RAIL HAUL OPPORTUNITIES

(Extract report as prepared by Malcolm Pirnie, Inc. for the City of New Haven – January 2008)

Rail Haul Opportunities

The City of New Haven may wish to consider the option of disposing of its solid waste by rail haul to a remote facility, normally a landfill, for both economic and environmental reasons. The following provides an overview of rail haul opportunities potentially available to the City of New Haven including development of a rail-spur to the existing New Haven Transfer Station site.

A.1. Introduction

Historically, the transportation and disposal of solid waste has been a "local" business in which waste is transported primarily by trucks from centralized transfer stations to landfills or waste to energy facilities relatively close to the source. In the Northeast, these nearby disposal options are reaching, or have reached their maximum capacity or are becoming cost-prohibitive. Exacerbating this situation is the fact that, according to its Solid Waste Master Plan, Connecticut is not issuing permits for any new landfills, even for incinerator ash disposal.

A.1.1. National and Regional Rail Services

In North America, most rail service is provided by six major, Class 1 railroads. CSX and Norfolk Southern service the East Coast, Burlington Northern Santa Fe (BNSF) and Union Pacific service the West Coast, and Canadian National and Canadian Pacific service Canada. In addition to the major service lines, there are regional railroads such as Conrail that are considered "switching railroads". These regional railroads coordinate with the major railroads to move goods from locations off their major lines onto their service lines which allow them to efficiently transport goods across the country. In the vicinity of New Haven Conrail and CSX are likely to be the regional and national carriers, respectively, needed for a Rail Haul option.

A.1.2. Trash Disposal and Hauling Costs

Currently, New Haven pays approximately $14 per ton to truck-haul waste to a waste-to-energy facility in Lisbon, CT and $77 per ton for the disposal of waste at the facility for a total haul and disposal cost of approximately $91 per ton.

The lack of sufficient in-state waste disposal capacity has forced waste trucking operators to seek out alternatives and this has led them to disposing of the waste they handle at facilities progressively longer distances from the source. Although this increases the hauling component of the total cost, the disposal cost at a remote landfill is significantly lower than any in-state disposal options. Therefore the major haulers are now

encouraged to look at alternative methods of transportation to conventional road hauling, i.e. rail. Within the rail option they are pursuing each alternative method of transportation to identify the overall lowest cost haul.

The City of Stamford recently issued a request for qualifications and proposals for disposal capacity and has selected Transload America as the most responsive proposer. Transload is proposing to bale the waste, load on a flat-bed carrier and rail-haul municipal solid waste to a landfill in Ohio. The proposed cost for the three-year rail haul and disposal contract is $69.00 per ton in 2008, $76.00 per ton in 2009 and $79.80 in 2010.

A.1.3. Haul-by-Rail Costs

Previous studies comparing the costs of road transportation with rail transportation for the solid waste transportation and disposal industry (T & D) have shown that road transportation costs increase in a more or less linear way with distance. The further the distance, the corresponding increase in hauling cost/ton. In contrast, the cost/ton to haul by rail "tops-out" at a certain point with distance. Therefore the cost/ton/mile to haul waste by rail over distances between about 250 miles and 1500 miles becomes progressively cheaper with rail than by trucking it by road.

Rail transportation offers many other benefits over trucking such as the reduction of traffic congestion by keeping trucks off the highways. Rail transportation produces almost 5 times less air pollution than transportation by trucking. Rail hauling is also safer, from an accident point of view, than truck hauling. The most significant difference is that a single railcar can carry up to 110-130 tons of waste while a single long-haul truck can only transport about 22 tons.

A.2. Alternative Ways to Haul by Rail

There are 3 basic alternative ways to haul trash by rail:

- Direct rail from transfer station to landfill
- Intermodal transportation by container and flat-bed rail cars
- Intermodal transportation by bulk loading dump trailers and gondolas

The method of hauling is dependent on what types of off-loading facilities are available at each end of the route. Therefore, not all landfill operations can accept all of the three alternative methods of hauling described below.

A.2.1. Direct Rail Transportation

Direct Rail Transportation refers to utilizing a direct rail access on-site at the transfer station and also at the actual landfill operation. The shipping container is usually a standard gondola car, 57-ft long, with a maximum 110-ton shipping capacity. Direct rail assumes gondola rail cars are delivered and removed from the site via a rail spur that exists (or is to be constructed) to the transfer station. Gondolas are moved by the regional operator at this end, the national operator for the long haul and (probably) a second regional operator at the landfill end of the route. It also assumes that there is a rail terminal with off-loading facilities at the disposal site. Capital costs associated with construction of the rail spur include: rail spur design and bidding, a turnout and side track agreement with the rail service, and construction cost for the spur.

