



Arapahoe County Colorado

*Department of Development Services
& Infrastructure Management*

Concrete Repair Policy Manual

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Concrete Repair Policy Manual

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CONCRETE REPAIR POLICY STATEMENTS

1. It is the policy of Arapahoe County Department of Development Services and Infrastructure Management ("DSIM") to immediately make safe any hazardous condition developing within County right-of-way. A hazardous condition would include a significant tripping hazard located in a high traffic pedestrian area. In some instances temporary repairs, such as an asphalt patch, may be performed until more permanent repairs can be scheduled. Permanent repairs occur as allowed by annual repair budget amounts.
2. County contractors, County Road and Bridge crews and private contractors may repair damaged concrete in the public right-of-way. Property owners may have repairs made by private contractors at the property owner's expense. Work performed by private contractors must conform to current Arapahoe County Standards and Specifications, and requires a County permit. Further information regarding the permitting process may be obtained by calling 303-795-4640.
3. DSIM believes that good drainage extends pavement life. For this reason concrete replacements are generally scheduled in advance of County roadway reconstruction and maintenance projects. Additional repairs are prioritized from throughout the urbanized areas of unincorporated Arapahoe County from the County's Concrete Repair Database. Distress type, distress severity, incidence of Maintenance Request Forms ("MRF"), and annual budget amounts help to define concrete replacement priorities. When possible, alternative maintenance techniques may be scheduled to bring existing concrete structures up to an acceptable level of service.
4. Concrete repairs can be requested through the Engineering Division (303-795-4640) or Road & Bridge (303-792-5016) offices. After MRFs are received they are assigned to a member of the DSIM Maintenance Team who will then evaluate the complaint. The DSIM Maintenance Team consists of staff members from both the Engineering and County Road and Bridge Sections of DSIM. The team members shall utilize the "Condition Classification Chart for Concrete Improvements" in the evaluation process, which follows in this document. Engineering attempts to evaluate concrete conditions for the entire roadway segment listed on each MRF and enter this data into the Concrete Repair Database.
5. A Maintenance Team supervisor shall select the most economical approved repair method. The minimum repair or replacement section (five feet in length for curb and gutter and combination curb and gutter) required to alleviate unsafe or highly distressed conditions may be the only work scheduled for completion.
6. Repairs are generally scheduled during the fall and winter months prior to the beginning of the annual construction season. DSIM will complete as much work on an annual basis as allowed by the budget. Work that is not completed in the year it was originally scheduled will be re-prioritized and re-scheduled.
7. Sections that have had temporary repairs to correct hazardous conditions may be given priority over other repairs.
8. Contract concrete replacement crews are generally scheduled to work in as many areas of the County as required to accomplish the County's concrete repair goals in any given year. Road & Bridge ("R&B") concrete replacement crews perform high-priority repairs and routinely complete maintenance request repairs and repairs in other locations and instances that may not be feasible for completion by outside contractors.
9. It is the policy of DSIM to fully comply with all provisions of the Americans with Disabilities Act of 1992 ("A.D.A."). Arapahoe County will install new handicap ramps according to the procedures and policies established within this document. (See American's with Disabilities Act Section following).
10. The County's Concrete Replacement Program is prepared on an annual basis and is generally available for review at the DSIM offices after April 15. Please call 303-795-4640 for more information on the plan.

INTRODUCTION

This Concrete Repair Policy Manual, including the "Condition Classification Chart for Concrete Improvements," is utilized as an aid for DSIM staff to evaluate and schedule repairs in a consistent manner for many of the concrete assets maintained by the County.

This document establishes the criteria for concrete repair and replacements by Arapahoe County DSIM. It is intended to be a guide for evaluating and determining repair priorities for many of the concrete features maintained by Arapahoe County, including sidewalks, curb and gutter and other concrete features. This manual is not intended to apply to structural concrete such as concrete pavement, bridge decks or hydraulic structures.

Policies are included for performing emergency repairs of potentially hazardous conditions; for citizen requests for repairs; for ADA compliance; and for DSIM's Concrete Repair Plan. Descriptions of the most common defects, or distresses, found in concrete features maintained by the County and definitions of the distress rating system utilized for them are also included. In addition, guidelines for repairing and replacing these concrete features are detailed. Finally, Appendix A contains miscellaneous policies and procedures and Appendix B follows with a variety of standard forms and letters used by DSIM.

COMMON TYPES OF CONCRETE DISTRESS

Common distresses include the following:

- 1) *displacement*
- 2) *cracking*
- 3) *spalling/scaling*
- 4) *buckling*
- 5) *chipping/gouging*
- 6) *ponding*

Arapahoe County maintains a variety of concrete structures including sidewalk; curb and gutter; combination curb, gutter, and sidewalk; crosspans; handicap ramps; sidewalk chase drains and inlets. This manual does not apply to the relatively small amount of concrete pavement maintained by The County. This manual covers the most commonly-occurring defects appearing in the structures above, which include displacement, cracking, spalling or scaling, buckling, chipping and gouging, and "ponding" conditions.

This document contains a complete description of each type of distress with explanations of the most common causes of the defect. Severity ratings are defined for each type of defect, along with a brief discussion of potential repair methods. Photographs have been included for a variety of defects and condition ratings. More photographs will be added, as they become available.

DISTRESS SEVERITY LEVELS

DSIM utilizes a 1-5 rating system to classify concrete conditions. (See "Concrete Distress Rating System," page 10).

A member of the DSIM Maintenance Team shall rate each type of concrete distress according to the severity of the distress, as defined within this manual. The Condition Classification Chart for Concrete Improvements contained in this document defines a one-to-five rating system, with a Condition 1 being an excellent condition and a Condition 5 being a very poor condition having little or no service life remaining. Depending on severity, a distress may require a specific type of repair in order to bring it up to an acceptable level of service, or may only require monitoring to determine its rate of deterioration and the appropriate maintenance activity required.

EMERGENCY REPAIRS

DSIM attempts to correct all hazardous conditions immediately.

A significant pedestrian tripping hazard or a gouge within a motor vehicle travel lane severe enough to effect traffic (typically condition 5) may present a hazardous situation to citizens. In these instances, emergency repairs of the concrete shall be made. An emergency repair is typically temporary in nature. Emergency repairs may involve use of temporary barricades, removal of concrete sections, or simply covering hazardous sections with asphalt to eliminate the hazard, until permanent repairs can be scheduled.

Hazardous locations may be temporarily patched with asphalt until permanent repairs can be scheduled.



Emergency repairs have priority.

Emergency repairs have priority over all other concrete work performed by Arapahoe County. If a crew is not immediately available to perform the emergency repair, County Road and Bridge crews shall barricade the location to warn the public of the hazard, until the emergency repair can be made.

MAINTENANCE**REQUEST
FORM
(MRF)**

-  MRF received

-  Concrete features evaluated and distresses rated.
(R&B notified of safety hazards for immediate action)

-  Condition evaluation data entered into Concrete Repair Database

-  Annual repairs prioritized and scheduled, when possible

-  Citizen receives MRF copy by mail
(Please allow 90 days for processing)

CITIZEN REQUESTS FOR REPAIRS

DSIM utilizes the MRF process to allow citizens to make their maintenance requests known to the County. An MRF can be initiated by telephone or in person (see MRF PROCESS, p. 35). A member of the DSIM Maintenance Team typically evaluates concrete conditions for an entire roadway along with an individually requested location. This evaluation data is then entered into the Engineering Concrete Repair Database, where records for the concrete features maintained by DSIM are kept. When fully populated, the database will contain condition ratings for most of the concrete features maintained by Arapahoe County and can be used as a planning tool to ensure that County funds are efficiently utilized.

After the County has processed the MRF, citizens will receive a notification by mail, including a brief inspection report and comments explaining any actions taken by DSIM to resolve the request. An example MRF form, along with a flow chart showing the sequences in the County's MRF process has been included in Appendix A.

