EXECUTIVE SUMMARY

INTRODUCTION

Water supply planning in Storrs and Mansfield has been underway for nearly two decades. The University of Connecticut (University) has prepared four individual water supply plans beginning in 1994. Additionally, the Town of Mansfield prepared a water supply plan in 2002. These water supply plans provided estimates of future water demand in different geographic areas, with the University's plans focusing on the main campus, Depot Campus, and immediately adjacent areas. The Town of Mansfield's plan included more distant areas that could benefit from water supply, such as the Mansfield Four Corners area and residential neighborhoods to the west of the main campus.

Two parallel efforts brought water supply issues to the forefront in 2010 and 2011: the University's development of its updated individual *Water Supply Plan* (submitted to state agencies in May 2011) and the Town of Mansfield's study of water supply options for redevelopment of the Mansfield Four Corners area. The University's 2011 *Water Supply Plan* identified four areas of future potable water service that were committed by the University: The Storrs Center development, the North Campus Technology Park, Depot Campus redevelopment, and the King Hill Road Planned Business Area. The 2011 *Water Supply Plan* further identified the need for an additional 0.5 mgd to 1.0 mgd of available supply to bolster available water during certain months of the year and boost margin of safety[1] (MOS) above 1.15 over the 50-year planning period. This amount of water was needed in the short/intermediate term to meet MOS requirements during periods of peak demand when Fenton River Wellfield production is curtailed or suspended.

Meanwhile, the Town of Mansfield's study of water supply options for redevelopment of the Mansfield Four Corners area identified future areas of water need in the town that were not committed by the University in its 2011 *Water Supply Plan*. Specific to the Mansfield Four Corners area, a total of 0.17 mgd of water demand has been estimated for this area through the 20-year planning period.

Given the mutual need for water to address potable water demands identified in the 2011 *Water Supply Plan* and the 2011 Mansfield Four Corners study report, the University and the Town of Mansfield began to collaborate to identify a source of water supply that would meet combined future needs. In June 2011, the University and the Town of Mansfield initiated the subject Environmental Impact Evaluation (EIE) under the Connecticut Environmental Policy Act (CEPA) to allow for a detailed evaluation of potential interconnection and groundwater supply alternatives. An additional water supply will have the dual benefit of increasing the University's MOS while also providing potable water for use on campus and in the town of Mansfield consistent with the town's *Plan of Conservation and Development* (POCD) and zoning regulations.

[1] Margin of Safety is defined as the ratio of available supply over demand. A margin of safety of 1.15 implies that a water system has 15% more water available than demand. This 15% provides a buffer against unforeseen circumstances, such as water main breaks or other emergencies.

PROJECT PURPOSE AND NEED

In order to enable growth of the University and the surrounding area consistent with the University's master plans and associated environmental analysis and the Town of Mansfield's *Plan of Conservation and Development*, the University and the Town of Mansfield are in need of a viable long-term public water supply source. This additional supply would have the dual benefit of increasing the margin of safety of the University's water supply system while also providing potable water for use on campus, in the Mansfield Four Corners area, and elsewhere in town. The need for additional water supply is driven by existing and future water demands as follows:

1. Need for Sufficient Margin of Safety (MOS) – MOS is thoroughly evaluated in the University's *Water Supply Plan* (2011) and in the water demand projections of the *Water and Wastewater Master Plan* (2006). A minimum of 0.32 mgd of new water supply will be necessary to meet the maximum month MOS goal of 1.15 during periods of peak demand and when the Fenton River Wellfield is curtailed or offline. This includes existing system demands plus committed water supply both on and off campus. It also accounts for the reduction of demand that will occur once the reclaimed water facility comes on line. Off-campus committed demands include Storrs Center and King Hill Road Planned Business Area. Of the 0.32 mgd quantity, only 0.04 mgd would be needed for consumption; the remainder would be placed on standby for MOS. A minimum of 0.73 mgd of new water will be necessary to meet the peak day MOS goal of 1.15 in 2060. Of the 0.73 mgd quantity, only 0.38 mgd would be needed for consumption; the remainder would be placed on standby for MOS.

