KINGSTON BUSINESS PARK

Kingston Local Development Corporation

T.R. Gallo, President

City of Kingston, New York

FINAL

GENERIC

ENVIRONMENTAL IMPACT STATEMENT

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Prepared by:

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CONSULTANTS PARTICIPATING IN THE PREPARATION OF THIS FINAL ENVIRONMENTAL IMPACT STATEMENT

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GEODESIGN, INC. 984 Southford Road Middlebury, CT 06762	Geology and Blasting
CREATIVE VISUALS, INC. Woodstock, NY	Visual Simulation

I. INTRODUCTION

A Draft Environmental Impact Statement (DGEIS) regarding the proposed Kingston Business Park was accepted by the lead agency, the Kingston City Planning Board, on November 9, 1995. The DGEIS and all exhibits thereto are incorporated by reference, into this Final Generic Environmental Impact Statement (FGEIS) as revised and/or supplemented hereby.

A public hearing on the DGEIS was conducted by the Kingston City Planning Board on November 30, 1995, at which time all persons wishing to submit oral comments were given an opportunity to do so. The period during which written comments were received extended to December 18, 1995.

This FGEIS has been prepared to address all comments submitted at the public hearing and in written form. The FGEIS also includes additional data developed during the preparation of the responses including revisions to the proposed action to mitigate potential impacts identified by commenters.

II. COMMENTS RECEIVED

A. Written Comments

Written comments were received from the following persons during the comment period. The complete text of each comment is included in Exhibit A.

1. Public Agencies/Officials

Ulster County Planning Board

Suzanne Cahill, Kingston City Planner

Robert Schrowang, Planning Aide

Donna K. Hintz, Asst. Corporation Counsel

Judith Hansen, Supt. Kingston Water Department

Kingston Urban Cultural Park Commission

2. Other Agencies/Individuals

Jeffrey Anzevino, Scenic Hudson

Susan G. Murphy, Broadway East Community Builders

Pat Vaselewski

Richard J. Schoonmaker

Nancie Secreto- Schoonmaker

B. J. Schoonmaker

Lance A. Woodworth

Josephine Schoonmaker

Eugene F. Nagele

Paul A. Rubin and John J. Privitera on behalf of Mark and Herman Karl Knaust

B. Comments at Public Hearing

A complete transcript of the public hearing held on November 30, 1995 is included in Exhibit B.

III. RESPONSES TO COMMENTS -- WRITTEN AND PUBLIC HEARING

This section is organized to correspond with the outline of Section III of the DGEIS, "Environmental Setting, Anticipated Impacts and Mitigation Measures." Similar comments are grouped under each heading and summarized and individual commenters identified (the outline reference is noted in the margin of each comment and the public hearing transcript); the response to the comment is then provided. Comments which relate to site plan approval, zoning or legal issues, rather than environmental issues, are noted SP, Z or L and do not require a response here. The only departure from this format relates to comments on behalf of Mark and Herman Karl Knaust by Paul A. Rubin and John J. Privitera. These lengthy technical comments require equally detailed responses which are provided in Part IV hereof.

A. GEOLOGY

1. Bedrock/Blasting

a. How will blasting procedures be implemented?
(Suzanne Cahill, City Planner; Pat Vaselewski)

Response: Procedures to be followed during blasting and site preparation are set forth in the Site Work Specifications (see Exhibit E).

b. **What are final results of geotechnical analysis and is there a need for further testing of Phase 2 area?**
(Robert Schrowang, Planning Aide)

Response: The final results of the geotechnical analysis are included in Exhibit C. Further testing of the Phase 2 area may be required for detailed site design and construction purposes. This testing is not necessary for environmental review purposes. Site geology and soil conditions are reasonably consistent throughout the upper plateaus of the property (where development is proposed).

c. **How will rock cut be limited to 4 vertical:1 horizontal?**
(Robert Schrowang, Planning Aide)

Response: Rock cuts will be limited generally to 4 vertical: 1 horizontal through standard blasting specifications and techniques used for highway construction. See Site Work Specifications (Exhibit E) related to excavations.

d. **The presence of "maturely karstified carbonate aquifer will affect nearby caves."**
(Paul A. Rubin)

Response: Detailed reports by the applicant's geological experts indicate that the site does not exhibit any evidence of karst. See Part IV and Exhibit C.