Concrete repairs are not scheduled on a "first come first served" basis. Rather, repairs are scheduled as previously noted in "Concrete Repair Policy Statement No. 3" (p. 4). Scheduling repairs and replacements in this manner allows DSIM to maximize County maintenance program budgets.

County Road and Bridge crews as well as private contractors perform annual roadway rehabilitation and maintenance. Prior to pavement rehabilitation, DSIM issues contracts to replace deteriorated concrete on the roadways selected in any given year. The extent of contracting is determined by the extent of repairs needed, the available time frame for making the repairs, and the budget allocated for the Concrete Replacement Program. Private contractors replace the majority of deteriorated concrete in Arapahoe County.

All contracted repairs shall conform to Arapahoe County Construction Standards, as well as to the Special Conditions of individual County contracts, if applicable. Permits are required for all work performed by contractors in County right-of-way.

AMERICANS WITH DISABILITIES ACT (ADA)

It is the policy of Arapahoe County to fully comply with all provisions of the American's With Disabilities Act.

Routes near schools, medical care facilities and other high pedestrian traffic areas generally have priority for new handicap ramp installations.

New handicap ramps are installed annually by County Road & Bridge crews, and by County contractors.



Citizens may request new handicap ramp installations at specific locations by telephone:



303-795-4640

It is the policy of Arapahoe County to fully comply with all provisions of the American's With Disabilities Act. DSIM utilizes three primary strategies to achieve this goal.

- 1) Depending on the availability of the Community Development Block Grant (CDBG) funds typically awarded to the County, DSIM prepares and administers an annual Handicap Ramp Installation Program. This program typically issues one contract each year to install new handicap ramps in locations throughout the urbanized areas of unincorporated Arapahoe County. High pedestrian traffic areas and access to activity centers have priority ahead of lower traffic areas. Pedestrian access to bus routes and pedestrian routes in the proximity of elderly care centers, medical facilities and routes near public buildings would generally have the highest priority.
- 2) Secondly, whenever concrete repairs are scheduled for an intersection radius which does not have a handicap ramp, crews will be directed to install a standard handicap ramp as a part of performing the normal work at that location. Routine concrete repairs are performed annually and may be performed by the County's Road and Bridge Division, or by County contractors as part of the Concrete Replacement Program and/or Roadway Rehabilitation Program. Handicap ramps are generally installed at all designated locations, however there are certain locations within Arapahoe County involving non-standard intersections, or non-standard structures, which may prevent or delay the installation of standard handicap ramps. In addition, handicap ramps would generally not be installed at locations otherwise indicated, if sidewalks do not exist. In these instances no architectural barrier exists to an accessible pedestrian route.
- 3) Thirdly, DSIM encourages open communication with other governmental agencies, advisory groups and citizens to determine critical locations for new handicap ramps. Individuals may request new handicap ramp installations at specific locations by calling 303-795-4640. It is DSIM's goal to have new handicap ramps installed within 60 days of receipt of the request, providing the request is received while weather conditions allow time for the work to be done and sufficient funds remain in DSIM project accounts. If handicap ramp requests are received after a construction season has ended, or after project budgets have been committed for the year, handicap ramp installations will be scheduled for the next construction season.

ANNUAL CONCRETE REPAIR PLAN

The overall Concrete Repair Plan is completed by in-house crews and by private contract.

DSIM prepares a Concrete Repair Plan on an annual basis. This plan typically includes the following strategies:

- 1) Concrete Replacement Program
- 2) Handicap Ramp Installation Program (If Funded)
- 3) County Road & Bridge Concrete Repair Program (In House)
- 4) Alternative Program(s) (a mudjacking contract or other maintenance contracts will be prepared as needed.)

DSIM's overall Concrete Repair Plan assists Arapahoe County in:

- 1) *Effectively managing pavements;*
- 2) *Maintaining a safe, high quality infrastructure;*
- 3) *Resolving citizen's Requests for Maintenance;*
- 4) *Performing emergency repairs;*
- 5) *Complying with ADA provisions.*

The contracts and strategies of the overall Concrete Repair Plan achieve several objectives. First, DSIM believes that pavements must be managed effectively and maintaining effective drainage on roadways is a primary factor in realizing their designed lifespan. For this reason, a primary purpose of the Concrete Repair Plan is to perform concrete replacements on roadways prior to them being sealed, resurfaced or reconstructed. In this way original drainage designs can be restored or improved and intended pavement designed lifespan can be fully realized, maximizing County taxpayer's maintenance dollars.

Another purpose of the Concrete Repair Plan is to maintain concrete structures in a safe, highly functional condition by performing routine repairs and replacements of deteriorated concrete features throughout the urbanized areas of unincorporated Arapahoe County. Routine replacements are prioritized from the County's Concrete Repair and MRF databases and will be included in the Concrete Replacement Program, as budget levels allow. In addition performing routine concrete repairs, County Road and Bridge concrete crews regularly perform emergency repairs and other replacements in areas where County contractors have not been scheduled to work as a part of their program.

A final purpose of the Concrete Repair Plan is to improve pedestrian accessibility and safety for County residents by assisting Arapahoe County meet ADA provisions. Many deteriorated curb ramps are replaced and new ones installed as a part of the County's overall Concrete Repair Plan.

| RATING SYSTEM | |
|------------------|-----------|
| ① | EXCELLENT |
| ② | GOOD |
| ③ | FAIR |
| ④ | POOR |
| ⑤ | FAILED |

CONCRETE DISTRESS RATING SYSTEM

DSIM has established a 1-5 rating system for the basic concrete features maintained by Arapahoe County. Conditions are rated for sidewalks; curb and gutters; combination curb, gutter, and sidewalks; crosspans; handicap ramps; sidewalk chase drains and inlets. Condition ratings range from a condition 1, which is an excellent condition, to a condition 5, which is an extremely deteriorated condition with little or no service life remaining. In general, conditions 4 and 5 are replaced anytime a crew is scheduled to work on a particular roadway. Condition 3 (fair) may also be replaced; depending on the nature of the defect, the type of maintenance scheduled for the roadway, if any, budget amount and the incidence of MRFs received for the roadway.

CONDITION CLASSIFICATION CHART FOR CONCRETE IMPROVEMENTS

Six common defects are rated with the County's "Concrete Condition Classification Chart" and prioritized for repairs and replacements.

Six of the most common distresses appearing in County-maintained concrete structures are identified and rated by severity according to the "Concrete Condition Classification Chart" included on the following page. Common distresses include the following:

- 1) displacement
- 2) cracking
- 3) spalling or scaling
- 4) buckling
- 5) chipping or gouging
- 6) sunken or "ponding" conditions.