2. Additional Incremental Demand to Supply the Technology Park – The proposed Technology Park on the University's North Campus was allocated a committed water demand of 89,600 gpd in the 2011 *Water Supply Plan*. This figure was revised in May 2011 from prior estimates through a tabulation of potential gross square footage of buildings to be constructed in the Technology Park. At the present time, higher average water demands are being forecast for the Technology Park. Current estimates are approximately 423,500 gpd. With 89,600 gpd already set aside in the 2011 *Water Supply Plan* and analyzed as part of the water needed to maintain future margins of safety, the increment of 333,900 gpd is therefore an additional future water demand. Maximum month demands and peak day demands will be somewhat higher although the timing of peaking factors is likely to be different for each parcel in the Technology Park, depending on the use (i.e., classroom versus year-round research). The analysis on page 6-25 of the 2011 *Water Supply Plan* provides the rationale and justification to support a ratio of 1.33 for peak day planning calculations. This factor is applied to the average day demand of 333,900 gpd to estimate a peak day demand of 444,087 gpd. Applying the desired 15% MOS yields the following demand forecasts:

TABLE ES-1
Additional Incremental Technology Park Demand

Condition	Base Demand	Base Demand Plus 15% MOS
Average Day	333,900 gpd	383,985 gpd
Peak Day	444,087 gpd	510,700 gpd

3. Future Town of Mansfield Demand – In addition to the previously committed water service in the Town of Mansfield, the town has identified previously uncommitted demands associated with the Mansfield Four Corners development (170,000 gpd), a planned elderly and assisted living facility

(30,000 gpd), and a number of residential development areas as identified in Tables 2-9, 2-10, and 2-11 of the *Water and Wastewater Master Plan* (totaling 253,500), for a total average day demand of 453,500 gpd. Provision of public water to these areas is consistent with Mansfield's *Plan of Conservation and Development*. Similar to the Technology Park, factors are applied to obtain peak day demand as well as a 15% MOS as follows:

TABLE ES-2
Additional Demand Within the Town of Mansfield

Condition	Base Demand	Base Demand Plus 15% MOS
Average Day	453,500 gpd	521,525 gpd
Peak Day	603,155 gpd	693,628 gpd

In total, the following additional water supply is needed to meet peak day demands in the 50-year planning horizon (2060) with a 15% MOS:

TABLE ES-3
Incremental Water Supply Demand in 2060

Need	Average Day Demand With 15% MOS	Peak Day Demand With 15% MOS
Committed Water Supply Demand	*320,000 gpd	730,000 gpd
Additional Incremental Technology Park Demand	383,985 gpd	510,700 gpd
Additional Town of Mansfield Demand	521,525 gpd	693,628 gpd
TOTALS:	***1,225,510 gpd***	***1,934,328 gpd***

*Due to the manner in which the demand was computed in the University's 2011 *Water Supply Plan*, maximum month average day demand is used in this table as a proxy for average day demand.

The above numbers are consistent with the University's *Water Supply Plan* and the *Water and Wastewater Master Plan*, both of which have been vetted by the public, Town of Mansfield officials, and state regulatory agencies.

4. Additional Future University Demand – The water supply planning period extends to the year 2060. It is likely that additional on-campus demands will materialize in that timeframe for uses that are as-of-yet undefined. Potential demand generators include the following:

   - Increased student population, with associated housing needs.
   - Expanded student recreational and/or athletic facilities, potentially including practice facilities, indoor recreational facilities, recreational fields (i.e. flag football, recreational soccer, rugby, baseball, and softball), athletic fields (i.e. football, soccer), and ice sports.
   - Additional classroom space, student laboratory space, and faculty offices.
   - Additional research space.

The extent to which the above demands may materialize is unknown at this time, as well as any associated timing. As such, a specific figure cannot be ascribed to the water that such uses might require. However, some measure of growth is likely. Therefore, alternatives are evaluated for their ability to expand to accommodate additional future potential on-campus growth.

