
Chapter 7

Grassed Waterways



Issued December 2007

Cover: Grassed waterway in Fayette County, Iowa

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Chapter 7

Grassed Waterways

Contents	650.0700	Introduction	7-1
	650.0701	Assessment of suitability	7-1
		(a) General considerations.....	7-1
		(b) Legal/regulatory considerations.....	7-2
	650.0702	Planning and preliminary design considerations	7-3
		(a) Location.....	7-3
		(b) Slope	7-3
		(c) Cross section shape	7-3
		(d) Vegetation.....	7-4
		(e) Outlets.....	7-4
		(f) Sediment control	7-4
		(g) Data collection.....	7-4
	650.0703	Design process	7-5
		(a) Steps in the design of a waterway.....	7-5
		(b) Initial design parameters: slope, discharge, section, and lining.....	7-5
		(c) Conditions for stability	7-6
	650.0704	Sizing channel sections	7-14
		(a) Techniques presented	7-14
		(b) Use of the design tables for parabolic and trapezoidal channels.....	7-15
		(c) Design examples.....	7-15
	650.0705	Layout and construction	7-21
		(a) Layout	7-21
		(b) Adjustment and marking	7-21
		(c) Site preparation	7-21
		(d) Excavation	7-21
		(e) Equipment.....	7-21
		(f) Appurtenant structures	7-21
		(g) Postconstruction protection of channel lining.....	7-22
	650.0706	Maintenance	7-25
		(a) General	7-25
		(b) Removal of sediment	7-25
		(c) Repair work.....	7-25
	650.0707	References	7-25
	Appendix A	Notations	7A-1
	Appendix B	Equations	7B-1
	Appendix C	Design Tables for Trapezoidal Channels	7C-1
	Appendix D	Design Tables for Parabolic Channels	7D-1

Tables	Table 7-1	Allowable effective stress for categories of soil erodibility	7-8
	Table 7-2	Void ratios for selected soils	7-9
	Table 7-3	Properties of grass channel linings; values apply to good uniform stands of each cover	7-12
	Table 7-4	Classification of vegetation cover as to degree of retardance	7-13
	Table 7-5	Retardance curve index by retardance class	7-13
	Table 7-6	Cross section properties	7-14
	Table 7-7	Trial and error solution for example 3	7-20
	Figures	Figure 7-1	Typical waterway cross sections
Figure 7-2		Cross section showing perforated grid pavers	7-7
Figure 7-3		Provision for vehicle crossing	7-7
Figure 7-4		Calculation for grain roughness for noncohesive soils	7-8
Figure 7-5		Allowable stress for noncohesive soils	7-9
Figure 7-6		Basic allowable stress for cohesive soils	7-10
Figure 7-7		Correction for void ratio	7-10
Figure 7-8		Design table for example 1	7-16
Figure 7-9		Design table for example 2	7-17
Figure 7-10		Design table for example 3	7-19
Figure 7-11		Installation of stone center drain	7-22
Figure 7-12		Fabric barrier	7-23
Figure 7-13		Use of woody plantings	7-24

650.0700 Introduction

Grassed waterways are natural or constructed channels shaped to required dimensions and lined with suitable vegetation for stable conveyance of runoff.

Grass-lined water conveyance channels are widely used to convey excess runoff water where flows are of a sufficiently short duration to allow the grass to withstand the inundation period and operation is sufficiently infrequent to allow healthy grass cover to be maintained. This type of channel may be used for diversions, spillways, and floodways, as well as for waterways to convey local runoff.

Research conducted during the 1930s and 1940s documented the benefit of grass as a water conveyance channel liner and provided the basis for engineering design of a stable section based on permissible velocity. This approach was documented in Soil Conservation Service (SCS) Technical Paper (TP)–61 published in 1947, revised in 1954 (SCS 1954), and was used for the design of grassed waterways throughout the remainder of the 20th century. Since the development of the permissible velocity approach and procedure, additional research has led to a more in-depth understanding of the interaction of the flow with the vegetated boundary of a grass-lined channel and the digital computer has allowed more extensive calculations to be easily carried out when needed. These advances led to the documentation of an effective stress approach to grass-lined channel design documented in USDA Agriculture Handbook #667 (Temple et al. 1987). This approach, which also incorporates more general stable channel design concepts and data, has been successfully integrated into the Waterway Design Tool (WDT) software used by the Natural Resources Conservation Service (NRCS) for design of vegetated earth spillways and is being used for design of other grass-lined channels. Incorporation of the allowable effective stress approach into the NRCS Engineering Field Handbook (EFH) allows additional design flexibility through separation of the effects of soil and vegetal parameters and makes the procedures used for waterway and diversion design consistent with those used for other grass-lined and unlined channels.

650.0701 Assessment of suitability

(a) General considerations

A constructed waterway is designed to carry the estimated flow without damage to the waterway or its lining. Waterways should be planned and designed to fit the conditions of a particular site, and the following factors dealing with construction and management should be determined before designing the waterway:

- slope of the proposed waterway (note that this may need to be modified to get a satisfactory design)
- vegetation suitable for site conditions
- expected height at which vegetative cover will be maintained, both in growing and dormant seasons
- allowance for area of field occupied by the waterway
- allowance for freeboard, if required by local standards and specifications

Design of a satisfactory vegetated waterway requires assessment of several site-specific factors: soil properties, management requirements of the vegetation, and climate. The soil properties define the allowable effective stress and are also a factor in the site hydrology and determination of the design discharge. Proper management of the vegetation is critical to its ability to provide the expected level of protection for the channel. The level of management at the site that is feasible, economical, and logistical should be determined and vegetation that will thrive under that degree of management selected. Since height of vegetation is an important factor in flow resistance, realistic estimates of the frequency of mowing and maximum height to be achieved between mowings should be made. In addition to its impact on site hydrology and design discharge, climate is an important factor in vegetation selection and the intensity of management required. In selecting the vegetation and maintenance program for a site, the goal should be to maximize the quality and uniformity of the resulting cover.

A successful grassed waterway also depends on good conservation treatment of the contributing watershed and a regular maintenance program. The better the erosion control in the watershed, the less silting there will be in the waterway. Good conservation practices also reduce the peak rate of runoff and volume of water to be carried by the waterway. When good conservation treatment of the drainage area is not obtained, greater maintenance is usually required.

Waterways subject to constant or prolonged flows require special supplemental treatment, such as stone centers or subsurface drains capable of carrying a portion of such flows. Typically, a grass lining is not suitable if continuous flows for more than 72 hours are expected. A grassed waterway is susceptible to considerable erosion damage until permanent vegetative cover is established. Flows experienced by the waterway during the establishment period may result in maintenance or repair being required.

If an existing natural waterway is to be used, it may need to be selectively cleared, shaped, or enlarged to accommodate the design flow. It also must be checked to ensure stability. Natural waterways that are providing important woody wildlife cover and are not seriously eroding should not normally be disturbed.

Avoid placing waterways where there are sharp, unnatural changes in flow direction. Land management systems should be planned to conform to natural land features. The location of the alignment should not pose a threat to important landscape elements such as unique trees, geologic formations, or scenic features. The slope of the waterway should not interfere with adjacent land uses. Shallower and broader designs usually blend in better and are less disruptive.

(b) Legal/regulatory considerations

If buried utilities cross the proposed alignment, contact the utility companies to determine the exact location of underground services, and analyze compatibility.

The use of public road ditches for the disposal of water should be in conformance with the policy of the local transportation authority and the NRCS. Where a road crosses a waterway, consideration should be

given to providing a culvert, bridge, or lining to protect the waterway from resulting damage.

Any other applicable state laws and local ordinances and regulations must be observed in locating waterways and outlets.

650.0702 Planning and preliminary design considerations

(a) Location

If possible, consider more than one location, and select the most practical and economical alternative, considering aesthetics and the nature of local land use. Consider outlet conditions, topography, vegetation, land values, cultural activities, visual quality, soil type, length of slope, and natural features. Waterways should be located such that they will not experience vehicle traffic or other activity sufficient to damage the vegetal cover.

The location of waterways is important to a good program of erosion and sediment control. Wherever possible, the natural drainage system should be preserved and used. Waterways should generally be located in natural drainageways where water can drain in from all sides. Moisture conditions and soil fertility are usually best in such areas for establishment of vegetation. Other advantages of natural waterways include:

- flattest grade in the immediate area
- most stable waterway conditions
- adequate capacity
- sufficient depth for outletting diversions, terraces, and rows with minimum earthwork

Waterways can also be located along development boundaries, road rights-of-way, property lines, or along storm sewer center lines. Special precautions should be taken when waterways start or end near property lines. Care must be taken to prevent sediment from damaging lower or downstream properties. If the upper or upstream end is near a property line, the transition must be stable to prevent erosion or degradation of neighboring land.

In lieu of a constructed or natural channel, an adjoining pasture or meadow strip may be used. The surface of such areas should be checked, however, to ensure that uniform surface and adequate width are available to spread the flow and that the type and density of vegetation are adequate to protect the soil from erosion.

An area of land parallel to a field boundary should be used for the waterway, if suitable. One advantage of this location is that the waterway is less likely to be damaged by farm equipment. Such a location often requires the construction of a channel to:

- provide an outlet for terraces or diversions that cannot be extended to a natural draw
- provide an outlet away from buildings or other critical areas
- avoid the use of a gullied natural draw that would be impractical to stabilize, especially those with large watersheds

(b) Slope

The design bed slope will generally reflect the slope along the chosen channel alignment. If the slope at the site changes significantly and the bed slope will need to change, the channel can be broken up into reaches for analysis. While it is generally most convenient to follow the lay of the land in selecting a slope, there are occasions where modifications to the slope may be necessary such as:

- If it is not possible to find an appropriately sized stable section, it may be necessary to build the channel on a flatter bed slope.
- If it is not possible to obtain adequate capacity under a depth and/or width limitation, then a steeper bed slope is needed.

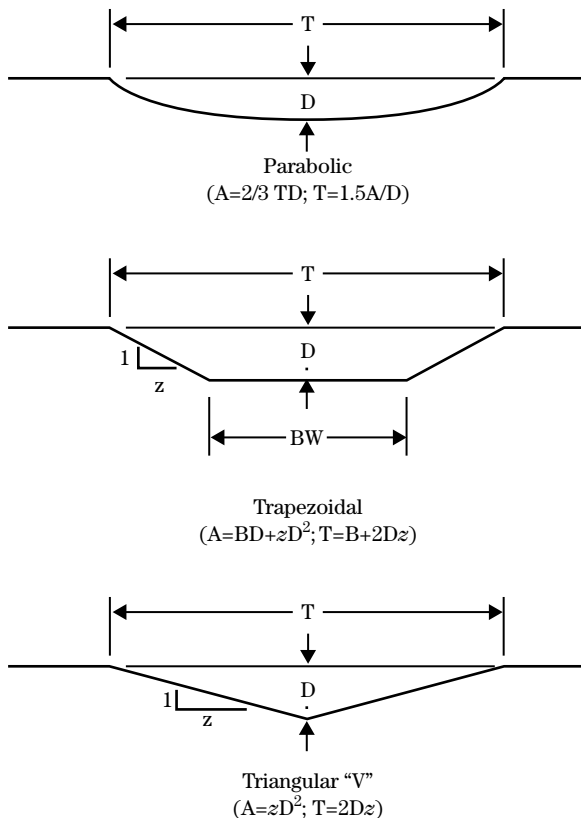
Final grades should be selected to meet capacity and stability requirements. When permanently vegetated waterways are used in residential or commercial developments to manage or convey storm water, the grade of the channel should be such as to minimize standing water or wetness problems. The slope should be steep enough to minimize sediment deposition in the waterway and flat enough to minimize erosion during large flow events.

(c) Cross section shape

The channel section is chosen to accommodate site conditions, limitations imposed by availability of excavating equipment, and allow for maintenance, grazing, or traffic.

Vegetated waterways may be built in a parabolic, trapezoidal, or V shape. Parabolic waterways are the most common and generally are the most satisfactory. This shape is ordinarily found in nature. Small flows are less likely to meander. Waterways constructed with a trapezoidal section often tend to revert to a parabolic cross section. A modified trapezoidal cross section with the bottom center constructed 0.3 to 0.5 feet lower than the edges is sometimes used on wide waterways. The cross section should be designed to permit easy crossing by equipment where necessary. Typical waterway cross sections are shown in figure 7-1.

Figure 7-1 Typical waterway cross sections



Where: A =cross section
 D =design depth
 T =design top width
 B =design bottom width
 z =side slope ratio

(d) Vegetation

Consider the possible future conditions of the vegetative lining based upon natural succession and maintenance. In some cases, the expected stand of vegetation may not be attained or will deteriorate under normal maintenance. Therefore, it is necessary to check the waterway design for stability under any eventual conditions of deterioration that may be anticipated. Select vegetation that will provide long-term uniform cover with the anticipated level of maintenance.

(e) Outlets

All waterways shall have stable outlets with adequate capacity for the design flow. The outlet may be another grassed waterway, earth ditch, structure, or other suitable outlet. In all cases, the outlet must discharge in a manner that prevents erosion. Outlets should be constructed and stabilized before the waterway is used.

(f) Sediment control

Permanent waterway channels should be protected from sediment. If sediment is not controlled before it reaches the waterway, several methods may be used:

- install a vegetated filter strip on each side of the waterway where surface water enters
- increase the channel depth to store trapped sediment and/or design areas of increased width or decreased slope to trap and store sediment
- provide for cleaning out the channel when its design capacity deteriorates

(g) Data collection

(1) Engineering surveys

A preliminary site investigation is recommended to determine the feasibility of using a natural watercourse or constructing a waterway. Such a survey includes a study of resource information such as soil maps, aerial photography, and contour maps; visual examination of potential alignment; topographic surveys; and estimating required capacity. A preliminary investigation should provide enough information to select a final alignment.

Surveys for waterways normally consist of field notes for waterway design, layout, and construction as shown by the example in Technical Release (TR)–62 (USDA 1979). These notes are satisfactory when drainage areas are small, topography is relatively uniform, and elevations with respect to other structures are not significant. Standard forms or data sheets approved for field offices may be used to record field notes. A profile and cross section of the original ground surface should be exhibited in enough detail to permit dividing the waterway into reaches of approximately uniform slope and shape.

Design information should include documentation of outlet conditions, topography, vegetation, land use and cultural patterns, soil type, length of slope, and other built or natural features. Typical design conditions will require general identification of the relative erodibility of the soil. Projects with larger drainage areas and more extensive design requirements may require more detailed information such as the unified classification of the soils that will be encountered along the alignment of the waterway, along with the plasticity index (I_w) and void ratio (e), or, for noncohesive soils, the representative particle diameter, d_{75} .

(2) Hydrologic investigations

Information on the watershed area, design storm frequency and duration, and runoff estimates are important in correctly sizing the waterway. The drainage area divides can be determined by field inspection or from topographic mapping. Drainage areas determined from mapping should be field-checked.

Determine the watershed area at the outlet of the waterway and at other points where it may be desirable to change the grade or cross section. Calculate the runoff in cubic feet per second at each design point for the frequency and duration of storm selected. Refer to EFH 650.02 (SCS 1989) or reference methods in National Engineering Handbook (NEH), Part 630 for the procedure.

650.0703 Design process

(a) Steps in the design of a waterway

Step 1 Plan the optimum location of the waterway centerline.

Step 2 Select design points along the waterway where grades, drainage areas, and/or type of lining change significantly.

Step 3 Determine the watershed area for the points in step 2 and for the outlet.

Step 4 Compute the peak runoff produced by the design storm.

Step 5 Determine the slope of each reach of the channel from the topographic map, profiles, or cross sections.

Step 6 Select the appropriate channel cross section and the type of channel lining(s) to be used.

Step 7 Design the channel for stability, typically based on the sparsest and shortest vegetation expected.

Step 8 Adjust the depth to obtain adequate capacity based on the densest and longest vegetation expected.

Step 9 Add appurtenant structures as needed to allow for prolonged flows.

(b) Initial design parameters: slope, discharge, section, and lining

If there are significant changes in slope or discharge along the waterway, it may be necessary to design the waterway in reaches. A reach (or segment) is generally a portion of the waterway having a near-uniform slope, discharge, soil type, and vegetal cover. A point of significant break in slope is a point of division between two reaches. The point of entrance of a diversion or other tributary where the discharge is significantly increased may also be a point of division between two reaches. Large changes in soil properties may also require cross section modification. Where there is a significant difference in cross section or slope between adjoining reaches, it may be necessary to install a transition section between them.

When the limits of two or more reaches have been determined, each reach is designed separately by procedures given in subsequent paragraphs.

Waterways are constructed to discharge the peak flow expected from at least a 10-year frequency, 24-hour duration storm. Out-of-bank flow may be permitted on land slopes parallel to the channel where the slope is not greater than one percent and where it is evident that no erosion or property damage will result. In every case, it is necessary to provide adequate capacity and limit velocities so there will be no danger to humans or animals, in accordance with site conditions.

The shape selected should be compatible with surrounding landform and landscape characteristics. Side slopes may be varied to better balance cut and fill and to improve aesthetics.

On sites where it is impossible to establish suitable permanent vegetation or it is desired to determine the stability of the channel in an as-constructed condition, the design can be based on bare ground conditions. Site conditions may warrant designing the waterway with a rigid or paved lining.

Perforated concrete blocks are a common form of structural lining in residential, commercial, or recreation areas where aesthetics, safety, maintenance, and rodent populations are primary design factors. First introduced as cellular concrete blocks by SCS in the 1950s, the improved versions are now referred to generally as grid pavers. Designed to carry heavy loads and allow turf to grow within the cells, their use is becoming more widespread as an alternative to conventional pavement surfaces or rock riprap (fig. 7-2).

The dimensions computed for waterway discharge capacity are the minimal measurements required to carry the actual flow and do not include a factor for extra depth required for space occupied by sedimentation or freeboard. Where local standards require such factors, they should be added to the computed dimensions. It is important that the depth be adequate to permit unimpeded discharge from terraces, diversions, and crop rows.

If the waterway must be crossed by farm equipment and other forms of traffic, consideration should be given to the need for increased width (fig. 7-3). Large combines, pickers, sprayers, and similar equipment

may require a significant increase in width over that needed for hydraulic capacity and freeboard. This scenario deserves consideration so that the proper modifications are made in waterway width and side slopes to meet the needs of equipment common to the locality. Vegetated crossing areas that are not otherwise reinforced may require additional maintenance and/or repair following flow events. Where paved channels are to be crossed, the lining must be designed to carry the expected loads. Culverts or bridges with adequate capacity may also be used.

(c) Conditions for stability

The purpose of the grass lining is to prevent damage to the channel by protecting the soil from eroding. To accomplish this requires limiting the stress on the soil and vegetation such that soil particles will not be detached and the vegetation will not be damaged. For most soils that will be encountered in practice, soil particles will be detached before damage to the vegetation occurs. In this case the effective stress on the soil controls channel stability. With highly erosion-resistant soils, however, the vegetation can become damaged before soil detachment occurs. The consequences of either mode of failure are similar.

Once vegetation becomes weak or damaged in a local area, there is a strong potential for rapid unraveling of the channel lining. This fact, along with high variability within the vegetative cover, makes it advisable for design criteria to be conservative. A very dense and uniform cover may be able to withstand larger stresses than those recommended here for stability design. Increasing the allowable stress is not recommended, however, unless the designer can be certain that the quality of the vegetative cover will *always* be maintained. In addition, the design should be adjusted to account for instances where highly variable cover conditions or low levels of maintenance are expected.

Design based on the erosionally effective stress considers the drag forces that can move individual soil particles, along with the influence of the vegetation on the distribution of stress. The approach is based on separating the stresses on the channel into components. Erosionally effective stress (τ_e) hereafter referred to as effective stress, is computed as:

$$\tau_e = \gamma DS(1 - C_F) \left(\frac{n_s}{n} \right)^2 \quad (\text{eq. 7-1})$$

where:

- γ = unit weight of water, 62.4 lb/ft³
- D = maximum flow depth in the cross section
- C_F = a vegetal cover factor
- n_s = roughness associated with soil grain size
- n = Manning's roughness coefficient
- S = channel bed slope, ft/ft

The vegetal cover factor was developed based on experimental data and accounts for the cover density and uniformity (Temple 1980). It takes on values between 0 and 1, with 0 indicating no vegetal protection and 1 indicating the channel is completely protected from stress. The vegetal cover factor is a function of vegetation type and condition.

Figure 7-2 Cross section showing perforated grid pavers

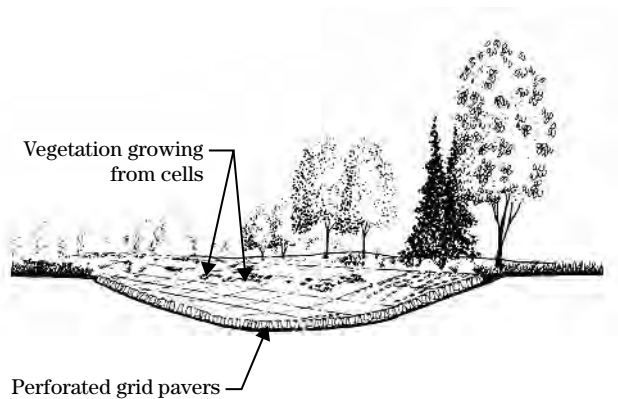
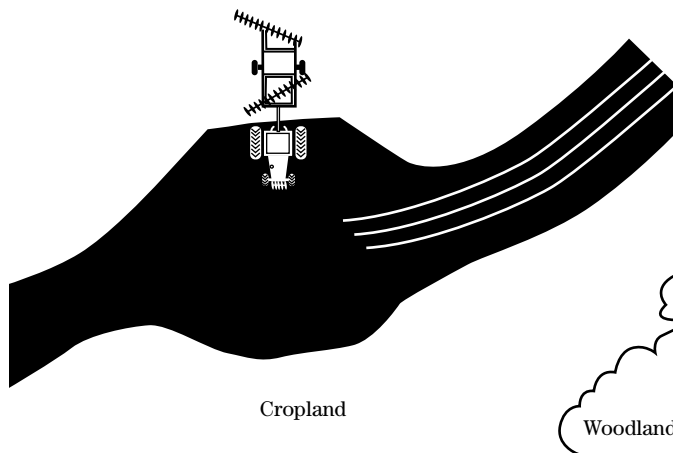


Figure 7-3 Provision for vehicle crossing



Flow depth rather than hydraulic radius is used in this calculation because it is the maximum stress in the cross section that governs the stability. The interaction of the vegetation and flow distorts the stress distribution in the cross section, and the vegetative lining tends to unravel rapidly once damage occurs.

Grain size roughness (n_s) for noncohesive soils is determined as:

$$n_s = \frac{d_{75}^{\frac{1}{6}}}{39} \quad (\text{eq. 7-2})$$

where the value of d_{75} is in inches. For fine-grained, cohesive soils, the value of n_s is taken as 0.0156. Figure 7-4 can be used to determine n_s based on d_{75} .

Steps in waterway design are as follows:

Step 1 Determine allowable effective stress based on an evaluation of the soil material.

Step 2 Determine the flow retardance and the allowable stress on the vegetation based on the sparsest and shortest vegetation expected (typically winter vegetation) and the flow retardance offered by the densest and longest vegetation (typically summer vegetation).

Step 3 Determine the vegetal cover factor associated with sparsest vegetation expected.

Step 4 Determine the bed slope.

Step 5 Choose a cross section shape.

Step 6 Use design aids or equations to size channel for sparsest and shortest vegetation.

Step 7 Use design aids or equations to determine depth required to contain the flow for densest and longest vegetation.

Step 8 Add freeboard as appropriate.

(1) Determination of allowable effective stress

The erodibility of the soil may be estimated to fall into one of these categories:

- easily eroded (sand textural soil classification)
- erodible (silt textural soil classification)
- erosion resistant (clay textural soil classification)

- very erosion resistant (based on local information or experience) (gravel textural soil classification)

Allowable effective stress is implied from this classification as indicated in table 7-1. Soil allowable effective stress may also be determined directly from soil properties. The allowable effective stress is the maximum hydraulic stress that may be applied directly to the soil without the occurrence of unacceptable erosion.

Figure 7-4 Calculation for grain roughness for noncohesive soils

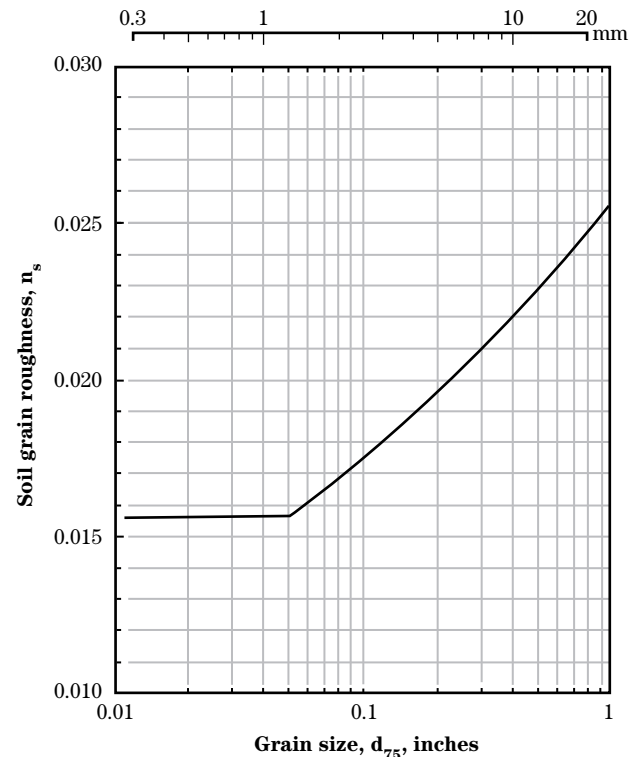


Table 7-1 Allowable effective stress for categories of soil erodibility

Category	Allowable stress, τ_a , lb/ft ²
Easily eroded	0.02
Erodible	0.03
Erosion resistant	0.05
Very erosion resistant	0.07

The first step in defining allowable stress from soil properties is to determine the unified soil classification of the soil from which the channel is to be constructed. This information may be available from the county soil survey (NCSS Web Soil Survey: <http://websoilsurvey.nrcs.usda.gov>). Soils classified as GW, GP, SW, and SP are considered noncohesive soils. The remainder of the soils—GM, SC, GC, SM, CH, CL, MH, ML, OH, and OL—are considered cohesive soils.

For noncohesive soils, the grain size d_{75} in inches is needed to determine the allowable effective stress, τ_a . The grain size may be estimated from data, found in the soil survey. Once the d_{75} is found, the allowable effective stress can be determined from figure 7-5 or from the equations in appendix B.

For cohesive soils, the plasticity and void ratio are needed. The plasticity index describes the range of water content over which a soil is in a plastic state, described as soft butter to stiff putty; deforms but will not crack (Sowers 1979). More specifically, it is the difference between the liquid limit and the plastic limit, where the liquid limit is the maximum water content at which the soil will hold a specific shape when vibrated and the plastic limit is the minimum water content at which the soil will not break and crumble. In general, an estimate of the plasticity index can be obtained from the county soil survey. Laboratory procedures for determination of liquid limit, plastic limit, and plasticity index are in ASTM D-4318-00 (ASTM 2000).

The void ratio is the ratio of the volume of voids (water and air) to the volume of solid particles. It is expressed as a decimal and may exceed 1. Void ratios may be estimated based on soil type as shown in table 7-2 (Das 1994) or by using standard laboratory procedures.

Determination of allowable stress for a cohesive soil is a two-step process. The first step is to use the plasticity index to determine the basic allowable stress, τ_{ab} . This can be estimated from figure 7-6 or by using the equations in appendix A.

A correction is then applied based on the void ratio. The correction, C_e , is determined from figure 7-7 or from the equations in appendix A. For the organic soils OH and OL, C_e is equal to 1.0. If the void ratio is not known, then the maximum value of C_e from figure 7-7 for the soil type can be used. This will result in a con-

servative design. The final allowable effective stress (τ_a) is then computed as

$$\tau_a = \tau_{ab} C_e^2 \quad (\text{eq. 7-3})$$

Figure 7-5 Allowable stress for noncohesive soils

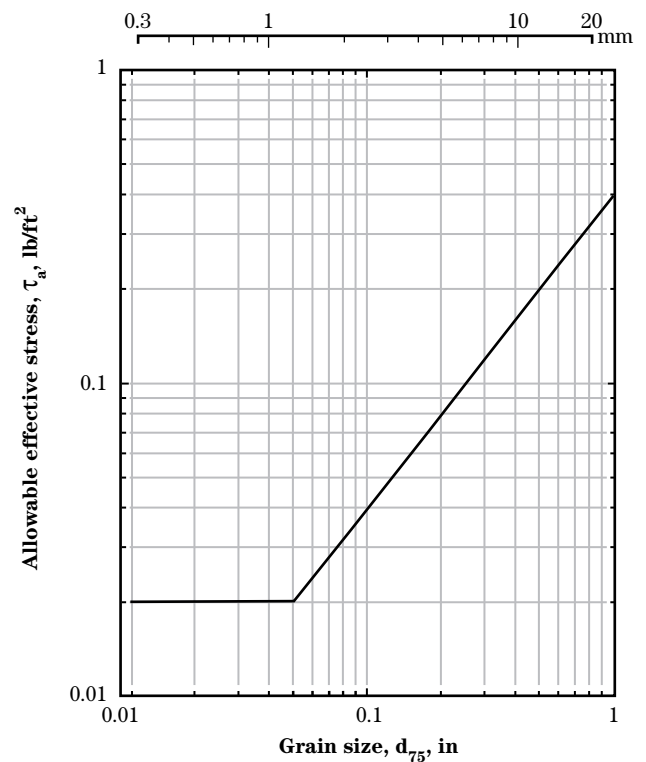


Table 7-2 Void ratios for selected soils

Soil Type	Void ratio, e
Loose angular-grained silty sand	0.65
Dense angular-grained silty sand	0.4
Stiff clay	0.6
Soft clay	0.9–1.4
Loess	0.9
Soft organic clay	2.5–3.2
Glacial till	0.3

Figure 7-6 Basic allowable stress for cohesive soils

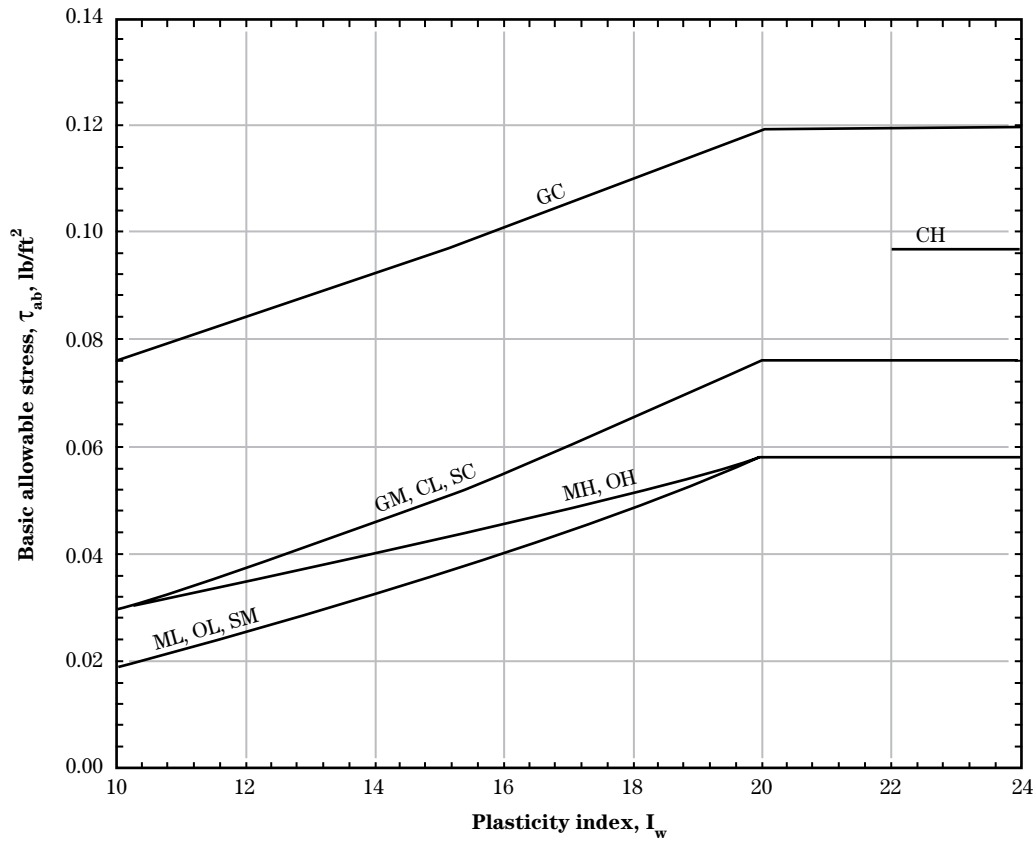
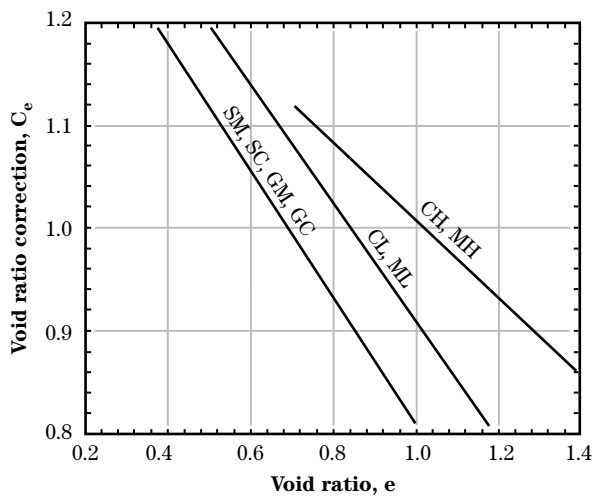


Figure 7-7 Correction for void ratio



(2) Determination of allowable vegetal stress

The allowable vegetal stress is the maximum total shear stress that may be withstood by the vegetal cover without unacceptable damage. It is directly related to the drag experienced by the stems and therefore to the level of flow retardance offered by the vegetal cover. The allowable vegetal stress (τ_{va}) is related to the retardance curve index as:

$$\tau_{va} = 0.75C_1 \quad (\text{eq. 7-4})$$

Retardance curve index (C_1) is in turn related to the stem length and density of the cover as:

$$C_1 = 2.5 \left(h\sqrt{M} \right)^{\frac{1}{3}} \quad (\text{eq. 7-5})$$

where:

h = the representative height of the vegetation in feet

M = the stem density in stems per square foot

Table 7-3 lists stem density for several grasses. Since the density and height of vegetation is likely to be seasonal, upper and lower boundary values of C_1 are typically established. The lower boundary value is used in determining if stability requirements are met (steps 5 and 6), and the upper boundary value is used to determine the additional capacity needed for summer vegetation, which generally provides more resistance to flow (step 7).

The value of C_1 can also be determined using the retardance classes. The retardance class for various example ground covers is given in table 7-4, and the relation of retardance curve index to retardance class is shown in table 7-5.

(3) Determination of vegetal cover factor

The vegetal cover factor describes the ability of the vegetal cover to reduce the maximum hydraulic stress on the soil. It is related to the type and quality of the vegetal cover. Table 7-3 lists typical values of the vegetal cover factor. The value of the cover factor may be estimated by comparison of the sparsest expected cover with the covers described in the table.

(4) Determination of effective and vegetal stress

Design of a stable waterway requires that the hydraulic stress applied to the soil and vegetation by the flowing water be less than or equal to the computed

allowable values. The design tables provided in this chapter were developed to provide a minimum cross sectional area satisfying this requirement. Otherwise, effective stress must be computed using equation 7-1 and compared with the allowable stress.

Calculation of effective stress will require the additional parameter of soil grain roughness and calculation of flow resistance in the form of Manning's n and of flow depth. For fine grained materials, including cohesive soils, the soil grain roughness n_s is equal to 0.0156. For coarse grained soils, n_s is a function of d_{75} and can be determined from figure 7-4 or equation 7-2. These computations may be carried out using the additional equations provided in appendix B. Because of the interaction of the flow with the vegetal cover, iterative solution of the equations is required and the computations are normally carried out using computer software.

The final step in designing a channel section is to compare the stress on the vegetation with the allowable vegetal stress, τ_{va} . When the allowable stress on the vegetation is the governing parameter, the stress on the soil will be only a small part of the total stress. Therefore, the computed allowable stress is compared to the total hydraulic stress, τ , where

$$\tau = \gamma DS \quad (\text{eq. 7-6})$$

Table 7-3 Properties of grass channel linings; values apply to good uniform stands of each cover^{1/}

Cover factor, C_F	Covers tested	Reference stem density (stem/ft ²)
0.90	Bermudagrass	500
	Centipedegrass	500
0.87	Buffalograss	400
	Kentucky bluegrass	350
	Blue grama	350
0.75	Grass mixture	200
0.5	Weeping lovegrass	350
	Yellow bluestem	250
	Alfalfa ^{2/}	500
	Lespedeza sericea ^{2/}	300
	Common lespedeza	150
	Sudangrass	50

1/ Multiply the stem densities given by $1/3$, $2/3$, 1 , $4/3$, and $5/3$, for poor, fair, good, very good, and excellent covers, respectively. The equivalent adjustment to C_F remains a matter of engineering judgment until more data are obtained or a more analytic model is developed. A reasonable, but arbitrary, approach is to reduce the cover factor by 20 percent for fair stands and 50 percent for poor stands. C_F values for untested covers may be estimated by recognizing that the cover factor is dominated by density and uniformity of cover near the soil surface. Thus, the sod-forming grasses near the top of the table exhibit higher C_F values than the bunch grasses and annuals near the bottom.

2/ For the legumes tested, the effective stem count for resistance (given) is approximately five times the actual stem count very close to the bed. Similar adjustment may be needed for other unusually large-stemmed, branching, and/ or woody vegetation.

Table 7-4 Classification of vegetation cover as to degree of retardance

Retardance	Cover	Condition
A	Weeping lovegrass	Excellent stand, tall (average 30 in)
	Reed canarygrass or Yellow bluestem ischaemum	Excellent stand, tall (average 36 in)
B	Smooth brome	Good stand, mowed (average 12 to 15 in)
	Bermudagrass	Good stand, tall (average 12 in)
	Native grass mixture (little bluestem, blue grama, and other long and short midwest grasses)	Good stand, unmowed
	Tall fescue	Good stand, unmowed (average 18 in)
	Sericea lespedeza	Good stand, not woody, tall (average 19 in)
	Grass-legume mixture—Timothy, smooth brome, or orchardgrass	Good stand, uncut (average 20 in)
	Reed canarygrass	Good stand, uncut (average 12 to 15 in)
	Tall fescue, with birdsfoot trefoil or ladino clover Blue grama	Good stand, uncut (average 18 in) Good stand, uncut (average 13 in)
C	Bahiagrass	Good stand, uncut (6 to 8 in)
	Bermudagrass	Good stand, mowed (average 6 in)
	Redtop	Good stand, headed (15 to 20 in)
	Grass-legume mixture—summer (orchardgrass, redtop, Italian ryegrass, and common lespedeza)	Good stand, uncut (6 to 8 in)
	Centipede	Very dense cover (average 6 in)
	Kentucky bluegrass	Good stand, headed (6 to 12 in)
D	Bermudagrass	Good stand, cut to 2.5-in height
	Red fescue	Good stand, headed (12 to 18 in)
	Buffalograss	Good stand, uncut (3 to 6 in)
	Grass-legume mixture—fall, spring (orchardgrass, redtop, Italian ryegrass, and common lespedeza)	Good stand, uncut (4 to 5 in)
	Sericea lespedeza or Kentucky bluegrass	Good stand, cut to 2-in height. Very good stand before cutting
E	Bermudagrass	Good stand, cut to 1.5-in height
	Bermudagrass	Burned stubble

Table 7-5 Retardance curve index by retardance class

SCS retardance class	Retardance curve index C_I
A	10.0
B	7.64
C	5.60
D	4.44
E	2.88

650.0704 Sizing channel sections

The channel cross section is normally sized for the minimum cross-sectional area satisfying the stability and capacity requirements for the geometry selected. The channel geometry is selected and the controlling parameters are computed to satisfy stability and capacity design requirements. Table 7-6 shows the typical parameters for design. The parameters specified as optional in table 7-6 influence the design only when the stability requirements would result in an unsuitably narrow cross section. The complete governing equations are given in appendix A, and all notation used throughout this and other sections of this chapter is described in appendix B.

(a) Techniques presented

Design tables are provided covering typical conditions for trapezoidal and parabolic cross sections. For other section shapes, and for use in checking calculations, the full equations are given in appendix A.

For conditions outside the range of parameters covered by the tables and when conditions warrant refinement of the design to better reflect details of the soil

and/or vegetal conditions, the equations of appendix A may be solved directly. Because design generally requires iterative solution of the equation set, a programmed solution is generally appropriate. Waterway Design Tool (WDT) software has been developed to provide these solutions.

Finally, a set of examples demonstrating use of the techniques and also including examples of determining allowable effective stress, curve index, and vegetal stress is provided.

The design tables are intended for use with parabolic or trapezoidal channels and include a range of slopes, discharges, and dimensions and should not be used for situations outside the ranges given. They were developed for curve index numbers corresponding to the traditionally used retardance classes, as shown in table 7-4, and for allowable effective stress values representing a typical range of conditions. At times, it may be advantageous to use the tables to obtain preliminary dimensions and then refine the design using the equations. When using the equations for design, it will be necessary to verify that allowable effective stress is the appropriate design parameter by considering the optional limiting parameters of table 7-6 and the maximum total stress on the vegetation as described in previous sections.

Table 7-6 Cross section properties

Section shape	Required design criteria	Optional criteria	Parameters in design table	Parameters computed from tabular data
Trapezoid	Side slope	Minimum bottom width	Bottom width Depth	Top width
Parabolic	None	Steepest side slope at water's edge	Top width Depth	Parabolic coefficient, a_p Side slope at water's edge
Triangular	None	Minimum side slope	Not available	Use equations to design

(b) Use of the design tables for parabolic and trapezoidal channels

In the absence of precise field data regarding the height and stem density vegetation, it is still considered acceptable to design based on retardance classes. In this case, retardance class D is generally used for stability (shortest and sparsest cover) and B or C are used for capacity (longest and densest cover). Tables for B/D (capacity/stability) and C/D design are presented in appendices C and D.

Use of the tables requires the design discharge, bed slope, type of cover (vegetal cover factor), and soil erodibility (allowable effective stress) to be identified. The numbers in the table are for fine-grained cohesive soils. For other conditions, the design should be checked using the equations.

The table is then selected based on capacity retardance (B or C), soil erodibility, cover factor, and side slope (trapezoidal) and is entered using the bed slope and discharge. The trapezoidal channel design table gives the bottom width and depth (B and D), and the parabolic design table gives the top width and depth (T and D).

For a trapezoid, the top width is computed as:

$$T = B + 2zD \quad (\text{eq. 7-7})$$

For a parabolic channel, the parabolic channel coefficient (a_p) is computed as:

$$a_p = \frac{4D}{T^2} \quad (\text{eq. 7-8})$$

and side slope at the water's edge, that is, point where the water surface meets the channel bank, is computed as:

$$z = \frac{1}{a_p T} \quad (\text{eq. 7-9})$$

If this side slope is steeper than 4:1, modification to the design may be needed, depending on mowing and maintenance requirements.

If the exact slope is not included in the table, there are two approaches possible. The design for the slopes bracketing the exact slope can be computed and the final results found by interpolation. Alternatively, the

next higher slope can be used to determine the minimum width (specific value of a_p) which will ensure stability criteria are met. To ensure adequate capacity, the depth should be increased to that associated with the next flatter slope or determined using the equations in appendix A and the curve index number for capacity. The final top width will increase accordingly. This computation is illustrated for a trapezoidal section in example 3.

If the exact discharge is not found in the table, the next higher discharge should be used. This will result in a slightly over designed channel, but stability and capacity criteria will be met.

(c) Design examples

Example 1

This example illustrates design of a trapezoidal channel and finding the soil effective stress. Find the channel depth, bottom width, and top width for the following design data. Check that the vegetal stress is within the allowable.

Channel parameters:	Trapezoidal section 6:1 side slopes bed slope = 0.75% $Q = 300 \text{ ft}^3/\text{s}$
Soil parameters:	Easily eroded soil (SM with plasticity index of 12 and void ratio of 0.7)
Vegetation parameters:	Bermudagrass ($C_F = 0.9$) B retardance (maximum length approximately 14 in) D retardance (minimum length approximately 4 in)

Solution: The tables may be entered directly with the information given. A portion of the table for B/D design of a channel with bermudagrass or equivalent cover ($C_F=0.9$) over an easily eroded soil ($\tau_a=0.02 \text{ lb/ft}^2$) is shown in figure 7-8. A slope of 0.75 percent and a discharge of 300 cubic feet per second yields a bed width of 24 feet and a flow depth of 2.4 feet as shown in figure 7-8. The top width for the channel is computed as:

$$\begin{aligned} T &= B + 2zD \\ &= 24 + 2(6)(2.4) \\ &= 53 \text{ ft} \end{aligned} \quad (\text{eq. 7-7})$$

Using the more detailed information given, the design may be refined if considered warranted. To do this, first, find allowable effective stress and the void ratio correction using figures 7-6 and 7-7. Using $\tau_{ab} = 0.025$ and $C_e = 0.99$, the allowable effective stress is:

$$\begin{aligned}\tau_a &= \tau_{ab} C_e^2 \\ &= 0.025(0.99) \\ &= 0.025 \text{ lb/ft}^2\end{aligned}\quad (\text{eq. 7-3})$$

Using the reference stem density for bermudagrass from table 7-3 of 500 stems per square foot with the stem lengths given yield retardance curve index values of 7.48 and 4.87, respectively, from equation 7-5. Solving the governing equations for stability and capacity with these values results in a channel section with a bed width of 10 feet and a flow depth of 3 feet with the difference dependent primarily on the larger value of τ_a used in the refined calculations.

$$\begin{aligned}C_1 &= 2.5(h\sqrt{M})^{\frac{1}{3}} \\ &= 2.5(14 \text{ in } \sqrt{500})^{\frac{1}{3}} \\ &= 2.5(1.2 \text{ ft } \sqrt{500})^{\frac{1}{3}} \\ &= 7.48\end{aligned}\quad (\text{eq. 7-5})$$

or

$$\begin{aligned}C_1 &= 2.5(h\sqrt{M})^{\frac{1}{3}} \\ &= 2.5(4 \text{ in } \sqrt{500})^{\frac{1}{3}} \\ &= 2.5(0.33 \text{ ft } \sqrt{500})^{\frac{1}{3}} \\ &= 4.87\end{aligned}$$

Finally, for the refined computations, the vegetal stress should be checked. The allowable vegetal stress is computed as:

$$\begin{aligned}\tau_{va} &= 0.75C_{1(4 \text{ in length})} \\ &= 0.75(4.87) \\ &= 3.65 \text{ lb/ft}^2\end{aligned}\quad (\text{eq. 7-4})$$

Using the quick check for shear stress:

$$\begin{aligned}\tau &= \gamma DS \\ &= 1.12 \text{ lb/ft}^2\end{aligned}\quad (\text{eq. 7-6})$$

Since the total average shear stress is less than the allowable stress on the vegetation, this section can be used for the final design. This check will normally have been programmed into design software and will not require separate checking.

Figure 7-8 Design table for example 1

Input parameters:										
Channel type=trapezoidal										
Cover factor=0.9										
Allowable soil stress=0.02										
B-D design										
Side slope=6										
Q	S=0.1%		S=0.25%		S=0.5%		S=0.75%		S=1%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
10										
20										
30										
40										
50										
60										
70										
80										
90										
100										
110										
120										
130									2.2	10
140									2.1	11
150									2.1	13
160									2.1	15
170									2.0	16
180									2.0	18
190							2.6	11	2.0	19
200							2.5	12	2.0	21
210							2.5	14	2.0	22
220							2.5	15	2.0	24
230							2.5	16	2.0	25
240							2.4	17	2.0	26
250							2.4	19	1.9	28
260							2.4	20	1.9	29
270							2.4	21	1.9	31
280							2.4	22	1.9	32
290							2.4	23	1.9	33
300					3.4	10	2.4	24	1.9	35
310					3.4	11	2.4	26	1.9	36
320					3.3	12	2.3	27	1.9	38

Example 2

This example illustrates design of a parabolic channel and the addition of 0.5 feet of freeboard. Find the channel depth and top width for the following design data.

Channel parameters: $Q = 100 \text{ ft}^3/\text{s}$
Bed slope $S = 2$ percent

Soil parameters: Erosion resistant soil
($\tau_a = 0.05 \text{ lb}/\text{ft}^2$)

Vegetation: C retardance for capacity
($C_I = 5.60$)
D retardance for stability
($C_I = 4.44$)
Grass mixture ($C_F = 0.75$)

Solution: Using the appropriate C/D table (fig. 7-9) and entering the table with $Q = 100 \text{ ft}^3/\text{s}$ and $S = 2\%$, the design depth and top width are $D = 1.2 \text{ ft}$ and $T = 37 \text{ ft}$. The channel parabolic coefficient (which is needed for finding the new top width once the 0.5 ft of freeboard are added) is found using equation 7-8:

$$\begin{aligned} a_p &= \frac{4D}{T^2} \\ &= \frac{4(1.2)}{(37)^2} \\ &= 0.0035 \end{aligned} \quad (\text{eq. 7-8})$$

The side slope at the water's edge can now be found using equation 7-9:

$$\begin{aligned} Z &= \frac{1}{a_p T} \\ &= \frac{1}{(0.0035)(37)} \\ &= 7.7 \end{aligned} \quad (\text{eq. 7-9})$$

With the 0.5 feet of freeboard, the total section depth, D_T , will be equal to 1.7 feet. The final top width of the excavated section is computed as:

$$\begin{aligned} D_T &= 1.2 + 0.5 \\ &= 1.7 \text{ ft} \\ T &= \sqrt{\frac{4D_T}{a_p}} \\ &= \sqrt{\frac{4(1.7)}{0.0035}} \\ &= 44.1 \text{ ft} \end{aligned} \quad (\text{eq. 7-8})$$

A final check of the side slope is computed using $T = 44.1 \text{ feet}$.

$$\begin{aligned} z_f &= \frac{1}{a_p T_f} \\ &= \frac{1}{(0.0035)(44.1)} \\ &= 6.5 \end{aligned}$$

Figure 7-9 Design table for example 2

Input parameters: Channel type=parabolic Cover factor=0.75 Allowable soil stress=0.05 C-D design																						
Q	S=0.1%		S=0.25%		S=0.5%		S=0.75%		S=1%		S=1.25%		S=1.5%		S=1.75%		S=2%		S=3%			
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)		
10	1.1	95	1.6	10	1.5	8																
20	1.5	110	2	11													1.2	7	1	10		
30	1.6	116	2.3	12										1.4	9	1.3	10	1.2	11	1	15	
40	1.6	121	2.5	13													1.6	11	1.4	12	1.3	13
50	1.7	124							1.8	11	1.6	13	1.4	15	1.3	17	1.2	18	0.9	24		
60	1.7	128							1.8	13	1.6	16	1.4	18	1.3	20	1.2	22	0.9	29		
70	1.8	125							1.8	16	1.6	18	1.4	21	1.3	23	1.2	26	0.9	34		
80	1.9	127					2.2	13	1.8	18	1.6	21	1.4	24	1.3	17	1.2	29	0.9	39		
90	1.9	130					2.2	16	1.8	20	1.6	24	1.4	27	1.3	30	1.2	33	0.9	44		
100	1.9	132					2.2	18	1.8	22	1.6	26	1.4	30	1.3	34	1.2	37	0.9	49		
110	2	134					2.2	20	1.8	24	1.6	29	1.4	33	1.3	37	1.2	41	0.9	54		
120	3.3	33			2.9	16	2.2	21	1.8	27	1.6	32	1.4	36	1.3	40	1.2	44	0.9	58		

Example 3

This example illustrates using the tables to do stability and capacity design for a slope that is not listed. A similar approach may be used to interpolate for other parameters as appropriate.

Channel parameters: Trapezoidal channel
4:1 side slopes
Bed slope = 0.85 percent
 $Q = 160 \text{ ft}^3/\text{s}$

Soil parameters: Erodible soil ($\tau_a = 0.03 \text{ lb}/\text{ft}^2$)

Vegetal parameters: C retardance for capacity
($C_I = 5.60$)
D retardance for stability
($C_I = 4.44$)
Grass mixture ($C_F = 0.75$)

Solution: To get the bottom width, the C/D table is entered using $S = 1$ percent. Figure 7-10 shows that the bottom width B should be 35 feet. Also from figure 7-10, for a slope equal to 0.75 percent, we get a trial capacity depth of 1.5 feet.

To find a more accurate capacity depth, start with the trial depth $D = 1.5$, $B = 35$, and $S = 0.0085 \text{ ft}/\text{ft}$, and compute area (A), hydraulic radius (R), trial velocity (V_T), and n . Then use Manning's formula to check velocity. If the velocity computed with Manning's (V_M) is higher, deduct 0.1 foot from the depth and repeat. Keep deducting 0.1 foot until the Manning's velocity is less than the trial velocity. The exact depth will be between the values obtained in the last two steps, and the higher value should be used in the design. The computations are:

$$\begin{aligned} A &= BD + zD^2 \\ &= 35(1.5) + 4(1.5)^2 \\ &= 61.5 \text{ ft}^2 \end{aligned} \quad (\text{table 7B-3})$$

$$\begin{aligned} R &= \frac{A}{B + 2D\sqrt{z^2 + 1}} \\ &= \frac{61.5}{35 + 2(1.5)\sqrt{4^2 + 1}} \\ &= 1.298 \end{aligned}$$

$$\begin{aligned} V_T &= \frac{Q}{A} \\ &= \frac{160}{61.5} \\ &= 2.60 \text{ ft/s} \end{aligned}$$

$$\begin{aligned} n &= \exp\left\{C_I\left(0.0133[\ln(VR)]^2 - 0.0954[\ln(VR)] + 0.297\right) - 4.16\right\} \\ &= 0.0479 \end{aligned} \quad (\text{table 7B-2})$$

where:

$$\begin{aligned} C_I &= 5.60 \\ V &= 2.60 \text{ ft/s} \\ R &= 1.298 \end{aligned}$$

$$\begin{aligned} V_m &= \frac{1.49}{n} R^{\frac{2}{3}} S^{\frac{1}{2}} \\ &= \frac{1.49}{0.0479} (1.298)^{\frac{2}{3}} (0.0085)^{\frac{1}{2}} \\ &= 3.40 \end{aligned} \quad (\text{table 7B-2})$$

Table 7-7 lists the results of the remainder of the computations.

Since the difference changes from positive to negative between $D=1.3$ and $D=1.2$ feet, a depth of 1.3 feet should be used in the final design. As a final step, vegetal stress is checked, and the stress, τ , is found to be less than the allowable vegetal stress, τ_{va} .

$$\begin{aligned} \tau_{va} &= 0.75C_I \\ &= 0.75(5.60) \\ &= 4.2 \end{aligned} \quad (\text{eq. 7-4})$$

$$\begin{aligned} \tau &= \gamma DS \\ &= 62.4(1.3)(0.0085) \\ &= 0.69 \end{aligned} \quad (\text{eq. 7-6})$$

Figure 7-10 Design table for example 3

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.03

C-D Design

Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	
10																															
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170					2	18																									
180					2	19																									
190					2	21																									
200					1.9	22																									
210					1.9	24																									
220					1.9	25																									
230					1.9	27																									
240					1.9	28																									
250					1.9	30																									
260					3.5	10																									
270					3.4	11																									
280					3.4	11																									
290					3.4	12																									
300					3.4	13																									
310					3.3	14																									
320					3.3	15																									
330					3.3	16																									
340					3.3	17																									
350					3.3	18																									
360					3.3	19																									
370					3.2	20																									
380					3.2	20																									
390					3.2	21																									
400					3.2	22																									
410					3.2	23																									
420					3.2	24																									
430					3.2	25																									
440					3.2	26																									
450					3.2	26																									
460					3.2	27																									
470					3.2	28																									
480					3.1	29																									
490					3.1	30																									
500					3.1	31																									

Table 7-7 Trial and error solution for example 3

Discharge, Q	160	160	160	160
Slope, S	0.0085	0.0085	0.0085	0.0085
Depth, D	1.5	1.4	1.3	1.2
Bottom width, B	35	35	35	35
Side slope, z	4	4	4	4
Area, A	61.5	56.84	52.26	47.76
Hydraulic radius, R	1.298	1.221	1.143	1.064
V_T , Q/A	2.602	2.815	3.062	3.350
C_I	5.6	5.6	5.6	5.6
n	0.048	0.048	0.047	0.047
V_M , Manning's	3.401	2.286	3.166	3.038
Difference: $V_M - V_T$	0.799	0.471	0.104	-0.312

650.0705 Layout and construction

(a) Layout

The layout of the waterway should begin at a key point. Usually, this is the outlet, but it may be a point determined by a building, property boundary, gully, or other landscape feature.

(b) Adjustment and marking

After the centerline has been staked, check and move some stakes, if necessary, to avoid landscape features or to improve alignment. The waterway should then be staked for construction. Mark all existing vegetation (trees, shrubs) and other landscape features to be protected during construction.

(c) Site preparation

A good time to build waterways is when the site has a good cover so that runoff and sedimentation will be at a minimum. All debris and vegetation not marked for retention should be removed from the site and disposed of in such a manner that does not adversely affect the environment or proper function of the waterway. For typical design and construction survey notes, see EFH 650.01. Soil may also be used as berms along the sides of the waterway.

(d) Excavation

The soil removed from the waterway should be deposited where it will not interfere with the flow of water into the waterway. Normally, the soil can be shaped and graded to fill low spots in the nearby fields or mounded to create visual interest and screening or to reduce noise and control wind.

The topsoil may be saved and spread in the constructed waterway if necessary for obtaining a good vegetative cover. Where this is done, the waterway should be overexcavated to allow for replacement of the topsoil without encroaching on the design cross section.

(e) Equipment

Many kinds of farming and construction equipment are adapted to the construction of waterways. However, it may be necessary to use equipment that will load and transport the excavated material to locations where it is needed, such as low spots in the surrounding field or washes in the waterway. Although scrapers that can be pulled by farm tractors are satisfactory for waterway construction, large self-propelled scrapers, bulldozers, and motor graders are the preferred equipment.

(f) Appurtenant structures

Effective vegetated waterways are not subjected to low flows of long duration nor kept wet for long periods. Subsurface drains, underground outlets, stone center drains, or other means of providing drainage and protecting the center of the waterway should be considered where low flows or wet conditions are prolonged.

(1) Subsurface drains

Subsurface drains should parallel the center of the vegetated waterway but be offset from the centerline at least a fourth of the top width of the waterway. Two drains may be required in some cases, one on each side of the center. The principles outlined in EFH 650.14 should be followed in designing and installing the subsurface drains. The subsurface drains may be outletted through a drop structure at the end of the waterway or through a standard pipe outlet.

