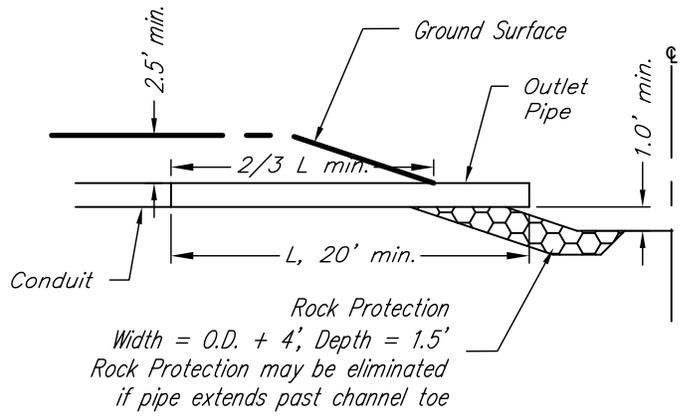
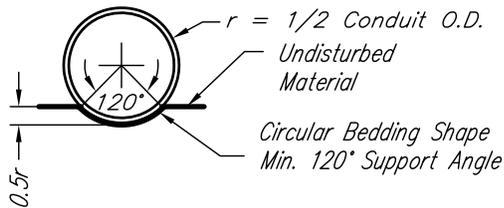
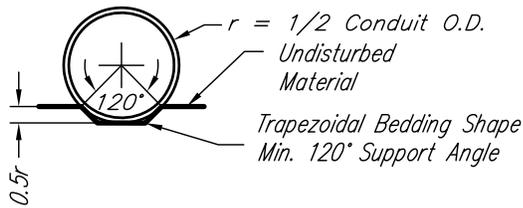
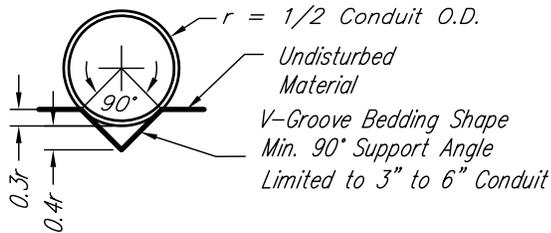


1. W = trench width at top of conduit
2. $W = O.D. + 6"$ min. for trench installation;
 $W = O.D. + 4"$ min. for plow installation.
3. Where $W > O.D. + 12"$, hand compact the blinding or use a granular envelope.

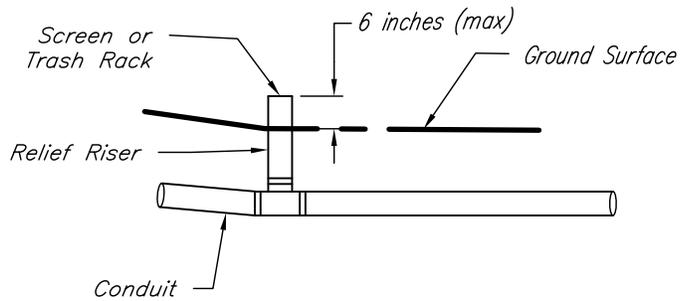
TRENCH DETAIL



OUTLET PIPE DETAIL



BEDDING DETAIL



RELIEF WELL DETAIL

Notes:

1. All work shall comply with Construction Specification IA-46.
2. See Sheet ___ of ___ for the Plan View.
3. Maximum fill over conduit installed in a trench condition ($W < O.D. + 24"$) shall be 11 feet or as specified by the manufacturer.
4. All changes must be approved by the person approving the original plans.