ALTERNATIVES ANALYSIS

In accordance with CEPA requirements, numerous alternatives have been analyzed for providing water supply to the University and Town of Mansfield. Four different types of actions have been evaluated:

- The "no action" or "no-build" alternative;
- Relocation or replacement of Fenton River Wellfield Well A;
- Interconnection with neighboring wholesale water providers; and
- Construction of new public supply wellfield(s).

Specifically, the seven alternatives considered in this EIE are as follows:

Alternative #1 - No action or no-build;
Alternative #2 - Relocation or replacement of Fenton River Wellfield Well A;
Alternative #3 - Interconnection with The Connecticut Water Company's (CWC) Northern Operations Western System in Tolland;
Alternative #4 - Interconnection with The Metropolitan District Commission (MDC) system in East Hartford;
Alternative #5 - Interconnection with Windham Water Works (WWW) system in southern Mansfield;
Alternative #6 - Development of New Groundwater Supply Sources along the Willimantic River; and
Alternative #7 - Development of New Groundwater Supply Sources Near Mansfield Hollow Lake.

Table ES-4 summarizes the capability of each alternative relative to the project purpose and need. Only Alternatives 3, 4, an 5 (the interconnections with water utilities) are capable of providing 1.23 million gallons per day average day demand (ADD), 1.93 mgd peak day demand (PDD), and have the ability to expand to accommodate additional future growth in water demand.

TABLE ES-4
Capability of Each Alternative to Deliver Potentially-Desired Quantities of Water

Alt. #	*Alternative Name*	*Able to Deliver ADD of 1.23 mgd?*	*Able to Deliver PDD of 1.93 mgd?*	*Able to Expand to Accommodate Additional Future Growth?*
#1	No action	No	No	No
#2	Replacement of Fenton Well A	No	No	No
#3	Interconnection with CWC	**Yes**	**Yes**	**Yes**
#4	Interconnection with MDC	**Yes**	**Yes**	**Yes**
#5	Interconnection with WWW	**Yes**	**Yes**	**Yes**
#6	Development of New Groundwater Supply along Willimantic River	No	No	No
#7	Development of New Groundwater Supply Near Mansfield Hollow Lake	No	No	No

CWC = Connecticut Water Company
MDC = Metropolitan District Commission
WWW = Windham Water Works

EXISTING ENVIRONMENT AND ANALYSIS OF IMPACT

Land Use – Table ES-5 summarizes state-designated land uses and current zoning by town for the interconnection pipeline routes. The State *Conservation and Development Policies Plan* for Connecticut discourages provision of public water supply in Existing Preserved Open Space, Preservation Areas, Conservation Areas, Rural Lands, Aquifer Protection Areas, and Historic Areas.

The intended developments for which a new source of supply is needed are all located within the Town of Mansfield in areas where such development is consistent State Plan designations, local zoning, and the Town of Mansfield's *Plan of Conservation and Development*. The Town of Mansfield is undergoing a comprehensive and detailed revision of its regulations and has proposed overlay zones to restrict development to areas of public water supply such that local development is consistent with the State Plan. The proposed overlay zones will restrict development along potential pipeline routes for the purpose of controlling unwanted or unanticipated secondary growth.

Land uses in the Towns of Tolland, Coventry, and Bolton may also be affected by potential interconnection pipeline routes. In particular, land uses in Tolland may be affected by the MDC and CWC interconnection alternatives, and land uses in Coventry and Bolton may be affected by the MDC interconnection alternative.

Water Resources – Impacts to source waters will vary depending on the selected alternative:

- Provision of water from CWC would draw upon the Shenipsit Reservoir while the Powder Hollow, Hunt, Preston, and other Western System wells will offset some of the treated water from Shenipsit that is currently distributed to the west and north. While system improvements are proposed, no new sources would be developed under this alternative and withdrawal rates would largely not exceed historic withdrawals. Reservoir withdrawals would be mitigated, as they are today, through continued releases from the Shenipsit Reservoir to the Hockanum River, to be supplanted in the future with releases that are consistent with Connecticut's streamflow regulations.

