

**AMERICAN RECOVERY AND REINVESTMENT ACT OF 2009  
GRANTS FOR TRANSPORTATION INVESTMENT GENERATING ECONOMIC RECOVERY  
“TIGER DISCRETIONARY GRANTS”**



New Haven Rail Yard Improvements – Independent Wheel True Facility

*Prepared by*

Connecticut Department of Transportation

Commissioner Joseph F. Marie

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## Project Overview

i. **Type of project:**  
Transit – Independent Wheel True Facility Project  
New Haven Rail Yard Maintenance Facility  
Improvements

ii. **Project location:** New Haven, CT  
New Haven County  
3rd Congressional District

iii. **Is project in urban or rural area?**  
The project site is located in an urban area

iv. **Amount of TIGER grant funds requested:**  
\$20,000,000  
**Connecticut Department of Transportation  
DUNS Number:** 807854583  
**Central Contractor Registration Confirmation  
Number:** QZX9NA

v. **Grant Application Summary:**  
The Independent Wheel True Facility Project is one project in the larger New Haven Rail Yard

Facilities Improvements which are designed to modify and expand the yard facilities to meet current and future storage, inspection and repair requirements for the fleet of rail vehicles used on the New Haven Line. The \$41 million Independent Wheel True Facility (IWT) will address the current shortfall in wheel truing capacity provided by the almost fifty year old single axle Wheel Mill in New Haven. Maintaining wheel profiles within limits noted in the Association of American Railroads (AAR) Wheel and Axle Manual Section G, is a critical activity upon which the integrity and availability of the fleet of rail vehicles is based. This manual contains guideline limits for high and thin flanges, tread flats, spalling, thermal cracks and tread hollowing. All of these conditions detract from ride quality, affect rail wear, can lead to premature failure of wheels and in the extreme can result in a derailment.

The IWT, which will contain a tandem axle wheel lathe, will protect the State of Connecticut's investments in rail vehicles and rail infrastructure that provided over 37.8 million rides totaling 1,195,046,871 passenger miles on the New Haven Line in 2008. During 2008, over 2,000 axles with two wheels each were trued in the existing Wheel Mill. As the fleet expands with new vehicles utilizing a more reliable AC traction system, wheel truing requirements are expected to increase above current requirements. The productivity limitation and advanced age of the almost fifty year old machinery in the Wheel Mill present a substantial risk to the reliable continuance of New Haven Line passenger service. The IWT is required to mitigate this risk to service, reduce labor costs and maintain wheel profile within guidelines.

An index to most of the internet links contained in this application can be found at <http://www.ct.gov/dot/cwp/view.asp?a=1372&Q=444928&PM=1>

### *Objective*

*This TIGER Grant funding request of \$20 million is to construct the Independent Wheel True Facility in the New Haven Rail Yard. This facility will house a tandem axle wheel lathe which is necessary to maintain the wheels of the New Haven Line fleet of multiple unit electric rail cars and the Shore Line East fleet of diesel locomotives and coaches. The facility will replace an existing single axle wheel mill constructed in the 1960's by the Penn Central Railroad that is antiquated, subject to frequent malfunctions and of insufficient capacity to meet current and future increasing requirements.*

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# 1 Project Description

The subject of this grant application is the Independent Wheel True (IWT) Facility, a project contained in the New Haven Rail Yard Facilities Improvements located at the New Haven Rail Yard (NHRY). The following narrative provides a description of the IWT, as well as information regarding how the IWT fits with the remaining elements of the New Haven Rail Yard Facilities Improvements.

The New Haven Line of the Metro-North Railroad (MNR) is one of nation's premier commuter rail lines, as well as one of its busiest. The Connecticut portion of the New Haven Line runs from the Connecticut-New York state line to Union Station in New Haven. The NHRY is located on approximately 74 acres in the Long Wharf section of the city of New Haven, in close proximity to New Haven Harbor to the east and Downtown New Haven to the northwest. Interstate 95 (I-95) and Interstate 91 (I-91) are two major interstate transportation corridors located east and northeast respectively of the project site.



CTDOT is the owner and commuter rail authority for the New Haven Rail Line, which is the Connecticut portion of the Metro-North Railroad (MNR). MNR operates and maintains the New Haven Line and its engines and rolling stock under a service agreement with CTDOT. CTDOT is responsible for programming and funding, as well as maintenance and upkeep of the New Haven Line's engines and rolling stock. The facilities in the New Haven Rail Yard were originally constructed in the 1960's and early 1970's to maintain a fleet of 242 M-2 type rail cars. Over the years, the electric multiple unit fleet has increased to 344 cars with the addition of M-4 and M-6 rail cars, straining the rail yard capacity. In addition, the imminent procurement of the M-8 rail cars further substantiates the need for this vital project. The effects of time on the existing facility and the increased fleet size have begun to undermine the railroad's ability to adequately maintain the fleet. An expanded rail maintenance facility must be constructed to maintain the fleet in a safe and reliable manner. ConnDOT views this project as critical to the continued safe and reliable operation of the New Haven Rail Line fleet.

The IWT Facility will provide the facilities to service the new M-8 fleet of rail cars, as well as the existing M-2, M-4, and M-6 rail cars. As the current fleet of aging rail cars (M-2s) is phased out, CTDOT will replace them with the next generation of rail cars (M-8s). The first deliveries of these new rail cars will take place in early 2010. The M-2 fleet (dating to the 1970s) was only designed to operate for 30 years. The M-8 cars require different maintenance facilities than the M-2s. The New Haven Rail Yard Facilities Improvements incorporate both the new facilities and improvements to the existing facilities.

The Independent Wheel True Facility is critically important to the New Haven Line service through its function of maintaining wheel profiles within industry guidelines. The only current such facility on the entire New Haven Line is the Wheel Mill, constructed by the Penn Central Railroad in the 1960's. This small facility houses a single axle wheel mill which is subject to frequent breakdowns due to age and is inadequate to meet the demands of the current fleet of cars.



The function of wheel truing is to return wheel diameter parity and profile to required limits when wheels deviate due to stresses of track wear, drift, spalling, and wheel flat spots. Wheels become worn during normal service, but there is a spike in wheel defects during the fall when wet leaves interfere with normal braking action resulting in flat wheel spots. In recent years, fully 40% of the New Haven Line rail car fleet has been unavailable at such times due to the lack of wheel truing resources required to keep the wheels of the fleet within acceptable tolerances.

The IWT Facility will contain a tandem wheel true machine to meet the requirements of the new fleet of M-8 rail vehicles. The M-8 rail vehicles will be equipped with an AC traction system replacing the DC traction system on the M-2, M-4 and M-6 fleet. Although AC traction eliminates much of the traction motor related maintenance tasks, this new technology requires that all of the wheels on each vehicle remain within close tolerances. Therefore, when one axle requires wheel truing, all of the axles on the vehicle must be trued. The tandem machine effectively doubles the wheel truing capacity and therefore is required.

Currently, the only tandem wheel true machine available in the United States is the Hegenscheidt U 2000-400D Tandem Underfloor Wheel Lathe, supplied through the Simmons Machine Tool Group, located in Albany, NY. This type of machine has been installed at Metro-North's Croton Harmon Yard. Specifically, the U 2000-400D is two U 2000 wheel lathes positioned back to back and situated in a pit large enough to contain the tandem design configuration. The tandem arrangement allows the simultaneous machining of two vehicle mounted wheel sets known as a truck with a total of four wheels. This facility will therefore more than double the wheel truing capacity available in New Haven. In addition a single separate truck or a single separate wheel set can be reprofiled on the wheel true lathe if desired.

