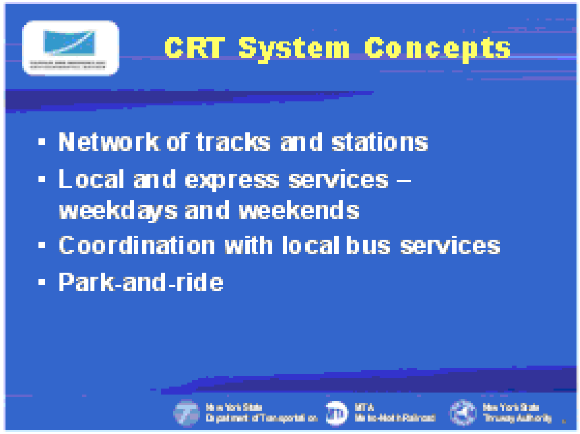
CRT Presentation continued from November 11, 2007 Transit TMA Presentation

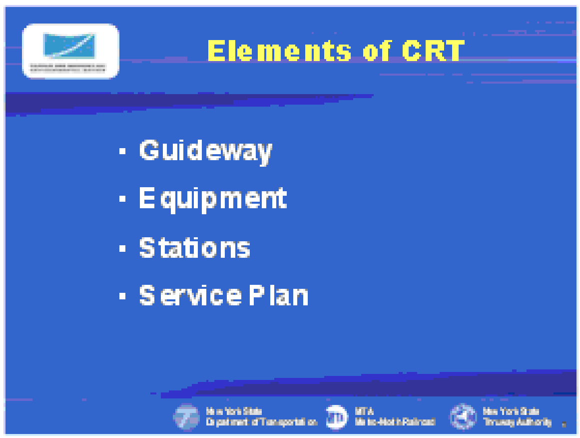
Slide 1: This presentation will provide an overview of the commuter rail technology, then will go into more detail on the CRT alternatives for the Tappan Zee Project.

Slide 2: One of the key points about the CRT Alternative is it is more than a collection of components. Not only must every piece fit with the others, but they must operate in close coordination to be effective. So CRT is truly a system.

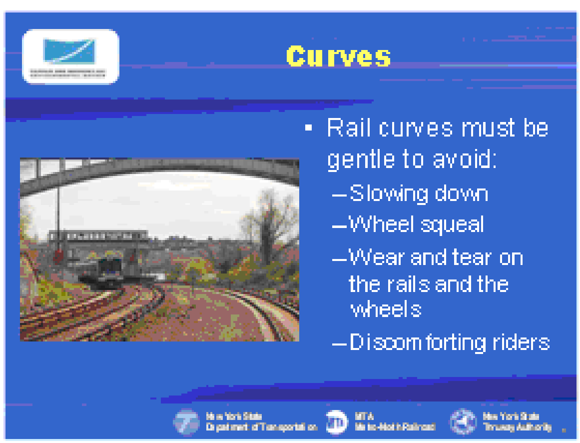
Slide 3: A quick preview here. Some of the distinguishing characteristics of CRT are the high speeds it can achieve, which requires long station spacing. The trains come less frequently but they are faster and have higher capacity per train than the other modal alternatives.



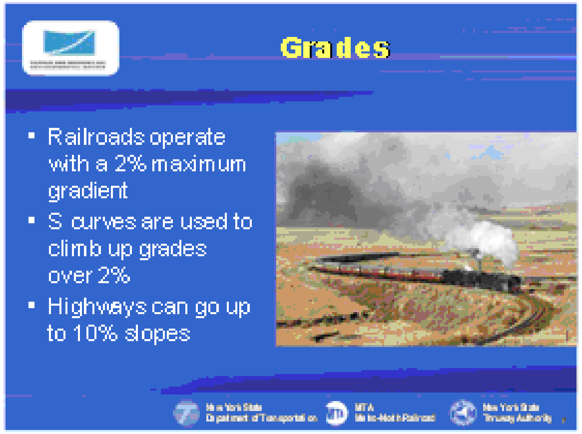
Slide 4: The key concepts are the network of tracks and stations that allow the high speed operations. There is also a mix of service types possible; every train does not have to stop at every station so express service is possible. And because there are few stations, each must have adequate parking for commuters.



