

DRAINAGE IMPROVEMENT PROJECT  
505 N. ROCK ROAD  
Rock Road and Central Avenue  
PROJECT NO. 468-84076

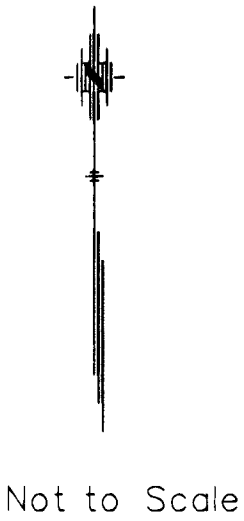
OCA #660507

LEGEND

- W Existing Water Line
- E Electric Line
- G Gas Line
- T Telephone Line
- CATV Cable TV Line
- Center Line
- Existing Right-of-Way
- Power Pole
- E.M. Electric Meter
- Luminaire
- Yard Light
- Pull Box
- Signal Control Box
- M.A. Mast Arm
- P.M.S. Pedestal Mounted Signal
- T.M.H. Telephone Manhole
- Telephone Pedestal
- PHONE Telephone
- Cable Television Box
- W.V. Water Valve
- W.M. Water Meter
- Fire Hydrant
- S.H. Sprinkler Head
- I.C.V. Irrigation Control Valve
- A.R. Air Release
- G.M.S. Gas Monitoring Station
- G.M. Gas Meter
- G.T.S. Gas Testing Station
- G.F.C. Gas Filler Cap
- S.S.M.H. Sanitary Sewer Manhole

INDEX TO DRAWINGS

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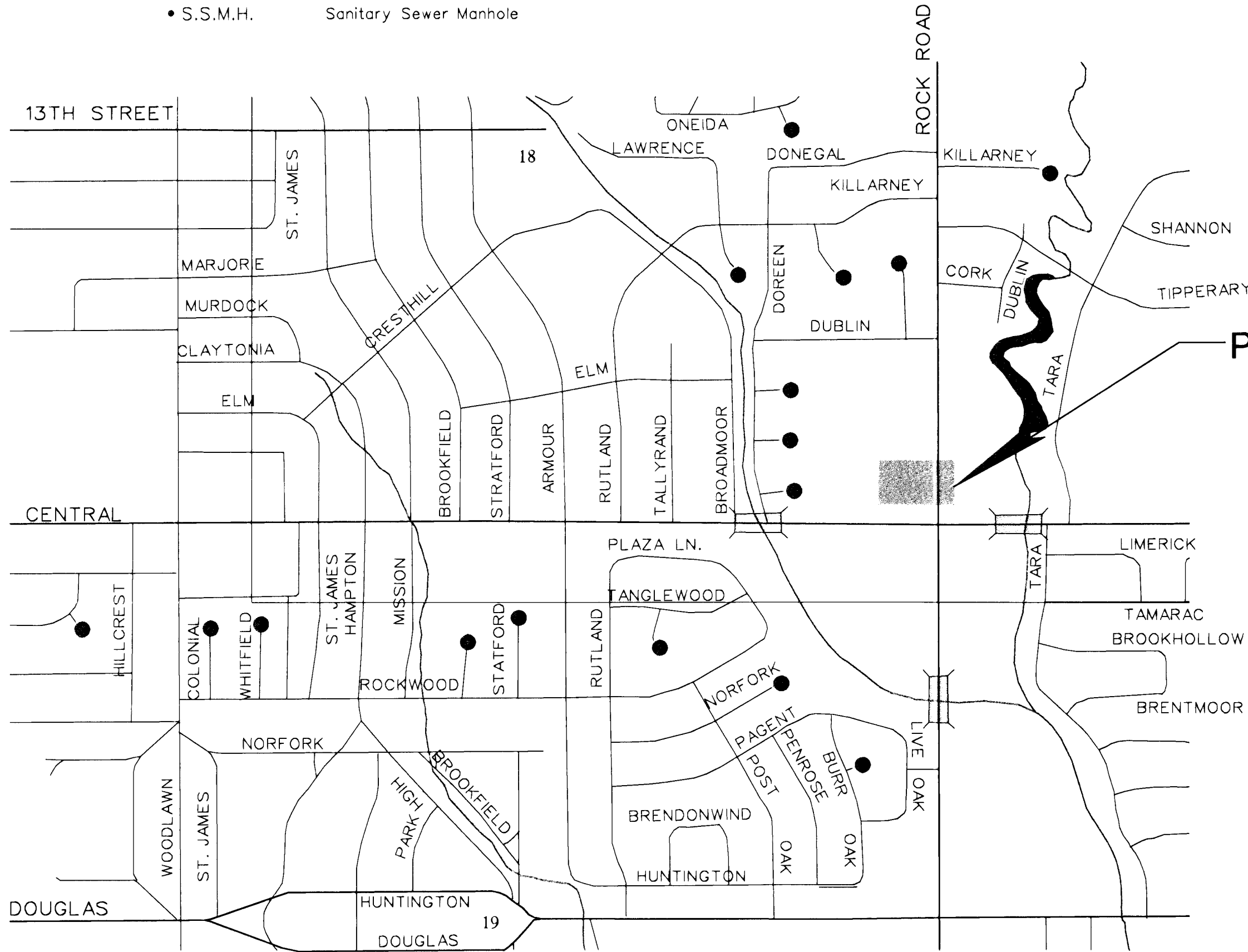


Horizon East Apartments  
OCA #660507

Rock Road

Vicinity Map

Project Location



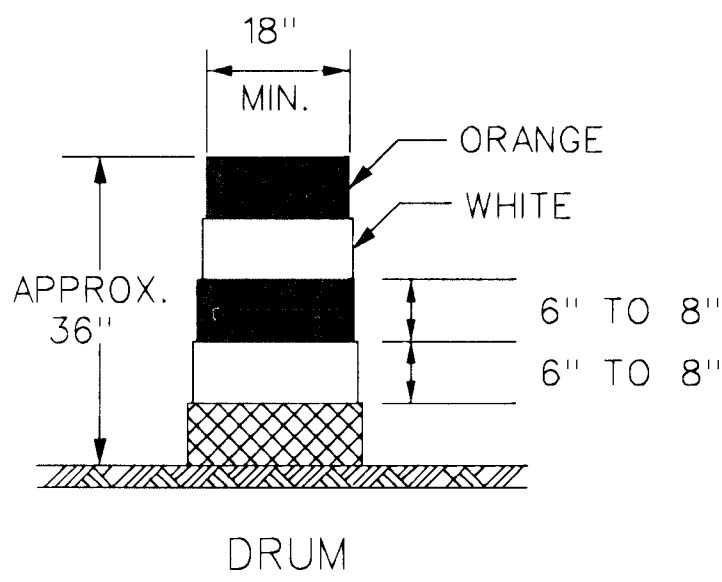
Project Map

CITY OF WICHITA, KANSAS  
James L. Armour, P.E. City Engineer  
FEBRUARY, 2006

2-13-06

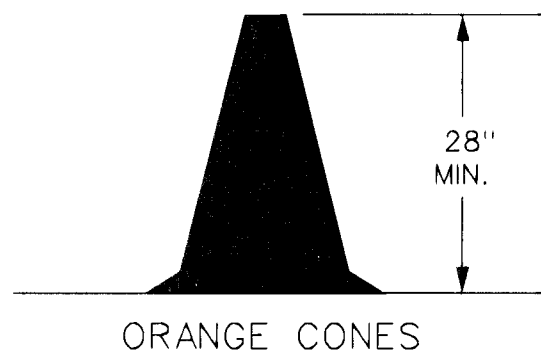
PREPARED BY  
TRANSYSTEMS CORPORATION  
245 North Waco Suite 420  
Wichita, Kansas

Plotted By :   
Plot File :   
Plot Date :



DRUMS AND TRIM LINE CHANNELIZERS SHALL BE RETROREFLECTORIZED FULL CIRCUMFERENCE WITH AT LEAST TWO ORANGE AND TWO WHITE 6" TO 8" WIDE STRIPES. ADDITIONAL STRIPES MAY BE NON-REFLECTIVE. IF THERE ARE NON-REFLECTIVE SPACES BETWEEN ADJACENT STRIPES, THEY SHALL BE NO MORE THAN 2" WIDE.

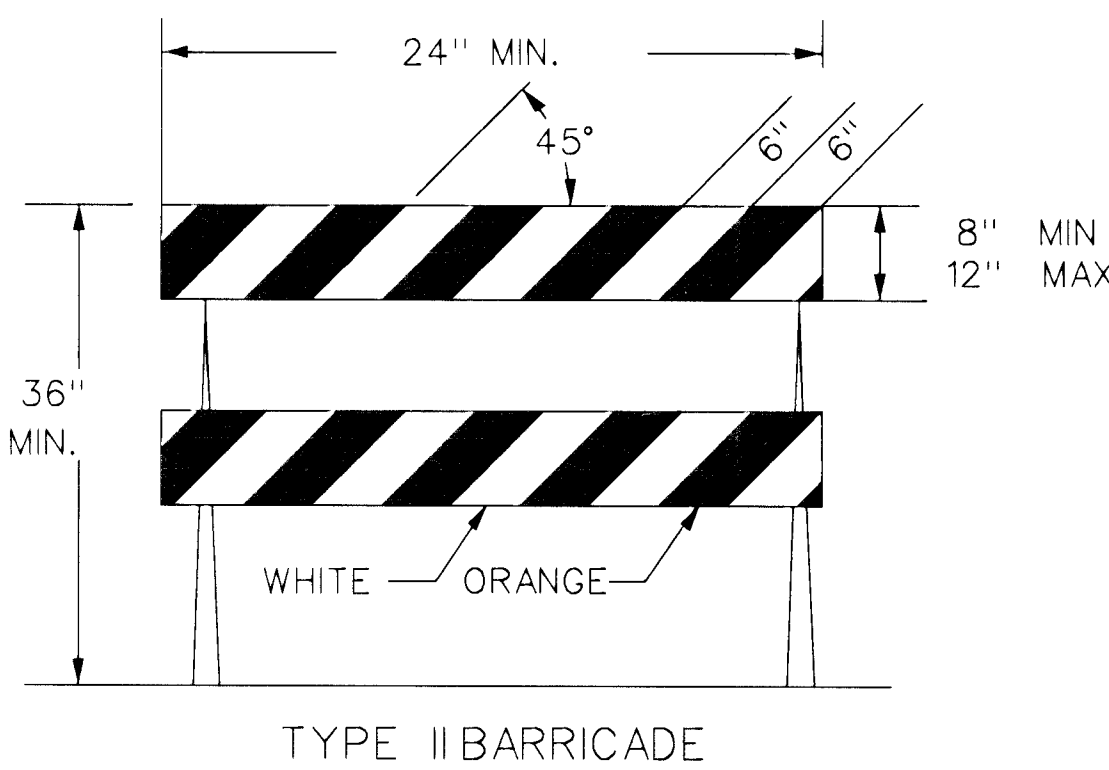
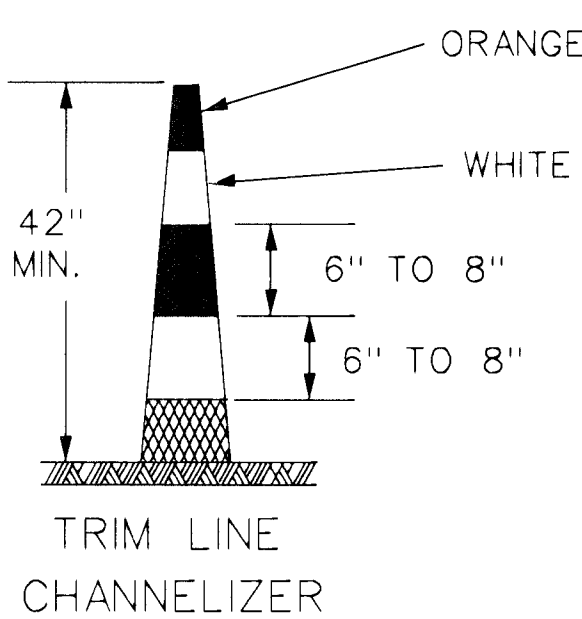
ALL RETROREFLECTIVE STRIPES ON DRUMS SHALL BE TYPE IIIHIGH PERFORMANCE SHEETING. THE WHITE STRIPES ON TRIM LINE CHANNELIZERS SHALL BE TYPE III HIGH PERFORMANCE SHEETING. PROJECTS LET AFTER JANUARY 1,2002 WILL REQUIRE THAT THE ORANGE STRIPES ON ALL TRIM LINE CHANNELIZERS BE FLOURESCENT ORANGE PRISMATIC GRADE SHEETING.



CONES MAY BE USED AS CHANNELIZING DEVICES FOR DAYTIME OPERATIONS ONLY. THEY WILL NOT BE PAID FOR SEPARATELY, BUT WILL BE SUBSIDIARY TO OTHER TRAFFIC CONTROL BID ITEMS. THE ENGINEER MAY REQUIRE THAT CONES BE SUPPLEMENTED BY OTHER TRAFFIC CONTROL DEVICES IN CERTAIN SITUATIONS.

| LOCATION |                               |             |            |          |        |       |              |                   |  |
|----------|-------------------------------|-------------|------------|----------|--------|-------|--------------|-------------------|--|
| ITEM     |                               | CROSS-OVERS | DIVERSIONS | TANGENTS | TAPERS | RAMPS | HEAD TO HEAD | OBJECT IDENTIFIER |  |
| PORTABLE | DRUMS                         | YES         | YES        | YES      | YES    | YES   | (1)          | YES               |  |
|          | TRIM LINES                    | YES         | YES        | YES      | YES    | YES   | (1)          | YES               |  |
|          | VERTICAL PANELS               | (2)         | (2)        | (2)      | (2)    | (2)   | (1,2)        | YES               |  |
|          | DIRECTION INDICATOR BARRICADE | NO          | NO         | NO       | YES    | NO    | NO           | NO                |  |
|          | TYPE IIBARRICADE              | (2)         | (2)        | (2)      | (2)    | NO    | NO           | YES               |  |
| FIXED    |                               |             |            |          |        |       |              |                   |  |
|          | TUBULAR MARKERS               | (3)         | (3)        | (3)      | NO     | (3)   | YES          | NO                |  |
|          | VERTICAL PANELS               | (3)         | (3)        | (3)      | (3)    | (3)   | (3)          | YES               |  |

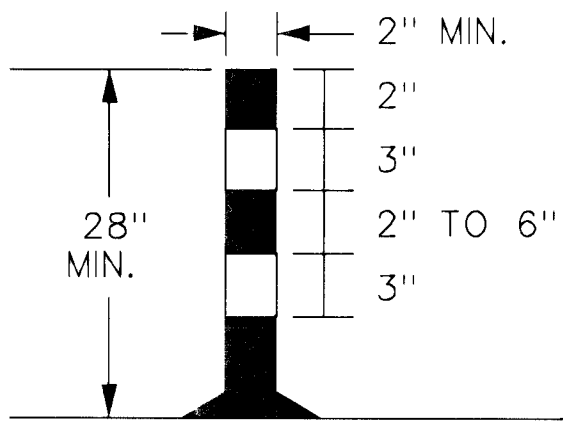
- (1) Not allowed on centerline delineation along freeways or expressways.
- (2) Slashes must slope down toward direction traffic is to pass.
- (3) May be used upon the approval of the Engineer.



FOR RAILS LESS THAN 36" LONG, 4" WIDE STRIPES MAY BE USED.

THE ENTIRE AREA OF BARRICADE RAILS,BOTH FRONT AND BACK, SHALL BE FULLY REFLECTORIZED WITH TYPE IIIHIGH PERFORMANCE RETROREFLECTIVE SHEETING.

THE STRIPES SHALL SLOPE DOWNWARD TO THE TRAFFIC SIDE FOR CHANNELIZATION.



TUBULAR MARKERS

TAPER FORMULAS:

L = WS FOR SPEEDS OF 45 MPH OR MORE

L = WS<sup>2</sup>/60 FOR SPEEDS OF 40 MPH OR LESS

WHERE: L = MINIMUM LENGTH OF TAPER IN FEET  
S = NUMERICAL VALUE OF POSTED SPEED  
PRIOR TO WORK STARTING IN MPH  
W = WIDTH OF OFFSET IN FEET

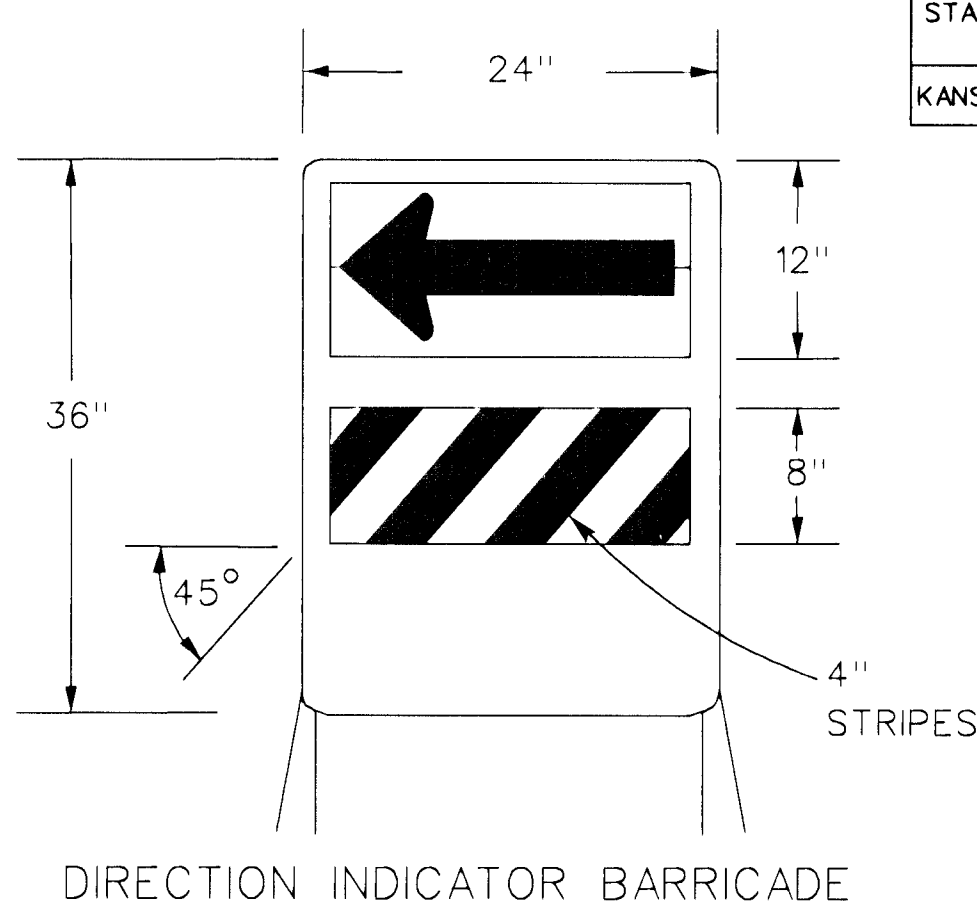
CHANNELIZER PLACEMENT:

(A) THE SPACING BETWEEN DEVICES IN THE TAPER SHOULD NOT EXCEED A DISTANCE IN FEET EQUAL TO THE POSTED SPEED LIMIT IN MPH PRIOR TO WORK STARTING.

