JUAB COUNTY, UTAH

MANUAL OF ROADWAY DESIGN& CONSTRUCTION STANDARDS

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MANUAL OF ROADWAY DESIGN AND CONSTRUCTION STANDARDS

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1.0 GENERAL IMPROVEMENT REQUIREMENTS

1.1 Scope of Work.

This section defines the general requirements for roadway related improvements designed and constructed as public infrastructure. The improvements shall include all public utilities (i.e. sanitary sewer and culinary water as pertains to roadway crossings, storm sewer and drainage facilities), grading, surfacing, erosion control, traffic signing, traffic control, and road improvements. Roadway improvements must provide for future extension beyond the proposed development and must be compatible with the contour of the ground for proper drainage and for servicing future development.

Developers shall be required to make improvements to roadways in accordance with the County adopted design standards. The developer is encouraged to work with adjacent property owners that will benefit from said roadway improvements for the purpose of mutual participation. The developer is responsible for all up-front costs associated with the design, acquisition of rights-of-way, and construction of the proposed improvements.

1.2 Definitions

Any terms or words not specifically defined herein shall be terms as defined in the common English language.

A. Developing Parcel – a parcel or lot being developed through the process of a subdivision, conditional use permit, building permit for a single family home, or commercial business.

B. Substandard Roadway – Any roadway that does not meet the standards as established within this document based on the classification of the roadway and the existing conditions of the roadway.

C. Private Road – A road constructed and maintained by private individual(s) or private entity(s).

D. Average Daily Traffic – A measure of the amount of annual average traffic on a roadway per day. A single family home is designated as impacting a roadway with ten (10) average trips per day. Business uses will vary in their impact. Abbreviated as ADT.

1.3 Electronic Deliverable Requirements

Prior to final acceptance of improvements, surveys in electronic format shall be submitted and accepted by Juab County.

The electronic drawings shall be in either Computer Aided Drafting (CAD) or Geographic Information Systems (GIS) file format. File formats shall be approved by the County.

All CAD and GIS files shall be registered to the North American Datum 83 (NAD 83) Utah State Plane North Zone coordinate system (grid) with ties to two public monuments.

Information on monuments is available through the Juab County Surveyor.

1.4 Licensed Professional Seal Requirements

Complete and detailed construction plans and drawings of all improvements shall be submitted to the Supervisor for review and approval prior to issuance of a permit(s). The plans containing the appropriate approval signatures and the current adopted specifications shall be the only valid documents from which the contractor shall construct the permitted improvements. The contractor shall have a copy of the approved plans and permit available at the construction site and shall make them available to the County's representative upon request.

Any final infrastructure improvement plan or report shall bear the seal of a professional licensed to prepare such plans in Utah. Additionally the signature of the individual named on the seal and the date shall appear across the face of each original seal.

1.5 Inspection

All construction work involving the installation or repair of public improvements shall be subject to inspection by the County. It shall be the responsibility of the person responsible for construction to ensure that inspections take place where and when required as indicated in the specifications, on the permit, and as determined by the County. Certain types of construction will require continuous inspection while others will only require periodic inspections. The type and amount of inspection performed shall be determined by the County.

Continuous inspection may be required on the following types of work:

A. Placement of road surfacing

B. Placing of concrete

C. Laying of drainage pipe

D. Testing and backfilling as per approved specifications

E. Roadway grading and gravel base placement and compaction

For construction requiring continuous or periodic inspection, no work shall start until an inspection request has been made to the County by the person responsible for the construction and the required submittals received and approved by the County. Notice of the initiation of work and requests for inspection shall be made at least two (2) working days prior to the commencing of the work. Construction completed without a required inspection will be required to be removed and reinstalled at the Contractor's expense.

Work performed by the Contractor which requires periodic or continuous inspection beyond the normal working hours of Juab County, on weekends, or on County holidays shall require payment of current County overtime rates by the contractor.

1.6 Guarantee of Work

For all private and public roadway improvements required as part of a project approval, the contractor shall provide a performance bond or other approved financial surety in the amount of 110% of the value of the proposed work naming Juab County as owner for a term covering the project construction up to final acceptance by the County. If out of specification work is not corrected by the contractor then the value of the work necessary to correct it will be applied against the performance bond. Following final project acceptance by the County, the performance bond shall continue to extend for a one (1) year period of time or as otherwise allowed by Utah Code 17-27a-604.5 (1953 as amended). Roadway improvement financial sureties may be incorporated into development agreements that also cover additional development needs (utilities, etc.).

The contractor will be required to correct any work of the initial construction that fails as determined by the County, within the time frame of the bond. If the contractor does not respond in a timely manner County forces (or a designated contractor) will complete the work with costs being applied against the performance bond.

The developer/contractor will be responsible to see that the excavation, backfilling, and compaction are properly and adequately completed and that all necessary permitting is obtained. Settlement of trenches within a period of one (1) year after final acceptance of the project shall be considered incontrovertible evidence of inadequate compaction, and the developer/contractor shall be responsible for correcting the condition in accordance with the provisions of these standards and specifications.

1.7 Other Standards Adopted

In addition to the adopted Juab County standards, the County adopts the following as standards for all issues related to the design, construction, maintenance, and other related road, utility, and infrastructure improvements not specifically covered within this document:

A. American Public Works Association Manual of Standard Specifications (current edition)

B. American Public Works Association Manual of Standard Plans (current edition)

C. AASHTO (American Association of State Highway and Transportation Officials): A Policy on Geometric Design of Streets and Highways (current edition)

D. AASHTO: Standard Specifications for Transportation Materials and Methods of Sampling and Testing (current edition)

E. UDOT Roadway Drainage Manual of Instruction (current edition)

F. AASHTO: Roadway Design Guide (current edition)

G. Manual of Uniform Traffic Control Devices (MUTCD) (current edition)

1.8 Authority and Design Exceptions

The Juab County Road Supervisor (herein referred to as the "Supervisor") shall have the authority to enforce this policy. Design exceptions to the Standard will be considered and evaluated on an individual basis by the Supervisor , or the Supervisor's designee. Full justification and documentation must be provided explaining the reasoning as to why the roadway standards cannot be met, why an alternative design or construction method can meet the intent of the roadway standards, and including any other relevant information.

A. In considering any design exception, the Supervisor may consult with the following individuals based on the needs of the project or infrastructure in question:

    1. Juab County Commission

    2. Juab County Engineer

    3. Juab County Fire Marshall

B. The Supervisor shall evaluate exceptions to the standards as set forth in this policy and approve, deny, or modify the requested exception. Appeals of the Supervisor's decision shall be made to the County Council.

C. For design exceptions on land use issues heard by the County Planning Commission or County Council, a further review and recommendation on the infrastructure improvements may be forwarded from the Commission to the County Council. The County Council shall have the final authority to provide an exception to this standard.

1.9 Traffic Impact Studies

The Supervisor may require that a Traffic Impact Study (TIS) be completed for any project where it is deemed necessary.

A. The purposes of the TIS are as follows:

1. Document whether or not the access request or roadway can meet the standards and requirements of this Standard and other applicable County ordinances and policies.

2. Analyze appropriate location, spacing, and design of access connection(s) necessary to mitigate traffic impacts.

3. Analyze operational impacts on the roadway in accordance with this Standard and any other applicable County ordinances and policies.

4. Recommend the need for any improvements to the adjacent and nearby roadway system to maintain a satisfactory level of service and safety and to protect the function of the road system while providing appropriate and necessary access to the proposed development.

5. Assure that the internal traffic circulation of the proposed development is designed to provide safe and efficient access to and from the adjacent and nearby roadway system consistent with this standard.

B. Traffic Impact Study Requirements

The traffic study shall, at a minimum, incorporate traffic engineering principles and standards as presented in national practices. Additional requirements and investigation may be imposed upon the applicant as necessary.

The County shall determine the need and requirements for a traffic impact study. The requirements of the TIS may be expanded, reduced, or altered by the County based on the proposed project being analyzed.

1. Study Area - Defined by the County.

   The study area, depending on the size and intensity of the development and surrounding development, may be identified by parcel boundary, area of immediate influence, or reasonable travel time boundary.

2. Design Year - Opening day of project.

3. Analysis Period - Identify site and adjacent road traffic for weekday A.M. and P.M. peak hours.

4. Data Collection Identify site and adjacent road roadway and intersection geometries.

   Identify adjacent road(s) traffic volume and characteristics.

5. Conflict / Capacity Analysis Diagram flow of traffic at access point(s) for site and adjacent development.

   Perform capacity analysis as determined by the County.

6. Right-of-Way Access Identify right-of-way, geometric boundaries, and physical conflicts.

   Investigate existence of private, city, federal, state, or no access/limited access control lines.

7. Design and Mitigation Determine and document safe and efficient operational design needs based on site and study area data. Identify operational concerns and mitigation measures to ensure safe and efficient operation pursuant to appropriate County Roadway Functional Classifications (See Section 2.1).

C. Study Report and Format Traffic impact studies shall be prepared by a firm or individual approved by the County as capable of performing a traffic analysis and when necessary, include engineered drawings based on County standards drawings and specifications. The traffic impact study should follow the recommended format below.

   1. Introduction and Summary
   2. Proposed Project
   3. Study Area Conditions
   4. Analysis of Existing Conditions
   5. Projected Traffic
   6. Traffic Analysis
   7. Conclusions
   8. Recommendations
   9. Appendices
      a. Traffic Counts
      b. Traffic Capacity Analysis

c. Accident Summary Request for change of access (if applicable)

10. Figures and tables

a. Site location – showing area roadways

b. Site Plan

i. Identify geometric / physical concerns relating to area, site, and specific access points. Include adjacent road and access points.

c. Existing roadway and traffic control features (number of lanes, lane widths, alignment, location of traffic signals, signs). Include off-system features as related to site plan and access point(s).

d. Existing daily volumes (directional if possible) and peak hour turning volumes. Discuss traffic characteristics (vehicle mix, % make-up, and any special vehicle requirements).

e. Collision diagram summary.

f. Site generated trip summary. Discuss trip/vehicle make-up and any special vehicle requirements. Discuss trip reduction strategies, if applicable.

g. Directional distribution of site generated traffic.

h. Assignment of non-site related traffic (existing, background, and future). Document both existing and committed development, and when appropriate other background planned development traffic.

Assignment of total future non-site traffic for design year.

i. Assignment of Site Traffic

j. Traffic Capacity Analysis

i. Projected levels of service without the project – coincide with development phase years.

ii. Projected levels of service with the project (by development phase years) iii. Recommended mitigation / improvement

Scaled schematic drawings illustrating alignment, number of lanes, lane widths, signing, and pavement markings. If traffic signal modifications are proposed, signal phasing, signal head locations, and lane marking shall be shown.

2.0 ROADWAY DESIGN

2.0 Roadway Design

The whole of Juab County, including its cities and unincorporated communities, was developed with the road grid as the basic building block of settlement. The grid provides multiple options for travel direction which reduces traffic congestion; provides for a clear, consistent, and understandable method for the arrangement of housing and business; and provides for interconnectivity within the transportation network.

Continued emphasis should be placed on maintaining the gridded network of public roads. New development shall be required to follow the grid pattern in all new roads being constructed wherever practical. Connections to existing and future planned roads shall also be required as development progresses. New roads proposed by county, city, state, and federal governments shall closely follow the established road grid where possible. All roads shall be located on the grid, and rights-of-way should vary based on roadway functional classification.

2.1 Roadway Functional Classification

A. Current Roadway Classification Juab County has a tiered classification system for all roadways that are under the jurisdiction and maintenance of the County (See Table 2.1). *Appendix E - Current Road Conditions Classification* provides for a graphical reference to the County's roadways and their classification.

Table 2.1
Roadway Functional Classifications

	County Designation
Category Assignment	Level-of-importance
A	Arterial
C	Collector
L	Local
R	Rural
P	Private
M	Mountain
U	Unimproved

1. Arterial (A)– This category is appropriate for use on roadways that have the capacity for moderate speed (generally 45 mph or higher) and moderate to high traffic volumes. There is a reasonable ability for direct access, but the priority is for safety, through transit, and mobility needs within this category. These facilities move traffic across multiple communities or jurisdictions, typically connecting facilities of system importance and through urban areas that have significant potential for development or redevelopment of adjacent land to the highest and best use.

2. Collector (C) – This category is appropriate for use on roadways that have the capacity for moderate to low speeds (generally to a speed range of 40 mph or less) and moderate to high traffic volumes. While this category provides service to through traffic movements, it allows more direct access to occur. These facilities move traffic across multiple communities or jurisdictions, typically connecting facilities of system importance, but through urban areas that are significantly developed to the point where function (travel speed and capacity) has eroded.

3. Local (L) – This category is appropriate for use on roadways that have the capacity for moderate to low speeds and moderate volumes. This category provides a balance between through traffic movements and direct access. These facilities move both regional and local rural traffic with emphasis on local movements.

4. Rural (R) – This category is appropriate for use on roadways that have the capacity for moderate to low speeds and low volumes. This category provides access to farms, other agricultural uses, and dispersed rural residences. Gravel or chip & seal road surfacing is typically acceptable.

5. Private – This category is appropriate for use on roadways that have the capacity for moderate to low speeds and low volumes. This category provides access to farms, other agricultural uses, and dispersed rural residences. These roads are not typically through roads providing public access to points beyond the areas the road is intended to serve. Gravel or chip & seal road surfacing is typically acceptable.

6. Mountain – This category is appropriate for use on forest access roads, mountain roads, back roads, and other special use facilities. Gravel roads are most typical, but some roads have limited improvements or are "two-track" in nature.

7. Unimproved – This category is appropriate for roadways that are within a designated County right-of-way, but are not improved for most passenger vehicles. Access may be limited to OHV, horses, hiking or bicycling, or access may be restricted.

B. Planned Roadway Classification Given the existing roadway conditions and the current classification of County roads, *Appendix F - Planned Road Conditions Classification* provides for a graphical reference to the County's planned roadway classifications.

2.2 County Roads In and Adjacent to Municipalities

A. Municipal County Roads

1. County roads within municipal boundaries shall be designated with a roadway classification as designated within Table 2.1, but also identified with a –MC.

2. County roads within municipalities shall meet the minimum standards of Juab County, but may, through agreement with the affected municipality, be required to meet the road standards and requirements of said municipality.

3. Any development being serviced by County roads within a municipality shall require the approval of the County prior to the issuance of a building permit, encroachment permit, or change in land use requiring a permit or license from the municipality.

B. Municipal Annexation Areas

1. County roads that are adjacent to municipalities, within the declared annexation area of a municipality, and designated by the County Council as a municipal annexation road (–MA) may have their Planned Road Conditions Classification designated by a municipality by the agreement and consent of the County.

2. Any planned development activities related to the roadway on a municipal annexation road shall be reviewed by the affected municipality. The County shall review any comments or requests made by an affected municipality.

2.3 Roadway Sections

A. Roadway Typical Sections: All Juab County roadways shall comply with the design elements shown on the roadway typical section in Table 2.2. Traveled way width, shoulder width, and clear zone dimensions shall be based on the design speed, design year traffic volumes, and guidance found in the Appendix.

Table 2.2 - Roadway Typical Sections

			PUBLIC ROADWAYS				
		Private[6]	Mountain Road [1,2,6]	Rural[6]	Local	Collector	Arterial
Planned	Design Limits - Approximate ADT	Up to 30	Up to 30	Up to 30	40-1500	1600-5000	Over 5000
Minimum Width (ft)	Travel Lane [3]	10	12	10	10	11	12
	Right-of-Way	33	66	66	66	80	100
	Median/Turn Lane [4]	-	-	-	12	12	14
	Shoulder (each side)	0	0	2	2	6	8
	Paved Shoulder	0	0	0	1	3	3
	Clear Zone	0	5	7	7	10	10
	Road Surface Material	Gravel (A)	Gravel (A)	Gravel (A)	Paved (B)	Paved (B)	Paved (C)

[1] Single lane roads may be permitted for Mountain roadways.

