

**CTP-ICE Best Management Practices
Recommendations
TECHNICAL MEMORANDUM
(CTP-ICE Product 4)**



Date:	Revision:	Date:
	Date of Original Version:	
To:	NCDOT Transportation Planning Branch Regional Unit Head, TPB NCDOT Community Studies Team Leader, HES	
From:	Staff, TPB/MPO/RPO	
Subject:	CTP-ICE Best Management Practices Recommendations for the 2009 Eden CTP	

This Technical Memorandum documents the CTP-ICE Best Management Practices Recommendations for the Eden 2009 Comprehensive Transportation Plan (CTP). Recommendations outline strategies that local governments may implement in order to minimize potential indirect and cumulative effects from proposed transportation projects.

Overview

The findings from the CTP-ICE Assessment (Products 1, 2, and 3) indicate potential indirect and cumulative effects to natural and cultural resources in the Eden CTP Study Area. These potential effects, which are documented in the technical memorandums and matrices, include increased development as well as impacts to natural resources and water quality. This Technical Memorandum outlines several strategies that could be implemented by the City of Eden and Rockingham County to assist in minimizing potential indirect and cumulative effects from project proposals on the 2009 Eden CTP.

Land Use and Growth

There is estimated to be a large amount of available land (57 percent) within the CTP Study Area. Water and sewer service is available in most parts of the CTP Study Area with plans for future water service extensions. These factors combined with the proposed CTP projects, notably the NC 14-87 Bypass, may induce development particularly west of Eden around the proposed bypass. The following strategies would assist in minimizing the indirect and cumulative effects resulting from the CTP project proposals and land development.

Revise Zoning Ordinances

The Eden Land Development Plan and the Rockingham County Land Use Plan both encourage sustainable growth and recommend specific practices such as cluster, in-fill, and mixed-use development to achieve that vision. However, in order for these plans to be effective the city and county zoning ordinances would need to be updated to include provisions that would implement these practices. The zoning ordinances should also be amended to reflect any additional recommendations that are selected by the local governments discussed further in this section.

Low Impact Development (LID)

Low Impact Development is an approach to minimize the impacts of development (particularly water impacts) through green infrastructure, systems, and land use practices that use or mimic natural processes to infiltrate, evapo-transpiration (the return of water to the atmosphere either through evaporation or by plants), or reuse stormwater or runoff on the site where it is generated. Specific techniques include using permeable pavement to reduce runoff, bio-retention, rain gardens to treat stormwater, green roofs and rain barrels to harvest water for reuse. These techniques can be required as part of a stormwater ordinance that Eden and/or Rockingham County may adopt

Eden and Rockingham County can evaluate the zoning ordinance, erosion and sediment control ordinance, landscaping requirements, and street design specifications (such as road widths or type of curbing), and other standards that might prohibit the use of LID practices. The evaluation should identify language that could be incompatible with LID and work with other municipal/county departments to discuss alternatives, and address the departments' concerns to ensure their support. Depending on how new requirements are codified in the respective communities, staff can develop new code language, propose changes (amendments) to the existing zoning or development ordinance, or develop a separate stormwater ordinance that outlines the new standards. For model ordinances that promote LID see the following websites:

http://www.mass.gov/envir/smart_growth_toolkit/pages/mod-lid.html or

http://www.des.nh.gov/organization/divisions/water/wmb/repp/innovative_land_use.htm

Eden and Rockingham County can combine Best Management Practice (BMP) design with LID design practices to improve overall water quality, help lower temperatures, decrease risk of flooding, effectively remove pollutants, and protect water channels. Techniques that can be incorporated into the ordinance include using (mandating) vegetated buffers, soil media filters, infiltration, and wet ponds with under-drained gravel filters. The design standards suggested include treatment for the first 1 inch of runoff from impervious surfaces and 0.4 inch from landscaped areas. For more information, see the Maine DEP Stormwater Management Manual at: <http://www.maine.gov/dep/blwq/docstand/stormwater/stormwaterbmps/index.htm>

Mixed Use

As suggested in the Eden and Rockingham County land use plans, mixed-use development is a more efficient use of land and reduces the number of trips by centrally locating destinations. Mixed-use developments are denser and contain residences, workplaces, shops, and services. Pedestrian and bicycle activity is more likely to occur in these developments because the distances between destinations are shorter and the necessary sidewalks and paths are often included. Mixed-use can be encouraged through zoning ordinances and would be particularly well-suited for in-fill developments.

Eden and Rockingham County can evaluate the zoning ordinance, and other standards that might discourage or prohibit mixed uses and assess opportunities to apply a mixed use zoning district or an overlay district within a commercial district to permit/encourage mixed use buildings. For more information see model ordinance:

<https://www.planning.org/research/smartgrowth/pdf/section41.pdf>

Cluster Development

Clustering development would help conserve undeveloped land. Instead of maximizing the number of lots, a portion of the tract is set aside for conservation. In addition to the conservation land serving its purpose to protect habitats and water quality, it also provides nearby residents with recreational amenities and open space. Given that much of the CTP Study Area is currently undeveloped and that growth is expected to occur, cluster development may be a particularly relevant best practice for minimizing indirect and cumulative effects.

Eden and Rockingham County can evaluate the zoning ordinance, and other standards that might discourage or prohibit Cluster Development and assess opportunities to apply a cluster development pattern, protect open space and notable features. For more information see model ordinance:

<https://www.planning.org/zoningpractice/2007/pdf/aug.pdf>

Natural Resources

Within the CTP Study Area there are seven natural heritage sites, only two of which are managed areas. There are also rare plant and animal species such as the Roanoke hog sucker, cliff stonecrop, and American barberry. Threatened and endangered species include the green floater, glade wild quinine, Virginia spiderwort, riverweed darter, and goldenseal. These natural resources have not been explicitly protected in local plans.