Slide 5: So, the major pieces of a CRT system is the guideway, stations, equipment that operates over the guideway and the way it is operated, which is called the service plan.

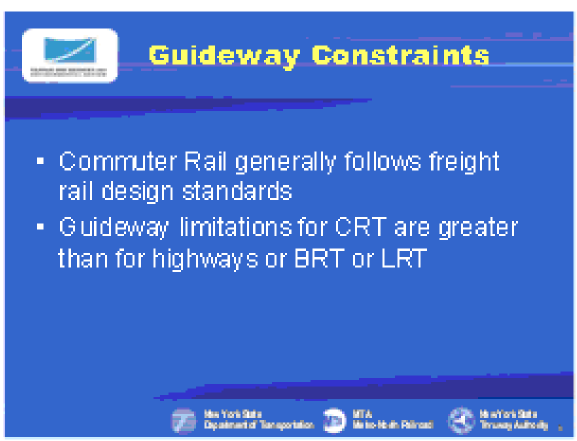


Slide 6: There are some constraints that CRT systems have. First, they are designed with broad curves to avoid having to slow down. In addition, tight curves could cause wheel squeal and would increase wear and tear on the rails and wheels. Finally, a key part of CRT service is the ride quality for the passengers, which tight curves would not provide.

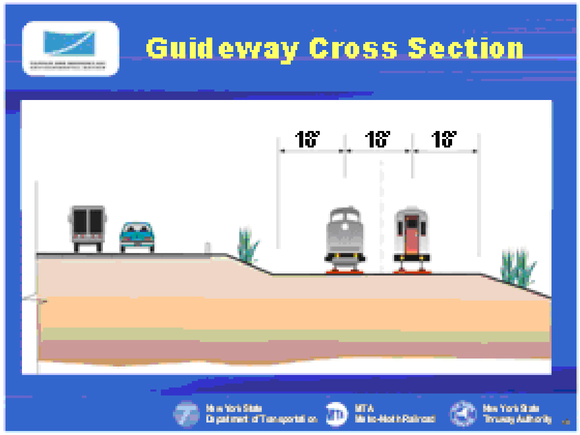


Slide 7: In addition, rail systems cannot climb the sort of steep grades cars and buses can, so they have to resort to several strategies when a steeper slope is involved. First, the tracks can be placed in an "S" curve to increase the distance, but this takes lots of space.

Slide 8: Or they can be put on elevated structures, or in open trenches or even tunnels to keep the tracks maximum grade under 2%. That is why some rail lines have so many more tunnels, open cuts and bridges than roadways in the same corridor.

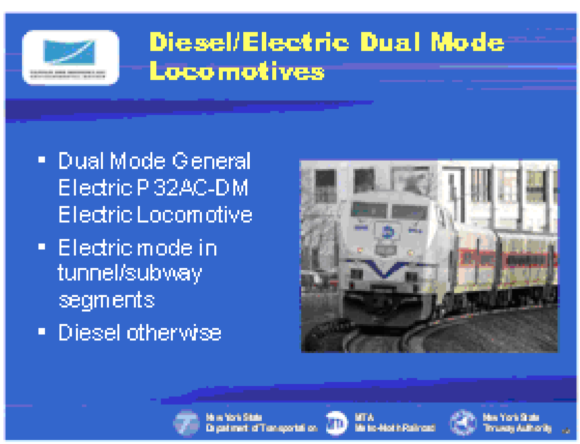


Slide 9: In general, CRT systems follow freight rail design standards. Sometimes this is because freight trains use the same corridor, but even when they do not, the practice makes sense for economic reasons. The result is that CRT has more limitations than BRT or LRT alternatives when it comes to alignments.