- Provision of water from MDC would draw upon the Barkhamsted and Nepaug Reservoirs in the Farmington River basin. Withdrawals would not exceed existing registered rates, and source and treatment plant improvements are not proposed. MDC is not required to release water under Connecticut's streamflow regulations; however, MDC will continue to manage releases from the West Branch Farmington River reservoirs in accordance with existing agreements.

- Provision of water from WWW would draw upon the Willimantic Reservoir, an impoundment of the Natchaug River. A new or modified diversion permit would be needed as well as removal of sediment from the reservoir to maintain adequate water quality. WWW operates its source of supply as a run-of-the-river withdrawal rather than relying on reservoir storage. Mitigation could take the form of increasing releases from Mansfield Hollow Lake by the U.S. Army Corps of Engineers, although this is beyond the control of the University, Town of Mansfield, or WWW.

No direct impacts are expected to occur to surface water or groundwater as a result the installation of water mains and pipelines. The integrity of bridges and culverts will not be compromised, as water mains will be primarily installed using directional drilling or attached to bridges.

TABLE ES-5
State Plan Designations, Zoning, and Summary of Recommended Mitigation per Town

Town Name	Interstate or Roadway	Alternatives Considered[1]	Adjacent Zoning Districts	State Plan Designations[2]								Existing PWS?	Mitigation
				RC	NC	GA	RCC	EPOS	PA	CA	RL		
Mansfield	Route 195 (northwest)	CWC, MDC	Neighborhood Business Zone 1							X		No	Overlay Zone
			Rural Agricultural Residence 90					X	X	X	X	No	Overlay Zone
			Professional Office 1							X	X	No	Overlay Zone
			Residence 90						X	X		No	Overlay Zone
			Planned Business 3			X						No	Overlay Zone
	Baxter Road/Route 44	CWC, MDC	Rural Agricultural Residence 90					X	X	X	X	No	Overlay Zone
			Planned Business 3			X						No	Overlay Zone
	Route 44	MDC	Neighborhood Business Zone 1							X		No	None
			Rural Agricultural Residence 90		X	X		X	X	X	X	Partial	Overlay Zone
			Institutional		X							Partial	None
	Chaffeeville Road	WWW	Rural Agricultural Residence 90					X	X	X		No	Overlay Zone
	Clover Mill/Maple Road	WWW	Rural Agricultural Residence 90					X	X	X	X	No	Overlay Zone
Coventry	Route 195	CWC, MDC	Neighborhood Commercial							X		No	None
			River/Aquifer Zone						X	X		No	None
	Route 44	MDC	Commercial				X		X	X	X	No	Possible Overlay Zone
			Professional Office							X	X	No	Possible Overlay Zone
			Commercial/Agricultural						X	X	X	No	Possible Overlay Zone
			General Residential Zone 80				X	X	X	X	X	No	Possible Overlay Zone
			General Residential Zone 40						X	X	X	No	Possible Overlay Zone
			River/Aquifer Zone						X	X		No	Possible Overlay Zone
Tolland	I-84	MDC	Commercial/Industrial			X		X				Yes	None
			Tolland Business Park			X		X				Yes	None
			Residential Design District					X	X	X	X	No	Possible Overlay Zone
			RDD-Nat. Resource & Wildlife					X	X	X	X	No	Possible Overlay Zone
			Tolland Village Area				X					Yes	None
			Gateway Design District				X					Yes	None
	Route 195	CWC, MDC	Gateway Design District				X					Yes	None
			Neighborhood Commercial				X					Yes	Possible Overlay Zone
			Residential Design District						X	X	X	No	Possible Overlay Zone
			RDD-Nat. Resource & Wildlife						X	X	X	No	Possible Overlay Zone
Bolton	I-384	MDC	Residential 1						X	X	X	No	Possible Reg. Amendment
			Residential 2							X		No	None
			Industrial							X		No	None
			General Business							X		No	None
	Route 44	MDC	Residential 1						X	X	X	No	None
			Residential 2								X	No	None
			Residential 3						X	X	X	No	None
			Industrial								X	No	None
			General Business						X	X	X	No	None
Vernon	I-84	MDC	Commercial		X	X			X	X		Partial	None
			Single-Family Residential R-27		X	X		X	X	X	X	Partial	None
			Planned Residential Development		X							Yes	None
			Special Economic Development		X	X						Partial	None
			Industrial			X			X	X		Yes	None
			Planned Development - Exit 67		X	X			X	X		Yes	None
Manchester	I-84	MDC	Rural Residence		X				X			Yes	None
			Residence B		X							Yes	None
			Industrial		X				X			Yes	None
			Planned Residential Development		X				X			Yes	None
			General Business		X				X			Yes	None
			Comprehensive Urban Develop.		X							Yes	None
			Business 5		X							Yes	None
			Residence A		X							Yes	None
			Special Design Commercial		X							Yes	None
	I-384	MDC	Industrial		X	X						Yes	None
			Rural Residence		X	X		X		X		Partial	None
			General Business		X							Yes	None
			Elderly Housing Development		X							Yes	None
			Business 1	X	X							Yes	None
			Business 2	X	X							Yes	None
			Residence AA	X	X			X				Yes	None
			Residence A		X							Yes	None
			Residence B	X	X							Yes	None
			Residence C	X	X							Yes	None
			Planned Residential Development	X	X							Yes	None
			Historic	X								Yes	None
South Windsor	I-84	MDC	Industrial		X							Yes	None