Eden and Rockingham County can evaluate the zoning ordinance and consider applying performance based zoning standards to specific resources that the community wants to protect. For example, floodways and wetlands can be protected in specified zoning districts, and would remain as 100 percent open space so no development occurs on that specified resource. For more information see model ordinance:

<http://www.smartcommunities.ncat.org/codes/bucks.shtml>

<http://www.landscapes2.org/ToolsLandscape/pages/PerfZoning.cfm>

Green Growth Toolbox

The North Carolina Wildlife Commission developed a Green Growth Toolbox intended to help communities conserve priority wildlife habitats and natural resources for future generations while accommodating planned growth. The toolbox provides North Carolina specific conservation data, which can be used for visioning, plan development, ordinances, and in development review. This data could assist Eden and Rockingham County in identifying the locations of these natural resources, especially if the presence and locations of resources have changed since local surveys were completed. The data can be downloaded from:

<http://www.ncwildlife.org/Conserving/Programs/GreenGrowthToolbox/ConservationData.aspx>

Incorporate Resources into Local Plans

Once natural resources have been identified, their protection depends on inclusion in land use plans and ordinances. The Green Growth Toolbox provides model development ordinances related to the protection of natural heritage sites, streams and wetlands, wildlife habitats, and steep slopes. It also gives examples of zoning ordinances such as the establishment of a rural buffer to focus growth and avoid sprawl. Ordinances from around the country are available for download on the Green Growth Toolbox website and may serve as templates for Eden and Rockingham County. The model ordinances can be found at this website:

<http://www.ncwildlife.org/Conserving/Programs/GreenGrowthToolbox/GreeningOrdinances.aspx>

References: City of Eden Land Development Plan (2007); City of Eden Zoning Ordinance (2008); EPA Low Impact Development (2013); North Carolina Heritage Program, <http://www.ncnhp.org/>; North Carolina Wildlife Commission: Green Growth Toolbox, <http://www.ncwildlife.org/Conserving/Programs/GreenGrowthToolbox.aspx>; Rockingham County Land Use Plan (2005); Rockingham County Ordinances (2011)

Water Quality

The Smith and Dan Rivers converge in the CTP Study Area where numerous other streams and wetlands are also present. Although the Smith and Dan Rivers have historically had water quality issues related to past industrial use, none of the water bodies within the CTP Study Area are included on the North Carolina 303(d) list. The proposed CTP projects and development spurred by them would impact water quality from increased runoff and sedimentation during construction. The following strategies would help minimize these potential impacts.

Preserve Open Space and Buffer Protections

Preserving open space, especially around water bodies, would help minimize impacts to water quality resulting from runoff. Natural lands serve critical functions in absorbing runoff and treating it naturally before it enters the stream or river. A study by the EPA "Protecting water resources with smart growth" states that a 20 to 30 foot buffer can remove 90 percent of nitrates. The city and county could initiate an open space conservation program that would target natural lands around water bodies. These lands could either be purchased by the city or county or a conservation easement could be established with the landowner.

Eden and Rockingham County can evaluate the zoning and development ordinances and apply buffer requirements in order to protect streams, wetlands and other water bodies. For more information see model ordinance and conservation easements to protect buffers:

<http://water.epa.gov/polwaste/nps/upload/nps-ordinanceuments-a2b-rhode-island.pdf>

https://www.albemarle.org/upload/images/Forms_Center/Departments/County_Attorney/Forms/Albemarle_County_Code_Ch17_Water_Protection.pdf

<http://water.epa.gov/polwaste/nps/upload/nps-ordinanceuments-a2e-model-land.pdf>

Stormwater Control Devices

In cases where development does occur, stormwater control devices can be implemented during and after construction to limit runoff and sedimentation of water bodies. There are various types of devices, each with a specific purpose. Devices or techniques to be used during site planning include construction sequencing where land disturbing activities are coordinated with the installation of erosion and sediment control devices. Preserving as much natural vegetation as possible during construction will also limit erosion and sedimentation. During the construction phase, geotextiles can slow runoff and protect new plantings. Following construction, devices such as grass-lined channels and rain gardens can become permanent installations to capture and treat stormwater. Regular maintenance is essential to the success of stormwater control devices and should be included in any stormwater control plan. For a comprehensive list of available devices visit the EPA's National Menu of Stormwater Best Management Practices: <http://cfpub.epa.gov/npdes/stormwater/menuofbmeps/index.cfm>.

Stormwater Ordinances

The city and county may consider adopting ordinances that would reduce stormwater runoff. Eden currently has an ordinance that requires a stormwater management plan for development of impervious surface in excess of 20,000 square feet. Eden may consider applying this ordinance to smaller developments as well and/or making the ordinance more stringent. Rockingham County currently has no stormwater ordinances in place. Both the city and county could decrease minimum parking standards, which would decrease impervious surfaces and resulting runoff. The EPA provides model ordinances that the city and county may use in drafting their own: http://water.epa.gov/polwaste/nps/ordinance_index.cfm.

References: City of Eden Zoning Ordinance (2006); Rockingham County Ordinances (2011); EPA Model Ordinances to Prevent and Control Nonpoint Source Pollution (2012); EPA National Menu of Stormwater Best Management Practices (2012); EPA Protecting Water Resources with Smart Growth (2009)