

MODIFIED BY EI 92-041

EFFECTIVE 9/16/92

SUPERSEDED BY

EI 09-003

EFFECTIVE 9/4/08

# ENGINEERING INSTRUCTION

NEW YORK STATE DEPARTMENT OF TRANSPORTATION

SUBJECT: DRAINAGE PIPE OPTIONAL  
(FOR DRIVEWAYS, GRAVEL AND  
DIRT SURFACED ROADWAYS)

Subject Code: 7.27-1-603  
7.26-2-21

Distribution:

30 Main Office 32 Regions 34 Special

Code: EI 83-15

Date: 3/17/83

Supersedes:

APPROVED:

R. H. EDWARDS, Deputy Chief Engineer, Facilities Design Div.

We are transmitting herewith a copy of each of the following special specifications:

- 15603.85 Drainage Pipe, Optional, (For Driveways, Gravel and Dirt Surfaced Roadways - Zone 1 - Fill Heights 12" or more)
- 15603.86 Drainage Pipe, Optional, (For Driveways, Gravel and Dirt Surfaced Roadways - Zone 2 - Fill Heights 12" or more)
- 15603.87 Drainage Pipe, Optional (For Driveways, Gravel, and Dirt Surfaced Roadways) - Fill Heights less than 12")
- 15603.88 End Sections - Optional

And Material Specification:

706-14 Corrugated Polyethylene Storm Drain Pipe

FHWA regulations for federally aided projects require the states to specify alternate culvert materials for side drains and cross drains not installed under high type pavement. These regulations are contained in the Federal Highway Program Manual, FHPM 6-4-1-16 and require a minimum of three alternate materials. These drains shall be defined as follows:

Side Drains - Driveway and Ditch Crossings

Cross Drains not installed under high type pavement -  
Culverts under gravel or dirt roads.

The new optional pipe specifications for Zone 1 or Zone 2 shall be used for installations to a maximum cover of 15 feet. Zone 1 and Zone 2 are shown on Figure 8A in the Highway Design Manual. For the unusual case, when the cover is greater than 15 feet, or when the pipes exceed the mentioned sizes, the designer will have to use several bid Items to provide the required options.

|                            |           |
|----------------------------|-----------|
| PREL.                      | FINAL     |
| DESIGN                     | LANDSCAPE |
| RECEIVED                   |           |
| FACILITIES DESIGN DIVISION |           |
| APR 11 1983                |           |
| CIRC.                      | FILE      |

|                                                                                    |                              |      |        |
|------------------------------------------------------------------------------------|------------------------------|------|--------|
| Manual                                                                             | Code 7.27-1-603<br>7.26-2-21 | Date | Page 2 |
| Subject: Drainage Pipe Optional (For Driveways, Gravel and Dirt Surfaced Roadways) |                              |      |        |

Under the optional pipe items, the designer picks the size and shape of the pipe and the Contractor picks the material from tables of equivalently strong pipe contained in the specification itself. Designers should, therefore, size the pipes based on the hydraulically least efficient pipe material. In most instances, this will be the uncoated corrugated metal pipe. When estimating this item, designers and estimators should also note the departure from customary practice in that the cost of all excavation, sheeting, granular fill, backfill and applying water are included in the price bid per linear foot of pipe installed.

Recent incidents in driveway installations have shown that oblate steel pipe may not perform reliably under low fills of less than 12 inches. Therefore, the attached specifications provide for installations for covers of less than 12 inches. This procedure involves using stronger pipe and/or substituting twin pipes which have been given hydraulic and structural considerations and are adequate substitutes.

These specifications should be used beginning with the letting of September 1, 1983.