Slide 10: This shows a typical cross section of the CRT alternative next to a roadway. As you can see, it needs a width of just over 50', and, of course, this must be exclusive right-of-way with the fewest possible crossings, preferably none.

Slide 11: The equipment used for Commuter Rail includes locomotives and passenger cars, with considerable selection available in terms of design and operations.



Slide 12: As far as locomotives go, they come in a number of choices including diesel/electric dual mode that can operate on third rail power in tunnels and terminals and diesel elsewhere. This saves the cost of electrifying miles of track where diesel operations are feasible.

Slide 13: If there are not long tunnels or underground stations, diesel/electric locomotives are the popular choices.

Slide 14: Where freight trains are not an issue, an all electric option is the electric locomotive. The top picture is the Amtrak Acela high speed locomotive.

Slide 15: Then, there are "self propelled" commuter rail cars, called EMU's for electric multiple units. The picture shows a Metro North train at a station platform and you can see the third rail which provides power to these trains.

Slide 16: The next piece of equipment is the passenger car. This is a typical single level passenger car. These cars are designed to give everyone a seat, and can handle between 80 and 120 passengers depending on their interior layout.

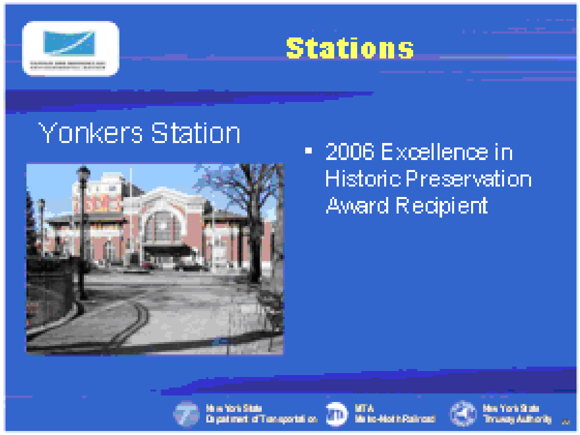
Slide 17: Where there is heavy demand and station and train lengths are already maximized – or too expensive to increase – bi-level cars are common. They do not double the capacity of the single level, but do provide more seating. Of course, there has to be enough clearance for these cars to fit under bridges, in tunnels, and the like.

Slide 18: Now for the stations, which come in as many forms as you can imagine.

Slide 19: The common elements of Commuter Rail stations are the platforms, platform enclosures, canopies, waiting areas, parking, bus transfer and pedestrian connections. This is the Tarrytown station, and you can see the parking and pedestrian overpass that station features.

Slide 20: One of the keys to a successful system is having adequate parking and good bus access. You can see the Poughkeepsie Station has a large parking area.

Slide 21: This is one of the prettier stations you are likely to see. It took the railroad and Beacon community's getting together to design a station the community wanted.

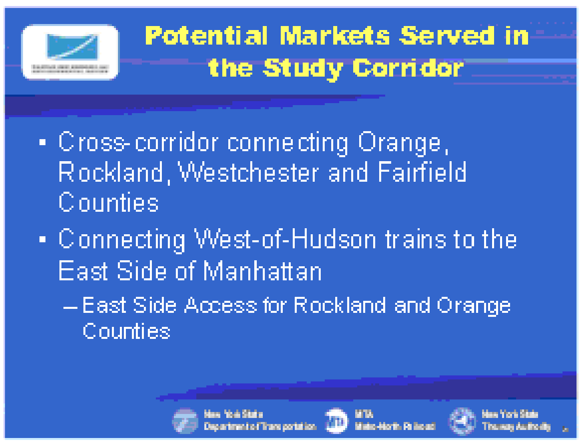


Slide 22: This is an historic station. When people say train station, this is what they usually visualize. The point is the stations can be designed to fit the areas they are to serve; they just have to include the key components.