Notes

1. CWC = The Connecticut Water Company
   MDC = The Metropolitan District
   WWW = Windham Water Works

2. State Plan Designations:
   - RC Regional Center
   - NC Neighborhood Conservation
   - GA Growth Area
   - RCC Rural Community Center
   - EPOS Existing Preserved Open Space
   - PA Preservation Area
   - CA Conservation Area
   - RL Rural Lands

Socioeconomics – The provision of additional water supply to the University and Town of Mansfield is expected to have a positive impact on the local and regional socioeconomic horizon through creation of direct new employment on campus as well as indirect and induced job creation off campus. The Town of Mansfield and its neighboring communities are well positioned to absorb any incremental increase in population and housing demand resulting from new water supply, even with the land use controls that will be enacted to limit development along the pipeline route in Mansfield.

Community Facilities and Services – The provision of additional water supply to the University and Town of Mansfield is consistent with current community services. The burden on municipal and University emergency services personnel is not expected to increase significantly.

Aesthetic and Visual Resources – The provision of additional water supply to the University and Mansfield will enable additional development on-campus as well as in portions of northern Mansfield in areas proximate to the University's Main and Depot campuses and Agronomy Farm. On-campus development will be congruent with the architecture and building heights throughout the campus. Any off-campus development within the Town of Mansfield will be guided by local regulations relative to aesthetics and will require approval through Mansfield's Planning & Zoning Commission. Additionally, the aesthetics of pumping stations and storage tanks will need to be sited and designed such that they are congruent with the aesthetic character of the surrounding area.

Public Utilities and Services – The provision of additional water supply to the University and Town of Mansfield will increase the capacity of the University's water system. Benefits to small community, non-transient non-community, and transient non-community water systems will be realized through interconnections or direct connection to new pipelines. However, the furtherance of duplicative water service in the State (specifically in Manchester, South Windsor, and Vernon for the MDC interconnection) is contrary to the State's statutory obligation for coordinated water supply planning.

Significant adverse impacts to storm sewer, electric, gas, telephone, and cable services are not anticipated.

Cultural Resources – Where pipeline is installed outside of previously disturbed public rights-of-way, sensitivity to historic or archeological resources is possible along pipeline routes in Mansfield, Tolland, Coventry, and Bolton. In such instances, site-specific investigations will be undertaken in consultation with state and local entities such that impacts to cultural resources are avoided or minimized to acceptable levels.

Traffic, Transportation and Parking – The provision of additional water supply to the University and Town of Mansfield will cause temporary impacts to traffic, as water mains will be installed in state and town roadways. No permanent impacts to traffic will occur. Individual development that occurs as a result of the availability of a source of public water supply will require site-specific review through local approval processes and, where applicable, through the Connecticut Office of State Traffic Administration (OSTA).