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ITEM 15603.85 DRAINAGE PIPE, OPTIONAL, (FOR DRIVEWAYS, GRAVEL  
AND DIRT SURFACED ROADWAYS - ZONE 1 - FILL HEIGHTS  
12" OR MORE)

1. Description. Under these items the Contractor shall furnish and install drainage pipes of the indicated sizes and shapes where shown on the plans or where indicated by the Engineer. The type of pipe material selected shall be at the Contractor's option from the list below.
2. Materials. The type of pipe materials shall meet the requirements given below. The dimensions given in the pay items for oblate pipes are those associated with corrugated oblate metal pipe but are not meant to exclude concrete elliptical pipe with substantially close conforming dimensions. Select granular fill used shall meet the requirements for this material given in subsection 203-2.02c.

|                                                                 |        |
|-----------------------------------------------------------------|--------|
| Non-Reinforced Concrete Pipe                                    | 706-01 |
| Reinforced Concrete Pipe                                        | 706-02 |
| Reinforced Concrete Elliptical Pipe                             | 706-03 |
| Corrugated Polyethylene Storm Drain<br>Pipe                     | 706-14 |
| Round Corrugated Steel Pipe and Pipe<br>Arches                  | 707-02 |
| Round Corrugated Aluminum Pipe, Pipe<br>Arches and End Sections | 707-13 |

The pipe class or gage shall be as indicated in TABLE 1, Zone 1 for pipes with cover of 12" or more.

3. Construction Details. The Construction Details of subsection 603-3 shall apply. Only one type of pipe material will be allowed in the same run of pipe.
4. Method of Measurement. Pipe shall be measured in linear feet along the bottom centerline as designated on the plans and specifications or as directed by the Engineer in writing.
5. Basis of Payment. The accepted quantities of pipe installed under this item will be paid for at the contract price bid which shall include the cost of furnishing all labor, materials and equipment necessary to complete the work. The cost of any required excavation, sheeting, granular fill and backfill and applying water for compaction shall be included in the price for this item.

Payment will be made under:

| <u>ITEM NO.</u> | <u>ITEM</u>                                                                                                                    | <u>PAY UNIT</u> |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Item 15603.8501 | Drainage Pipe, Optional 12" Diameter (For Driveways, Gravel and Dirt Surfaced Roadways-Zone 1 - Fill Heights 12" or More)      | Linear Foot     |
| Item 15603.8502 | Drainage Pipe, Optional 15" Diameter (For Driveways, Gravel and Dirt Surfaced Roadways-Zone 1 - Fill Heights 12" or More)      | Linear Foot     |
| Item 15603.8503 | Drainage Pipe, Optional 18" Diameter (For Driveways, Gravel and Dirt Surfaced Roadways-Zone 1 - Fill Heights 12" or More)      | Linear Foot     |
| Item 15603.8504 | Drainage Pipe, Optional 21" Diameter (For Driveways, Gravel and Dirt Surfaced Roadways-Zone 1 - Fill Heights 12" or More)      | Linear Foot     |
| Item 15603.8505 | Drainage Pipe, Optional 24" Diameter (For Driveways, Gravel and Dirt Surfaced Roadways-Zone 1 - Fill Heights 12" or More)      | Linear Foot     |
| Item 15603.8506 | Drainage Pipe Oblate, Optional 17" x 13" (For Driveways, Gravel, and Dirt Surfaced Roadways-Zone 1 - Fill Heights 12" or More) | Linear Foot     |

| <u>ITEM NO.</u> | <u>ITEM</u>                                                                                                                               | <u>PAY UNIT</u> |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Item 15603.8507 | Drainage Pipe Oblate, Optional<br>21" x 15" (For Driveways,<br>Gravel and Dirt Surfaced<br>Roadways-Zone 1 - Fill Heights<br>12" or More) | Linear Foot     |
| Item 15603.8508 | Drainage Pipe Oblate, Optional<br>24" x 18" (For Driveways,<br>Gravel and Dirt Surfaced<br>Roadways-Zone 1 - Fill Heights<br>12" or More) | Linear Foot     |
| Item 15603.8509 | Drainage Pipe Oblate, Optional<br>28" x 20" (For Driveways,<br>Gravel and Dirt Surfaced<br>Roadways-Zone 1 - Fill Heights<br>12" or More) | Linear Foot     |

