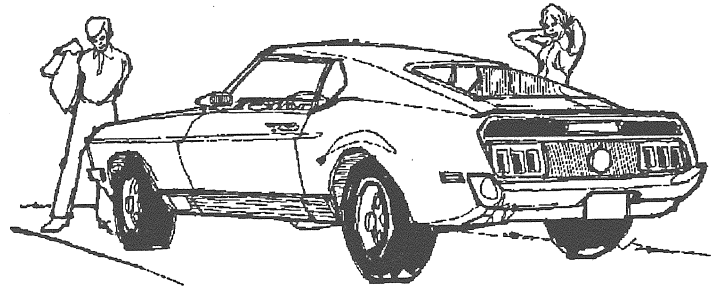


REUSE PLAN FOR 95A PENDLETON HILL ROAD

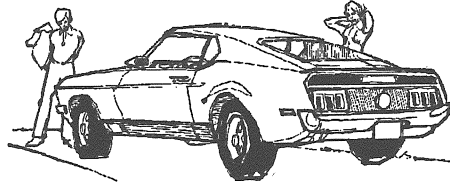
NORTH STONINGTON
CONNECTICUT



Eastern Connecticut Environmental Review Team Report

REUSE PLAN FOR PENDLETON HILL ROAD

NORTH STONINGTON CONNECTICUT



ENVIRONMENTAL REVIEW TEAM REPORT

**Prepared by the
Eastern Connecticut Environmental Review Team
of the Eastern Connecticut
Resource Conservation and Development Area, Inc.**

**for the
North Stonington
First Selectman
Inland Wetlands Agency
Planning and Zoning Commission**

October 1996

**CT Environmental Review Teams
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ACKNOWLEDGMENTS

This report is an outgrowth of a request from the North Stonington First Selectman, Inland Wetlands Agency and the Planning and Zoning Commission to the New London County Soil and Water Conservation District (SWCD). The SWCD referred this request to the Eastern Connecticut Resource Conservation and Development Area (RC&D) Executive Council for their consideration and approval. The request was approved and the measure reviewed by the Eastern Connecticut Environmental Review Team (ERT).

The Eastern Connecticut Environmental Review Team Coordinator, Elaine Sych, would like to thank and gratefully acknowledge the following Team members whose professionalism and expertise were invaluable to the completion of this report.

The field review took place on Wednesday, September 11, 1996.

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I would also like to thank Dick Cooper, Wayne Berardi, W. Bishop, J.A. Bill, and Lynne Krynicki, representatives of various town commissions and agencies and First Selectman Charles Elias of North Stonington and its engineering consultant Karl Brantner, and David Rathbun, Robert Granato, and Peter Thacher representatives of Stonington commissions, Neftali Soto, town engineer for Westerly, RI, and Bob Birmingham, David Schweid, John Bear and Mike Boland of the Mashantucket Pequot Tribal Nation Planning Department and its consultants Richard Snarski and Frederick Hesketh for their attendance, cooperation and assistance during this environmental review.

Prior to the review day, each Team member received a summary of the proposed project with a series of questions on the project developed by the various town commissions and a general location and soils map. During the field review Team members were able to view a video tape and were given additional detailed plans and information along with the applicant's responses to the town's questions. Following the review, reports from each Team member were submitted to the ERT coordinator for compilation and editing into this final report.

This report represents the Team's findings. It is not meant to compete with private consultants by providing site plans or detailed solutions to development problems. The Team does not recommend what final action should be taken on a proposed project - all final decisions rest with the Town. This report identifies the existing resource base and evaluates its significance to the proposed development, and also suggests considerations that should be of concern to the Town. The results of this Team action are oriented toward the development of better environmental quality and the long term economics of land use.

The Eastern Connecticut RC&D Executive Council hopes you will find this report of value and assistance in making your decision concerning this proposed parking lot and employee service center.

If you require additional information please contact:

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INTRODUCTION

Introduction

The North Stonington's First Selectman's Office, Inland Wetlands Agency and Planning and Zoning Commission have requested an environmental review of a proposed reuse plan for a former gravel excavation site.

The 55 acre site is located on Pendleton Hill Road. The Mashantucket Pequot Tribe is applying for a Special Permit for a Planned Business Development for the site. Their plans for the site include a financial institution, offices for employee services and a +2400 car parking lot for Foxwoods Casino employees.

The site was previously excavated for sands and gravels and was left "as is" without any reclamation plan. The site is located adjacent to the Shunock River and is over a significant, potentially high yielding, stratified drift aquifer. The Town of Westerly, Rhode Island is proposing a well field on 44 adjacent acres that will serve as a public water supply.

This project site was included in a study conducted by the ERT in October of 1995 entitled "Special Land Use Study - Office/Research Zone." This report updated an older ERT study of the Route 2 corridor. Background natural resource information and development recommendations can also be found in that report and Team members referred to it in their preparation of this report.

Objectives of the ERT Study

The town has requested assistance in reviewing the proposed project because of their concern with the type of project being proposed (a large parking lot) for this water resource sensitive area. The various town agencies and commissions developed a list of questions that they have asked the ERT to provide responses to which cover the areas of aquifer protection, wetlands, stormwater management, fisheries, traffic and site planning.

This report answers many of the town's questions while discussing the possible environmental impacts to natural resources and presents planning and land use guidelines. Some Team members have used the question and answer format to respond to the town's concerns.

The ERT Process

Through the efforts of the town this environmental review and report was prepared for the Town of North Stonington.

The review process consisted of four phases:

1. Inventory of the site's natural resources;
2. Assessment of these resources;
3. Identification of resource problem areas and review of plans and other documentation;
4. Presentation of management and land use guidelines.