(B) THE SPACING BETWEEN DEVICES IN THE WORK ZONE SHOULD NOT EXCEED A DISTANCE IN FEET EQUAL TO TWO TIMES THE POSTED SPEED LIMIT IN MPH PRIOR TO WORK STARTING.

(C) CHANNELIZING DEVICES SHALL BE PLACED FOR OPTIMUM VISABILITY, NORMALLY AT RIGHT ANGLES TO THE TRAFFIC FLOW.

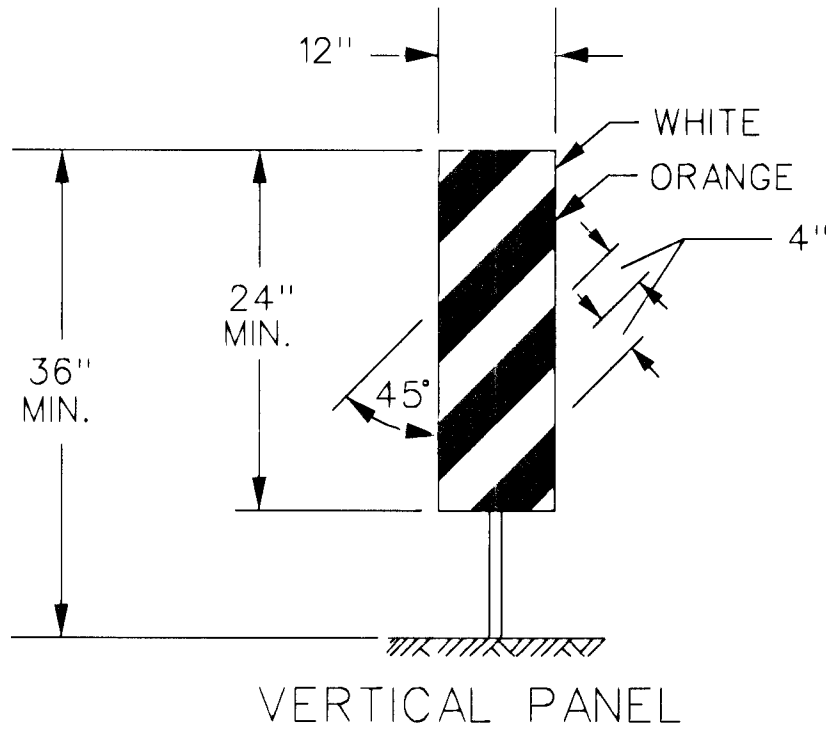
(D) CHANNELIZING DEVICES PLACED ALONG SHOULDER EDGES OR IN DROPOFFS SHALL HAVE A MINIMUM OF 24" FROM THE TOP OF THE CHANNELIZING DEVICE TO THE TOP OF THE PAVEMENT.



THE ARROW PANEL SHALL BE BLACK ON FLUORESCENT ORANGE PRISMATIC GRADE SHEETING. THE STRIPES SHALL BE ORANGE AND WHITE TYPE III HIGH PERFORMANCE RETROREFLECTIVE SHEETING SLOPING DOWNWARD IN THE DIRECTION TRAFFIC IS TO PASS.

THE DIRECTION INDICATOR BARRICADE SHALL BE USED IN SERIES TO DIRECT THE MOTORIST INTO THE INTENDED LANE OF TRAVEL.

THE ARROW PANEL SHOULD NOT BE VISIBLE TO OPPOSING TRAFFIC.



THE ENTIRE AREA OF VERTICAL PANELS,BOTH FRONT AND BACK, SHALL BE FULLY REFLECTORIZED WITH TYPE IIIHIGH PERFORMANCE RETROREFLECTIVE SHEETING. THE STRIPES SHALL SLOPE DOWNWARD TO THE TRAFFIC SIDE FOR CHANNELIZATION.

| STATE  | PROJECT NO. | YEAR | SHEET NO. | TOTAL SHEETS |
|--------|-------------|------|-----------|--------------|
| KANSAS | -           | 2006 | 8         | 10           |

|     |          |                                    |      |        |
|-----|----------|------------------------------------|------|--------|
| 3   | 11-19-03 | CHANGED BORDER                     | B.H. | S.A.B. |
| 2   | 9-26-02  | MODIFIED NOTES                     | M.H. | S.A.B. |
| 1   | 11-13-01 | REVISED CHANNELIZING DEVICE MATRIX | J.H. | S.A.B. |
| NO. | DATE     | REVISIONS                          | BY   | APPD   |

KANSAS DEPARTMENT OF TRANSPORTATION  
CHANNELIZING DEVICES

|               |                    |
|---------------|--------------------|
| TE702         | 9/1/00             |
| FHWA APPROVAL | 11-26-03           |
| DESIGNED      | L.E.R.             |
| DESIGN CK.    | DETAIL CK.         |
| APP'D         | Michael P. McKenna |
| QUANTITIES    | TRACED             |
| QUAN. CK.     | TRACE CK.          |

1. The Contractor will be required to provide a minimum advance notice of forty-eight (48) hours to utility companies prior to excavation or working adjacent to utilities.

Kansas One-Call 687-2470

The following numbers are provided:

Cox Communications.....316-262-4270  
Westar Energy.....316-261-6251  
Aquila Networks.....316-942-8811  
SBC.....316-268-2245  
Kansas Gas Service.....316-262-3121  
Jayhawk Pipeline.....888-542-9575  
City of Wichita Water Department.....316-268-4940  
City of Wichita Sewer Maintenance.....316-268-4924

2. The Contractor shall notify pipeline companies at least forty-eight (48) hours in advance of any work being performed over or adjacent to existing pipelines.

3. The Contractor shall give all property owners and/or tenants of developed property directly abutting the construction of this project a minimum of ten (10) days notice prior to start of construction.

4. Storm sewer pipe and appurtenances shall be installed in accordance with City of Wichita, Kansas, Standard Specifications for Sewer installations.

5. Contractor shall not start work on the project until the Project Inspector is assigned to the project and is present on the site. Any work done without inspection will be required to be uncovered for inspection.

6. The Contractor shall be required for preserving property irons. The Contractor will be required to re-establish any property irons which are damaged or destroyed by their construction operations. Such irons shall be re-established by a licensed land surveyor in accordance to state laws.

7. Utility service lines, poles, gas valve boxes, meter, et cetera are to be adjusted as necessary by others prior to construction unless the plans specifically call for their adjustment by the Contractor or unless the plans specifically identify a utility to be adjusted by its owner during construction. Existing utilities and their locations, as shown on the plans, represent the best information obtainable for design. The contractor will be required to work around existing utilities within the right-of-way which do not conflict with proposed construction.

8. Each bidder shall visit the site of the project before submitting their proposal for the work so that they may inform themselves as to the existing field conditions and the obstacles which might be encountered.

9. Interurban traffic generated outside the project area and local businesses or residential traffic generated within the project area is to be carried through construction as further promulgated by project special provisions. The Contractor shall utilize barricades, signs, guards, and flagman in accordance with the Manual on Uniform Traffic Control Devices.

10. Rubble from the removal of miscellaneous structures including pavement, pipes, and ect. shall be disposed of on sites provided by the Contractor. These sites shall also be approved by the Engineer as to suitability, appearance, and site location. Locations that, in the opinion of the Engineer, leave an unsightly appearance will not be approved. All disposal sites must be approved by the Kansas Department of Health and Environment. Material either stockpiled or disposed if in a flood plain will require a Kansas Board of Agriculture permit. Any material dumped in water of the United States or wetlands is subject to U.S. Corps of Engineers permitted regulations. Any material buried or stockpiled beyond approved construction limits may require archaeological investigations unless buried in a previously approved disposal location.

11. Side road drainage to be maintained throughout construction. All existing culverts to be protected and maintained.

12. Contractor to coordinate with the United States Postal Service prior to any temporary or permanent relocation of existing mailboxes.

13. Contractor to follow all current City of Wichita erosion control standards.

14. Contractor to maintain access to all driveways at the end of each construction day, unless prior approval from the Project Inspector.

15. Contractor shall notify Horizons East Apartments (316-683-4611) at least seven (7) days prior to start of construction.

16. Plan quantities for the "Removal and Replacement of Existing Keystone Retaining Wall" and "Sidewalk Removal and Replacement" are for bidding purposes only. Actual removal limits may be reduced as deemed necessary by the City's Inspector.

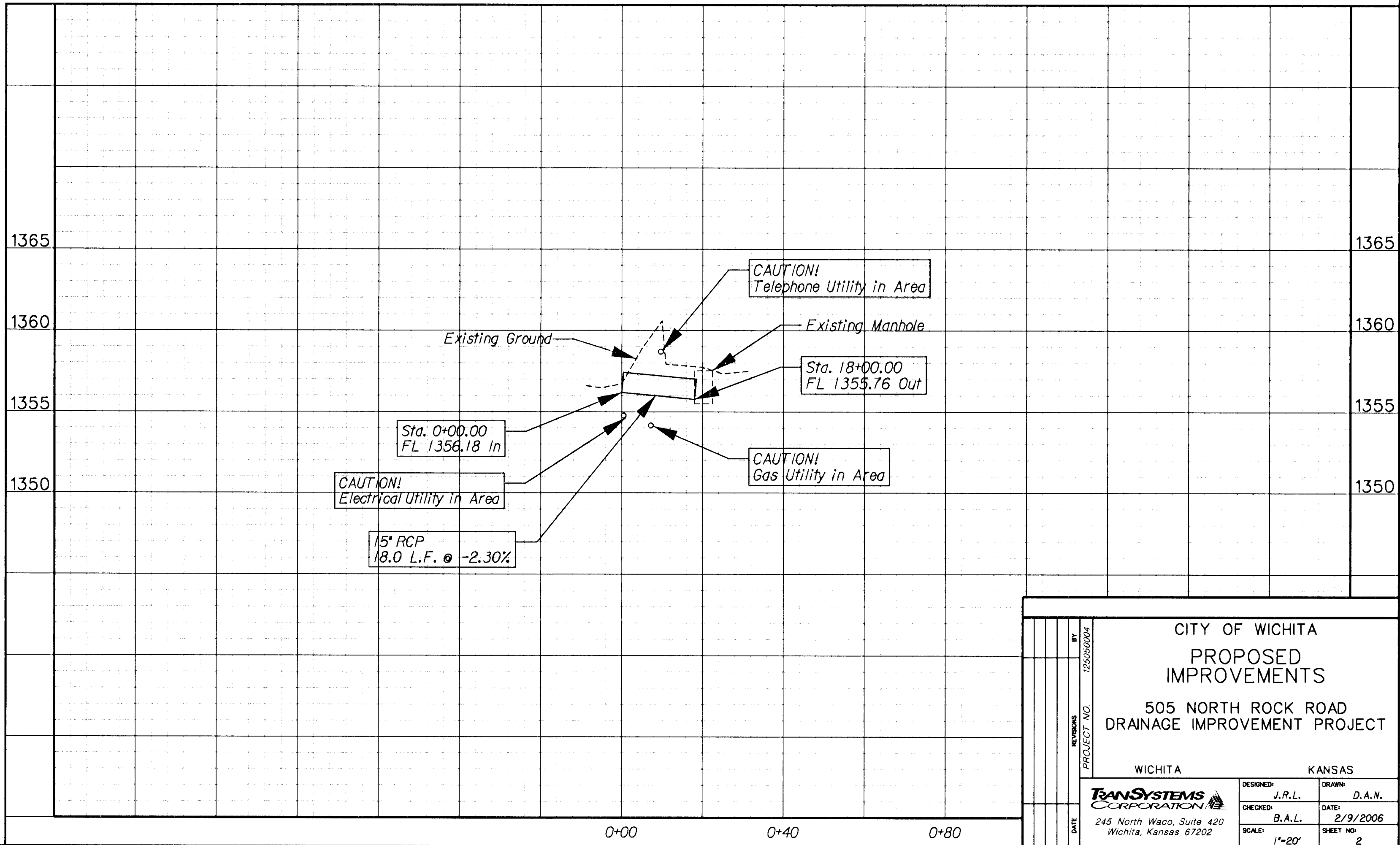
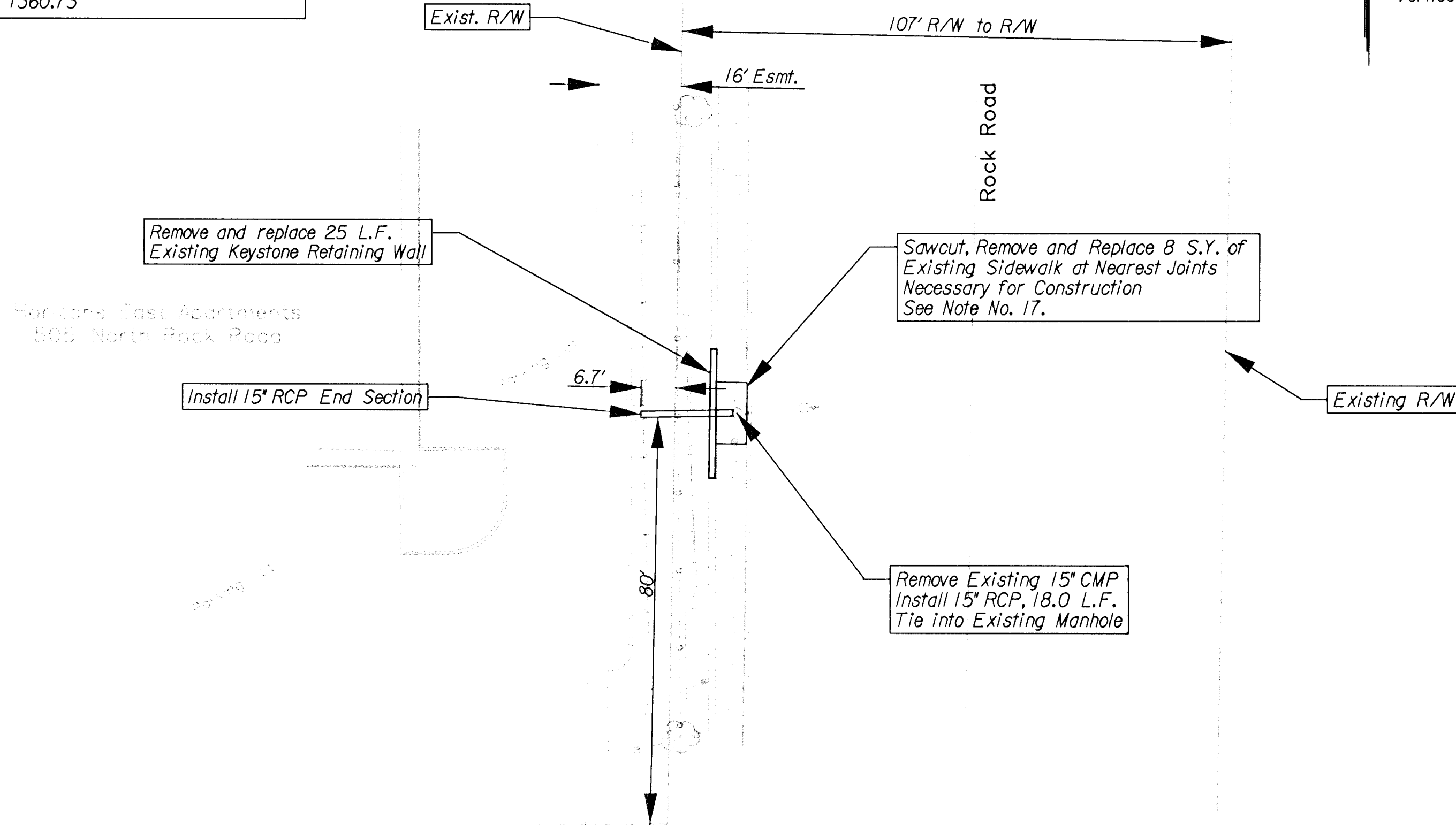
17. Cuts made to paved surfaces on public property will be repaired by City's contractor and charged against the project. Unit repair prices are available at the City, a surcharge may be applicable call 316-268-4418 for details. Contractor shall obtain permit prior to construction.

18. The Contractor shall repair any disturbed grass areas with a fescue sod. Any sod placement shall be in accordance with City of Wichita, Kansas, Standard Specifications for Sod Placement.

19. The adjacent property to this project site owns a sprinkler systems that will be in conflict with the excavation of this project. Contractor shall remove and replace in like kind all pipe, fittings, connections, sprinkler heads and any other appurtenances associated with the underground sprinkler system. Contractor shall notify property owner a minimum of 7 days prior to sprinkler system excavation.

