

# Chapter 4

## Bridge Program Drawings

### Section 4.07-Abutments

#### Introduction

Abutments are the support elements connecting the ends of the bridge to the roadway. Abutments serve to prevent erosion, retain the backfill to a desirable spill slope, keep the soil from coming in contact with the bearings, and transfer the bridge loads to the foundation. There are numerous configurations of abutments; however, the most commonly used are cap, spill-through, sill, or full retaining types of abutments. To retain the fill, wingwalls are attached to the abutment as either sweptback or, most commonly, elephant ear.

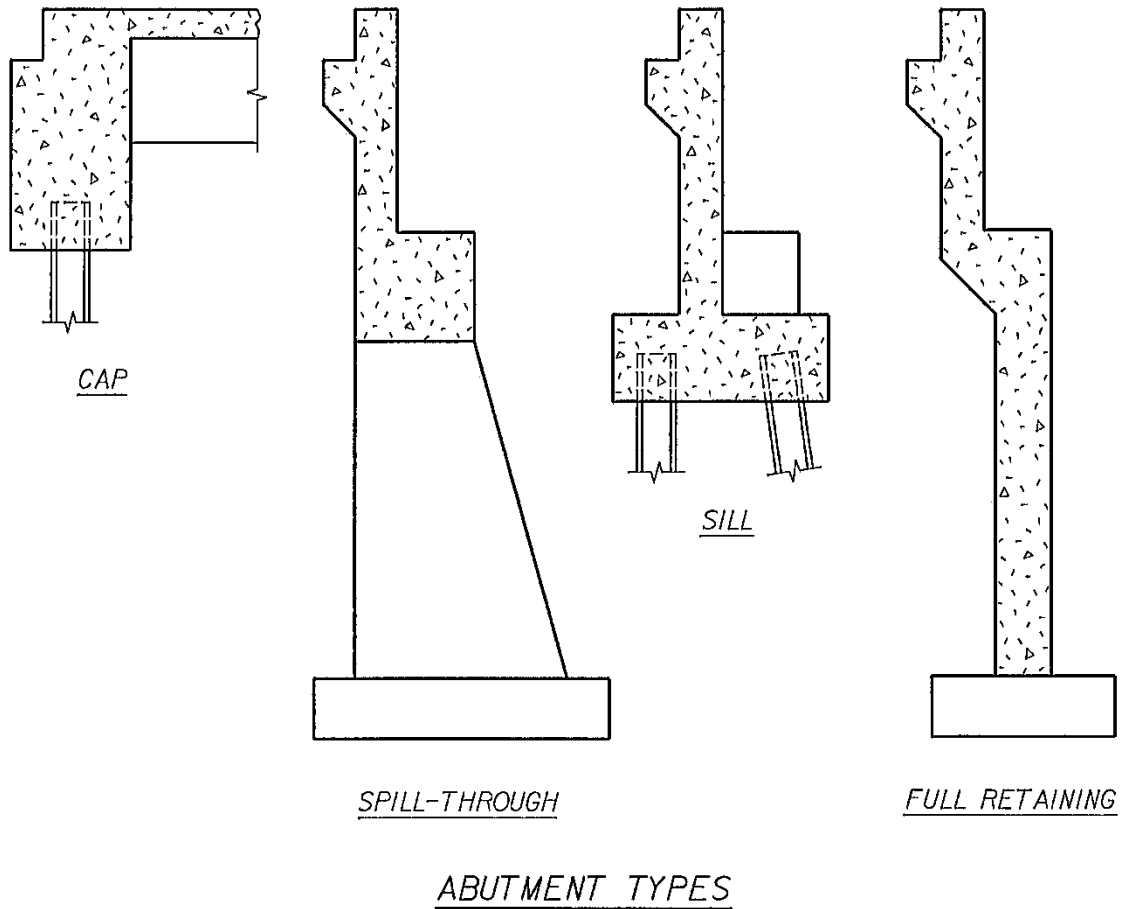
#### Abutment Types

**CAP-TYPE ABUTMENTS** are generally used with steel and concrete girder bridges that have no expansion devices built into the abutment. This type of abutment is supported by steel H piles, concrete columns on footings, or drilled shaft foundations.

**SPILL-THROUGH ABUTMENTS** allow the soil to spill through the supporting columns. Typically, spill-through abutments are used with longer bridges and may have provisions for expansion. These are founded on spread footings and are used when adequate foundation material is close to the ground line.