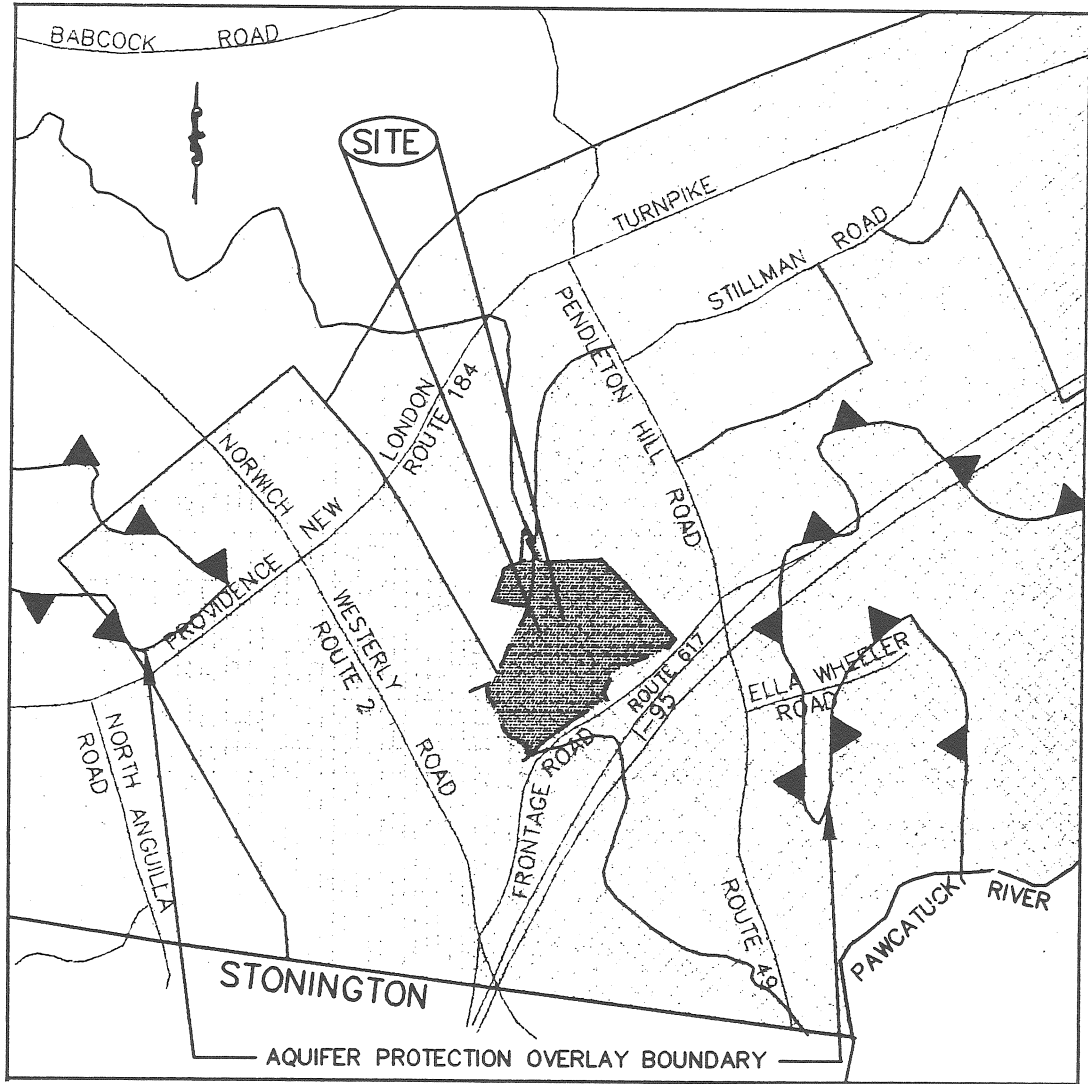
The data collection phase (inventory) involved both literature and field research. The field review was conducted on September 11, 1996. The emphasis of the field review was on the exchange of ideas, concerns and recommendations. Being on site allowed some Team members to verify information and to identify other resources.

Once Team members had assimilated an adequate data base, they were able to analyze and interpret their findings. Individual Team members then prepared and submitted their reports to the ERT Coordinator for compilation into this final ERT report.

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Site Location

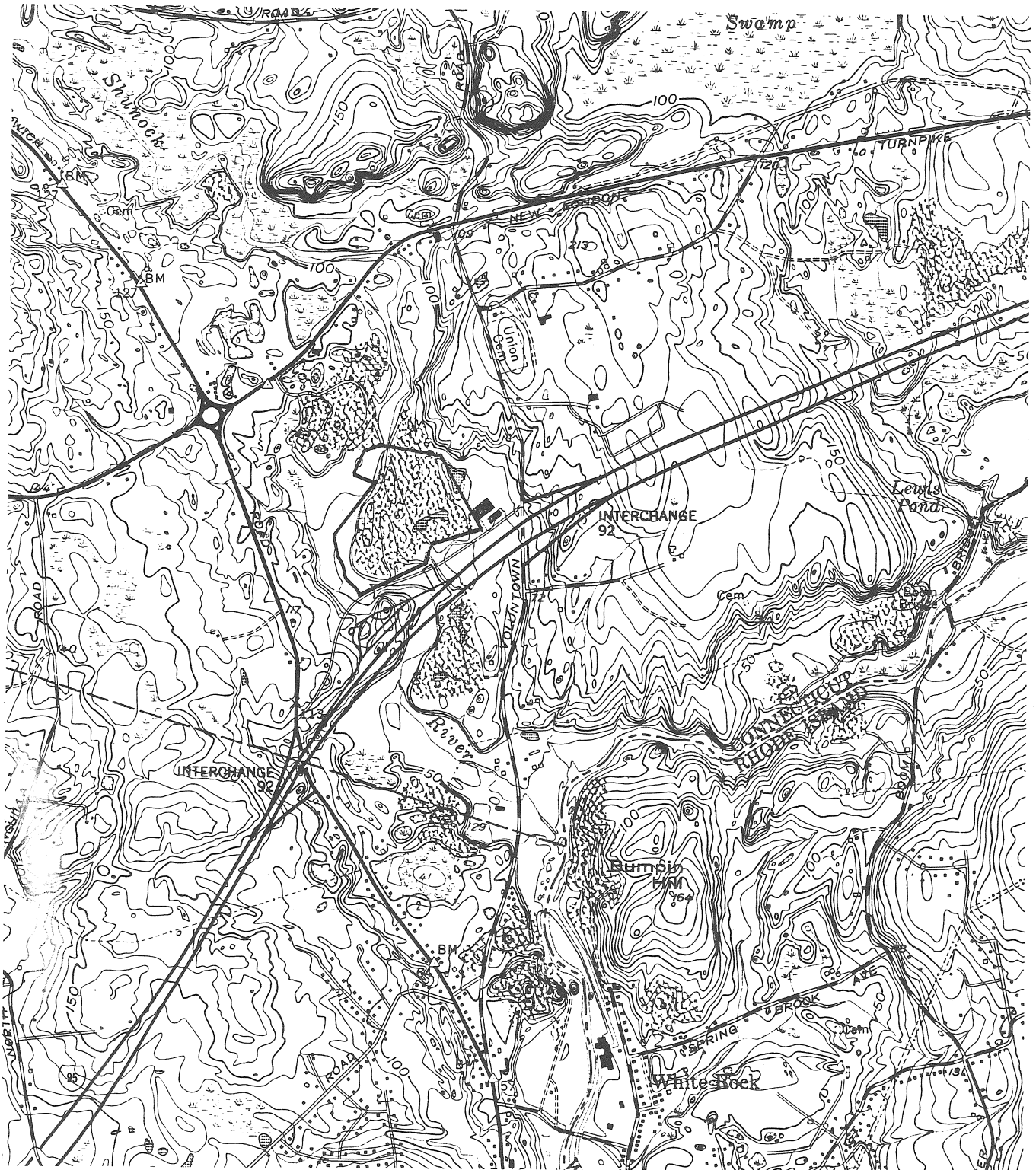
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Topographic Map