[2] Single lane roads do not provide adequate levels of service to development and may be required to meet the Rural road standard, provide pullouts, or other improvements as deemed necessary to provide adequate service provision in compliance with this standard, the County Code, and the latest edition of the International Fire Code.

[3] Minimum roadway is 2 lanes of traffic unless otherwise specified.

[4] Provided only where needed as determined by the County or a Traffic Impact Study

[5] Refer to Appendix Table A-8 Typical Cross Section Structural Values

[6] No commercial or industrial development shall be permitted.

[7] See Section 6.

B. Roadway standard structural cross sections shall comply with standard sections as shown in Table A-8 in the Appendix. The applicable structural section may be amended based on a review of the roadway by the Supervisor. Consideration will be given to traffic volumes and general knowledge of site conditions. As an alternative, the proposed roadway structural section thickness design may be based on subsurface soil conditions and design year traffic volumes. Structural section thickness shall be determined by a licensed geotechnical engineer and approved by the County. A soils investigation shall be submitted that includes but is not necessarily limited to:

    1. Soil borings along roadway centerline and other areas as needed.

    2. Analysis on the overall bearing capacity of the soil.

    3. Recommendation for structural road cross section.

    4. Recommendation as to the requirements for land drains to adequately collect groundwater that may adversely affect development.

    5. Cut and fill slope requirements.

    6. Compaction requirements.

2.4 Improvements to County Roadways

A. Any and all improvements made to County roads or within County rights-of-way or roadway easements shall meet the minimum standards as adopted within the County Manual of Roadway Design and Construction Standards.

    1. Basic Improvement Requirements

        a. All public roadways shall be identified and mapped (Appendix E) by roadway functional classification (Section 2.1). Improvements made to roadways through the County's Capital Improvement Plan or by any other interested parties shall comply with the requirements established within this standard based on the functional classification for the roadway.

        b. A primary access point for all development shall be identified based on current conditions and projected travel demand for the proposed development.

A development may be required to provide multiple access points if it is deemed necessary for health, safety and welfare reasons.

c. No development shall be approved on inadequate roadways, public or private.

i. Roads along the identified access to proposed development shall be required to meet the minimum roadway standards as outlined herein.

ii. Development that is serviced by multiple substandard roads shall be reviewed on the ability of the entire road network providing service to said development. Substandard roadways that are not directly adjacent to a proposed development, but that still provide service to the development, shall be required to meet the minimum standards outlined in this section for development to be approved.

iii. Unmanned utility facilities and agricultural structures are exempt from meeting the roadway standards. The facilities must provide appropriate access including easement/rights-of-way as needed.

d. Developer controlled property shall provide all necessary rights-of-way dedication along the frontage of any roadway.

e. Roadways shall be constructed across the entire frontage of the proposed development.

2. County Implemented Roadway Improvements

a. All County roadway improvements shall be designated on the County's Capital Improvements Plan. Repair and emergency maintenance of roadways shall be completed at the discretion of the Road Superintendent. The County shall not maintain, improve, or cause any public funding to be expended on private roads within the County.

3. Improvements Required for Development:

a. Private and Mountain Roads

i. A roadway section, in conformance with Table 2.2, shall be required on all roads of the identified access that provide service to a proposed development.

ii. Any substandard roads that provide the identified access to a development shall be fully improved to the minimum roadway standard.

b. Rural, Local, Collector, and Arterial Roads

i. Roadway travel lanes, in conformance with Table 2.2, shall be required on all roads of the identified access that provide service to a proposed development.

ii. Full shoulder and clear zone improvements shall be made for the immediate frontage of any developing parcel as determined by the County.

iii. At the discretion of the County and based on traffic volume and site/safety considerations, shoulder improvements and clear zone issues may be required to be addressed and completed on both sides of any affected roadway.

iv. With the approval of Juab County the developer may offer alternative roadway improvements to the road network servicing a development. The County may accept alternative roadway improvements if they are deemed to create a safer operational system, improve the access situation for the development and the general public, and meet the general intent of this Standard.

4. Requests for Permits on Existing Roadways

a. The following requests shall be required to meet this Standard:

i. Subdivisions and subdivision amendments that create one (1) or more new building lots including one (1) lot subdivisions

ii. Conditional use permits

iii. Boundary line adjustments iv. Zoning clearances for commercial structures v. Zoning clearances for residential structures on:

I. 1970/1978/2000 Legal Parcels

II. Other Legal Lots where no specific approval has been issued for said parcel

III. Legal Lots with a legal Accessory/Agricultural Structures 2.0

b. Residential building permit requests on the following types of lots are considered to be grandfathered, however, the Supervisor shall review the proposed development through the Design Exception process and apply minimum safety standards to the roadway access:

    i. Lots created by an approved subdivision or conditional use permit

    ii. Subdivision amendments where no new lots are created

    iii. Legal Lots with a legal Residential Structure Permits may still be denied if roadways cannot meet the minimum health and safety requirements. At a minimum, a full improvement of the parcel frontage is required.

c. Non-Commercial Accessory/Agricultural Structures or Utility Facilities/Structures

    i. The minimum standard shall be a 12 foot all weather surface roadway or as otherwise approved through a Design Exception and by the Fire District.

2.5 Roadway Layout

A. The arrangement, character, extent, width, grade, and location of all roadways shall be in conformity with the official Juab County Comprehensive Plan, regulations, this document, and any further plans adopted by the County and any applicable State and Federal laws. If geographical/geological conditions prevent this from being observed, any deviations must first be approved through the design exception process.

B. Where appropriate to the design and terrain, proposed roads shall be continuous and in alignment with existing planned or platted roads with which they are to connect and based on the grid system common to Juab County. Proposed new roadways shall be located appropriately to be placed and numbered on the historic block system grid, avoiding mid-block numbering where possible.

C. Provision for the continuation of existing roadways to adjoining areas (or their proper protection where adjoining land is not subdivided, insofar as such may be deemed necessary for public use by Supervisor) shall be made in the arrangement of roadways in new developments. Where cul-de-sacs are proposed, the road and/or a road right-ofway shall be extended to the edge of the property to provide road connectivity and access alternatives for current, proposed, and future development.

D. The creation of looped through roads within the established roadway grid system will be encouraged wherever Supervisor finds that such type of development will not interfere with normal traffic circulation in the area.

E. In order to promote road connectivity and mobility options, dead end roadways shall not be allowed except for cul-de-sac roads not exceeding 500 feet in length, and situations where the Supervisor determines that topographic constraints will not allow through roads. Roads that are temporarily terminated in a cul-de-sac but are planned as through roads may be allowed under section 2.5(F). Reconfiguration of the proposed road layout may be required by the Supervisor to provide through roads. Dead end roads, when approved, shall meet the following requirements:

1. Length: Terminal roads shall not be longer than 500 feet from the centerline of the adjoining road to the center of the cul-de-sac.

2. Cul-de-sac: A dead end road shall terminate in a circular turnaround or cul-de-sac 2.0 consisting of a 48 foot radius paved surface and a right-of-way radius which allows for the shoulder improvements of the corresponding road section.

3. Corner Radii: The corners at the entrances to the cul-de-sac shall have a radius of not fewer than 15' at the edge of the asphalt.

4. Drainage Facilities: If surface water drains into the dead end road due to the grade of the road, then necessary catch basins, drainage systems and easements shall be provided.

5. Utility & Pedestrian Easement: The County may require the reservation of up to a thirty-three foot (33') wide easement to provide for continuation of pedestrian traffic and utilities to nearby roads.

F. Temporary Dead End Roads: Temporary turnarounds shall be required on all roads which will be extended in the future and which exceed 300 feet or one lot in depth from the centerline intersections of the closest intersecting road.

1. Temporary turnarounds shall consist of a sixty (60) foot radius, all weather graded or paved surface.

2. Additional rights-of-way or easements necessary to construct and maintain the temporary turnaround are also required.

3. At such time that the temporary turnaround is removed due to adjacent improvements, a typical road section shall be constructed.

4. Temporary dead end roads shall have right-of-way sufficient to allow a planned continuation of the roadway and shall be required to extend a fully improved roadway section to the terminal end of the project site.

5. Temporary dead end roads may not exist longer than one year after approval.

G. Service Roads: Roadways that are constructed to provide alternative access to high level roadway facilities or adjacent to difficult to cross areas (rivers, railroads, or

other natural features)with the primary intent being to provide an adequate and safe method of providing access to properties that may otherwise have limited access options.

1. Where a development borders on or contains a railroad right-of-way or limited access highway right-of-way, existing or planned, Juab County may require a road approximately parallel to and on each side of such right-of-way, at a distance suitable for the appropriate use of the intervening land.

2. When a development abuts or contains an existing or proposed collector, or arterial roadway, Juab County may require provisions for adequate protection of residential properties or to separate through and local traffic. These provisions may include: a. Limited access roads b. Reverse frontage with screen planting contained in a non-access reservation along the rear property line c. Deep lots with rear service alleys d. Other treatment as may be necessary H. Intersection Sight Distance: Intersection sight distance shall conform to the guidance in the latest edition of the AASHTO publication of A Policy on the Geometric Design of Streets and Roads.

2.6 Right-of-Way Encroachment Permits

A. A right-of-way encroachment permit issued by the Supervisor is required for any person desiring to perform work in a County right-of-way or on County owned property. The base requirement for each permit is established in Table 2.3 Encroachment Permit Requirements. The decision by the County to issue a permit shall be based on, among other factors determined by the County, the following:

1. The capacity of the public right-of-way to accommodate the facilities or structures proposed to be installed in the public right-of-way.

2. The capacity of the public right-of-way to accommodate multiple utilities, such as electrical, telephone, gas, sewer, water, or other conduits or pipes.

3. The potential for damage or disruption, if any, of public or private facilities, improvements, or landscaping previously existing in the public right-of-way.

4. The public interest in minimizing the cost, and disruption of construction from numerous excavations in the public right-of-way.

5. Compliance with the County Roadway Standard.

6. Signing, flagging, detouring, traffic control, roadway surface impact and restoration, cleanup following construction, clear zone requirements, construction duration, contractor performance bonding, utility installation by use of tunneling, implementation of best management practices during construction, assumption of liability by licensee, and other site specific factors.

7. Any other restrictions or requirements as established by current Juab County ordinance(s) or any other considerations.

B. The permit holder shall assume liability and maintenance of utilities placed in the public right-of-way, including relocation or removal as may be determined by the County.

C. The permit holder shall forfeit the encroachment permit upon failure to comply with the conditions and stipulations of the encroachment permit. The County may require that the contractor's bond or other financial surety be utilized to finish the project, correct deficiencies created by the contractor, or to return the infrastructure to its preconstruction status.

D. Any person maintaining facilities within County rights-of-way may proceed with emergency work on said facilities if the circumstances demand the work be done immediately; provided that a permit cannot be reasonably and practicably obtained prior to commencing the work. Any emergency work shall conform to these Standards, and the person(s) doing the work shall immediately contact the County Road Superintendent or the County.

E. Inspection of Construction: The County shall cause the inspection of roadway, access, utility, or other development to be inspected as deemed necessary. Any costs associated with the inspection process shall be paid by the developer of the improvements. The County has the right to require the correction of construction deficiencies that fail to meet this standard or generally accepted construction standards. The County may refuse to accept any infrastructure improvements that fail to meet this standard and can cause the correction or reconstruction of said infrastructure.

F. Licensed and Bonded Contractor Required:

1. The contractor performing the proposed work shall be licensed and bonded to perform the type of work proposed. A performance bond for a one year term in the amount equivalent to the value of the proposed work shall be posted naming the County as owner.

2. If corrective action pertaining to permitted work is necessary, the County shall request the contractor to perform such work at no cost to the County. If a favorable response is not received in a reasonable time frame the County will call upon the bond to complete the work.

3. The County may inspect and approve project components as deemed necessary.

4. The County may waive this requirement if it is deemed to not be necessary.

Table 2.3 - Encroachment Permit Requirements

Road/Work Type	Permit Required	Traffic Control	Inspection	L/B Contractor Required
Mountain Road				
Minor Work	Yes	TBD	TBD	TBD
Major Work	Yes	Yes	Yes	Yes
Rural Road				
Minor Work	Yes	TBD	TBD	TBD
Major Work	Yes	Yes	Yes	Yes
Local, Collector, or Arterial				
Minor Work	Yes	TBD	TBD	TBD
Major Work	Yes	Yes	Yes	Yes

Minor Work	Agricultural Access, Driveway Access, placement of mailboxes/fences etc., other work that does not impact the traveled way.
Major Work	Any work that disrupts the roadway surface or structure including but not limited to road rebuild/widening/resurfacing/excavation, shoulder or drainage work, installation of utilities, or other items as determined by the permit authority.
TBD	The County shall provide a determination as to the need for various portions of the permit based on the work being performed.

2.7 Right-of-Way Encroachments

Third party obstructions that currently exist within the County's right-of-way that do not comply with this standard shall be allowed to remain unless it is determined by the County that said obstruction creates an unreasonable safety hazard to the traveling public or infringes substantially on the ability of the County to safely utilize its right-of-way.

The County does not assume liability for obstructions that are built or placed within the County's right-of-way or easement that are not in compliance with this standard. All new right-of-way encroachments shall comply with the following standards:

A. Mailboxes: Standard USPS approved type mail boxes may be located within the public road right-of-way providing that:

1. The preferred mounting post shall be a standard 4" x 4" wood post.

2. A decorative mounting post may be used that is not considered a hazard to the traveling public as determined by the County, and will have similar break away characteristics of a 4" x 4" wood post when struck by a passenger vehicle.

3. The County shall not be liable for damage to mailboxes created by snowplowing or other maintenance operations.

B. Fences: Fences separating the public roadway from adjoining properties are subject to the following:

1. Fences shall be owned and maintained by the adjoining property owner.

2. Fences shall be located on the right-of-way line except when:

a. It is determined to be in the County's interest to locate the fence within the public right-of-way, or

b. It is determined that the adjoining property owner may effectively utilize the public right-of-way without creating a hazard to the traveling public. At no time shall the fence be located within the clear zone of the roadway as determined by the County.

c. The fence being proposed is constructed in a manner as to make it temporary or easily moved. The preferred fence shall be four strand standard barb wire fence. Decorative fences are not permitted to be constructed within County rights-of-way.

3. The County shall not be liable for damage to fences created by snowplowing or other maintenance operations.

4. The property owner is responsible to relocate the fence when requested by the County. The County may replace or relocate barbed wire fences.

C. Street Trees or Shrubs: Trees and shrubs to be planted on the public right-of-way (area between property line and the road) will be determined on a case-by-case basis.

Factors to be considered will include, but not be limited to, interference with or impact upon sub-surface infrastructure, overhead utilities, visibility, and subsequent maintenance. Allowed plants, trees, and shrubs will become the property of the County at the expiration of twelve months from planting; however, the adjacent property owner is required to maintain the flora.

D. Waste Container Pads – Along county roads where insufficient space is present to safely locate waste containers outside of the travel lanes, gravel pads shall be required for each single family home or business. A standard pad size for residential waste

containers shall be four (4) feet deep by eight (8) feet long, measured a minimum of one (1) foot from the travel lane, constructed to the minimum standards of the roadway shoulder. In situations where dumpsters or joint access locations are proposed, the pad size and construction shall be approved by the Supervisor with input from Service Area 1.

2.8 Road Naming Conventions & Addressing Standards

A. Newly built roads which follow the grid system shall be assigned the numeric value of the address gridline with which they most closely align. Newly constructed roads shall be located on either a full '100' block designation or an inter-block '50' designation.

B. Newly built roads that do not conform with the grid system, e.g. a diagonal road or a road which winds or changes direction without intersection, shall not be assigned a grid value, but shall be named. Addresses on that named road should be numbered sequentially from one end to the other without particular regard for their approximate grid location.

