Sustainability in Roadway Design and Construction Guidance Document

CDOT Environmental Programs Branch
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1. Introduction

Transportation planners, engineers and environmental scientists within the United States recognize that roadway systems today need to become more sustainable in light of finite natural resources, sensitive environmental conditions, limited economic resources and public expectations. Transportation systems need to be planned, designed, constructed and maintained in a fashion that recognizes the positive and negative impacts to environmental, economic and social issues over the project life cycle. Sustainability is a decision making process and a philosophy that takes into account these impacts and strives to go beyond the basic environmental protection provided by regulations; it strives toward natural, social and economic resource enhancement and restoration.

2. Guidance Document Purpose and Goals

This Guidance Document is meant to be a stand-alone reference document for CDOT Project Managers and their design teams. It is a tool that should be referenced early in the design process in order to integrate sustainable actions into roadway design and construction projects.

This document was created in direct response to the CDOT and Governor's Energy Office Energy Smart Transportation Initiative in 2012. The development of this Guidance Document was guided by a Project Task Force made up of CDOT design, construction, and materials engineers; a maintenance representative; and an environmental representative. The overall purpose and goal of this document is as follows:

- Develop a list of sustainable actions that will be a reference tool for CDOT design and construction teams, environmental representatives, operation and maintenance professionals and CDOT management
- Identify specific steps for the Project Manager and design team on how to implement sustainable actions into the design and construction processes

3. Design and Construction Sustainable Actions

There are over 80 sustainable actions contained in the attached Sustainable Actions Table that are relevant to roadway design and construction activities. The main criteria used by the Project Task Force to select and evaluate the sustainable actions are as follows:

- Cost Effectiveness- the level to which the sustainable action will be *perceived or estimated* to be cost effective in terms of life cycle costs (short and long term)
- Environmental and Natural Resource Conservation- the level to which environmental resources (fossil fuels, wildlife, water quality, air quality, virgin materials, etc.) are being conserved, protected or enhanced by the sustainable action, consistent with CDOT's Environmental Ethic

- Ease of Implementation- the level to which implementing the sustainable action is viable and easy to perform based upon CDOT contractual and policy procedures or existing operating conditions and circumstances

- Community Context Sensitivity- the level to which the sustainable action promotes, maintains and/or enhances the local/regional community or driving public by improving their safety quality of life and sense of place

The Sustainable Actions Table is structured such that sustainable actions are organized, identified and defined in an easy to follow fashion for the user. The following are the Sustainable Actions Table's elements:

- Sustainability Topics- there are three main sustainability topics: Community Well Being, Program-Project Management and Environmental Stewardship

- Category- an organizational unit that contains sub-topic elements (natural resource management, socio-economic, etc.)

- Aspect- an organizational unit that contains sub-category elements (energy, water quality, etc.)

- Long Term Goal- identifies the long term goal associate with that particular sustainable action (e.g. zero waste material going to landfills). This long term goal is aspirational in nature and represents the optimum desired state

- Measuring Success (Performance Measures)- identifies basic approaches to measure or evaluate sustainable action implementation in the design and construction phase of a project

- Sustainable Action- a description of the sustainable action associated with design and construction phases and actions

- Action Intent- describes the purpose of the sustainable action for user clarity

- Design/Construction Phase- identifies if the sustainable action is pertinent to design and/or construction phases

- CDOT and AASHTO Specification Consistency- identifies if a sustainable action is consistent with CDOT and AASHTO specifications or if specifications or programs will need to be changed to adopt the sustainable action

4. How to Use this Guidance Document

This Guidance Document should be considered an important tool and guidance reference primarily for Project Managers and their design teams. The sustainable actions selected by the project design teams will have an influence on the design of the roadway but will also influence

the construction actions via designs, specifications, special conditions and scope of work requirements. It is anticipated and envisioned that the Guidance Document and Sustainable Actions Table will be reviewed by the Project Manager and design team early and often throughout the design process.

5. Integrating Sustainability into the CDOT Design Process

Sustainable actions can be identified and incorporated at numerous points within the CDOT design and construction processes. **Figure 1** provides a flow chart illustration of the typical CDOT design-bid-build process that identifies points for sustainable action inclusion.

5.1 Recommended Steps for Using this Guidance Document

The following are recommended steps for implementing sustainable actions into the CDOT design and construction processes:

Step 1- The Project Manager contacts the CDOT Sustainability Program Manager about the design team's interest in including sustainability-based elements into the project design. The Sustainability Program Manager will provide training and guidance to the Project Team as necessary. The Project Manager communicates with and gains support from CDOT Management about sustainable action integration into the project.

Step 2- Designate a Project Sustainability Design Team that is multi-disciplinary in nature and comprised of *at least* the design team members, resident engineer, an environmental representative, the CDOT Sustainability Program Manager or designee (as available/needed) and other stakeholders as necessary. The Project Manager is expected to be the driving force behind the meetings to incorporate sustainable actions into the project design, with facilitation support from the Sustainability Program Manager or designee.

Step 3- Conduct a Project Sustainability Pre-Scoping Meeting that should dedicate sufficient time to discuss and select sustainable actions from the Sustainable Actions Table, attached. The Sustainable Actions Table needs to be reviewed prior to the meeting and meeting participates should come to the meeting well prepared to discuss the project and selected implementable sustainable actions. The Sustainable Actions Table should be modified into a Draft "Project" Sustainable Action Checklist to document and track the selected sustainable actions for upcoming discussions.

**Columns B, C, D and E of the Sustainable Actions Table can be hidden as desired. These columns are beneficial when taking credit for mitigating impacts or when a specific mitigation is necessary. For example: If a project has major impacts to a local population, the columns can be sorted by Community Well-Being, Quality of Life, or a more specific aspect.

Step 4- Discuss the identified sustainable actions in the Design Scoping Meeting and obtain feedback from the Design Team. A Final "Project" Sustainable Action Checklist should be agreed upon by the project team and adopted.

Step 5- The Final “Project” Sustainable Action Checklist is transmitted to all design team members by the Project Manager. The Checklist should be referenced routinely to ensure these actions are being considered and implemented throughout the design process. The Project Manager should coordinate with the CDOT Sustainability Program Manager, as needed, to discuss approaches and implementation ideas.

Step 6- The CDOT Sustainability Program Manager or designee is asked to attend the project FIR and FOR meetings to review sustainable action selection and elimination during the project design process and provide feedback as appropriate

Step 7- As part of the final design package review, the “Project” Sustainable Action Checklist is reviewed and approved by the Project Manager and the Program Manager to document that inclusion of sustainable actions into the design was considered by the Project Manager and design team. The checklist must document why initially selected sustainable actions were eliminated during the design process.