(2) Underground outlets

Underground outlets can be used to carry prolonged low flows. Buried conduits with surface inlets are frequently used downstream of highway culverts or other locations where low flows are concentrated. Blind inlets are sometimes used, but they frequently become a maintenance problem.

(3) Stone center drains

In areas where field stones or other sources of rock are plentiful, a stone center drain may be the best solution to problems of prolonged flow and wetness. A gravel bedding or filter fabric (nonwoven geotextile) is commonly used under the rock to prevent erosion of the underlying soil. These drains are installed as shown in figure 7-11. An alternate cross section would have a stone center that could carry the flow from a

1-year, 24-hour event. Required stone size can be computed using techniques for sizing riprap found in EFH 650.16 or Hydraulic Engineering Circular 11 (FHWA 1989).

(4) Filter fabric barriers

The stability of grassed waterways is based on the establishment of vegetation within the constructed channel's boundaries. Until grass can be established, the waterway is subject to failure from rainfall events significantly less than the design storm. Installing filter fabric in the waterway immediately after the waterway has been constructed is one approach used to minimize the erosive damage caused by untimely rainfall events before the vegetation is established. The barriers are a light weight nonwoven filter fabric (geotextile) plowed into the waterway perpendicular to the direction of flow at intervals ranging from 50 to 100 feet (fig. 7-12).

(g) Postconstruction protection of channel lining

If vegetation is to be used for erosion protection, it should be established as soon after construction as weather conditions permit. (Check Field Office Technical Guide for local planting dates.) Prepare a seedbed

and seed with a mixture of grasses and legumes adapted to soil conditions and local climate. Most excavated areas will require fertilizers to establish good cover. If weather conditions are not favorable for permanent seeding, it may be necessary to use a temporary seeding, mulch, or lining. Irrigation may be needed to assure adequate germination and growth initially. If an immediate turf cover is desired or if it is difficult to establish turf from seed, it may be necessary to use sod. Sodding by sprigging or broadcasting root stalks and stolons gives good results with bermudagrass and other grasses in favorable climates. In other areas, direct planting of sod in strips is practical. Woody plantings may be appropriate on channel back slopes to improve screening, wildlife habitat, space definition, and climate control (fig. 7-13). Check Field Office Technical Guides for tree planting dates.

Mulching materials such as straw, hay, jute, paper, or plastic mesh should be used to protect new seeding. At least the center-third portion of the cross section should be anchored. If temporary seedings or nurse crops are used, they should be mowed to reduce competition to permanent seeding. All seeding, planting, sodding, and mulching should conform to standards as given in the local Field Office Technical Guide.

Figure 7-11 Installation of stone center drain

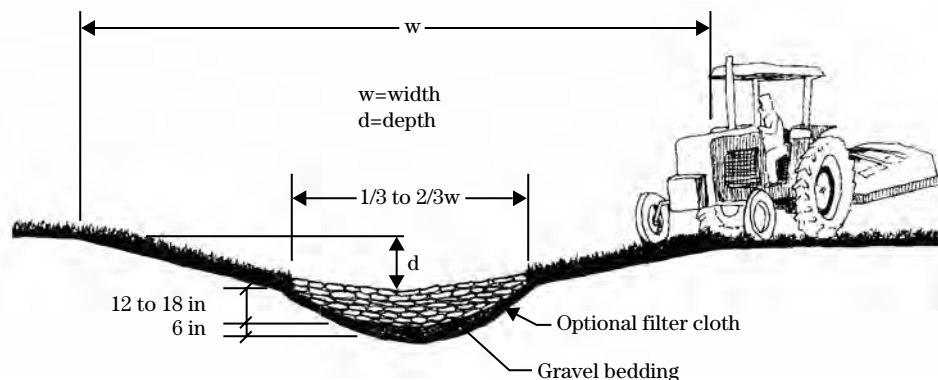
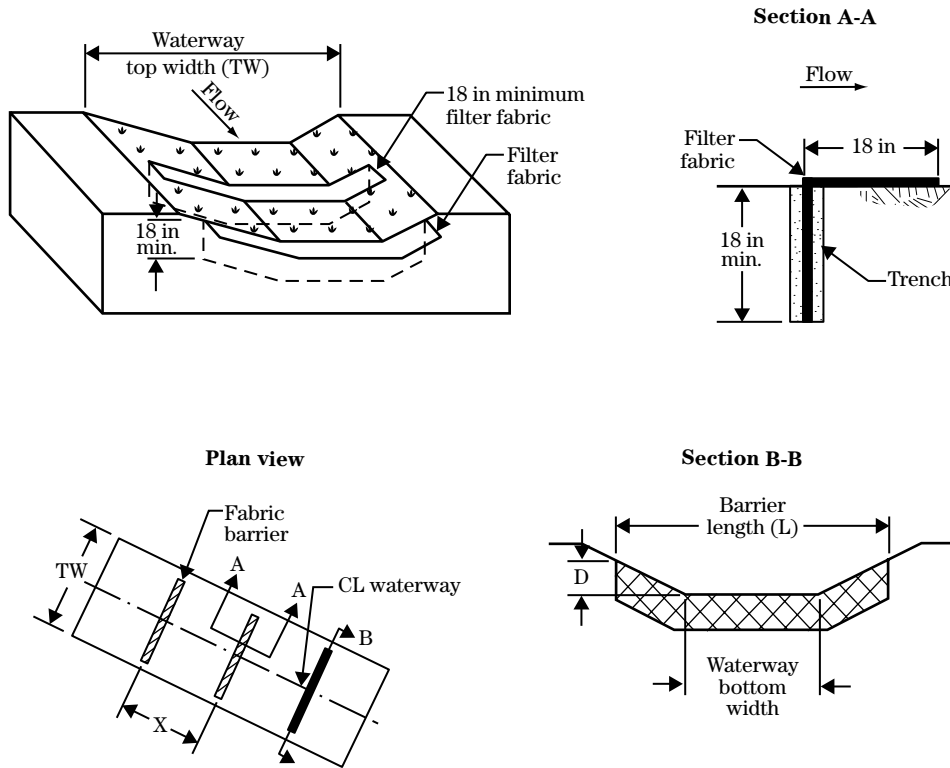


Figure 7-12 Fabric barrier

Barrier depth (D)
Barrier spacing (X)
Barrier length (L)

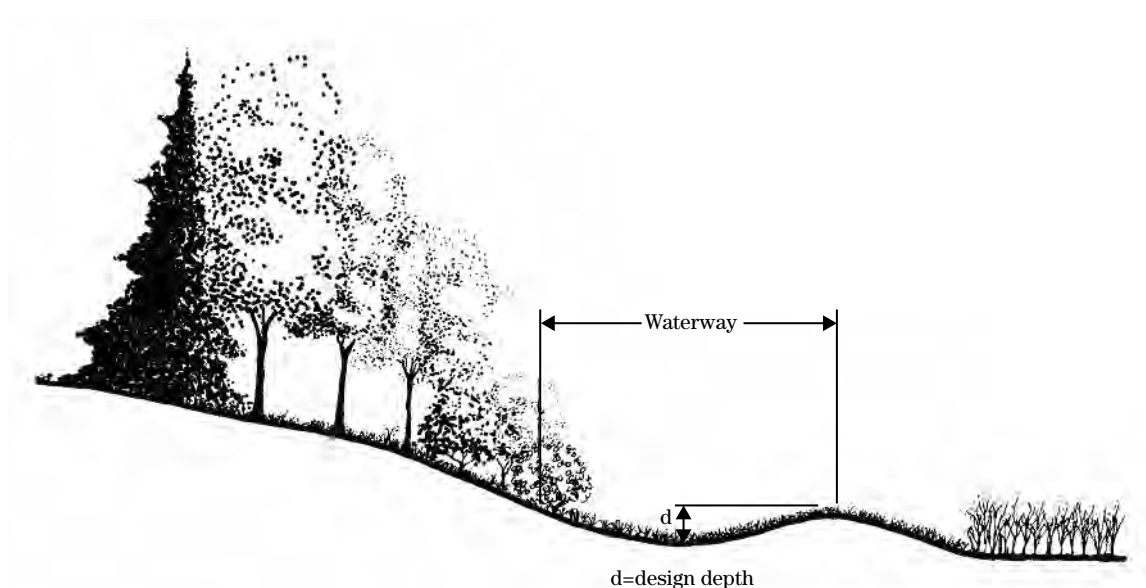
Notes

Fabric barriers are 36 inches wide with 18 inches of the fabric buried and anchored with compacted soil; lay the remaining 18 inches of fabric down the watercourse in the direction of the waterflow. After installation, compact the trench with rear tractor tire; the geotextile shall meet the requirements of NRCS Material Specification 592—Geotextile (ms592), class III nonwoven geotextile. Barriers need to be completed within 14 days after construction check-out. It is recommended that installation be done after seeding.

The waterway may be protected by using a combination of the following steps that best fits the needs of the site:

- Reduce the required capacity by dividing the runoff between two or more waterways.
- Construct and vegetate the waterway before any other channels or structures are allowed to discharge into it.
- Carry prolonged low flows in a subsurface drainage system or in a surface-protected section such as a stone center.
- When possible, divert major flows from the waterway during establishment period.
- Maintain vegetative cover by mowing, spraying, fertilizing, and performing other maintenance as needed.

Figure 7-13 Use of woody plantings



650.0706 Maintenance

(a) General

Timely maintenance is important for keeping a waterway in good working condition. Recommended maintenance generally includes mowing of waterways and removing vegetation so as not to retard water flow and cause excessive sedimentation in the channel. Timely mowing is critical for wildlife. The cool-season grasses typically should be fertilized for hay production, while the native grasses may not need fertilizer. Very often herbicides in field runoff can kill introduced grass species, while native grasses may not be affected as much by this problem. Grazing, if permitted, should be rigidly controlled. Livestock should be excluded during wet periods. Vehicular traffic should be excluded except at designated crossings.

(b) Removal of sediment

The waterway channel may require maintenance to remove small sediment deposits. However, if the deposit extends over long reaches or for the full length of the waterway, the channel should be reconstructed by use of appropriate construction equipment. Sediment should be used onsite or disposed of properly.

(c) Repair work

Eroded areas or damage to lining materials should be repaired promptly. This will prevent or reduce further degradation of the waterway system.

The transition section of waterway outlets is the most susceptible to erosion damage. Repairs should be made promptly to prevent gulying from advancing up the waterway channel. If vegetation proves inadequate in the transition section, it may be necessary to line this section of channel or construct a grade stabilization structure.

Where underground outlets are used, it is important to keep the outlet free of trash that may plug it and cause failure.

650.0707 References

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Table 7A-1 Description of symbols

Symbol	Description
A	Cross section area, ft ²
a _p	Parabolic coefficient (determines shape of parabola)
B	Bottom width of trapezoidal channel, ft
C _e	Correction for void ratio
C _F	Vegetal cover factor
C _I	Retardance curve index
D	Maximum depth of flow in cross section, ft
d ₇₅	75th percentile particle diameter, in
D _T	Section depth after addition of freeboard, ft
e	Void ratio
h	Representative height of vegetation, ft
I _w	Plasticity index
M	Stem density, stems/ft ²
n	Manning's roughness coefficient
n _s	Roughness associated with soil grain size
Q	Discharge in channel, ft ³ /s (cfs)
R	Hydraulic radius, ft
S	Channel bed slope, ft/ft
T	Top width of trapezoidal or parabolic channel, ft
V _M	Velocity computed with Manning's equation
V _T	Average section velocity, Q/A (trial value in iterative solution)
z	Side slope
γ	Unit weight of water, 62.4 lb/ft ³
τ	Maximum hydraulic stress, lb/ft ²
τ _a	Allowable effective stress on soil, lb/ft ²
τ _{ab}	Basic allowable stress on soil, before correction for void ratio, lb/ft ²
τ _e	Erosionally effective stress on soil, lb/ft ²
τ _{va}	Allowable stress on vegetation, lb/ft ²

Blank

Appendix B

Equations

Table 7B-1 Equations for determining allowable effective stress

Soil classification	Applicable range	Equation
Noncohesive soils	$I_w < 10$	
GW, GP, SW, SP	$d_{75} < 0.05$	$n_s = 0.0156$ $\tau_a = 0.02$
	$d_{75} \geq 0.05$	$n_s = 0.0256d_{75}^{\frac{1}{6}}$ $\tau_a = 0.4d_{75}$
Cohesive soils	$I_w > 10$	$n_s = 0.0156$ $\tau_a = \tau_{ab} C_e^2$
GM, SC		$C_e = 1.42 - 0.61e$
	$10 < I_w < 20$	$\tau_{ab} = (1.07I_w^2 + 14.3I_w + 47.7) \times 10^{-4}$
	$I_w > 20$	$\tau_{ab} = 0.076$
GC		$C_e = 1.42 - 0.61e$
	$10 < I_w < 20$	$\tau_{ab} = (1.0477I_w^2 + 2.86I_w + 42.9) \times 10^{-3}$
	$I_w > 20$	$\tau_{ab} = 0.119$
SM		$C_e = 1.42 - 0.61e$
	$10 < I_w < 20$	$\tau_{ab} = (1.07I_w^2 + 7.15I_w + 11.9) \times 10^{-4}$
	$I_w > 20$	$\tau_{ab} = 0.058$
CH		$C_e = 1.38 - 0.373e$
		$\tau_{ab} = 0.0966$

Table 7B-1 Equations for determining allowable effective stress—Continued

Soil classification	Applicable range	Equation
CL		$C_e = 1.48 - 0.57e$
	$10 < I_w < 20$	$\tau_{ab} = (1.07I_w^2 + 14.3I_w + 47.7) \times 10^{-4}$
	$I_w > 20$	$\tau_{ab} = 0.076$
MH		$C_e = 1.38 - 0.373e$
	$10 < I_w < 20$	$\tau_{ab} = (1.0477I_w^2 + 1.43I_w + 10.7) \times 10^{-3}$
	$I_w > 20$	$\tau_{ab} = 0.058$
ML		$C_e = 1.48 - 0.57e$
	$10 < I_w < 20$	$\tau_{ab} = (1.07I_w^2 + 7.15I_w + 11.9) \times 10^{-4}$
	$I_w > 20$	$\tau_{ab} = 0.058$
OH		$C_e = 1.0$
	$10 < I_w < 20$	$\tau_{ab} = (1.0477I_w^2 + 1.43I_w + 10.7) \times 10^{-3}$
	$I_w > 20$	$\tau_{ab} = 0.058$
OL		$C_e = 1.0$
	$10 < I_w < 20$	$\tau_{ab} = (1.07I_w^2 + 7.15I_w + 11.9) \times 10^{-4}$
	$I_w > 20$	$\tau_{ab} = 0.058$

Table 7B-2 Governing hydraulic equations**Basic hydraulic equations**

Manning's n	$n = \exp \left\{ C_1 \left(0.0133 [\ln(VR)]^2 - 0.0954 [\ln(VR)] + 0.297 \right) - 4.16 \right\}$
Velocity (Manning's formula)	$V = \frac{1.49}{n} R^{\frac{2}{3}} S^{\frac{1}{2}}$
Unit discharge, or discharge per unit width	$q = \frac{Q}{T} = VD$

Stable unit discharge equations

Condition(s)	Equation	Parameters
$0.0025C_1^{2.5} \leq q \leq 36$ and $\gamma DS \leq \tau_{va} + \tau_e$	$q = \exp \left\{ \frac{-b - \sqrt{b^2 - 4ac}}{2a} \right\}$	$a = 0.0133C_1$
		$b = -(0.0954C_1 + 0.429)$
		$c = 0.297C_1 - 0.5 \ln(S) + 0.714 \ln \left\{ \frac{\tau_a}{(1 - C_F)n_s^2} \right\} - 6.94$
$q < 0.0025C_1^{2.5}$ or $q > 36$ and $\gamma DS \leq \tau_{va} + \tau_e$	$q = \frac{0.0015\tau_a^{\frac{5}{3}}n^{\frac{7}{3}}}{(1 - C_F)^{\frac{5}{3}}n_s^{\frac{10}{3}}S^{\frac{7}{6}}}$	n computed with eq.: for $q < 0.0025C_1^{2.5}$ then $VR = 0.0025C_1^{2.5}$; for $q > 36$ then $VR = 36$
$0.0025C_1^{2.5} \leq q \leq 36$ and $\gamma DS \geq \tau_{va} + \tau_e$ (stress on vegetation controls)	$q = \exp \left\{ \frac{-b - \sqrt{b^2 - 4ac}}{2a} \right\}$	$a = 0.0133C_1$
		$b = -(0.0954C_1 + 0.429)$
		$c = 0.297C_1 - 1.67 \ln(\tau_{va}) + 1.17 \ln(S) + 2.33$
neither $0.0025C_1^{2.5} \leq q \leq 36$ or $\gamma DS \leq \tau_{va} + \tau_e$ is satisfied	$q = \frac{0.0015\tau_{va}^{\frac{5}{3}}}{nS^{\frac{7}{6}}}$	$n = \exp(0.126C_1 - 4.16)$

Table 7B-3 Cross section geometry equations

Area—trapezoidal channel	$A = BD + zD^2$
Area—parabolic channel	$A = \frac{D^{\frac{3}{2}}}{.75\sqrt{a_p}}$
Depth—trapezoidal channel	$D = \frac{-B\sqrt{B^2 + 4Az}}{2z}$
Depth—parabolic channel	$D = \left(0.75A\sqrt{a_p}\right)^{\frac{2}{3}}$
Hydraulic radius—trapezoidal channel	$R = \frac{A}{B + 2D\sqrt{z^2 + 1}}$
Hydraulic radius—parabolic channel	$R = \frac{A}{\sqrt{4D^2 + \frac{D}{a_p}} + \frac{1}{2a_p} \ln\left(\sqrt{4a_p D} + \sqrt{4a_p D + 1}\right)}$

Appendix C

Design Tables for Trapezoidal Channels

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.02

B-D Design

Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%						
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)					
10																				0.8	11	0.7	14	0.6	16	0.6	18	0.5	21						
20									1.3	11	1.1	13	1	15	0.9	17	0.9	19	0.7	25	0.6	29	0.6	33	0.6	37	0.5	44							
30								1.4	14	1.2	18	1.1	21	1	24	0.9	27	0.8	29	0.7	38	0.6	45	0.6	51	0.6	56								
40					1.7	13	1.3	20	1.2	25	1	29	1	33	0.9	36	0.8	39	0.7	51	0.6	60	0.6	68	0.6	75	0.5	75							
50					1.7	18	1.3	25	1.1	31	1	37	0.9	41	0.9	46	0.8	50	0.7	64	0.6	75	0.6	85	0.5	94									
60					1.6	22	1.3	31	1.1	38	1	44	0.9	50	0.9	55	0.8	60	0.7	77	0.6	90													
70			2.6	13	1.6	27	1.3	37	1.1	45	1	52	0.9	59	0.9	65	0.8	70	0.7	90															
80			2.5	16	1.6	31	1.3	42	1.1	52	1	60	0.9	67	0.9	74	0.8	81																	
90			2.5	19	1.6	36	1.3	48	1.1	59	1	68	0.9	76	0.9	84	0.8	91																	
100			2.4	21	1.6	40	1.3	54	1.1	65	1	76	0.9	85	0.9	93																			
110			2.4	24	1.6	45	1.3	60	1.1	72	1	83	0.9	93																					
120			2.3	27	1.6	49	1.3	65	1.1	79	1	91																							
130			2.3	30	1.5	53	1.3	71	1.1	86	1	99																							
140			2.3	33	1.5	58	1.3	77	1.1	93																									
150			2.3	35	1.5	62	1.3	82	1.1	99																									
160			2.3	38	1.5	66	1.3	88																											
170	4.5	11	2.3	41	1.5	71	1.3	93																											
180	4.4	13	2.2	44	1.5	75	1.3	99																											
190	4.4	15	2.2	46	1.5	79																													
200	4.3	16	2.2	49	1.5	84																													
210	4.3	18	2.2	52	1.5	88																													
220	4.2	19	2.2	55	1.5	92																													
230	4.2	21	2.2	57	1.5	97																													
240	4.2	22	2.2	60																															
250	4.1	24	2.2	63																															
260	4.1	25	2.2	65																															
270	4.1	27	2.2	68																															
280	4.1	28	2.2	71																															
290	4	30	2.2	74																															
300	4	31	2.2	76																															
310	4	33	2.2	79																															
320	4	34	2.2	82																															
330	4	35	2.2	84																															
340	4	37	2.2	87																															
350	4	38	2.2	90																															
360	3.9	40	2.2	93																															
370	3.9	41	2.2	95																															
380	3.9	43	2.2	98																															
390	3.9	44																																	
400	3.9	45																																	
410	3.9	47																																	
420	3.9	48																																	
430	3.9	50																																	
440	3.9	51																																	
450	3.9	52																																	
460	3.9	54																																	
470	3.9	55																																	
480	3.8	56																																	
490	3.8	58																																	
500	3.8	59																																	

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.02

B-D Design

Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	
10																				0.8	11	0.7	14	0.6	16	0.6	18	0.5	21		
20										1.1	12	1	14	0.9	16	0.9	18	0.7	24	0.6	29	0.6	33	0.6	37	0.5	43				
30								1.4	12	1.2	17	1.1	20	1	23	0.9	26	0.9	29	0.7	37	0.6	44	0.6	50	0.6	56				
40				1.8	11	1.4	18	1.2	24	1	28	1	32	0.9	36	0.8	39	0.7	50	0.6	60	0.6	68	0.5	75						
50				1.7	16	1.3	24	1.1	30	1	36	0.9	41	0.9	45	0.8	49	0.7	63	0.6	75	0.6	85	0.5	94						
60				1.7	21	1.3	30	1.1	37	1	44	0.9	49	0.9	55	0.8	60	0.7	76	0.6	90										
70				1.6	25	1.3	36	1.1	44	1	52	0.9	58	0.9	64	0.8	70	0.7	89												
80			2.7	12	1.6	30	1.3	41	1.1	51	1	59	0.9	67	0.9	74	0.8	80													
90			2.6	15	1.6	34	1.3	47	1.1	58	1	67	0.9	76	0.9	83	0.8	90													
100			2.5	18	1.6	39	1.3	53	1.1	65	1	75	0.9	84	0.9	93															
110			2.5	22	1.6	43	1.3	59	1.1	71	1	83	0.9	93																	
120			2.4	24	1.6	48	1.3	64	1.1	78	1	90																			
130			2.4	27	1.6	52	1.3	70	1.1	85	1	98																			
140			2.3	30	1.5	56	1.3	76	1.1	92																					
150			2.3	33	1.5	61	1.3	81	1.1	99																					
160			2.3	36	1.5	65	1.3	87																							
170			2.3	39	1.5	69	1.3	93																							
180			2.3	42	1.5	74	1.3	98																							
190			2.3	44	1.5	78																									
200			2.3	47	1.5	83																									
210	4.6	10	2.2	50	1.5	87																									
220	4.5	12	2.2	53	1.5	91																									
230	4.5	14	2.2	55	1.5	96																									
240	4.4	16	2.2	58	1.5	100																									
250	4.4	17	2.2	61																											
260	4.3	19	2.2	64																											
270	4.3	21	2.2	66																											
280	4.2	23	2.2	69																											
290	4.2	24	2.2	72																											
300	4.2	26	2.2	75																											
310	4.1	27	2.2	77																											
320	4.1	29	2.2	80																											
330	4.1	31	2.2	83																											
340	4.1	32	2.2	85																											
350	4.1	34	2.2	88																											
360	4	35	2.2	91																											
370	4	37	2.2	94																											
380	4	38	2.2	96																											
390	4	40	2.2	99																											
400	4	41																													
410	4	43																													
420	4	44																													
430	3.9	45																													
440	3.9	47																													
450	3.9	48																													
460	3.9	50																													
470	3.9	51																													
480	3.9	53																													
490	3.9	54																													
500	3.9	55																													

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.02

B-D Design

Side Slope = 8

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	
10																				0.8	10										
20											1.1	11		1	13	0.9	15	0.9	17	0.7	24	0.7	13	0.6	15	0.6	17	0.5	21		
30								1.5	10	1.2	15	1.1	19	1	22	0.9	25	0.9	28	0.7	37	0.6	44	0.6	33	0.6	37	0.5	43		
40								1.4	17	1.2	22	1	27	1	31	0.9	35	0.8	38	0.7	50	0.6	59	0.6	50	0.6	56				
50					1.8	14	1.3	23	1.2	30	1	35	0.9	40	0.9	45	0.8	49	0.7	63	0.6	74	0.6	67	0.6	67	0.5	75			
60					1.7	19	1.3	29	1.1	36	1	43	0.9	49	0.9	54	0.8	59	0.7	76	0.6	90									
70					1.7	24	1.3	35	1.1	43	1	51	0.9	58	0.9	64	0.8	69	0.7	89											
80					1.6	28	1.3	40	1.1	50	1	59	0.9	66	0.9	73	0.8	80													
90			2.8	10	1.6	33	1.3	46	1.1	57	1	66	0.9	75	0.9	83	0.8	90													
100			2.7	14	1.6	37	1.3	52	1.1	64	1	74	0.9	84	0.9	92	0.8	100													
110			2.6	18	1.6	42	1.3	58	1.1	71	1	82	0.9	92																	
120			2.5	21	1.6	46	1.3	63	1.1	77	1	90																			
130			2.5	24	1.6	51	1.3	69	1.1	84	1	98																			
140			2.4	27	1.6	55	1.3	75	1.1	91																					
150			2.4	30	1.5	60	1.3	80	1.1	98																					
160			2.4	33	1.5	64	1.3	86																							
170			2.3	36	1.5	68	1.3	92																							
180			2.3	39	1.5	73	1.3	97																							
190			2.3	42	1.5	77																									
200			2.3	45	1.5	81																									
210			2.3	48	1.5	86																									
220			2.3	51	1.5	90																									
230			2.3	53	1.5	95																									
240			2.2	56	1.5	99																									
250			2.2	59																											
260	4.7	10	2.2	62																											
270	4.6	12	2.2	64																											
280	4.5	14	2.2	67																											
290	4.5	16	2.2	70																											
300	4.4	18	2.2	73																											
310	4.4	20	2.2	75																											
320	4.3	22	2.2	78																											
330	4.3	24	2.2	81																											
340	4.2	26	2.2	84																											
350	4.2	28	2.2	86																											
360	4.2	29	2.2	89																											
370	4.2	31	2.2	92																											
380	4.1	33	2.2	95																											
390	4.1	34	2.2	97																											
400	4.1	36	2.2	100																											
410	4.1	37																													
420	4.1	39																													
430	4	41																													
440	4	42																													
450	4	44																													
460	4	45																													
470	4	47																													
480	4	48																													
490	4	50																													
500	4	51																													

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.03

B-D Design

Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
10																														
20													1.1	10	1	11	1	12	0.8	17	0.7	21	0.6	24	0.6	27	0.5	32		
30									1.4	11	1.2	14	1.1	16	1	18	0.9	20	0.8	26	0.7	32	0.6	36	0.6	40	0.5	48		
40						1.6	12	1.3	16	1.2	19	1	22	1	25	0.9	27	0.8	36	0.7	43	0.6	49	0.6	54	0.5	64			
50				2.1	10	1.5	16	1.3	21	1.1	25	1	28	1	31	0.9	34	0.8	45	0.7	54	0.6	61	0.6	68	0.5	80			
60				2	13	1.5	20	1.3	25	1.1	30	1	34	1	38	0.9	42	0.7	54	0.7	65	0.6	74	0.6	82	0.5	97			
70				1.9	16	1.5	24	1.3	30	1.1	36	1	40	0.9	45	0.9	49	0.7	64	0.7	76	0.6	86	0.6	96					
80				1.9	19	1.5	28	1.2	35	1.1	41	1	46	0.9	52	0.9	56	0.7	73	0.7	87	0.6	99							
90				1.8	22	1.4	32	1.2	40	1.1	46	1	53	0.9	58	0.9	64	0.7	82	0.7	98									
100		3.1	10	1.8	25	1.4	36	1.2	44	1.1	52	1	59	0.9	65	0.9	71	0.7	91											
110		3	12	1.8	28	1.4	39	1.2	49	1.1	57	1	65	0.9	72	0.9	78													
120		2.9	14	1.8	31	1.4	43	1.2	54	1.1	63	1	71	0.9	78	0.9	85													
130		2.9	16	1.8	34	1.4	47	1.2	58	1.1	68	1	77	0.9	85	0.9	93													
140		2.9	18	1.8	37	1.4	51	1.2	63	1.1	74	1	83	0.9	92	0.9	100													
150		2.8	20	1.8	40	1.4	55	1.2	68	1.1	79	1	89	0.9	98															
160		2.8	22	1.8	43	1.4	59	1.2	72	1.1	84	1	95																	
170		2.8	24	1.8	46	1.4	63	1.2	77	1.1	90																			
180		2.8	25	1.7	49	1.4	67	1.2	82	1.1	95																			
190		2.7	27	1.7	52	1.4	71	1.2	86																					
200		2.7	29	1.7	55	1.4	74	1.2	91																					
210		2.7	31	1.7	58	1.4	78	1.2	96																					
220		2.7	33	1.7	61	1.4	82																							
230		2.7	34	1.7	64	1.4	86																							
240		2.7	36	1.7	67	1.4	90																							
250		2.7	38	1.7	69	1.4	94																							
260		2.6	40	1.7	72	1.4	98																							
270		2.6	42	1.7	75																									
280		2.6	44	1.7	78																									
290	5.4	10	2.6	45	1.7	81																								
300	5.4	11	2.6	47	1.7	84																								
310	5.3	12	2.6	49	1.7	87																								
320	5.3	13	2.6	51	1.7	90																								
330	5.3	14	2.6	52	1.7	93																								
340	5.2	15	2.6	54	1.7	96																								
350	5.2	16	2.6	56	1.7	99																								
360	5.2	17	2.6	58																										
370	5.1	18	2.6	60																										
380	5.1	19	2.6	61																										
390	5.1	20	2.6	63																										
400	5.1	21	2.6	65																										
410	5.1	22	2.6	67																										
420	5	23	2.6	68																										
430	5	24	2.6	70																										
440	5	25	2.6	72																										
450	5	26	2.6	74																										
460	5	27	2.5	75																										
470	5	27	2.5	77																										
480	4.9	28	2.5	79																										
490	4.9	29	2.5	81																										
500	4.9	30	2.5	83																										

Input Parameters:
Channel Type = Trapezoidal
Cover factor = 0.5
Allowable Soil Stress = 0.03
B-D Design
Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	
10																															
20																															
30																															
40																															
50																															
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190																															
200																															
210																															
220																															
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240																															
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420																															
430																															
440																															
450																															
460																															
470																															
480																															
490																															
500																															

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.03

B-D Design

Side Slope = 8

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
10																														
20																														
30																														
40																														
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60																														
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80																														
90																														
100																														
110																														
120																														
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140																														
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160																														
170																														
180																														
190																														
200																														
210																														
220																														
230																														
240																														
250																														
260																														
270																														
280																														
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390																														
400																														
410																														
420																														
430																														
440																														
450																														
460																														
470																														
480																														
490																														
500																														

Input Parameters:
Channel Type = Trapezoidal
Cover factor = 0.5
Allowable Soil Stress = 0.05
B-D Design
Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%					
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)				
10																															0.6	10	0.5	11
20																															0.6	20	0.5	24
30																																		
40																																		
50																																		
60																																		
70																																		
80																																		
90																																		
100																																		
110																																		
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440																																		
450																																		
460																																		
470																																		
480																																		
490																																		
500																																		

Input Parameters:
Channel Type = Trapezoidal
Cover factor = 0.5
Allowable Soil Stress = 0.05
B-D Design
Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%			
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)		
10																														0.5	11	
20																							0.8	12	0.7	14	0.6	16	0.6	20	0.5	23
30																			1.1	10	0.9	15	0.7	19	0.7	22	0.6	26	0.5	31	0.5	35
40													1.3	11	1.2	13	1.1	15	0.9	21	0.7	26	0.7	31	0.6	35	0.5	42				
50											1.4	12	1.2	15	1.1	17	1	20	0.8	27	0.7	33	0.7	39	0.6	44	0.5	52				
60									1.6	11	1.4	16	1.2	19	1.1	22	1	24	0.8	33	0.7	41	0.7	47	0.6	53	0.5	63				
70									1.6	15	1.3	19	1.2	23	1.1	26	1	29	0.8	39	0.7	48	0.7	55	0.6	62	0.5	74				
80						2	12		1.5	18	1.3	23	1.2	27	1.1	30	1	34	0.8	45	0.7	55	0.7	63	0.6	71	0.5	85				
90						1.9	14		1.5	21	1.3	26	1.2	30	1.1	35	1	38	0.8	51	0.7	62	0.7	72	0.6	80	0.5	95				
100						1.8	17		1.5	24	1.3	29	1.2	34	1.1	39	1	43	0.8	57	0.7	69	0.7	80	0.6	89						
110						1.8	20		1.5	27	1.3	33	1.2	38	1.1	43	1	47	0.8	63	0.7	76	0.7	88	0.6	98						
120				2.5	11	1.8	22		1.5	30	1.3	36	1.2	42	1.1	47	1	52	0.8	69	0.7	83	0.7	96								
130				2.4	14	1.8	25		1.5	33	1.3	40	1.2	46	1.1	51	1	57	0.8	75	0.7	90										
140				2.4	16	1.7	27		1.4	36	1.3	43	1.1	50	1.1	56	1	61	0.8	81	0.7	97										
150				2.4	18	1.7	29		1.4	39	1.3	46	1.1	53	1.1	60	1	66	0.8	87												
160				2.3	20	1.7	32		1.4	41	1.3	50	1.1	57	1.1	64	1	70	0.8	93												
170				2.3	22	1.7	34		1.4	44	1.3	53	1.1	61	1.1	68	1	75	0.8	99												
180				2.3	23	1.7	37		1.4	47	1.3	56	1.1	65	1.1	72	1	80														
190				2.3	25	1.7	39		1.4	50	1.3	60	1.1	69	1	77	1	84														
200				2.2	27	1.7	41		1.4	53	1.3	63	1.1	72	1	81	1	89														
210				2.2	29	1.7	44		1.4	56	1.2	66	1.1	76	1	85	1	93														
220				2.2	31	1.7	46		1.4	59	1.2	70	1.1	80	1	89	1	98														
230				2.2	33	1.7	48		1.4	61	1.2	73	1.1	84	1	93																
240				2.2	34	1.7	51		1.4	64	1.2	76	1.1	87	1	98																
250				2.2	36	1.7	53		1.4	67	1.2	80	1.1	91																		
260		3.8	11	2.2	38	1.7	55		1.4	70	1.2	83	1.1	95																		
270		3.8	12	2.2	40	1.7	58		1.4	73	1.2	86	1.1	99																		
280		3.7	13	2.2	41	1.7	60		1.4	76	1.2	90																				
290		3.7	15	2.2	43	1.7	62		1.4	79	1.2	93																				
300		3.7	16	2.1	45	1.7	65		1.4	82	1.2	96																				
310		3.6	17	2.1	47	1.6	67		1.4	84	1.2	100																				
320		3.6	18	2.1	48	1.6	69		1.4	87																						
330		3.6	19	2.1	50	1.6	72		1.4	90																						
340		3.6	21	2.1	52	1.6	74		1.4	93																						
350		3.6	22	2.1	54	1.6	76		1.4	96																						
360		3.5	23	2.1	55	1.6	79		1.4	99																						
370		3.5	24	2.1	57	1.6	81																									
380		3.5	25	2.1	59	1.6	83																									
390		3.5	26	2.1	61	1.6	86																									
400		3.5	27	2.1	62	1.6	88																									
410		3.5	29	2.1	64	1.6	90																									
420		3.4	30	2.1	66	1.6	93																									
430		3.4	31	2.1	67	1.6	95																									
440		3.4	32	2.1	69	1.6	97																									
450		3.4	33	2.1	71	1.6	100																									
460		3.4	34	2.1	73																											
470		3.4	35	2.1	74																											
480		3.4	36	2.1	76																											
490		3.4	37	2.1	78																											
500		3.4	38	2.1	80																											

Input Parameters:
Channel Type = Trapezoidal
Cover factor = 0.5
Allowable Soil Stress = 0.05
B-D Design
Side Slope = 8

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%			
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)		
10																														0.5	10	
20																							0.8	11	0.7	14	0.6	16	0.6	20	0.5	23
30																					0.9	14	0.8	18	0.7	22	0.6	25	0.5	30		
40															1.2	11	1.1	14	0.9	20	0.7	26	0.7	30	0.7	30	0.6	34	0.5	41		
50											1.5	10	1.3	13	1.2	16	1.1	19	0.8	27	0.8	33	0.7	33	0.7	38	0.6	43	0.5	52		
60										1.4	14	1.2	17	1.1	21	1	23	0.8	33	0.7	40	0.7	40	0.7	47	0.6	53	0.5	63			
70									1.7	12	1.4	18	1.2	22	1.1	25	1	28	0.8	39	0.7	47	0.7	55	0.6	62	0.5	74				
80									1.6	16	1.3	21	1.2	26	1.1	29	1	33	0.8	45	0.7	54	0.7	63	0.6	71	0.5	84				
90						2	12	1.6	19	1.3	25	1.2	29	1.1	34	1	37	0.8	51	0.7	61	0.7	71	0.6	80	0.5	95					
100						1.9	14	1.5	22	1.3	28	1.2	33	1.1	38	1	42	0.8	56	0.7	69	0.7	79	0.6	89							
110						1.9	17	1.5	25	1.3	32	1.2	37	1.1	42	1	47	0.8	63	0.7	76	0.7	87	0.6	98							
120						1.8	20	1.5	28	1.3	35	1.2	41	1.1	46	1	51	0.8	68	0.7	83	0.7	96									
130						1.8	23	1.5	31	1.3	39	1.2	45	1.1	51	1	56	0.8	74	0.7	90											
140					2.5	12	1.8	25	1.5	34	1.3	42	1.2	49	1.1	55	1	60	0.8	80	0.7	97										
150					2.5	14	1.8	28	1.5	37	1.3	45	1.1	52	1.1	59	1	65	0.8	86												
160					2.4	16	1.7	30	1.4	40	1.3	49	1.1	56	1.1	63	1	70	0.8	92												
170					2.4	18	1.7	32	1.4	43	1.3	52	1.1	60	1.1	67	1	74	0.8	98												
180					2.4	20	1.7	35	1.4	46	1.3	55	1.1	64	1.1	72	1	79														
190					2.3	22	1.7	37	1.4	49	1.3	59	1.1	68	1.1	76	1	83														
200					2.3	24	1.7	40	1.4	52	1.3	62	1.1	71	1.1	80	1	88														
210					2.3	26	1.7	42	1.4	55	1.3	66	1.1	75	1	84	1	93														
220					2.3	28	1.7	45	1.4	57	1.2	69	1.1	79	1	88	1	97														
230					2.3	30	1.7	47	1.4	60	1.2	72	1.1	83	1	93																
240					2.2	32	1.7	49	1.4	63	1.2	76	1.1	87	1	97																
250					2.2	34	1.7	52	1.4	66	1.2	79	1.1	90																		
260					2.2	36	1.7	54	1.4	69	1.2	82	1.1	94																		
270					2.2	37	1.7	56	1.4	72	1.2	86	1.1	98																		
280					2.2	39	1.7	59	1.4	75	1.2	89																				
290					2.2	41	1.7	61	1.4	78	1.2	92																				
300					2.2	43	1.7	63	1.4	81	1.2	96																				
310		3.9	10		2.2	45	1.7	66	1.4	83	1.2	99																				
320		3.8	11		2.2	46	1.7	68	1.4	86																						
330		3.8	13		2.2	48	1.7	70	1.4	89																						
340		3.8	14		2.2	50	1.6	73	1.4	92																						
350		3.7	16		2.1	52	1.6	75	1.4	95																						
360		3.7	17		2.1	53	1.6	77	1.4	98																						
370		3.7	18		2.1	55	1.6	80																								
380		3.6	20		2.1	57	1.6	82																								
390		3.6	21		2.1	59	1.6	85																								
400		3.6	22		2.1	61	1.6	87																								
410		3.6	23		2.1	62	1.6	89																								
420		3.6	25		2.1	64	1.6	92																								
430		3.5	26		2.1	66	1.6	94																								
440		3.5	27		2.1	67	1.6	96																								
450		3.5	28		2.1	69	1.6	98																								
460		3.5	29		2.1	71																										
470		3.5	31		2.1	73																										
480		3.5	32		2.1	74																										
490		3.5	33		2.1	76																										
500		3.4	34		2.1	78																										

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.07

B-D Design

Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
10																														
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440																														
450																														
460																														
470																														
480																														
490																														
500																														

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.07

B-D Design

Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%												
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)											
10																																									
20																								0.8	10	0.7	11	0.6	14	0.5	17										
30																				1	10	0.8	13	0.7	16	0.7	18	0.6	23	0.5	26										
40																				1	14	0.8	19	0.7	22	0.7	25	0.6	31	0.5	36										
50																				0.9	19	0.8	24	0.7	28	0.7	32	0.6	39	0.5	45										
60																				1.3	11	1.2	13	0.9	23	0.8	29	0.7	34	0.6	39	0.6	47	0.5	54						
70																				1.3	14	1.2	16	0.9	28	0.8	35	0.7	40	0.6	46	0.6	55	0.5	63						
80																				1.4	14	1.3	17	1.2	20	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73				
90																				1.4	17	1.2	20	1.1	23	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73				
100																				1.5	11	1.3	14	1.2	16	0.9	23	0.8	29	0.7	34	0.6	39	0.6	47	0.5	54				
110																				1.4	14	1.3	17	1.2	20	0.9	28	0.8	35	0.7	40	0.6	46	0.6	55	0.5	63				
120																				1.6	11	1.4	14	1.3	17	1.2	20	0.9	28	0.8	35	0.7	40	0.6	46	0.6	55	0.5	63		
130																				1.6	14	1.4	17	1.2	20	1.1	23	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73		
140																				1.8	12	1.5	16	1.4	20	1.1	26	0.9	37	0.8	45	0.7	53	0.6	59	0.6	71	0.5	82		
150																				1.8	14	1.5	19	1.3	23	1.2	26	1.1	30	0.9	41	0.8	50	0.7	59	0.6	66	0.6	79	0.5	91
160																				1.8	16	1.5	21	1.3	26	1.2	30	1.1	33	0.9	45	0.8	56	0.7	65	0.6	73	0.6	87	0.5	100
170																				1.3	26	1.2	30	1.1	33	0.9	45	0.8	56	0.7	65	0.6	73	0.6	87	0.5	100				
180																				1.5	11	1.3	14	1.2	16	0.9	23	0.8	29	0.7	34	0.6	39	0.6	47	0.5	54				
190																				1.3	14	1.2	16	1.1	23	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73				
200																				1.3	14	1.2	16	1.1	23	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73				
210																				1.5	11	1.3	14	1.2	16	0.9	23	0.8	29	0.7	34	0.6	39	0.6	47	0.5	54				
220																				1.4	14	1.3	17	1.2	20	1.1	23	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73		
230																				1.3	14	1.2	16	1.1	23	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73				
240																				1.3	14	1.2	16	1.1	23	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73				
250																				1.3	14	1.2	16	1.1	23	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73				
260																				1.3	14	1.2	16	1.1	23	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73				
270																				1.3	14	1.2	16	1.1	23	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73				
280																				1.3	14	1.2	16	1.1	23	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73				
290																				1.3	14	1.2	16	1.1	23	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73				
300																				1.3	14	1.2	16	1.1	23	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73				
310																				1.3	14	1.2	16	1.1	23	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73				
320																				1.3	14	1.2	16	1.1	23	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73				
330																				1.3	14	1.2	16	1.1	23	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73				
340																				1.3	14	1.2	16	1.1	23	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73				
350																				1.3	14	1.2	16	1.1	23	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73				
360																				1.3	14	1.2	16	1.1	23	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73				
370																				1.3	14	1.2	16	1.1	23	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73				
380																				1.3	14	1.2	16	1.1	23	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73				
390																				1.3	14	1.2	16	1.1	23	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73				
400																				1.3	14	1.2	16	1.1	23	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73				
410																				1.3	14	1.2	16	1.1	23	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73				
420																				1.3	14	1.2	16	1.1	23	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73				
430																				1.3	14	1.2	16	1.1	23	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73				
440																				1.3	14	1.2	16	1.1	23	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73				
450																				1.3	14	1.2	16	1.1	23	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73				
460																				1.3	14	1.2	16	1.1	23	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73				
470																				1.3	14	1.2	16	1.1	23	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73				
480																				1.3	14	1.2	16	1.1	23	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73				
490																				1.3	14	1.2	16	1.1	23	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73				
500																				1.3	14	1.2	16	1.1	23	0.9	32	0.8	40	0.7	46	0.6	52	0.6	63	0.5	73				

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.07

B-D Design

Side Slope = 8

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
10																														
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440																														
450																														
460																														
470																														
480																														
490																														
500																														

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.02

B-D Design

Side Slope = 8

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	
10																														0.6	11
20																														0.5	24
30																															
40																															
50																															
60																															
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440																															
450																															
460																															
470																															
480																															
490																															
500																															

Input Parameters:
Channel Type = Trapezoidal
Cover factor = 0.75
Allowable Soil Stress = 0.03
B-D Design
Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%			
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)		
10																																
20																						0.8	10	0.7	12	0.7	14	0.6	17	0.5	20	
30																					0.9	13	0.8	16	0.7	19	0.6	22	0.6	27	0.5	31
40													1.2	11	1.1	13	0.9	18	0.8	23	0.7	26	0.7	33	0.6	30	0.6	36	0.5	41		
50											1.5	10	1.3	13	1.2	15	1.1	17	0.9	23	0.8	29	0.7	33	0.6	38	0.6	45	0.5	52		
60									1.7	10	1.5	13	1.3	16	1.2	18	1.1	21	0.9	28	0.8	35	0.7	40	0.6	45	0.6	54	0.5	62		
70									1.7	13	1.4	16	1.3	19	1.2	22	1.1	25	0.9	33	0.8	41	0.7	47	0.6	53	0.6	63	0.5	73		
80						2.1	10	1.7	15	1.4	19	1.3	22	1.1	26	1.1	29	0.9	38	0.8	47	0.7	54	0.6	61	0.6	73	0.5	83			
90						2	12	1.6	18	1.4	22	1.2	26	1.1	29	1.1	32	0.9	43	0.7	53	0.7	61	0.6	69	0.6	82	0.5	94			
100						2	14	1.6	20	1.4	25	1.2	29	1.1	33	1.1	36	0.9	48	0.7	59	0.7	68	0.6	76	0.6	91					
110						1.9	17	1.6	22	1.4	28	1.2	32	1.1	36	1	40	0.9	53	0.7	65	0.7	75	0.6	84	0.6	100					
120				2.6	10	1.9	19	1.6	25	1.4	30	1.2	35	1.1	40	1	44	0.9	59	0.7	71	0.7	82	0.6	92							
130				2.6	12	1.9	21	1.6	27	1.4	33	1.2	38	1.1	43	1	48	0.9	64	0.7	77	0.7	89	0.6	100							
140				2.5	13	1.9	23	1.5	30	1.4	36	1.2	42	1.1	47	1	52	0.8	69	0.7	83	0.7	96									
150				2.5	15	1.9	24	1.5	32	1.3	39	1.2	45	1.1	50	1	56	0.8	74	0.7	89											
160				2.5	16	1.9	26	1.5	35	1.3	42	1.2	48	1.1	54	1	59	0.8	79	0.7	95											
170				2.5	18	1.8	28	1.5	37	1.3	44	1.2	51	1.1	57	1	63	0.8	84													
180				2.4	19	1.8	30	1.5	39	1.3	47	1.2	54	1.1	61	1	67	0.8	89													
190				2.4	21	1.8	32	1.5	42	1.3	50	1.2	57	1.1	64	1	71	0.8	94													
200				2.4	22	1.8	34	1.5	44	1.3	53	1.2	61	1.1	68	1	75	0.8	99													
210				2.4	24	1.8	36	1.5	46	1.3	55	1.2	64	1.1	71	1	79															
220				2.4	25	1.8	38	1.5	49	1.3	58	1.2	67	1.1	75	1	82															
230				2.4	27	1.8	40	1.5	51	1.3	61	1.2	70	1.1	78	1	86															
240				2.4	28	1.8	42	1.5	54	1.3	64	1.2	73	1.1	82	1	90															
250				2.4	30	1.8	44	1.5	56	1.3	67	1.2	76	1.1	85	1	94															
260		4.1	10	2.4	31	1.8	46	1.5	58	1.3	69	1.2	79	1.1	89	1	98															
270		4.1	11	2.4	33	1.8	48	1.5	61	1.3	72	1.2	83	1.1	92																	
280		4.1	11	2.3	34	1.8	50	1.5	63	1.3	75	1.2	86	1.1	96																	
290		4	12	2.3	35	1.8	52	1.5	65	1.3	78	1.2	89	1.1	99																	
300		4	13	2.3	37	1.8	54	1.5	68	1.3	80	1.2	92																			
310		4	14	2.3	38	1.8	55	1.5	70	1.3	83	1.2	95																			
320		4	15	2.3	40	1.8	57	1.5	72	1.3	86	1.2	99																			
330		4	16	2.3	41	1.8	59	1.5	75	1.3	89																					
340		3.9	17	2.3	42	1.8	61	1.5	77	1.3	91																					
350		3.9	18	2.3	44	1.8	63	1.5	80	1.3	94																					
360		3.9	19	2.3	45	1.8	65	1.5	82	1.3	97																					
370		3.9	20	2.3	47	1.8	67	1.5	84	1.3	100																					
380		3.9	20	2.3	48	1.8	69	1.5	87																							
390		3.9	21	2.3	49	1.8	71	1.5	89																							
400		3.8	22	2.3	51	1.8	73	1.5	91																							
410		3.8	23	2.3	52	1.8	75	1.5	94																							
420		3.8	24	2.3	54	1.8	77	1.5	96																							
430		3.8	25	2.3	55	1.8	78	1.5	98																							
440		3.8	26	2.3	56	1.8	80																									
450		3.8	26	2.3	58	1.8	82																									
460		3.8	27	2.3	59	1.8	84																									
470		3.8	28	2.3	61	1.7	86																									
480		3.8	29	2.3	62	1.7	88																									
490		3.8	30	2.3	63	1.7	90																									
500		3.8	31	2.3	65	1.7	92																									

Input Parameters:
Channel Type = Trapezoidal
Cover factor = 0.75
Allowable Soil Stress = 0.03
B-D Design
Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	
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450																															
460																															
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480																															
490																															
500																															

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.03

B-D Design

Side Slope = 8

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	
10																															
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490																															
500																															

Input Parameters:
Channel Type = Trapezoidal
Cover factor = 0.75
Allowable Soil Stress = 0.05
B-D Design
Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	
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500																															

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.05

B-D Design

Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%			
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)		
10																																
20																																
30																																
40																																
50																				1.1	12	0.9	12	0.8	10	0.7	12	0.6	16	0.6	19	
60																			1.1	15	0.9	20	0.8	24	0.7	27	0.6	34	0.6	39		
70																		1.4	11	1	18	0.9	24	0.8	28	0.7	32	0.6	40	0.6	46	
80																	1.5	12	1	21	0.9	27	0.8	33	0.7	37	0.6	46	0.6	53		
90																	1.7	11	1	25	0.9	31	0.8	37	0.7	42	0.6	51	0.6	60		
100																	1.6	13	1	28	0.9	35	0.8	41	0.7	47	0.6	57	0.5	66		
110																	1.6	15	1	31	0.9	39	0.8	46	0.7	52	0.6	63	0.5	73		
120																	1.9	11	1	31	0.9	39	0.8	46	0.7	52	0.6	63	0.5	73		
130																	1.8	13	1	34	0.9	43	0.8	50	0.7	57	0.6	69	0.5	80		
140																	2.2	10	1	37	0.9	46	0.8	54	0.7	62	0.6	75	0.5	87		
150																	2.1	11	1	40	0.8	50	0.8	59	0.7	67	0.6	81	0.5	93		
160																	2.1	13	1	43	0.8	54	0.8	63	0.7	72	0.6	87	0.5	100		
170																	2.1	15	1	46	0.8	58	0.8	68	0.7	77	0.6	93				
180																	2	16	1	49	0.8	61	0.8	72	0.7	81	0.6	99				
190																	2	18	1	53	0.8	65	0.8	76	0.7	86						
200																	2.6	11	1	56	0.8	69	0.8	81	0.7	91						
210																	2.5	12	1	59	0.8	73	0.8	85	0.7	96						
220																	2	21	1	62	0.8	76	0.8	89								
230																	2.5	14	1	65	0.8	80	0.8	94								
240																	2	24	1	68	0.8	84	0.8	98								
250																	2.5	16	1	71	0.8	88										
260																	2	25	1	74	0.8	91										
270																	2.4	17	1	77	0.8	95										
280																	2.4	19	1	80	0.8	99										
290																	2.4	20	1	83												
300																	2.4	21	1	86												
310																	2.4	22	1	89												
320																	2.4	23	1	92												
330																	2.4	24	1	95												
340																	3.4	10	1	98												
350																	3.4	11	1	101												
360																	3.3	12	1	104												
370																	3.3	13	1	107												
380																	3.3	14	1	110												
390																	3.3	15	1	113												
400																	3.3	16	1	116												
410																	3.2	17	1	119												
420																	3.2	18	1	122												
430																	3.2	19	1	125												
440																	3.2	20	1	128												
450																	3.2	21	1	131												
460																	3.2	22	1	134												
470																	3.1	23	1	137												
480																	3.1	24	1	140												
490																	3.1	25	1	143												
500																	3.1	26	1	146												

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.07

B-D Design

Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
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500																														

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.07

B-D Design

Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%			
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)		
10																																
20																																
30																																
40																																
50																							1.1	10	0.9	10	0.8	12	0.7	11	0.6	13
60																						1	13	0.9	13	0.8	15	0.7	15	0.6	18	
70																						1	16	0.9	16	0.8	19	0.7	20	0.6	23	
80																						1	18	0.9	19	0.8	23	0.7	24	0.6	28	
90																						1	16	0.9	19	0.8	23	0.7	28	0.6	33	
100																						1	18	0.9	23	0.8	26	0.7	33	0.6	38	
110																						1	21	0.9	26	0.8	30	0.7	37	0.6	43	
120																						1	24	0.9	29	0.8	33	0.7	41	0.6	48	
130																						1	27	0.8	32	0.8	37	0.7	46	0.6	53	
140																						1	29	0.8	35	0.8	41	0.7	50	0.6	58	
150																						1	32	0.8	38	0.8	44	0.7	54	0.6	63	
160																						1	35	0.8	42	0.8	48	0.7	59	0.6	68	
170																						1	38	0.8	45	0.8	51	0.7	63	0.6	73	
180																						1	40	0.9	48	0.8	55	0.7	67	0.6	79	
190																						1	43	0.9	51	0.8	58	0.7	72	0.6	83	
200																						1	46	0.9	54	0.8	61	0.7	76	0.6	88	
210																						1	49	0.9	57	0.8	64	0.7	80	0.6	93	
220																						1	51	0.9	60	0.8	67	0.7	85	0.6	99	
230																						1	54	0.9	63	0.8	70	0.7	89			
240																						1	57	0.9	66	0.8	73	0.7	93			
250																						1	60	0.9	69	0.8	76	0.7	97			
260																						1	63	0.9	72	0.8	79	0.7	101			
270																						1	66	0.9	75	0.8	82	0.7	105			
280																						1	69	0.9	78	0.8	85	0.7	109			
290																						1	72	0.9	81	0.8	88	0.7	113			
300																						1	75	0.9	84	0.8	91	0.7	117			
310																						1	78	0.9	87	0.8	94	0.7	121			
320																						1	81	0.9	90	0.8	97	0.7	125			
330																						1	84	0.9	93	0.8	100	0.7	129			
340																						1	87	0.9	96	0.8	103	0.7	133			
350																						1	90	0.9	99	0.8	106	0.7	137			
360																						1	93	0.9	102	0.8	109	0.7	141			
370																						1	96	0.9	105	0.8	112	0.7	145			
380																						1	99	0.9	108	0.8	115	0.7	149			
390																						1	102	0.9	111	0.8	118	0.7	153			
400																						1	105	0.9	114	0.8	121	0.7	157			
410																						1	108	0.9	117	0.8	124	0.7	161			
420																						1	111	0.9	120	0.8	127	0.7	165			
430																						1	114	0.9	123	0.8	130	0.7	169			
440																						1	117	0.9	126	0.8	133	0.7	173			
450																						1	120	0.9	129	0.8	136	0.7	177			
460																						1	123	0.9	132	0.8	139	0.7	181			
470																						1	126	0.9	135	0.8	142	0.7	185			
480																						1	129	0.9	138	0.8	145	0.7	189			
490																						1	132	0.9	141	0.8	148	0.7	193			
500																						1	135	0.9	144	0.8	151	0.7	197			

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.07

B-D Design

Side Slope = 8

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
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Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.02

B-D Design

Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
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Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.02

B-D Design

Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	
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Input Parameters:
Channel Type = Trapezoidal
Cover factor = 0.87
Allowable Soil Stress = 0.02
B-D Design
Side Slope = 8

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	
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Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.03

B-D Design

Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%									
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)								
10																															0.6	11						
20																																0.6	17					
30																																0.6	17					
40																																0.6	23					
50																																0.6	29					
60																																	0.6	35				
70																																	0.6	41				
80																																	0.6	47				
90																																	0.6	53				
100																																	0.6	58				
110																																	0.6	64				
120																																	0.6	70				
130																																	0.6	76				
140																																	0.6	82				
150																																	0.6	88				
160																																	0.6	94				
170																																	0.6	100				
180																																		0.6	92			
190																																	0.6	97				
200																																			0.6	97		
210																																				0.6	89	
220																																				0.6	93	
230																																				0.6	97	
240																																					0.6	89
250																																					0.6	93
260																																					0.6	97
270																																					0.6	86
280																																					0.6	86
290																																					0.6	89
300																																					0.6	93
310																																					0.6	96
320																																					0.6	99
330																																					0.6	99
340																																					0.6	83
350																																					0.6	86
360																																					0.6	88
370																																					0.6	91
380																																					0.6	94
390																																					0.6	94
400																																					0.6	96
410																																					0.6	99
420																																					0.6	99
430																																					0.6	99
440																																					0.6	99
450																																					0.6	99
460																																					0.6	99
470																																					0.6	99
480																																					0.6	99
490																																					0.6	99
500																																					0.6	99