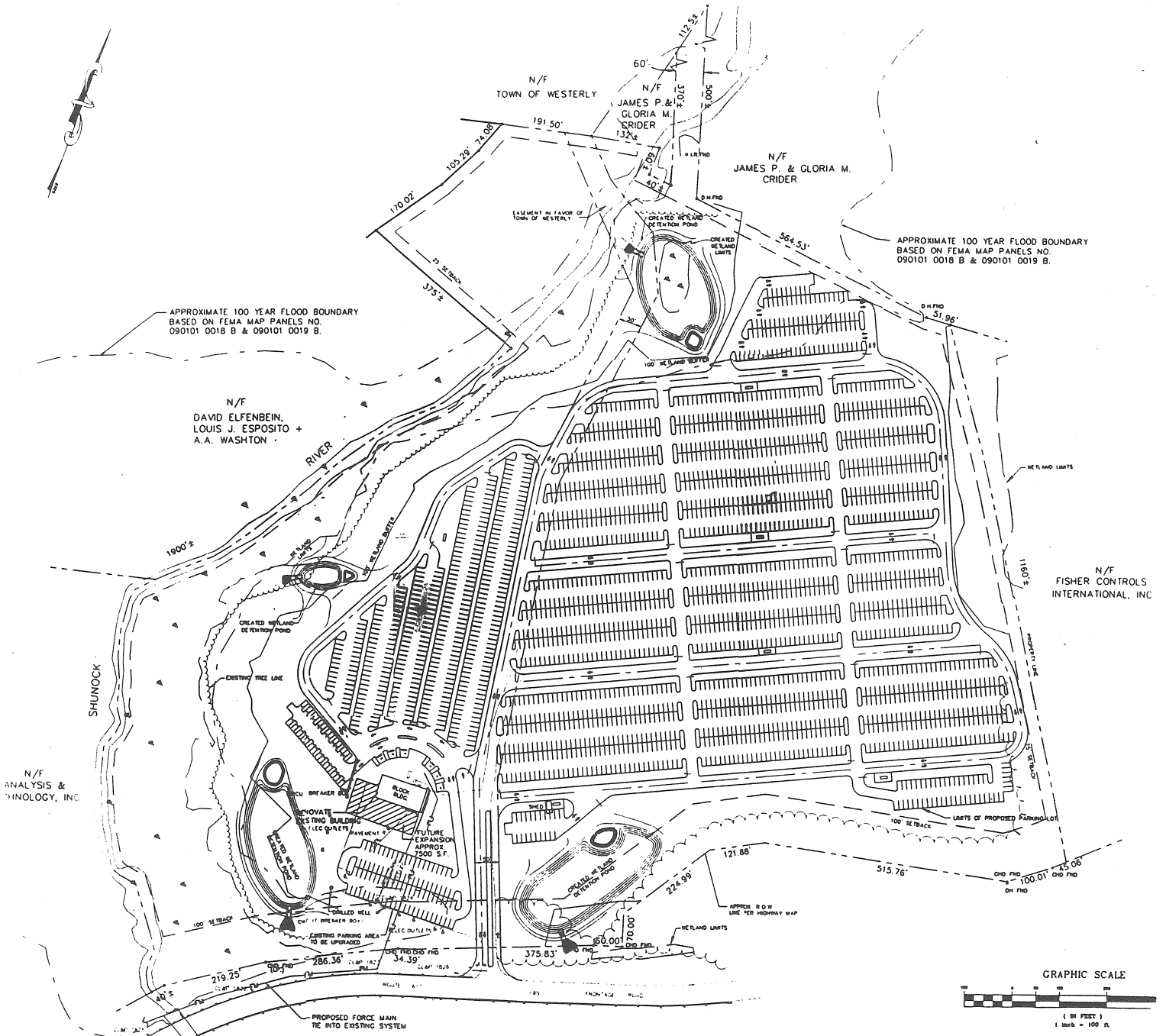
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Site Plan

No Scale



GEOLOGY

The Mashantucket Pequot Tribe has proposed to reclaim land at the site of a previous gravel removal operation on Pendleton Hill Road. Site plans presented indicate that, after reclamation, the parcel's major use will be a parking lot accommodating in excess of 2400 vehicles. The parcel is located within a larger area subject to a special land use study in 1995 by the Environmental Review Team, "Office/Research Zone, North Stonington, CT". A discussion of the geology of the broader area is presented on pp. 4-8 of that document, to which the interested reader is referred.