| CONDITION CLASSIFICATION CHART - * CONCRETE IMPROVEMENTS | | | | | |
|--|---|--|---|--|--|
| CONDITION RATING | ① | ② | ③ | ④ | ⑤ |
| DESCRIPTION | EXCELLENT | GOOD | FAIR | POOR | FAILED |
| CLASSIFICATION | Appearance | Minor | Moderate | Extensive | Extreme |
| DISTRESS TYPES | | | | | |
| DISPLACEMENT (Sidewalk) Measured within 12" of front or back edge. | 0-1/4" No hazard. | 3/8 - 1/2" No hazard. | 5/8-3/4" Minor tripping hazard. | 7/8-1 1/2" Tripping hazard present. | Greater than 1 1/2". Tripping hazard present. |
| DISPLACEMENT (C & G, Pan, Apron) | Less than 1/4" | 1/4-1/2" | 5/8-1" Ponding may be present. No hazard. | 1 1/2-2" Ponding may be present. No traffic hazard. | 2 + Ponding may be present. Potential traffic hazard. |
| CRACKING | Single closed crack (< 1/8"). No hazard. No significant infiltration. No settlement or displacement. | One or more closed cracks. 1-2 open cracks (1/4-3/8"). No hazard. Minor infiltration. No significant settlement or displacement. | Multiple closed cracks per section (1/8" or less). One open crack (1/2-3/4) per section. Flowline crack that has not separated. No hazard. infiltration likely. | Multiple open cracks per section (3/4-1 1/2"). Interconnected cracks. Open cracks at 3 foot intervals. Potential tripping hazard. Significant infiltration potential. | Multiple open cracks (> 1 1/2") per section. Interconnected cracks. Open cracks at 2 foot intervals. Potential tripping hazard. Significant infiltration potential. |
| SPALLING / SCALING | Surface spalling (< 1/8" depth). < 50% area. | Surface spalling. Spalling primarily of fine aggregate (to 1/4" depth). 50- 75% area. | Spalling of coarse aggregate. (1/2-1" depth). To 50% area. <i>Condition 4 in walking surface.</i> | Spalling of coarse aggregate. (1-2" depth). 25-50% area. <i>Condition 5 in walking surface.</i> Spalling may effect traffic. | Spalling of coarse aggregate. (> 2" depth). > 25% area. Spalling may effect traffic. |
| BUCKLING | Not evident. | To 1/4". | 1/2 - 3/4" | 1-2". | >2". |
| CHIPPING / GOUGING (Sidewalk) | To 1/4" depth. 0-1/4" width at joint. No hazard. | 3/8-3/4" depth. 1/2-1" width at joint. No hazard. | 7/8-1 1/2" depth. 1 1/4-2" width at joint. < 1" diameter. Minor tripping hazard. | 1 5/8-2" depth. 2 1/4-3" width at joint. 1-2" diameter. Tripping hazard. | > 2" depth. > 3" width at joint. >2" diameter. Tripping hazard. |
| CHIPPING / GOUGING (C & G, Pan, Apron) | To 1/4" depth. 0-1/2" width at joint. No hazard. | 3/8-3/4" depth. 1/2-1" width at joint. No hazard. | 7/8-1 1/2" depth. 1 1/4-2" width at joint. < 1" diameter. Minor tripping hazard. | 1 5/8-2" depth. 2 1/4-3" width at joint. 1-2" diameter. Tripping hazard. | > 2" depth. > 3" width at joint. >2" diameter. Tripping hazard. |
| PONDING | 0-3/8" depth. No hazard. Water retained within concrete section. | 1/2-1" depth. No hazard. Minor icing potential. Water retained within concrete section. | 1 1/4-2" depth. Potential icing hazard. Most water retained within concrete section. | 2 1/4-4" depth. Potential ped and traffic icing hazard. Water exceeds invert capacity. May have associated pavement stripping or cracking. | > 4" depth. Potential ped and traffic icing hazard. Water exceeds mountable curb height. May have associated pavement stripping or cracking. |

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In order to develop an orderly procedure for maintenance and replacement of concrete public improvements, the condition of the concrete improvement can be classified according to the criteria listed above. Concrete improvements to be classified under this system are crossspans, trickle channels, curb and gutter, sidewalks, and combination curb/ gutter/sidewalk. Trickle channels shall be classified under crossspan criteria. The condition of the sidewalk shall generally govern when classifying combination curb/gutter/sidewalk. * This classification is not to be used for assessing the condition of structural concrete, such as concrete paving, bridge decks, headwalls, hydraulic structures, etc.

This classification chart is utilized to rate each of the commonly occurring defects in Arapahoe County's concrete features. A brief discussion of the of the individual defects follows and includes a description, typical causes of the defects, how the defects are rated and which conditions are typically replaced.

CONCRETE DISTRESS IDENTIFICATION

DISPLACEMENT

DESCRIPTION AND CAUSES

Settled or displaced concrete creates a tripping hazard for pedestrians and cyclists. The associated crack also allows surface run-off to infiltrate into the subgrade soils. Water entering the subgrade soils generally leads to more widespread concrete damage and may precipitate street failures.

Differential settlement is normally a result of one or more of the following conditions: poor sub-grade preparation, trench failure, frost heave or tree root growth. The severity rating is determined by the amount of displacement between sections. The range will be defined in inches. Photos of various condition ratings for this defect have been attached.

SEVERITY RATING:

| CONDITION CLASSIFICATION CHART - * CONCRETE IMPROVEMENTS | | | | | |
|--|----------------------|--------------------------|---|--|--|
| CONDITION RATING | ① | ② | ③ | ④ | ⑤ |
| DESCRIPTION | EXCELLENT | GOOD | FAIR | POOR | FAILED |
| CLASSIFICATION | Appearance | Minor | Moderate | Extensive | Extreme |
| DISTRESS TYPES | | | | | |
| DISPLACEMENT (Sidewalk) Measured within 6" from edge. | 0-1/4" No hazard. | 3/8 - 1/2" No hazard. | 5/8-3/4" Minor tripping hazard. | 7/8-1 1/2" Tripping hazard present. | Greater than 1 1/2". Tripping hazard present. |
| DISPLACEMENT (C & G, Pan, Apron) | Less than 1/4" | 1/4-1/2" | 5/8-1" Ponding may be present. No hazard. | 1 1/4-2" Ponding may be present. No traffic hazard. | 2 + Ponding may be present. Potential traffic hazard. |

REPAIR METHODS

A slow rate of settlement, combined with a low condition rating, is generally a stable condition that warrants a future evaluation. Crack sealing may be warranted, to slow the rate of water infiltration and subsequent concrete settlement. If settlement has occurred in a high pedestrian traffic area, and/or is significantly displaced, mud jacking, where possible, grinding, or removal and replacement would be necessary. Condition 4 and 5 displacement ratings generally require removal and replacement and may be temporarily patched with asphalt until permanent repairs can be scheduled.

Displacement Condition 1. Excellent.

Photo unavailable on this date. Appearance defect with displacement of 1/4" or less.

Displacement Condition 2. Good.

Photo unavailable on this date. Minor displacement of 1/2" or less.

Displacement Condition 3. Fair.

Minor tripping hazard. Concrete remains serviceable.



Displacement Condition 4. Poor.

Tripping hazard with little service life remaining.



Displacement Condition 5. Failed.

Tripping Hazard exceeds 1 1/2." Little or no service life remaining.



CRACKING

DESCRIPTION AND CAUSES

Cracking may create a tripping hazard for pedestrians and cyclists and the associated crack also allows surface run-off to infiltrate into the subgrade soils. Cracks tend to widen over time and water entering the subgrade soils generally leads to more widespread concrete damage and street failures.

Concrete cracking is normally a result of one or more of the following conditions: poor subgrade preparation, trench failure, improper loading, poor curing practices, or inadequate slab thickness. The severity rating is determined by both the size and the amount of cracks occurring within a section. The standard section length for curb and gutter is generally 10 feet. Photos of various condition ratings for this defect have been attached.

SEVERITY RATING:

| CONDITION CLASSIFICATION CHART - * CONCRETE IMPROVEMENTS | | | | | |
|---|--|--|---|--|---|
| CONDITION RATING | ① | ② | ③ | ④ | ⑤ |
| DESCRIPTION | EXCELLENT | GOOD | FAIR | POOR | FAILED |
| CLASSIFICATION | Appearance | Minor | Moderate | Extensive | Extreme |
| DISTRESS TYPES | | | | | |
| CRACKING | Single closed crack (< 1/8"). No hazard. No significant infiltration. No settlement or displacement. | One or more closed cracks. 1-2 open cracks (1/4-3/8"). No hazard. Minor infiltration. No significant settlement or displacement. | Multiple closed cracks per section (1/8" or less). One open crack (2/3-3/4) per section. Flowline crack that has not separated. No hazard, infiltration likely. May have minor settlement and displacement. | Multiple open cracks per section (3/4-1 1/2"). Interconnected cracks. Open cracks at 3 foot intervals. Potential tripping hazard. Significant infiltration potential. May have moderate settlement and displacement. | Multiple open cracks (> 1 1/2") per section. Interconnected cracks. Open cracks at 2 foot intervals. Potential tripping hazard. Significant infiltration potential. May have extensive settlement and displacement. |

REPAIR METHODS

A slow rate of movement and associated cracking, combined with a low condition rating, may warrant a future evaluation. In addition, crack sealing may be warranted to slow the rate of water infiltration and subsequent concrete cracking and settlement. If cracking has occurred in a high pedestrian traffic area, the cracked section may warrant removal and replacement. Cracked sections having condition ratings of 4 and 5 will generally warrant removal and replacement and may be temporarily patched with asphalt until permanent repairs can be scheduled.