2. **Erosion Control**

a. **More erosion control devices are needed and erosion control measures should be indicated in the Phase 2 area.**
(Suzanne Cahill, City Planner; Pat Vaselewski)

Response: A final erosion and sedimentation control plan is required and will be developed for each stage of construction. These are prepared for specific construction activities and are part of a General Permit requirement of the NYSDEC. The site plan for the Huck site includes detailed erosion control and sediment control measures. The Phase II area, in particular, will have a comprehensive plan in place as specific development plans for this area evolve. This portion of the site development plan is currently generic.

Specific erosion control measures for Phase II development are premature at this point. However, the need for and requirement to provide detailed erosion control measures for this area during the specific design and review period is acknowledged.

3. Topography and Slopes

a. **Site disturbance is too close to the steep slope on the western edge of the site.**

(Suzanne Cahill, City Planner)

Response: In order to ensure that an undisturbed buffer will be maintained above the steep slopes, the concept plan has been modified to reduce the size of the westernmost building and to move it approximately 75 feet from the edge of the steep slope (see Map No. 1, Revised Concept Plan). The park buffer area established by the Performance and Development Standards has been redefined (see Map No. 3) to reflect on-site topographic features and will have a minimum width of 125 feet behind the westernmost building, 50 feet of which is on top of the plateau. As shown on Map No. 3, a substantial area beyond the required buffer will also be undisturbed. Impacts from erosion will be further reduced since the ground above the slope will be undisturbed. Visual impacts will be further mitigated since it will now be possible to maintain a natural, vegetated barrier between the westernmost building and the steep slope.

b. **How will excess excavation and rock removal from road construction be disposed?**

(Suzanne Cahill, City Planner; Robert Schrowang, Planning aide)

Response: Site grading results in an almost equal balance between cut and fill. Any small amount of excess material will be utilized on the project site for road and parking lot base and stormwater filtration media.

B. WATER RESOURCES

1. Groundwater

a. **Water in underground mines will be contaminated by site drainage.**
(Paul A. Rubin)

Response: This comment assumes that the geology of the site is maturely karstified. As discussed extensively in Part IV and Exhibit C, this assumption is not valid and site drainage will not enter the underground mines owned by Knaust.

2. Surface Drainage

a. **A 25 year storm analysis is necessary.**
(Dennis Doyle, UCPB; Donna K. Hintz, Asst. Corp. Counsel, Bob Senor)

Response: A 25 year stormwater model is not required to identify peak flow impacts in the SEQRA process, as the stormwater retention capabilities of the existing on-site mines

will reduce off-site flow to below pre-development conditions for all stormwater events. The peak flow conditions for the 10 year event are very close to those of a 25 year event, as there is only a 0.25 inch differential in the peak hour of rainfall. The stormwater analysis identifies significant peak flow rate reductions for the 10 year event. The Modified Stormwater Report includes the 25 year event and also indicates a peak flow rate reduction for the post-development conditions (see Exhibit F).

b. **What will be the effect on perennial streambeds, if any?** (Donna Hintz, Asst. Corp. Counsel)

Response: There are no perennial streams on the site.

c. **What will be the effect of chemicals in run-off water?** (Pat Vaselewski)

Response: The Modified Stormwater Management Report Exhibit F, contains detailed procedures and specifications for control of any pollutants which may occur in stormwater run-off.

C. ECOLOGY AND WETLANDS

1. On-site Flora and Fauna

a. **Certain wildlife species on site will be adversely affected.**

(Pat Vaselewski, Arlene McCandlish, Bob Senor, Charles Van Wagenen; Robert Porter)

Response: As noted in the DGEIS, some disturbance of wildlife habitat on the site is unavoidable. However, the nature of the wildlife population and the measures taken to limit disturbance will minimize adverse effects to the maximum extent practicable.

No endangered or threatened species have been identified on the site. Over 54 acres of the 107 acre site will remain in an undisturbed state capable of supporting a wildlife population. Much of this undisturbed area will be in the form of a continuous buffer around the site within which wildlife will be free to migrate. On the southern and eastern sides of the site this buffer will measure over 500 feet wide and will be a minimum of 100 feet at all locations. These buffers connect with other undisturbed areas to the north and south including Hasbrouck Park, a permanent open space.