C. Addressing of subdivision lots and homes shall be completed by the Juab County Land Use (Planning & Zoning) Administrator.

1. Addressing shall be assigned to all new construction at the point of issuance of a building permit, with the address being assigned at the center point of the driveway connection to the road.

2. For subdivision lots, addressing shall be assigned to the middle of the road-facing side of the lot. Where a lot is greater than one (1) acre or where multiple frontages may be used for access, addressing will not be assigned at the point of subdivision, but will be issued at the time of building permit issuance.

3. Addressing shall be assigned based on an overlay grid rule of eight (8) blocks to a section, with every block containing 100 numbers. The address number is determined by measuring from the nearest grid lines, using the addressing rule of a number change for every 6.6 feet. The standard rule of addressing with even and odd numbering is as follows:

    a. Even Numbers: Structures on east side of the road, facing west Structures on south side the road, facing north

    b. Odd Numbers: Structures on the west side of the road, facing east Structures on the north side of the road, facing south D. Non-Conforming Roads and Addresses Where conditions exist that do not meet the standards set forth herein, or where roads or structures have been incorrectly assigned an incorrect numerical address, the Development Services Department will attempt to issue a correct

address for new roads/lots, but will not rename/renumber historically inaccurate roadways unless it is practical or necessary to do so.

2.9 Miscellaneous

A. Survey Monuments: Permanent survey monuments shall be accurately set and established at the intersections of centerlines of roads within the development and intersections with centerlines of existing roads and the beginning and ends of curves on centerlines or points of intersections or tangents. All permanent survey monuments shall remain in place, or be reset at the developer's expense when approved by the County, after the roadway pavement and related improvements are installed. All development plans shall be tied to a section corner or monument of record, as established by the Juab County Surveyor.

B. Bridges & Culverts: Design and construction of new bridges, box culverts, or other spanning structures shall be approved in advance by the County. For bridges identified as essential structures to the County, the County may participate financially, and in the case of a bridge required to serve only a development, the developer shall pay the total cost of construction. The developer shall comply with all the conditions imposed by the County relative to the bridge location, design & construction. All bridge design shall be according to the American Association of State Highway and Transportation Officials (AASHTO) design guidelines and performed by a professional engineer as per applicable state laws.

C. Environmental Permits: Any permits or clearances required for the proposed development shall be the responsibility of the developer. Permits may include, but not be limited to, the following:

    1. Stream Alteration Permit issued by the State Engineer’s Office for stream alterations, or encroachments.

    2. Individual or Nationwide Permit for Waters of the US issued by the US Army Corps of Engineers for impacts to wetlands and navigable waterways.

    3. Utah Pollutant Discharge Elimination System issued by the State Department of Environmental Quality for construction activities disturbing more than one acre. In addition the developer shall comply with the Utah Noxious Weed Act and the Juab County Noxious Weed Policy.

3.0 IRRIGATION WATER FACILITIES DESIGN

3.1 General

A. All design and construction must comply with the requirements and standards of the applicable irrigation company and Juab County.

B. Relocation or modification of irrigation facilities shall be approved by the affected irrigation company. The County shall require that a letter of approval, signed by an authorized agent, be provided by the irrigation company.

C. Existing irrigation ditches or canals may be required to either be piped or fenced on both sides when adjacent to or contained within property to be developed.

D. Rights-of-way and/or easements for irrigation company owned facilities on developer's property shall be provided by the developer. Right-of–way/easement width must meet irrigation company requirements.

E. Minimum horizontal clearance between an open irrigation line and other utilities shall be at least sixteen and one-half (16.5) feet. Closer tolerances require piping of the irrigation system or other design alternative, and require approval from the affected irrigation company.

F. Co-location of utilities with an irrigation company facility shall have irrigation and utility company concurrence.

4.0 STORM DRAINAGE DESIGN

4.1 General

A. Post-development peak runoff rates, including sheet flow, shall not exceed predevelopment peak rates. County approved storm drainage and detention facilities will be required to meet this Standard.

B. No drainage facility may be directed to or flow into County rights-of-way, easements, or property.

C. All storm water facilities must adequately handle run-off from the site development, as well as all upstream contributing flows for specified storm events.

D. A drainage system shall be designed to:

1. Accept all natural drainage patterns and channels and create no adverse impact on downstream properties.

2. Accommodate all off-site storm water flows that enter the development site under the influence of natural drainage patterns.

3. Convey discharge surface waters to the flow line of an existing watercourse or an adequate existing underground or above-ground conveyance system with appropriate permits as required

4. If an existing irrigation system is used as part of a storm water collection system or outfall system, obtain permission and concurrence from the irrigation system operators/owners for such use.

5. Control storm water discharge rates not to exceed the pre-development flow rate.

6. Accommodate the design flows created by a 10-year return intensity storm event.

7. Base storm water flows on the appropriate small area or larger area run-off calculation technology.

8. Comply with the County Storm Water Management Program as applicable.

9. Comply with Clean Water Act requirements for allowable pollutant levels in discharge flows.

10. Comply with the Juab County Water Master Plan.

E. Storm drainage design shall consider the provision of drainage easements for off-site contributory run-off through the site, and allow future improvements of adjacent developments.

F. A new discharge of concentrated storm water from a pipe, culvert, channel, or other drainage structure shall not be created through lands of another property without first obtaining a permanent storm drainage easement and constructing a channel to guarantee continuity of an outfall from the point of discharge to the nearest natural or man-made watercourse with appropriate permits as required.

G. If off-site downstream construction and easements are required to construct an adequate channel outfall, no plans shall be approved until such storm drainage easements have been obtained and recorded. Conditional approval may be granted upon review of the plans prior to the securing the easements or rights-of-way.

H. If the installation of a storm water system requires publicly owned easements, the developer shall convey such easements by deed to Juab County.

I. Storm water design and construction methods must adequately address potential problems which may arise during construction or by design so as not to pollute, erode, or deposit sediment or cause any other degradation to existing natural conditions. Oil and grease separation devices shall be used in conformance with requirements of the Clean Water Act. A feasible plan for device maintenance shall be provided.

4.2 Road Drainage

A. Roads shall be designed for a minimum storm frequency of a ten (10) year return period.

B. The design spread for a ten (10) year event shall be limited so that all traffic lanes in each travel direction shall be kept free of flooding.

C. No concentrated flow greater than one (1) cubic foot per second shall cross a pedestrian pathway or sidewalk.

D. Roadway facilities that cross streams or other flowing water shall be designed to handle a storm frequency of a one-hundred (100) year return period within the road right-of-way or easement to reduce flooding of adjacent properties and to maintain channel integrity on either side of the roadway.

4.3 Storm Sewers

A. Storm sewer trunk lines and laterals shall be designed to adequately handle run-off from a ten (10) year storm.

B. The hydraulic gradient of storm sewers for the post-development shall be lower than the grate inlet top elevation at all points.

C. If easements are necessary for the installation and maintenance of public storm sewer systems such easements shall be a minimum of 20 feet in width with the storm sewer line centered within the easement. No buildings, utilities or structures shall be erected or constructed within such easements as to interfere with the activities necessary to properly access and maintain or replace such lines or storm sewer structures.

D. Allowable storm sewer pipe material is as follows:

1. Concrete (reinforced or non-reinforced)

2. High Density Poly Ethylene (HDPE)

3. Corrugated Metal Pipe (CMP)

E. Storm water inlets shall be industry standard approved.

F. Pipe size shall be determined by required capacity but in no instance shall the minimum mainline size be less than 15" diameter.

G. Cover over storm drain facilities shall be sufficient to adequately protect such facilities from potential loadings either during construction or final finished surface.

H. Minimum clearance between storm drain facilities and other buried utilities shall be at least 18 inches.

I. Test pits will be required and shall be shown on the plans for all storm drain crossings which involve gas lines, water mains 12 inches in diameter and larger, sanitary sewer crossings, and all fiber optic telephone service lines.

J. Storm drain lines shall be installed with no horizontal or vertical deflection, unless authorized by the County.

K. Storm Sewer manhole spacing shall be 350 feet maximum.

L. Storm Sewer manholes shall be four (4) feet in diameter for in-line manholes where grade changes occur. Five (5) foot diameter manholes are required when deflection angle is greater than or equal to 45 degrees, when the manhole is a junction manhole of three or more lines, for sewers whose inside diameter is 15" or greater, or when the cover above invert elevations is 14 feet or greater. All manholes shall be constructed with steps for maintenance access.

M. All storm sewer taps, either public or private, into existing storm sewer piping shall be limited to 4" and 6" and shall be constructed by the contractor and inspected by the County. All connections greater than 6" shall require a storm drain manhole to be constructed.

4.4 Subsurface Drainage and Drainage Swales

A. When connected to the storm sewer allowable Sub-Drain pipe materials are as follows: 1. Concrete (reinforced or non-reinforced) 2. HDPE (High Density Polyethylene) for service laterals only 3. Corrugated Metal Pipe (CMP)

B. When connected to the storm sewer install magnetic locator tape 12 inches below finished grade centered along the subsurface drainage pipe alignment.

C. If drains are used around building foundations, a typical section and layout of the peripheral drain shall be shown on the development plan and on individual grading plans. The upper end invert shall be a minimum of six inches (6") below the finished grade of the basement floor and laid at a minimum grade of two percent (2%).

D. Subsurface drainage lateral material shall be HDPE and shall be clearly marked with identifiable tape or other approved methods in order to avoid confusion with other drainage systems. Connections to the mainline shall be accomplished via adapters provided by the manufacturer.

E. Subsurface drainage manholes shall be 4' diameter for in-line manholes where grade changes occur. Five foot (5') diameter manholes are required when deflection angle is greater than or equal to 45 degrees, when the manhole is a junction manhole of three or more lines, for sewers whose inside diameter is 18 inches or greater, or when the cover above invert elevations is 14 feet or greater. All manholes shall be constructed with steps for maintenance access.

F. Sumps and drainage swales designed as part of the development's detention systems shall only be allowed when approved by the County and only when no available outlet exists and the soil conditions are such that they will adequately permit the water to infiltrate properly. In areas within a well or spring protection zone, sumps and drainage swales will be allowed only when found to be acceptable under the current Drinking Water Source Protection Plan, or the owner of the water source being protected agrees that the storm water disposal facilities can be accommodated in the next updating of the Drinking Water Source Protection Plan.

G. The capacity of sumps and drainage swales can only include the cross sectional area in calculating the required storage volume available. Percolation tests submitted by the developer must demonstrate that sumps and drainage swales can adequately dissipate the generated storm run-off in a reasonable time period.

H. Drainage swales may be utilized on County roadways. Drainage swales shall meet the following guidelines: 1. Meet the same design criteria as retention basins 2. Side slopes do not exceed 3:1 in steepness 3. Swales do not exceed 18" in total depth 4. Swales do not extend below the natural water table 5. Swales will not support wetland vegetation under normal conditions 6. Vegetation in the swale shall be maintained by the adjacent property owner.

4.5 Channels and Culverts

A. Channels and culverts shall be designed to adequately handle run-off from a 50-year storm.

B. Culverts and Channels shall be designed in accordance with the UDOT Roadway Drainage Manual of Instruction.

C. The sides of all conveyance channels shall be extended until a minimum of six inches of free board (distance from water surface to top of bank) is provided above the 50-year event water surface elevation within the conveyance channel.

D. Conveyance channels with side slopes steeper than 3:1 (Horizontal/Vertical) shall be stabilized by paving, riprap, gabions, or other approved measures.

E. The minimum conduit diameter for culverts shall be 18 inches.

F. Culverts shall be designed and installed to account for ultimate right-of-way and road widths.

G. Culvert design calculations shall include exit velocities.

H. Culvert exit velocity shall be consistent with the maximum velocity in the natural channel or shall be mitigated by using energy dissipation devices and / or channel stabilization in accordance with the UDOT Roadway Drainage Manual of Instruction.

I. Flared end sections shall be installed at the open ends of all drainage pipes.

4.6 Detention / Retention Facilities

A. Detention basins shall be designed to detain post development condition run-off to precondition run-off during a 10-year storm and to safely pass a 100-year storm while maintaining at least one foot (1') of freeboard.

B. Basin outflow shall be limited to the maximum rate which maintains the adequacy of the channel and shall not exceed the pre-development rate of flow to the specific point of concentrated discharge, not the pre-developed flow from the entire drainage area. Under no circumstances shall an outlet flow exceed 0.2 cfs/acre for a 10-year storm event. If a channel does not exist at the point of discharge, then a channel shall be constructed to convey the drainage to a stable outlet.

C. Detention and Retention basins shall be designed with an emergency overflow for events greater than the 100-year storm event that safely conveys flood waters to an acceptable facility.

D. Hand or computer generated routing calculations are required along with inflow and outflow hydrographs.

E. The use of pumps to drain detention facilities shall not be allowed.

F. Minimum conduit diameter for basin outlets shall be 18 inches. Lesser orifice sizes for flow control shall be provided with a manhole or other acceptable structure fitted with the required orifice.

G. Safety measures shall be incorporated into the design of all storm water detention facilities. These may include, but are not limited to safety ledges, fencing, warning signs, anti vortex devices, stadia rod indicating depth at the lowest point, and outlet structures designed to limit public access.

H. All detention facilities must comply with current Clean Water Act requirements.

I. Detention basins may be designed to provide the following:

    1. Side slopes of 3:1 maximum.

    2. All weather vehicular maintenance access around the entire basin (min. ten foot (10') widths).

    3. Lot shall provide normal frontage requirements.

    4. Flow through design which eliminates "wet basin".

    5. Cross slope within basin shall provide adequate drainage. Under no circumstances shall the slope be less than 1% across any portion of the basin.

    6. All detention lots or easements shall be properly surveyed and corners permanently marked prior to acceptance of improvements.

J. Detention facilities shall be constructed on a parcel that will not be maintained by Juab County. Easements and provisions allowing access to the inlet and outlet

structures by the County shall be required. The decision to accept a detention lot as County property shall be made by the County Council.

K. Retention (infiltration) systems will be considered for review only if a Soils and Geo-Technical Report is provided which discusses soil permeability, potential effects on ground water, and potential effects on underlying geologic strata. A percolation test will be required to determine the capacity of retention basins. Basin capacity must be based on the infiltration rate, drainage area, and a 50 year storm event. In areas within a well or spring protection zone, sumps, and drainage swales will be allowed only when found to be acceptable under the current Drinking Water Source Protection Plan or the owner of the water source being protected agrees that the storm water disposal facilities can be accommodated in the next updating of the Drinking Water Source Protection Plan.

5.0 ACCESS MANAGEMENT

5.1 General

Access to County roadways from adjoining properties is managed according to the following regulations to maintain the safety and operational characteristics of the County roadway system. Each County roadway is assigned an access category and category assignments are shown in Appendix E.

5.2 Minimum Access Spacing

To maintain safe and effective transportation corridors, Juab County limits the access of roads (private or public), homes, and businesses to all roadways. Table 5.1 designates the spacing requirements for all County roads. Road Access refers to any public or private road, either a full or partial movement intersection. Commercial Access is access to any commercial or industrial business, excluding a home based business as defined in the Juab County Land Use Code. Residential/Farm Access refers to any home, farm structure, cabin, or other accessory structure. Minimum spacing includes all access points and road intersections on both sides of the roadway.

Table 5.1 - Juab County Access Management Standards

		Minimum Spacing Standard (Feet)[1]		
Level-of-importance		Road Access	Commercial Access	Residential/Farm Access
A	Arterial	660	350	350
C	Collector	350	200	200
L	Local	300	150	10[1]
R	Rural	300	Not Permitted	10[1]
M	Mountain Road	300	Not Permitted	10[1]

[1]Minimum spacing from an intersection shall be 80 feet.