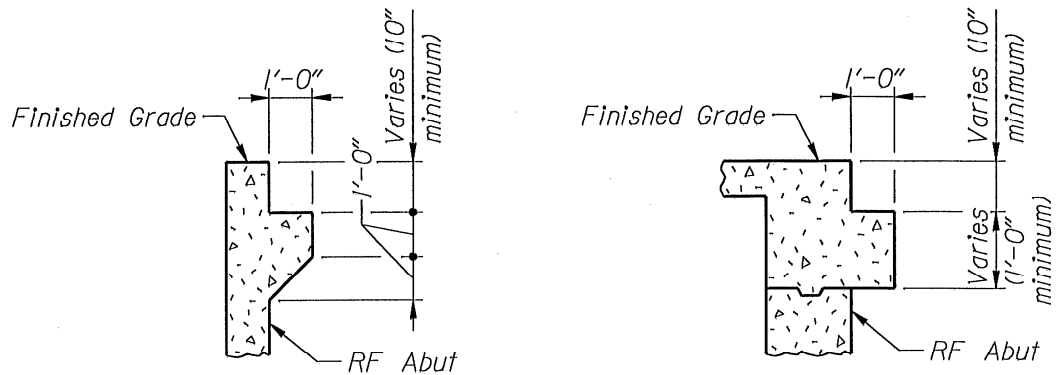
**SILL-TYPE ABUTMENTS** are also used with longer bridges, but when adequate foundation material is at too great a depth for footings. Therefore, this type must be supported by piles or drilled shaft foundations.

**FULL RETAINING ABUTMENTS**, as their name implies, retain nearly all of the soil behind the abutment. In many cases, this will allow for a shorter structure, but the abutment cost will be dramatically higher. These abutments employ a wall to retain the embankment and are supported on footings. Because of this, full retaining abutments are used when good foundation material is near the final grade.

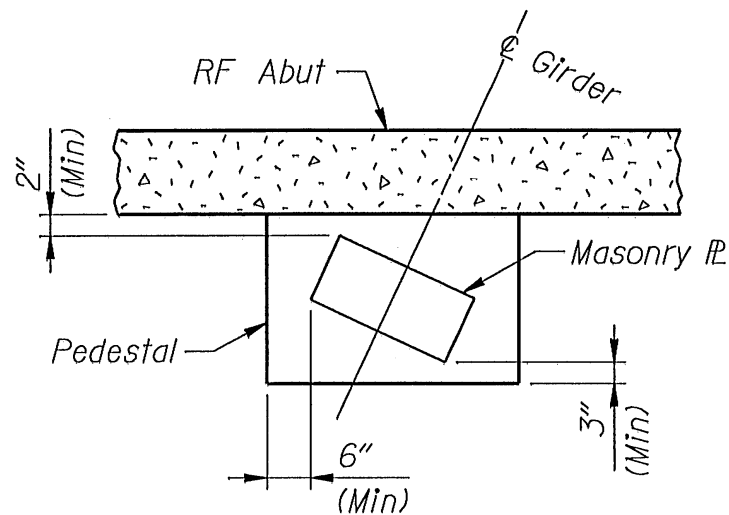


## General Design and Detail Information

**CORBELS** are provided to support approach slabs on all bridge structures except on minor county roads, or as directed by the Squad Team Leader. Corbel details shall be similar to those shown below.



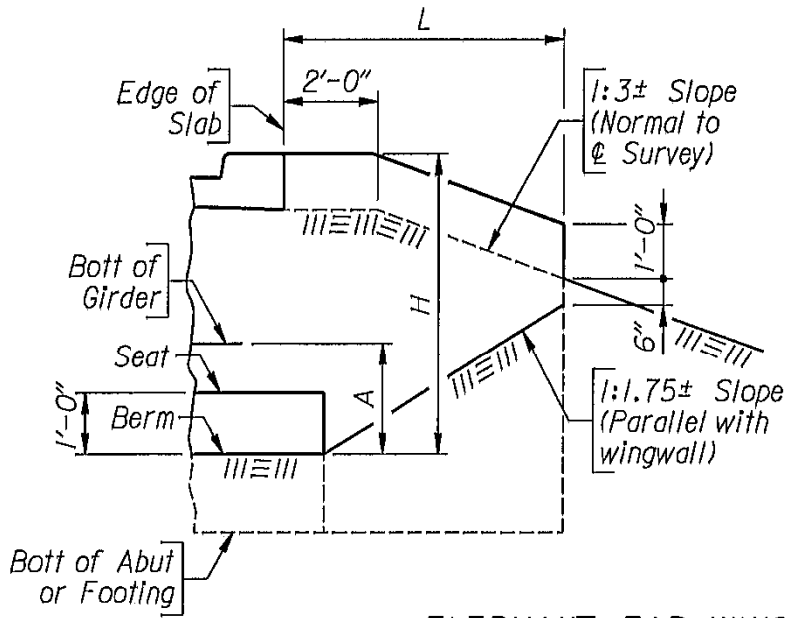
**SEAT SIZE** shall be of sufficient dimension to minimize the chance of concrete spalling when the loads are placed. As a general guideline, the sketch below should be used for typical situations and adapted to suit other situations as well.