If a new rail spur is to be constructed on-site, it will most likely be considered a "new haul location" and will be subject to current fuel surcharge rates (estimated at 18%) rather than an existing haul location that may have a locked in low fuel surcharge rate under an existing agreement.

A.2.2. Intermodal Transportation Using Containers and Flatbed Rail Cars

Intermodal rail transportation using containers is another alternative and involves trucking the waste from the site by intermodal containers to a rail service terminal/"transload" facility for rail shipment. The containers are sized/configured to fit onto both flat-bed trucks (road) and flat-bed rail cars. This alternative is similar to that proposed by Transload America for the Stamford project mentioned previously.

The trucking cost associated with this intermodal alternative at the transfer station end is referred to as "front dray" cost. The cost associated with hauling the waste from the transload facility owned by the disposal facility is referred to as "rear dray" and is typically included in the disposal price offered by the facility. Intermodal rail transport requires site access for trucks and development of potential trucking routes at the transfer station end of the route in urban communities like New Haven. At the landfill end of the route, facilities to discharge from containers must be available.

Intermodal containers usually have a maximum shipping capacity of 24 tons. Actual shipping load typically averages 22 tons/intermodal container. They are delivered empty by truck, dropped off at the transfer station for loading, and then picked up loaded by truck for delivery to a transload rail terminal where they are loaded onto flat bed rail cars. A flat bed rail car typically has the capacity to haul 6 intermodal containers, approximately 130 tons. The front and rear dray cost for intermodal shipment varies with disposal schedules, disposal volumes, demurrage fees, fuel surcharge costs, local and state taxes, efficiency in loading, intermodal availability and construction related delays, if any.

A.2.3. Intermodal by Bulk Loading Using Dump Trailers and Gondolas

A second intermodal method involves using dump trailers to load the waste at the transfer station into bulk haul trucks and take it to a second transfer station facility where the waste is transferred into a gondola rail car for rail shipment. This option requires double handling of the waste from one container to another and then to a regulated facility that allows this type of waste handling. Rail tonnages accepted at the facilities by bulk hauling may vary and are subject to local and state highway loading restrictions.

A.3. Transportation by Road Trucking

Direct trucking includes directly loading waste into trucks, typically 24-ton shipping capacity trucks, at the transfer station site and then trucking it on interstate highways to the selected disposal facility where it is dumped directly at the landfill operations area. This method is only seen as cost effective for short haul distances (see below figure).