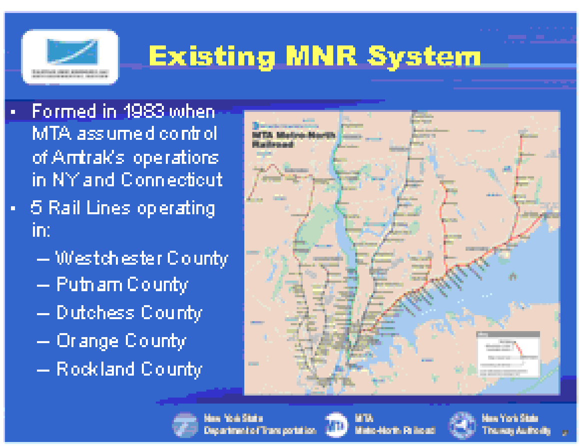
Slide 23: Pedestrian access takes a number of forms, from overpasses to steps, underpasses and simple street crossings. Where there are people or destinations within walking distance of a station, it is essential to make these connections safe, attractive and convenient.

Slide 24: Parking can be an important part of making commuter rail work. These show where parking areas have been landscaped or enclosed in attractive buildings. Parking does not have to be an eyesore.

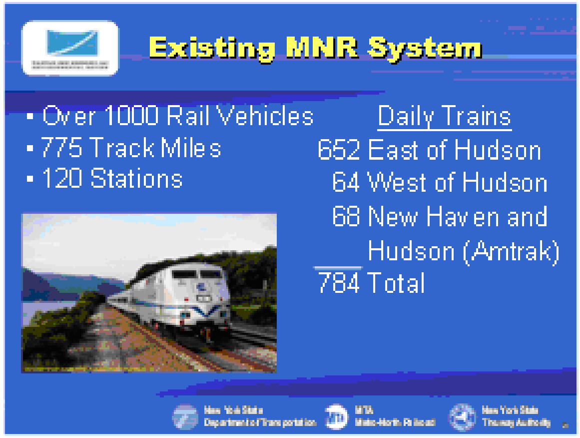
Slide 25: Having given in overview of the concepts behind CRT, it is time to look at how it is applied to the study corridor.



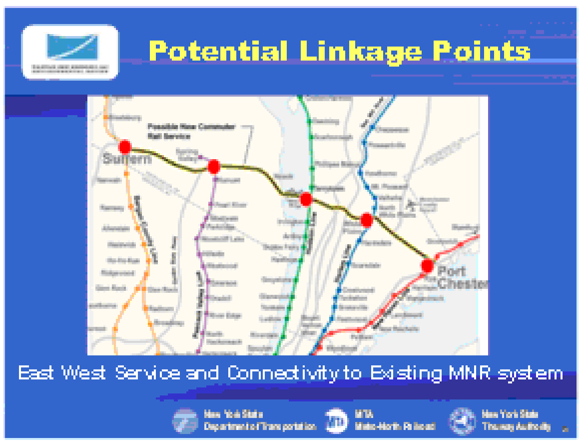
Slide 26: The two major markets of the corridor are cross-corridor, going east and west, and west to south going from Orange and Rockland Counties to the East Side of Manhattan.



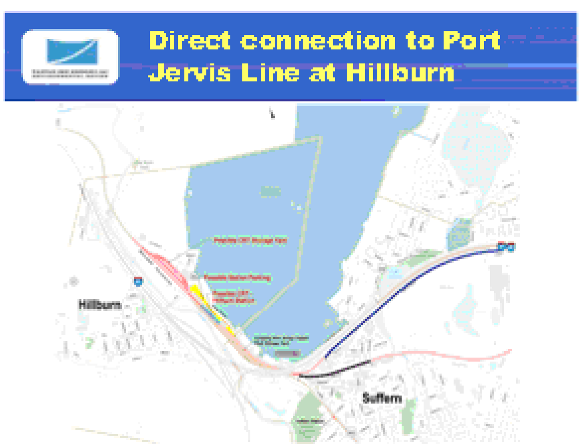
Slide 27: The existing Metro North system was formed when MNR took over Amtrak operations in New York and Connecticut. The five lines shown on the map show the extent and coverage of those lines.