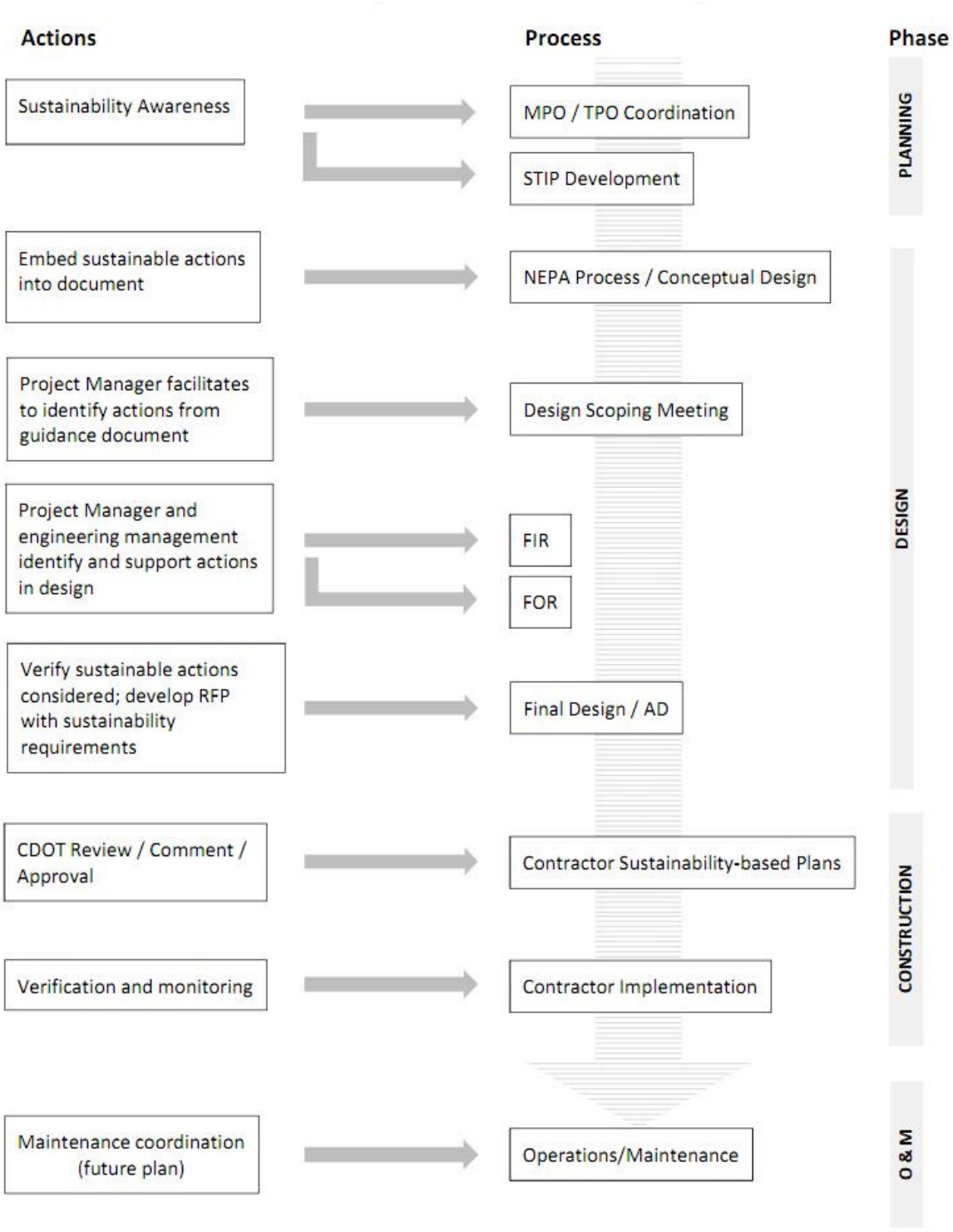
Step 8- Sustainable actions are placed directly into the design, special conditions, and project directives or within the RFP scope of work. Contractors will be expected to construct and/or follow required protocols and actions detailed in these documents. The contractor may be asked to develop a Project Sustainability Plan as part of the proposal or as a deliverable after the project has been awarded.

Step 9- The Project Manager verifies that the identified sustainable actions documented in the “Project” Sustainable Action Checklist were actually constructed/implemented and evaluates the effectiveness of the sustainable actions (with support from the CDOT Sustainability Program Manager as needed).

5.2 Integration into Innovative Contracting and Design Build Projects

Sustainable actions and processes can also be incorporated into CDOT Innovative Contracting (Construction Management/General Contractor [CM/GC]) and Design-Build (DB) projects which are expected to be a significant road design/construction mechanism in the future. Due to the nature of the CM/GC and DB processes, CDOT has an active review role in the design process; however, the selected designer/contractor is directly responsible for the design and subsequent construction with minimal to moderate daily interaction with CDOT. There are no internal FIR or FOR meetings with DB contactors; although there are definite review checkpoints. To integrate sustainable actions into the Innovative Contracting process the Prime Contractor Team should develop a Project Sustainability Plan as per RFP requirements or contract requirements. The Project Sustainability Plan contains at a minimum some sustainability actions identified from the Sustainable Actions Table and can be submitted as a proposal requirement or a separate deliverable after contractor award. Monitoring and verification can occur at specific timeframes to monitor sustainable action adoption and/or elimination by the contractor.

Figure 1 – Integrating Sustainable Actions into the CDOT Design & Construction Processes



6. Internal CDOT Construction Phase Integration

CDOT will need to direct contractors to consider and implement sustainable actions identified on the "Project" Sustainable Action Checklist. The Checklist will likely contain specific sustainable actions that are directed toward contractors such as material recycling and reuse, equipment emissions, water conservation, waste management, etc.

- CDOT Specifications- specifications can be developed or amended to implement new sustainable actions as technology changes or new ideas and approaches are discovered. Identifying the specification(s) to be modified within the roadway design process is critical.

- Request for Proposal/Scope of Work- detailed project specific language can be inserted into the RFP that would require contractors to develop a Project Sustainability Plan that contains required sustainability actions. The Sustainability Plan can be a RFP submittal requirement or can be developed after the award, pending CDOT approval.

7. Considerations During Guidance Application

- The user of this document should recognize that when selecting and integrating sustainable actions into projects there needs to be a reasonable balance among the environmental, social and economic elements. It is possible that the project team will focus on the engineering aspects of the project such as material usage, waste reduction and recycling/reuse and have less interest in community coordination or environmental enhancement. Overall, the selected sustainable actions need to be cost effective and/or provide added value to the project. Identifying and implementing sustainable actions can have a direct cost saving effect using a life cycle analysis.

- The Guidance Document and Sustainable Actions Table can be a useful reference when developing prime contractor specifications, project directives or standard operating procedures for projects. It can be expected that contractors may attempt to avoid or be reluctant to accept sustainable actions due to perceived additional material/labor costs, extra work, and unfamiliarity with the tasks.

- Measuring success via site monitoring and documentation reviews are important programmatic components when implementing sustainable actions and criteria throughout the project process. Monitoring performed by the Sustainability Program Manager (or designee) is a critical part of the process, such as using the Environmental Management System (EMS) process (plan-do-check-act). To ensure continuing quality improvement and sustainable action inclusion, it is important that some project specific performance metrics or performance criteria be assigned to future projects in an effort to measure success and make future project and program adjustments.