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.03

B-D Design

Side Slope = 8

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
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Input Parameters:
Channel Type = Trapezoidal
Cover factor = 0.87
Allowable Soil Stress = 0.05
B-D Design
Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%													
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)												
10																																										
20																																										
30																																										
40																														0.7	10											
50																													0.8	11	0.7	13										
60																													0.9	11	0.8	14	0.7	17								
70																							1	11	0.9	14	0.7	17	0.7	21	0.7	25										
80																							1.1	13	1	16	0.9	19	0.7	21	0.7	28										
90																							1.4	11	1	18	0.9	21	0.7	27	0.6	32										
100																							1.4	12	1.1	17	1	21	0.9	24	0.7	30	0.6	36								
110																							1.4	14	1.1	19	1	23	0.9	27	0.7	33	0.6	39								
120																							1.3	16	1.1	21	1	25	0.9	29	0.7	37	0.6	43								
130																							1.8	10	1.3	17	1.1	23	0.9	32	0.7	40	0.6	47								
140																							1.8	11	1.3	19	1.1	25	0.9	30	0.8	35	0.7	43	0.6	51						
150																							2	10	1.8	13	1.3	20	1.1	27	0.9	32	0.8	37	0.7	46	0.6	54				
160																							2	11	1.8	14	1.3	22	1.1	29	0.9	34	0.8	40	0.7	49	0.6	58				
170																							1.9	12	1.7	15	1.3	23	1.1	30	0.9	37	0.8	42	0.7	53	0.6	62				
180																							2.2	10	1.9	13	1.7	16	1.3	25	1.1	32	0.9	39	0.8	45	0.7	56	0.6	65		
190																							2.2	11	1.9	15	1.7	17	1.3	27	1.1	34	0.9	41	0.8	48	0.7	59	0.6	69		
200																							2.2	12	1.9	16	1.7	18	1.3	28	1.1	36	0.9	43	0.8	50	0.7	62	0.6	73		
210																							2.1	13	1.9	17	1.7	20	1.3	30	1.1	38	0.9	46	0.8	53	0.7	65	0.6	76		
220																							2.5	10	2.1	14	1.9	18	1.7	21	1.3	31	1.1	40	0.9	48	0.8	55	0.7	68	0.6	80
230																							2.5	11	2.1	15	1.9	19	1.7	22	1.3	33	1.1	42	0.9	50	0.8	58	0.7	72	0.6	84
240																							2.5	12	2.1	16	1.9	20	1.7	23	1.3	34	1.1	44	0.9	52	0.8	60	0.7	75	0.6	87
250																							2.4	13	2.1	17	1.9	21	1.7	24	1.3	36	1.1	46	0.9	55	0.8	63	0.7	78	0.6	91
260																							2.4	14	2.1	18	1.8	22	1.7	25	1.3	37	1.1	48	0.9	57	0.8	66	0.7	81	0.6	95
270																							2.4	14	2.1	19	1.8	23	1.7	26	1.3	39	1.1	50	0.9	59	0.8	68	0.7	84	0.6	99
280																							2.9	10	2.4	15	2.1	20	1.8	24	1.7	28	1.3	40	1.1	52	0.9	62	0.8	71	0.7	87
290																							2.9	11	2.4	16	2.1	21	1.8	25	1.7	29	1.3	42	1.1	54	0.9	64	0.8	73	0.7	91
300																							2.9	11	2.4	17	2.1	22	1.8	26	1.7	30	1.3	44	1.1	55	0.9	66	0.8	76	0.7	94
310																							2.9	12	2.4	18	2.1	23	1.8	27	1.7	31	1.3	45	1.1	57	0.9	68	0.8	79	0.7	97
320																							2.9	13	2.4	18	2	23	1.8	28	1.7	32	1.3	47	1.1	59	0.9	71	0.8	81	0.7	100
330																							2.9	13	2.4	19	2	24	1.8	29	1.7	33	1.3	48	1.1	61	0.9	73	0.8	84		
340																							2.9	14	2.4	20	2	25	1.8	30	1.7	34	1.3	50	1.1	63	0.9	75	0.8	86		
350																							2.8	15	2.4	21	2	26	1.8	31	1.7	35	1.3	51	1	65	0.9	77	0.8	89		
360																							2.8	15	2.3	22	2	27	1.8	32	1.6	37	1.3	53	1	67	0.9	80	0.8	92		
370																							2.8	16	2.3	22	2	28	1.8	33	1.6	38	1.3	54	1	69	0.9	82	0.8	94		
380																							2.8	17	2.3	23	2	29	1.8	34	1.6	39	1.3	56	1	71	0.9	84	0.8	97		
390																							2.8	17	2.3	24	2	30	1.8	35	1.6	40	1.3	57	1	73	0.9	87	0.8	99		
400																							3.6	10	2.8	18	2.3	25	2	31	1.8	36	1.6	41	1.3	59	1	75	0.9	89		
410																							3.6	10	2.8	19	2.3	25	2	31	1.8	37	1.6	42	1.3	61	1	77	0.9	91		
420																							3.6	11	2.8	19	2.3	26	2	32	1.8	38	1.6	43	1.2	62	1	78	0.9	93		
430																							3.6	11	2.8	20	2.3	27	2	33	1.8	39	1.6	44	1.2	64	1	80	0.9	96		
440																							3.6	12	2.8	21	2.3	28	2	34	1.8	40	1.6	45	1.2	65	1	82	0.9	98		
450																							3.6	12	2.8	21	2.3	28	2	35	1.8	41	1.6	47	1.2	67	1	84	0.9	100		
460																							3.6	13	2.8	22	2.3	29	2	36	1.8	42	1.6	48	1.2	68	1	86				
470																							3.6	13	2.8	22	2.3	30	2	37	1.8	43	1.6	49	1.2	70	1	88				
480																							3.5	14	2.8	23	2.3	31	2	38	1.8	44	1.6	50	1.2	71	1	90				
490																							3.5	14	2.8	24	2.3	31	2	38	1.8	45	1.6	51	1.2	73	1	92				
500																							3.5	15	2.7	24	2.3	32	2	39	1.8	46	1.6	52	1.2	74	1	94				

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.05

B-D Design

Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	
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500																															

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.05

B-D Design

Side Slope = 8

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	
10																															
20																															
30																															
40																															
50																														0.7	12
60																															
70																															
80																															
90																															
100																															
110																															
120																															
130																															
140																															
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440																															
450																															
460																															
470																															
480																															
490																															
500																															

Input Parameters:
Channel Type = Trapezoidal
Cover factor = 0.87
Allowable Soil Stress = 0.07
B-D Design
Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	
10																															
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350																															
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420																															
430																															
440																															
450																															
460																															
470																															
480																															
490																															
500																															

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.07

B-D Design

Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%														
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)													
10																																											
20																																											
30																																											
40																																											
50																														0.8	11												
60																													0.9	11	0.8	14											
70																													0.9	13	0.7	16											
80																										1.1	11		0.9	15	0.7	19											
90																								1.2	10	1	13		0.8	18	0.7	22											
100																								1.2	12	1	15		0.8	20	0.7	24											
110																							1.4	10	1	17		0.8	22	0.7	27												
120																							1.3	11	1.1	15	1	19		0.8	25	0.7	30										
130																							1.3	13	1.1	17	1	21		0.8	27	0.7	32										
140																							1.3	14	1.1	19	1	22		0.8	29	0.7	35										
150																							1.6	10	1.3	20	1	24		0.8	31	0.7	38										
160																							1.6	11	1.3	17	1.1	22	1	26		0.8	34	0.7	40								
170																							1.6	12	1.3	18	1.1	24	1	28		0.8	36	0.7	43								
180																							1.6	14	1.3	20	1.1	25	1	30		0.8	38	0.7	46								
190																							1.6	15	1.3	21	1.1	27	1	32		0.8	40	0.7	48								
200																							1.6	16	1.3	23	1.1	28	1	34		0.8	43	0.7	51								
210																							1.6	17	1.3	24	1.1	30	1	35		0.8	45	0.7	54								
220																							1.6	18	1.3	25	1.1	32	1	37		0.8	47	0.7	56								
230																							1.6	19	1.3	27	1.1	33	1	39		0.8	50	0.7	59								
240																							2.2	10	1.5	20	1.3	28	1.1	35	1	41		0.8	52	0.7	62						
250																							2.2	11	1.5	21	1.3	29	1.1	36	1	43		0.8	54	0.7	64						
260																							2.1	12	1.5	22	1.3	31	1.1	38	1	45		0.8	56	0.7	67						
270																							2.1	12	1.5	24	1.3	32	1.1	40	1	46		0.8	59	0.7	70						
280																							2.1	13	1.5	25	1.2	33	1.1	41	1	48		0.8	61	0.7	72						
290																							2.4	10	2.1	14	1.5	26	1.2	35	1.1	43	1	50		0.8	63	0.7	75				
300																							2.4	11	2.1	15	1.5	27	1.2	36	1.1	44	1	52		0.8	65	0.7	77				
310																							2.4	12	2.1	16	1.5	28	1.2	37	1.1	46	1	54		0.8	68	0.7	80				
320																							2.3	13	2.1	17	1.5	29	1.2	39	1.1	48	1	55		0.8	70	0.7	83				
330																							2.3	13	2.1	18	1.5	30	1.2	40	1.1	49	1	57		0.8	72	0.7	85				
340																							2.3	14	2.1	18	1.5	31	1.2	41	1.1	51	1	59		0.8	74	0.7	88				
350																							2.7	10	2.3	15	2.1	19	1.5	32	1.2	43	1.1	52	1	61		0.8	77	0.7	91		
360																							2.7	11	2.3	16	2.1	20	1.5	33	1.2	44	1.1	54	0.9	63		0.8	79	0.7	93		
370																							2.6	12	2.3	16	2	21	1.5	34	1.2	45	1.1	55	0.9	64		0.8	81	0.7	96		
380																							2.6	12	2.3	17	2	22	1.5	35	1.2	47	1.1	57	0.9	66		0.8	83	0.7	99		
390																							2.6	13	2.3	18	2	22	1.5	36	1.2	48	1.1	59	0.9	68		0.8	86				
400																							2.6	14	2.3	19	2	23	1.5	37	1.2	49	1.1	60	0.9	70		0.8	88				
410																							2.6	14	2.3	19	2	24	1.5	38	1.2	51	1.1	62	0.9	72		0.8	90				
420																							2.6	15	2.3	20	2	25	1.5	40	1.2	52	1.1	63	0.9	74		0.8	92				
430																							2.6	16	2.3	21	2	25	1.5	41	1.2	53	1.1	65	0.9	75		0.8	95				
440																							3.1	10	2.6	16	2.2	22	2	26	1.5	42	1.2	55	1.1	66	0.9	77		0.8	97		
450																							3.1	10	2.6	17	2.2	22	2	27	1.5	43	1.2	56	1.1	68	0.9	79		0.8	99		
460																							3	11	2.6	17	2.2	23	2	28	1.5	44	1.2	57	1.1	70	0.9	81					
470																							3	11	2.6	18	2.2	24	2	28	1.5	45	1.2	59	1.1	71	0.9	83					
480																							3	12	2.5	19	2.2	24	2	29	1.5	46	1.2	60	1.1	73	0.9	84					
490																							3	13	2.5	19	2.2	25	2	30	1.5	47	1.2	61	1.1	74	0.9	86					
500																							3	13	2.5	20	2.2	26	2	31	1.5	48	1.2	63	1.1	76	0.9	88					

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.07

B-D Design

Side Slope = 8

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	
10																															
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440																															
450																															
460																															
470																															
480																															
490																															
500																															

Input Parameters:
Channel Type = Trapezoidal
Cover factor = 0.9
Allowable Soil Stress = 0.02
B-D Design
Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
10																														
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80																														
90																														
100																														
110																														
120																														
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400																														
410																														
420																														
430																														
440																														
450																														
460																														
470																														
480																														
490																														
500																														

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.02

B-D Design

Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%				
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)			
10																																	
20																																	
30																																	
40																																	
50																					1.1	12	0.9	12	0.8	10	0.7	12	0.6	16	0.6	19	
60																				1.1	15	0.9	20	0.8	24	0.7	27	0.6	34	0.6	39		
70																				1.4	11	1	18	0.9	24	0.8	28	0.7	32	0.6	40	0.6	46
80																				1.5	12	1	21	0.9	27	0.8	33	0.7	37	0.6	46	0.6	53
90																				1.7	11	1	25	0.9	31	0.8	37	0.7	42	0.6	51	0.6	60
100																				1.6	13	1	28	0.9	35	0.8	41	0.7	47	0.6	57	0.5	66
110																				1.6	15	1	31	0.9	39	0.8	46	0.7	52	0.6	63	0.5	73
120																				1.9	11	1	31	0.9	39	0.8	46	0.7	52	0.6	63	0.5	73
130																				1.8	13	1	34	0.9	43	0.8	50	0.7	57	0.6	69	0.5	80
140																				2.2	10	1	37	0.9	46	0.8	54	0.7	62	0.6	75	0.5	87
150																				2.1	11	1	40	0.8	50	0.8	59	0.7	67	0.6	81	0.5	93
160																				2.1	13	1	43	0.8	54	0.8	63	0.7	72	0.6	87	0.5	100
170																				2.1	15	1	46	0.8	58	0.8	68	0.7	77	0.6	93		
180																				2	16	1	49	0.8	61	0.8	72	0.7	81	0.6	99		
190																				2	18	1	53	0.8	65	0.8	76	0.7	86				
200																				2	19	1	56	0.8	69	0.8	81	0.7	91				
210																				2	21	1	59	0.8	73	0.8	85	0.7	96				
220																				2.5	12	1	62	0.8	76	0.8	89						
230																				2.5	14	1	65	0.8	80	0.8	94						
240																				2.5	15	1	68	0.8	84	0.8	98						
250																				2.5	16	1	71	0.8	88								
260																				2.4	17	1	74	0.8	91								
270																				2.4	19	1	77	0.8	95								
280																				2.4	20	1	80	0.8	99								
290																				2.4	21	1	83										
300																				2.4	22	1	86										
310																				2.4	23	1	89										
320																				2.4	24	1	92										
330																				3.4	10	1	95										
340																				3.4	11	1	98										
350																				3.3	12	1	101										
360																				3.3	13	1	104										
370																				3.3	14	1	107										
380																				3.3	15	1	110										
390																				3.2	16	1	113										
400																				3.2	17	1	116										
410																				3.2	18	1	119										
420																				3.2	19	1	122										
430																				3.2	20	1	125										
440																				3.2	21	1	128										
450																				3.2	22	1	131										
460																				3.1	23	1	134										
470																				3.1	24	1	137										
480																				3.1	25	1	140										
490																				3.1	26	1	143										
500																				3.1	27	1	146										
500																				3.1	28	1	149										

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.03

B-D Design

Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%						
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)					
10																																			
20																																			
30																																			
40																																			
50																						1.1	10	0.9	10	0.8	11	0.7	11	0.6	13				
60																					1	13	0.9	16	0.8	18	0.7	23	0.6	27					
70																					1	15	0.9	19	0.8	22	0.7	27	0.6	32					
80																					1	18	0.9	22	0.8	25	0.7	31	0.6	36					
90																					1	20	0.9	25	0.8	28	0.7	35	0.6	41					
100																					1	23	0.9	27	0.8	32	0.7	39	0.6	46					
110															1.7	10	1.6	13	1.2	20	1	25	0.9	30	0.8	35	0.7	43	0.6	50					
120															1.7	12	1.6	14	1.2	22	1	28	0.9	33	0.8	38	0.7	47	0.6	55					
130														1.9	11	1.7	13	1.6	16	1.2	24	1	30	0.9	36	0.8	42	0.7	51	0.6	60				
140														1.9	12	1.7	15	1.5	17	1.2	26	1	33	0.9	39	0.8	45	0.7	55	0.6	64				
150														2.2	10	1.9	13	1.7	16	1.5	19	1.2	28	1	35	0.9	42	0.8	48	0.7	59	0.6	69		
160														2.2	11	1.9	15	1.7	18	1.5	20	1.2	30	1	38	0.9	45	0.8	52	0.7	63	0.6	74		
170														2.2	12	1.9	16	1.7	19	1.5	22	1.2	32	1	40	0.9	48	0.8	55	0.7	67	0.6	78		
180														2.1	13	1.8	17	1.7	20	1.5	23	1.1	34	1	43	0.9	51	0.8	58	0.7	71	0.6	83		
190														2.6	10	2.1	14	1.8	18	1.6	22	1.5	25	1.1	36	1	45	0.9	54	0.8	62	0.7	76	0.6	88
200														2.5	10	2.1	15	1.8	19	1.6	23	1.5	26	1.1	38	1	48	0.9	57	0.8	65	0.7	80	0.6	93
210														2.5	11	2.1	16	1.8	21	1.6	24	1.5	28	1.1	40	1	50	0.8	60	0.8	68	0.7	84	0.6	97
220														2.5	12	2.1	17	1.8	22	1.6	26	1.5	29	1.1	42	1	53	0.8	63	0.8	72	0.7	88		
230														2.5	13	2.1	19	1.8	23	1.6	27	1.5	31	1.1	44	1	55	0.8	66	0.8	75	0.7	92		
240														2.5	14	2.1	20	1.8	24	1.6	29	1.5	32	1.1	46	1	58	0.8	69	0.8	78	0.7	96		
250														2.5	15	2.1	21	1.8	26	1.6	30	1.5	34	1.1	48	1	60	0.8	71	0.8	82	0.7	100		
260														2.4	16	2	22	1.8	27	1.6	31	1.5	35	1.1	50	1	63	0.8	74	0.8	85				
270														3.1	10	2.4	17	2	23	1.8	28	1.6	33	1.5	37	1.1	52	1	65	0.8	77	0.8	88		
280														3.1	10	2.4	18	2	24	1.8	29	1.6	34	1.5	38	1.1	54	1	68	0.8	80	0.8	92		
290														3.1	11	2.4	19	2	25	1.8	30	1.6	35	1.5	40	1.1	56	1	70	0.8	83	0.8	95		
300														3.1	12	2.4	20	2	26	1.8	31	1.6	37	1.5	41	1.1	58	1	73	0.8	86	0.8	98		
310														3.1	13	2.4	21	2	27	1.8	33	1.6	38	1.5	43	1.1	60	1	75	0.8	89				
320														3.1	13	2.4	21	2	28	1.8	34	1.6	39	1.5	44	1.1	62	1	78	0.8	92				
330														3	14	2.4	22	2	29	1.8	35	1.6	41	1.5	46	1.1	64	1	80	0.8	95				
340														3	15	2.4	23	2	30	1.8	36	1.6	42	1.5	47	1.1	66	1	83	0.8	98				
350														3	16	2.4	24	2	31	1.8	37	1.6	43	1.5	49	1.1	68	1	85						
360														3	16	2.4	25	2	32	1.8	39	1.6	45	1.4	50	1.1	70	1	88						
370														3	17	2.4	26	2	33	1.8	40	1.6	46	1.4	52	1.1	72	1	90						
380														3	18	2.4	27	2	34	1.8	41	1.6	47	1.4	53	1.1	74	1	93						
390														3	18	2.4	27	2	35	1.8	42	1.6	49	1.4	55	1.1	76	1	95						
400														3	19	2.4	28	2	36	1.8	43	1.6	50	1.4	56	1.1	79	1	98						
410														3	20	2.3	29	2	37	1.7	44	1.6	51	1.4	58	1.1	80	0.9	100						
420														3	20	2.3	30	2	38	1.7	46	1.6	53	1.4	59	1.1	82								
430														2.9	21	2.3	31	2	39	1.7	47	1.6	54	1.4	61	1.1	85								
440														2.9	22	2.3	32	2	40	1.7	48	1.6	55	1.4	62	1.1	87								
450														2.9	22	2.3	33	2	41	1.7	49	1.6	57	1.4	64	1.1	89								
460														4.2	10	2.9	23	2.3	33	2	42	1.7	50	1.6	58	1.4	65	1.1	91						
470														4.2	10	2.9	24	2.3	34	2	43	1.7	51	1.6	59	1.4	66	1.1	92						
480														4.2	11	2.9	24	2.3	35	2	44	1.7	53	1.6	61	1.4	68	1.1	95						
490														4.2	11	2.9	25	2.3	36	2	45	1.7	54	1.6	62	1.4	69	1.1	97						
500														4.2	12	2.9	26	2.3	37	2	46	1.7	55	1.6	63	1.4	71	1.1	99						

Input Parameters:
Channel Type = Trapezoidal
Cover factor = 0.9
Allowable Soil Stress = 0.03
B-D Design
Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%				
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)			
10																																	
20																																	
30																																	
40																												0.9	11	0.7	10	0.6	12
50																							0.9	12	0.8	14	0.7	14	0.7	18	0.6	22	
60																						1.1	12	0.9	15	0.8	18	0.7	22	0.6	26		
70																				1.3	10	1	14	0.9	18	0.8	21	0.7	26	0.6	31		
80																			1.3	12	1	17	0.9	21	0.8	24	0.7	30	0.6	36			
90																			1.2	14	1	19	0.9	24	0.8	28	0.7	35	0.6	41			
100																			1.2	16	1	22	0.9	27	0.8	31	0.7	39	0.6	45			
110															1.6	11	1	25	1.2	19	1	25	0.9	30	0.8	34	0.7	43	0.6	50			
120															1.6	12	1	27	1.2	21	1	27	0.9	33	0.8	38	0.7	47	0.6	55			
130														1.8	11	1	30	1.6	14	1.2	23	1	30	0.9	36	0.8	41	0.7	51	0.6	59		
140														1.7	13	1	32	1.6	16	1.2	25	1	32	0.9	39	0.8	44	0.7	55	0.6	64		
150													2	11	1.7	14	1.6	17	1.2	27	1	35	0.9	42	0.8	48	0.7	59	0.6	69			
160													1.9	12	1.7	16	1.6	19	1.2	29	1	37	0.9	44	0.8	51	0.7	63	0.6	73			
170													1.9	13	1.7	17	1.5	20	1.2	31	1	40	0.9	47	0.8	54	0.7	67	0.6	78			
180										2.2	10	1.9	15	1.7	19	1.5	22	1.2	33	1	42	0.9	50	0.8	58	0.7	71	0.6	83				
190										2.2	11	1.9	16	1.7	20	1.5	24	1.2	35	1	45	0.9	53	0.8	61	0.7	75	0.6	87				
200										2.2	12	1.9	17	1.7	21	1.5	25	1.2	37	1	47	0.9	56	0.8	64	0.7	79	0.6	92				
210										2.2	14	1.9	19	1.7	23	1.5	27	1.1	39	1	50	0.9	59	0.8	68	0.7	83	0.6	97				
220										2.1	15	1.8	20	1.7	24	1.5	28	1.1	41	1	52	0.8	62	0.8	71	0.7	87						
230										2.1	16	1.8	21	1.6	26	1.5	30	1.1	43	1	55	0.8	65	0.8	74	0.7	91						
240						2.6	11	2.1	17	1.8	22	1.6	27	1.5	31	1.1	45	1	57	1	57	0.8	68	0.8	78	0.7	95						
250						2.6	12	2.1	18	1.8	24	1.6	28	1.5	33	1.1	47	1	60	1	60	0.8	71	0.8	81	0.7	99						
260						2.5	13	2.1	19	1.8	25	1.6	30	1.5	34	1.1	49	1	62	1	62	0.8	74	0.8	84								
270						2.5	14	2.1	21	1.8	26	1.6	31	1.5	36	1.1	51	1	65	1	65	0.8	77	0.8	88								
280						2.5	15	2.1	22	1.8	27	1.6	33	1.5	37	1.1	53	1	67	1	67	0.8	80	0.8	91								
290						2.5	16	2.1	23	1.8	29	1.6	34	1.5	39	1.1	55	1	70	1	70	0.8	83	0.8	94								
300						2.5	17	2.1	24	1.8	30	1.6	35	1.5	40	1.1	57	1	72	1	72	0.8	85	0.8	98								
310						2.5	18	2	25	1.8	31	1.6	37	1.5	42	1.1	60	1	75	1	75	0.8	88										
320						2.4	18	2	26	1.8	32	1.6	38	1.5	43	1.1	62	1	77	1	77	0.8	91										
330						2.4	19	2	27	1.8	34	1.6	39	1.5	45	1.1	64	1	80	1	80	0.8	94										
340						3.2	10	2.4	20	2	28	1.8	35	1.6	41	1.1	66	1	82	1	82	0.8	97										
350						3.1	11	2.4	21	2	29	1.8	36	1.6	42	1.1	68	1	85	1	85	0.8	100										
360						3.1	12	2.4	22	2	30	1.8	37	1.6	43	1.1	70	1	87	1	87												
370						3.1	13	2.4	23	2	31	1.8	38	1.6	45	1.1	72	1	90	1	90												
380						3.1	13	2.4	24	2	32	1.8	39	1.6	46	1.1	74	1	92	1	92												
390						3.1	14	2.4	25	2	33	1.8	41	1.6	47	1.1	76	1	95	1	95												
400						3.1	15	2.4	26	2	34	1.8	42	1.6	49	1.1	78	1	97	1	97												
410						3	16	2.4	27	2	35	1.8	43	1.6	50	1.1	80	1	100	1	100												
420						3	17	2.4	28	2	37	1.8	44	1.6	51	1.1	82																
430						3	17	2.4	28	2	37	1.8	46	1.6	53	1.1	84																
440						3	18	2.4	29	2	39	1.8	47	1.6	54	1.1	86																
450						3	19	2.4	30	2	40	1.8	48	1.6	55	1.1	88																
460						3	20	2.3	31	2	41	1.7	49	1.6	57	1.1	90																
470						3	20	2.3	32	2	42	1.7	50	1.6	58	1.1	92																
480						3	21	2.3	33	2	43	1.7	51	1.6	59	1.1	94																
490						3	22	2.3	34	2	44	1.7	53	1.6	61	1.1	96																
500						3	22	2.3	35	2	45	1.7	54	1.6	62	1.1	98																

Input Parameters:
Channel Type = Trapezoidal
Cover factor = 0.9
Allowable Soil Stress = 0.03
B-D Design
Side Slope = 8

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40															0.6 11
50															0.6 16
60															0.6 21
70															0.6 26
80															0.6 31
90															0.6 35
100															0.6 40
110															0.6 45
120															0.6 50
130															0.6 54
140															0.6 59
150															0.6 64
160															0.6 68
170															0.6 73
180															0.6 78
190															0.6 82
200															0.6 87
210															0.6 92
220															0.6 96
230															
240															
250															
260															
270															
280															
290															
300															
310															
320															
330															
340															
350															
360															
370															
380															
390															
400															
410															
420															
430															
440															
450															
460															
470															
480															
490															
500															

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.05

B-D Design

Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%			
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)		
10																																
20																																
30																																
40																																
50																															0.8	10
60																															0.9	10
70																															0.8	10
80																															0.8	13
90																															0.8	15
100																															0.8	18
110																															0.8	20
120																															0.8	23
130																															0.8	25
140																															0.8	27
150																															0.8	30
160																															0.8	33
170																															0.8	36
180																															0.8	39
190																															0.8	41
200																															0.8	44
210																															0.8	47
220																															0.8	50
230																															0.8	53
240																															0.8	56
250																															0.8	58
260																															0.8	61
270																															0.8	64
280																															0.8	67
290																															0.8	70
300																															0.8	73
310																															0.8	76
320																															0.8	78
330																															0.8	81
340																															0.8	84
350																															0.8	87
360																															0.8	90
370																															0.8	93
380																															0.8	96
390																															0.8	99
400																															0.8	100
410																															0.8	100
420																															0.8	100
430																															0.8	100
440																															0.8	100
450																															0.8	100
460																															0.8	100
470																															0.8	100
480																															0.8	100
490																															0.8	100
500																															0.8	100

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.05

B-D Design

Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
10																														
20																														
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40																														
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70																														
80																														
90																														
100																														
110																														
120																														
130																														
140																														
150																														
160																														
170																														
180																														
190																														
200																														
210																														
220																														
230																														
240																														
250																														
260																														
270																														
280																														
290																														
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330																														
340																														
350																														
360																														
370																														
380																														
390																														
400																														
410																														
420																														
430																														
440																														
450																														
460																														
470																														
480																														
490																														
500																														

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.05

B-D Design

Side Slope = 8

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%				
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)			
10																																	
20																																	
30																																	
40																																	
50																														0.8	11		
60																													0.9	11	0.7	14	
70																												0.9	14	0.7	17		
80																									1	11		0.8	16	0.7	20		
90																								1.2	10	1	14	0.8	19	0.7	23		
100																								1.2	12	1	16	0.8	21	0.7	26		
110																							1.4	10	1.1	14	1	18	0.8	24	0.7	29	
120																								1.3	11	1.1	16	1	20	0.8	26	0.7	32
130																								1.3	13	1.1	18	1	22	0.8	29	0.7	35
140																								1.3	15	1.1	20	1	24	0.8	31	0.7	37
150																								1.3	16	1.1	21	1	26	0.8	34	0.7	40
160																					1.6	11	1.3	18	1.1	23	1	28	0.8	36	0.7	43	
170																					1.6	12	1.3	19	1.1	25	1	30	0.8	39	0.7	46	
180																					1.6	14	1.3	21	1.1	27	0.9	32	0.8	41	0.7	49	
190																					1.5	15	1.2	22	1.1	29	0.9	34	0.8	43	0.7	52	
200																					1.5	16	1.2	24	1.1	30	0.9	36	0.8	46	0.7	55	
210																					1.5	18	1.2	25	1.1	32	0.9	38	0.8	48	0.7	58	
220																					1.5	19	1.2	27	1.1	34	0.9	40	0.8	51	0.7	60	
230																					1.5	20	1.2	28	1.1	36	0.9	42	0.8	53	0.7	63	
240																					1.5	21	1.2	30	1.1	37	0.9	44	0.8	56	0.7	66	
250																2.1	10				1.5	23	1.2	31	1	39	0.9	46	0.8	58	0.7	69	
260																2.1	11				1.5	24	1.2	33	1	41	0.9	48	0.8	61	0.7	72	
270																2.1	12				1.5	25	1.2	34	1	43	0.9	50	0.8	63	0.7	75	
280																2.1	13				1.5	26	1.2	36	1	44	0.9	52	0.8	65	0.7	78	
290																2	14				1.5	27	1.2	37	1	46	0.9	54	0.8	68	0.7	80	
300																2.3	10				1.5	29	1.2	39	1	48	0.9	56	0.8	70	0.7	83	
310																2.3	11				1.5	30	1.2	40	1	49	0.9	58	0.8	73	0.7	86	
320																2.3	12				1.5	31	1.2	42	1	51	0.9	60	0.8	75	0.7	89	
330																2.3	13				1.5	32	1.2	43	1	53	0.9	62	0.8	78	0.7	92	
340																2.3	14				1.5	33	1.2	45	1	55	0.9	64	0.8	80	0.7	95	
350																2.2	15				1.5	35	1.2	46	1	56	0.9	66	0.8	83	0.7	98	
360																2.6	10				1.5	36	1.2	48	1	58	0.9	68	0.8	85	0.7	100	
370																2.6	10				1.4	37	1.2	49	1	60	0.9	70	0.8	87			
380																2.6	11				1.4	38	1.2	50	1	61	0.9	72	0.8	90			
390																2.5	12				1.4	39	1.2	52	1	63	0.9	74	0.8	92			
400																2.5	13				1.4	40	1.2	53	1	65	0.9	76	0.8	95			
410																2.5	14				1.4	41	1.2	55	1	67	0.9	77	0.8	97			
420																2.5	15				1.4	43	1.2	56	1	68	0.9	79	0.8	100			
430																2.5	15				1.4	44	1.2	58	1	70	0.9	81					
440																2.5	16				1.4	45	1.2	59	1	72	0.9	83					
450																2.5	17				1.4	46	1.2	61	1	73	0.9	85					
460																2.5	18				1.4	47	1.2	62	1	75	0.9	87					
470																2.9	10				1.4	48	1.2	64	1	77	0.9	89					
480																2.9	11				1.4	50	1.2	65	1	79	0.9	91					
490																2.9	12				1.4	51	1.2	66	1	80	0.9	93					
500																2.9	12				1.4	52	1.2	68	1	82	0.9	95					

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.07

B-D Design

Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%			
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)		
10																																
20																																
30																																
40																																
50																														0.8	10	
60																														0.8	12	
70																											1	10	0.8	14		
80																										1	11	0.8	16			
90																									1.2	10	1	13	0.8	18		
100																									1.2	11	0.9	15	0.8	20		
110																								1.3	10	0.9	17	0.8	22			
120																								1.3	11	1.1	14	0.9	18	0.8	24	
130																								1.3	12	1.1	15	0.9	20	0.8	26	
140																							1.5	10	1.3	14	1.1	17	0.9	22	0.8	28
150																							1.5	11	1.3	15	1.1	18	0.9	24	0.8	30
160																							1.5	12	1.3	16	1.1	19	0.9	25	0.8	32
170																							1.5	13	1.3	17	1.1	21	0.9	27	0.8	34
180																							1.5	14	1.3	18	1.1	22	0.9	29	0.8	36
190														1.9	10	1.5	15	1.2	20	1.1	23	0.9	30	0.8	38							
200														1.8	11	1.5	16	1.2	21	1.1	25	0.9	32	0.8	40							
210														1.8	12	1.5	17	1.2	22	1.1	26	0.9	34	0.8	42							
220														1.8	12	1.5	18	1.2	23	1.1	27	0.9	35	0.8	44							
230														1.8	13	1.4	19	1.2	24	1.1	29	0.9	37	0.8	46							
240														1.8	14	1.4	20	1.2	25	1.1	30	0.9	39	0.8	48							
250														1.8	15	1.4	21	1.2	27	1.1	32	0.9	41	0.8	50							
260														1.8	16	1.4	22	1.2	28	1.1	33	0.9	42	0.8	52							
270														1.8	16	1.4	23	1.2	29	1.1	34	0.9	44	0.8	54							
280														1.8	17	1.4	24	1.2	30	1.1	36	0.9	46	0.8	56							
290														1.8	18	1.4	25	1.2	31	1.1	37	0.9	47	0.8	58							
300												2.5	10	1.8	19	1.4	26	1.2	32	1.1	38	0.9	49	0.8	60							
310												2.5	10	1.8	20	1.4	27	1.2	34	1.1	40	0.9	51	0.8	62							
320												2.5	11	1.8	20	1.4	28	1.2	35	1.1	41	0.9	52	0.8	64							
330												2.5	11	1.8	21	1.4	29	1.2	36	1.1	42	0.9	54	0.8	66							
340												2.5	12	1.8	22	1.4	30	1.2	37	1.1	44	0.9	56	0.8	69							
350												2.5	13	1.8	23	1.4	31	1.2	38	1.1	45	0.9	58	0.8	70							
360												2.8	10	2.5	13	1.8	23	1.4	32	1.2	39	1.1	46	0.9	59	0.8	72					
370												2.8	10	2.5	14	1.8	24	1.4	33	1.2	41	1.1	48	0.9	61	0.8	74					
380												2.8	11	2.4	14	1.7	25	1.4	34	1.2	42	1.1	49	0.9	63	0.8	76					
390												2.8	11	2.4	15	1.7	26	1.4	35	1.2	43	1.1	51	0.9	64	0.8	78					
400												2.7	12	2.4	15	1.7	26	1.4	36	1.2	44	1.1	52	0.9	66	0.8	80					
410												2.7	12	2.4	16	1.7	27	1.4	37	1.2	45	1.1	53	0.9	68	0.8	82					
420												2.7	13	2.4	16	1.7	28	1.4	38	1.2	46	1.1	55	0.9	69	0.8	84					
430												2.7	13	2.4	17	1.7	29	1.4	39	1.2	48	1.1	56	0.9	71	0.8	86					
440												3.1	10	2.7	14	2.4	18	1.7	30	1.4	40	1.2	49	1.1	57	0.9	73	0.8	89			
450												3.1	10	2.7	14	2.4	18	1.7	30	1.4	41	1.2	50	1.1	59	0.9	74	0.8	91			
460												3.1	11	2.7	15	2.4	19	1.7	31	1.4	42	1.2	51	1.1	60	0.9	76	0.8	93			
470												3.1	11	2.7	15	2.4	19	1.7	32	1.4	43	1.2	52	1.1	61	0.9	78	0.8	95			
480												3.1	12	2.7	16	2.4	20	1.7	33	1.4	44	1.2	53	1.1	63	0.9	79	0.8	97			
490												3.1	12	2.7	16	2.4	20	1.7	33	1.4	45	1.2	55	1.1	64	0.9	81	0.8	99			
500												3.1	13	2.7	17	2.4	21	1.7	34	1.4	45	1.2	56	1.1	65	0.9	83					

Input Parameters:
Channel Type = Trapezoidal
Cover factor = 0.9
Allowable Soil Stress = 0.07
B-D Design
Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%							
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)						
10																																				
20																																				
30																																				
40																																				
50																															0.8	10				
60																															0.8	12				
70																															0.8	14				
80																												1	11			0.8	16			
90																											1	12	0.8			0.8	18			
100																										1.2	10	1	14	0.8			0.8	20		
110																									1.2	11	1	16	0.8				0.8	22		
120																									1.2	13	0.9	18	0.8				0.8	24		
130																								1.3	11	1.1	14	0.9	19	0.8			0.8	26		
140																								1.3	12	1.1	15	0.9	21	0.8			0.8	28		
150																								1.3	13	1.1	17	0.9	23	0.8			0.8	30		
160																	1.5	10	1.3	15	1.1	18	0.9	25	0.8					0.9	25	0.8	32			
170																1.5	11	1.3	16	1.1	20	0.9	26	0.8						0.9	26	0.8	34			
180																1.5	12	1.3	17	1.1	21	0.9	28	0.8						0.9	28	0.8	36			
190																1.5	14	1.3	18	1.1	23	0.9	30	0.8						0.9	30	0.8	38			
200																1.5	15	1.3	20	1.1	24	0.9	31	0.8						0.9	31	0.8	40			
210																1.5	16	1.3	21	1.1	25	0.9	33	0.8						0.9	33	0.8	42			
220																1.9	10	1.5	17	1.2	22	1.1	27	0.9	35	0.8					0.9	35	0.8	44		
230																1.9	11	1.5	18	1.2	23	1.1	28	0.9	37	0.8					0.9	37	0.8	46		
240																1.9	12	1.5	19	1.2	24	1.1	29	0.9	38	0.8					0.9	38	0.8	48		
250																1.8	13	1.5	20	1.2	26	1.1	31	0.9	40	0.8					0.9	40	0.8	50		
260																1.8	14	1.4	21	1.2	27	1.1	32	0.9	42	0.8					0.9	42	0.8	52		
270																1.8	14	1.4	22	1.2	28	1.1	33	0.9	43	0.8					0.9	43	0.8	54		
280																1.8	15	1.4	23	1.2	29	1.1	35	0.9	45	0.8					0.9	45	0.8	56		
290																1.8	16	1.4	24	1.2	30	1.1	36	0.9	47	0.8					0.9	47	0.8	58		
300																1.8	17	1.4	25	1.2	32	1.1	38	0.9	48	0.8					0.9	48	0.8	60		
310																1.8	18	1.4	26	1.2	33	1.1	39	0.9	50	0.8					0.9	50	0.8	62		
320																1.8	19	1.4	27	1.2	34	1.1	40	0.9	52	0.8					0.9	52	0.8	64		
330																1.8	19	1.4	28	1.2	35	1.1	42	0.9	54	0.8					0.9	54	0.8	66		
340																1.8	20	1.4	29	1.2	36	1.1	43	0.9	55	0.8					0.9	55	0.8	68		
350																1.8	21	1.4	30	1.2	37	1.1	44	0.9	57	0.8					0.9	57	0.8	70		
360																2.5	10	1.8	22	1.4	31	1.2	39	1.1	46	0.9	59	0.8			0.9	59	0.8	72		
370																2.5	10	1.8	23	1.4	32	1.2	40	1.1	47	0.9	60	0.8			0.9	60	0.8	74		
380																2.5	11	1.8	23	1.4	33	1.2	41	1.1	48	0.9	62	0.8			0.9	62	0.8	76		
390																2.5	12	1.8	24	1.4	34	1.2	42	1.1	50	0.9	64	0.8			0.9	64	0.8	78		
400																2.5	12	1.8	25	1.4	35	1.2	43	1.1	51	0.9	65	0.8			0.9	65	0.8	80		
410																2.5	13	1.8	26	1.4	36	1.2	44	1.1	53	0.9	67	0.8			0.9	67	0.8	82		
420																2.5	13	1.7	26	1.4	37	1.2	46	1.1	54	0.9	69	0.8			0.9	69	0.8	84		
430																2.8	10	2.5	14	1.7	27	1.4	38	1.2	47	1.1	55	0.9	71	0.8			0.9	71	0.8	86
440																2.8	10	2.5	15	1.7	28	1.4	39	1.2	48	1.1	57	0.9	72	0.8			0.9	72	0.8	88
450																2.8	11	2.4	15	1.7	29	1.4	40	1.2	49	1.1	58	0.9	74	0.8			0.9	74	0.8	90
460																2.8	11	2.4	16	1.7	30	1.4	41	1.2	50	1.1	59	0.9	76	0.8			0.9	76	0.8	92
470																2.8	12	2.4	16	1.7	30	1.4	42	1.2	52	1.1	61	0.9	77	0.8			0.9	77	0.8	94
480																2.8	12	2.4	17	1.7	31	1.4	43	1.2	53	1.1	62	0.9	79	0.8			0.9	79	0.8	96
490																2.7	13	2.4	18	1.7	32	1.4	44	1.2	54	1.1	63	0.9	81	0.8			0.9	81	0.8	98
500																2.7	13	2.4	18	1.7	33	1.4	44	1.2	55	1.1	65	0.9	82	0.8			0.9	82	0.8	100

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.07

B-D Design

Side Slope = 8

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%									
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)								
10																																						
20																																						
30																																						
40																																						
50																																						
60																															0.8	11						
70																														0.8	13							
80																											1	10	0.8	15								
90																										1	12	0.8	17									
100																										1	13	0.8	19									
110																										1	15	0.8	21									
120																									1.2	11	1	17	0.8	23								
130																									1.2	13	1	18	0.8	25								
140																									1.3	10	1.2	14	0.9	20	0.8	27						
150																									1.3	12	1.2	16	0.9	22	0.8	29						
160																									1.3	13	1.1	17	0.9	24	0.8	31						
170																									1.3	14	1.1	19	0.9	25	0.8	33						
180																									1.6	10	1.3	16	1.1	20	0.9	27	0.8	35				
190																									1.5	11	1.3	17	1.1	21	0.9	29	0.8	37				
200																									1.5	13	1.3	18	1.1	23	0.9	31	0.8	39				
210																									1.5	14	1.3	19	1.1	24	0.9	32	0.8	41				
220																									1.5	15	1.3	21	1.1	26	0.9	34	0.8	44				
230																									1.5	16	1.3	22	1.1	27	0.9	36	0.8	46				
240																									1.5	17	1.3	23	1.1	28	0.9	38	0.8	47				
250																									1.9	10	1.5	18	1.2	24	1.1	30	0.9	39	0.8	49		
260																									1.9	11	1.5	19	1.2	26	1.1	31	0.9	41	0.8	52		
270																									1.9	12	1.5	20	1.2	27	1.1	33	0.9	43	0.8	54		
280																									1.9	13	1.5	21	1.2	28	1.1	34	0.9	44	0.8	56		
290																									1.9	14	1.5	22	1.2	29	1.1	35	0.9	46	0.8	58		
300																									1.8	14	1.4	23	1.2	30	1.1	37	0.9	48	0.8	60		
310																									1.8	15	1.4	24	1.2	32	1.1	38	0.9	50	0.8	62		
320																									1.8	16	1.4	25	1.2	33	1.1	39	0.9	51	0.8	64		
330																									1.8	17	1.4	26	1.2	34	1.1	41	0.9	53	0.8	65		
340																									1.8	18	1.4	27	1.2	35	1.1	42	0.9	55	0.8	67		
350																									1.8	19	1.4	28	1.2	36	1.1	44	0.9	56	0.8	70		
360																									1.8	20	1.4	29	1.2	38	1.1	45	0.9	58	0.8	72		
370																									1.8	21	1.4	31	1.2	39	1.1	46	0.9	60	0.8	74		
380																									1.8	21	1.4	32	1.2	40	1.1	48	0.9	61	0.8	76		
390																									1.8	22	1.4	32	1.2	41	1.1	49	0.9	63	0.8	78		
400																									1.8	23	1.4	34	1.2	42	1.1	50	0.9	65	0.8	80		
410																									1.8	24	1.4	34	1.2	44	1.1	52	0.9	67	0.8	82		
420																									1.8	25	1.4	36	1.2	45	1.1	53	0.9	68	0.8	84		
430																									2.5	10	1.8	25	1.4	36	1.2	46	1.1	55	0.9	70	0.8	86
440																									2.5	11	1.8	26	1.4	37	1.2	47	1.1	56	0.9	72	0.8	88
450																									2.5	11	1.8	27	1.4	38	1.2	48	1.1	57	0.9	73	0.8	90
460																									2.5	12	1.8	28	1.4	39	1.2	50	1.1	59	0.9	75	0.8	92
470																									2.5	13	1.8	29	1.4	40	1.2	51	1.1	60	0.9	77	0.8	94
480																									2.5	13	1.7	29	1.4	41	1.2	52	1.1	61	0.9	78	0.8	96
490																									2.5	14	1.7	30	1.4	42	1.2	53	1.1	63	0.9	80	0.8	98
500																									2.5	15	1.7	31	1.4	43	1.2	54	1.1	64	0.9	82	0.8	100

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.02

C-D Design

Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	
10									0.9	11	0.8	13	0.7	15	0.6	17	0.6	19	0.5	11											
20									0.8	18	0.7	21	0.7	24	0.6	27	0.6	29													
30							1	14	0.8	25	0.7	29	0.7	33	0.6	36	0.6	39													
40					1.3	13	1	20	0.8	31	0.7	37	0.7	41	0.6	46	0.6	50													
50					1.2	18	1	25	0.8	38	0.7	44	0.7	50	0.6	55	0.6	60													
60					1.2	22	1	31	0.8	45	0.7	52	0.7	59	0.6	65	0.6	70													
70			2	13	1.2	27	0.9	37	0.8	52	0.7	60	0.7	67	0.6	74	0.6	81													
80			1.9	16	1.2	31	0.9	42	0.8	52	0.7	60	0.7	67	0.6	74	0.6	81													
90			1.9	19	1.2	36	0.9	48	0.8	59	0.7	68	0.7	76	0.6	84	0.6	91													
100			1.8	21	1.2	40	0.9	54	0.8	65	0.7	76	0.7	85	0.6	93															
110			1.8	24	1.2	45	0.9	60	0.8	72	0.7	83	0.7	93																	
120			1.8	27	1.2	49	0.9	65	0.8	79	0.7	91																			
130			1.8	30	1.2	53	0.9	71	0.8	86	0.7	99																			
140			1.8	33	1.2	58	0.9	77	0.8	93																					
150			1.8	35	1.2	62	0.9	82	0.8	99																					
160			1.8	38	1.2	66	0.9	88																							
170	3.6	11	1.8	41	1.2	71	0.9	93																							
180	3.6	13	1.7	44	1.2	75	0.9	99																							
190	3.5	15	1.7	46	1.1	79																									
200	3.5	16	1.7	49	1.1	84																									
210	3.4	18	1.7	52	1.1	88																									
220	3.4	19	1.7	55	1.1	92																									
230	3.4	21	1.7	57	1.1	97																									
240	3.3	22	1.7	60																											
250	3.3	24	1.7	63																											
260	3.3	25	1.7	65																											
270	3.3	27	1.7	68																											
280	3.3	28	1.7	71																											
290	3.3	30	1.7	74																											
300	3.2	31	1.7	76																											
310	3.2	33	1.7	79																											
320	3.2	34	1.7	82																											
330	3.2	35	1.7	84																											
340	3.2	37	1.7	87																											
350	3.2	38	1.7	90																											
360	3.2	40	1.7	93																											
370	3.2	41	1.7	95																											
380	3.2	43	1.7	98																											
390	3.1	44																													
400	3.1	45																													
410	3.1	47																													
420	3.1	48																													
430	3.1	50																													
440	3.1	51																													
450	3.1	52																													
460	3.1	54																													
470	3.1	55																													
480	3.1	56																													
490	3.1	58																													
500	3.1	59																													

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.02

C-D Design

Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%			
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)		
10																				0.5	11											
20											0.8	12	0.7	14	0.6	16	0.6	18														
30								1.1	12	0.9	17	0.8	20	0.7	23	0.6	26	0.6	29													
40					1.3	11	1	18	0.8	24	0.7	28	0.7	32	0.6	36	0.6	39														
50					1.3	16	1	24	0.8	30	0.7	36	0.7	41	0.6	45	0.6	49														
60					1.2	21	1	30	0.8	37	0.7	44	0.7	49	0.6	55	0.6	60														
70					1.2	25	1	36	0.8	44	0.7	52	0.7	58	0.6	64	0.6	70														
80			2	12	1.2	30	0.9	41	0.8	51	0.7	59	0.7	67	0.6	74	0.6	80														
90			2	15	1.2	34	0.9	47	0.8	58	0.7	67	0.7	76	0.6	83	0.6	90														
100			1.9	18	1.2	39	0.9	53	0.8	65	0.7	75	0.7	84	0.6	93																
110			1.9	22	1.2	43	0.9	59	0.8	71	0.7	83	0.7	93																		
120			1.8	24	1.2	48	0.9	64	0.8	78	0.7	90																				
130			1.8	27	1.2	52	0.9	70	0.8	85	0.7	98																				
140			1.8	30	1.2	56	0.9	76	0.8	92																						
150			1.8	33	1.2	61	0.9	81	0.8	99																						
160			1.8	36	1.2	65	0.9	87																								
170			1.8	39	1.2	69	0.9	93																								
180			1.8	42	1.2	74	0.9	98																								
190			1.8	44	1.2	78																										
200			1.8	47	1.2	83																										
210	3.7	10	1.7	50	1.2	87																										
220	3.7	12	1.7	53	1.1	91																										
230	3.6	14	1.7	55	1.1	96																										
240	3.6	16	1.7	58	1.1	100																										
250	3.5	17	1.7	61																												
260	3.5	19	1.7	64																												
270	3.4	21	1.7	66																												
280	3.4	23	1.7	69																												
290	3.4	24	1.7	72																												
300	3.4	26	1.7	75																												
310	3.3	27	1.7	77																												
320	3.3	29	1.7	80																												
330	3.3	31	1.7	83																												
340	3.3	32	1.7	85																												
350	3.3	34	1.7	88																												
360	3.2	35	1.7	91																												
370	3.2	37	1.7	94																												
380	3.2	38	1.7	96																												
390	3.2	40	1.7	99																												
400	3.2	41																														
410	3.2	43																														
420	3.2	44																														
430	3.2	45																														
440	3.2	47																														
450	3.2	48																														
460	3.1	50																														
470	3.1	51																														
480	3.1	53																														
490	3.1	54																														
500	3.1	55																														

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.02

C-D Design

Side Slope = 8

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
10											0.8	11	0.7	13	0.7	15	0.6	17	0.5	10										
20											1	17	0.8	22	0.7	27	0.6	28												
30							1.1	10	0.9	15	0.8	19	0.7	22	0.6	25	0.6	28												
40							1	17	0.8	22	0.7	27	0.7	31	0.6	35	0.6	38												
50					1.3	14	1	23	0.8	30	0.7	35	0.7	40	0.6	45	0.6	49												
60					1.3	19	1	29	0.8	36	0.7	43	0.7	49	0.6	54	0.6	59												
70					1.3	24	1	35	0.8	43	0.7	51	0.7	58	0.6	64	0.6	69												
80					1.2	28	1	40	0.8	50	0.7	59	0.7	66	0.6	73	0.6	80												
90			2.1	10	1.2	33	0.9	46	0.8	57	0.7	66	0.7	75	0.6	83	0.6	90												
100			2	14	1.2	37	0.9	52	0.8	64	0.7	74	0.7	84	0.6	92	0.6	100												
110			2	18	1.2	42	0.9	58	0.8	71	0.7	82	0.7	92																
120			1.9	21	1.2	46	0.9	63	0.8	77	0.7	90																		
130			1.9	24	1.2	51	0.9	69	0.8	84	0.7	98																		
140			1.9	27	1.2	55	0.9	75	0.8	91																				
150			1.8	30	1.2	60	0.9	80	0.8	98																				
160			1.8	33	1.2	64	0.9	86																						
170			1.8	36	1.2	68	0.9	92																						
180			1.8	39	1.2	73	0.9	97																						
190			1.8	42	1.2	77																								
200			1.8	45	1.2	81																								
210			1.8	48	1.2	86																								
220			1.8	51	1.2	90																								
230			1.8	53	1.2	95																								
240			1.7	56	1.2	99																								
250			1.7	59																										
260	3.8	10	1.7	62																										
270	3.7	12	1.7	64																										
280	3.7	14	1.7	67																										
290	3.6	16	1.7	70																										
300	3.6	18	1.7	73																										
310	3.5	20	1.7	75																										
320	3.5	22	1.7	78																										
330	3.4	24	1.7	81																										
340	3.4	26	1.7	84																										
350	3.4	28	1.7	86																										
360	3.4	29	1.7	89																										
370	3.3	31	1.7	92																										
380	3.3	33	1.7	95																										
390	3.3	34	1.7	97																										
400	3.3	36	1.7	100																										
410	3.3	37																												
420	3.3	39																												
430	3.2	41																												
440	3.2	42																												
450	3.2	44																												
460	3.2	45																												
470	3.2	47																												
480	3.2	48																												
490	3.2	50																												
500	3.2	51																												

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.03

C-D Design

Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
10																														
20													0.8	10	0.7	11	0.7	12	0.5	17										
30									1	11	0.9	14	0.8	16	0.7	18	0.7	20	0.5	26										
40							1.2	12	1	16	0.8	19	0.8	22	0.7	25	0.6	27	0.5	36										
50				1.6	10	1.2	16	1	21	0.8	25	0.8	28	0.7	31	0.6	34	0.5	45											
60				1.5	13	1.1	20	0.9	25	0.8	30	0.7	34	0.7	38	0.6	42	0.5	54											
70				1.5	16	1.1	24	0.9	30	0.8	36	0.7	40	0.7	45	0.6	49	0.5	64											
80				1.4	19	1.1	28	0.9	35	0.8	41	0.7	46	0.7	52	0.6	56	0.5	73											
90				1.4	22	1.1	32	0.9	40	0.8	46	0.7	53	0.7	58	0.6	64	0.5	82											
100		2.4	10	1.4	25	1.1	36	0.9	44	0.8	52	0.7	59	0.7	65	0.6	71	0.5	91											
110		2.4	12	1.4	28	1.1	39	0.9	49	0.8	57	0.7	65	0.7	72	0.6	78													
120		2.3	14	1.4	31	1.1	43	0.9	54	0.8	63	0.7	71	0.7	78	0.6	85													
130		2.3	16	1.4	34	1.1	47	0.9	58	0.8	68	0.7	77	0.7	85	0.6	93													
140		2.2	18	1.4	37	1.1	51	0.9	63	0.8	74	0.7	83	0.7	92	0.6	100													
150		2.2	20	1.4	40	1.1	55	0.9	68	0.8	79	0.7	89	0.7	98															
160		2.2	22	1.4	43	1.1	59	0.9	72	0.8	84	0.7	95																	
170		2.2	24	1.4	46	1.1	63	0.9	77	0.8	90																			
180		2.2	25	1.4	49	1.1	67	0.9	82	0.8	95																			
190		2.2	27	1.4	52	1.1	71	0.9	86																					
200		2.1	29	1.3	55	1.1	74	0.9	91																					
210		2.1	31	1.3	58	1.1	78	0.9	96																					
220		2.1	33	1.3	61	1.1	82																							
230		2.1	34	1.3	64	1.1	86																							
240		2.1	36	1.3	67	1.1	90																							
250		2.1	38	1.3	69	1.1	94																							
260		2.1	40	1.3	72	1.1	98																							
270		2.1	42	1.3	75																									
280		2.1	44	1.3	78																									
290	4.5	10	2.1	45	1.3	81																								
300	4.5	11	2.1	47	1.3	84																								
310	4.5	12	2.1	49	1.3	87																								
320	4.4	13	2.1	51	1.3	90																								
330	4.4	14	2.1	52	1.3	93																								
340	4.4	15	2.1	54	1.3	96																								
350	4.3	16	2.1	56	1.3	99																								
360	4.3	17	2.1	58																										
370	4.3	18	2.1	60																										
380	4.3	19	2.1	61																										
390	4.2	20	2.1	63																										
400	4.2	21	2.1	65																										
410	4.2	22	2.1	67																										
420	4.2	23	2	68																										
430	4.2	24	2	70																										
440	4.2	25	2	72																										
450	4.1	26	2	74																										
460	4.1	27	2	75																										
470	4.1	27	2	77																										
480	4.1	28	2	79																										
490	4.1	29	2	81																										
500	4.1	30	2	83																										

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.03

C-D Design

Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
10														0.8	10	0.7	11	0.5	16											
20														0.7	17	0.7	19	0.5	26											
30												0.9	12	0.8	15	0.8	21	0.7	24	0.7	26	0.5	35							
40							1.2	10	1	14	0.9	18	0.8	21	0.7	24	0.7	26	0.5	35										
50							1.2	14	1	19	0.8	24	0.8	27	0.7	31	0.6	34	0.5	44										
60					1.6	10	1.2	18	1	24	0.8	29	0.8	34	0.7	37	0.6	41	0.5	54										
70					1.5	14	1.1	22	0.9	29	0.8	35	0.7	40	0.7	44	0.6	48	0.5	63										
80					1.5	17	1.1	26	0.9	34	0.8	40	0.7	46	0.7	51	0.6	56	0.5	72										
90					1.5	20	1.1	30	0.9	39	0.8	46	0.7	52	0.7	58	0.6	63	0.5	82										
100					1.4	23	1.1	34	0.9	43	0.8	51	0.7	58	0.7	64	0.6	70	0.5	91										
110					1.4	26	1.1	38	0.9	48	0.8	56	0.7	64	0.7	71	0.6	78	0.5	100										
120					1.4	29	1.1	42	0.9	53	0.8	62	0.7	70	0.7	78	0.6	85												
130		2.4	11	1.4	32	1.1	46	0.9	57	0.8	67	0.7	76	0.7	84	0.6	92													
140		2.4	14	1.4	36	1.1	50	0.9	62	0.8	73	0.7	82	0.7	91	0.6	99													
150		2.3	16	1.4	38	1.1	54	0.9	67	0.8	78	0.7	88	0.7	98															
160		2.3	18	1.4	41	1.1	58	0.9	72	0.8	84	0.7	94																	
170		2.3	20	1.4	44	1.1	62	0.9	76	0.8	89	0.7	100																	
180		2.2	22	1.4	48	1.1	66	0.9	81	0.8	94																			
190		2.2	24	1.4	50	1.1	70	0.9	86	0.8	100																			
200		2.2	26	1.4	53	1.1	73	0.9	90																					
210		2.2	28	1.4	56	1.1	77	0.9	95																					
220		2.2	30	1.4	59	1.1	81	0.9	100																					
230		2.2	32	1.3	62	1.1	85																							
240		2.1	34	1.3	65	1.1	89																							
250		2.1	35	1.3	68	1.1	93																							
260		2.1	37	1.3	71	1.1	97																							
270		2.1	39	1.3	74																									
280		2.1	41	1.3	77																									
290		2.1	43	1.3	80																									
300		2.1	45	1.3	83																									
310		2.1	47	1.3	86																									
320		2.1	48	1.3	89																									
330		2.1	50	1.3	92																									
340		2.1	52	1.3	95																									
350		2.1	54	1.3	98																									
360		2.1	56	1.3	100																									
370		2.1	57																											
380	4.6	10	2.1	59																										
390	4.6	11	2.1	61																										
400	4.5	12	2.1	63																										
410	4.5	13	2.1	64																										
420	4.5	14	2.1	66																										
430	4.4	15	2.1	68																										
440	4.4	17	2.1	70																										
450	4.4	18	2.1	72																										
460	4.3	19	2.1	73																										
470	4.3	20	2	75																										
480	4.3	21	2	77																										
490	4.3	22	2	79																										
500	4.3	23	2	80																										