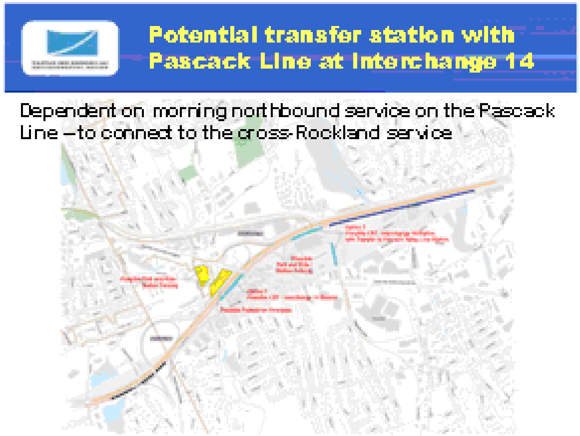
Slide 28: MNR operates an extensive system. Operating hundreds of trains per day over 775 track miles and serving 120 stations. It uses over 1,000 vehicles, a mixture of passenger cars, locomotive and EMU's, to provide this service.



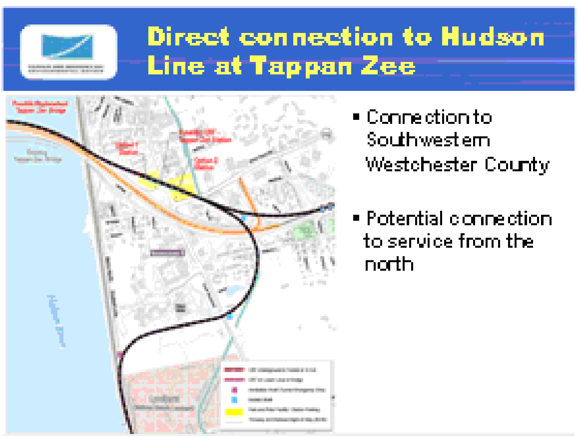
Slide 29: There are five potential linkage points to the MNR in the study corridor. These are not necessarily where trains could move between lines; in some cases they would be where passengers could transfer.



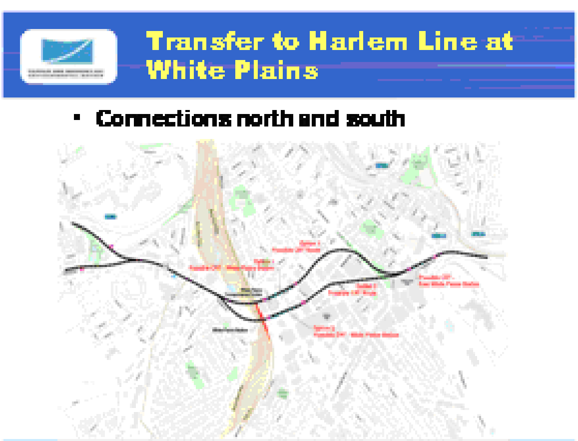
Slide 30: The Port Jervis line at Hillburn could have a direct connection to the corridor to the east through Suffern. This would provide access to the west side of Manhattan via Penn Station or 34th Street.



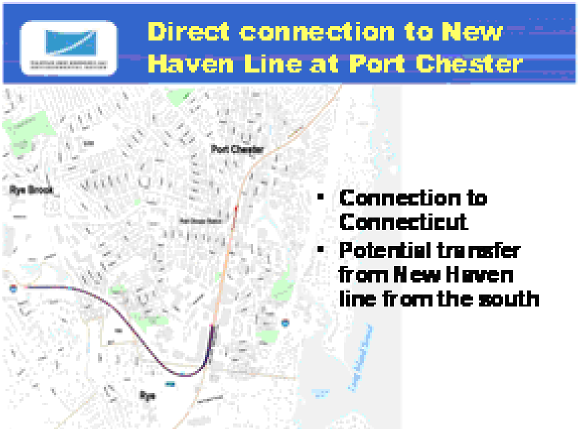
Slide 31: The Pascack Line at Interchange 14 could have a transfer point between the CRT alternative and that line. This would provide access to the west side of Manhattan via Penn Station or 34th Street.