BENCHMARK INFORMATION  
RR Spike in Power Pole  
Approx. 27' North of South Property Line  
and 7' East of East Property Line of  
Horizons East Apartment Complex  
Elev. = 1360.73

Scale  
Horizontal 1" = 20'  
Vertical 1" = 5'



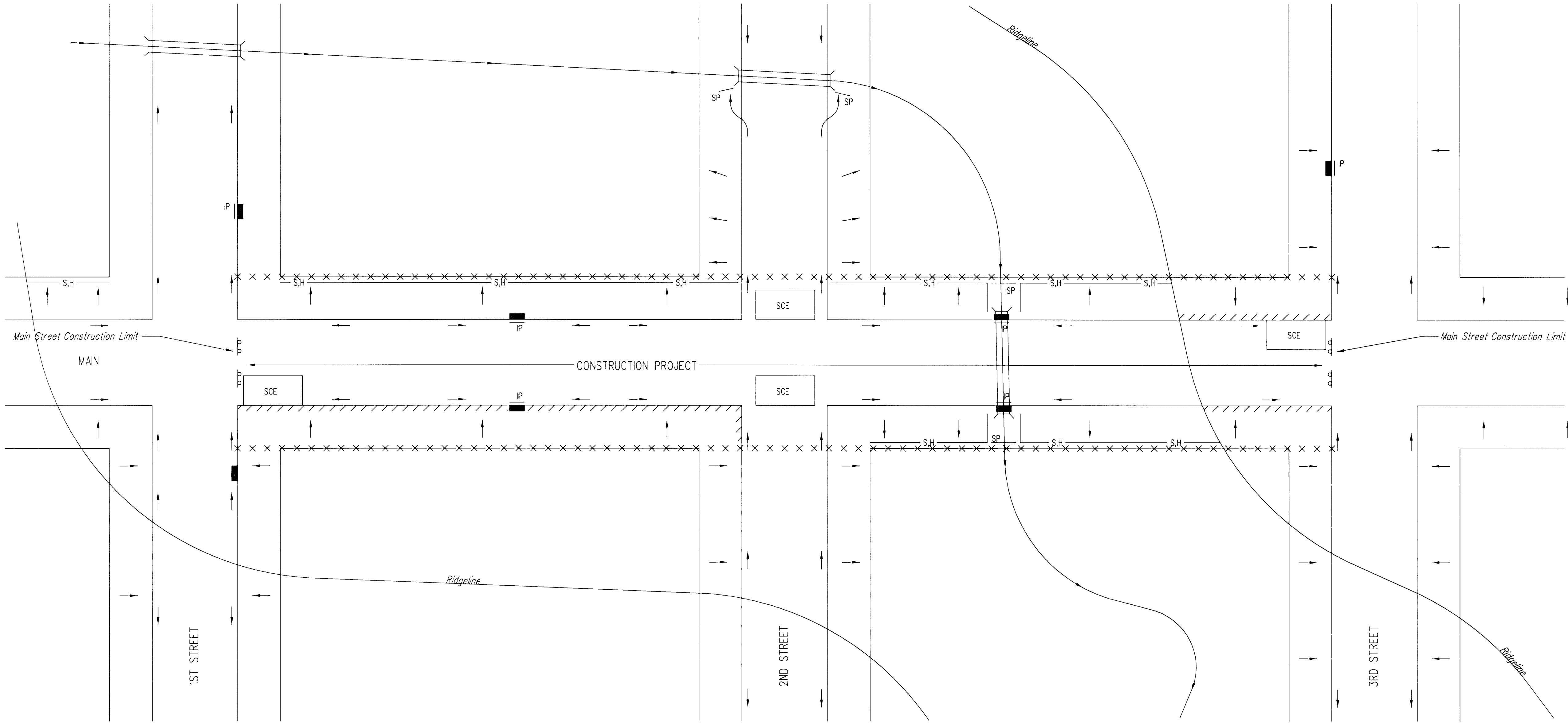
SUMMARY OF QUANTITIES

| ITEM                                                      | UM.  | QTY. |
|-----------------------------------------------------------|------|------|
| Site Clearing & Restoration                               | L.S. | 1    |
| Soil Erosion BMP's                                        | L.S. | 1    |
| Sod                                                       | L.S. | 1    |
| Traffic Control                                           | L.S. | 1    |
| Removal of Existing 15' CMP                               | L.F. | 18   |
| Removal & Replacement of Existing Keystone Retaining Wall | L.F. | 25   |
| 15' RCP                                                   | L.F. | 18   |
| Sidewalk Removal & Replacement                            | S.Y. | 8    |
| 15' RCP End Section                                       | EA.  | 1    |

|                              |                |
|------------------------------|----------------|
| CITY OF WICHITA              |                |
| PROPOSED IMPROVEMENTS        |                |
| 505 NORTH ROCK ROAD          |                |
| DRAINAGE IMPROVEMENT PROJECT |                |
| WICHITA                      | KANSAS         |
| DESIGNED: J.R.L.             | DRAWN: D.A.M.  |
| CHECKED: B.A.L.              | DATE: 2/9/2006 |
| SCALE: 1"=20'                | SHEET NO: 2    |

GENERAL NOTES:

1. THIS SHEET IS INTENDED TO PROVIDE GUIDELINES AS TO WHAT TYPES OF BMP'S WILL BE INSTALLED DURING THE CONSTRUCTION PROCESS. CONTRACTORS ARE EXPECTED TO BID PROJECTS ACCORDINGLY.
2. BMP'S MUST BE MAINTAINED BY THE CONTRACTOR THROUGHOUT THE CONSTRUCTION PROCESS.
3. IF THE PROJECT WILL DISTURB 5 ACRES OR MORE, A FEDERAL/STATE NPDES STORMWATER PERMIT IS REQUIRED. A DETAILED STORMWATER POLLUTION PREVENTION PLAN, IS REQUIRED. THE BMP'S SHOWN ON THIS SHEET ARE CONSIDERED TO BE THE MINIMUM TO BE SHOWN IN THE POLLUTION PREVENTION PLAN.
4. FOR PROJECTS DISTURBING LESS THAN 5 ACRES, CONTRACTORS ARE ENCOURAGED TO PREPARE STORMWATER POLLUTION PREVENTION PLANS PRIOR TO CONSTRUCTION.
5. FAILURE TO USE AND MAINTAIN BMP'S IS A VIOLATION OF SECTION 16.32 OF THE CITY CODE AND WILL SUBJECT THE CONTRACTOR TO THE PENALTIES PROVIDED FOR THEREIN.
6. THE APPLICATION OF BMP'S SHOWN ON THIS SHEET IS FOR SITUATIONS NORMALLY ENCOUNTERED. FROM TIME TO TIME, SITUATIONS WILL ARISE THAT MAY REQUIRE A DIFFERENT BMP OTHER THAN THOSE SHOWN. BMP'S, OTHER THAN THOSE SHOWN, MAY BE UTILIZED AS LONG AS THEY ARE EFFECTIVE AND MAINTAINED.

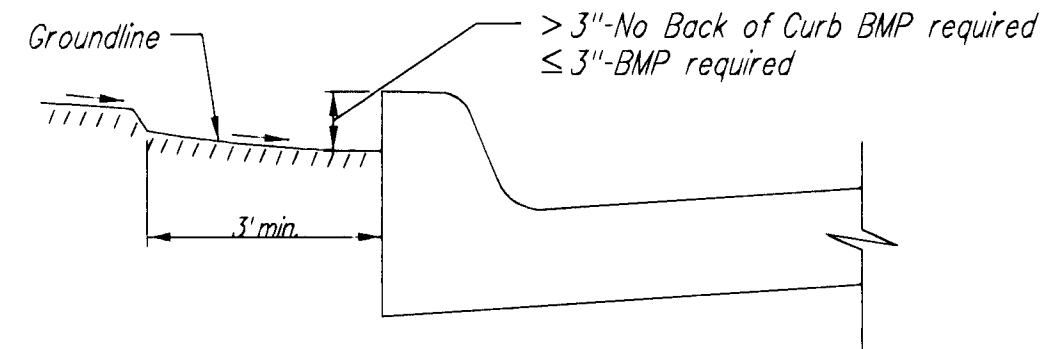


LEGEND

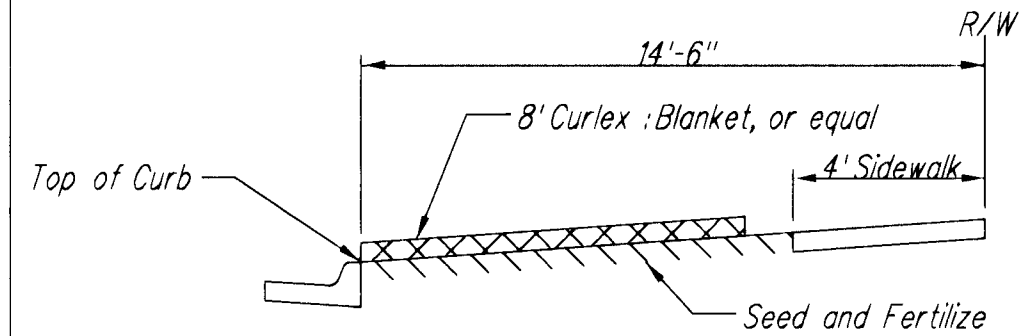
- R-O-W LIMITS
- DRAINAGE FLOW PATH
- X X X X X R/W LIMIT WITHIN CONSTRUCTION LIMIT
- STORM WATER INLETS
- IP INLET PROTECTION
- S.H — SILT FENCE OR HAYBALE BMP
- SP — STREAM PROTECTION
- SCE STABILIZED CONSTRUCTION ENTRANCE
- //// BACK OF CURB PROTECTION

NOTES:

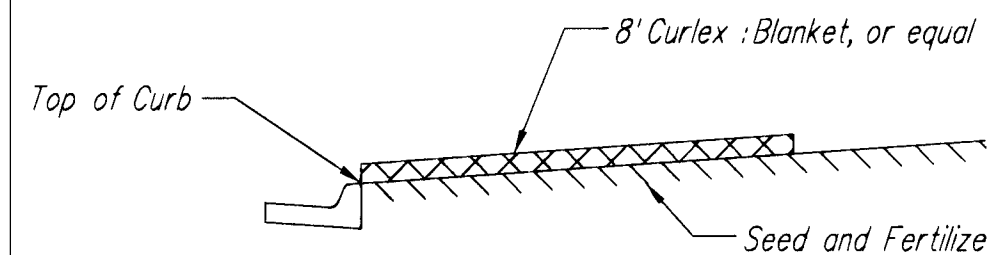
1. GENERAL BMP GOAL IS TO KEEP ALL SEDIMENT CONFINED TO THE CONSTRUCTION SITE, AND OUT OF ALL UNDERGROUND PIPES, DITCHES, AND OTHER DRAINAGE FACILITIES.
2. THE POINT OF COMPLIANCE IS GENERALLY THE RIGHT-OF-WAY LINES WITHIN THE LIMITS OF CONSTRUCTION.
3. BMP'S WILL BE REQUIRED AT ALL POINTS ALONG THE PROJECT WHERE DISTURBED EARTH CAN DRAIN ONTO PRIVATE PROPERTY.
4. INLET PROTECTION DEVICES WILL BE REQUIRED WHEREVER WATER CAN DRAIN OFF THE PROJECT SITE INTO AN INLET, INCLUDING ANY SIDE STREET INLETS.
5. BMP'S SHALL BE INSTALLED AT CREEK CROSSINGS SO AS TO PREVENT SEDIMENT FROM ENTERING THEREIN.
6. STABILIZED CONSTRUCTION ENTRANCES SHALL BE PROVIDED, AS NEEDED, TO PREVENT MUD FROM TRACKING ONTO STREETS NOT UNDER CONSTRUCTION AND ON STREETS WITHIN THE PROJECT LIMITS IF TRAFFIC IS BEING MAINTAINED THROUGH THE PROJECT.
7. ANY MUD TRACKED ONTO STREETS MUST BE REMOVED AT THE END OF EACH WORK DAY.
8. THE CONTACTOR WILL BE REQUIRED TO PLACE BMP'S BACK OF CURB, WHENEVER WATER CAN DRAIN OVER CURB, TO KEEP ERODED SOIL OUT OF THE GUTTERLINES, IN ACCORDANCE WITH THE FOLLOWING:
  - A. THE BMP REQUIRED WILL BE CURLEX :EXCELSIOR BLANKET, OR EQUAL. SAID BLANKET SHALL BE PLACED OVER THE APPROPRIATE SEED AND FERTILIZER, AS SPECIFIED IN THE PROJECT SPECIFICATIONS. (SEE BACK OF CURB PROTECTION DETAIL)
  - B. THIS BMP SHALL BE INSTALLED IMMEDIATELY WHENEVER THE CURB IS BACKFILLED TO WITHIN 3" OF THE TOP OF CURB. (SEE CURB BACKFILL DETAIL)
  - C. ADDITIONALLY, OTHER BMP'S (HAYBALES, SILT FENCE, ETC.) WILL BE INSTALLED AT LOCATIONS OF CONCENTRATED FLOW RESULTING IN SEDIMENT OVERRUNNING THE MAT.
  - D. SHOULD THE PROJECT PLANS SPECIFY THAT THE RIGHT-OF-WAY IS TO BE SODDED, THE EXCELSIOR MAT WILL NOT BE REQUIRED SO LONG AS THE SOD IS PLACED WITHIN 48 HOURS AFTER CURB BACKFILL REACHES A HEIGHT OF 3" OR LESS FROM TOP OF CURB. (SEE DETAIL)



CURB BACKFILL DETAIL

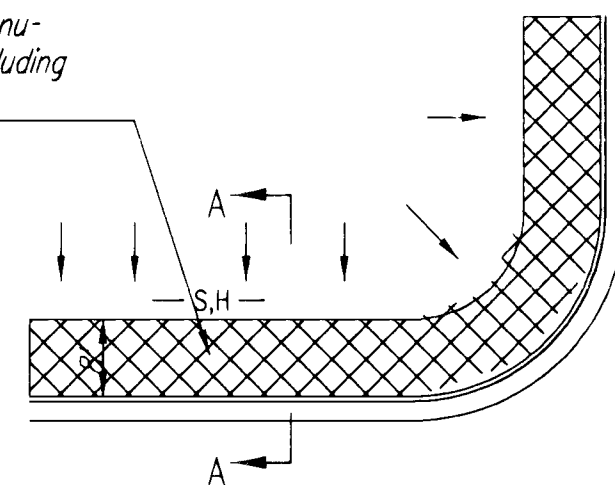


SECTION B-B

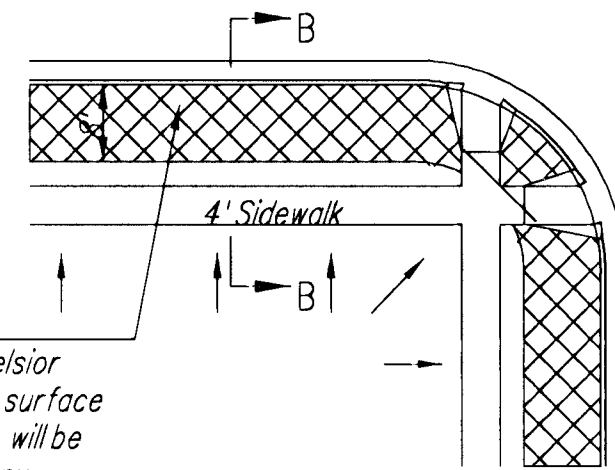


SECTION A-A

BMP-Install 8' wide Curlex :Excelsior Blanket, or equal, on prepared surface back of curb. Edge of blanket will be at back of curb. Install per manufacturer's recommendation, including staples.



SOUTH STREET



BMP-Install 8' wide Curlex :Excelsior Blanket, or equal, on prepared surface back of curb. Edge of blanket will be at back of curb. Install per manufacturer's recommendation, including staples.

BACK OF CURB PROTECTION DETAIL

NOTES:

1. EXCELSIOR MAT TO BE INSTALLED WHEN SOD IS NOT SPECIFIED ON PROJECT.
2. EXCELSIOR BLANKET TO BE INSTALLED OVER SEED AND FERTILIZER, AS SPECIFIED IN THE PROJECT SPECIFICATIONS.
3. AFTER INSTALLATION OF EXCELSIOR BLANKET, AT LOCATIONS WHERE CONCENTRATED FLOW CARRIES SEDIMENT OVER THE CURB AND INTO THE GUTTER, SUPPLEMENTAL BMP'S WILL BE INSTALLED BY THE CONTRACTOR AS NEEDED, TO FIX THE PROBLEM.

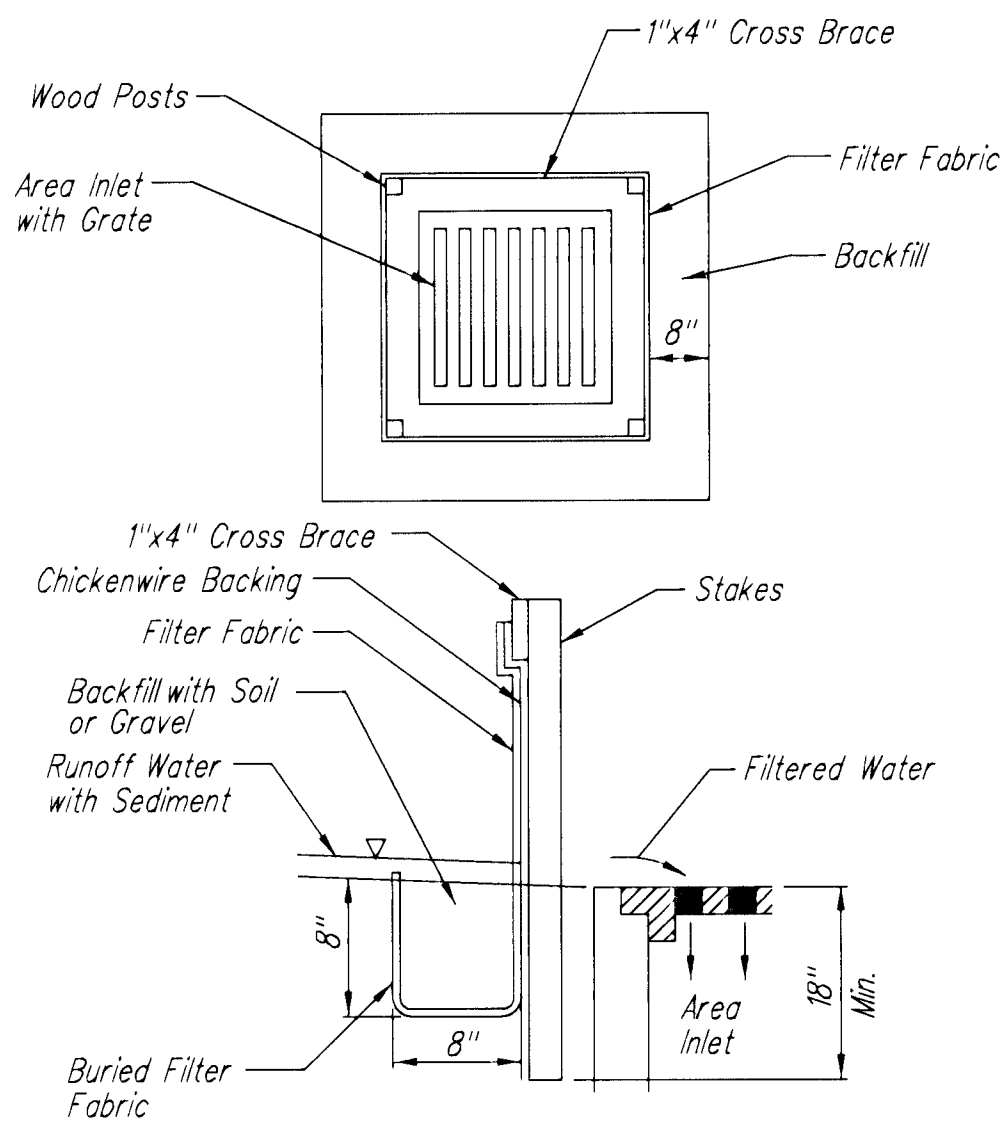


SOIL EROSION BMP'S  
STREET  
IMPROVEMENT  
PROJECTS

STORM WATER ENGINEER

PROJECT NUMBER OCA NO.

DATE MAY 2001 3 of 10



SILT FENCE BARRIERS FOR AREA INLETS  
(INLET PROTECTION)

Material Specification:

Silt fence fabric should conform to the AASHTO M288 96 silt fence specification. The wire or polymeric mesh backing used to help support the silt fence fabric should conform to the AASHTO M288 96 silt fence specification. The posts used to support the silt fence fabric should be a hardwood material with the following minimum dimensions: 2" square (nominal) by 4' long. The material used to frame the tops of the posts should be 1" by 4" boards. Silt fence fabric and support backing should be attached to the wooden posts and frame with staples, wire, zip ties, or nails.

Placement:

Place a silt fence drop inlet barrier in a location where it is unlikely to be overtopped. Water should flow through silt fence, not over it. Silt fence barriers for area inlets often fail when repeatedly overtopped. When used as a barrier for area inlets, silt fence fabric and posts must be supported at the top by a wooden frame. When a silt fence barrier for area inlets is located near an inlet that has steep approach slopes, the storage capacity behind the barrier is drastically reduced. Timely removal of sediment must occur for a barrier to operate properly in this location.