Sidewalk Cracking Condition 1. Excellent.

Appearance defect. No photo.

Sidewalk Cracking Condition 2. Good.

Concrete remains highly serviceable.

Sidewalk Cracking Condition 3. Fair.

Concrete remains serviceable.



Sidewalk Cracking Condition 4. Poor.

Little service life remaining.



Cross Pan Cracking Condition 5. Failed.

Little or no service life remaining.



SPALLING / SCALING

DESCRIPTION AND CAUSES

Spalling or scaling is characterized by the loss of mortar and/or aggregate from the surface of the concrete. Spalling reduces the load carrying capabilities of the concrete, due to a thinning of the section, and results in a concrete sections that are more susceptible to damage caused by freeze/thaw cycles and erosion. This type of distress can be pedestrian and cyclist hazard, as well as an unsightly visual condition.

The causes of spalled concrete are most often attributed to either defects in workmanship during concrete placement or improper curing of the product. Over-working of the surface or the addition of water after placement can also lead to spalling, as can improper cold weather protection during curing. Photos of various condition ratings for this defect have been attached.

SEVERITY RATING:

| CONDITION CLASSIFICATION CHART - * CONCRETE IMPROVEMENTS | | | | | |
|---|--|---|---|--|--|
| CONDITION RATING | ① | ② | ③ | ④ | ⑤ |
| DESCRIPTION | EXCELLENT | GOOD | FAIR | POOR | FAILED |
| CLASSIFICATION | Appearance | Minor | Moderate | Extensive | Extreme |
| DISTRESS TYPES | | | | | |
| SPALLING / SCALING | Surface spalling (< 1/8" depth). < 50% area. | Surface spalling. Spalling primarily of fine aggregate (to 1/4" depth). 50- 75% area. | Spalling of coarse aggregate. (1/4-1" depth). To 50% area. <i>Condition 4 in walking surface.</i> | Spalling of coarse aggregate. (1-2" depth). 25-50% area. <i>Condition 3 in walking surface.</i> Spalling may effect traffic. | Spalling of coarse aggregate. (> 2" depth). > 25% area. Spalling may effect traffic. |

REPAIR METHODS

Spalled sections of concrete should be monitored to determine the rate of deterioration. Deterioration rates may be highly variable. There are no approved long-term intermediate repair methods for spalling, so rapidly deteriorating sections should be scheduled for replacement. Condition 4 and 5 spalling sections are generally scheduled for removal and replacement and may be temporarily patched with asphalt until permanent repairs can be scheduled.

Spalling Condition 1. Excellent.

Spalling Condition 2. Good.

Depth of spall is limited to paste area. Minimal exposure of coarse aggregate.



Spalling Condition 3. Fair.

Considerable loss of fine aggregate. Coarse aggregate has become exposed.



Spalling Condition 4. Poor.

Spall is 1" to 2" in depth, large area.



Spalling Condition 5. Failed.

Depth is greater than 2." Little or no service life remaining.



BUCKLING

DESCRIPTION AND CAUSES

Buckling may create a tripping hazard for pedestrians and cyclists and the associated crack allows surface run-off to infiltrate into the subgrade soils. Associated cracks tend to widen over time and water entering the subgrade soils generally leads to more widespread concrete damage and street failures.

Concrete buckling is normally a result of one or more of the following conditions: poor sub-grade preparation, trench failure, improper loading, poor curing practices, or inadequate slab thickness. The severity rating is determined by the amount of warp or distortion occurring within a section. Standard sections for curb and gutter are generally ten feet. Photos showing various condition ratings for this defect have been attached.

SEVERITY RATING:

| CONDITION CLASSIFICATION CHART - * CONCRETE IMPROVEMENTS | | | | | |
|---|--------------|----------|------------|-----------|---------|
| CONDITION RATING | ① | ② | ③ | ④ | ⑤ |
| DESCRIPTION | EXCELLENT | GOOD | FAIR | POOR | FAILED |
| CLASSIFICATION | Appearance | Minor | Moderate | Extensive | Extreme |
| DISTRESS TYPES | | | | | |
| BUCKLING | Not evident. | To 1/4". | 1/2 - 3/4" | 1-2". | >2". |

REPAIR METHODS

Buckled sections of concrete should be monitored to determine the rate of deterioration. Deterioration rates may be highly variable. Rapidly deteriorating sections should be scheduled for replacement. Condition 4 and 5 buckling sections are generally scheduled for removal and replacement and may be temporarily patched with asphalt until permanent repairs can be scheduled. Condition 3 may be replaced depending on current scope of work, location and repair budget amount.

Buckling Condition 1. Excellent.

Photo unavailable on this date.

Buckling Condition 2. Good.

Photo unavailable on this date.

Buckling Condition 3. Fair.

Photo unavailable on this date. Concrete remains serviceable.

Buckling Condition 4. Poor.

Little service life remaining. Temporary asphalt patch has been placed to make sidewalk safe until replacement can be made.



Buckling Condition 5. Very Poor.

Concrete may remain serviceable, but should be considered to have little service life remaining.



CHIPPING / GOUGING

DESCRIPTION AND CAUSES

Chipped concrete can be a pedestrian and cyclist hazard, as well as an unsightly visual condition. Chips that hold water can make the concrete section more susceptible to damage from freeze/thaw cycles.

Gouged or chipped concrete is most often the result of either external damage by snow and ice removal and construction equipment, or excessive sub-grade pressures. Chipping adjacent to contraction joints is normally a result of poor workmanship or inadequate tooling practices. Photos showing various condition ratings for this defect have been attached.

SEVERITY RATING:

| CONDITION CLASSIFICATION CHART - * CONCRETE IMPROVEMENTS | | | | | |
|---|--|---|---|---|--|
| CONDITION RATING | ① | ② | ③ | ④ | ⑤ |
| DESCRIPTION | EXCELLENT | GOOD | FAIR | POOR | FAILED |
| CLASSIFICATION | Appearance | Minor | Moderate | Extensive | Extreme |
| DISTRESS TYPES | | | | | |
| CHIPPING / GOUGING (Sidewalk) | To 1/4" depth. 0-1/2" width at joint. No hazard. | 3/8-3/4" depth. 1/2-1" width at joint. No hazard. | 7/8-1 1/2" depth. 1 1/4-2" width at joint. < 1' diameter. Minor tripping hazard. | 1 5/8-2" depth. 2 1/4-3" width at joint. 1-2' diameter. Tripping hazard. | > 2" depth. > 3" width at joint. >2' diameter. Tripping hazard. |
| CHIPPING / GOUGING (C & G, Pan, Apron) | To 1/4" depth. 0-1/2" width at joint. No hazard. | 3/8-3/4" depth. 1/2-1" width at joint. No hazard. | 7/8-1 1/2" depth. 1 1/4-2" width at joint. < 1' diameter. Minor tripping hazard. | 1 5/8-2" depth. 2 1/4-3" width at joint. 1-2' diameter. Tripping hazard. | > 2" depth. > 3" width at joint. >2' diameter. Tripping hazard. |

Note: a distinction has been made above between concrete sections subject to pedestrian traffic (sidewalks) and other concrete features. In this way pedestrian safety can be maintained without unnecessarily replacing other concrete features that have not lost significant functionality.