8. Roadway & Transportation Sustainability Information

The field of transportation sustainability is a rapidly changing and evolving area. It is difficult to find and keep pace with the latest research or standard practices developed by research organizations, state and federal transportation agencies, foundations, institutes, regulatory agencies and professional organizations. The CDOT **Sustainability in Roadway Design and Construction Plan** contains a partial listing of references that will aid the Project Sustainability Task Force and other interested CDOT professionals in keeping up with new sustainable transportation practices, criteria and performance indicators. The table in **Appendix C** of the **Sustainability in Roadway Design and Construction Plan** identifies both technology and programmatic based websites.

Sustainable Actions Table

#	Sustainability Topics	Category	Aspect	Long Term Goal	Sustainable Actions	Measuring Success	Action Intent	Design Phase Action*	Construction Phase Action*	CDOT Specifications, Policy Directives and Programs
1	Community Well-Being	Quality of Life	Sensitive populations	No construction or long term system operation impacts will occur to sensitive receptors (schools, hospitals, nursing homes, retirement homes, etc.)	Sensitive community facilities and receptors (hospitals, schools, retirement communities, etc.) are identified and impacts will be avoided or minimized	Review the design project file to determine if sensitive facilities (hospital, schools, nursing homes, etc.) were identified and if various alignment alternatives were adopted for avoidance or if appropriate buffer zones were provided beyond regulatory requirements	The action promotes awareness of sensitive community populations that will or could be impacted by the project and maintains or improves community health and quality	X	X	Consistent with the CDOT NEPA Process and CDOT Stewardship Guidance
2	Community Well-Being	Quality of Life	Relocations	Minimize to the full extent possible residential and/or business relocations on all CDOT projects	The number of land and residential takes (voluntary and involuntary relocations) will be evaluated and minimized to the full extent possible	Evaluate design alternatives and analysis to see if the number of land and residential takes were taken into account and avoided whenever possible by the final alignment	Reduces resident and business impacts the stress of relocating and maintains community and social neighborhood structure	X		Consistent with CDOT NEPA and CDOT Stewardship Guidance
3	Community Well-Being	Quality of Life	Safety	Zero human and animal fatalities on CDOT's transportation system due to animal-vehicle collisions	Reduce number of animal/vehicle collisions by instituting fencing, warning systems or wildlife passages in high collision areas	Review design drawings and specifications to determine if wildlife collision avoidance approaches were taken especially in known high animal collision areas	Improve driving public safety to prevent wildlife collisions beyond existing levels in high animal mobility and collision areas	X		Consistent with CDOT NEPA Process
4	Community Well-Being	Quality of Life	Safety	Eliminate solid or chemical material releases from trucks that will impact sensitive environmental and community resources	Truck transport spill prevention and response plans and/or containment structures can be placed into the design beyond regulatory requirements for public health and environmental protection in high accident or environmentally sensitive areas	Determine if the project identified sensitive and environmental locations relative to truck tanker transport and high accident areas; determine if a risk evaluation was performed by design team toward development of spill prevention and response plans; evaluate if plans and structures were implemented along right-of-way at high risk areas; and review and evaluate response plans	Ensure that sensitive environmental areas and communities are protected in areas of high truck/tanker traffic and accidents that could result in accidental releases of chemical and/or solid materials	X		Will require project specific Emergency Management Plans (developed for high risk areas such as Eisenhower Tunnel, Wolf Creek Pass, Loveland Pass)
5	Community Well-Being	Quality of Life	Safety	Install Intelligent Transportation Systems (ITS) at all strategic locations in CDOT roadway systems to reduce accidents, congestion and improve driving public safety	ITS can be deployed at critical locations to manage congestion, promote safety, detail on coming weather conditions, and encourage car pooling and public transportation usage	ITS is incorporated into the roadway design and constructed	Promotes public safety, reduces traffic congestion and increases public transportation awareness	X		No specifications on ITS deployment; place in RFP Scope of Work and Project Directive
6	Community Well-Being	Quality of Life	Safety	Zero human fatalities associated within cross walks at major intersections statewide	Use High Intensity Activated Crosswalks (HAWK) pedestrian beacons at major arterials with street minor intersections	Review designs to evaluate if HAWK or other pedestrian safety walk systems were incorporated; evaluate reductions in pedestrian fatalities locally and regionally	Improve pedestrian safety at crossing with high traffic volumes	X		Develop new specification with Safety and Traffic Engineering Branch
7	Community Well-Being	Quality of Life	Safety	Zero truck driver fatalities associated on highway systems related to mountain topography conditions	Use additional safety improvements for truck traffic at high risk areas such as additional safety signage, speed warnings systems for hills and steep grades	Determine from project documentation that a safety analysis was performed within the project area and high accident areas were identified; assess if pro-active safety design and signage was implemented beyond basic regulations	Recognize truck traffic safety and take a proactive approach before accidents occur	X		No specifications or directive toward safety improvements at high risk areas; place within RFP Scope of Work and/or Project Directive; note: Emergency Management Plans have been developed for high risk areas such as Eisenhower Tunnel, Wolf Creek Pass, Loveland Pass. On projects with steep grades truck escape ramps and warning signage are also constructed.
8	Community Well-Being	Quality of Life	Safety	Zero human fatalities associated with cross walks at major intersections	Pedestrian countdowns installed at all crosswalk signals with crosswalks	Review designs and specification regarding installation of countdown signals in urban areas	Promote pedestrian and community safety	X		Consistent with of the Manual of Uniform Traffic Control Devices (MUTCD) Chapter 4E
9	Community Well-Being	Quality of Life	Viewshed Aesthetics	There will be no remnants of past CDOT construction activities within communities or along highway right-of-way area	Remove all fencing (including silt fence) and revegetate haul roads and staging areas when construction is complete and stormwater permit is deactivated	Review before/after photographs, contractor diaries, documentation acknowledging removal and determine there were no complaints from communities	Maintains previous pre-construction viewshed and aesthetics of local communities and right of way	X	X	Required by CDOT Standard Specification 104.06 Final Clean Up and 107.12 Protection and Restoration of Property and Landscape
10	Community Well-Being	Quality of Life	Light Pollution	All CDOT highway projects will eliminate stray lighting during and after construction that impacts human quality of life and wildlife conditions.	Lighting shields used for roadway lighting and parking area to focus and direct light that is compliant with Dark Skies criteria	Review design specifications to contractors on light shielding according to Dark Skies criteria and evaluate installation via field observation	Reduces stray diffuse lighting that can impact wildlife while impacting human viewing of night sky conditions and quality of life conditions	X		Consistent with Lighting Specification 613.06 and CDOT Dark Sky Program