**ANCHOR BOLTS** shall be used to securely anchor the superstructure to the substructure. Anchor bolts shall be threaded or swaged to secure a satisfactory grip on the material used to embed them in their holes. The holes shall be either drilled, or square formed. For more information on anchor bolt sizes and required holes, see Section 4.09 - Superstructure.

**WING LENGTHS** shall be long enough to prevent the approach roadway soil from spilling onto the seats and to control erosion. The following sketches give adequate wing lengths, berm locations, and widths for use on any of the abutment types. Wing lengths should be detailed in 3" increments.

For elephant ear wingwalls, a 3:1 slope is used to ensure adequate wingwall length, regardless of abutment skew.



$$L = \frac{(5.25 \times H) - 1.75}{4.75}$$

TABLE OF DIMENSIONS	
Structure Type	Dim A
Steel Girder	1'-3"
Box Girder	3'-0"
Prestressed	1'-3"

ELEPHANT EAR WINGWALL  
(Minimum dimensions)

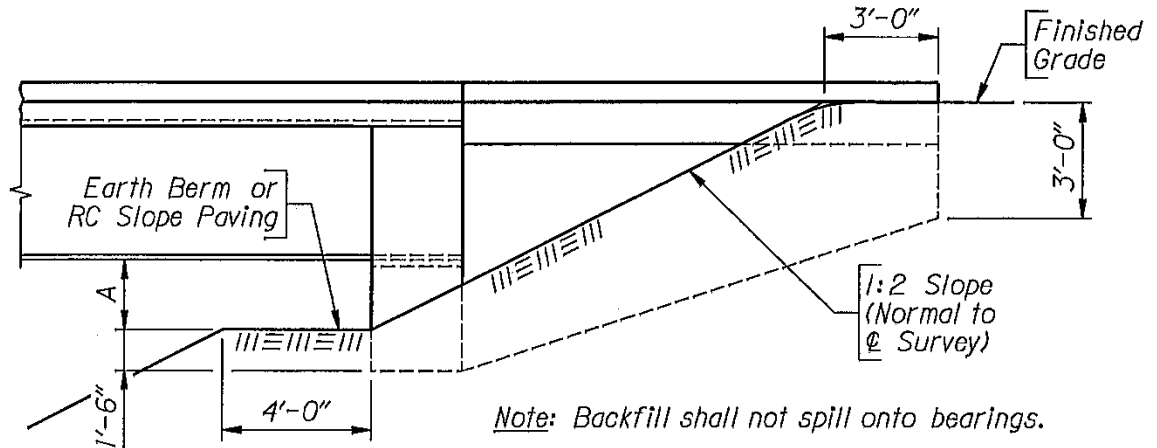
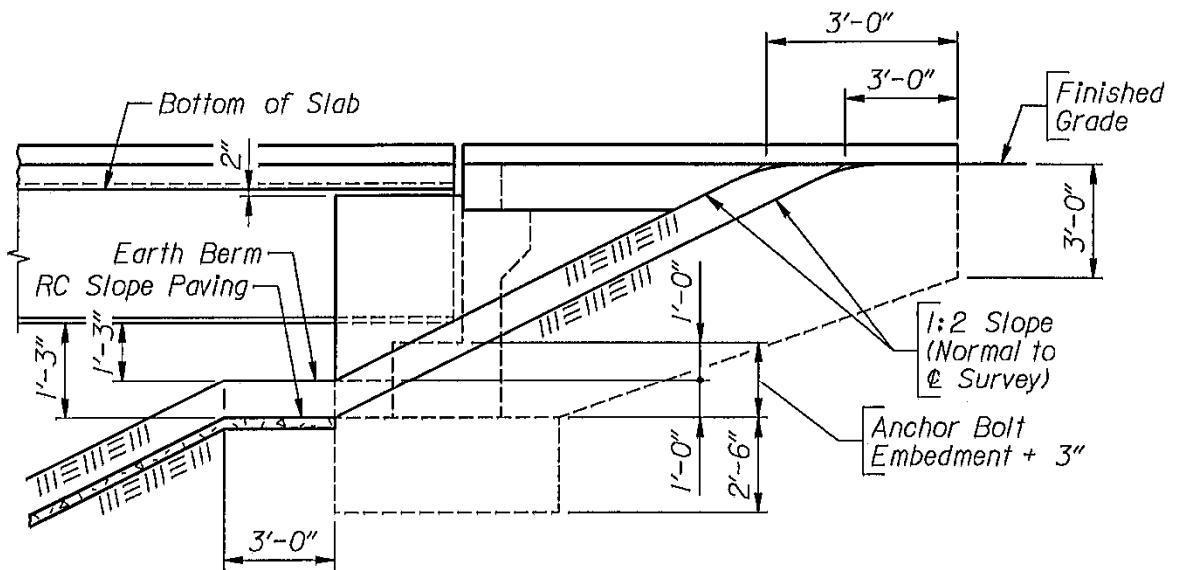