Flood Hazard Potential – Installation of pipelines will have minimal impacts where they cross special flood hazard areas (SFHAs), as piping and appurtenances will be below grade.

Biological Environment – The majority of pipeline installation will occur where roads are currently paved and therefore do not support significant biological communities. Best practices will be undertaken to minimize disturbances to adjacent biological resources. Protection of fishery resources and fish habitats

will be of paramount importance for all of the alternatives. For the WWW alternative, increased withdrawals from the Willimantic Reservoir may adversely affect riffle and run habitats in the Natchaug River downstream of the reservoir. Removal of sediment from the Willimantic Reservoir will likely impact some wetland vegetation, although the extent and length of such impact can only be evaluated following a specific proposal for excavation. Based upon similar projects undertaken at other Connecticut reservoirs, sediment excavation can be achieved without unacceptable impacts to wetlands or fisheries.

Physical Environment – No significant changes will occur to the physical environment as a result of provision of water to the University and Mansfield. Significant modifications to area topography are not contemplated.

Air Quality – The provision of additional water supply to the University and Town of Mansfield will not significantly impact air quality in the Town of Mansfield or the region. Numerous controls are proposed for minimizing short-term construction related impacts to air quality from fugitive dust and other pollutant emissions.

Noise Quality – Minor temporary noise impacts are anticipated during construction of the water pipeline. The majority of construction activities will occur in the daylight hours to minimize noise impacts. New pumping stations for the CWC, MDC, and WWW alternatives will become localized sources of noise, although such noise will be minimal.

Solid Waste and Hazardous Materials – Other than temporary construction and demolition-related impacts, minimal impacts related to solid waste and hazardous materials are expected as a result of provision of water to the University and Mansfield.

Energy Resources – Increases in energy usage would occur for all of the feasible alternatives. For the CWC interconnection alternative, energy will be used to withdraw additional groundwater from wells in the Western System, filter and treat additional water at the Rockville WTP, and pump water through the pipeline. For the MDC interconnection alternative, energy will be used to filter and treat additional water at the West Hartford and Bloomfield WTPs and to pump water through a series of pumping stations along the pipeline. For the WWW alternative, energy will be used to filter and treat additional water at the WTP and pump water through the pipeline. Systems that are more proximal and at higher elevations (CWC and WWW) will use less energy than systems that are distant and at lower elevations (MDC). The periods of peak water demand at the University (late August and early September), and hence peak electrical demand for pumping and treating, does not typically coincide with peak Statewide electrical demand (typically July). Energy usage will also increase where additional water allows development; however, these are not anticipated to be regionally significant.

Cumulative Impacts – Cumulative impacts are those that result from the incremental impact of the proposed action when added to other past, present, or reasonably foreseeable future actions. Cumulative impacts associated with the feasible alternatives include the following:

- Additional groundwater and/or surface water supply withdrawals;
- Interbasin transfer of water;
- Formation of additional disinfection byproducts in treated water due to higher water ages along the pipeline;
- Additional water mains within roadways;

- Incremental energy demands; and
- Additional development due to the presence of public water.

Cumulative impacts are most likely for the alternatives that cause further diminution of flows in nearby watercourses, such as the WWW interconnection. On the other hand, CWC and MDC have a greater ability to actively mitigate for diminution of flows below their reservoirs, and the cumulative impacts will be minimized.

Unavoidable Adverse Environmental Impacts – Certain adverse impacts associated with provision of water to the University and Mansfield are unavoidable. Delivery of water to the University and Mansfield from CWC, MDC, or WWW will constitute an interbasin transfer of water and resulting loss of water from local donor basins; this cannot be avoided. The CWC and MDC alternatives would involve transfers of water from the Connecticut River major basin whereas the WWW alternative would involve the transfer of water within the Thames River major basin. CWC and MDC are capable of managing releases to downstream watercourses. WWW does not have such capabilities because it operates a run-of-the-river dam.

The project will undergo a construction phase wherein equipment will be utilized. Mitigation measures have been identified with respect to associated short-term air and noise quality. However, a certain degree of additional truck and equipment use and access will be necessary during this time period, which is unavoidable. Potential soil erosion and sedimentation impacts will be largely mitigated through proper construction management techniques.