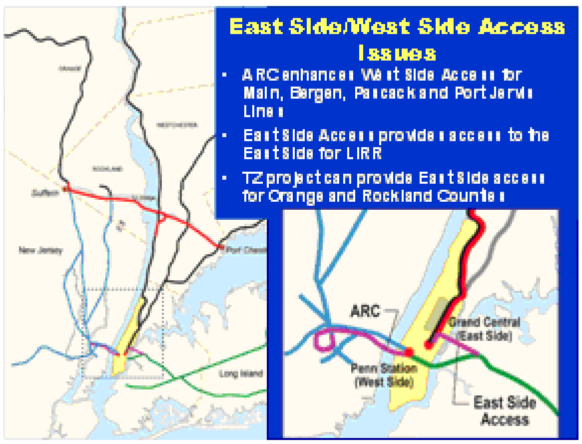
Slide 32: The junction with the Hudson Line at Tappan Zee would provide direct access to Grand Central Station and the east side of Manhattan.



Slide 33: The Harlem Line could not be directly accessed because of the relative elevations of the Tappan Zee and Hudson Lines (the Hudson Line is elevated and the Tappan Zee CRT alternative would be in tunnel) and the presence of environmentally sensitive uses.

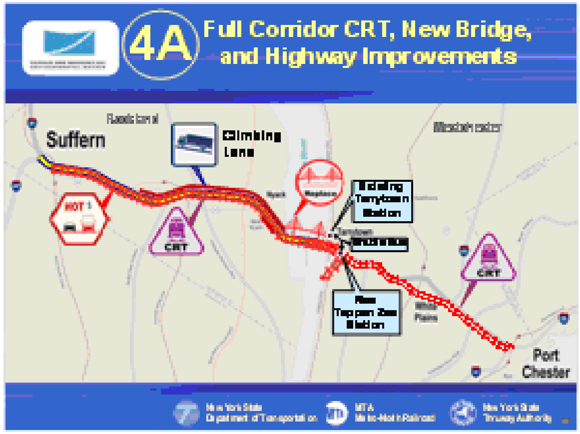


Slide 34: The eastern end of the route would junction with the New Haven Line at Port Chester. From there it would be possible to transfer to the New Haven line from the south.



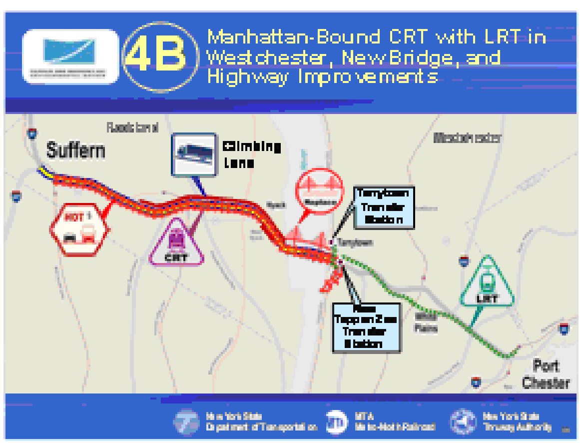
Slide 35: There are two projects that would also improve access to Manhattan. The ARC project would improve access for west Rockland County to Penn Station. The East Side Access project would improve access to the east side of Manhattan from Long Island.

Slide 36: There are four service plans, but all are based on the same Rockland County CRT alternative.