The IWT Facility will be situated on an independent feed track that will accommodate a pair of cars parked east of the building without fouling the Coal Bridge Lead. Physically, the building will be located approximately in the position of the recently demolished Amtrak Power Plant. The finished floor of the shop will be constructed at elevation 10.4 feet, a foot above the 500 year flood elevation. The stub ended track currently located to the south of the old Power Plant location will be replaced by new Track 37 to provide access to the IWT Facility from the east. The IWT Facility including the pre-engineered structures on either side will be of sufficient length for a married pair to be within the building with the doors closed for the duration of the truing work. When reprofiling triplets, one vehicle will extend outside the doors at the beginning and end of the work.

The tandem under floor wheel set lathe is embedded in a pit. The wheel sets to be reprofiled are positioned onto the feed rail, whether by car mover, if they are still assembled under the vehicle, or by crane, if disassembled. To carry out reprofiling, the wheel sets are driven at the treads by two friction rollers for each wheel. To achieve the highest possible machining accuracy, while taking into account a high dynamic rigidity, the wheels sets are centered at their axle bearing boxes. In addition, they are guided by the axial guide rollers in the axial direction.

The Underfloor wheel set lathe is suitable for:

- Profile machining and machining of the inner faces of the wheels

- Turning of the treads up to the flange top and the flange rear face
- Unilateral reprofiling of one wheel set
- Simultaneous reprofiling of two wheel sets in a common bogie/truck
- Machining of inner axle mounted brake disks and wheel mounted brake disks
- Machining of the outer wheel faces

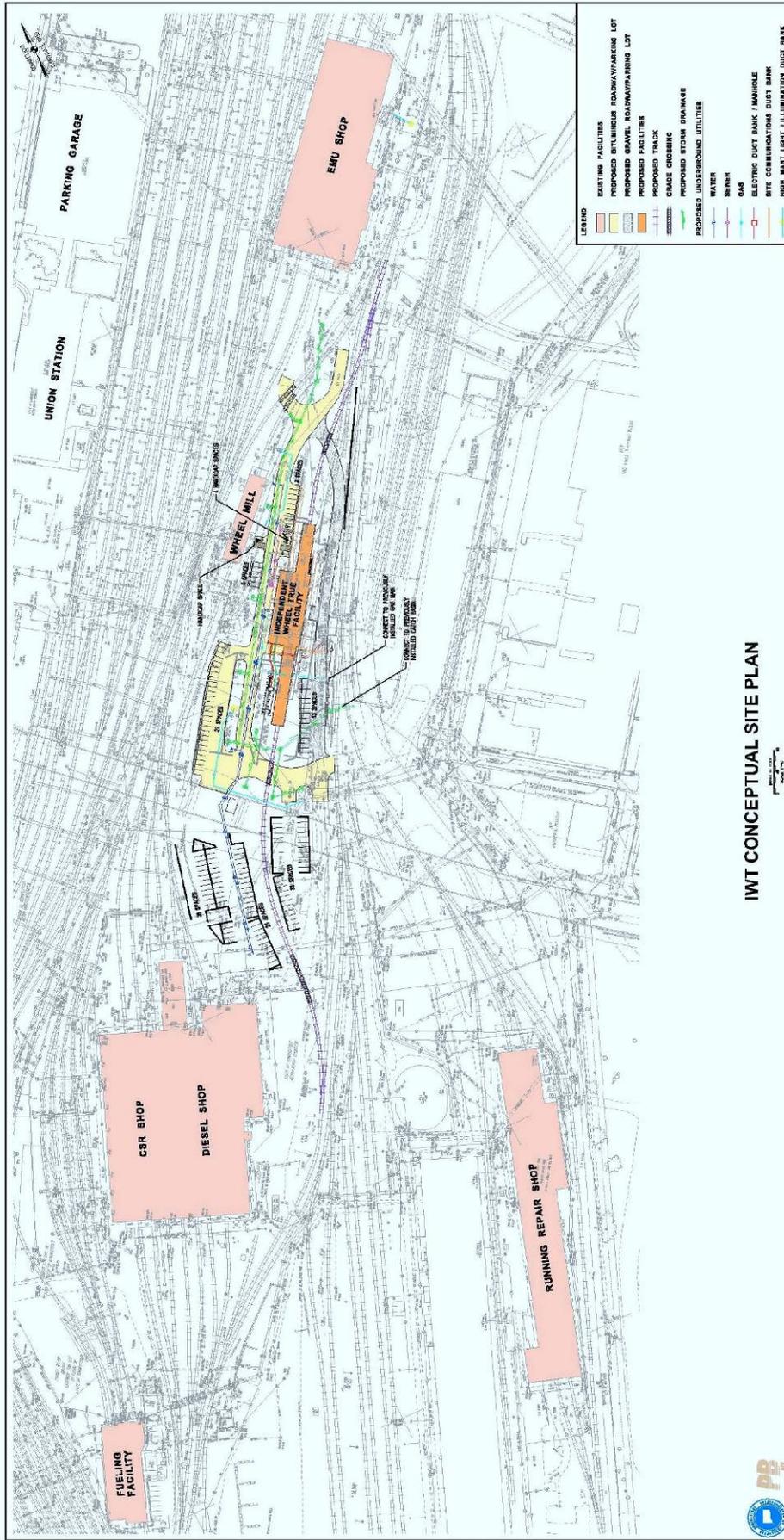
The machine is operated via a centralized control panel for each side of the tandem machine so that the operator has continuous access to all machine functions while being in the optimum working position. During machining, operators are protected against flying metal chips. The chips are managed through the use of a chip grinder and a chip conveyor which is centrally located. The chips are fed by the conveyor through the outside wall into a large chip bin stored outside the facility for easy access for scrap pick up. The automatic machining system relieves the operator to a large extent and thus enables easy handling of the machine.

