact the material to the desired density.

B. Marshall Density

Bituminous materials used on play areas or walkways will be required to conform to the laboratory density as specified for the individual mix, however, the field density requirements shall be waived.

12. TESTING AND PROTECTION OF FINISHED SURFACE

A. Core Drilling

If directed by the Director, the Contractor shall cut sample cores, approximately four (4) inches in diameter, on which density tests will be performed by the Bureau of Tests. The Contractor shall cooperate in ordering changes in the rolling procedures to comply with the test procedure designated by the Director.

Any and all surface course found to be deficient more than one-quarter (1/4) of an inch from the specified thickness shall be removed and replaced to the correct thickness or otherwise satisfactorily corrected.

B. Testing Finished Surface

For the purpose of testing the finished surface, a sixteen (16) foot straightedge shall be used except that a ten (10) foot straightedge may be used on vertical curves. The straightedge shall be held in successive positions parallel to the road centerline in contact with the surface, and the whole area gone over from one side to the other as necessary. Advance along the pavement shall be in successive stages of not more than one-half (1/2) the length of the straightedge. Any irregularities which vary more than one-quarter (1/4) of an inch shall be corrected. Irregularities which may develop before the completion of rolling shall be remedied by loosening the surface mixture and removing or adding materials as may be required. Should any irregularities or defects remain after the final compression, the surface course shall be promptly removed and sufficient new material laid to form a true and even surface. All minor surface projections, joints, and minor honeycombed surfaces shall be ironed smooth to grade as may be directed. The pavement adjacent to the curb shall be painted for a width of twelve (12) inches with the hot asphalt cement or asphalt cut-back.

Total thickness after attainment of specified density shall be as indicated on the Drawings or specified in the Proposal.

When tests show that the pavement is uniformly more than one-eighth (1/8) of an inch deficient in thickness at three (3) or more adjoining sections,

these sections shall be removed and replaced to correct thickness, or otherwise satisfactorily corrected.

C. Protection of Surface Course

The Contractor shall not haul heavy loads over the surface course, and any damage caused by the Contractor or his agents, due to their operations, shall be repaired satisfactorily at the Contractor's expense.

After the surface mixture has received its final rolling, no vehicular traffic of any kind shall be permitted on the pavement until it shall have hardened sufficiently and in no case in less than sixteen (16) hours after being placed unless specific approval of the Engineer is obtained.

At the discretion of the Director, the Contractor shall broom dry 1A aggregate over the completed wearing surface and have it removed twenty-four (24) hours later.

CITY OF PITTSBURGH
SPECIFICATIONS
FOR
FINE AND COARSE AGGREGATE FOR BITUMINOUS MIXTURES

1. GENERAL REQUIREMENTS

A. Source of Supply

All bidders shall furnish the City with a letter stating the source of their material. No material will be changed without the approval of the City of Pittsburgh's Bureau of Tests.

B. Applicability

These Specifications apply to all vendors providing aggregates either in their basic form or as part of any bituminous mixture.

C. Aggregate Type

All aggregates will meet the physical requirements of Type A, as defined in Tables A and B.

All aggregates with the exception of #1A will meet the size requirements as shown in Table C of these Specifications.

(#1A WILL MEET THE GRADATION REQUIREMENTS SHOWN IN THIS SECTION 2-E OF THESE SPECIFICATIONS).

Aggregate for use in all bituminous wearing courses shall have a minimum of 85% crushed particles which shall have at least two faces resulting from fracture. Nicked gravel will not be considered as a crushed particle.

Aggregate for use in base or binder courses shall have a minimum of 55% crushed particles which shall have at least two faces resulting from fracture.

2. FINE AGGREGATE

Fine aggregate for use in bituminous mixtures shall be natural or manufactured sand composed of hard, durable, uncoated particles, thoroughly cleaned by washing, free from lumps of clay and all vegetable and deleterious substances. All sand bid as fine aggregate shall be natural or river sand, Blast Furnace Slag Sand, or crushed limestone of good quality from an approved source. No other type of aggregate will be acceptable under these Specifications.

A. Natural or River Sand

Sand resulting from glacial or water action.

B. Slag Sand

This material shall be produced from air-cooled blast furnace slag, crushed graded and screened. The slag under this item shall be a hard, durable, non vitrified, air-cooled blast furnace product, free from an excess of porous or honey combed particles. The slag shall be broken into rough cubicles of

pyramidal fragments, which are so graded as to produce a uniformly graded material.

C. Crushed Limestone

All stone aggregate shall be of approved quality and shall be obtained from tough durable rock, the source of which is to meet the approval of the Director. The stone shall be free from slate like texture, cleavage planes and shall contain not more than 5% thin or elongated pieces. Aggregate manufactured from Freeport or Vanport limestone will not be permitted in any bituminous wearing surface; however, it may be used as base or binder courses.

D. Filler

Filler shall be cement, fly ash, or the graded fines free of silt or clay resulting from crushing stone, gravel or slag. The filler shall meet the following gradation:

Sieve	Total Percent Passing
#30	100
#50	95 - 100
#100	90 - 100
#200	70 - 100

Filler manufactured from Vanport or Freeport limestone will not be permitted in any wearing course.

E. Gradation for City of Pittsburgh Type 1A Fine Aggregate

The following limits shall cover the natural variation in the sources of supply. The gradation from any one source shall be reasonably uniform and not subject to the extreme percentages of gradation specified.

Sieve	Total Percent Passing
3/8	100
#4	90 - 100
#8	70 - 100
#16	45 - 80
#30	25 - 60
#50	10 - 30
#100	2 - 20
#200	0 - 10

3. COARSE AGGREGATE

A. Description - General

All materials prepared for coarse aggregate shall meet the physical requirements specified in Table A and Table B, and the size and grading requirements as indicated in Table C. All particles shall be free from coatings of clay or earth materials, and reasonably free from silt or crusher dust. The maximum amount of deleterious substances shall not exceed the values given in Table B.

The coarse aggregate shall be prepared from stone, gravel or slag as herein specified.

B. Stone

Type A aggregate shall be crushed and prepared from tough durable rock, free from slaty texture or cleavage planes.

Aggregate prepared from Vanport or Freeport limestone will not be approved for use, or in combination with aggregate from another source, in any bituminous wearing course, seal coat, surface treatment, or surface finish.

C. Gravel

Type A aggregate shall be crushed unless otherwise designated, and prepared from tough, hard, durable and impermeable particles. It shall be washed to remove impurities prior to loading.

D. Slag

Type A slag aggregate shall be crushed and prepared from durable pieces of air-cooled blast furnace slag. The slag shall be obtained as a by-product in the production of pig iron and shall be reasonably uniform in density and quality.

4. PHYSICAL REQUIREMENTS

TABLE A

		Type A		
		Stone	Gravel	Slag
	Sodium Sulfate Test - Maximum % Loss at 5 cycles by weight AASHO Designation T 104 (Except pans used instead of sieves)	12	12	12
Maximum	Los Angeles Rattler Test - ASTM C131 (Run on surface-dry basis) % Loss by weight at 500 revolutions A, B, & C Gradings.	40	40	40
(1)	Thin and elongated pieces, % by weight - maximum	15	15	15
(2)	Loss by washing, % by weight - maximum ASTM Designation C111	1	1	1
(3)	Crushed Fragments - Minimum % by weight - Individual size and % by weight - Combined Sizes		85	
(4)	Compact weight - Minimum lbs. per cu. ft.			70

The following notes are applicable to TABLE A:

1. Thin and elongated pieces

Coarse aggregate shall be subject to a test for thin and elongated pieces when required by the Engineer. The portion retained on the 3/4 inch sieve shall not contain more than the percentage specified in TABLE A of particles so flat or elongated, or both, that the ratio between the maximum and the minimum dimensions of a circumscribing rectangular prism exceeds 5:1.

2. Loss by washing

Except that a No. 200 sieve shall be used, the sample tested shall weigh between two and five pounds depending on the size of aggregate being tested.

3. Crushed Fragments

Crushed gravel shall be the product resulting from crushing gravel by mechanical means. A crushed fragment is one having one or more fractured faces. Nicked gravel will not be considered as crushed fragments.

An exception will be Bituminous Concrete Base and binder courses where 55% of the gravel will have at least two fractured faces.

4. Compact Weight

The compact weight of the dry slag Type A shall not be less than seventy (70) pounds per cubic foot when individual sizes are used. When the No. 2B and No. 3A sizes are used in combination, the compact weight shall not be less than seventy (70) pounds per cubic foot. This compact weight determination shall be made on a combination of 50% No. 2B and 50% No. 3A aggregate.

Physical Requirements - Deleterious Substances*

TABLE B

	Type A		
	Stone	Gravel	Slag
Soft Fragments, % by Weight (Maximum)	2	2	
Shale, % by Weight (Maximum)	1	1	
Clay Lumps, % by Weight (Maximum)	0.25	0.25	
Coal Coke, % by Weight (Maximum)		1	1
Flux Stone, % by Weight (Maximum)			0
Glassy Particles, % by Weight (Maximum)			4 or 10 **
***Iron, % by Weight (Maximum)			2

*The sum of percentages of all deleterious or objectionable substances, exclusive of glassy particles and iron, shall not exceed 2% for Type A aggregate.

**Pieces of slag containing more than 50% glass shall be considered as glassy particles.

***Pieces of slag containing iron will be considered as iron.

TABLE C

SIZE AND GRADING REQUIREMENTS FOR COARSE AGGREGATES
(Based on Laboratory Sieve Tests, Square Openings)

TOTAL PERCENT PASSING

PENNA. NO.	4"	3 1/2"	2 1/2"	2"	1 1/2"	1"	3/4"	1/2"	3/8"	#4	#8	#16	#100	#200
4	100	90-100	35-70		0-15		0-5							
3A			100	90-100	35-70	0-15		0-5						
2B					100	90-100		25-60		0-10	0-5			
2A				100			52-100		36-70	24-50	16-38	10-30		0-10
2						100	90-100		20-55	0-10	0-5			
1B								100	75-100	10-30	0-10			
INS						100		90-100		0-15				
2NS					100	90-100		0-15						

CITY OF PITTSBURGH
SPECIFICATIONS
FOR
BITUMINOUS BINDER COURSE JA-1

1. GENERAL REQUIREMENTS

Manufacture and paving shall be in accordance with "City of Pittsburgh Specifications for Manufacture and Paving with Pre-Mix Bituminous Materials" dated January 3, 1974, attached.

2. MATERIALS

A. Bituminous

The asphalt cement shall be AC 2000 meeting "City of Pittsburgh Specifications for Asphalt Cement" dated October, 1976, attached.

B. Aggregate

The fine aggregate shall be either natural or river sand, crushed limestone, or crushed air-cooled blast furnace slag.

The coarse aggregate shall be either crushed limestone, crushed gravel or crushed air-cooled blast furnace slag.

All fine and coarse aggregate shall conform to "City of Pittsburgh Specifications for Fine and Coarse Aggregate for Bituminous Mixes" dated January 3, 1974, attached.

C. Composition of Mixture

Aggregate gradation and composition of mixtures total percent by weight passing square openings (Based on Laboratory Sieve Tests).

Passing Sieve	Required Composition of Mixture
1"	100
3/4"	90 - 100
3/8"	38 - 68
#4	15 - 44
#8	10 - 30
#16	7 - 24
#30	4 - 19
#50	1 - 14
#100	0 - 10
#200	0 - 5
Bitumen	% by Weight
Stone or Crushed Gravel	3.5 - 7.5
Slag	4.0 - 9.0

The Director of the City of Pittsburgh's Department of Supplies or his authorized representative will have the authority to specify the exact amount of asphalt cement within the above limitations.

Temperature of the completed mix shall be 260° to 325° F.

The general composition limits prescribed above are master ranges for tolerance to govern mixtures made from any raw materials meeting Specifications and they are maximum and minimum for all cases. A closer control appropriate to the materials is required in accordance with the mix as follows:

Passing #4 and Larger Sieves	± 7%
Passing #8 to #100 Sieves (Inclusive)	± 4%
Bitumen	± 0.4%

The Marshall Stability at 140° F. shall be a minimum of 1000 pounds. The Marshall Flow value shall be 6 to 16. The percentage of aggregate voids filled with bitumen shall be 60% to 85%. The field density shall be at least 95% of the corresponding daily plant Marshall density.

The percentage of voids by volume will be 3-6%.

CITY OF PITTSBURGH
SPECIFICATIONS
FOR
BITUMINOUS BINDER COURSE ID2-A

1. GENERAL REQUIREMENTS

Manufacture and paving shall be in accordance with "City of Pittsburgh Specifications for Manufacture and Paving with Pre-Mix Bituminous Materials" dated January 3, 1974, attached.

2. MATERIALS

A. Bituminous

The asphalt cement shall be AC 2000 meeting "City of Pittsburgh Specifications for Asphalt Cement" dated October, 1976, attached.

B. Aggregate

The fine aggregate shall be either natural or river sand, crushed limestone or crushed air-cooled blast furnace slag.

The coarse aggregate shall be either crushed limestone, crushed gravel or crushed air-cooled blast furnace slag.

All fine and coarse aggregate shall conform to "City of Pittsburgh Specifications for Fine and Coarse Aggregate for Bituminous Mixes" dated January 3, 1974, attached.

C. Composition of Mixture

Aggregate gradation and composition of mixtures total percent by weight passing square openings (Base on Laboratory Sieve Tests).

Passing Sieve	Required Composition of Mixture
1 1/2"	100
1"	90 - 100
1/2"	40 - 75
#4	20 - 47
#8	15 - 37
#16	10 - 30
#30	5 - 24
#50	4 - 17
#100	3 - 10
#200	2 - 6
Bitumen	% by weight
Stone or Crushed Gravel	4.0 - 7.0
Slag	5.5 - 9.0

The Director of the City of Pittsburgh's Department of Supplies or his authorized representative will have the authority to specify the exact amount of asphalt cement within the above limitations.

Temperature of the completed mix shall be 260° to 325° F.

The general composition limits prescribed above are master ranges for tolerance to govern mixtures made from any raw materials meeting Specifications and they are maximum and minimum for all cases. A closer control appropriate to the materials is required in accordance with the mix as follows:

Passing #4 and Larger Sieves	± 7%
Passing #8 to #100 Sieves (Inclusive)	± 4%
Bitumen	± 0.4%

The Marshall Stability at 140° F. shall be a minimum of 1000 pounds. The Marshall Flow value shall be 6 to 16. The percentage of aggregate voids filled with bitumen shall be 60% to 85%. The field density shall be at least 95% of the corresponding daily plant Marshall density.

The percentage of voids by volume will be 3-6%.

CITY OF PITTSBURGH
SPECIFICATIONS
FOR
BITUMINOUS WEARING COURSE ID2-A

1. GENERAL REQUIREMENTS

Manufacture and Paving shall be in accordance with "City of Pittsburgh Specifications for Manufacture and Paving with Pre-Mix Bituminous Materials" dated January 3, 1974, attached.

2. MATERIALS

A. Bituminous

The asphalt cement shall be AC 2000 meeting "City of Pittsburgh Specifications for Asphalt Cement" dated October, 1976, attached.

B. Aggregate

The mineral aggregate shall be one of the following combinations:

1 - 1A and 1B air-cooled blast furnace slag.
2 - Natural or River sand and 1B crushed gravel.
3 - Crushed 1A and 1B limestone.

All fine and coarse aggregate shall conform to "City of Pittsburgh Specifications for Fine and Coarse Aggregate for Bituminous Mixes" dated January 3, 1974, attached.

C. Composition of Mixture

Aggregate gradation and composition of mixtures total percent by weight passing square openings (Based on Laboratory Sieve Tests).

Passing Sieve	Required Composition of Mixture
1/2"	100
3/8"	80 - 100
#4	45 - 80
#8	30 - 60
#16	20 - 45
#30	10 - 35
#50	5 - 25
#100	4 - 14
#200	3 - 10
Bitumen	% by Weight
Stone or Crushed Slag	4.5 - 8.0
Slag	7.0 - 10.5

The Director of the City of Pittsburgh's Department of Supplies or his authorized representative will have the authority to specify the exact amount of asphalt cement within the above limitations.

Temperature of the completed mix shall be 260° to 325° F.

The general composition limits prescribed above are master ranges for tolerance to govern mixtures made from any raw materials meeting Specifications and they are maximum and minimum for all cases. A closer control appropriate to the materials is required in accordance with the mix as follows:

Passing #4 and Larger Sieves	± 7%
Passing #8 to #100 Sieves (Inclusive)	± 4%
Passing #200 Sieve	± 2%
Bitumen	± 0.4%

The Marshall Stability at 140° F. shall be minimum of 1200 pounds. The Marshall flow value shall be 6 to 16. The percentage of aggregate voids filled with bitumen shall be 70% - 90%. The field density shall be at least 95% of the corresponding daily plant Marshall density.

The percentage of voids by volume will be 2-6%.

CITY OF PITTSBURGH
SPECIFICATIONS
FOR
BITUMINOUS WEARING COURSE T50-C

1. GENERAL REQUIREMENTS

Manufacture and paving shall be in accordance with "City of Pittsburgh Specifications for Manufacture and Paving with Pre-Mix Bituminous Materials" dated January 3, 1974, attached.

2. MATERIALS

A. Bituminous

The asphalt cement shall be AC 2000 meeting "City of Pittsburgh Specifications for Asphalt Cement"dated Oct., 1976, attached.

B. Mineral Aggregates

The mineral aggregate shall be air-cooled blast furnace slag meeting the requirements of the attached "City of Pittsburgh Specifications for Fine and Coarse Aggregate".

C. Composition of Mixture

Aggregate gradation and composition of mixtures total percent by weight passing square openings (Based on Laboratory Sieve Tests).

Passing Sieve	Required Composition of Mixture
3/8"	100
#4	90 - 100
#8	70 - 90
#16	43 - 77
#30	25 - 58
#50	15 - 35
#100	8 - 20
#200	4 - 10
Bitumen	% By Weight
Slag	9.0 - 12.0

The Director of the City of Pittsburgh Department of Supplies, or his authorized representative, will have the authority to specify the exact amount of asphalt cement within the above limitations.

Temperature of the completed mix shall be 260° to 325°F.

The general composition limits prescribed above are master ranges for tolerance to govern mixtures made from any raw materials meeting specifications and they are maximum and minimum for all cases. A closer control appropriate to the materials is required in accordance with the mix as follows:

Passing #4 and Larger Sieves	± 7%
Passing #8 to #100 Sieves, inclusive	± 4%
Passing Sieve #200	± 2%
Bitumen	± 0.4%

The Marshall Stability at 140°F. shall be a minimum of 1200 pounds. The Marshall flow value shall be 6 to 18. The percentage of aggregate voids filled with bitumen shall be 70% to 90%. The field density shall be at least 95% of the corresponding daily plant Marshall density.

The percentage of voids by volume will be 2-6%.

CITY OF PITTSBURGH
SPECIFICATIONS
FOR
BITUMINOUS WEARING COURSE FJ-1A

1. GENERAL REQUIREMENTS

Manufacture and paving shall be in accordance with "City of Pittsburgh Specifications for Manufacture and Paving with Pre-Mix Bituminous Materials", dated January 3, 1974, attached.

2. MATERIALS

A. Bituminous

The asphalt cement shall be AC 2000 meeting "City of Pittsburgh Specifications for Asphalt Cement", dated Oct., 1976, attached.

B. Aggregate

The mineral aggregate shall be natural or river sand, crushed limestone, or crushed air-cooled blast furnace slag.

All fine and coarse aggregate shall conform to "City of Pittsburgh Specifications for Fine and Coarse Aggregate for Bituminous Mixes", dated January 3, 1974, attached.

C. Composition of Mixture

Aggregate gradation and composition of mixtures total percent by weight passing square openings (based on laboratory sieve tests).

Passing Sieve	Required Composition of Mixture
3/8"	100
#4	90 - 100
#8	60 - 100
#16	40 - 80
#30	20 - 60
#50	10 - 40
#100	7 - 25
#200	3 - 15
Bitumen	% by Weight
Slag	6.0 - 12.0

The Director of the City of Pittsburgh Department of Supplies, or his authorized representative, will have the authority to specify the exact amount

of asphalt cement within the above limitations.

Temperature of the completed mix shall be 260° to 325°F.

The general composition limits prescribed above are master ranges for tolerance to govern mixtures made from any raw materials meeting specifications and they are maximum and minimum for all cases. A closer control appropriate to the materials is required in accordance with the mix as follows:

Passing #4 and Larger Sieves	± 7%
Passing #8 to #100 Sieves (inclusive)	± 4%
Passing Sieve #200	± 2%
Bitumen	± 0.4%

The Marshall Stability at 140°F. shall be a minimum of 1,000 pounds. The Marshall flow value shall be 6 to 18. The percentage of aggregate voids filled with bitumen shall be 70% to 90%. The field density shall be at least 95% of the corresponding daily plant Marshall density.

CITY OF PITTSBURGH
SPECIFICATIONS
FOR
BITUMINOUS CONCRETE BASE COURSE - (BLACK BASE)

1. GENERAL REQUIREMENTS

Manufacture and paving shall be in accordance with "City of Pittsburgh Specifications for Manufacture and Paving with Pre-Mix Bituminous Materials", dated January 3, 1974, attached.

2. MATERIALS

A. Bituminous

The asphalt cement shall be AC 2000 meeting "City of Pittsburgh Specifications for Asphalt Cement" dated June, 1971, attached.

B. Aggregate

The fine aggregate shall be either natural or river sand, crushed limestone, or crushed air-cooled blast furnace slag.

The coarse aggregate shall be either crushed limestone, crushed gravel, or crushed air-cooled blast furnace slag.

All fine and coarse aggregate shall conform to "City of Pittsburgh Specifications for Fine and Coarse Aggregrate for Bituminous Mixes", dated January 3, 1974, attached with the exception that 50% of the gravel will have at least one fractured face and loss by washing shall not apply.

C. Composition of Mixture

Aggregate gradation and composition of mixtures total percent by weight passing square openings (based on laboratory sieve tests).

Passing Sieve	Required Composition of Mixture
2"	100
1-1/2"	95 - 100
3/4"	52 - 100
3/8"	36 - 70
#8	16 - 38
#30	8 - 24
#50	6 - 18
#100	4 - 10
Bitumen	% By Weight
Stone or Gravel	3.0 - 6.0
Slag	4.5 - 8.5

The Director of the City of Pittsburgh Department of Supplies, or his authorized representative, will have the authority to specify the exact amount of asphalt cement within the above limitations.

Temperature of the completed mix shall be 260° to 325°F.

The general composition limits prescribed above are master ranges for tolerance to govern mixtures made from any raw materials meeting specifications and they are maximum and minimum for all cases.

3. JOB MIX FORMULA REQUIREMENTS

The bituminous concrete mixture shall meet the following requirements:

A. Stability

The stability at 140°F. shall be as follows:

When the maximum aggregate size does not exceed 1-1/2 inches and the standard 4-inch test specimen is used, the stability shall be not less than 700 pounds. When the maximum aggregate size exceeds 1-1/2 inches and the standard 6-inch test specimen is used, the stability shall be not less than 1500 pounds.

B. Flow Value

The flow value shall be not less than 6, nor more than 16 for the standard 4-inch test specimen.. For the 6-inch test specimen, the flow value shall be not less than 9 nor more than 24.

C. Uniformity

The field density of the mixture shall be not less than 90% of the approved design density.

After the job mix formula is established, all mixtures furnished for the project shall conform thereto; however, should a change in sources of materials be made, a new job mix formula shall be established before the new material is used. When unsatisfactory results or other conditions make it necessary, the engineer may establish a new job mix formula.

The Marshall stability and flow values specified herein shall be used to establish the job mix formula, but need not be used for daily plant control of the mixture.

The Contractor shall furnish the mixed material according to the plant formula, not only within the master ranges given, but as a further requirement he shall meet the specified bituminous content within the tolerance of + 0.5 of one percentage point, based on the daily plant tests for bituminous content. Samples of the completed mixture shall be analyzed at least once daily, or more frequently when necessary and shall not deviate from the master range of the preceding chart.

CITY OF PITTSBURGH
SPECIFICATIONS
FOR
BITUMINOUS COLD PATCH CP-1

1. GENERAL REQUIREMENTS

This material shall consist of a plant-mixed bituminous patching mixture suitable for stockpiling for use in all seasons. It shall be composed of a mineral aggregate coated with a medium curing liquid type bituminous material.

Manufacture shall be in accordance with "City of Pittsburgh Specifications for Manufacture and Paving with Pre-Mix Bituminous Materials", dated January 3, 1974, attached. Any portion of the aforementioned Specification that applies only to hot-mixed material such as weather limitation and mixing temperature will not apply.

2. MATERIALS

A. Bituminous

The asphalt cement shall be AASHO Grade-MC-800 meeting "City of Pittsburgh Specifications for MC-800", dated June, 1971, attached.

B. Aggregate

The mineral aggregate shall be natural or river sand and 1B crushed gravel or crushed limestone.

All fine and coarse aggregate shall conform to "City of Pittsburgh Specifications for Fine and Coarse Aggregate for Bituminous Mixes", dated January 3, 1974, attached.

C. Composition of Mixture

Aggregate gradation and composition of mixture total percent by weight passing square openings (based on laboratory sieve tests).

Passing Sieve	Required Composition of Mixture
1/2"	100
3/8"	75 - 100
#4	10 - 30
#8	2 - 10
Bitumen	% by Weight
Stone or Crushed Gravel	6.0 - 8.0

The Director of the City of Pittsburgh, Department of Supplies, or his authorized representative, will have the authority to specify the exact amount of cut back asphalt cement and vary the proportions of aggregate within the above limitations.

The temperature of the cut back prior to mixing will be as follows:

Minimum	Maximum
140°F.	225°F.

The mineral aggregates shall be clean and dry prior to mixing, and the temperature at the time of mixing shall not exceed 150°F.

The mixture shall be such that it may be stocked, handled, placed, and finished without stripping of the asphalt material from the aggregate.

3. TESTING AND SAMPLING

Prior to the initial purchase of this material, it shall be sampled and tested by an assigned representative of the City of Pittsburgh, Bureau of Tests.

The approved stockpiles shall be subject to re-sampling and testing as a control measure at any time during delivery if the material fails to have satisfactory workability and setting qualities.

CITY OF PITTSBURGH
SPECIFICATIONS
FOR
GRADED-TAR CONCRETE STOCKPILE MIX
FOR
PATCHING AND SURFACING CP-8

1. MATERIALS

A. Coal Tar Cut-Back

City of Pittsburgh Specification AASHO - RT4 TAR, dated November, 1971, AASHO - RT6 TAR, dated November, 1971, or AASHO - RTCB6 TAR, dated February, 1974, as specified by designated representative of the Department of Supplies Bureau of Tests.

B. Mineral Aggregates

The mineral aggregate shall be 1B-crushed gravel and Type A river sand for bituminous mixes or crushed limestone. All fine and coarse aggregate shall conform to "City of Pittsburgh Specifications for Fine and Coarse Aggregate for Bituminous Mixes", dated January 3, 1974.

2. GENERAL COMPOSITION OF MIXTURE

Total percent by weight passing square openings, based on laboratory sieves:

Square Opening Sieves	Percent by Weight
Pass 1/2"	100
3/8"	90 - 100
#4	55 - 80
#8	35 - 62
#50	8 - 24
#200	0 - 3

The proportion of tar to total mixture by weight will be:

	Stone and Gravel
Tar percent by weight	6.0 - 8.0

The Director of the City of Pittsburgh Department of Supplies or his authorized representative will have the authority to specify the exact amount of tar within the above limitations.

The general composition limits prescribed above are master ranges for tolerances to govern mixtures made from any raw materials meeting specifications and they are maximum and minimum for all cases. A closer control appropriate to the materials is required in accordance with the mix as follows:

Job Mix Tolerances	Plus or Minus
Aggregate passing #4 sieve and larger	5%
Aggregate passing #8 sieve and larger	4%
Aggregate passing #200 sieve	0.5%
Tar	0.5%

3. MIXING TEMPERATURE

The temperature of the tar entering the mixer shall be maintained at between 140° - 180°F.

The temperature of the aggregate shall be maintained at between 100° - 200°F. At no time shall the aggregate be heated above 200°F. When this occurs the aggregate must be cooled to 200°F. or below before mixing.

The temperature of the mixture as it is dropped from the pugmill must be between 100° - 190°F.

4. STOCKPILING

For best results the mixture will be stockpiled for a minimum of two weeks before use.

CITY OF PITTSBURGH
SPECIFICATIONS
FOR
ASPHALT CEMENT
AC-2000

October - 1976

The maximum delivery temperature shall not exceed 350° F. When the temperature of the material falls below the temperature which yields a viscosity between 150 and 250 centistokes, it shall be heated to yield the proper viscosity. The Asphalt Cement shall be homogenous and shall not foam when heated. It shall conform to the following requirements:

AC-2000

Absolute Viscosity at 140° F. (60° C.) poises
(Refinery and project) 2000 ± 400 poises

	Minimum	Maximum
Water, percent by weight	-	0
Flash point (open cup) degrees fahr.	450	-
Penetration at 77° F. 100 gms. 5 sec.	60	90
Ductility at 77° F. cm	100	-
Solubility in trichloroethylene	99.0%	-
Spot Test	Negative	
Thin film oven test at 325° F. 5 hrs.		
Loss, percent by weight	-	1.5
Retained penetration, percent of original	50	73
Ductility of Residue @60° F. 5 cm per min., cm	10	-
Ductility of Residue @77° F. 5 cm per min., cm	20	-
Absolute Viscosity ratio (TFO/original)	1.5	4.5

CITY OF PITTSBURGH
SPECIFICATIONS
FOR
CUT-BACK ASPHALT
(MEDIUM CURING TYPE)
AASHO MC-800.

These Specifications cover liquid petroleum products produced by fluxing an asphalt cement with suitable distillates to be used in bituminous pre-mixed stockpile patching material.

The material is to be heated, if required for proper application to the road, between 175°F. and 220°F., depending on the viscosity of the material.

When used in mixing operations the material shall be heated between 165°F. and 205°F., depending on the viscosity of the material.

The cut-back asphalt shall show no separation or curdling prior to use.

The cut-back asphalt shall conform to the following requirements:

	Minimum	Maximum
Water, percent by weight.....	-	0
Flash point (Tag open cup) degrees F.	150	-
Viscosity, Kinematic at 140°F., (60°C.) Centistokes.....	800	1200
Distillation: Distillate, percentage by volume of total distillate to 680°F. (360°C.)		
0 to 437°F. (225°C.)	-	-
0 to 500°F. (260°C.)	-	35
0 to 600°F. (316°C.)	45	80
Residue from distillation to 680°F. (360°C.), percentage volume by difference.....	75	-
Tests on Residue from Distillation:		
Penetration at 77°F., (25°C.), 100 g, 5 sec....	120	250
Viscosity, Absolute at 140°F., (60°C.), poises...	K ± 20 percent	
Viscosity, Kinematic at 275°F., (135°C), centistokes.....	K ± 20 percent	
Ductility at 60°F.,(15.5°C.),5 cm per min, cm....	100	-
Solubility in trichloroethylene, % by weight..	99.5	-
Spot test, standard naphtha solvent.....	Negative	

Class MC-800 shall be Treated Bituminous Material meeting requirements of the supplement to current Pennsylvania Department of Highways Bulletin 25.

For stockpile mixes these requirements serve as a guide only. When used in stockpile mixes, the job aggregates shall be substituted for the reference aggregates.

For constants "K" procedure - see Page 4, Bulletin 25.

CITY OF PITTSBURGH
SPECIFICATIONS
FOR
(ASSHO GRADE RS-1)

This Specification covers emulsified asphalt of the rapid breaking grade for use by City forces as a tack coat.

The material shall be heated, if required for proper distributor application, between 70°F. and 150°F. When the material is obtained from the drums the minimum application temperature of the material shall be 40°F.

The emulsified asphalt shall be homogenious, shall be miscible with water in all proportions and shall show no separation of asphalt within thirty (30) days after delivery, provided separation has not been caused by freezing.

Emulsified asphalts held in storage tanks or drums for periods longer than thirty (30) days shall be inspected visually to determine if separation occurred during storage. If no separation is noted, the emulsified asphalt shall be agitated, sampled and re-tested to determine its compliance with Specification requirements.

The specific gravity of the emulsified asphalt shall be reported for each shipment and shall also meet the following requirements:

	Minimum	Maximum
Viscosity, Saybolt Fural at 77°F., (25°C.), sec.....	20	100
Settlement test, 7 days, numerical difference between top and bottom residues.....	-	3
Demulsibility, 35 ml of 0.02N $CaCl_2$, percent by weight..	60	-
Sieve test, retained on No. 20 sieve, percent by weight..	-	0.1
Distillation:		
Asphalt, percent by weight.....	55	-
Water, percent by weight.....	-	45
Tests on residue from distillation:		
Penetration at 77°F., (25°C.), 100 g, 5 sec.....	100	200
Ductility at 60°F., (15.5°C.), 5 cm per min, cm.....	40	-
Solubility in trichloroethylene, % by weight.....	97	-
Ash, % by weight.....	-	2.0

For cold weather use up to 5 percent maximum of oil distillate, percent by volume of total emulsion may be added, if necessary, to provide better workability.

CITY OF PITTSBURGH
SPECIFICATIONS
FOR
AASHO-RT-4 TAR

DESCRIPTION

This Specification covers a Coal Tar for use in pre-mix stockpile patching material. The tar shall be that known as AASHO RT-4 and shall be produced from high temperature coke oven tar distilled to grade or fluxed back with distillates and/or light petroleum tars and shall conform to the following requirements:

	RT-4
Spec. Visc. Engler, 50 cc/40°C.	22-35
Spec. Gravity @ 25° C.	1.12+
Total Bitumen, Sol. CS_2	85+
Water, % by weight	2-
Distillation, % by weight:	
0-170°C.	0-5
0-270°C.	--30
0-300°C.	--40
Softening point of residue distilled at 300° F. Ring and Ball Method	35-55° C

CITY OF PITTSBURGH
SPECIFICATIONS
FOR
AASHO RT-6 TAR

DESCRIPTION

This Specification covers a Coal Tar for use in pre-mix stockpile patching material. The tar shall be that known as AASHO RT-6 and shall be produced from high temperature coke oven tar distilled to grade or fluxed back with distillates and/or light petroleum tars and shall conform to the following requirements:

	RT-6
Spec. Visc. Engler, 50 cc/50° C.	26-40
Spec. Gravity @ 25° C.	1.14+
Total Bitumen, Sol. CS_2	80
Water, % by weight	1.5-
Distillation, % by weight:	
0-170° C.	0-5
0-270° C.	25
0-300° C.	35
Soft. Point (R&D) Dist. Res. at 300° C.	35-55

CITY OF PITTSBURGH
SPECIFICATIONS
FOR
COAL TAR CEMENT
AASHO - RTCB-6-C

These Specifications cover coal tar cement cut-back for use in the manufacture of City of Pittsburgh plant-mixed cold patch - CP-8.