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.03

C-D Design

Side Slope = 8

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
10																														
20																			0.7	10	0.6	16								
30											0.9	11	0.8	14	0.7	16	0.7	18	0.5	25										
40									1	13	0.9	17	0.8	20	0.7	23	0.7	26	0.5	35										
50							1.2	12	1	18	0.9	23	0.8	26	0.7	30	0.7	33	0.5	44										
60						1.2	16	1	23	0.8	28	0.8	33	0.7	37	0.6	40	0.5	53											
70				1.6	10	1.2	21	1	28	0.8	34	0.7	39	0.7	43	0.6	48	0.5	63											
80				1.5	14	1.1	25	0.9	33	0.8	39	0.7	45	0.7	50	0.6	55	0.5	72											
90				1.5	18	1.1	29	0.9	37	0.8	45	0.7	51	0.7	57	0.6	62	0.5	81											
100				1.5	21	1.1	33	0.9	42	0.8	50	0.7	57	0.7	64	0.6	70	0.5	90											
110				1.4	24	1.1	37	0.9	47	0.8	56	0.7	63	0.7	70	0.6	77	0.5	100											
120				1.4	27	1.1	41	0.9	52	0.8	61	0.7	69	0.7	77	0.6	84													
130				1.4	31	1.1	45	0.9	56	0.8	66	0.7	76	0.7	84	0.6	92													
140				1.4	34	1.1	49	0.9	61	0.8	72	0.7	82	0.7	90	0.6	99													
150		2.5	10	1.4	37	1.1	53	0.9	66	0.8	77	0.7	88	0.7	97															
160		2.4	13	1.4	40	1.1	57	0.9	71	0.8	83	0.7	94																	
170		2.4	15	1.4	43	1.1	61	0.9	75	0.8	88	0.7	100																	
180		2.3	18	1.4	46	1.1	65	0.9	80	0.8	94																			
190		2.3	20	1.4	49	1.1	68	0.9	85	0.8	99																			
200		2.3	22	1.4	52	1.1	72	0.9	89																					
210		2.3	24	1.4	55	1.1	76	0.9	94																					
220		2.2	26	1.4	58	1.1	80	0.9	99																					
230		2.2	28	1.4	61	1.1	84																							
240		2.2	30	1.4	64	1.1	88																							
250		2.2	32	1.4	67	1.1	92																							
260		2.2	34	1.3	70	1.1	96																							
270		2.2	36	1.3	73	1.1	100																							
280		2.1	38	1.3	76																									
290		2.1	40	1.3	79																									
300		2.1	42	1.3	82																									
310		2.1	44	1.3	85																									
320		2.1	46	1.3	87																									
330		2.1	47	1.3	90																									
340		2.1	49	1.3	93																									
350		2.1	51	1.3	96																									
360		2.1	53	1.3	99																									
370		2.1	55																											
380		2.1	57																											
390		2.1	59																											
400		2.1	60																											
410		2.1	62																											
420		2.1	64																											
430		2.1	66																											
440		2.1	68																											
450		2.1	69																											
460		2.1	71																											
470		2.1	73																											
480	4.6	10	2.1	75																										
490	4.6	12	2.1	77																										
500	4.6	13	2.1	78																										

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.05

C-D Design

Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	
10																				0.7	10	0.5	13								
20																				0.6	16	0.6	20								
30																				0.6	22	0.6	27								
40																				0.8	16	0.8	22								
50																				0.8	18	0.8	21								
60																				0.8	20	0.8	23								
70																				0.8	23	0.8	25								
80																				0.8	25	0.8	27								
90																				0.8	27	0.8	30								
100																				0.8	30	0.6	40								
110																				0.8	34	0.6	46								
120																				0.8	34	0.6	46								
130																				0.8	35	0.6	52								
140																				0.8	39	0.6	52								
150																				0.8	40	0.6	58								
160																				0.7	44	0.6	58								
170																				0.7	48	0.6	64								
180																				0.7	48	0.6	64								
190																				0.6	52	0.5	62								
200																				0.6	58	0.5	70								
210																				0.6	64	0.5	77								
220																				0.6	64	0.5	77								
230																				0.6	70	0.5	84								
240																				0.6	76	0.5	91								
250																				0.5	98	0.5	98								
260																				0.7	62	0.6	81								
270																				0.6	87	0.6	87								
280																				0.7	71	0.6	93								
290																				0.6	99	0.6	99								
300																				0.7	85	0.7	85								
310																				0.7	89	0.7	89								
320																				0.7	94	0.7	94								
330																				0.7	98	0.7	98								
340																				0.8	86	0.8	86								
350																				0.8	90	0.8	90								
360																				0.8	94	0.8	94								
370																				0.8	98	0.8	98								
380																				0.9	88	0.9	88								
390																				0.9	92	0.9	92								
400																				0.9	96	0.9	96								
410																				0.9	100	0.9	100								
420																				0.9	87	0.9	87								
430																				0.9	91	0.9	91								
440																				0.9	94	0.9	94								
450																				0.9	96	0.9	96								
460																				0.9	97	0.9	97								
470																				0.9	99	0.9	99								
480																				0.9	99	0.9	99								
490																				0.9	99	0.9	99								
500																				0.9	99	0.9	99								

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.05

C-D Design

Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
10																														
20																							0.6	12						
30																							0.5	19						
40													1	11	0.9	13						0.8	15	0.6	21	0.5	26			
50											1.1	12	0.9	15	0.9	17	0.8	20	0.6	27	0.5	33								
60									1.2	11	1	16	0.9	19	0.8	22	0.8	24	0.6	33	0.5	41								
70									1.2	15	1	19	0.9	23	0.8	26	0.8	29	0.6	39	0.5	48								
80						1.5	12		1.2	18	1	23	0.9	27	0.8	30	0.8	34	0.6	45	0.5	55								
90						1.4	14		1.2	21	1	26	0.9	30	0.8	35	0.8	38	0.6	51	0.5	62								
100						1.4	17		1.2	24	1	29	0.9	34	0.8	39	0.8	43	0.6	57	0.5	69								
110						1.4	20		1.1	27	1	33	0.9	38	0.8	43	0.7	47	0.6	63	0.5	76								
120				1.9	11	1.4	22	1.1	30	1	36	0.9	42	0.8	47	0.7	52	0.6	69	0.5	83									
130				1.9	14	1.4	25	1.1	33	1	40	0.9	46	0.8	51	0.7	57	0.6	75	0.5	90									
140				1.9	16	1.4	27	1.1	36	1	43	0.9	50	0.8	56	0.7	61	0.6	81	0.5	97									
150				1.8	18	1.4	29	1.1	39	1	46	0.9	53	0.8	60	0.7	66	0.6	87											
160				1.8	20	1.3	32	1.1	41	1	50	0.9	57	0.8	64	0.7	70	0.6	93											
170				1.8	22	1.3	34	1.1	44	1	53	0.9	61	0.8	68	0.7	75	0.6	99											
180				1.8	23	1.3	37	1.1	47	1	56	0.9	65	0.8	72	0.7	80													
190				1.8	25	1.3	39	1.1	50	1	60	0.9	69	0.8	77	0.7	84													
200				1.8	27	1.3	41	1.1	53	1	63	0.9	72	0.8	81	0.7	89													
210				1.8	29	1.3	44	1.1	56	1	66	0.9	76	0.8	85	0.7	93													
220				1.7	31	1.3	46	1.1	59	1	70	0.9	80	0.8	89	0.7	98													
230				1.7	33	1.3	48	1.1	61	1	73	0.9	84	0.8	93															
240				1.7	34	1.3	51	1.1	64	1	76	0.9	87	0.8	98															
250				1.7	36	1.3	53	1.1	67	1	80	0.9	91																	
260		3.2	11	1.7	38	1.3	55	1.1	70	1	83	0.9	95																	
270		3.1	12	1.7	40	1.3	58	1.1	73	1	86	0.9	99																	
280		3.1	13	1.7	41	1.3	60	1.1	76	1	90																			
290		3.1	15	1.7	43	1.3	62	1.1	79	1	93																			
300		3	16	1.7	45	1.3	65	1.1	82	1	96																			
310		3	17	1.7	47	1.3	67	1.1	84	1	100																			
320		3	18	1.7	48	1.3	69	1.1	87																					
330		3	19	1.7	50	1.3	72	1.1	90																					
340		2.9	21	1.7	52	1.3	74	1.1	93																					
350		2.9	22	1.7	54	1.3	76	1.1	96																					
360		2.9	23	1.7	55	1.3	79	1.1	99																					
370		2.9	24	1.7	57	1.3	81																							
380		2.9	25	1.7	59	1.3	83																							
390		2.9	26	1.7	61	1.3	86																							
400		2.9	27	1.7	62	1.3	88																							
410		2.8	29	1.7	64	1.3	90																							
420		2.8	30	1.7	66	1.3	93																							
430		2.8	31	1.7	67	1.3	95																							
440		2.8	32	1.7	69	1.3	97																							
450		2.8	33	1.7	71	1.3	100																							
460		2.8	34	1.7	73																									
470		2.8	35	1.7	74																									
480		2.8	36	1.7	76																									
490		2.8	37	1.7	78																									
500		2.8	38	1.7	80																									

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.05

C-D Design

Side Slope = 8

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
10																														
20																							0.6	11						
30																						0.6	14							
40															0.9	11	0.8	14				0.6	20							
50											1.1	10	1	13	0.9	16	0.8	19	0.6	27		0.5	33							
60											1.1	14	0.9	17	0.9	21	0.8	23	0.6	33	0.5	40								
70										1.3	12	1.1	18	0.9	22	0.8	25	0.8	28	0.6	39	0.5	47							
80										1.2	16	1	21	0.9	26	0.8	29	0.8	33	0.6	45	0.5	54							
90										1.5	12	1.2	19	1	25	0.9	29	0.8	34	0.8	37	0.6	51	0.5	61					
100										1.5	14	1.2	22	1	28	0.9	33	0.8	38	0.8	42	0.6	56	0.5	69					
110										1.4	17	1.2	25	1	32	0.9	37	0.8	42	0.8	47	0.6	63	0.5	76					
120										1.4	20	1.1	28	1	35	0.9	41	0.8	46	0.8	51	0.6	68	0.5	83					
130										1.4	23	1.1	31	1	39	0.9	45	0.8	51	0.7	56	0.6	74	0.5	90					
140						2	12			1.4	25	1.1	34	1	42	0.9	49	0.8	55	0.7	60	0.6	80	0.5	97					
150						1.9	14			1.4	28	1.1	37	1	45	0.9	52	0.8	59	0.7	65	0.6	86							
160						1.9	16			1.4	30	1.1	40	1	49	0.9	56	0.8	63	0.7	70	0.6	92							
170						1.9	18			1.4	32	1.1	43	1	52	0.9	60	0.8	67	0.7	74	0.6	98							
180						1.8	20			1.3	35	1.1	46	1	55	0.9	64	0.8	72	0.7	79									
190						1.8	22			1.3	37	1.1	49	1	59	0.9	68	0.8	76	0.7	83									
200						1.8	24			1.3	40	1.1	52	1	62	0.9	71	0.8	80	0.7	88									
210						1.8	26			1.3	42	1.1	55	1	66	0.9	75	0.8	84	0.7	93									
220						1.8	28			1.3	45	1.1	57	1	69	0.9	79	0.8	88	0.7	97									
230						1.8	30			1.3	47	1.1	60	1	72	0.9	83	0.8	93											
240						1.8	32			1.3	49	1.1	63	1	76	0.9	87	0.8	97											
250						1.8	34			1.3	52	1.1	66	1	79	0.9	90													
260						1.7	36			1.3	54	1.1	69	1	82	0.9	94													
270						1.7	37			1.3	56	1.1	72	1	86	0.9	98													
280						1.7	39			1.3	59	1.1	75	1	89															
290						1.7	41			1.3	61	1.1	78	1	92															
300						1.7	43			1.3	63	1.1	81	1	96															
310						3.2	10			1.7	45	1.3	83	1	99															
320						3.2	11			1.7	46	1.3	86																	
330						3.2	13			1.7	48	1.3	90																	
340						3.1	14			1.7	50	1.3	92																	
350						3.1	16			1.7	52	1.3	95																	
360						3.1	17			1.7	53	1.3	98																	
370						3	18			1.7	55	1.3	80																	
380						3	20			1.7	57	1.3	82																	
390						3	21			1.7	59	1.3	85																	
400						3	22			1.7	61	1.3	87																	
410						2.9	23			1.7	62	1.3	89																	
420						2.9	25			1.7	64	1.3	92																	
430						2.9	26			1.7	66	1.3	94																	
440						2.9	27			1.7	67	1.3	96																	
450						2.9	28			1.7	69	1.3	98																	
460						2.9	29			1.7	71																			
470						2.9	31			1.7	73																			
480						2.9	32			1.7	74																			
490						2.8	33			1.7	76																			
500						2.8	34			1.7	78																			

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.07

C-D Design

Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	
10																															
20																															
30																															
40																															
50													1.1	10	1	12	0.9	10	0.7	11	0.6	14	0.5	17	0.5	17	0.5	23	0.5	29	
60												1.1	13	1	15	0.9	17	0.7	24	0.6	30	0.5	35	0.5	35	0.5	41	0.5	47		
70								1.4	10	1.2	13	1.1	16	0.9	18	0.9	21	0.7	29	0.6	35	0.5	41	0.5	47	0.5	53	0.5	59		
80								1.4	12	1.2	15	1	19	0.9	21	0.9	24	0.7	33	0.6	40	0.5	47	0.5	53	0.5	59	0.5	65		
90								1.4	14	1.2	18	1	21	0.9	24	0.9	27	0.7	37	0.6	46	0.5	53	0.5	59	0.5	65	0.5	71		
100						1.7	11	1.4	16	1.2	20	1	24	0.9	28	0.9	31	0.7	42	0.6	51	0.5	59	0.5	65	0.5	71	0.5	77		
110						1.7	13	1.3	18	1.1	23	1	27	0.9	31	0.9	34	0.7	46	0.6	56	0.5	65	0.5	71	0.5	77	0.5	83		
120						1.7	14	1.3	20	1.1	25	1	30	0.9	34	0.8	37	0.7	50	0.6	61	0.5	71	0.5	77	0.5	83	0.5	89		
130						1.6	16	1.3	22	1.1	28	1	32	0.9	37	0.8	41	0.7	55	0.6	67	0.5	77	0.5	83	0.5	89	0.5	95		
140						1.6	18	1.3	24	1.1	30	1	35	0.9	40	0.8	44	0.7	59	0.6	72	0.5	83	0.5	89	0.5	95	0.5	101		
150			2.3	10	1.6	20	1.3	27	1.1	32	1	38	0.9	43	0.8	47	0.7	63	0.6	77	0.5	89	0.5	95	0.5	101	0.5	107	0.5	113	
160			2.2	12	1.6	21	1.3	29	1.1	35	1	40	0.9	46	0.8	51	0.7	68	0.6	82	0.5	95	0.5	101	0.5	107	0.5	113	0.5	119	
170			2.2	13	1.6	23	1.3	31	1.1	37	1	43	0.9	49	0.8	54	0.7	72	0.6	88	0.5	101	0.5	107	0.5	113	0.5	119	0.5	125	
180			2.2	14	1.6	25	1.3	33	1.1	40	1	46	0.9	52	0.8	57	0.7	77	0.6	93	0.5	107	0.5	113	0.5	119	0.5	125	0.5	131	
190			2.2	16	1.6	26	1.3	35	1.1	42	1	49	0.9	55	0.8	61	0.7	81	0.6	98	0.5	113	0.5	119	0.5	125	0.5	131	0.5	137	
200			2.2	17	1.6	28	1.3	37	1.1	44	1	51	0.9	58	0.8	64	0.7	85	0.6	101	0.5	119	0.5	125	0.5	131	0.5	137	0.5	143	
210			2.1	18	1.6	30	1.3	39	1.1	47	1	54	0.9	61	0.8	67	0.7	89	0.6	107	0.5	125	0.5	131	0.5	137	0.5	143	0.5	149	
220			2.1	20	1.6	31	1.3	41	1.1	49	1	57	0.9	64	0.8	70	0.7	94	0.6	113	0.5	131	0.5	137	0.5	143	0.5	149	0.5	155	
230			2.1	21	1.6	33	1.3	43	1.1	51	1	59	0.9	67	0.8	74	0.7	98	0.6	119	0.5	137	0.5	143	0.5	149	0.5	155	0.5	161	
240			2.1	22	1.6	35	1.3	45	1.1	54	1	62	0.9	70	0.8	77	0.7	101	0.6	125	0.5	143	0.5	149	0.5	155	0.5	161	0.5	167	
250			2.1	23	1.5	36	1.3	47	1.1	56	1	65	0.9	73	0.8	80	0.7	104	0.6	128	0.5	149	0.5	155	0.5	161	0.5	167	0.5	173	
260			2.1	25	1.5	38	1.3	49	1.1	59	1	68	0.9	76	0.8	84	0.7	107	0.6	131	0.5	155	0.5	161	0.5	167	0.5	173	0.5	179	
270			2.1	26	1.5	39	1.3	51	1.1	61	1	70	0.9	79	0.8	87	0.7	110	0.6	134	0.5	161	0.5	167	0.5	173	0.5	179	0.5	185	
280			2.1	27	1.5	41	1.3	53	1.1	63	1	73	0.9	82	0.8	90	0.7	113	0.6	137	0.5	167	0.5	173	0.5	179	0.5	185	0.5	191	
290			2.1	28	1.5	43	1.3	55	1.1	66	1	76	0.9	85	0.8	94	0.7	116	0.6	140	0.5	173	0.5	179	0.5	185	0.5	191	0.5	197	
300			2.1	29	1.5	44	1.3	57	1.1	68	1	78	0.9	88	0.8	97	0.7	119	0.6	143	0.5	179	0.5	185	0.5	191	0.5	197	0.5	203	
310			2.1	31	1.5	46	1.3	59	1.1	70	1	81	0.9	91	0.8	100	0.7	122	0.6	146	0.5	185	0.5	191	0.5	197	0.5	203	0.5	209	
320			2.1	32	1.5	48	1.3	61	1.1	73	1	84	0.9	94	0.8	103	0.7	125	0.6	149	0.5	191	0.5	197	0.5	203	0.5	209	0.5	215	
330		3.8	10	2.1	33	1.5	49	1.3	63	1.1	75	1	87	0.9	97	0.8	106	0.7	128	0.6	152	0.5	197	0.5	203	0.5	209	0.5	215	0.5	221
340		3.8	10	2.1	34	1.5	51	1.3	65	1.1	78	1	89	0.9	100	0.8	109	0.7	131	0.6	155	0.5	203	0.5	209	0.5	215	0.5	221	0.5	227
350		3.8	11	2	35	1.5	52	1.3	67	1.1	80	1	92	0.9	103	0.8	112	0.7	134	0.6	158	0.5	209	0.5	215	0.5	221	0.5	227	0.5	233
360		3.7	12	2	37	1.5	54	1.3	69	1.1	82	1	95	0.9	106	0.8	115	0.7	137	0.6	161	0.5	215	0.5	221	0.5	227	0.5	233	0.5	239
370		3.7	13	2	38	1.5	56	1.3	71	1.1	85	1	97	0.9	109	0.8	118	0.7	140	0.6	164	0.5	221	0.5	227	0.5	233	0.5	239	0.5	245
380		3.7	13	2	39	1.5	57	1.3	73	1.1	87	1	100	0.9	112	0.8	121	0.7	143	0.6	167	0.5	227	0.5	233	0.5	239	0.5	245	0.5	251
390		3.7	14	2	40	1.5	59	1.3	75	1.1	89	1	103	0.9	115	0.8	124	0.7	146	0.6	170	0.5	233	0.5	239	0.5	245	0.5	251	0.5	257
400		3.7	15	2	41	1.5	61	1.3	77	1.1	92	1	106	0.9	118	0.8	127	0.7	149	0.6	173	0.5	239	0.5	245	0.5	251	0.5	257	0.5	263
410		3.7	16	2	43	1.5	62	1.3	79	1.1	94	1	109	0.9	121	0.8	130	0.7	152	0.6	176	0.5	245	0.5	251	0.5	257	0.5	263	0.5	269
420		3.6	16	2	44	1.5	64	1.3	81	1.1	96	1	112	0.9	124	0.8	133	0.7	155	0.6	179	0.5	251	0.5	257	0.5	263	0.5	269	0.5	275
430		3.6	17	2	45	1.5	65	1.3	83	1.1	99	1	115	0.9	127	0.8	136	0.7	158	0.6	182	0.5	257	0.5	263	0.5	269	0.5	275	0.5	281
440		3.6	18	2	46	1.5	67	1.3	85	1.1	101	1	118	0.9	130	0.8	139	0.7	161	0.6	185	0.5	263	0.5	269	0.5	275	0.5	281	0.5	287
450		3.6	19	2	47	1.5	69	1.3	87	1.1	103	1	121	0.9	133	0.8	142	0.7	164	0.6	188	0.5	269	0.5	275	0.5	281	0.5	287	0.5	293
460		3.6	19	2	48	1.5	70	1.3	89	1.1	105	1	124	0.9	136	0.8	145	0.7	167	0.6	191	0.5	275	0.5	281	0.5	287	0.5	293	0.5	299
470		3.6	20	2	49	1.5	72	1.3	91	1.1	107	1	127	0.9	139	0.8	148	0.7	170	0.6	194	0.5	281	0.5	287	0.5	293	0.5	299	0.5	305
480		3.6	21	2	51	1.5	73	1.3	93	1.1	109	1	130	0.9	142	0.8	151	0.7	173	0.6	197	0.5	287	0.5	293	0.5	299	0.5	305	0.5	311
490		3.6	21	2	52	1.5	75	1.3	95	1.1	111	1	133	0.9	145	0.8	154	0.7	176	0.6	200	0.5	293	0.5	299	0.5	305	0.5	311	0.5	317
500		3.5	22	2	53	1.5	77	1.3	97	1.1	113	1	136	0.9	148	0.8	157	0.7	179	0.6	203	0.5	299	0.5	305	0.5	311	0.5	317	0.5	323

Input Parameters:
Channel Type = Trapezoidal
Cover factor = 0.5
Allowable Soil Stress = 0.07
C-D Design
Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	
10																															
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440																															
450																															
460																															
470																															
480																															
490																															
500																															

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.07

C-D Design

Side Slope = 8

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	
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440																															
450																															
460																															
470																															
480																															
490																															
500																															

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.02

C-D Design

Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
10																				0.6	13	0.5	16							
20																				0.6	20									
30																				0.6	20									
40									1.1	11	1	14	0.9	11	0.8	13	0.7	15	0.6	20										
50								1.3	10	1.1	15	0.9	18	0.8	21	0.8	24	0.7	26	0.6	35									
60								1.3	13	1.1	18	0.9	22	0.8	26	0.8	29	0.7	32	0.6	42									
70					1.8	10	1.3	17	1.1	22	0.9	26	0.8	30	0.8	34	0.7	37	0.6	49										
80					1.7	12	1.3	20	1	25	0.9	31	0.8	35	0.7	39	0.7	43	0.6	56										
90					1.7	15	1.2	23	1	29	0.9	35	0.8	40	0.7	44	0.7	49	0.6	64										
100					1.6	17	1.2	26	1	33	0.9	39	0.8	44	0.7	50	0.7	54	0.6	71										
110					1.6	19	1.2	29	1	36	0.9	43	0.8	49	0.7	55	0.7	60	0.6	78										
120					1.6	21	1.2	32	1	40	0.9	47	0.8	54	0.7	60	0.7	65	0.6	85										
130					1.6	24	1.2	34	1	43	0.9	51	0.8	58	0.7	65	0.7	71	0.6	93										
140					1.6	26	1.2	37	1	47	0.9	55	0.8	63	0.7	70	0.7	77	0.6	100										
150		2.8	10	1.6	28	1.2	40	1	51	0.9	60	0.8	68	0.7	75	0.7	82													
160		2.7	12	1.6	30	1.2	43	1	54	0.9	64	0.8	72	0.7	80	0.7	88													
170		2.7	13	1.6	33	1.2	46	1	58	0.9	68	0.8	77	0.7	86	0.7	94													
180		2.6	15	1.6	35	1.2	49	1	61	0.9	72	0.8	82	0.7	91	0.7	99													
190		2.6	16	1.5	37	1.2	52	1	65	0.9	76	0.8	86	0.7	96															
200		2.6	18	1.5	39	1.2	55	1	68	0.9	80	0.8	91																	
210		2.6	19	1.5	41	1.2	58	1	72	0.9	84	0.8	96																	
220		2.6	20	1.5	44	1.2	61	1	76	0.9	89	0.8	100																	
230		2.5	22	1.5	46	1.2	64	1	79	0.9	93																			
240		2.5	23	1.5	48	1.2	67	1	83	0.9	97																			
250		2.5	25	1.5	50	1.2	70	1	86																					
260		2.5	26	1.5	52	1.2	72	1	90																					
270		2.5	27	1.5	55	1.2	75	1	93																					
280		2.5	29	1.5	57	1.2	78	1	97																					
290		2.5	30	1.5	59	1.2	81																							
300		2.5	31	1.5	61	1.2	84																							
310		2.5	33	1.5	63	1.2	87																							
320		2.5	34	1.5	65	1.2	90																							
330		2.4	35	1.5	68	1.2	93																							
340		2.4	37	1.5	70	1.2	96																							
350		2.4	38	1.5	72	1.2	99																							
360		2.4	39	1.5	74																									
370		2.4	40	1.5	76																									
380		2.4	42	1.5	79																									
390		2.4	43	1.5	81																									
400		2.4	44	1.5	83																									
410		2.4	46	1.5	85																									
420		2.4	47	1.5	87																									
430		2.4	48	1.5	89																									
440		2.4	50	1.5	92																									
450	5.4	10	2.4	51	1.5	94																								
460	5.3	10	2.4	52	1.5	96																								
470	5.3	11	2.4	53	1.5	98																								
480	5.3	12	2.4	55	1.5	100																								
490	5.3	12	2.4	56																										
500	5.3	13	2.4	57																										

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.02

C-D Design

Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
10																														
20																				0.6	12	0.5	15							
30													0.9	10	0.8	12	0.7	14	0.6	19	0.5	24								
40											1	12	0.9	15	0.8	17	0.7	19	0.6	27										
50									1.1	13	1	17	0.9	20	0.8	23	0.7	25	0.6	34										
60							1.4	11	1.1	17	0.9	21	0.8	25	0.8	28	0.7	31	0.6	41										
70							1.3	15	1.1	20	0.9	25	0.8	29	0.8	33	0.7	37	0.6	48										
80							1.3	18	1.1	24	0.9	29	0.8	34	0.8	38	0.7	42	0.6	56										
90				1.8	11	1.3	21	1	28	0.9	34	0.8	39	0.8	44	0.7	48	0.6	63											
100				1.7	14	1.3	24	1	32	0.9	38	0.8	44	0.7	49	0.7	54	0.6	70											
110				1.7	17	1.2	27	1	35	0.9	42	0.8	48	0.7	54	0.7	59	0.6	77											
120				1.6	19	1.2	30	1	39	0.9	46	0.8	53	0.7	59	0.7	65	0.6	85											
130				1.6	21	1.2	33	1	42	0.9	50	0.8	58	0.7	64	0.7	70	0.6	92											
140				1.6	24	1.2	36	1	46	0.9	55	0.8	62	0.7	69	0.7	76	0.6	99											
150				1.6	26	1.2	39	1	50	0.9	59	0.8	67	0.7	75	0.7	82													
160				1.6	28	1.2	42	1	53	0.9	63	0.8	72	0.7	80	0.7	87													
170				1.6	31	1.2	45	1	57	0.9	67	0.8	76	0.7	85	0.7	93													
180				1.6	33	1.2	48	1	60	0.9	71	0.8	81	0.7	90	0.7	98													
190		2.8	11	1.6	35	1.2	51	1	64	0.9	75	0.8	86	0.7	95															
200		2.8	13	1.6	37	1.2	54	1	67	0.9	79	0.8	90	0.7	100															
210		2.7	14	1.6	40	1.2	57	1	71	0.9	84	0.8	95																	
220		2.7	16	1.5	42	1.2	60	1	75	0.9	88	0.8	100																	
230		2.7	17	1.5	44	1.2	63	1	78	0.9	92																			
240		2.6	19	1.5	46	1.2	66	1	82	0.9	96																			
250		2.6	20	1.5	49	1.2	69	1	85	0.9	100																			
260		2.6	22	1.5	51	1.2	71	1	89																					
270		2.6	23	1.5	53	1.2	74	1	92																					
280		2.6	25	1.5	55	1.2	77	1	96																					
290		2.5	26	1.5	57	1.2	80	1	100																					
300		2.5	28	1.5	60	1.2	83																							
310		2.5	29	1.5	62	1.2	86																							
320		2.5	31	1.5	64	1.2	89																							
330		2.5	32	1.5	66	1.2	92																							
340		2.5	33	1.5	68	1.2	95																							
350		2.5	35	1.5	71	1.2	98																							
360		2.5	36	1.5	73																									
370		2.5	37	1.5	75																									
380		2.5	39	1.5	77																									
390		2.4	40	1.5	79																									
400		2.4	41	1.5	82																									
410		2.4	43	1.5	84																									
420		2.4	44	1.5	86																									
430		2.4	46	1.5	88																									
440		2.4	47	1.5	90																									
450		2.4	48	1.5	92																									
460		2.4	49	1.5	95																									
470		2.4	51	1.5	97																									
480		2.4	52	1.5	99																									
490		2.4	53																											
500		2.4	55																											

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.02

C-D Design

Side Slope = 8

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
10																				0.6	11	0.5	14							
20															0.9	10	0.8	13	0.6	19	0.5	23								
30															0.9	14	0.8	16	0.7	19	0.6	26								
40											1	10	0.9	14	0.8	16	0.7	19	0.6	26										
50										1.2	11	1	15	0.9	19	0.8	22	0.7	24	0.6	33									
60										1.1	15	1	20	0.8	24	0.8	27	0.7	30	0.6	41									
70								1.4	12	1.1	19	0.9	24	0.8	28	0.8	32	0.7	36	0.6	48									
80								1.3	16	1.1	23	0.9	28	0.8	33	0.8	38	0.7	42	0.6	55									
90								1.3	19	1.1	26	0.9	33	0.8	38	0.8	43	0.7	47	0.6	62									
100			1.8	10	1.3	22	1.1	30	0.9	37	0.8	43	0.8	48	0.7	53	0.6	70												
110			1.8	13	1.3	25	1	34	0.9	41	0.8	47	0.7	53	0.7	59	0.6	77												
120			1.7	16	1.3	28	1	38	0.9	45	0.8	52	0.7	58	0.7	64	0.6	84												
130			1.7	19	1.2	32	1	41	0.9	49	0.8	57	0.7	64	0.7	70	0.6	92												
140			1.7	21	1.2	35	1	45	0.9	54	0.8	62	0.7	69	0.7	75	0.6	99												
150			1.6	24	1.2	38	1	48	0.9	58	0.8	66	0.7	74	0.7	81														
160			1.6	26	1.2	41	1	52	0.9	62	0.8	71	0.7	79	0.7	87														
170			1.6	28	1.2	44	1	56	0.9	66	0.8	76	0.7	84	0.7	92														
180			1.6	31	1.2	47	1	59	0.9	70	0.8	80	0.7	89	0.7	98														
190			1.6	33	1.2	50	1	63	0.9	75	0.8	85	0.7	95																
200			1.6	35	1.2	53	1	66	0.9	79	0.8	90	0.7	100																
210			1.6	38	1.2	55	1	70	0.9	83	0.8	94																		
220			1.6	40	1.2	59	1	74	0.9	87	0.8	99																		
230			1.6	42	1.2	61	1	77	0.9	91																				
240		2.8	11	1.6	45	1.2	64	1	81	0.9	95																			
250		2.8	13	1.6	45	1.2	64	1	81	0.9	95																			
260		2.8	15	1.5	47	1.2	67	1	84	0.9	99																			
270		2.7	17	1.5	49	1.2	70	1	88																					
280		2.7	18	1.5	51	1.2	73	1	91																					
290		2.7	20	1.5	54	1.2	76	1	95																					
300		2.6	22	1.5	56	1.2	79	1	99																					
310		2.6	23	1.5	58	1.2	82																							
320		2.6	25	1.5	60	1.2	85																							
330		2.6	26	1.5	62	1.2	88																							
340		2.6	28	1.5	65	1.2	91																							
350		2.5	29	1.5	67	1.2	94																							
360		2.5	31	1.5	69	1.2	97																							
370		2.5	32	1.5	71	1.2	100																							
380		2.5	34	1.5	73																									
390		2.5	35	1.5	76																									
400		2.5	37	1.5	78																									
410		2.5	38	1.5	80																									
420		2.5	39	1.5	82																									
430		2.5	41	1.5	84																									
440		2.5	42	1.5	87																									
450		2.5	44	1.5	89																									
460		2.4	45	1.5	91																									
470		2.4	46	1.5	93																									
480		2.4	48	1.5	95																									
490		2.4	49	1.5	98																									
500		2.4	50	1.5	100																									
510		2.4	52	1.5	100																									

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.03

C-D Design

Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
10																														
20																						0.6	10	0.5	12					
30																						0.6	16	0.5	19					
40															0.9	11	0.9	13	0.7	13	0.7	18	0.6	23						
50										1.2	10	1	13	0.9	15	0.8	17	0.7	23	0.6	29	0.6	29							
60									1.3	10	1.1	13	1	16	0.9	18	0.8	21	0.6	28	0.6	35								
70									1.3	13	1.1	16	1	19	0.9	22	0.8	25	0.6	33	0.6	41								
80						1.6	10		1.3	15	1.1	19	1	22	0.9	26	0.8	29	0.6	38	0.5	47								
90						1.6	12		1.3	18	1.1	22	1	26	0.9	29	0.8	32	0.6	43	0.5	53								
100						1.5	14		1.2	20	1.1	25	1	29	0.9	33	0.8	36	0.6	48	0.5	59								
110						1.5	17		1.2	22	1.1	28	0.9	32	0.9	36	0.8	40	0.6	53	0.5	65								
120				2.1	10	1.5	19		1.2	25	1.1	30	0.9	35	0.9	40	0.8	44	0.6	59	0.5	71								
130				2.1	12	1.5	21		1.2	27	1.1	33	0.9	38	0.9	43	0.8	48	0.6	64	0.5	77								
140				2	13	1.5	23		1.2	30	1.1	36	0.9	42	0.9	47	0.8	52	0.6	69	0.5	83								
150				2	15	1.5	24		1.2	32	1	39	0.9	45	0.9	50	0.8	56	0.6	74	0.5	89								
160				2	16	1.5	26		1.2	35	1	42	0.9	48	0.9	54	0.8	59	0.6	79	0.5	95								
170				2	18	1.5	28		1.2	37	1	44	0.9	51	0.9	57	0.8	63	0.6	84										
180				2	19	1.5	30		1.2	39	1	47	0.9	54	0.9	61	0.8	67	0.6	89										
190				2	21	1.4	32		1.2	42	1	50	0.9	57	0.9	64	0.8	71	0.6	94										
200				1.9	22	1.4	34		1.2	44	1	53	0.9	61	0.9	68	0.8	75	0.6	99										
210				1.9	24	1.4	36		1.2	46	1	55	0.9	64	0.8	71	0.8	79												
220				1.9	25	1.4	38		1.2	49	1	58	0.9	67	0.8	75	0.8	82												
230				1.9	27	1.4	40		1.2	51	1	61	0.9	70	0.8	78	0.8	86												
240				1.9	28	1.4	42		1.2	54	1	64	0.9	73	0.8	82	0.8	90												
250				1.9	30	1.4	44		1.2	56	1	67	0.9	76	0.8	85	0.8	94												
260		3.5	10	1.9	31	1.4	46		1.2	58	1	69	0.9	79	0.8	89	0.8	98												
270		3.4	11	1.9	33	1.4	48		1.2	61	1	72	0.9	83	0.8	92														
280		3.4	11	1.9	34	1.4	50		1.2	63	1	75	0.9	86	0.8	96														
290		3.4	12	1.9	35	1.4	52		1.2	65	1	78	0.9	89	0.8	99														
300		3.4	13	1.9	37	1.4	54		1.2	68	1	80	0.9	92																
310		3.3	14	1.9	38	1.4	55		1.2	70	1	83	0.9	95																
320		3.3	15	1.9	40	1.4	57		1.2	72	1	86	0.9	99																
330		3.3	16	1.9	41	1.4	59		1.2	75	1	89																		
340		3.3	17	1.9	42	1.4	61		1.2	77	1	91																		
350		3.3	18	1.9	44	1.4	63		1.2	80	1	94																		
360		3.3	19	1.9	45	1.4	65		1.2	82	1	97																		
370		3.2	20	1.9	47	1.4	67		1.2	84	1	100																		
380		3.2	20	1.9	48	1.4	69		1.2	87																				
390		3.2	21	1.9	49	1.4	71		1.2	89																				
400		3.2	22	1.9	51	1.4	73		1.2	91																				
410		3.2	23	1.9	52	1.4	75		1.2	94																				
420		3.2	24	1.8	54	1.4	77		1.2	96																				
430		3.2	25	1.8	55	1.4	78		1.2	98																				
440		3.2	26	1.8	56	1.4	80																							
450		3.2	26	1.8	58	1.4	82																							
460		3.2	27	1.8	59	1.4	84																							
470		3.2	28	1.8	61	1.4	86																							
480		3.1	29	1.8	62	1.4	88																							
490		3.1	30	1.8	63	1.4	90																							
500		3.1	31	1.8	65	1.4	92																							

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.03

C-D Design

Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
10																														
20																								0.5	12					
30																							0.5	19						
40															1	10	0.9	12			0.7	12	0.6	16						
50													1	11	0.9	14	0.9	16			0.7	17	0.6	22						
60										1.2	11	1	15	0.9	17	0.8	20			0.7	28	0.6	34							
70									1.4	10	1.1	15	1	18	0.9	21	0.8	24		0.6	33	0.6	40							
80									1.3	13	1.1	18	1	21	0.9	25	0.8	28		0.6	38	0.6	46							
90									1.3	16	1.1	20	1	25	0.9	28	0.8	32		0.6	43	0.5	52							
100						1.6	12	1.3	18	1.1	23	1	28	0.9	32	0.8	35		0.6	48	0.5	58								
110						1.6	14	1.3	21	1.1	26	1	31	0.9	35	0.8	39		0.6	53	0.5	64								
120						1.5	16	1.2	23	1.1	29	1	34	0.9	39	0.8	43		0.6	58	0.5	70								
130						1.5	18	1.2	26	1.1	32	0.9	37	0.9	42	0.8	47		0.6	63	0.5	76								
140						1.5	20	1.2	28	1.1	35	0.9	41	0.9	46	0.8	51		0.6	68	0.5	83								
150				2.1	11	1.5	23	1.2	31	1.1	38	0.9	44	0.9	50	0.8	55		0.6	73	0.5	89								
160				2.1	13	1.5	25	1.2	33	1.1	40	0.9	47	0.9	53	0.8	59		0.6	78	0.5	95								
170				1.5	27	1.2	36	1	43	0.9	50	0.9	56	0.8	62	0.6	83													
180				2	16	1.5	29	1.2	38	1	46	0.9	53	0.9	60	0.8	66		0.6	88										
190				2	18	1.5	31	1.2	40	1	49	0.9	57	0.9	64	0.8	70		0.6	93										
200				2	19	1.5	33	1.2	43	1	52	0.9	60	0.9	67	0.8	74		0.6	98										
210				2	21	1.5	35	1.2	45	1	54	0.9	63	0.9	71	0.8	78													
220				2	23	1.4	37	1.2	48	1	57	0.9	66	0.9	74	0.8	82													
230				2	24	1.4	38	1.2	50	1	60	0.9	69	0.9	78	0.8	86													
240				1.9	26	1.4	40	1.2	52	1	63	0.9	72	0.8	81	0.8	89													
250				1.9	27	1.4	42	1.2	55	1	66	0.9	76	0.8	85	0.8	93													
260				1.9	29	1.4	44	1.2	57	1	68	0.9	79	0.8	88	0.8	97													
270				1.9	30	1.4	46	1.2	60	1	71	0.9	82	0.8	92															
280				1.9	32	1.4	48	1.2	62	1	74	0.9	85	0.8	95															
290				1.9	33	1.4	50	1.2	64	1	77	0.9	88	0.8	99															
300				1.9	34	1.4	52	1.2	67	1	80	0.9	91																	
310				1.9	36	1.4	54	1.2	69	1	82	0.9	94																	
320				1.9	37	1.4	56	1.2	71	1	85	0.9	98																	
330				1.9	39	1.4	58	1.2	74	1	88																			
340				3.5	10	1.9	40	1.4	60	1.2	76	1	91																	
350				3.5	11	1.9	42	1.4	62	1.2	79	1	94																	
360				3.4	12	1.9	43	1.4	64	1.2	81	1	96																	
370				3.4	13	1.9	45	1.4	66	1.2	83	1	99																	
380				3.4	14	1.9	46	1.4	67	1.2	86																			
390				3.4	16	1.9	47	1.4	69	1.2	88																			
400				3.4	16	1.9	49	1.4	71	1.2	90																			
410				3.3	17	1.9	50	1.4	73	1.2	93																			
420				3.3	18	1.9	52	1.4	75	1.2	95																			
430				3.3	19	1.9	53	1.4	77	1.2	97																			
440				3.3	20	1.9	55	1.4	79	1.2	100																			
450				3.3	21	1.9	56	1.4	81																					
460				3.3	22	1.9	57	1.4	83																					
470				3.2	23	1.8	59	1.4	85																					
480				3.2	24	1.8	60	1.4	87																					
490				3.2	25	1.8	62	1.4	89																					
500				3.2	26	1.8	63	1.4	91																					

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.03

C-D Design

Side Slope = 8

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
10																														
20																														
30																														
40																														
50																														
60																														
70																														
80																														
90																														
100																														
110																														
120																														
130																														
140																														
150																														
160																														
170																														
180																														
190																														
200																														
210																														
220																														
230																														
240																														
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320																														
330																														
340																														
350																														
360																														
370																														
380																														
390																														
400																														
410																														
420																														
430																														
440																														
450																														
460																														
470																														
480																														
490																														
500																														

Input Parameters:
Channel Type = Trapezoidal
Cover factor = 0.75
Allowable Soil Stress = 0.05
C-D Design
Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%									
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)								
10																																						
20																																						
30																																						
40																					0.8	10	0.7	13	0.6	11	0.5	13										
50																				0.8	13	0.7	17	0.6	20	0.5	23											
60																			1.1	11	0.8	16	0.7	21	0.6	24	0.5	28										
70																			1	13	0.8	19	0.7	24	0.6	29	0.5	33										
80																			1	15	0.8	22	0.7	28	0.6	33	0.5	38										
90																			1.3	11	1.1	13	1	15	0.8	22	0.7	28										
100																			1.5	10	1.3	13	1.1	16	1	18	0.8	26	0.7	32	0.6	38	0.5	43				
110																			1.4	12	1.2	15	1.1	18	1	20	0.8	29	0.7	36	0.6	42	0.5	48				
120																			1.7	10	1.2	17	1.1	20	1	23	0.8	32	0.7	39	0.6	46	0.5	53				
130																			1.7	11	1.4	15	1.2	19	1.1	22	1	25	0.8	35	0.7	43	0.6	51	0.5	57		
140																			1.7	13	1.4	17	1.2	21	1.1	24	1	27	0.8	38	0.6	47	0.6	55	0.5	62		
150																			1.6	14	1.4	19	1.2	23	1.1	26	1	29	0.8	41	0.6	51	0.6	59	0.5	67		
160																			2.1	10	1.6	16	1.4	20	1.2	25	1.1	28	1	32	0.8	44	0.6	54	0.6	64	0.5	72
170																			2.1	11	1.6	17	1.4	22	1.2	26	1.1	30	1	34	0.8	47	0.6	58	0.6	68	0.5	77
180																			2	12	1.6	19	1.3	24	1.2	28	1.1	33	1	36	0.8	50	0.6	62	0.6	72	0.5	82
190																			2	13	1.6	20	1.3	25	1.2	30	1.1	35	1	39	0.8	53	0.6	66	0.6	77	0.5	87
200																			2	15	1.6	21	1.3	27	1.2	32	1.1	37	1	41	0.8	56	0.6	69	0.6	81	0.5	92
210																			2	16	1.6	23	1.3	29	1.2	34	1.1	39	1	43	0.8	59	0.6	73	0.6	86	0.5	97
220																			2	17	1.6	24	1.3	30	1.2	36	1.1	41	1	46	0.8	62	0.6	77	0.6	90		
230																			2	18	1.6	26	1.3	32	1.2	38	1.1	43	1	48	0.8	66	0.6	81	0.6	94		
240																			2	19	1.6	27	1.3	34	1.2	40	1.1	45	1	50	0.8	69	0.6	84	0.6	98		
250																			2.8	10	1.9	20	1.6	28	1.3	35	1.2	42	1.1	47	1	53	0.8	72	0.6	88		
260																			2.8	11	1.9	21	1.5	30	1.3	37	1.2	43	1.1	49	1	55	0.8	75	0.6	92		
270																			2.8	11	1.9	23	1.5	31	1.3	38	1.2	45	1.1	51	1	57	0.8	78	0.6	96		
280																			2.7	12	1.9	24	1.5	32	1.3	40	1.2	47	1.1	53	1	60	0.8	81	0.6	99		
290																			2.7	13	1.9	25	1.5	34	1.3	42	1.2	49	1.1	56	1	62	0.8	84				
300																			2.7	14	1.9	26	1.5	35	1.3	43	1.2	51	1	64	0.8	87						
310																			2.7	15	1.9	27	1.5	37	1.3	45	1.2	53	1	66	0.8	90						
320																			2.7	16	1.9	28	1.5	38	1.3	47	1.2	55	1	69	0.8	93						
330																			2.7	17	1.9	29	1.5	39	1.3	48	1.2	56	1	71	0.8	96						
340																			2.7	17	1.9	30	1.5	41	1.3	50	1.2	58	1	73	0.8	99						
350																			2.6	18	1.9	31	1.5	42	1.3	51	1.2	60	1	76								
360																			2.6	19	1.9	32	1.5	43	1.3	53	1.2	62	1	78								
370																			2.6	20	1.9	34	1.5	45	1.3	55	1.2	64	1	80								
380																			2.6	21	1.9	35	1.5	46	1.3	56	1.2	66	1	82								
390																			2.6	22	1.9	36	1.5	47	1.3	58	1.2	67	1	85								
400																			2.6	22	1.9	37	1.5	49	1.3	59	1.2	69	1	87								
410																			2.6	23	1.9	38	1.5	50	1.3	61	1.2	71	1	89								
420																			2.6	24	1.9	39	1.5	52	1.3	63	1.2	73	1	91								
430																			2.6	25	1.9	40	1.5	53	1.3	64	1.2	75	1	93								
440																			2.6	26	1.9	41	1.5	54	1.3	66	1.1	77	1	96								
450																			2.6	26	1.9	42	1.5	56	1.3	68	1.1	79	1	99								
460																			2.6	27	1.9	43	1.5	57	1.3	69	1.1	81	1	101								
470																			2.6	28	1.9	44	1.5	58	1.3	71	1.1	82	1	103								
480																			2.6	29	1.9	45	1.5	60	1.3	72	1.1	84	1	105								
490																			2.6	29	1.9	47	1.5	61	1.3	74	1.1	86	1	107								
500																			2.6	30	1.9	48	1.5	62	1.3	76	1.1	88	1	109								

Input Parameters:
Channel Type = Trapezoidal
Cover factor = 0.75
Allowable Soil Stress = 0.05
C-D Design
Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	
10																															
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450																															
460																															
470																															
480																															
490																															
500																															

Input Parameters:
Channel Type = Trapezoidal
Cover factor = 0.75
Allowable Soil Stress = 0.05
C-D Design
Side Slope = 8

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
10																														
20																														
30																														
40																														
50																					0.9	10	0.7	11	0.6	14	0.6	19	0.5	22
60																				0.8	14	0.7	19	0.6	23	0.5	27			
70																				0.8	17	0.7	23	0.6	28	0.5	32			
80																			1.1	12	0.8	21	0.7	27	0.6	32	0.5	37		
90																			1.1	15	0.8	24	0.7	31	0.6	36	0.5	42		
100														1.3	11	1.2	14	1	17	0.8	27	0.7	34	0.6	41	0.5	47			
110													1.3	13	1.1	17	1	20	0.8	30	0.7	38	0.6	45	0.5	52				
120											1.5	10	1.3	15	1.1	19	1	22	0.8	33	0.7	42	0.6	50	0.5	56				
130											1.5	12	1.3	17	1.1	21	1	25	0.8	36	0.7	46	0.6	54	0.5	61				
140											1.4	14	1.2	19	1.1	24	1	27	0.8	39	0.7	49	0.6	58	0.5	66				
150											1.4	16	1.2	21	1.1	26	1	30	0.8	43	0.7	53	0.6	63	0.5	71				
160									1.7	11	1.4	18	1.2	23	1.1	28	1	32	0.8	46	0.6	57	0.6	67	0.5	76				
170									1.7	13	1.4	20	1.2	25	1.1	30	1	34	0.8	49	0.6	61	0.6	71	0.5	81				
180									1.7	15	1.4	22	1.2	27	1.1	32	1	37	0.8	52	0.6	65	0.6	76	0.5	86				
190									1.7	16	1.4	24	1.2	29	1.1	34	1	39	0.8	55	0.6	68	0.6	80	0.5	91				
200									1.6	18	1.4	25	1.2	31	1.1	37	1	41	0.8	58	0.6	72	0.6	85	0.5	96				
210									1.6	20	1.4	27	1.2	33	1.1	39	1	44	0.8	61	0.6	76	0.6	89						
220						2.1	10		1.6	21	1.4	29	1.2	35	1.1	41	1	46	0.8	64	0.6	80	0.6	93						
230						2.1	12		1.6	23	1.3	30	1.2	37	1.1	43	1	48	0.8	67	0.6	83	0.6	98						
240						2.1	13		1.6	24	1.3	32	1.2	39	1.1	45	1	51	0.8	70	0.6	87								
250						2.1	15		1.6	26	1.3	34	1.2	41	1.1	47	1	53	0.8	73	0.6	91								
260						2	16		1.6	27	1.3	36	1.2	43	1.1	49	1	55	0.8	77	0.6	95								
270						2	18		1.6	29	1.3	37	1.2	45	1.1	52	1	58	0.8	80	0.6	98								
280						2	19		1.6	30	1.3	39	1.2	47	1.1	54	1	60	0.8	83										
290						2	20		1.6	31	1.3	41	1.2	48	1.1	56	1	62	0.8	86										
300						2	21		1.6	33	1.3	42	1.2	50	1.1	58	1	65	0.8	89										
310						2	23		1.6	34	1.3	44	1.2	52	1.1	60	1	67	0.8	92										
320						2	24		1.6	36	1.3	46	1.2	54	1.1	62	1	69	0.8	95										
330						2	25		1.5	37	1.3	47	1.2	56	1.1	64	1	72	0.8	98										
340						1.9	26		1.5	39	1.3	49	1.2	58	1.1	66	1	74												
350						1.9	27		1.5	40	1.3	50	1.2	60	1.1	68	1	76												
360						1.9	29		1.5	41	1.3	52	1.2	62	1	70	1	79												
370					2.9	11			1.9	30	1.5	43	1.3	54	1.2	63	1	73	1	81										
380					2.8	12			1.9	31	1.5	44	1.3	55	1.2	65	1	75	1	83										
390					2.8	13			1.9	32	1.5	46	1.3	57	1.2	67	1	77	1	85										
400					2.8	14			1.9	33	1.5	47	1.3	59	1.2	69	1	79	1	88										
410					2.8	15			1.9	34	1.5	48	1.3	60	1.2	71	1	81	1	90										
420					2.8	16			1.9	36	1.5	50	1.3	62	1.2	73	1	83	1	92										
430					2.7	17			1.9	37	1.5	51	1.3	64	1.2	75	1	85	1	95										
440					2.7	18			1.9	38	1.5	53	1.3	65	1.2	77	1	87	1	97										
450					2.7	19			1.9	39	1.5	54	1.3	67	1.2	78	1	89	1	99										
460					2.7	20			1.9	40	1.5	55	1.3	69	1.2	80	1	91												
470					2.7	21			1.9	41	1.5	57	1.3	70	1.2	82	1	93												
480					2.7	22			1.9	42	1.5	58	1.3	72	1.2	84	1	95												
490					2.7	23			1.9	44	1.5	60	1.3	73	1.2	86	1	98												
500					2.6	23			1.9	45	1.5	61	1.3	75	1.2	88	1	100												

Input Parameters:
Channel Type = Trapezoidal
Cover factor = 0.75
Allowable Soil Stress = 0.07
C-D Design
Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	
10																															
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480																															
490																															
500																															

Input Parameters:
Channel Type = Trapezoidal
Cover factor = 0.75
Allowable Soil Stress = 0.07
C-D Design
Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	
10																															
20																															
30																															
40																															
50																							0.8	10	0.7	10	0.6	12	0.5	11	
60																							0.8	13	0.7	13	0.6	15	0.5	20	
70																						1	11	0.8	16	0.7	16	0.6	19	0.5	24
80																						0.9	13	0.8	18	0.7	19	0.6	23	0.5	28
90																						0.9	16	0.8	21	0.7	23	0.6	26	0.5	33
100																						0.9	16	0.8	21	0.7	26	0.6	30	0.5	37
110																1.3	10	0.9	18	0.8	24	0.7	29	0.6	32	0.6	37	0.5	41		
120															1.4	10	1.2	12	0.9	20	0.8	27	0.7	32	0.6	37					
130															1.4	11	1.2	14	0.9	23	0.8	29	0.7	35	0.6	41					
140															1.6	10	1.2	16	0.9	25	0.7	32	0.7	38	0.6	44					
150															1.5	11	1.3	15	1.2	18	0.9	27	0.7	35	0.7	42	0.6	48			
160															1.5	13	1.3	16	1.2	19	0.9	29	0.7	38	0.7	45	0.6	51			
170											1.8	10	1.5	14	1.3	18	1.2	21	0.9	32	0.7	40	0.6	48	0.6	55					
180											1.7	11	1.5	16	1.3	19	1.2	23	0.9	34	0.7	43	0.6	51	0.6	58					
190											1.7	12	1.5	17	1.3	21	1.2	24	0.9	36	0.7	46	0.6	54	0.6	62					
200											1.7	14	1.5	18	1.3	22	1.2	26	0.9	38	0.7	48	0.6	57	0.6	66					
210											1.7	15	1.4	20	1.3	24	1.2	28	0.9	40	0.7	51	0.6	61	0.6	69					
220										2.1	10	1.7	16	1.4	21	1.3	25	1.2	29	0.9	43	0.7	54	0.6	64	0.6	73				
230										2.1	11	1.7	17	1.4	22	1.3	27	1.2	31	0.9	45	0.7	56	0.6	67	0.6	76				
240										2	12	1.7	19	1.4	24	1.3	28	1.2	33	0.9	47	0.7	59	0.6	70	0.6	80				
250										2	13	1.6	20	1.4	25	1.3	30	1.2	34	0.9	49	0.7	62	0.6	73	0.6	83				
260										2	14	1.6	21	1.4	26	1.3	31	1.1	36	0.9	51	0.7	64	0.6	76	0.6	87				
270										2	15	1.6	22	1.4	28	1.3	33	1.1	37	0.9	53	0.7	67	0.6	79	0.6	91				
280										2	16	1.6	23	1.4	29	1.3	34	1.1	39	0.9	56	0.7	70	0.6	82	0.6	94				
290										2	17	1.6	24	1.4	30	1.3	36	1.1	41	0.9	58	0.7	73	0.6	86	0.6	98				
300										2	18	1.6	26	1.4	32	1.3	37	1.1	42	0.9	60	0.7	75	0.6	89						
310						2.6	10	1.9	19	1.6	27	1.4	33	1.3	39	1.1	44	0.9	62	0.7	78	0.6	92								
320						2.6	11	1.9	20	1.6	28	1.4	34	1.3	40	1.1	46	0.9	64	0.7	81	0.6	95								
330						2.5	12	1.9	21	1.6	29	1.4	36	1.2	42	1.1	47	0.9	67	0.7	83	0.6	98								
340						2.5	12	1.9	22	1.6	30	1.4	37	1.2	43	1.1	49	0.9	69	0.7	86										
350						2.5	13	1.9	24	1.6	31	1.4	38	1.2	45	1.1	50	0.9	71	0.7	89										
360						2.5	14	1.9	24	1.6	33	1.4	40	1.2	46	1.1	52	0.9	73	0.7	91										
370						2.5	15	1.9	25	1.6	34	1.4	41	1.2	48	1.1	54	0.9	75	0.7	94										
380						2.5	16	1.9	26	1.6	35	1.4	42	1.2	49	1.1	55	0.9	77	0.7	97										
390						2.4	17	1.9	27	1.6	36	1.4	43	1.2	50	1.1	57	0.9	80	0.7	99										
400						2.4	18	1.9	28	1.6	37	1.4	45	1.2	52	1.1	58	0.9	82												
410						2.4	18	1.9	29	1.6	38	1.4	46	1.2	53	1.1	60	0.9	84												
420						2.4	19	1.9	30	1.6	39	1.4	47	1.2	55	1.1	62	0.9	86												
430						2.4	20	1.9	31	1.6	40	1.4	49	1.2	56	1.1	63	0.9	88												
440						2.4	21	1.9	32	1.6	42	1.4	50	1.2	58	1.1	65	0.9	90												
450						2.4	22	1.9	33	1.6	43	1.4	51	1.2	59	1.1	66	0.9	93												
460						2.4	22	1.9	34	1.6	44	1.4	53	1.2	60	1.1	68	0.9	95												
470						2.4	23	1.9	35	1.6	45	1.4	54	1.2	62	1.1	70	0.9	97												
480						2.4	24	1.9	36	1.6	46	1.4	55	1.2	63	1.1	71	0.9	99												
490						2.4	25	1.9	37	1.6	47	1.4	56	1.2	65	1.1	73														
500						2.4	25	1.9	38	1.6	48	1.4	58	1.2	66	1.1	74														
510						2.4	26	1.9	39	1.6	49	1.4	59	1.2	68	1.1	76														