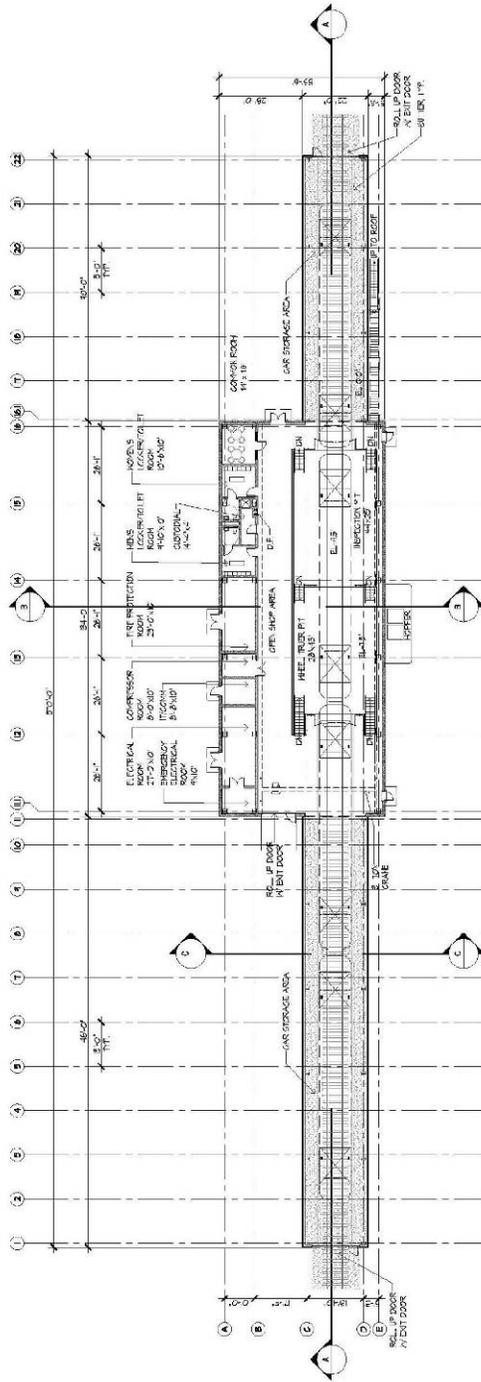
The total length of the facility will be 370 feet. This length includes the west and east car storage areas, which will consist of pre-engineered structures of 146 feet and 90 feet in length, respectively. Each car storage area will be 22 feet in width and enclose ballasted track. The 22 foot width will allow approximately 5 feet of clearance from the side of the vehicle to the building structure on either side. The main portion of the building will be 134 feet in length by 55.5 feet in width and will accommodate fork lift access around the wheel true machines. Support rooms in the main building area include men's and women's locker/toilet rooms, a common room, a custodial room, a fire protection room, a compressor room, an IT/Communications room, an electrical room and an emergency electrical room. Since there will likely be times when the track doors are open during cold weather, the car storage areas and the main shop area containing the wheel true machines will be protected by a dry pipe sprinkler system. The enclosed rooms will be outfitted with wet pipe sprinkler systems and the IT/Communications room will also have a flooding clean agent system and higher temperature sprinkler heads.

The main building and car storage areas will be supported by precast pre-stressed concrete piles due to the subsurface soil conditions. The two car storage areas will be pre-engineered buildings with ballasted track and concrete grade beams connecting to the wall units. Each end door will be 18 feet in height to allow passage of the rail cars and will include a person door for egress. The pre-engineered buildings will have lights, ventilation, and heat as required per building code.

Site work in this project includes 136 parking spaces and five handicap parking spaces to replace parking areas displaced by the construction, connections to site electric, gas, water, sanitary and drainage systems. Also included is the relocation of an existing high mast light and installation of a new high mast light. New Track 37 will be installed through the building with access provided from two new No. 8 turnouts connecting to Track 38 on the east and Track 29 on the west. Liquids collected in the pit will be pumped to a 10,000 gallon waste storage tank where they will be tested and then disposed of appropriately. Two existing 13.2 KV electrical feeders will serve a single transformer via a transfer switch to provide redundancy. A natural gas fired emergency generator will provide back-up power for emergency life safety systems in the event of a simultaneous fault of the two electrical feeders or a transformer failure.

The next three pages contain a site plan, building floor plan and building sections illustrating the project.

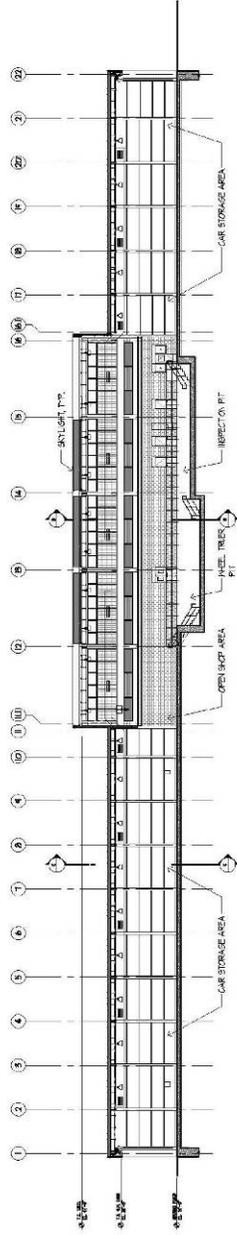




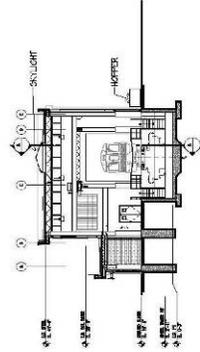
12,629 SF

IWT CONCEPTUAL BUILDING FLOOR PLAN

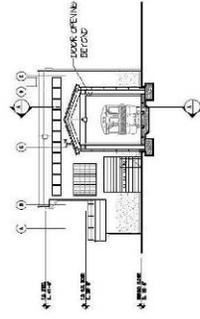




SECTION A-A  
 0' 5' 10' 20'  
 1/8" = 1'-0"



SECTION B-B  
 0' 5' 10' 20'  
 1/8" = 1'-0"



SECTION C-C  
 0' 5' 10' 20'  
 1/8" = 1'-0"

