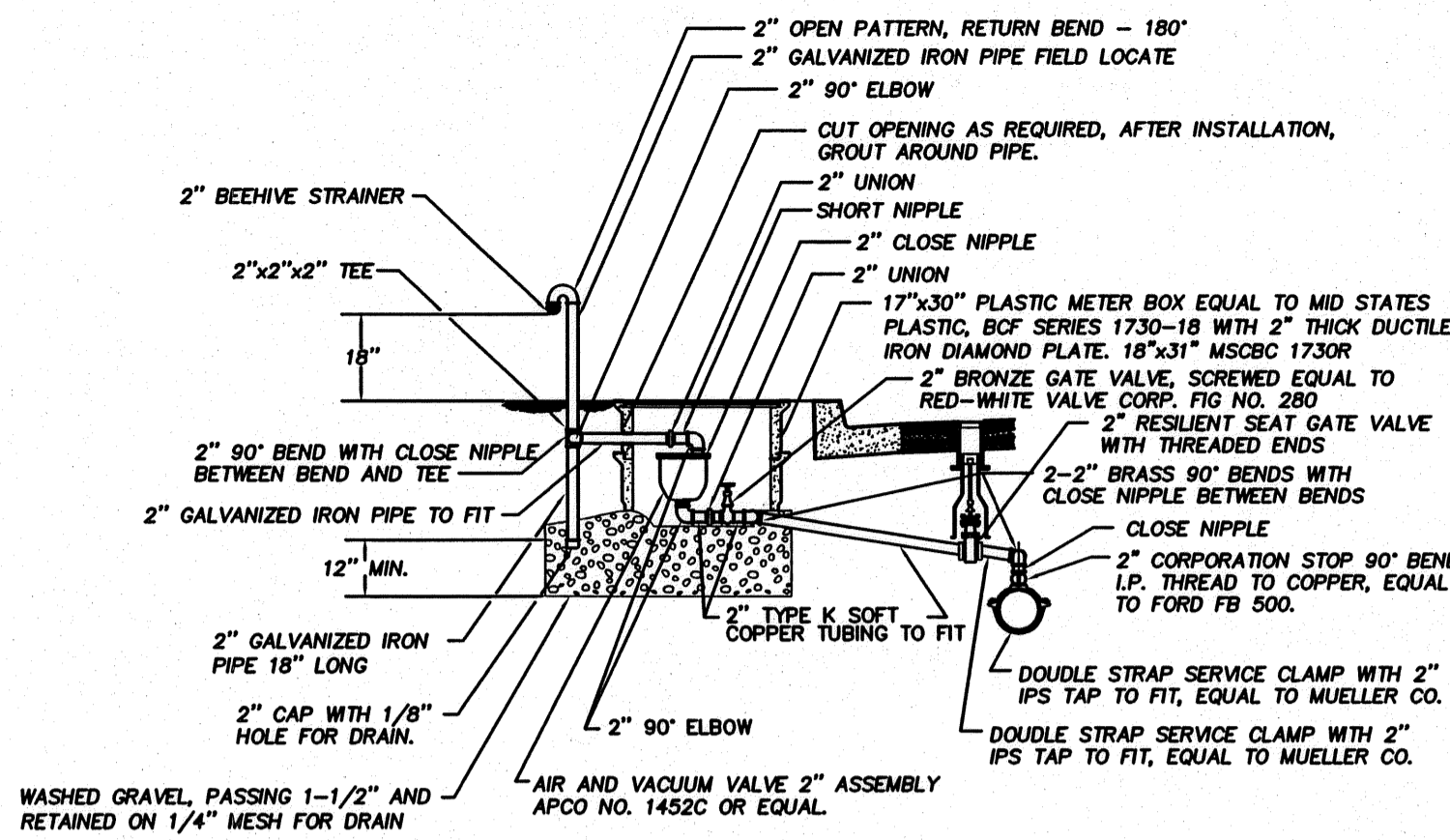


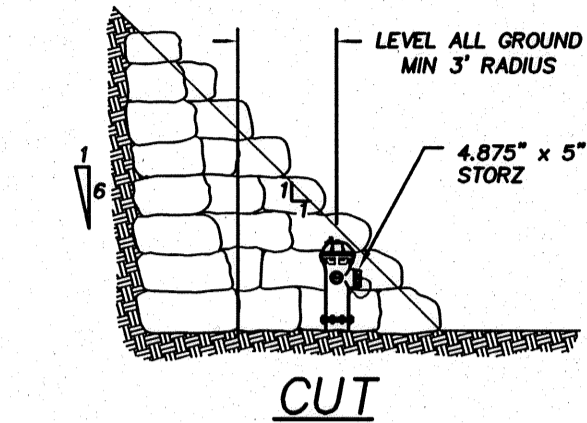
PORTION OF THE S.E. 1/4, S.E. 1/4, SECTION 4, TOWNSHIP 23 NORTH, RANGE 5 EAST, W.M.

DATE: \_\_\_\_\_ FILED: \_\_\_\_\_ DRAWING NO.: C25 SHEET 25 OF 28  
 REEDSHAW PLAT WATER DETAILS  
 CITY OF RENTON  
 NONE  
 SURVEYED: \_\_\_\_\_ DESIGNED: LEL DRAWN: VK CHECKED: GAD APPROVED: \_\_\_\_\_  
 JCC 08-20-07 LEL BY DATE APPR  
 PER CITY OF RENTON COMMENTS REVISION  