To be heated, as required, for proper thinning, but not in excess of 120°F.

The flux shall be a suitable mixture of hydrocarbons derived from either coal tar or water gas tar and free from petroleum products. The base shall contain only products derived from the high temperature carbonization of coal. The material shall be prepared by combining a flux with a base.

The flux, base and mixture shall comply with the following requirements:

	Flux		Base		Mixture	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Water, percent by weight	-	2.0	-	-	-	1.0
Specific gravity at 25° C.	0.80	-	1.18	1.26	1.14	1.20
Specific viscosity, Engler 50 cc. at 50° C.	-	-	-	-	26	40
Float test at 50° C., sec	-	-	90	140	-	-
Bitumen, soluble in carbon disulphide, percent by weight	99	-	80	95	80	95
Distillation: dry basis, percent by weight:						
0-130°C.	-	25	-	-	-	-
0-170°C.	30	85	-	1	1	8
0-200°C.	70	-	-	-	-	-
0-235°C.	-	-	-	-	8	20
0-300°C.	-	-	-	20	-	36
Specific gravity at 38/38°C. of total distillate (water free) to 300°C. ...	-	-	1.02	-	0.94	-
Softening point of distillation residue, °C. (ring and ball method).....	-	-	40	60	40	60
Sulfonation index (on 300°C. to 355°C. distillate)	-	-	-	-	-	1.5

GLOSSARY OF TEST METHODS

1. Aggregate gradation testing will begin in accordance with ASTM Method C-136-71.
2. Extraction of bitumen from Hot Mix, Hot Laid bituminous mixtures will be in accordance with ASTM Method 2-172-75.
3. Soundness of Aggregates - Sodium Sulfate Test - according to AASHO Designation T-104.
4. Resistance to abrasion of small size course aggregate by use of Los Angelos Machine in accordance with ASTM C-131.
5. Loss by Washing - According to ASTM Designation C-111.
6. Unit Weight of Aggregate - will be in accordance with ASTM Designation C-29.
7. Soft Fragments % by weight - ASTM Designation C-235.
8. Shale % by Weight - Sight Method.
9. Clay Lumps % by Weight - ASTM Designation C-142.
10. Coal or Coke % by Weight - ASTM Designation C-123.
11. Flux Stone % by Weight - Sight Method.
12. Glassy Particles % by Weight - Sight Method.
13. Iron % by Weight - by use of magnet.
14. Penetration of Bituminous Materials - ASTM D-5.
15. Water % by Weight - ASTM Designation D-95.
16. Flash Point (Open Cup) - ASTM Designation D-92.
17. Ductility of Asphalt Cement - ASTM Designation D-113.
18. Solubility of Asphalt Cement in Trichlorethylene - ASTM D-2042.
19. Thin Film Oven Test - ASTM Designation D-1754.
20. Kinematic Viscosity - ASTM Designation D-2170.
21. Distillation of Cut Back Asphaltic (Bituminous) Products, Test for ASTM Designation D-402.
22. Absolute Viscosity of Asphalts - ASTM Designation D-2171.
23. Viscosity of Saybolt Furol - ASTM Designation D-88.
24. Settlement Test - ASTM Designation D-244.
25. Sieve Test - ASTM Designation D-244.
26. Water % by Weight (Bituminous Water Emulsion) Test for ASTM Designation D-244.

27. Asphalt % by Weight (Bituminous Water Emulsion) Distillation Test for ASTM Designation D-244.

28. Ash % by Weight in bituminous water emulsions - ASTM Designation D-128 - Section 5.

29. Demulsibility of Emulsified Asphalt - Section 25 - 28 ASTM Designation D-244.

30. Specific Viscosity of Coal Tar (Engler) ASTM Designation D-1665.

31. Specific Gravity of Coal Tar - ASTM Method D-70.

32. Total Bitumen Soluble in CS_2 - ASTM Designation D-4.

33. Distillation % by Weight (Coal Tar) - ASTM Designation D-20.

34. Test for Softening Point of Distilled Residue - Ring and Ball Method ASTM Designation D-36.

35. Sulfonation Index (Coal Tar Distillate) - ASTM Designation D-872.

36. Theoretical Maximum Specific Gravity of Bituminous Paving Mixtures - ASTM Designation D-2041.

37. Resistance to plastic flow of Bituminous Mixtures using Marshall apparatus ASTM Designation - 1559.

38. Percent air voids in compacted Dense and Open Bituminous Paving Mixtures - ASTM Designation D-3203 with exception that volumeter will be used to determine bulk specific gravity.

39. Requirements for Mixing Plants for hot mixed, hot laid, Bituminous Paving Mixtures - ASTM Designation D-995.

40. Test for Contact Compatibility between Asphaltic Materials (Oleiensis Test) (Spot Test) - ASTM Designation D-1370.

SPECIFICATIONS
FOR
PAINTING OF BRIDGES AND VARIOUS STEEL STRUCTURES

[Revised - November, 1970]

I N D E X

CITY OF PITTSBURGH
SPECIFICATIONS
FOR
PAINTING OF BRIDGES AND VARIOUS STEEL STRUCTURES

(Revised - November, 1970)

1. GENERAL CONDITIONS

A. No paint shall be applied until all surfaces are cleaned of dirt, rust, scale, and other detrimental material as outlined in City of Pittsburgh Specifications. This cleaning shall be done to the satisfaction and approval of the engineer or his appointed inspector or representative.

B. It shall be the responsibility of the contractor to properly man and provide signs, traffic markers, cones, and other equipment to move and protect all traffic on or below the bridge or structure as may be required. He shall also properly protect private property, cars and public by providing adequate covers and supervision.

2. INSPECTION OF PAINT AND PAINT MATERIALS

A. All paint and paint materials shall be approved by the Bureau of Tests, City of Pittsburgh, prior to use.

B. A letter or affidavit of actual analysis shall be supplied when requested by the Director or his representative.

C. Normal testing time will be five days from the date the sample is received in the laboratory. NOTE: Paint manufacturers are therefore urged to notify their customers of this sampling and testing time so that orders may be placed far enough in advance of anticipated use to avoid delays in production schedules.

D. Samples for test may be taken daily either from painting pots or shipments at the discretion of the Director or his representative.

E. All paint shall be brush applied unless otherwise directed or indicated by the Director or his representative.

CITY OF PITTSBURGH SPECIFICATIONS FOR FIELD, SHOP, AND MAINTENANCE PAINTING:

A. STORAGE OF PAINT

1. All containers of paint shall be clearly marked or labeled to show paint identification, date of manufacture, batch number, and any special instructions, all legible at the time of use.

2. All paint and thinner shall be stored in an area that is well ventilated and protected from sparks, flame, direct rays of the sun or from excessive heat. Paint susceptible to damage by low temperature shall be kept in a heated storage area.

3, All containers of paint shall remain unopened until required for use. Any paint which has livered, jelled, or otherwise deteriorated in storage shall not be used. The oldest paint of each kind shall be used first.

B. MIXING AND THINNING

1. Paints shall not be mixed or kept in suspension by an air stream bubbling under the surface.

2. The paint shall be mixed in a manner which will insure breaking-up of all lumps, complete dispersion of settled pigment and a uniform composition. If mixing is done by hand, most of the vehicle shall be poured off into a clean container. The pigment in the paint shall be lifted from the bottom of the container with a broad flat paddle. Lumps shall be broken up and the pigment thoroughly mixed with the vehicle. The poured off vehicle shall be returned to the paint with simultaneous stirring, or pouring repeatedly from one container to another until the composition is uniform. The bottom of the container shall be examined for unmixed pigment.

3. Where a skin has formed in the container the skin shall be cut loose from the sides of the container, removed and discarded. If such skins are thick enough to have a practical effect on the quality and composition of the paint, the paint shall not be used.

4. All pigmented paint shall be strained after mixing. Strainers shall be of a type to remove only skins and undesirable matter, but not to remove pigment.

5. Mixing shall be done by mechanical methods for all paint in containers over five gallons in size.

6. Tinting pastes or colors added to paints shall be wetted with a small amount of thinner, vehicle, or paint and thoroughly mixed. The thinned mixture shall be strained and then added to the large container of paint and mixed until the color is uniform.

7. No thinner shall be added to the paint to be applied by brush. Paints to be sprayed, if not specifically formulated for spraying, may require thinning when proper adjustment of the spray equipment and air pressure does not result in proper paint application. In no case shall more than one pint of thinner be added per gallon unless the paint is intentionally formulated for greater thinning. This shall also apply when painting in cool weather. Paints shall not remain in spray pots, painter buckets, etc., overnight, but shall be gathered into a container and remixed before use.

C. GENERAL PROVISIONS

1. The surface shall be cleaned as outlined in "Surface Preparation Specifications SP-1, SP-2, or SP-3. In the event no cleaning method has been specified, it shall be understood that dirt, rust scale, loose rust, loose mill scale, welding flux oil, grease, and other detrimental foreign matter which may impair the adhesion of the coating to be applied shall be removed. Cleaning and painting shall be so programmed that detrimental amounts of dust or other contaminates do not fall on wet, newly painted surfaces. Surfaces not intended to be painted shall be suitably protected from the effects of cleaning and painting operations.

2. Temperatures - Paint shall not be applied when the temperature of the steel is below 40°F. Paint shall not be applied when the surface temperature of the steel is expected to drop to 32°F. before the paint has dried. Paint shall not be applied to surfaces that are hot enough to cause blistering, porosity, or otherwise be detrimental to the life of the paint.

3. Moisture - Paint shall not be applied in rain, snow, or mist, or when the steel surface is below the dew point resulting in condensation of moisture. Any paint exposed to freezing, excess humidity, rain, snow, or condensation, shall be permitted to dry. Damaged areas shall be removed and repainted.

4. Thickness - Unless otherwise specified by supplemental specifications, the prime coat and the first field coat (if specified) shall be at least 1.5 to 2.0 mils thick when dry. Each intermediate and finish coat of paint shall be at least 1.0 to 1.5 mils thick when dry. No portion of the paint films shall be less than those specified film thicknesses. Vinyls, lacquers, emulsions, and bituminous coatings are not included in these thicknesses. They shall be applied at the specified thickness for the individual material.

5- Tinting - When successive coats of paint of the same color have been specified, alternate coats of paint shall be tinted sufficiently to produce enough contrast to indicate complete coverage of the surface. When the paint is the color of the steel, or when the tinting of the final coat is objectionable, the first coat to be applied shall be tinted. The tinting material shall be compatible with the paint and not detrimental to its service life.

D. BRUSH APPLICATION

1. Brushes shall be of good quality and style that will enable proper application of paint. Round or oval brushes shall be used for rivets, bolts, irregular surfaces and rough or pitted steel. Wide, flat brushes shall be used for large, flat areas, but they shall not be over five-inches wide.

2. Paint shall be worked into all crevices and corners. Any runs or sags shall be brushed out. There shall be a minimum of brush marks left in the paint and surfaces not accessible to brushes shall be painted by spray, or by daubers or by sheepskins.

E. SPRAY APPLICATION

1. The equipment shall be suitable for the intended purpose and shall be equipped with suitable pressure regulators and gauges.

2. Paint ingredients shall be kept properly mixed in the spray pots either by continuous mechanical agitation or by intermittent agitation as frequent as necessary.

3. The air caps, nozzles and needles shall be those recommended by the manufacturer of the material being sprayed and the equipment being used.

4. Spray equipment shall be kept sufficiently clean so that dirt, dried paint, and other foreign material are not deposited in the paint film.

5. Paint shall be applied in uniform layers with overlapping at the edge of the spray pattern. The spray pattern shall be adjusted so that the paint is deposited uniformly. During application the gun shall be held perpendicular to the surface and at a distance which will insure that a wet film is uniformly deposited. The trigger of the gun shall be released at the end of each stroke.

6. All runs and sags shall be brushed out immediately or the paint shall be removed and the surface repainted.

7. Blind sides of all rivets, bolts, and all other areas inaccesible to the spray gun shall be painted by brush. If not accessible by brush, daubers or sheepskins shall be used. Brushes shall be used to work paint into cracks, crevices and blind spots which are not adequately painted by spray.

8. In air spray application, traps or separators shall be provided to remove oil and condensed water from the air. These traps or separators must be of adequate size and must be drained periodically during operation. The spray impinging against the surface shall show no condensed water or oil.

SHOP PAINTING

A. The number of coats and the type of paint shall be specified by the Director. Unless otherwise specified, all fabricated steel shall be coated with at least one coat of primer in the shop where fabrication is done. In the event no partifular shop coat is specified, one coat of BT-1 Red Lead, Iron Oxide and Linseed Oil Primer shall be applied. Steel to be shop coated shall be cleaned in accordance with Section SP-3 of these specifications.

If the shop coat is damaged in fabrication it shall be repaired before leaving the shop.

B. Shop welds and areas within two-inches of such welds shall be cleaned in the shop before painting. All detrimental welding flux deposits shall be removed by either blast cleaning or thorough power wire brush cleaning.

C. Machine finished or similar surfaces that should not be painted, but do require protection shall be protected with a coating of rust inhibitive petrolatum.

D. Erection Marks and weight marks shall be copied on areas that have been previously painted with the shop coat, unless markers or tags are attached.

CONTACT SURFACES

Unless otherwise specified the following practices shall be followed regarding painting of contact surfaces:

a. The areas of steel to be in direct bonded contact with concrete, paving or footing or encased or imbedded in concrete or coated with concrete shall not be painted.

b. Contact surfaces of members to be joined by high strength bolts in friction-type joints shall be left unpainted unless specifically authorized to the contrary.

c. Steel to be completely enclosed in brick or other masonry shall be given at least one coat of shop paint.

d. Steel not in direct bonded contact but inaccessible after assembly shall receive either the full specified paint system or three coats of the specified primer before assembly.

SURFACE PREPARATION SPECIFICATIONS:

SP-1 - HAND TOOL CLEANING

1. Definition - This specification covers procedure for the hand tool cleaning of structural steel surfaces prior to painting or coating. This is a method of preparing metal surfaces for painting by removing loose mill scale, loose rust, and loose paint by hand brushing, hand sanding, hand scraping, hand chipping, or hand impact tools, or by a combination of these methods.

It is not intended that all mill scale, rust and paint be removed by this process, but loose mill scale, loose rust, loos paint, and other detrimental foreign matter present shall be removed.

2. Procedure-Hand tool cleaning shall consist of the following sequence of operations:

2.1 Oil, grease, soluble wetting flux residues and salts shall first be removed by soluble solvents.

2.2 Stratified rust (rust scale) shall be removed by hand hammering, hand chipping, other impact tools, or a combination of them. Power impact tool or blast cleaning may, at the contractor's option, be used for this operation.

2.3 All loose mill scale, and all loose or non-adherent rust as classified in 2.4 shall be removed by hand wire brushing, hand sanding, hand scraping, or a combination of these methods.

2.4 Rust and mill scale are classified as loose mill scale and loose non-adherent rust if they can be removed from a steel surface by vigorous hand brushing with a new, commercially acceptable wire brush, of suitable type, at a rate of two (2) square feet per minute. This test shall be conducted on an area not previously brushed, scraped, or sanded, but from which all detrimental stratified rust (rust scale) oil and grease have been removed. This test establishes a standard for surface preparation and shall not be considered as establishing the production rate of cleaning.

2.5 All loose or non-adherent paint shall be removed. Thick edges of remaining old paint shall be feathered so that the repainted surface can have a smooth appearance. The remaining old paint shall have sufficient adhesion so that it cannot be lifted as a layer by inserting the blade of a dull putty knife under it.

2.6 All accessible weld flux and spatter shall be removed by hand scraping or by hand impact tools followed by wire brushing. Any remaining detrimental weld flux deposits shall be removed by blast cleaning or thorough power tool cleaning.

2.7 The accessible portions of all partially enclosed steel members shall be cleaned. New work areas which will be inaccessible after assembly, shall be cleaned before assembly.

2.8 All rivets, welds, corners, joints, and openings shall be properly cleaned. The steel wire of the wire brushes shall have sufficient rigidity to clean the surface, shall be kept free of excess foreign matter and shall be discarded when they are no longer effective. Hand scrapers shall be made of suitable material and shall be kept sharp enough to be effective. The tools shall be operated in such a manner that no burrs or sharp ridges are left on the surface and no sharp cuts made into the steel.

2.9 After hand cleaning is completed, dust and other loose matter shall be removed from the surface. If detrimental amounts of grease or oil are still present, these areas shall be spot-cleaned with solvent.

3. It shall be the responsibility of the contractor to assume all safety precautions related to his work.

SP-2 - POWER TOOL CLEANING

1. Definition - Power Tool Cleaning is a method of preparing metal surfaces for painting by removing loose mill scale, loose rust, and loose paint with power wire brushes, power impact tools, power grinder, power sanders, or by a combination of these methods.

1.1 It is not intended that all mill scale, rust and paint be removed by this process; but loose mill scale, loose rust, loose paint and other detrimental foreign matter shall be removed.

2. Procedure - Power tool cleaning shall consist of the following sequence of operations:

2.1 Oil, grease, welding flux residues and salts shall be removed by suitable solvents.

2.2 Stratified rust (rust scale) shall be removed by power impact tools. If minor quantities of stratified rust are present, they may be removed as outlined in (SP-1) Hand Tool Cleaning.

2.3 All loose mill scale and all loose or non-adherent rust and all loose paint, as defined in this specification shall be removed by one or more of the following methods:

a. Power wire brushing using rotary radial or cup brushes of suitable size entering all accessible openings, angles, joints, and corners. The steel wire of such brushes shall have sufficient rigidity to clean the surface. Brushes shall be kept free of excessive, foreign matter and shall be discarded when no longer effective. The surface shall be clean but not burnished to a detrimental degree.

b. Power impact tool cleaning using power driven needle guns, chipping or scaling hammers, rotary scalers, single or multiple piston scalers, or other similar impact cleaning tools. Cutting edges of such tools shall be kept in effective condition.

c. Power grinding using abrasive wheels or power sanding using abrasive materials. Sanding material or abrasive wheel shall be discarded when they become ineffective.

2.4 Mill scale, rust and paint are classified as loose mill scale, loose and non-adherent rust and loose or removable paint if they can be removed from a steel surface by power wire brushing using a commercial air or electric wire brushing machine operated at a speed under load of 3450 RPM and equipped with a 6-inch diameter cup brush of double row knotted construction, made of No. 20 gauge music wire (Osborn Manufacturing Company, Cleveland, Ohio, Brush No. 4503 or equal). The brush shall be held against the steel surface with a force of approximately

minute. This test must be on an area not previously brushed, scraped, or sanded, but from which all detrimental stratified rust (rust scale) oil and grease, if present, have been removed. This test establishes a standard for surface preparation and shall not be considered as establishing the production rate of cleaning.

2.5 All loose paint shall be removed. Thick edges of remaining old paint shall be feathered so that the repainted surface can have a smooth appearance. The remaining old paint shall have sufficient adhesion so that it cannot be lifted as a layer by inserting the blade of a dull putty knife under it.

2.6 All accessible weld flux and spatter shall be removed by blast cleaning or thorough power tool cleaning.

2.7 The accessible portions of all partially enclosed steel members shall be cleaned. New work areas, which will be inaccessible after assembly, shall be cleaned before assembly.

2.8 Rivet heads, cracks, crevices, lap joints, fillet welds and reentrant angles shall be cleaned out by use of power wire brushes, needle guns, sharp chisels used in chipping, scaling hammers, rotary grinders or sanders, or by a combination of such tools.

2.9 All tools shall be operated in such a manner that no burrs or sharp ridges are left on the surface and no sharp cuts made into the steel.

2.10 Areas inaccessible for cleaning by power tools but accessible for hand cleaning shall be cleaned by the method outlined in SP-1 Hand Tool Cleaning.

2.11 After cleaning operations are completed dust and other loose matter shall be removed from the surface. If detrimental amounts of grease or oil are still present, these areas shall be spot cleaned with solvent.

2.12 The prime coat shall be applied as soon as possible after cleaning and before further deterioration of the surface occurs.

3. It shall be the responsibility of the contractor to assume all safety precautions related to his work.

SP-3 COMMERCIAL BLAST CLEANING

1. Definition - Commercial Blast Cleaning is a method of preparing metal surfaces for painting or coating by removing mill scale, rust, rust scale, paint or other foreign matter by the use of abrasives propelled through nozzles or by centrifugal wheels to a degree of which all oil, grease, dirt, rust scale and foreign matter have been completely removed except for slight shadows, streaks or discolorations caused by rust stain, mill scale oxides or slight, tight residues of paint or coating that may remain. If the surface is pitted, slight residues of rust or paint may be found in the bottom of pits. At least two-thirds (2/3) of each square inch of surface area shall be free of all visible residues and the remainder shall be limited to light discoloration, slight staining or light residues mentioned above.

2. Procedure - Commercial Blast Cleaning shall consist of the following sequence of operations:

2.1 Oil, grease and soluble welding flux deposits shall first be removed with suitable solvents. Small quantities of oil or grease may be removed by the blast cleaning operation. If oil and grease are removed by blast cleaning, the abrasive shall not be re-used.if such re-use is detrimental to the surface.

2.2 Excessive rust scale may be removed by impact tools, as outlined in SP-1 "Hand Tool Cleaning" or SP-2 "Power Tool Cleaning".

2.3 The surface of the metal shall be blast cleaned to a commercial finish by any of the following methods:

(a) Dry sandblasting using compressed air blast nozzles and dry sand of a maximum particle size no larger than passing through a 16-mesh screen, U.S. sieve series.

(b) Wet or Water-Vapor sandblasting using compressed air blast nozzles water and sand of a maximum particle size no larger than that passing through a 16-mesh screen, U.S. sieve series.

(c) Grit Blasting using compressed air blast nozzles and crushed grit made of cast iron, malleable iron, steel, or synthetic grits other than sand of a maximum particle size no larger than that passing through 16-mesh screen, U.S. sieve series.

(d) Shot Blasting using compressed air nozzles and cast iron, malleable iron, malleable iron steel, or synthetic shot of a maximum size no larger than that passing through a 16-mesh screen U.S. sieve series.

(e) Closed, recirculating nozzle blasting using compressed air, vacuum and any of the preceding abrasives.

(f) Grit blasting using centrifugal wheels and crushed grit made of cast iron, malleable iron, steel or synthetic grits of a maximum particle size no larger than that passing through a 16-mesh screen, U. S. sieve series.

(g) Shot blasting using centrifugal wheels and cast iron, malleable iron, steel or synthetic shot of a maximum particle size no larger than that passing through a 16-mesh screen U.S. sieve series.

2.4 The surface if dry blasted shall be brushed with clean brushes made of hair, bristle or fiber or blown off with compressed air (from which detrimental oil or water have been removed) or cleaned by vacuum, for the purpose of removing any traces of blast products from the surface and also for the removal of any traces of abrasive from pickets and corners.

2.5 The surface, if wet sandblasted, shall be cleaned by rinsing with fresh water to which sufficient corrosion inhibitor has been added to prevent rusting. This cleaning shall be supplemented by brushing, if necessary, to remove any residue.

2.6 The compressed air used for nozzle blasting shall be free of detrimental amounts of condensed water or oil. Adequate separators or traps shall be provided.

2.7 Dry blasting operations shall not be conducted on surfaces that will become wet after blast cleaning and before painting. Since moisture condenses on any surface that is colder than the dew point of the surrounding air, no blast cleaning shall be conducted when the steel surface is less than 5° F. above the dew point. If any rust forms after blast cleaning the surface shall be re-blast cleaned before painting.

2.8 The height of pattern produced on the surface shall be limited to a height that will not be detrimental to the life of the paint film. If the maximum particle size specified in Sections a, b, f, and g produces a surface too rough for the paint system to be used, the abrasive sizes shall be reduced.

3. When this specification is used in maintenance painting specific instructions should be given on the extent of the surface to be blast cleaned in accordance with this specification. It is not ordinarily intended that sound oil paint be removed unless it is excessively thick or inflexible.

4. The contractor shall assume all necessary safety precautions related to this work.

PAINT SYSTEMS FOR STRUCTURAL STEEL
OIL BASE PAINT SYSTEM

100 Minimum surface preparation - SP - 1 Hand tool cleaning or SP - 2 power tool cleaning.

First Coat- BT-1 - Red lead, iron oxide, and linseed oil
Second coat - BT-2 - Red lead, iron oxide, alkyd varnish, linseed oil paint
Third coat - BT-3 - Aluminum alkyd paint, Type I, leafing

Alternate finish coat (only if specified) BT-8 cement Grey Finish Coat, alkyd resin vehicle, Federal Std. No. 595, Color No. 16307.

Minimum dry film thickness applied:
1st coat - 1.7 mils min.
2nd coat - 1.3 mils min.
3rd coat - 1.0 mils min. (BT-3)

If the alternate finish of BT-8 cement grey is used, it shall be applied at a minimum wet film thickness of 3.2 mils.

BASIC LEAD SILICO CHROMATE OIL ALKYD SYSTEM

102 Minimum surface preparation SP-1 hand tool cleaning or SP-2 power tool cleaning.

First Coat - BT-5 - Dull Orange, primer, linseed oil, alkyd resin
Second Coat - BT-6 - Sandstone intermediate coat, linseed oil, alkyd resin
Third Coat - BT-7 - Light green, linseed oil, alkyd resin, Federal Std. No. 595, Color No. 24227.

Alternate finish coat (only if specified) BT-8 cement Grey - Alkyd resin vehicle, Federal Std. No. 595, Color No. 16307.

Minimum wet film thickness applied:

1st coat - 3.2 mils
2nd coat - 3.2 mils
3rd coat - 2.0 mils

Vinyl Paint systems:

Vinyl paint systems are recommended for floor systems of bridges exposed to de-icing salts or brine drippings for most chemical exposures and for very severe exposures.

BASIC LEAD SILICO CHROMATE - VINYL PAINT SYSTEM

103 a. Aluminum surface preparation - SP-3 commercial blast cleaning
b. Pre-treatment of blasted surfaces - Basic zinc chromate vinyl butyral wash coat, city specification BT-9
c. Dull orange primer to be applied within the same working day over the pretreatment.

1st coat - BT-10 Dull orange vinyl primer
2nd coat - BT-11 Buff vinyl intermediate coat
3rd coat - BT-12 Grey vinyl-alkyd finish coat

The total dried film thickness of the complete system shall be a minimum of 6.3 mils - 0.3-0.5 mils of pretreatment and 2.0 mils for each subsequent paint coat.

PAINT SYSTEMS FOR STRUCTURAL STEEL
BASIC LEAD SILICO CHROMATE OIL ALKYD SYSTEM

104 Minimum surface preparation - SP-1 hand tool cleaning of SP-2 power tool cleaning.

First coat - BT-5 - Dull orange primer, linseed oil, alkyd resin
Second coat - BT-6 - Sandstone intermediate coat, linseed oil, alkyd resin
Third coat - BT-14 - Dark red finish coat, linseed oil, alkyd resin, Federal Std. No. 595, Color No. 20061.

Alternate finish coat for railings and other areas as directed. BT-13 Tan Finish Coat, linseed oil, alkyd resin vehicle, Federal Std. No. 595, Color No. 30277.

Min. wet film thickness applied:

1st coat - 3.2 mils
2nd coat - 3.2 mils
3rd coat - BT-13 - 2.5 mils
BT-14 - 2.0 mils

BT-1 RED LEAD, IRON OXIDE AND LINSEED OIL PRIMER

This specification covers a slow drying red lead, iron oxide, linseed oil primer for structural steel. It has excellent rust inhibitive characteristics, wetting ability and weathering before finish coating.

This specification permits (but does not require) the use of extracted(fractionated) linseed oil as a replacement for raw linseed oil in order to achieve faster drying.

	Weight % Min.	Max.
Pigment	73 %	75 %
Red Lead (97% Pb_3O_4)	75.0%	-
Red Iron Oxide (85% Fe_2O_3)	20.0%	24.7%
Pigment Suspending Agent	-	0.3%

	Weight %	
Vehicle	25%	27%
Linseed Oil	95%	-
Volatile Thinner and Driers	-	5.0%

	Fed. Std. 141	Min.	Max.
Volatiles, %/wt.	4021	-	1.4%
Viscoisity KU	4281	77%	-
Weight/gallon	4184	22#	-

Ingredients for this specification shall meet the following requirements:

Red Lead - 97% Grade ASTM Specification D 83-41	
Red or Brown Iron Oxide (Natural) Type A Class II	ASTM D 84-51
Raw Linseed Oil	ASTM D-234-58T
Fractionated Linseed Oil	ASTM D-234-58T
Mineral Spirits (Deodorized)	ASTM D-235-61

The drying time of this paint under normal conditions shall be 72 hours for recoat. This may be decreased to 36 hours in good weather by choice of the extracted linseed oil. (Option.)

The component raw materials of this paint shall be mixed and dispersed by grinding as required to produce a product which is uniform, stable, free from grit, and entirely suitable for the purpose intended.

For spray application up to one pint of thinner (only mineral spirits or turpentine) may be added. The spray shall be applied to a dry film thickness of 1.7 to 2.3 mils.

BT-2 RED LEAD BASE - FIELD COAT, LINSEED OIL, ALKYD RESIN

When this paint is to be used as a field coat over BT-1 Red Lead Iron Oxide Linseed Oil Primer, small amounts of non-soluble tinting pigment may be used for contrast.

	Min.	Max.
Pigment	66.0%	-
Red Lead - 97% Grade	65.0%	-
Red Iron Oxide - 85% Fe_2O_3	15.0%	-
Magnesium Silicate	-	14.7%
Mica 325 mesh	4.0%	6.0%
Pigment Suspending Agent	0.3%	0.4%
Vehicle	-	34%
Raw Linseed Oil	28.0%	-
Alkyd Resin Solids	28.0%	-
Volatile Thinner and Drier	-	44.0%

Quantitive requirements of the paint:

	Min.	Max.
Pigment	66	-
Non Volatile Vehicle	56	-

Phthalic Anhydride per cent by:

	Min.	Max.
Weight of N.V. Vehicle	-	15
Weight/gallon	16.5	-
K.U.	73	86

Drying Time - hours

Set to Touch	6	-
Dry Through	36	-

Ingredients for this specification shall meet the following requirements:

Red Lead	ASTM D 83-41
Raw Linseed Oil	ASTM D 234-58T
Alkyd Resin	Fed. Spec. TT-R-266a

The acid number of the non-volatile vehicle shall not exceed seven.

BT-3 ALUMINUM ALKYD PAINT

This specification consists of two components. A leafing-type aluminum paste and a long oil alkyd varnish vehicle. It is to be used over rust inhibitive primers. The aluminum paste is mixed with the alkyd varnish prior to use. To obtain maximum leafing only enough paint shall be mixed for one day's use. The proportion of aluminum paste to varnish vehicle shall be maintained so that the final mixture will be in the ratio of two pounds of aluminum paste to one gallon of varnish vehicle.

Requirement of Varnish Vehicle:

	Min.	Max.
Volatiles - %/wt.	-	50%
Viscosity Garner Air Bubble	C	D
Weight/Gallon	7.6	8.1
Set to Touch	-	4 hrs.
Dry Hard	-	10 hrs.
Flash Point °F.	86	-
Rosin or Rosin Derivatives	-	0

The qualitative requirements of the alkyd varnish shall equal or exceed those required in Steel Structures Painting Council Paint Specification 101-64T.

Specifications for Ingredients: The aluminum paste shall conform to the requirements of Type II Class B ASTM D 962-49 with the exception that the total retained on a 325 mesh sieve shall be 4-6%.

The alkyd resin shall be Type I Class A Federal Specifications TT-R-266a, except that the acid number of the vehicle shall not exceed seven on the non volatile.

Mineral Spirits	ASTM D 235-61
Driers	Class B ASTM D 600-59T

For spray application up to one pint of thinner may be added per gallon of paint. Paint shall be sprayed to a minimum film thickness of 1.0 mils min.

BT-5 DULL ORANGE PRIMER, LINSEED OIL, ALKYD RESIN

This specification is intended for use over properly prepared structural steel surfaces to be permanently exposed. The paint shall be well ground and shall be easily broken up with a paddle to a smooth uniform product of good brushing consistency.

Pigment	Min.	Max.
Basic Lead Silico Chromate	62.0%	-
Pure Red Iron Oxide (97%) Fe_2O_3	94.0	-
Organo Montmorillonite	-	5.3%
	0.5	0.7

Note: For the greatest effectiveness the organo montmorillonite should be pre-wetted, 30% by weight with methyl alcohol (95% methanol - 5% water).

Vehicle - The vehicle shall consist of not less than 69% non-volatile vehicle by weight. The non-volatile vehicle shall consist of raw linseed oil and alkyd resin combined respectively in the approximate portions of 2 1/4:1 by weight and shall contain a minimum of 7% phythalic anhydride. The drier catalyst shall be 0.02% cobalt, 0.06% Zirconium, and 0.05% calcium metals based on the non-volatile by weight introduced therein as soluble organic metal salts. Small quantities of grinding and wetting aids may be used if desired.

The paint shall consist of:

	Min.	Max.
Pigment	64.0%	-
Vehicle	-	38.0%
Water	-	0.5%
Coarse Particles & Skins	-	-
(total retained on 325 sieve)	-	1.0%
Viscosity KU	74	85
Weight/gallon, lbs.	15.0	-

Ingredients for this specification shall meet the following requirements:

Basic Lead Silico Chromate	ASTM-D-1648 Type III
Linseed Oil	ASTM-D-234-58T
Alkyd Resin	TT-R-266a Type I Class A

This paint shall dry to light handling in not more than eighteen hours under normal dry conditions.

The color shall approximate that of National Lead Paint No. T-9822.

This paint is essentially the same formulation as Pennsylvania Department of Highways Specification - Dull Orange Primer, Color No. 1 or National Lead Specification P-7 Paint No. T-9822. Either of these two formulations is acceptable under this specification.

BT-6 SANDSTONE INTERMEDIATE COAT, LINSEED OIL, ALKYD RESIN

This specification is intended for use as an intermediate coat over properly primed structural steel surfaces. The paint shall be well ground and shall be easily broken with a paddle to a smooth uniform product of good brushing consistency. The paint shall dry to a dull finish without streaking, running or sagging.