Unavoidable adverse environmental impacts are possible along some of the pipelines, especially in the rural or less-developed areas of Tolland, Bolton, Coventry, and Mansfield. These unavoidable adverse impacts could be mitigated by local land use regulations and zoning, with the Town of Mansfield considered most equipped and well-positioned to directly address the risks for development along pipelines. By virtue of the shorter potential pipelines, the CWC and WWW alternatives present a lesser degree of risk than the MDC alternative.

No other unavoidable adverse environmental impacts have been identified.

Irreversible and Irretrievable Commitment of Resources – The construction of any of the interconnection alternatives will utilize nonrenewable resources during the construction and implementation (i.e., construction supplies, fuel, personnel time, etc.). Since these resources cannot be reused, they are considered to be irreversibly and irretrievably committed. Specifically, these include the following actions:

- Clearing;
- Access road construction;
- Installation of water mains to connect to the University and Mansfield; and
- Installation of associated infrastructure, treatment plant expansion, etc.

OPPORTUNITIES FOR MITIGATION

Numerous opportunities for mitigation of adverse impacts have been identified. These have been described throughout the document. Table ES-6 provides a summary. The two primary areas for

mitigation are for land uses and associated secondary growth and streamflow mitigation associated with increased water withdrawals.

As indicated above, the Town of Mansfield is undergoing a comprehensive and detailed revision of its regulations and has proposed an overlay zone to restrict development in areas of public water supply such that local development is consistent with the state plan. The proposed overlay zone will restrict development within potential pipeline areas for the purpose of controlling unwanted or unanticipated secondary growth.

Secondary growth mitigation is possible in other communities where potential pipeline routes traverse land that, were it developed as a direct result of the availability of public water supply, would be contrary to the State Plan, local planning and zoning designations, or local plans of conservation and development. This is the case in Tolland, Coventry, and Bolton; however, those communities have not committed to such protections at this time. In the case of Coventry and Bolton, discrepancies exist between the community's local vision and the State Plan such that mitigation through development protections may not have local support.

TABLE ES-6
Opportunities for Mitigation

Mitigation Opportunities	Alternative		
	3	4	5
	CWC	MDC	WWW
Actively manage releases to rivers located downstream of reservoirs	Yes	Yes	No
Implementation of overlay zones to reduce future development densities	Yes	Yes	Yes
Coordination with various local departments, commissions, and committees regarding proposed pipelines	Yes	Yes	Yes
Pipeline designs that hang pipe on bridges or include directional drilling to prevent direct wetland impacts	Yes	Yes	Yes
Construction occurring in the summer whenever possible to minimize traffic impacts near the University	Yes	Yes	Yes
Performing a biological survey for endangered, threatened, or special concern species during the design phase to establish buffers and construction timetables to minimize the impact to these species	Yes	Yes	Yes
Adherence to best management practices to mitigate impacts to stormwater runoff	Yes	Yes	Yes
Performance of construction activities during daylight hours to minimize noise impacts	Yes	Yes	Yes
Reduction of water age, mixing in tanks, and blending with groundwater (the University's or otherwise) to reduce DBPs	Yes	Yes	Yes
Provide benefits such as emergency interconnections with other water utilities where pipelines are contrary to exclusive service areas	No	Yes	No
Provide emergency interconnection with Tolland's municipal water system	Yes	Yes	No

Under the CWC interconnection alternative, Shenipsit Reservoir withdrawals would be mitigated, as they are today, through continued releases from the Shenipsit Reservoir to the Hockanum River, to be supplanted in the future with releases that are consistent with Connecticut's streamflow regulations. For the MDC interconnection alternative, MDC is not required to release water under Connecticut's streamflow regulations; however, they will continue to manage releases from the West Branch

Farmington River reservoirs. Under the WWW interconnection alternative, Mitigation could take the form of additional releases from Mansfield Hollow Lake by the U.S. Army Corps of Engineers, although this is beyond the control of the University, Town of Mansfield, or WWW. Overall, CWC and MDC have a greater ability to actively mitigate for diminution of flows below their reservoirs.