Proper installation method:

Excavate a trench around the perimeter of the area inlet that is at least 8" deep by 8" wide. Drive posts to a depth of at least 18" around the perimeter of the area inlet. The distance between posts should be 4' or less. If the distance between two adjacent corner posts is more than 4', add another post(s) between them. Connect the tops of all the posts with a wooden frame made of 1" by 4" boards. Use nails or screws for fastening. Attach the wire or polymeric-mesh backing to the outside of the post/frame structure with staples, wire, zip ties, or nails. Rollout a continuous length of silt fence fabric long enough to wrap around the perimeter of the area inlet. Add more length for overlapping the fabric joint. Place the edge of the fabric in the trench, starting at the outside edge of the trench. Line all three sides of the trench with the fabric. Backfill over the fabric in the trench with the excavated soil and compact. After filling the trench, approximately 24" to 36" of silt fence fabric should remain exposed. Attach the silt fence to the outside of the post/frame structure with staples, wire, zip ties, or nails. The joint should be overlapped to the next post.

Note: When a silt fence barrier for area inlet is placed in a shallow median ditch, make sure that the top of the barrier is not higher than the paved road. In this configuration, water may spread onto the roadway causing a hazardous condition.

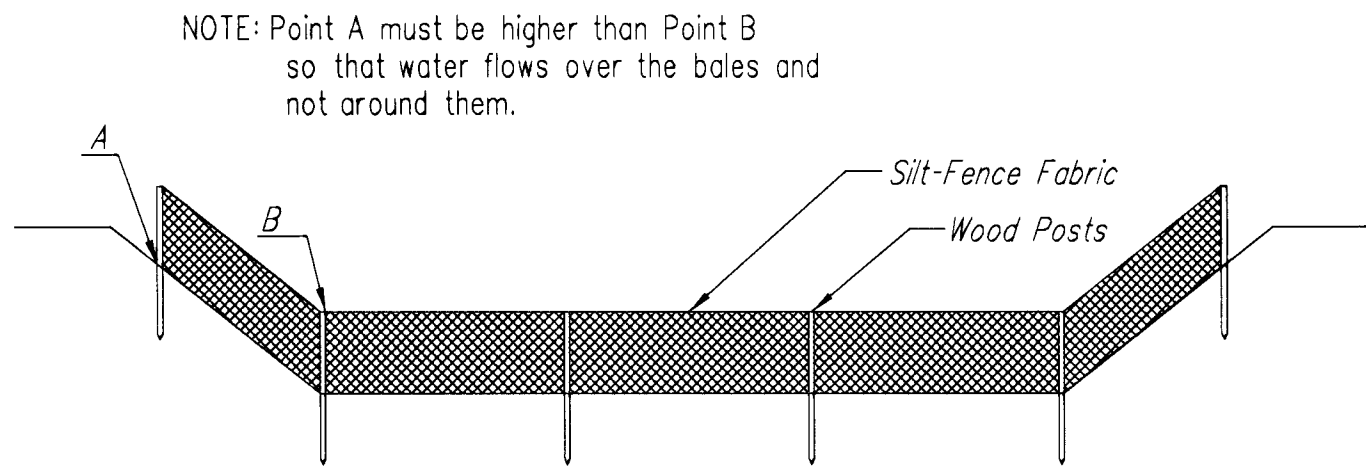
List of common placement/installation mistakes to avoid:

Water should flow through a silt fence barrier for area inlet-not over it. Place a silt fence barrier for area inlet in a location where it is unlikely to be overtopped. Silt fence barrier for area inlets often fail when repeatedly overtopped. Do not place posts on the outside of the silt fence barrier for area inlet. In this configuration, the force of the water is not resisted by the posts, but only by the staples (wire, zip-ties, nails, etc.). The silt fence will rip and fail. Do not install silt fence barrier for area inlets without framing the top of the posts. The corner posts around area inlets are stressed in two directions whereas a normal silt fence is only stressed in one direction. This added stress requires more support.

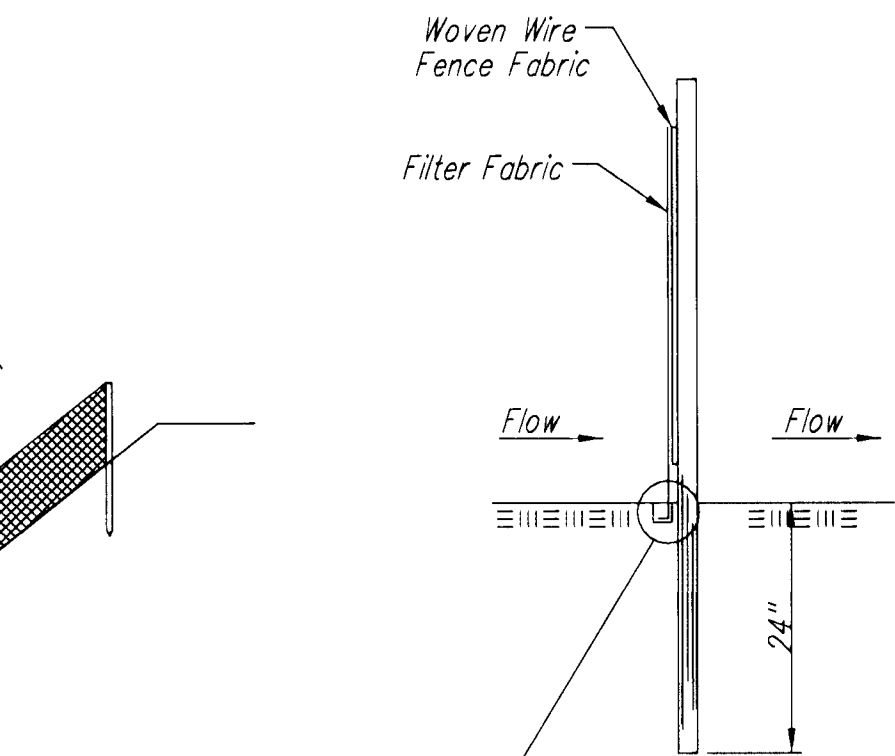
Inspection and Maintenance:

Silt fence barrier for area inlets should be inspected every 7 days and within 24 hours of a rainfall of 1/2" or more. The following is a list of questions that should be addressed during each inspection:

Does water flow under the silt fence?  
Does the silt fence sag excessively?  
Has the silt fence torn or become detached from the posts?  
Does sediment need to be removed from behind the area inlet barrier?



ELEVATION  
SILT FENCE DITCH CHECKS  
(STREAM PROTECTION)



ANCHOR TRENCH DETAIL

Material Specification:

Silt fence fabric should conform to the AASHTO M288 96 silt fence specification. The posts used to support the silt fence fabric should be a hardwood material with the following minimum dimensions: 2" square (nominal) by 4' long. Silt fence fabric should be attached to the wooden posts with staples, wire, zip ties, or nails.

Placement:

Place silt fence in ditches where it is unlikely that it will be overtopped. Water should flow through a silt fence ditch check, not over it. Silt fence ditch checks often fail when overtopped. Silt fence ditch checks should be placed perpendicular to the flowline of the ditch. The silt fence should extend far enough so that the ground level at the ends of the fence is higher than the top of the low point of the fence. This prevents water from flowing around the check. Checks should not be placed in ditches where high flows are expected. Rock checks should be used instead. Silt fence should be placed in ditches with slopes of 6% or less. For slopes steeper than 6%, rock checks should be used.

The following table provides check spacing for a given ditch grade:

| Ditch Check<br>Ditch grade | Spacing<br>Check<br>Spacing<br>(%)<br>(feet) |
|----------------------------|----------------------------------------------|
| 0.5                        | 200                                          |
| 1.0                        | 200                                          |
| 2.0                        | 100                                          |
| 3.0                        | 65                                           |
| 4.0                        | 50                                           |
| 5.0                        | 40                                           |
| 6.0                        | 30                                           |

Proper installation method:

Excavate a trench perpendicular to the ditch flowline that is at least 12" deep by 6" wide. Extend the trench in a straight line along the entire length of the proposed ditch check. Place the soil on the upstream side of the trench for later use. Rollout a continuous length of silt fence fabric on the downstream side of the trench. Place the edge of the fabric in the trench starting at the top upstream edge of the trench. Line two sides of the trench with the fabric as shown on detail. Backfill over the fabric in the trench with the excavated soil and compact. After filling the trench, approximately 24" to 36" of silt fence fabric should remain exposed. Lay the exposed silt fence on the upstream side of the trench to clear an area for driving in the posts. Just downstream of the trench, drive posts into the ground to a depth of at least 24". Place posts no more than 4' apart. Attach the silt fence to the anchored post with staples, wire, zip ties, or nails.

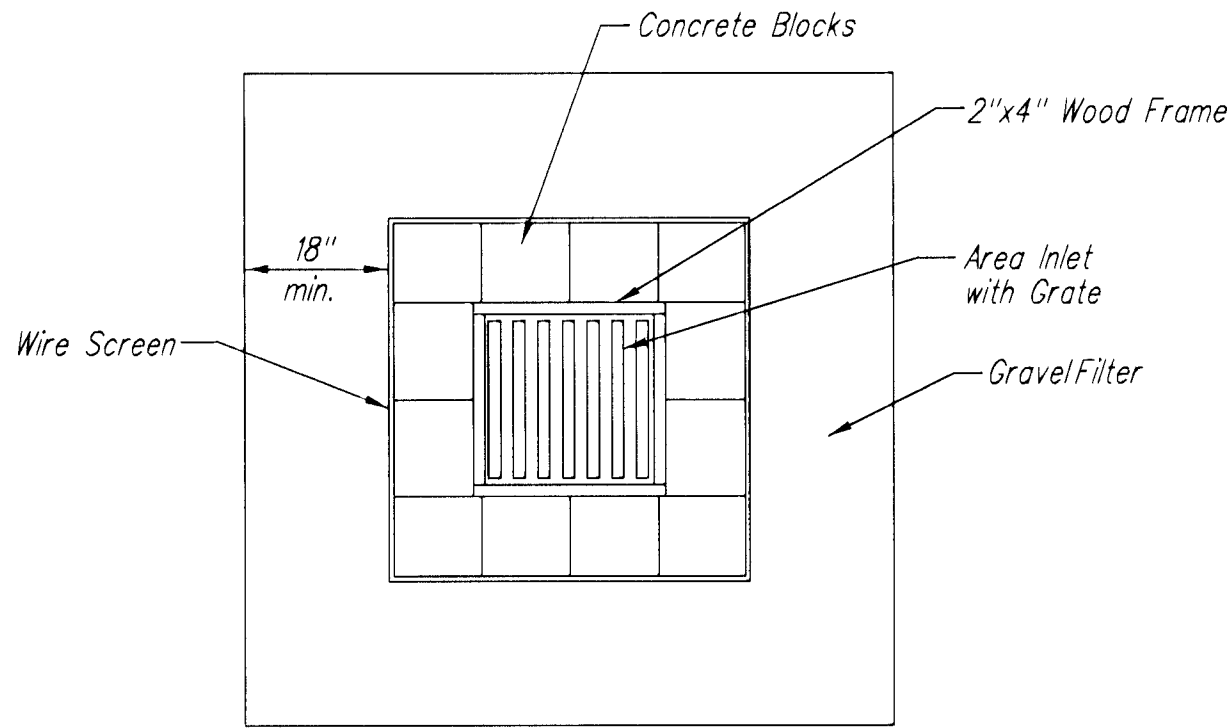
List of common placement/installation mistakes to avoid:

Water should flow through a silt fence ditch check-not over it. Place silt fence in ditches where it is unlikely that it will be overtopped. Silt fence installations quickly deteriorate when water overtops them. Do not place silt fence posts on the upstream side of the silt fence fabric. In this configuration, the force of the water is not restricted by the posts, but only by the staples (wire, zip ties, nails, etc.). The silt fence will rip and fail. Do not place a silt fence ditch check directly in front of a culvert outlet. It will not stand up to the concentrated flow. Do not place silt fence ditch checks in ditches that will likely experience high flows. They will not stand up to concentrated flow. Follow prescribed ditch check spacing guidelines. If spacing guidelines are exceeded, erosion will occur between the ditch checks. Do not allow water to flow around the ditch check. Make sure that the ditch check is long enough so that the ground level at the ends of the fence is higher than the low point on the top of the fence. Do not place silt fence ditch checks in channels with shallow soils underlain by rock. If the check is not anchored sufficiently, it will wash out.

Inspection and Maintenance:

Silt fence ditch checks should be inspected every 7 days and within 24 hours of a rainfall of 1/2" or more. The following is a list of questions that should be addressed during each inspection:

Does water flow around the ditch check?  
Does water flow under the ditch check?  
Does the silt fence sag excessively?  
Has the silt fence torn or become detached from the posts?  
Does sediment need to be removed from behind the ditch check?



CONCRETE BLOCK FILTER FOR AREA DRAIN  
(INLET PROTECTION)

Gravel barriers provide little filtering of large inflow waters. However, when installed correctly and maintained, they can effectively treat low runoff flows.

Placement of gravel filters around area drains must be completed in a manner that will not cause local flooding.

Gravel filters can be used if the immediate and adjacent area to the area drain consists of soil or pavement.

Only gravel filters are to be installed on top of the pavement.

Instructions for installing:

STEP 1: Place concrete blocks around the grate. The blocks can be stacked one or two high and should be supported by a 2'x4" board.  
STEP 2: Wrap 1/2" mesh wire screen around the concrete blocks.  
STEP 3: Place 1" to 1-1/2" diameter rock around the blocks and wire screen. Be sure the rock extends down from the top of the concrete block.  
STEP 4: To prevent damage to vehicles, signs warning drivers about the structures may be necessary.

An alternative method is use of gravel bags that are supported to prevent collapsing.

Use of rock having diameters smaller than 1" may result in clogging of pores and reduce the amount of water flowing into an inlet.

Maintenance:

All gravel filters installed around area drains should be inspected and repaired after each runoff event. Sediment should be removed when material is within 3" of the top of any block. Periodically, the gravel should be raked to increase infiltration and filtering of runoff waters. Accumulated sediment is to be removed immediately from roads and streets after every runoff event.



SOIL EROSION  
BMP DETAILS

STORM WATER ENGINEER

PROJECT NUMBER

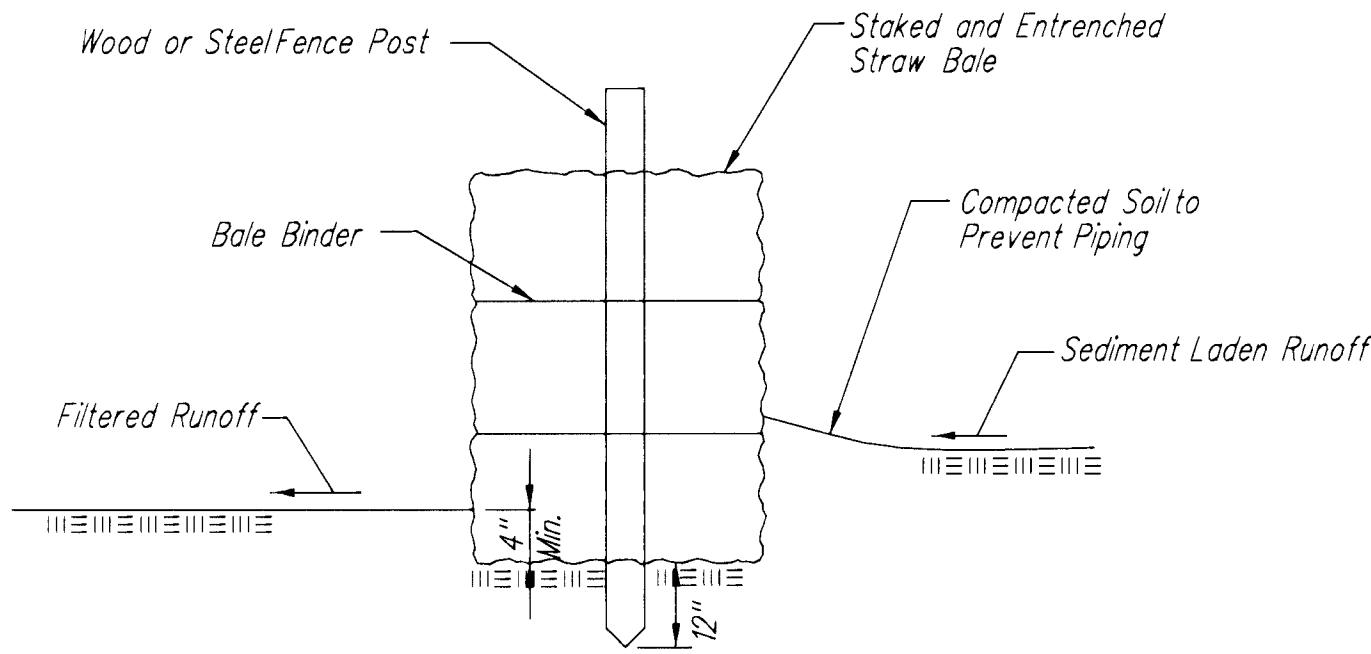
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DATE

MAY 2001

4 of 10

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DSNR: DEP - OPER: DEP - SCALE: 1=100  
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### STRAW BALE BARRIERS

#### Material Specification:

Bale slope barriers may be constructed of wheat straw, oat straw, prairie hay, or brome grass hay that is free of weeds declared noxious by the Kansas State Board of Agriculture. The stakes used to anchor the bales should be a hardwood material with the following minimum dimensions: 2" square (nominal) by 4' long.

#### Placement:

A slope barrier should be used at the toe of a slope when a ditch does not exist. The slope barrier should be placed on nearly level ground 5' to 10' away from the toe of a slope. The barrier is placed away from the toe of the slope to provide adequate storage for settling out sediment. When practicable, bale slope barriers should be placed along contours to avoid a concentration of flow. Bale slope barriers can also be placed along right-of-way fence lines to keep sediment from crossing onto adjacent property. When placed in this manner, the slope barrier will not likely follow contours.

#### Proper installation method:

Excavate a trench the length of the planned slope barrier that is 4" deep and a bale's width wide. Make sure that the trench is excavated along a single contour. When practicable, slope barriers should be placed along contours to avoid a concentration of flow. Place the soil on the upslope side of the trench for later use. Place the bales in the trench, making sure that they are butted tightly. Two stakes should be driven through each bale along the centerline of the ditch check, approximately 6" to 8" in from the bale ends. Stakes should be driven at least 12" into the ground. Once all the bales have been installed and anchored, place the excavated soil against the upslope side of the check and compact it. The compacted soil should be no more than 3" to 4" deep.