The Pigment and Vehicle shall conform to the following specified requirements:

Pigment	% by Weight Min.	Max.
Basic lead silico chromate	33.0	-
Titanium dioxide (Rutile non chalking)	18.0	-
Magnesium silicate and tinting colors (Chromium Oxide Green, Lamp Black, Chrome Yellow)	-	48.4
Suspending agent	0.6	0.8

Vehicle	% by Weight Min.	Max.
Raw Linseed Oil	4.0	8.0
Alkyd Resin Solids	45.0	-
Volatile mineral spirits & driers	-	51.0

The paint shall consist of:

	Min.	Max.
Pigment	47.0	-
Vehicle	-	53.0
Vehicle solids	49.0	-
Consistency (Modified stormer)	70	78
Drying time - hours	-	16
Weight/gallon, lbs.	11.5	-

Ingredients for this specification shall meet the following requirements:

Basic lead silico chromate	ASTM D-1648-61
Titanium dioxide	TT-P-00442a, Type IV
Magnesium Silicate	TT-P-403a
Raw Linseed Oil	TT-L-215a
Alkyd resin solution	TT-R-266a Type I Class A
Mineral Spirits	TT-R-219a Grade I

This color is to match State Specification Matching Color No. 8. This is essentially the same formulation as Commonwealth of Pennsylvania sandstone intermediate coat and is acceptable under this specification.

BT-7 CORROSION RESISTANT GREEN FINISH PAINT, LINSEED OIL, ALKYD RESIN

This specification covers a green, corrosion resistant oil-alkyd paint suitable for use over prime and intermediate paints as a finish coat for structural steel. The paint shall be well ground and be readily broken with a paddle to a smooth uniform product of good brushing concistency.

Pigment	Min. 55. %	Max. 58%
Basic Lead silico chromate	62.0%	-
Titanium dioxide	-	28.0%
Chrome oxide	9.0%	-
Phthalocyanine green		
Phthalocyanine blue		
Lampblack to required shade.	-	1.5%
Organo- Montmorillonite	0.3	0.7

Note: For greatest effectiveness the organo montmorillonite should be pre-wetted 30% by weight with methyl alcohol (95% methanol 5% water).

Vehicle	Min. 42.0%	Max. 45.0%
Non-volatile vehicle	66.0%	-
Raw Linseed Oil	28.0%	-
Alkyd Resin Solids	38.0%	-
Mineral Spirits, driers and Anti-skinning agents	-	34.0%
Phthalic anhydride, % non-volatile veh.	11.0	-
Rosin & Rosin Derivatives	-	None
Small quantities of grinding and wetting agents may be used if desired.		

The paint shall have the following characteristics:

Pigment	Min. 55%	Max. 58%
Vehicle	42%	45%
Weight/gallon lbs.	13.5	-
Coarse Particles and Skins	-	1.0%
Viscosity KU	75	85
Dry Time - Set to Touch	-	6 hrs.
Dry Through	-	24 hrs.

Ingredients for this specification shall meet the following requirements:

Basic Lead Silico Chromate	ASTM-D-1648
Linseed Oil	ASTM-D-234-58T
Alkyd Resin	TT-R-266a Type I Class A
Titanium Dioxide (non-chalking)	ASTM-D-476 Type III

This paint shall dry to a semi-gloss finish and possess a color closely approaching Fed. Std. No. 595 - 24227.

BT-8 CEMENT GREY FINISH COAT

This paint is intended for use as a finish coat over properly primed and field coated structural steel surfaces to be weather exposed. The paint shall be well ground and shall be readily broken up with paddle to a smooth uniform product of good brushing consistency.

Pigment - The pigment shall be composed of:

	Min.	Max.
Basic lead silico chromate	39.0%	-
Titanium dioxide, non-chalking	57.0%	-
Phthaloxyanine Blue and Lampblack to desired shade	Balance	
Organo montmorillonite	0.7	0.9

Note: For greatest effectiveness the organo montmorillonite should be pre-wetted 30.0% by weight with methyl alcohol (95% methanol 5% water).

Liquid - The liquid shall consist of not less than 50.0% non-volatile vehicle, the balance to be combined drier and thinner. The non-volatile vehicle shall be an alkyd resin. The thinner shall be essentially mineral spirits. Small quantities of grind and wetting agents may be used if desired.

The paint shall consist of:	Min.	Max.
Pigment	33.0%	-
Vehicle	-	67.0%
Weight/gallon lbs.	10	-
Viscosity KU	68	75

Ingredients for this specification shall meet the following requirements:

Basic lead silico chromate	ASTM-D-1648
Titanium dioxide rutile	ASTM-D-476 Type III
Alkyd Resin	TT-R-266 Type I Class A
Mineral spirits	ASTM-235

This paint shall dry to a gloss finish and possess a color closely approaching Federal Std. No. 595-16307.

This paint is essentially the same formulation as Pennsylvania Department of Highways Grey Finish Coat Color #15, or National Lead Specification F-66 - Paint Number T-10425. Either of these two formulations is acceptable under this specification. There are, however, slight differences in color tone and the formulations shall not be mixed at the same job site.

BT-9 PRETREATMENT: STEEL STRUCTURES PAINTING COUNCIL - BASIC ZINC CHROMATE - VINYL BUTYRAL WASH COAT

This specification covers the procedures required for the basic zinc chromate-vinyl butyral wash coat pretreatment of structural steel surfaces prior to painting.

Basic zinc chromate-vinyl butyral wash coat (sometimes referred to as wash primer) is a pretreatment for metals which reacts with the metal and at the same time forms a protective vinyl film which contains an inhibitive pigment to help prevent rusting. This wash coat is supplied as two components which are mixed together just prior to use. The base contains an alcohol solution of polyvinyl butyral resin pigmented with basic zinc chromate. The diluent contains an alcohol solution of phosphoric acid which reacts with the vinyl resin, the pigment, and the steel.

It is intended that this pretreatment be used on clean steel free from rust and scale, or on galvanized iron.

Specified surface preparations shall be completed first. Any dust or dirt shall be removed from the surface. Oil and grease shall be removed from the surface by methods provided in SSPC Sp 1-52T, "Solvent Cleaning".

As soon as practicable and before rusting of the surface occurs, the surface shall be pretreated with material which meets the following specifications: MIL-C-15328A, dated 17 March 1952, or Bureau of Ships' Formula 17.
Four volumes of base shall be mixed with one volume of diluent, as follows:

First break up the pigment settled in the base with a wooden paddle, mechanical stirrer, or mixer, and mix to distribute the pigment evenly throughout the base. After the base is thoroughly mixed, slowly pour one volume of the diluent into four volumes of the base with constant agitation. Do not pour off the liquid which has separated from the pigment. Add the diluent to the settled pigment to aid mixing. Material which is not mixed properly may gel and be unfit for use. The wash coat base shall be mixed with the diluent in quantities which will be applied within six to eight hours after mixing. The pretreatment is most effective when freshly mixed. Storage periods in excess of eight hours may make the mixed material useless.

Apply the wash coat pretreatment by spraying or brushing. Spraying is generally the preferred method, but brushing may be desirable over rough or poorly prepared steel. Roller coating may be used only if specified. Paint brushes should be clean and dry, or wetted with alcoholic solvents. The wash coat should be strained before spraying. When spraying, avoid excess air pressure or liquid pressure.

Apply to a dried film thickness of 0.3 to 0.5 mils, which is usually obtained at a spreading rate of about 250 to 300 square feet per gallon. Note that at this thickness, which should not be exceeded, the base metal will show through the wash coat as evidenced by uneven coloring. This is the normal appearance; do not attempt to apply wash coat so as to obtain complete hiding.

When sprayed, the wash coat must be deposited on the surface wet; if dusting is encountered, move the gun closer to the surface; if already within six inches of the surface, decrease atomizing air pressure or increase the liquid pressure, or add thinner.

BT-9 ...Continued....

Wash coat that cannot be used within a maximum of eight hours after mixing with diluent shall not be used.

Use denatured or isopropyl alcohol to clean equipment or to remove deposits of excess wash coat.

Paint may be applied as soon as the wash coat is dry - usually one half to one hour, although a longer drying period is more desirable (up to three hours).

BT-10 DULL ORANGE VINYL PRIMER

This primer, which can be applied only over sandblasted clean steel that has been pretreated with Basic Zinc Chromate-Vinyl Butyral Wash Coat, shall be applied uniformly to all surfaces by brush or spray. For spraying, it may be cut for handling with methyl isobutyl ketone if necessary, but in any case a dry film thickness of 2.0 mils (0.002 inches) minimum must be applied (11.5 mils wet). When spraying, a wet film must be laid down - not a dust. The paint film shall dry hard within 30 minutes and can be recoated in 4 hours. This primer may be exposed, without subsequent coats, for several days without damage to it. It is, of course, desirable that it be topcoated in a reasonable time to develop the necessary film thickness.

Pigment - The pigment shall be composed of:	Min.%	Max.%
Basic Lead Silico Chromate ASTM D 1648	78	-
Dibasic Lead Phosphite	5.0	-
Pure Red Iron Oxide	-	8.0
Organo Montmorillonite	6.0	8.0

Note: For the greatest effectiveness the Organo Montmorillonite should be predampened with 30-35% Methyl Alcohol (95% Methanol-5% Water) by weight.

Liquid - The liquid shall consist of not less than 21.0% non-volatile vehicle, the balance to be suitable volatile and diluents. The non-volatile vehicle shall be composed of vinyl resin and tricresyl phosphate in the proportions of 9-2/3:1 by weight. The volatile vehicle shall be composed of any mixture of methyl isobutyl ketone, methyl ethyl ketone, toluene and isopropyl alcohol which will dissolve the vinyl resin and impart the proper viscosity and stability to the coating in order to obtain an indefinitely usable and workable paint. No incompatibility or precipitation of the vehicle shall be observed. To assist package stability, 0.7% epichlorohydrin, based on the vinyl resin, shall be included.

The Paint Shall Consist Of:	Min.	Max.
Pigment, %	14.0	16.0
Vehicle, %	84.0	86.0
Weight/Gallon, lbs.	8.4	8.6
Water, %	-	0.5
Coarse Particles & Skins (total residue retained on 325 sieve based on paint)%	-	1.0
Fineness of Grind (North Standard)	6	-
Viscosity (Stormer-Krebs Units)	75	90

The paint shall dry hard in not more than 3 hours with temperatures at 75 ± 2°F. with a relative humidity of 50%.

The percentages noted relate to mixture by weight.

BT-10...Continued.....

INGREDIENTS - Ingredients for this specification shall meet the following requirements:

Basic Lead Silico Chromate	ASTM-D-1648
Pure Red Iron Oxide	TT-P-735
Methyl Isobutyl Ketone	ASTM-D-1153
Isopropanol	ASTM-D-770
Toluena	ASTM-D-362
Xylene	ASTM-D-364
Methyl Ethyl Ketone	ASTM-D-740
Tricresyl Phosphate	ASTM-D-363

Vinyl Resin - The vinyl resin shall be a hydroxyl containing vinyl chloride-acetate copolymer. It shall contain 89.5 to 91.5 percent vinyl chloride, 5.3 to 7.0 percent vinyl alcohol and 2.0 to 5.5 percent vinyl acetate. The resin shall have a specific gravity of 1.38 to 1.40.

BT-11 BUFF VINYL INTERMEDIATE COAT

The buff intermediate coat is to be applied over the dull orange vinyl primer. It may be thinned with methyl isobutyl ketone for application by spray to obtain a dry film thickness of 2.0 mils (.002 inches) minimum (11.5 mils wet). The paint shall dry within thirty (30) minutes and can be recoated in one hour, although 24 hours is preferable. A good spraying technique should be followed to insure a wet film with good film structure.

Pigment - The pigment shall be composed of:

	Min. %	Max.%
Basic Lead Silico Chromate	78.0	-
Titanium Dioxide, Rutile non-chalking	13.7	-
Organo Montmorillonite	6.0	8.0
Phthalocyanine Blue	0.10	0.30

Note: For the greatest effectiveness, the Organo Montmorillonite should be predampened with 30-35% Methyl Alcohol (95% Methanol-5% Water) by weight.

Liquid - The liquid shall consist of not less than 21.0% non-volatile vehicle, the balance to be suitable volatile and diluents. The non-volatile vehicle shall be composed of vinyl resin and tricresyl phosphate in the proportions of 9 2/3:1 by weight. The volatile vehicle shall be composed of any mixture of methyl isobutyl ketone, methyl ethyl ketone, toluene and isporopyl alcohol which will dissolve the vinyl resin and impart the proper viscosity and stability to the coating in order to obtain an indefinitely usable and workable paint. No incompatibility or precipitation of the vehicle shall be observed. To assist package stability, 0.7% epichlorohydrin, based on the vinyl resin, shall be included.

The paint shall consist of:

	Min.	Max.
Pigment - %	14.0	16.0
Vehicle - %	84.0	86.0
Weight/Gallon-lbs.	8.4	8.6
Water - %	-	0.5
Coarse Particles and Skins (total residue retained on a 325 mesh sieve based on the paint)-%	-	1.0
Fineness of Grind (North Standard	6	-
Viscosity (Stormer-Krebs Units)	66	85

The paint shall dry hard in not more than 3 hours with temperature at 75 ± 2°F., with a relative humidity of 50%.

The percentages noted relate to mixture by weight.

Ingredients for this specification shall meet the following requirements:

Basic Lead Silico Chromate	ASTM-D-1648
Titanium Dioxide Rutile Non-Chalking	ASTM-D-476
Methyl Isobutyl Ketone	ASTM-D-1153

Ingredients B-11....continued.....

Isopropanol	ASTM-D-770
Toluene	ASTM-D-362
Xylene	ASTM-D-364
Methyl Ethyl Ketone	ASTM-D-740
Tricresyl Phosphate	ASTM-D-363

Vinyl - The vinyl resin shall be a hydroxyl containing vinyl chloride-acetate copolymer. It shall contain 89.5 to 91.5 percent vinyl chloride, 5.3 to 7.0 percent vinyl alcohol and 2.0 to 5.5 percent vinyl acetate. The resin shall have a specific gravity of 1.38 to 1.40.

BT-12 GREY VINYL-ALKYD FINISH COAT

This Grey Finish coat shall be applied over the prescribed undercoats. It may be thinned with methyl isobutyl ketone for application by spray to obtain a dried film thickness of 2.0 mils (0.002 inches) minimum (6.4 mils wet). The paint shall dry hard in not more than 3 hours. Should it be found desirable to recoat this finish, this should not be undertaken for at least seven (7) days.

This finish is particularly designed for brush application within the limits of the solvents used. Where desired, it may be used over existing aged sound Alkyd vehicle finish coats as a repaint coat. Paint made in accordance with the specification will adhere well to such surfaces.

Pigment - The pigment shall be composed of:

	Min.%	Max.%
Basic Lead Silico Chromate	30	-
Titanium Dioxide, Rutile Non-Chalking	45	-
Non-Leafing Aluminum Pigment	9.0	11.0
Dibasic Lead Phosphite	3.0	4.0
Organo Montmorillonite	9.0	10.0
Weather-Stable Tinting Colors (i.e., phthalocyanine blue, Lampblack)	As Required	

Note: For the greatest effectiveness, the Organo Montmorillonite should be predampened with 30-35% Methyl Alcohol (95% Methanol - 5% Water) by weight.

Liquid - The liquid shall consist of not less than 30.5% non-volatile vehicle, the balance to be suitable volatile solvents, diluents, and driers. The non-volatile vehicle shall be composed of vinyl resin and long oil alkyd solids in the proportion of 1:1.9 by weight and shall contain between 15.0% and 16.5% phthalic anhydride. The alkyd resin supplied as a solution in xylene shall meet Federal Specification TT-R-266a, Type I, Class C. The volatile vehicle shall be composed of a mixture, for example, of methyl isobutyl ketone, xylene, aromatic petroleum solvent, low gravity carbitol, and 2-nitropropane blended in proportions which will dissolve the vinyl resin and impart an indefinitely usable stable paint. Viscosity shall be such that the paint may be brush applied with relative ease to obtain a film of good structure. No incompatibility or precipitation of the vehicle shall be observed. To assist package stability, 1.0% epichlorohydrin based on the vinyl resin shall be included.

The paint shall consist of:	Min.	Max.
Pigment %	19.0	20.0
Vehicle %	-	81.0
Weight/gallon, lbs.	9.0	-
Coarse Particles & Skins (total residue retained on a 325 mesh sieve based on the paint) %	-	1.0
Fineness of Grind	4	-
Viscosity (Stormer-Krebs Units)	69	85

BT-12....Continued.....

Ingredients for this specification shall meet the following requirements:

Basic Lead Silico Chromate	ASTM-D-1648
Titanium Dioxide, Rutile Non-Chalking	ASTM-D-476
Methyl Isobutyl Ketone	ASTM-D-1153
Isopropanol	ASTM-D-770
Toluene	ASTM-D-362
Xylene	ASTM-D-364
Methyl Ethyl Ketone	ASTM-D-740
Tricresyl Phosphate	ASTM-D-363

Vinyl Resin - The vinyl resin shall be a hydroxyl containing vinyl chloride-acetate copolymer. It shall contain 89.5 to 91.5 percent vinyl chloride, 5.3 to 7.0 percent vinyl alcohol and 2.0 to 5.5 percent vinyl acetate. The resin shall have a specific gravity of 1.38 to 1.40.

BT-13 TAN FINISH COAT, LINSEED OIL, ALKYD RESIN

This specification is intended as a Finish Coat over properly primed structural steel surfaces.

	Min.	Max.
Pigment %/weight	36%	38%
Basic Lead Silico Chromate	50.0	-
Non-Chalking TiO_2	34.0	-
Mapico Orange Iron Oxide & Chromium Oxide to Desired Shade	-	15.0
Orange Montmorillonite	-	1.5

NOTE: For the best results the orange montmorillonite should be pre-wetted with methyl alcohol (95% methanol - 5% H_2O)

	Min.	Max.
Vehicle %/weight	-	62.0%
TT-R-266 Type I (70%solids)	75.0%	78.0
Raw Linseed Oil	5.0	7.0
Mineral Spirits and Driers	-	20.0

The paint shall have the following characteristics:

Total solids	73% Min.
Vehicle solids	58% Min.
Weight/gal.	10.7# Min.
Viscosity KU	70-75
Grind	5-1/2 Min.
Gloss	85 Min.
Dry to Touch	6 hours
Dry Hard	Overnight

This paint shall dry to a gloss finish and possess a color closely approaching Fed. Std. No. 595, Color Number 30277.

BT-14 DARK RED FINISH COAT, LINSEED OIL, ALKYD RESIN

This specification is intended for use as a finish coat over properly primed and field coated structural steel surfaces. The paint shall be well ground and be easily broken up with a paddle to a smooth product of good brushing consistency.

The Pigment shall be composed of:

	Min.	Max.
Basic Lead Silico Chromate	65.0%	75.0%
Indian Red Maroon and Molora Red Toner (RT-6306 made by Holland Suco Color Co.) Non-Fading Red	Balance	
Organo Montmorillonite	1.0	

LIQUID - The liquid shall consist of not less than 48.0% non-volatile vehicle; the balance to be combined drier and thinner. The non-volatile vehicle shall be an alkyd resin conforming to Federal Specification TT-R-261, Type I, Class A. The thinner shall be essentially mineral spirits meeting Federal Specifications TT-T-29a.

The paint shall consist of	Min.	Max.
Pigment	32.0%	-
Vehicle	-	68.0%
Weight/gallon, lbs.	10.0	-
Viscosity KU	65	75
Drying Time HOurs	-	8

The paint shall be brush applied without difficulty and exhibit no running, streaking, sagging, or other film defects and dry to a gloss finish.

The color shall be Federal Std. No. 595 - 20061.

(This Addendum becomes a part of the City of Pittsburgh Specifications for Painting of Bridges and Various Steel Structures, dated November, 1970.)

CITY OF PITTSBURGH
DSBT

BT-24 - DARD RED SILICONE ALKYD COPOLYMER FINISH COAT

This specification is intended for use as a finish coat over properly primed and field coated structural steel surfaces. The paint shall be well ground and be easily broken up with a paddle to a smooth uniform product of good brushing consistency. The paint, when applied, shall exhibit no running, streaking, sagging, or other film defects.

The pigment and paint shall conform to the following specified requirements:

Pigment	% by weight Min.	Max.
Pure Indian Red (98% Fe_2O_3	81.5	-
Organo Montmorillonite	-	3.62
Yellow Iron Oxide	9.05	-
Phthalocyanine Blue and TiO_2 to proper color	-	5.88

The pigments shall comply with the following specifications:

Indian Red	R 8090 - Pfizer Company
Suspension Agent	Bentone #11
Yellow Iron Oxide	ASTM-D-768

Vehicle	% by weight Min.	Max.
Silicone-Alkyd Resin solution (60% solids)	75.0	-
Balance Mineral Spirits Driers and Anti-skin	-	25.0

The vehicle constituents shall comply with the following specifications:

Silicone-Alkyd Resin Solution	TT-E-490B (30% minimum silicone content)
Mineral Spirits	TT-291c Grade I
Cobalt Naphthenate	TT-643d Type II

BT-24 DARK RED SILICONE ALKYD COPOLYMER FINISH COAT

The paint shall have the following characteristics:

	% by weight Min.	Max.
Pigment	23	25
Vehicle	75	77
Vehicle solids	45 ± 1	-
Weight per gallon (pounds)	9.2	9.4
Viscosity KU	72	78
Fineness of Grind N.S.	6.5	-
Set to touch (hours)	-	4
Dry hard (hours)	-	16
Gloss 60°	85	
Total Solids	58 ± 1	

This specification permits no lead driers.

The color shall be Federal Standard No. 595-20061.

The paint shall be applied at a minimum wet film thickness of 2.5 mils.

CITY OF PITTSBURGH
DEPARTMENT OF PUBLIC WORKS
BUREAU OF ENGINEERING

STANDARDS FOR CONSTRUCTION

CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS — BUREAU OF ENGINEERING

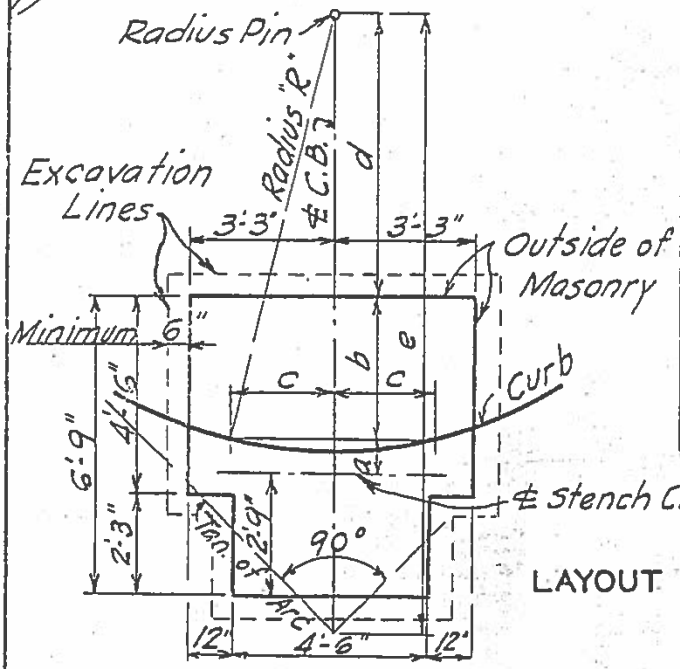
CATCH BASIN LAYOUTS AND GUTTER SUMPS

Approved Jan. 6, '37 — ENGR IN CHARGE E. OF E.

Approved Jan. 6, 1937 — CHIEF ENGR D.P.W.

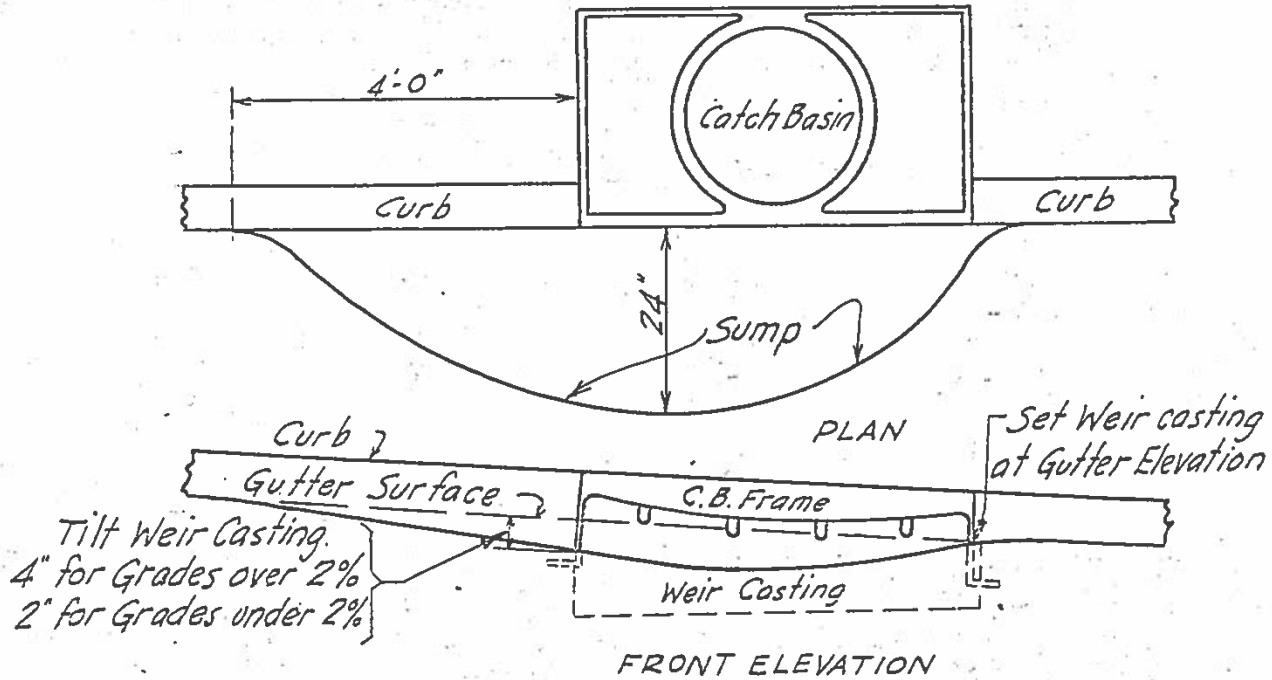
Approved Jan. 6, '37 — DIRECTOR

Approved Jan. 6, 1937
Carl M. Vetter
DESIGNING ENGR



Curb Rad.	a	b	c	d	e
6'	12 5/8"	2'-11 3/8"	2'-6"	2'-6"	8'-5 3/4"
10'	8 7/8"	3'-3 1/8"	2'-4 3/4"	6'-6"	14'-1 3/4"
12'	8 7/8"	3'-3 1/8"	2'-4 3/4"	8'-6"	16'-11 3/4"
15'	8 7/8"	3'-3 1/8"	2'-4 3/4"	11'-6"	21'-2 1/2"
20'	6"	3'-6"	2'-3"	16'-4 1/2"	28'-3 3/8"

LAYOUT FOR CATCH BASIN--CONSTRUCTION ON CURVES



WEIR AND GUTTER SUMP ARRANGEMENT

At intersection of two descending grades, set ends of weir casting 2" below normal gutter grades and provide sump 9 Ft. long and 18 inches maximum width at ℄ of Catch Basin

FOLDER NO. M-14

CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS — BUREAU OF ENGINEERING

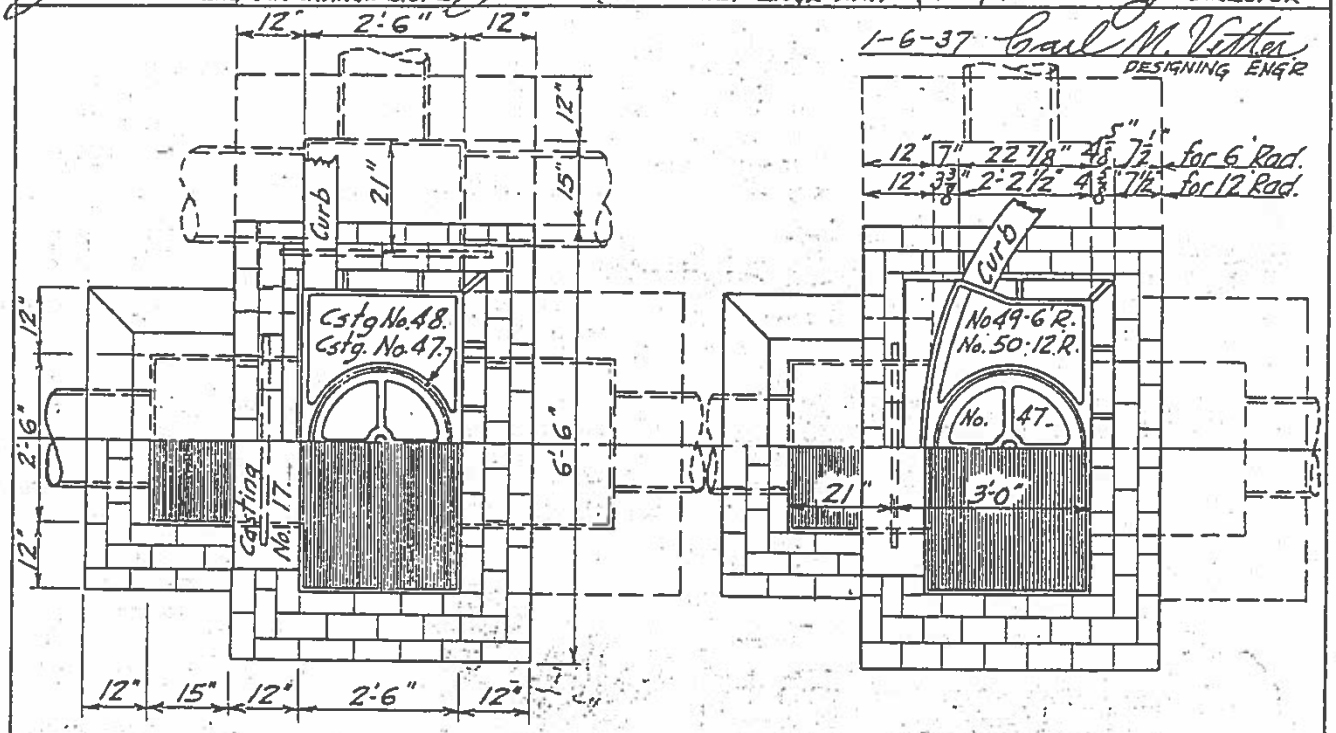
CATCH BASIN TYPE I.

Approved Jany 6, 37 — John H. Stevenson, ENGR IN CHARGE B. OF E.

Approved Jan 8 1937 — John J. Crook, CHIEF ENGR D.P.W.

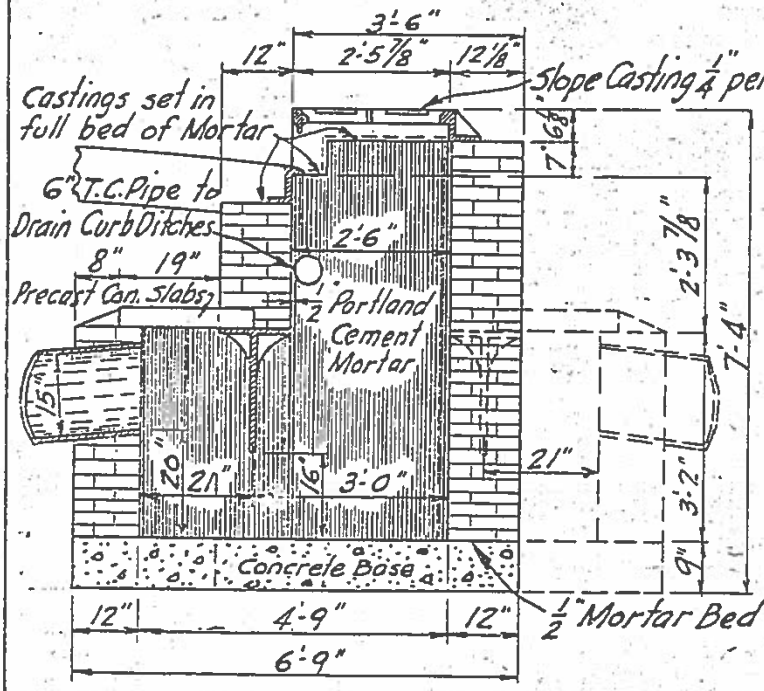
Approved Jan 9-37 — [illegible], DIRECTOR

1-6-37 Carl M. Vetter, DESIGNING ENGR



SECTIONAL PLAN - STRAIGHT CURB

SECTIONAL PLAN FOR 6' AND 12' RADIUS CURB



SECTIONAL ELEVATION

Use Weir Plate Casting No. 8 for Straight Curb No. 9 for 6' Radius Curb and No. 51 for 12' Radius Curb.

See Specifications for excavation, construction and back-filling with Slag-Cement Mixture

Concrete for Catch Basins shall be Class A and shall be mixed with high early strenght special cement.

Cast Stench Chamber Slabs in two pieces 24"x 19"x 4" each reinforced with wire mesh not less than 0.8 lbs. per sq. ft. and set in mortar bed.

All outside joints shall be struck flush.

FOLDER NO. IV-14

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS — BUREAU OF ENGINEERING

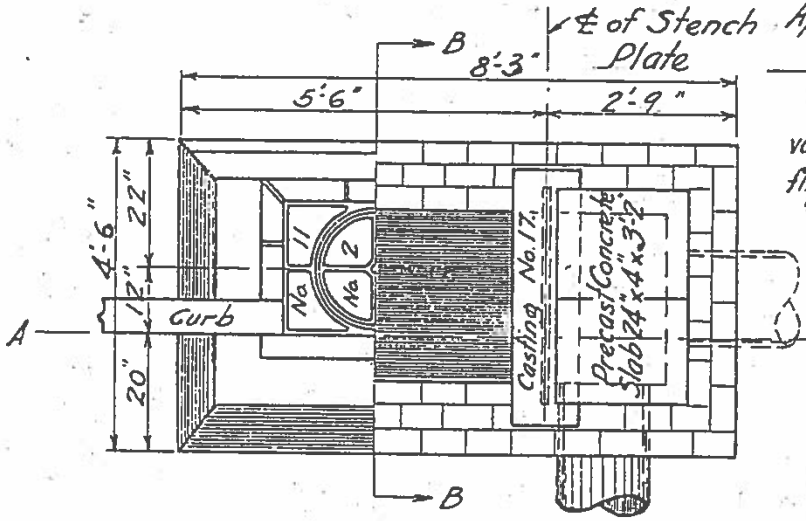
CATCH BASIN TYPE 3.

Approved Jan 6, 37 — ENGR IN CHARGE B OF E

Approved Jan 8, 1937 — CHIEF ENGR D.P.W.