Prior to gravel removal operations the site was a kame terrace with an elevation 20-40 feet above the adjacent Shunock River. The terrace was formed by deposition of stratified deposits of sand and gravel from glacial melt-water streams at the end of the last Ice Age. The sand and gravel was deposited against remaining chunks of ice which later melted forming kettle holes (surface depressions as seen on topographic maps of site and adjacent area).

Mining of the sand and gravel lead to removal of hundreds of thousands of cubic yards of the material. Unfortunately, when permits were given for the operation, reclamation of the land was not a requirement. This allowed for removal of too much material, rendering the land unsuitable for further development. Excavation removed material to the depth of the seasonal high water-table and at some locations even deeper. Today the topography of the site is greatly disturbed, being generally flat, but with random piles of rocky gravel scattered about along with random depressions. The ground surface is too close to the water table and the land elevation is such that it is susceptible to major flood events.

In the opinion of this reviewer, the land has been extensively disturbed by past mining activities and as a result may have little value in its present state. Therefore, significant fill material (94,000 cubic yards) will need to be placed on the site by the applicant to

make the land usable even for a parking lot. There should have been a minimum of 3 - 4 feet of sand and gravel left above the seasonal high water table with 4 - 6 inches of topsoil when the excavation ceased. The town should strongly consider putting in place (if they do not already exist) mining regulations that include land reclamation requirements when mining activities are complete. This will avoid having land left in the condition of the applicant's property.

The site is underlain by highly permeable sands and gravels that yield large quantities of water when drilled into making it a good aquifer. An aquifer with high permeability potentially may disperse any pollutants rapidly down the hydraulic gradient, possibly adversely affecting neighboring down-gradient wells. Thus devices and procedures to protect the aquifer are warranted.

Reference: Eastern Connecticut Environmental Review Team, 1995, "Office/Research Zone, North Stonington, CT". A report prepared for North Stonington First Selectman and Economic Development Commission, February 1995, 74 p.

WETLAND RESOURCES

Included in this section are observations of the wetland resources, the impacts that the proposed activities may have on those resources and recommendations for future development of this parcel given these possible impacts.

Existing Conditions

Inland wetland resources on this property consist of the Shunock River and associated (riparian) wetlands adjacent to the river, which form the western boundary of the site, as well as a small (0.2 acre) pond located on the northern section of the parcel. Past land use of this site was primarily gravel extraction and processing, however, the site also contains a 100 by 500 foot building apparently used for vehicle maintenance and repair. The site is now inactive.

Portions of the riparian, forested wetlands associated with the Shunock River have been filled with what appears to be spoil material generated by the gravel mining activities and various construction debris. The majority of these riparian wetlands are found in the southern portion of the site with a maximum width of approximately 300 feet. The pond appears to have been used as part of a gravel processing operation.

Wetland Functional Values

Riparian wetlands hold a very high value due to their function as water quality renovators, flood control, wildlife habitat and recreation. The overall condition of the existing riparian wetlands on this site appear to be good, however, as mentioned earlier, an undetermined amount of these wetlands appear to have been filled as a result of past use of this land. The pond consists of open water habitat with negligible emergent or scrub/shrub type habitats.

Impact of Proposed Activities on Watercourses and Wetlands

The only proposed, direct wetland impact on the site is on the existing pond which will be replaced with a larger, created marsh detention system which will store and treat stormwater runoff generated from the proposed parking lot. Construction of three other created marsh detention systems will take place within 100 feet of the riparian wetland boundary and a small amount of fill will be placed within 100 feet of off-site wetlands near the eastern property boundary. In general, construction is limited to those portions of the property which were previously disturbed as part of the gravel operation, with approximately 5200 square feet (0.11 acre) of disturbance to existing riparian forests for the construction of created marsh #3. Possible indirect impacts may occur to the riparian wetland system on this site as a result of inadequate treatment of accumulated stormwater runoff, reduction of groundwater contributions resulting from the construction of impervious surfaces, downstream channel bank erosion and modification due to increased storm peak flows, as well as sedimentation resulting from improper erosion and sedimentation control during the construction phase of the project.

Comments and Recommendations

The following comments will address specific questions asked by the Town of North Stonington as part of their ERT request which are relevant to the jurisdiction of the CT DEP's Inland Water Resources Division.

What is the exact location of the 100-year flood boundary based on the "new" topography of the site? Can this type of construction occur within a 100-year flood plain? What would be the effects of the storm if the development were within the flood plain?

The methodology used by the applicant to establish a more realistic 100-year flood plain limit, given the topographic changes resulting from gravel extraction appears to be a rational one, given the data readily available to the applicant. However, it is based on 1975 flood profile data and if upstream or downstream development has occurred in the 20 years since it was established, which has significantly changed this flood profile, the derived line may not be reasonably accurate or "exact". To establish a more accurate 100-year floodplain boundary

which could be used to officially revise the FEMA Flood Insurance Study, more involved, standardized hydraulic modeling would need to be performed. Barring an "official" map revision submitted to FEMA, the existing floodway and flood fringe lines which have been transposed onto the site plan should be used to guide any local floodplain management decisions.

As stated in the 1995 ERT Special Land Use Study - Office/Research Zone report, "[D]evelopment may be allowed within the flood fringe (100-year flood plain) if designed in accordance with FEMA standards (44 CFR 60.3) and the local ordinance. Development may not, however, be allowed within the regulatory floodway unless it can be demonstrated through hydraulic and hydrologic analysis, performed in accordance with standard engineering practices, that no (0.00) increase in flood heights will occur during the base flood (100-year) discharge." According to the site plan, there are development activities proposed inside the floodway zone on the northern portions of the property. These activities include placement of fill and parking lot construction as well as the construction of a created marsh detention area. The applicant should confirm if there is any additional, proposed development taking place in the floodway.

To answer the second part of the question, North Stonington's local "flood loss reduction ordinance" should be consulted. In general, development in a floodplain may have an effect on the conveyance as well as the storage of floodwaters within that floodplain. The limited development currently proposed in the floodplain would probably not have a significant effect on the overall flooding pattern, however, it is the less quantifiable, and accumulative effects of possible future projects in the Shunock River watershed which may cause significant impacts over time.