 NO. 2



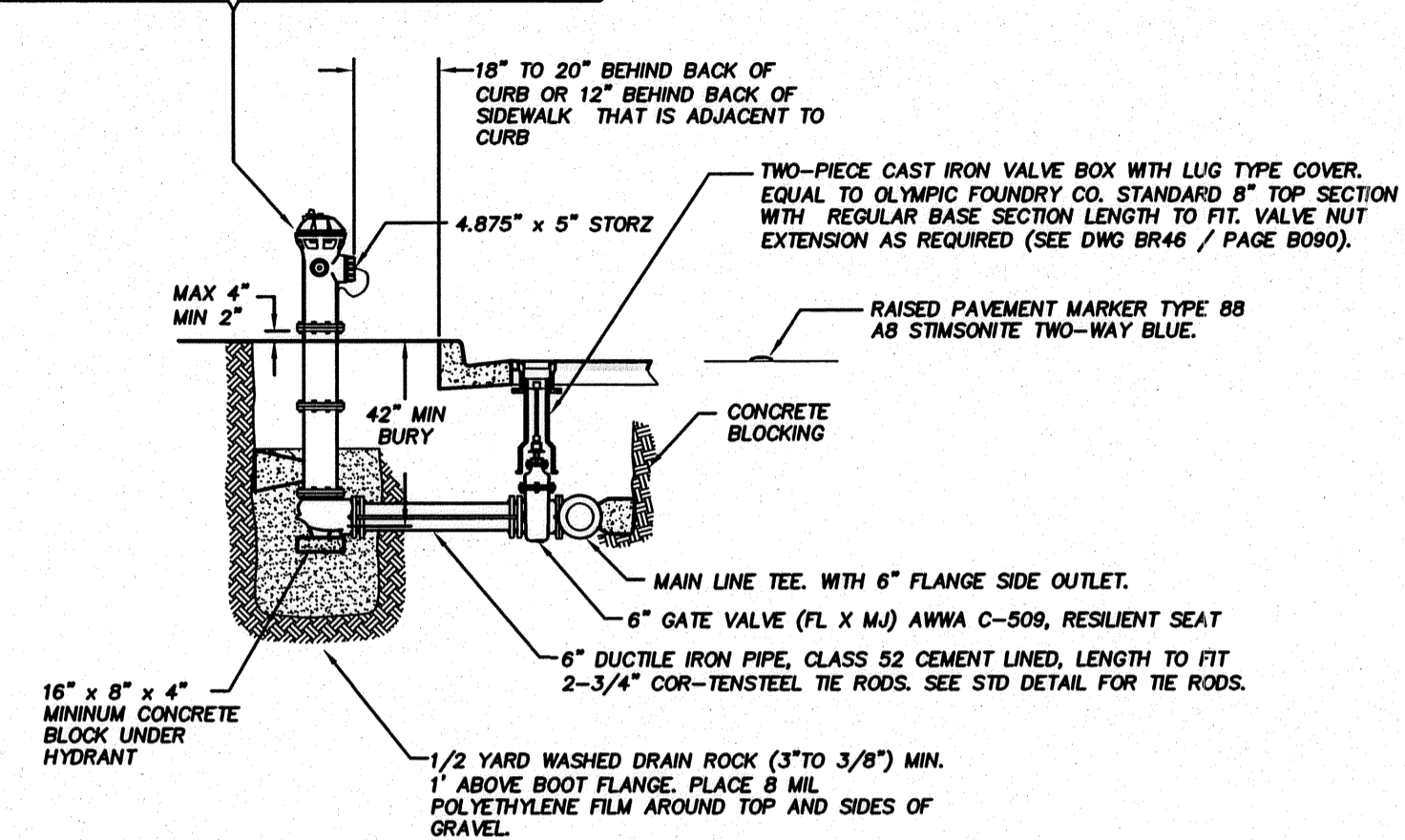
**NOTES:**  
 AIR AND VACUUM RELEASE VALVE ASSEMBLY SHALL BE INSTALLED AT HIGHEST POINT OF LINE. IF HIGH POINT FALLS IN A LOCATION WHERE ASSEMBLY CANNOT BE INSTALLED, PROVIDE ADDITIONAL DEPTH OF LINE TO CREATE A HIGH POINT AT A LOCATION WHERE ASSEMBLY CAN BE INSTALLED.  
 LOCATE AIR VACUUM METER BOX OUTSIDE OF TRAFFIC AREAS, IN PLANTING STRIPS, BEHIND CURB AND SIDEWALK.