Approved Jan 4 / 37 — DIRECTOR

Approved: Jan. 6, 1937
Earl M. Vetter
DESIGNING ENG'R



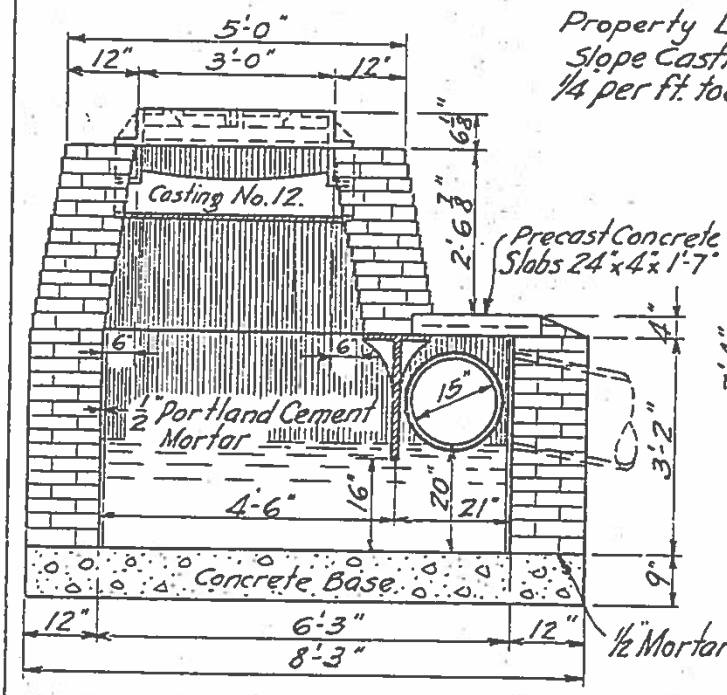
SECTIONAL PLAN

See Specifications for excavation, construction and backfilling with slag-cement Mixture

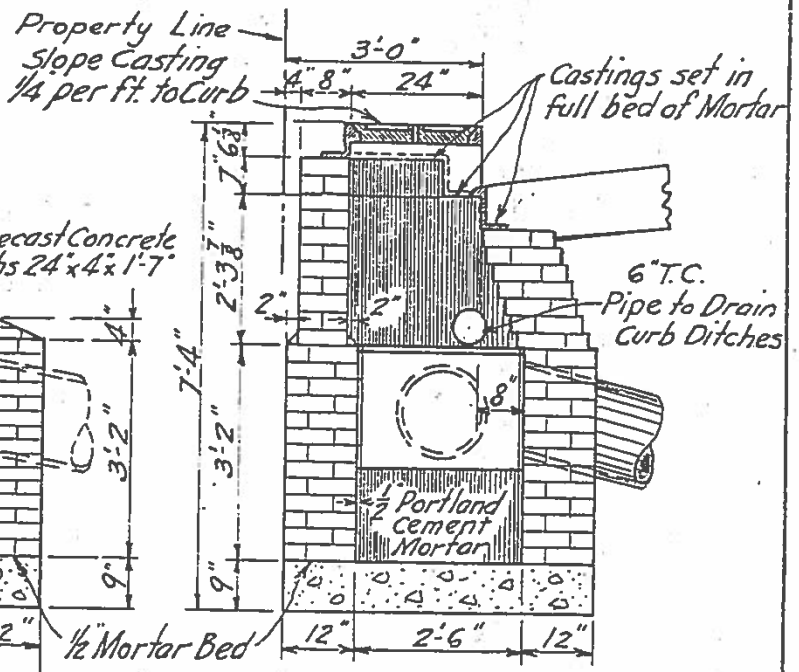
Concrete for base of C.B and Stench Chamber top shall be mixed with high early strength special cement.

Cast Stench Chamber slabs in two pieces 24" x 4"x1'-7" each, reinforced with wire mesh not less than 0.8 lbs per sq. ft. set in Mortar Bed.

All outside joints shall be struck flush.



SECTION A-A



SECTION B-B

Note: Type 3 Catch Basin designed for use on 3 foot sidewalks

FOLDER No. M-14

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS — BUREAU OF ENGINEERING

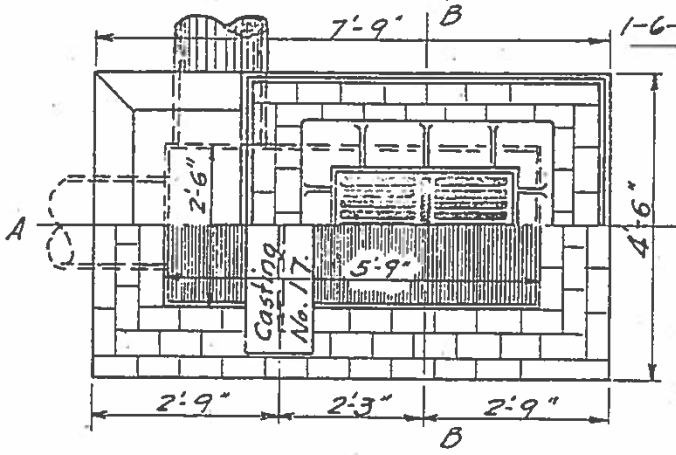
CATCH BASIN AND STORM INLET TYPE 4.

Approved Jan 6, 37 — ENGR IN CHARGE B OF E.

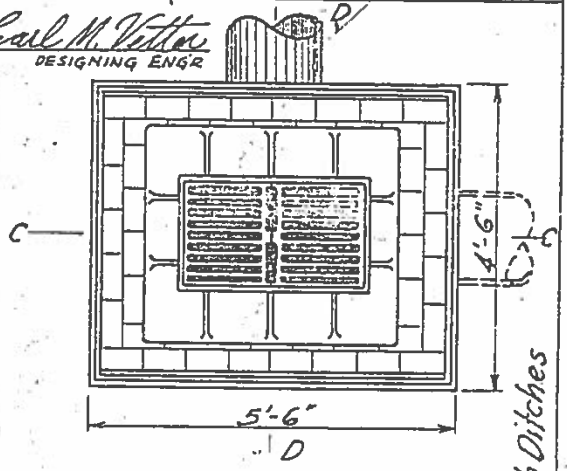
Approved June 8, 1937 — CHIEF ENGR D.P.W.

Approved Jan 9 37 — DIRECTOR

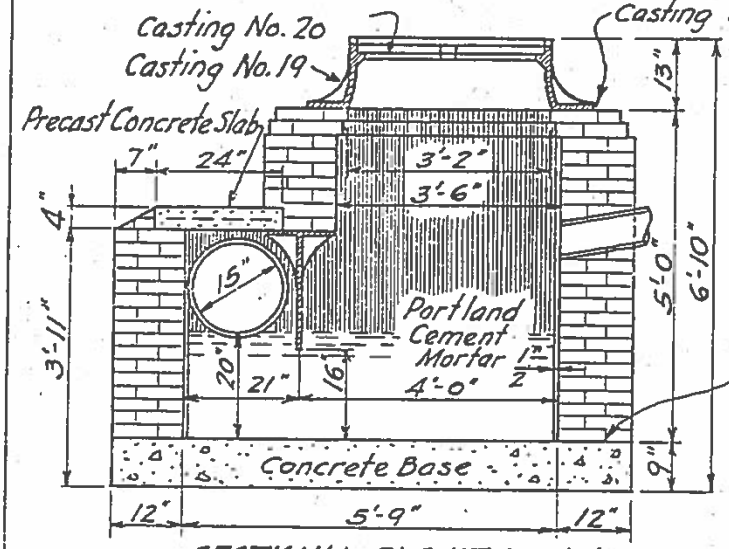
1-6-37 Earl M. Vetter — DESIGNING ENGR



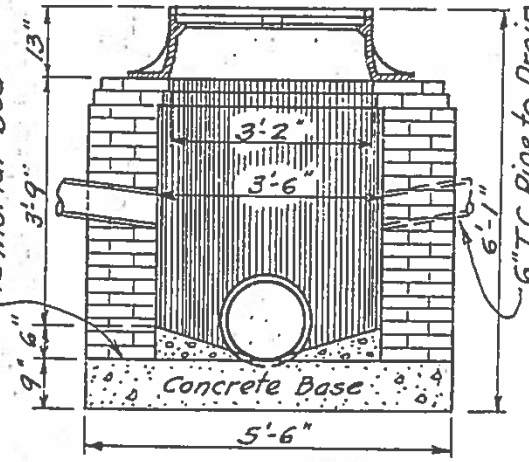
SECTIONAL PLAN OF CATCH BASIN



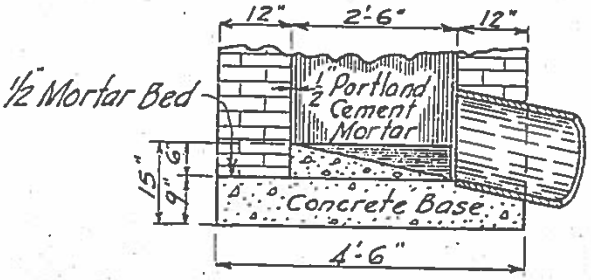
PLAN OF STORM INLET



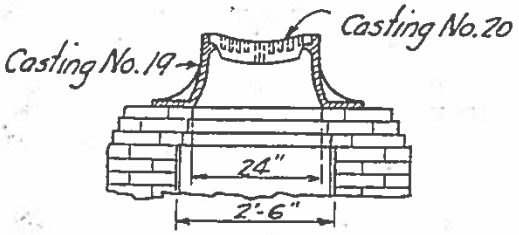
SECTIONAL ELEVATION A-A



SECTIONAL ELEVATION C-C



BOTTOM SECTION D-D



TOP SECTION B-B AND D-D

All outside joints struck flush.

See Specifications for excavation, construction and back-filling with slag-cement Mixture. Concrete for Catch Basin and Storm Inlet Base and Stench Chamber Top shall be Class A and shall be mixed with High Early Strength Special Cement. Cast Stench Chamber Slabs in two pieces 24"x 4"x 19" each reinforced with wire Mesh not less than 0.8 lbs per Sq. Ft. set in Mortar Bed.

COLLIER PUB. M-14

CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS — BUREAU OF ENGINEERING

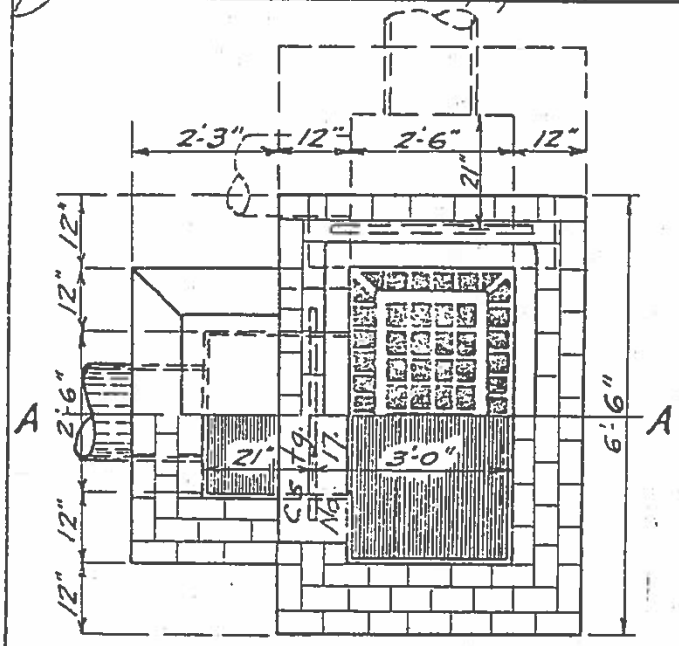
CATCH BASIN AND STORM INLET TYPE 5.

Approved Jan 6 37 — ENG'R IN CHARGE B. OF E.

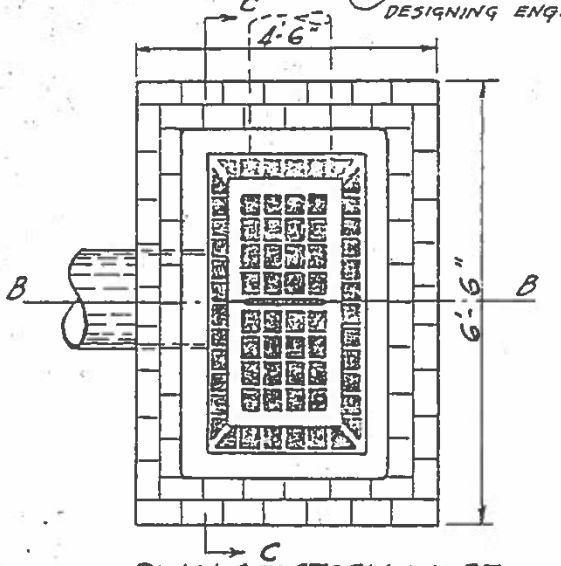
Approved Jan. 8, 1937 — CHIEF ENG'R D.P.W.

Approved Jan 9/37 — DIRECTOR

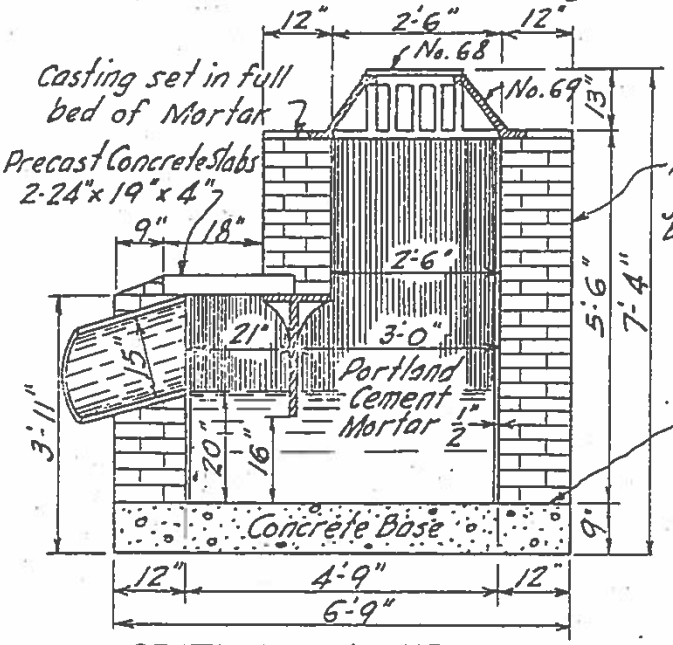
1-6-37 — Carl M. Vittal, DESIGNING ENG'R



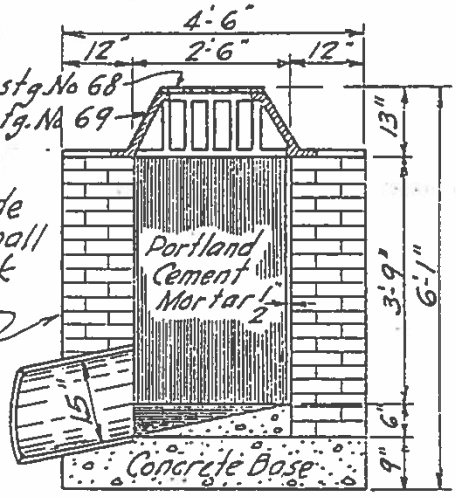
SECTIONAL PLAN OF CATCH BASIN



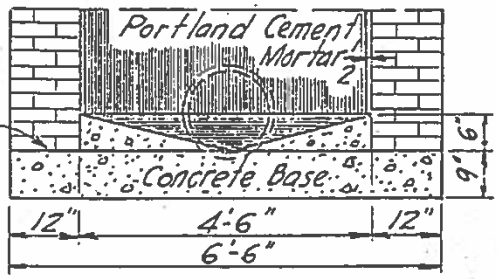
PLAN OF STORM INLET



SECTIONAL ELEVATION A-A



SECTIONAL ELEVATION B-B



BOTTOM SECTION C-C

See Specifications for excavation, construction and Back-filling with Slag-Cement Mixture.

Concrete for Catch Basins shall be Class A and shall be mixed with High Early Strength Special Cement.

Cast Stench Chamber Slabs in two pieces 24"x19"x4" each reinforced with not less than 0.8 lbs per Sq. Ft. and set in Mortar Bed.

Folder No. M-14

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS — BUREAU OF ENGINEERING

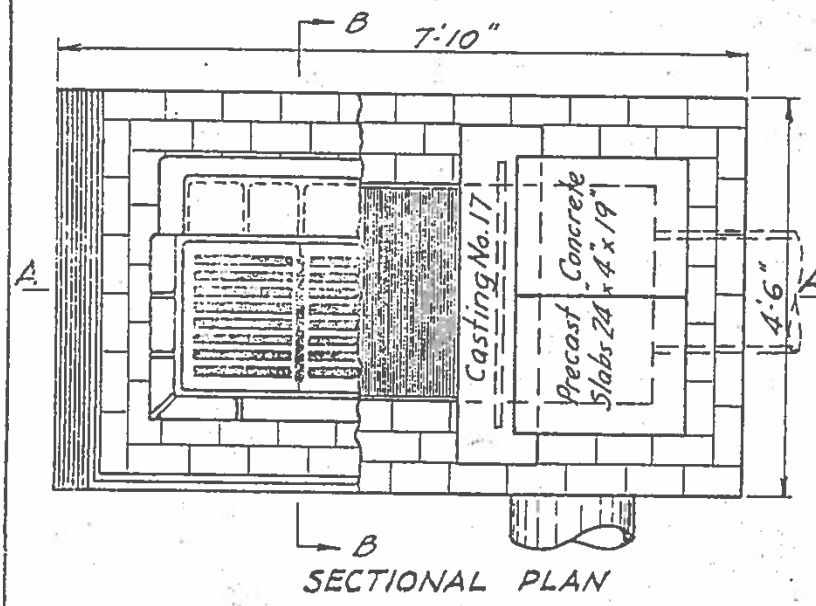
CATCH BASIN TYPE 6

Approved Jan. 6, '37 — ENGR. IN CHG. B. OF E.

Approved Jan. 8, 1937 — CHIEF ENGR. D.P.W.

Approved Jan. 9, '37 — DIRECTOR

Approved 9-28-36
Earl M. Vetter
DESIGNING ENGR.



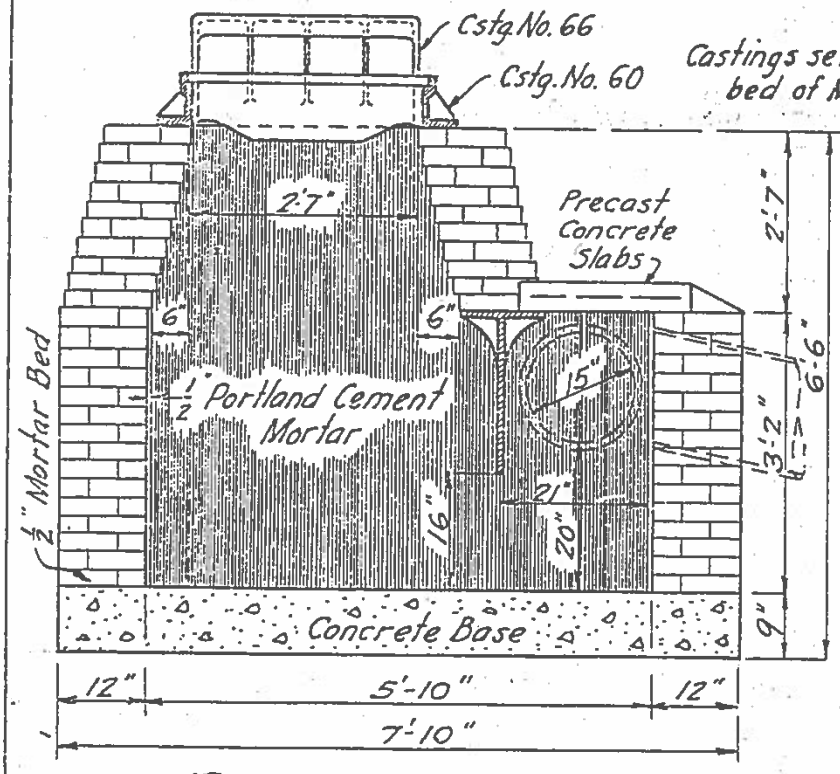
SECTIONAL PLAN

See Specifications for excavation, construction and back-filling with slag cement mixture.

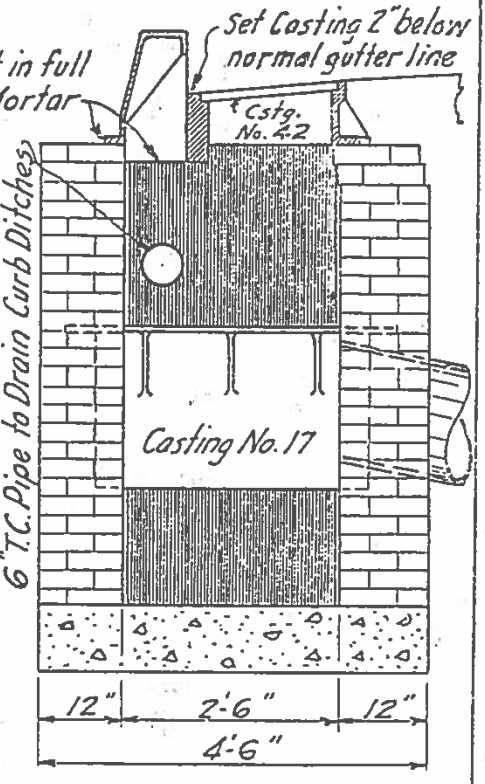
Concrete for Catch Basins shall be Class A and shall be mixed with High Early Strength Special Cement

Cast Stench Chamber Slabs in two pieces 24"x4"x19" each reinforced with wire mesh not less than 0.8 lbs. per Sq. Ft., and set in mortar bed.

All outside joints shall be struck flush.



SECTION A-A



SECTION B-B

FOLDER NO. M-14

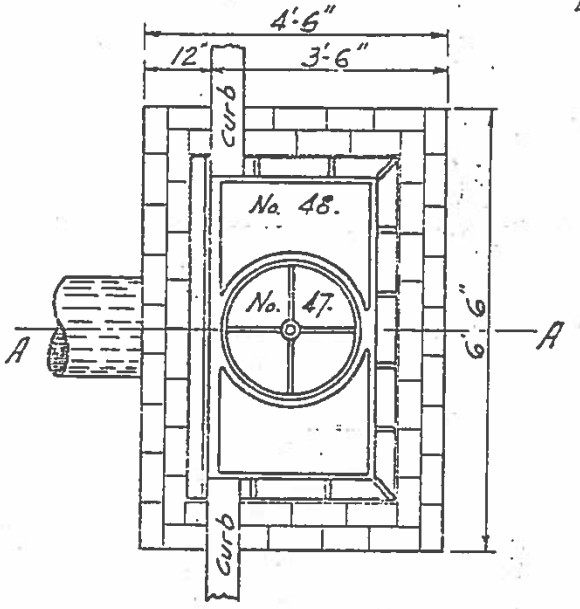
CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS — BUREAU OF ENGINEERING

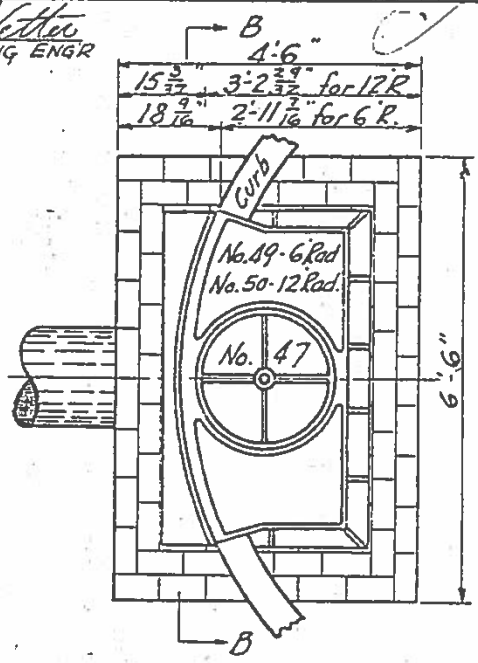
STORM INLET TYPE I.

Approved June 6, '37 — ENGR IN CHARGE B. OF E.
Approved Jan. 8, 1937 — CHIEF ENGR D.P.W.
Approved Feb. 7, 1937 — DIRECTOR

1-6-37 Carl M. Vetter — DESIGNING ENGR

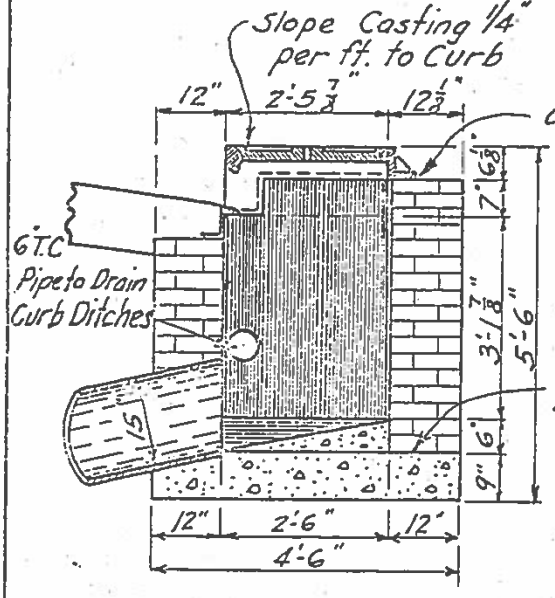


PLAN

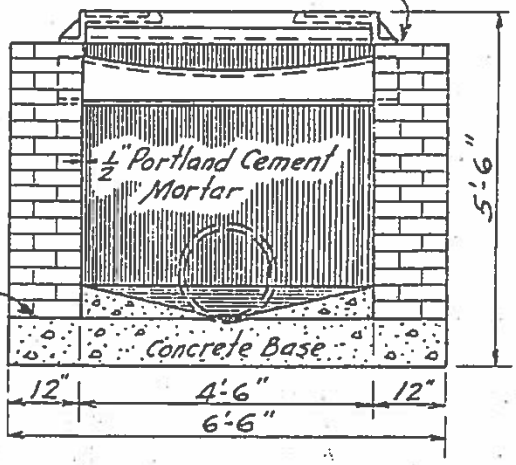


PLAN

Use Weir Casting No. 8 for Straight Curb, No. 9 for 6' Radius Curb and No. 51 for 12' Radius Curb



SECTIONAL ELEVATION A-A



SECTIONAL ELEVATION B-B

See Specifications for excavation, construction and back-filling with Slag-cement Mixture. Concrete for Base of Storm Inlet shall be Class A and shall be mixed of High Early Strength Special Cement.
All outside joints shall be struck flush.

FOLDER NO. M-14

CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS — BUREAU OF ENGINEERING

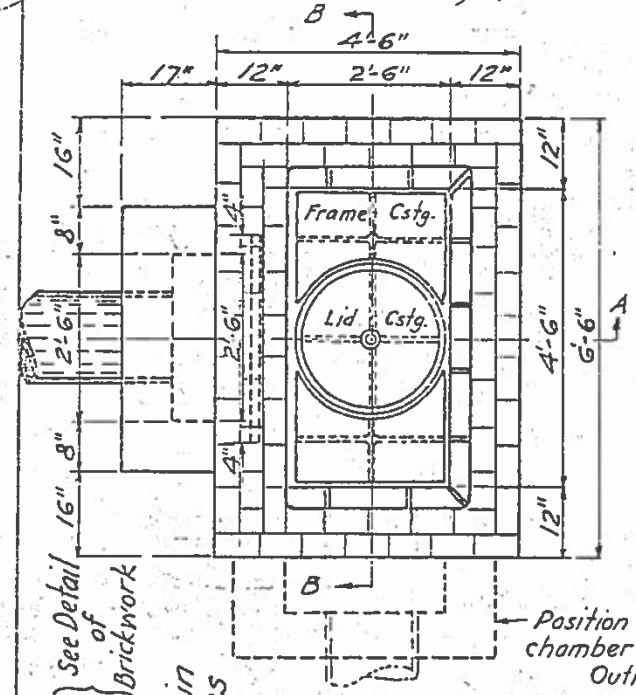
STORM INLET TYPE 2

Approved June 6, 1934 — ENGR IN CHARGE B.C.F.E.

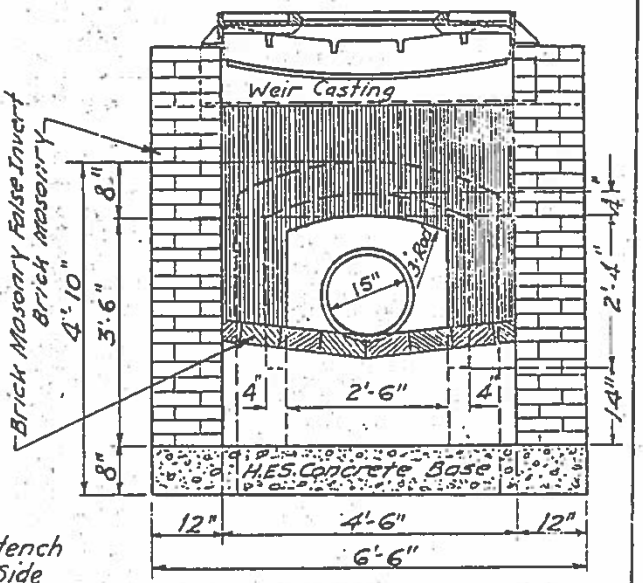
Approved June 8, 1934. — CHIEF ENGR D.P.W.

Approved June 7, 1934 — DIRECTOR

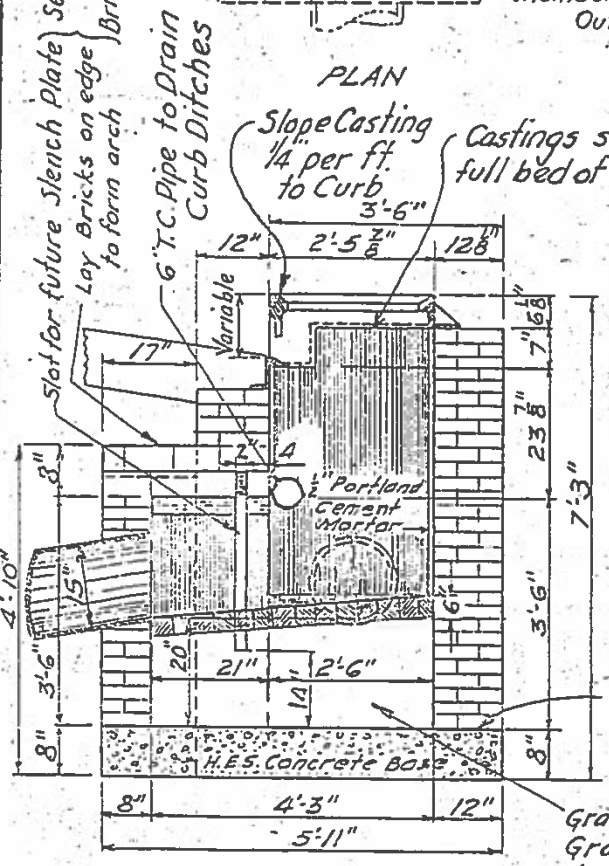
Designing Engr



PLAN



SECTION-B-B



SECTION-A-A

CASTING ASSEMBLY

	STRAIGHT	6' RADIUS	12' RADIUS
FRAME	48	49	50
LID	47	47	47
WEIR	8	9	51

The above Storm Inlet is designed for delivery of water into combined sewers.

Provide slot for future mortaring in of Number 67 Stench Casting to give 4" water seal after removal of false brick invert and supporting fill.

Back-fill in accordance with the specifications.

Concrete for base of Storm Inlet shall be mixed of High Early Strength Special Cement

FOLDER No. M-14

11

CITY OF PITTSBURGH

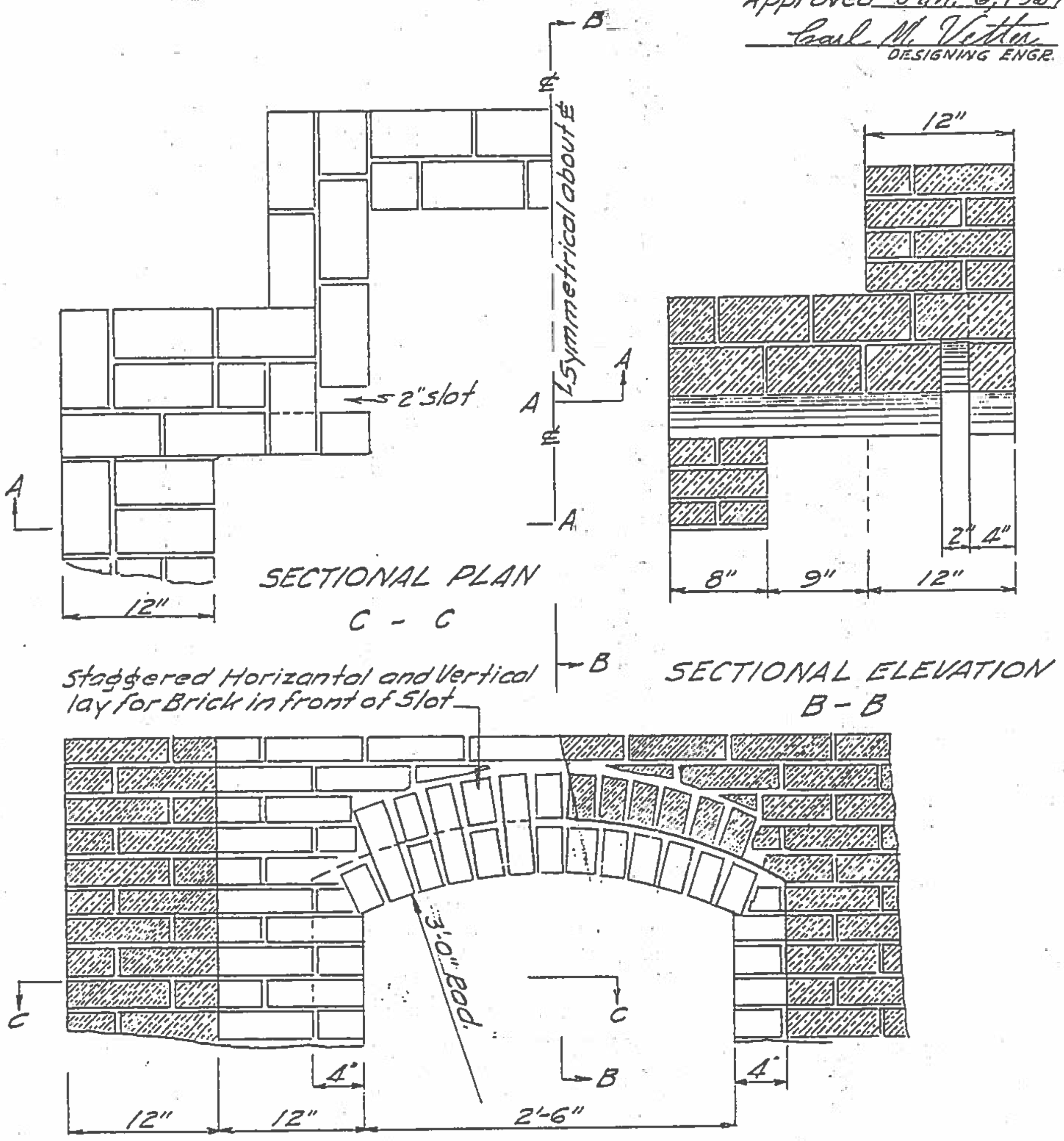
DEPT. OF PUBLIC WORKS — BUREAU OF ENGINEERING

STORM INLET TYPE 2

METHOD OF CONSTRUCTING SLOT IN BRICK WORK

Approved Jan. 6, '37 — ENGR IN CHARGE B. OF E.
Approved Jan. 8, 1937 — CHIEF ENGR D.P.W.
Approved Jan. 9, '37 — DIRECTOR

Approved Jan. 6, 1937
Carl M. Vetter
DESIGNING ENGR.