TABLE OF DIMENSIONS			
Structure Type	Steel Girder	Box Girder	Prestressed
Dim A	1'-3"	3'-0"	1'-3"

CAP-TYPE ABUTMENT

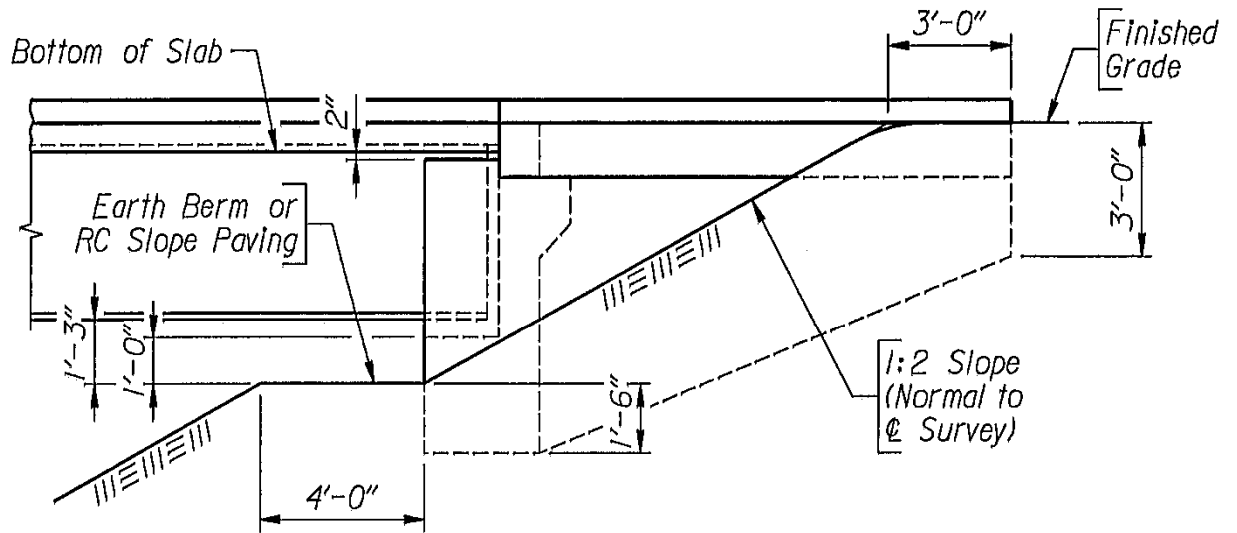
(Minimum dimensions)  
(Sweptback wingwall shown, elephant ear wingwall similar)



Note: Backfill shall not spill onto bearings.