Input Parameters:
Channel Type = Trapezoidal
Cover factor = 0.75
Allowable Soil Stress = 0.07
C-D Design
Side Slope = 8

Q	S = 0.1%	S = 0.25%	S = 0.5%	S = 0.75%	S = 1%	S = 1.25%	S = 1.5%	S = 1.75%	S = 2%	S = 3%	S = 4%	S = 5%	S = 6%	S = 8%	S = 10%	
	D(ft) B(ft)	D(ft) B(ft)	D(ft) B(ft)	D(ft) B(ft)	D(ft) B(ft)	D(ft) B(ft)	D(ft) B(ft)	D(ft) B(ft)	D(ft) B(ft)	D(ft) B(ft)	D(ft) B(ft)	D(ft) B(ft)	D(ft) B(ft)	D(ft) B(ft)	D(ft) B(ft)	
10																
20																
30																
40														0.5	10	
50														0.5	15	
60														0.6	11	
70												0.7	12	0.6	15	
80												0.7	12	0.6	18	
90										1	12	0.7	19	0.6	22	
100										1	14	0.7	22	0.6	26	
110										0.9	17	0.7	25	0.6	29	
120									1.3	10	0.8	23	0.7	28	0.5	31
130									1.3	12	0.8	26	0.7	31	0.6	33
140									1.2	16	0.8	29	0.7	35	0.6	40
150								1.4	10	0.9	24	0.7	38	0.6	44	
160								1.4	12	0.9	26	0.7	41	0.6	47	
170								1.4	14	0.9	28	0.7	44	0.6	51	
180							1.6	11	1.2	17	0.7	40	0.7	47	0.6	54
190							1.5	13	1.2	19	0.9	31	0.7	50	0.6	58
200							1.5	14	1.2	21	0.9	33	0.7	54	0.6	62
210						1.8	10	1.3	19	0.9	35	0.7	57	0.6	65	
220						1.8	12	1.2	23	0.9	37	0.7	60	0.6	69	
230						1.7	13	1.2	25	0.9	39	0.7	63	0.6	72	
240						1.7	14	1.2	28	0.9	42	0.7	66	0.6	76	
250						1.7	16	1.2	30	0.9	44	0.7	69	0.6	79	
260					2.1	10	1.7	17	1.2	31	0.9	46	0.7	72	0.6	83
270					2.1	11	1.7	17	1.2	33	0.9	48	0.6	73	0.6	86
280					2.1	13	1.7	20	1.2	34	0.9	50	0.6	76	0.6	90
290					2	14	1.6	22	1.2	38	0.9	53	0.6	79	0.6	94
300					2	15	1.6	23	1.1	40	0.9	55	0.6	82	0.6	97
310					2	16	1.6	25	1.1	41	0.9	57	0.6	85		
320					2	17	1.6	26	1.1	43	0.9	59	0.6	88		
330					2	18	1.6	27	1.1	44	0.9	61	0.6	91		
340					2	19	1.6	28	1.1	46	0.9	64	0.6	94		
350					2	20	1.6	29	1.1	48	0.9	66	0.6	97		
360					2	21	1.6	29	1.1	49	0.9	68	0.6			
370					1.9	22	1.6	31	1.1	51	0.9	70	0.6			
380					1.9	23	1.6	32	1.1	52	0.9	72	0.6			
390					2.6	10	1.9	23	1.1	54	0.9	75	0.6			
400					2.6	11	1.9	24	1.1	56	0.9	77	0.6			
410					2.6	12	1.9	25	1.1	58	0.9	79	0.6			
420					2.5	13	1.9	26	1.1	60	0.9	81	0.6			
430					2.5	14	1.9	27	1.1	62	0.9	83	0.6			
440					2.5	15	1.9	28	1.1	64	0.9	85	0.6			
450					2.5	16	1.9	29	1.1	66	0.9	87	0.6			
460					2.5	17	1.9	30	1.1	68	0.9	89	0.6			
470					2.5	18	1.9	31	1.1	70	0.9	91	0.6			
480					2.5	19	1.9	32	1.1	72	0.9	93	0.6			
490					2.4	19	1.9	33	1.1	74	0.9	95	0.6			
500					2.4	20	1.9	34	1.1	76	0.9	97	0.6			
					2.4	21	1.9	35	1.1	78	0.9	99	0.6			
					2.4	22	1.9	36	1.1	80	0.9	101	0.6			
					2.4	23	1.9	37	1.1	82	0.9	103	0.6			
					2.4	24	1.9	38	1.1	84	0.9	105	0.6			
					2.4	25	1.9	39	1.1	86	0.9	107	0.6			
					2.4	26	1.9	40	1.1	88	0.9	109	0.6			
					2.4	27	1.9	41	1.1	90	0.9	111	0.6			
					2.4	28	1.9	42	1.1	92	0.9	113	0.6			
					2.4	29	1.9	43	1.1	94	0.9	115	0.6			
					2.4	30	1.9	44	1.1	96	0.9	117	0.6			
					2.4	31	1.9	45	1.1	98	0.9	119	0.6			
					2.4	32	1.9	46	1.1	100	0.9	121	0.6			
					2.4	33	1.9	47	1.1	102	0.9	123	0.6			
					2.4	34	1.9	48	1.1	104	0.9	125	0.6			
					2.4	35	1.9	49	1.1	106	0.9	127	0.6			
					2.4	36	1.9	50	1.1	108	0.9	129	0.6			
					2.4	37	1.9	51	1.1	110	0.9	131	0.6			
					2.4	38	1.9	52	1.1	112	0.9	133	0.6			
					2.4	39	1.9	53	1.1	114	0.9	135	0.6			
					2.4	40	1.9	54	1.1	116	0.9	137	0.6			
					2.4	41	1.9	55	1.1	118	0.9	139	0.6			
					2.4	42	1.9	56	1.1	120	0.9	141	0.6			
					2.4	43	1.9	57	1.1	122	0.9	143	0.6			
					2.4	44	1.9	58	1.1	124	0.9	145	0.6			
					2.4	45	1.9	59	1.1	126	0.9	147	0.6			
					2.4	46	1.9	60	1.1	128	0.9	149	0.6			
					2.4	47	1.9	61	1.1	130	0.9	151	0.6			
					2.4	48	1.9	62	1.1	132	0.9	153	0.6			
					2.4	49	1.9	63	1.1	134	0.9	155	0.6			
					2.4	50	1.9	64	1.1	136	0.9	157	0.6			
					2.4	51	1.9	65	1.1	138	0.9	159	0.6			
					2.4	52	1.9	66	1.1	140	0.9	161	0.6			
					2.4	53	1.9	67	1.1	142	0.9	163	0.6			
					2.4	54	1.9	68	1.1	144	0.9	165	0.6			
					2.4	55	1.9	69	1.1	146	0.9	167	0.6			
					2.4	56	1.9	70	1.1	148	0.9	169	0.6			
					2.4	57	1.9	71	1.1	150	0.9	171	0.6			
					2.4	58	1.9	72	1.1	152	0.9	173	0.6			
					2.4	59	1.9	73	1.1	154	0.9	175	0.6			
					2.4	60	1.9	74	1.1	156	0.9	177	0.6			
					2.4	61	1.9	75	1.1	158	0.9	179	0.6			
					2.4	62	1.9	76	1.1	160	0.9	181	0.6			
					2.4	63	1.9	77	1.1	162	0.9	183	0.6			
					2.4	64	1.9	78	1.1	164	0.9	185	0.6			
					2.4	65	1.9	79	1.1	166	0.9	187	0.6			
					2.4	66	1.9	80	1.1	168	0.9	189	0.6			
					2.4	67	1.9	81	1.1	170	0.9	191	0.6			
					2.4	68	1.9	82	1.1	172	0.9	193	0.6			
					2.4	69	1.9	83	1.1	174	0.9	195	0.6			
					2.4	70	1.9	84	1.1	176	0.9	197	0.6			
					2.4	71	1.9	85	1.1	178	0.9	199	0.6			
					2.4	72	1.9	86	1.1	180	0.9	201	0.6			
					2.4	73	1.9	87	1.1	182	0.9	203	0.6			
					2.4	74	1.9	88	1.1	184	0.9	205	0.6			
					2.4	75	1.9	89	1.1	186	0.9	207	0.6			
					2.4	76	1.9	90	1.1	188	0.9	209	0.6			
					2.4	77	1.9	91	1.1	190	0.9	211	0.6			
					2.4	78	1.9	92	1.1	192	0.9	213	0.6			
					2.4	79	1.9	93	1.1	194	0.9	215	0.6			
					2.4	80	1.9	94	1.1	196	0.9	217	0.6			
					2.4	81	1.9	95	1.1	198	0.9	219	0.6			
					2.4	82	1.9	96	1.1	200	0.9	221	0.6			

Input Parameters:
Channel Type = Trapezoidal
Cover factor = 0.87
Allowable Soil Stress = 0.02
C-D Design
Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	
10																															
20																															
30																															
40																					0.8	10	0.6	13	0.5	15					
50																				0.7	14	0.6	17	0.5	21						
60																				0.9	12	0.7	18	0.6	22	0.5	26				
70																				1	11	0.9	15	0.7	22	0.6	27	0.5	32		
80																				1.1	11	1	13	0.9	18	0.7	26	0.6	32	0.5	37
90																				1.1	14	1	16	0.9	18	0.7	26	0.6	32	0.5	43
100																				1.1	16	1	19	0.9	22	0.7	30	0.6	37	0.5	43
110																				1.1	19	1	22	0.9	25	0.7	34	0.6	42	0.5	48
120																				1.1	22	1	25	0.9	28	0.7	38	0.6	46	0.5	54
130																				1.1	24	1	27	0.9	31	0.7	42	0.6	51	0.5	60
140																				1.1	27	1	30	0.9	34	0.7	46	0.6	56	0.5	65
150																				1.1	29	1	33	0.9	37	0.7	50	0.6	61	0.5	71
160																				1	31	1	36	0.9	40	0.7	54	0.6	66	0.5	76
170																				1	34	0.9	39	0.9	43	0.7	58	0.6	70	0.5	82
180																				1	36	0.9	41	0.9	46	0.7	62	0.6	75	0.5	87
190																				1	39	0.9	44	0.9	49	0.7	66	0.6	80	0.5	93
200																				1	41	0.9	47	0.9	52	0.7	70	0.6	85	0.5	98
210																				1	44	0.9	50	0.9	55	0.7	74	0.6	90		
220																				1	46	0.9	52	0.9	58	0.7	78	0.6	94		
230																				1	49	0.9	55	0.9	61	0.7	82	0.6	99		
240																				1	51	0.9	58	0.9	64	0.7	86				
250																				1	54	0.9	60	0.9	67	0.7	89				
260																				1	56	0.9	63	0.9	70	0.7	93				
270																				1	59	0.9	66	0.9	73	0.7	97				
280																				1	61	0.9	69	0.9	76						
290																				1	63	0.9	71	0.9	79						
300																				1	66	0.9	74	0.9	82						
310																				1	68	0.9	77	0.9	85						
320																				1	71	0.9	80	0.9	88						
330																				1	73	0.9	82	0.9	91						
340																				1	76	0.9	85	0.9	94						
350																				1	78	0.9	88	0.9	97						
360																				1	81	0.9	91	0.9	100						
370																				1	83	0.9	93								
380																				1	85	0.9	96								
390																				1	88	0.9	99								
400																				1	90										
410																				1	93										
420																				1	95										
430																				1	98										
440																				1	100										
450																				1	100										
460																				1	100										
470																				1	100										
480																				1	100										
490																				1	100										
500																				1	100										

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.02

C-D Design

Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
10																														
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460																														
470																														
480																														
490																														
500																														

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.02

C-D Design

Side Slope = 8

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	
10																															
20																															
30																															
40																					0.8	12		0.7	11		0.6	14		0.5	16
50																				0.7	16		0.6	21		0.6	16		0.5	25	
60																															
70																															
80																															
90																															
100																															
110																															
120																															
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420																															
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440																															
450																															
460																															
470																															
480																															
490																															
500																															

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.03

C-D Design

Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	
10																															
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180																															
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440																															
450																															
460																															
470																															
480																															
490																															
500																															

Input Parameters:
Channel Type = Trapezoidal
Cover factor = 0.87
Allowable Soil Stress = 0.03
C-D Design
Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	
10																															
20																															
30																															
40																															
50																							0.8	10	0.6	13	0.6	15	0.6	19	
60																						0.7	13	0.6	16	0.6	19	0.6	24	0.6	28
70																					0.9	12	0.7	17	0.6	20	0.6	24	0.6	28	
80																					0.9	15	0.7	20	0.6	24	0.6	28	0.6	32	
90																					1.2	11	0.8	18	0.7	23	0.6	28	0.6	32	
100																1.3	10	1.1	13	0.8	21	0.7	27	0.6	32	0.6	37	0.6	41		
110																1.2	13	1.1	15	0.8	23	0.7	30	0.6	36	0.5	41	0.6	45		
120														1.4	11	1.2	15	1.1	17	0.8	26	0.7	33	0.6	40	0.5	45	0.6	49		
130														1.4	13	1.2	17	1.1	19	0.8	29	0.7	37	0.6	43	0.5	50	0.6	54		
140											1.6	11	1.3	15	1.2	18	1.1	21	0.8	32	0.7	40	0.6	47	0.5	54	0.6	58	0.6	62	
150											1.6	12	1.3	17	1.2	20	1.1	24	0.8	34	0.7	43	0.6	51	0.5	58	0.6	62	0.6	66	
160											1.5	14	1.3	18	1.2	22	1.1	26	0.8	37	0.7	46	0.6	55	0.5	62	0.6	66	0.6	70	
170									1.9	10	1.5	16	1.3	20	1.2	24	1.1	28	0.8	40	0.7	50	0.6	59	0.5	67	0.6	74	0.5	84	
180									1.8	11	1.5	17	1.3	22	1.2	26	1.1	30	0.8	42	0.7	53	0.6	62	0.5	71	0.6	74	0.5	84	
190									1.8	13	1.5	19	1.3	24	1.2	28	1.1	32	0.8	45	0.7	56	0.6	66	0.5	75	0.6	74	0.5	84	
200									1.8	14	1.5	20	1.3	25	1.2	30	1.1	34	0.8	48	0.7	59	0.6	70	0.5	80	0.6	74	0.5	84	
210									1.8	15	1.5	22	1.3	27	1.1	31	1	36	0.8	50	0.7	63	0.6	74	0.5	84	0.6	74	0.5	84	
220									1.8	17	1.5	23	1.3	29	1.1	33	1	38	0.8	53	0.7	66	0.6	78	0.5	88	0.6	74	0.5	84	
230									1.7	18	1.5	25	1.3	30	1.1	35	1	40	0.8	56	0.7	69	0.6	81	0.5	92	0.6	74	0.5	84	
240									2.3	10	1.7	19	1.5	26	1.3	32	1.1	37	1	42	0.8	58	0.7	73	0.6	85	0.5	97	0.6	89	
250									2.3	12	1.7	21	1.4	27	1.3	33	1.1	39	1	44	0.8	61	0.7	76	0.6	89	0.6	89	0.6	93	
260									2.2	13	1.7	22	1.4	29	1.3	35	1.1	41	1	46	0.8	64	0.7	79	0.6	93	0.6	93	0.6	97	
270									2.2	14	1.7	23	1.4	30	1.3	37	1.1	42	1	48	0.8	66	0.7	82	0.6	97	0.6	93	0.6	97	
280									2.2	15	1.7	24	1.4	32	1.3	38	1.1	44	1	50	0.8	69	0.7	85	0.6	97	0.6	93	0.6	97	
290									2.2	16	1.7	25	1.4	33	1.3	40	1.1	46	1	52	0.8	72	0.7	89	0.6	97	0.6	93	0.6	97	
300									2.2	17	1.7	27	1.4	35	1.3	41	1.1	48	1	54	0.8	74	0.7	92	0.6	97	0.6	93	0.6	97	
310									2.2	18	1.7	28	1.4	36	1.3	43	1.1	50	1	56	0.8	77	0.7	95	0.6	97	0.6	93	0.6	97	
320									2.1	19	1.7	29	1.4	37	1.3	45	1.1	51	1	58	0.8	80	0.7	99	0.6	97	0.6	93	0.6	97	
330									2.1	20	1.7	30	1.4	39	1.3	46	1.1	53	1	60	0.8	82	0.7	99	0.6	97	0.6	93	0.6	97	
340									2.1	21	1.7	32	1.4	40	1.2	48	1.1	55	1	62	0.8	85	0.7	99	0.6	97	0.6	93	0.6	97	
350									2.1	22	1.7	33	1.4	42	1.2	50	1.1	57	1	64	0.8	88	0.7	99	0.6	97	0.6	93	0.6	97	
360									2.1	23	1.7	34	1.4	43	1.2	51	1.1	59	1	66	0.8	90	0.7	99	0.6	97	0.6	93	0.6	97	
370									2.1	24	1.7	35	1.4	44	1.2	53	1.1	60	1	68	0.8	93	0.7	99	0.6	97	0.6	93	0.6	97	
380									2.1	25	1.7	36	1.4	46	1.2	54	1.1	62	1	70	0.8	96	0.7	99	0.6	97	0.6	93	0.6	97	
390									3.1	10	2.1	26	1.7	37	1.4	47	1.2	56	1.1	64	1	71	0.8	98	0.7	99	0.6	97	0.6	97	
400									3.1	11	2.1	27	1.7	39	1.4	49	1.2	57	1.1	66	1	73	0.8	98	0.7	99	0.6	97	0.6	97	
410									3.1	12	2.1	28	1.7	40	1.4	50	1.2	59	1.1	68	1	76	0.8	98	0.7	99	0.6	97	0.6	97	
420									3	12	2.1	29	1.7	41	1.4	51	1.2	61	1.1	69	1	77	0.8	98	0.7	99	0.6	97	0.6	97	
430									3	13	2.1	30	1.7	42	1.4	53	1.2	62	1.1	71	1	79	0.8	98	0.7	99	0.6	97	0.6	97	
440									3	14	2.1	31	1.6	43	1.4	54	1.2	64	1.1	73	1	81	0.8	98	0.7	99	0.6	97	0.6	97	
450									3	15	2.1	32	1.6	45	1.4	56	1.2	65	1.1	75	1	83	0.8	98	0.7	99	0.6	97	0.6	97	
460									3	16	2.1	33	1.6	46	1.4	57	1.2	67	1.1	76	1	85	0.8	98	0.7	99	0.6	97	0.6	97	
470									3	16	2.1	34	1.6	47	1.4	58	1.2	69	1.1	78	1	87	0.8	98	0.7	99	0.6	97	0.6	97	
480									3	17	2.1	35	1.6	48	1.4	60	1.2	70	1.1	80	1	89	0.8	98	0.7	99	0.6	97	0.6	97	
490									2.9	18	2	36	1.6	49	1.4	61	1.2	72	1.1	82	1	91	0.8	98	0.7	99	0.6	97	0.6	97	
500									2.9	19	2	37	1.6	50	1.4	62	1.2	73	1.1	84	1	93	0.8	98	0.7	99	0.6	97	0.6	97	

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.03

C-D Design

Side Slope = 8

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%														
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)													
10																																											
20																																											
30																																											
40																																											
50																									0.7	12	0.6	14															
60																								0.6	16	0.6	19																
70																								0.9	11	0.7	16	0.6	20	0.6	23												
80																								0.9	14	0.7	19	0.6	23	0.6	27												
90																								0.9	17	0.7	23	0.6	27	0.6	32												
100																								1.2	11	0.9	20	0.7	26	0.6	31	0.6	36										
110																								1.3	10	1.1	13	0.8	22	0.7	29	0.6	35	0.6	40								
120																								1.3	12	1.1	16	0.8	25	0.7	33	0.6	39	0.5	45								
130																								1.4	11	1.2	15	1.1	18	0.8	28	0.7	36	0.6	43	0.5	49						
140																								1.4	13	1.2	17	1.1	20	0.8	31	0.7	39	0.6	47	0.5	53						
150																								1.4	14	1.2	19	1.1	22	0.8	33	0.7	42	0.6	50	0.5	58						
160																								1.6	11	1.4	16	1.2	21	1.1	24	0.8	36	0.7	46	0.6	54	0.5	62				
170																								1.6	13	1.3	18	1.2	23	1.1	26	0.8	39	0.7	49	0.6	58	0.5	66				
180																								1.3	20	1.2	24	1.1	28	0.8	41	0.7	52	0.6	62	0.5	70						
190																								1.5	16	1.3	22	1.2	26	1.1	30	0.8	44	0.7	56	0.6	66	0.5	75				
200																								1.9	10	1.5	18	1.3	23	1.2	28	1.1	32	0.8	47	0.7	59	0.6	69	0.5	79		
210																								1.9	12	1.5	19	1.3	25	1.2	30	1.1	35	0.8	50	0.7	62	0.6	73	0.5	83		
220																								1.8	13	1.5	21	1.3	27	1.2	32	1.1	37	0.8	52	0.7	65	0.6	77	0.5	88		
230																								1.8	15	1.5	22	1.3	28	1.2	34	1.1	39	0.8	55	0.7	69	0.6	81	0.5	92		
240																								1.8	16	1.5	24	1.3	30	1.1	36	1	41	0.8	58	0.7	72	0.6	85	0.5	96		
250																								1.8	18	1.5	26	1.3	32	1.1	37	1	43	0.8	60	0.7	75	0.6	88	0.5	100		
260																								1.8	19	1.5	27	1.3	34	1.1	39	1	45	0.8	63	0.7	78	0.6	92				
270																								1.8	20	1.5	28	1.3	35	1.1	41	1	47	0.8	66	0.7	82	0.6	96				
280																								2.3	10	1.7	22	1.5	30	1.3	37	1.1	43	1	49	0.8	68	0.7	85	0.6	100		
290																								2.3	11	1.7	23	1.4	31	1.3	38	1.1	45	1	51	0.8	71	0.7	88				
300																								2.3	13	1.7	24	1.4	33	1.3	40	1.1	47	1	53	0.8	74	0.7	92				
310																								2.2	14	1.7	26	1.4	34	1.3	42	1.1	48	1	55	0.8	76	0.7	95				
320																								2.2	15	1.7	27	1.4	36	1.3	43	1.1	50	1	57	0.8	79	0.7	98				
330																								2.2	16	1.7	28	1.4	37	1.3	45	1.1	52	1	59	0.8	82						
340																								2.2	17	1.7	29	1.4	39	1.3	47	1.1	54	1	61	0.8	84						
350																								2.2	19	1.7	31	1.4	40	1.3	48	1.1	56	1	63	0.8	87						
360																								2.2	20	1.7	32	1.4	41	1.3	50	1.1	57	1	65	0.8	90						
370																								2.2	21	1.7	33	1.4	43	1.2	52	1.1	59	1	67	0.8	92						
380																								2.1	22	1.7	34	1.4	44	1.2	53	1.1	61	1	69	0.8	95						
390																								2.1	23	1.7	35	1.4	46	1.2	55	1.1	63	1	71	0.8	98						
400																								2.1	24	1.7	37	1.4	47	1.2	56	1.1	65	1	73	0.8	100						
410																								2.1	25	1.7	38	1.4	49	1.2	58	1.1	67	1	74								
420																								2.1	26	1.7	39	1.4	50	1.2	60	1.1	68	1	77								
430																								2.1	27	1.7	40	1.4	51	1.2	61	1.1	70	1	79								
440																								2.1	28	1.7	41	1.4	53	1.2	63	1.1	72	1	80								
450																								2.1	29	1.7	43	1.4	54	1.2	64	1.1	74	1	83								
460																								2.1	30	1.7	44	1.4	56	1.2	66	1.1	76	1	84								
470																								3.1	10	2.1	31	1.7	45	1.4	57	1.2	68	1.1	77	1	86						
480																								3.1	11	2.1	32	1.7	46	1.4	58	1.2	69	1.1	79	1	88						
490																								3.1	12	2.1	33	1.6	47	1.4	60	1.2	71	1.1	81	1	90						
500																								3.1	13	2.1	34	1.6	49	1.4	61	1.2	72	1.1	83	1	92						
																								3.1	14	2.1	35	1.6	50	1.4	62	1.2	74	1.1	85	1	94						

Input Parameters:
Channel Type = Trapezoidal
Cover factor = 0.87
Allowable Soil Stress = 0.05
C-D Design
Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
10																														
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360																														
370																														
380																														
390																														
400																														
410																														
420																														
430																														
440																														
450																														
460																														
470																														
480																														
490																														
500																														

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.05

C-D Design

Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%								
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)							
10																																					
20																																					
30																																					
40																																					
50																												0.6	10	0.5	13						
60																																					
70																								0.8	10	0.7	13	0.6	17	0.5	20						
80																						0.9	12	0.8	15	0.7	18	0.6	20	0.5	24						
90																						0.9	14	0.8	17	0.7	21	0.6	26								
100																				1.1	11	0.9	16	0.8	20	0.7	23	0.6	30								
110																				1.1	12	0.9	18	0.8	22	0.7	26	0.6	33								
120																				1.1	14	0.9	20	0.8	24	0.7	29	0.6	36								
130																				1.1	16	0.9	22	0.8	27	0.7	31	0.6	39								
140																				1.1	17	0.9	24	0.8	29	0.7	34	0.6	42								
150																				1.5	10	1.1	19	0.9	26	0.7	31	0.7	36	0.6	46						
160																				1.5	11	1.1	21	0.9	28	0.7	34	0.7	39	0.6	49						
170																				1.7	10	1.1	22	0.9	30	0.7	36	0.7	42	0.6	52						
180																				1.6	11	1.4	14	1	24	0.9	32	0.7	38	0.7	44	0.6	55				
190																				1.6	12	1.4	15	1	25	0.9	33	0.7	40	0.7	47	0.6	58				
200																				1.6	13	1.4	17	1	27	0.9	35	0.7	43	0.7	50	0.6	62				
210																				1.8	10	1.6	14	1.4	18	1	29	0.9	37	0.7	45	0.7	52	0.6	65		
220																				1.8	11	1.6	15	1.4	19	1	30	0.9	39	0.7	47	0.7	55	0.6	68		
230																				1.8	12	1.6	17	1.4	20	1	32	0.9	41	0.7	50	0.7	57	0.6	71		
240																				1.8	13	1.6	18	1.4	21	1	33	0.9	43	0.7	52	0.7	60	0.6	74		
250																				1.8	14	1.6	19	1.4	22	1	35	0.8	45	0.7	54	0.7	62	0.6	77		
260																				1.8	15	1.5	20	1.4	24	1	36	0.8	47	0.7	56	0.7	65	0.6	81		
270																				2.1	11	1.8	16	1.5	21	1.4	25	1	38	0.8	49	0.7	59	0.7	68	0.6	84
280																				2.1	12	1.8	17	1.5	22	1.4	26	1	39	0.8	51	0.7	61	0.7	70	0.6	87
290																				2.1	13	1.7	18	1.5	23	1.4	27	1	41	0.8	53	0.7	63	0.7	73	0.6	90
300																				2.1	14	1.7	19	1.5	24	1.4	28	1	43	0.8	55	0.7	65	0.7	75	0.6	93
310																				2	15	1.7	20	1.5	25	1.4	29	1	44	0.8	57	0.7	68	0.7	78	0.6	96
320																				2	15	1.7	21	1.5	26	1.4	31	1	46	0.8	59	0.7	70	0.7	81	0.6	100
330																				2	16	1.7	22	1.5	27	1.4	32	1	47	0.8	60	0.7	72	0.7	83		
340																				2.5	10	2	17	1.7	23	1.5	28	1.4	33	1	49	0.8	62	0.7	75	0.7	86
350																				2.5	10	2	18	1.7	24	1.5	29	1.4	34	1	50	0.8	64	0.7	77	0.7	88
360																				2.5	11	2	19	1.7	25	1.5	30	1.4	35	1	52	0.8	66	0.7	79	0.7	91
370																				2.5	12	2	20	1.7	26	1.5	31	1.4	36	1	53	0.8	68	0.7	81	0.7	94
380																				2.5	13	2	20	1.7	27	1.5	32	1.4	37	1	55	0.8	70	0.7	84	0.7	96
390																				2.4	13	2	21	1.7	28	1.5	33	1.4	39	1	57	0.8	72	0.7	86	0.7	99
400																				2.4	14	2	22	1.7	29	1.5	34	1.4	40	1	58	0.8	74	0.7	88		
410																				2.4	15	2	23	1.7	30	1.5	35	1.4	41	1	60	0.8	76	0.7	91		
420																				2.4	16	2	24	1.7	30	1.5	36	1.4	42	1	61	0.8	78	0.7	93		
430																				2.4	16	2	25	1.7	31	1.5	37	1.3	43	1	63	0.8	80	0.7	95		
440																				2.4	17	2	25	1.7	32	1.5	39	1.3	44	1	64	0.8	82	0.7	97		
450																				2.4	18	1.9	26	1.7	33	1.5	39	1.3	45	1	66	0.8	84	0.7	100		
460																				2.4	18	1.9	27	1.7	34	1.5	41	1.3	46	1	67	0.8	85				
470																				2.4	19	1.9	28	1.7	35	1.5	42	1.3	48	1	69	0.8	87				
480																				2.4	20	1.9	28	1.7	36	1.5	42	1.3	49	1	70	0.8	89				
490																				2.4	20	1.9	29	1.7	37	1.5	44	1.3	50	1	72	0.8	91				
500																				2.4	21	1.9	30	1.7	38	1.5	44	1.3	51	1	74	0.8	93				

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.05

C-D Design

Side Slope = 8

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%			
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)		
10																																
20																																
30																																
40																																
50																														0.5	12	
60																													0.6	13	0.5	16
70																									0.7	12	0.6	16	0.5	20		
80																							0.9	10	0.8	14	0.7	17	0.6	19	0.5	23
90																							0.9	12	0.8	16	0.7	20	0.6	23	0.5	27
100																							0.9	14	0.8	19	0.7	23	0.6	26	0.5	31
110																				1.1	10		0.9	16	0.8	21	0.7	25	0.6	29		
120																				1.1	12		0.9	19	0.8	24	0.7	28	0.6	32		
130																				1.1	14		0.9	21	0.8	26	0.7	31	0.6	35		
140																				1.1	16		0.9	23	0.8	28	0.7	33	0.6	39		
150																				1.1	17		0.9	25	0.8	31	0.7	36	0.6	42		
160																				1.1	19		0.9	27	0.7	33	0.7	38	0.6	45		
170															1.5	10				1.1	21		0.9	29	0.7	35	0.7	41	0.6	48		
180															1.5	11				1.1	22		0.9	31	0.7	37	0.7	44	0.6	52		
190															1.5	13				1.1	24		0.9	33	0.7	40	0.7	46	0.6	55		
200															1.5	14				1.1	26		0.9	34	0.7	42	0.7	49	0.6	58		
210															1.7	10				1.1	27		0.9	36	0.7	44	0.7	51	0.6	61		
220															1.7	11				1.5	15		1	27	0.9	38	0.7	47	0.6	64		
230															1.6	13				1.4	17		1	29	0.9	40	0.7	54	0.6	67		
240															1.6	14				1.4	18		1	31	0.9	40	0.7	49	0.7	71		
250														1.9	10				1.4	19		1	32	0.9	42	0.7	51	0.7	57	0.6	74	
260														1.9	11				1.6	16		1	34	0.9	44	0.7	53	0.7	62	0.6	77	
270														1.8	12				1.6	17		1	35	0.9	46	0.7	56	0.7	65	0.6	80	
280														1.8	13				1.6	19		1	37	0.9	48	0.7	58	0.7	67	0.6	83	
290														1.8	14				1.6	20		1	38	0.8	50	0.7	60	0.7	70	0.6	86	
300														1.8	15				1.6	21		1	40	0.8	52	0.7	63	0.7	72	0.6	90	
310														1.8	16				1.5	22		1	42	0.8	54	0.7	65	0.7	75	0.6	93	
320											2.1	11		1.8	18				1.5	23		1	43	0.8	56	0.7	67	0.7	78	0.6	96	
330											2.1	11		1.8	19				1.5	24		1	45	0.8	58	0.7	69	0.7	80	0.6	99	
340											2.1	13		1.8	20				1.5	25		1	46	0.8	60	0.7	72	0.7	83			
350											2.1	13		1.7	21				1.5	26		1	48	0.8	62	0.7	74	0.7	85			
360											2.1	14		1.7	22				1.5	27		1	49	0.8	64	0.7	76	0.7	88			
370											2.1	15		1.7	23				1.5	28		1	51	0.8	66	0.7	79	0.7	90			
380											2	16		1.7	23				1.5	29		1	53	0.8	67	0.7	81	0.7	93			
390											2	17		1.7	24				1.5	31		1	54	0.8	69	0.7	83	0.7	96			
400											2	18		1.7	25				1.5	32		1	56	0.8	71	0.7	85	0.7	98			
410											2	19		1.7	26				1.5	33		1	57	0.8	73	0.7	88					
420											2.5	10		2	20				1.7	27		1	59	0.8	75	0.7	90					
430											2.5	11		2	21				1.7	28		1	60	0.8	77	0.7	92					
440											2.5	12		2	22				1.7	29		1	62	0.8	79	0.7	94					
450											2.5	12		2	22				1.7	30		1	63	0.8	81	0.7	97					
460											2.5	13		2	23				1.7	31		1	65	0.8	83	0.7	99					
470											2.5	14		2	24				1.7	32		1	67	0.8	85							
480											2.5	15		2	25				1.7	33		1	68	0.8	87							
490											2.4	16		2	26				1.7	34		1	70	0.8	89							
500											2.4	16		2	27				1.7	35		1	71	0.8	91							
											2.4	17		2	28				1.7	36		1	73	0.8	92							

Input Parameters:
Channel Type = Trapezoidal
Cover factor = 0.87
Allowable Soil Stress = 0.07
C-D Design
Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%			
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)		
10																																
20																																
30																																
40																																
50																														0.6	12	
60																													0.7	12	0.6	14
70																										0.8	10	0.7	14	0.6	17	
80																								0.9	10	0.8	12	0.7	16	0.6	20	
90																							0.9	12	0.8	14	0.7	18	0.6	22		
100																						1.1	10	0.9	13	0.8	16	0.7	21	0.6	25	
110																						1.1	12	0.9	15	0.8	18	0.7	23	0.6	28	
120																						1.1	13	0.9	17	0.8	20	0.7	25	0.6	30	
130																					1.3	10	1.1	14	0.9	18	0.8	22	0.6	28	0.6	33
140																					1.3	11	1	16	0.9	20	0.8	23	0.6	30	0.6	36
150																					1.3	12	1	17	0.9	21	0.8	25	0.6	32	0.6	38
160																					1.3	13	1	18	0.9	23	0.8	27	0.6	34	0.6	41
170																					1.3	14	1	20	0.9	25	0.8	29	0.6	37	0.6	44
180																					1.3	15	1	21	0.9	26	0.8	31	0.6	39	0.6	46
190																					1.3	16	1	22	0.9	28	0.8	32	0.6	41	0.6	49
200																					1.8	10	1	24	0.9	29	0.8	34	0.6	43	0.6	51
210																					1.8	10	1	25	0.9	31	0.8	36	0.6	46	0.6	54
220																					1.8	11	1	26	0.9	32	0.8	38	0.6	48	0.6	57
230																					1.8	12	1	28	0.9	34	0.8	40	0.6	50	0.6	59
240																					2	10	1	29	0.9	36	0.8	42	0.6	52	0.6	62
250																					2	11	1	30	0.9	37	0.8	43	0.6	55	0.6	65
260																					2	11	1	32	0.9	39	0.8	45	0.6	57	0.6	67
270																					2	12	1	33	0.9	40	0.8	47	0.6	59	0.6	70
280																					2	13	1	34	0.9	42	0.8	49	0.6	61	0.6	73
290																					2.2	10	1	36	0.9	43	0.8	51	0.6	64	0.6	75
300																					2.2	11	1	37	0.9	45	0.8	52	0.6	66	0.6	78
310																					2.2	11	1	38	0.9	47	0.8	54	0.6	68	0.6	80
320																					2.2	12	1	40	0.9	48	0.8	56	0.6	70	0.6	83
330																					2.2	13	1	41	0.9	50	0.8	58	0.6	73	0.6	86
340																					2.2	13	1	42	0.9	51	0.8	60	0.6	75	0.6	88
350																					2.2	14	1	44	0.9	53	0.8	61	0.6	77	0.6	91
360																					2.6	10	1	45	0.9	55	0.8	63	0.6	79	0.6	94
370																					2.6	10	1	46	0.9	56	0.8	65	0.6	82	0.6	96
380																					2.6	11	1	48	0.9	58	0.8	67	0.6	84	0.6	99
390																					2.6	11	1	49	0.9	59	0.8	69	0.6	86		
400																					2.6	12	1	50	0.9	61	0.8	71	0.6	88		
410																					2.6	13	1	52	0.9	62	0.8	72	0.6	91		
420																					2.6	13	1	53	0.9	64	0.8	74	0.6	93		
430																					2.5	14	1	54	0.9	66	0.8	76	0.6	95		
440																					2.5	14	1	56	0.9	67	0.8	78	0.6	97		
450																					2.5	15	1	57	0.9	69	0.8	80	0.6	99		
460																					2.5	15	1	58	0.9	70	0.8	81				
470																					2.5	16	1	59	0.9	72	0.8	83				
480																					3.1	10	1	61	0.9	73	0.8	85				
490																					3.1	10	1	62	0.9	75	0.8	87				
500																					3.1	11	1	63	0.9	76	0.8	89				

Input Parameters:
Channel Type = Trapezoidal
Cover factor = 0.87
Allowable Soil Stress = 0.07
C-D Design
Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%					
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)				
10																																		
20																																		
30																																		
40																																		
50																														0.6	11			
60																													0.7	11	0.6	14		
70																												0.7	13	0.6	16			
80																										0.8	11	0.7	15	0.6	19			
90																								0.9	10	0.8	13	0.7	18	0.6	22			
100																								0.9	12	0.8	15	0.7	20	0.6	24			
110																							1.1	10	0.9	14	0.8	17	0.7	22	0.6	27		
120																							1.1	11	0.9	15	0.8	19	0.7	25	0.6	30		
130																							1.1	13	0.9	17	0.8	21	0.7	27	0.6	32		
140																							1.1	14	0.9	19	0.8	22	0.7	29	0.6	35		
150																							1.4	10	0.9	20	0.8	24	0.6	31	0.6	38		
160																							1.3	11	1	17	0.9	22	0.8	26	0.6	40	0.6	40
170																							1.3	12	1	18	0.9	24	0.8	28	0.6	36	0.6	43
180																							1.3	14	1	20	0.9	25	0.8	30	0.6	38	0.6	46
190																							1.3	15	1	21	0.9	27	0.8	32	0.6	40	0.6	48
200																							1.3	16	1	23	0.9	28	0.8	34	0.6	43	0.6	51
210																							1.3	17	1	24	0.9	30	0.8	35	0.6	45	0.6	54
220																							1.3	18	1	25	0.9	32	0.8	37	0.6	47	0.6	56
230																							1.3	19	1	27	0.9	33	0.8	39	0.6	50	0.6	59
240																							1.8	10	1	28	0.9	35	0.8	41	0.6	52	0.6	62
250																							1.8	11	1	29	0.9	36	0.8	43	0.6	54	0.6	64
260																							1.8	12	1	31	0.9	38	0.8	45	0.6	56	0.6	67
270																							1.8	12	1	32	0.9	40	0.8	46	0.6	59	0.6	70
280																							1.8	13	1	33	0.9	41	0.8	48	0.6	61	0.6	72
290																							2	10	1	35	0.9	43	0.8	50	0.6	63	0.6	75
300																							2	11	1	36	0.9	44	0.8	52	0.6	65	0.6	77
310																							2	12	1	37	0.9	46	0.8	54	0.6	68	0.6	80
320																							2	13	1	39	0.9	48	0.8	55	0.6	70	0.6	83
330																							2	13	1	40	0.9	49	0.8	57	0.6	72	0.6	85
340																							2	14	1	41	0.9	51	0.8	59	0.6	74	0.6	88
350																							2.3	10	1	43	0.9	52	0.8	61	0.6	77	0.6	91
360																							2.3	11	1	44	0.9	54	0.8	63	0.6	79	0.6	93
370																							2.2	12	1	45	0.9	55	0.8	64	0.6	81	0.6	96
380																							2.2	12	1	47	0.9	57	0.8	66	0.6	83	0.6	99
390																							2.2	13	1	48	0.9	59	0.8	68	0.6	86		
400																							2.2	14	1	49	0.9	60	0.8	70	0.6	88		
410																							2.2	14	1	51	0.9	62	0.8	72	0.6	90		
420																							2.2	15	1	52	0.9	63	0.8	74	0.6	92		
430																							2.2	16	1	53	0.9	65	0.8	75	0.6	95		
440																							2.6	10	1	55	0.9	66	0.8	77	0.6	97		
450																							2.6	10	1	56	0.9	68	0.8	79	0.6	99		
460																							2.6	11	1	57	0.9	70	0.8	81				
470																							2.6	11	1	59	0.9	71	0.8	83				
480																							2.6	12	1	60	0.9	73	0.8	84				
490																							2.6	13	1	61	0.9	74	0.8	86				
500																							2.6	13	1	63	0.9	76	0.8	88				

Input Parameters:
Channel Type = Trapezoidal
Cover factor = 0.87
Allowable Soil Stress = 0.07
C-D Design
Side Slope = 8

Q	S = 0.1%	S = 0.25%	S = 0.5%	S = 0.75%	S = 1%	S = 1.25%	S = 1.5%	S = 1.75%	S = 2%	S = 3%	S = 4%	S = 5%	S = 6%	S = 8%	S = 10%
	D(ft) B(ft)	D(ft) B(ft)	D(ft) B(ft)	D(ft) B(ft)	D(ft) B(ft)	D(ft) B(ft)	D(ft) B(ft)	D(ft) B(ft)	D(ft) B(ft)	D(ft) B(ft)	D(ft) B(ft)	D(ft) B(ft)	D(ft) B(ft)	D(ft) B(ft)	D(ft) B(ft)
10															
20															
30															
40															
50															0.6 10
60														0.7 10	0.6 13
70														0.7 12	0.6 16
80													0.9 10	0.7 15	0.6 18
90													0.8 12	0.7 17	0.6 21
100												1 10	0.8 14	0.7 19	0.6 24
110												0.9 12	0.8 16	0.7 22	0.6 26
120												0.9 14	0.8 18	0.7 24	0.6 29
130											1.1 11	0.9 16	0.8 20	0.7 26	0.6 32
140											1.1 13	0.9 17	0.8 22	0.7 29	0.6 34
150											1.1 14	0.9 19	0.8 23	0.7 31	0.6 37
160											1.1 16	0.9 21	0.8 25	0.6 33	0.6 40
170										1.4 10	1.1 17	0.9 22	0.8 27	0.6 35	0.6 42
180										1.4 11	1.1 19	0.9 24	0.8 29	0.6 38	0.6 45
190										1.3 12	1 20	0.9 26	0.8 31	0.6 40	0.6 48
200										1.3 14	1 21	0.9 27	0.8 33	0.6 42	0.6 51
210										1.3 15	1 23	0.9 29	0.8 35	0.6 44	0.6 53
220										1.3 16	1 24	0.9 31	0.8 36	0.6 47	0.6 56
230										1.3 17	1 25	0.9 32	0.8 38	0.6 49	0.6 58
240										1.3 18	1 27	0.9 34	0.8 40	0.6 51	0.6 61
250										1.3 20	1 28	0.9 36	0.8 42	0.6 54	0.6 64
260										1.3 21	1 30	0.9 37	0.8 44	0.6 56	0.6 66
270										1.3 22	1 31	0.9 39	0.8 46	0.6 58	0.6 69
280									1.9 10	1.3 23	1 32	0.9 40	0.8 47	0.6 60	0.6 72
290									1.8 11	1.3 24	1 34	0.9 42	0.8 49	0.6 63	0.6 74
300									1.8 12	1.3 25	1 35	0.9 43	0.8 51	0.6 65	0.6 77
310									1.8 13	1.3 26	1 36	0.9 45	0.8 53	0.6 67	0.6 80
320									1.8 14	1.3 27	1 38	0.9 47	0.8 55	0.6 69	0.6 82
330								2.1 10	1.8 15	1.3 29	1 39	0.9 48	0.8 57	0.6 72	0.6 85
340								2 10	1.8 15	1.2 30	1 41	0.9 50	0.8 58	0.6 74	0.6 88
350								2 11	1.8 16	1.2 31	1 42	0.9 51	0.8 60	0.6 76	0.6 90
360								2 12	1.8 17	1.2 32	1 43	0.9 53	0.8 62	0.6 78	0.6 93
370								2 13	1.7 18	1.2 33	1 44	0.9 55	0.8 64	0.6 81	0.6 96
380								2 14	1.7 19	1.2 34	1 46	0.9 56	0.8 66	0.6 83	0.6 98
390								2 15	1.7 20	1.2 35	1 47	0.9 58	0.8 68	0.6 85	
400								2 16	1.7 21	1.2 36	1 48	0.9 59	0.8 69	0.6 87	
410							2.3 10	2 16	1.7 21	1.2 37	1 50	0.9 61	0.8 71	0.6 90	
420							2.3 11	1.9 17	1.7 22	1.2 38	1 51	0.9 63	0.8 73	0.6 92	
430							2.3 11	1.9 18	1.7 23	1.2 39	1 52	0.9 64	0.8 75	0.6 94	
440							2.3 12	1.9 19	1.7 24	1.2 40	1 54	0.9 66	0.8 77	0.6 96	
450							2.3 13	1.9 19	1.7 25	1.2 42	1 55	0.9 67	0.8 79	0.6 99	
460							2.2 14	1.9 20	1.7 26	1.2 43	1 56	0.9 69	0.8 80		
470							2.2 14	1.9 21	1.7 26	1.2 44	1 58	0.9 70	0.8 82		
480							2.2 15	1.9 22	1.7 27	1.2 45	1 59	0.9 72	0.8 84		
490							2.2 16	1.9 22	1.7 28	1.2 46	1 60	0.9 74	0.8 86		
500							2.2 16	1.9 23	1.7 29	1.2 47	1 62	0.9 75	0.8 88		

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.02

C-D Design

Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%			
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)		
10																																
20																																
30																																
40																					0.8	10	0.7	13	0.6	11	0.5	13				
50																					0.8	13	0.7	17	0.6	20	0.5	18				
60																					1.1	11	0.8	16	0.7	21	0.6	24	0.5	23		
70																					1.1	13	0.8	19	0.7	24	0.6	29	0.5	28		
80																					1	13	0.8	22	0.7	28	0.6	33	0.5	33		
90																					1	15	0.8	25	0.7	32	0.6	38	0.5	38		
100																					1	15	0.8	28	0.7	36	0.6	42	0.5	43		
110																					1.3	11	1.1	13	1	15	0.8	22	0.7	28		
120																					1	20	0.8	29	0.7	36	0.6	42	0.5	48		
130																					1	23	0.8	32	0.7	39	0.6	46	0.5	53		
140																					1	23	0.8	32	0.7	39	0.6	46	0.5	57		
150																					1	24	0.8	34	0.7	41	0.6	48	0.5	62		
160																					1	27	0.8	38	0.6	47	0.6	55	0.5	67		
170																					1	29	0.8	41	0.6	51	0.6	59	0.5	67		
180																					1	29	0.8	41	0.6	51	0.6	59	0.5	72		
190																					1	29	0.8	41	0.6	51	0.6	59	0.5	72		
200																					2.1	10	1.6	16	1.4	20	1.2	25	1.1	28	0.6	64
210																					2.1	11	1.6	17	1.4	22	1.2	26	1.1	30	0.6	64
220																					2	12	1.6	19	1.3	24	1.2	28	1.1	33	0.6	68
230																					2	12	1.6	19	1.3	24	1.2	28	1.1	33	0.6	68
240																					2	13	1.6	20	1.3	25	1.2	30	1.1	35	0.6	69
250																					2	15	1.6	21	1.3	27	1.2	32	1.1	37	0.6	77
260																					2	16	1.6	23	1.3	29	1.2	34	1.1	39	0.6	77
270																					2	16	1.6	23	1.3	29	1.2	34	1.1	39	0.6	82
280																					2	17	1.6	24	1.3	30	1.2	36	1.1	41	0.6	87
290																					2	17	1.6	24	1.3	30	1.2	36	1.1	41	0.6	87
300																					2	18	1.6	26	1.3	32	1.2	38	1.1	43	0.6	92
310																					2	18	1.6	26	1.3	32	1.2	38	1.1	43	0.6	92
320																					2	19	1.6	27	1.3	34	1.2	40	1.1	45	0.6	94
330																					2	19	1.6	27	1.3	34	1.2	40	1.1	45	0.6	94
340																					2.8	10	1.9	20	1.6	28	1.3	35	1.2	42	0.6	98
350																					2.8	11	1.9	21	1.5	30	1.3	37	1.2	43	0.6	98
360																					2.8	11	1.9	21	1.5	30	1.3	37	1.2	43	0.6	98
370																					2.8	11	1.9	23	1.5	31	1.3	38	1.2	45	0.6	99
380																					2.7	12	1.9	24	1.5	32	1.3	40	1.2	47	0.6	99
390																					2.7	12	1.9	24	1.5	32	1.3	40	1.2	47	0.6	99
400																					2.7	13	1.9	25	1.5	34	1.3	42	1.2	49	0.6	99
410																					2.7	13	1.9	25	1.5	34	1.3	42	1.2	49	0.6	99
420																					2.7	14	1.9	26	1.5	35	1.3	43	1.2	51	0.6	99
430																					2.7	14	1.9	26	1.5	35	1.3	43	1.2	51	0.6	99
440																					2.7	15	1.9	27	1.5	37	1.3	45	1.2	53	0.6	99
450																					2.7	15	1.9	27	1.5	37	1.3	45	1.2	53	0.6	99
460																					2.7	16	1.9	28	1.5	38	1.3	47	1.2	55	0.6	99
470																					2.7	16	1.9	28	1.5	38	1.3	47	1.2	55	0.6	99
480																					2.7	17	1.9	29	1.5	39	1.3	48	1.2	56	0.6	99
490																					2.7	17	1.9	29	1.5	39	1.3	48	1.2	56	0.6	99
500																					2.7	17	1.9	29	1.5	39	1.3	48	1.2	56	0.6	99

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.02

C-D Design

Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	
10																															
20																															
30																															
40																															
50																															
60																															
70																															
80																															
90																															
100																															
110																															
120																															
130																															
140																															
150																															
160																															
170																															
180																															
190																															
200																															
210																															
220																															
230																															
240																															
250																															
260																															
270																															
280																															
290																															
300																															
310																															
320																															
330																															
340																															
350																															
360																															
370																															
380																															
390																															
400																															
410																															
420																															
430																															
440																															
450																															
460																															
470																															
480																															
490																															
500																															

Input Parameters:
Channel Type = Trapezoidal
Cover factor = 0.9
Allowable Soil Stress = 0.02
C-D Design
Side Slope = 8

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%			
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)		
10																																
20																																
30																																
40																																
50																					0.9	10	0.7	11	0.6	14	0.6	19	0.5	22		
60																				0.8	14	0.7	19	0.6	23	0.6	23	0.5	27			
70																				0.8	17	0.7	23	0.6	28	0.6	28	0.5	32			
80																			1.1	12	0.8	21	0.7	27	0.6	32	0.5	37				
90																			1.1	15	0.8	24	0.7	31	0.6	36	0.5	42				
100														1.3	11	1.2	14	1	17	0.8	27	0.7	34	0.6	41	0.5	47					
110													1.3	13	1.1	17	1	20	0.8	30	0.7	38	0.6	45	0.5	52						
120											1.5	10	1.3	15	1.1	19	1	22	0.8	33	0.7	42	0.6	50	0.5	56						
130											1.5	12	1.3	17	1.1	21	1	25	0.8	36	0.7	46	0.6	54	0.5	61						
140											1.4	14	1.2	19	1.1	24	1	27	0.8	39	0.7	49	0.6	58	0.5	66						
150											1.4	16	1.2	21	1.1	26	1	30	0.8	43	0.7	53	0.6	63	0.5	71						
160									1.7	11	1.4	18	1.2	23	1.1	28	1	32	0.8	46	0.6	57	0.6	67	0.5	76						
170									1.7	13	1.4	20	1.2	25	1.1	30	1	34	0.8	49	0.6	61	0.6	71	0.5	81						
180									1.7	15	1.4	22	1.2	27	1.1	32	1	37	0.8	52	0.6	65	0.6	76	0.5	86						
190									1.7	16	1.4	24	1.2	29	1.1	34	1	39	0.8	55	0.6	68	0.6	80	0.5	91						
200									1.6	18	1.4	25	1.2	31	1.1	37	1	41	0.8	58	0.6	72	0.6	85	0.5	96						
210									1.6	20	1.4	27	1.2	33	1.1	39	1	44	0.8	61	0.6	76	0.6	89								
220						2.1	10		1.6	21	1.4	29	1.2	35	1.1	41	1	46	0.8	64	0.6	80	0.6	93								
230						2.1	12		1.6	23	1.3	30	1.2	37	1.1	43	1	48	0.8	67	0.6	83	0.6	98								
240						2.1	13		1.6	24	1.3	32	1.2	39	1.1	45	1	51	0.8	70	0.6	87										
250						2.1	15		1.6	26	1.3	34	1.2	41	1.1	47	1	53	0.8	73	0.6	91										
260						2	16		1.6	27	1.3	36	1.2	43	1.1	49	1	55	0.8	77	0.6	95										
270						2	18		1.6	29	1.3	37	1.2	45	1.1	52	1	58	0.8	80	0.6	98										
280						2	19		1.6	30	1.3	39	1.2	47	1.1	54	1	60	0.8	83												
290						2	20		1.6	31	1.3	41	1.2	48	1.1	56	1	62	0.8	86												
300						2	21		1.6	33	1.3	42	1.2	50	1.1	58	1	65	0.8	89												
310						2	23		1.6	34	1.3	44	1.2	52	1.1	60	1	67	0.8	92												
320						2	24		1.6	36	1.3	46	1.2	54	1.1	62	1	69	0.8	95												
330						2	25		1.5	37	1.3	47	1.2	56	1.1	64	1	72	0.8	98												
340						1.9	26		1.5	39	1.3	49	1.2	58	1.1	66	1	74														
350						1.9	27		1.5	40	1.3	50	1.2	60	1.1	68	1	76														
360						1.9	29		1.5	41	1.3	52	1.2	62	1	70	1	79														
370						2.9	11		1.9	30	1.5	43	1.3	54	1.2	63	1	73	1	81												
380						2.8	12		1.9	31	1.5	44	1.3	55	1.2	65	1	75	1	83												
390						2.8	13		1.9	32	1.5	46	1.3	57	1.2	67	1	77	1	85												
400						2.8	14		1.9	33	1.5	47	1.3	59	1.2	69	1	79	1	88												
410						2.8	15		1.9	34	1.5	48	1.3	60	1.2	71	1	81	1	90												
420						2.8	16		1.9	36	1.5	50	1.3	62	1.2	73	1	83	1	92												
430						2.7	17		1.9	37	1.5	51	1.3	64	1.2	75	1	85	1	95												
440						2.7	18		1.9	38	1.5	53	1.3	65	1.2	77	1	87	1	97												
450						2.7	19		1.9	39	1.5	54	1.3	67	1.2	78	1	89	1	99												
460						2.7	20		1.9	40	1.5	55	1.3	69	1.2	80	1	91														
470						2.7	21		1.9	41	1.5	57	1.3	70	1.2	82	1	93														
480						2.7	22		1.9	42	1.5	58	1.3	72	1.2	84	1	95														
490						2.7	23		1.9	44	1.5	60	1.3	73	1.2	86	1	98														
500						2.6	23		1.9	45	1.5	61	1.3	75	1.2	88	1	100														

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.03

C-D Design

Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%						
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)					
10																																			
20																																			
30																																			
40																																			
50																							0.8	10	0.7	10	0.6	11	0.5	11	0.5	15			
60																						0.8	13	0.7	16	0.6	18	0.5	23	0.5	27				
70																					1	11	0.8	15	0.7	19	0.6	22	0.5	27					
80																					1	13	0.8	18	0.7	22	0.6	25	0.5	31					
90																					1	16	0.8	20	0.7	25	0.6	28	0.5	35					
100																					1.3	11	0.9	18	0.8	23	0.7	27	0.6	32	0.5	39			
110															1.4	10	1.3	13	0.9	20	0.9	20	0.8	25	0.7	30	0.6	35	0.5	43					
120															1.4	12	1.3	14	0.9	22	0.9	22	0.8	28	0.7	33	0.6	38	0.5	47					
130															1.6	11	1.4	13	1.2	16	0.9	24	0.8	30	0.7	36	0.6	42	0.5	51					
140															1.6	12	1.4	15	1.2	17	0.9	26	0.8	33	0.7	39	0.6	45	0.5	55					
150															1.8	10	1.5	13	1.4	16	1.2	19	0.9	28	0.8	35	0.7	42	0.6	48	0.5	59			
160															1.8	11	1.5	15	1.3	18	1.2	20	0.9	30	0.8	38	0.7	45	0.6	52	0.5	63			
170															1.8	12	1.5	16	1.3	19	1.2	22	0.9	32	0.8	40	0.7	48	0.6	55	0.5	67			
180															1.8	13	1.5	17	1.3	20	1.2	23	0.9	34	0.8	43	0.7	51	0.6	58	0.5	71			
190															2.1	10	1.7	14	1.5	18	1.3	22	1.2	25	0.9	36	0.8	45	0.7	54	0.6	62	0.5	76	
200															2.1	10	1.7	15	1.5	19	1.3	23	1.2	26	0.9	38	0.8	48	0.7	57	0.6	65	0.5	80	
210															2.1	11	1.7	16	1.5	21	1.3	24	1.2	28	0.9	40	0.8	50	0.7	60	0.6	68	0.5	84	
220															2.1	12	1.7	17	1.5	22	1.3	26	1.2	29	0.9	42	0.8	53	0.7	63	0.6	72	0.5	88	
230															2.1	13	1.7	19	1.5	23	1.3	27	1.2	31	0.9	44	0.8	55	0.7	66	0.6	75	0.5	92	
240															2.1	14	1.7	20	1.5	24	1.3	29	1.2	32	0.9	46	0.8	58	0.7	69	0.6	78	0.5	96	
250															2	15	1.7	21	1.5	26	1.3	30	1.2	34	0.9	48	0.8	60	0.7	71	0.6	82	0.5	100	
260															2	16	1.7	22	1.5	27	1.3	31	1.2	35	0.9	50	0.8	63	0.7	74	0.6	85			
270															2.6	10	2	17	1.7	23	1.5	28	1.3	33	1.2	37	0.9	52	0.8	65	0.7	77	0.6	88	
280															2.6	10	2	18	1.7	24	1.5	29	1.3	34	1.2	38	0.9	54	0.8	68	0.7	80	0.6	92	
290															2.6	11	2	19	1.7	25	1.5	30	1.3	35	1.2	40	0.9	56	0.8	70	0.7	83	0.6	95	
300															2.6	12	2	20	1.7	26	1.5	31	1.3	37	1.2	41	0.9	58	0.8	73	0.7	86	0.6	98	
310															2.6	13	2	21	1.7	27	1.4	33	1.3	38	1.2	43	0.9	60	0.8	75	0.7	89			
320															2.6	13	2	21	1.7	28	1.4	34	1.3	39	1.2	44	0.9	62	0.8	78	0.7	92			
330															2.6	14	2	22	1.7	29	1.4	35	1.3	41	1.2	46	0.9	64	0.8	80	0.7	95			
340															2.6	15	2	23	1.7	30	1.4	36	1.3	42	1.2	47	0.9	66	0.8	83	0.7	98			
350															2.5	16	2	24	1.7	31	1.4	37	1.3	43	1.2	49	0.9	68	0.8	85					
360															2.5	16	2	25	1.7	32	1.4	39	1.3	45	1.2	50	0.9	70	0.8	88					
370															2.5	17	2	26	1.6	33	1.4	40	1.3	46	1.2	52	0.9	72	0.8	90					
380															2.5	18	2	27	1.6	34	1.4	41	1.3	47	1.2	53	0.9	74	0.8	93					
390															2.5	18	2	27	1.6	35	1.4	42	1.3	49	1.2	55	0.9	76	0.8	95					
400															2.5	19	2	28	1.6	36	1.4	43	1.3	50	1.2	56	0.9	79	0.8	98					
410															2.5	20	2	29	1.6	37	1.4	44	1.3	51	1.2	58	0.9	80	0.8	100					
420															2.5	20	1.9	30	1.6	38	1.4	46	1.3	53	1.2	59	0.9	82							
430															2.5	21	1.9	31	1.6	39	1.4	47	1.3	54	1.2	61	0.9	85							
440															2.5	22	1.9	32	1.6	40	1.4	48	1.3	55	1.2	62	0.9	87							
450															2.5	22	1.9	33	1.6	41	1.4	49	1.3	57	1.2	64	0.9	89							
460															3.6	10	2.5	23	1.9	33	1.6	42	1.4	50	1.3	58	1.2	65	0.9	91					
470															3.6	10	2.5	24	1.9	34	1.6	43	1.4	51	1.3	59	1.2	66	0.9	92					
480															3.6	11	2.5	24	1.9	35	1.6	44	1.4	53	1.3	61	1.2	68	0.9	95					
490															3.6	11	2.5	25	1.9	36	1.6	45	1.4	54	1.3	62	1.2	69	0.9	97					
500															3.6	12	2.5	26	1.9	37	1.6	46	1.4	55	1.3	63	1.2	71	0.9	99					