ADOPTED CITY OF RENTON  
 Standard plans LST DATE: 04/04  
**2" AIR & VACUUM RELEASE VALVE ASSEMBLY**  
 DWG. NAME: BR51 SP PAGE: B095



HYDRANT LOCATION IN CUT OR FILL

FIRE HYDRANT SHALL BE COREY-TYPE EQUAL TO IOWA F-5110 OR COMPRESSION TYPE SUCH AS CLOW MEDALLION; M & H 929, MUELLER SUPER CENTURION 200, AND WATEROUS PACER WITH 6" MECHANICAL JOINT INLET WITH LUGS. 5-1/4" MAIN VALVE OPENING. TWO 2-1/2" HOSE CONNECTIONS NATIONAL STANDARD THREADS. 4" PUMPER CONNECTION CITY OF SEATTLE THREADS WITH A STORZ ADAPTOR. 4.875" SEATTLE THREAD X 5" STORZ, ATTACHED WITH 1/8" STAINLESS STEEL CABLE 1-1/4" PENTAGON OPERATING NUT. FIRE HYDRANT TO BE PAINTED WITH TWO COATS OF PAINT, KELLY-MOORE/PRESERVATIVE PAINT No. 5780-563 DTM ACRYLIC GLOSS, SAFETY YELLOW OR APPROVED EQUAL. PUMPER CONNECTION TO FACE ROADWAY OR AS DIRECTED BY RENTON FIRE DEPARTMENT. FIRE HYDRANT EXTENSION TO BE USED IF REQUIRED.