HALF ELEVATION—HALF SECTION THROUGH SLOT ON LINE A-A-A-A

FOLDER No. M-14

11. A

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS — BUREAU OF ENGINEERING

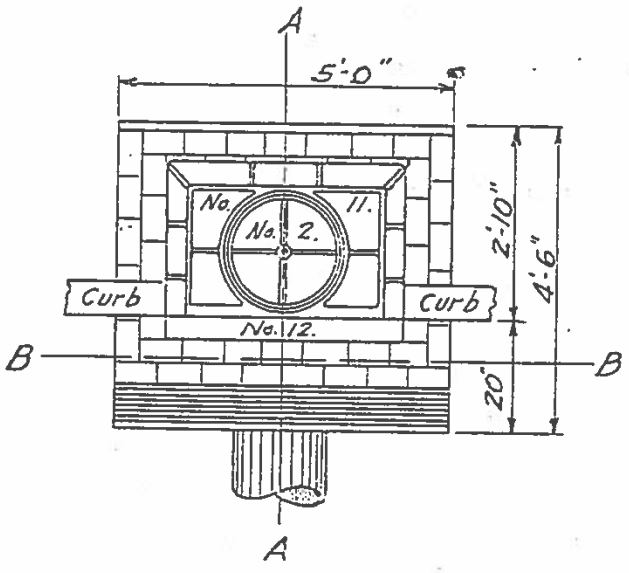
STORM INLET TYPE 3.

Approved Jan 4 1927 — ENGR IN CHARGE B. OF E.

Approved Jan 8, 1927 — CHIEF ENGR D.P.W.

Approved Jan 4 1927 — DIRECTOR

Approved Jan. 6, 1927
Carl M. Vetter
DESIGNING ENG'R

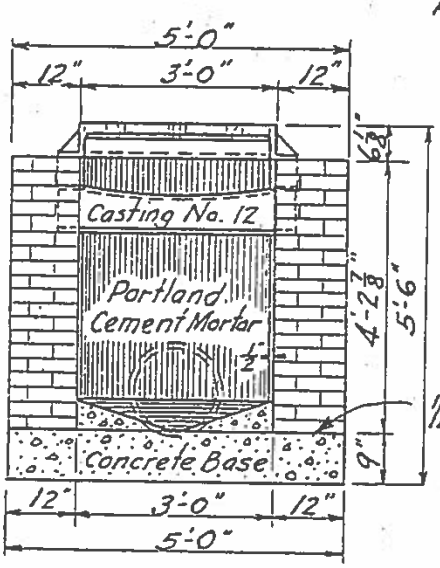


PLAN

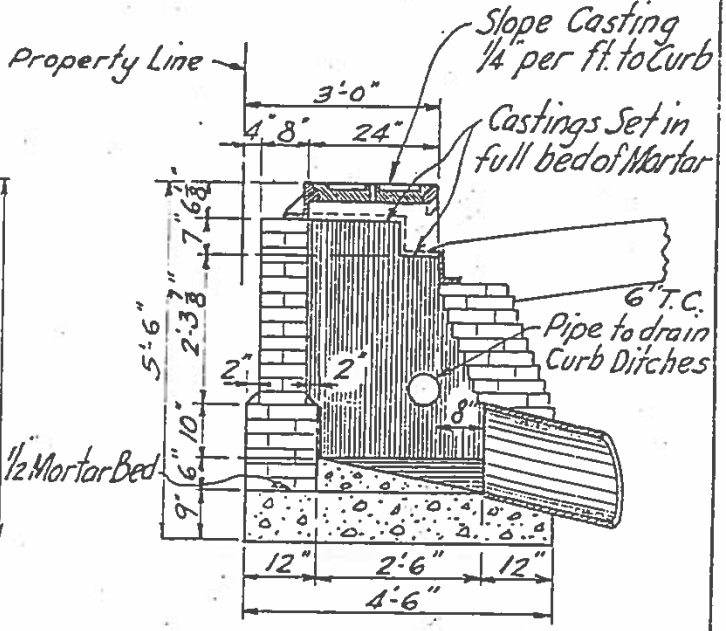
See Specifications for excavation, construction and back-filling with Slag-cement Mixture.

Concrete for base of Storm Inlet shall be Class A and shall be mixed of High Early Strength Special Cement.

All outside joints shall be struck flush.



SECTION B-B



SECTION A-A

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS — BUREAU OF ENGINEERING

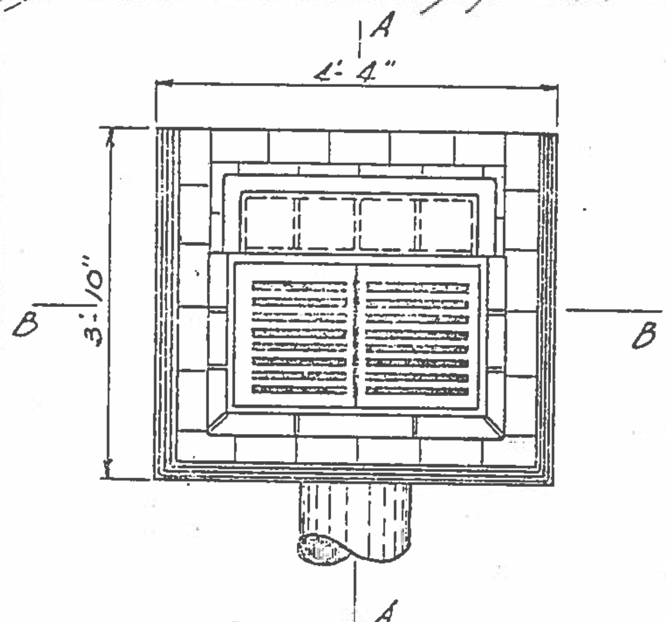
STORM INLET TYPE 6

Approved [illegible] [illegible] ENGR IN CHARGE B of E.

Approved Jan. 8, 1937 [illegible] CHIEF ENGR D.P.W.

Approved [illegible] [illegible] DIRECTOR

Approved Jan. 6, 1937 Carl M. Vetter DESIGNING ENGR

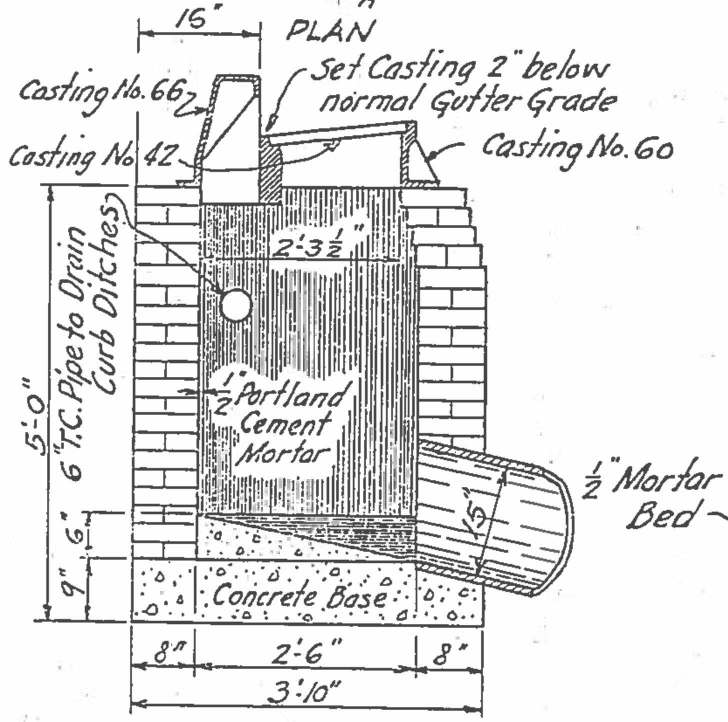


PLAN

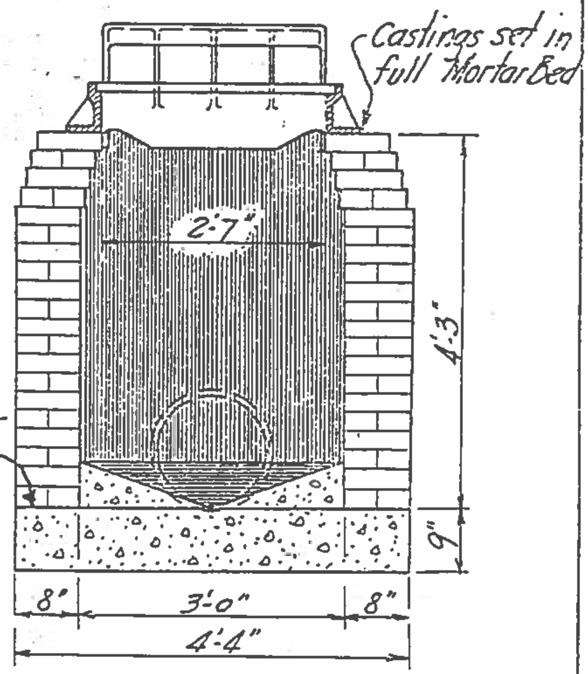
See Specifications for excavation, construction and back-filling with Slag-cement Mixture.

Concrete for Base of Inlet shall be Class A and shall be mixed of High Early Strength Special Cement.

All outside joints shall be struck flush.



SECTION A-A



SECTION B-B

FOLDER NO. M-14

CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS — BUREAU OF ENGINEERING

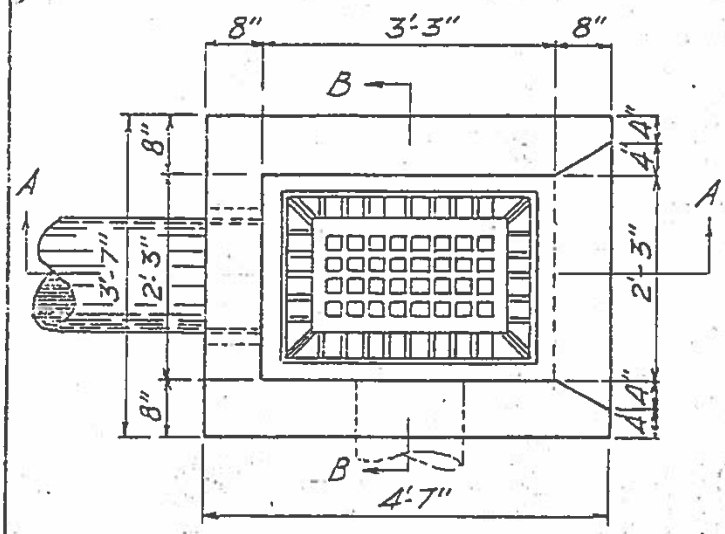
STORM INLET TYPE 7.

Approved [illegible] — ENGR IN CHARGE B. OF E.

Approved Jan. 8, 1937 — CHIEF ENGR. D.P.W.

Approved [illegible] — DIRECTOR

Approved 7-24-36
Earl M. Watts
DESIGNING ENGR.



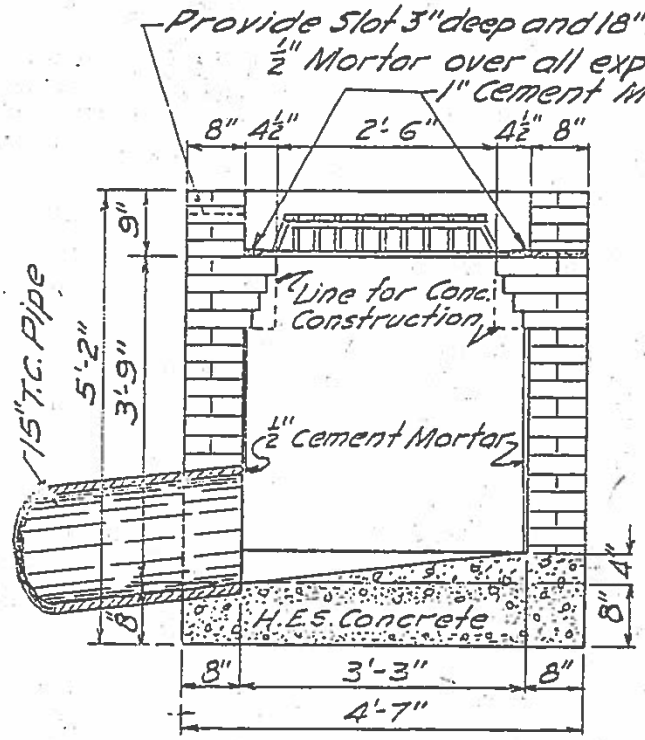
PLAN

See Specifications for Excavation, Construction and Backfilling with Slag Cement.

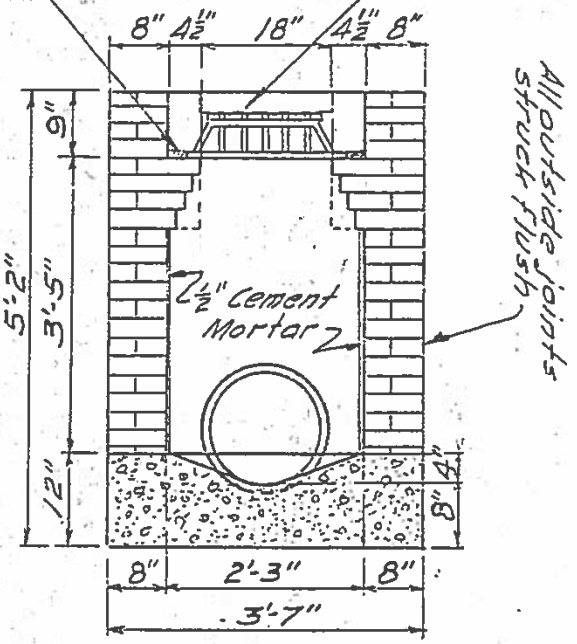
Contractor has option of constructing entire Inlet with H.E.S. Cement.

Provide 1" beveled edges on exposed corners for Concrete Construction.

Castings Required
Frame No. 63
Grating No. 62



SECTION A-A



SECTION B-B

FOLDER No. M-14

14

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS — BUREAU OF ENGINEERING

HOUSE LATERALS

Approved [illegible] Approved Jan 8 1937 Approved Jan 9 37

ENGR. IN CHARGE B. of F.C. — CHIEF ENGR D.P.W. — DIRECTOR

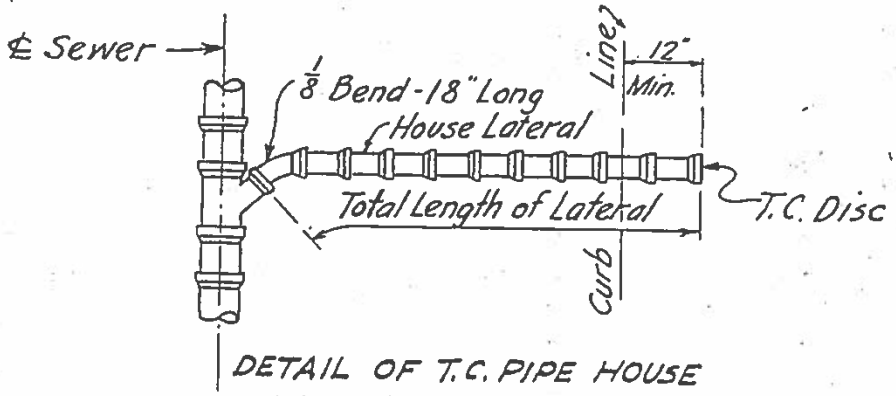
Approved Jan. 6, 1937

Earl M. Vetter

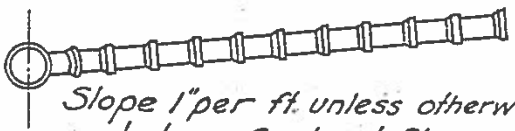
DESIGNING ENGR

BILL OF MATERIAL FOR HOUSE LATERAL CONNECTIONS

Lin. Ft. ℄ Sewer to Curb	Total Length lateral for 15"x9"-15"x8" 12"x6"-10"x6"-8"x6"Y's	Pieces Straight Pipe 2'-0" Long		Extension Inside Curb Line			
		8" Pipe	6" Pipe	15"x9"Y 15"x8"Y	12"x6"Y	10"x6"Y	8"x6"Y
4	5'-6"	2	2	2'-5"	2'-3"	2'-2"	2'-0"
5	5'-6"	2	2	1'-5"	1'-3"	1'-2"	1'-0"
6	7'-6"	3	3	2'-5"	2'-3"	2'-2"	2'-0"
7	7'-6"	3	3	1'-5"	1'-3"	1'-2"	1'-0"
8	9'-6"	4	4	2'-5"	2'-3"	2'-2"	2'-0"
9	9'-6"	4	4	1'-5"	1'-3"	1'-2"	1'-0"
10	11'-6"	5	5	2'-5"	2'-3"	2'-2"	2'-0"
11	11'-6"	5	5	1'-5"	1'-3"	1'-2"	1'-0"
12	13'-6"	6	6	2'-5"	2'-3"	2'-2"	2'-0"
13	13'-6"	6	6	1'-5"	1'-3"	1'-2"	1'-0"
14	15'-6"	7	7	2'-5"	2'-3"	2'-2"	2'-0"
15	15'-6"	7	7	1'-5"	1'-3"	1'-2"	1'-0"



DETAIL OF T.C. PIPE HOUSE LATERAL CONNECTION



Slope 1" per ft. unless otherwise noted on Contract Plans

PROFILE OF HOUSE LATERALS ALL SIZES

FOLDER No. M-14

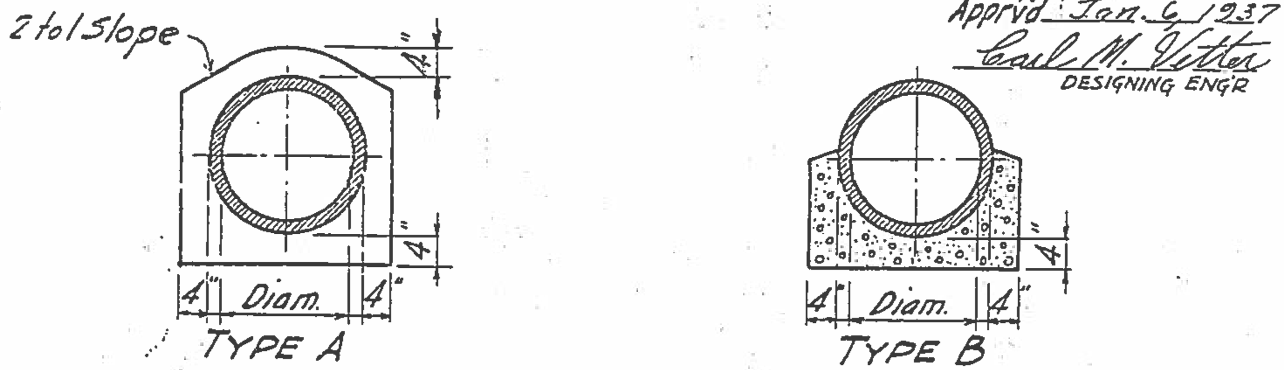
CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS — BUREAU OF ENGINEERING

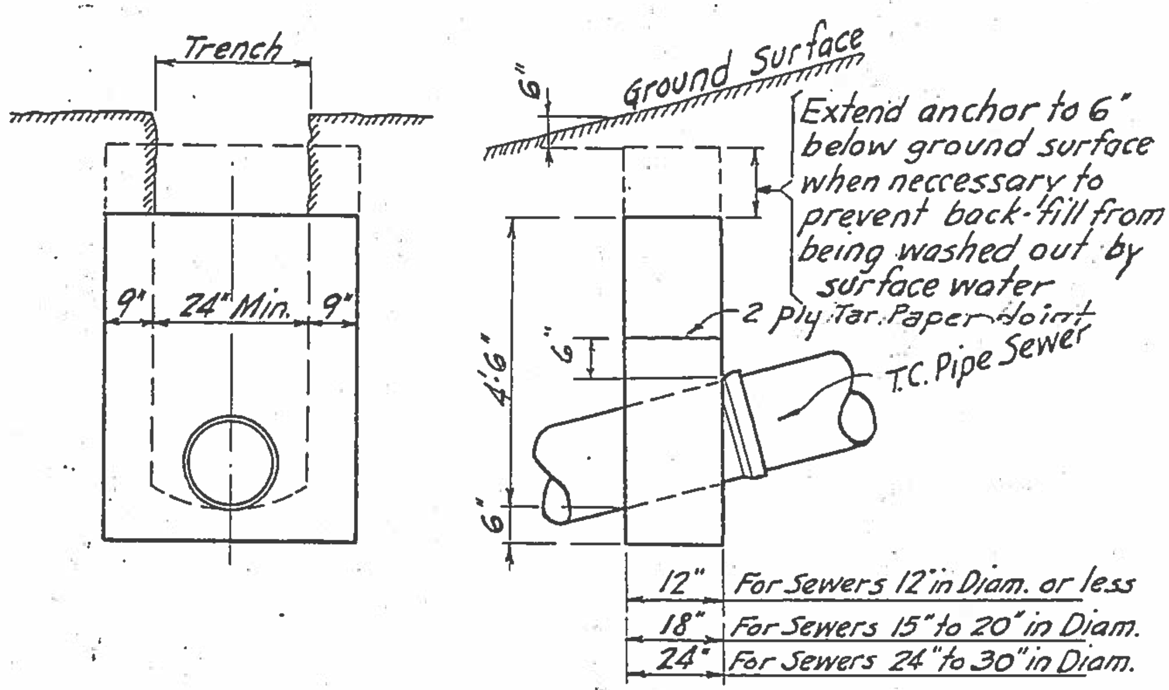
CONCRETE REINFORCEMENT FOR SEWERS

Approved ______ ENGR IN CHARGE B of E — Approved Jan. 8, 1937 ______ CHIEF ENGR D.P.W. — Approved ______ DIRECTOR

Apprvd Jan. 6, 1937 Carl M. Vetter DESIGNING ENGR



DETAILS OF CONCRETE REINFORCEMENT FOR PIPE SEWERS



CONCRETE ANCHORS FOR SEWERS ON STEEP GRADES

Provide no anchors on grades less than 24%

Provide anchors 36' C. to C. on grades between 24% and 34%

Provide anchors 24' C. to C. on grades between 34% and 50%

Provide anchors 16' C. to C. on grades between 50% and 70%

For Conditions other than shown hereon anchors shall be provided as required by the Contract Plans or ordered in the field by the Director.

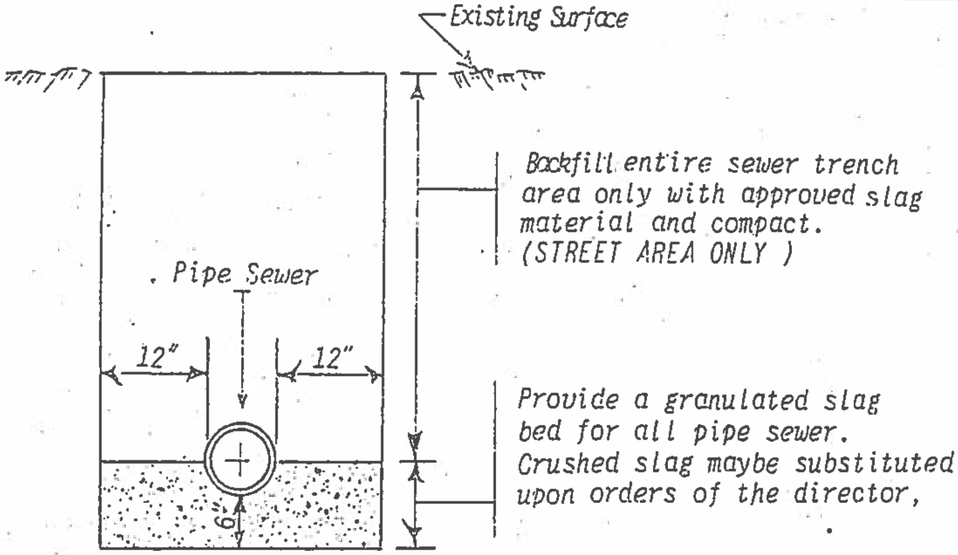
FOLDER No. M-14

CITY OF PITTSBURGH

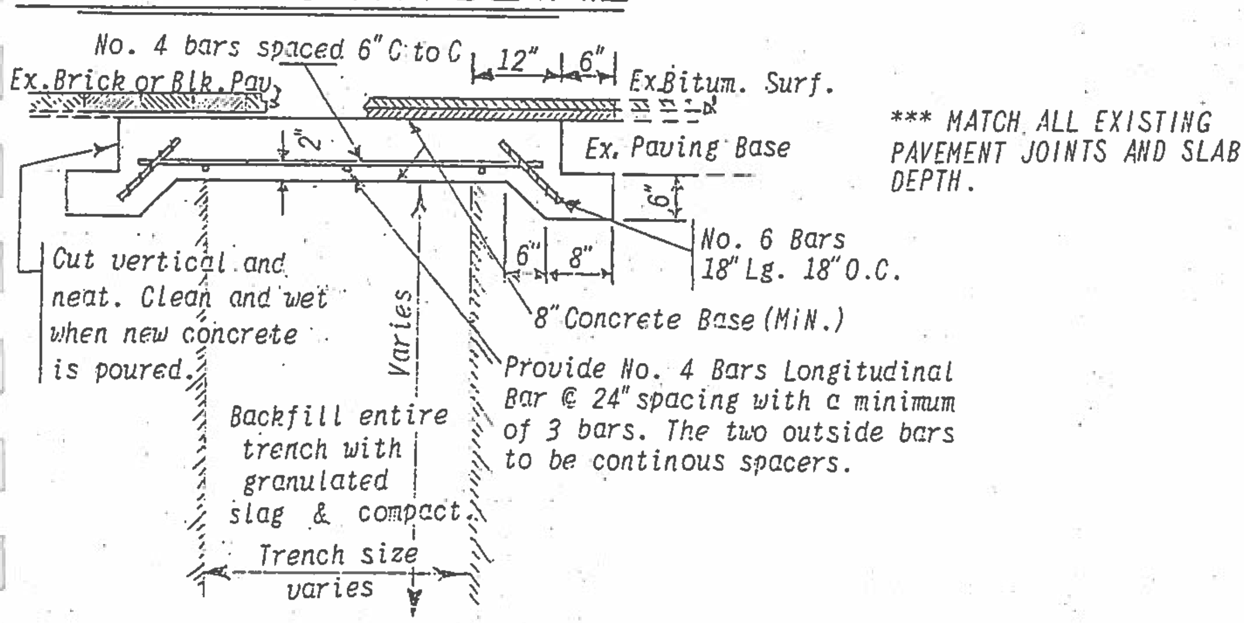
DEPT. OF PUBLIC WORKS — BUREAU OF ENGINEERING

EXCAVATION LINES AND TRENCH REPAVING FOR SEWER CONSTRUCTION

DESIGN DIV. ENGR.	APP'D 2-2-82	CITY ENGR.	APP'D 2/3/82
SEWER DIV. ENGR.	APP'D 2-3-82	DIRECTOR	APP'D 2/3/82



SEWER TRENCH DETAIL



*The underpinning method should not be used if it will interfere with sub-base drainage.

*Excavation made to greater dimensions than those shown for underpinning shall be replaced with concrete; backfilling with other material will not be permitted.

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS — BUREAU OF ENGINEERING

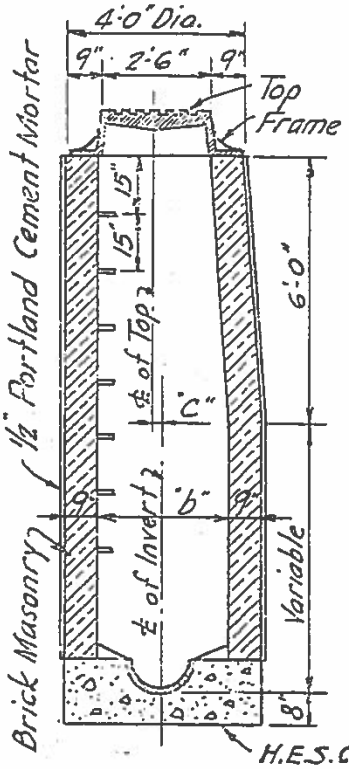
MANHOLES OVER TERRA COTTA PIPE SEWERS

Approved Jan. 6, 1937 — ENGR IN CHARGE B of E

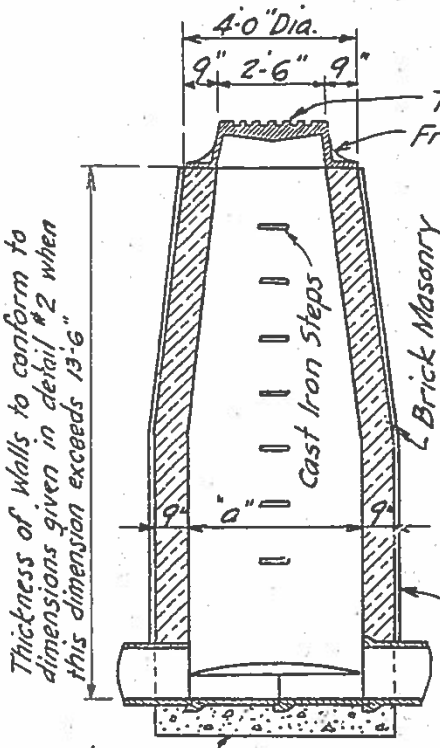
Approved Jan. 6, 1937. — CHIEF ENGR D.P.W.

Approved — DIRECTOR

Approved Jan. 6, 1937
Earl M. Vetter
DESIGNING ENGR

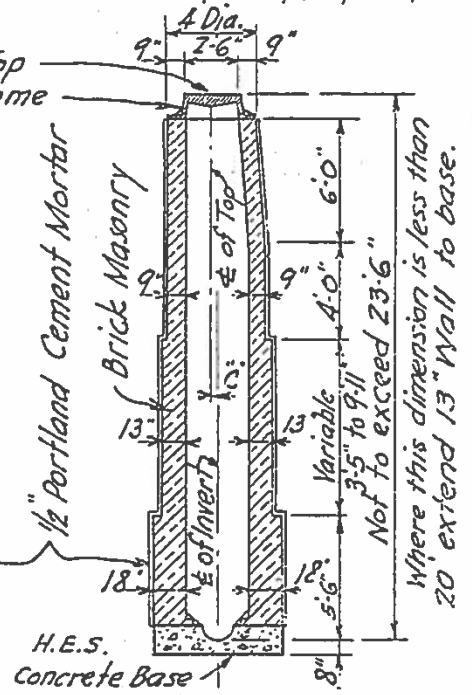


CROSS SECTION



LONGITUDINAL SECTION

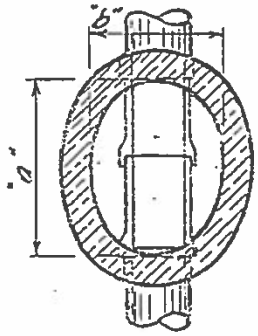
DETAIL No 1.



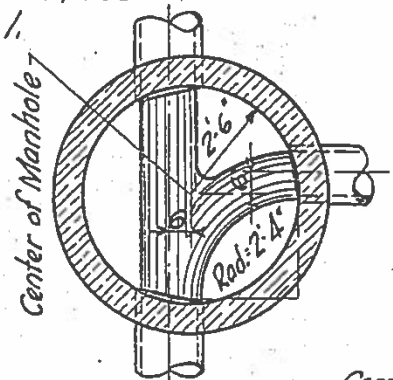
CROSS SECTION

Respective thickness of Manhole Wall where depth exceed 13'-6"

DETAIL No. 2.

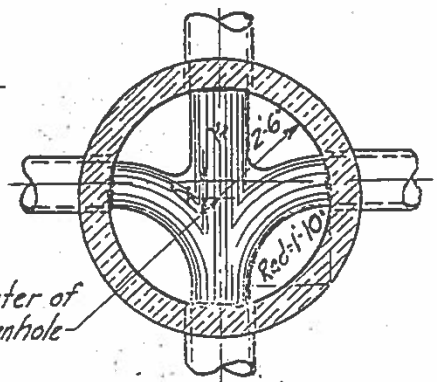


Class "A" Manhole



Class "B" Manhole

2 WAY INVERT



Class "B" Manhole

3 WAY INVERT

CLASS A MANHOLES

INSIDE BASE DIMENSIONS											
Size of Sewer	6"	8"	9"	10"	12"	15"	18"	20"	24"	30"	36"
"a" Length	4'-0"	4'-0"	4'-0"	4'-0"	4'-0"	4'-0"	4'-0"	4'-0"	4'-0"	4'-6"	4'-6"
"b" Width	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-3"	3'-6"	3'-9"	4'-0"	4'-6"
"c" Offset	3"	3"	3"	3"	3"	3"	4½"	6"	7½"	9"	12"

Class A Manholes are 1 Way with invert formed with Split pipe embedded in concrete. Class B Manholes are 2 or 3 way with invert moulded in concrete base.

18

FOLDER NO. M-14

CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS — BUREAU OF ENGINEERING

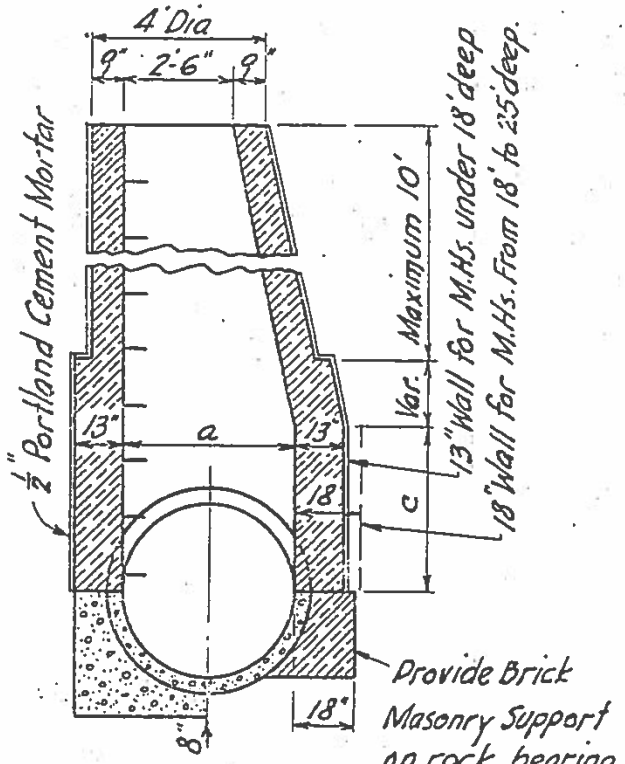
MANHOLES OVER CONCRETE PIPE SEWERS

Approved Jan. 2, 1937 — ENGR IN CHARGE B. OF E.