Input Parameters:
Channel Type = Trapezoidal
Cover factor = 0.9
Allowable Soil Stress = 0.03
C-D Design
Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
10																														
20																														
30																														
40																														
50																														
60																														
70																														
80																														
90																														
100																														
110																														
120																														
130																														
140																														
150																														
160																														
170																														
180																														
190																														
200																														
210																														
220																														
230																														
240																														
250																														
260																														
270																														
280																														
290																														
300																														
310																														
320																														
330																														
340																														
350																														
360																														
370																														
380																														
390																														
400																														
410																														
420																														
430																														
440																														
450																														
460																														
470																														
480																														
490																														
500																														

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.03

C-D Design

Side Slope = 8

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	
10																															
20																															
30																															
40																															
50																															
60																															
70																															
80																															
90																															
100																															
110																															
120																															
130																															
140																															
150																															
160																															
170																															
180																															
190																															
200																															
210																															
220																															
230																															
240																															
250																															
260																															
270																															
280																															
290																															
300																															
310																															
320																															
330																															
340																															
350																															
360																															
370																															
380																															
390																															
400																															
410																															
420																															
430																															
440																															
450																															
460																															
470																															
480																															
490																															
500																															

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.05

C-D Design

Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%			
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)		
10																																
20																																
30																																
40																																
50																														0.6	10	
60																														0.7	10	
70																													0.7	13	0.6	16
80																													0.6	15	0.6	18
90																													0.6	18	0.6	21
100																													0.6	20	0.6	24
110																													0.6	23	0.6	27
120																													0.6	25	0.5	30
130																													0.6	28	0.5	33
140																													0.6	30	0.5	36
150																													0.6	32	0.5	39
160																													0.6	35	0.5	41
170																													0.6	37	0.5	44
180																													0.6	40	0.5	47
190																													0.6	42	0.5	50
200																													0.6	45	0.5	53
210																													0.6	47	0.5	56
220																													0.6	49	0.5	58
230																													0.6	52	0.5	61
240																													0.6	54	0.5	64
250																													0.6	57	0.5	67
260																													0.6	59	0.5	70
270																													0.6	62	0.5	73
280																													0.6	64	0.5	76
290																													0.6	66	0.5	78
300																													0.6	69	0.5	81
310																													0.6	71	0.5	84
320																													0.6	74	0.5	87
330																													0.6	77	0.5	90
340																													0.6	79	0.5	93
350																													0.6	81	0.5	96
360																													0.6	83	0.5	99
370																													0.6	86		
380																													0.6	88		
390																													0.6	91		
400																													0.6	93		
410																													0.6	96		
420																													0.6	98		
430																													0.6	100		
440																													0.6	83		
450																													0.6	75	0.7	87
460																													0.6	77	0.7	88
470																													0.6	78	0.7	90
480																													0.6	80	0.7	92
490																													0.6	82	0.7	94
500																													0.6	83	0.7	96

Input Parameters:
Channel Type = Trapezoidal
Cover factor = 0.9
Allowable Soil Stress = 0.05
C-D Design
Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	
10																															
20																															
30																															
40																															
50																															
60																															
70																															
80																															
90																															
100																															
110																															
120																															
130																															
140																															
150																															
160																															
170																															
180																															
190																															
200																															
210																															
220																															
230																															
240																															
250																															
260																															
270																															
280																															
290																															
300																															
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320																															
330																															
340																															
350																															
360																															
370																															
380																															
390																															
400																															
410																															
420																															
430																															
440																															
450																															
460																															
470																															
480																															
490																															
500																															

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.05

C-D Design

Side Slope = 8

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%											
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)										
10																																								
20																																								
30																																								
40																																								
50																														0.6	11									
60																													0.7	11	0.6	14								
70																												0.7	14	0.6	17									
80																									0.8	11			0.7	16	0.6	20								
90																								0.9	10	0.8	14	0.6	19	0.6	23									
100																								0.9	12	0.8	16	0.6	21	0.6	26									
110																							1.1	10	0.9	14	0.8	18	0.6	24	0.6	29								
120																							1.1	11	0.9	16	0.8	20	0.6	26	0.6	32								
130																							1	13	0.9	18	0.8	22	0.6	29	0.6	35								
140																							1	15	0.9	20	0.8	24	0.6	31	0.5	37								
150																							1	16	0.9	21	0.8	26	0.6	34	0.5	40								
160																							1	18	0.9	23	0.8	28	0.6	36	0.5	43								
170																							1.3	11	1	18	0.9	23	0.8	28	0.6	36	0.5	43						
180																							1.3	12	1	19	0.9	25	0.8	30	0.6	39	0.5	46						
190																							1.3	14	1	21	0.9	27	0.8	32	0.6	41	0.5	49						
200																							1.3	15	1	22	0.9	29	0.8	34	0.6	43	0.5	52						
210																							1.3	16	1	24	0.8	30	0.7	36	0.6	46	0.5	55						
220																							1.2	18	1	25	0.8	32	0.7	38	0.6	48	0.5	58						
230																							1.2	19	1	27	0.8	34	0.7	40	0.6	51	0.5	60						
240																							1.2	20	1	28	0.8	36	0.7	42	0.6	53	0.5	63						
250																							1.2	21	1	30	0.8	37	0.7	44	0.6	56	0.5	66						
260																							1.8	10	1.2	23	1	31	0.8	39	0.7	46	0.6	58	0.5	69				
270																							1.8	11	1.2	24	1	33	0.8	41	0.7	48	0.6	61	0.5	72				
280																							1.7	12	1.2	25	1	34	0.8	43	0.7	50	0.6	63	0.5	75				
290																							1.7	13	1.2	26	1	36	0.8	44	0.7	52	0.6	65	0.5	78				
300																							1.7	14	1.2	27	1	37	0.8	46	0.7	54	0.6	68	0.5	80				
310																							2	10	1.7	15	1.2	29	1	39	0.8	48	0.7	56	0.6	70	0.5	83		
320																							1.9	11	1.7	16	1.2	30	1	40	0.8	49	0.7	58	0.6	73	0.5	86		
330																							1.9	12	1.7	17	1.2	31	1	42	0.8	51	0.7	60	0.6	75	0.5	89		
340																							1.9	13	1.7	18	1.2	32	1	43	0.8	53	0.7	62	0.6	78	0.5	92		
350																							1.9	14	1.7	19	1.2	33	1	45	0.8	55	0.7	64	0.6	80	0.5	95		
360																							1.9	15	1.7	20	1.2	35	1	46	0.8	56	0.7	66	0.6	83	0.5	98		
370																							2.2	10	1.9	16	1.6	21	1.2	36	1	48	0.8	58	0.7	68	0.6	85	0.5	100
380																							2.2	10	1.9	17	1.6	22	1.2	37	1	49	0.8	60	0.7	70	0.6	87		
390																							2.2	11	1.9	17	1.6	23	1.2	38	1	50	0.8	61	0.7	72	0.6	90		
400																							2.2	12	1.8	18	1.6	23	1.2	39	1	52	0.8	63	0.7	74	0.6	92		
410																							2.1	13	1.8	19	1.6	24	1.2	40	1	53	0.8	65	0.7	76	0.6	95		
420																							2.1	14	1.8	20	1.6	25	1.2	41	1	55	0.8	67	0.7	77	0.6	97		
430																							2.1	15	1.8	21	1.6	26	1.2	43	1	56	0.8	68	0.7	79	0.6	100		
440																							2.1	15	1.8	22	1.6	27	1.2	44	1	58	0.8	70	0.7	81				
450																							2.1	16	1.8	22	1.6	28	1.2	45	1	59	0.8	72	0.7	83				
460																							2.1	17	1.8	23	1.6	29	1.2	46	1	61	0.8	73	0.7	85				
470																							2.1	18	1.8	24	1.6	29	1.2	47	1	62	0.8	75	0.7	87				
480																							2.5	10	2.1	18	1.8	25	1.6	30	1.2	48	1	64	0.8	77	0.7	89		
490																							2.5	11	2.1	19	1.8	26	1.6	31	1.2	50	1	65	0.8	79	0.7	91		
500																							2.5	12	2.1	20	1.8	26	1.6	32	1.2	51	1	66	0.8	80	0.7	93		
																							2.5	12	2.1	21	1.8	27	1.6	33	1.2	52	1	68	0.8	82	0.7	95		

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.07

C-D Design

Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%			
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)		
10																																
20																																
30																																
40																																
50																														0.6	10	
60																														0.6	12	
70																													0.8	10	0.6	14
80																												0.8	11	0.6	16	
90																										0.9	10	0.8	13	0.6	18	
100																										0.9	11	0.8	15	0.6	20	
110																								1.1	10	0.9	12	0.7	17	0.6	22	
120																								1.1	11	0.9	14	0.7	18	0.6	24	
130																								1	12	0.9	15	0.7	20	0.6	26	
140																								1	14	0.9	17	0.7	22	0.6	28	
150																							1.3	10	1	15	0.9	18	0.7	24	0.6	30
160																							1.2	11	1	16	0.9	19	0.7	25	0.6	32
170																							1.2	12	1	17	0.9	21	0.7	27	0.6	34
180																							1.2	13	1	18	0.9	22	0.7	29	0.6	36
190																							1.2	14	1	19	0.9	23	0.7	30	0.6	38
200																							1.6	10	1	20	0.9	25	0.7	32	0.6	40
210																							1.5	11	1	21	0.9	27	0.7	34	0.6	42
220																							1.5	12	1	22	0.9	28	0.7	35	0.6	44
230																							1.5	12	1	23	0.9	29	0.7	37	0.6	46
240																							1.5	13	1	24	0.9	29	0.7	37	0.6	46
250																							1.5	14	1	25	0.9	30	0.7	39	0.6	48
260																							1.5	15	1	26	0.9	31	0.7	40	0.6	50
270																							1.5	16	1	27	0.9	32	0.7	41	0.6	52
280																							1.5	16	1	28	0.9	33	0.7	42	0.6	54
290																							1.5	17	1	29	0.9	34	0.7	44	0.6	56
300																							1.5	17	1	30	0.9	36	0.7	46	0.6	58
310																							1.5	18	1	31	0.9	37	0.7	47	0.6	60
320																							2.1	10	1	32	0.9	38	0.7	49	0.6	62
330																							2.1	10	1	33	0.9	40	0.7	51	0.6	64
340																							2.1	11	1	34	0.9	41	0.7	52	0.6	66
350																							2.1	11	1	35	0.9	42	0.7	54	0.6	68
360																							2.1	12	1	36	0.9	44	0.7	56	0.6	70
370																							2.1	12	1	37	0.9	45	0.7	58	0.6	72
380																							2.1	13	1	38	0.9	46	0.7	59	0.6	74
390																							2.4	10	1	39	0.9	48	0.7	61	0.6	76
400																							2.4	11	1	40	0.9	49	0.7	63	0.6	78
410																							2.4	11	1	41	0.9	51	0.7	64	0.6	80
420																							2.4	12	1	42	0.9	52	0.7	66	0.6	82
430																							2.3	12	1	43	0.9	53	0.7	68	0.6	84
440																							2.3	13	1	44	0.9	55	0.7	69	0.6	86
450																							2.3	13	1	45	0.9	56	0.7	71	0.6	88
460																							2.7	10	1	46	0.9	57	0.7	73	0.6	90
470																							2.7	10	1	47	0.9	59	0.7	74	0.6	91
480																							2.7	11	1	48	0.9	60	0.7	76	0.6	93
490																							2.7	11	1	49	0.9	61	0.7	78	0.6	95
500																							2.7	12	1	50	0.9	63	0.7	79	0.6	97
																							2.7	12	1	51	0.9	64	0.7	81	0.6	99
																							2.7	13	1	52	0.9	65	0.7	83		

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.07

C-D Design

Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%			
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)		
10																																
20																																
30																																
40																																
50																															0.6	10
60																															0.6	12
70																															0.6	14
80																															0.8	11
90																															0.8	12
100																										1	10				0.8	14
110																										0.9	11				0.8	16
120																										0.9	13				0.7	18
130																										1.1	11				0.7	19
140																										1.1	12				0.7	21
150																										1.1	13				0.7	23
160																		1.3	10							1	15			0.7	25	
170																		1.3	11								1	16			0.7	26
180																		1.2	12								1	17			0.7	28
190																		1.2	14								1	18			0.7	30
200																		1.2	15								1	20			0.7	31
210																		1.2	16								1	21			0.7	33
220																		1.6	10								1	22			0.7	35
230																		1.6	11								1	23			0.7	37
240																		1.6	12								1	24			0.7	38
250																		1.5	13								1	26			0.7	40
260																		1.5	14								1	27			0.7	42
270																		1.5	14								1	28			0.7	43
280																		1.5	15								1	29			0.7	45
290																		1.5	16								1	30			0.7	47
300																		1.5	17								1	32			0.7	48
310																		1.5	18								1	33			0.7	50
320																		1.5	19								1	34			0.7	52
330																		1.5	19								1	35			0.7	54
340																		1.5	20								1	36			0.7	55
350																		1.5	21								1	37			0.7	57
360																		2.2	10								1	39			0.7	59
370																		2.2	10								1	40			0.7	60
380																		2.1	11								1	41			0.7	62
390																		2.1	12								1	42			0.7	64
400																		2.1	12								1	43			0.7	65
410																		2.1	13								1	44			0.7	67
420																		2.1	13								1	46			0.7	69
430																		2.4	10								1	47			0.7	71
440																		2.4	10								1	48			0.7	72
450																		2.4	11								1	49			0.7	74
460																		2.4	11								1	50			0.7	76
470																		2.4	12								1	52			0.7	77
480																		2.4	12								1	53			0.7	79
490																		2.4	13								1	54			0.7	81
500																		2.3	13								1	55			0.7	82

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.07

C-D Design

Side Slope = 8

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%					
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)				
10																																		
20																																		
30																																		
40																																		
50																																		
60																																		
70																														0.6	11			
80																														0.6	13			
90																													0.8	10	0.6	15		
100																													0.8	12	0.6	17		
110																													0.8	13	0.6	19		
120																													0.8	15	0.6	21		
130																										1	11	0.8	17	0.6	23			
140																													0.9	13	0.8	18	0.6	25
150																									1.1	10	0.9	14	0.7	20	0.6	27		
160																									1.1	12	0.9	16	0.7	22	0.6	29		
170																									1.1	13	0.9	17	0.7	24	0.6	31		
180																									1.1	14	0.9	19	0.7	25	0.6	33		
190																													1.3	10	0.7	27	0.6	35
200																													1.3	11	0.7	29	0.6	37
210																													1.3	13	0.7	31	0.6	39
220																													1.2	14	0.7	32	0.6	41
230																													1.2	15	0.7	34	0.6	44
240																													1.2	16	0.7	36	0.6	46
250																													1.2	17	0.7	38	0.6	47
260																													1.6	10	0.7	39	0.6	49
270																													1.6	11	0.7	41	0.6	52
280																													1.6	12	0.7	43	0.6	54
290																													1.6	13	0.7	44	0.6	56
300																													1.5	14	0.7	46	0.6	58
310																													1.5	14	0.7	48	0.6	60
320																													1.5	15	0.7	50	0.6	62
330																													1.5	16	0.7	51	0.6	64
340																													1.5	17	0.7	53	0.6	65
350																													1.5	18	0.7	55	0.6	67
360																													1.5	19	0.7	56	0.6	70
370																													1.5	20	0.7	58	0.6	72
380																													1.5	21	0.7	60	0.6	74
390																													1.5	21	0.7	61	0.6	76
400																													1.5	22	0.7	63	0.6	78
410																													1.5	23	0.7	65	0.6	80
420																													1.5	24	0.7	67	0.6	82
430																													1.5	25	0.7	68	0.6	84
440																													2.2	10	0.7	70	0.6	86
450																													2.2	11	0.7	72	0.6	88
460																													2.2	11	0.7	73	0.6	90
470																													2.1	12	0.7	75	0.6	92
480																													2.1	13	0.7	77	0.6	94
490																													2.1	13	0.7	78	0.6	96
500																													2.1	14	0.7	80	0.6	98
																													2.1	15	0.7	82	0.6	100

Appendix D

Design Tables for Parabolic Channels

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.5

Allowable Soil Stress = 0.02

B-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)
10							1.7	10	1.5	13	1.4	14	1.3	16	1.2	18	1.1	19	1	25										
20					2	16	1.7	21	1.5	25	1.3	29	1.3	32	1.2	36	1.1	39	1	50	0.8	57	0.7	63	0.7	69	0.6	78	0.5	86
30			2.8	15	2	24	1.6	31	1.5	37	1.3	43	1.3	49	1.2	53	1.1	58	1	75	0.8	85	0.7	95	0.7	103				
40			2.8	20	2	32	1.6	41	1.5	50	1.3	58	1.3	65	1.2	71	1.1	78	1	100	0.8	114	0.7	126						
50			2.7	24	2	39	1.6	52	1.5	62	1.3	72	1.3	81	1.2	89	1.1	97	1	124	0.8	142								
60			2.7	29	1.9	47	1.6	62	1.5	75	1.3	86	1.3	97	1.2	107	1.1	116	1	149										
70			2.7	34	1.9	55	1.6	72	1.5	87	1.3	101	1.3	113	1.2	125	1.1	136	1	174										
80			2.7	39	1.9	63	1.6	83	1.5	100	1.3	115	1.3	129	1.2	143	1.1	155												
90			2.7	44	1.9	71	1.6	93	1.5	112	1.3	130	1.3	146	1.2	160	1.1	174												
100	4.5	25	2.7	49	1.9	79	1.6	103	1.5	125	1.3	144	1.3	162	1.2	178	1.1	194												
110	4.5	27	2.7	53	1.9	87	1.6	114	1.5	137	1.3	158	1.3	178	1.2	196	1.1	213												
120	4.4	30	2.7	58	1.9	95	1.6	124	1.5	150	1.3	173	1.3	194	1.2	214														
130	4.4	32	2.7	63	1.9	102	1.6	134	1.5	162	1.3	187	1.3	210	1.2	232														
140	4.4	34	2.7	68	1.9	110	1.6	145	1.5	175	1.3	202	1.3	227																
150	4.4	37	2.7	73	1.9	118	1.6	155	1.5	187	1.3	216	1.3	243																
160	4.4	39	2.7	78	1.9	126	1.6	165	1.5	199	1.3	230																		
170	4.4	42	2.7	82	1.9	134	1.6	176	1.5	212	1.3	245																		
180	4.3	44	2.7	87	1.9	142	1.6	186	1.5	224	1.3	259																		
190	4.3	46	2.7	92	1.9	150	1.6	196	1.5	237																				
200	4.3	49	2.7	97	1.9	157	1.6	207	1.5	249																				
210	4.3	51	2.7	102	1.9	165	1.6	217	1.5	262																				
220	4.3	54	2.7	107	1.9	173	1.6	227	1.5	274																				
230	4.3	56	2.7	112	1.9	181	1.6	238	1.5	287																				
240	4.3	59	2.7	116	1.9	189	1.6	248																						
250	4.3	61	2.7	121	1.9	197	1.6	258																						
260	4.3	63	2.7	126	1.9	205	1.6	269																						
270	4.3	66	2.7	131	1.9	213	1.6	279																						
280	4.3	68	2.7	136	1.9	220	1.6	289																						
290	4.3	71	2.7	141	1.9	228	1.6	300																						
300	4.3	73	2.7	146	1.9	236	1.6	310																						
310	4.3	76	2.7	150	1.9	244	1.6	320																						
320	4.3	78	2.7	155	1.9	252																								
330	4.3	80	2.7	160	1.9	260																								
340	4.3	83	2.7	165	1.9	268																								
350	4.3	85	2.7	170	1.9	276																								
360	4.3	88	2.7	175	1.9	283																								
370	4.3	90	2.7	180	1.9	291																								
380	4.3	93	2.7	184	1.9	299																								
390	4.3	95	2.7	189	1.9	307																								
400	4.3	98	2.7	194	1.9	315																								
410	4.3	100	2.7	199	1.9	323																								
420	4.3	102	2.7	204	1.9	331																								
430	4.3	105	2.7	209	1.9	339																								
440	4.3	107	2.7	213	1.9	346																								
450	4.3	110	2.7	218	1.9	354																								
460	4.3	112	2.7	223	1.9	362																								
470	4.3	115	2.7	228	1.9	370																								
480	4.3	117	2.7	233	1.9	378																								
490	4.3	119	2.7	238	1.9	386																								
500	4.3	122	2.7	243																										

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.5

Allowable Soil Stress = 0.03

B-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)
10							1.8	14	1.7	9	1.5	10	1.4	11	1.3	12	1.2	13	1	17	0.9	21	0.8	24	0.8	26	0.7	30	0.6	33
20							1.8	17	1.6	17	1.4	20	1.3	22	1.2	25	1.2	27	1	35	0.9	42	0.8	48	0.8	53	0.7	60	0.6	67
30					2.2	16	1.8	21	1.6	26	1.4	30	1.3	33	1.2	37	1.2	40	1	52	0.9	62	0.8	72	0.8	79	0.7	90	0.6	100
40					2.2	21	1.8	28	1.6	34	1.4	40	1.3	45	1.2	49	1.2	54	1	70	0.9	83	0.8	95	0.8	105	0.7	120		
50			3.2	16	2.1	26	1.8	35	1.6	43	1.4	49	1.3	56	1.2	62	1.2	67	1	87	0.9	104	0.8	119	0.8	131				
60			3.1	19	2.1	32	1.8	42	1.6	51	1.4	59	1.3	67	1.2	74	1.2	81	1	104	0.9	125	0.8	143						
70			3.1	22	2.1	37	1.8	49	1.6	60	1.4	69	1.3	78	1.2	86	1.2	94	1	122	0.9	146	0.8	167						
80			3.1	25	2.1	42	1.8	56	1.6	68	1.4	79	1.3	89	1.2	99	1.2	107	1	139	0.9	166								
90			3.1	29	2.1	47	1.8	63	1.6	76	1.4	89	1.3	100	1.2	111	1.2	121	1	156										
100			3	32	2.1	53	1.8	70	1.6	85	1.4	99	1.3	111	1.2	123	1.2	134	1	174										
110			3	35	2.1	58	1.8	77	1.6	94	1.4	109	1.3	123	1.2	136	1.2	148	1	191										
120			3	38	2.1	63	1.8	84	1.6	102	1.4	119	1.3	134	1.2	148	1.2	161												
130			3	41	2.1	68	1.8	91	1.6	111	1.4	128	1.3	145	1.2	160	1.2	175												
140			3	44	2.1	74	1.8	98	1.6	119	1.4	138	1.3	156	1.2	172	1.2	188												
150			3	48	2.1	79	1.8	105	1.6	128	1.4	148	1.3	167	1.2	185	1.2	202												
160			3	51	2.1	84	1.8	112	1.6	136	1.4	158	1.3	178	1.2	197	1.2	215												
170			3	54	2.1	89	1.8	119	1.6	145	1.4	168	1.3	189	1.2	209	1.2	228												
180	5.3	28	3	57	2.1	95	1.8	126	1.6	153	1.4	178	1.3	201	1.2	222														
190	5.3	29	3	60	2.1	100	1.8	133	1.6	162	1.4	188	1.3	212	1.2	234														
200	5.3	31	3	63	2.1	105	1.8	140	1.6	170	1.4	198	1.3	223	1.2	246														
210	5.3	32	3	66	2.1	110	1.8	147	1.6	179	1.4	208	1.3	234																
220	5.2	34	3	70	2.1	116	1.8	154	1.6	187	1.4	217	1.3	245																
230	5.2	35	3	73	2.1	121	1.8	161	1.6	196	1.4	227	1.3	256																
240	5.2	37	3	76	2.1	126	1.8	168	1.6	204	1.4	237																		
250	5.2	38	3	79	2.1	132	1.8	175	1.6	213	1.4	247																		
260	5.2	40	3	82	2.1	137	1.8	182	1.6	221	1.4	257																		
270	5.2	41	3	85	2.1	142	1.8	189	1.6	230	1.4	267																		
280	5.2	43	3	89	2.1	147	1.8	196	1.6	238	1.4	277																		
290	5.2	44	3	92	2.1	153	1.8	203	1.6	247																				
300	5.2	46	3	95	2.1	158	1.8	210	1.6	255																				
310	5.2	47	3	98	2.1	163	1.8	217	1.6	264																				
320	5.2	49	3	101	2.1	168	1.8	224	1.6	272																				
330	5.2	50	3	104	2.1	174	1.8	231	1.6	281																				
340	5.2	52	3	108	2.1	179	1.8	238	1.6	289																				
350	5.2	53	3	111	2.1	184	1.8	245	1.6	298																				
360	5.2	55	3	114	2.1	189	1.8	252	1.6	306																				
370	5.1	56	3	117	2.1	195	1.8	259																						
380	5.1	58	3	120	2.1	200	1.8	266																						
390	5.1	59	3	123	2.1	205	1.8	273																						
400	5.1	61	3	127	2.1	210	1.8	280																						
410	5.1	62	3	130	2.1	216	1.8	287																						
420	5.1	64	3	133	2.1	221	1.8	294																						
430	5.1	65	3	136	2.1	226	1.8	301																						
440	5.1	67	3	139	2.1	231	1.8	308																						
450	5.1	69	3	142	2.1	237	1.8	315																						
460	5.1	70	3	146	2.1	242	1.8	322																						
470	5.1	72	3	149	2.1	247	1.8	328																						
480	5.1	73	3	152	2.1	252	1.8	335																						
490	5.1	75	3	155	2.1	258	1.8	342																						
500	5.1	76	3	158	2.1	263	1.8	349																						

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.5

Allowable Soil Stress = 0.05

B-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)
10											1.4	8	1.3	8	1.1	11	1	13	0.9	15	0.8	17	0.7	20	0.7	23				
20									1.8	10	1.6	12	1.5	14	1.4	15	1.3	17	1.1	22	1	26	0.9	30	0.8	34	0.7	41	0.7	47
30							2.1	13	1.8	15	1.6	18	1.5	20	1.4	23	1.3	25	1.1	33	1	39	0.9	45	0.8	51	0.7	61	0.7	70
40							2	17	1.8	21	1.6	24	1.4	27	1.3	30	1.3	33	1.1	44	1	52	0.9	61	0.8	68	0.7	81	0.7	93
50					2.6	16	2	21	1.7	26	1.6	30	1.4	34	1.3	38	1.3	41	1.1	54	1	66	0.9	76	0.8	85	0.7	102	0.7	117
60					2.5	19	2	25	1.7	31	1.6	36	1.4	41	1.3	45	1.3	50	1.1	65	1	79	0.9	91	0.8	102	0.7	122		
70					2.5	22	2	29	1.7	36	1.6	42	1.4	48	1.3	53	1.3	58	1.1	76	1	92	0.9	106	0.8	119	0.7	142		
80					2.5	25	2	33	1.7	41	1.6	48	1.4	55	1.3	61	1.3	66	1.1	87	1	105	0.9	121	0.8	136				
90					2.5	28	2	37	1.7	46	1.6	54	1.4	61	1.3	68	1.3	75	1.1	98	1	118	0.9	136	0.8	153				
100					2.5	31	2	42	1.7	51	1.6	60	1.4	68	1.3	76	1.3	83	1.1	109	1	131	0.9	151						
110		3.8	20		2.5	34	2	46	1.7	56	1.6	66	1.4	75	1.3	83	1.3	91	1.1	120	1	144	0.9	166						
120		3.8	22		2.5	37	2	50	1.7	62	1.6	72	1.4	82	1.3	91	1.3	99	1.1	131	1	157								
130		3.8	23		2.5	40	2	54	1.7	67	1.6	78	1.4	89	1.3	98	1.3	108	1.1	141	1	170								
140		3.8	25		2.5	43	2	58	1.7	72	1.6	84	1.4	95	1.3	106	1.3	116	1.1	152	1	183								
150		3.7	27		2.5	46	2	63	1.7	77	1.6	90	1.4	102	1.3	114	1.3	124	1.1	163										
160		3.7	29		2.5	49	2	67	1.7	82	1.6	96	1.4	109	1.3	121	1.3	133	1.1	174										
170		3.7	30		2.5	52	2	71	1.7	87	1.6	102	1.4	116	1.3	129	1.3	141	1.1	185										
180		3.7	32		2.5	55	2	75	1.7	92	1.6	108	1.4	123	1.3	136	1.3	149	1.1	196										
190		3.7	34		2.5	58	2	79	1.7	97	1.6	114	1.4	130	1.3	144	1.3	157	1.1	207										
200		3.7	36		2.5	62	2	83	1.7	102	1.6	120	1.4	136	1.3	151	1.3	166												
210		3.7	37		2.5	65	2	87	1.7	108	1.6	126	1.4	143	1.3	159	1.3	174												
220		3.7	39		2.5	68	2	92	1.7	113	1.6	132	1.4	150	1.3	167	1.3	182												
230		3.7	41		2.5	71	2	96	1.7	118	1.6	138	1.4	157	1.3	174	1.3	191												
240		3.7	43		2.5	74	2	100	1.7	123	1.6	144	1.4	164	1.3	182	1.3	199												
250		3.7	45		2.5	77	2	104	1.7	128	1.6	150	1.4	170	1.3	189	1.3	207												
260		3.7	46		2.5	80	2	108	1.7	133	1.6	156	1.4	177	1.3	197	1.3	216												
270		3.7	48		2.5	83	2	112	1.7	138	1.6	162	1.4	184	1.3	204	1.3	224												
280		3.7	50		2.5	86	2	117	1.7	143	1.6	168	1.4	191	1.3	212	1.3	232												
290		3.7	52		2.5	89	2	121	1.7	149	1.6	174	1.4	198	1.3	220	1.3	240												
300		3.7	53		2.5	92	2	125	1.7	154	1.6	180	1.4	205	1.3	227	1.3	249												
310		3.7	55		2.5	95	2	129	1.7	159	1.6	186	1.4	211	1.3	235														
320		3.7	57		2.5	98	2	133	1.7	164	1.6	192	1.4	218	1.3	242														
330		3.7	59		2.5	101	2	137	1.7	169	1.6	198	1.4	225	1.3	250														
340		3.7	61		2.5	105	2	142	1.7	174	1.6	204	1.4	232	1.3	257														
350		3.7	62		2.5	108	2	146	1.7	179	1.6	210	1.4	239	1.3	265														
360		3.7	64		2.5	111	2	150	1.7	184	1.6	216	1.4	245																
370		3.7	66		2.5	114	2	154	1.7	190	1.6	222	1.4	252																
380		3.7	68		2.5	117	2	158	1.7	195	1.6	228	1.4	259																
390		3.7	69		2.5	120	2	162	1.7	200	1.6	234	1.4	266																
400		3.7	71		2.5	123	2	167	1.7	205	1.6	240	1.4	273																
410		3.7	73		2.5	126	2	171	1.7	210	1.6	246	1.4	280																
420		3.7	75		2.5	129	2	175	1.7	215	1.6	252	1.4	286																
430	7	35			3.7	76		2	179	1.7	220	1.6	258																	
440	7	36			3.7	78		2	183	1.7	225	1.6	264																	
450	7	37			3.7	80		2	187	1.7	231	1.6	270																	
460	7	37			3.7	82		2	192	1.7	236	1.6	276																	
470	7	38			3.7	84		2	196	1.7	241	1.6	282																	
480	6.9	39			3.7	85		2	200	1.7	246	1.6	288																	
490	6.9	40			3.6	87		2	204	1.7	251	1.6	294																	
500	6.9	40			3.6	89		2	208	1.7	256	1.6	300																	

Input Parameters:
Channel Type = Parabolic
Cover factor = 0.5
Allowable Soil Stress = 0.07

B-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%			
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)		
10														1.6	10	1.5	11	1.4	12	1.1	8	1	10	0.9	11	0.9	13	0.8	15	0.7	17	
20														1.6	19	1.5	22	1.4	24	1.1	16	1	19	0.9	22	0.9	25	0.8	30	0.7	35	
30														1.6	15	1.5	16	1.4	18	1.1	24	1	29	0.9	33	0.9	37	0.8	45	0.7	52	
40								2.3	12	2	15	1.7	17	1.6	19	1.5	22	1.4	24	1.1	32	1	38	0.9	44	0.9	50	0.8	60	0.7	69	
50								2.3	15	1.9	18	1.7	21	1.6	24	1.5	27	1.4	30	1.1	39	1	48	0.9	55	0.9	62	0.8	75	0.7	87	
60								2.3	18	1.9	22	1.7	26	1.6	29	1.4	33	1.4	36	1.1	47	1	57	0.9	67	0.9	75	0.8	90	0.7	104	
70				2.9	15	2.3	20	1.9	25	1.7	30	1.6	34	1.6	34	1.4	38	1.4	42	1.1	55	1	67	0.9	78	0.9	87	0.8	105	0.7	121	
80				2.9	17	2.2	23	1.9	29	1.7	34	1.6	39	1.6	39	1.4	43	1.4	48	1.1	63	1	76	0.9	89	0.9	100	0.8	120	0.7	138	
90				2.9	19	2.2	26	1.9	33	1.7	38	1.6	44	1.6	44	1.4	49	1.4	54	1.1	71	1	86	0.9	100	0.9	112	0.8	135			
100				2.9	21	2.2	29	1.9	36	1.7	43	1.6	49	1.6	49	1.4	54	1.4	60	1.1	79	1	96	0.9	111	0.9	125	0.8	150			
110				2.8	23	2.2	32	1.9	40	1.7	47	1.6	53	1.6	53	1.4	60	1.4	66	1.1	87	1	105	0.9	122	0.9	137					
120				2.8	25	2.2	35	1.9	43	1.7	51	1.6	58	1.6	58	1.4	65	1.4	71	1.1	95	1	115	0.9	133	0.9	150					
130				2.8	28	2.2	38	1.9	47	1.7	55	1.6	63	1.6	63	1.4	70	1.4	77	1.1	102	1	124	0.9	144	0.9	162					
140				2.8	30	2.2	41	1.9	51	1.7	60	1.6	68	1.6	68	1.4	76	1.4	83	1.1	110	1	134	0.9	155							
150				2.8	32	2.2	44	1.9	54	1.7	64	1.6	73	1.6	73	1.4	81	1.4	89	1.1	118	1	143	0.9	166							
160				2.8	34	2.2	46	1.9	58	1.7	68	1.6	78	1.6	78	1.4	87	1.4	95	1.1	126	1	153	0.9	178							
170				2.8	36	2.2	49	1.9	61	1.7	72	1.6	83	1.6	83	1.4	92	1.4	101	1.1	134	1	163									
180				2.8	38	2.2	52	1.9	65	1.7	77	1.6	87	1.6	87	1.4	98	1.4	107	1.1	142	1	172									
190		4.5	23	2.8	40	2.2	55	1.9	69	1.7	81	1.6	92	1.6	92	1.4	103	1.4	113	1.1	150	1	182									
200		4.5	24	2.8	42	2.2	58	1.9	72	1.7	85	1.6	97	1.6	97	1.4	108	1.4	119	1.1	158	1	191									
210		4.4	25	2.8	44	2.2	61	1.9	76	1.7	89	1.6	102	1.6	102	1.4	114	1.4	125	1.1	165	1	201									
220		4.4	26	2.8	47	2.2	64	1.9	79	1.7	94	1.6	107	1.6	107	1.4	119	1.4	131	1.1	173											
230		4.4	28	2.8	49	2.2	67	1.9	83	1.7	98	1.6	112	1.6	112	1.4	125	1.4	137	1.1	181											
240		4.4	29	2.8	51	2.2	70	1.9	87	1.7	102	1.6	117	1.6	117	1.4	130	1.4	143	1.1	189											
250		4.4	30	2.8	53	2.2	73	1.9	90	1.7	106	1.6	121	1.6	121	1.4	135	1.4	149	1.1	197											
260		4.4	31	2.8	55	2.2	75	1.9	94	1.7	111	1.6	126	1.6	126	1.4	141	1.4	155	1.1	205											
270		4.4	32	2.8	57	2.2	78	1.9	98	1.7	115	1.6	131	1.6	131	1.4	146	1.4	161	1.1	213											
280		4.4	33	2.8	59	2.2	81	1.9	101	1.7	119	1.6	136	1.6	136	1.4	152	1.4	167	1.1	221											
290		4.4	34	2.8	61	2.2	84	1.9	105	1.7	123	1.6	141	1.6	141	1.4	157	1.4	173													
300		4.4	36	2.8	63	2.2	87	1.9	108	1.7	128	1.6	146	1.6	146	1.4	163	1.4	179													
310		4.4	37	2.8	65	2.2	90	1.9	112	1.7	132	1.6	151	1.6	151	1.4	168	1.4	185													
320		4.4	38	2.8	68	2.2	93	1.9	116	1.7	136	1.6	155	1.6	155	1.4	173	1.4	191													
330		4.4	39	2.8	70	2.2	96	1.9	119	1.7	140	1.6	160	1.6	160	1.4	179	1.4	197													
340		4.3	40	2.8	72	2.2	99	1.9	123	1.7	145	1.6	165	1.6	165	1.4	184	1.4	202													
350		4.3	41	2.8	74	2.2	102	1.9	126	1.7	149	1.6	170	1.6	170	1.4	190	1.4	208													
360		4.3	43	2.8	76	2.2	104	1.9	130	1.7	153	1.6	175	1.6	175	1.4	195	1.4	214													
370		4.3	44	2.8	78	2.2	107	1.9	134	1.7	157	1.6	180	1.6	180	1.4	201	1.4	220													
380		4.3	45	2.8	80	2.2	110	1.9	137	1.7	162	1.6	185	1.6	185	1.4	206	1.4	226													
390		4.3	46	2.8	82	2.2	113	1.9	141	1.7	166	1.6	189	1.6	189	1.4	211	1.4	232													
400		4.3	47	2.8	84	2.2	116	1.9	144	1.7	170	1.6	194	1.6	194	1.4	217	1.4	238													
410		4.3	48	2.8	87	2.2	119	1.9	148	1.7	174	1.6	199	1.6	199	1.4	222	1.4	244													
420		4.3	50	2.8	89	2.2	122	1.9	152	1.7	179	1.6	204	1.6	204	1.4	228	1.4	250													
430		4.3	51	2.8	91	2.2	125	1.9	155	1.7	183	1.6	209	1.6	209	1.4	233	1.4	256													
440		4.3	52	2.8	93	2.2	128	1.9	159	1.7	187	1.6	214	1.6	214	1.4	238	1.4	262													
450		4.3	53	2.8	95	2.2	131	1.9	162	1.7	191	1.6	218	1.6	218	1.4	244	1.4	268													
460		4.3	54	2.8	97	2.2	133	1.9	166	1.7	196	1.6	223	1.6	223	1.4	249	1.4														
470		4.3	56	2.8	99	2.2	136	1.9	170	1.7	200	1.6	228	1.6	228	1.4	255	1.4														
480		4.3	57	2.8	101	2.2	139	1.9	173	1.7	204	1.6	233	1.6	233	1.4	260	1.4														
490		4.3	58	2.8	103	2.2	142	1.9	177	1.7	208	1.6	238	1.6	238	1.4	266	1.4														
500		4.3	59	2.8	105	2.2	145	1.9	181	1.7	213	1.6	243	1.6	243	1.4	271	1.4														

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.75

Allowable Soil Stress = 0.02

B-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)
10																														
20							2	11	1.7	13	1.5	15	1.5	9	1.3	9	1.3	10	1.1	13	0.9	16	0.9	19	0.8	21	0.7	25	0.6	28
30							1.9	16	1.7	19	1.5	22	1.4	25	1.3	28	1.2	31	1	40	0.9	48	0.9	56	0.8	62	0.7	74	0.6	83
40				2.4	16	1.9	21	1.7	26	1.5	30	1.4	34	1.3	38	1.2	41	1	54	0.9	64	0.9	74	0.8	83	0.7	99	0.6	110	
50				2.3	20	1.9	26	1.7	32	1.5	37	1.4	42	1.3	47	1.2	51	1	67	0.9	80	0.9	93	0.8	104	0.7	124			
60				2.3	23	1.9	31	1.6	39	1.5	45	1.4	51	1.3	56	1.2	62	1	80	0.9	97	0.9	111	0.8	124					
70				2.3	27	1.9	37	1.6	45	1.5	52	1.4	59	1.3	66	1.2	72	1	94	0.9	113	0.9	130	0.8	145					
80			3.5	19	2.3	31	1.9	42	1.6	51	1.5	60	1.4	68	1.3	75	1.2	82	1	107	0.9	129	0.9	148						
90			3.5	21	2.3	35	1.9	47	1.6	58	1.5	67	1.4	76	1.3	85	1.2	92	1	120	0.9	145	0.9	167						
100			3.4	23	2.3	39	1.9	52	1.6	64	1.5	75	1.4	85	1.3	94	1.2	103	1	134	0.9	161								
110			3.4	25	2.3	43	1.9	58	1.6	71	1.5	82	1.4	93	1.3	103	1.2	113	1	147	0.9	177								
120			3.4	28	2.3	47	1.9	63	1.6	77	1.5	90	1.4	102	1.3	113	1.2	123	1	161										
130			3.4	30	2.3	51	1.9	68	1.6	83	1.5	97	1.4	110	1.3	122	1.2	134	1	174										
140			3.4	32	2.3	55	1.9	73	1.6	90	1.5	105	1.4	119	1.3	132	1.2	144	1	187										
150			3.4	35	2.3	59	1.9	79	1.6	96	1.5	112	1.4	127	1.3	141	1.2	154	1	201										
160			3.4	37	2.3	63	1.9	84	1.6	103	1.5	120	1.4	136	1.3	150	1.2	164												
170			3.4	39	2.3	66	1.9	89	1.6	109	1.5	127	1.4	144	1.3	160	1.2	175												
180			3.4	42	2.3	70	1.9	94	1.6	115	1.5	135	1.4	153	1.3	169	1.2	185												
190			3.4	44	2.3	74	1.9	100	1.6	122	1.5	142	1.4	161	1.3	179	1.2	195												
200			3.3	46	2.3	78	1.9	105	1.6	128	1.5	150	1.4	170	1.3	188	1.2	205												
210			3.3	48	2.3	82	1.9	110	1.6	135	1.5	157	1.4	178	1.3	197	1.2	216												
220			3.3	51	2.3	86	1.9	115	1.6	141	1.5	165	1.4	186	1.3	207	1.2	226												
230			3.3	53	2.3	90	1.9	121	1.6	147	1.5	172	1.4	195	1.3	216	1.2	236												
240			3.3	55	2.3	94	1.9	126	1.6	154	1.5	180	1.4	203	1.3	226														
250			3.3	58	2.3	98	1.9	131	1.6	160	1.5	187	1.4	212	1.3	235														
260			3.3	60	2.3	102	1.9	136	1.6	167	1.5	195	1.4	220	1.3	244														
270			3.3	62	2.3	105	1.9	141	1.6	173	1.5	202	1.4	229	1.3	254														
280			3.3	64	2.3	109	1.9	147	1.6	180	1.5	210	1.4	237																
290	6.2	32	3.3	67	2.3	113	1.9	152	1.6	186	1.5	217	1.4	246																
300	6.1	33	3.3	69	2.3	117	1.9	157	1.6	192	1.5	225	1.4	254																
310	6.1	34	3.3	71	2.3	121	1.9	162	1.6	199	1.5	232	1.4	263																
320	6.1	35	3.3	74	2.3	125	1.9	168	1.6	205	1.5	240	1.4	271																
330	6.1	36	3.3	76	2.3	129	1.9	173	1.6	212	1.5	247																		
340	6.1	37	3.3	78	2.3	133	1.9	178	1.6	218	1.5	255																		
350	6.1	38	3.3	81	2.3	137	1.9	183	1.6	224	1.5	262																		
360	6.1	39	3.3	83	2.3	141	1.9	189	1.6	231	1.5	270																		
370	6.1	40	3.3	85	2.3	144	1.9	194	1.6	237	1.5	277																		
380	6	41	3.3	87	2.3	148	1.9	199	1.6	244	1.5	285																		
390	6	42	3.3	90	2.3	152	1.9	204	1.6	250	1.5	292																		
400	6	43	3.3	92	2.3	156	1.9	210	1.6	256																				
410	6	44	3.3	94	2.3	160	1.9	215	1.6	263																				
420	6	45	3.3	97	2.3	164	1.9	220	1.6	269																				
430	6	46	3.3	99	2.3	168	1.9	225	1.6	276																				
440	6	47	3.3	101	2.3	172	1.9	230	1.6	282																				
450	6	48	3.3	103	2.3	176	1.9	236	1.6	288																				
460	6	49	3.3	106	2.3	180	1.9	241	1.6	295																				
470	6	50	3.3	108	2.3	183	1.9	246	1.6	301																				
480	6	51	3.3	110	2.3	187	1.9	251	1.6	308																				
490	6	52	3.3	113	2.3	191	1.9	257	1.6	314																				
500	6	54	3.3	115	2.3	195	1.9	262	1.6	321																				

Input Parameters:
Channel Type = Parabolic
Cover factor = 0.75
Allowable Soil Stress = 0.03

B-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	
10											1.7	10	1.5	11	1.4	13	1.3	14	1.1	9	1	11	0.9	13	0.8	14	0.8	17	0.7	20	
20																															
30																															
40										1.9	13	1.7	15	1.5	17	1.4	19	1.3	21	1.1	27	1	33	0.9	38	0.8	43	0.8	52	0.7	60
50								2.2	14	1.9	17	1.7	20	1.5	23	1.4	25	1.3	28	1.1	37	1	44	0.9	51	0.8	58	0.8	69	0.7	79
60								2.2	17	1.8	21	1.6	25	1.5	28	1.4	32	1.3	35	1.1	46	1	55	0.9	64	0.8	72	0.8	86	0.7	99
70					2.7	15	2.1	21	1.8	26	1.6	30	1.5	34	1.4	38	1.3	42	1.1	55	1	66	0.9	77	0.8	86	0.8	104	0.7	119	
80					2.7	18	2.1	24	1.8	30	1.6	35	1.5	40	1.4	44	1.3	49	1.1	64	1	78	0.9	90	0.8	101	0.8	121	0.7	139	
90					2.7	20	2.1	28	1.8	34	1.6	40	1.5	45	1.4	51	1.3	56	1.1	73	1	89	0.9	102	0.8	115	0.8	138			
100					2.7	23	2.1	31	1.8	38	1.6	45	1.5	51	1.4	57	1.3	63	1.1	82	1	100	0.9	115	0.8	130					
110					2.7	25	2.1	34	1.8	42	1.6	50	1.5	57	1.4	63	1.3	69	1.1	92	1	111	0.9	128	0.8	144					
120					2.7	28	2.1	38	1.8	47	1.6	55	1.5	63	1.4	70	1.3	76	1.1	101	1	122	0.9	141	0.8	158					
130					2.6	30	2.1	41	1.8	51	1.6	60	1.5	68	1.4	76	1.3	83	1.1	110	1	133	0.9	154							
140					2.6	33	2.1	45	1.8	55	1.6	65	1.5	74	1.4	82	1.3	90	1.1	119	1	144	0.9	166							
150					2.6	35	2.1	48	1.8	59	1.6	70	1.5	80	1.4	89	1.3	97	1.1	128	1	155	0.9	179							
160	4.1	22	2.6	38	2.1	51	1.8	64	1.6	75	1.5	85	1.4	95	1.3	104	1.1	137	1	166											
170	4.1	23	2.6	40	2.1	55	1.8	68	1.6	80	1.5	91	1.4	101	1.3	111	1.1	146	1	177											
180	4.1	25	2.6	43	2.1	58	1.8	72	1.6	85	1.5	97	1.4	108	1.3	118	1.1	156	1	188											
190	4.1	26	2.6	45	2.1	62	1.8	76	1.6	90	1.5	102	1.4	114	1.3	125	1.1	165													
200	4.1	27	2.6	48	2.1	65	1.8	81	1.6	95	1.5	108	1.4	120	1.3	132	1.1	174													
210	4.1	29	2.6	50	2.1	69	1.8	85	1.6	100	1.5	114	1.4	127	1.3	139	1.1	183													
220	4.1	30	2.6	53	2.1	72	1.8	89	1.6	105	1.5	119	1.4	133	1.3	146	1.1	192													
230	4	32	2.6	55	2.1	75	1.8	93	1.6	110	1.5	125	1.4	139	1.3	153	1.1	201													
240	4	33	2.6	58	2.1	79	1.8	98	1.6	115	1.5	131	1.4	146	1.3	160	1.1	211													
250	4	34	2.6	60	2.1	82	1.8	102	1.6	120	1.5	136	1.4	152	1.3	167	1.1	220													
260	4	36	2.6	63	2.1	86	1.8	106	1.6	125	1.5	142	1.4	158	1.3	174															
270	4	37	2.6	65	2.1	89	1.8	110	1.6	130	1.5	148	1.4	165	1.3	181															
280	4	39	2.6	68	2.1	93	1.8	115	1.6	135	1.5	153	1.4	171	1.3	187															
290	4	40	2.6	70	2.1	96	1.8	119	1.6	140	1.5	159	1.4	177	1.3	194															
300	4	42	2.6	73	2.1	99	1.8	123	1.6	145	1.5	165	1.4	184	1.3	201															
310	4	43	2.6	75	2.1	103	1.8	127	1.6	150	1.5	170	1.4	190	1.3	208															
320	4	44	2.6	78	2.1	106	1.8	132	1.6	155	1.5	176	1.4	196	1.3	215															
330	4	46	2.6	80	2.1	110	1.8	136	1.6	160	1.5	182	1.4	202	1.3	222															
340	4	47	2.6	83	2.1	113	1.8	140	1.6	165	1.5	188	1.4	209	1.3	229															
350	4	49	2.6	85	2.1	117	1.8	144	1.6	170	1.5	193	1.4	215	1.3	236															
360	4	50	2.6	88	2.1	120	1.8	148	1.6	175	1.5	199	1.4	221	1.3	243															
370	4	51	2.6	90	2.1	124	1.8	153	1.6	180	1.5	205	1.4	228	1.3	250															
380	4	53	2.6	93	2.1	127	1.8	157	1.6	185	1.5	210	1.4	234	1.3	257															
390	4	54	2.6	96	2.1	130	1.8	161	1.6	190	1.5	216	1.4	240																	
400	4	56	2.6	98	2.1	134	1.8	165	1.6	195	1.5	222	1.4	247																	
410	4	57	2.6	101	2.1	137	1.8	170	1.6	200	1.5	227	1.4	253																	
420	4	59	2.6	103	2.1	141	1.8	174	1.6	205	1.5	233	1.4	259																	
430	4	60	2.6	106	2.1	144	1.8	178	1.6	210	1.5	239	1.4	266																	
440	4	62	2.6	108	2.1	148	1.8	182	1.6	215	1.5	244	1.4	272																	
450	4	63	2.6	111	2.1	151	1.8	187	1.6	220	1.5	250	1.4	278																	
460	4	64	2.6	113	2.1	154	1.8	191	1.6	225	1.5	256																			
470	4	66	2.6	116	2.1	158	1.8	195	1.6	230	1.5	261																			
480	4	67	2.6	118	2.1	161	1.8	199	1.6	235	1.5	267																			
490	4	69	2.6	121	2.1	165	1.8	204	1.6	240	1.5	273																			
500	4	70	2.6	123	2.1	168	1.8	208	1.6	245	1.5	278																			
	4	72	2.6	126	2.1	172	1.8	212	1.6	250	1.5	284																			

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.75

Allowable Soil Stress = 0.05

B-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	
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440																															
450																															
460																															
470																															
480																															
490																															
500																															

Input Parameters:
Channel Type = Parabolic
Cover factor = 0.75
Allowable Soil Stress = 0.07

B-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	
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420																															
430																															
440																															
450																															
460																															
470																															
480																															
490																															
500																															

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.87

Allowable Soil Stress = 0.02

B-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)
10																														
20													1.7	9	1.5	10	1.4	11	1.2	14	1	18	0.9	10	0.9	11	0.8	14	0.7	16
30											1.8	12	1.6	13	1.5	15	1.4	16	1.2	22	1	26	0.9	30	0.9	34	0.8	41	0.7	48
40									2	13	1.8	15	1.6	18	1.5	20	1.4	22	1.2	29	1	35	0.9	41	0.9	46	0.8	55	0.7	64
50						2.4	13		2	16	1.8	19	1.6	22	1.5	25	1.4	27	1.2	36	1	44	0.9	51	0.9	57	0.8	69	0.7	79
60						2.4	16		2	20	1.8	23	1.6	26	1.5	30	1.4	32	1.2	43	1	52	0.9	61	0.9	69	0.8	83	0.7	95
70						2.3	18		2	23	1.8	27	1.6	31	1.5	35	1.4	38	1.2	50	1	61	0.9	71	0.9	80	0.8	96	0.7	111
80					3	15		2	26	1.8	31	1.6	35	1.5	39	1.4	43	1.2	57	1	70	0.9	81	0.9	92	0.8	110	0.7	127	
90					3	17		2	29	1.8	35	1.6	40	1.5	44	1.4	49	1.2	65	1	79	0.9	91	0.9	103	0.8	124			
100					3	19		2	33	1.8	39	1.6	44	1.5	49	1.4	54	1.2	72	1	87	0.9	101	0.9	115	0.8	138			
110					3	21		2	36	1.7	42	1.6	48	1.5	54	1.4	60	1.2	79	1	96	0.9	112	0.9	126	0.8	152			
120					3	23		2	39	1.7	46	1.6	53	1.5	59	1.4	65	1.2	86	1	105	0.9	122	0.9	137					
130					2.9	25		2	42	1.7	50	1.6	57	1.5	64	1.4	70	1.2	93	1	114	0.9	132	0.9	149					
140					2.9	27		2	46	1.7	54	1.6	62	1.5	69	1.4	76	1.2	101	1	122	0.9	142	0.9	160					
150					2.9	29		2	49	1.7	58	1.6	66	1.5	74	1.4	81	1.2	108	1	131	0.9	152	0.9	172					
160					2.9	30		2	52	1.7	62	1.6	70	1.5	79	1.4	87	1.2	115	1	140	0.9	162							
170					2.9	32		2	56	1.7	66	1.6	75	1.5	84	1.4	92	1.2	122	1	149	0.9	172							
180					2.9	34		2	59	1.7	69	1.6	79	1.5	89	1.4	97	1.2	129	1	157	0.9	183							
190					2.9	36		2	62	1.7	73	1.6	84	1.5	94	1.4	103	1.2	136	1	166									
200					2.9	38		2	65	1.7	77	1.6	88	1.5	98	1.4	108	1.2	144	1	175									
210					2.9	40		2	69	1.7	81	1.6	92	1.5	103	1.4	114	1.2	151	1	184									
220					2.9	42		2	72	1.7	85	1.6	97	1.5	108	1.4	119	1.2	158	1	192									
230		4.7	25		2.9	44		2	75	1.7	89	1.6	101	1.5	113	1.4	125	1.2	165	1	201									
240		4.7	26		2.9	45		2	78	1.7	93	1.6	106	1.5	118	1.4	130	1.2	172											
250		4.7	27		2.9	47		2	82	1.7	96	1.6	110	1.5	123	1.4	135	1.2	180											
260		4.7	28		2.9	49		2	85	1.7	100	1.6	114	1.5	128	1.4	141	1.2	187											
270		4.6	29		2.9	51		2	88	1.7	104	1.6	119	1.5	133	1.4	146	1.2	194											
280		4.6	30		2.9	53		2	91	1.7	108	1.6	123	1.5	138	1.4	152	1.2	201											
290		4.6	31		2.9	55		2	95	1.7	112	1.6	128	1.5	143	1.4	157	1.2	208											
300		4.6	32		2.9	57		2	98	1.7	116	1.6	132	1.5	148	1.4	162	1.2	215											
310		4.6	33		2.9	59		2	101	1.7	119	1.6	136	1.5	153	1.4	168	1.2	223											
320		4.6	34		2.9	61		2	104	1.7	123	1.6	141	1.5	158	1.4	173	1.2	230											
330		4.6	35		2.9	62		2	108	1.7	127	1.6	145	1.5	162	1.4	179													
340		4.6	36		2.9	64		2	111	1.7	131	1.6	150	1.5	167	1.4	184													
350		4.6	37		2.9	66		2	114	1.7	135	1.6	154	1.5	172	1.4	190													
360		4.6	38		2.9	68		2	118	1.7	139	1.6	158	1.5	177	1.4	195													
370		4.6	39		2.9	70		2	121	1.7	143	1.6	163	1.5	182	1.4	200													
380		4.6	40		2.9	72		2	124	1.7	146	1.6	167	1.5	187	1.4	206													
390		4.6	41		2.9	74		2	127	1.7	150	1.6	172	1.5	192	1.4	211													
400		4.6	42		2.9	76		2	131	1.7	154	1.6	176	1.5	197	1.4	217													
410		4.6	43		2.9	78		2	134	1.7	158	1.6	181	1.5	202	1.4	222													
420		4.6	44		2.9	79		2	137	1.7	162	1.6	185	1.5	207	1.4	227													
430		4.6	45		2.9	81		2	140	1.7	166	1.6	189	1.5	212	1.4	233													
440		4.6	46		2.9	83		2	144	1.7	170	1.6	194	1.5	217	1.4	238													
450		4.6	47		2.9	85		2	147	1.7	173	1.6	198	1.5	221	1.4	244													
460		4.6	48		2.9	87		2	150	1.7	177	1.6	203	1.5	226	1.4	249													
470		4.6	49		2.9	89		2	153	1.7	181	1.6	207	1.5	231	1.4	254													
480		4.6	50		2.9	91		2	157	1.7	185	1.6	211	1.5	236	1.4	260													
490		4.6	51		2.9	93		2	160	1.7	189	1.6	216	1.5	241	1.4	265													
500		4.6	52		2.9	95		2	163	1.7	193	1.6	220	1.5	246	1.4	271													