The development is designed for a 25-year storm. Is this adequate? What will occur during a 50- or 100-year storm?

Yes, the 25-year design storm is sufficient for this type of development. During the 50- or 100-year storms the stormwater management system would be over-burdened and temporary flooding of the parking lot would occur. The created marsh detention ponds would reach maximum storage and begin to overflow through the weir structure. It is not clear, however, at what point the entire outflow structure would be crested and water would begin to flow over the surrounding embankment, risking a "blow out" of earthen fill material. There appears to be

no emergency spillway planned for these ponds which would act to prevent this from happening.

Will the “created wetlands” technology proposed by the applicant adequately protect the ground and surface waters from all the potential contaminants of the parking lot? Has the ability of this technology to sufficiently treat parking lot stormwater been proven?

Wet detention ponds have been proven to be one of the most effective Best Management Practices (BMP's) when evaluated for pollutant removal and when the additional sediment and removal capabilities of properly maintained catch basins and grit/oil separators are added to the stormwater system, as proposed here, the overall pollutant removal percentages are significant (see Stormwater Management section for pollutant removal percentages).

Besides the previously mentioned absence of an emergency spillway the proposed basins appear to incorporate normal design guidelines including adequate storage volume, water residence time, sediment forebays, distance from inlet to outlet (increased through the use of internal baffles), depth, dimension and vegetation. If properly maintained, the proposed basins and additional “on-line” stormwater treatment practices should be effective in removing most of the common pollutants expected from a development such as this.

What are the impacts of parking lot run-off, vehicle emissions, and other parking lot-associated activities on nearby vegetation, fish and wildlife? Will there be “warming effect” impacts on the Shunock River or other surface waters?

Most of the common pollutants which might be associated with the parking lot operations were listed above as part of the previous question. Their effect on wildlife and vegetation ranges from stunted growth and reproduction to mortality depending on how concentrated they become in the environment. At high concentrations, stormwater runoff can be polluted enough to cause mortality not only in sensitive organisms, but also less-sensitive, tolerant organisms. A full discussion on this topic could easily fill a report on its own. The presence and accumulation of these “non-point” sources of pollution have been recognized by private and public environmental agencies to be our most significant water pollution issue.

The possibility of significant thermal pollution, another “non point source” pollution issue, as a result of this proposal is low here given the design of the created marsh detention systems. As stated previously these basins will be able to contain more than the first 1" of stormwater runoff,

which would contain not only most of the heavy metals, sediments and hydrocarbons, but also most of the heating would take place during the first inch of runoff. Once in the basins, this runoff would mix with the water already in the basin, supported by cool groundwater contributions and would then either infiltrate into the ground, transpire through the wetland vegetation or evaporate off the surface. (Please also refer to the Stormwater Management section.)

How will the parking lot's construction and drainage system be effected by building it at or below the intermittent water table? Is there an environmental concern about operating parking lots in areas where the water table is routinely exposed during minor storms or rainy periods?

The applicant ' s response to this question appears to be adequate and should suffice here.

Should a drainage management system Maintenance Plan be prepared? If so, what should it address? How can it be enforced?

Maintenance of the stormwater management system is addressed by the applicant with item #15 on sheet 11 of 14, however it should also include maintenance of the detention pond plunge pools, ponds and pond outlets. Obviously, the success of this stormwater management plan is dependent on the effective operation of the created wetlands. Monitoring of these wetlands by a qualified wetland scientist should occur on a regular basis for at least three and preferably five years. Corrective measures that may be necessary to restore these wetlands to their intended condition and function may need to occur throughout their intended "life span." The maintenance plan can be enforced as an implicit or explicit condition of a permit issued based on this site plan. If a higher degree of enforcement is needed, the maintenance plan could be incorporated into a separate legal agreement of covenant entered into by the applicant and the Town of North Stonington. (Please also refer to the Stormwater Management section.)

Should the riparian zone be wider than shown on the site plan? Will the Russian olive that is currently growing within the proposed buffer area provide an adequate riparian zone?

Recommended riparian zone or corridor widths vary according to the purposes designated for that corridor. It has been shown that for most water quality issues a corridor 100 feet wide is sufficient. For the purpose of wildlife movement, a 200 foot corridor is more effective. According to the site plans, all parking lot construction is kept 100 feet from the wetland boundary and for

at least half the site, 200 feet from the Shunock River. The proposed basins will fall within the 100 foot buffer zone, however they could be viewed as habitat enhancement, not development per se, due to their created marsh habitats.

If public river access is to be encouraged at this location, it is often beneficial to formally document this agreement within a legal easement document.

Yes, Russian olive that exists at this site will be more than successful in providing an adequate riparian zone. This plant is very hardy and provides good food and cover for wildlife. This plant had been recommended planting for this purpose, until it was discovered that it was an "exotic invasive", that is, a plant introduced from a foreign country that has no natural check or balance in this country and spreads quickly without much control.

Will the Soil Erosion and Sediment Control Plan that the applicant proposes provide adequate environmental protection during all construction?

Given the relatively flat topography of this site, erosion and sedimentation control should not be that much of a challenge. If the construction sequence as proposed is adhered to, this should act to limit off-site erosion impacts. It is important that the sides, bottom and outlets of the detention basins are stabilized prior to bringing them "on-line ." The applicant proposes to surround the entire property with silt fence. This is not necessary. Sediment barriers of this type are meant to be placed at the bottom of or on disturbed slopes. For at least half the site, silt fence is proposed at the bottom of short, steep hills sloping into the subject property on the perimeter of the site that are not proposed to be disturbed. Unless the applicant is anticipating runoff from disturbed sites off the property, these fences would not be serving their intended purpose. (Please also refer to the Stormwater Management section.)