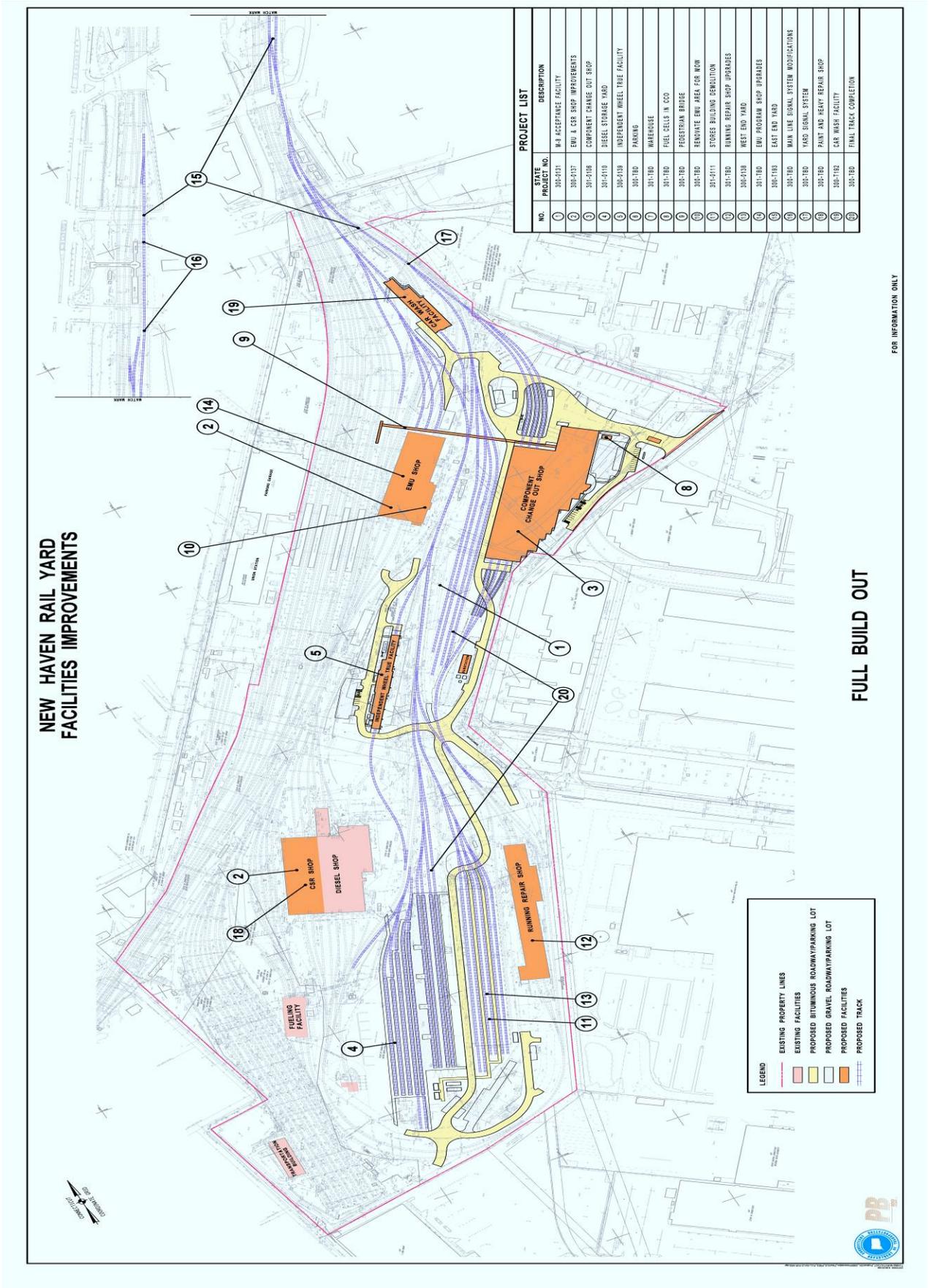
IWT CONCEPTUAL BUILDING SECTIONS

As previously mentioned, the IWT Facility is part of a larger NHRY Facilities Improvements program. This program contains 20 individual projects which will transform and expand the existing NHRY into a fully functional and coordinated facility that provides for efficient and effective storage, dispatching, inspection, maintenance, and cleaning of an increasing and changing fleet of rail cars. The improvements will provide the space, equipment, and administrative support structure needed to operate and maintain a new generation of rail cars and will coordinate the new facilities with the existing facilities. This program is designed to support rail transit services in Connecticut well into the 21st Century.

Project scope for the entire NHRY Maintenance Facility Improvements program includes the following individual projects as presented in the table below:

<b>Project</b>	<b>Status</b>	<b>Cost (2009 \$)</b>	<b>Anticipated Funding</b>
M-8 Acceptance Facility	Completed in July 2009	\$14,813,350	State of Connecticut
EMU and CSR Shop Improvements	Under Construction, Scheduled for Completion in January 2010	\$6,568,792	Federal and State of Connecticut
Component Change Out Facility	Currently out for Public Bid	\$291,416,771	Federal and State of Connecticut
Diesel Storage Yard	Construction anticipated in 2010	\$6,888,922	State of Connecticut
Independent Wheel True Facility	Bid anticipated in 2010	\$41,021,000	Federal and State of Connecticut
Employee Parking		\$15,008,000	State of Connecticut
Central Distribution Warehouse		\$15,025,000	State of Connecticut
Fuel Cells in the CCO		\$5,110,000	State of Connecticut
Pedestrian Bridge		\$11,109,100	State of Connecticut
Renovate EMU Annex for Maintenance of Way		\$1,370,000	State of Connecticut
Stores Building Demolition	Follows Component Change Out	\$3,820,640	State of Connecticut
Running Repair Shop Upgrades	Follows Component Change Out	\$20,020,000	Federal and State of Connecticut
West End Yard	Follows Stores Building Demo	\$45,625,700	State of Connecticut
EMU/Program Shop Upgrades		\$22,000,000	State of Connecticut
East End Yard		\$42,871,700	State of Connecticut
Main Line Signal System Modification		\$6,120,700	State of Connecticut
Yard Signal System		\$6,740,700	State of Connecticut
Convert CSR Shop to Paint & Heavy Repair Shop		\$30,050,000	State of Connecticut
Car Wash Facility		\$18,422,000	State of Connecticut
Final Track Completion		\$40,000,000	State of Connecticut

A “Full Build Out” Diagram of the NHRY Facilities Improvements program is presented on the next page.



## 2 Project Parties

The project sponsor for the IWT Facility is the CTDOT. CTDOT is the owner and commuter rail authority for the New Haven Rail Line, which is the Connecticut portion of the MNR. MNR operates and maintains the New Haven Line and its engines and rolling stock under a service agreement with CTDOT. CTDOT is responsible for programming and funding, as well as maintenance and upkeep of the New Haven Line’s engines and rolling stock. In addition, CTDOT operates the Shore Line East Service between New Haven and New London under contract with Amtrak over a portion of the Northeast Corridor.

## 3 Grant Funds

The grant request for the IWT Facility project is \$20 million. The total project cost is approximately \$41 million; therefore grant funding is approximately 49 percent of the total project costs. As previously mentioned, the IWT Facility project is part of a larger NHRY Facilities Improvements program, which is projected to cost approximately \$650 million in current dollars. Of this amount, 28 percent or \$184 million is projected to be funded with Federal grants and 72 percent with State of Connecticut funds. The following table presents the project costs for the IWT Facility and the NHRY Maintenance Facility Improvements program with projected funding sources for each.

	IWT Facility		NHRY Maintenance Facility Improvements	
	Project Cost	% Funding	Project Cost	% Funding
<b>Project Costs (2009 \$)</b>	<b>\$41 M</b>		<b>\$650 M</b>	
Funding Sources:				
Federal	\$20 M	49%	\$184 M	28%
State	\$21 M	51%	\$466 M	72%
Other	-	-	-	-
<b>Total</b>	<b>\$41 M</b>	<b>100%</b>	<b>\$650 M</b>	<b>100%</b>

## 4 Selection Criteria

### 4.1 Selection Criteria: Primary

#### 4.1.1 Long Term Outcomes

##### (i) State of Good Repair

The existing New Haven Rail Yard maintenance facility was constructed in the 1960’s and early 1970’s to maintain a fleet of 242 M-2 type rail cars. The facilities range in age to almost fifty years old and with the addition of 54 M-4 and 48 M-6 rail cars, the electric multiple unit fleet size has increased to 344 cars. In addition, the Shore Line East fleet includes 24 coaches and 8 diesel locomotives. The procurement of 380 M-8 rail cars beginning in 2010 further increases the criticality of the project as the overall fleet size will increase to 482 electric multiple unit rail cars. The effects of time on the existing facility and the increased fleet size have begun to undermine the railroad’s ability to adequately maintain the fleet. An expanded rail maintenance facility must be constructed to maintain the fleet in a safe and reliable manner. ConnDOT views this project as critical to the continued safe operation of rail service.

The existing wheel mill at the New Haven Rail Yard was built by the Penn Central Railroad and is almost fifty years old. The wheel true machine is subject to frequent breakdowns due to age and does not have the capacity to handle the wheel truing needs of the current fleet of electric multiple unit rail cars in service on the New Haven Line. The State of Connecticut is replacing the fleet of 242 M-2 cars, which were procured in the 1970's, with a new fleet of 380 M-8 cars. The M-8 cars have a lower seating capacity due to ADA requirements resulting in a larger fleet size and have more stringent wheel tolerance requirements due to the AC traction system. The increased fleet size and the higher wheel truing requirements combined indicate a substantially higher wheel truing capacity requirement. The IWT with the tandem wheel true machine is a necessary component of the maintenance facilities to be constructed in the New Haven Rail Yard in order to keep the fleet of rail cars in revenue service.