**TABLE I**  
**PIPES TO BE USED WHEN COVER IS 12" OR MORE-ZONE I**

| CLASS OR GAGE PIPE REQUIRED |                     |                 |                        |              |     |             |             |             |        |  |
|-----------------------------|---------------------|-----------------|------------------------|--------------|-----|-------------|-------------|-------------|--------|--|
| FILL                        | NON REINF. CONCRETE | REINF. CONCRETE | REINF. CONCRETE (H.E.) | CORR. POLY.  |     | CORR. STEEL |             | CORR. ALUM. |        |  |
| HGT.                        | 8706-01             | 8706-02         | 8706-03                | 8706-14      |     | 8707-02     |             | 8707-13     |        |  |
| FT.                         | CLASS               | CLASS           | CLASS                  | STIFFNESS(1) |     | GAUGE       |             | GAUGE       |        |  |
|                             |                     |                 |                        | 5%           | 10% | ROUND       | OBLATE      | ROUND       | OBLATE |  |
| 1                           | II                  | II              | II                     | 45           | 40  | 18          | 18          | 16          | 14     |  |
| 2                           | II                  | II              | II                     | "            | "   | 18          | 18          | 16          | 14     |  |
| 3                           | II                  | II              | II                     | "            | "   | 18          | 18          | 16          | 14     |  |
| 4                           | II                  | II              | II                     | "            | "   | 18          | 18          | 16          | 14     |  |
| 5                           | II                  | II              | II                     | "            | "   | 18          | 18          | 16          | 14     |  |
| 6                           | II                  | II              | II                     | "            | "   | 18          | 18          | 16          | 14     |  |
| 7                           | II                  | II              | II                     | "            | "   | 18          | 18          | 16          | 14     |  |
| 8                           | II                  | II              | II                     | "            | "   | 18          | 18          | 16          | 14     |  |
| 9                           | II                  | II              | II                     | "            | "   | 18          | 18          | 16          | 14     |  |
| 10                          | NOT ALLOWED         | III             | III                    | "            | "   | 18          | 18          | 16          | 14     |  |
| 11                          | "                   | III             | III                    | "            | "   | 18          | NOT ALLOWED | 16          | 14     |  |
| 12                          | "                   | III             | III                    | "            | "   | 18          | "           | 16          | 14     |  |
| 13                          | "                   | IV              | IV                     | "            | "   | 18          | "           | 16          | 14     |  |
| 14                          | "                   | IV              | IV                     | "            | "   | 18          | "           | 16          | 14     |  |
| 15                          | "                   | IV              | IV                     | "            | "   | 18          | "           | 16          | 14     |  |

(1) Tubular values, as determined by ASTM D2412, in psi at 5 & 10% deflection.

Gages are based on requirements for 24" Round Pipe and 28" Span Oblate.  
For Zone 1 location refer to Highway Design Manual, Figure 8A.

ITEM 15603.86 DRAINAGE PIPE, OPTIONAL (FOR DRIVEWAYS, GRAVEL AND DIRT  
SURFACED ROADWAYS-ZONE 2 - FILL HEIGHTS 12" OR MORE)

1. Description. Under these items the Contractor shall furnish and install drainage pipe of the indicated sizes and shapes where shown on the plans or where indicated by the Engineer. The type of pipe material selected shall be at the Contractor's option from the list below.
2. Materials. The type of pipe materials shall meet the requirements given below. The dimensions given in the pay items for oblate pipes are those associated with corrugated oblate metal pipe but are not meant to exclude concrete elliptical pipe with substantially close conforming dimensions. Select granular fill used shall meet the requirements for this material given in subsection 203-2.02c.

|                                             |        |
|---------------------------------------------|--------|
| Non-Reinforced Concrete Pipe                | 706-01 |
| Reinforced Concrete Pipe                    | 706-02 |
| Reinforced Concrete Elliptical Pipe         | 706-03 |
| Corrugated Polyethylene Storm Drain Pipe    | 706-14 |
| Round Corrugated Steel Pipe and Pipe Arches | 707-02 |
| Round Corrugated Aluminum Pipe, Pipe Arches | 707-13 |
| and End Sections                            |        |

The pipe class or gage shall be as indicated in TABLE 1, Zone 2, for pipes with cover of 12" or more.