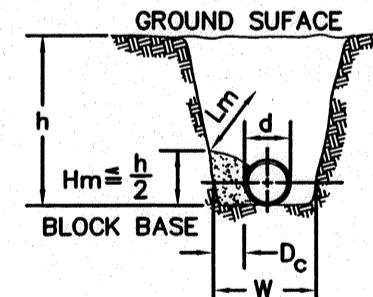


FIRE HYDRANT ASSEMBLY

ADOPTED CITY OF RENTON  
 Standard plans LST DATE: 04/04  
**FIRE HYDRANT ASSEMBLY DETAIL**  
 DWG. NAME: BR24 SP PAGE: B102

CONCRETE BLOCKING SIZING PROCEDURE

- A. GENERAL**  
 The amount of concrete required to anchor horizontal bends, tees, and dead ends depends on the strength of the soil. The methods of placing concrete to keep the joint accessible is shown in Figure 1. The area in square feet of concrete which must bear against the side of the trench is found by dividing the thrust in pounds shown in Table 1 by the safe bearing load of the soil as shown in Table 2.
- B. CRITERIA**
- The sizing procedure is for horizontal or downward thrust only.
  - Height of the thrust block must be equal to or less than 1/2 the depth from the ground surface to the block base.
  - The thrust block bearing face is approximately rectangular.
  - The concrete blocking shall be as per APWA Specification 74-2.14.
- C. SYMBOLS**
- d = Outside Diameter of Pipe in Feet
  - T = Thrust in Pounds at the Fitting (Table 1)
  - SBL = Safe Bearing Load in Pounds/Sq. Ft. (Table 2)
  - h = Depth of Trench in Feet
  - W = Width of Trench in Feet
  - A = Area of Concrete which must bear against the side of the Trench in Sq. Ft.
  - Hm = Maximum Height of the Thrust Block in Feet
  - Dc = Depth of the Concrete Thrust Block to Bearing Surface in Feet
  - Lm = Maximum Length of the Thrust Block in Feet



- D. CALCULATION EQUATIONS**
- Area of Concrete (A) =  $\frac{\text{Thrust (In Pounds)}}{\text{Safe Bearing Load (In Pounds/Sq. Ft.)}} = \frac{T}{SBL}$
  - Maximum Height of Thrust Block (Hm) =  $\frac{\text{Depth of Trench in Feet}}{2} = \frac{h}{2}$
  - Depth of Concrete Thrust Block =  $\frac{\text{Width of Trench in Feet} - \text{Outside Diameter of Pipe in Feet}}{2} = \frac{W-d}{2}$
  - Maximum Length of Thrust Block (Lm) =  $\frac{\text{Area of Concrete}}{\text{Maximum Height}} = \frac{A}{Hm}$
  - Required Amount of Concrete (Cu. Yd.) =  $\frac{(\text{Height} \times \text{Depth} \times \text{Length}) \times 0.03704}{27}$   
 =  $\frac{(\text{Hm} \times \text{Lm} \times \text{Dc}) \times 0.03704}{27}$

**E. EXAMPLE**

- 1. Problem:**  
 Calculation of the amount of concrete required to block a 90° bend in an 8" C.I. water main; the normal operating pressure in the pipe will be 65 psi and the soil condition in the area indicates sand and gravel.
- 2. Solution:**
- Maximum testing pressure (See Table 1) = 300 psi. = 0.75 ft.
  - Outside diameter of 8" pipe = 9.05 in. = 9.05/12
  - Go to Table 1: The testing pressure of 300 psi, we see that the thrust on a 90° bend is 21,360 pounds.

- Go to Table 2: Table 2 gives the safe bearing load for sand and gravel: 3,000 lbs./sq. ft.
  - Go to Figure 1: Figure 1 indicates the position of the concrete for blocking the 90° bend.
  - Go to the specifications of the project and find:
    - depth of trench (h) = 4 feet
    - width of trench (W) = 3 feet
- With the above assembled information, we proceed to the final calculations:
- Thrust = 21,360
  - Safe Bearing Load = 3,000
  - Area of Concrete (A) =  $\frac{21,360}{3,000} = 7.12 \text{ sq. ft.}$
  - Maximum Height of Thrust Block (Hm) =  $\frac{\text{Depth of Trench in Feet}}{2} = \frac{4}{2} = 2.0 \text{ ft.}$
  - Depth of Concrete Thrust Block (Dc) =  $\frac{\text{Width of Trench in Feet} - \text{Outside Diameter of Pipe (d)}}{2} = \frac{3 - 0.67}{2} = 1.13 \text{ ft.}$
  - Maximum Length of Thrust Block (Lm) =  $\frac{\text{Area of Concrete}}{\text{Height of Concrete}} = \frac{7.12}{2.0} = 3.56 \text{ ft.}$
  - Required Amount of Concrete =  $\frac{(\text{Height} \times \text{Depth} \times \text{Length}) \times 0.03704}{27} = \frac{(2.0 \times 1.13 \times 3.56) \times 0.03704}{27} = 0.30 \text{ cu. yd.}$