The wildlife mentioned by commenters is common on the fringe of urban areas. For example, the pileated woodpecker (dryocupus pileatus) "has recently become adapted to civilization and has become relatively numerous even on the outskirts of large cities" (The Audobon Society Field Guide to North American Birds, Alfred A. Knopf, Inc.). Turkeys, also, have "again become fairly common in many parts of its former range." The deer population in recent years has continued to

expand; migratory birds will have access to the undisturbed majority portion of the site.

b. **How will site clearing be controlled?**
(Robert Schrowang, Planning Aide)

Response: Site clearance will take place on the basis of an approved site plan. No clearing will take place within the "non-disturbance area" illustrated on Map No. 3. In addition to inspections normally carried out by the Building Inspector's office, the KLDC will monitor all construction on a regular basis.

c. **Site roadways were constructed prematurely and illegally.**
(Arlene McCandlish)

Response: The site of the proposed development is partially underlain by man-made caverns from which limestone was excavated to manufacture cement. In order to determine if the areas of the site proposed for development of roadways or buildings were safe and to determine if the project was feasible to construct, GeoDesign, Inc., P.C., a professional geotechnical firm was retained to conduct concurrent engineering and feasibility tests and studies necessary to formulate a site development plan for the site. A primary method of analysis required subsurface investigation by test borings to determine the extent and location of the caverns.

This technique required physical access to a large portion of the site with a self-propelled drilling rig. While there was no grading or other excavation, the drilling and testing resulted in minor vegetation removal caused by movement of the rig. This minor physical alteration of the site was unavoidable and mitigated to the greatest extent practicable, and did not commit any involved agency to undertake, commence, fund or approve the action. These limited testing activities were, therefore, permitted pursuant to 6 NYCRR Part 617.3(c). See Appendix C-7 to the DGEIS.

2. **Wetlands**

a. **Location of cited wetlands should be illustrated.**
(Suzanne Cahill, City Planner; Pat Vaselewski)

Response: The only possible wetland on the site is located in the northwest corner, as shown on Map No. 3. This area is less than one quarter acre in size and has been included in the defined buffer area and will not be disturbed.

D. TRANSPORTATION

1. **Future "background" traffic and reserve capacity should be evaluated; revise Tables 3-7.**
(Dennis Doyle, UCPB; Suzanne Cahill, City Planner)

Response: No other projects which will generate additional traffic on Delaware Avenue have been proposed or approved. If such a project were proposed in the future, the review of that project would require evaluation of its impact on traffic capacity in addition to that already projected for the Kingston Business Park. Should additional background traffic result from "popularity of the waterfront" it will be associated with recreational uses such as marinas, Kingston Point Park, the Maritime Museum, etc. Such uses generate traffic during different peak hours, than an office/light industrial park (primarily week-ends), and, therefore, are not likely to add significant traffic during peak hour generation by the Business Park.

The revised procedures (1994) for traffic capacity analysis, as promulgated by the Institute of Transportation Engineers (ITE), no longer use reserve capacities as a measure of intersection level of service. It should be noted that each intersection analyzed will function at level of service B upon full project build-out. Level of service C is a normal goal to maintain and level of service D is acceptable during the peak hour.

2. **What is the status of the proposed connection to Route 32?**
(Dennis Doyle, UCPB; Robert Schrowang, Planning Aide; Bob Senor)

Response: During conceptual planning for the Kingston Business Park, various locations for road access to the site were explored as discussed on pages 69 and 70 of the DGEIS. The traffic capacity

analysis demonstrated that the proposed access road from Delaware Avenue would have more than adequate capacity to accommodate completion of Phase 2 of the Business Park, as would the adjacent street intersections. Furthermore, the access to Route 32 was determined to be very expensive due to the nature of the lands to be traversed which include wetlands and large man-made excavations from previous mining. Nevertheless, the applicant will continue to evaluate this access road based on development of the Business Park and to explore other options for alignments to connect with Route 32. Should a feasible means of providing a direct connection to Route 32 become available, it will be pursued. The City's proposed purchase of the Business Park site will include an easement to Route 32 for this purpose, if it proves feasible.