REPAIR METHODS

Chipped or gouged sections meeting condition-ratings 1, 2 and 3 generally do not warrant removal and replacement. Condition 3 chipping in sections may be scheduled for removal and replacement, depending on the location of the concrete section, pedestrian traffic levels and the type of maintenance scheduled for the roadway. Chipped sections meeting condition 4 and 5 are generally scheduled for removal and replacement and may be temporarily patched with asphalt, or grout, until permanent repairs can be scheduled.

Chipping Condition 1. Excellent.

Photo unavailable on this date.

Chipping Condition 2. Good.

Photo unavailable on this date.

Sidewalk Chipping Condition 3. Fair.

Concrete remains serviceable.



Curb & Gutter Chipping Condition 3. Fair.

Concrete remains serviceable.



Chipping Condition 4. Poor.

No photo available on this date.

Curb & Gutter Chipping Condition 5. Failed.

Little or no service life remaining.



PONDING

DESCRIPTION AND CAUSES

Sunken areas create ponds of water in the concrete. These ponds may allow water to penetrate into the subgrade soils at the interface, or joint, between the concrete and the asphalt. Water ponds may also create potentially hazardous roadway conditions due to splashing and cold weather icing problems.

Sunken concrete is normally the result of one or more of the following items: poor sub-grade preparation, trench failure, street related sub-grade failures or excessive loading. The severity levels will be determined by the ability to maintain adequate flow, as compared to the original design criteria.

SEVERITY RATING

| CONDITION CLASSIFICATION CHART - * CONCRETE IMPROVEMENTS | | | | | |
|---|--|---|--|---|---|
| CONDITION RATING | ① | ② | ③ | ④ | ⑤ |
| DESCRIPTION | EXCELLENT | GOOD | FAIR | POOR | FAILED |
| CLASSIFICATION | Appearance | Minor | Moderate | Extensive | Extreme |
| DISTRESS TYPES | | | | | |
| PONDING | 0-3/8" depth. No hazard. Water retained within concrete section. | 1/2-1" depth. No hazard. Minor icing potential. Water retained within concrete section. | 1 1/4-2" depth. Potential icing hazard. Most water retained within concrete section. | 2 1/4-4" depth. Potential ped and traffic icing hazard. Water exceeds invert capacity. May have associated pavement stripping or cracking. | > 4" depth. Potential ped and traffic icing hazard. Water exceeds mountable curb height. May have associated pavement stripping or cracking. |

REPAIR METHODS

Ponding conditions 1 and 2 deviate from the original line and grade which cause minor ponding of runoff water, yet still allow the majority of the flow to escape. Ponding of this classification is generally not a significant problem and is not scheduled for removal and replacement. Ponding condition 3 deviates in line and grade and inhibits the flow of runoff water and does not permit the concrete structure to function according to design. Ponding of this classification is generally contained within the limits of the concrete structure and is generally not scheduled for removal and replacement. This condition needs to be monitored to determine the rate of deterioration. If joint sealing or crack sealing will reduce the rate of deterioration of a section, it should be scheduled as soon as possible. Sunken sections, which contribute to localized traffic or pedestrian problems, should be scheduled for replacement. Ponding conditions 4 and 5 deviate in line and grade causing excessive ponding, which will generally exceed the limits of the slab. Ponding of this classification is generally prioritized for removal and replacement.

Ponding Condition 1. Excellent.

Photo unavailable on this date. Nuisance condition. Ponding depth less than 3/8”.

Ponding Condition 2. Good.

Pond depth 3/8” to 3/4.” Water retained in gutter.



Ponding Condition 3. Fair.

Depth of 1/2” to 3/4.” Water retained within inverted section. Generally little evidence of water-related damage to pavements.



Ponding Condition 4. Poor.

Depth is 2" to 4". Water depth exceeds invert capacity. Water-related pavement damage is typically evident.



Ponding Condition 5. Failed.

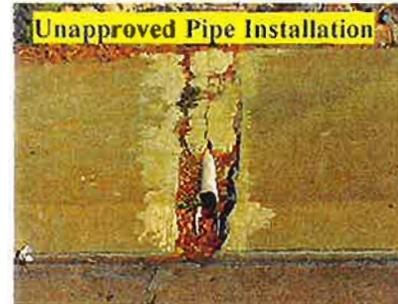
Greater than 4" depth. Water depth exceeds back of walk elevation.

Photo unavailable on this date.

APPENDIX A MISCELLANEOUS

SIDEWALK CHASES

DSIM shall maintain chase structures that have been permitted and installed according to Arapahoe County Construction Standards. DSIM shall not be responsible for maintaining the integrity of unapproved discharge pipes/drainage structures placed through County curbs and sidewalks by private parties.



SIDEWALK CHASE INSTALLATION USING COUNTY FUNDS

"DSIM will only authorize the installation of new sidewalk chase sections with public funds if surface storm water runoff is being conveyed to the street from greater than 4 lots."

DSIM has established a policy for installation of sidewalk chase sections through curb/gutter/sidewalk within public right-of-way. DSIM will only authorize the installation of sidewalk chase sections with County funds if surface storm water runoff is being conveyed to the street from greater than 4 lots (as determined by DSIM).



Side yard swales between two homes are not considered to be multi-lot drainage facilities. DSIM will not authorize expenditures of County funds to install chase sections for water accumulations resulting from landscape over-watering, sump pump discharge, side yard swales, down spouts from residences or landscaping under-drains, etc.

DSIM will conduct a site inspection when the County is requested to install sidewalk chases and may review County drainage maps and/or studies to determine if the location meets County chase installation criteria. If these requirements are met, DSIM will add the sidewalk chase request into the County's overall Concrete Repair Plan and prioritize for construction. Construction will be prioritized and scheduled, as allowed by annual repair budget amounts and overall repair priorities.

ALTERNATIVES TO SIDEWALK CHASE INSTALLATION WITH PUBLIC FUNDS

If the DSIM inspection shows the location does not meet County installation criteria, property owners will be asked to choose one of two options listed below (also see Standard Letter, Appendix B):

OPTION 1:
.....
**MAINTAIN
DRAINAGE
TO PUBLIC
RIGHT-OF-
WAY AT
PROPERTY
OWNER'S
EXPENSE**

OPTION 1: The property owner wishes to keep the pipe running from their property through, or across County-maintained curb/gutter/sidewalk, and chooses to have a sidewalk chase drain installed, at their expense, in the curb/gutter/sidewalk to replace the pipe which currently passes through it or discharges across it.

Providing the chase section meets Arapahoe County's Construction Standards, the County will assume future maintenance of this structure. DSIM may be able to facilitate the installation of the chase by referring the property owner to a County contractor, depending on the nature and scope of the County's project, and contract time. DSIM will not authorize payment for initial chase installation, unless the existing pipe is utilized for multi-lot (greater than 4 lots) surface storm water drainage (as determined by Arapahoe County Engineering Division).

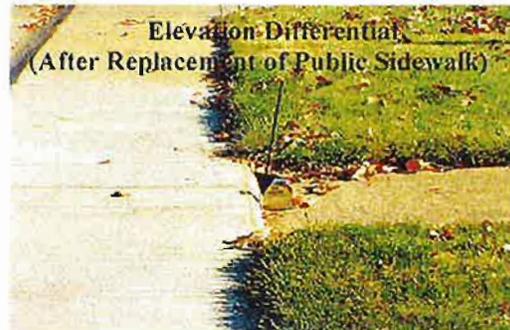
OPTION 2:
.....
**TERMINATE
DRAINAGE
TO PUBLIC
RIGHT-OF-
WAY**

OPTION 2: The pipe does not meet County installation criteria (convey surface storm water drainage from greater than 4 lots, as determined by Arapahoe County Engineering Division) and the property owner does not wish to pay for the installation of a County-approved sidewalk chase. County representatives will replace the deteriorated concrete feature and terminate the pipe running from the property through the County's curb/gutter/sidewalk.

The property owner shall be responsible for the pipe remaining on private property and for disconnecting the pipe and re-routing its flow to another County-approved discharge point on their property.