**TABLE 1**  
 Thrust at Fittings in Pounds

| Size | Pressure PSI | Tees     |          |              |              |
|------|--------------|----------|----------|--------------|--------------|
|      |              | 90° Bend | 45° Bend | 22-1/2° Bend | 11-1/4° Bend |
| 3"   | 300          | 2,120    | 3,000    | 1,630        | 830          |
| 4"   | 300          | 3,780    | 5,370    | 2,910        | 1,470        |
| 6"   | 300          | 8,500    | 12,000   | 6,510        | 3,320        |
| 8"   | 300          | 15,100   | 21,360   | 11,550       | 5,960        |
| 10"  | 275          | 21,620   | 30,570   | 16,540       | 8,430        |
| 12"  | 250          | 33,930   | 48,000   | 25,950       | 13,280       |
| 16"  | 225          | 48,200   | 65,370   | 35,340       | 18,030       |
| 18"  | 200          | 59,900   | 82,000   | 44,000       | 22,500       |
| 20"  | 200          | 62,840   | 86,900   | 46,080       | 23,520       |
| 24"  | 200          | 90,480   | 127,980  | 69,200       | 35,320       |
| 30"  | 200          | 141,370  | 198,960  | 105,150      | 53,140       |
| 36"  | 200          | 203,580  | 287,950  | 155,740      | 79,400       |

**TABLE 2**  
 Safe Bearing Loads in Lb./Sq. Ft.

The safe bearing loads given in the following table are for horizontal thrusts when the depth of cover over the pipe exceeds 2 feet.

| SOIL                               | Safe Bearing Load Lb. per Sq. Ft. |
|------------------------------------|-----------------------------------|
| *Muck, peat, etc.                  | 0                                 |
| Soft Clay                          | 1,000                             |
| Sand                               | 2,000                             |
| Sand and Gravel                    | 3,000                             |
| Sand and Gravel Cemented with Clay | 4,000                             |
| Hard Shale                         | 10,000                            |