3. **The entrance road, construction access road and emergency access road should be precisely located.**

(Dennis Doyle, UCPB; Suzanne Cahill, City Planner; Robert Schrowang, Planning Aide; Bob Senor, Robert Porter, Richard Schoonmaker, Nancie-Secreto-Schoonmaker, B.J. Schoonmaker, Lance A. Woodworth, Josephine Schoonmaker, Eugene F. Nagele)

Response:

a. The main entrance road from Delaware Avenue will utilize the alternate located 200 feet west of Roseanna Street, as recommended by most commenters. This location moves the signalized intersection beyond the high point of Delaware

Avenue to eliminate possible problems associated with stopping on the up-grade in winter months. Although this route requires the expenditure of an additional $100,000 in construction costs, it is deemed to be justified by the benefits achieved.

b. Upon development of the second stage of the Business Park, an emergency access entrance will be developed from the end of Ulster Avenue via the Central Hudson right-of-way. This access will be controlled by a locked "break-away gate," available only to emergency vehicles, and will connect to the parking lot of one of the Phase 2 buildings (see Map No. 1). This emergency road will be designed and controlled so as to prevent use by unauthorized vehicles and to avoid any other traffic through the adjacent neighborhood.

c. As discussed in the DGEIS, early access to the proposed site of Huck International to initiate building construction is a critical element of the development program. The DGEIS presented a possible alternative access from the north (see page 13 and pages 70-71) which was still under consideration. At this time, in view of construction schedules and weather constraints, it appears that this option will be utilized. It will involve routing of heavy construction vehicles (primarily cement trucks) from Route 32 on the north, via Devil's Lake Road/First Avenue, to Kingston Street and Fourth Avenue to the site. It is estimated that approximately 10 to 12 round trips per day will use this

route. In order to mitigate impacts on the adjacent neighborhood, the following measures will be instituted:

(1) Only essential trips will use this route. All other trips will be required to access the site from Delaware Avenue via the access road.

(2) Use of this route will be limited to a 2-3 month period in the Spring of 1996.

(3) Use of this route will be restricted to the hours of 7:00 AM to 3:00 PM, Monday through Saturday.

(4) Traffic control measures will be instituted by the City to ensure that the routing restrictions are followed, including signage, additional crossing guards and police enforcement.

4. **Provisions should be made for public transit and pedestrian access and safety.**

(Donna K. Hintz, Asst. Corp. Counsel; Jeffrey Anzevino, Scenic Hudson)

Response: The crossing guard referred to as mitigation on page 36 of the DGEIS is a new crossing guard to be posted at the intersection of the new access road and Delaware Avenue, in addition to the crossing guard presently assigned to the intersection of Delaware Avenue and

Murray Street, despite the extremely low pedestrian traffic during school hours.

As cited in the DGEIS, none of the employees of Huck International, the first proposed site occupant, use mass transit to commute to work. The schedule of many of the employees does not coincide with hours during which mass transit is available. However, the Citibus system is intended to serve all potential generators of ridership. Therefore, a bus will be routed through the Business Park site and a bus stop will be provided. As future businesses locate in the park, the demand for and viability of additional bus routes to serve new riders will be periodically evaluated and if necessary, the bus routes will be modified accordingly.

The access road is almost one-half mile long up a continuous grade. The cost of providing a sidewalk for the occasional pedestrian who would choose to use it does not warrant the additional cost and design features which would be required/

5. **Effects on the Murray Street/Koenig Boulevard intersection should be evaluated.**

(Susan G. Murphy, B'wy East Community Builders; Bob Senor)

Response: Upon total development of the Business park (Phases 1 and 2) an additional 101 vehicles (including trucks) are projected to use Murray Street between Delaware Avenue and Koenig Boulevard during the evening peak hour. The traffic analysis assumed a "worst case

scenario" that the evening peak hour for Business Park traffic coincided with the peak hour of school traffic, between 2:15 and 3:15 PM, and that most truck traffic took place during the same period. Even under this worst case scenario, the Murray Street-Delaware Avenue intersection will function at level of service B. In reality, peak traffic generation from the Business Park is not likely to coincide with peak school traffic hours. Furthermore, truck traffic is distributed throughout the day rather than concentrated during the peak hour. Therefore, actual impacts from Business Park traffic will be less than under the worst case scenario.