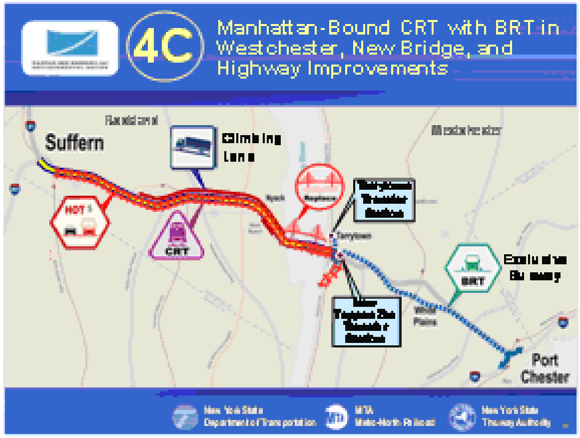


Slide 37: Alternative 4A provides CRT service across the entirety of the corridor. It would include all of the five connections to the Metro North lines in the corridor.

Slide 38: The operations plan for this alternative would feature direct services from Suffern to both Penn Station and Grand Central with additional cross corridor service as far as Port Chester from Suffern.

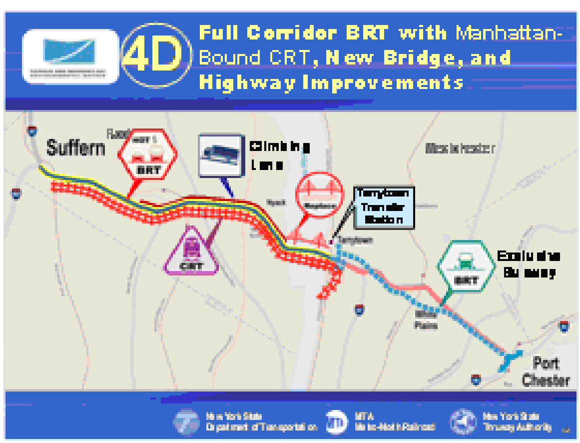


Slide 39: Alternative 4B differs from 4A only east of the Hudson River, where there would be an LRT from Tarrytown to Port Chester in place of the CRT alternative.

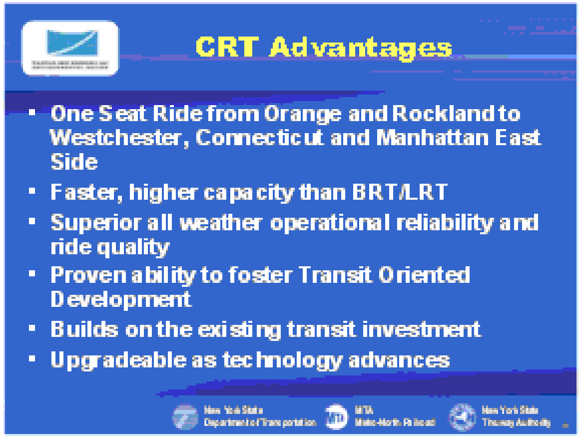


Slide 40: 4C would be the same as 4B, but would have a BRT line instead of an LRT line between Tarrytown and Port Chester.

Slide 41: The operations plan would be the same for 4B, 4C and 4D. The CRT portion of this alternative would provide direct – one-seat service from Rockland County to Manhattan via both Penn Station and Grand Central Station. The operations between Tarrytown and Port Chester would provide a transfer at Tarrytown to the CRT line to go to Manhattan or to Rockland County.



Slide 42: Alternative 4D differs from the other CRT Alternatives in having a BRT line that would span the entire corridor, while the CRT line would serve Rockland County and connect directly to Grand Central Station and indirectly to Penn Station.



Slide 43: The CRT Alternative provides several advantages over the other alternatives. It provides a one seat rider to the east side of Manhattan from Rockland and Orange Counties. It would be faster and have a higher capacity than the BRT or LRT Alternatives. It would operate reliably in all weather. It builds on the existing MNR investment and is upgradeable.

Slide 44: We will now review the CRT Alternative using alignment drawings. Introduce David Rubin, who made that presentation.