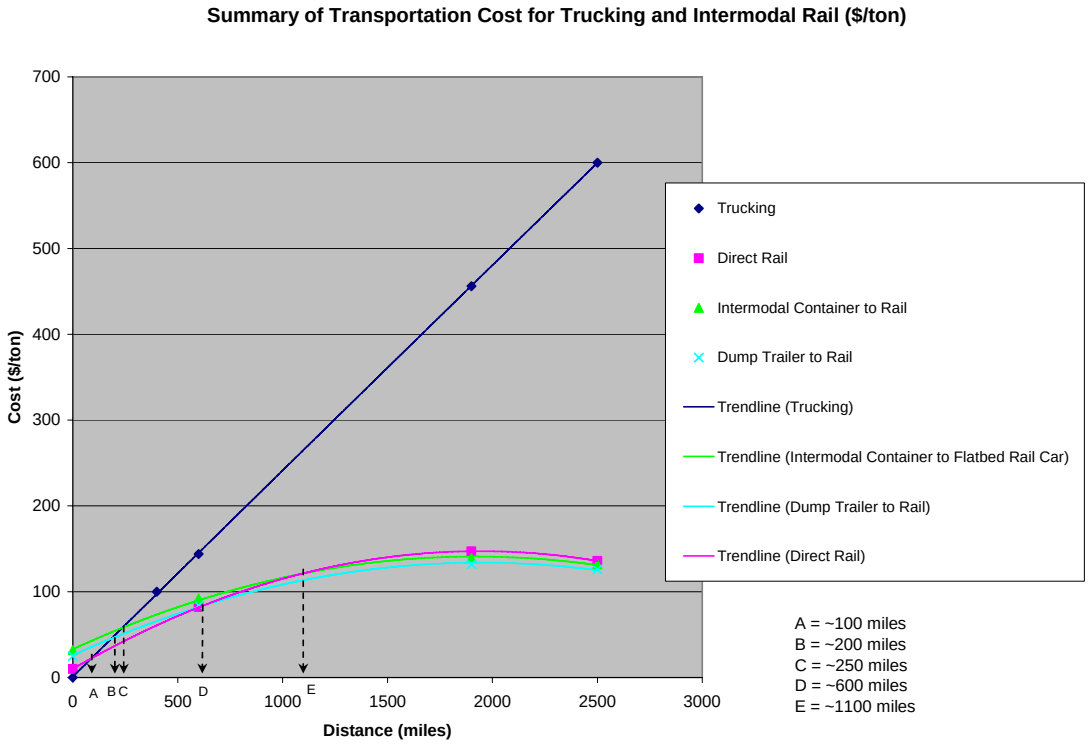
A.4. Transportation Cost Comparison

A comparison of alternative transportation methods indicates that rail transportation is typically more cost effective than direct trucking for distances in excess of 250 miles. Within this range a number of factors might favor one method of transportation over the other.

Direct rail is usually most cost effective of the three rail options for shorter rail-haul distances (250 - 600 miles). Beyond that distance, intermodal transportation by way of dump truck and gondola or intermodal container/flatbed car are typically more cost effective than direct rail.

Solid Waste is currently being shipped to a number of states in the mid-west such as Ohio, Pennsylvania and New York, by rail. These states all fall within the 250 - 600-mile range and demonstrate that rail is the option currently favored by some east coast communities and commercial enterprises.

Below is a graph taken from a cost comparison study performed for an east coast site in June 2006 and refer to an operation with many similarities to the situation in New Haven. The costs and distances were developed for specific disposal options that would not apply here but the range of costs shown and the comparison between costs for different alternatives is helpful.



A.5. Advantages and Disadvantages of Rail Hauling Waste Alternatives for New Haven

A.5.1. Direct Rail:

The following section summarizes the advantages and disadvantages of direct rail including constructing a new rail spur at the New Haven transfer station to provide access for gondola rail car shipment from the site to a selected disposal facility. It is noted that while our preliminary analysis indicates that it is technically feasible to bring rail access to the existing transfer station site, the economic and legal feasibility is not known.

Advantages:

- The capital cost to build the new rail spur may add future re-development value to the site depending on future land use decisions.
- Reduces out-bound truck traffic which minimizes impacts to surrounding land uses due to high truck traffic, air/dust, and noise nuisances.
- Rail transportation produces almost 5 times less air pollution than transportation by trucking.
- Depending on available disposal options the capital costs required for direct rail implementation maybe relatively small compared to typical trucking dray costs and

other fees associated with multiple waste handling and result in lower overall haul and disposal cost.

Disadvantages:

- Requires capital investment.
- Permitting of the construction of the rail access and coordination with the regional rail operator for a side track agreement can be cost prohibitive and time consuming.
- Coordination with rail car delivery and pick up can be challenging to manage during operations (use of a single T&D subcontractor coordinator is recommended).
- Design of rail spur including potential additional land acquisition, easement acquisition, subsurface investigations, and environmental impacts i.e. Little River, wetlands, and fill area of the landfill) are crucial to the project economics.
- A new rail spur would be considered a "new haul" to the railroads and therefore, the project may not benefit from any long term pre-negotiated fuel surcharge rates.

A.5.2. Intermodal Transportation by Containers and Flatbed Rail Cars:

The following lists the advantages and disadvantages to intermodal transportation by bulk containers:

Advantages

- A rail spur does not need to be constructed on site.
- Intermodal containers are completely contained. They provide a "cleaner" operation then dump trucks or dump trailers with less potential for spills and releases.
- Potential to benefit from long-term negotiated fuel costs with an established private transload facility.
- Rail transportation produces almost 5 times less air pollution than transportation by trucking

Disadvantages:

- Front trucking and handling dray costs are expensive.
- Potential for impacts to the surrounding areas/residents from hauling the inter-modal containers off-site to the rail transfer facility such as traffic, air/dust, and noise nuisances.
- Availability of intermodal containers and flatbed shipping rail cars is more constrained then standard gondola cars.