#### List of common placement/installation mistakes to avoid:

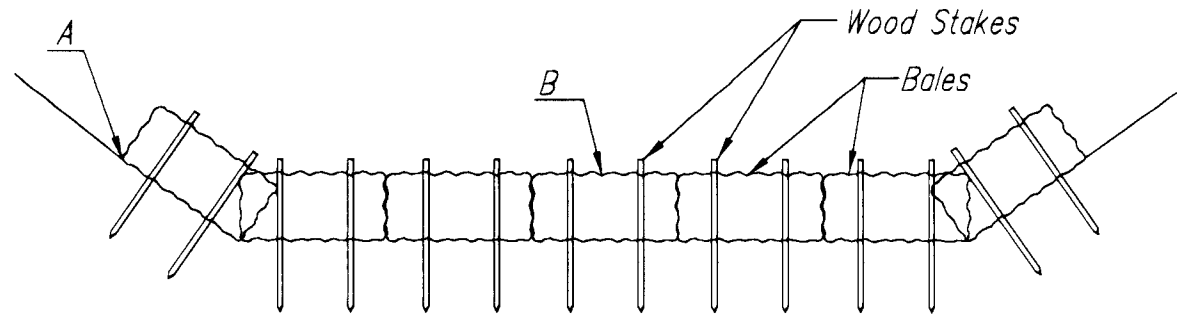
When practicable, do not place bale slope barriers across contours. Slope barriers should be placed along contours to avoid a concentration of flow. Concentrated flow over a slope barrier creates a scour hole on the downslope side of the barrier. The scour hole eventually undermines the bales and the barrier fails. Do not place bale slope barriers in areas with shallow soils underlain by rock. If the barrier is not anchored sufficiently, it will wash out. Bale slope barriers must be dug into the ground. Bales at ground level do not work because they allow water to flow under the barrier.

#### Inspection and Maintenance:

Bale slope barriers should be inspected every 7 days and within 24 hours of a rainfall of 1/2" or more. The following is a list of questions that should be addressed during each inspection:

- Are there any points along the slope barrier where water is concentrating?
- Does water flow under the slope barrier?
- Does water flow through spaces between abutting bales?
- Are any bales dislodged?
- Are bales decomposing due to age and/or water damage?
- Does sediment need to be removed from behind the slope barrier?

NOTE: Point A must be higher than Point B so that water flows over the bales and not around them.



### STRAW BALE DITCH CHECKS

#### Material Specification:

Bale ditch checks may be constructed of wheat straw, oat straw, prairie hay, or brome grass hay that is free of weeds declared noxious by the Kansas State Board of Agriculture. The stakes used to anchor the bales should be a hardwood material with the following minimum dimensions: 2" square (nominal) by 4' long. Optional: The downstream scour apron should be constructed of a double-netted straw erosion-control blanket at least 6' wide. Optional: The metal landscape staples used to anchor the erosion-control blanket should be at least 8" long.

#### Placement:

Bale ditch checks should be placed perpendicular to the flowline of the ditch. The ditch check should extend far enough so that the ground level at the ends of the check is higher than the top of the lowest center bale. This prevents water from flowing around the check. Checks should not be placed in ditches where high flows are expected. Rock checks should be used instead. Bales should be placed in ditches with slopes of 6% or less. For slopes steeper than 6%, rock checks should be used. The following table provides check spacing for a given ditch grade:

| Ditch grade (%) | Check Spacing (feet) |
|-----------------|----------------------|
| 0.5             | 200                  |
| 1.0             | 200                  |
| 2.0             | 100                  |
| 3.0             | 65                   |
| 4.0             | 50                   |
| 5.0             | 40                   |
| 6.0             | 30                   |

#### Proper installation method:

Excavate a trench perpendicular to the ditch flowline that is 4" deep and a bale's width wide. Extend the trench in a straight line along the entire length of the proposed ditch check. Place the soil on the upstream side of the trench; it will be used later. Optional: On the downstream side of the trench, roll out a length of erosion-control blanket (scour apron) equal to the length of the trench. Place the upstream edge of the erosion-control blanket along the bottom upstream edge of the trench. The erosion control blanket should be anchored in the trench with one row of 8" landscape staples placed on 18" centers. The remainder of the erosion-control blanket (the portion that is not lying in the trench) will serve as the downstream scour apron. This section of the blanket should be anchored to the ground with 8" landscape staples placed around the perimeter of the blanket on 18" centers. The remainder of the blanket should be anchored using two evenly spaced rows of 8" landscape staples on 18" centers placed perpendicular to the flowline of the ditch. Place the bales in the trench, making sure that they are butted tightly. Two stakes should be driven through each bale along the centerline of the ditch check, approximately 6" to 8" in from the bale ends. Stakes should be driven at least 12" into the ground. Once all the bales have been installed and anchored, place the excavated soil against the upstream side of the check and compact it. The compacted soil should be no more than 3" to 4" deep and extend upstream no more than 24".

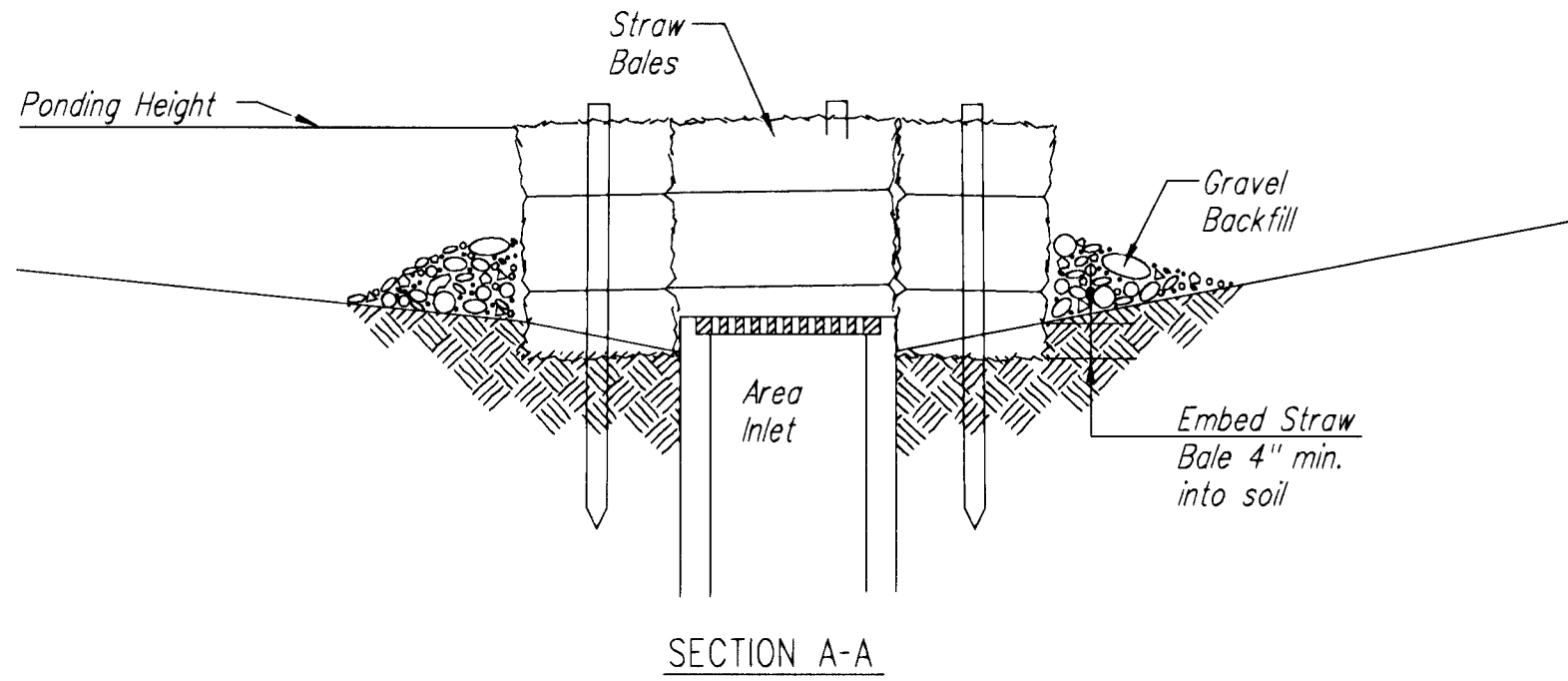
#### List of common placement/installation mistakes to avoid:

Do not place a bale ditch check directly in front of a culvert outlet. It will not stand up to the concentrated flow. Do not place bale ditch checks in ditches that will likely experience high flows. They will not stand up to concentrated flow. Follow prescribed ditch-check spacing guidelines. If spacing guidelines are exceeded, erosion will occur between the ditch checks. Do not allow water to flow around the ditch check. Make sure that the ditch check is long enough so that the ground level at the ends of the check is higher than the top of the lowest center bale. Do not place bale ditch checks in channels with shallow soils underlain by rock. If the check is not anchored sufficiently, it will wash out. Bale ditch checks must be dug into the ground. Bales at ground level do not work because they allow water to flow under the check.

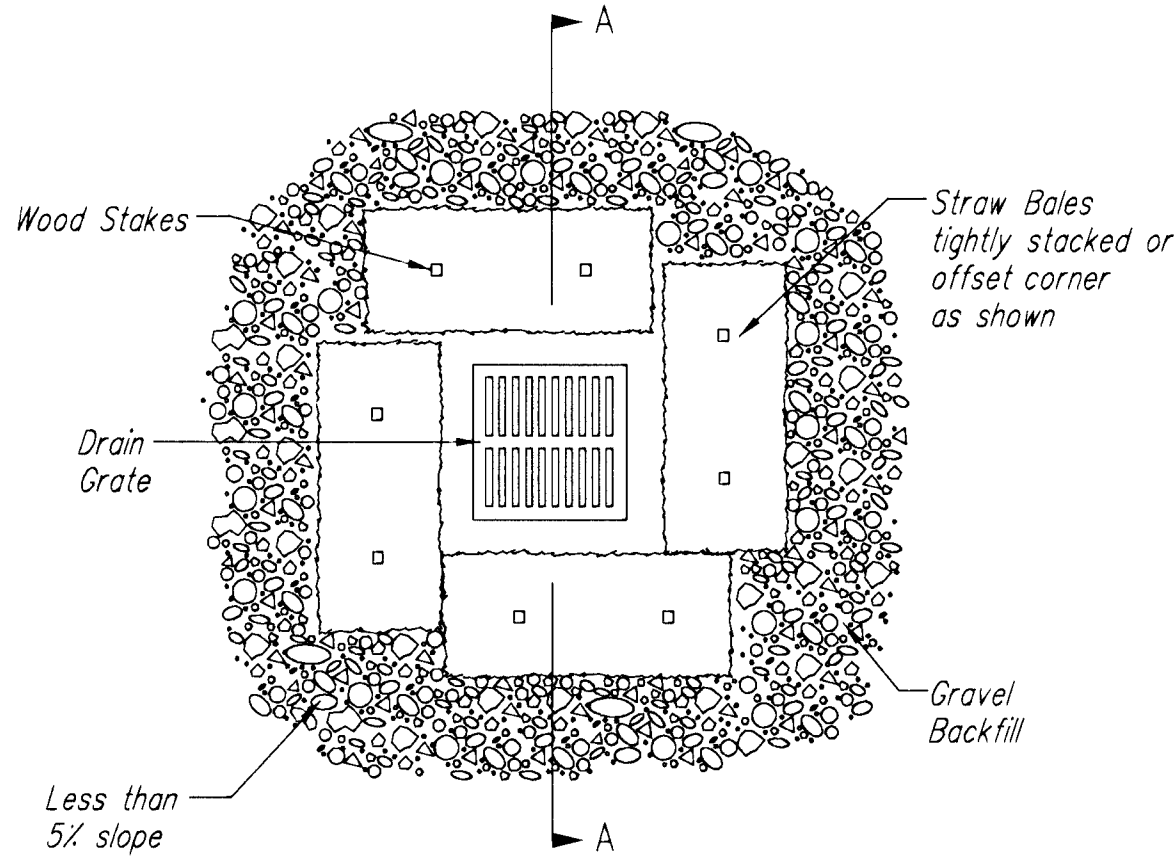
#### Inspection and Maintenance:

Bale ditch checks should be inspected every 7 days and within 24 hours of a rainfall of 1/2" or more. The following is a list of questions that should be addressed during each inspection:

- Does water flow around the ditch check?
- Does water flow under the ditch check?
- Does water flow through spaces between abutting bales?
- Are any bales and/or scour aprons (optional) dislodged?
- Are bales decomposing due to age and/or water damage?
- Does sediment need to be removed from behind the ditch check?



SECTION A-A



### STRAW BALE BARRIERS FOR AREA INLETS

#### (INLET PROTECTION)

#### Material Specification:

Bale area inlet barriers should be constructed of wheat straw, oat straw, prairie hay, or brome grass hay that is free of weeds declared noxious by the Kansas State Board of Agriculture. The stakes used to anchor the bales should be a hardwood material with the following minimum dimensions: 2" square (nominal) by 4' long.

#### Placement:

Bale area inlet barriers should be placed directly around the perimeter of a drop inlet. When a bale area inlet barrier is located near an inlet that has steep approach slopes, the storage capacity behind the barrier is drastically reduced. Timely removal of sediment must occur for a barrier to operate properly in this location.

#### Proper Installation Method:

Excavate a trench around the perimeter of the area inlet that is at least 4" deep by a bale's width wide. Place the bales in the trench, making sure that they are butted tightly. Some bales may need to be shortened to fit into the trench around the area inlet. Two stakes should be driven through each bale, approximately 6" to 8" in from the bale ends. Stakes should be driven at least 12" into the ground. Once all the bales have been installed and anchored, place the excavated soil against the receiving side of the barrier and compact it. The compacted soil should be no more than 3" to 4" deep. Note: When a bale area inlet barrier is placed in a shallow median ditch, make sure that the top of the barrier is not higher than the paved road. In this configuration, water may spread onto the roadway causing a hazardous condition.

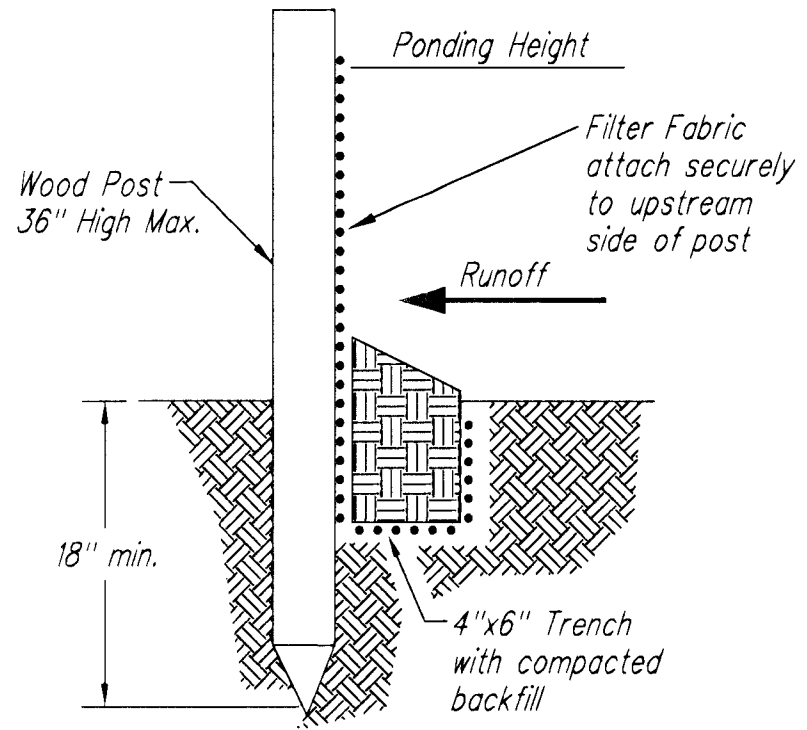
#### List of common placement installation mistakes to avoid:

Bales should be placed directly against the perimeter of the area inlet. This allows overtopping water to flow directly into the inlet instead of onto nearby soil causing scour. Bale area inlet barriers must be dug into the ground. Bales at ground level do not work because they allow water to flow under the barrier.

#### Inspection and Maintenance:

Bale area inlet barriers should be inspected every 7 days and within 24 hours of a rainfall of 1/2" or more. The following is a list of questions that should be addressed during each inspection:

- Does water flow under the area inlet barrier?
- Does water flow through spaces between abutting bales?
- Are any bales dislodged?
- Are bales decomposing due to age and/or water damage?
- Does sediment need to be removed from behind the area inlet barrier?



### SILT FENCE BARRIERS

#### SILT FENCE BARRIERS

#### Material Specification:

Silt fence fabric should conform to the AASHTO M288 96 silt fence specification. The posts used to support the silt fence fabric should be a hardwood material with the following minimum dimensions: 2" square (nominal) by 4' long. Silt fence fabric should be attached to the wooden posts with staples, wire, zip ties, or nails.

#### Placement:

A slope barrier should be used at the toe of a slope when a ditch does not exist. The slope barrier should be placed on nearly level ground 5' to 10' away from the toe of a slope. The barrier is placed away from the toe of the slope to provide adequate storage for settling out sediment. When practicable, silt fence slope barriers should be placed along contours to avoid a concentration of flow. Silt fence slope barriers can also be placed along right-of-way fence lines to keep sediment from crossing onto adjacent property. When placed in this manner, the slope barrier will not likely follow contours.

#### Proper installation method:

Excavate a trench the length of the planned slope barrier that is 6" deep by 4" wide. Make sure that the trench is excavated along a single contour. When practicable, slope barriers should be placed along contours to avoid a concentration of flow. Place the soil on the upslope side of the trench for later use. Roll out a continuous length of silt fence fabric on the downslope side of the trench. Place the edge of the fabric in the trench starting at the top upslope edge. Line all three sides of the trench with the fabric. Backfill over the fabric in the trench with the excavated soil and compact. After filling the trench, approximately 24" to 36" of silt-fence fabric should remain exposed. Lay the exposed silt fence upslope of the trench to clear an area for driving in the posts. Just downslope of the trench, drive posts into the ground to a depth of at least 18". Place posts no more than 4' apart. Attach the silt fence to the anchored post with staples, wire, zip ties, or nails.