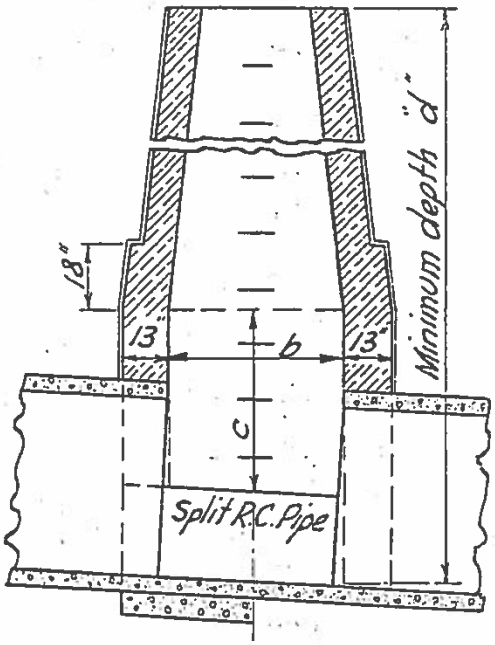
Approved Jan. 2, 1937 — CHIEF ENGR D.P.W.

Approved [illegible] — DIRECTOR

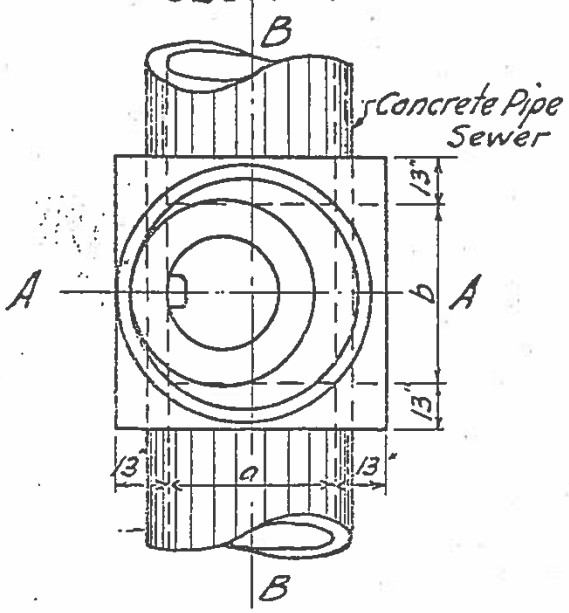
Approved Jan. 6, 1937
Paul M. Vetter
DESIGNING ENG'R



SECTION A-A



SECTION B-B



PLAN

Size of Sewer	a	b	c	d
24"	3'-0"	4'-0"	1'-8"	3'-8"
27"	3'-0"	4'-0"	1'-10"	4'-0"
30"	3'-1"	4'-0"	2'-0"	4'-5"
33"	3'-4½"	4'-0"	2'-1"	5'-3"
36"	3'-0"	4'-0"	2'-3"	5'-9"
42"	3'-6"	4'-0"	2'-7"	6'-3"
48"	4'-0"	4'-0"	2'-10"	7'-10"
54"	4'-6"	4'-0"	3'-2"	9'-5"
60"	5'-0"	4'-0"	3'-5"	10'-11"
66"	5'-6"	4'-6"	3'-9"	12'-6"
72"	6'-0"	5'-0"	4'-0"	14'-0"

Note:- Where M.Hs. are shallower than the minimum depth "d" special construction must be provided.

FOLDER NO. M-14

:a

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS — BUREAU OF ENGINEERING

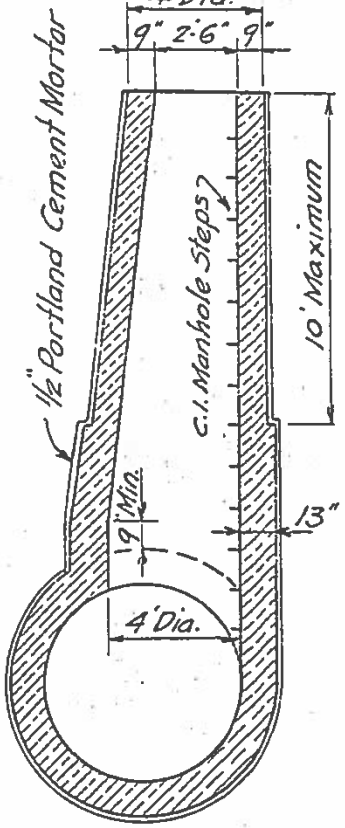
BRICK SEWERS AND MANHOLES OVER BRICK SEWERS

Approved Jan 4 37 — ENG'R IN CHARGE B. OF E.

Approved Jan. 8, 1937 — CHIEF ENG'R D.P.W.

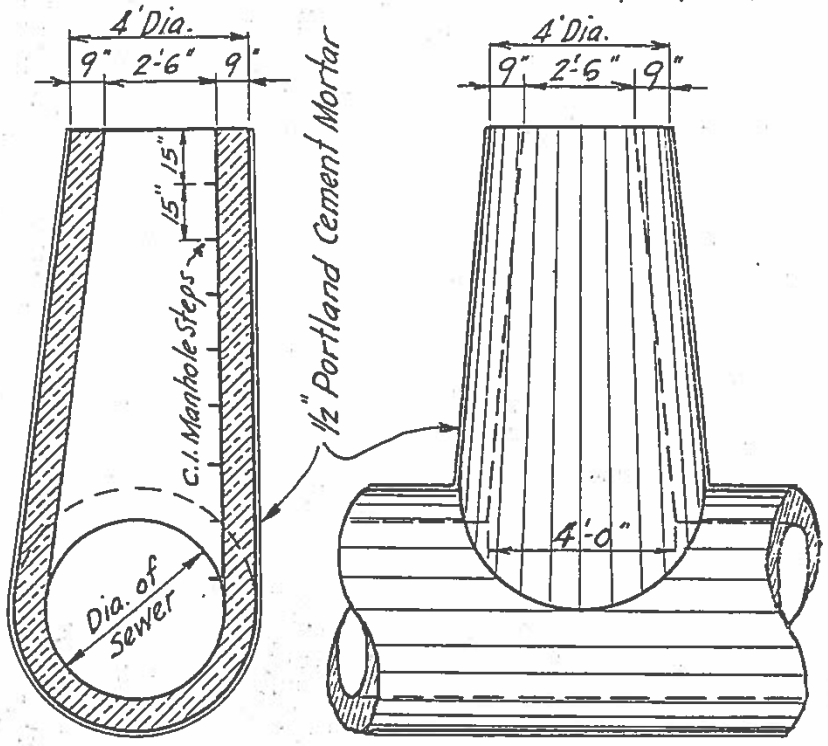
Approved Jan 7 1937 — DIRECTOR

Approved Jan. 6, 1937
Earl M. Vetter
DESIGNING ENG'R



CROSS SECTION

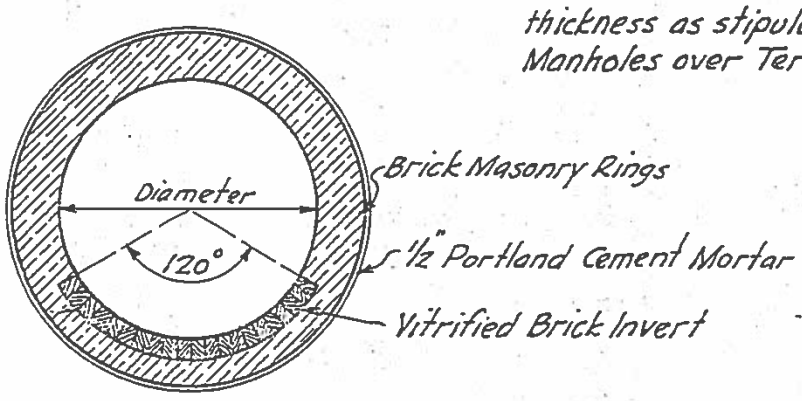
BRICK MANHOLE
ON SEWER OVER 48" IN DIA.



CROSS SECTION

BRICK MANHOLE OVER BRICK SEWERS
36" TO 48" IN DIAMETER

Construct Brick Manhole of Walls with thickness as stipulated on Standard for Manholes over Terra Cotta Pipe Sewers.



BRICK SEWER SECTION

FOLDER No. M-14

20

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS — BUREAU OF ENGINEERING

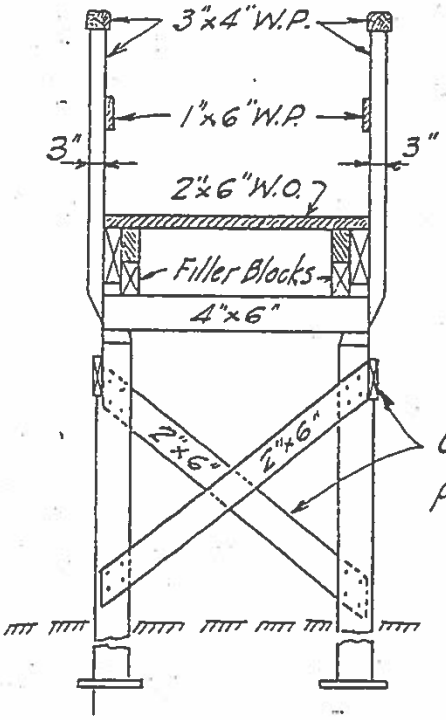
STANDARD WOODEN STEPS

Approved 9-28-38
Chief Engr. Bur. of E.

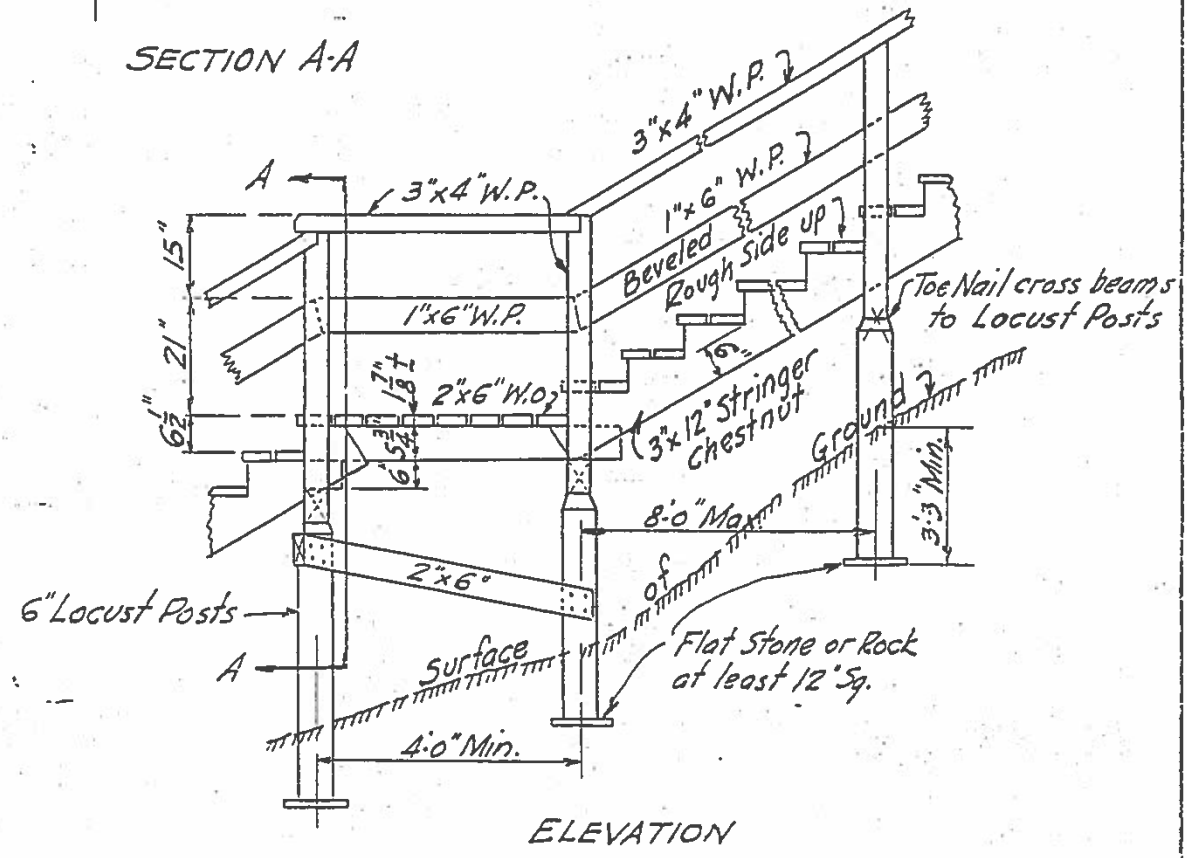
Approved 10-11-38
Chief Engr. D.P.W.

Approved 10/11/38
Director

Approved 9-27-38
Division Engr.



SECTION A-A



ELEVATION

TOLDEN No. WI-15

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS — BUREAU OF ENGINEERING

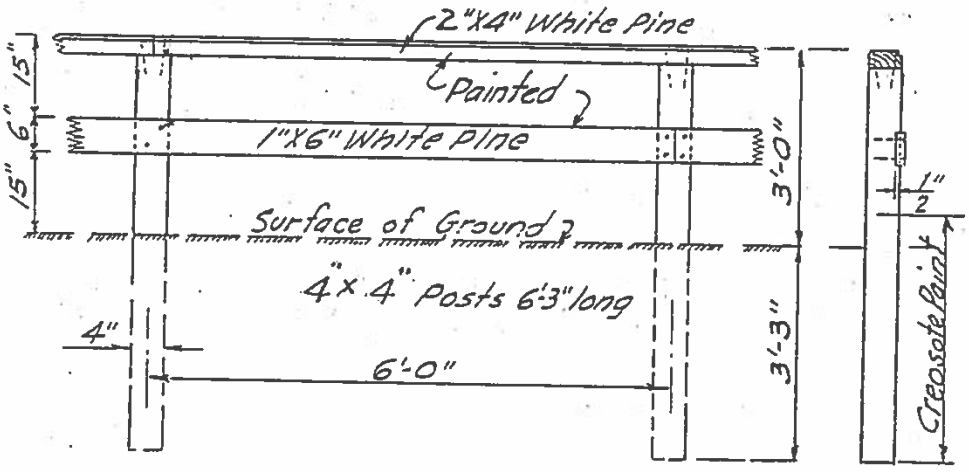
STANDARD WOODEN FENCE AND WOODEN BARRIER

Approved 9-28-38
Earl M. Vetter
CHIEF ENG'R. BofE.

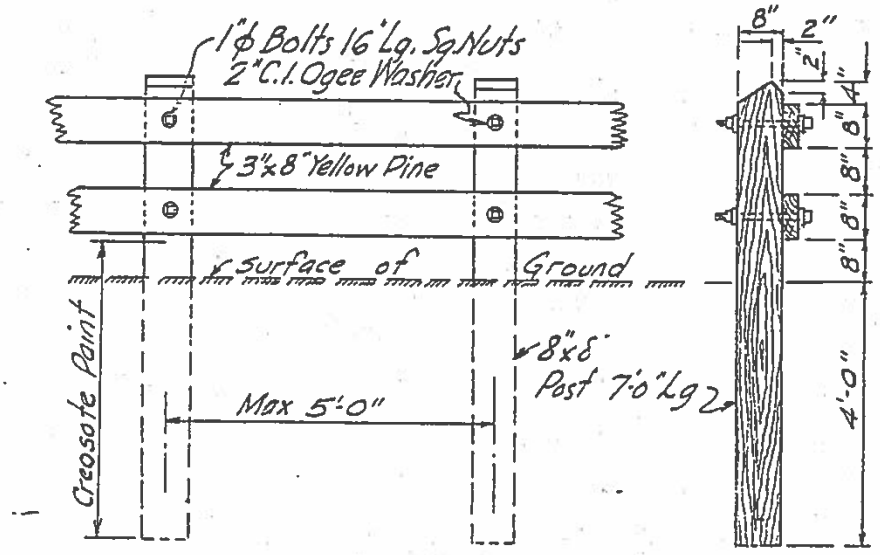
Approved 10-11-38
John J. Crook
CHIEF ENG'R D.P.W.

Approved 10/11/38
DIRECTOR

Approved 9-27-38
B. J. Gordon
DIVISION ENGR.



DETAIL OF WOODEN FENCE



DETAIL OF WOODEN BARRIER

FOLDER NO. M-15

CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS — BUREAU OF ENGINEERING

STANDARD SIDEWALK PAVEMENTS

ARRANGEMENT AND CONSTRUCTION

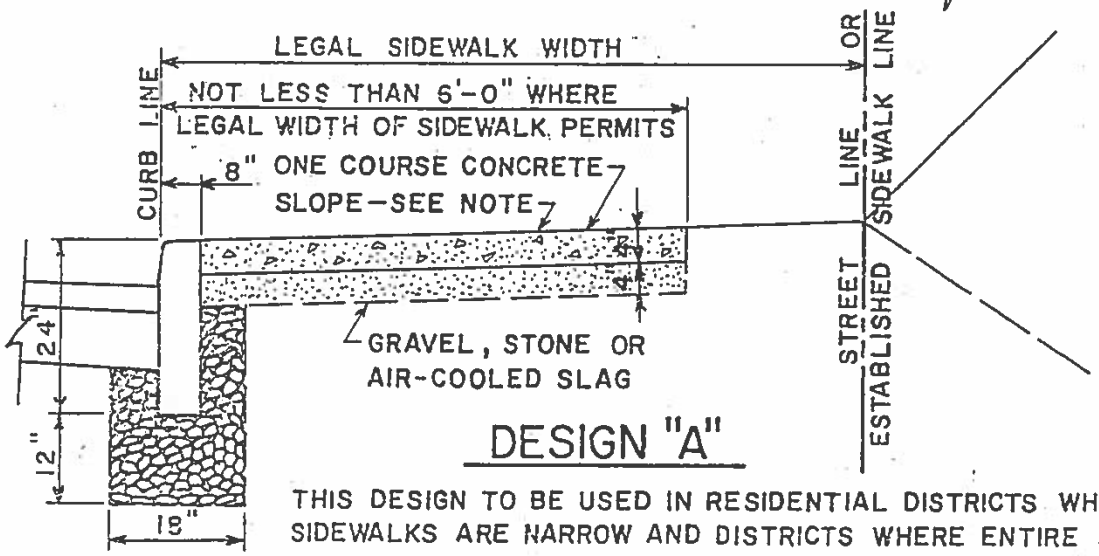
Approved 9-11-78 — DIVISION ENGR. DESIGN

Approved 9-11-78 — DIRECTOR OF ENGR. D.P.W.

Approved — DIRECTOR

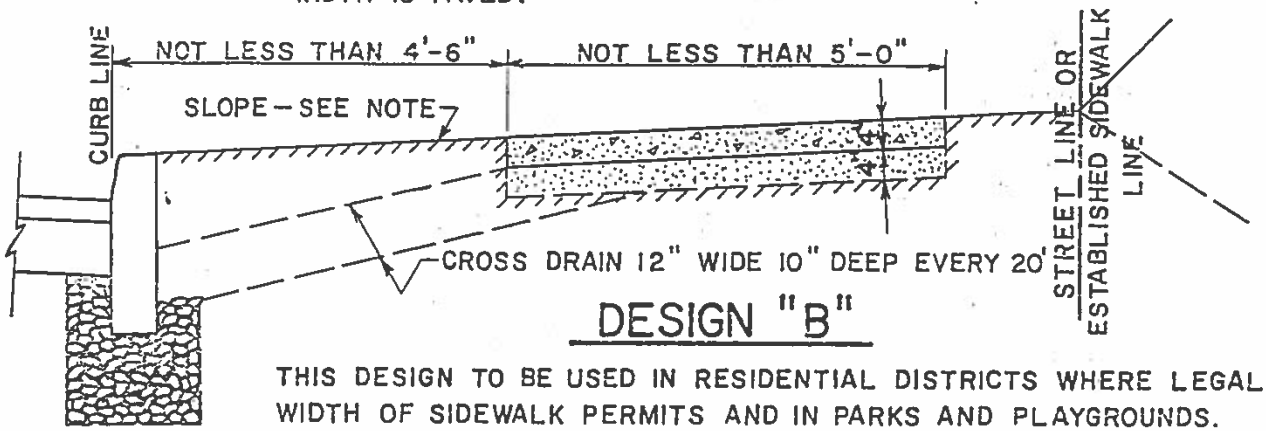
Approved 9/11/78 — DIVISION ENGR. STREETS

NOTE: THIS DRAWING SUPERSEDES 1938 5" DEPTH ON SIDEWALK SPECIFICATIONS



DESIGN "A"

THIS DESIGN TO BE USED IN RESIDENTIAL DISTRICTS WHERE SIDEWALKS ARE NARROW AND DISTRICTS WHERE ENTIRE SIDEWALK WIDTH IS PAVED.



DESIGN "B"

THIS DESIGN TO BE USED IN RESIDENTIAL DISTRICTS WHERE LEGAL WIDTH OF SIDEWALK PERMITS AND IN PARKS AND PLAYGROUNDS.

SLOPE OF SIDEWALKS

ON GRADES UP TO 2 PERCENT 1/2" IN 1 FT.
ON GRADES ABOVE 2 TO 7 PERCENT 3/8" IN 1 FT.
ON GRADES ABOVE 7 PERCENT 1/4" IN 1 FT.

THE ABOVE DESIGNS SHALL BE USED WHERE PRACTICAL AND WITH DUE CONSIDERATION TO EXISTING CONSTRUCTION AND CHARACTER OF IMPROVEMENTS IN THE COMMUNITY AFFECTED.

AROUND ALL POLES, FIRE HYDRANTS, OR OTHER STRUCTURES, PROVIDE A FULL DEPTH CONSTRUCTION JOINT IN THE SIDEWALK 6" CLEAR OF THE POLE OR STRUCTURE.

FOLDER NO. M-15

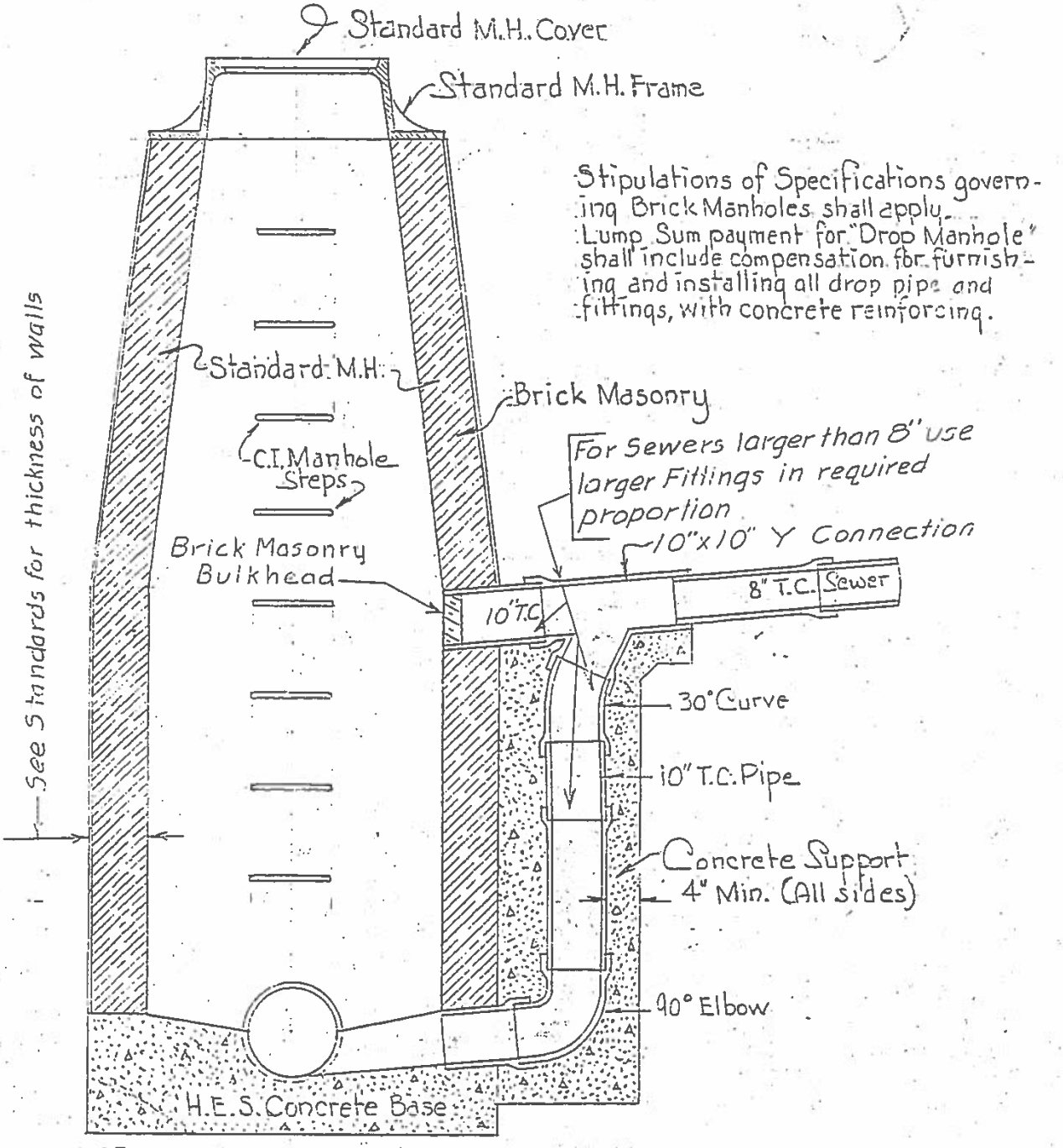
CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS BUREAU OF ENGINEERING

DETAIL OF DROP MANHOLE

Approved 3-18-44 Approved 3-18-44 Approved

DESIGNING ENGINEER ASST. CHIEF ENGR. D.P.W. DIRECTOR



ACCESSION NO. ML-183

FOLDER NO. M-16

REVISED 7-18-45

24

CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS BUREAU OF ENGINEERING

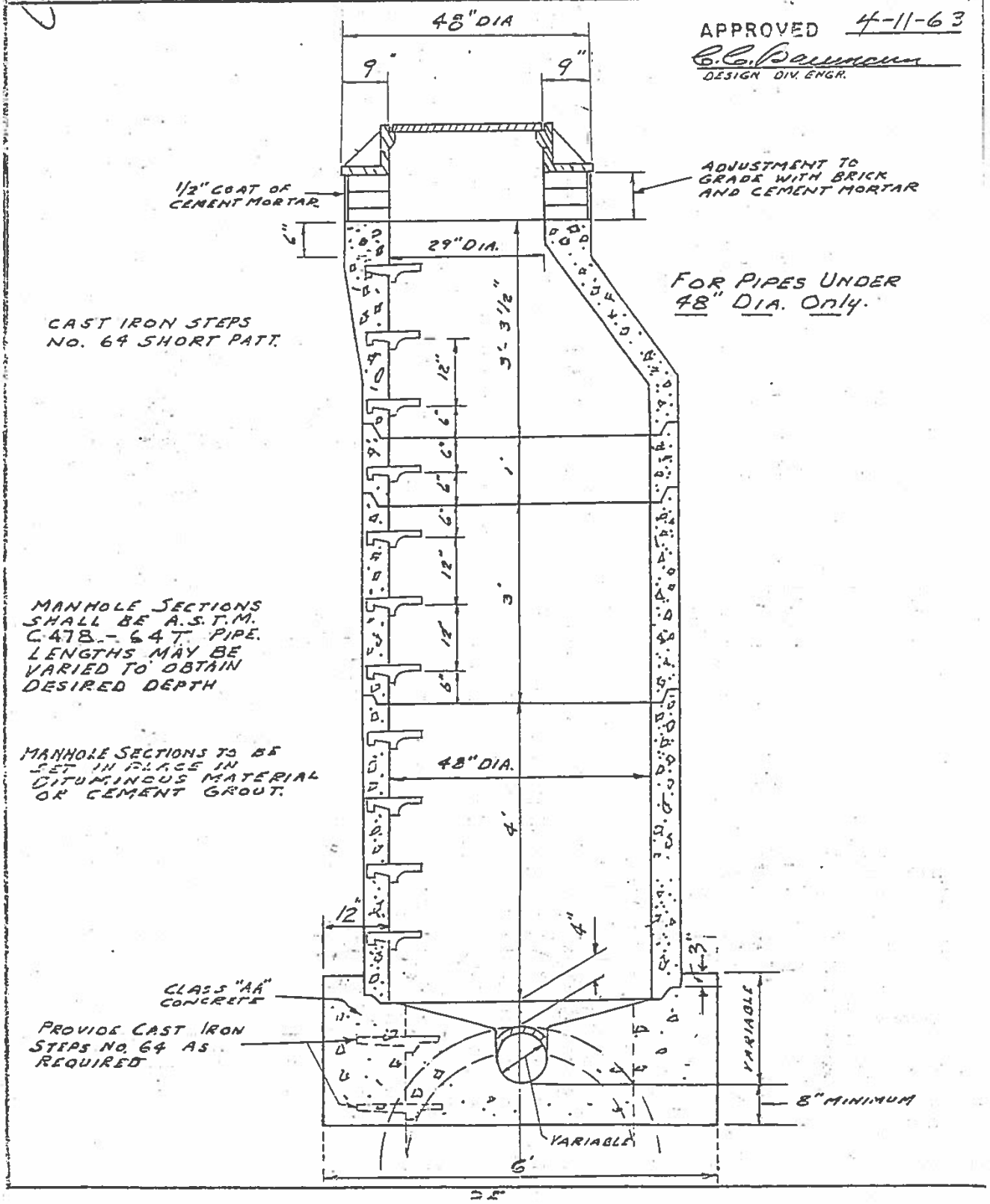
PRE-CAST CONCRETE MANHOLE

APPROVED 4-11-63
ASST. CHIEF ENGR. DPW

APPROVED 4-11-63
CHIEF ENGR. DPW

APPROVED 4-11-63
DIRECTOR

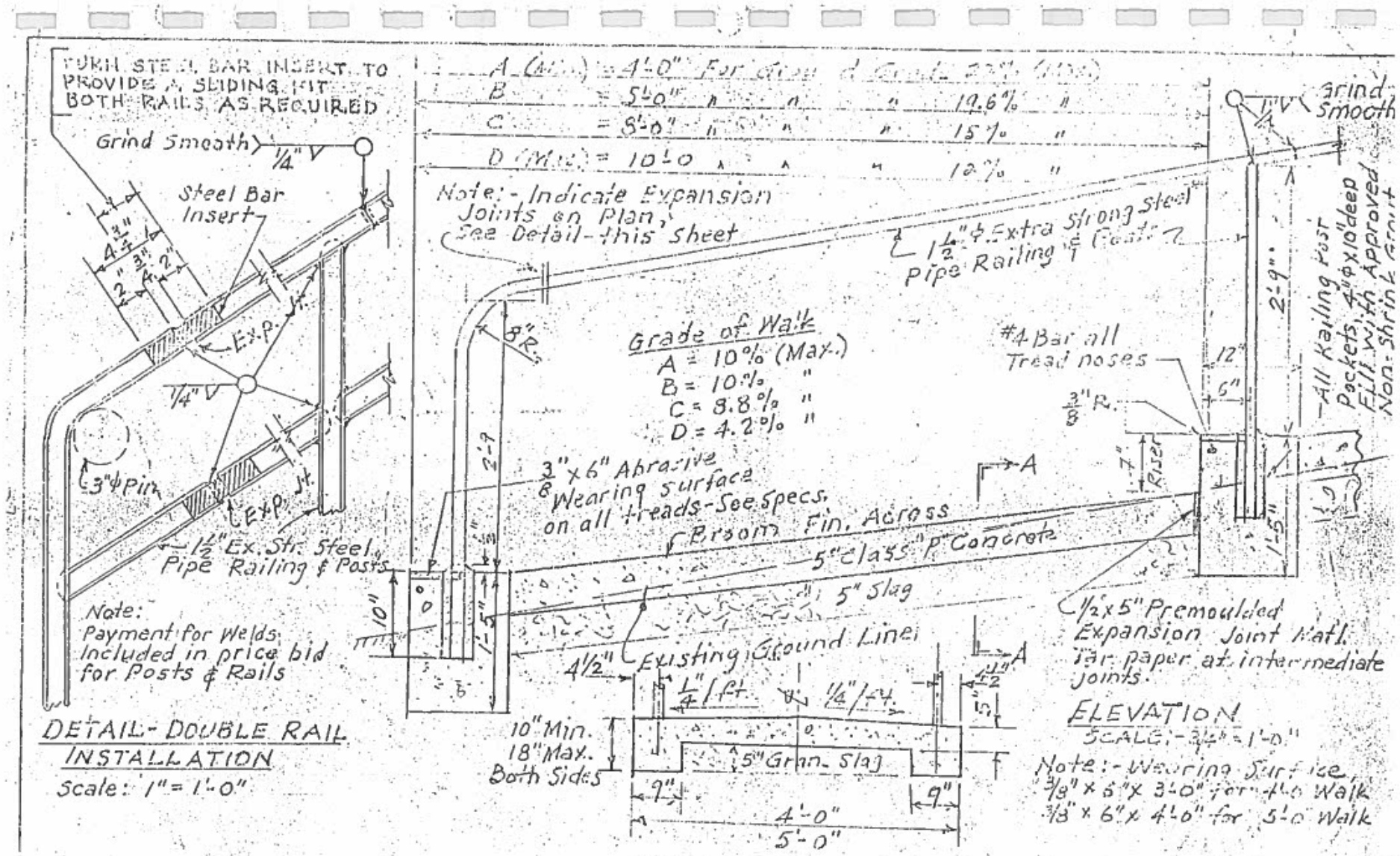
APPROVED 4-11-63
DESIGN DIV. ENGR.