Sustainable Actions Table

#	Sustainability Topics	Category	Aspect	Long Term Goal	Sustainable Actions	Measuring Success	Action Intent	Design Phase Action*	Construction Phase Action*	CDOT Specifications, Policy Directives and Programs
11	Community Well-Being	Context Sensitive Design	Collaboration	The local community that will be impacted and influenced by the highway project has a voice and influence on the final project design, beyond NEPA requirements	Context sensitive designs are incorporated into the final design based upon municipality and public solicited feedback	Review public involvement documentation through a post-NEPA outreach program such as charettes or one on one meetings between the pubic and design engineers; review project meeting notes that document final design changes	Work with local community to maintain or improve quality of life and modify final designs as necessary from public input.	X		Consistent with the CDOT NEPA Process and CDOT Stewardship Guidance
12	Community Well-Being	Multi-Modal	Bicycle and Pedestrian Mobility	Multi-modal concerns and mobility accommodations will be on an equal scale with motorized vehicle impacts during construction	Consultation and consideration given to the compatibility of project to pedestrians and cyclists and links with existing and proposed routes to local services and between communities during the construction	Review minutes from meetings with local groups, drawings or documents that show consideration of public space-access during construction	Provide community multi modal opportunities to promote non motorized travel and improve community linkages		X	Consistent with the CDOT NEPA Process
13	Community Well-Being	Multi-Modal	Bicycle and Pedestrian Mobility	Bicycle transportation will be a major form of transportation especially within urban areas; CDOT will design and construct safety precautions to promote use of bicycle and other forms of alternative transportation	Institute new or improve existing bicycle operations or technologies into the project design such as added signage, installing bicycle detectors in driving lanes or granting signal priority, adding bicycle storage facilities, etc.	Review design documentation to assess if enhanced bicycle accommodations were considered and incorporated into the design and verify that they were implemented during construction; and evaluate if increase bike usage occurred in project area	Action promotes a safe bicycling environment that will increase bike ridership and reduce vehicle driving	X		Consistent with the CDOT NEPA Process
14	Community Well-Being	Multi-Modal	Bicycle and Pedestrian Mobility		Provided Flexibility in the roadway alignment and other highway features-structures (water lines, sewer lines, communication lines, gas lines etc.) within ROW to enable future development of separated multi-use paths or other bike and pedestrian facilities	Review design documentation for utility planning, mapping and coordination; assess consistency and flexibility to future multi-modal transportation planning	Action considers flexibility for long term multi-modal opportunities within ROW over time	X		Consistent with the CDOT NEPA Process
15	Community Well-Being	Multi-Modal	Bicycle and Pedestrian Mobility		Design new or improved separated bike path or shoulder widening to provide for on-road bike lane or provide shoulder restoration for bicycling mobility	Review design documentation to assess bicycle or pedestrian enhancements and measure increase bicycle usage from project	Promotes safe bicycling environment that will increase bike ridership thus reduce VMT, emissions and fossil fuel consumption. Action will promote healthy human exercise activity	X		Consistent with CDOT NEPA Process and CDOT Stewardship Guidance
16	Community Well-Being	Quality of Life	Community Outreach	CDOT and their contractors will be responsive to all public outreach actions and concerns throughout all the phases in the project cycle	Construction team required to assess and respond to comments and concerns from a public outreach plan and take appropriate response action within the construction process	Review evidence that comments from the community were assessed and taken into account in the construction phase decision making process	Ensures that public concerns during construction actions are being addressed directly by the Contractor		X	Consistent with the CDOT-CSS Process and Stewardship Guidance
17	Community Well-Being	Quality of Like	Stakeholder Outreach	CDOT will be proactive and reach out to all environmental regulatory agencies for the development of the project final design	Engage regulators, resource agencies and municipalities to avoid/minimize the negative environmental effects and assess resource enhancement opportunities for the final design	Review project documentation for meeting summaries and outreach plans for pro-active coordination and communication early and often throughout the final design project; and assess if regulatory and resource agency recommendations for impact avoidance and resource enhancement were integrated into the design and constructed	Ensures that the final design team attempts to assess potential resource improvements and enhancements that meet and exceed NEPA requirements	X		Consistent with the CDOT-CSS Process and Stewardship Guidance
18	Program-Project Management	Contracting	Sustainability Plan	Sustainability concepts and actions within a Sustainability Plan and/or Sustainability Program document will be a contract requirement for all CDOT design and construction projects	Develop contractor contracting mechanism that promotes the development and execution of a construction-based Sustainability Plan before construction initiates	Review contract specifications for Project Sustainability Plan requirements within the proposal or within a post- award Project Sustainability Plan for CDOT approval	Contract action provide a mechanism that requires the integration of sustainability actions into projects via contractor selection or plan approval before construction initiates	X	X	No specifications or directive for Sustainability Plan development; place in RFP Scope of Work as a Project Directive

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19	Program-Project Management	Safety and Health	Contractor Safety	There will be zero subcontractor accidents on CDOT construction sites and no environmental violations or impacts beyond those identified in the NEPA document	Contractor required to develop subcontractor contract language and train its supervisors and project-employees to actively promote worker safety and environmental enforcement	Review subcontracts, minutes of meetings, construction memorandums to supervisors; and evaluate if improved worker safety and compliance was experienced on project via accident reports and compliance documentation	Training action during prior to and during construction promotes execution of sustainability based actions that enhances safety and environmental protection	X	X	No specifications or directive on for environmental training for supervisors; place in RFP Scope of Work as a Project Directive
20	Program-Project Management	Environmental Compliance	Contractor Commitment	There will be zero contractor/subcontractor environmental violations on CDOT construction sites	Obtain a documented commitment by the contractor to consider and assess all environmental compliance and protection aspects during construction	Obtain documentation of a written commitment from Contractor's Project Manager to CDOT on their commitment to environmental compliance and protections	Action ensures there is an environmental compliance commitment to the project by the Contractor		X	No specifications or directive on for environmental compliance commitment by contractor; place in RFP Scope of Work as a Project Directive
21	Program-Project Management	Environmental Compliance	Oversight and Monitoring	All CDOT highway projects will eliminate stray lighting during and after construction that impacts human quality of life and wildlife conditions.	Require a qualified contractor environmental compliance manager to monitor and provide environmental oversight for construction projects in sensitive and complex environmental areas	Review project team qualifications to determine environmental qualifications and project role and responsibilities	Action helps ensure environmental protection and compliance on construction project by a CDOT or Contractor qualified environmental manager		X	No specifications or directive on for qualified environmental manager by contractor; place in RFP Scope of Work as a Project Directive
22	Environmental Stewardship	Land Use	Project footprint	Reduce the extent of developed and undeveloped land areas used for CDOT projects to the maximum extent possible that will reduce environmental impacts and resulting mitigation and compliance costs	Minimize the overall construction "footprint" to avoid environmental impacts and reduce life cycle costs	Review design alternative analysis to determine if footprint reduction strategies were conducted by design team	Action will reduce environmental and social impacts and environmental compliance and mitigation costs	X		Consistent with the CDOT NEPA Process
23	Environmental Stewardship	Land Use	Staging and Haul Road Areas	CDOT construction projects will reduce short and long term impacts from construction mobilization and operations beyond NEPA requirements, as needed	Construction team will make effective use of land resources made available to them and minimize the short and long-term adverse impacts to natural land such as but not limited to haul roads or staging areas	Review construction site configuration and meeting notes to determine if options were considered for the avoidance of sensitive areas in haul road/staging area placement	Minimize temporary and permanent environmental impacts beyond NEPA requirements		X	Consistent with the CDOT NEPA Process and CDOT Stewardship Guidance
24	Environmental Stewardship	Habitat and Biodiversity	Species enhancement	CDOT projects will strive to improve roadside ecology conditions within the CDOT right-of-way and adjacent habitat areas to promote species enhancement and habitat improvement	Provide enhancements to existing wildlife habitat or the creation of new ones (e.g. bird & bat houses, nesting boxes, fish spawning areas, T&E habitat improvements) within and adjacent to the project area	Review design documentation for wildlife habitat design enhancements; verify implementation and habitat improvements in the field	Provides for some environmental enhancement and restoration opportunities during CDOT projects	X		Consistent with the CDOT NEPA Process and CDOT Stewardship Guidance
25	Environmental Stewardship	Habitat and Biodiversity	Species enhancement		Require project scheduling and logistics to avoid disrupting wildlife nesting or breeding activities, as per RFP scope of work requirements	Review project based wildlife management plans and/or the preliminary project construction schedule that accommodates wildlife nesting and breeding periods	Action will provide environmental protection during sensitive wildlife breeding activities		X	Consistent with CDOT NEPA Process and CDOT Design Bulletin 2011 Number 2 Migratory Birds
26	Environmental Stewardship	Habitat and Biodiversity	Species enhancement		Native species seed mixes and other native plantings will be used for vegetation restoration and soil stabilization and no genetically modified plants used for revegetation	Review the seed mix specification selected by the design team landscape architect; assess if native species are in the landscaping and revegetation plan; and assess implementation via field assessment	The promoted use of native species maintains and/or improves roadside ecology while conserving water	X	X	Consistent with Specification 212.02 Seed, Soil Conditioners, Fertilizers and Sod
27	Environmental Stewardship	Habitat and Biodiversity	Species enhancement		Use a tree mitigation ratio expanded to 2:1 ratio where woodland preservation desired for high quality forest resources	Review landscaping plan to identify if sensitive tree system identified and tree mitigation ratio was incorporated; and evaluate in field	This action will Increase roadside and adjacent area ecology conditions by enhancement and restoration	X		Consistent with Specification 107.17 for Landscaping and CDOT Landscaping Guidance
28	Environmental Stewardship	Habitat and Biodiversity	Species enhancement		Retention and enhancement of non-noxious classified trees and other vegetation as part of a landscaping design recommended by a qualified landscape architect	Review project design landscaping plan and compare to environmental assessment to determine if tree-vegetation enhancement was considered in design; determine if sensitive vegetation was identified and protected by architect	Improvements in roadside ecology using a qualified landscape professional	X		Consistent with CDOT Noxious Weed Policy and CDOT Landscaping Guidance