COST AND BENEFITS

Table ES-7 presents a summary of capital costs associated with the feasible alternatives, as well as a normalized cost per million gallons (MG) of water.

TABLE ES-7
Summary of Estimated Interconnection Costs

	CWC Interconnection	MDC Interconnection	WWW Interconnection
Capital Cost	$20,113,200	$51,276,000	$44,377,800
Normalized per MG*	$10,056,600	$25,638,000	$22,188,900

*Assumes 2.0 mgd

Table ES-8 presents a comparison of potential water rates for residential and commercial customers using the Public Utility Regulatory Authority (PURA) annual household consumption value. For this analysis, commercial customers are assumed to consume an equal amount of water as residential customers, and the estimates include any applicable service charges (though not initial construction and connection fees which would be borne by the consumer).

TABLE ES-8
Summary of Average Annual Water Costs to Customers

Public Water System	Residential	Commercial
CWC	$643	$577
MDC	$549	$549
WWW	$371	$371
Town of Tolland	$413	$413
University of Connecticut	$393	$393

Sources: CWC website, MDC Website, WWW, Tolland Water Commission, UConn, Tighe & Bond
Note: Tolland rates assume that an equal amount of water is used each quarter.

Although this EIE has not estimated additional energy costs for the alternatives, the water systems that are more proximal and at higher elevations (CWC and WWW) will use less energy than systems that are distant and at lower elevations (MDC) to move water to the University and Mansfield.

The following positive benefits are expected to occur as a result of the construction of or connection to additional sources of water supply:

- Increase the University water system's MOS to above 1.15 for the 50-year planning period while meeting the four committed demands.

- Enable the appropriate supply of public water to proposed expansions on the University campus, such as the University Technology Park and redeveloped facilities at the Depot Campus as outlined in the University of Connecticut Academic Plan that will result in an overall improvement of the campus environment.

- Provide additional redundancy and flexibility to the University of Connecticut water system.

- Allow for the University to reduce potential impacts to fisheries within the Willimantic and Fenton rivers during low streamflow periods by utilizing water supply from a less sensitive area.

- Supply the Mansfield Four Corners area with public water supply, eliminating the need for utilizing existing wells in an area with historically contaminated groundwater and spurring redevelopment of this area that is one of the gateways to the University of Connecticut.

- Enable the appropriate supply of public water to proposed growth areas identified in the Town of Mansfield *Plan of Conservation and Development.*

- Provide the potential for supply redundancy to one or more small community water systems in Mansfield, as well as a potential increase in access to public water for adjacent residents with low-yielding wells or wells with poor water quality.

- Create temporary engineering and construction jobs related to implementing the eventual project, as well as additional long-term jobs in the proposed University Technology Park, the redeveloped buildings on the Depot Campus, and in commercial developments in Mansfield Four Corners.

SELECTION OF PREFERRED ALTERNATIVES

In light of the foregoing analysis, three alternatives are potentially feasible, with the ability to meet the project purpose and need. While the degree and types of potential impacts vary among the alternatives, none is believed to cause significant adverse environmental impacts that cannot be mitigated. For the CWC and WWW alternatives, potential impacts are similar among the alternate routing scenarios within each alternative. For the MDC interconnection, routing alternative #4B will result in significantly fewer land use conflicts between existing land uses, local zoning regulations, and the State *Conservation and Development Policies Plan*. In all cases of conflict, land use overlay zones could overcome such inconsistencies; however, at the present time, only the Town of Mansfield has committed to such a course of action.

Issues of cost, phasing, and financing will be critical to the ultimate action taken. Financial feasibility and project affordability will be informed by funding sources, cost sharing arrangements, financing mechanisms, and project phasing. Project affordability includes the total cost of ownership over time in combination with how that cost might be shared among the parties who will be the beneficiaries.

Each of the interconnection alternatives must overcome financial, technical, regulatory, and contractual hurdles to become a reality, any one of which could prevent the alternative from moving forward. As such, it is the University's intent to proceed with multiple potential "preferred" alternatives for interconnection with CWC, MDC, or WWW.