Input Parameters:
Channel Type = Parabolic
Cover factor = 0.87
Allowable Soil Stress = 0.03

B-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%			
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)		
10																				1.2	6	1	7	1	8	0.8	9	0.8	11			
20																				1.1	12	1	14	0.9	16	0.8	19	0.7	22			
30															1.7	10	1.6	11	1.3	14	1.1	18	1	21	0.9	23	0.8	28	0.7	33		
40													1.9	12	1.7	13	1.6	14	1.3	19	1.1	23	1	27	0.9	31	0.8	38	0.7	44		
50											2.1	13	1.9	14	1.7	16	1.6	18	1.3	24	1.1	29	1	34	0.9	39	0.8	47	0.7	55		
60									2.4	13	2.1	15	1.8	17	1.7	19	1.6	21	1.3	29	1.1	35	1	41	0.9	47	0.8	57	0.7	66		
70									2.4	15	2	17	1.8	20	1.7	23	1.6	25	1.3	34	1.1	41	1	48	0.9	54	0.8	66	0.7	77		
80									2.3	17	2	20	1.8	23	1.7	26	1.6	28	1.3	38	1.1	47	1	55	0.9	62	0.8	75	0.7	87		
90									2.8	15	2.3	19	2	22	1.8	26	1.7	29	1.6	32	1.3	43	1.1	53	1	62	0.9	70	0.8	85	0.7	98
100									2.8	17	2.3	21	2	25	1.8	29	1.7	32	1.6	36	1.3	48	1.1	59	1	69	0.9	78	0.8	94	0.7	109
110									2.8	18	2.3	23	2	27	1.8	31	1.7	35	1.6	39	1.3	53	1.1	65	1	75	0.9	86	0.8	104	0.7	120
120									2.8	20	2.3	25	2	30	1.8	34	1.7	39	1.6	43	1.3	57	1.1	70	1	82	0.9	93	0.8	113	0.7	131
130									2.8	21	2.3	27	2	32	1.8	37	1.7	42	1.6	46	1.3	62	1.1	76	1	89	0.9	101	0.8	123	0.7	142
140									2.8	23	2.3	29	2	35	1.8	40	1.7	45	1.6	50	1.3	67	1.1	82	1	96	0.9	109	0.8	132		
150									2.7	25	2.3	31	2	37	1.8	43	1.7	48	1.6	53	1.3	72	1.1	88	1	103	0.9	117	0.8	142		
160			3.7	19					2.7	26	2.3	33	2	40	1.8	46	1.7	51	1.6	57	1.3	77	1.1	94	1	110	0.9	124	0.8	151		
170			3.6	20					2.7	28	2.3	35	2	42	1.8	49	1.7	55	1.6	60	1.3	81	1.1	100	1	117	0.9	132	0.8	160		
180			3.6	21					2.7	30	2.3	37	2	45	1.8	51	1.7	58	1.6	64	1.3	86	1.1	106	1	123	0.9	140				
190			3.6	22					2.7	31	2.3	40	2	47	1.8	54	1.7	61	1.6	67	1.3	91	1.1	112	1	130	0.9	148				
200			3.6	23					2.7	33	2.3	42	2	50	1.8	57	1.7	64	1.6	71	1.3	96	1.1	117	1	137	0.9	155				
210			3.6	25					2.7	35	2.3	44	2	52	1.8	60	1.7	67	1.6	75	1.3	101	1.1	123	1	144	0.9	163				
220			3.6	26					2.7	36	2.3	46	2	55	1.8	63	1.7	71	1.6	78	1.3	105	1.1	129	1	151	0.9	171				
230			3.6	27					2.7	38	2.3	48	2	57	1.8	66	1.7	74	1.6	82	1.3	110	1.1	135	1	158	0.9	179				
240			3.6	28					2.7	39	2.3	50	2	60	1.8	69	1.7	77	1.6	85	1.3	115	1.1	141	1	164						
250			3.6	29					2.7	41	2.3	52	2	62	1.8	71	1.7	80	1.6	89	1.3	120	1.1	147	1	171						
260			3.6	30					2.7	43	2.3	54	2	65	1.8	74	1.7	84	1.6	92	1.3	124	1.1	153	1	178						
270			3.6	31					2.7	44	2.3	56	2	67	1.8	77	1.7	87	1.6	96	1.3	129	1.1	159	1	185						
280			3.6	33					2.7	46	2.3	58	2	69	1.8	80	1.7	90	1.6	99	1.3	134	1.1	164	1	192						
290			3.6	34					2.7	48	2.3	60	2	72	1.8	83	1.7	93	1.6	103	1.3	139	1.1	170	1	199						
300			3.6	35					2.7	49	2.3	62	2	74	1.8	86	1.7	96	1.6	107	1.3	144	1.1	176								
310			3.6	36					2.7	51	2.3	64	2	77	1.8	89	1.7	100	1.6	110	1.3	148	1.1	182								
320			3.5	37					2.7	53	2.3	66	2	79	1.8	91	1.7	103	1.6	114	1.3	153	1.1	188								
330			3.5	38					2.7	54	2.3	69	2	82	1.8	94	1.7	106	1.6	117	1.3	158	1.1	194								
340			3.5	39					2.7	56	2.3	71	2	84	1.8	97	1.7	109	1.6	121	1.3	163	1.1	200								
350			3.5	41					2.7	57	2.3	73	2	87	1.8	100	1.7	112	1.6	124	1.3	167	1.1	206								
360			3.5	42					2.7	59	2.3	75	2	89	1.8	103	1.7	116	1.6	128	1.3	172	1.1	211								
370			3.5	43					2.7	61	2.3	77	2	92	1.8	106	1.7	119	1.6	131	1.3	177	1.1	217								
380			3.5	44					2.7	62	2.3	79	2	94	1.8	109	1.7	122	1.6	135	1.3	182										
390			3.5	45					2.7	64	2.3	81	2	97	1.8	111	1.7	125	1.6	138	1.3	187										
400			3.5	46					2.7	66	2.3	83	2	99	1.8	114	1.7	128	1.6	142	1.3	191										
410			3.5	48					2.7	67	2.3	85	2	102	1.8	117	1.7	132	1.6	146	1.3	196										
420			3.5	49					2.7	69	2.3	87	2	104	1.8	120	1.7	135	1.6	149	1.3	201										
430			3.5	50					2.7	71	2.3	89	2	107	1.8	123	1.7	138	1.6	153	1.3	206										
440			3.5	51					2.7	72	2.3	91	2	109	1.8	126	1.7	141	1.6	156	1.3	211										
450			3.5	52					2.7	74	2.3	93	2	112	1.8	129	1.7	145	1.6	160	1.3	215										
460			3.5	53					2.7	75	2.3	95	2	114	1.8	131	1.7	148	1.6	163	1.3	220										
470			3.5	54					2.7	77	2.3	98	2	117	1.8	134	1.7	151	1.6	167	1.3	225										
480			3.5	56					2.7	79	2.3	100	2	119	1.8	137	1.7	154	1.6	170	1.3	230										
490			6	31					2.7	80	2.3	102	2	122	1.8	140	1.7	157	1.6	174	1.3	234										
500			6	31					2.7	82	2.3	104	2	124	1.8	143	1.7	161	1.6	178	1.3	239										

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.87

Allowable Soil Stress = 0.05

B-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%													
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)												
10																					1.3	7	1.2	8	1.1	9	0.9	6	0.8	7												
20																					1.3	10	1.2	12	1	14	0.9	11	0.8	13												
30																				1.5	11	1.3	14	1.1	16	1	19	0.9	23	0.8	27											
40																			2	10	1.5	14	1.3	17	1.1	20	1	23	0.9	29	0.8	33										
50																			2.1	11	1.5	17	1.3	21	1.1	25	1	28	0.9	34	0.8	40										
60																			2.1	13	1.5	20	1.3	24	1.1	29	1	33	0.9	40	0.8	47										
70																			2.3	13	1.5	22	1.3	28	1.1	33	1	37	0.9	46	0.8	54										
80																			2.3	15	1.5	25	1.3	31	1.1	37	1	42	0.9	51	0.8	60										
90																			2.6	14	2.3	16	2.1	18	1.9	20	1.5	28	1.3	35	1.1	41	1	47	0.9	57	0.8	67				
100																			2.6	15	2.3	18	2	20	1.9	22	1.5	31	1.3	38	1.1	45	1	51	0.9	63	0.8	74				
110																			2.6	17	2.3	19	2	22	1.9	24	1.5	33	1.3	42	1.1	49	1	56	0.9	69	0.8	80				
120																			2.6	18	2.3	21	2	24	1.9	26	1.5	36	1.3	45	1.1	53	1	61	0.9	74	0.8	87				
130																			3	16	2.5	19	2.3	22	2	25	1.9	28	1.5	39	1.3	48	1.1	57	1	65	0.9	80	0.8	94		
140																			3	17	2.5	21	2.2	24	2	27	1.9	30	1.5	42	1.3	52	1.1	61	1	70	0.9	86	0.8	100		
150																			3	18	2.5	22	2.2	26	2	29	1.9	32	1.5	44	1.3	55	1.1	65	1	75	0.9	92	0.8	107		
160																			3	19	2.5	23	2.2	27	2	31	1.9	34	1.5	47	1.3	59	1.1	69	1	79	0.9	97	0.8	114		
170																			3	20	2.5	25	2.2	29	2	33	1.9	36	1.5	50	1.3	62	1.1	73	1	84	0.9	103	0.8	120		
180																			3	22	2.5	26	2.2	30	2	34	1.9	38	1.5	53	1.3	66	1.1	77	1	89	0.9	109	0.8	127		
190																			2.9	23	2.5	27	2.2	32	2	36	1.9	40	1.5	55	1.3	69	1.1	82	1	93	0.9	114	0.8	134		
200																			2.9	24	2.5	29	2.2	33	2	38	1.9	42	1.5	58	1.3	73	1.1	86	1	98	0.9	120	0.8	140		
210																			3.7	19	2.9	24	2.5	29	2.2	33	2	38	1.9	42	1.5	58	1.3	73	1.1	86	1	98	0.9	120	0.8	140
220																			3.7	19	2.9	25	2.5	30	2.2	35	2	40	1.9	44	1.5	61	1.3	76	1.1	90	1	102	0.9	126	0.8	147
230																			3.7	20	2.9	26	2.5	31	2.2	37	2	42	1.9	46	1.5	64	1.3	80	1.1	94	1	107	0.9	132	0.8	154
240																			3.6	21	2.9	27	2.5	33	2.2	38	2	43	1.9	48	1.5	67	1.3	83	1.1	98	1	112	0.9	137	0.8	160
250																			3.6	22	2.9	28	2.5	34	2.2	40	2	45	1.9	50	1.5	69	1.3	86	1.1	102	1	116	0.9	143		
260																			3.6	23	2.9	29	2.5	36	2.2	41	2	47	1.9	52	1.5	72	1.3	90	1.1	106	1	121	0.9	149		
270																			3.6	24	2.9	30	2.5	37	2.2	43	2	49	1.9	54	1.5	75	1.3	93	1.1	110	1	126	0.9	154		
280																			3.6	24	2.9	32	2.5	38	2.2	45	2	51	1.9	56	1.5	78	1.3	97	1.1	114	1	130	0.9	160		
290																			3.6	25	2.9	33	2.5	40	2.2	46	2	53	1.9	58	1.5	80	1.3	100	1.1	118	1	135	0.9	166		
300																			3.6	26	2.9	34	2.5	41	2.2	48	2	54	1.9	60	1.5	83	1.3	104	1.1	122	1	140	0.9	172		
310																			3.6	27	2.9	35	2.5	42	2.2	49	2	56	1.9	62	1.5	86	1.3	107	1.1	126	1	144	0.9	177		
320																			3.6	28	2.9	36	2.5	44	2.2	51	2	58	1.9	64	1.5	89	1.3	111	1.1	130	1	149				
330																			3.6	29	2.9	37	2.5	45	2.2	53	2	60	1.9	66	1.5	92	1.3	114	1.1	135	1	154				
340																			3.6	30	2.9	38	2.5	46	2.2	54	2	62	1.9	68	1.5	94	1.3	118	1.1	139	1	158				
350																			3.6	30	2.9	39	2.5	48	2.2	56	2	63	1.9	71	1.5	97	1.3	121	1.1	143	1	163				
360																			3.6	31	2.9	40	2.5	49	2.2	57	2	65	1.9	73	1.5	100	1.3	124	1.1	147	1	168				
370																			3.6	32	2.9	42	2.5	50	2.2	59	2	67	1.9	75	1.5	103	1.3	128	1.1	151	1	172				
380																			3.6	33	2.9	43	2.5	52	2.2	60	2	69	1.9	77	1.5	105	1.3	131	1.1	155	1	177				
390																			3.6	34	2.9	44	2.5	53	2.2	62	2	71	1.9	79	1.5	108	1.3	135	1.1	159	1	182				
400																			3.6	35	2.9	45	2.5	55	2.2	64	2	72	1.9	81	1.5	111	1.3	138	1.1	163	1	186				
410																			3.6	36	2.9	46	2.5	56	2.2	65	2	74	1.9	83	1.5	114	1.3	142	1.1	167	1	191				
420																			5	25	3.6	36	2.9	47	2.5	57	2	76	1.9	85	1.5	116	1.3	145	1.1	171	1	196				
430																			5	26	3.6	37	2.9	48	2.5	59	2.2	78	1.9	87	1.5	119	1.3	149	1.1	175	1	200				
440																			5	26	3.6	38	2.9	49	2.5	60	2.2	80	1.9	89	1.5	122	1.3	152	1.1	179	1	205				
450																			5	27	3.6	39	2.9	50	2.5	61	2.2	81	1.9	91	1.5	125	1.3	156	1.1	183						
460																			5	28	3.6	40	2.9	52	2.5	63	2.2	83	1.9	93	1.5	128	1.3	159	1.1	188						
470																			5	28	3.6	41	2.9	53	2.5	64	2.2	85	1.9	95	1.5	131	1.3	163	1.1	192						
480																			4.9	29	3.6	42	2.9	54	2.5	65	2.2	87	1.9	97	1.5	133	1.3	166	1.1	196						
490																			4.9	29	3.6	42	2.9	55	2.5	67	2.2	89	1.9	99	1.5	136	1.3	169	1.1	200						
500																			4.9	30	3.6	43	2.9	56	2.5	68	2.2	90	1.9	101	1.5	139	1.3	173	1.1	204						

Input Parameters:
Channel Type = Parabolic
Cover factor = 0.87
Allowable Soil Stress = 0.07

B-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%									
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)								
10																														0.8	7							
20																														1	9	0.8	13					
30																																0.8	20					
40																																	0.8	26				
50																					1.8	10			1.3	9	1.2	10	1	13	0.8	26						
60																					1.7	11	1.4	14	1.3	11	1.2	13	1	17	0.8	26						
70																					1.7	13	1.4	17	1.3	20	1.1	20	1	21	0.8	33						
80																					1.7	15	1.4	19	1.3	23	1.1	23	1	30	0.8	46						
90																					1.7	17	1.4	22	1.3	26	1.1	26	1	34	0.8	52						
100																					2.3	12	1.7	17	1.4	22	1.3	26	1.1	29	1	38	0.8	59				
110																					2.2	14	1.7	19	1.4	24	1.3	28	1.1	33	1	43	0.8	65				
120																					2.5	13	1.7	21	1.4	26	1.3	31	1.1	36	1	47	0.8	72				
130																					2.5	15	2.2	16	1.7	23	1.3	34	1.1	39	1	51	0.8	78				
140																					2.7	14	2.4	16	2.2	18	1.7	25	1.4	42	1	55	0.8	85				
150																					2.7	15	2.4	17	2.2	19	1.7	27	1.4	43	1	59	0.8	91				
160																					2.7	16	2.4	18	2.2	20	1.7	28	1.4	46	1	64	0.8	98				
170																					2.7	17	2.4	19	2.2	22	1.7	30	1.4	48	1	68	0.8	104				
180																					2.7	18	2.4	21	2.2	23	1.7	32	1.4	51	1	72	0.8	111				
190																					2.7	19	2.4	22	2.2	24	1.7	34	1.4	53	1	76	0.8	117				
200																					3.1	16	2.7	20	2.4	23	2.2	26	1.7	36	1	81	0.8	124				
210																					3.1	18	2.7	21	2.4	24	2.2	27	1.7	38	1	85	0.8	130				
220																					3.1	19	2.7	22	2.4	25	2.2	28	1.7	40	1	89	0.8	137				
230																					3.1	20	2.7	23	2.4	27	2.2	30	1.7	42	1	93	0.8	143				
240																					3.1	21	2.7	24	2.4	28	2.2	31	1.7	44	1	98	0.8	150				
250																					3.1	22	2.7	25	2.4	29	2.2	32	1.7	46	1	102	0.8	156				
260																					3.7	18	3.1	22	2.7	26	2.4	30	2.2	34	1.7	47	1	106	0.8	163		
270																					3.7	19	3.1	23	2.7	27	2.4	31	2.2	35	1.7	49	1	110				
280																					3.6	20	3	24	2.7	28	2.4	33	2.2	36	1.7	51	1	115				
290																					3.6	21	3	25	2.7	29	2.4	34	2.2	38	1.7	53	1	119				
300																					3.6	21	3	26	2.7	31	2.4	35	2.2	39	1.7	55	1	123				
310																					3.6	22	3	27	2.7	32	2.4	36	2.2	41	1.7	57	1	127				
320																					3.6	23	3	28	2.7	33	2.4	37	2.2	42	1.7	59	1	131				
330																					3.6	23	3	29	2.7	34	2.4	39	2.2	43	1.7	61	1	136				
340																					3.6	24	3	30	2.7	35	2.4	40	2.2	45	1.7	63	1	140				
350																					3.6	25	3	30	2.7	36	2.4	41	2.2	46	1.7	64	1	144				
360																					3.6	26	3	31	2.6	37	2.4	42	2.2	47	1.7	66	1	148				
370																					3.6	26	3	32	2.6	38	2.4	43	2.2	49	1.7	68	1	153				
380																					3.6	27	3	33	2.6	39	2.4	44	2.2	50	1.7	70	1	157				
390																					3.6	28	3	34	2.6	40	2.4	46	2.2	51	1.7	72	1	161				
400																					3.6	28	3	35	2.6	41	2.4	47	2.2	53	1.7	74	1	165				
410																					3.6	29	3	36	2.6	42	2.4	48	2.2	54	1.7	76	1	170				
420																					4.6	23	3.6	30	3	37	2.6	43	2.4	49	2.2	55	1.7	78	1	174		
430																					4.6	23	3.6	30	3	37	2.6	44	2.4	50	2.2	57	1.7	80	1	178		
440																					4.6	24	3.6	31	3	38	2.6	45	2.4	52	2.2	58	1.7	81	1	182		
450																					4.6	25	3.6	32	3	39	2.6	46	2.4	53	2.2	59	1.7	83	1	187		
460																					4.6	25	3.6	33	3	40	2.6	47	2.4	54	2.2	61	1.7	85	1	191		
470																					4.6	26	3.6	33	3	41	2.6	48	2.4	55	2.2	62	1.7	87	1	191		
480																					4.6	26	3.6	34	3	42	2.6	49	2.4	56	2.2	63	1.7	89	1	191		
490																					4.5	27	3.6	35	3	43	2.6	50	2.4	58	2.2	65	1.7	91	1	191		
500																					4.5	27	3.6	35	3	44	2.6	51	2.4	59	2.2	66	1.7	93	1	191		
																					4.5	28	3.6	36	3	44	2.6	52	2.4	60	2.2	67	1.7	95	1	191		

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.9

Allowable Soil Stress = 0.02

B-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	
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450																															
460																															
470																															
480																															
490																															
500																															

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.9

Allowable Soil Stress = 0.03

B-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%			
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)		
10																				1.5	7	1.2	9	1.1	11	1	6	0.9	7	0.8	9	
20																																
30																					1.4	11	1.2	14	1.1	16	1	18	0.9	22	0.8	26
40																1.9	10	1.8	11	1.4	15	1.2	18	1.1	21	1	24	0.9	29	0.8	34	
50													2.1	11	1.9	12	1.7	13	1.4	18	1.2	22	1.1	26	1	30	0.9	37	0.8	43		
60												2.1	13	1.9	15	1.7	16	1.4	22	1.2	27	1.1	32	1	36	0.9	44	0.8	51			
70											2.3	13	2	15	1.9	17	1.7	19	1.4	25	1.2	31	1.1	37	1	42	0.9	51	0.8	60		
80											2.3	15	2	17	1.8	19	1.7	21	1.4	29	1.2	36	1.1	42	1	48	0.9	59	0.8	68		
90										2.7	14	2.3	17	2	19	1.8	22	1.7	24	1.4	33	1.2	40	1.1	47	1	54	0.9	66	0.8	77	
100										2.6	15	2.3	18	2	21	1.8	24	1.7	27	1.4	36	1.2	45	1.1	53	1	60	0.9	73	0.8	85	
110										2.6	17	2.3	20	2	23	1.8	27	1.7	29	1.4	40	1.2	49	1.1	58	1	66	0.9	81	0.8	94	
120										2.6	18	2.3	22	2	26	1.8	29	1.7	32	1.4	44	1.2	54	1.1	63	1	72	0.9	88	0.8	102	
130										2.6	20	2.2	24	2	28	1.8	31	1.7	35	1.4	47	1.2	58	1.1	69	1	78	0.9	95	0.8	111	
140						3.2	17	2.6	21	2.2	26	2	30	1.8	34	1.7	37	1.4	51	1.2	63	1.1	74	1	84	0.9	103	0.8	119			
150						3.2	18	2.6	23	2.2	28	2	32	1.8	36	1.7	40	1.4	55	1.2	67	1.1	79	1	90	0.9	110	0.8	128			
160						3.2	19	2.6	25	2.2	29	2	34	1.8	39	1.7	43	1.4	58	1.2	72	1.1	84	1	96	0.9	117	0.8	136			
170						3.2	21	2.6	26	2.2	31	2	36	1.8	41	1.7	45	1.4	62	1.2	76	1.1	90	1	102	0.9	125	0.8	145			
180						3.1	22	2.6	28	2.2	33	2	38	1.8	43	1.7	48	1.4	65	1.2	81	1.1	95	1	108	0.9	132	0.8	153			
190						3.1	23	2.6	29	2.2	35	2	41	1.8	46	1.7	51	1.4	69	1.2	85	1.1	100	1	114	0.9	139					
200						3.1	24	2.6	31	2.2	37	2	43	1.8	48	1.7	53	1.4	73	1.2	90	1.1	105	1	120	0.9	147					
210						3.1	25	2.6	32	2.2	39	2	45	1.8	51	1.7	56	1.4	76	1.2	94	1.1	111	1	126	0.9	154					
220						3.1	26	2.6	34	2.2	40	2	47	1.8	53	1.7	59	1.4	80	1.2	99	1.1	116	1	132	0.9	161					
230						3.1	28	2.6	35	2.2	42	2	49	1.8	55	1.7	61	1.4	84	1.2	103	1.1	121	1	138	0.9	169					
240						3.1	29	2.6	37	2.2	44	2	51	1.8	58	1.7	64	1.4	87	1.2	108	1.1	126	1	144							
250						3.1	30	2.6	38	2.2	46	2	53	1.8	60	1.7	67	1.4	91	1.2	112	1.1	132	1	150							
260				4.2	22	3.1	31	2.6	40	2.2	48	2	55	1.8	63	1.7	69	1.4	95	1.2	117	1.1	137	1	156							
270				4.2	23	3.1	32	2.6	41	2.2	50	2	58	1.8	65	1.7	72	1.4	98	1.2	121	1.1	142	1	162							
280				4.2	24	3.1	33	2.6	43	2.2	51	2	60	1.8	67	1.7	75	1.4	102	1.2	126	1.1	148	1	168							
290				4.2	24	3.1	35	2.6	44	2.2	53	2	62	1.8	70	1.7	77	1.4	105	1.2	130	1.1	153	1	174							
300				4.2	25	3.1	36	2.6	46	2.2	55	2	64	1.8	72	1.7	80	1.4	109	1.2	135	1.1	158	1	180							
310				4.2	26	3.1	37	2.6	47	2.2	57	2	66	1.8	75	1.7	83	1.4	113	1.2	139	1.1	163	1	186							
320				4.2	27	3.1	38	2.6	49	2.2	59	2	68	1.8	77	1.7	85	1.4	116	1.2	144	1.1	169	1	192							
330				4.2	28	3.1	39	2.6	50	2.2	61	2	70	1.8	79	1.7	88	1.4	120	1.2	148	1.1	174									
340				4.2	28	3.1	41	2.6	52	2.2	62	2	72	1.8	82	1.7	91	1.4	124	1.2	153	1.1	179									
350				4.2	29	3.1	42	2.6	53	2.2	64	2	75	1.8	84	1.7	93	1.4	127	1.2	157	1.1	184									
360				4.2	30	3.1	43	2.6	55	2.2	66	2	77	1.8	87	1.7	96	1.4	131	1.2	162	1.1	190									
370				4.2	31	3.1	44	2.6	56	2.2	68	2	79	1.8	89	1.7	99	1.4	135	1.2	166	1.1	195									
380				4.2	32	3.1	45	2.6	58	2.2	70	2	81	1.8	91	1.7	101	1.4	138	1.2	171	1.1	200									
390				4.2	32	3.1	46	2.6	59	2.2	72	2	83	1.8	94	1.7	104	1.4	142	1.2	175	1.1	206									
400				4.2	33	3.1	48	2.6	61	2.2	73	2	85	1.8	96	1.7	107	1.4	145	1.2	180	1.1	211									
410				4.2	34	3.1	49	2.6	62	2.2	75	2	87	1.8	99	1.7	109	1.4	149	1.2	184											
420				4.1	35	3.1	50	2.6	64	2.2	77	2	89	1.8	101	1.7	112	1.4	153	1.2	189											
430				4.1	36	3.1	51	2.6	66	2.2	79	2	92	1.8	103	1.7	115	1.4	156	1.2	193											
440				4.1	36	3.1	52	2.6	67	2.2	81	2	94	1.8	106	1.7	117	1.4	160	1.2	198											
450				4.1	37	3.1	54	2.6	69	2.2	83	2	96	1.8	108	1.7	120	1.4	164	1.2	202											
460				4.1	38	3.1	55	2.6	70	2.2	84	2	98	1.8	111	1.7	123	1.4	167	1.2	207											
470				4.1	39	3.1	56	2.6	72	2.2	86	2	100	1.8	113	1.7	125	1.4	171	1.2	211											
480				4.1	40	3.1	57	2.6	73	2.2	88	2	102	1.8	115	1.7	128	1.4	174	1.2	216											
490				4.1	41	3.1	58	2.5	75	2.2	90	2	104	1.8	118	1.7	131	1.4	178	1.2	220											
500				4.1	41	3.1	60	2.5	76	2.2	92	2	106	1.8	120	1.7	133	1.4	182	1.2	225											

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.9

Allowable Soil Stress = 0.05

B-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%				
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)			
10																														0.8	7		
20																															0.8	13	
30																															0.8	20	
40																															0.8	26	
50																															0.8	33	
60																															0.8	40	
70																															0.8	46	
80																															0.8	53	
90																															0.8	59	
100																															0.8	66	
110																															0.8	72	
120																															0.8	79	
130																															0.8	85	
140																															0.8	92	
150																															0.8	98	
160																															0.8	105	
170																															0.8	112	
180																															0.8	118	
190																															0.8	125	
200																															0.8	131	
210																															0.8	138	
220																															0.8	144	
230																															0.8	151	
240																															0.8	158	
250																																	
260																																	
270																																	
280																																	
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420																																	
430																																	
440																																	
450																																	
460																																	
470																																	
480																																	
490																																	
500																																	

Input Parameters:
Channel Type = Parabolic
Cover factor = 0.9
Allowable Soil Stress = 0.07
B-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%			
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)		
10																														0.8	7	
20																													1	9	0.8	13
30																																
40																																
50																																
60																																
70																																
80																																
90																																
100																																
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420																																
430																																
440																																
450																																
460																																
470																																
480																																
490																																
500																																

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.5

Allowable Soil Stress = 0.02

C-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)
10							1.2	9	1.1	10	0.9	12	0.9	13	0.8	15	0.8	16	0.6	20	0.6	23	0.5	27	0.5	29	0.4	34	0.4	39
20					1.5	14	1.2	18	1	21	0.9	24	0.9	27	0.8	29	0.8	32	0.6	40	0.6	47	0.5	53	0.5	59	0.4	68	0.4	77
30			2.2	13	1.5	20	1.2	26	1	32	0.9	36	0.9	40	0.8	44	0.8	48	0.6	60	0.6	70	0.5	80	0.5	88				
40			2.1	17	1.5	27	1.2	35	1	42	0.9	48	0.9	54	0.8	59	0.8	63	0.6	80	0.6	94								
50			2.1	21	1.5	34	1.2	44	1	52	0.9	60	0.9	67	0.8	73	0.8	79	0.6	100										
60			2.1	26	1.5	41	1.2	53	1	63	0.9	72	0.9	80	0.8	88	0.8	95	0.6	120										
70			2.1	30	1.5	48	1.2	62	1	73	0.9	84	0.9	94	0.8	103	0.8	111												
80			2.1	34	1.5	54	1.2	70	1	84	0.9	96	0.9	107	0.8	117	0.8	127												
90	3.7	20	2.1	39	1.5	61	1.2	79	1	94	0.9	108	0.9	121	0.8	132	0.8	143												
100	3.7	22	2.1	43	1.5	68	1.2	88	1	105	0.9	120	0.9	134	0.8	147														
110	3.6	24	2.1	47	1.5	75	1.2	97	1	115	0.9	132	0.9	147																
120	3.6	27	2.1	51	1.4	82	1.2	106	1	126	0.9	144	0.9	161																
130	3.6	29	2.1	56	1.4	88	1.2	114	1	136	0.9	156																		
140	3.6	31	2.1	60	1.4	95	1.2	123	1	147	0.9	168																		
150	3.6	33	2.1	64	1.4	102	1.2	132	1	157	0.9	180																		
160	3.6	35	2.1	69	1.4	109	1.2	141	1	168																				
170	3.6	38	2.1	73	1.4	116	1.2	150	1	178																				
180	3.6	40	2.1	77	1.4	122	1.2	158	1	189																				
190	3.6	42	2.1	82	1.4	129	1.2	167	1	199																				
200	3.6	44	2.1	86	1.4	136	1.2	176																						
210	3.6	47	2.1	90	1.4	143	1.2	185																						
220	3.6	49	2.1	94	1.4	150	1.2	194																						
230	3.6	51	2.1	99	1.4	156	1.2	202																						
240	3.6	53	2.1	103	1.4	163	1.2	211																						
250	3.6	55	2.1	107	1.4	170	1.2	220																						
260	3.6	58	2.1	112	1.4	177	1.2	229																						
270	3.6	60	2.1	116	1.4	184	1.2	238																						
280	3.6	62	2.1	120	1.4	190																								
290	3.6	64	2.1	125	1.4	197																								
300	3.6	66	2.1	129	1.4	204																								
310	3.6	69	2.1	133	1.4	211																								
320	3.6	71	2.1	137	1.4	218																								
330	3.5	73	2.1	142	1.4	224																								
340	3.5	75	2.1	146	1.4	231																								
350	3.5	77	2.1	150	1.4	238																								
360	3.5	80	2.1	155	1.4	245																								
370	3.5	82	2.1	159	1.4	252																								
380	3.5	84	2.1	163	1.4	259																								
390	3.5	86	2.1	167	1.4	265																								
400	3.5	89	2.1	172	1.4	272																								
410	3.5	91	2.1	176	1.4	279																								
420	3.5	93	2.1	180	1.4	286																								
430	3.5	95	2.1	185																										
440	3.5	97	2.1	189																										
450	3.5	100	2.1	193																										
460	3.5	102	2.1	197																										
470	3.5	104	2.1	202																										
480	3.5	106	2.1	206																										
490	3.5	109	2.1	210																										
500	3.5	111	2.1	215																										

Input Parameters:
Channel Type = Parabolic
Cover factor = 0.5
Allowable Soil Stress = 0.03

C-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	
10					1.7	9	1.4	12	1.2	7	1.1	8	1	9	0.9	10	0.8	11	0.7	14	0.6	17	0.6	19	0.5	21	0.5	25	0.4	28	
20					1.7	14	1.3	18	1.2	15	1	17	1	19	0.9	21	0.8	22	0.7	29	0.6	34	0.6	38	0.5	43	0.5	50	0.4	57	
30					1.7	19	1.3	24	1.2	22	1	25	0.9	28	0.9	31	0.8	34	0.7	43	0.6	51	0.6	58	0.5	64	0.5	75			
40					1.7	23	1.3	30	1.2	29	1	34	0.9	38	0.9	41	0.8	45	0.7	57	0.6	68	0.6	77	0.5	85					
50		2.5	14	1.7	23	1.3	30	1.2	37	1	42	0.9	47	0.9	52	0.8	56	0.7	72	0.6	85	0.6	96								
60		2.5	17	1.7	28	1.3	36	1.2	44	1	51	0.9	57	0.9	62	0.8	68	0.7	86	0.6	102										
70		2.5	20	1.7	32	1.3	43	1.2	51	1	59	0.9	66	0.9	73	0.8	79	0.7	100	0.6	119										
80		2.5	23	1.7	37	1.3	49	1.2	59	1	67	0.9	76	0.9	83	0.8	90	0.7	115												
90		2.5	26	1.7	42	1.3	55	1.2	66	1	76	0.9	85	0.9	93	0.8	101	0.7	129												
100		2.5	29	1.6	46	1.3	61	1.2	73	1	84	0.9	94	0.9	104	0.8	113														
110		2.4	31	1.6	51	1.3	67	1.2	81	1	93	0.9	104	0.9	114	0.8	124														
120		2.4	34	1.6	56	1.3	73	1.2	88	1	101	0.9	113	0.9	125	0.8	135														
130		2.4	37	1.6	60	1.3	79	1.2	95	1	110	0.9	123	0.9	135	0.8	146														
140		2.4	40	1.6	65	1.3	85	1.2	103	1	118	0.9	132	0.9	145	0.8	158														
150		2.4	43	1.6	70	1.3	91	1.2	110	1	127	0.9	142	0.9	156																
160	4.5	23	2.4	46	1.6	74	1.3	97	1.2	117	1	135	0.9	151	0.9	166															
170	4.5	24	2.4	48	1.6	79	1.3	103	1.2	125	1	143	0.9	161																	
180	4.5	26	2.4	51	1.6	83	1.3	109	1.2	132	1	152	0.9	170																	
190	4.5	27	2.4	54	1.6	88	1.3	115	1.2	139	1	160	0.9	179																	
200	4.4	28	2.4	57	1.6	93	1.3	122	1.2	146	1	169	0.9	189																	
210	4.4	30	2.4	60	1.6	97	1.3	128	1.2	154	1	177																			
220	4.4	31	2.4	63	1.6	102	1.3	134	1.2	161	1	186																			
230	4.4	32	2.4	65	1.6	107	1.3	140	1.2	168	1	194																			
240	4.4	34	2.4	68	1.6	111	1.3	146	1.2	176	1	202																			
250	4.4	35	2.4	71	1.6	116	1.3	152	1.2	183																					
260	4.4	37	2.4	74	1.6	121	1.3	158	1.2	190																					
270	4.4	38	2.4	77	1.6	125	1.3	164	1.2	198																					
280	4.4	39	2.4	80	1.6	130	1.3	170	1.2	205																					
290	4.4	41	2.4	83	1.6	134	1.3	176	1.2	212																					
300	4.4	42	2.4	85	1.6	139	1.3	182	1.2	220																					
310	4.4	44	2.4	88	1.6	144	1.3	188	1.2	227																					
320	4.4	45	2.4	91	1.6	148	1.3	195																							
330	4.4	46	2.4	94	1.6	153	1.3	201																							
340	4.4	48	2.4	97	1.6	158	1.3	207																							
350	4.4	49	2.4	100	1.6	162	1.3	213																							
360	4.4	51	2.4	103	1.6	167	1.3	219																							
370	4.4	52	2.4	105	1.6	172	1.3	225																							
380	4.4	53	2.4	108	1.6	176	1.3	231																							
390	4.4	55	2.4	111	1.6	181	1.3	237																							
400	4.4	56	2.4	114	1.6	185	1.3	243																							
410	4.3	57	2.4	117	1.6	190	1.3	249																							
420	4.3	59	2.4	120	1.6	195	1.3	255																							
430	4.3	60	2.4	122	1.6	199	1.3	261																							
440	4.3	62	2.4	125	1.6	204																									
450	4.3	63	2.4	128	1.6	209																									
460	4.3	64	2.4	131	1.6	213																									
470	4.3	66	2.4	134	1.6	218																									
480	4.3	67	2.4	137	1.6	223																									
490	4.3	69	2.4	140	1.6	227																									
500	4.3	70	2.4	142	1.6	232																									

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.5

Allowable Soil Stress = 0.05

C-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	
10									1.4	9	1.2	11	1.2	6	1.1	7	1	7	0.8	9	0.7	11	0.6	13	0.6	14	0.5	17	0.4	19	
20									1.4	14	1.2	16	1.1	12	1	13	0.9	14	0.8	18	0.7	22	0.6	25	0.6	28	0.5	33	0.4	38	
30							1.6	11	1.4	14	1.2	16	1.1	18	1	20	0.9	21	0.8	28	0.7	33	0.6	38	0.6	42	0.5	50	0.4	56	
40				2.1	11	1.6	15	1.4	18	1.2	21	1.1	24	1	26	0.9	29	0.8	37	0.7	44	0.6	50	0.6	56	0.5	66	0.4	75		
50				2.1	14	1.6	19	1.4	23	1.2	26	1.1	30	1	33	0.9	36	0.8	46	0.7	55	0.6	63	0.6	70	0.5	83				
60				2	17	1.6	22	1.4	27	1.2	32	1.1	36	1	39	0.9	43	0.8	55	0.7	66	0.6	76	0.6	84						
70				2	19	1.6	26	1.4	32	1.2	37	1.1	41	1	46	0.9	50	0.8	65	0.7	77	0.6	88	0.6	98						
80				2	22	1.6	30	1.4	36	1.2	42	1.1	47	1	52	0.9	57	0.8	74	0.7	88	0.6	101	0.6	112						
90				2	25	1.6	33	1.4	41	1.2	47	1.1	53	1	59	0.9	64	0.8	83	0.7	99	0.6	113								
100		3.2	16	2	28	1.6	37	1.4	45	1.2	53	1.1	59	1	66	0.9	71	0.8	92	0.7	110										
110		3.2	18	2	31	1.6	41	1.4	50	1.2	58	1.1	65	1	72	0.9	79	0.8	102	0.7	121										
120		3.2	20	2	33	1.6	44	1.3	54	1.2	63	1.1	71	1	79	0.9	86	0.8	111	0.7	132										
130		3.1	21	2	36	1.6	48	1.3	59	1.2	68	1.1	77	1	85	0.9	93	0.8	120												
140		3.1	23	2	39	1.6	52	1.3	63	1.2	74	1.1	83	1	92	0.9	100	0.8	129												
150		3.1	25	2	42	1.6	56	1.3	68	1.2	79	1.1	89	1	98	0.9	107	0.8	139												
160		3.1	26	2	44	1.6	59	1.3	72	1.2	84	1.1	95	1	105	0.9	114	0.8	148												
170		3.1	28	2	47	1.6	63	1.3	77	1.2	89	1.1	101	1	111	0.9	121														
180		3.1	29	2	50	1.6	67	1.3	81	1.2	95	1.1	107	1	118	0.9	129														
190		3.1	31	2	53	1.6	70	1.3	86	1.2	100	1.1	113	1	125	0.9	136														
200		3.1	33	2	55	1.6	74	1.3	90	1.2	105	1.1	119	1	131	0.9	143														
210		3.1	34	2	58	1.6	78	1.3	95	1.2	110	1.1	125	1	138	0.9	150														
220		3.1	36	2	61	1.6	82	1.3	99	1.2	116	1.1	131	1	144	0.9	157														
230		3.1	38	2	64	1.6	85	1.3	104	1.2	121	1.1	137	1	151	0.9	164														
240		3.1	39	2	67	1.6	89	1.3	109	1.2	126	1.1	143	1	157	0.9	171														
250		3.1	41	2	69	1.6	93	1.3	113	1.2	131	1.1	148	1	164	0.9	179														
260		3.1	42	2	72	1.6	96	1.3	118	1.2	137	1.1	154	1	170	0.9	186														
270		3.1	44	2	75	1.6	100	1.3	122	1.2	142	1.1	160	1	177																
280		3.1	46	2	78	1.6	104	1.3	127	1.2	147	1.1	166	1	184																
290		3.1	47	2	80	1.6	108	1.3	131	1.2	153	1.1	172	1	190																
300		3.1	49	2	83	1.6	111	1.3	136	1.2	158	1.1	178	1	197																
310		3.1	51	2	86	1.6	115	1.3	140	1.2	163	1.1	184																		
320		3.1	52	2	89	1.6	119	1.3	145	1.2	168	1.1	190																		
330		3.1	54	2	91	1.6	122	1.3	149	1.2	174	1.1	196																		
340		3.1	55	2	94	1.6	126	1.3	154	1.2	179	1.1	202																		
350		3.1	57	2	97	1.6	130	1.3	158	1.2	184	1.1	208																		
360		3.1	59	2	100	1.6	134	1.3	163	1.2	189	1.1	214																		
370		3.1	60	2	103	1.6	137	1.3	167	1.2	195																				
380		3.1	62	2	105	1.6	141	1.3	172	1.2	200																				
390		3.1	64	2	108	1.6	145	1.3	176	1.2	205																				
400	6.1	30	3.1	65	2	111	1.6	148	1.3	181	1.2	210																			
410	6.1	31	3.1	67	2	114	1.6	152	1.3	185	1.2	216																			
420	6.1	32	3.1	69	2	116	1.6	156	1.3	190	1.2	221																			
430	6	33	3.1	70	2	119	1.6	159	1.3	194	1.2	226																			
440	6	33	3.1	72	2	122	1.6	163	1.3	199	1.2	231																			
450	6	34	3.1	73	2	125	1.6	167	1.3	203	1.2	237																			
460	6	35	3.1	75	2	127	1.6	171	1.3	208																					
470	6	35	3.1	77	2	130	1.6	174	1.3	213																					
480	6	36	3.1	78	2	133	1.6	178	1.3	217																					
490	6	37	3.1	80	2	136	1.6	182	1.3	222																					
500	6	38	3.1	82	2	139	1.6	185	1.3	226																					

Input Parameters:
Channel Type = Parabolic
Cover factor = 0.5
Allowable Soil Stress = 0.07

C-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)
10											1.4	8	1.3	9	1.1	10	1.1	10	0.9	7	0.7	8	0.7	9	0.6	11	0.5	13	0.5	14
20																			0.9	14	0.7	16	0.7	19	0.6	21	0.5	25	0.5	29
30											1.6	10	1.4	11	1.2	13	1.1	14	0.8	20	0.7	25	0.7	28	0.6	32	0.5	38	0.5	43
40						1.9	11	1.6	13	1.4	15	1.2	17	1.1	19	1	21	0.8	27	0.7	33	0.7	38	0.6	42	0.5	50	0.5	57	
50						1.9	13	1.5	16	1.4	19	1.2	21	1.1	24	1	26	0.8	34	0.7	41	0.7	47	0.6	53	0.5	63	0.5	71	
60						1.8	16	1.5	19	1.4	23	1.2	26	1.1	29	1	31	0.8	41	0.7	49	0.7	56	0.6	63	0.5	75	0.5	86	
70				2.4	14	1.8	18	1.5	23	1.4	26	1.2	30	1.1	33	1	37	0.8	48	0.7	57	0.7	66	0.6	74	0.5	88			
80				2.4	16	1.8	21	1.5	26	1.3	30	1.2	34	1.1	38	1	42	0.8	54	0.7	65	0.7	75	0.6	84	0.5	100			
90				2.4	17	1.8	24	1.5	29	1.3	34	1.2	39	1.1	43	1	47	0.8	61	0.7	74	0.7	85	0.6	95					
100				2.4	19	1.8	26	1.5	32	1.3	38	1.2	43	1.1	48	1	52	0.8	68	0.7	82	0.7	94	0.6	105					
110				2.4	21	1.8	29	1.5	36	1.3	42	1.2	47	1.1	52	1	57	0.8	75	0.7	90	0.7	103	0.6	116					
120				2.3	23	1.8	32	1.5	39	1.3	45	1.2	52	1.1	57	1	63	0.8	82	0.7	98	0.7	113							
130				2.3	25	1.8	34	1.5	42	1.3	49	1.2	56	1.1	62	1	68	0.8	88	0.7	106	0.7	122							
140				2.3	27	1.8	37	1.5	45	1.3	53	1.2	60	1.1	67	1	73	0.8	95	0.7	114	0.7	132							
150				2.3	29	1.8	39	1.5	49	1.3	57	1.2	64	1.1	72	1	78	0.8	102	0.7	123									
160				2.3	31	1.8	42	1.5	52	1.3	61	1.2	69	1.1	76	1	84	0.8	109	0.7	131									
170				2.3	33	1.8	45	1.5	55	1.3	64	1.2	73	1.1	81	1	89	0.8	116	0.7	139									
180	3.8	20	2.3	35	1.8	47	1.5	58	1.3	68	1.2	77	1.1	86	1	94	0.8	122												
190	3.8	21	2.3	37	1.8	50	1.5	61	1.3	72	1.2	82	1.1	91	1	99	0.8	129												
200	3.8	22	2.3	39	1.8	52	1.5	65	1.3	76	1.2	86	1.1	95	1	104	0.8	136												
210	3.8	23	2.3	40	1.8	55	1.5	68	1.3	79	1.2	90	1.1	100	1	110	0.8	143												
220	3.8	24	2.3	42	1.8	58	1.5	71	1.3	83	1.2	95	1.1	105	1	115	0.8	150												
230	3.8	25	2.3	44	1.8	60	1.5	74	1.3	87	1.2	99	1.1	110	1	120	0.8	157												
240	3.8	27	2.3	46	1.8	63	1.5	78	1.3	91	1.2	103	1.1	115	1	125	0.8	163												
250	3.8	28	2.3	48	1.8	66	1.5	81	1.3	95	1.2	107	1.1	119	1	130														
260	3.7	29	2.3	50	1.8	68	1.5	84	1.3	98	1.2	112	1.1	124	1	136														
270	3.7	30	2.3	52	1.8	71	1.5	87	1.3	102	1.2	116	1.1	129	1	141														
280	3.7	31	2.3	54	1.8	73	1.5	91	1.3	106	1.2	120	1.1	134	1	146														
290	3.7	32	2.3	56	1.8	76	1.5	94	1.3	110	1.2	125	1.1	138	1	151														
300	3.7	33	2.3	58	1.8	79	1.5	97	1.3	114	1.2	129	1.1	143	1	157														
310	3.7	34	2.3	60	1.8	81	1.5	100	1.3	117	1.2	133	1.1	148	1	162														
320	3.7	35	2.3	62	1.8	84	1.5	104	1.3	121	1.2	137	1.1	153	1	167														
330	3.7	36	2.3	64	1.8	86	1.5	107	1.3	125	1.2	142	1.1	157	1	172														
340	3.7	37	2.3	65	1.8	89	1.5	110	1.3	129	1.2	146	1.1	162	1	177														
350	3.7	38	2.3	67	1.8	92	1.5	113	1.3	132	1.2	150	1.1	167	1	183														
360	3.7	39	2.3	69	1.8	94	1.5	116	1.3	136	1.2	155	1.1	172	1	188														
370	3.7	41	2.3	71	1.8	97	1.5	120	1.3	140	1.2	159	1.1	177	1	193														
380	3.7	42	2.3	73	1.8	100	1.5	123	1.3	144	1.2	163	1.1	181	1	198														
390	3.7	43	2.3	75	1.8	102	1.5	126	1.3	148	1.2	168	1.1	186	1	204														
400	3.7	44	2.3	77	1.8	105	1.5	129	1.3	151	1.2	172	1.1	191																
410	3.7	45	2.3	79	1.8	107	1.5	133	1.3	155	1.2	176	1.1	196																
420	3.7	46	2.3	81	1.8	110	1.5	136	1.3	159	1.2	180	1.1	200																
430	3.7	47	2.3	83	1.8	113	1.5	139	1.3	163	1.2	185	1.1	205																
440	3.7	48	2.3	85	1.8	115	1.5	142	1.3	166	1.2	189	1.1	210																
450	3.7	49	2.3	87	1.8	118	1.5	146	1.3	170	1.2	193	1.1	215																
460	3.7	50	2.3	89	1.8	121	1.5	149	1.3	174	1.2	198	1.1	219																
470	3.7	51	2.3	90	1.8	123	1.5	152	1.3	178	1.2	202																		
480	3.7	53	2.3	92	1.8	126	1.5	155	1.3	182	1.2	206																		
490	3.7	54	2.3	94	1.8	128	1.5	158	1.3	185	1.2	210																		
500	3.7	55	2.3	96	1.8	131	1.5	162	1.3	189	1.2	215																		

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.75

Allowable Soil Stress = 0.02

C-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)
10							1.5	9	1.3	11	1.1	13	1	15	1	8	0.9	9	0.7	11	0.6	13	0.6	15	0.5	17	0.5	20	0.4	23
20																	0.9	17	0.7	22	0.6	27	0.6	30	0.5	34	0.5	40	0.4	45
30				1.9	10	1.5	14	1.3	17	1.1	19	1	22	0.9	24	0.9	26	0.7	34	0.6	40	0.6	46	0.5	51	0.5	60	0.4	68	
40				1.9	14	1.5	18	1.3	22	1.1	26	1	29	0.9	32	0.9	35	0.7	45	0.6	53	0.6	61	0.5	68	0.5	80			
50				1.9	17	1.5	23	1.3	28	1.1	32	1	36	0.9	40	0.9	44	0.7	56	0.6	67	0.6	76	0.5	84					
60				1.8	21	1.5	28	1.3	34	1.1	39	1	44	0.9	48	0.9	52	0.7	67	0.6	80	0.6	91	0.5	101					
70		2.9	15	1.8	24	1.5	32	1.3	39	1.1	45	1	51	0.9	56	0.9	61	0.7	79	0.6	93	0.6	106							
80		2.9	17	1.8	28	1.5	37	1.3	45	1.1	52	1	58	0.9	64	0.9	70	0.7	90	0.6	107									
90		2.8	19	1.8	31	1.5	42	1.3	50	1.1	58	1	66	0.9	72	0.9	79	0.7	101	0.6	120									
100		2.8	21	1.8	35	1.5	46	1.3	56	1.1	65	1	73	0.9	81	0.9	87	0.7	112											
110		2.8	23	1.8	38	1.5	51	1.3	62	1.1	71	1	80	0.9	89	0.9	96	0.7	123											
120		2.8	25	1.8	42	1.5	55	1.3	67	1.1	78	1	88	0.9	97	0.9	105	0.7	135											
130		2.8	27	1.8	45	1.5	60	1.3	73	1.1	84	1	95	0.9	105	0.9	114	0.7	146											
140		2.8	29	1.8	49	1.5	65	1.3	78	1.1	91	1	102	0.9	113	0.9	122													
150		2.8	31	1.8	52	1.5	69	1.3	84	1.1	97	1	109	0.9	121	0.9	131													
160		2.8	34	1.8	56	1.5	74	1.3	90	1.1	104	1	117	0.9	129	0.9	140													
170		2.8	36	1.8	59	1.5	79	1.3	95	1.1	110	1	124	0.9	137	0.9	149													
180		2.8	38	1.8	63	1.5	83	1.3	101	1.1	117	1	131	0.9	145	0.9	157													
190		2.8	40	1.8	66	1.5	88	1.3	106	1.1	123	1	139	0.9	153	0.9	166													
200		2.8	42	1.8	70	1.5	92	1.3	112	1.1	130	1	146	0.9	161	0.9	175													
210		2.8	44	1.8	73	1.5	97	1.3	118	1.1	136	1	153	0.9	169															
220		2.8	46	1.8	77	1.5	102	1.3	123	1.1	143	1	161	0.9	177															
230		2.8	48	1.8	80	1.5	106	1.3	129	1.1	149	1	168	0.9	185															
240		2.8	50	1.8	84	1.5	111	1.3	134	1.1	156	1	175																	
250		2.8	52	1.8	87	1.5	115	1.3	140	1.1	162	1	182																	
260		2.8	54	1.8	91	1.5	120	1.3	146	1.1	169	1	190																	
270	5.3	27	2.8	56	1.8	94	1.5	125	1.3	151	1.1	175	1	197																
280	5.3	28	2.8	59	1.8	98	1.5	129	1.3	157	1.1	182																		
290	5.3	29	2.8	61	1.8	101	1.5	134	1.3	162	1.1	188																		
300	5.2	30	2.8	63	1.8	105	1.5	139	1.3	168	1.1	195																		
310	5.2	31	2.8	65	1.8	108	1.5	143	1.3	174	1.1	201																		
320	5.2	32	2.8	67	1.8	112	1.5	148	1.3	179	1.1	208																		
330	5.2	33	2.8	69	1.8	115	1.5	152	1.3	185	1.1	214																		
340	5.2	34	2.8	71	1.8	119	1.5	157	1.3	190	1.1	221																		
350	5.2	35	2.8	73	1.8	122	1.5	162	1.3	196																				
360	5.2	36	2.8	75	1.8	125	1.5	166	1.3	202																				
370	5.2	37	2.8	77	1.8	129	1.5	171	1.3	207																				
380	5.2	38	2.8	80	1.8	132	1.5	176	1.3	213																				
390	5.2	39	2.8	82	1.8	136	1.5	180	1.3	218																				
400	5.2	40	2.8	84	1.8	139	1.5	185	1.3	224																				
410	5.2	41	2.8	86	1.8	143	1.5	189	1.3	230																				
420	5.2	42	2.8	88	1.8	146	1.5	194	1.3	235																				
430	5.2	43	2.8	90	1.8	150	1.5	199	1.3	241																				
440	5.2	44	2.8	92	1.8	153	1.5	203	1.3	246																				
450	5.2	45	2.8	94	1.8	157	1.5	208																						
460	5.2	46	2.8	96	1.8	160	1.5	212																						
470	5.2	47	2.8	98	1.8	164	1.5	217																						
480	5.1	48	2.8	100	1.8	167	1.5	222																						
490	5.1	49	2.8	103	1.8	171	1.5	226																						
500	5.1	50	2.8	105	1.8	174	1.5	231																						