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29	Environmental Stewardship	Habitat and Biodiversity	Noxious Vegetation	Promote improved roadside ecology by the eradication of all noxious weeds and vegetation on all CDOT right-of-way and properties	Remove noxious tree species with native tree replacements	Review the project landscaping plan that identified noxious vegetation (trees) for removal and replacement	Improves roadside ecology of right-of-way	X		Consistent with CDOT Noxious Weed Policy and CDOT Landscaping Guidance
30	Environmental Stewardship	Habitat and Biodiversity	Noxious Vegetation		Survey invasive plant species and removed within and adjacent to project area	Review project Noxious Weed Plan; verify by onsite observation	Increases roadside ecology conditions by enhancement and restoration	X		Consistent with CDOT Noxious Weed Policy, Integrative Weed Management Plan and CDOT Landscaping Guidance
31	Environmental Stewardship	Habitat and Biodiversity	Wildfire Protection	There will be no fires generated by CDOT Projects	Prepare a Fire Control Plan to specify actions necessary to prevent and mitigate fires during road construction in forested areas	Obtain and review the Fire Control Plan for an appropriate area	Community and roadway safety protection	X	X	Consistent with Specification 107.13 Forest Protection
32	Environmental Stewardship	Habitat and Biodiversity	Land Conservation	Use innovative landscaping and soil erosion best management practices to protect water quality while keeping soil on the project site in light of high intensity storms	Evaluate the use of a native vegetation mix that would provide a variable depth root structure to stabilize slopes in light of high intensity storm events	Review project landscaping plan for variable root plants; verify by field observations	Provide slope stability in areas prone to erosion from high intensity storm events that may occur from climate change			New CDOT Specification Needed
33	Environmental Stewardship	Habitat and Biodiversity	Buffer Zones	All projects will be designed to allow adequate distance (buffer zones) from highway surfaces to sensitive environmental areas	Road alignment establish a protective buffer zone between the edge of pavement and sensitive environmental areas (wetlands, riparian areas, stream systems, sensitive tree systems, etc.)	Review design documentation and evaluate buffer width distances from sensitive areas; review documentation by qualified biologist on buffer zone width for protection	Environmental protection and enhancement	X		New CDOT Specification Needed
34	Environmental Stewardship	Habitat and Biodiversity	Connectivity	Colorado transportation systems will develop structures or practices to facilitate the movement of all wildlife and prevent further habitat fragmentation	Enhance aquatic and terrestrial habitat connectivity and mobility to increase biodiversity and mobility (mountain corridor/publically driven example)	Review design plans to determine if habitat connectivity assessments and plans were developed specifically to address mobility and habitat fragmentation; assess if structures constructed and successful via field visit	Environmental enhancement and restoration during projects	X		Consistent with the CDOT NEPA Process
35	Environmental Stewardship	Water	Water Conservation	Eliminate the use of water for long term landscaping within the CDOT and adjacent municipal right-of-ways	Use landscaping approaches that reduce and/or eliminate the use of water for long term landscaping (after vegetative establishment)	Review contractor specification and landscaping plan regarding water conservation measures including vegetation irrigation	This action promote conservation of a very limited resource in Colorado	X		Consistent with CDOT Landscaping Guidance
36	Environmental Stewardship	Water	Water Conservation	Eliminate the use of water for long term landscaping within the CDOT and municipal right-of-ways	Develop and institute water conservation strategies during construction activities preferably though a water conservation plan	Review contractor specification and landscaping plan regarding water conservation measures including vegetation establishment. Review water conservation plan, if developed	This action promote conservation of a limited resource in Colorado		X	Consistent with CDOT Landscaping Guidance
37	Environmental Stewardship	Water	Stormwater Management	Identify and implement CDOT stormwater best management practices include that reduce stormwater costs while protecting local and regional water quality	Use post-construction best stormwater management practices; use low impact development (LID) and/or green infrastructure techniques such as infiltration trenches or basins, grass buffers, wetlands, etc.	Review the stormwater management plan to assess best management practices design and installation of controls that promote non structural (basins) controls	This stormwater action provide water quality protection with low maintenance costs	X		Consistent with Specifications 107.25 and 208 and CDOT Erosion Control Handbook; new BMPs will require CDOT Water Quality Managers Approval
38	Environmental Stewardship	Water	Stormwater Management	The selection of CDOT stormwater best management practices includes reducing stormwater management costs while protecting local water quality and local habitat conditions	A life cycle analysis is used for post construction BMP selection taking into account location, ROW acquisition, maintenance costs and regulatory requirements	Review the stormwater management plan and/or stormwater strategy plan and assess if life cycle costs were involved with BMP selection	Best management practices are selected based upon cost in addition to the level of environmental protection	X	X	No specifications or directive on for life cycle analysis for BMP selection; place in RFP Scope of Work as a Project Directive