A.5.3. Intermodal by Bulk Loading Dump Trailers and Gondolas

The following lists the advantages and disadvantages to intermodal transportation by bulk loading:

Advantages:

- A rail spur does not need to be constructed on-site.
- Potential to benefit from long-term negotiated fuel costs with an established transload or terminal facility.
- Rail transportation produces almost 5 times less air pollution than transportation by trucking.

Disadvantages:

- Front trucking and handling dray cost is expensive
- Open truck needs to be secured (i.e., tarp).
- Potential for impacts to the surrounding areas from hauling the inter-modals off-site to the transfer facility such as traffic, air/dust, and noise nuisances.

Gondola Rail Cars (Courtesy of Wikipedia)

A.5.4. Trucking by Road

The following lists the advantages and disadvantages to direct trucking transportation:

Advantages:

- Depending on disposal location, trucking to a facility within 100 -200 miles of the Site is a cost effective transportation method.

- A rail spur does not need to be constructed on-site, therefore scheduling and coordination of the design, construction, and use of the rail spur on site is not an issue.
- Trucks are readily available and have no identified scheduling impact at this time.
- Rail transportation is a safer mode of transportation

Disadvantages:

- Potential for impacts to the surrounding areas from trucking on local roads such as traffic, air/dust, and noise nuisances.
- Higher potential for accidents and spills over long trucking distances compared to other alternatives.
- Open truck needs to be secured (i.e., tarps).
- Truck traffic tends to have a significantly higher accident incidence per ton. mile than rail traffic
- Limited disposal opportunities within a 100 mile radius.

A.6. New Haven's Opportunities and Challenges

New Haven is well placed to take advantage of available rail haul opportunities due to close proximity of existing rail line and the fact that its put-or-pay agreement with Wheelabrator is set to expire next year (December 2008). It is likely that New Haven would be given support from State agencies for a MSW Rail Haul disposal option since the CTDEP no longer discourages out-of-state waste disposal and the first ever rail transfer station for solid waste, not located on federally regulated land, is about to be permitted in Danbury, CT. It is noted, that although rail-haul is currently used throughout CT for some waste types these facilities are currently used primarily for construction and demolition debris and are located on rail-road property which is federally regulated. As such, these rail facilities are currently not subject to State regulations and permitting requirements. Several bills, however, are currently under consideration by the federal government to remove this loophole which exempts these facilities from state regulation and permitting.

A.6.1. Direct Rail: City Operation

Consideration has been given to bringing a spur connection onto the transfer station site, which would be under the City's control. To verify that it was technically feasible for a new rail spur to be extended from the rail yards adjacent to the property the City engaged the services of an experienced rail engineer, DiCesare Associates, to provide an opinion of the technical feasibility of this option. The letter report and a schematic plan showing

two alternative routes for the construction of a rail spur prepared by DiCesare Associates are attached as Appendices I and II.

The following criteria illustrate how geographically well situated the City is to take advantage of a waste-by-rail option at the transfer station:

- There is excellent regional rail service adjacent to the Middletown Avenue transfer station.
- There are no technical impediments to making a rail connection with the many national services described in Section A.1 above.
- The transfer station site, and therefore the rail connection, is directly accessible from interstate highway I-91 in a north-south direction and only a few miles from interstate highway I-95 in and east-west direction with minimal impact of heavy loads and high truck traffic volumes onto City streets.

Issues that would need to be addressed to bring in and operate a new rail connection include:

- Geotechnical challenges related to foundations for structures and rail-bed.
- Wetlands and other environmental concerns in the immediate area.
- Identifying the capital funding source and requirements for design, permitting and construction of the rail spur.
- Reaching rail agreement with all rail operators. This includes the regional operator at the front end of the haul, the national carrier for the long haul and the regional operator at the landfill end of the haul.

Although this method of hauling waste, and the costs associated with it, have not been thoroughly investigated and analyzed at this time, all indications are that it would be cost effective when compared with current costs to dispose of solid waste. Costs at the waste-to-energy facilities currently under contract to the City are very high in relation to the predicted cost of long haul by rail. In addition, there currently is a shortage of in-State disposal capacity.

A.6.2. Direct Rail: Third Party Vendor with Existing Rail-Haul Operation

There is an existing solid waste-by-rail disposal operation that is well established and takes place on the property adjacent to the City's transfer station. There is a transfer station on the property that takes waste delivered by truck and loads it into gondolas. This operation currently handles construction and demolition type waste. It is not specifically permitted to accept municipal solid waste (MSW). However, should this facility be appropriately permitted, or should the operation fall under a separate rail-service jurisdiction, the opportunity exists for the City to enter into some form of long

term agreement with this vendor. A thorough analysis of the issues, costs and benefits associated with such a venture would have to be performed.