5.3 Criteria for Granting Access

A. The number and location/spacing of access points allowed is based on the Category of Roadway, the minimum spacing standards as set forth in Table 5.1 Juab County Access Management Standards, and the following:

1. When application is made, access to a roadway may be granted if reasonable access cannot be obtained from the lower classification roadway.

2. A determination of reasonable access from a local road or road should include consideration of the road function, purpose, capacity, operational and safety conditions, and opportunities to improve the road.

3. Direct access to a higher functional roadway classification will be approved if the alternative access will create a significant operational or safety problem at the alternative location and the direct access to the roadway will not cause a significant problem.

4. Juab County may limit access points beyond that which is allowed in Table 5.1 if the County establishes that the access will create a significant safety or operational problem or the access does not meet acceptable design standards including spacing.

B. The minimum spacing of all intersecting public ways and other significant accesses that will be full movement intersections is 660 feet. Where it is not feasible to meet 660 feet of spacing a design exception and traffic study will be required. Spacing to nearby intersections must be sufficient to accommodate the future year left turn and through vehicle storage queues for both turning movements. The access location shall also meet other access spacing, design, and need requirements.

5.4 Driveways

Table 5.2 - Juab County Driveway Standards

Dimension within ROW	Access Width	Residential	Commercial / Industrial[1]
	Minimum	10’ [2]	24’
	Maximum	24’	36’
	Surfacing Material Minimum Depths		
	Granular Borrow (Pit run)	8”	8”
	Untreated Base Course (Road base)	4”	N/A
	Paved (Bituminous)	3”	6”
	Road with Concrete Curb and Gutter	6” Concrete	8” Concrete

[1] Does not include home based businesses as defined by Title 17 of the County Code.
[2] Minimum may be increased by international fire code requirements.

A. All driveway standards herein are for the portion of the driveway within the County right-of-way only. These standards do not impose requirements on driveways connecting to private roads or for the portions of driveways not within County rightof- way. All driveways shall meet the requirements of the most current and adopted International Fire Code.

B. Driveway Location: Driveways for all uses except single-family homes shall not be closer than eight (8) feet to an adjacent interior property line. Accesses for single family homes may be granted within two (2) feet of the property line. All driveways shall be set back a minimum of eighty feet (80') from any intersection.

C. Common Driveways: Driveways along the property lines may be installed for common use of both adjacent properties only upon approval by the Supervisor and guaranteed by a recorded access agreement.

D. Driveway Access Design

1. Driveways that access a County road shall be reviewed by the Supervisor to determine the need, sizing, and placement of a culvert.

2. Driveways that access a County road that have concrete curb and gutter shall not use a bridge to span the gutter, but rather shall complete the access using a curb cut.

5.5 Access to State Roads

Any new access, existing access that is being altered, change in land use that utilizes an existing access, or any work within the right-of-way of a State facility is required to obtain the appropriate permits from the Utah Department of Transportation (UDOT) – Region 3.

5.6 Access Requirements for Multi-Jurisdictional Development

A. County Developments Accessing City Roadways: No development within the unincorporated County shall be permitted to utilize a roadway for direct access that is under the jurisdiction of a municipality without express written approval from the affected municipality. Unincorporated development shall be required to meet all standards and requirements as established by the municipality as part of the conditions for development. Direct access shall constitute driveway or private road access from a public roadway.

B. Municipal Development Accessing County Roadways: No municipal development shall be permitted to access a County roadway without the express written approval from the Juab County Council. It is the policy of Juab County that no service shall be

provided to municipal developments from County roadways unless extreme circumstances provide no alternative and annexation or acceptance of ownership of the roadway by the municipality is not possible.

6.0 SIGNAGE AND ROADSIDE HAZARDS

6.1 General

The purpose of this policy is to establish and maintain uniform procedures and practices concerning sign maintenance and traffic operations on county roadways. The county will provide such control in a safe and cost-effective manner, balancing the needs of safety for roadway users with county personnel, budget, and social/environmental concerns.

6.2 Procedures

The Road Department will make decisions concerning scheduling and the procedures to be followed for daily traffic sign maintenance needs and subsequent yearly detailed condition inspections. Scheduling and the procedures to be followed will be based upon consideration of the following factors: significance of the traffic device to driver safety; condition and effectiveness of the devices; standards compliance; and whether damage or condition of device creates an immediate safety hazard.

In every instance, the onsite county personnel must assess the conditions of the traffic control device and rely on judgment and experience to determine the appropriate action to correct or maintain the device. Factors that may delay completion of traffic sign maintenance include but are not limited to other repair needs, utility locates, fabrication of necessary material, weather conditions, limited visibility; and other staff and field condition issues.

6.3 Sign Maintenance

A. General: All county signs shall be entered into a database for tracking. Signs shall have the following information collected/assigned: sign number for all regulatory and warning signs, photograph of the sign, direction of the sign face(s), date of installation, type of post, type of sign material, a record of maintenance, and a GPS coordinate. All regulatory and warning signs shall be identified by a sign sticker placed on the back of the sign. Any signs removed shall be indicated as such within the database.

B. Installation: All signs shall be installed in compliance with the most recent edition of the MUTCD, Title 12 of the county code, and this policy. The county may deviate from typical sign installations, at their discretion, due to conflicts with utilities,

narrow rights-of-way, sight distance issues, or other road side or environmental factors.

1. County signs are typically installed on telspar type posts.

2. Road name/address signs are typically collocated with stop/yield signs at intersections and placed above the regulatory sign.

3. All sign requests shall be made on a sign request form, which shall then be reviewed in compliance with this policy.

C. Sign Retro-reflectivity: It shall be the intent of the county to conduct a retroreflectivity evaluation of all signs at least once a year via a visual nighttime inspection as authorized by the MUTCD. Signs that do not meet the retro-reflectivity standard shall be replaced to ensure compliance with the MUTCD and this policy.

D. Maintenance: The County shall perform a visual inspection of all signs once a quarter. This inspection shall ensure and record the condition/effectiveness of the sign, update the sign inventory, and make any minor repairs as required. After the initial placement of signs, the county shall, as budgetary factors allow, replace signs as they reach the end of the latter of their (a) warranty period, (b) expected life expectancy for the facing material used on the sign, or (c) expected life as determined by an authorized engineering study. Damaged, stolen, or missing signs shall be replaced as needed.

1. Sign maintenance personnel shall use the necessary equipment and traffic controls, as directed by proper county sign maintenance practices and the Field Manual of Temporary Traffic Control Zone Layouts when performing sign maintenance activities along county roadways.

2. All signs (regulatory, warning, or informational) that are replaced for any reason shall be replaced with a retro-reflectivity compliant sign consistent with the MUTCD.

E. Maintenance Responsibility

1. The county is responsible for all signs located on county roadways, including those on county roadways within municipal limits and those designated for county maintenance by UDOT within R918-6, with the following exceptions:

    a. Municipalities may request to place additional or specialized signs along county roadways including street markers, community directional or welcome signage, electronic pedestrian crossing signs, etc. All requests shall obtain the appropriate approval for the sign type as per this policy and Title 12 of the county code. The requesting municipality shall be responsible for the installation and maintenance

of the signage unless specific agreements are otherwise made with the county.

b. Signs on private roads that enter onto county roadways shall be required to conform to the MUTCD, this policy, and Title 12 of the county code.

    i. The placement of signs or need thereof on private roads shall be reviewed at the time of development.

    ii. To ensure for the health and safety of the traveling public, the county may place and/or maintain signage at private/County roadway intersections. At the county's option, the owner(s) of the private road may be billed the full cost of the signage improvements.

c. Other organizations may request to locate signs along county roadways that serve to benefit the traveling public. In no instance shall commercial or advertising signs be located within the county right of way or roadway. All such signs shall be approved in conformance with this policy.

F. Removal of Signage:

1. The county shall remove all unauthorized signage from county right of ways and roadways.

2. As excess road signs reduce the effectiveness of signage and impose an unnecessary financial burden on the county, signs determined to be unnecessary for safety purposes and which are not otherwise required to comply with an applicable state or federal statute or regulation shall be removed. The removal of signs shall follow the same process and approval requirements as the placement of a sign.

G. Temporary Signage: All temporary signage shall be approved by the county.

1. Special event signage shall be approved through the special event permit process as established in Title 8.40 of the county code. All traffic control devices shall conform to the requirements of this policy and the MUTCD. Markings on the roadway shall be made with temporary marking paint.

2. Construction signage shall comply with all encroachment permitting requirements as outlined in Section 2.6 of this policy.

H. Response to Incident Report for Sign Repair Needs: Sign maintenance staff will respond after receiving notice of an incident that damages a sign and will determine the appropriate action. Repair of signs shall be made using the following priorities:

1. All Regulatory Signs: As soon as practical, but no later than four (4) hours from the time of notification, a temporary sign may be placed in this time period, prior to permanent repairs being made.

2. Warning Signs (e.g. Stop ahead, Curve, etc.): Within two scheduled working days.

3. All other signs: When time and manpower allow.

6.4 Road Side Hazards

A. Clear Zone Requirements: The AASHTO Roadside Design Guide defines a clear zone as the total roadside border area, starting at the edge of the traveled way, available for safe use by errant vehicles. This area may consist of a shoulder, a recoverable slope, and a non-recoverable slope.

   1. Shoulder – minimum shoulder shall be provided in compliance with Table 2.

   2. Recoverable slope – flatter than 1V:4H

   3. Non-recoverable slope – between 1V:3H and 1V:4H if they are smooth and free of fixed objects

B. Vegetation

   1. The county shall maintain regular vegetation control programs to prevent growth of trees, shrubs, and other vegetation by the roadside that can become a safety hazard.

      a. Trees that are within the clear zone should be removed. Trees with branches that infringe on the clear zone should be trimmed.

      b. Grass and brush should be mowed within the clear zone.

C. Utilities and Canals/Ditches

   1. Newly located utilities (above or below ground) shall be placed outside of the clear zone to reduce the potential for conflict with vehicles. On narrow roadways, additional distance between the roadway and utility placement may be required to accommodate widening of the roadway over time.

   2. Canals/Ditches shall be, where practical, located (relocated when possible) outside of the clear zone.

D. Objects in the Clear Zone

   1. Placement of hazards within a county right-of-way or within the clear zone of any county roadway constitutes unauthorized work within the right-of-way.

The landowner or person responsible for the hazard will be notified in writing and requested to remove or correct the hazardous condition.

2. If, after a reasonable amount of time, the landowner refuses or has not corrected or removed the hazard, the county will correct or remove the hazard at the landowner's expense. If there appears to be a significant hazard to the traveling public or maintenance equipment, the county may immediately remove the hazard at the landowner expense.

APPENDIX

APPENDIX A – STANDARDS FOR CONSTRUCTION DRAWINGS

The following instructions are for the purpose of standardizing the preparation of drawings to obtain uniformity in appearance, clarity, size, and style. These plans and designs shall meet the standards defined in the specifications and drawings herein outlined unless approved otherwise.

The minimum information required on drawings for improvements are as follows:

A. All drawings and/or prints shall be clear and legible and conform to good engineering and drafting practice, on 24" X 36" or 11" X 17" sheets as approved by the County.

B. In general, the following shall be included on all drawings:

1. North arrow (plan)
2. Scale, written and graphic: 1" = 40' horizontal, 1" = 4' vertical (other appropriate scales as approved by the County)
3. Elevations referenced to the NAD 8
4. Stationing and elevations for profiles
5. Location map
6. Index map
7. General and Construction notes
8. Title block, located in lower right corner of sheet to include:
    a. Name of County
    b. Project title (subdivision, etc.)
    c. Specific type and location of work
    d. Signature block for approval signature of County and date
    e. Name, address, phone number, etc. of engineer or firm preparing drawings with license number, stamp, and signature
9. Details at 1" = 10' or other appropriate scale to adequately provide required information

C. Roadway surfacing drawings, and pedestrian paths or sidewalks shall show:

1. Plan and profile views must be shown for centerline of road.

2. Cross sections at 50-foot intervals showing existing ground, proposed roadway template, cut/fill slope catch points, and right-of-way

3. All existing elevations shall be shown in parentheses

4. Include stationing, centerline elevations, and curve data

5. Flow direction and type of drainage structures with adequate flow line elevations

6. Typical cross section for all roadways and variations

7. 100' minimum of existing plan and profile design when connecting to existing improvements

8. 300' minimum of future plan and profile design when roadway is to be extended (must also include 300' of existing profile along future rights-of-way lines)

9. Soil Boring Log along roadway centerline if required by County

D. Storm drainage drawings shall show:

1. Minimum scale: 1" = 40’ horizontal, 1" = 4' vertical

2. Location, size and slope of mains, and lateral connections

3. Location, size and details of inlets, junction boxes, etc.

4. Stationing of manhole center lines, lateral connections, and crossings

5. Manhole size, location and flow line elevation, lid elevations

6. Design flow rate (10 yr. storm), hydraulic grade line and velocity (all indicated in profile for each pipe section)

7. Type of mainline pipe

8. Outfall or receiving waters identification.

E. Roadway, Drainage, and Grading Plans

1. Plans showing site general layout and drainage patterns

2. Roadway plan drawings shall show cut/fill catch points

3. Cut and fill lines shall be labeled accordingly

4. Spot elevations of final grades

5. Finished grade contours at one foot intervals

6. Detention facility details including: inlets, outlets, and piping facilities with final elevations

7. Calculations to substantiate design (include in submittal but not to be included on plans)

F. Erosion Control Plans

1. Plans showing site general layout and drainage patterns and outlets for water exiting construction site

2. De-silting basin details including inlets, outlets, and piping facilities

3. Calculations to substantiate design (include in submittal but not to be included on plans)

4. Erosion control construction notes

5. Plan shall include an emergency phone number and name of the developer's responsible person who will be available 24 hours a day if an emergency situation arises

6. Re-vegetation plans of disturbed soils

7. Notes indicating compliance with Storm Water Pollution Prevent Plan and noxious weed control regulations

APPENDIX B – GEOMETRIC DESIGN CRITERIA

A. Design Traffic Volume: Roads shall be designed for a specific traffic volume that is based on the average daily traffic (ADT) volume projected to a 20 year design future. Upon approval from the Supervisor, the design year may range from the current year to 20 years depending on the nature of the improvements.

B. Design Speed: The design speed is a selected speed used to determine the various design features of the roadway. Geometric features should be consistent with a specific design speed selected as appropriate for site conditions and anticipating the speed of vehicles using the roadway. Low design speeds are generally applicable to roads with winding alignment in rolling or mountainous terrain. High design speeds are generally applicable to roads in level terrain. Intermediate design speeds would be appropriate where terrain, roadside development conditions, and environmental conditions would support moderate roadway speeds. Table A-1 lists values for minimum design speeds as appropriate for traffic needs and types of terrain.

Table A-1 Minimum Design Speeds for Juab County Roads

	Design Speed (mph) for specified design volume (veh/day)					
Type of Terrain	Under 50 veh/day	50 to 250	250 to 400	400 to 1500	1500 tTo 2000	2000 And over
Level	30	30	40	50	50	50
Rolling	20	30	30	40	40	40
Mountainous	20	20	20	30	30	30

C. Sight Distance: Minimum stopping sight distance and passing sight distance should be as shown in Table A-2 and Table A-3. These tables provide characteristics of vertical curves allowing adequate sight distances based on traveling speed.