ACCESSION NO. M-1-173
FOLDER NO. M-15

ITEM	FRAME			LID			GRATING			WEIR			STENCH			TOTAL WT. PER UNIT
	WT.	CAST. NO.	ACC. NO.	WT.	CAST. NO.	ACC. NO.	WT.	CAST. NO.	ACC. NO.	WT.	CAST. NO.	ACC. NO.	WT.	CAST. NO.	ACC. NO.	
C.B. TYPE 1-STRAIGHT	604	48	M-84	104	47	M-84				133	8	M-84	294	17	M-74	1105
C.B. TYPE 1-6' RAD.	589	49	M-85	104	47	M-84				158	9	M-85	294	17	M-74	1145
C.B. TYPE 1-12' RAD.	592	50	M-85	104	47	M-84				142	51	M-85	294	17	"	1132
C.B. TYPE 3-STRAIGHT	328	11	M-73	81	2	M-72				96	12	M-73	294	17	"	709
C.B. TYPE 4-STRAIGHT	713	19	M-75				244	20	M-75				294	17	"	1251
C.B. TYPE 5 STRAIGHT	433	69	M-125				149	68	M-125				294	17	"	876
C.B. TYPE 6 STRAIGHT	724	60-66	M-86				244	42	M-75				294	17	"	1262
C.B. TYPE 8 STRAIGHT	250	Allghy. Foundry Cast No FRAME #160 LID #161											294	17	"	544
C.B. TYPE 9 (4FT.) STR.	670	76	M-125	BAR 85	73	M-125	327	71	M-125				280	79	M-125	1352
C.B. TYPE 10 (6FT.) STR.	892	78	"	BAR 126	74	"	500	72	"				280	79	M-125	1728
C.B. TYPE 11 (4FT.) STR.	600	75	"	BAR 85	73	"	327	71	"	90° REINF. BARS IN CURB			294	17	M-74	1306
C.B. TYPE 12 (6FT.) STR.	792	77	"	BAR 126	74	"	500	72	"	120° REINF. BARS IN CURB			294	17	M-74	1832
S.I. TYPE 1-STRAIGHT	604	48	M-84	104	47	M-84				133	8	M-84				841
S.I. TYPE 1-6' RAD.	589	49	M-85	104	47	"				158	9	M-85				881
S.I. TYPE 1-12' RAD.	592	50	M-85	104	47	"				142	51	M-85				868
S.I. TYPE 2-STRAIGHT	604	48	M-84	104	47	"				133	8	M-84				841
S.I. TYPE 2-6' RAD.	589	49	M-85	104	47	"				158	9	M-85				881
S.I. TYPE 2-12' RAD.	592	50	M-85	104	47	"				142	51	M-85				868
S.I. TYPE 5-STRAIGHT	433	69	M-125				149	68	M-125							532
S.I. TYPE 6-STRAIGHT	724	60-66	M-85				244	42	M-75							968
S.I. TYPE 9 (4FT.) STR.	670	76	"	BAR 85	73	M-125	327	71	M-125							1032
S.I. TYPE 10 (6FT.) STR.	892	78	"	BAR 126	74	"	500	72	"							1518
S.I. TYPE 11 (4FT.) STR.	600	75	"	BAR 85	73	"	327	71	"	90° REINF. BARS IN CURB						1102 ✓
S.I. TYPE 12 (6FT.) STR.	792	77	"	BAR 126	74	"	500	72	"	120° REINF. BARS IN CURB						1538
MANHOLE-6" FRAME	283	65	M-76	216	25	M-76										499
MANHOLE-9" FRAME	572	26	M-76	216	25	M-76										788
MANHOLE-13" FRAME	744	23	M-76	216	25	M-76										960
8' Depth-MANHOLE STEPS	13/step	64	M-74	6 STEPS												78
10' " " "	"	"	"	8 STEPS												104
15' " " "	"	"	"	12 STEPS												156
20' " " "	"	"	"	16 STEPS												208
C.B. Type 11																1250
C.B. Type 12																1686

Hook No. 404
Trap No. 402-15
Allghy. Fdry. or Eq.
Wt. 19 Lbs.



CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS BUREAU OF ENGINEERING

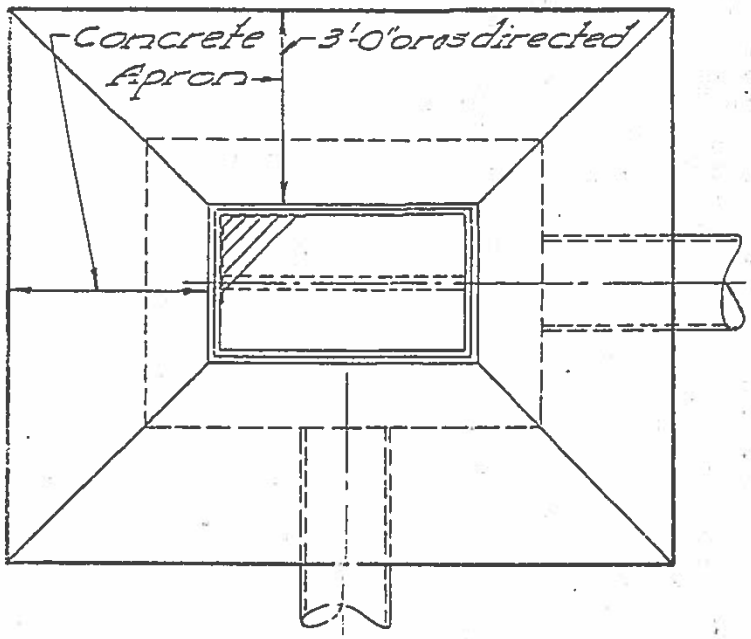
STORM INLET TYPES 9 & 10

Approved 4-14-53
ASST. CHIEF ENGR. D.P.W.

Approved 4-14-53
CHIEF ENGR. D.P.W.

Approved 4-14-53
DIRECTOR

Approved 4/14/53
SR. DES. ENGR. DESIGN

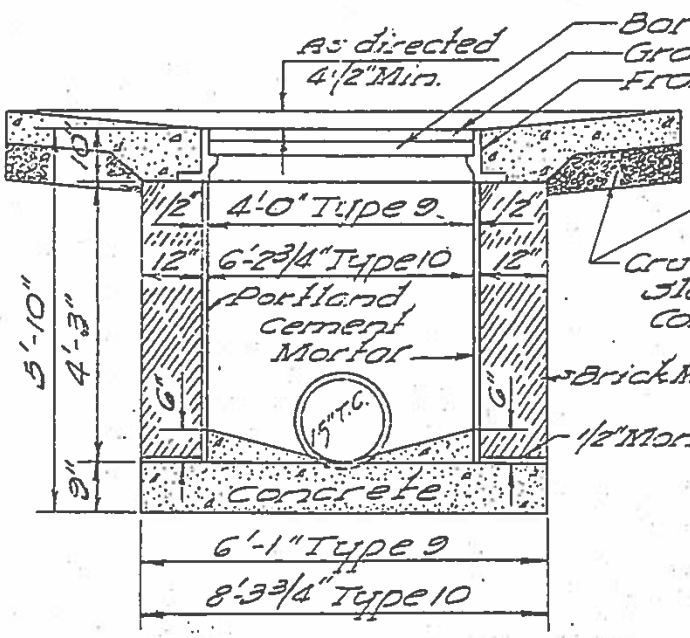


PLAN

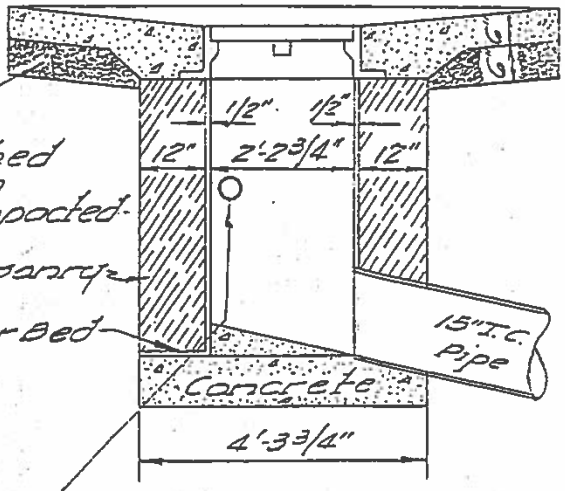
See Specifications for excavation, construction and backfilling with slag cement mixture.

Concrete for storm inlet base shall be class A and shall be mixed with high early strength special cement.

All outside joints to be struck flush.



LONGITUDINAL SECTION



CROSS SECTION

6" I.C. Pipe to drain curb ditches where required

Rev. 4-6-53

FOLDER No. M-16

38

CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS BUREAU OF ENGINEERING

STORM INLET TYPES 11 & 12

APPROVED 11-24-54 — SR. ASS'T. ENGR. DESIGN

APPROVED 11-24-54 — CHIEF ENGR. D.P.W.

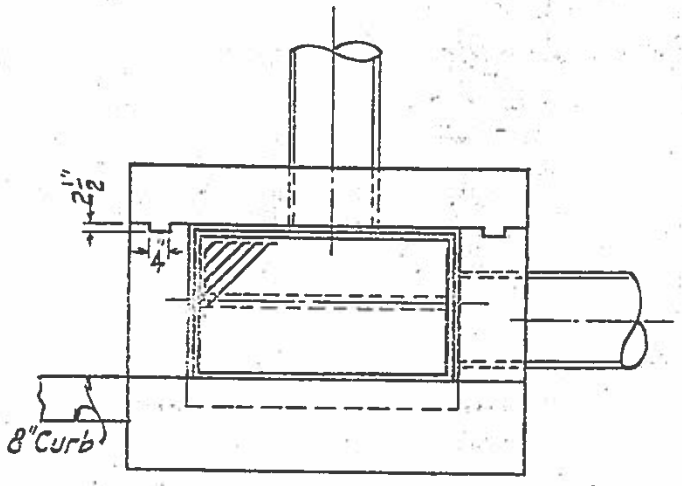
APPROVED — DIRECTOR

REVISED 9-8-55

See Specifications for excavation, construction and backfilling with Slag Cement mixture.

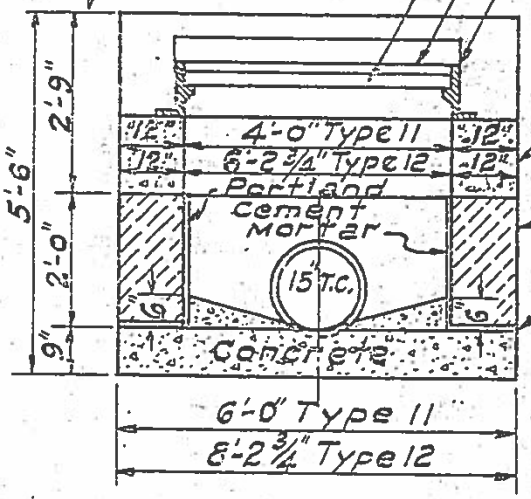
All concrete shall be Class A and shall be mixed with high early strength special cement.

All outside joints to be struck flush.

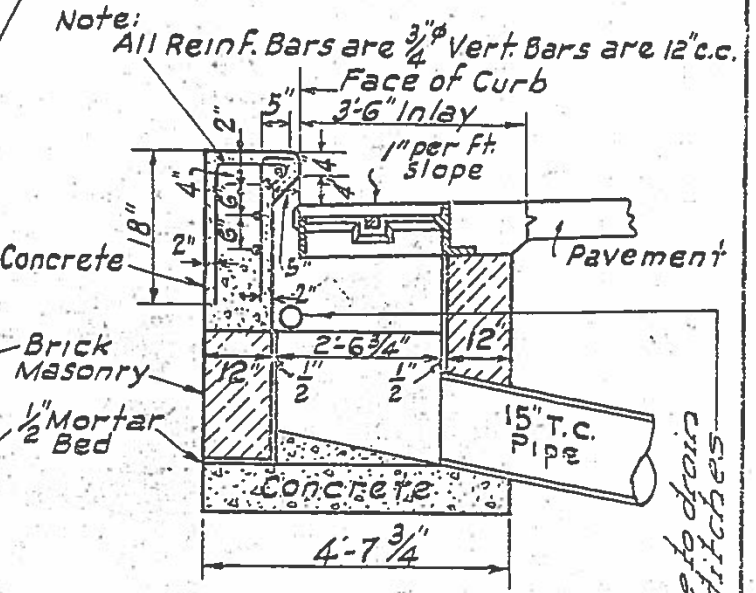


PLAN

Bar Casting No. 73 S.I. #11 - No. 74 S.I. #12
Grating Casting No. 71 S.I. #11 - No. 72 S.I. #12
Frame Casting No. 75 S.I. #11 - No. 77 S.I. #12



LONGITUDINAL SECTION



CROSS SECTION

15" T.C. Storm Sewer Pipe

ACCESSION NO. MG-188
FOLDER NO. M-16

CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS BUREAU OF ENGINEERING

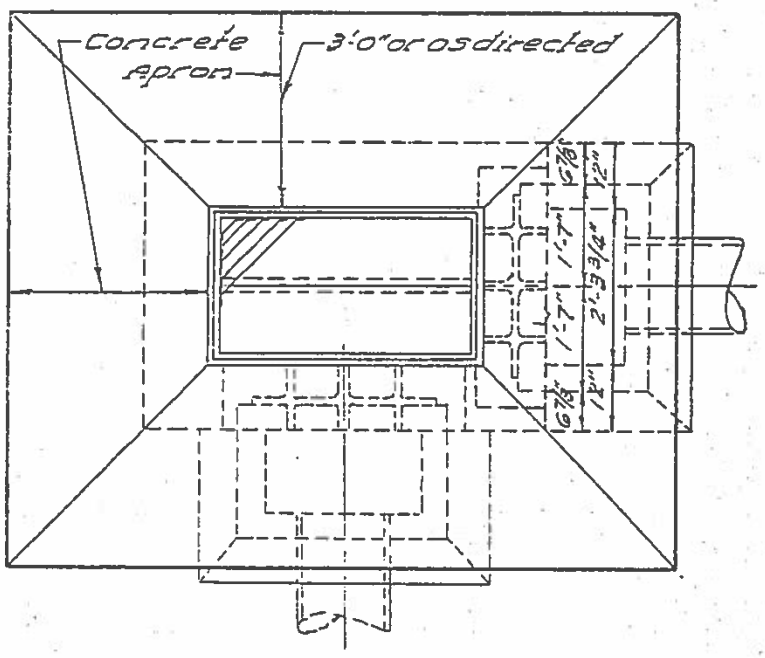
CATCH BASIN TYPES 9 & 10

Approved 4-14-53
ASST. CHIEF ENGR. D.P.W.

Approved 4-14-53
CHIEF ENGR. D.P.W.

Approved 4-14-53
DIRECTOR

Approved 4/14/53
ASST. DES. ENGR. DESIGN



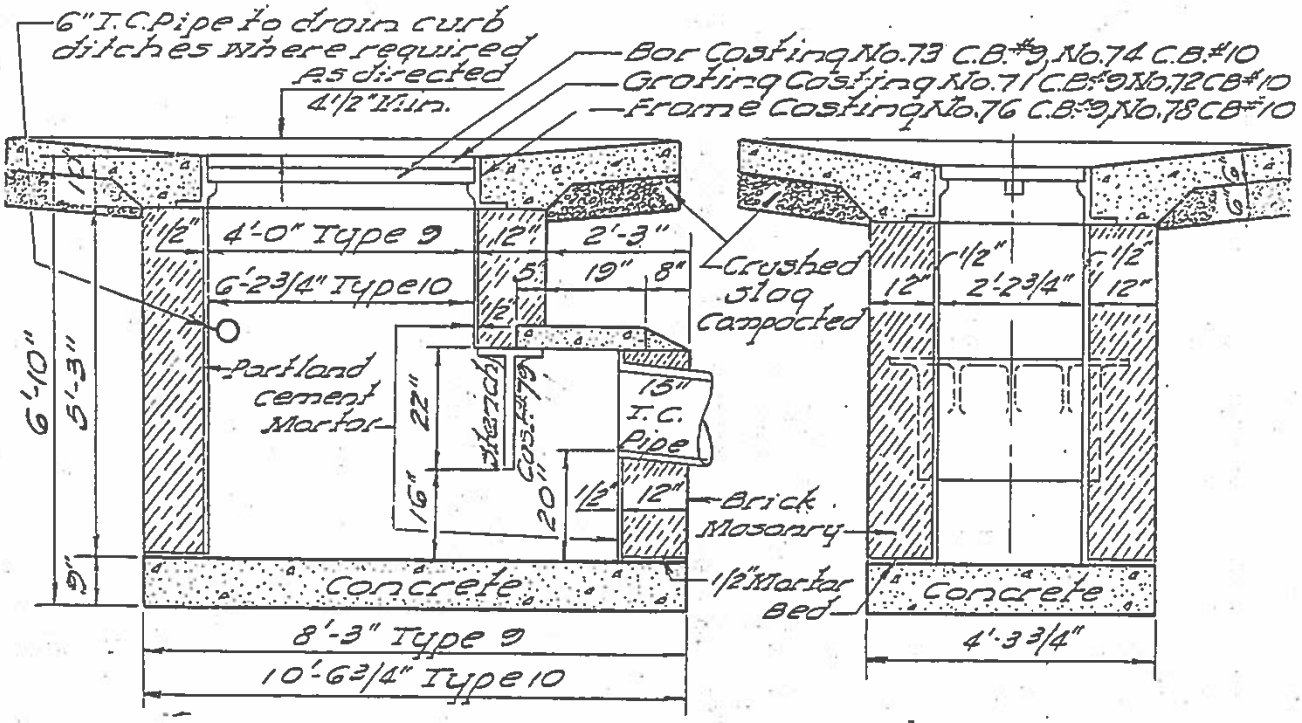
PLAN

See specifications for excavation, construction and backfilling with slag-cement mixture.

Concrete for catch basin base and stench chamber top shall be class A and shall be mixed with high early strength special cement.

Cast stench chamber slabs in two pieces, 24"x4'x19" each reinforced with wire mesh not less than 0.8 lbs. per sq.ft. set in mortar bed.

All outside joints to be struck flush.



LONGITUDINAL SECTION

CROSS SECTION

Rev. 9-3-55

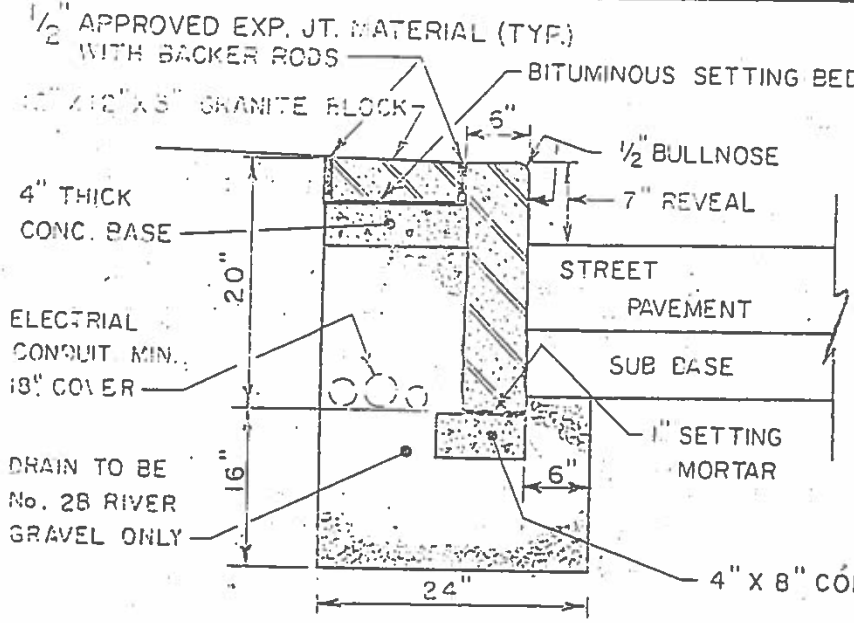
FOLDER. No. M-16

CITY OF PITTSBURGH

DEPARTMENT OF PUBLIC WORKS — BUREAU OF ENGINEERING

GRANITE CURBS AND PRIVATE DRIVEWAYS

Don Waldorf — DESIGN DIV. ENGR.	2-5-82 APPROVED	Frank L. Pline — CITY ENGR.	2-5-82 APPROVED
A J Tarasi — STREET DIV. ENGR.	2-5-82 APPROVED	— DIRECTOR	2-5-82 APPROVED



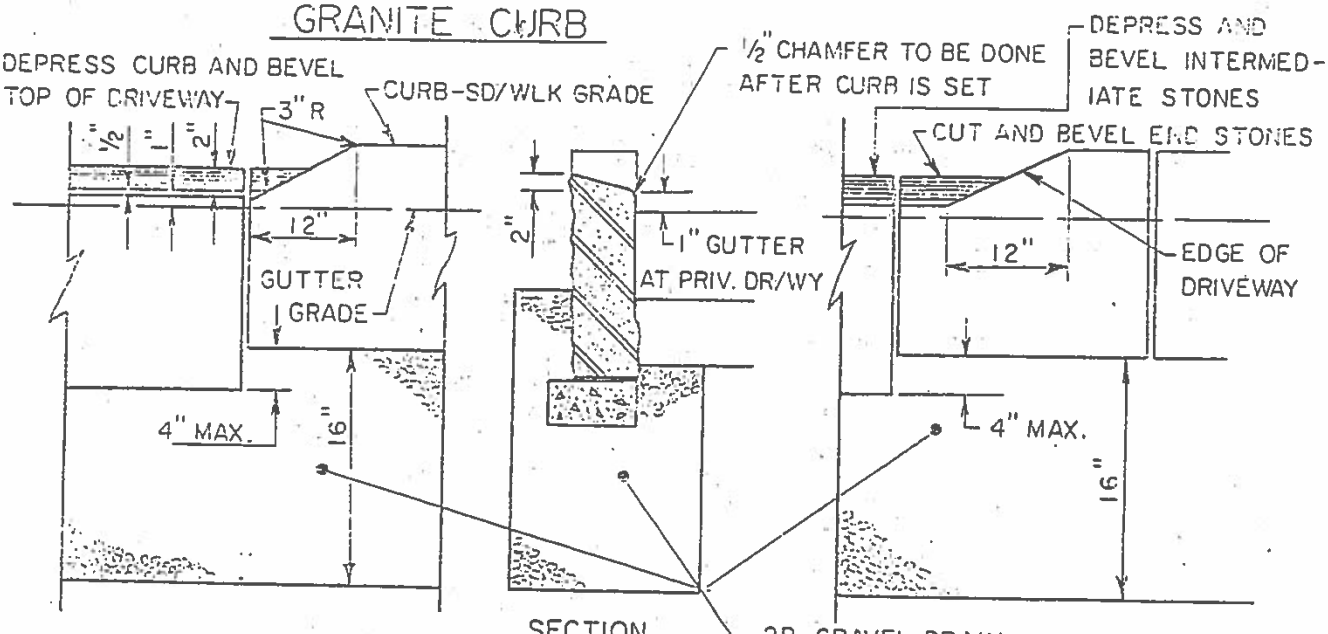
NOTE:

ALL GRANITE CURBS AND UTILITY ACCESS BLOCKS ARE TO BE WHITE UNIFORM IN COLOR WITH MEDIUM FINE GRAIN.

GRANITE CURBS TO BE SAWED AND ALL EXPOSED SURFACES TO HAVE FLAME FINISH.

UTILITY ACCESS BLOCKS MAY BE DELETED AT PRIVATE DRIVEWAY LOCATIONS AND ADJUSTED IN THICKNESS WHERE VAULTS INTERFERE

GRANITE CURB



CONSTRUCTION FOR PRIVATE DRIVEWAY WITH GRANITE CURB

REVISED 12-20-82

41

ML-244 FOL. M-18

CITY OF PITTSBURGH
DEPT OF PUBLIC WORKS — BUREAU OF ENGINEERING

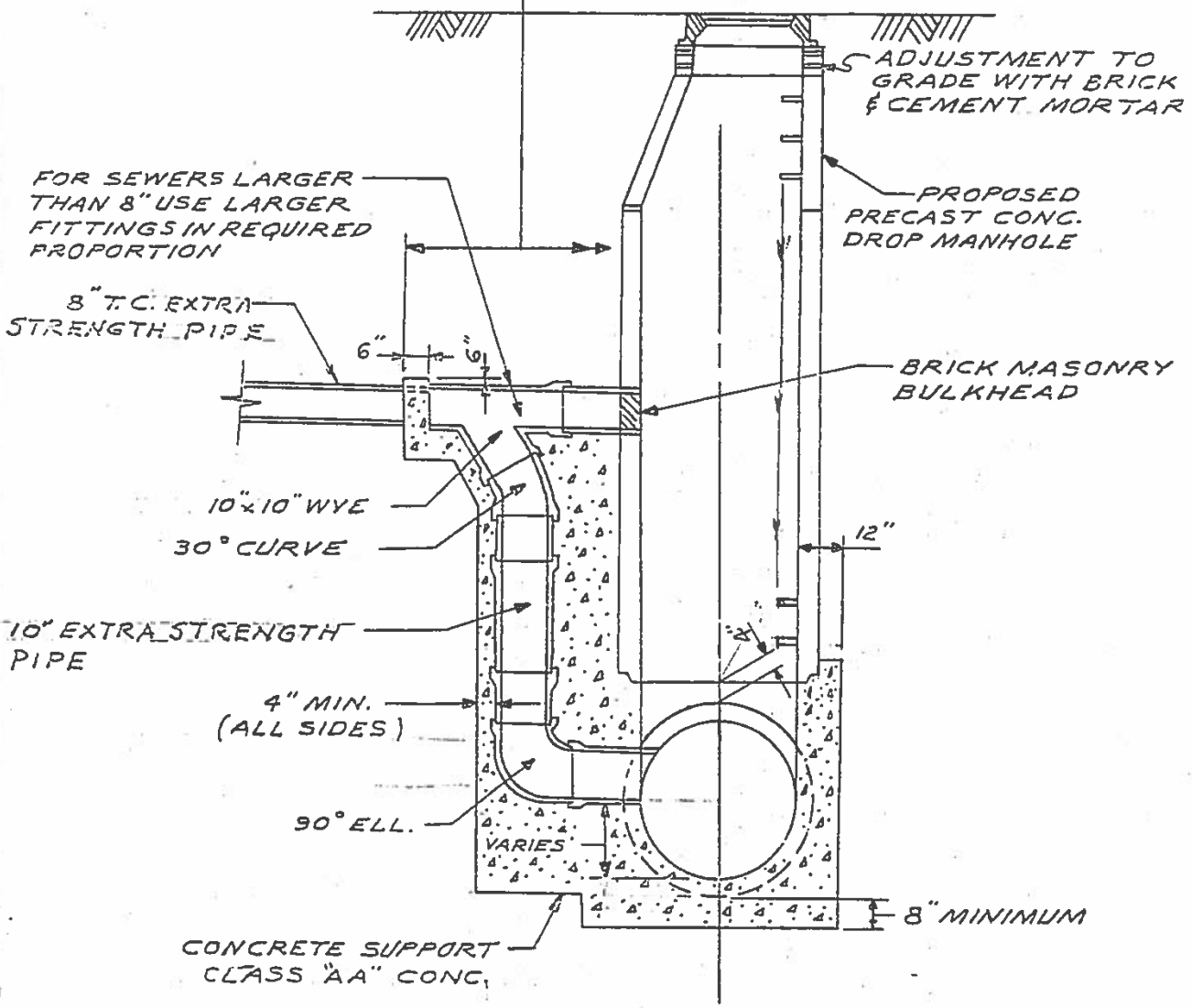
DETAIL PRECAST CONC DROP MANHOLE

APPROVED 3-21-67 — Anthony L Tarasi, DES. DIV. ENGR.

APPROVED 4-28-67 — ACTING CITY ENGR.

APPROVED 4/28/67 — DIRECTOR

DWG NO. ML-193 FOL M-16 GOVERNING PRECAST CONC. MANHOLE SHALL APPLY. LUMP SUM PAYMENT FOR PRECAST "DROP MANHOLE" SHALL INCLUDE COMPENSATION FOR FURNISHING AND INSTALLING ALL DROP PIPE AND FITTINGS WITH CONCRETE REINFORCING



DWN: A. PERELLA 3-6-67

SHEET 1 OF 2

ACCESSION NO. ML-210
FOLDER NO. M-16

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS BUREAU OF ENGINEERING

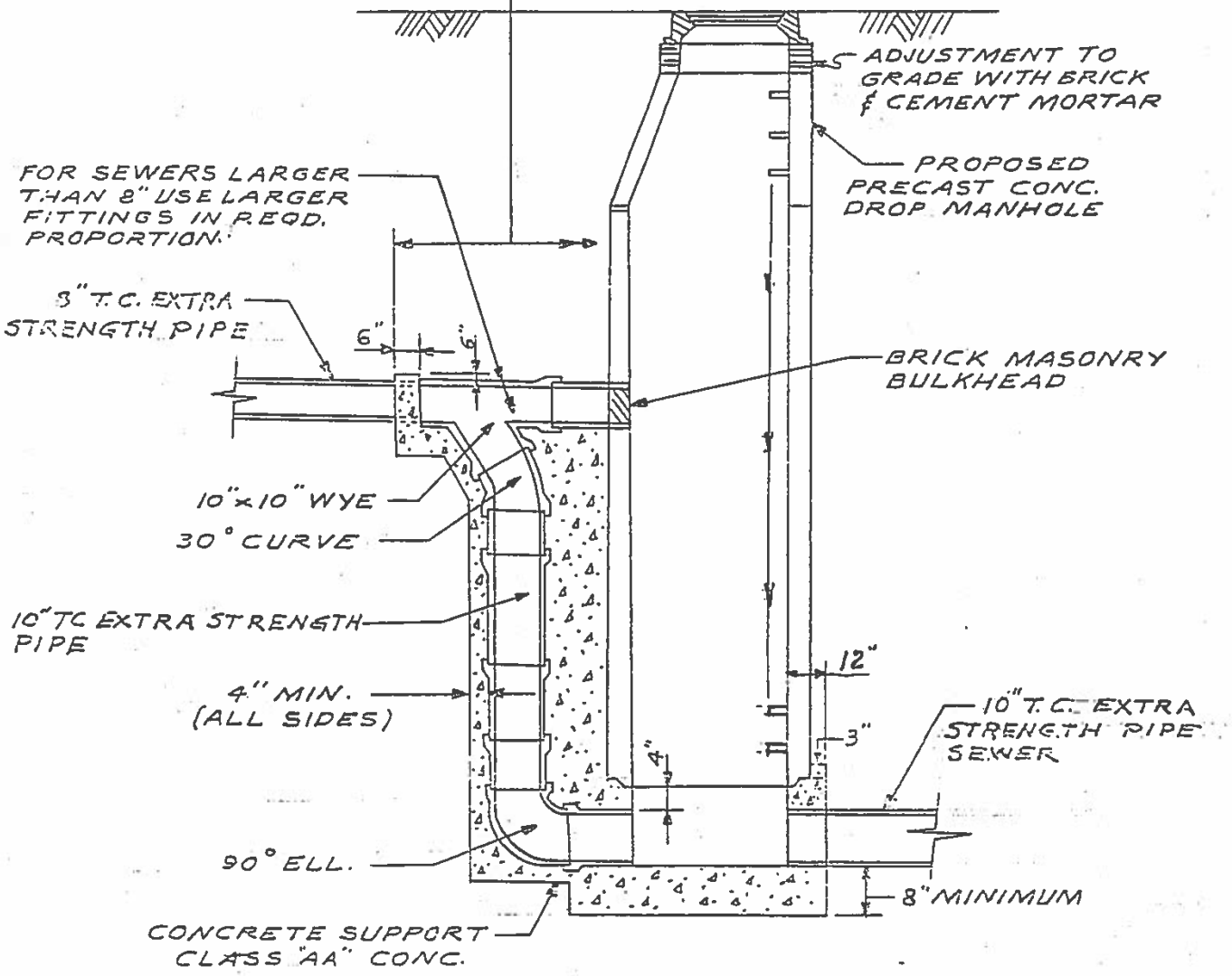
DETAIL PRECAST CONC DROP MANHOLE

APPROVED 3-21-67 Anthony J Tarasi DES DIV ENGR

APPROVED 4-28-67 John K Roth ACTING CITY ENGR

APPROVED 11-1-67 [illegible] DIRECTOR

DWG NO. ML-193 FOL. M-16 GOVERNING PRECAST CONC. MANHOLE SHALL APPLY. LUMP SUM PAYMENT FOR PRECAST "DROP MANHOLE" SHALL INCLUDE COMPENSATION FOR FURNISHING AND INSTALLING ALL DROP PIPE AND FITTINGS WITH CONCRETE REINFORCING



DWN: A. PERELLA 3-8-67

ACCESSION NO. ML-210-A

SHEET 2 OF 2 FOLDER NO. M-16

CITY OF PITTSBURGH
DEPT OF PUBLIC WORKS BUREAU OF ENGINEERING
PRE-CAST "T" SECTION MANHOLE & BASE

APPROVED 5-13-70 DESIGN DIV. ENGR. | APPROVED 5-14-70 CITY ENGR. D.P.W. | APPROVED DIRECTOR

City of Pittsburgh
Frame-Casting No.26
Cover-Casting No.25

½" Coat of Cement Mortar

Adjust to Grade With Brick and Cement Mortar

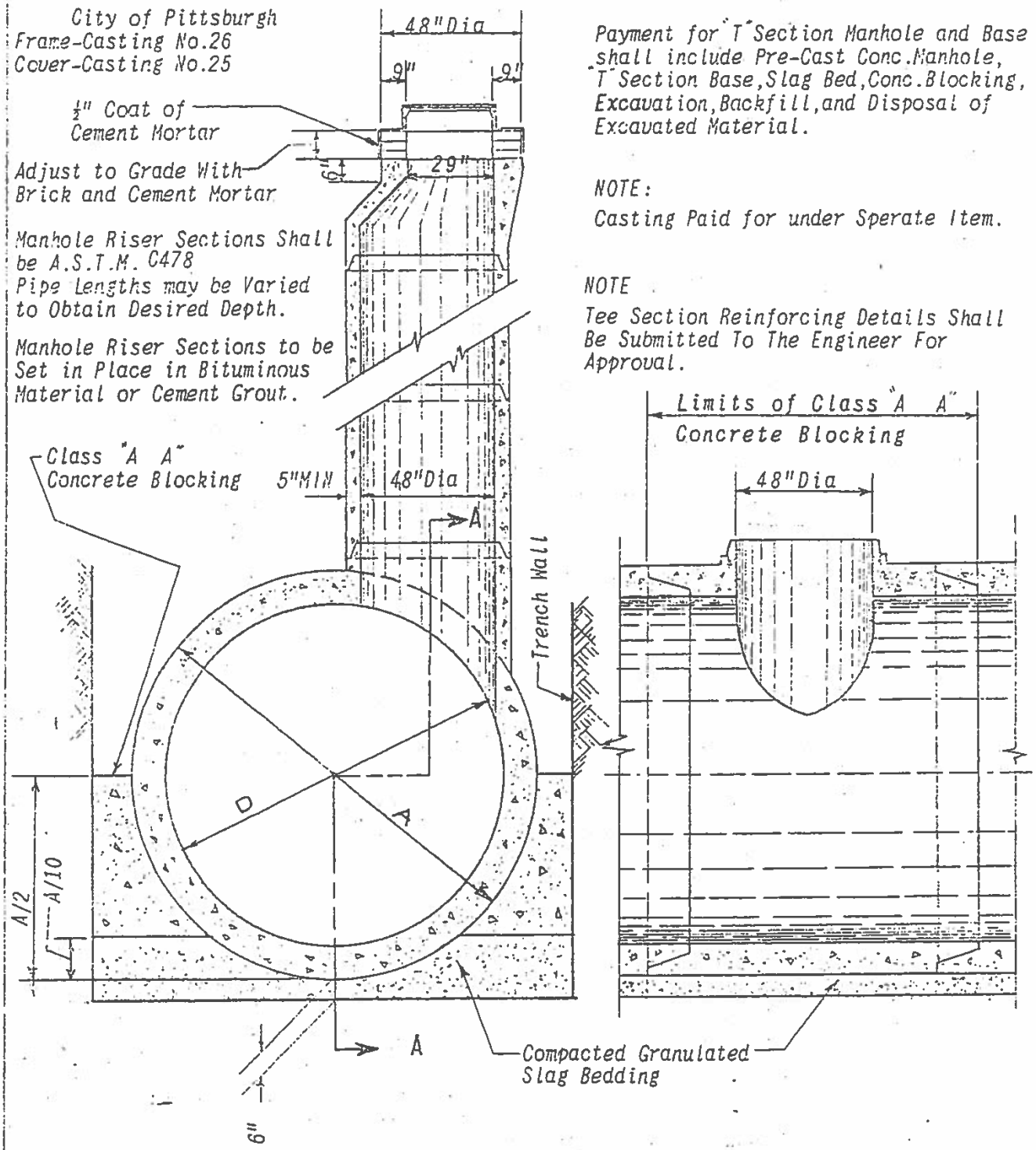
Manhole Riser Sections Shall be A.S.T.M. C478
Pipe Lengths may be Varied to Obtain Desired Depth.