Existing truck traffic volumes were observed at the Murray/Delaware intersection. From this data, the number of trucks on Murray Street, leaving or approaching Koenig Boulevard was estimated. During the weekday AM peak hour, this amounts to 4 heavy trucks, consisting of 1 tractor-trailer ("combination truck") and 3 heavy "single-unit" trucks. During the weekday evening, there were 5 trucks on Murray Street, all "single-unit."

Site generated truck traffic by Huck (based upon truck trips counted by Huck employees) is at a higher rate than standard truck generation by industrial uses. Huck generates 11 to 13 trucks throughout the day. During the peak hour, this translates into 3 additional combination trucks on Murray Street in the morning and one additional combination truck during the evening. Using a more typical rate for the remainder of the Business Park, a total of 5 additional trucks in morning peak hour and 2 in the evening are predicted at full development.

The truck traffic generated by the relocated Huck facilities and the build-out of the remainder of the Kingston Business Park will not necessarily all represent an increase in truck traffic at the Murray-Koenig intersection. There is the likelihood that some truck traffic being presently generated by Huck at their current location, may already be travelling through this intersection.

In addition, consideration must be given to the traffic characteristics of Koenig Boulevard. As a designated "state arterial highway" (pursuant to §349 of NYS Highway Law), posted as part of US Route 9W and on the primary federal aid highway system, Koenig Boulevard can be expected to carry more truck traffic than other public roads in the study area. NYSDOT data indicates that truck traffic constitutes about 6% of the total traffic volume on Koenig Boulevard. Counts taken in the late 1980's indicated an average annual daily traffic (AADT) volume of just under 14,000 vehicles. This suggests about 800 to 850 trucks per day on this road. Even if 10 percent of this figure were to represent the total number of trucks present at the Koenig-Murray intersection (80 to 85) during the peak hours, the amount of heavy trucks added to this by development of the Kingston Business Park, 3 in the morning and 1 in the evening, represents less than 4% of this possible total and is not significant.

There is likely to be additional truck traffic during construction of the access road and the first phase development. This traffic will be short term (6 - 8 months). During this period additional crossing guards and traffic control measures will be provided as necessary.

E. LAND USE

1. **The development standards should be revised and made consistent.**
(Dennis Doyle, UCPB; Suzanne Cahill, City Planner; Pat Vaselewski)

Response: The Performance and Development Standards have been revised (see Exhibit D) to provide more stringent requirements than those of the M-1 Zoning District, and to reflect the nature of the site and special site planning considerations and to eliminate any inconsistencies.

F. VISUAL RESOURCES

1. **The buffer area limits should be expanded and revised.**
(Dennis Doyle, UCPB; Suzanne Cahill, City Planner; Pat Vaselewski)

Response: The buffer zone which surrounds the Business Park has been revised and substantially expanded, as illustrated on Map No. 3. The buffer area boundary follows site features and topography and ranges in width from a minimum of 100 feet to over 600 feet. The area within the buffer zone includes a total of 41 acres, or 38% of the total 107 acre site.

2. **Vegetation removal should be minimized.**
(Jeffrey Anzevino, Scenic Hudson; Pat Vaselewski)

Response: Including the buffer zone, a total of some 54 acres (over half of the site) will remain undisturbed (see Map No. 3). Modifications to the Concept Plan (Map No. 1) will preserve a vegetative border on the western edge of the site and along most of the eastern edge as well. In addition, every effort will be made during site planning to preserve existing vegetation within development sites. These modifications and site planning techniques will minimize the creation of unnatural "notches" along the ridge line, as viewed from the Hudson River to the east and existing neighborhoods from the west.

3. **Visual simulation assumptions and policies should be stated.** (Dennis Doyle, UCPB)

Response: The visual simulations were based on the buildings in Phase 1 only, the two southernmost buildings on the original Concept Plan. A building height of 24 feet was utilized with a first floor elevation at 265 feet above sea level. Thus maximum building height was at an elevation of approximately 290 feet above sea level. A "worst case scenario" was considered which removed all existing vegetation to the east and west edges of the plateau adjacent to these two buildings.

The KLDC and the Planning Board will adhere to the following policies regarding potential visual impacts for development in Phase 2 or modifications, if any, to site plans in Phase 1:

(a) A visual simulation will be prepared for any proposed building whose maximum height exceeds an elevation of 300 feet above sea level.