The present Wheel Mill has the capacity, when the machine is functioning well, of truing a single axle with 2 wheels in an approximate two hour time period. The following table presents the recent history of wheel truing activity at New Haven with all figures denoting the truing of a single axle with two wheels.

**New Haven Wheel Truing History**

Month	M-2	M-4	M-6	Monthly Total
January 2008	108	19	6	133
February 2008	96	19	8	123
March 2008	114	28	22	164
April 2008	144	10	14	168
May 2008	128	14	22	164
June 2008	133	32	9	174
July 2008	142	13	8	163
August 2008	119	25	20	164
September 2008	176	21	12	209
October 2008	147	29	29	205
November 2008	166	19	17	202
December 2008	88	23	22	133
January 2009	81	14	14	109
February 2009	112	20	4	136
March 2009	144	5	14	163
April 2009	142	29	18	189
May 2009	120	13	25	158
June 2009	126	17	24	167
July 2009	91	27	16	134
Monthly Averages	125.1	19.8	16.0	160.9
Monthly Ave/Car	0.52	0.37	0.33	0.47

The second passenger rail service originating from New Haven; the Shore Line East (SLE) is operated by Amtrak under contract to the State of Connecticut. This service consists of diesel hauled coaches operating between New Haven and New London. When truing is required for this fleet of cars, the New Haven Wheel Mill handles this work as well. In 2008, a total of 124 axles or 248 wheels were trued on SLE coaches and locomotives. An analysis of recent wheel true data reveals that based on the average production rate per car for the New Haven Line fleet over the time frame shown, 160 axles are trued each month. The SLE fleet raises that figure to a total of 170 axles per month. Using the production figure of two hours per axle or four axles per shift yields a figure of 42.5 shifts required per month. Note that in the autumn when falling leaves interfere with normal braking resulting in flat spots on the wheels, the requirement increases to over 52 shifts per month.

As the fleet size increases from 344 to 482 wheel truing requirements will result in additional increases to wheel truing requirements. Due to the AC traction system on the M-8 vehicles, the incidences of wheel maintenance per car may increase somewhat. Even using the optimistic assumption that the monthly average requirement per car remains the same as the fleet size increases, a total of 222 axles could be expected to be trued per month with the peak monthly requirement reaching as high as 280 axles. These numbers translate into an average of 55 shifts and a peak of 70 shifts required at the current production rate. Even if the antiquated wheel mill could maintain this pace, labor costs can be expected to rise and cars out-of-service awaiting wheel truing would decrease the percentage of the fleet available for revenue service.

The IWT with the tandem wheel true machine can be expected to roughly double the wheel truing capacity lowering future shift requirements to slightly less than current requirements. In addition, the existing Wheel Mill could be utilized during peak truing season to keep fleet availability within acceptable levels

**(ii) Economic Competitiveness**

The New Haven Line is one of nation’s premier commuter rail lines, as well as one of its busiest and provides a robust train service between New Haven Connecticut and Grand Central Terminal in midtown Manhattan. In addition, reverse peak and intra-State ridership has been increasing. This project is a critical component required to provide reliable commuter train service by maintaining rail cars. Out of service cars result in shorter trains with standees or in the extreme, canceling some scheduled trains. Reliable and frequent New Haven Line service is a critical component of the economic health of New Haven and Fairfield Counties in Connecticut and Westchester County in New York, as well as the boroughs of the Bronx and Manhattan. The table below provides recent metrics on New Haven Line ridership and on time performance.

**New Haven Line Metrics**

<b>Year</b>	<b>Annual Rides</b>	<b>On Time Performance</b>
2005	33,891,500	97.0%
2006	34,935,200	97.1%
2007	36,360,300	97.1%
2008	37,895,800	97.0%
2009	8,514,000 (1 <sup>st</sup> quarter only)	96.0% (1 <sup>st</sup> quarter only)

The table below provides similar metrics for the CTDOT operated SLE rail service.

<b>Shore Line East Metrics</b>		
<b>Year</b>	<b>Annual Rides</b>	<b>On Time Performance</b>
2005	423,500	95.1%
2006	458,000	95.3%
2007	483,600	93.4%
2008	568,100	92.1%
2009	137,200 (1 <sup>st</sup> quarter only)	95.0% (1 <sup>st</sup> quarter only)

Although the SLE service is significantly smaller than the New Haven Line, this growing service provides links at New Haven and Stamford to allow rail passengers to continue their travels east of New Haven. The service area covered extends east through Middlesex County and into New London County.

### **(iii) Livability**

The New Haven Line connects New Haven Connecticut with Grand Central Terminal in midtown Manhattan. Three branch lines in Connecticut connect to the New Haven Line serving New Canaan, Danbury and Waterbury. Within the State, there are nineteen stations on the New Haven Line, four stations on the New Canaan Branch, seven stations on the Danbury Branch and six stations on the Waterbury Branch. The cities of New Haven, Bridgeport and Waterbury are noted as economically distressed areas and are all served by this rail network. Of the total of thirty-six stations in Connecticut, twenty-five have connecting bus service to and from residential areas and four have commuter connection bus service to local work sites. This rail/bus network provides for accessibility and transportation services in a large portion of New Haven and Fairfield Counties. Thirteen of the stations are fully ADA accessible and an additional six stations have limited ramp/elevator accessibility. In addition, New Haven Line riders may connect with Shore Line East Rail Service at New Haven and continue east to New London. New Haven is also a connection point with Amtrak service on the Northeast Corridor or north to Hartford, CT or Springfield, MA. There are eight SLE stations east of Union Station in New Haven, the terminus of the New Haven Line. Seven of the eight stations are ADA accessible and one, State Street in New Haven, is served by commuter connection bus connections.

Senior citizens and the disabled may purchase tickets at a discount that varies by service, but can be up to a 50% discount. Discounted tickets are also available for children and for monthly passes for school children.

### **(iv) Sustainability**

The New Haven Line runs parallel to I-95 connecting the major employment centers of New Haven, Bridgeport, Norwalk, Stamford and Greenwich. The rail service provides congestion relief to automobile traffic on I-95 by providing a reliable alternative mode of transportation. In 2008, the approximately 37.9 million rides on the New Haven Line represented a total of 1.2 billion passenger miles. In addition, the Danbury Branch parallels State Route 7 and the Waterbury Branch parallels State Route 8 with the same type of benefits to highway traffic on those roadways. Since the New Haven Line and the New

Canaan Branch are electrified, further air quality benefits are provided through the use of electric multiple unit trains that do not introduce exhaust into the atmosphere.

Shore Line East service is operated on Amtrak's Northeast Corridor. It too parallels I-95 and provides congestion relief on this major interstate artery.

### **(v) Safety**

The removal of highway vehicles from major roadways by the diversion of commuters to rail travel lowers the potential for accidents. The New Haven Line is fully grade separated from highways thereby eliminating any potential for highway/rail collisions. The IWT provides for rail wheel maintenance thereby enhancing the safety of rail passengers on the New Haven Line and east on SLE trains.

#### **4.1.2 Evaluation of Expected Project Costs and Benefits**

The Independent Wheel True Facility project provides economic, livability, sustainability, and safety benefits well beyond the costs associated with the project. Data limitations prevent the project's benefits from being quantified.