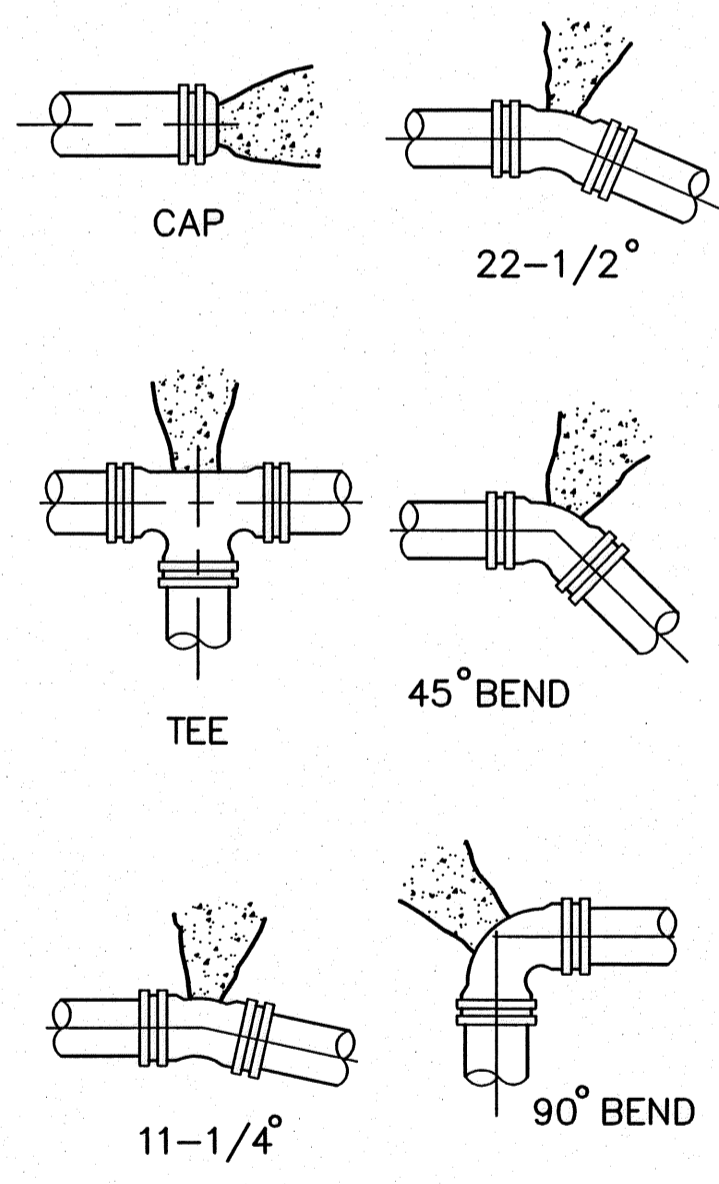
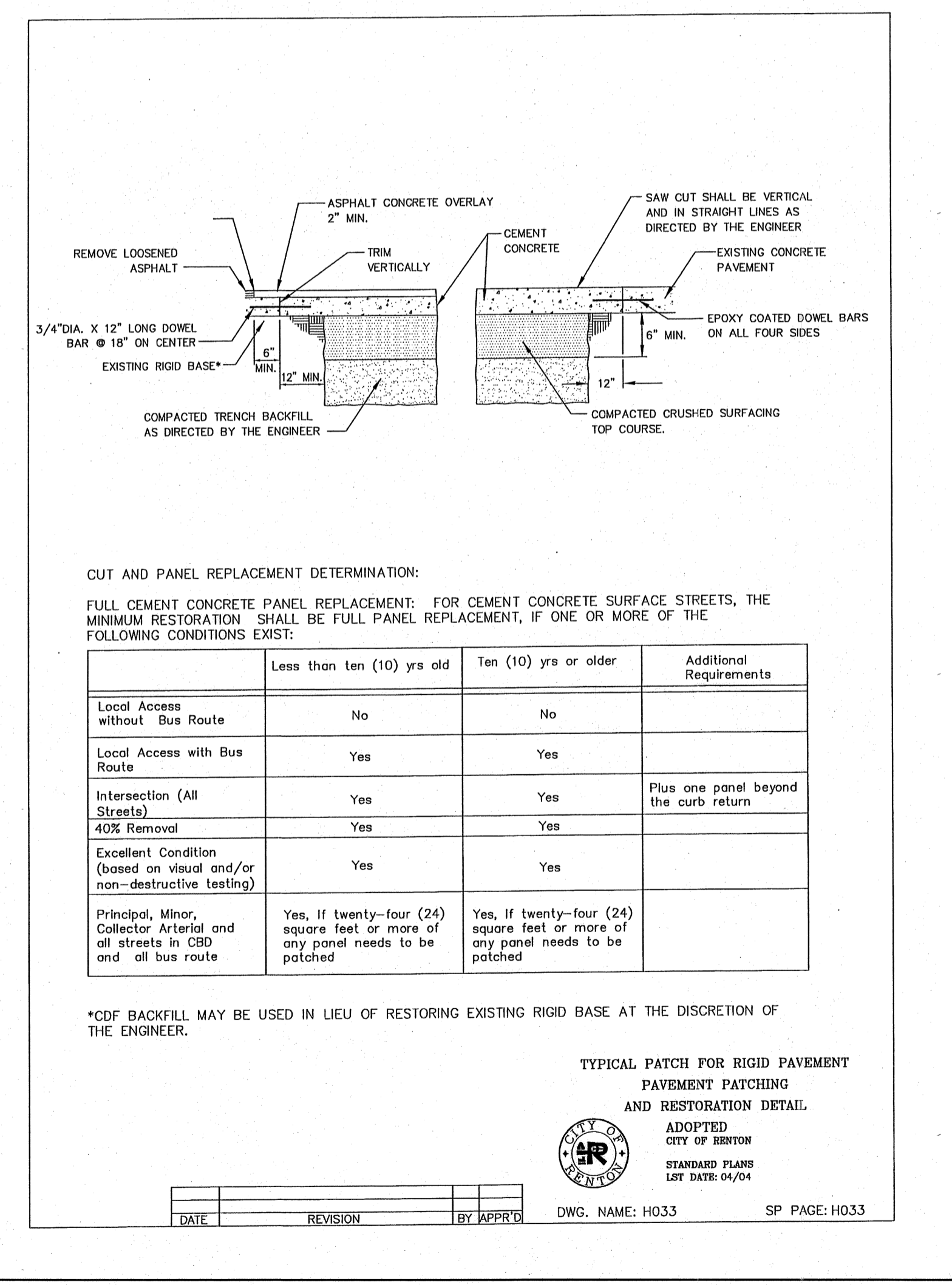