#### List of common placement/installation mistakes to avoid:

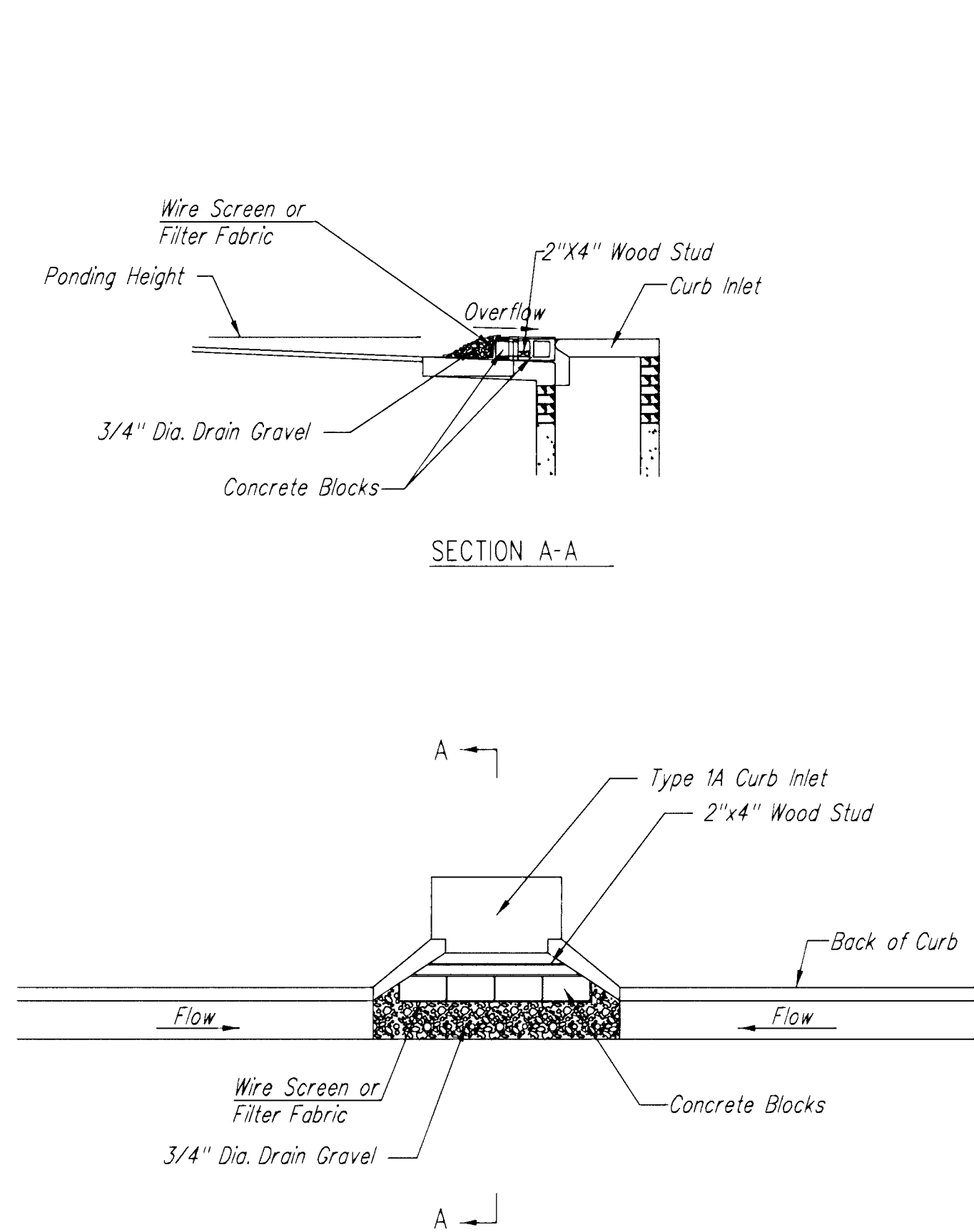
When practicable, do not place silt fence slope barriers across contours. Slope barriers should be placed along contours to avoid a concentration of flow. When the flow concentrates, it overtops the barrier and the silt fence slope barrier quickly deteriorates. Do not place silt-fence posts on the upslope side of the silt fence fabric. In this configuration, the force of the water is not restricted by the posts, but only by the staples (wire, zip ties, nails, etc.). The silt fence will rip and fail. Do not place silt fence slope barriers in areas with shallow soils underlain by rock. If the barrier is not sufficiently anchored, it will wash out. Silt fence slope barriers must be dug into the ground; silt fence at ground level does not work because water will flow underneath.

#### Inspection and Maintenance:

Silt fence slope barriers should be inspected every 7 days and within 24 hours of a rainfall of 1/2" or more. The following is a list of questions that should be addressed during each inspection:

- Are there any points along the slope barrier where water is concentrating?
- Does water flow under the slope barrier?
- Do the silt fences sag excessively?
- Has the silt fence torn or become detached from the posts?
- Does sediment need to be removed from behind the slope barrier?

|                                                                                       |                             |                  |
|---------------------------------------------------------------------------------------|-----------------------------|------------------|
|  | SOIL EROSION<br>BMP DETAILS |                  |
|                                                                                       | STORM WATER ENGINEER        |                  |
|                                                                                       | PROJECT NUMBER<br>-         | OCA NO.<br>----- |
|                                                                                       | DATE<br>MAY 2001            | 5 of 10          |



CURB INLET GRAVEL FILTERS  
(INLET PROTECTION-RESIDENTIAL STREETS ONLY)  
NOTE: Other types of curb inlet protection may be approved by the city so long as equal protection is provided.

A gravel inlet filter shall be installed at sump locations on residential streets. This type of protection is not to be used on arterial or collector streets at any time that it would pose an undue traffic hazard.

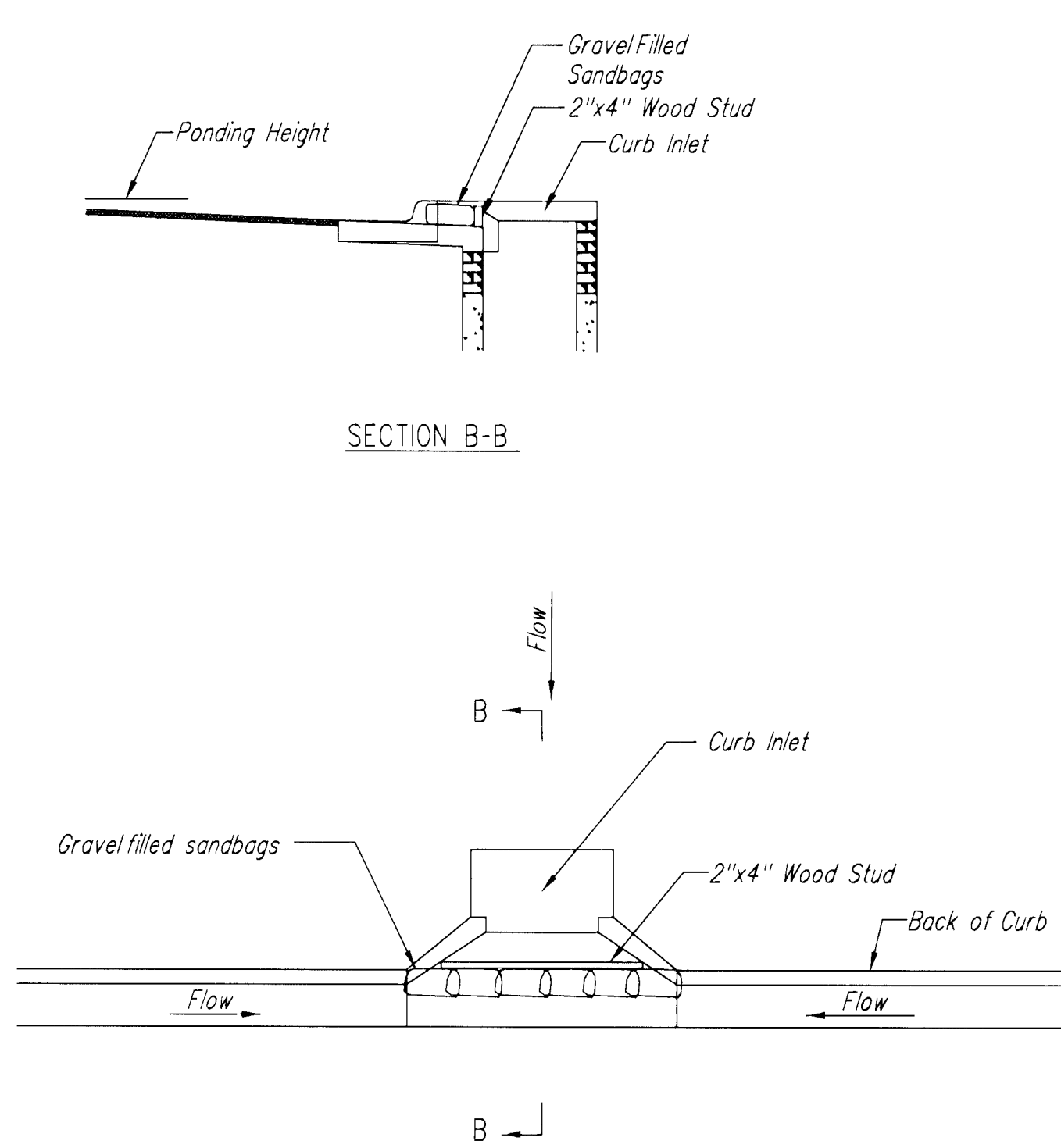
Instructions for Installing:

- STEP 1: Place concrete blocks around the inlet as shown on drawing. Insert 2x4 board as shown.
- STEP 2: Wrap 1/2" mesh wire screen around the concrete blocks.
- STEP 3: Place 1" to 1-1/2" diameter rock around the blocks and wire screen. Be sure the rock extends down from the top of the concrete block.
- STEP 4: To prevent damage to vehicles, signs warning drivers about the structures may be necessary. An alternative installation is the use of gravel bags supported by a 2"x4" board to prevent collapsing.

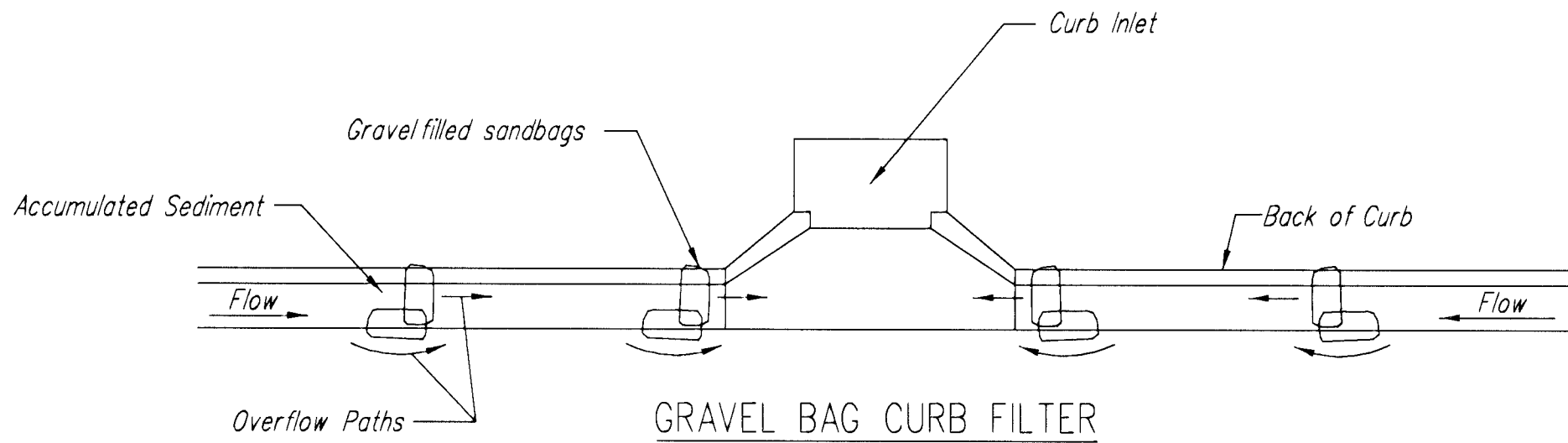
Use of rock with diameters smaller than 1" in the bag may result in clogging of pores and reduce the amount of water flowing into an inlet.

Maintenance:

All curb inlet gravel filters shall be inspected and repaired after each runoff event. Sediment deposits are to be removed once materials within 8 cm (3 inches) of the top of any block. Periodically, the gravel shall be raked to increase infiltration and filtering of runoff waters. Accumulated sediment is to be removed immediately from roads and streets.



CURB INLET SANDBAG FILTERS  
(INLET PROTECTION)  
NOTE: Other types of curb inlet protection may be approved by the City so long as equal protection is provided.



NOTE: Place two or more sets of bags in a manner that results in maximum support. The flow line bag must be lower than top of curb.

CURB SEDIMENT TRAPS

When inlets are located on streets having a grade (i.e., sump conditions do not exist), installing gravel (or sand) bags in the gutter flow line to create small sediment traps can be considered. Gravel bags are recommended over sand bags to allow for drainage.

If the spacing between bags becomes too large, little sediment may be trapped. Spacing of bags should be completed using the table or graph that illustrates placement distances based upon street slope. When installed in the gutter, bag tops must be lower than the sidewalk.

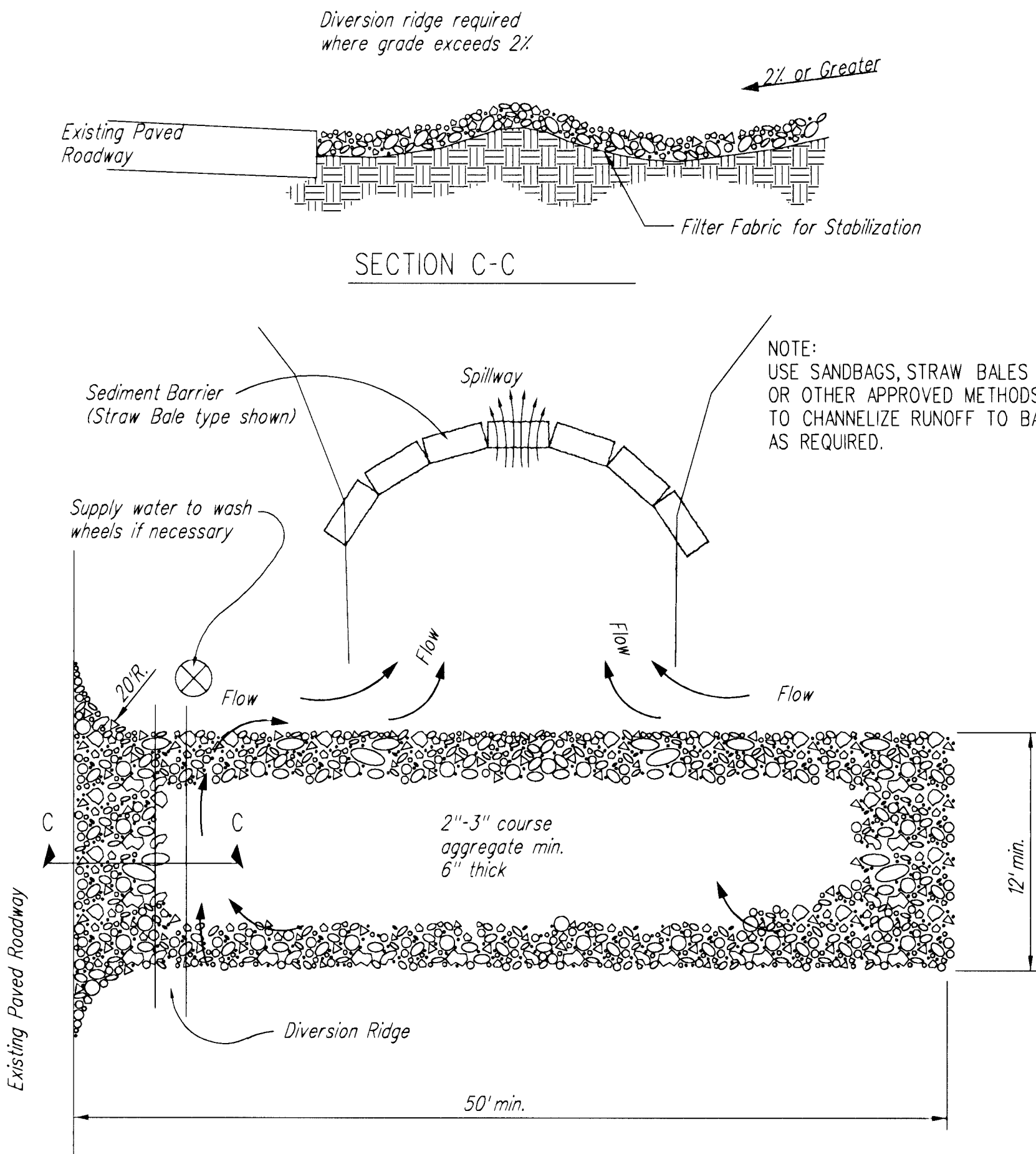
Spacing:

Gravel bags are to be placed according to street grades using the following table or graph that appears below.

| GRADE (%) | SPACING (FEET) |
|-----------|----------------|
| 0.5       | 75             |
| 1.0       | 45             |
| 2.0       | 18             |
| 3.0       | 12             |
| 4.0       | 9              |
| 5.0       | 6              |

Maintenance:

Collected sediment shall be removed after every runoff event. Bags that are destroyed by vehicular traffic or through natural deterioration are to be immediately replaced.



STABILIZED CONSTRUCTION ENTRANCE

NOTES:

1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN, AS SHOWN ABOVE.
4. DRIVE ENTRANCES ONTO RESIDENTIAL LOTS WILL NOT BE REQUIRED TO HAVE THE SEDIMENT BARRIER SHOWN, BUT WHEEL WASHING MAY BE REQUIRED IF STABILIZED ENTRANCE IS NOT SUFFICIENT TO KEEP MUD FROM BEING TRACKED ONTO ADJACENT STREET. ENTRANCE SHALL EXTEND FROM BACK OF CURB TO DWELLING.



SOIL EROSION  
BMP DETAILS

STORM WATER ENGINEER

PROJECT NUMBER OCA NO.

DATE MAY 2001 6 of 10

Plotted By :   
Plot File :   
Plot Date :

1. MUTCD COMPLIANCE:

ALL TRAFFIC CONTROL DEVICES AND THEIR INSTALLATION AND MAINTENANCE SHALL COMPLY WITH THE REQUIREMENTS OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) FOR STREETS AND HIGHWAYS. WHENEVER THE TRAFFIC CONTROL STANDARDS CONFLICT WITH THE MANUAL, THE STANDARDS SHALL GOVERN.

2. DESIGN SPEED:

THOSE ITEMS DELEGATED TO TRAFFIC CONTROL SHOULD BE DESIGNED AND INSTALLED USING THE POSTED/LEGAL SPEED OF THE ROADWAY PRIOR TO WORK STARTING.

3. CLEAR ZONE:

ALL CONSTRUCTION EQUIPMENT (INCLUDING VEHICLES), MATERIALS, AND DEBRIS SHALL BE STORED OUT OF THE CLEAR ZONE. WHERE THIS CANNOT BE ACHIEVED, THE CONTRACTOR SHALL PLACE APPROPRIATE SIGNS, OBJECT IDENTIFIERS, AND/OR BARRICADES AS DESIGNATED BY THE ENGINEER. TRAFFIC CONTROL DEVICES NEEDED FOR THIS CONDITION SHALL BE CONSIDERED SUBSIDIARY TO OTHER BID ITEMS.

4. MINIMUM LANE WIDTHS:

LANE WIDTHS SHALL BE A MINIMUM OF 11' (MEASURED BETWEEN CENTERLINES OF PAVEMENT MARKINGS) OR AS SHOWN ON THE PLANS, OR AS DIRECTED BY THE ENGINEER. A LANE WIDTH LESS THAN 11' MAY REQUIRE RESTRICTED ROADWAY WIDTH SIGNING.

5. FLAGGER:

A MINIMUM OF ONE FLAGGER SHALL BE STATIONED WITHIN EACH MULTI-LANE ROADWAY WORK AREA WHERE WORK IS IN A CLOSED LANE ADJACENT TO TRAFFIC AND NOT SEPERATED BY CONCRETE SAFETY BARRIER.