As previously noted, the New Haven Line provides a vital service for commuters between New Haven Connecticut and Grand Central Terminal in midtown Manhattan. Commuters use the New Haven Line to connect to other forms of transit including bus service at 25 of the 36 Connecticut stations and Amtrak service to get to work on a daily basis. The New Haven Rail Yard is an essential project to assure continuing, safe service for one of the nation's busiest rail lines. The service has experienced an increase in demand since 2005 ranging from 3 to 4 percent annually, see the tables in Section 4.1.1 (ii). New cars are necessary to replace cars that have exceeded their useful life as well as to expand the fleet of cars in order to meet the increasing demand. An analysis of vehicle occupancy ratios on Connecticut State Roads completed by the Connecticut Public Transportation Commission revealed a 24-hour vehicle occupancy ratio of 1.424 for the years from 1992 through 2000. Using this figure for vehicle occupancy, the approximately 1.2 billion passenger miles traveled on the New Haven Line in 2008 yields a savings of over 839 million VMT per year by the New Haven Line Rail Service.

The current single axle Wheel Mill is outdated, aging, and inadequate to service the existing fleet. The capacity of the wheel true machine barely keeps up with current demand. The new cars while necessary to meet the demand of the commuters, will further exacerbate the ability of CTDOT to maintain the wheels of the rail fleet within safe and acceptable tolerances. Without the project, the level of service and the safety of the service would drop to unacceptable levels and labor costs for this work will rise. A critical element of the New Haven Rail Yard project is upgrading the facilities with the Independent Wheel Truing Facility. The expeditious



truing of the car wheels strengthens the operating rail system integrity by reducing time for wheel maintenance and maximizing the availability of the fleet. Wheels with flat spots or other defects can damage rails or switch components causing downtime to repair infrastructure and increased maintenance costs.



Safety and passenger comfort are also concerns associated with wheel defects. The wheel to the left caused poor riding conditions that resulted in the rail car being removed from revenue service. This wheel exhibits a false flange, thermal cracks and a rolled flange. Each of these defects could have been avoided by timely wheel truing which would have extended the service life of the wheel set resulting in a more efficient use of resources. In the extreme, these types of wheel conditions could result in a derailment.

### **4.1.3 Evaluation of Project Performance**

There are a number of metrics that can be used to evaluate project performance for the IWT in an indirect manner. The proof of the performance will be reflected in the continuation of high On Time Performance and Passenger Ridership. CTDOT tracks and reports these figures on their website. A link to the report titled DOT On The Move – Performance Measures Quarterly Update can be found here: [http://www.ct.gov/dot/lib/dot/documents/dcommunications/misc/Performance\\_Measures\\_Q1\\_2009\\_Combined\\_rev82109\\_DAL\\_.pdf](http://www.ct.gov/dot/lib/dot/documents/dcommunications/misc/Performance_Measures_Q1_2009_Combined_rev82109_DAL_.pdf)

The most relevant statistic would be the number of axles and therefore wheels trued. Metro-North Railroad's Mechanical Department maintains this data through their Equipment Management Information System.

### **4.1.4 Job Creation & Economic Stimulus**

#### **(i) Job Creation**

The IWT Facility project is expected to create significant near-term economic benefits for the New Haven County area, the State of Connecticut, in addition to other regions of the United States. Connecticut's economic benefits from the project would be driven by an increase in construction spending in the region. These project expenditures would generate a short term increase in demand for engineering and technical services, as well as construction-related labor and materials.

To quantify the near-term economic benefits of this project an analysis was conducted utilizing Bureau of Economic Analysis (BEA) Regional Input-Output Modeling System (RIMS II) multipliers. RIMS II multipliers classify each capital cost category according to industrial sectors using North American Industry Classification System (NAICS) codes and can vary widely depending on the geographic region being analyzed. This particular analysis utilizes RIMS II data for the State of Connecticut and New Haven

County<sup>1</sup>. The multipliers were used to determine the quantity and industry composition of benefits generated by the project resulting in estimations of short-term job creation, earnings, and economic output as a result of the project. The multipliers estimate two types of impacts:

- **Direct Impacts:** Direct impacts represent new spending, hiring, and production by civil engineering construction companies to accommodate the demand for resources in order to complete the project.
- **Indirect/Induced Impacts:** Indirect impacts result from the quantity of inter-industry purchases necessary to support the increase in production from the construction industry experiencing new demand for its goods and services. All industries that produce goods and services consumed by the construction industry will also increase production and, if necessary, hire new workers to meet the additional demand. The level of inter-industry trade within the area will determine the size of the indirect impact. Induced impacts stem from the re-spending of wages earned by workers benefitting from the direct and indirect activity within area. For example, if an increase in demand leads to new employment and earnings in a set of industries, workers in these industries will spend some proportion of their increased earnings at local retail shops, restaurants, and other places of commerce, further stimulating economic activity.

In addition to measuring the effects of the project on the New Haven County economy, the economic impacts that will accrue to the rest of the state due to the project were also quantified. These impacts, referred to as “spillover” benefits, reflect the inter-county trade that occurs to supply industries in New Haven County with the goods and services it needs to increase production.

The results of the short term economic impacts are shown below in Exhibit 1:

**Exhibit 1: Summary of Near-Term Economic Impacts Resulting from the Project**

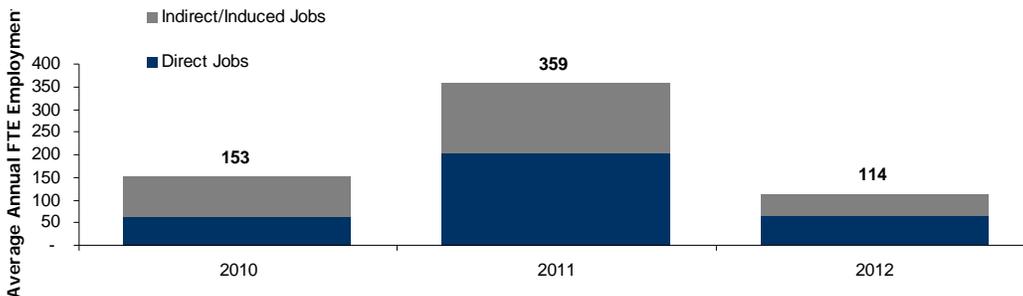
<b>Direct Impacts</b>	
Employment (Average Annual FTE Employment)	133
Earnings (2009 \$)	\$14,692,000
Output (2009 \$)	\$27,692,000
<b>Indirect/Induced Impacts</b>	
Employment (Average Annual FTE Employment)	113
Earnings (2009 \$)	\$10,515,000
Output (2009 \$)	\$52,577,000
<b>Total Impacts</b>	
Employment (Average Annual FTE Employment)	246
Earnings (2009 \$)	\$25,207,000
Output (2009 \$)	\$80,269,000

Beginning in 2010, the Independent Wheel True Facility project is expected to generate significant economic benefits for the region. An estimated average of 246 jobs will be created annually by the project, including an average of 133 direct jobs per year. Exhibit 2 shows the profile of average annual full-time equivalent (FTE) employment generated by the project’s expenditures. At the peak of

<sup>1</sup> RIMS II industry codes 7 (*Construction*), 16 and 47 (*Professional, Scientific, and Technical Services*) were utilized in this analysis.

spending, in the second quarter of 2011, approximately 461 FTE persons are employed as a result of the project, including 268 direct jobs.