Manhole Riser Sections to be Set in Place in Bituminous Material or Cement Grout.

Payment for "T" Section Manhole and Base shall include Pre-Cast Conc.Manhole, "T" Section Base, Slag Bed, Conc.Blocking, Excavation, Backfill, and Disposal of Excavated Material.

NOTE:
Casting Paid for under Sperate Item.

NOTE
Tee Section Reinforcing Details Shall Be Submitted To The Engineer For Approval.



CROSS SECTION SECTION "A-A"

Accession No. 14-218
Folder M-17

CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS BUREAU OF ENGINEERING

CATCH BASIN TYPES 11 & 12

APPROVED 5-13-70 — DESIGN CITY ENGR.

APPROVED 5-13-70 — CITY ENGR. D.P.W.

APPROVED 5-13-70 — DEPUTY DIRECTOR

Revised -5-7-70

NOTE: Hood must be sealed to C.B. wall with approved bituminastic sealer

NOTE: All Reinf. Bars are #6 Vert Bars are 12" C.C.

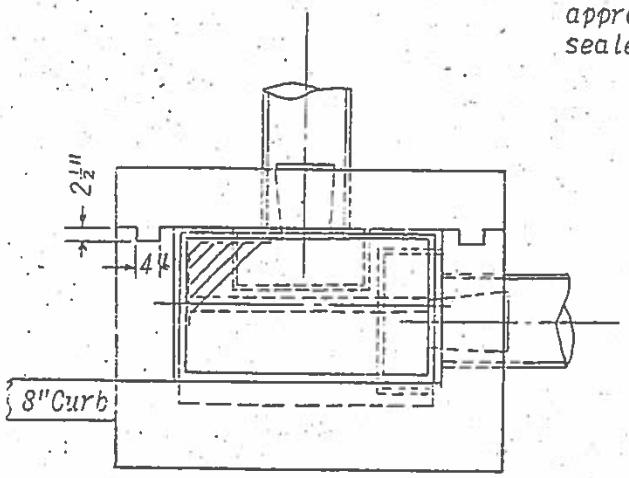
See Specifications for excavation, construction and backfilling with slag cement mixture.

All concrete shall be class "A A"

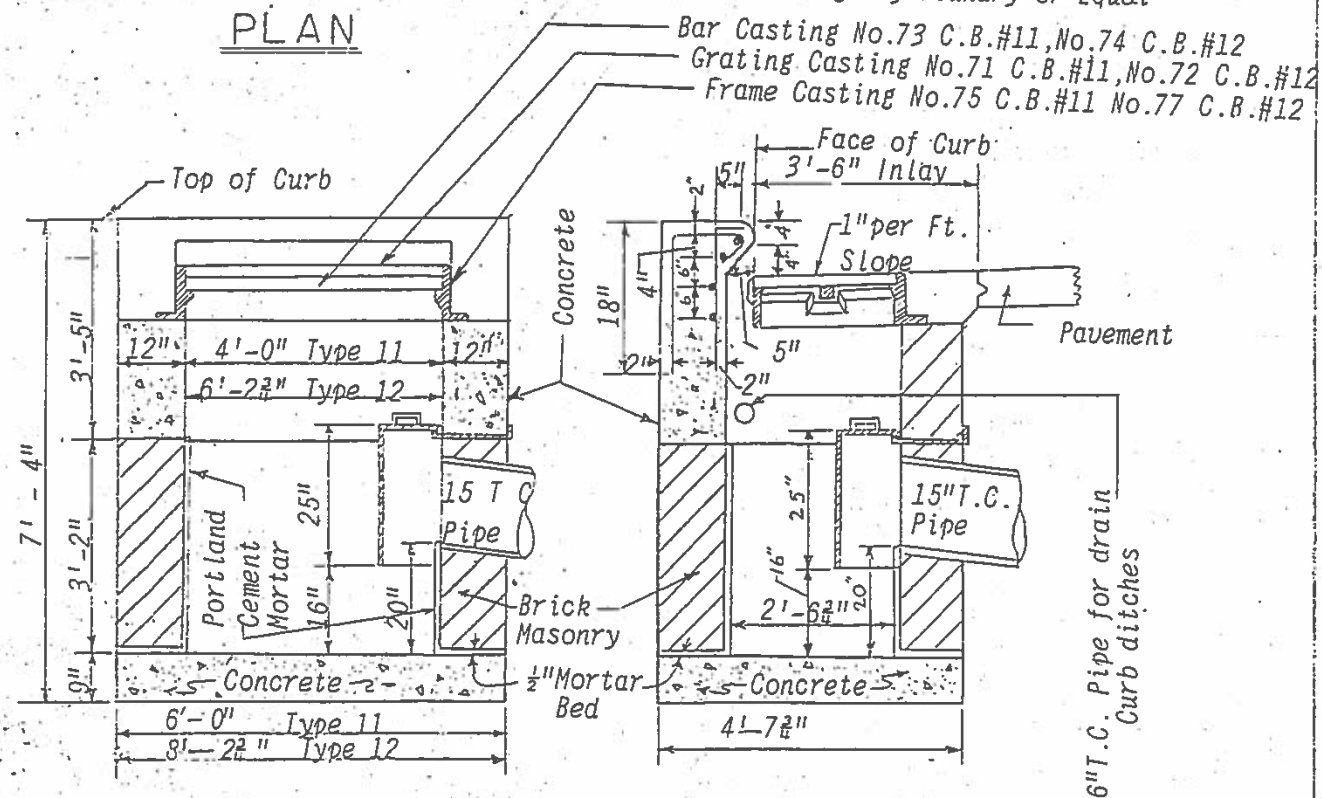
All outside joints to be struck flush.

Trap Pattern No.402-15 Allegheny Foundry or Equal

Hook Pattern No.404 Allegheny Foundry or Equal



PLAN



LONGITUDINAL SECTION CROSS SECTION

Folder M-17

4.5

CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS — BUREAU OF ENGINEERING

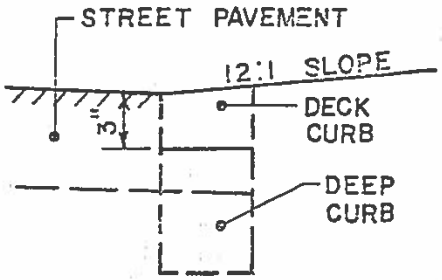
HANDICAP SIDEWALK RAMP

Approved 9-11-78 — DIVISION ENGR. DESIGN

Approved 9-11-78 — DIRECTOR OF ENGR. D.P.W.

Approved — DIRECTOR

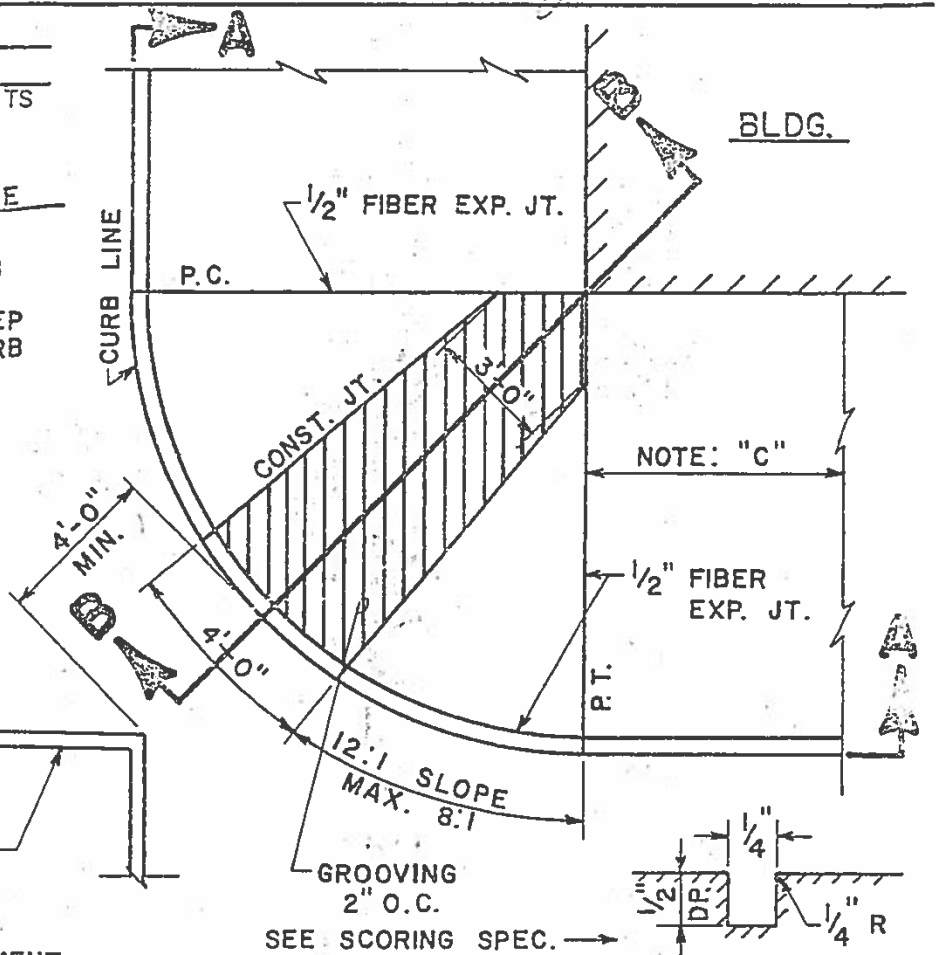
Approved 9/11/78 — DIVISION ENGR. STREETS



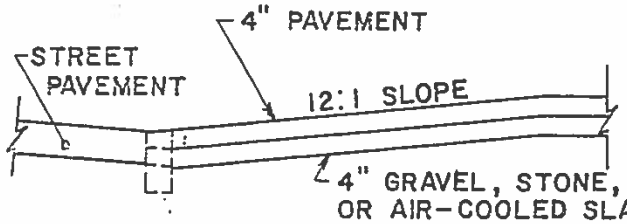
CURB DETAIL

"CAUTION"

NO CITY MONUMENTS ARE TO BE REMOVED OR DESTROYED DURING CONSTRUCTION.



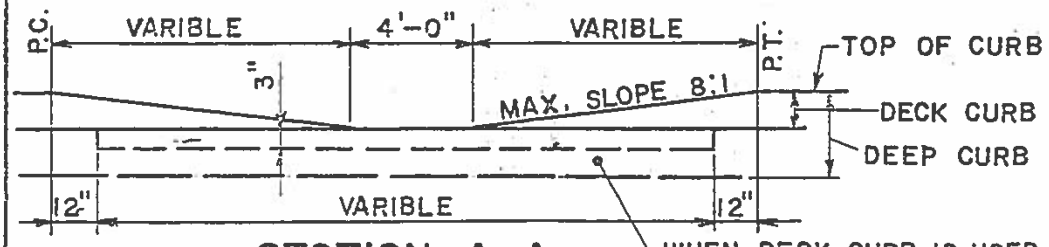
GROOVE DETAIL



SECTION B-B

NOTE "C"

WHEN THIS DISTANCE IS 18" OR LESS, IT SHOULD BE ELIMINATED BY INCREASING SLOPE ON RADIUS. BUT IN NO CASE SHOULD ANY SLOPE EXCEED 8:1



SECTION A-A

WHEN DECK CURB IS USED, NOTCH ST. PAVEMENT 3" DEPTH

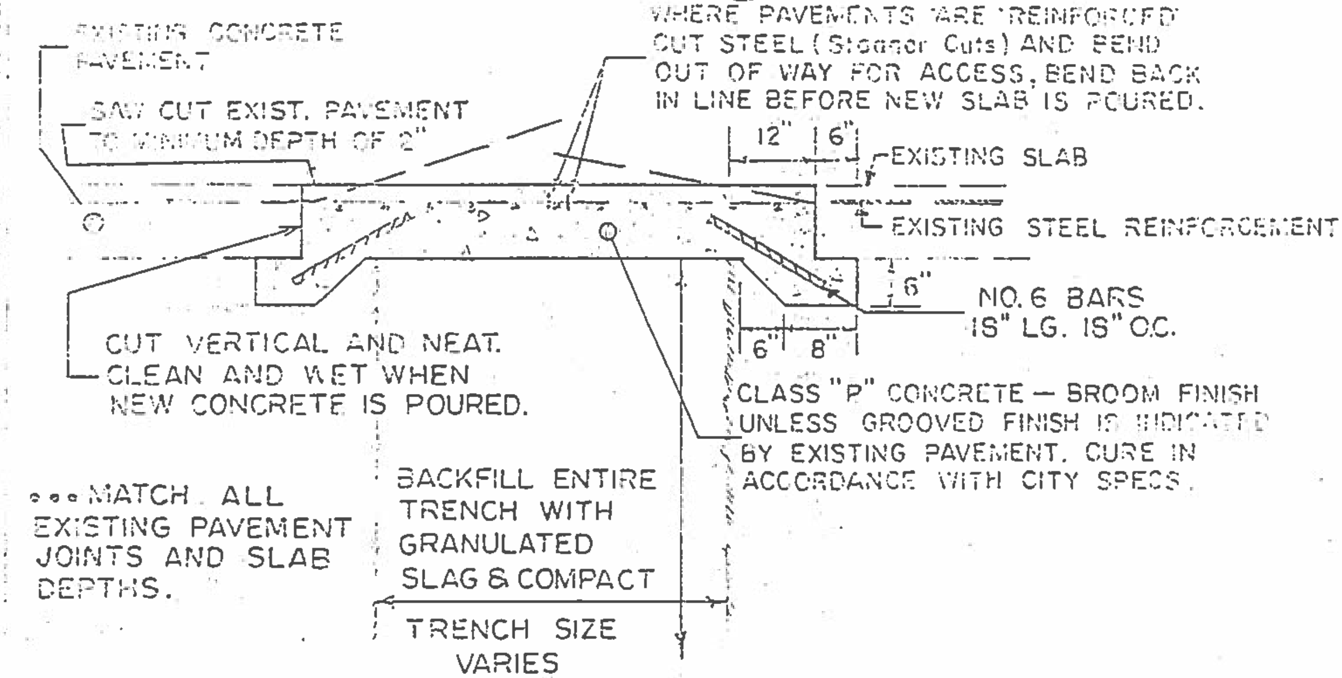
FOLDER M-17

CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS — BUREAU OF ENGINEERING

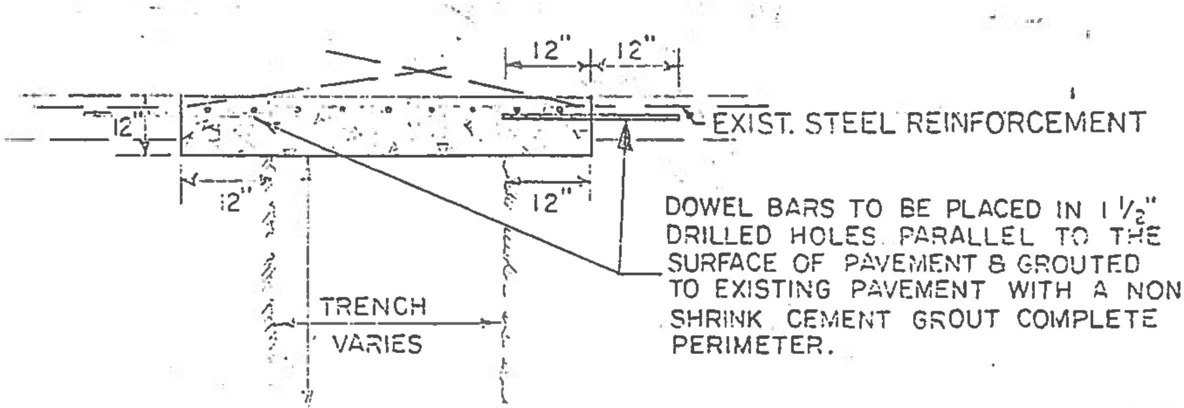
CONCRETE STREET TRENCH REPAVING

7-7-81		7-7-81	
DESIGN DIV. ENGR.	APP'D.	CITY ENGR.	APP'D.
7/7/81		7-7-81	
STREET DIV. ENGR.	APP'D.	DIRECTOR	APP'D.



DETAIL OF TRENCH REPAVING

- The underpinning method should not be used if it will interfere with subbase drainage.
- Excavation made to greater dimensions than those shown for underpinning shall be replaced with concrete, and backfilling with other material will not be permitted.



ALTERNATE DETAIL

TOTAL SLAB REPLACEMENT REQ'D. ON ALL CONCRETE STREETS.

ACCESSION NO. ML-243 FOL. 14-13

A7

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS · BUREAU OF ENGINEERING

CORR. METAL PIPE SEWER ANCHOR

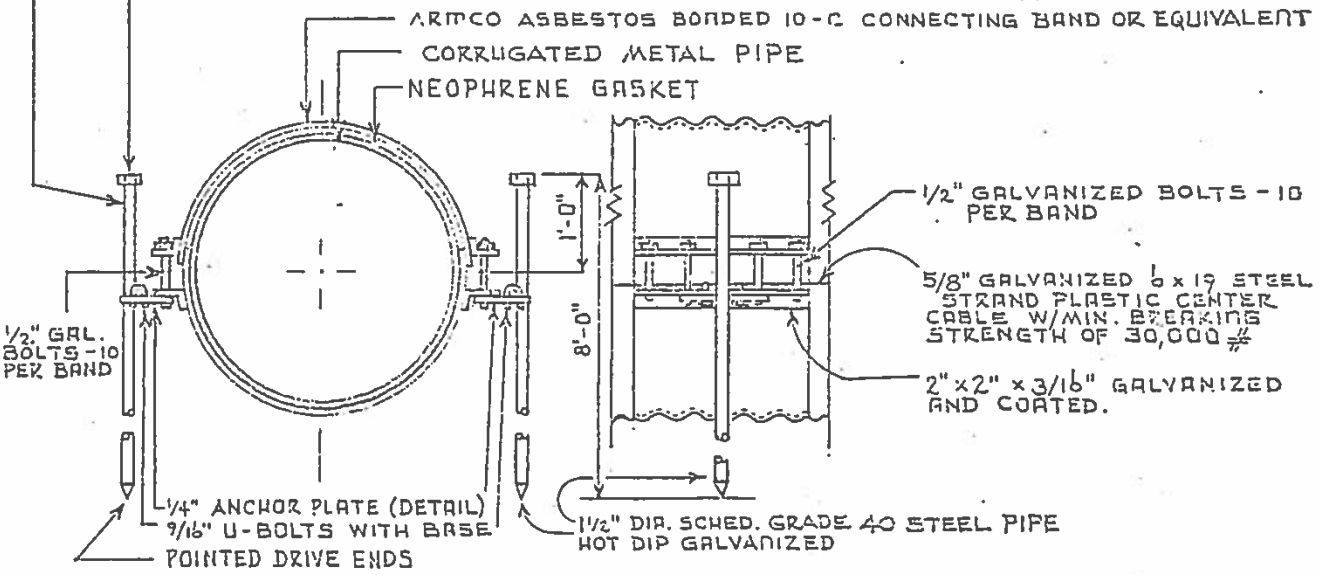
APPROVED 1-19-81 — DIVISION ENGR. DESIGN

APPROVED — CITY ENGINEER

APPROVED 1/19/81 — DIRECTOR D.P.W.

APPROVED — SEWER DIV. ENGR.

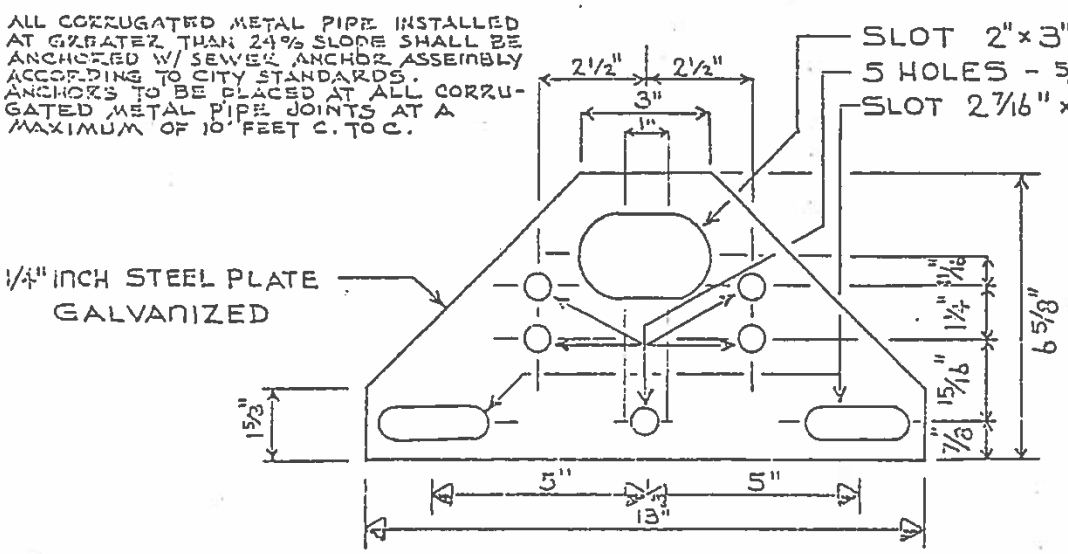
NOTE: ANCHOR ASSEMBLY TO BE FIELD COATED W/ BITUMINOID MATERIAL



SECTION ELEVATION

STORM SEWER ANCHOR ASSEMBLY

ALL CORRUGATED METAL PIPE INSTALLED AT GREATER THAN 24% SLOPE SHALL BE ANCHORED W/ SEWER ANCHOR ASSEMBLY ACCORDING TO CITY STANDARDS. ANCHORS TO BE PLACED AT ALL CORRUGATED METAL PIPE JOINTS AT A MAXIMUM OF 10' FEET C. TO C.



ANCHOR PLATE DETAIL

NO SCALE

ML-242 FOL. M-18

48

CITY OF PITTSBURGH

DEPT. OF PUBLIC WORKS **TYPE 2** **BUREAU OF ENGINEERING**

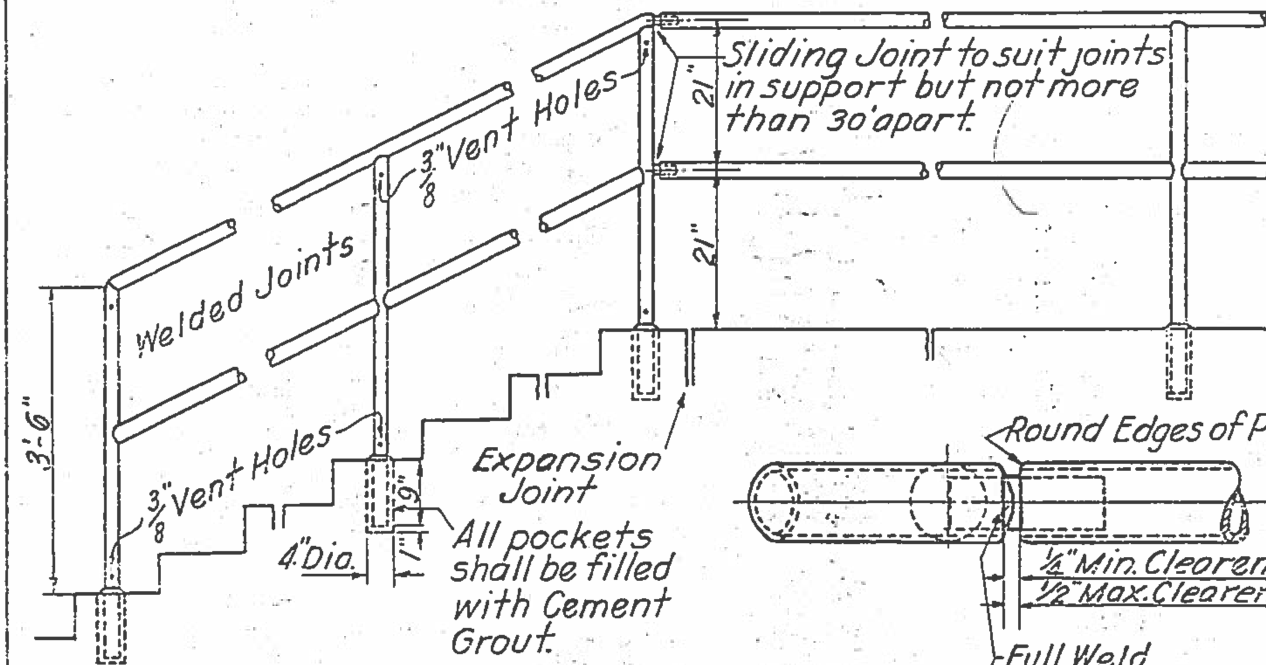
STANDARD IRON PIPE HAND RAILING

APPROVED Nov. 27, 1940 APPROVED 11-27-40 APPROVED 11/27/40

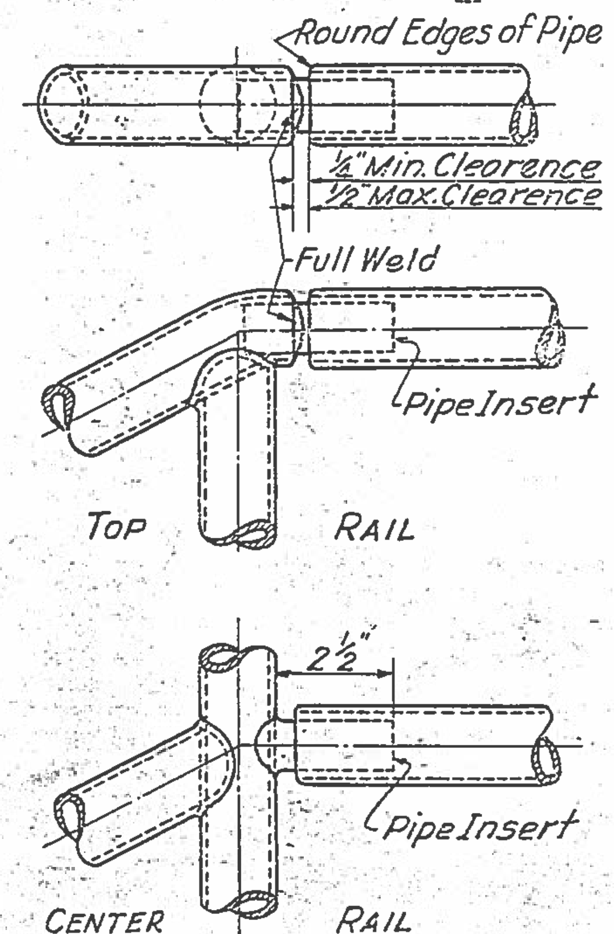
CHIEF ENGR. B.OF E. CHIEF ENGR. D.P.W. DIRECTOR

APPROVED 11-22-40

DIVISION ENGR.



ELEVATION



DETAIL OF SLIP JOINTS

All rail posts to be set vertical
All Posts and Railings shall be Extra strong Steel Pipe of size specified and painted in accordance with the Standard Specifications. Omit paint on bottom 9" of Posts.
All Welds shall be ground smooth.
Detail of Joints not shown to be approved by the Director.

CITY OF PITTSBURGH

DEPT OF PUBLIC WORKS — TYPE NO. 3 — BUREAU OF ENGINEERING

STANDARD STEEL PIPE WELDED RAILING

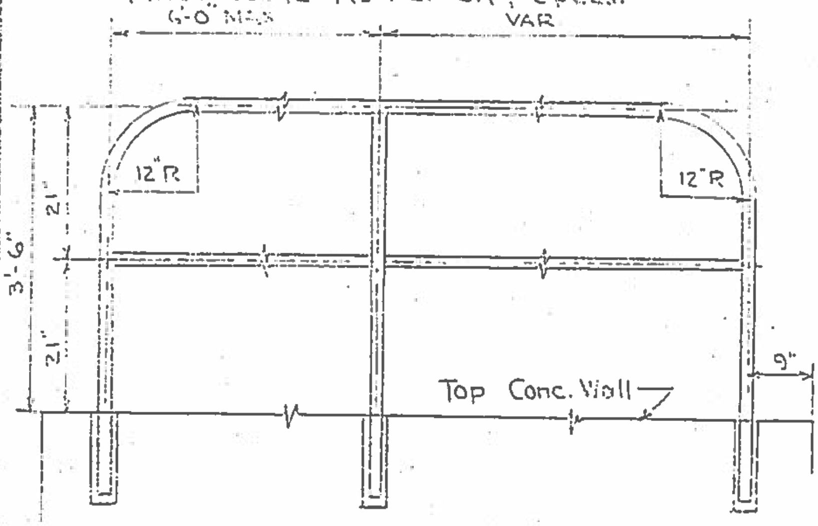
Approved 7-28-1965 John K. Roth — ASST. [illegible]

Approved 1-28-65 C. H. Barrett — CHIEF ENGR. [illegible]

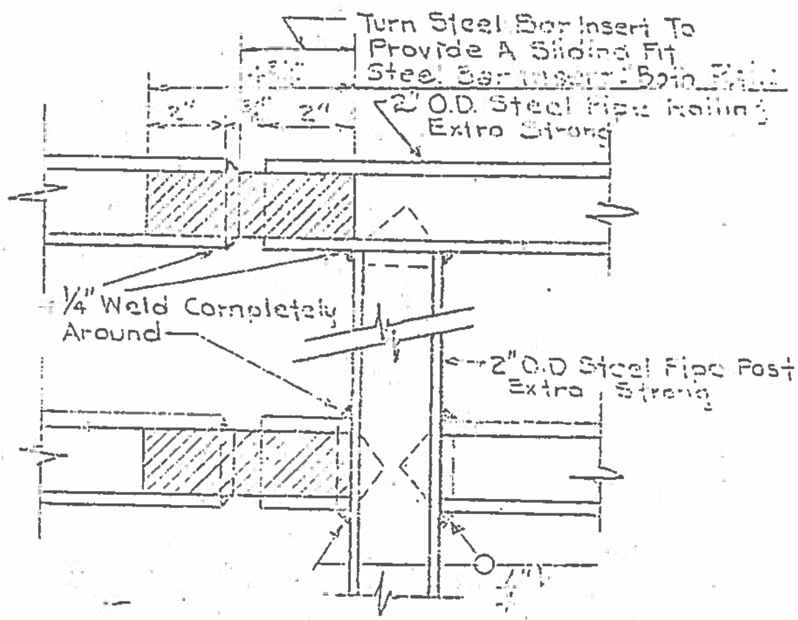
Approved ______ — DIRECTOR [illegible]

Approved 7-27-65 A. J. Tarasi — [illegible]

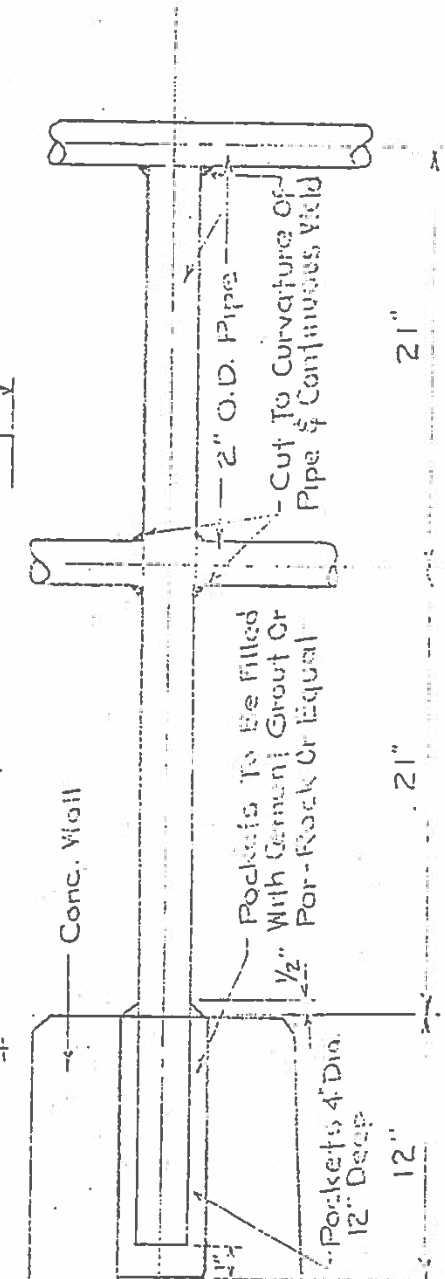
NOTE
All Welds To Be Ground Smooth
Shop Coat - One Coat Red Lead
Final Coats - As Per City Specs.



ELEVATION



PIPE RAIL EXPANSION JOINT
NOT TO SCALE



DETAIL OF POST
NOT TO SCALE

ACCESSION No. ML-205
FOLDER No. [illegible]