Table A-2

Design Controls for Stopping Sight Distance for Crest and Sag Vertical Curves

Initial Speed (mph)	Design Stopping Sight Distance (feet)	Rate of Vertical Curvature, Ka (ft%)	
		Crest	Sag
15	80	3	10
20	115	7	17
25	155	12	26
30	200	19	37
358	250	29	49
40	305	44	64
45	360	61	79
50	425	84	96
55	495	114	115
60	570	151	136

Table A-3

Design Controls for Crest Vertical Curves Based on Passing Sight Distance

Initial Speed (mph)	Design Passing Sight Distance (ft)	Rate of Vertical Curvature, Ka (ft/%)
20	710	180
25	900	289
30	1090	424
35	1280	585
40	1470	772
45	1625	943
50	1835	1203
55	1985	1407
60	2135	1628

D. Roadway Grades: Maximum roadway grades are shown in Table A-4:

Table A-4 Maximum Grades for Juab County Roads

	Maximum Grade (%) for specified design speed (mph)							
Type of Terrain	15	20	25	30	40	50	55	60
Level	9	8	7	7	7	6	6	5
Rolling	10	10	10	10	10	8	7	6
Mountainous	10	10	10	10	10	10	9	8

E. Alignment: Horizontal and vertical alignment between control points should be designed to be as favorable as possible consistent with environmental impact, topography, terrain, design speed, design traffic volume, and the amount of reasonable obtainable right-of-way. Sudden changes between curves of widely different radii or between long tangents and sharp curves should be avoided. Where

crest vertical curves and horizontal curves occur together, there should be greater than minimum sight distance to ensure that the potential hazards are visible to approaching drivers. Table A-5 lists minimum radius of horizontal curves with respect to design speed for Juab County roads. Curve data is required for all roadway centerlines.

Table A-5 Minimum Horizontal Curve Radius for Cache County Roads

Design Speed (mph)	10	15	20	25	30	35	40	45	50	55	60
Curve Radius (ft)	16	42	86	154	250	371	533	711	926	1190	1500

If possible, the horizontal alignment shall be tangent through intersections, but where horizontal curves cannot be avoided, the following shall be observed:

1. Use a curve of sufficient radius to provide adequate sight distance and eliminate the need for super elevation. Under no condition shall the curve radius be less than that required for the road classification.

2. Curves should not begin or end within an intersection.

3. Eliminate angle points in excess of two degrees (2°) on intersecting roadways by use of a large radius curve.

4. Angle points up to five degrees (5°) are permissible at the intersection of two residential roads.

5. Curve radii and super elevation shall consider the design speed for the given road.

F. Landings - A landing is defined as the area between the through road roadway and the point at which the side road grade begins to exceed 3%. The required minimum lengths of the landings are as follows:

1. Arterial 200 feet

2. Collector 100 feet

3. Local/Rural 50 feet

4. Cul-de-sac 25 feet

G. Roadway Intersections:

1. Number of Roadways: Conventional at grade intersections shall not be designed to accommodate more than two (2) roadways or four (4) corners. If

additional intersecting roadways are necessary, a roundabout intersection design may be appropriate.

2. Intersection Angle: Roadways shall intersect at a ninety degree (90°) angle, or as near to a right angle as practicable, but shall not to exceed a ten degree (10°) deviation.

3. Corner Radii: Roadway intersections shall be rounded with the minimum radii measured at the edge of asphalt: a. 25 feet for local/rural roads b. 30 feet for arterials and collectors 4. Roundabouts: Roundabouts shall be designed following Federal Highway Administration's publication No. FHWA-RD-00-067 "Roundabouts: An Informational Guide" and the Guide & Manual on Uniform Traffic Control Devices (MUTCD).

   Concept shall be approved in advance by the Supervisor.

H. Cross Slope: Pavement cross slope shall be adequate to provide proper drainage.

   1. Asphalt surfaced roadways shall have cross slopes ranging from 1.5 to 2 percent.

   2. Gravel surfaced roads shall have a 3 percent cross slope.

   3. Cross slopes may vary based on the specific project conditions, but shall be approved by the County.

I. Super Elevation: The maximum super elevation rate for Juab County roadways is 8%.

J. Width of Traveled Way and Shoulder

   1. Graded shoulder width is measured from the edge of the traveled way to the point of intersection of shoulder slope and fore slope as shown on the typical roadway section drawing.

   2. The minimum roadway width is the sum of the traffic lanes, median, auxiliary lanes, and graded shoulder widths given in Table A-6. Where roadside barriers (guardrail) are proposed, it is desirable to provide a minimum offset of 4 feet from the traveled way to the barrier when practical.

K. Median: Need and justification for a two-way left turn median shall be determined by the Supervisor. The median shall be placed in the travel way and equally placed on the roadway centerline. The travel way width is increased by the amount of median width. See Figure A- 7.

L. Auxiliary Turning Lanes: Auxiliary left and/or right turning lanes shall be included in the roadway typical section when required. See Figure A-7.

M. Horizontal Clearance to Obstructions: A clear zone of 7 feet or more from the edge of traveled way that is appropriately graded is required for roadway design speeds less than 40 mph. Clear zone widths for roadways with design speeds for 40 mph and greater shall comply with the AASHTO Roadside Design Guide, latest edition. See Figure A-7.

1. An exception may be made where guardrail protection is provided.

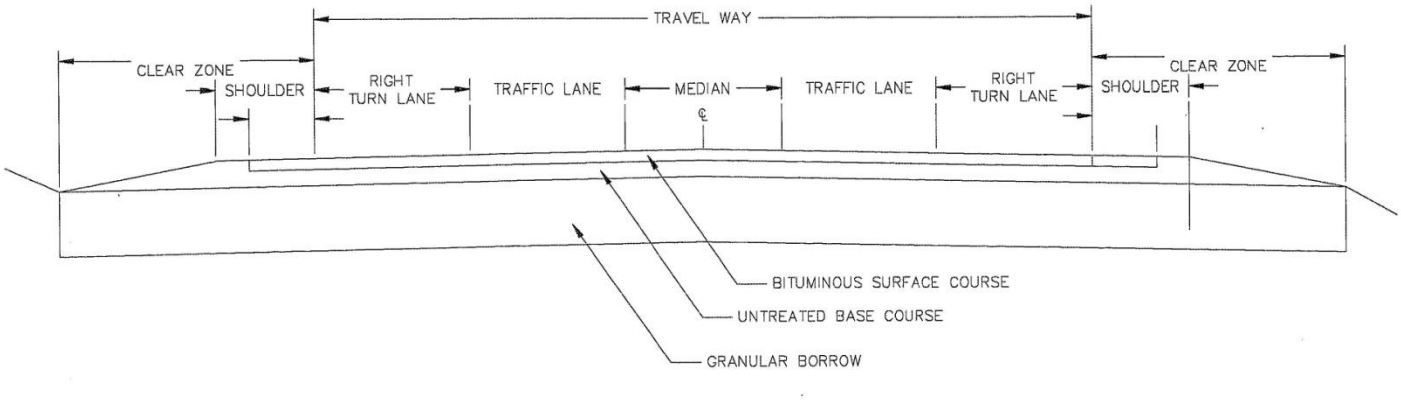
2. The clear zone area shall be clear of all unyielding objects such as trees, sign supports, utility poles, light poles, and any other fixed objects that might severely damage an out-of-control vehicle.

3. Drainage and irrigation ditches shall not be within the clear zone area.

Table A-6 Typical Cross Section Minimum Standards

		Minimum Width of Traffic Lanes (ft) for Specified Design Volume (ADT)				
	Roadway Classification	Mountain	Rural	Local	Collector	Arterial
	Design Speed (mph)	Under 50	Under 200	200 to 1500	1500 to 5000	Over 5000
	15/20	12	10	-	-	-
	25	12	10	10	-	-
	30	12	10	10	11	-
	40	-	10	10	11	12
	45/50	-	10	11	11	12
	55+	-	11	11	12	12
Minimum	R/W Width	66	66	66	80	100
	Median Width	-	-	12	12	14
	Right Turn Lane	-	-	12	12	12
	Shoulder Width	0	2	2	6	8

Figure A-7 Typical Cross Section



N. Gravel Road Structural Construction

1. All work shall be verified by an independent soils testing materials technician acceptable to the County. The materials technician shall provide certification of each phase of the completed work to the County.

2. Topsoil and organic material shall be excavated from the roadway alignment area to a depth and width to accommodate the placement of sub base materials.

3. Underlying soils shall be proof rolled with a vibratory compactor roller. Adequate rolling and compaction of soft areas shall be verified by observation by the materials technician.

4. Geotextile reinforcement shall be placed in saturated or soft soil areas as deemed necessary by the County.

5. Compacted granular borrow shall be placed to the specified depth and width in accordance with Table A-8. The soils technician shall verify proper gradation, placement, and compaction of the material.

6. Compacted untreated base course shall be placed to the specified depth and width in accordance with Table A-8. The soils technician shall verify proper gradation, placement, and compaction of the material.

Table A-8 Typical Cross Section Structural Values

Typical Section	Bituminous Surface Course (BSC)	Untreated Base Course (UTBC)	Granular Borrow (GB)
A	0	6	14
B	2.5[1]	6	14
C	4	6	14

[1]Double Chip & Seal coat may be utilized based on traffic volume and engineering requirements.

O. Chip & Seal Surfacing Standards

1. All work shall be verified by an independent soils testing materials technician acceptable to the County. The materials technician shall provide certification that the following requirements were met at each phase of the completed work to the County.

2. Complete all work between May 15 and August 31.

3. Place seal coat when road temperature is at least 70º F, air temperature is at least 50º F, and forecasted temperature is not expected to be below 40º F within three (3) days after placement.

4. Use a self-propelled aggregate chip spreader specifically designed and manufactured for chip seal operations with gates to drop the correct amount of aggregate, plus or minus one (1) pound per square yard.

5. Use articulating type pneumatic roller weighing between six (6) and ten (10) tons with a maximum width of six (6) feet.

6. Water shall be applied to dampen the surface of the compacted untreated base course surface prior to placement of chip seal paving material. No standing water shall be present on the roadway surface.

7. CRS-2 emulsified asphalt material shall diluted to two (2) part of concentrate to one (1) part of water by the manufacturer be applied at a minimum temperature of 145º F and at a rate to attain 50% chip embedment prior to rolling and 70% embedment following rolling. An application rate of 0.42 gal per square yard is expected. Adjust application rates as necessary. The materials technician shall verify proper application of the asphalt material.

8. Place Type I crushed stone aggregate immediately applied to the asphalt coated roadway surface at the rate of 25 pounds per square yard. The materials technician shall verify proper gradation and application of the gravel material.

9. Roll to seat the gravel material into the asphalt coated roadway surface. The materials technician shall verify proper rolling and seating of the gravel material.

10. The rolled roadway surface shall be lightly swept to remove excess gravel material. Care shall be taken not to dislodge seated material. Any areas stripped of gravel material shall be repaired with cold mix asphalt material.

11. Water shall be applied to dampen the surface of the rolled roadway surface prior to placement of additional chip seal paving material.

12. As above, CRS-2 emulsified asphalt material shall be applied at the approximate rate of 0.35 gal per square yard of the roadway surface. The materials technician shall verify proper application of the asphalt material.

13. Type II crushed stone aggregate shall be immediately applied to the asphalt coated roadway surface at the rate of twenty five (25) pounds per square yard. The materials technician shall verify proper gradation and application of the gravel material.

14. Roll to seat the gravel material into the asphalt coated roadway surface. The materials technician shall verify proper rolling and seating of the gravel material.

15. The rolled roadway surface shall be lightly swept to remove excess gravel material. Care shall be taken not to dislodge seated material.

Table A-9 Gradation Limits

Sieve Size	Percent Passing	
	Type I	Type II
1 in	100	10
1/2 in	0-10	100
3/8 in	0-10	70-90
No 4	0-10	0-10
No 8	0-5	0-5
No 200	0-1	0-1

APPENDIX C – DRAINAGE CALCULATIONS

A. Drainage calculations by a licensed professional shall be provided to show that all storm water facilities can adequately handle run-off from the site development as well as all upstream contributing flows. Hydraulic capacity of pipe and culvert systems must be verified with engineering calculations in accordance with the Utah Department of Transportation (UDOT) Roadway Drainage Manual of Instruction.

B. Calculations shall include a copy of the of the site grading and drainage plan, at the plan scale with the boundaries, acreages and C-factors of the interior drainage areas shown.

C. Calculations shall also include a map at an appropriate scale delineating the boundaries, flow paths, acreages and C-factors of the drainage areas upstream of the development, which contribute storm water to the development.

D. Construction drawings shall show the location, size, flow line elevations, profiles and details of drainage facilities and structures, including, but not limited to swales, ditches, culverts under public roads and private drives, drop inlets, storm sewers, and detention/retention ponds. Typical cross sections of all swales and ditches shall be shown.

E. Profiles of roads shall show profiles of storm sewers and cross sections of culverts together with points of intersection. Profiles shall show clearance of such drainage facilities with water mains and sanitary sewers.

APPENDIX D – HYDROLOGIC PROCEDURES

A. For purposes of computing run-off, all existing and proposed gravel surfaced roadways, driveways, and parking areas shall be treated as being asphalt paved.

B. The Rational Method may be used to determine peak flows for sites smaller than 300 acres and having a time of concentration less than 30' minimum if the site surface characteristics make it applicable.

C. When the rational method is used, times of concentration for pre-development and post development shall be shown with their corresponding rain intensity.

D. Values from Table A-10 of rainfall intensity-duration-frequency shall be used with the rational method.

Table A-10 Rainfall Intensity Duration Frequency Precipitation Intensity Estimates (in/hr)

From NOAA Atlas 14 Logan Utah State University, Utah (42-5186) 41.7456 N 111.8033 W 4786 feet											
ARI* (years)	**5 min**	**10 min**	**15 min**	**30 min**	**60 min**	**120 min**	**3 hr**	**6 hr**	**12 hr**	**24 hr**	**48 hr**
2	1.62	1.24	1.02	0.69	0.43	0.28	0.22	0.15	0.10	0.06	0.04
5	2.26	1.72	1.42	0.96	0.59	0.37	0.28	0.19	0.12	0.08	0.05
10	2.78	2.12	1.76	1.18	0.73	0.45	0.33	0.22	0.14	0.09	0.05
25	3.64	2.77	2.29	1.54	0.95	0.57	0.42	0.27	0.17	0.11	0.06
50	4.37	3.32	2.75	1.85	1.15	0.68	0.49	0.31	0.19	0.12	0.07
100	5.23	3.98	3.29	2.22	1.37	0.80	0.57	0.36	0.22	0.13	0.08
200	6.18	4.70	3.89	2.62	1.62	0.94	0.66	0.40	0.24	0.15	0.09
500	7.74	5.89	4.86	3.28	2.03	1.15	0.79	0.47	0.28	0.17	0.10
1000	9.07	6.90	5.70	3.84	2.38	1.34	0.91	0.53	0.31	0.18	0.11

E. When the site surface characteristics warrant the use of a method other than the Rational Method, use the SCS method, Modified Rational Method or an approved procedure in accordance with Chapter 7 Hydrology of the UDOT Roadway Drainage Manual of Instruction.

F. Table A-11 shows precipitation frequency values that shall be used in conjunction with an approved hydrological procedure.

Table A-11 Precipitation Frequency Estimates (inches)

From NOAA Atlas 14 Logan Utah State University, Utah (42-5186) 41.7456 N 111.8033 W 4786 feet											
ARI* (years)	**5 min**	**10 min**	**15 min**	**30 min**	**60 min**	**120 min**	**3 hr**	**6 hr**	**12 hr**	**24 hr**	**48 hr**
2	0.14	0.21	0.26	0.34	0.43	0.56	0.66	0.90	1.21	1.55	1.86
5	01.9	0.29	0.35	0.48	0.59	0.74	0.84	1.13	1.48	1.90	2.26
10	0.23	0.35	0.44	0.59	0.73	0.90	1.00	1.33	1.73	2.18	2.59
25	0.30	0.46	0.57	0.77	0.95	1.14	1.25	1.62	2.07	2.58	3.05
50	0.36	0.55	0.69	0.93	1.15	1.36	1.47	1.86	2.34	2.89	3.42
100	0.44	0.66	0.82	1.11	1.37	1.60	1.71	2.13	2.64	3.23	3.81
200	0.52	0.78	0.97	1.31	1.62	1.88	1.98	2.41	2.95	3.58	4.22
500	0.65	0.98	1.22	1.64	2.03	2.31	2.38	2.83	3.39	4.05	4.78
1000	0.76	1.15	1.43	1.92	2.38	2.69	2.73	3.19	3.74	4.42	5.22

G. An inflow and outflow hydrograph will be required on all retention/detention basins.

H. Table A-12 shows the SCS 24-hr (Type II) rainfall distribution and the Farmer Fletcher rainfall distribution that shall be used to generate runoff hydrographs for detention/retention basins.