REPLACEMENT OF PRIVATE CONCRETE IMPROVEMENTS

Over time, overwatering of landscaping and poor subgrade soil conditions may lead to settlement of concrete sidewalks and curb and gutter. In many instances County-maintained concrete structures settle at the same rate as adjacent private sidewalks and driveways. These conditions present problems when County crews and contractors replace County-maintained curbs and sidewalks and restore or improve the original design grades. The resulting differential in



elevations between concrete sections can present safety hazards in areas subject to pedestrian traffic. It is not the policy of DSIM to authorize the expenditure of public funds for replacing concrete improvements located on private property, however, DSIM attempts to avoid hazards resulting from County concrete replacements as follows:

- 1) When original drainage designs are *improved*, DSIM will assume responsibility for resulting differential elevations in adjacent driveways and sidewalks to avoid hazards.
- 2) Where original drainage designs are *restored*, DSIM will not assume responsibility for maintaining or replacing private concrete features located behind the sidewalk, such as private sidewalks and driveways. However, DSIM may take some of the following actions to mitigate impact to private improvements in specific cases:
 - a) When replacements are made, efforts will be made to match existing private improvements, within reasonable conformance with Arapahoe County *Roadway Design and Construction Standards*.
 - b) DSIM may make temporary repairs, including concrete overlay or patching, to temporarily alleviate tripping hazards (County Condition 3, > 5/8") resulting from County work.
 - c) DSIM may elect to replace portions of private improvements located on County right-of-way at County expense to avoid safety hazards.
 - d) DSIM staff shall attempt to advise property owners of potential problems that may result from County work and attempt to obtain property owner's participation to resolve the problem.

DRIVEWAY FILLETS

“Driveway fillets” typically consist of concrete or asphalt slabs placed in the flow line of sections of curb and gutter to provide smoother access to driveways. Filling in the gutter with these materials may allow easier access to private driveways, but fillets invariably become flow-line obstructions



resulting in accumulations of dirt and ice, restricted drainage, accelerated damage to pavements and potential safety hazards. For these reasons, driveway fillets are in violation of *Arapahoe County Roadway Standards*, federal safety standards adopted by the *American Association of State Highway and Transportation Officials (AASHTO)*, *The Manual on Uniform Traffic Control Devices (MUTCD)* and *Colorado Revised Statutes*.

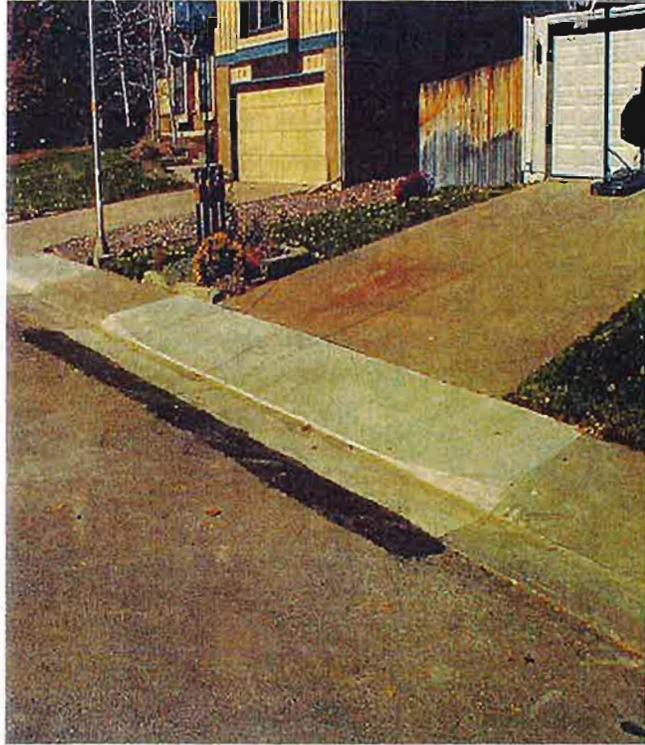


DSIM utilizes the following strategies to minimize the potential problems associated with driveway fillets:

- 1) DSIM requests that property owners remove driveway fillets (See Appendix B) on a complaint basis. Residents frequently complain due to fillets' tendency to accumulation of water and sediments in adjacent gutters.
- 2) Driveway fillets may be removed with annual rehabilitation projects when County crews or contractors replace concrete or resurface pavements.
- 3) Engineering staff may notify property owners to remove fillets on streets scheduled for pavement overlay or reconstruction where fillets are expected to significantly decrease the lifespan of new pavements (i.e., water accumulations into street).

Estimates of the quantity of fillets existing in unincorporated Arapahoe County has been performed recently, however DSIM believes that 500 or more fillets may exist throughout the County.

As an alternative to placing fillets in gutters, property owners may contract privately for the installation of a curb depression or “curb cut,” (see photo at right and detail in Appendix B). Curb cuts are a County-approved method of obtaining relatively smooth driveway access, while avoiding the problems typically associated with driveway fillets. A County permit is required to have this work performed. Permit information can be obtained by calling 303-795-4640. A permit is not required if residents contract directly with the County’s annual Concrete Replacement Program contractor(s). County residents may contact Engineering for contractor phone numbers and may realize savings in cases where the County is replacing portions of the concrete in front of a driveway necessary for curb cut installation.



CURB CUT INSTALLATION BY COUNTY

DSIM has established a policy for expenditure of County funds for installation of curb cuts, or depressed driveway approaches when County representatives are replacing curb/gutter/sidewalk within public right-of-way. DSIM will *only* authorize curb cut installation utilizing County funds if 100% of the driveway width (measured to the nearest foot) meets the County’s replacement criteria, as determined by Arapahoe County DSIM, and has been scheduled for replacement. Concrete that does not meet the County’s replacement criteria will not be replaced with County funds for the convenience of property owners.



If the County’s requirements are met, DSIM representatives will install a curb cut, including the necessary transition lengths on either side of the driveway, at no cost to the property owner.

INSTALLATION OF NEW SIDEWALKS

Pedestrian facilities are the responsibility of both the private and public sectors. The private sector, by development statutes and regulations, is typically responsible for pedestrian facilities within developments. The public sector is typically responsible for community-wide pedestrian facility planning and the design of facilities along major roadways. However, when private landowners are responsible for providing sidewalks, continuous sidewalk systems are frequently disrupted by missing links in the system where individual parcels are awaiting development or redevelopment. The following factors have been weighted for use as aids for the County to prioritize construction of new sidewalks. A score of 105 would be the maximum number of points any location or project could score.

| <u>FACTOR</u> | <u>POINTS</u> |
|---|---------------|
| 1. Safety | |
| a. Arterial. Speeds typically 35 mph or greater | 20 |
| b. Collector. Speeds typically 30-35 mph | 10 |
| c. Residential. Speeds typically 25-30 mph | 5 |
| 2. Potential for joint funding or participation by others | |
| a. Participation >10% of costs | 15 |
| b. Participation >5%, <10% of costs | 10 |
| c. Participation <= 5% of costs | 5 |
| 3. Potential for future development including new sidewalk | |
| a. Very unlikely | 15 |
| b. Possible | 5 |
| c. Very likely | 0 |
| 4. Proximity to activity center (includes transit, commercial, recreational, health care, schools) | 15 |
| 5. Pedestrian volume | |
| a. High | 10 |
| b. Medium | 5 |
| c. Low | 0 |
| 6. Connectivity | 10 |
| a. Completing accessible routes, filling in gaps | |
| b. Linking residential areas with commercial/other areas | |
| 7. Existence of alternative routes | |
| a. No/poor alternative pedestrian route | 10 |
| 8. Number of requests received | 5 |
| 9. Integration with national and regional plans/goals | 5 |
| a. ADA Compliance | |
| b. South East Corridor Development Plans | |
| c. RTD | |
| d. CDOT | |
| e. DRCOG Regional Transportation Plan | |
| f. Continuity with neighboring city and county facilities | |
| 10. Barriers to construction (i.e. utility relocation, lack of ROW). | -5 |