**Exhibit 2: Average Annual Employment per Year During Construction**



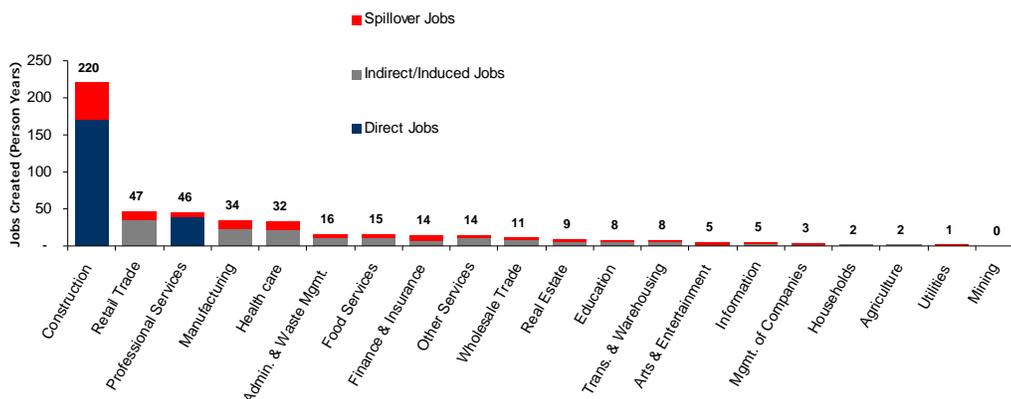
In total, the project is projected to create 537 person years of employment, including 290 direct job person years. Exhibit 3, below, shows the number of persons directly employed on the project per quarter.

**Exhibit 3: Direct (On-Project) Jobs by Quarter**

2010		2011				2012	
Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
42	85	186	268	230	122	79	54

Exhibit 4 shows the breakdown of jobs created by industry and type of impact. As expected, the civil engineering construction industry is estimated to receive the largest increase in jobs from the project (220 person years), almost all of which are direct jobs created. The industries that will see the largest number of jobs created include retail trade (47 person years), professional services (46 person years), manufacturing (34 person years), health care (32 person years), administration and waste management (16 person years), food services (15 person years), finance and insurance (14 person years) and other services (14 person years).

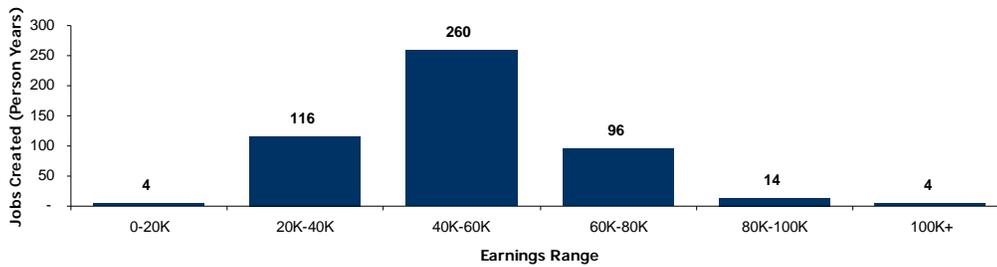
**Exhibit 4: Breakdown of Job Creation by Industry and Type of Impact**



It is also important to consider the quality of the jobs that would be created by the project, which can be most easily measured by the number of jobs created at various levels of compensation. Exhibit 5 shows that the majority of jobs generated by the project would receive compensation above \$40,000/year,

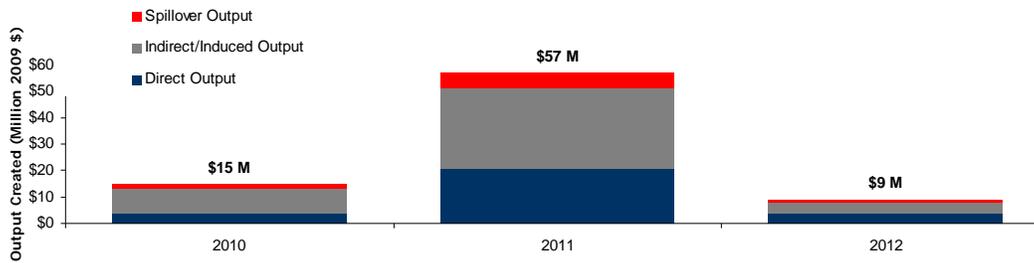
which is above the average US per capita income. This indicates that the project would generate jobs that are above the average US per capita income. This will help stimulate the regional economy.

**Exhibit 5: Breakdown of Job Creation by Earnings Range**



The amount of short-term economic activity generated by the project is shown in Exhibit 6. In total, the project would generate \$80 million in real economic output (measured in 2009 dollars), with over \$15 million dollars of economic output generated in 2010. The majority of economic activity would be generated in 2011.

**Exhibit 6: Breakdown of Statewide Economic Output Generated by Contract**



**(ii) Equal Opportunity**

Construction contracts for the IWT Facility will be administered by CTDOT, which conforms to all employment opportunity laws. CTDOT requires all contractors with contracts receiving Federal-aid funds of \$10,000 or more to complete an Annual Equal Employment Opportunity Report (FHWA Form 1391). All CTDOT construction contracts must comply with the Department’s Form 816 – Standard Specifications for Roads, Bridges and Incidental Construction. Section 1.05.12 of the Form 816 requires that every Contractor or subcontractor performing Project work is required to post the relevant prevailing wage rates as determined by the State Labor Commissioner and, on federal aid projects, those determined by the United States Secretary of Labor. The wage rate determinations must be posted in prominent and easily accessible places at the work site. All Contractors are advised in a Notice to Contractor – Requirements of Title 49, Code of Federal Regulations Part 26 of the requirement to comply with these provisions and that the Contractor, and all subcontractors must not discriminate on the basis of race, color, national origin, or sex in the performance of the contract. Each contract that will be let by CTDOT for the Project will also contain documents pertaining to equal employment opportunities and prevailing wage posting requirements. These documents can be found at the

following internet link:

[http://www.ct.gov/dot/lib/dot/documents/dcommunications/stimulus/tiger/Federal\\_Wage\\_Certification\\_082509.pdf](http://www.ct.gov/dot/lib/dot/documents/dcommunications/stimulus/tiger/Federal_Wage_Certification_082509.pdf)

CTDOT is committed to the effective implementation of the Disadvantaged Business Enterprise (DBE) Program as defined in Title 49, Code of Federal Regulations (CFR) Part 26. As such DBE participation will be required for projects with Federal fund participation. CTDOT's full DBE Program Policy and Purpose can be found at the following internet link: <http://www.ct.gov/dot/lib/dot/documents/ddbe/policy.pdf>

#### **4.1.5 Project Readiness**

##### **(i) Project Schedule**

The project is currently at about the 50 percent design stage with final design documentation expected to be complete in early 2010 through a fast-track design process. Construction is expected to begin in August 2010. Exhibit 3 presents the number of direct jobs projected to be created by quarter for the IWT Facility. As shown in Exhibit 3, the project is projected to create a total of 290 direct job person years.