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.75

Allowable Soil Stress = 0.03

C-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)
10											1.3	9	1.2	10	1.1	11	1	6	0.8	8	0.7	9	0.6	11	0.6	12	0.5	14	0.5	16
20											1.3	18	1.2	20	1.1	22	1	12	0.8	16	0.7	19	0.6	22	0.6	24	0.5	28	0.5	32
30					1.8	9	1.5	11	1.3	13	1.2	15	1.1	17	1	18	0.8	24	0.7	28	0.6	32	0.6	36	0.5	43	0.5	49		
40					1.7	12	1.5	15	1.3	18	1.2	20	1.1	22	1	24	0.8	31	0.7	38	0.6	43	0.6	48	0.5	57	0.5	65		
50				2.3	12	1.7	15	1.5	19	1.3	22	1.2	25	1.1	28	1	30	0.8	39	0.7	47	0.6	54	0.6	60	0.5	71	0.5	81	
60				2.2	14	1.7	19	1.4	23	1.3	26	1.2	30	1.1	33	1	36	0.8	47	0.7	56	0.6	65	0.6	72	0.5	85			
70				2.2	16	1.7	22	1.4	26	1.3	31	1.2	35	1.1	39	1	42	0.8	55	0.7	66	0.6	75	0.6	84	0.5	100			
80				2.2	18	1.7	25	1.4	30	1.3	35	1.2	40	1.1	44	1	48	0.8	63	0.7	75	0.6	86	0.6	96					
90				2.2	21	1.7	28	1.4	34	1.3	40	1.2	45	1.1	50	1	54	0.8	71	0.7	84	0.6	97	0.6	108					
100				2.2	23	1.7	31	1.4	38	1.3	44	1.2	50	1.1	55	1	60	0.8	78	0.7	94	0.6	108							
110				2.2	25	1.7	34	1.4	42	1.3	49	1.2	55	1.1	61	1	66	0.8	86	0.7	103	0.6	118							
120				2.2	27	1.7	37	1.4	45	1.3	53	1.2	60	1.1	66	1	72	0.8	94	0.7	113									
130				2.2	30	1.7	40	1.4	49	1.3	57	1.2	65	1.1	72	1	79	0.8	102	0.7	122									
140		3.5	19	2.2	32	1.7	43	1.4	53	1.3	62	1.2	70	1.1	77	1	85	0.8	110	0.7	131									
150		3.5	20	2.2	34	1.7	46	1.4	57	1.3	66	1.2	75	1.1	83	1	91	0.8	118	0.7	141									
160		3.5	21	2.2	37	1.7	49	1.4	60	1.3	71	1.2	80	1.1	88	1	97	0.8	126											
170		3.5	23	2.2	39	1.7	52	1.4	64	1.3	75	1.2	85	1.1	94	1	103	0.8	133											
180		3.5	24	2.2	41	1.7	55	1.4	68	1.3	79	1.2	90	1.1	100	1	109	0.8	141											
190		3.4	25	2.2	43	1.7	58	1.4	72	1.3	84	1.2	95	1.1	105	1	115	0.8	149											
200		3.4	27	2.2	46	1.7	62	1.4	76	1.3	88	1.2	100	1.1	111	1	121	0.8	157											
210		3.4	28	2.2	48	1.7	65	1.4	79	1.3	93	1.2	105	1.1	116	1	127													
220		3.4	29	2.2	50	1.7	68	1.4	83	1.3	97	1.2	110	1.1	122	1	133													
230		3.4	30	2.2	52	1.7	71	1.4	87	1.3	101	1.2	115	1.1	127	1	139													
240		3.4	32	2.2	55	1.7	74	1.4	91	1.3	106	1.2	120	1.1	133	1	145													
250		3.4	33	2.2	57	1.7	77	1.4	94	1.3	110	1.2	125	1.1	138	1	151													
260		3.4	34	2.2	59	1.7	80	1.4	98	1.3	115	1.2	130	1.1	144	1	157													
270		3.4	36	2.2	62	1.7	83	1.4	102	1.3	119	1.2	135	1.1	149	1	163													
280		3.4	37	2.2	64	1.7	86	1.4	106	1.3	124	1.2	140	1.1	155	1	169													
290		3.4	38	2.2	66	1.7	89	1.4	109	1.3	128	1.2	145	1.1	160	1	175													
300		3.4	40	2.2	68	1.7	92	1.4	113	1.3	132	1.2	150	1.1	166	1	181													
310		3.4	41	2.2	71	1.7	95	1.4	117	1.3	137	1.2	155	1.1	171	1	187													
320		3.4	42	2.2	73	1.7	98	1.4	121	1.3	141	1.2	160	1.1	177	1	193													
330		3.4	44	2.2	75	1.7	102	1.4	125	1.3	146	1.2	165	1.1	182															
340		3.4	45	2.2	78	1.7	105	1.4	128	1.3	150	1.2	170	1.1	188															
350		3.4	46	2.2	80	1.7	108	1.4	132	1.3	154	1.2	175	1.1	194															
360		3.4	47	2.2	82	1.7	111	1.4	136	1.3	159	1.2	180	1.1	199															
370		3.4	49	2.2	84	1.7	114	1.4	140	1.3	163	1.2	185	1.1	205															
380		3.4	50	2.2	87	1.7	117	1.4	143	1.3	168	1.2	190	1.1	210															
390		3.4	51	2.2	89	1.7	120	1.4	147	1.3	172	1.2	195																	
400		3.4	53	2.2	91	1.7	123	1.4	151	1.3	176	1.2	200																	
410		3.4	54	2.2	94	1.7	126	1.4	155	1.3	181	1.2	205																	
420		3.4	55	2.2	96	1.7	129	1.4	159	1.3	185	1.2	210																	
430		3.4	57	2.2	98	1.7	132	1.4	162	1.3	190	1.2	215																	
440		3.4	58	2.2	100	1.7	136	1.4	166	1.3	194	1.2	220																	
450		3.4	59	2.2	103	1.7	139	1.4	170	1.3	199	1.2	225																	
460		3.4	61	2.2	105	1.7	142	1.4	174	1.3	203	1.2	230																	
470		3.4	62	2.2	107	1.7	145	1.4	177	1.3	207																			
480		3.4	63	2.2	109	1.7	148	1.4	181	1.3	212																			
490		3.4	65	2.2	112	1.7	151	1.4	185	1.3	216																			
500		3.4	66	2.2	114	1.7	154	1.4	189	1.3	221																			

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.75

Allowable Soil Stress = 0.05

C-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	
10																		1.2	7	1	10	0.8	6	0.7	7	0.7	8	0.6	9	0.5	11
20																															
30																															
40													1.4	9	1.3	10	1.2	11	1	15	0.8	18	0.7	20	0.7	23	0.6	28	0.5	32	
50													1.4	12	1.3	13	1.2	15	0.9	19	0.8	24	0.7	27	0.7	31	0.6	37	0.5	42	
60													1.6	11	1.4	15	1.3	17	1.2	18	0.9	24	0.8	30	0.7	34	0.6	46	0.5	53	
70													1.8	11	1.6	13	1.4	18	1.3	20	1.2	22	0.9	29	0.8	35	0.7	41	0.6	55	
80													1.6	16	1.4	18	1.3	20	1.2	22	0.9	29	0.8	35	0.7	41	0.6	55	0.5	63	
90													1.6	18	1.4	21	1.3	23	1.2	26	0.9	34	0.8	41	0.7	48	0.6	64	0.5	74	
100													1.6	21	1.4	24	1.3	27	1.2	29	0.9	39	0.8	47	0.7	55	0.6	73	0.5	84	
110													1.6	24	1.4	27	1.3	30	1.2	33	0.9	44	0.8	53	0.7	61	0.6	83	0.5	95	
120													1.6	26	1.4	30	1.3	34	1.2	37	0.9	49	0.8	59	0.7	68	0.6	92			
130													1.6	29	1.4	33	1.3	37	1.2	41	0.9	54	0.8	65	0.7	75	0.6	101			
140													1.6	32	1.4	36	1.3	40	1.2	44	0.9	58	0.8	71	0.7	82	0.7	92	0.6	110	
150													1.6	34	1.4	39	1.3	44	1.2	48	0.9	63	0.8	77	0.7	89	0.7	100			
160													1.6	37	1.4	42	1.3	47	1.2	52	0.9	68	0.8	83	0.7	95	0.7	107			
170													1.6	39	1.4	45	1.3	50	1.2	55	0.9	73	0.8	89	0.7	102	0.7	115			
180													1.6	42	1.4	48	1.3	54	1.2	59	0.9	78	0.8	94	0.7	109	0.7	123			
190													1.6	44	1.4	51	1.3	57	1.2	63	0.9	83	0.8	100	0.7	116	0.7	130			
200													1.6	47	1.4	54	1.3	60	1.2	66	0.9	88	0.8	106	0.7	123					
210													1.6	50	1.4	57	1.3	64	1.2	70	0.9	93	0.8	112	0.7	129					
220													1.6	52	1.4	60	1.3	67	1.2	74	0.9	97	0.8	118	0.7	136					
230													1.6	55	1.4	63	1.3	70	1.2	77	0.9	102	0.8	124	0.7	143					
240													1.6	58	1.4	66	1.3	74	1.2	81	0.9	107	0.8	130							
250													1.6	61	1.4	69	1.3	77	1.2	85	0.9	112	0.8	136							
260													1.6	64	1.4	72	1.3	80	1.2	88	0.9	117	0.8	142							
270													1.6	67	1.4	75	1.3	84	1.2	92	0.9	122	0.8	148							
280													1.6	70	1.4	78	1.3	87	1.2	96	0.9	127	0.8	153							
290													1.6	73	1.4	81	1.3	91	1.2	99	0.9	131	0.8	159							
300													1.6	76	1.4	84	1.3	94	1.2	103	0.9	136									
310													1.6	79	1.4	87	1.3	97	1.2	107	0.9	141									
320													1.6	82	1.4	90	1.3	101	1.2	110	0.9	146									
330													1.6	85	1.4	93	1.3	104	1.2	114	0.9	151									
340													1.6	88	1.4	96	1.3	107	1.2	118	0.9	156									
350													1.6	91	1.4	99	1.3	111	1.2	122	0.9	161									
360													1.6	94	1.4	102	1.3	114	1.2	125	0.9	166									
370													1.6	97	1.4	105	1.3	117	1.2	129	0.9	170									
380													1.6	100	1.4	108	1.3	121	1.2	133	0.9	175									
390													1.6	103	1.4	111	1.3	124	1.2	136	0.9	180									
400													1.6	106	1.4	114	1.3	127	1.2	140	0.9	185									
410													1.6	109	1.4	117	1.3	131	1.2	144											
420													1.6	112	1.4	120	1.3	134	1.2	147											
430													1.6	115	1.4	123	1.3	137	1.2	151											
440													1.6	118	1.4	126	1.3	141	1.2	155											
450													1.6	121	1.4	129	1.3	144	1.2	158											
460													1.6	124	1.4	132	1.3	148	1.2	162											
470													1.6	127	1.4	135	1.3	151	1.2	166											
480													1.6	130	1.4	138	1.3	154	1.2	169											
490													1.6	133	1.4	141	1.3	158	1.2	173											
500													1.6	136	1.4	144	1.3	161	1.2	177											
													1.6	139	1.4	147	1.3	164	1.2	180											
													1.6	142	1.4	150	1.3	168	1.2	184											

Input Parameters:
Channel Type = Parabolic
Cover factor = 0.75
Allowable Soil Stress = 0.07
C-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	
10																				1.1	7	0.9	9	0.8	5	0.8	6	0.6	7	0.6	8
20																															
30																															
40													1.7	8	1.5	9	1.4	10	1.1	14	0.9	17	0.8	15	0.7	17	0.6	20	0.6	23	
50													1.7	11	1.5	12	1.4	13	1.1	17	0.9	21	0.8	20	0.7	22	0.6	27	0.6	31	
60													1.6	13	1.5	14	1.4	16	1.1	21	0.9	26	0.8	30	0.7	34	0.6	41	0.6	47	
70													1.8	13	1.8	15	1.5	17	1.4	18	1.1	24	0.9	30	0.8	35	0.7	39	0.6	47	
80													1.6	17	1.5	19	1.4	21	1.1	28	0.9	34	0.8	40	0.7	45	0.6	54	0.6	63	
90													2.2	12	1.8	15	1.5	19	1.4	21	1.1	28	0.9	34	0.8	40	0.7	45	0.6	54	
100													2.1	14	1.8	16	1.6	19	1.5	21	1.1	31	0.9	38	0.8	45	0.7	51	0.6	61	
110													2.1	15	1.8	18	1.6	21	1.5	24	1.4	26	1.1	35	0.9	43	0.8	50	0.7	56	
120													2.6	13	2.1	17	1.8	20	1.6	23	1.5	26	1.4	29	1.1	38	0.9	47	0.8	55	
130													2.6	15	2.1	18	1.8	22	1.6	25	1.5	28	1.4	31	1.1	42	0.9	51	0.8	60	
140													2.6	16	2.1	20	1.8	24	1.6	27	1.5	31	1.4	34	1.1	45	0.9	55	0.8	65	
150													2.6	17	2.1	21	1.8	26	1.6	29	1.5	33	1.4	36	1.1	49	0.9	60	0.8	70	
160													2.6	18	2.1	23	1.8	27	1.6	31	1.5	35	1.4	39	1.1	52	0.9	64	0.8	75	
170													2.6	19	2.1	24	1.8	29	1.6	34	1.5	38	1.4	42	1.1	56	0.9	68	0.8	80	
180													2.6	21	2.1	26	1.8	31	1.6	36	1.5	40	1.4	44	1.1	59	0.9	73	0.8	84	
190													2.6	22	2.1	27	1.8	33	1.6	38	1.5	42	1.3	47	1.1	63	0.9	77	0.8	89	
200													2.6	23	2.1	29	1.8	35	1.6	40	1.5	45	1.3	49	1.1	66	0.9	81	0.8	94	
210													2.6	24	2.1	31	1.8	36	1.6	42	1.5	47	1.3	52	1.1	70	0.9	85	0.8	101	
220													2.6	25	2.1	32	1.8	38	1.6	44	1.5	50	1.3	55	1.1	73	0.9	90	0.8	107	
230													3.5	18	2.6	26	2.1	34	1.8	40	1.6	46	1.5	52	1.3	57	1.1	77	0.9	112	
240													3.5	20	2.6	28	2.1	35	1.8	42	1.6	48	1.5	54	1.3	60	1.1	80	0.9	118	
250													3.5	21	2.6	29	2.1	37	1.8	44	1.6	50	1.5	57	1.3	62	1.1	84	0.9	123	
260													3.5	22	2.6	30	2.1	38	1.8	45	1.6	52	1.5	59	1.3	65	1.1	87	0.9	129	
270													3.5	23	2.6	31	2.1	40	1.8	47	1.6	54	1.5	61	1.3	68	1.1	91	0.9	135	
280													3.5	24	2.6	32	2.1	41	1.8	49	1.6	57	1.5	64	1.3	70	1.1	94	0.9	141	
290													3.5	25	2.6	33	2.1	43	1.8	51	1.6	59	1.5	66	1.3	73	1.1	98	0.9	147	
300													3.5	26	2.6	35	2.1	44	1.8	53	1.6	61	1.5	68	1.3	75	1.1	101	0.9	153	
310													3.5	27	2.5	36	2.1	46	1.8	55	1.6	63	1.5	71	1.3	78	1.1	105	0.9	159	
320													3.5	28	2.5	37	2.1	47	1.8	56	1.6	65	1.5	73	1.3	81	1.1	108	0.9	165	
330													3.5	29	2.5	38	2.1	49	1.8	58	1.6	67	1.5	75	1.3	83	1.1	112	0.9	171	
340													3.4	28	2.5	40	2.1	50	1.8	60	1.6	69	1.5	78	1.3	86	1.1	115	0.9	177	
350													3.4	29	2.5	41	2.1	52	1.8	62	1.6	71	1.5	80	1.3	88	1.1	119	0.9	183	
360													3.4	30	2.5	42	2.1	53	1.8	64	1.6	73	1.5	83	1.3	91	1.1	122	0.9	189	
370													3.4	31	2.5	43	2.1	55	1.8	65	1.6	75	1.5	85	1.3	94	1.1	126	0.9	195	
380													3.4	32	2.5	44	2.1	56	1.8	67	1.6	77	1.5	87	1.3	96	1.1	129	0.9	201	
390													3.4	33	2.5	46	2.1	58	1.8	69	1.6	80	1.5	90	1.3	99	1.1	133	0.9	207	
400													3.4	34	2.5	47	2.1	59	1.8	71	1.6	82	1.5	92	1.3	101	1.1	136	0.9	213	
410													3.4	35	2.5	48	2.1	61	1.8	73	1.6	84	1.5	94	1.3	104	1.1	140	0.9	219	
420													3.4	36	2.5	49	2.1	62	1.8	75	1.6	86	1.5	97	1.3	107	1.1	143	0.9	225	
430													3.4	37	2.5	50	2.1	64	1.8	76	1.6	88	1.5	99	1.3	109	1.1	147	0.9	231	
440													3.4	38	2.5	52	2.1	65	1.8	78	1.6	90	1.5	101	1.3	112	1.1	150			
450													3.4	39	2.5	53	2.1	67	1.8	80	1.6	92	1.5	104	1.3	114	1.1	154			
460													3.4	40	2.5	54	2.1	68	1.8	82	1.6	94	1.5	106	1.3	117	1.1	157			
470													3.4	41	2.5	55	2.1	70	1.8	84	1.6	96	1.5	108	1.3	120	1.1	161			
480													3.4	42	2.5	56	2.1	72	1.8	85	1.6	98	1.5	111	1.3	122	1.1	164			
490													3.4	43	2.5	58	2.1	73	1.8	87	1.6	101	1.5	113	1.3	125	1.1	168			
500													3.4	44	2.5	59	2.1	75	1.8	89	1.6	103	1.5	116	1.3	127	1.1	171			
													3.4	45	2.5	60	2.1	76	1.8	91	1.6	105	1.5	118	1.3	130	1.1	175			

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.87

Allowable Soil Stress = 0.02

C-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)
10													1.3	8	1.2	9	1.1	10	0.9	6	0.8	8	0.7	9	0.6	10	0.5	12	0.5	13
20																														
30									1.7	9	1.4	10	1.3	12	1.2	13	1.1	14	0.9	19	0.8	23	0.7	26	0.6	29	0.5	35	0.5	40
40									1.6	12	1.4	14	1.3	16	1.2	17	1.1	19	0.9	25	0.8	30	0.7	35	0.6	39	0.5	46	0.5	53
50							1.9	12	1.6	15	1.4	17	1.3	20	1.2	22	1.1	24	0.9	31	0.8	38	0.7	43	0.6	48	0.5	58	0.5	66
60							1.9	14	1.6	18	1.4	21	1.3	23	1.2	26	1.1	29	0.9	37	0.8	45	0.7	52	0.6	58	0.5	69	0.5	79
70							1.9	17	1.6	21	1.4	24	1.3	27	1.2	30	1.1	33	0.9	44	0.8	53	0.7	61	0.6	68	0.5	81	0.5	92
80					2.5	14	1.9	19	1.6	23	1.4	28	1.3	31	1.2	35	1.1	38	0.9	50	0.8	60	0.7	69	0.6	78	0.5	92		
90					2.5	16	1.9	21	1.6	26	1.4	31	1.3	35	1.2	39	1.1	43	0.9	56	0.8	68	0.7	78	0.6	87	0.5	104		
100					2.5	17	1.9	24	1.6	29	1.4	34	1.3	39	1.2	44	1.1	48	0.9	62	0.8	75	0.7	86	0.6	97				
110					2.5	19	1.9	26	1.6	32	1.4	38	1.3	43	1.2	48	1.1	52	0.9	69	0.8	83	0.7	95	0.6	107				
120					2.5	21	1.9	28	1.6	35	1.4	41	1.3	47	1.2	52	1.1	57	0.9	75	0.8	90	0.7	104	0.6	116				
130					2.5	23	1.9	31	1.6	38	1.4	45	1.3	51	1.2	57	1.1	62	0.9	81	0.8	98	0.7	112						
140					2.5	24	1.9	33	1.6	41	1.4	48	1.3	55	1.2	61	1.1	67	0.9	87	0.8	105	0.7	121						
150					2.4	26	1.9	36	1.6	44	1.4	52	1.3	59	1.2	65	1.1	72	0.9	94	0.8	113	0.7	130						
160					2.4	28	1.9	38	1.6	47	1.4	55	1.3	63	1.2	70	1.1	76	0.9	100	0.8	120								
170					2.4	30	1.9	40	1.6	50	1.4	59	1.3	67	1.2	74	1.1	81	0.9	106	0.8	128								
180					2.4	31	1.9	43	1.6	53	1.4	62	1.3	70	1.2	78	1.1	86	0.9	112	0.8	135								
190					2.4	33	1.9	45	1.6	56	1.4	65	1.3	74	1.2	83	1.1	91	0.9	119	0.8	143								
200					2.4	35	1.9	47	1.6	59	1.4	69	1.3	78	1.2	87	1.1	95	0.9	125	0.8	150								
210	4	21			2.4	36	1.9	50	1.6	62	1.4	72	1.3	82	1.2	91	1.1	100	0.9	131										
220	4	22			2.4	38	1.9	52	1.6	65	1.4	76	1.3	86	1.2	96	1.1	105	0.9	137										
230	4	23			2.4	40	1.9	55	1.6	68	1.4	79	1.3	90	1.2	100	1.1	110	0.9	143										
240	4	24			2.4	42	1.9	57	1.6	70	1.4	83	1.3	94	1.2	104	1.1	114	0.9	150										
250	4	25			2.4	43	1.9	59	1.6	73	1.4	86	1.3	98	1.2	109	1.1	119	0.9	156										
260	4	26			2.4	45	1.9	62	1.6	76	1.4	90	1.3	102	1.2	113	1.1	124	0.9	162										
270	4	27			2.4	47	1.9	64	1.6	79	1.4	93	1.3	106	1.2	118	1.1	129	0.9	168										
280	4	28			2.4	49	1.9	66	1.6	82	1.4	96	1.3	110	1.2	122	1.1	133												
290	4	29			2.4	50	1.9	69	1.6	85	1.4	100	1.3	113	1.2	126	1.1	138												
300	4	29			2.4	52	1.9	71	1.6	88	1.4	103	1.3	117	1.2	131	1.1	143												
310	4	30			2.4	54	1.9	73	1.6	91	1.4	107	1.3	121	1.2	135	1.1	148												
320	4	31			2.4	55	1.9	76	1.6	94	1.4	110	1.3	125	1.2	139	1.1	153												
330	4	32			2.4	57	1.9	78	1.6	97	1.4	114	1.3	129	1.2	144	1.1	157												
340	4	33			2.4	59	1.9	81	1.6	100	1.4	117	1.3	133	1.2	148	1.1	162												
350	4	34			2.4	61	1.9	83	1.6	103	1.4	121	1.3	137	1.2	152	1.1	167												
360	3.9	35			2.4	62	1.9	85	1.6	106	1.4	124	1.3	141	1.2	157	1.1	172												
370	3.9	36			2.4	64	1.9	88	1.6	109	1.4	127	1.3	145	1.2	161	1.1	176												
380	3.9	37			2.4	66	1.9	90	1.6	112	1.4	131	1.3	149	1.2	165	1.1	181												
390	3.9	38			2.4	68	1.9	92	1.6	114	1.4	134	1.3	153	1.2	170	1.1	186												
400	3.9	39			2.4	69	1.9	95	1.6	117	1.4	138	1.3	156	1.2	174	1.1	191												
410	3.9	40			2.4	71	1.9	97	1.6	120	1.4	141	1.3	160	1.2	178	1.1	195												
420	3.9	41			2.4	73	1.9	99	1.6	123	1.4	145	1.3	164	1.2	183	1.1	200												
430	3.9	42			2.4	74	1.9	102	1.6	126	1.4	148	1.3	168	1.2	187	1.1	205												
440	3.9	43			2.4	76	1.9	104	1.6	129	1.4	152	1.3	172	1.2	191	1.1	210												
450	3.9	44			2.4	78	1.9	107	1.6	132	1.4	155	1.3	176	1.2	196	1.1	215												
460	3.9	45			2.4	80	1.9	109	1.6	135	1.4	158	1.3	180	1.2	200														
470	3.9	46			2.4	81	1.9	111	1.6	138	1.4	162	1.3	184	1.2	205														
480	3.9	47			2.4	83	1.9	114	1.6	141	1.4	165	1.3	188	1.2	209														
490	3.9	48			2.4	85	1.9	116	1.6	144	1.4	169	1.3	192	1.2	213														
500	3.9	49			2.4	87	1.9	118	1.6	147	1.4	172	1.3	196	1.2	218														

Input Parameters:
Channel Type = Parabolic
Cover factor = 0.87
Allowable Soil Stress = 0.03

C-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	
10																				1	8	0.9	5	0.8	6	0.7	7	0.6	8	0.5	9
20																				1	10	0.9	10	0.8	12	0.7	13	0.6	16	0.5	19
30																				1	13	0.9	15	0.8	18	0.7	20	0.6	24	0.5	28
40											1.7	9	1.5	10	1.4	12	1.3	13	1	17	0.9	21	0.8	24	0.7	27	0.6	32	0.5	37	
50													1.5	13	1.4	14	1.3	16	1	21	0.9	26	0.8	30	0.7	34	0.6	40	0.5	46	
60										2	11	1.7	14	1.5	16	1.4	17	1.3	19	1	25	0.9	31	0.8	36	0.7	40	0.6	48	0.5	56
70									1.9	13	1.7	16	1.5	18	1.4	20	1.3	22	1	30	0.9	36	0.8	42	0.7	47	0.6	57	0.5	65	
80						2.4	12	1.9	15	1.7	18	1.5	21	1.4	23	1.2	26	1	34	0.9	41	0.8	48	0.7	54	0.6	65	0.5	74		
90						2.4	14	1.9	17	1.7	20	1.5	23	1.4	26	1.2	29	1	38	0.9	46	0.8	54	0.7	60	0.6	73	0.5	84		
100						2.3	15	1.9	19	1.7	23	1.5	26	1.4	29	1.2	32	1	42	0.9	51	0.8	60	0.7	67	0.6	81	0.5	93		
110						2.3	17	1.9	21	1.7	25	1.5	28	1.3	32	1.2	35	1	47	0.9	57	0.8	66	0.7	74	0.6	89	0.5	102		
120						2.3	18	1.9	23	1.7	27	1.5	31	1.3	35	1.2	38	1	51	0.9	62	0.8	72	0.7	81	0.6	97				
130						2.3	20	1.9	25	1.7	29	1.5	34	1.3	38	1.2	41	1	55	0.9	67	0.8	78	0.7	87	0.6	105				
140						2.3	21	1.9	27	1.7	32	1.5	36	1.3	40	1.2	45	1	59	0.9	72	0.8	84	0.7	94	0.6	113				
150			3.1	16		2.3	23	1.9	29	1.7	34	1.5	39	1.3	43	1.2	48	1	64	0.9	77	0.8	89	0.7	101						
160			3.1	17		2.3	24	1.9	30	1.7	36	1.5	41	1.3	46	1.2	51	1	68	0.9	82	0.8	95	0.7	108						
170			3.1	19		2.3	26	1.9	32	1.7	38	1.5	44	1.3	49	1.2	54	1	72	0.9	88	0.8	101	0.7	114						
180			3.1	20		2.3	27	1.9	34	1.6	41	1.5	46	1.3	52	1.2	57	1	76	0.9	93	0.8	107	0.7	121						
190			3.1	21		2.3	29	1.9	36	1.6	43	1.5	49	1.3	55	1.2	60	1	81	0.9	98	0.8	113	0.7	128						
200			3.1	22		2.3	30	1.9	38	1.6	45	1.5	52	1.3	58	1.2	64	1	85	0.9	103	0.8	119	0.7	134						
210			3.1	23		2.3	32	1.9	40	1.6	47	1.5	54	1.3	61	1.2	67	1	89	0.9	108	0.8	125								
220			3.1	24		2.3	33	1.9	42	1.6	50	1.5	57	1.3	64	1.2	70	1	93	0.9	113	0.8	131								
230			3.1	25		2.3	35	1.9	44	1.6	52	1.5	59	1.3	66	1.2	73	1	97	0.9	118	0.8	137								
240			3.1	26		2.3	36	1.9	46	1.6	54	1.5	62	1.3	69	1.2	76	1	102	0.9	124	0.8	143								
250			3.1	27		2.3	38	1.9	47	1.6	56	1.5	65	1.3	72	1.2	80	1	106	0.9	129	0.8	149								
260			3.1	28		2.3	39	1.9	49	1.6	59	1.5	67	1.3	75	1.2	83	1	110	0.9	134										
270			3.1	29		2.3	41	1.9	51	1.6	61	1.5	70	1.3	78	1.2	86	1	114	0.9	139										
280			3.1	30		2.3	42	1.9	53	1.6	63	1.5	72	1.3	81	1.2	89	1	119	0.9	144										
290			3	31		2.3	44	1.9	55	1.6	65	1.5	75	1.3	84	1.2	92	1	123	0.9	149										
300			3	32		2.3	45	1.9	57	1.6	68	1.5	77	1.3	87	1.2	95	1	127	0.9	154										
310			3	33		2.3	47	1.9	59	1.6	70	1.5	80	1.3	90	1.2	99	1	131	0.9	160										
320			3	34		2.3	48	1.9	61	1.6	72	1.5	83	1.3	92	1.2	102	1	136	0.9	165										
330			3	36		2.3	50	1.9	63	1.6	74	1.5	85	1.3	95	1.2	105	1	140	0.9	170										
340			3	37		2.3	51	1.9	64	1.6	77	1.5	88	1.3	98	1.2	108	1	144												
350			3	38		2.3	53	1.9	66	1.6	79	1.5	90	1.3	101	1.2	111	1	148												
360			3	39		2.3	54	1.9	68	1.6	81	1.5	93	1.3	104	1.2	115	1	153												
370			3	40		2.3	56	1.9	70	1.6	83	1.5	95	1.3	107	1.2	118	1	157												
380			3	41		2.3	57	1.9	72	1.6	86	1.5	98	1.3	110	1.2	121	1	161												
390			3	42		2.3	59	1.9	74	1.6	88	1.5	101	1.3	113	1.2	124	1	165												
400			3	43		2.3	60	1.9	76	1.6	90	1.5	103	1.3	116	1.2	127	1	169												
410			3	44		2.3	62	1.9	78	1.6	92	1.5	106	1.3	118	1.2	130	1	174												
420			3	45		2.3	63	1.9	80	1.6	95	1.5	108	1.3	121	1.2	134	1	178												
430			3	46		2.3	65	1.9	82	1.6	97	1.5	111	1.3	124	1.2	137	1	182												
440			3	47		2.3	66	1.9	83	1.6	99	1.5	114	1.3	127	1.2	140	1	186												
450			3	48		2.3	68	1.9	85	1.6	101	1.5	116	1.3	130	1.2	143	1	191												
460		5.3	27	3	49	2.3	69	1.9	87	1.6	104	1.5	119	1.3	133	1.2	146	1	195												
470		5.3	27	3	50	2.3	71	1.9	89	1.6	106	1.5	121	1.3	136	1.2	150														
480		5.3	28	3	52	2.3	72	1.9	91	1.6	108	1.5	124	1.3	139	1.2	153														
490		5.3	29	3	53	2.3	74	1.9	93	1.6	110	1.5	126	1.3	142	1.2	156														
500		5.2	29	3	54	2.3	75	1.9	95	1.6	113	1.5	129	1.3	145	1.2	159														

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.87

Allowable Soil Stress = 0.05

C-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%			
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)		
10																						1.1	6	0.9	7	0.8	8	0.7	5	0.6	6	
20																						1	9	0.9	11	0.8	12	0.7	10	0.6	12	
30																					1.3	8	1	12	0.9	15	0.8	17	0.7	20	0.6	23
40																					1.2	10	1	16	0.9	18	0.8	21	0.7	25	0.6	29
50																		1.6	9	1.2	13	1	19	0.9	22	0.8	25	0.7	30	0.6	35	
60																	1.8	10	1.6	11	1.2	15	1	22	0.9	25	0.8	29	0.7	35	0.6	41
70														2	10	1.7	12	1.6	13	1.2	18	1	25	0.9	25	0.8	29	0.7	35	0.6	41	
80														1.9	12	1.7	13	1.6	15	1.2	20	1	22	0.9	29	0.8	33	0.7	40	0.6	47	
90												2.2	12	1.9	13	1.7	15	1.6	17	1.2	23	1	28	0.9	33	0.8	37	0.7	45	0.6	52	
100												2.2	13	1.9	15	1.7	17	1.6	18	1.2	25	1	31	0.9	36	0.8	41	0.7	50	0.6	58	
110												2.2	14	1.9	16	1.7	18	1.6	20	1.2	28	1	34	0.9	40	0.8	45	0.7	55	0.6	64	
120												2.2	15	1.9	18	1.7	20	1.6	22	1.2	30	1	37	0.9	44	0.8	50	0.7	60	0.6	70	
130										2.6	14	2.2	16	1.9	19	1.7	22	1.6	24	1.2	33	1	40	0.9	47	0.8	54	0.7	65	0.6	76	
140										2.6	15	2.2	18	1.9	21	1.7	23	1.6	26	1.2	35	1	43	0.9	51	0.8	58	0.7	70	0.6	82	
150										2.6	16	2.2	19	1.9	22	1.7	25	1.6	28	1.2	38	1	47	0.9	55	0.8	62	0.7	75	0.6	87	
160										2.5	17	2.2	20	1.9	23	1.7	27	1.6	29	1.2	40	1	50	0.9	58	0.8	66	0.7	80	0.6	93	
170										2.5	18	2.2	21	1.9	25	1.7	28	1.6	31	1.2	43	1	53	0.9	62	0.8	70	0.7	85	0.6	99	
180										2.5	19	2.1	23	1.9	26	1.7	30	1.6	33	1.2	45	1	56	0.9	65	0.8	74	0.7	90	0.6	105	
190										2.5	20	2.1	24	1.9	28	1.7	32	1.6	35	1.2	48	1	59	0.9	69	0.8	78	0.7	95	0.6	111	
200										3.2	16	2.5	21	1.9	29	1.7	33	1.6	37	1.2	50	1	62	0.9	73	0.8	83	0.7	100	0.6	117	
210										3.2	17	2.5	22	1.9	31	1.7	35	1.6	39	1.2	53	1	65	0.9	76	0.8	87	0.7	105	0.6	122	
220										3.2	18	2.5	23	1.9	32	1.7	36	1.6	41	1.2	55	1	68	0.9	80	0.8	91	0.7	111			
230										3.2	19	2.5	24	1.9	34	1.7	38	1.6	42	1.2	58	1	71	0.9	84	0.8	95	0.7	116			
240										3.1	20	2.5	25	1.9	35	1.7	40	1.6	44	1.2	60	1	74	0.9	87	0.8	99	0.7	121			
250										3.1	20	2.5	26	1.9	37	1.7	41	1.6	46	1.2	63	1	78	0.9	91	0.8	103	0.7	126			
260										3.1	21	2.5	27	1.9	38	1.7	43	1.6	48	1.2	65	1	81	0.9	94	0.8	107	0.7	131			
270										3.1	22	2.5	28	1.9	40	1.7	45	1.6	50	1.2	68	1	84	0.9	98	0.8	111	0.7	136			
280										3.1	23	2.5	29	1.9	41	1.7	46	1.6	52	1.2	70	1	87	0.9	102	0.8	116					
290										3.1	24	2.5	30	1.9	42	1.7	48	1.6	53	1.2	73	1	90	0.9	105	0.8	120					
300										3.1	24	2.5	31	1.9	44	1.7	50	1.6	55	1.2	75	1	93	0.9	109	0.8	124					
310										3.1	25	2.5	32	1.9	45	1.7	51	1.6	57	1.2	78	1	96	0.9	113	0.8	128					
320										3.1	26	2.5	33	1.9	47	1.7	53	1.6	59	1.2	80	1	99	0.9	116	0.8	132					
330										3.1	27	2.5	34	1.9	48	1.7	55	1.6	61	1.2	83	1	102	0.9	120	0.8	136					
340										3.1	28	2.5	35	1.9	50	1.7	56	1.6	63	1.2	85	1	105	0.9	124	0.8	140					
350										3.1	28	2.5	36	1.9	51	1.7	58	1.6	64	1.2	88	1	109	0.9	127	0.8	145					
360										3.1	29	2.5	37	1.9	53	1.7	60	1.6	66	1.2	90	1	112	0.9	131	0.8	149					
370										3.1	30	2.5	39	1.9	54	1.7	61	1.6	68	1.2	93	1	115	0.9	134	0.8	153					
380										3.1	31	2.5	40	1.9	56	1.7	63	1.6	70	1.2	95	1	118	0.9	138	0.8	157					
390										4.4	22	3.1	32	2.5	41	1.9	57	1.7	65	1.2	98	1	121	0.9	142	0.8	161					
400										4.4	23	3.1	32	2.5	42	1.9	59	1.7	66	1.2	100	1	124	0.9	145							
410										4.4	23	3.1	33	2.5	43	1.9	60	1.7	68	1.2	103	1	127	0.9	149							
420										4.3	24	3.1	34	2.5	44	1.9	61	1.7	70	1.2	105	1	130	0.9	153							
430										4.3	24	3.1	35	2.5	45	1.9	63	1.7	71	1.2	108	1	133	0.9	156							
440										4.3	25	3.1	36	2.5	46	1.9	64	1.7	73	1.2	111	1	137	0.9	160							
450										4.3	25	3.1	36	2.5	47	1.9	66	1.7	75	1.2	113	1	140	0.9	164							
460										4.3	26	3.1	37	2.5	48	1.9	67	1.7	76	1.2	116	1	143	0.9	167							
470										4.3	26	3.1	38	2.5	49	1.9	69	1.7	78	1.2	118	1	146	0.9	171							
480										4.3	27	3.1	39	2.5	50	1.9	70	1.7	80	1.2	121	1	149	0.9	174							
490										4.3	27	3.1	40	2.5	51	1.9	72	1.7	81	1.2	123	1	152	0.9	178							
500										4.3	28	3.1	40	2.5	52	1.9	73	1.7	83	1.2	126	1	155									

Input Parameters:
Channel Type = Parabolic
Cover factor = 0.87
Allowable Soil Stress = 0.07
C-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	
10																															
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410																															
420																															
430																															
440																															
450																															
460																															
470																															
480																															
490																															
500																															

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.9

Allowable Soil Stress = 0.02

C-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	
10																		1.2	7	1	10	0.8	6	0.7	7	0.7	8	0.6	9	0.5	11
20																															
30													1.4	9	1.3	10	1.2	11	1	15	0.8	18	0.7	20	0.7	23	0.6	28	0.5	32	
40											1.6	11	1.4	12	1.3	13	1.2	15	0.9	19	0.8	24	0.7	27	0.7	31	0.6	37	0.5	42	
50									1.8	11	1.6	13	1.4	15	1.3	17	1.2	18	0.9	24	0.8	30	0.7	34	0.7	38	0.6	46	0.5	53	
60									1.8	13	1.6	16	1.4	18	1.3	20	1.2	22	0.9	29	0.8	35	0.7	41	0.7	46	0.6	55	0.5	63	
70							2.2	13	1.8	16	1.6	18	1.4	21	1.3	23	1.2	26	0.9	34	0.8	41	0.7	48	0.7	54	0.6	64	0.5	74	
80							2.2	14	1.8	18	1.6	21	1.4	24	1.3	27	1.2	29	0.9	39	0.8	47	0.7	55	0.7	61	0.6	73	0.5	84	
90							2.2	16	1.8	20	1.6	24	1.4	27	1.3	30	1.2	33	0.9	44	0.8	53	0.7	61	0.7	69	0.6	83	0.5	95	
100							2.2	18	1.8	22	1.6	26	1.4	30	1.3	34	1.2	37	0.9	49	0.8	59	0.7	68	0.7	77	0.6	92			
110							2.2	20	1.8	24	1.6	29	1.4	33	1.3	37	1.2	41	0.9	54	0.8	65	0.7	75	0.7	84	0.6	101			
120			2.9	16	2.2	21	1.8	27	1.6	32	1.4	36	1.3	40	1.2	44	0.9	58	0.8	71	0.7	82	0.7	92	0.6	110					
130			2.9	17	2.1	23	1.8	29	1.6	34	1.4	39	1.3	44	1.2	48	0.9	63	0.8	77	0.7	89	0.7	100							
140			2.9	18	2.1	25	1.8	31	1.6	37	1.4	42	1.3	47	1.2	52	0.9	68	0.8	83	0.7	95	0.7	107							
150			2.8	19	2.1	27	1.8	33	1.6	39	1.4	45	1.3	50	1.2	55	0.9	73	0.8	89	0.7	102	0.7	115							
160			2.8	21	2.1	28	1.8	36	1.6	42	1.4	48	1.3	54	1.2	59	0.9	78	0.8	94	0.7	109	0.7	123							
170			2.8	22	2.1	30	1.8	38	1.5	45	1.4	51	1.3	57	1.2	63	0.9	83	0.8	100	0.7	116	0.7	130							
180			2.8	23	2.1	32	1.8	40	1.5	47	1.4	54	1.3	60	1.2	66	0.9	88	0.8	106	0.7	123									
190			2.8	24	2.1	34	1.8	42	1.5	50	1.4	57	1.3	64	1.2	70	0.9	93	0.8	112	0.7	129									
200			2.8	26	2.1	36	1.8	44	1.5	52	1.4	60	1.3	67	1.2	74	0.9	97	0.8	118	0.7	136									
210			2.8	27	2.1	37	1.8	47	1.5	55	1.4	63	1.3	70	1.2	77	0.9	102	0.8	124	0.7	143									
220			2.8	28	2.1	39	1.8	49	1.5	58	1.4	66	1.3	74	1.2	81	0.9	107	0.8	130											
230			2.8	30	2.1	41	1.8	51	1.5	60	1.4	69	1.3	77	1.2	85	0.9	112	0.8	136											
240			2.8	31	2.1	43	1.8	53	1.5	63	1.4	72	1.3	80	1.2	88	0.9	117	0.8	142											
250			2.8	32	2.1	44	1.8	55	1.5	66	1.4	75	1.3	84	1.2	92	0.9	122	0.8	148											
260			2.8	33	2.1	46	1.8	58	1.5	68	1.4	78	1.3	87	1.2	96	0.9	127	0.8	153											
270			2.8	35	2.1	48	1.8	60	1.5	71	1.4	81	1.3	91	1.2	99	0.9	131	0.8	159											
280			2.8	36	2.1	50	1.8	62	1.5	73	1.4	84	1.3	94	1.2	103	0.9	136													
290			2.8	37	2.1	51	1.8	64	1.5	76	1.4	87	1.3	97	1.2	107	0.9	141													
300			2.8	38	2.1	53	1.8	67	1.5	79	1.4	90	1.3	101	1.2	110	0.9	146													
310			2.8	40	2.1	55	1.8	69	1.5	81	1.4	93	1.3	104	1.2	114	0.9	151													
320			2.8	41	2.1	57	1.8	71	1.5	84	1.4	96	1.3	107	1.2	118	0.9	156													
330			2.8	42	2.1	59	1.8	73	1.5	87	1.4	99	1.3	111	1.2	122	0.9	161													
340		4.8	24	2.8	43	2.1	60	1.8	75	1.5	89	1.4	102	1.3	114	1.2	125	0.9	166												
350		4.8	25	2.8	45	2.1	62	1.8	78	1.5	92	1.4	105	1.3	117	1.2	129	0.9	170												
360		4.8	25	2.8	46	2.1	64	1.8	80	1.5	94	1.4	108	1.3	121	1.2	133	0.9	175												
370		4.7	26	2.8	47	2.1	66	1.8	82	1.5	97	1.4	111	1.3	124	1.2	136	0.9	180												
380		4.7	27	2.8	49	2.1	67	1.8	84	1.5	100	1.4	114	1.3	127	1.2	140	0.9	185												
390		4.7	28	2.8	50	2.1	69	1.8	87	1.5	102	1.4	117	1.3	131	1.2	144														
400		4.7	28	2.8	51	2.1	71	1.8	89	1.5	105	1.4	120	1.3	134	1.2	147														
410		4.7	29	2.8	52	2.1	73	1.8	91	1.5	108	1.4	123	1.3	137	1.2	151														
420		4.7	30	2.8	54	2.1	75	1.8	93	1.5	110	1.4	126	1.3	141	1.2	155														
430		4.7	30	2.8	55	2.1	76	1.8	95	1.5	113	1.4	129	1.3	144	1.2	158														
440		4.7	31	2.8	56	2.1	78	1.8	98	1.5	115	1.4	132	1.3	148	1.2	162														
450		4.7	32	2.8	58	2.1	80	1.8	100	1.5	118	1.4	135	1.3	151	1.2	166														
460		4.7	32	2.8	59	2.1	82	1.8	102	1.5	121	1.4	138	1.3	154	1.2	169														
470		4.7	33	2.8	60	2.1	83	1.8	104	1.5	123	1.4	141	1.3	158	1.2	173														
480		4.7	34	2.8	61	2.1	85	1.8	107	1.5	126	1.4	144	1.3	161	1.2	177														
490		4.7	34	2.8	63	2.1	87	1.8	109	1.5	129	1.4	147	1.3	164	1.2	180														
500		4.7	35	2.8	64	2.1	89	1.8	111	1.5	131	1.4	150	1.3	168	1.2	184														

Input Parameters:
Channel Type = Parabolic
Cover factor = 0.9
Allowable Soil Stress = 0.03
C-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	
10																				1.1	7	1	8	0.9	5	0.8	5	0.7	6	0.6	7
20																															
30																															
40															1.6	9	1.4	10	1.1	13	0.9	16	0.8	14	0.8	16	0.6	19	0.6	22	
50													1.7	10	1.5	11	1.4	12	1.1	16	0.9	20	0.8	19	0.7	21	0.6	25	0.6	29	
60											1.9	10	1.7	12	1.5	13	1.4	15	1.1	20	0.9	24	0.8	28	0.7	32	0.6	38	0.6	44	
70											1.9	12	1.7	14	1.5	15	1.4	17	1.1	23	0.9	28	0.8	33	0.7	37	0.6	45	0.6	51	
80									2.3	11	1.9	14	1.7	16	1.5	18	1.4	19	1.1	26	0.9	32	0.8	37	0.7	42	0.6	51	0.6	59	
90									2.2	13	1.9	15	1.7	18	1.5	20	1.4	22	1.1	29	0.9	36	0.8	42	0.7	47	0.6	57	0.6	66	
100									2.2	14	1.9	17	1.7	19	1.5	22	1.4	24	1.1	33	0.9	40	0.8	46	0.7	53	0.6	64	0.6	73	
110									2.2	16	1.9	19	1.7	21	1.5	24	1.4	27	1.1	36	0.9	44	0.8	51	0.7	58	0.6	70	0.6	81	
120									2.2	17	1.9	20	1.7	23	1.5	26	1.4	29	1.1	39	0.9	48	0.8	56	0.7	63	0.6	76	0.6	88	
130						2.7	15	2.2	18	1.9	22	1.7	25	1.5	28	1.4	31	1.1	42	0.9	52	0.8	60	0.7	68	0.6	83	0.6	95		
140						2.7	16	2.2	20	1.9	24	1.7	27	1.5	31	1.4	34	1.1	46	0.9	56	0.8	65	0.7	74	0.6	89	0.6	103		
150						2.7	17	2.2	21	1.9	25	1.7	29	1.5	33	1.4	36	1.1	49	0.9	60	0.8	70	0.7	79	0.6	95	0.6	110		
160						2.7	18	2.2	23	1.9	27	1.7	31	1.5	35	1.4	39	1.1	52	0.9	64	0.8	74	0.7	84	0.6	102				
170						2.7	19	2.2	24	1.9	29	1.7	33	1.5	37	1.4	41	1.1	55	0.9	68	0.8	79	0.7	89	0.6	108				
180						2.7	20	2.2	25	1.9	30	1.7	35	1.5	39	1.4	44	1.1	59	0.9	72	0.8	84	0.7	95	0.6	114				
190						2.7	21	2.2	27	1.9	32	1.7	37	1.5	42	1.4	46	1.1	62	0.9	76	0.8	88	0.7	100	0.6	121				
200						2.7	22	2.2	28	1.9	34	1.7	39	1.5	44	1.4	48	1.1	65	0.9	80	0.8	93	0.7	105	0.6	127				
210						2.7	23	2.2	30	1.9	35	1.7	41	1.5	46	1.4	51	1.1	68	0.9	84	0.8	98	0.7	110						
220						2.7	24	2.2	31	1.9	37	1.7	43	1.5	48	1.4	53	1.1	72	0.9	88	0.8	102	0.7	116						
230						2.7	25	2.2	32	1.9	39	1.7	45	1.5	50	1.4	56	1.1	75	0.9	92	0.8	107	0.7	121						
240						2.7	27	2.2	34	1.9	40	1.7	47	1.5	52	1.4	58	1.1	78	0.9	96	0.8	111	0.7	126						
250			3.7	19	2.7	28	2.2	35	1.9	42	1.7	49	1.5	55	1.4	60	1.1	81	0.9	100	0.8	116	0.7	131							
260			3.7	20	2.7	29	2.2	37	1.9	44	1.7	51	1.5	57	1.4	63	1.1	85	0.9	104	0.8	121	0.7	137							
270			3.7	21	2.7	30	2.2	38	1.9	45	1.7	52	1.5	59	1.4	65	1.1	88	0.9	108	0.8	125	0.7	142							
280			3.6	22	2.7	31	2.2	39	1.9	47	1.7	54	1.5	61	1.4	68	1.1	91	0.9	112	0.8	130	0.7	147							
290			3.6	23	2.7	32	2.2	41	1.9	49	1.7	56	1.5	63	1.4	70	1.1	94	0.9	116	0.8	135									
300			3.6	23	2.7	33	2.2	42	1.9	50	1.7	58	1.5	66	1.4	73	1.1	98	0.9	120	0.8	139									
310			3.6	24	2.7	34	2.2	44	1.9	52	1.7	60	1.5	68	1.4	75	1.1	101	0.9	124	0.8	144									
320			3.6	25	2.7	35	2.2	45	1.9	54	1.7	62	1.5	70	1.4	77	1.1	104	0.9	128	0.8	149									
330			3.6	26	2.7	36	2.2	46	1.9	56	1.7	64	1.5	72	1.4	80	1.1	107	0.9	132	0.8	153									
340			3.6	26	2.7	38	2.2	48	1.9	57	1.7	66	1.5	74	1.4	82	1.1	111	0.9	136	0.8	158									
350			3.6	27	2.7	39	2.2	49	1.9	59	1.7	68	1.5	77	1.4	85	1.1	114	0.9	140	0.8	163									
360			3.6	28	2.6	40	2.2	51	1.9	61	1.7	70	1.5	79	1.4	87	1.1	117	0.9	144											
370			3.6	29	2.6	41	2.2	52	1.9	62	1.7	72	1.5	81	1.4	89	1.1	120	0.9	148											
380			3.6	29	2.6	42	2.2	53	1.9	64	1.7	74	1.5	83	1.4	92	1.1	124	0.9	151											
390			3.6	30	2.6	43	2.2	55	1.9	66	1.7	76	1.5	85	1.4	94	1.1	127	0.9	155											
400			3.6	31	2.6	44	2.2	56	1.9	67	1.7	78	1.5	87	1.4	97	1.1	130	0.9	159											
410			3.6	32	2.6	45	2.2	58	1.9	69	1.7	80	1.5	90	1.4	99	1.1	133	0.9	163											
420			3.6	32	2.6	46	2.2	59	1.9	71	1.7	82	1.5	92	1.4	102	1.1	137	0.9	167											
430			3.6	33	2.6	47	2.2	60	1.9	72	1.7	84	1.5	94	1.4	104	1.1	140	0.9	171											
440			3.6	34	2.6	49	2.2	62	1.9	74	1.7	85	1.5	96	1.4	106	1.1	143	0.9	175											
450			3.6	35	2.6	50	2.2	63	1.9	76	1.7	87	1.5	98	1.4	109	1.1	146	0.9	179											
460			3.6	36	2.6	51	2.2	65	1.9	77	1.7	89	1.5	101	1.4	111	1.1	150	0.9	183											
470			3.6	36	2.6	52	2.2	66	1.9	79	1.7	91	1.5	103	1.4	114	1.1	153													
480			3.6	37	2.6	53	2.2	67	1.9	81	1.7	93	1.5	105	1.4	116	1.1	156													
490			3.6	38	2.6	54	2.2	69	1.9	82	1.7	95	1.5	107	1.4	118	1.1	160													
500			3.6	39	2.6	55	2.2	70	1.9	84	1.7	97	1.5	109	1.4	121	1.1	163													

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.9

Allowable Soil Stress = 0.05

C-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	
10																															
20																								1	6	0.9	6	0.8	4	0.6	6
30																							1	8	0.9	10	0.8	8	0.6	12	
40																							1	11	0.9	13	0.8	12	0.6	17	
50																							1	14	0.9	16	0.8	16	0.6	23	
60																							1	17	0.9	19	0.8	19	0.6	29	
70																							1	19	0.9	22	0.8	23	0.6	34	
80																							1	19	0.9	22	0.8	27	0.6	40	
90																							1	22	0.9	25	0.8	31	0.6	46	
100																							1	25	0.9	29	0.8	35	0.6	52	
110																							1	25	0.9	29	0.8	35	0.6	52	
120																							1	25	0.9	29	0.8	35	0.6	52	
130																							1	25	0.9	29	0.8	35	0.6	52	
140																							1	25	0.9	29	0.8	35	0.6	52	
150																							1	25	0.9	29	0.8	35	0.6	52	
160																							1	25	0.9	29	0.8	35	0.6	52	
170																							1	25	0.9	29	0.8	35	0.6	52	
180																							1	25	0.9	29	0.8	35	0.6	52	
190																							1	25	0.9	29	0.8	35	0.6	52	
200																							1	25	0.9	29	0.8	35	0.6	52	
210																							1	25	0.9	29	0.8	35	0.6	52	
220																							1	25	0.9	29	0.8	35	0.6	52	
230																							1	25	0.9	29	0.8	35	0.6	52	
240																							1	25	0.9	29	0.8	35	0.6	52	
250																							1	25	0.9	29	0.8	35	0.6	52	
260																							1	25	0.9	29	0.8	35	0.6	52	
270																							1	25	0.9	29	0.8	35	0.6	52	
280																							1	25	0.9	29	0.8	35	0.6	52	
290																							1	25	0.9	29	0.8	35	0.6	52	
300																							1	25	0.9	29	0.8	35	0.6	52	
310																							1	25	0.9	29	0.8	35	0.6	52	
320																							1	25	0.9	29	0.8	35	0.6	52	
330																							1	25	0.9	29	0.8	35	0.6	52	
340																							1	25	0.9	29	0.8	35	0.6	52	
350																							1	25	0.9	29	0.8	35	0.6	52	
360																							1	25	0.9	29	0.8	35	0.6	52	
370																							1	25	0.9	29	0.8	35	0.6	52	
380																							1	25	0.9	29	0.8	35	0.6	52	
390																							1	25	0.9	29	0.8	35	0.6	52	
400																							1	25	0.9	29	0.8	35	0.6	52	
410																							1	25	0.9	29	0.8	35	0.6	52	
420																							1	25	0.9	29	0.8	35	0.6	52	
430																							1	25	0.9	29	0.8	35	0.6	52	
440																							1	25	0.9	29	0.8	35	0.6	52	
450																							1	25	0.9	29	0.8	35	0.6	52	
460																							1	25	0.9	29	0.8	35	0.6	52	
470																							1	25	0.9	29	0.8	35	0.6	52	
480																							1	25	0.9	29	0.8	35	0.6	52	
490																							1	25	0.9	29	0.8	35	0.6	52	
500																							1	25	0.9	29	0.8	35	0.6	52	

Input Parameters:
Channel Type = Parabolic
Cover factor = 0.9
Allowable Soil Stress = 0.07
C-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%									
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)								
10																														0.6	6							
20																											1	5	0.8	8	0.6	12						
30																										1	7	0.8	12	0.6	17							
40																										1	10	0.8	15	0.6	23							
50																						1.4	8	1.2	8	1	10	0.8	19	0.6	29							
60																						1.4	10	1.2	12	1	14	0.8	23	0.6	34							
70																					1.7	9	1.4	11	1.2	14	1	17	0.8	27	0.6	40						
80																					1.7	10	1.4	13	1.2	15	1	19	0.8	31	0.6	46						
90																					1.7	12	1.4	15	1.2	17	1	21	0.8	34	0.6	51						
100																					1.7	13	1.3	16	1.2	19	1	24	0.8	38	0.6	57						
110																					1.6	14	1.3	18	1.2	21	1	26	0.8	42	0.6	63						
120																					1.6	15	1.3	19	1.2	23	1	28	0.8	46	0.6	69						
130																					2.2	12	1.6	17	1.3	21	1.2	25	1	31	0.8	50	0.6	74				
140																					2.2	13	1.6	18	1.3	23	1.2	27	1	33	0.8	53	0.6	80				
150																					2.2	14	1.6	19	1.3	24	1.2	29	1	35	0.8	57	0.6	86				
160																					2.5	13	2.2	15	1.6	21	1.3	26	1.2	31	1	38	0.8	61	0.6	92		
170																					2.5	14	2.2	16	1.6	22	1.3	28	1.2	33	1	40	0.8	65	0.6	97		
180																					2.5	15	2.2	16	1.6	23	1.3	29	1.2	35	1	43	0.8	69	0.6	103		
190																					2.4	15	2.2	17	1.6	24	1.3	31	1.2	37	1	45	0.8	73	0.6	109		
200																					2.8	14	2.4	16	2.2	18	1.6	26	1.3	32	1.2	39	1	47	0.8	76	0.6	114
210																					2.8	15	2.4	17	2.2	19	1.6	27	1.3	34	1.2	41	1	50	0.8	80	0.6	120
220																					2.8	16	2.4	18	2.2	20	1.6	28	1.3	36	1.2	43	1	52	0.8	84		
230																					2.8	16	2.4	19	2.2	21	1.6	29	1.3	37	1.2	44	1	54	0.8	88		
240																					2.8	17	2.4	19	2.2	22	1.6	31	1.3	39	1.2	46	1	57	0.8	92		
250																					2.8	18	2.4	20	2.2	23	1.6	32	1.3	41	1.2	48	1	59	0.8	95		
260																					2.8	18	2.4	21	2.2	24	1.6	33	1.3	42	1.2	50	1	62	0.8	99		
270																					3.2	16	2.7	19	2.4	22	2.2	24	1.6	35	1.3	44	1.2	52	1	64	0.8	103
280																					3.2	17	2.7	20	2.4	23	2.2	25	1.6	36	1.3	45	1.2	54	1	66	0.8	107
290																					3.2	17	2.7	20	2.4	23	2.2	26	1.6	37	1.3	47	1.2	56	1	69	0.8	111
300																					3.2	18	2.7	21	2.4	24	2.2	27	1.6	38	1.3	49	1.2	58	1	71	0.8	115
310																					3.2	18	2.7	22	2.4	25	2.2	28	1.6	40	1.3	50	1.2	60	1	73	0.8	118
320																					3.2	19	2.7	22	2.4	26	2.2	29	1.6	41	1.3	52	1.2	62	1	76	0.8	122
330																					3.2	20	2.7	23	2.4	26	2.2	30	1.6	42	1.3	53	1.2	64	1	78	0.8	126
340																					3.2	20	2.7	24	2.4	27	2.2	31	1.6	44	1.3	55	1.2	66	1	80	0.8	130
350																					3.2	21	2.7	24	2.4	28	2.2	32	1.6	45	1.3	57	1.2	68	1	83	0.8	134
360																					3.2	21	2.7	25	2.4	29	2.2	33	1.6	46	1.3	58	1.2	70	1	85	0.8	137
370																					3.2	22	2.7	26	2.4	30	2.2	33	1.6	47	1.3	60	1.2	71	1	88	0.8	141
380																					3.2	22	2.7	26	2.4	30	2.2	34	1.6	49	1.3	62	1.2	73	1	90	0.8	145
390																					3.2	23	2.7	27	2.4	31	2.2	35	1.6	50	1.3	63	1.2	75	1	92	0.8	149
400																					3.2	24	2.7	28	2.4	32	2.2	36	1.6	51	1.3	65	1.2	77	1	95	0.8	153
410																					3.9	20	3.2	24	2.7	29	2.4	33	2.2	37	1.6	52	1.3	66	1.2	79	1	97
420																					3.9	20	3.2	25	2.7	29	2.4	34	2.2	38	1.6	54	1.3	68	1.2	81	1	99
430																					3.8	21	3.2	25	2.7	30	2.4	34	2.2	39	1.6	55	1.3	70	1.2	83	1	102
440																					3.8	21	3.2	26	2.7	31	2.4	35	2.2	40	1.6	56	1.3	71	1.2	85	1	104
450																					3.8	22	3.2	26	2.7	31	2.4	36	2.2	41	1.6	58	1.3	73	1.2	87	1	106
460																					3.8	22	3.2	27	2.7	32	2.4	37	2.2	41	1.6	59	1.3	75	1.2	89	1	109
470																					3.8	22	3.2	28	2.7	33	2.4	38	2.2	42	1.6	60	1.3	76	1.2	91	1	111
480																					3.8	23	3.2	28	2.7	33	2.4	38	2.2	43	1.6	61	1.3	78	1.2	93	1	114
490																					3.8	23	3.2	29	2.7	34	2.4	39	2.2	44	1.6	63	1.3	79	1.2	95	1	116
500																					3.8	24	3.2	29	2.7	35	2.4	40	2.2	45	1.6	64	1.3	81	1.2	97	1	118