3. Construction Details. The Construction Details of subsection 603-3 shall apply. Only one type of pipe material will be allowed in the same run of pipe.
4. Method of Measurement. Pipe shall be measured in linear feet along the bottom centerline as designated on the plans and specifications or as directed by the Engineer in writing.
5. Basis of Payment. The accepted quantities of pipe installed under this item will be paid for at the contract price bid which shall include the cost of furnishing all labor, materials and equipment necessary to complete the work. The cost of any required excavation, sheeting, granular fill and backfill and applying water for compaction shall be included in the price for this item.

Payment will be made under:

| <u>ITEM NO.</u> | <u>ITEM</u>                                                                                                                        | <u>PAY UNIT</u> |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Item 15603.8601 | Drainage Pipe, Optional 12" Diameter<br>(For Driveways, Gravel and Dirt Sur-<br>faced Roadways-Zone 2-Fill Heights 12"<br>or More) | Linear Foot     |
| Item 15603.8602 | Drainage Pipe, Optional 15" Diameter<br>(For Driveways, Gravel and Dirt Sur-<br>faced Roadways-Zone 2-Fill Heights 12"<br>or More) | Linear Foot     |
| Item 15603.8603 | Drainage Pipe, Optional 18" Diameter<br>(For Driveways, Gravel and Dirt Sur-<br>faced Roadways-Zone 2-Fill Heights 12"<br>or More) | Linear Foot     |
| Item 15603.8604 | Drainage Pipe, Optional 21" Diameter<br>(For Driveways, Gravel and Dirt Sur-<br>faced Roadways-Zone 2-Fill Heights 12"<br>or More) | Linear Foot     |
| Item 15603.8605 | Drainage Pipe, Optional 24" Diameter<br>(For Driveways, Gravel and Dirt Sur-<br>faced Roadways-Zone 2-Fill Heights 12"<br>or More) | Linear Foot     |
| Item 15603.8606 | Drainage Pipe Oblate, Optional 17" x 13"<br>(For Driveways, Gravel and Dirt Surfaced<br>Roadways-Zone 2-Fill Heights 12" or More)  | Linear Foot     |
| Item 15603.8607 | Drainage Pipe Oblate, Optional 21" x 15"<br>(For Driveways, Gravel and Dirt Surfaced<br>Roadways-Zone 2-Fill Heights 12" or More)  | Linear Foot     |
| Item 15603.8608 | Drainage Pipe Oblate, Optional 24" x 18"<br>(For Driveways, Gravel and Dirt Surfaced<br>Roadways-Zone 2-Fill Heights 12" or More)  | Linear Foot     |
| Item 15603.8609 | Drainage Pipe Oblate, Optional 28" x 20"<br>(For Driveways, Gravel and Dirt Surfaced<br>Roadways-Zone 2-Fill Heights 12" or More)  | Linear Foot     |