A.6.3. Direct Rail: Third Party Vendor with a New Rail-Haul Operation

There are a number of miscellaneous rail freight operations within the City. Some are currently operational; others are capable of becoming operational with the application of a significant level of capital investment. These operations are situated in various parts of the City including some locations in the very heart of residential and/or commercial areas. None of these is currently permitted to accept MSW. Therefore the opportunity exists for the private sector to develop any of these into a MSW Rail-Haul operation without the City being an active partner. In this case, the City would be given another option for solid waste disposal rather than continuing to direct all its waste to the transfer station.

However, such operations would need to be approved and permitted by both City and State agencies. Issues such as the impact of a high volume of truck traffic, noise, dust and the debris, which is inevitably part of any solid waste operation, would probably create serious community objections. Therefore, while this is technically feasible, this solution should be considered much less desirable than locating any new MSW Rail-Haul operation in association with existing solid waste disposal operations with direct access to the interstate highway system, in an area of the City much less likely to be affected by the increase in activity. All these criteria are met at Middletown Avenue.

A.6.4. Intermodal Transportation

Due to the very close cost comparison between the various methods of intermodal transportation by road/rail, whether by bulk haul/gondola or by container/flat-beds, the decision as to which method is most suitable and/or cost effective is likely to be dictated by the cost of constructing on-load facilities at the transfer station end of the haul and the available means of off-loading at the landfill end of the haul and not by a purely financial one.

A.6.5. Effect on the Solid Waste Market

Notwithstanding the discussion above, if a solid waste solution utilizing the rail network becomes cost-effective for the City of New Haven then it is likely to become equally cost-effective for its neighbors and other communities within economic haul distance of a suitable rail connection. It should be assumed that the economic advantage of a successful MSW Rail-Haul operation can attract customers from adjacent communities and that permitting such a facility may involve re-directed waste from any of number of competing disposal methods.

With the expiration of the "put-or-pay" agreements currently in place between many municipalities such and New Haven and, either directly with a waste-to-energy facility operator or alternatively with the Connecticut Resources Recovery Authority, that require the municipality to take its waste to specific facilities, under the terms of these agreements, this presents the first opportunity in 20 years for the City to take a fresh look at all its options . It is most likely that every municipality currently restricted by these agreements will also consider taking this step. Several municipalities in southwestern Connecticut have already issued a Request for Proposals for solid waste disposal. Responses are due back at the end of November 2007.

There a number of nationally distributed waste management companies that would be attracted to the opportunity to get involved with a regional solution to dispose of solid waste by rail. Once permitted, any new MSW transfer facility accepting New Haven's waste would also be constantly looking out for opportunities to expand its economic base, increase through-put and thereby increasing revenues.

A.7. Conclusion

The analysis and discussion above demonstrates that the costs associated with Rail-Haul to an out of state disposal facility is a cost effective alternative to the current method of local road haul to an in-state disposal facility.

A.8. Attachments

I: Preliminary technical review of bringing a rail spur to the Middletown Avenue transfer station site.

II: Topological map of the transfer station site showing alignment Options A and B.

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September 12, 2007

Malcolm Pirnie, Inc.
100 Roscommon Drive, Suite 100
Middletown, Connecticut 06457

Attn: Mr. Martin Overton
Senior Associate

Re: New Haven Transfer Station
ADA File No. 207035

Dear Mr. Overton:

In accordance with your request, we have reviewed the theoretical viability of linking the New Haven Transfer Station with the active railway in the vicinity of the site.

We considered two options, see options A&B on the attached layout Our review was based on the construction of an "industrial-standard track" utilizing a minimum horizontal radius of 500 feet, track speed of 10 mph, and a maximum incline of 3%. We find each option to be technically viable, however, we must point out that due to the conceptual nature of our work, further investigation of engineering considerations related to physical construction should be undertaken.