Table A-12 SCS 24-hr and Farmer Fletcher Rainfall Distribution
Farmer Fletcher 1-hr Storm Distribution

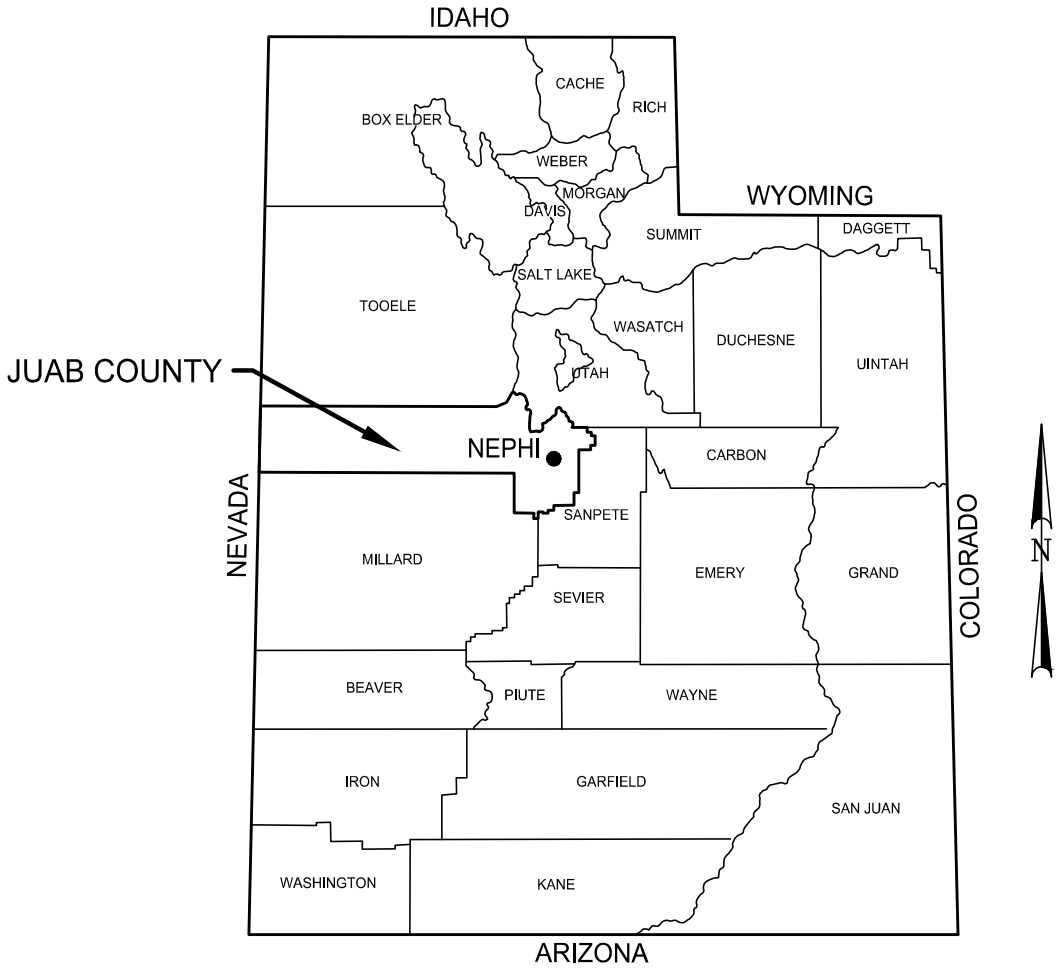
Time	Cumulative Depth	Time	Cumulative Depth	Time	Cumulative Depth
(hrs)	(%)	(hrs)	(%)	(Min)	(%)
1	1.08	13	77.24	6	36.5
1.5	1.64	13.5	79.89	9	51
2	2.23	14	81.97	12	61.5
2.5	2.84	14.5	83.8	15	70
3	3.47	15	85.38	18	76.5
3.5	4.14	15.5	86.76	21	80.6
4	4.83	16	88.01	24	83.9
4.5	5.55	16.5	89.14	27	86.2
5	6.32	17	90.19	30	88
5.5	7.12	17.5	91.15	33	89.5
6	7.97	18	92.06	36	90.8
6.5	8.87	18.5	92.91	39	92
7	9.84	19	93.71	42	93.2
7.5	10.89	19.5	94.46	45	94.4
8	12.03	20	95.19	48	95.5
8.5	13.28	20.5	95.88	51	96.8
9	14.67	21	96.53	54	98
9.5	16.25	21.5	97.17	57	99
10	18.08	22	97.77	60	100
10.5	20.42	22.5	98.36		
11	23.51	23	98.92		
11.5	28.33	23.5	99.47		
		24	100		

APPENDIX E – CURRENT ROAD CONDITIONS CLASSIFICATION

APPENDIX F – PLANNED ROADWAY CLASSIFICATION

APPENDIX G – STANDARD DRAWINGS

JUAB COUNTY
STANDARD DRAWING
NEPHI, UTAH
MARCH 2019



VICINITY MAP

JUAB COUNTY
160 N MAIN
NEPHI, UT 84648
www.co,juab.ut,us

SCALE: 1' = 10000'

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	TITLE		
DRAWN:	FILE: TITLE	PROJECT: 1903-258	SHEET: 1
CHECK:	UPDATED: 3/21/2019	PLOTTED: 3/21/2019	

INDEX TO SHEETS

JUAB COUNTY
160 N MAIN
NEPHI, UT 84648
www.co,juab.ut,us

SCALE: NONE

JUAB COUNTY

STANDARD DRWAING

INDEX

FIGURE: 2

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UPDATED: 3/21/2019
PROJECT: 1903-258
PLOTTED: 3/21/2019
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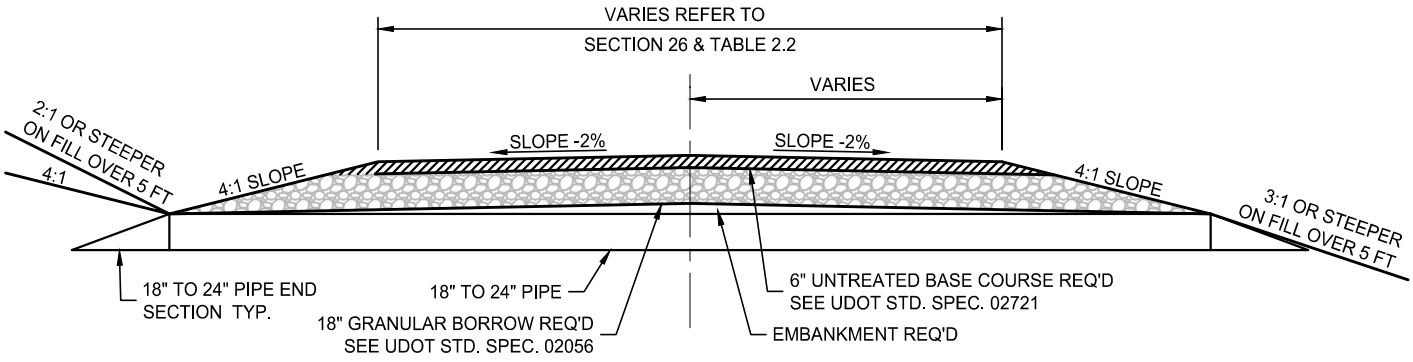

TYPICAL SECTION GRAVEL

JUAB COUNTY
160 N MAIN NEPHI,
UT 84648
www.co.juab.ut.us

SCALE: 1" = 8"

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TYPICAL SECTION GRAVEL			
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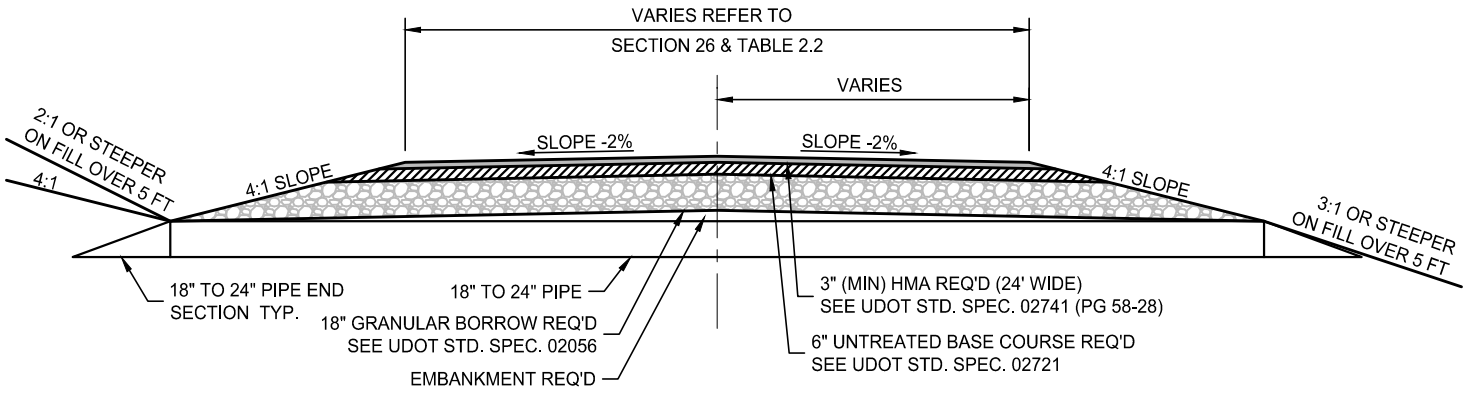

TYPICAL SECTION PAVED

JUAB COUNTY
160 N MAIN NEPHI,
UT 84648
www.co,juab.ut,us

SCALE: 1" = 8'

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	TYPICAL SECTION PAVED		
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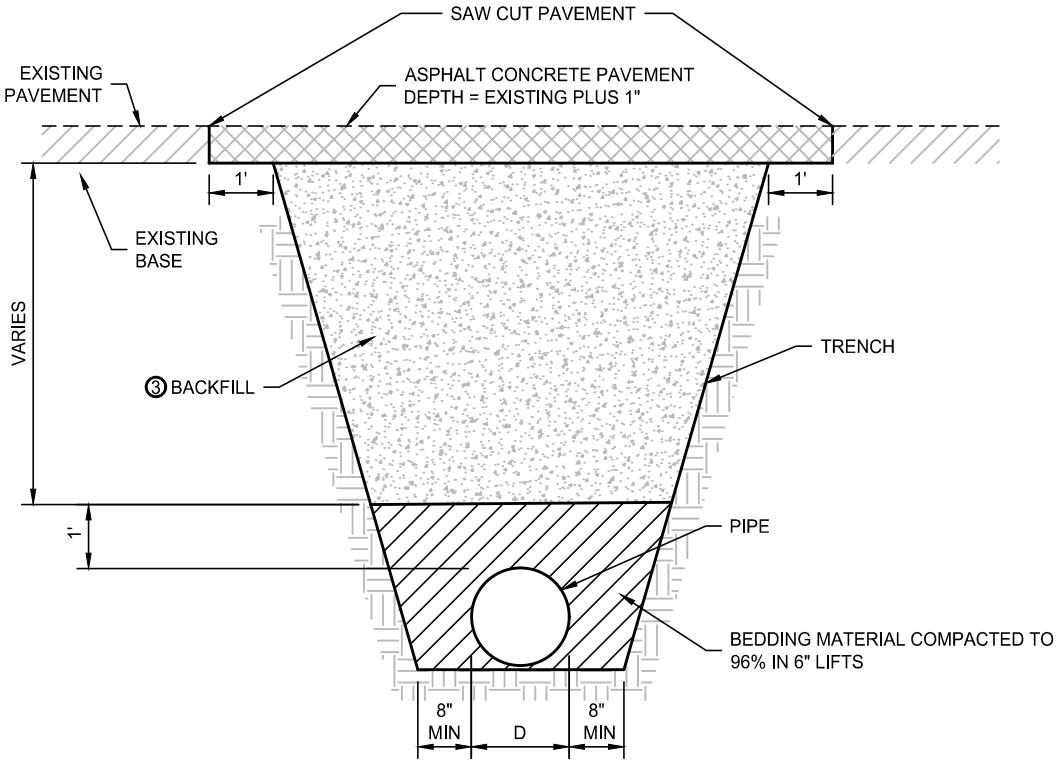

TRENCH REPAIR

NOTES:

1. DO NOT PLACE NEW PAVEMENT OR PERMIT VEHICULAR TRAFFIC OVER TRENCH FOR AT LEAST 24 HOURS AFTER PLACING FLOWABLE FILL.
2. IF NEW PAVEMENT SURFACE WILL NOT BE PLACED WITHIN 7 DAYS AFTER TRENCHING, BACKFILL WITH FLOWABLE TO MATCH ELEVATION OF EXISTING PAVEMENT. REMOVE FLOWABLE FILL AS REQUIRED TO PLACE NEW PAVEMENT.

③ USE FLOWABLE FILL FOR COLLECTOR & ARTERIAL AND NATIVE FOR ALL OTHERS.
FLOWABLE FILL REQD ON ASPHALT ROADS

JUAB COUNTY
160 N MAIN NEPHI,
UT 84648
www.co,juab.ut,us

SCALE: NONE

JUAB COUNTY			FIGURE: 5
STANDARD DRAWING			
TRENCH REPAIR DETAIL			
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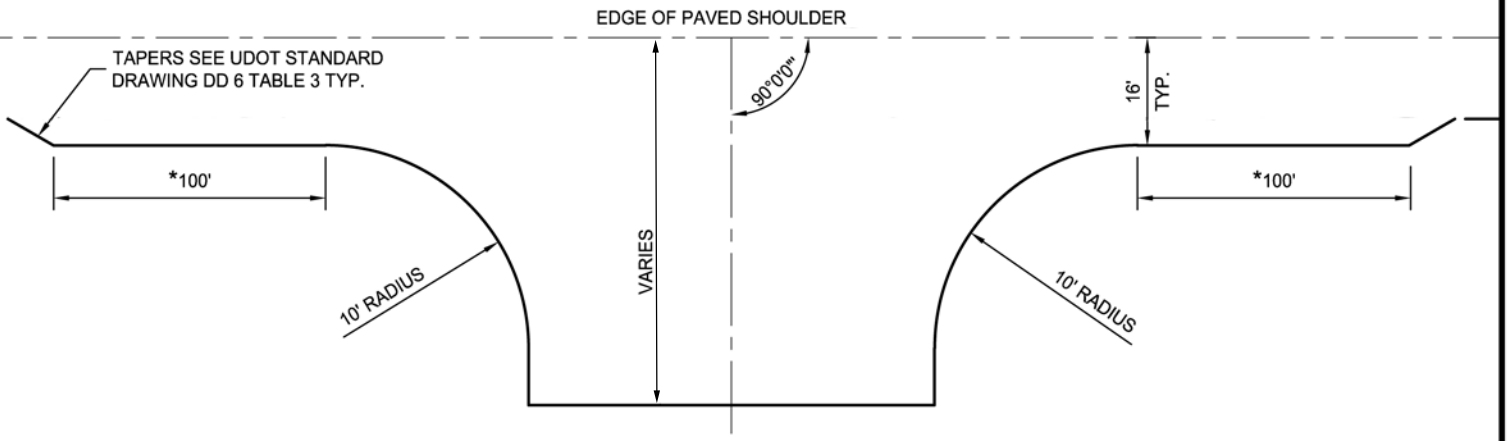
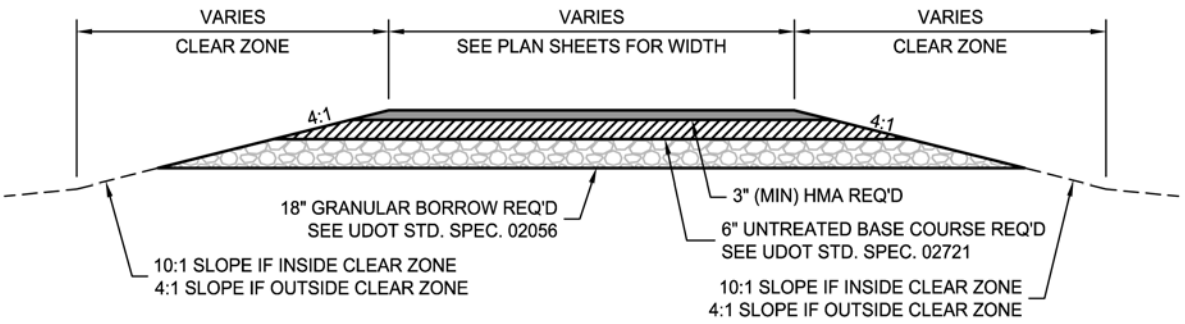
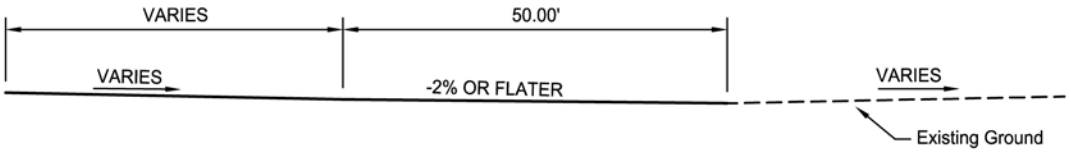