6. PAVEMENT MARKING:

WHEN THE WORK WILL OCCUPY A LOCATION MORE THAN THREE DAYS, ALL CONFLICTING PAVEMENT MARKINGS SHALL BE REMOVED OR MASKED AND ALL TRANSITION TAPERS, CROSSTOVERS, AND EDGE LINES ALONG CHANNELIZING DEVICES SHALL BE MARKED WITH SOLID 4" WIDE PAVEMENT MARKING.

7. FIRST MODULE OF IBS:

THE FIRST MODULE OF EACH INERTIAL BARRIER SYSTEM (IBS) SHALL HAVE A MINIMUM OF 2 SQ. FT. OF FLOURESCENT ORANGE PRISMATIC GRADE RETRORREFLECTIVE SHEETING FACING TRAFFIC. EITHER A VERTICAL RECTANGLE OR DIAMOND SHAPE MAY BE USED.

8. PEDESTRIAN / BICYCLE SAFETY:

WORK ZONE SIGNS SHALL NOT INHIBIT PEDESTRIAN AND BICYCLE TRAFFIC ON SIDEWALKS OR OTHER AREAS DESIGNATED FOR PEDESTRIAN OR BICYCLE USE.

CONSIDERATION SHOULD BE MADE TO SEPERATE PEDESTRIAN AND BICYCLE MOVEMENTS FROM BOTH WORK SITE ACTIVITY AND VEHICULAR TRAFFIC. UNLESS A REASONABLE SAFE ROUTE THAT DOES NOT INVOLVE CROSSING THE ROADWAY CAN BE PROVIDED, PEDESTRIANS AND BICYCLISTS SHOULD BE APPROPRIATELY DIRECTED WITH ADVANCE SIGNING THAT ENCOURAGES THEM TO CROSS TO THE OPPOSITE SIDE OF THE ROADWAY. IN URBAN AND SUBURBAN AREAS WITH HIGH VEHICULAR TRAFFIC VOLUMES, THESE SIGNS SHOULD BE PLACED AT INTERSECTIONS (RATHER THAN MID BLOCK LOCATIONS) SO THAT PEDESTRIANS AND BICYCLISTS ARE NOT CONFRONTED WITH MID-BLOCK WORK SITES THAT WILL INDUCE THEM TO ATTEMPT SKIRTING THE WORK SITE OR MAKING A MID-BLOCK CROSSING.

9. CHANGED STOP CONDITIONS:

ATTACH TWO FLAGS AND A RED TYPE B HIGH INTENSITY WARNING LIGHT TO ANY STOP SIGN THAT CREATES A NEW STOP CONDITION OR MOVES THE STOP CONDITION TO A NEW LOCATION. LEAVE FLAGS AND LIGHTS IN PLACE FOR AT LEAST THE FIRST 30 DAYS. INSTALL W3-1 (SYMBOLIC STOP AHEAD) SIGN IN ADVANCE OF STOP SIGN IF STOP SIGN IS NOT VISIBLE FOR A MINIMUM OF DISTANCE 'A' (SEE CHART ON TE710) OR IF STOP CONDITION IS MOVED TO LESS THAN DISTANCE 'A' FROM AN EXISTING STOP AHEAD SIGN.

10. LUMP SUM BIDDING:

WHEN TRAFFIC CONTROL IS BID LUMP SUM, ADDITIONAL DEVICES WILL BE PAID FOR AS EXTRA WORK.

11. NIGHT TIME LIGHTING:

WHEN NIGHTTIME WORK IS REQUIRED, FLOODLIGHTS SHOULD BE USED TO ILLUMINATE FLAGGER STATIONS, EQUIPMENT CROSSINGS, AND OTHER AREAS WHERE EXISTING LIGHT IS NOT ADEQUATE FOR THE WORK TO BE PERFORMED SAFELY.

IN NO CASE SHALL FLOODLIGHTS BE PERMITTED TO CREATE A DISABLING GLARE FOR THE DRIVER. THE ADEQUACY OF THE FLOODLIGHT PLACEMENT AND ELIMINATION OF POTENTIAL GLARE SHOULD BE CHECKED BY DRIVING THROUGH THE PROJECT.

12. NCHRP REPORT 350 CRASHWORTHY REQUIREMENTS:

TRAFFIC CONTROL DEVICES SHALL MEET THE EVALUATION CRITERIA IN NCHRP REPORT 350 AS SUPPLEMENTED BY FHWA MEMORANDUM "IDENTIFYING ACCEPTABLE HIGHWAY SAFETY FEATURES," DATED JULY 25, 1997. AVAILABLE ON THE INTERNET AT [http://safety.fhwa.dot.gov/roadway\\_dept/road\\_hardware/nchrp\\_350/nchrp350.htm](http://safety.fhwa.dot.gov/roadway_dept/road_hardware/nchrp_350/nchrp350.htm)

THE CONTRACTOR SHALL:

1) PROVIDE TO THE ENGINEER A COPY OF THE MANUFACTURER'S SELF-CERTIFICATION THAT ANY CATEGORY 1 (i.e. - PLASTIC TRIMLINE CONES, TUBULAR MARKERS, DRUMS WITHOUT ATTACHMENTS) AND CATEGORY 2 (i.e. - PORTABLE SIGN STANDS (WITH SIGNS), TYPE II AND III BARRICADES, AND VERTICAL PANELS) DEVICES USED ON THE PROJECT ARE NCHRP REPORT 350 COMPLIANT.

2) PROVIDE TO THE ENGINEER, UPON REQUEST, A COPY OF THE ENTIRE FHWA NCHRP REPORT 350 ACCEPTANCE LETTER (WZ-xxx) FOR ANY CATEGORY 2 DEVICE (i.e. - PORTABLE SIGN STANDS (WITH SIGNS), TYPE II AND III BARRICADES, AND VERTICAL PANELS) USED ON THE PROJECT. WORK ZONE FHWA NCHRP REPORT 350 ACCEPTANCE LETTERS (WZ-xxx) ARE AVAILABLE ON THE INTERNET AT [http://safety.fhwa.dot.gov/roadway\\_dept/road\\_hardware/listing.cfm?code=work](http://safety.fhwa.dot.gov/roadway_dept/road_hardware/listing.cfm?code=work)

3) CERTIFY THAT THE TRUCK MOUNTED ATTENUATORS (TMA'S) (WHICH ARE DEFINED AS CATEGORY 3 DEVICES BY THE FHWA MEMORANDUM) WERE PURCHASED PRIOR TO OCTOBER 1, 1998, AND INCLUDE A COPY OF THE ENTIRE FHWA ACCEPTANCE LETTER STATING THAT THE TMA'S ARE NCHRP REPORT 230 COMPLIANT; OR IF THE DEVICES WERE PURCHASED AFTER OCTOBER 1, 1998, INCLUDE A COPY OF THE ENTIRE FHWA'S ACCEPTANCE LETTER STATING THAT THE TMA'S ARE NCHRP REPORT 350 COMPLIANT.

ALL CATEGORY 1 & 2 DEVICES USED ON PROJECTS LET AFTER JANUARY 1, 2002 SHALL BE NCHRP REPORT 350 COMPLIANT. TMA'S PURCHASED PRIOR TO OCTOBER 1, 1998, MAY BE USED UNTIL THE END OF THEIR SERVICEABLE LIVES.

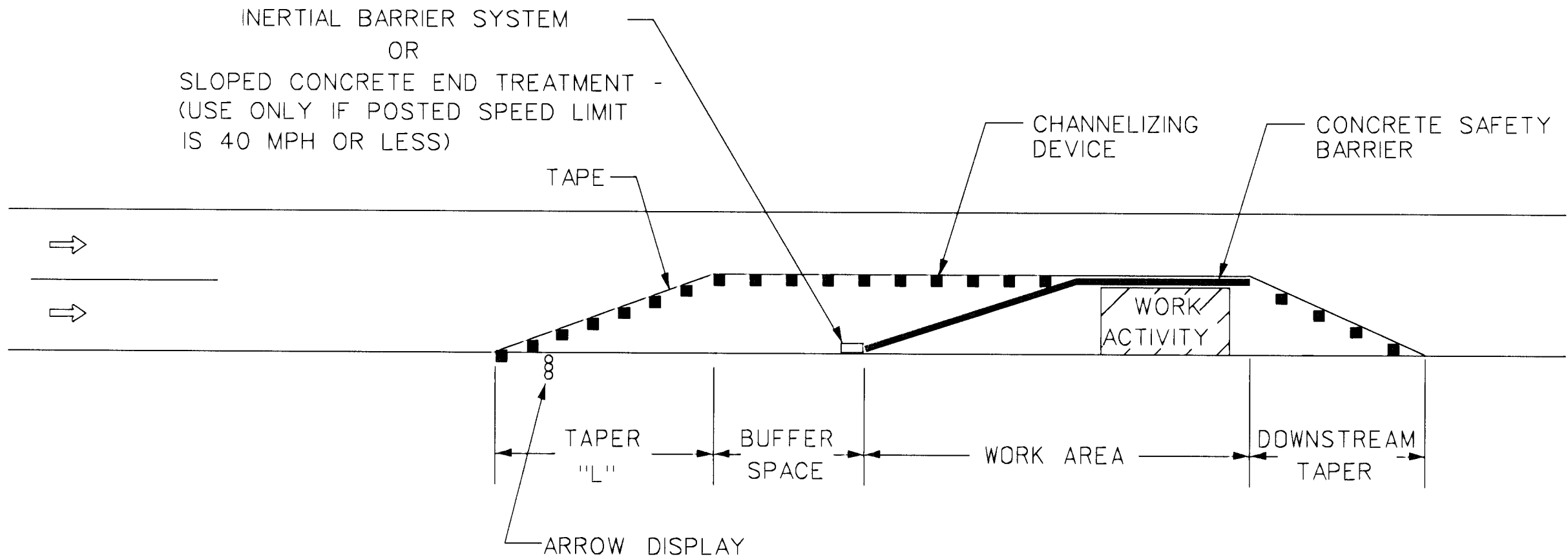
BUFFER SPACE:

| SPEED (MPH) * | 20 | 25 | 30 | 35  | 40  | 45  | 50  | 55  | 60  | 65  | 70  |
|---------------|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|
| LENGTH (ft)   | 35 | 50 | 85 | 115 | 165 | 215 | 280 | 330 | 410 | 500 | 575 |

NEITHER WORK ACTIVITY NOR STORAGE OF EQUIPMENT, VEHICLES, OR MATERIAL SHOULD OCCUR IN THE BUFFER SPACE. WHEN A PROTECTION VEHICLE IS PLACED IN ADVANCE OF THE WORK SPACE, ONLY THE SPACE UPSTREAM OF THE VEHICLE CONSTITUTES THE BUFFER SPACE.

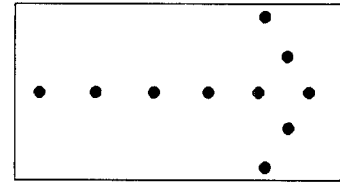
- \* POSTED SPEED PRIOR TO WORK STARTING

IF TEMPORARY CONCRETE SAFETY BARRIER IS USED TO SEPERATE APPROACHING TRAFFIC FROM THE WORK ACTIVITY, THE BARRIER SHALL BE CONSIDERED PART OF THE WORK AREA. A FULL LANE WIDTH SHOULD BE AVAILABLE THROUGHOUT THEN LENGTH OF THE BUFFER SPACE. FOR EXAMPLE:

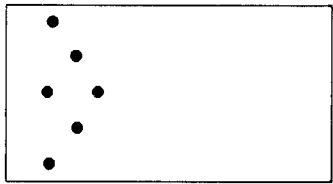


| STATE  | PROJECT NO. | YEAR | SHEET NO. | TOTAL SHEETS |
|--------|-------------|------|-----------|--------------|
| KANSAS | -           | 2006 | 7         | 10           |

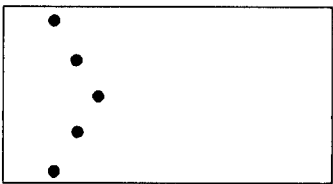
ARROW DISPLAYS



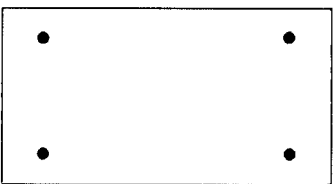
FLASHING ARROW



SEQUENTIAL ARROW



SEQUENTIAL CHEVRON



CAUTION

ARROW DISPLAY ELEMENTS SHALL BE CAPABLE OF A MINIMUM 50 PERCENT DIMMING FROM THEIR FULL-RATED LAMP VOLTAGE. FULL LAMP VOLTAGE SHOULD BE USED FOR DAY AND DIMMED MODE SHALL BE USED FOR NIGHT. AN ARROW DISPLAY IN THE CAUTION MODE SHALL BE USED ONLY FOR SHOULDER WORK OR ROADSIDE WORK NEAR THE SHOULDER.

|     |          |                          |      |        |
|-----|----------|--------------------------|------|--------|
| 3   | 2-1-05   | MODIFIED NOTES *2, 8, 12 | B.H. | A.A.A. |
| 2   | 11-19-03 | CHANGED BORDER           | B.H. | S.A.B. |
| 1   | 3-17-03  | MODIFIED NOTE 12         | M.H. | S.A.B. |
| NO. | DATE     | REVISIONS                | BY   | APP'D  |

KANSAS DEPARTMENT OF TRANSPORTATION

GENERAL TRAFFIC CONTROL

TE700

9/1/00

|                        |                           |
|------------------------|---------------------------|
| FHWA APPROVAL 2-1-2005 | APP'D Anthony A. Alrobore |
| DESIGNED B.A.H.        | DETAILED B.A.H.           |
| DESIGN CK.             | DETAIL CK.                |
| QUANTITIES             | TRACE CK.                 |

GENERAL NOTES

1. MAINTENANCE:

THE CONTRACTOR SHALL MAINTAIN ALL SIGNS AND DEVICES IN AN UPRIGHT POSITION. THE CONTRACTOR SHALL CLEAN OR REPLACE ANY DAMAGED OR ILLEGIBLE SIGN OR DEVICE AS DIRECTED BY THE ENGINEER.

2. EXISTING SIGNS:

IF EXISTING SIGNS THAT ARE TO REMAIN (WHETHER DENOTED ON THE PLANS OR NOT) INTERFERE WITH CONSTRUCTION WORK, THE CONTRACTOR SHALL REMOVE, STORE, AND RESET THE SIGNS. THIS SHALL BE SUBSIDIARY TO OTHER TRAFFIC CONTROL BID ITEMS. SIGNING DAMAGED BY THE CONTRACTOR SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.

3. CONFLICTING SIGNS AND SIGNS NOT IN USE:

SIGNS THAT ARE IN CONFLICT WITH THE TRAFFIC CONTROL PLAN OR DO NOT APPLY TO THE TRAFFIC OPERATIONS SHALL BE IMMEDIATELY REMOVED, TURNED SO NOT VISIBLE TO TRAFFIC FROM ANY DIRECTION, OR COMPLETELY COVERED WITH ADEQUATE OPAQUE WATERPROOF MATERIAL. TAPE SHALL NOT BE APPLIED TO THE FACE OF THE SIGN.

4. TEMPORARY AND POST MOUNTED SIGNS:

TRAFFIC CONTROL SIGNS THAT ARE ANTICIPATED TO REMAIN IN PLACE FOR 3 DAYS OR LESS ARE CONSIDERED "TEMPORARY." TEMPORARY SIGNS SHALL BE MOUNTED ON AN APPROVED SUPPORT AT A MINIMUM HEIGHT OF 12". TRAFFIC CONTROL SIGNS IN PLACE FOR OVER 3 DAYS ARE REQUIRED TO BE MOUNTED ON APPROVED POSTS. A MINIMUM OF 42" OF THE APPROVED POST MUST BE BELOW THE GROUND SURFACE WITH ADEQUATE BACKFILL AND COMPACTION. ALL POSTS SHALL EXTEND NO GREATER THAN 6" ABOVE THE SIGN.

WHEN THE SIGN LENGTH IS EQUAL TO OR GREATER THAN 9', THREE OR MORE WOOD POSTS MAY BE USED WITH A MINIMUM OF 4' BETWEEN THE CENTERLINE OF EACH POST. ALL SIGNS LESS THAN 9' IN WIDTH SHALL USE A MAXIMUM OF TWO WOOD POSTS.

5. SHEETING:

ALL ORANGE SIGNS SHALL BE RETROREFLECTORIZED WITH FLOURESCENT ORANGE PRISMATIC GRADE SHEETING. ALL OTHER SIGNS SHALL BE RETROREFLECTORIZED WITH TYPE III HIGH PERFORMANCE SHEETING OF STANDARD COLORS.

6. ROLL-UP SIGNS:

ROLL-UP SIGNS MAY BE USED FOR TEMPORARY WARNING SIGNS. THEY MUST BE FLOURESCENT ORANGE PRISMATIC GRADE RETROREFLECTIVE SIGNS OF OPAQUE MATERIAL. MESH SIGNS ARE NOT ALLOWED.

7. SIGNS INVOLVING SPEEDS:

THE W3-5 (SPEED LIMIT  AHEAD) SHOULD BE USED ONLY IF THE ENGINEER DETERMINES THAT A REDUCED SPEED IS REQUIRED ON THE PROJECT.

THE M4-20 (WORK ZONE) PLAQUE SHALL BE PLACED ABOVE ALL SPEED LIMIT SIGNS, (R2-1), EXISTING AND TEMPORARY.

FOR SPEEDS OF 30 MPH OR LESS, THE W1-1(TURN) OR W1-3(REVERSE TURN) SHOULD BE USED. FOR SPEEDS OF 35 MPH OR MORE, THE W1-2(CURVE) OR W1-4(REVERSE CURVE) SHOULD BE USED. THE W13-1(MPH) IS TO BE ELIMINATED IF THE ADVISORY SPEED IS WITHIN 5 MPH OF THE SPEED LIMIT.

8. SIGNS CONTROLLING WORK AREA:

THE G20-2A(END ROAD WORK) SHOULD BE PLACED 500' FROM THE END OF THE ACTUAL WORK AREA, NOT NECESSARILY AT THE EXTREME LIMITS OF THE PROJECT.

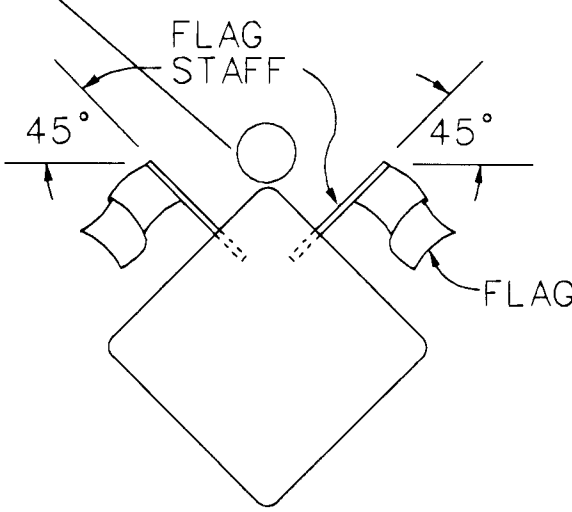
WHERE TWO WORK AREAS ARE LESS THAN 1 MILE APART IN RURAL AREAS OR 1/4 MILE APART IN URBAN AREAS, THE G20-2A(END ROAD WORK) FOR THE FIRST WORK AREA AND THE W20-1(ROAD WORK) FOR THE SECOND WORK AREA SHOULD BE ELIMINATED.