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#	Sustainability Topics	Category	Aspect	Long Term Goal	Sustainable Actions	Measuring Success	Action Intent	Design Phase Action*	Construction Phase Action*	CDOT Specifications, Policy Directives and Programs
39	Environmental Stewardship	Water	Floodplains	Projects will eliminate intrusion of new highway systems into floodplain areas, wherever possible	Ensure that the project avoids alignments within the designated floodplain unless infrastructure is pre-existing or must cross a waterway	Acquire and assess the project floodplain areas and alignments to determine if floodplain was avoided	Avoidance reduces long term environmental and safety risk due to flooding	X		Consistent with the CDOT NEPA Process
40	Environmental Stewardship	Water	Stormwater Management	CDOT projects will use recycled or reused materials to the maximum extent possible to reduce the demand for virgin materials	Design vegetated swales for stormwater controls using recycled and reused materials to replace virgin sourced sand and/or gravel	Review the project stormwater management plan and hydraulic designs for swales development and evaluate via field observations	Reduces the need for virgin materials thus saving financial and extractable resources	X		No specifications or directive on for swale design using recycled materials; place in RFP Scope of Work as a Project Directive
41	Environmental Stewardship	Water	Stormwater Management	Projects will implement stormwater best management practices that are compliant to all stakeholder MS4 programs and protect water quality on a watershed basis	Coordinate post construction stormwater BMPs with local watershed organizations to promote local and regional water quality protection and improvements	Review meeting summaries with watershed stakeholders; evaluate if BMP recommendations were implemented	Promotes local community participation and outreach towards managing local/regional water resources	X	X	Consistent with CSS Process
42	Environmental Stewardship	Water	Stormwater Management	Institute project phasing or other best management practices to reduce the amount of exposed soil to erosion forces during and after construction activities	Reduce acres of exposed soil from vegetative grubbing and clearance to reduce erosion and protect water quality using project phasing	Assess the project revegetation and landscaping plan for erosion control for innovative approaches that reduce the amount of expose soil without stabilization during construction	Protect receiving streams from sediment loading during storm events and reduces erosion impacts to land surfaces		X	Consistent with CSS Process and Specification 107.25 and 208
43	Environmental Stewardship	Materials & Resources	Recycling and Reuse	CDOT will eliminate the removal of soil within project areas to reduce landfilling costs, environmental impacts and transport related emissions	Contractor restores, reuses and/or maintains on site 100% of disturbed soils during construction	Review evidence in photographs, inclusion in landscaping plans and inspecting site after construction is complete	Action reduce landfilling and transportation costs while reducing fuel consumption and emissions	X		Would require revision to Section 200 Earthwork of the CDOT Standard Specifications
44	Environmental Stewardship	Materials & Resources	Materials	Projects will use pavement materials that will reduce the number of surface applications that impact local communities and the environment	Use new or reconstructed pavement materials that meets long-life pavement design criteria (minimum 40-year design life)	Review design specifications and documentation showing that long life pavement was selected	Reduces need for additional pavement application that reduces costs and materials	X		Consistent with CDOT Pavement Design Manual Chapter 10 Life Cycle Cost Analysis
45	Environmental Stewardship	Materials & Resources	Materials	Projects will explore and utilize locally sourced materials to reduce transportation of materials and promote business with local firms near or within the project area	Promote use of locally sourced materials to reduce impacts from transportation emissions, reduce fuel costs, and support local economies	Review design specifications and list of vendors showing that locally sourced materials was used on the project or at least considered	Reduced transportation fuel costs and consumption and emissions from the use of fossil fuels will be reduced	X	X	No specifications or directive on for purchasing locally sourced materials; place in RFP Scope of Work as a Project Directive
46	Environmental Stewardship	Materials & Resources	Materials	All paints, adhesives and coating materials will be low emission volatile organic compounds that are biodegradable in the environment and consistent with the State of Colorado Environmentally Preferred Purchasing Policy	Coatings and other treatments for temporary and permanent infrastructure will be specified as low-VOC and/or biodegradable	Review design material specifications that detail low VOC materials and biodegradable products when feasible	Promote reduction of toxic fumes being inhaled during application and by off-gassing; reduces the amount of hazardous material and waste generated from manufacturing	X	X	No specifications or directive on for low VOC materials; place in RFP Scope of Work as a Project Directive or require adherence to State of Colorado Environmentally Preferred Purchasing Policy
47	Environmental Stewardship	Materials & Resources	Recycling and Reuse	All pavement materials will contain recycled components that reduce the demand for virgin materials	Use asphalt pavement mixes containing Recycled Asphalt Pavement (RAP) and/or Portland concrete pavement mixes containing Recycled Concrete Aggregate (RCA)	Review design material specifications and material documentation that considered or specified RAP and RCA	Action reduces the need for virgin materials thus saving financial resources	X		Consistent with CDOT Standard Specification Section 401.02 Composition of Mixtures for asphalt only. Recycled concrete is only allowed for use as road base CDOT Standard Specification Section 703.03
48	Environmental Stewardship	Materials & Resources	Recycling and Reuse	All vegetative materials generated on CDOT projects will be used on the project site or on another project sites without landfilling while being in compliance to CDOT Weed Management requirements	Contractor uses an on-site location for chipped wood waste storage and used as mulch or other uses from clearing and grubbing operations	Review evidence in Waste Management Plan and onsite implementation	Reduces landfilling cost by chipping and reduced transportation costs and fuel consumption by keeping materials on site		X	No specifications or directive on for reuse of chipped wood; place in RFP Scope of Work as a Project Directive
49	Environmental Stewardship	Materials & Resources	Recycling and Reuse		Landscaping waste is reused or composted	Review the project landscaping plan for landscaping waste reuse and compositing	Reduced landfilling and transportation costs and reduces demand for land being used for disposal		X	No specifications or directive on for reuse of landscaping waste; place in RFP Scope of Work as a Project Directive