PLAN

* TO BE DETERMINED BY JUAB COUNTY



SECTION



PROFILE

PAVED ACCESS ROAD

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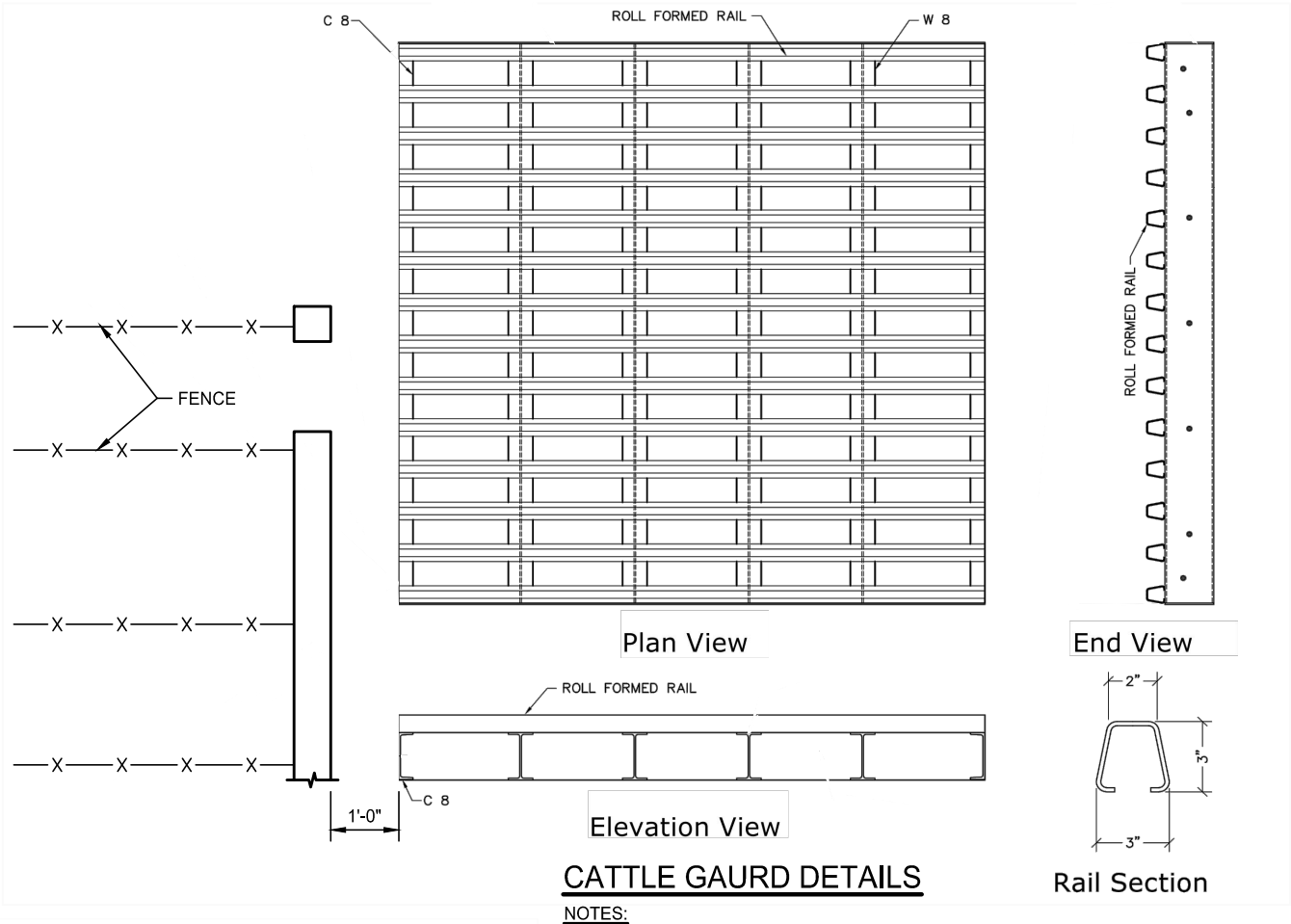
SCALE: N.T.S.

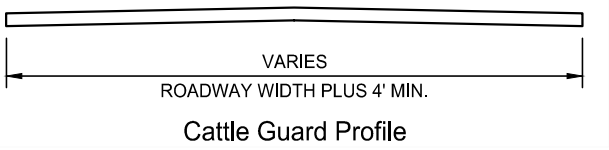
JUAB COUNTY			FIGURE: 6
STANDARD DRAWING			
PAVED ACCESS ROAD DETAIL			
DRAWN:	FILE: DETAILS_2	PROJECT: 1903-258	SHEET: 6
CHECK:	UPDATED: 3/21/2019	PLOTTED: 3/21/2019	



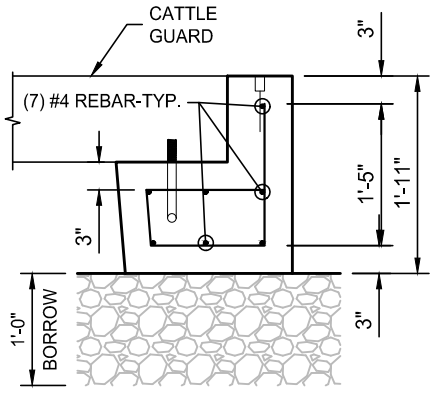
CATTLE GAURD DETAILS

NOTES:

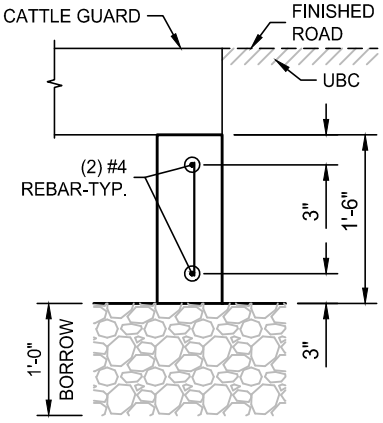
1. H-20 POWDER RIVER OR EQUIVALENT FOR ALL ROADS EXCPET ARTERIAL AND COLLECTORS.
2. H-52 POWDER RIVER OR EQUIVALENT FOR ARTERIAL AND COLLECTORS.



Cattle Guard Profile



Foundation Plan
ARTERIAL AND COLLECTORS



Foundation Plan
NON ARTERIAL AND COLLECTORS

CONCRETE FOUNDATION DETAILS

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SCALE: N.T.S.

JUAB COUNTY			FIGURE: 7
STANDARD DRAWING			
CATTLE GUARD DETAIL			
DRAWN:	FILE: DETAILS_2	PROJECT: 1903-258	SHEET: 7
CHECK:	UPDATED: 3/21/2019	PLOTTED: 3/21/2019	

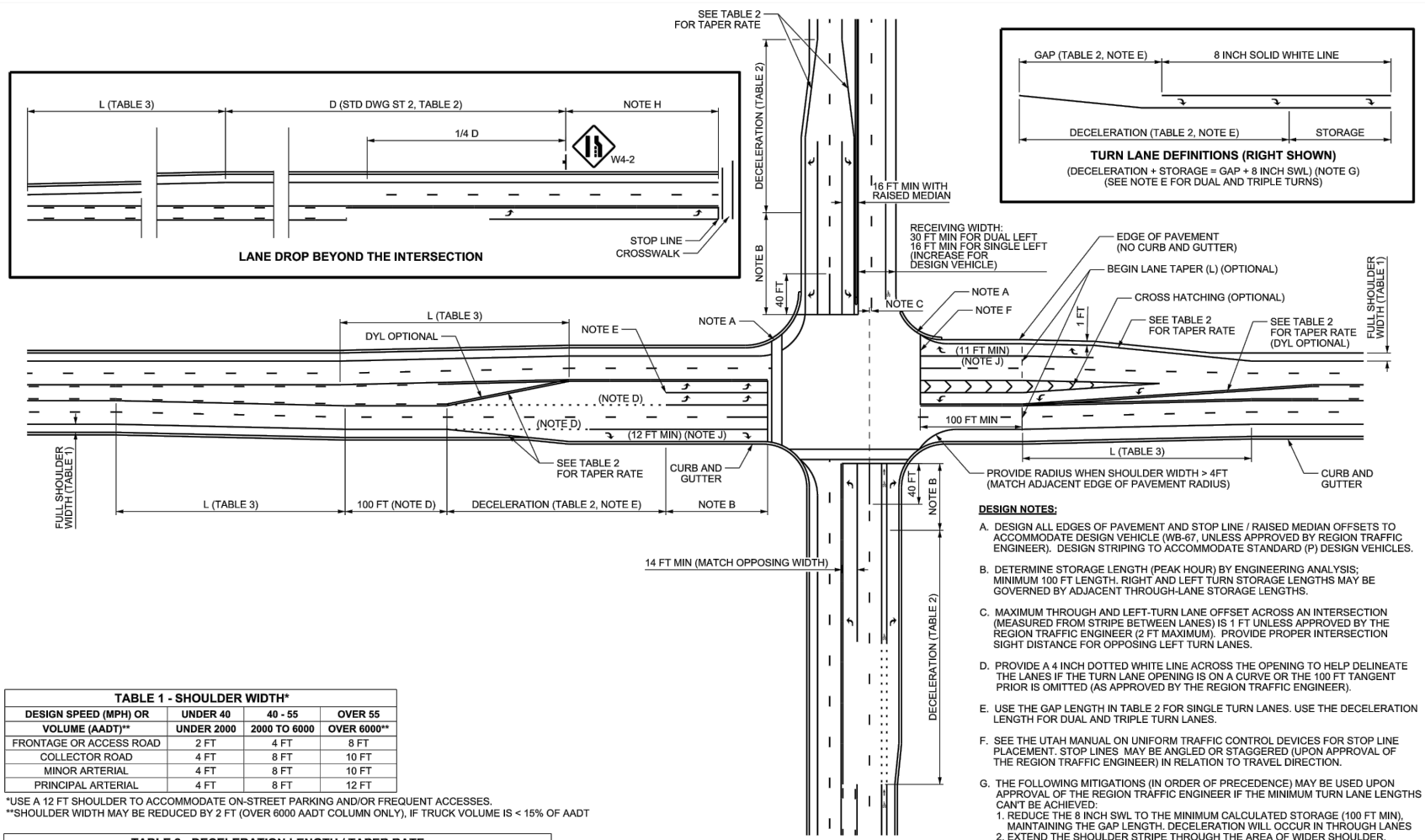

TABLE 1 - SHOULDER WIDTH*			
DESIGN SPEED (MPH) OR	UNDER 40	40 - 55	OVER 55
VOLUME (AADT)**	UNDER 2000	2000 TO 6000	OVER 6000**
FRONTAGE OR ACCESS ROAD	2 FT	4 FT	8 FT
COLLECTOR ROAD	4 FT	8 FT	10 FT
MINOR ARTERIAL	4 FT	8 FT	10 FT
PRINCIPAL ARTERIAL	4 FT	8 FT	12 FT

*USE A 12 FT SHOULDER TO ACCOMMODATE ON-STREET PARKING AND/OR FREQUENT ACCESSES.
**SHOULDER WIDTH MAY BE REDUCED BY 2 FT (OVER 6000 AADT COLUMN ONLY), IF TRUCK VOLUME IS < 15% OF AADT

TABLE 2 - DECELERATION LENGTH / TAPER RATE										
DESIGN SPEED (MPH)	TAPER RATE	ENTRY SPEED (MPH)	DECEL LENGTH (FT)	DOWNGRADE -3%	DOWNGRADE -6%	DOWNGRADE -9%	UPGRADE 3%	UPGRADE 6%	UPGRADE 9%	GAP (FT)
30	8:1	28	130	153	185	234	113	100	90	100
35		32	170	199	241	306	148	131	117	
40		36	215	252	305	387	187	165	149	
45		40	265	311	376	477	231	204	183	
50	10:1	44	325	376	455	577	279	247	222	160
55		48	385	447	542	687	332	294	264	
60	15:1	52	450	525	636	806	389	345	309	190
65		55	505	587	711	902	435	386	346	

L_{DEC} = 1.075 x (ENTRY SPEED / a), WHERE a=6.5 FT/S

L_{DEC} ON GRADE = ENTRY SPEED^2 / 30 (a/32.2 ± G), WHERE a=6.5 FT/S^2

GAP = L / 3 (W), WHERE L = TAPER LENGTH IN FEET AND W = 9 FT, WITH A 100 FT MIN LENGTH

TABLE 3		
SPEED	FORMULA	RATE
LESS THAN 40 MPH	$L=\frac{WS^2}{60}$	$\frac{S^2}{60}$:1
45 MPH AND GREATER	L= WS	S:1

WHERE:
L = TAPER LENGTH IN FEET
W = WIDTH OF OFFSET IN FEET
S = POSTED SPEED IN MPH

DESIGN NOTES:

A. DESIGN ALL EDGES OF PAVEMENT AND STOP LINE / RAISED MEDIAN OFFSETS TO ACCOMMODATE DESIGN VEHICLE (WB-67, UNLESS APPROVED BY REGION TRAFFIC ENGINEER). DESIGN STRIPING TO ACCOMMODATE STANDARD (P) DESIGN VEHICLES.

B. DETERMINE STORAGE LENGTH (PEAK HOUR) BY ENGINEERING ANALYSIS; MINIMUM 100 FT LENGTH. RIGHT AND LEFT TURN STORAGE LENGTHS MAY BE GOVERNED BY ADJACENT THROUGH-LANE STORAGE LENGTHS.

C. MAXIMUM THROUGH AND LEFT-TURN LANE OFFSET ACROSS AN INTERSECTION (MEASURED FROM STRIPE BETWEEN LANES) IS 1 FT UNLESS APPROVED BY THE REGION TRAFFIC ENGINEER (2 FT MAXIMUM). PROVIDE PROPER INTERSECTION SIGHT DISTANCE FOR OPPOSING LEFT TURN LANES.

D. PROVIDE A 4 INCH DOTTED WHITE LINE ACROSS THE OPENING TO HELP DELINEATE THE LANES IF THE TURN LANE OPENING IS ON A CURVE OR THE 100 FT TANGENT PRIOR IS OMITTED (AS APPROVED BY THE REGION TRAFFIC ENGINEER).