(b) Site planning and review will seek to preserve existing trees, particularly those with a diameter of 12 inches or more, along the outside perimeter of development sites to provide site screening as seen from off-site view points to the maximum extent practicable.

(c) Where it is impossible to preserve major trees on the site perimeter, landscaping plans will emphasize trees that have characteristics of both rapid growth and large size and are planted in a way that simulates naturally occurring vegetation.

4. **Impact of light fixtures should be evaluated.**
(Robert Schrowang, Planning Aide)

Response: Lighting standards have been reconsidered during site plan revisions, particularly with regard to the effect of reduced light heights on the number of lights required. The original Performance and Development Standards called for 20 foot maximum height. This would require 50% more light standards than at a more typical 28 foot height, at a significant increase in cost. In view of the increased buffer area, a 28 foot height is considered acceptable if shielded to prevent direct view of the light source. Street lights along the access

road will be at the minimum height recommended by Central Hudson Gas & Electric Co. -- 30 feet.

G. DEMOGRAPHICS

None.

H. COMMUNITY SERVICES

1. Water Supply

a. Revise description of water supply system to reflect actual conditions.

(Judith Hansen, Water Supt.)

Response: The comments of the Water Superintendent are hereby accepted and incorporated into this FGEIS as submitted.

b. The location and design of the pump station should be clarified.

(Suzanne Cahill, City Planner; Bob Senor)

Response: The pump station will be housed in a 20 x 20 foot structure, 10 feet high. It will be located on the south side of the access road, at approximately Station Point 2+00, in the rock cut which will screen it from Delaware Avenue.

2. Recreation Services

a. Public access to the site and hiking trails should be provided. (Dennis Doyle, UCPB; Jeff Anzevino, Scenic Hudson; Charles Van Wagenen)

Response: Although the Business Park site offers scenic vistas of the Hudson River and its surroundings, a number of factors suggest that complete and unobstructed public access to the site in conjunction with a greenway system would present some serious problems. The site itself and the extensive lands to the north include the remnants of former extensive mining activities. Steep rock cuts, flood quarries (on the site to the north), man-made mines and tunnels all pose public safety hazards unless protective measure such as fences or barriers are provided. These conditions are most prevalent in the undisturbed buffer areas which would be the logical location for a trail system. It should also be noted that Hasbrouck Park, immediately to the south, provides many of the same features as the Business Park site and is already available and accessible to the public. A more logical trail route might continue from Hasbrouck Park along Delaware Avenue to the waterfront at Kingston Point which has recreation facilities. A continued route to the north could then utilize North Street, an abandoned City Street that extends along the river to East Kingston. Nevertheless, the design of the Business Park will consider incorporating walkways within the developed portions

of the site, wherever possible, to provide passive recreation opportunities for workers and visitors.

3. **Energy Supply**

a. **Provide gas service to site.**
(Dennis Doyle, UCPB)

Response: Gas service will be provided to the Business Park.

4. **Other Services**

None.

I. AIR RESOURCES AND NOISE

1. **Effect of noise and dust should be minimized.**
(Bob Senor)

Response: Procedures to control noise and dust are contained in the Site Work Specifications (see Exhibit E).

J. CULTURAL RESOURCES

None.

K. FISCAL IMPACTS

1. **Effect on tax assessment of neighboring properties should be identified.**
(Bob Senor)

Response: No impacts on tax assessments are anticipated due to construction of the Business Park.

2. **Effect on City real estate taxes should be established.**
(Suzanne Cahill, City Planner)

Response: The site will be owned by the KLDC which does not pay real estate taxes. However, site tenants will make payments in lieu of taxes (PILOT) which are estimated to amount to $450,000 per year 10 years after completion of the Business Park. These payments will be based on the same schedule for initial exemption that applies to all new construction in the Economic Development Zone.

L. OTHER ITEMS

Alternatives

1. **Site alternatives should be considered further.**
(Charles Van Wagenen)

Response: Site requirements for the relocation of Huck International were the first parameter governing initial site selection. Huck required a one-story building of 142,000 square feet plus expansion capacity of 45,000 square feet, a total of 187,000 square feet of building area (4.3 acres). In addition, site area for parking (260 spaces), loading docks, internal circulation and landscaping normally require an additional area of two to three times building area -- or a total site of approximately 12-16 acres. Furthermore, in order to promote orderly industrial development in the City, it was recognized that a site to accommodate additional businesses was essential to the City's future. A suitable site for a modern, high-tech industrial park to accommodate Huck and other uses requires acquisition of a site with at least 50 usable acres.