Finally, as stated previously, if properly constructed and maintained, the BMP's proposed by the applicant should maintain the function and value of nearby water resources. However, simply said, the most effective way to reduce the level of stormwater pollutants would be to reduce the size of the facility generating those pollutants. Nowhere in the record reviewed was there a clear "statement of need" for this relatively large area of impervious surface (25 acres) proposed for employee parking (2,450 spaces) . The permit decision makers would be better

informed of the basic need for this project by being supplied with a detailed analysis supporting the proposed scope of this project.

STORMWATER MANAGEMENT

Will the "created wetlands" technology proposed by the applicant adequately protect the ground and surface waters from all the potential contaminants of the parking lot? Has the ability of this technology to sufficiently treat parking lot stormwater been proven? If so, will the design of the stormwater management system shown on the plan adequately implement and achieve the objectives of this technology?

The use of created wetlands in the treatment of stormwater runoff pollution is still a developing technology. Every site presents different physical, hydrologic, and environmental variables which must be taken into account in designing such a system. However, research over the past 15 years has shown that proper design and construction of wetlands for stormwater treatment yields significant removal of typical pollutants found in urban and, in this case, parking lot runoff. The created wetlands areas for the proposed site total approximately 1 1/2 acres to treat runoff from approximately 25 acres of parking. The wetland-to-drainage -area ratio is therefore about 6%. Previous study indicates that the ratio of wetlands to drainage area should be at least 2% for optimum effectiveness.¹ The wetlands are designed to retain at least the first inch of runoff from the parking lot and more during dry periods. Removal efficiencies of typical parking runoff pollutants for this degree of retention can be expected to be in the following ranges²:

- Suspended Solids 90%
- Organics (BOD, COD) 80%
- Total N and Total P 55-70%
- Heavy Metals 85-90%
- Bacteria 90%

Since the proposed basins are lined with low permeability soils, the risk of groundwater contamination should be negligible. Also, the use of calcium manganese acetate (CMA) for winter deicing will minimize the potential for salt contamination of surface and groundwater. CMA is considered to be a safer alternative to deicing than salt, though studies on groundwater effects are limited.

¹ Woodward-Clyde Consultants for Terrene Institute. 1992. The Use of Wetlands for Controlling Stormwater Pollution.

² Woodward-Clyde Consultants for Region V, USEPA. 1990. Urban Targeting and BMP Selection.

Is the stormwater drainage system, particularly the oil-separators, pipes, sediment basins and "created wetlands" sized large enough to treat the runoff during storms and prevent downstream flooding?

The treatment adequacy has been addressed in the response to the question above. The stormwater system, including structures, sediment basins and created wetlands, has been designed to properly detain the runoff from a 25-year storm with no peak increase in flows leaving the site. In addition, the created wetlands areas have been designed to completely *retain* the first 1 to 2 inches of runoff with no release at all, providing excellent long-term treatment capabilities.

What are the impacts of parking lot runoff, vehicle emissions, and other parking lot-associated activities on nearby vegetation, fish and wildlife? Will there be "warming effect" impacts on the Shunock River or other surface waters?

The pollutants in parking lot runoff consist primarily of oil and grease, heavy metals (copper, lead, zinc), salt (in winter) and sediment (from winter sanding). Heavy metals can be toxic to fish and other aquatic organisms at fairly low concentrations and can have long-term chronic effects on wildlife. Salt, in typical runoff concentrations, is less deleterious to aquatic life and dissipates quickly in surface waters. It can, however, be damaging to perimeter vegetation where snow plowing accumulations are piled. Sediments from winter sanding are particularly problematic to aquatic life and surface vegetation. The material can cover and destroy aquatic and surface vegetation which serve as a food source for fish and wildlife. Sediments also tend to contain other pollutants such as heavy metals and oil and grease which are leached from material over time. The proposed parking lot stormwater system is designed to negate or minimize these potential effects.

Warming effects on the Shunock River are obviously only a concern in the summer months. The "first flush" (approximately 1/2") of runoff will have elevated temperatures from hot pavement on a summer day after which the pavement has been cooled by the rainfall. During this time of year, the created wetlands are designed to hold approximately 2 inches of rainfall. This amount of rainfall not only exceeds the "first flush" but is exceeded for only about 10% of all storms in Connecticut. Thermal impacts should, therefore, be limited. (Also please refer to the Fisheries Resources section of this report.)

... What other testing should be conducted on the site such as testing the materials removed from the oil-water separators, monitoring of the water in the detention basins and "created wetlands", and monitoring surface waters on and off-site such as the Shunock River?

Materials removed from the oil-water/grit separators and sedimentation basins should be tested before disposal to be sure they contain no hazardous substances. The Tribe currently conducts inflow and outflow monitoring of the "Lot 10" stormwater renovation wetland. An extension of that monitoring program to this proposed lot would be beneficial in expanding our knowledge of the effectiveness of these systems. If such a monitoring program is developed, monitoring of adjacent surface waters would be a logical extension of this program. (Please also refer to the Fisheries Resources section of this report.)

Should a drainage management system Maintenance Plan be prepared? If so, what should it address? How can it be enforced?

There should definitely be a maintenance plan for this proposed drainage system. The plan should address system structural integrity, sediment in catch basin sumps, sediment in the sedimentation basins and created wetlands, oil and sediment in the oil-water/grit separators, seasonal sweeping of the parking lot after snow-melt and leaf-fall, illicit discharges, off-site observation for potential impacts and a general inspection program of the entire site and system. Enforcement could consist of regular reports to an on-site "stormwater management director" who is responsible for reporting to the town. Town personnel can also conduct periodic inspection of the site and report records. If necessary, DEP personnel can be called in for consultation or enforcement. Potential grounds for enforcement could include state statute 22a-430 which specifies that no pollutants may be discharged to waters of the state.

How should the materials that are removed from the oil-water separators and sediment basins be disposed? The applicant claims that materials from existing parking lots are currently deposited in local landfills.

These sediments are routinely used as cover material at landfills and also as material for base or pavement mixtures for road and parking lot construction. As stated previously, they should first be tested for hazardous materials that would require more stringent disposal standards.

Will the Soil Erosion and Sediment Control Plan that the applicant proposes provide adequate environmental protection during all construction?