E. USE THE GAP LENGTH IN TABLE 2 FOR SINGLE TURN LANES. USE THE DECELERATION LENGTH FOR DUAL AND TRIPLE TURN LANES.

F. SEE THE UTAH MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STOP LINE PLACEMENT. STOP LINES MAY BE ANGLED OR STAGGERED (UPON APPROVAL OF THE REGION TRAFFIC ENGINEER) IN RELATION TO TRAVEL DIRECTION.

G. THE FOLLOWING MITIGATIONS (IN ORDER OF PRECEDENCE) MAY BE USED UPON APPROVAL OF THE REGION TRAFFIC ENGINEER IF THE MINIMUM TURN LANE LENGTHS CAN'T BE ACHIEVED:
1. REDUCE THE 8 INCH SWL TO THE MINIMUM CALCULATED STORAGE (100 FT MIN), MAINTAINING THE GAP LENGTH. DECELERATION WILL OCCUR IN THROUGH LANES
2. EXTEND THE SHOULDER STRIPE THROUGH THE AREA OF WIDER SHOULDER.

H. DISTANCE IS THE GREATER OF THE PRECEDING CALCULATED THROUGH OR DUAL TURN MOVEMENT STORAGE (THE STORAGE OF THE THROUGH LANES OR TURN LANES FLOWING INTO THESE LANES) (150 FT MIN).

I. PROVIDE A TWO-WAY LEFT TURN LANE CONNECTING ADJACENT ACCESSES WHEN OPPOSING TAPERS OVERLAP OR AS DIRECTED BY THE REGION TRAFFIC ENGINEER.

J. RIGHT TURN LANE WIDTHS MAY BE REDUCED (10 FT MIN) UPON APPROVAL OF THE REGION TRAFFIC ENGINEER.

K. PROVIDE A MINIMUM 100 FT TANGENT APPROACH SECTION PRIOR TO STOP LINES. USE THE SAME ENTRANCE AND EXIT BEARINGS FOR OPPOSING INTERSECTION DIRECTIONS.

L. USE THE AASHTO A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS FOR DESIGN OF ROADWAY ELEMENTS NOT SHOWN ON THIS STANDARD DRAWING.

M. USE THE AASHTO ROADSIDE DESIGN GUIDE AND STD DWG DD 17 FOR CLEAR ZONE REQUIREMENTS.

DESIGN ONLY DRAWING

FIGURE: 8

JUAB COUNTY

UDOT STANDARD DRAWING (DD 6)

INTERSECTION GEOMETRICS

SHEET: 8

DRAWN: . PROJECT: 1903-258

CHECK: . FILE: DETAILS

UPDATED: 3/21/2019 PLOTTED: 3/21/2019

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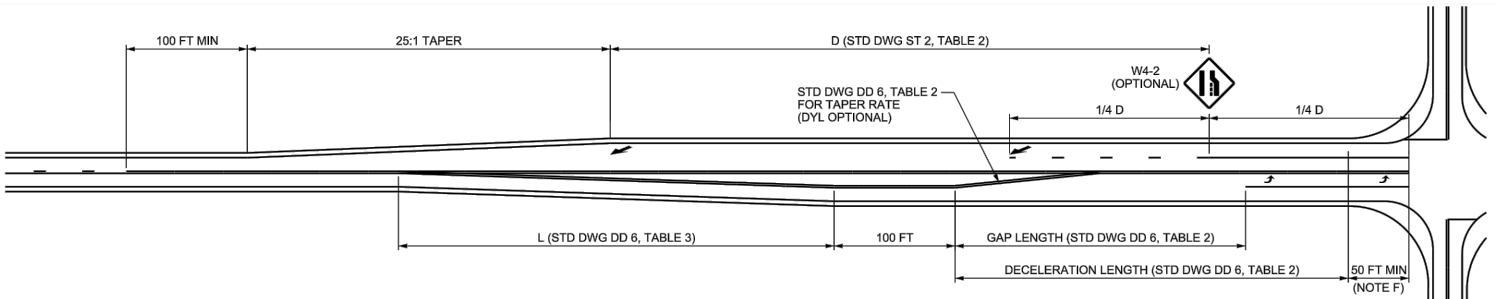
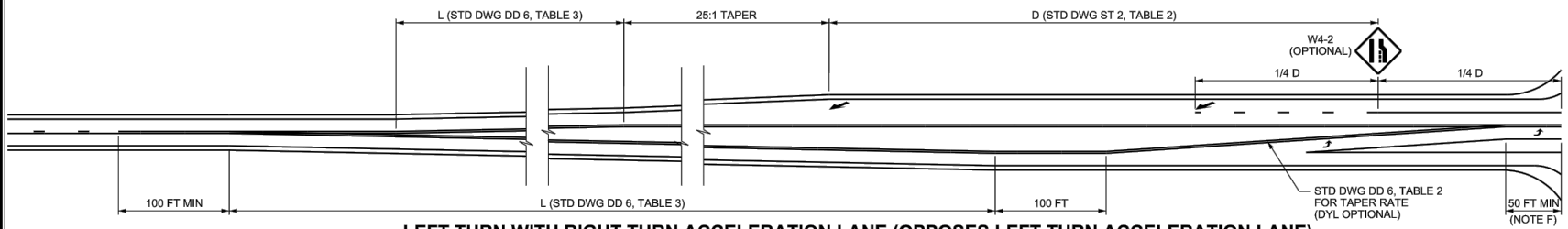
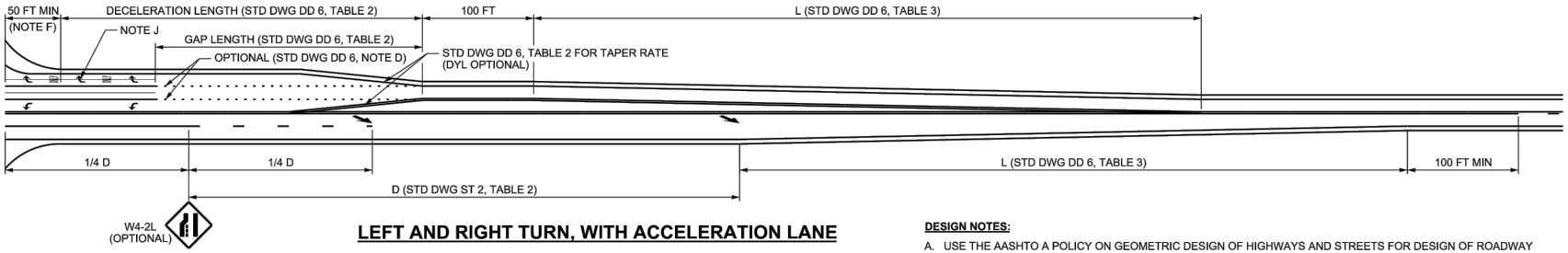


LEFT TURN WITH RIGHT TURN ACCELERATION LANE



LEFT TURN WITH RIGHT TURN ACCELERATION LANE (OPPOSES LEFT TURN ACCELERATION LANE)



LEFT AND RIGHT TURN, WITH ACCELERATION LANE

TABLE 1				
MINIMUM LEVELS FOR INSTALLATION OF TURN AND ACCELERATION LANES ON TWO LANE ROADS				
SPEED	LEFT TURN LANE	RIGHT TURN LANE	LEFT TURN ACCELERATION LANE	RIGHT TURN ACCELERATION LANE
40 MPH AND LESS	25 VPH	50 VPH	*	*
45 TO 55 MPH	10 VPH	25 VPH	*	50 VPH
60 MPH AND GREATER	5 VPH	10 VPH	**	25 VPH

* OPTIONAL FOR 50 MPH AND LESS. FOR 55 MPH, AS REQUIRED BY THE REGION TRAFFIC ENGINEER.
** AS REQUIRED BY THE REGION TRAFFIC ENGINEER.
VPH= VEHICLES PER HOUR IN ANY ONE HOUR PERIOD IN PASSENGER CAR EQUIVALENTS.

DESIGN NOTES:

A. USE THE AASHTO A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS FOR DESIGN OF ROADWAY ELEMENTS NOT SHOWN ON THIS STD DWG.

B. USE THE AASHTO ROADSIDE DESIGN GUIDE AND STD DWG DD 17 FOR CLEAR ZONE REQUIREMENTS NOT SHOWN.

C. STANDARDS SHOWN ARE RECOMMENDED VALUES. EXCEED STANDARDS WHEREVER POSSIBLE.

D. CONFIGURATIONS SHOWN MAY VARY BASED ON LOCATION OF WIDENING SUCH AS EQUAL WIDENING TO BOTH SIDES AS OPPOSED TO ONE SIDE OF THE EXISTING ROAD OR ANOTHER.

E. MATCH THE EXISTING OUTSIDE SHOULDER WIDTH (4 FT MIN) FOR ACCELERATION AND DECELERATION LANES (INCLUDING TAPERS). USE TABLE 1 ON STD DWG DD 6 FOR ALL OTHER SHOULDER WIDTHS.

F. INCREASE VEHICLE STORAGE LENGTH AS DETERMINED BY ENGINEERING STUDY OR REGION TRAFFIC ENGINEER.

G. SEE ST SERIES STD DWGS FOR INFORMATION ON STRIPING DETAILS.

H. PROVIDE A TWO-WAY LEFT TURN LANE CONNECTING ADJACENT ACCESS POINTS WHEN THEIR TAPERS OVERLAP, OR AS DIRECTED BY THE REGION TRAFFIC ENGINEER.

I. DESIGN ALL EDGES OF PAVEMENT AND STOP LINE / RAISED MEDIAN OFFSETS FOR DESIGN VEHICLE (WB-67, UNLESS APPROVED BY REGION TRAFFIC ENGINEER). DESIGN STRIPING FOR STANDARD (P) DESIGN VEHICLES.

J. PLACE RIGHT TURN ARROWS AND "ONLY" MARKINGS WHEN AN OPPOSING RIGHT TURN ACCELERATION OR A MANDATORY LANE DROP IS USED.

DESIGN ONLY DRAWING

FIGURE: 9

JUAB COUNTY

UDOT STANDARD DRAWING (DD13)

TWO-LANE INTERSECTION 1 OF 2

SHEET: 9

DRAWN: . FILE: DETAILS PROJECT: 1903-258

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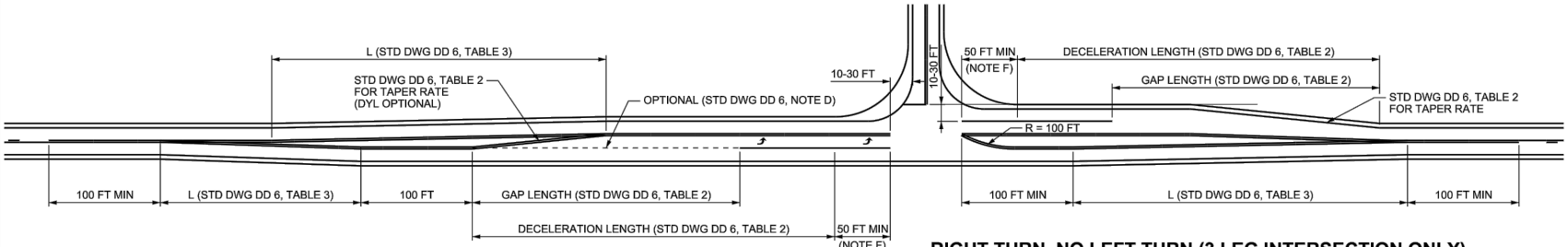
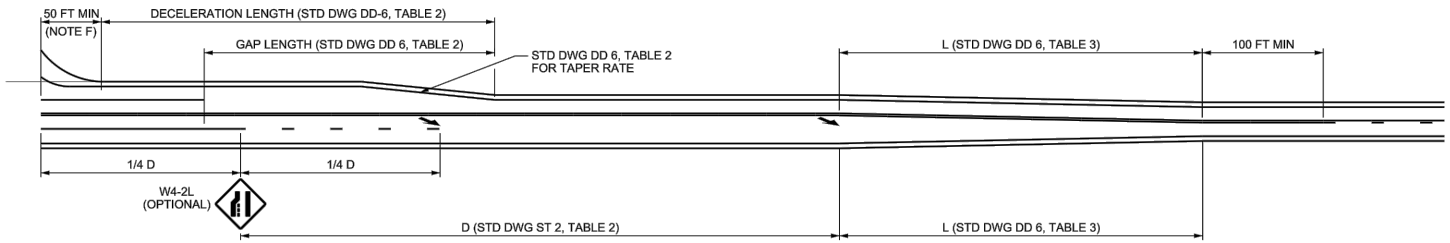


LEFT TURN

RIGHT TURN, NO LEFT TURN (3 LEG INTERSECTION ONLY)



RIGHT TURN, NO LEFT TURN, WITH ACCELERATION LANE

TABLE 1				
MINIMUM LEVELS FOR INSTALLATION OF TURN AND ACCELERATION LANES ON TWO LANE ROADS				
SPEED	LEFT TURN LANE	RIGHT TURN LANE	LEFT TURN ACCELERATION LANE	RIGHT TURN ACCELERATION LANE
40 MPH AND LESS	25 VPH	50 VPH	*	*
45 TO 55 MPH	10 VPH	25 VPH	*	50 VPH
60 MPH AND GREATER	5 VPH	10 VPH	**	25 VPH

* OPTIONAL FOR 50 MPH AND LESS. FOR 55 MPH, AS REQUIRED BY THE REGION TRAFFIC ENGINEER.
** AS REQUIRED BY THE REGION TRAFFIC ENGINEER.
VPH= VEHICLES PER HOUR IN ANY ONE HOUR PERIOD IN PASSENGER CAR EQUIVALENTS.

DESIGN NOTES:

A. USE THE AASHTO A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS FOR DESIGN OF ROADWAY ELEMENTS NOT SHOWN ON THIS STD DWG.

B. USE THE AASHTO ROADSIDE DESIGN GUIDE AND STD DWG DD 17 FOR CLEAR ZONE REQUIREMENTS NOT SHOWN.

C. STANDARDS SHOWN ARE RECOMMENDED VALUES. EXCEED STANDARDS WHEREVER POSSIBLE.

D. CONFIGURATIONS SHOWN MAY VARY BASED ON LOCATION OF WIDENING SUCH AS EQUAL WIDENING TO BOTH SIDES AS OPPOSED TO ONE SIDE OF THE EXISTING ROAD OR ANOTHER.

E. MATCH THE EXISTING OUTSIDE SHOULDER WIDTH (4 FT MIN) FOR ACCELERATION AND DECELERATION LANES (INCLUDING TAPERS). USE TABLE 1 ON STD DWG DD 6 FOR ALL OTHER SHOULDER WIDTHS.

F. INCREASE VEHICLE STORAGE LENGTH AS DETERMINED BY ENGINEERING STUDY OR REGION TRAFFIC ENGINEER.

G. SEE ST SERIES STD DWGS FOR STRIPING DETAILS.

H. PROVIDE A TWO-WAY LEFT TURN LANE CONNECTING ADJACENT ACCESS POINTS WHEN THEIR TAPERS OVERLAP, OR AS DIRECTED BY THE REGION TRAFFIC ENGINEER.

I. DESIGN ALL EDGES OF PAVEMENT AND STOP LINE / RAISED MEDIAN OFFSETS FOR DESIGN VEHICLE (WB-67, UNLESS APPROVED BY REGION TRAFFIC ENGINEER). DESIGN STRIPING FOR STANDARD (P) DESIGN VEHICLES.

DESIGN ONLY DRAWING

JUAB COUNTY

UDOT STANDARD DRAWING (DD14)

TWO-LANE INTERSECTION 2 OF 2

FIGURE: 10

SHEET: 10

PROJECT: 1903-258

FILE: DETAILS

UPDATED: 3/21/2019

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