MRF PROCESS

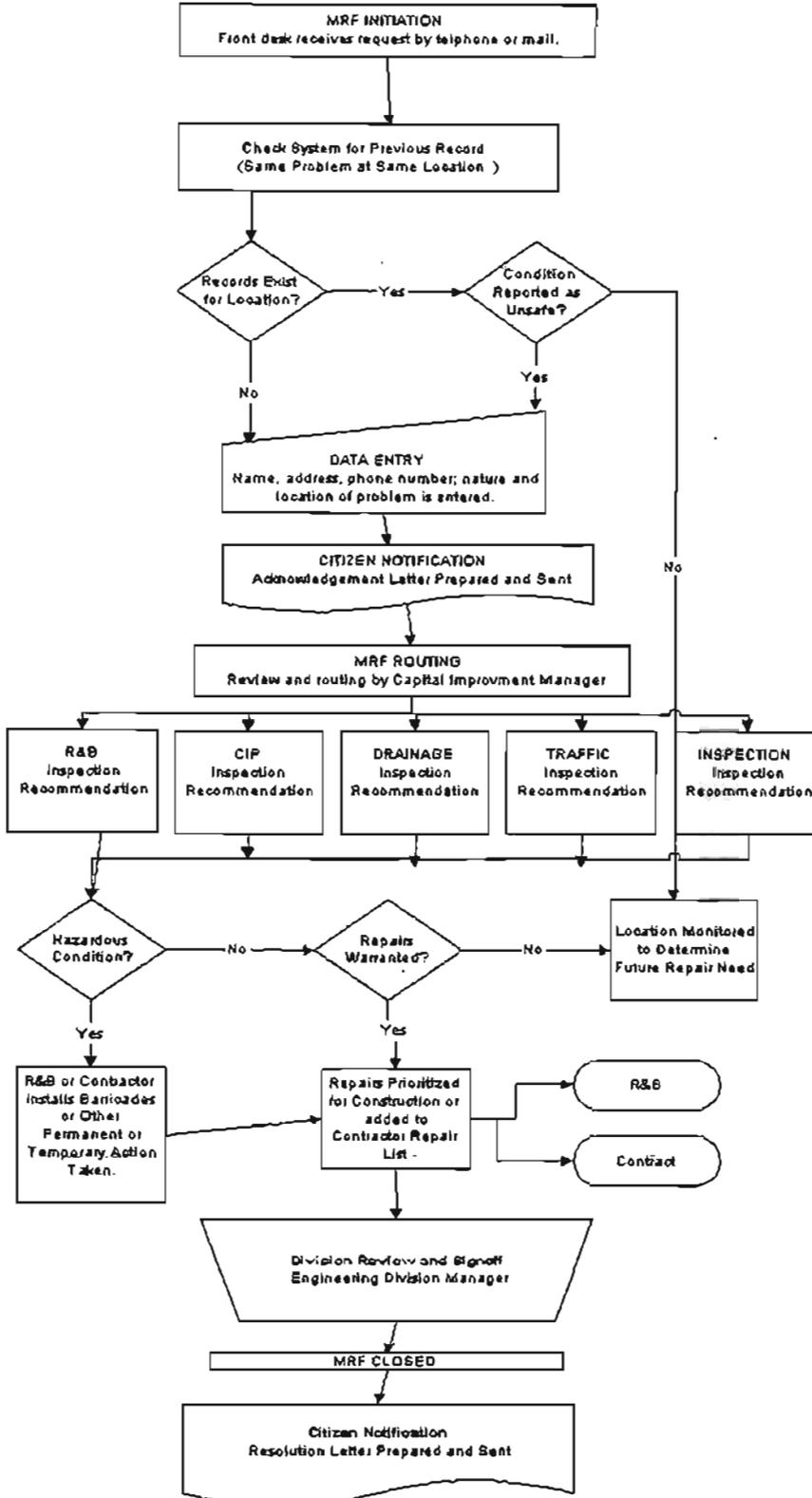
At this time Arapahoe County is in the process of implementing changes in our MRF process. Permits Plus™ client server software has recently been implemented to improve in-house accessibility and use of various County databases. This system is expected to provide one-stop access to information including building permits, planning cases, engineering projects, MRFs as well as other information. Sharing of information between departments should increase and overall County response time to customers both inside and outside of Arapahoe County should decrease as a result of this system.

MRF FLOW SEQUENCE

In general MRFs received by DSIM are processed by the following actions:

1. *MRF Initiation.* Information received by DSIM office by telephone or in person. Information is entered into MRF database.
2. *Citizen Notification.* Citizen is sent a letter acknowledging the County's receipt of the request and anticipated time for response (see MRF Acknowledgement Letter, Appendix B).
3. *MRF Routing.* MRF is reviewed by the designated manager and routed to appropriate Section/inspector, staff member.
4. *MRF Inspection.* Inspector evaluates location and suggests repair or action necessary to resolve request. Inspection may be performed for entire roadway segment, depending on staff resource availability.
5. *Division Review and Sign-Off.* Completed MRFs will be forwarded to Division Manager for QC review and sign-off.
6. *Citizen Notification.* If MRF has been completed, a resolution letter will be sent to citizen.
7. *MRF Closed.* (Note: MRF may be closed prior to final resolution of complaint. MRF records will be maintained in database until final resolution).

MRF FLOW CHART



ROAD & BRIDGE MRFs

On this date, limitations in the computer network linkage between Engineering and Road and Bridge offices require the following additional actions by Engineering. After MRFs have been initiated at DSIM, Engineering Section, and assigned to the Road & Bridge Section, a hard copy will be sent to R&B offices via interoffice mail. R&B staff will then evaluate the location and suggest repairs or actions necessary to resolve the requests. The MRF will then be returned to Engineering where R&B staff comments will be entered into the County's database and the MRF will be finalized in the normal manner.

APPENDIX B STANDARD FORMS/LETTERS

STANDARD DRIVEWAY FILLET LETTER

[Property Owner Name]
[Address]
[Address 2]

RE: DRIVEWAY FILLET AT [ADDRESS]

Dear Mr./Ms. [Property Owner]:

Arapahoe County, as the owner of the public roadway and sidewalk adjacent to your property at [Address], has identified a flow-line obstruction located in the curb and gutter, in front of the driveway at the above address. The obstruction consists of a driveway approach slab, or “driveway fillet.”

While filling in the gutter with concrete or other materials may provide smoother access to your driveway, flow-line obstructions typically cause accumulations of dirt and ice to build up, restrict drainage, accelerate damage to pavements and may present safety hazards. For these reasons, driveway fillets are in violation of *Arapahoe County Roadway Standards*, federal safety standards adopted by the *American Association of State Highway and Transportation Officials (AASHTO)*, *The Manual on Uniform Traffic Control Devices (MUTCD)* and *Colorado Revised Statutes*.

Therefore, Arapahoe County requests that this obstruction be removed. The obstruction must be removed within thirty (30) days from the receipt of this letter. If you do not remove the obstruction, Arapahoe County representatives will clear the obstruction and bill you for the associated costs. If you wish to avoid this assessment, please remove the obstruction prior to the expiration of the 30-day period.