At a minimum, the following should be studied to assess the potential impacts on each of the two (2) options shown:

- Disturbance/filling/displacement of wetlands
- Right-of-way takings and related impacts
- Geotechnical (i.e. foundation) engineering
- Construction of retaining structures within the footprint of a "closed" landfill
- Track design and alignment including transitions (spiral curves), at grade roadway crossing and rail/rail crossing, signage, signalization (if deemed necessary).
- Ownership of active rail system to be connected and/or rail-bed ROW

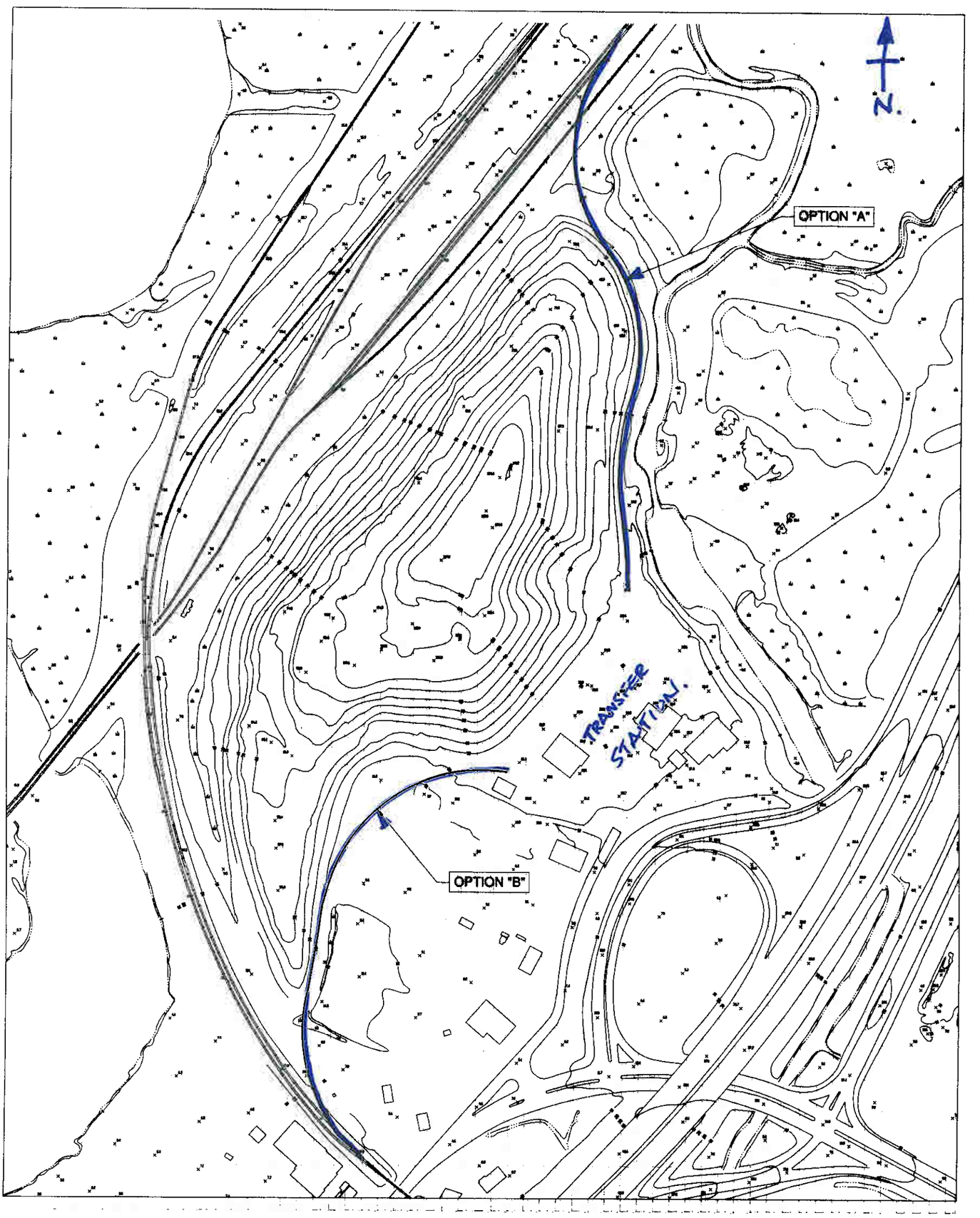
Our work was limited to a cursory review of available topography, aerial photography, and a site visit to become familiar with the site environs.

I hope that this is of value to you. Should there be any questions, please do not hesitate to contact me.

Very truly yours,
The Office of
A.DiCesare Associates, P.C.

Arthur DiCesare, P.E.
Engineer-in-Charge

APPENDIX 'II' TRANSFER STATION RAIL ALIGNMENTS.



SEPTEMBER 2007.