TABLE I

PIPES TO BE USED WHEN COVER IS 12" OR MORE - ZONE 2

| CLASS OR GAGE PIPE REQUIRED |                     |                 |                  |               |     |             |             |             |        |  |  |  |
|-----------------------------|---------------------|-----------------|------------------|---------------|-----|-------------|-------------|-------------|--------|--|--|--|
| FILL<br>HGT.<br>FT.         | NON REINF.<br>CONC. | REINF.<br>CONC. | REINF. CONC.H.E. | CORR. POLY    |     | CORR. STEEL |             | CORR. ALUM. |        |  |  |  |
|                             | CLASS               | CLASS           | CLASS            | STIFFNESS (1) |     | GAUGE       |             | GAUGE       |        |  |  |  |
|                             |                     |                 |                  | 5%            | 10% | ROUND       | OBLATE      | ROUND       | OBLATE |  |  |  |
| 1                           | II                  | II              | II               | 45            | 40  | 14          | 18          | 16          | 14     |  |  |  |
| 2                           | II                  | II              | II               | "             | "   | 14          | 14          | 16          | 14     |  |  |  |
| 3                           | II                  | II              | II               | "             | "   | 14          | 14          | 16          | 14     |  |  |  |
| 4                           | II                  | II              | II               | "             | "   | 14          | 14          | 16          | 14     |  |  |  |
| 5                           | II                  | II              | II               | "             | "   | 14          | 14          | 16          | 14     |  |  |  |
| 6                           | II                  | II              | II               | "             | "   | 14          | 14          | 16          | 14     |  |  |  |
| 7                           | II                  | II              | II               | "             | "   | 14          | 14          | 16          | 14     |  |  |  |
| 8                           | II                  | II              | II               | "             | "   | 14          | 14          | 16          | 14     |  |  |  |
| 9                           | II                  | II              | II               | "             | "   | 14          | 14          | 16          | 14     |  |  |  |
| 10                          | NOT ALLOWED         | III             | III              | "             | "   | 14          | 18          | 16          | 14     |  |  |  |
| 11                          | "                   | III             | III              | "             | "   | 14          | NOT ALLOWED | 16          | 14     |  |  |  |
| 12                          | "                   | III             | III              | "             | "   | 14          | "           | 16          | 14     |  |  |  |
| 13                          | "                   | IV              | IV               | "             | "   | 14          | "           | 16          | 14     |  |  |  |
| 14                          | "                   | IV              | IV               | "             | "   | 14          | "           | 16          | 14     |  |  |  |
| 15                          | "                   | IV              | IV               | "             | "   | 14          | "           | 16          | 14     |  |  |  |

(1) Tabular values, as determined by ASTM D2412, in psi at 5 &amp; 10% deflection.

Gages are based on requirements for 24" Round Pipes and 28" Span Oblate.  
For Zone 2 location refer to Highway Design Manual, Fig. 8A.

706-14 - CORRUGATED POLYETHYLENE STORM DRAIN PIPE

SCOPE. This specification covers the material and quality requirements for polyethylene storm drain pipe and fittings.

MATERIAL REQUIREMENTS. The polyethylene material for the pipe and fittings shall meet the requirements of AASHTO M252 except as modified below:

- The drain pipe shall be black high density polyethylene.
- The minimum pipe stiffness at 5% and 10% deflection at  $23^{\circ}\pm 2^{\circ}\text{C}$  ( $73^{\circ}\pm 4\text{F}$ ) shall be 45 psi and 40 psi respectively.
- Only straight lengths of pipe shall be furnished with a minimum nominal length of fifteen feet or as shown on the plans.
- Screw, split, snap or alternate type fittings as approved by the Engineer, shall be used.

BASIS OF ACCEPTANCE. Acceptance of this material will be based on the manufacturers name appearing on the Department's approved list and the manufacturer's certification of compliance with these requirements.

Item 15603.88 END SECTIONS - OPTIONAL

1. Description. Under this item the Contractor shall furnish and install end sections according to the option selected under the item for DRAINAGE PIPE - OPTIONAL, (For Driveways, Gravel and Dirt Surfaced Roadways-Zones 1 or 2).

2. Materials, End Sections shall meet the following requirements:

|                                                              |        |
|--------------------------------------------------------------|--------|
| Reinforced Concrete Pipe End Sections                        | 706-07 |
| Galvanized Steel End Sections                                | 707-10 |
| Round Corrugated Aluminum Pipe, Pipe Arches and End Sections | 707-13 |

The dimensions given in the pay items for oblate end sections are those associated with corrugated oblate metal pipe but are not meant to exclude concrete elliptical shaped end sections with substantially close conforming dimensions.