The measures outlined in the proposed erosion and sediment control plan (E&S plan) appear to be adequate except that the location and protection measures for temporary soil stockpile areas are not shown. Drainage outfalls should also be protected with a double row of silt fence. Any E&S plan is only as good as its installation and maintenance. These should be monitored carefully by on-site personnel as well as town and state inspectors. Changes that are inevitable in any construction project must also take the E&S plan into account. The project will be covered under the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities and must also comply with the requirements of that permit. Town and DEP personnel may make inspections and require changes at any time to keep the site in compliance with town and state regulations.

WATER MANAGEMENT - PLANNING & STANDARDS REVIEW

Should the applicant be required to install a "geomembrane liner" beneath all development that occurs over the aquifer or that is close to the water table?

It wouldn't seem reasonable to require this. The site drainage system serves to collect runoff through a closed system and the forbay settling basins will be lined as extra protection against accidental releases. Liners are usually used to collect leachate from specific waste sources, reduce infiltration through the waste, or provide secondary containment for other release points such as underground fuel/chemical tanks.

Will the groundwater monitoring program as proposed by the applicant be truly beneficial? Should monitoring wells be installed around the property, both upstream and downstream in the aquifer? What tests should be conducted and when? What other testing should be conducted on the site?

The proposed groundwater monitoring program would exceed requirements that the DEP - Bureau of Water Management are currently drafting for the State Aquifer Protection Area Program. Under this program DEP would not typically require strategic monitoring for this type of use. However, review of the program indicates the parameters seem reasonable, and DEP would recommend that if it is done the following be considered: groundwater elevations be taken with each test; initial monitoring be done quarterly the first year to establish a baseline; and a well should be located strategically between the northern most basin and the proposed Westerly, RI wellfield.

An old tailings pond exists in the northern area and appears to be regraded as part of basin #4. If sediment in this pond is to be disturbed or reused, it should be tested first, if this has not already been done. Problems would not be expected from the natural geologic materials mined here but processing could have generated pollutants. Material should be tested for EPA TCLP and RCRA 8 Metals. Although the ERT members have not seen the Phase II Environmental Site Investigation report the

following site areas may require additional testing or investigation during construction: soil in the open floor pit in the vehicle repair building; and a 4' PVC drainage pipe about 50' west of the building.

How is the zone of influence of the proposed Westerly wellfield defined and what effect does this proposal have on it?

The zone of influence (ZOI) is the area in which the aquifer water table is lowered by a withdrawal (well). The area of contribution (AOC) is the ZOI portion that is diverted to the well. The best estimate of the areas of contribution and recharge area for the Westerly wellfield were included on figure 10 and discussed on pages 19-24 in the 1995 ERT report (Special Land Use Study - Office/Research Zone) for the area. This was based on the best available information on the proposed wellfield and no new information is available now. It was conservatively (on the larger side) estimated from the limited information. As can be seen from that figure, the northern portion of the site may be within the AOC and the rest in the recharge area. The AOC and recharge areas make up a State Aquifer Protection Area (which is really a wellhead protection area). If this was a State Aquifer Protection Area (which it may become if the well is developed) the proposal would be an allowed use and would meet the current Best Management Standards in the draft state land use regulations .

Will the uses proposed for the site be permitted to use individual septic systems or must they connect to a sewer service system?

An on-site septic system for this type of use (only domestic sewage) and volume (< 5,000 gallons per day) is regulated under the state health code, and in this case administered by the local sanitarian. Although no detailed design plans were reviewed, soil test information of the area and separation requirements seem to be met except that the system must be kept 25' from a water drain constructed of tight pipe or 50' from an open pipe. Catch basin #6 or a section of the system pipe should easily be able to be relocated for this.

FISHERIES RESOURCES

Fish Population

The Shunock River, a vital tributary of the Pawcatuck River, supports a coldwater fishery of significant recreational value. It is annually stocked by the DEP Fisheries Division with over 2,100 adult brook, brown, and rainbow trout at various locations in North Stonington. The river was last sampled adjacent to the Romanella Property on June 15, 1993. In addition to stocked trout, the survey documented the presence of a wild (naturally reproducing) population of brown trout and a native brook trout population as well as a diverse mixture of resident finfish. Most dominant species were tessellated darter, American eel, white sucker, common shiner, and longnose dace. Less common species included fallfish, brown bullhead, bluegill, redbreast sunfish, pumpkinseed, chain pickerel, grass pickerel, yellow perch, and golden shiner.

The river also supports anadromous fish species. Anadromous fish runs of alewives, blueback herring, and sea-run brown trout can be expected. Anadromous fish passage to upper sections of the Shunock River Watershed is currently prevented by the presence of three (3) small impoundment dams in the village of North Stonington.

Impacts

The applicant has made a concerted effort to minimize impacts to aquatic resources. A 100 foot riparian buffer zone is planned adjacent to the Shunock River which is in compliance with North Stonington inland wetland regulations and consistent with DEP Fisheries Division Policy. A primary fisheries resource concern with the construction of a large, impervious surface parking lot are possible stormwater runoff impacts to the Shunock River. Stormwater drainage from the site will eventually be conveyed to the river via four (4) marsh detention basins. Created marshes will contain wetland plants to assist with water quality renovation. Each basin is designed to contain the 25 year storm event. Stormwaters that outlet from each basin will sheetflow over land and into riparian wetlands before being conveyed into the Shunock River.

Temperature loading to the Shunock River does not appear to be a serious concern with this development since stormwater runoff during the summer will be contained within the basins and not allowed to enter the river. Albeit events greater than the 25 year storm will spill out of the basin, over land flow into riparian wetlands will help abate any temperature increases to surface waters of the Shunock River.

The proposed use of the site by the City of Westerly, RI as an active site for withdrawal and diversion of groundwaters is an impact of most concern to the Fisheries Division. Depletion of stream flow in the Shunock River due to this proposed diversion could result in a "significant" reduction in the quantity and quality of instream habitat throughout the entire summer-early fall base flow period. These concerns were addressed in the ERT Special Land Use Study report completed for the town in 1995.