DRAFT STANDARD DWG. IA-1502

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SUBSURFACE DRAIN INSTALLATION

Owner: _____
 Location: Sec. _____, T _____ N, R _____
 _____ Township
 _____ County, Iowa

Designed _____	Date _____	File Name _____
Drawn _____		Drawing Name _____
Checked _____		
Approved _____		Sheet _____ of _____

Guidance for use of IA-1502 Standard Drawing

January 22, 2013

1. Standard Drawing IA-1502 can be used as part of a plan set that includes subsurface drains, for example, for a grassed waterway design. It is not meant to fit all design situations and needs. The designer may use other drawings to present the information contained in this document. Print only the sheets that you need. Please use the most current version.
2. If needed, clear the form by selecting <Tools>, <Forms>, <Clear Form> from the 'Tools' pane in Adobe Acrobat. Using the 'tab' key is a good way to navigate through the entry fields.
3. More than one design may be shown on the drawing. Separate each with a blank line in the station and design elevation columns.
4. Station: Do not use a "+" when entering the stationing; use distance only. For example, enter 500, not 5+00. If you do enter a "+" by mistake, you will get an error message because the data is seen as incorrect by other fields that calculate distance and grade. You should be able to delete the entry and reenter it correctly without consequence.
5. Design Elevation: This is an optional, but highly recommended entry. If elevations are entered, the grade will be calculated. Elevations must be entered to the hundredth of a foot since that is the precision needed for flat grades. If you get unexpected values for grade, you may want to re-check the design elevations.
6. Conduit Capacity
 - a. Area drained: the area expected to contribute water to the drain.
 - b. Drainage coefficient: the design rate of water removal for the area drained.
 - c. Required capacity: this is the drainage capacity required for the design. It would be based on the area drained and the design drainage coefficient, plus any surface inlet requirements.
 - d. Drain Capacity: This is the capacity of the drain at the specified grade.
7. Nominal Conduit Diameter: Select the appropriate value from the list. Needed values should be available but you can enter another value if needed.
8. Conduit Material: Select the appropriate entry. Abbreviations are used to reduce the size of the table and are found in Note 1 on this page.
9. Perf. (Perforated?): Select Y (Yes) if perforated pipe is specified. This will cover most situations, but there could be instances where non-perforated pipe is needed.
10. Reach Length: Reach length is calculated from the stationing. This and the grade calculations serve as a check that design information is entered correctly. Calculation is done to the nearest foot.

11. Grade: This value is calculated if design elevations are entered and is displayed in the 'Grade' column. You must then skip the manual grade entry field.
 - a. The grade will display in hundredths of a percent. It is assumed that the designer has determined stations and elevations so that the grade will display to the required precision. In other words, the designer will have the math correct. If the grade is displayed incorrectly, the stations and or elevations will have to be adjusted to get the appropriate display.
 - b. As noted above, for designs where elevations are not determined, you must enter the grade manually.
 - c. A column on the right edge of the form has been added as a check on the grade calculations. This value will be calculated to thousandths so you can compare it to the value displayed in the grade column to check for rounding errors. You should strive to have this value displayed to the nearest hundredth of a foot so the elevations are correct to the nearest hundredth of a foot. The values in this column are not printed.
12. Quantities are not calculated; the user must enter the values. Don't forget to enter quantities for appurtenances (animal guards, relief wells, outlet pipes).

Checkout sheet

1. A simple check out sheet is included in this file as IA-1502C. This is not strictly a part of the plan. Other forms of check out sheets may be used and may be more useful in many situations. Since the stations selected for checkout may differ from site to site, the information must be filled out by hand after the form is printed.
2. The name and location of the job will be carried forward from the standard drawing.
3. The person doing the as-built survey will sign and date the sheet. A field office employee will check the calculations and conclusions and sign as checker.
4. The practice certification on this sheet can be completed on this sheet or on the plan cover sheet, IA-1005 or equivalent.

Digital Signatures

1. The person approving the waterway design & plan may sign digitally if desired. *The use of a digital signature is not required.* A digital signature will change all fields to "read only" so that the plan cannot be changed. This may be useful for archival purposes and when transmitting plans electronically to landowners or contractors. You will be prompted to save the file after signing. If subsequent editing is necessary, the approver, but no one else, can open the file and clear his signature to make changes.
2. To sign this document, you must obtain or create a digital signature. Adobe Acrobat Help provides instructions or you may consult with your IT specialist or someone who has done this. Follow area and state NRCS policy when using digital signatures.