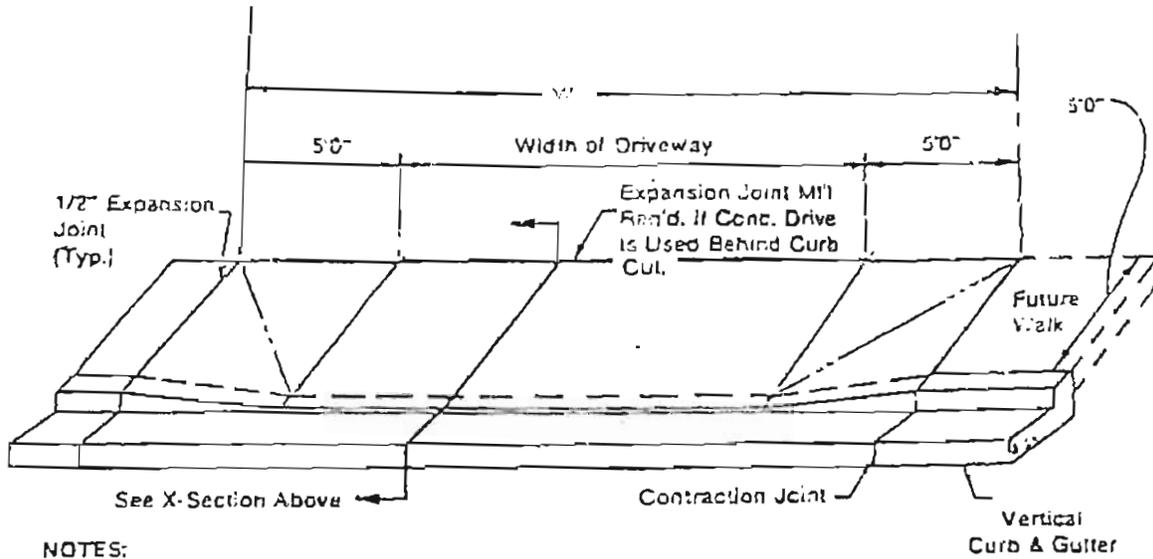
If you desire, you may contract privately for the installation of a curb depression or “curb cut,” (see attached drawing). Curb cuts are a County-approved method of obtaining relatively smooth driveway access, while avoiding the problems typically associated with driveway fillers. A County permit is required in advance of performing this work and permit information can be obtained by calling [County Contact Phone Number].

Please contact me at the above number if you have questions regarding this letter. Thank you in advance for your cooperation in assisting Arapahoe County in meeting the needs of all citizens.

Sincerely,

[Title]
[Division]

CURB CUT DETAIL



NOTES:

1. Back of curb cut extends to back of walk or back of bicycle path. If no walk is present extend back of curb cut to 5'0" behind flowline.
2. Traffic engineer shall approve location of curb cut before construction.

ARAPAHOE COUNTY CONCRETE REPAIR POLICY MANUAL

ARAPAHOE COUNTY
ENGINEERING DEPARTMENT
MAINTENANCE REQUEST FORM

MRF NO.

MRF DATE:

REQUESTED BY: Citizen

Name: Unit or Apt Phone:
Address: State: CO Zip code:
City:

PROBLEM LOCATION:

ADDRESS:

Between:
MRF Information taken by:

And:
Subdivision:

Detail of Request:

Special Instructions:

Assigned to: R&B: CIP: DRAINAGE: TRAFFIC: DES.ANYL: INSP:

Type of complaint: Potholes

INSPECTION REPORT

Section Number:
INSPECTION NOTES

Segment Number:

Duplicate MRF:

Inspector:

Inspection Date:

ACTION TAKEN

ACTION COMMENTS

Action by:

Action Date:

APPROVED
BY:

APPROVAL
DATE:

Action Date: _____

ARCHIVE THIS MRF IF COMPLAINT HAS BEEN FIXED: _____

MRF ACKNOWLEDGEMENT LETTER

Arapahoe County Resident
123 Any St.
Unincorporated City, CO 00000

Dear Resident:

We have received your Maintenance Request in our office. We appreciate your bringing this maintenance need to our attention and your patience while we process your request. Our resources are limited and this may effect the time it takes for us to perform an inspection and respond back to you. A copy of your Maintenance Request will be mailed to you after our inspection has been completed (please allow up to 90 days for processing).

To improve our efficiency in handling Maintenance Requests, we have designed a database that will eventually contain addresses and condition ratings for most of the improvements maintained by Arapahoe County. When this database is fully populated we will be better able to plan County maintenance work when and where it is needed the most. Our goal is to manage County-maintained improvements as efficiently as possible. We are working hard to improve our service to the residents of Arapahoe County.

Thank you in advance for your cooperation in assisting Arapahoe County in meeting the needs of all citizens.

Sincerely,

Department of Development Services/Infrastructure Management

STANDARD SIDEWALK CHASE LETTER

Arapahoe County Property Owner
1234 Any St.
Unincorporated City, CO 00000

Dear Property Owner:

Arapahoe County Department of Development Services and Infrastructure Management ("DSIM") has established a policy for expenditure of County funds for installation of sidewalk chase sections placed within public right-of-way. Arapahoe County will only install chase sections through County-maintained curbs, gutters and sidewalks, if surface storm water runoff is being conveyed to the street from greater than 4 lots (as determined by Arapahoe County DSIM). Side yard swales between two homes are not considered to be multi-lot drainage facilities. Arapahoe County will not expend County funds to install chase sections for sump pump discharge, side yard swales, down spouts, landscaping under-drains, etc.

Arapahoe County shall main sidewalk chase sections that have been properly permitted and constructed in accordance with Arapahoe County Design and Construction Standards. The County will not maintain unauthorized, substandard sidewalk chase installations or concrete sections having discharge pipes placed through sidewalks. Damage to curb and sidewalks resulting from unauthorized drainage conveyance shall be the responsibility of the property owner, who shall be responsible for replacing or repairing the concrete sufficiently to bring the concrete structure up to an acceptable level of service.

County representatives have inspected the location identified below and have provided this notice and inspection report to the adjacent property owner(s). No action is required on your part if the pipe described below does not belong to, or effect your property. In this case, County representatives will be directed to terminate the pipe and replace the deteriorated concrete as described in Option 1 below. If the pipe is associated with your property, please choose either Option 1 or Option 2 listed below and respond to Arapahoe County DSIM within ten (10) days of the receipt of this letter. If you do not respond with ten (10) days, County representatives will be directed to terminate the pipe and replace the deteriorated concrete as described in Option 1 below.

OPTION 1: REMOVAL OF PIPE

The County will terminate the pipe, which is running from the above property through Arapahoe County's curb/gutter/sidewalk, and replace the deteriorated concrete. The resident will be responsible for the pipe to remain on private property and for disconnecting the pipe and re-routing its flow to another County approved discharge point on their property.

OPTION 2. INSTALL CHASE

If the property owner desires they may elect to have a chase drain installed, at their expense, in the curb/gutter/sidewalk to replace the pipe that currently passes through it or discharges across it. Providing the chase section meets Arapahoe County's Construction Standards, the County will assume future maintenance of this structure. DSIM will assist property owners with chase installations by County contractors, if possible, however, individual property owners are

ARAPAHOE COUNTY CONCRETE REPAIR POLICY MANUAL

responsible for paying for the initial chase installation. As noted above, Arapahoe County will not pay for installation, unless the existing pipe is utilized for multi-lot (greater than 4 lots) surface storm water drainage, as determined by DSIM.

If you have any questions regarding this letter please contact _____ at Arapahoe County DSIM, at 303-795-4640.

Thank you in advance for your cooperation.

Sincerely,

INSPECTION REPORT

Property Street Address:

Date: _____

1234 Any St.
Unincorporated City, CO 00000

Source of pipe drainage:

- | | |
|--|--|
| <input type="checkbox"/> Sump Pump | <input type="checkbox"/> Single or double lot surface drainage |
| <input type="checkbox"/> Can not be determined | <input type="checkbox"/> Downspouts from residence |
| <input type="checkbox"/> Landscaping underdrains | <input type="checkbox"/> Other _____ |

Inspector's comments:

This location does not meet County sidewalk chase installation criteria. The condition of this location has been rated as Failed/Poor condition (County Condition 5 replacement criteria). If you would like to have a chase installed at your expense, you may contact _____ at 303-000-0000 for information regarding pricing and availability. This contractor is currently under contract with Arapahoe County and may or may not be interested in providing products and services to individual property owners.

Inspector

PHOTO OF PIPE ATTACHED BELOW (IF AVAILABLE)