##### **(ii) Environmental Approvals**

Preparation of the Federal Environmental Assessment (EA) and Environmental Impact Evaluation (EIE) for the entire NHRY Maintenance Facility Improvements began in 2006 and was completed in 2009. A Record of Decision (ROD) and Finding of No Significant Impact (FONSI) were received by CTDOT from the Federal Transit Administration (FTA) in October of 2008 and May of 2009, respectively. The complete EA can be found at the following internet link:

[http://www.ct.gov/dot/lib/dot/documents/dcommunications/stimulus/tiger/nhrailyard/FINAL\\_NHRMF\\_EA\\_3-2-09.pdf](http://www.ct.gov/dot/lib/dot/documents/dcommunications/stimulus/tiger/nhrailyard/FINAL_NHRMF_EA_3-2-09.pdf)

The FONSI can be found at this internet link:

[http://www.ct.gov/dot/lib/dot/documents/dcommunications/stimulus/tiger/nhrailyard/5\\_07\\_09\\_FINAL\\_NHRY\\_FONSI.pdf](http://www.ct.gov/dot/lib/dot/documents/dcommunications/stimulus/tiger/nhrailyard/5_07_09_FINAL_NHRY_FONSI.pdf)

The ROD can be found at this internet link:

[http://www.ct.gov/dot/lib/dot/documents/dcommunications/stimulus/tiger/nhrailyard/ROD\\_NHRY\\_Final\\_080108.pdf](http://www.ct.gov/dot/lib/dot/documents/dcommunications/stimulus/tiger/nhrailyard/ROD_NHRY_Final_080108.pdf)

##### **(iii) Legislative Approvals**

The Project has received all required State of Connecticut approvals. Documents pertaining to these approvals can be found at State of Connecticut Department of Transportation website which has a link to Recovery Information. The CTDOT website may be accessed at:

<http://www.ct.gov/dot/site/default.asp>

#### **(iv) State and Local Planning**

The Project is included in the “Long-Range Transportation Plan for the State of Connecticut, 2009-2035”, which was completed in June 2009. The complete plan can be found at the following internet link: [http://www.ct.gov/dot/lib/dot/documents/dpolicy/lrp/2009lrp/lrp2009\\_final\\_document\\_june\\_2009.pdf](http://www.ct.gov/dot/lib/dot/documents/dpolicy/lrp/2009lrp/lrp2009_final_document_june_2009.pdf)

The project is also included in the 2007 Statewide Transportation Improvement Program (STIP) as of March 13, 2009. The STIP can be found at the following internet link: <http://www.ct.gov/dot/lib/dot/documents/dpolicy/stip/2007stipprojects.pdf>

#### **(v) Technical Feasibility**

As previously mentioned the IWT Facility is currently at about the 50 percent design stage with final design documentation expected to be complete in early 2010. Thus far, through the planning, environmental approval and design phases of the project nothing has indicated the project to be technically infeasible.

#### **(vi) Financial Feasibility**

The Project is financially feasible as it is projected to be funded entirely with both State and Federal funds. A contingency is included in each of the individual project cost estimates ranging from 7 to 10 percent depending upon the magnitude of each project. CTDOT is a regular recipient of Federal grants in aid for transportation projects and has repeatedly demonstrated its ability to manage the receipt of Federal grants and comply with all Federal grant requirements.

## **4.2 Selection Criteria: Secondary**

### **4.2.1 Innovation**

The IWT will incorporate a tandem wheel truing machine which effectively doubles the capacity of a single axle machine. This feature reduces labor costs while increasing productivity. In addition, the configuration of the machine allows the operator to complete the work without direct access to moving machine parts, thereby enhancing safety. The existing single axle wheel truing machine in the Wheel Mill has been the scene of serious accidents resulting in injury and even one death.

### **4.2.2 Partnership**

The State of Connecticut and their contract rail operator for the New Haven Line, Metro-North Railroad, have worked collaboratively since 2000 to address the replacement of the fleet of M-2 rail cars and the supporting facilities improvements. The June 2002 New Haven Line Fleet Configuration Analysis produced for CTDOT evaluated the type of vehicle that would best replace the M-2 fleet and described the required supporting facilities. The State of Connecticut initiated the procurement for the M-8 vehicles in 2005. In 2006 CTDOT commissioned the conceptual design of the yard facilities and then commenced the final design of individual projects in the New Haven Rail Yard Facilities Improvements later that same year.

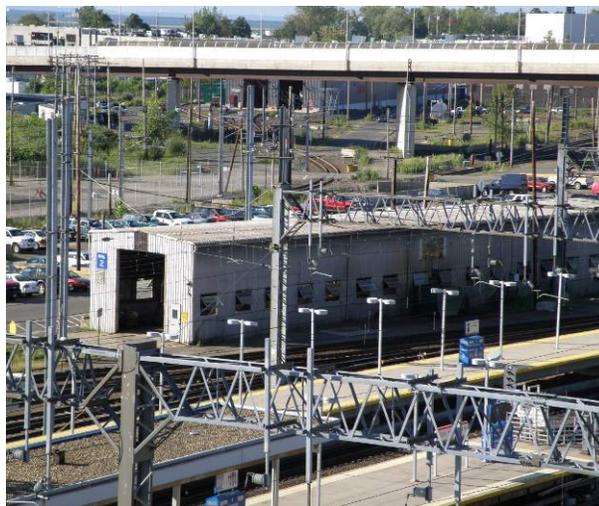
Throughout the concept development and design process, CTDOT worked closely with Metro-North to ensure that the improvements reflected a coordinated campus that would effectively and efficiently serve the requirements of passenger service and rail operations. Also during the design, CTDOT held public hearings on the project and met numerous times with the City of New Haven to explain plans and gather feedback on municipal concerns.

During the development of environmental documentation, public hearings were conducted for scoping and to present documents and receive comments. Permitting for individual projects involved interaction with the Army Corps of Engineers and the Connecticut Department of Environmental Protection.

Connecticut State Legislators have been involved through hearings at the State Capital, site tours of the rail yard and legislation authorizing funding for the vehicles and the rail yard.

#### **4.2.3 Program-Specific Criteria**

One of the program-specific criteria listed in the Federal Register for transit projects is the rehabilitation and replacement of assets that have exceeded the useful life span as identified in FTA policy. The existing Wheel Mill was constructed by the Penn Central Railroad in the 1960's. As noted earlier in this application, the facility and wheel true machine would have to function without interruption to serve the increasing wheel truing requirements. This facility, which predates the FTA, is no longer capable of meeting the capacity requirements and must be replaced to protect the integrity of the rolling stock, the rail infrastructure and service delivery to New Haven Line and Shore Line East riders.



## **5 Federal Wage Rate Requirement**

CTDOT has signed federal a wage rate certification stating that it will comply with Subchapter IV of Chapter 31 of Title 40 of the United States Code. This certification can be found at the following internet link:

[http://www.ct.gov/dot/lib/dot/documents/dcommunications/stimulus/tiger/Federal\\_Wage\\_Certification\\_082509.pdf](http://www.ct.gov/dot/lib/dot/documents/dcommunications/stimulus/tiger/Federal_Wage_Certification_082509.pdf)

## **6 NEPA Requirement**

An Environmental Assessment (EA) and Environmental Impact Evaluation (EIE) were completed for the entire project and a ROD and FONSI were issued in October of 2008 and May of 2009 respectively. All of these documents can be accessed via the following internet link:

<http://www.ct.gov/dot/cwp/view.asp?a=1372&Q=444928&PM=1>

## **7 Environmentally Related Federal, State, and Local Actions**

The project will require completion of a Coastal Area Management Permit (CAM), a Flood Management Application and a Stormwater Discharge Permit. These permits are typically forwarded with the 90% design submission which is scheduled for late 2009. Construction is anticipated to commence in August of 2010.

## **8 Confidential Information**

There is no confidential information that should be noted for this application per the Guidelines published in the Federal Register.