Sustainable Actions Table

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50	Environmental Stewardship	Materials & Resources	Recycling and Reuse	All construction related waste materials will be 100% recycled or reused	Require the identification and management of waste streams arising from construction, reuse on site or find vendor for material recycling	Obtain and review waste management plan and documentation showing waste stream separation for material reuse and recycling	Action reduces the amount of waste being transported and landfilled and reduces the need for virgin materials		X	No specifications or directive on for identification and management of waste streams for reuse or recycling; place in RFP Scope of Work as a Project Directive
51	Environmental Stewardship	Materials & Resources	Waste Minimization	Proposals, design, specifications and other documentation will be delivered to CDOT electronically to reduce paper consumption and solid waste generation	Electronic deliveries of proposals and plan sets are required by proposers to reduce paper consumption	Review request for proposal and other contractor directed guidance on deliverables to the project	Reduces the need for virgin materials thus saving financial resources	X		No specifications or directive on for electronic deliverables; place in RFP Scope of Work as a Project Directive
52	Environmental Stewardship	Materials & Resources	Pesticides	Pesticides and herbicides that are toxic with long persistence times will not be part of the CDOT Integrated Pest Management Program; chemicals purchased will be consistent with the State of Colorado State Environmentally Preferred Purchasing Policy	Specify that only bio-degradable pesticides, herbicides and fertilizers applications are used as part of an integrated pest management strategy	Determine if the project team developed an integrated pest management plan for implementation during and after construction and verify success by onsite assessment	Pesticides and herbicides are persistent in the environment and present risks to wildlife and the manufacturing uses and generates hazardous waste/materials	X	x	No specifications or directive on bio-degradable chemicals for pest control; place in RFP Scope of Work as a Project Directive
53	Environmental Stewardship	Materials & Resources	Recycling and Reuse	Projects will use recycled petroleum materials whenever feasible on project vehicles to reduce demand for fossil fuel consumption and reduction in waste material	Recycled motor oils are used on CDOT project truck fleet and recommended to contractors	Review contractor directed documentation toward using recycled motor oils on truck fleets and obtain CDOT guidance in using recycled motor oils and verify usage	Reduces the need and consumption for petroleum materials thus saving financial resources		X	No specifications or directive for recycled motor oils; place within scope of Work as a Project Directive
54	Environmental Stewardship	Materials & Resources	Recycling and Reuse	Projects will use reused concrete and asphalt materials for road base material instead of using virgin road base materials	Reuse 100% of existing roadway materials for road base on the project (crushed concrete, millings routinely used as aggregate based concrete)	Review contractor directed specifications on the use of reused materials for road base	Action reduces the need for virgin materials thus saving financial resources	X	x	No specifications or directive for reusing 100% existing roadway materials ; place within scope of Work as a Project Directive
55	Environmental Stewardship	Materials & Resources	Recycling and Reuse	All projects will collect, store and use millings for shoulder improvements and other uses to avoid land disposal	Reuse 100% of all millings collected by CDOT	Review contractor directed specification toward use of millings or CDOT records showing collection and storage	Reduces the need for virgin materials thus saving financial resources	X		No specifications or directive for reusing millings; place within scope of Work as a Project Directive
56	Environmental Stewardship	Materials & Resources	Recycling and Reuse	Projects will use reused materials whenever feasible for roadway pavement materials (concrete/pavement) instead of using virgin materials	Rubblized concrete use for structural road base	Review contractor directed specifications on the use of broken concrete materials	Reduces the need for virgin materials thus saving financial resources	X		No specifications or directive using rubblized concrete for roadbase; place within scope of Work as a Project Directive
57	Environmental Stewardship	Materials & Resources	Recycling and Reuse		Reuse of previous pavement and other materials into the project as replacement road sub-base or usable aggregate material	Review contractor directed specifications for material reuse	Action reduces the need for virgin materials thus saving financial resources and reduce landfilling costs	x	x	Consistent with CDOT Standard Specification 703.03 Aggregate for Bases
58	Environmental Stewardship	Materials & Resources	Recycling and Reuse	Eliminate the transport and landfilling of construction materials	Evaluate the use of prefabricated bridge sections and infrastructure to reduce project construction time and reduce demolition costs	Review project design for prefabricated bridge section(s) or other prefabricated infrastructure	Action reduces construction and decommissioning costs and promotes easier recycling during demolition	X		Consistent with CDOT Project Development Manual Section 5.14 Accelerated Bridge construction (ABC)
59	Environmental Stewardship	Materials & Resources	Recycling and Reuse	Asphalt pavement applications will use the best available technology to reduce emissions and fossil fuel consumption	Develop and use cold and hot recycle methods	Review contractor directed specifications on the use of cold and hot recycle methods	Action reduces the need for virgin materials thus saving financial resources. Reduced air emissions can be realized	X		Consistent with CDOT Pavement Design Manual Chapter 5 Recycle and Section 406 of the CDOT Standard Specifications
60	Environmental Stewardship	Materials & Resources	Recycling and Reuse		Warm asphalt mix used on the project as a cost effective and environmentally sound material and application	Review contractor directed specifications the use of warm asphalt by CDOT	Reduce emissions and fossil fuel consumption	X		No specifications or directive on for warm asphalt mix; modify Specification 406
61	Environmental Stewardship	Materials & Resources	Recycling and Reuse		Resurfacing projects consider the use heater remix asphalt recycling	Review contractor directed specifications on the use of recycled asphalt	Reduces the need for virgin materials thus saving financial resources	X		No specifications or directive on for warm asphalt mix; modify Specification 406

Sustainable Actions Table

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62	Environmental Stewardship	Materials & Resources	Recycling and Reuse	CDOT projects will maximize the use of onsite materials to the full extent possible to reduce transportation costs and excessive use of virgin materials	Estimate the amount of excavated material (soil and topsoil) that will be reused on-site such for revegetation, embankments and fill	Review project design documentation and contractor specifications for onsite soil/topsoil usage	Reduce landfilling and transportation costs will result while reducing fuel consumption and emissions	X	X	Covered by current CDOT Standard Specification Section 207 Topsoil
63	Environmental Stewardship	Materials & Resources	Recycling and Reuse		Optimize cut and fill volumes (less than 10%) to reduce the quantity of excavated material to be taken off site	Review the design grading plan and other documentation. Review cut-fill calculations and approaches for onsite use optimization	Reduce landfilling and transport costs will be realized	X	X	No specification or directive for optimizing fill volumes. Place within scope of Work as a Project Directive
64	Environmental Stewardship	Materials & Resources	Recycling and Reuse	Projects will use non hazardous recycled materials whenever feasible for roadway noise barriers	Crumb rubber, recycled tires or recycled plastic are used for noise barrier material	Review project design documentation to determine if crumb rubber or recycled plastic for noise barrier material was addressed in the design and assess on site	Use of reusable materials reduces the need for virgin materials thus saving financial resources	X		No specifications or directive using crumb rubber; place within scope of Work as a Project Directive
65	Environmental Stewardship	Material and Resources	Recycling and Reuse	All materials used by projects will be recycled or reused unless there are integrity problems that prevent their reuse	Recycle and/or reuse bridge girders and other metal materials	Review design team specifications to contractor on recycling-reusing metal materials	Reduce use of virgin materials for other projects and uses	X		No specifications or directive for recycling bridge girders; place within scope of Work as a Project Directive
66	Environmental Stewardship	Materials & Resources	Waste Management	All landfills used on CDOT projects will have a high level of environmental protection to reduce long term environmental risk and liability	Contracted landfill disposal facility for project waste are protective to the environment and disposal site selection is not based solely on cost	Review the project waste management plan and evaluate the landfill vendors' environmental record, environmental safeguards, and monitoring systems	Reduces long term project hazardous waste/material liability and protects disposal area environmental conditions		X	No specifications or directive for landfill section by CDOT or contractor; place within scope of Work as a Project Directive
67	Environmental Stewardship	Material and Resources	Material Transport	Where feasible, batch plant(s) will be placed near or at the project area to reduce transportation cost and resulting emissions	Concrete batch plant placed on site to reduce transportation costs	Review design team specifications to contractor for cost effective batch plant placement	Action reduces transportation costs and emissions to/from project site	X	X	No specifications or directive for batch plant location on site; place within scope of Work as a Project Directive
68	Environmental Stewardship	Materials & Resources	Procurement	CDOT projects and all operations will reference and follow the State of Colorado Environmentally Preferred Purchasing Policy to select products and materials that are protective to human health and the environment	Contractors and subcontractors are directed to reference and consider State of Colorado Environmentally Preferred Purchasing Policy when purchasing materials	Review materials used on the project against the State of Colorado Environmentally Preferred Purchasing Policy	Use materials that are non-hazardous and biodegradable that are not persistent in environment and not hazardous material intensive during manufacturing	X		No specifications or directive to purchasing materials throught Environmentally Preferred Purchasing Policy; place within RFP Scope of Work and/or Project Directive
69	Environmental Stewardship	Energy and Emissions	Alternative Energy	CDOT projects will use alternative energy sources as the major source of electrical power for CDOT projects and operations	Use alternative energy powered signal, tunnels and warning signs; evaluate potential alternative energy utilization for CDOT operations	Assess design documentation and vendor information to determine if alternative energy alternatives or options were considered	Reduced or eliminated use of fossil fuels for long term power needs will be realized and cost saving achieved	X		Consistent with Specification 614.05 for lighting; no specifications for LED for tunnels and street lighting; place within RFP Scope of Work and/or Project Directive
70	Environmental Stewardship	Energy and Emissions	Lighting	CDOT projects will use highway and traffic signal lighting technologies that are energy efficient and life cycle cost effective while providing safety to the traveling public	Energy efficient lighting equipment selected via life cycle analysis	Review design team designs and specifications for high efficiency lighting; evaluate cost and energy savings	Evaluate lighting equipment based upon cost and energy life cycle data to reduce costs and energy consumption	X		No specifications or directive for lighting selection based upon life cycle costs; place within scope of Work as a Project Directive
71	Environmental Stewardship	Energy and Emissions	Lighting		All traffic lighting (street, signals, tunnels) to use LED lighting or other technologies that conserve energy and reduce life cycle costs	Review design team designs and specifications for high efficiency lighting and evaluate calculated cost and energy savings	Increased lighting and cost efficiencies that will improve safety and reduce energy demand will be realized	X		No specifications or directive for lighting selection based upon life cycle costs; place within scope of Work as a Project Directive
72	Environmental Stewardship	Energy and Emissions	Emissions	CDOT projects will use pavement technologies that provide surface integrity while reducing emissions to the maximum extent possible	Use warm mix asphalt to reduce fossil fuel use at the asphalt plant	Review design team specifications to contractor using warm mix asphalt	Reduces air emissions and consumption of fossil fuels	X		No specifications or directive for warm mix asphalt; place within scope of Work as a Project Directive
73	Environmental Stewardship	Energy and Emissions	Emissions	Projects will use non hazardous low VOC emitting materials whenever feasible for roadway surfaces and structures	Avoid use of cutback asphalt (VOC emitter) and all paints and coatings will comply with the low Green Seal Environmental Standard for Paints and Coatings or equivalent	Review specifications to the contractor for low VOC materials; follow State of Colorado Green Procurement Guidelines for material selection	Reduce use of high volatile chemical emissions that can be toxic and use certified non toxic materials	X	X	No specifications or directive for cutback asphalt and low VOC paints and coatings; place within scope of Work as a Project Directive