SILL-TYPE ABUTMENT

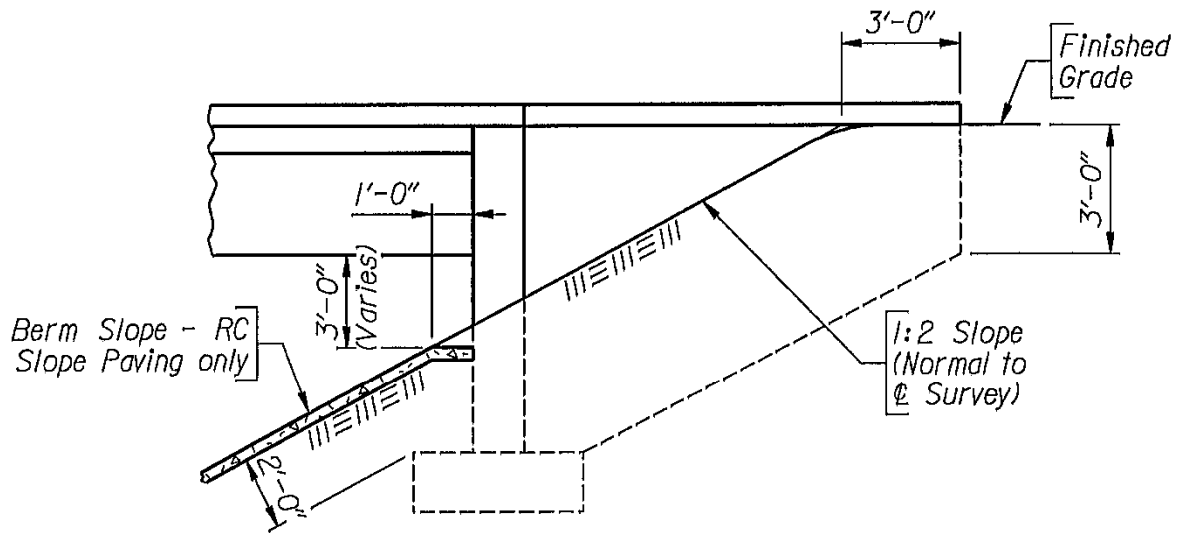
(Minimum dimensions)  
(Sweptback wingwall shown, elephant ear wingwall similar)



**SPILL-THROUGH ABUTMENT**

(Minimum dimensions)

(Sweptback wingwall shown, elephant ear wingwall similar)



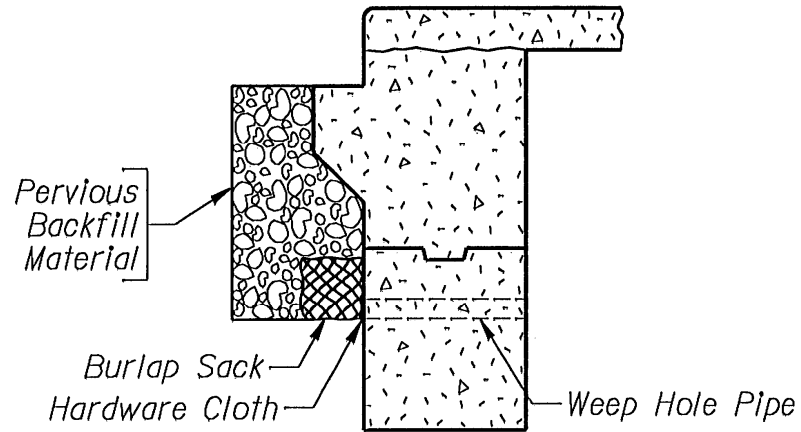
**GENERAL ABUTMENT**

(Minimum dimensions)

(Use to reduce span length on Interstate Underpasses as approved by Bridge Staff)

(Sweptback wingwall shown, elephant ear wingwall similar)

**WEEP HOLES** are placed in the abutment backwalls of bridges without approach slabs to provide drainage of the pervious backfill material. They may be spaced at 5'-0" minimum and 9'-0" maximum and placed 3" from centerline weep hole to top of berm.



### WEEP HOLE DETAIL

## Cells

Name	Description
ABSECL	Abut Section A-A Large
ABSECS	Abut Section A-A Small
CORBEL_ABUT	Corbel Detail at Abut
EYEBLT	Eyebolt Detail
HP10X42E	Elevation of HP 10X42
HP10X42P	Hidden Plan of HP 10X42
HP10X42S	Side View of HP 10X42
HP12X53E	Elevation of HP 12X53
HP12X53P	Hidden Plan of HP 12X53
HP12X53S	Side View of HP12X53
HP12X74E	Elevation of HP 12X74
HP12X74P	Hidden Plan of HP 12X74
HP12X74S	Side View of HP12X74
HP14X73E	Elevation of HP 14X73
HP14X73P	Hidden Plan of HP 14X73
HP14X73S	Side View of HP 14X73
HP14X89E	Elevation of HP 14X89
HP14X89P	Hidden Plan of HP 14X89
HP14X89S	Side View of HP 14X89
KEY1X3H	1"x3" Hidden Keyway Elev
KEY1X3S	1"x3" Keyway Elev
KEY2X4H	2"x4" Hidden Keyway Elev

KEY2X4S	2"x4" Keyway Elev
KEY2X6H	2"x6" Hidden Keyway Elev
KEY2X6S	2"x6" Keyway Elev
KEY2X8H	2"x8" Hidden Keyway Elev
KEY2X8P	2"x8" Keyway Plan
KEY2X8S	2"x8" Keyway Elev