FIGURE 1

NOTE: FOR CONVEX VERTICAL BENDS BLOCKING SEE APWA STANDARD PLAN NO. 73.

ADOPTED CITY OF RENTON  
 Standard plans LST DATE: 12/98  
**CONCRETE BLOCKING SIZING PROCEDURE**  
 DWG. NAME: BR26 SP PAGE: B085



**CUT AND PANEL REPLACEMENT DETERMINATION:**  
 FULL CEMENT CONCRETE PANEL REPLACEMENT: FOR CEMENT CONCRETE SURFACE STREETS, THE MINIMUM RESTORATION SHALL BE FULL PANEL REPLACEMENT, IF ONE OR MORE OF THE FOLLOWING CONDITIONS EXIST:

|  | Less than ten (10) yrs old  | Ten (10) yrs or older   | Additional Requirements               |
|--|---|---|---------------------------------------|
| Local Access without Bus Route                                       | No  | No  |                                       |
| Local Access with Bus Route  | Yes   | Yes   |                                       |
| Intersection (All Streets)   | Yes   | Yes   | Plus one panel beyond the curb return |
| 40% Removal  | Yes   | Yes   |                                       |
| Excellent Condition (based on visual and/or non-destructive testing) | Yes   | Yes   |                                       |
| Principal, Minor, Collector Arterial and all bus route               | Yes, if twenty-four (24) square feet or more of any panel needs to be patched | Yes, if twenty-four (24) square feet or more of any panel needs to be patched |                                       |

\*CDF BACKFILL MAY BE USED IN LIEU OF RESTORING EXISTING RIGID BASE AT THE DISCRETION OF THE ENGINEER.

TYPICAL PATCH FOR RIGID PAVEMENT PAVEMENT PATCHING AND RESTORATION DETAIL.  
 ADOPTED CITY OF RENTON  
 STANDARD PLANS LST DATE: 04/04  
 DWG. NAME: H033 SP PAGE: H033

W-337205

CHECKED FOR COMPLIANCE TO CITY STANDARDS  
 Date \_\_\_\_\_  
 Date \_\_\_\_\_  
 Date \_\_\_\_\_

RECOMMENDED FOR APPROVAL  
 BY: \_\_\_\_\_  
 BY: \_\_\_\_\_



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 510 RAINIER AVENUE SOUTH  
 SEATTLE, WA 98144  
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PROJECT NO.: 06085  
 DRAWN BY: VK  
 ISSUE DATE: 12/05/06  
 SHEET REV.: 10/30/07

WATER DETAILS

060850T04-C25.DWG  
**C25**  
 SHEET 25 OF 28