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74	Environmental Stewardship	Energy and Emissions	Emissions	CDOT projects will use innovative best management practices to control air pollutants and emissions consistent with CDPHE regulations and CDOT guidance that protect the traveling public's safety, local residences' health, and local area's air quality	Eliminate or reduce adverse dust impacts during construction and operations through innovative construction phasing, landscaping and erosion control techniques	Review the project dust control and air pollution management plan that eliminates or significantly reduces air particulate transport. Review landscape or stormwater management plan for innovative approaches	Action promotes increased safety by dust suppression that conserves water and provides better soil stability		X	Consistent with Specifications 107.25, 208 and CDPHE Air Quality Permit Requirements
75	Environmental Stewardship	Energy and Emissions	Emissions		Implement items identified in the CDOT Air Quality Policy Directive within the RFP	Review the project RFP to contactors that require conformance to CDOT Air Quality Directives and evaluate conformance via field observations and documentation	Implements CDOT Air Quality Policy and action issues that will protect and improve air quality conditions	X		Consistent with the CDOT Air Quality Policy
76	Environmental Stewardship	Energy and Emissions	Emissions		Use an equipment idling restriction program to reduce idling to a maximum of 10 minutes to reduce fuel costs and greenhouse gas emissions	Obtain and review contractor emission control plan or equivalent for idling controls on equipment and truck fleets and evaluate conformance via field observations	Provides a method to reduce idling to reduce fuel consumption and reduced emissions	X	X	No specifications or directive for idling restrictions; place within scope of Work as a Project Directive
77	Environmental Stewardship	Energy and Emissions	Emissions		Require that batch plant operations and emissions equipment are maintained to limit carbon emissions	Review contractor emission control plan or equivalent documentation and review subcontractor contract for emission control requirements	Action reduces energy consumption and emissions	X	X	No specifications or directive for batch plant emissions; place within scope of Work as a Project Directive
78	Environmental Stewardship	Energy and Emissions	Emissions		Plant trees and vegetation along the road periphery to help absorb mobile source air toxics (MSATs) and carbon/greenhouse gases from road traffic and emit low levels of VOCs as ozone precursors	Assess project landscaping plan , review before -after photographs and/or perform field verification	Promotes carbon sequestration actions and reductions of potential air pollutants especially in populated areas	X		Consistent with the CDOT Air Quality Action Plan
79	Environmental Stewardship	Energy and Emissions	Emissions		Require construction areas and ancillary equipment maintained to maximize fuel efficiency and minimize carbon emissions	Obtain and review contractor records of regular maintenance and emission testing and review contractor emissions control program, if developed	Action achieves reduction of energy consumption by maintaining efficiencies		X	No specifications or directive for equipment maintenance and emissions control; place within scope of Work as a Project Directive
80	Environmental Stewardship	Energy and Emissions	Emissions		Develop traffic control plan that reduces traffic congestion and delays during construction that will reduce engine idling and high emissions	Review project traffic operations plan and perform field evaluations on congestion within project area	Reduces idling due to excessive stop and go near and within construction area		X	Consistent with the CDOT Air Quality Action Plan
81	Environmental Stewardship	Energy and Emissions	Energy Conservation	CDOT projects will use the most efficient technologies and equipment possible for energy conservation and fossil fuel consumption reduction	Develop an office energy conservation plan using Energy Star rated equipment	Review documentation on equipment purchases, review energy ratings and verify with onsite visits	Action requires certified energy equipment purchase to save energy and reduce costs	X		No specifications or directive for office energy conservation; place within scope of Work as a Project Directive

Acronnyms

CDOT- Colorado Department of Transportation

CDPHE- Colorado Department of Public Health and Environment

CSS- Context Sensitive Solutions

HAWK- High Intensity Activated Cross Walk

LED- Light-Emitting Diode

LID- Low Impact Development

MAST- Mobile Source Air Toxics

MS4- Municipal Separate Storm Sewer System

NEPA- National Environmental Policy Act

ITS- Intelligent Transportation Systems

RAP- Recycled Asphalt Pavement

RCA- Recycled Concrete Aggregate

RFP- Request for Proposal

T&E- Threatened and Endangered Species

VOC- Volatile Organic Compounds

VMT- Vehicle Miles Traveled

*Note: Both design and construction actions may occur within the same project for Design Build and Construction Manager-General Contractor contract mechanisms