9. WARNING LIGHTS ON SIGNS:

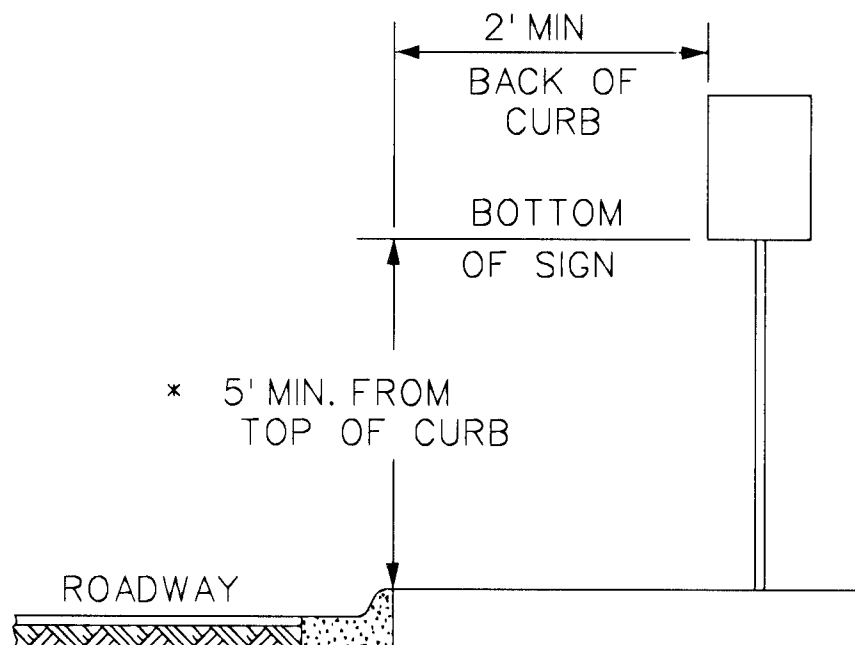
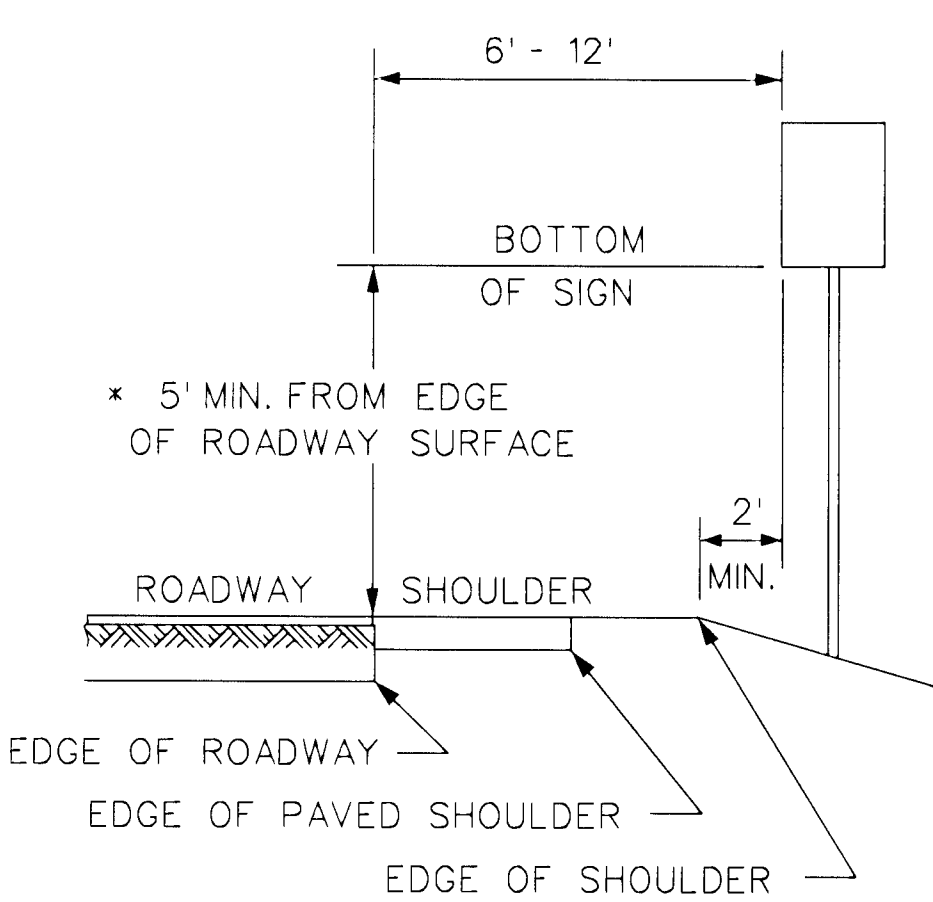
TYPE A L.E.D. BI-DIRECTIONAL LOW INTENSITY LIGHTS SHOULD BE USED ON ALL CONSTRUCTION WARNING ACTION SIGNS AND SHALL NOT BE USED ON SIGNS MOUNTED LESS THAN 5' HIGH ON TEMPORARY SUPPORTS. ON ALL OTHER CONSTRUCTION WARNING SIGNS, TYPE A L.E.D. LOW INTENSITY LIGHTS ARE TO BE USED AS DIRECTED BY THE ENGINEER. THE TYPE "B" HIGH INTENSITY LIGHT MAY BE USED UNTIL THE END OF ITS SERVICEABLE LIFE TO REPLACE A TYPE "A" L.E.D. LIGHT.

TYPE A L.E.D. LIGHTS SHALL BE MAINTAINED SO AS TO BE CAPABLE OF BEING VISIBLE ON A CLEAR NIGHT FROM A DISTANCE OF 3000 FT. IF A TYPE A LIGHT HAS A SEPARATE BATTERY CASE, THE BATTERY CASE SHALL BE MOUNTED NO HIGHER THAN 12" ABOVE THE GROUND AND MOUNTED BEHIND THE SIGN POST. FOR A TYPE A LIGHT, WHERE THE LENS IS MOUNTED TO THE TOP OF THE BATTERY CASE, THE TYPE A LIGHT (LENS AND BATTERY) SHALL BE MOUNTED AT THE TOP OF THE SIGN.

TYPE A LIGHT L.E.D. BI-DIRECTIONAL



TWO (2) 18" x 18" FLOURESCENT RED-ORANGE FLAGS SHALL BE ATTACHED IN THE POSITION SHOWN ON THE W20-2(DETOUR), W1-1(TURN), W1-2(CURVE), W1-3(REVERSE TURN), W1-4(REVERSE CURVE), W3-3(SIGNAL AHEAD), W4-2(LANE REDUCTION), W20-4(ONE LANE ROAD), W20-5(LANE CLOSED), W20-7A(FLAGGER), AND W3-4 (BE PREPARED TO STOP) SIGNS AND ANY OTHER ACTION SIGNS AS SHOWN ON THE PLANS OR DIRECTED BY THE ENGINEER. THE FLAGS AND STAFFS ARE TO BE ATTACHED IN SUCH A MANNER THAT THE SIGN WILL NOT BE OBSCURED. THE FLAGS MAY BE EITHER A CLOTH OR VINYL MATERIAL. THE FLAGS SHALL BE SUBSIDIARY TO THE CONSTRUCTION SIGN BID ITEMS.



\* NOTE:

A. IN BUSINESS, COMMERCIAL, AND RESIDENTIAL DISTRICTS, THE DISTANCE BETWEEN THE BOTTOM OF THE SIGN AND THE TOP OF THE NEAR EDGE OF THE TRAVEL WAY SHALL BE AT LEAST 7'.

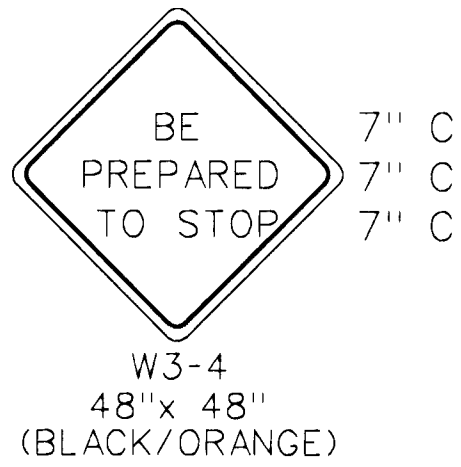
B. LARGE SIGNS HAVING AN AREA EXCEEDING 54 SQUARE FEET THAT ARE INSTALLED ON MULTIPLE BREAKAWAY POSTS SHALL BE MOUNTED A MINIMUM OF 7' ABOVE THE GROUND.

C. THE HEIGHT TO THE BOTTOM OF THE SECONDARY SIGN MOUNTED BELOW ANOTHER SIGN MAY BE 1' LESS THAN THE APPROPRIATE HEIGHT SPECIFIED ABOVE.

HEIGHT AND LATERAL DIMENSIONS FOR POST MOUNTED SIGNS  
(SIGNS LEFT IN PLACE OVER 3 DAYS)

| STATE  | PROJECT NO. | YEAR | SHEET NO. | TOTAL SHEETS |
|--------|-------------|------|-----------|--------------|
| KANSAS | -           | 2006 | 9         | 10           |

SIGN LAYOUT INFORMATION



LETTER SIZES FOR BLACK ON ORANGE "DESTINATION" SIGNS

STD. SIZE EXPWY/FREEWAY  
6" C 10" D

WORK ZONE  
M4-20 (BLACK/ORANGE) 3" C 6" C  
24" x 6" 48" x 12"

NOTE:  
TEXT DIMENSIONS ARE IN INCHES.  
BORDER IS BLACK NON-REFLECTIVE.

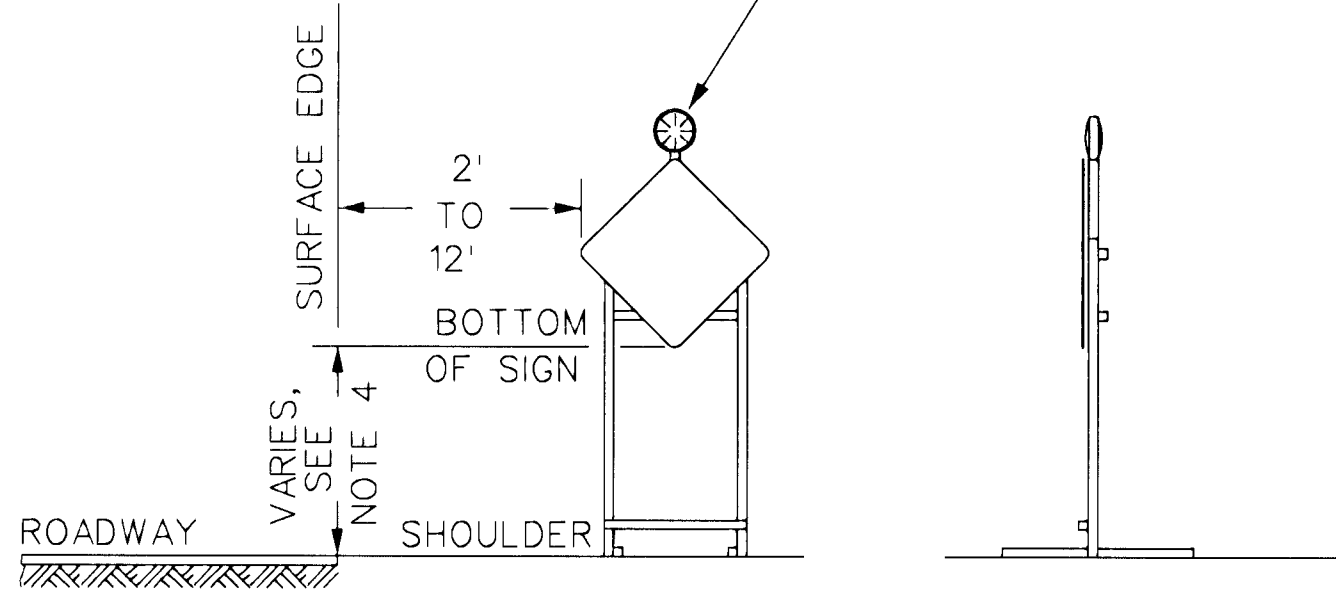
ADVANCE WARNING SIGN SPACING (IN FEET):

|                          | A    | B    | C    |
|--------------------------|------|------|------|
| URBAN (40 MPH OR LOWER)  | 100  | 100  | 100  |
| URBAN (45 MPH OR HIGHER) | 350  | 350  | 350  |
| RURAL (55 MPH OR LOWER)  | 500  | 500  | 500  |
| RURAL (60 MPH OR HIGHER) | 750  | 750  | 750  |
| EXPRESSWAY/FREEWAY       | 1000 | 1500 | 2640 |

THE SPACING BETWEEN ANY SIGNS MAY BE ADJUSTED AS APPROVED BY THE ENGINEER IN ORDER TO MAXIMIZE VISIBILITY.

THE SPACING BETWEEN SIGNS SHALL BE NO LESS THAN 100', UNLESS DIRECTED BY THE ENGINEER.

POSITION OF TYPE A L.E.D. BI-DIRECTIONAL LIGHT WHEN USED  
(SEE NOTE 9)



(SEE NOTE 6 FOR ROLL-UP SIGNS OPTION)

HEIGHT AND LATERAL DIMENSIONS FOR SIGNS  
MOUNTED ON SKIDS OR OTHER PORTABLE SUPPORTS

|     |          |                  |      |        |
|-----|----------|------------------|------|--------|
| 3   | 2-1-05   | MODIFIED NOTE #9 | B.H. | A.A.A. |
| 2   | 11-19-03 | CHANGED BORDER   | B.H. | S.A.B. |
| 1   | 3/17/03  | MODIFIED NOTES   | M.H. | S.A.B. |
| NO. | DATE     | REVISIONS        | BY   | APP'D  |

KANSAS DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL SIGNS

TE710 9/1/00

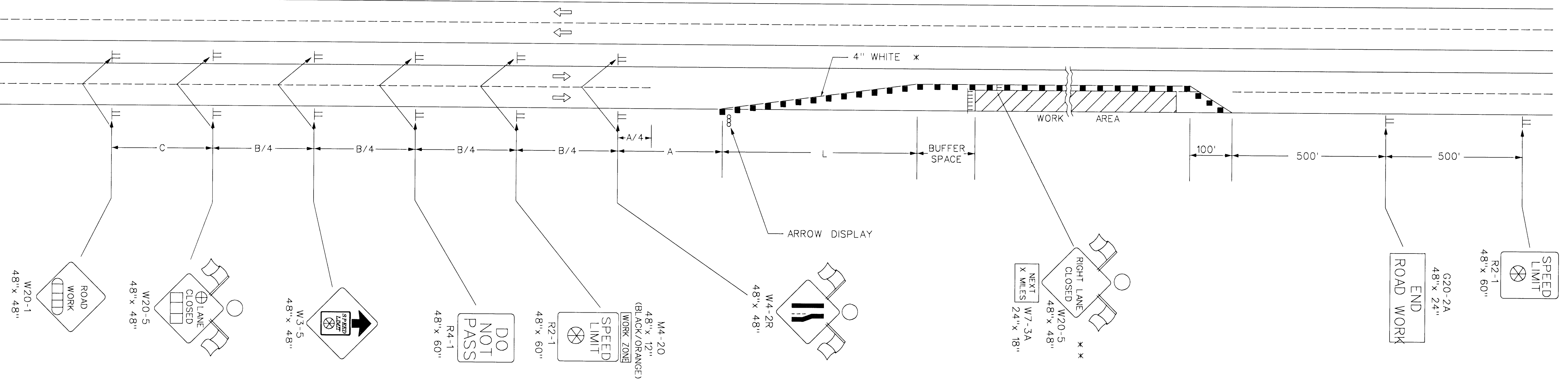
|                        |                            |
|------------------------|----------------------------|
| FHWA APPROVAL 2-1-2005 | APP'D Anthony A. Alarabire |
| DESIGNED B.A.H.        | DETAILED B.A.H.            |
| DESIGN CK.             | DETAIL CK.                 |
| QUANTITIES             | TRACE CK.                  |

| STATE  | PROJECT NO. | YEAR | SHEET NO. | TOTAL SHEETS |
|--------|-------------|------|-----------|--------------|
| KANSAS | -           | 2006 | 10        | 10           |

REFER TO STD. TE710 FOR ADDITIONAL INFORMATION ON TRAFFIC CONTROL SIGNS AND SIGN SPACING.

REFER TO STD. TE702 FOR INFORMATION ON TAPERS AND CHANNELIZING DEVICES.

REFER TO STD. TE700 FOR LENGTH OF BUFFER SPACE.



LEFT-SIDE SIGNS SHALL BE OMITTED FOR A FOUR-LANE UNDIVIDED HIGHWAY.

\* FOR LEFT LANE CLOSURES USE W4-2L AND YELLOW EDGE LINE  
ALONG CHANNELIZING DEVICES.

× × THE W20-5 (RIGHT LANE CLOSED) AND W7-3A (NEXT X MILES)  
SIGNS SHOULD BE PLACED AT 2 MILE INCREMENTS  
ON A PROJECT OF 4 MILES OR LONGER.

- Channelizing Devices
- ⏏ Type III Barricades
- ▢ AHEAD, 1500 FT Or 1 MILE
- ⊗ Speed To Be Determined By The Engineer
- ▤ AHEAD, 1000 FT, 1500 FT Or ½MILE
- ⊕ RIGHT OR LEFT
- X Length To The Nearest Whole Mile
- TYPE "A" LIGHT

|     |          |                                            |      |        |
|-----|----------|--------------------------------------------|------|--------|
| 3   | 2-1-05   | CLARIFIED NOTES, UPDATED WARNING SIGNS     | B.H. | A.A.A. |
| 2   | 11-19-03 | CHANGED BORDER                             | B.H. | S.A.B. |
| 1   | 9-26-02  | REMOVED G20-1 SIGNS, ADDED W20-5 AND W7-3A | M.H. | S.A.B. |
| NO. | DATE     | REVISIONS                                  | BY   | APP'D  |

KANSAS DEPARTMENT OF TRANSPORTATION  
TYPICAL TRAFFIC CONTROL  
FOUR-LANE HIGHWAY  
ONE LANE CLOSED

|                        |                 |                            |           |
|------------------------|-----------------|----------------------------|-----------|
| TE744                  |                 | 9/1/00                     |           |
| FHWA APPROVAL 2-1-2005 |                 | APP'D Anthony A. Alrobaire |           |
| DESIGNED B.A.H.        | DETAILED B.A.H. | QUANTITIES                 | TRACED    |
| DESIGN CK.             | DETAIL CK.      | QUAN. CK.                  | TRACE CK. |

58-03-04-01

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Plot File : 000000000000DGNSSPEC0000000000000000
Plot Date : 000000SYTIME00000000
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