3. The Construction Details of subsection 603-3 shall apply. In addition steel end sections shall be used with steel pipe, concrete end sections with concrete pipe, aluminum end sections with aluminum pipe and either steel or aluminum end sections with polyethylene pipe.

Under the optional oblate end section items, in cases when the contractor has elected to install twin pipes, the contractor shall furnish and install an appropriate end section for each of the twin pipes.

Method of Measurement

Subsection 603-4.03 shall apply. Under the items for oblate optional end sections in cases when the contractor has elected to furnish and install twin pipes, each pair of end sections installed will be measured for payment as a single unit.

Basis of Payment

The requirements of subsection 603-3 shall apply except any required excavation, granular fill and backfill and applying water for compaction shall be included in the price bid for this item.

Payment will be made under:

| <u>Item No.</u> | <u>Item</u>                          | <u>Pay Unit</u> |
|-----------------|--------------------------------------|-----------------|
| Item 15603.8801 | End Sections - Optional 12" Diameter | Each            |
| Item 15603.8802 | End Sections - Optional 15" Diameter | Each            |
| Item 15603.8803 | End Sections - Optional 18" Diameter | Each            |

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| <u>Item No.</u>        | <u>Item</u>                            | <u>Pay Unit</u> |
|------------------------|----------------------------------------|-----------------|
| Item <u>15603.8804</u> | End Sections - Optional 21" Diameter   | Each            |
| Item <u>15603.8805</u> | End Sections - Optional 24" Diameter   | Each            |
| Item <u>15603.8806</u> | End Sections - Oblate-Optional 17"X13" | Each            |
| Item <u>15603.8807</u> | End Sections - Oblate-Optional 21"X15" | Each            |
| Item <u>15603.8808</u> | End Sections - Oblate-Optional 24"X18" | Each            |
| Item <u>15603.8809</u> | End Sections - Oblate-Optional 28"X20" | Each            |

ITEM 15603.87 DRAINAGE PIPE, OPTIONAL, (FOR DRIVEWAYS, GRAVEL AND  
DIRT SURFACED ROADWAYS-FILL HEIGHTS LESS THAN 12")

1. Description. Under these items the Contractor shall furnish and install drainage pipes of the indicated sizes and shapes where shown on the plans or where indicated by the Engineer. The type of pipe material selected shall be at the Contractor's option from the list below.
2. Materials. The type of pipe materials shall meet the requirements given below. The dimensions given in the pay items for oblate pipes are those associated with corrugated oblate metal pipe but are not meant to exclude concrete elliptical pipe with substantially close conforming dimensions. Select granular fill used shall meet the requirements for this material given in subsection 203-2.02c.

|                                             |        |
|---------------------------------------------|--------|
| Reinforced Concrete Pipe                    | 706-02 |
| Reinforced Concrete Elliptical Pipe         | 706-03 |
| Corrugated Polyethylene Storm Drain Pipe    | 706-14 |
| Round Corrugated Steel Pipe and Pipe Arches | 707-02 |

The pipe class or gage shall be as indicated in TABLE 2, for pipes with cover of less than 12".

3. Construction Details. The Construction Details of subsection 603-3 shall apply. Only one type of pipe material will be allowed in the same run of pipe.
4. Method of Measurement. Pipe shall be measured in linear feet along the bottom centerline as designated on the plans and specifications or as directed by the Engineer in writing.

When twin round pipes are substituted for oblate pipes, only one of the installed pipes will be measured for payment.

5. Basis of Payment. The accepted quantities of pipe installed under this item will be paid for at the contract price bid which shall include the cost of furnishing all labor, materials and equipment necessary to complete the work. The cost of any required excavation, sheeting, granular fill and backfill and applying water for compaction shall be included in the price for this item. In addition, when the contractor elects to provide twin pipes, the unit price bid shall also include the cost of the unmeasured twin pipe.