Recommendations

The following recommendations are provided which would improve onsite resources and recreational utilization of the property.

- 1.** The proposed water quality monitoring plan directly targets the monitoring of groundwaters but does not address surface water quality. Periodic surface water quality grabs are recommended in the Shunock River at a station down gradient of the lowermost stormwater basin. Some baseline data should be collected before construction. This will provide the applicant with not only some baseline water quality information but enhance the ability to make pre and post construction comparisons.
- 2.** The applicant should consider the development of a hiking trail along the Shunock River to encourage access for hikers and anglers. Since the property has been disturbed due to previous utilization, vegetation that recolonized the riparian zone is very dense, inhibiting access to the river. A trail can be constructed which would minimize impacts to existing riparian area vegetation and not create any soil erosion. A small designated parking lot would have to be created to control public access to the trails.

3. The culvert which conveys the Shunock River underneath the unimproved road crossing presents a partial barrier to upstream movement for resident and anadromous fishes. To enhance fish passage and improve the fishery in this section of the stream, the applicant should consider some infrastructure modifications. The preferred and least costly alternative is to totally remove the culvert. If this is not a viable alternative, then culvert removal and replacement with a timber bridge should be considered. The installation of box culverts is the least preferred alternative. Stream gradient and steep side slopes would require the installation of very long culverts accompanied by excessive fills.

4. There are several opportunities to enhance instream fish habitat within the Shunock River in this area. One improvement technique would involve the installation of small boulders. The primary goal of boulder placement is to provide overhead cover and velocity refuges for fish as well as provide added depth through scouring. Boulders would not have to be purchased since a supply already exists within the property being discarded from the mining operation. The installation process could be a cooperative arrangement between the DEP Fisheries Division and environmental conservation groups such as Trout Unlimited.

TRAFFIC REVIEW

These comments pertain to the "traffic Impact Report" prepared by F. A. Hesketh & Associates, Inc.

- ConnDot Traffic Forecasting Office has noted the following comments regarding traffic counts east of Route 2 and S.R. 617 eastbound. The report shows 475 vehicles on S.R. 617 on Friday summertime between 4 and 5 P.M. (page 14 of the report). The ConnDot has actual 1996 counts of 187 in the same area. How did the consultant arrive at this number? Although the traffic diagram on page 14 of the report indicates a projection estimate for 1997, it still exceeds the approximate annual increase of 2%.
- This report does not appear to be addressing customer traffic in the project area, only employees. The new parking lot on S.R. 617 will probably relieve employee traffic on Route 2, however, with the evacuation of most of the employees from Lot 10, these spaces will now likely be utilized by customers. Taking into account that the average customer turnaround is between 4 and 5 hours, compared with an 8 hour employee shift change, customer traffic generated by Lot 10 will actually increase.

PLANNING REVIEW

Will the proposed landscaping be adequate to protect the appearance of "rural character" as required by the Plan of Development? Will the vehicles be visible from off-site? What portions of the lot will be visible from off-site and what locations will they be visible from?

The proposed reuse development is located in an industrial zone on the northerly side of Route 617. Route 617 is a frontage road to I-95 which is located immediately to the south of Route 617. Route 617 connects the easterly end of Exit 92 at Route 49 (Pendleton Hill Road) to the westerly end of Exit 92 at Route 2 (Norwich-Westerly Road). The industrial use Fisher Controls is located east of the site at the intersection of Routes 617 and 49, and Analysis and Technology, Inc. is located west of the site on the easterly side of Route 2, north of the intersection with Route 617. On a land use basis the proposed reuse development is compatible with surrounding land uses.

The proposed reuse should not be visible from Routes 2, 49 and 184 because of its location and surrounding vegetation both on and off site. The existing on-site perimeter vegetation is indicated as remaining undisturbed, with numerous deciduous trees to be added along the perimeter. Even though there is some existing deciduous and coniferous vegetation along Route 617, site development would most likely make this southern portion visible from Route 617. According to the site plan (sheets 6 & 7) and the MPTN narrative of 9/ 11 /96, a privet hedge will be planted on the easterly side of the Route 617 entrance and a landscaped berm and white pines are proposed west of the entrance. In addition, the entire frontage of the site is proposed for a planting of white pines. In terms of the lot interior, numerous deciduous trees and shrubs are scheduled for planting in landscaped islands. This plan should provide for adequate screening of the proposed reuse of the property.

ABOUT THE TEAM

The Eastern Connecticut Environmental Review Team (ERT) is a group of professionals in environmental fields drawn together from a variety of federal, state and regional agencies. Specialists on the Team include geologists, biologists, foresters, soil specialists, engineers and planners. The ERT operates with state funding under the supervision of the Eastern Connecticut Resource Conservation and Development (RC&D) Area — an 86 town region.

**The services of the Team are available as a public service
at no cost to Connecticut towns.**

PURPOSE OF THE TEAM

The Environmental Review Team is available to help towns and developers in the review of sites proposed for major land use activities. To date, the ERT has been involved in reviewing a wide range of projects including subdivisions, landfills, commercial and industrial developments, sand and gravel excavations, elderly housing, recreation/open space projects, watershed studies and resource inventories.

Reviews are conducted in the interest of providing information and analysis that will assist towns and developers in environmentally sound decision-making. This is done through identifying the natural resource base of the project site and highlighting opportunities and limitations for the proposed land use.

REQUESTING A REVIEW

Environmental reviews may be requested by the chief elected official of a municipality or the chairman of town commissions such as planning and zoning, conservation, inland wetlands, parks and recreation or economic development. Requests should be directed to the chairman of your local Soil and Water Conservation District and the ERT Coordinator. A request form should be completely filled out and should include the required materials. When this request is approved by the local Soil and Water Conservation District and the Eastern Connecticut RC&D Executive Council, the Team will undertake the review on a priority basis.

For additional information and request forms regarding the Environmental Review Team please contact the ERT Coordinator: 860-345-3977, Eastern Connecticut RC&D Area, P.O. Box 70, Haddam, Connecticut 06438.