IN GENERAL, PROVIDE MINEWALLS OF SUFFICIENT LENGTH TO RETAIN THE ROADWAY EMBANKMENT TO THE REQUIRED EXTENT AND TO FURNISH PROTECTION AGAINST EROSION. COMPUTE MINEWALL LENGTHS USING THE ACTUAL CONDITION, THE FOLLOWING METHOD IS PROPOSED TO COMPUTE THE REQUIRED LENGTHS.

**LENGTH OF WINGWALL**

**SCHEME A**

- **EDGE OF SHOULDER** or **ROADWAY**

**SCHEME B**

- **PLACE A 20" X 3/4" CHAMFER AT TOP OF ROCK PROTECTION**
- **PLACE A 20" X 3/4" CHAMFER AT TOP OF ROCK PROTECTION**

**SUBSTRUCTURE DRAINAGE**

**GIVEN:**
- **BRC. ELEV. LEVEL**
- **ELEV. A**
- **ELEV. B**
- **ELEV. C**
- **ELEV. D**
- **FACE OF ABUTT.**
- **WING**
  - **ELEV. A**
  - **ELEV. C**
- **WING LENGTH X SIN(E)**
- **WING LENGTH X COS(E)**
- **CHANNEL CUT SLOPE**
- **ROADWAY FILL SLOPE**
- **W.L.**
- **W.L.**
- **D.1**
- **E.1**
- **D.2**
- **E.2**
- **D.3**
- **E.3**
- **W.H.**
- **W.D.**
- **W.L.**

**ABUTMENT, WING & RETAINING WALL**

**INSTRUCTIONS:**
- **USE SCHEME A IF DISCHARGE AT FRONT OF WALL IS NOT ORIENTATIONAL, OTHERWISE USE SCHEME B.**
- **SPACE MINE HOLES SO AS TO NOT EXCEED 4500 mm (15')**
- **SLOPE 15° (6") STRUCTURE DRAINAGE A MINIMUM OF 10 mm per 1' (4")**
- **REINFORCE MINE HOLES WITH 1/2" X (8") STRENGTH HOLES ON EACH FACE PLACED IN A DIAGONAL PATTERN.**
- **SHOW PIPES USED TO COLLECT WATER AT THE REAR OF ABUTMENTS, WINGWALLS AND RETAINING WALLS ON SCHEMATIC DRAWINGS AND IN SCHEMATIC DRAWINGS AND LEGEND.**
- **NOTE: ABUTMENT, WINGWALL & RETAINING WALLS BETWEEN THE CREST OF THE ROADWAY AND CANAL LINE, AND RETAINING WALLS TO A HIGHWAY DRAINAGE STONE SYSTEM ARE TO BE DESIGNATED IN BLACK, AND KEYED TO BE PRESENTED IN THE BRIDGE DRAWING AS A GREAT DRAINAGE ITEM.**

**STUB ABUTMENT IN CUT**

**LEGEND:***
- **STR/FOU DIAM ** STRUCTURE DRAINAGE FOUNDATION
- **V.C.** VITRIFIED CLAY
- **PL/C.C.** PLAIN CEMENT CONCRETE
- **P.V.C.** POLYVINYL CHLORIDE (SCHEDULE 40)

**NOTE:**
- **ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED. USE CUSTOMARY UNITS IN "A" PARENTHESES.**
- **NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS, METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.**

**COMMONWEALTH OF PENNSYLVANIA**
**DEPARTMENT OF TRANSPORTATION**
**BUREAU OF HIGHWAYS**

**STANDARD REINFORCED CONCRETE ABUTMENTS**

**MISCELLANEOUS DETAILS**