Payment will be made under:

| <u>ITEM NO.</u>        | <u>ITEM</u>                                                                                                                   | <u>PAY UNIT</u> |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Item <u>15603.8701</u> | Drainage Pipe, Optional 12" Diameter<br>(For Driveways, Gravel and Dirt Sur-<br>faced Roadways-Fill Heights Less Than<br>12") | Linear Foot     |
| Item <u>15603.8702</u> | Drainage Pipe, Optional 15" Diameter<br>(For Driveways, Gravel and Dirt Sur-<br>faced Roadways-Fill Heights Less Than<br>12") | Linear Foot     |
| Item <u>15603.8703</u> | Drainage Pipe, Optional 18" Diameter<br>(For Driveways, Gravel and Dirt Sur-<br>faced Roadways-Fill Heights Less Than<br>12") | Linear Foot     |
| Item <u>15603.8704</u> | Drainage Pipe, Optional 21" Diameter<br>(For Driveways, Gravel and Dirt Sur-<br>faced Roadways-Fill Heights Less Than<br>12") | Linear Foot     |
| Item <u>15603.8705</u> | Drainage Pipe, Optional 24" Diameter<br>(For Driveways, Gravel and Dirt Sur-<br>faced Roadways-Fill Heights Less Than<br>12") | Linear Foot     |
| Item <u>15603.8708</u> | Drainage Pipe Oblate, Optional 24" x 18"<br>(For Driveways, Gravel and Dirt Surfaced<br>Roadways-Fill Heights Less Than 12")  | Linear Foot     |
| Item <u>15603.8709</u> | Drainage Pipe Oblate, Optional 28" x 20"<br>(For Driveways, Gravel and Dirt Surfaced<br>Roadways-Fill Heights Less Than 12")  | Linear Foot     |

**TABLE 2**  
**PIPES TO BE USED WHEN LESS THAN 12" FILL HEIGHT AVAILABLE**

| SIZE<br>SPECIFIED | CONCRETE PIPES REINFORCED & NON-REINFORCED |          |                | CORR. POLY.<br>DIAMETER | CORR. STEEL | CORR. ALUM. |
|-------------------|--------------------------------------------|----------|----------------|-------------------------|-------------|-------------|
|                   | NUMBER, DIAMETER AND CLASS                 |          |                |                         |             |             |
|                   | § 706-01                                   | § 706-02 | § 706-03       |                         |             |             |
| OBLATE            |                                            |          |                |                         |             |             |
| 24 X 18           |                                            | 2 15" IV | 1 30" X 19" IV | 2 15" 12                |             |             |
| 28 X 20           |                                            | 2 18" IV | 1 30" X 19" IV | 2 18" 12                |             |             |
| ROUND             |                                            |          |                |                         |             |             |
| 12                |                                            | 1 12" IV |                | 1 12" 12                |             |             |
| 15                |                                            | 1 15" IV |                | 1 15" 12                |             |             |
| 18                |                                            | 1 18" IV |                | 1 18" 12                |             |             |
| 21                |                                            | 1 21" IV |                | 1 21" 12                |             |             |
| 24                |                                            | 1 24" IV |                | 1 24" 12                |             |             |

NOT PERMITTED

NOT PERMITTED

- NOTES**
1. COUPLING DEVICES FOR CORRUGATED PIPES TO BE 14 GAGE STEEL.
  2. CORRUGATED PIPES FOR DRAINS UP TO 40 FEET LONG SHALL BE CONTINUOUS PIPE WITHOUT JOINTS. FOR DRAINS LONGER THAN 40 FEET, JOINTS SHALL NOT BE LOCATED IN THE WHEELPATHS.

\* STIFFNESS: 5% @ 45 PSI; 10% @ 40 PSI -- ASTM D2412