The first approach was to investigate sites already zoned for industrial use in the M-1 and M-2 Districts. The only vacant site of sufficient size was the property on Abeel Street discussed in the DGEIS. Other sites in the M-1 and M-2 Districts are considerably smaller and most are occupied by a combination of industrial, commercial and residential uses, mostly along the old industrial corridor on either side of the railroad. Even if it were possible to assemble sites in this area by acquiring and demolishing existing uses, the existing street system divides this area into blocks of no more than 5-6 acres in size. Such a process, even if it could produce a site of the required size, would be costly and disruptive to purchase many parcels, displace and relocate current occupants and demolish many

structures. It should also be noted that the KLDC does not have powers of condemnation and must rely on a willing seller.

When no properly zoned sites could be located, other sites of sufficient size were investigated that had suitable features -- adequate street access, available utilities and ample separation from adjacent neighborhoods. The other two sites discussed in the DGEIS were in this category -- North Street and Washington Avenue.

The site finally selected -- the Kingston Business Park -- is one of the largest, vacant parcels in single ownership in the City. It has a long history of heavy industrial use and is adjacent to a similar parcel to the north. Its size permits the creation of buffers from adjacent neighborhoods and also offers an opportunity to provide sites for additional industrial uses in the City which, as discussed above, has few other options to offer.

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IV. RESPONSES TO TECHNICAL AND LEGAL COMMENTS ON BEHALF OF MARK AND HERMAN KARL KNAUST

A. Response to the Paul A. Rubin Report and Comments

The only technical comments to the Draft Generic EIS submitted by a professional was the Report of Paul A. Rubin, Hydrologist, of Accord, New York, which report raises twenty-three (23) issues on behalf of the Knaust family. As these comments are extensive and varied and require technical responses, they are being treated separately from the other comments received by the lead agency.

1. LOCATION AND CHARACTERISTICS OF THE KNAUST "MINES"

An examination of the real property records of the Ulster County Clerk's Office and the Real Property Tax Department shows that on November 28, 1949 the Ulster County Chamber of Commerce, Inc. conveyed a three acre parcel of land situate on the westerly side of Delaware Avenue in the City of Kingston to Knaust Brothers, Inc. This deed was recorded in the Ulster County Clerk's Office on December 7, 1949 in Liber 752 of Deeds, at Page 77 and is depicted on the current tax map of the City of Kingston as Lot 1, Block 1, Section 56.028 and adjoins the extreme southeasterly corner of the 107.056 acre site.

This parcel was subsequently conveyed by Knaust Brothers, Inc. to Katherine M. Knaust by deed dated November 27, 1964 and recorded in the Ulster County Clerk's Office on December 2, 1964 in Liber 1160 of Deeds, at Page 673. By deed dated March 30, 1983 and recorded in the Ulster County Clerk's Office on May 27, 1983 in Liber 1483 of Deeds, at Page 363, Katherine M. Knaust conveyed this property to Barbara Knaust, Mark H. Knaust and Herman Karl Knaust II, who are the current owners of record. This deed

specifically includes all caves underlying the three acre parcel. A copy of the last referenced deed is also annexed to this response.

The location and extent of the portion of the "Kingston Mine" referred to in the report and comments of Paul Rubin prepared for Mark and Herman Knaust is more particularly shown on a survey map on file in the City of Kingston Engineers Office entitled "Knaust Bros. Inc. caves at Kingston, N.Y. as prepared by Boyd F. Allen, January, 1956", which survey map contains additions as of April 13, 1965 and was recertified by John W. Worth, Jr., L.S. #38819 of Boyd F. Allen Associates, Licensed Land Surveyors of Tannersville, New York on June 15, 1965. The pertinent portion of the survey map of the Kingston Mine is contained in the Draft Generic EIS (DGEIS) as Figure 2 to Appendix 2 and is reproduced in this response in its entirety.

The entrance to The Kingston Mine or "Spring Quarry" is depicted on Page 49 of Picturesque Ulster, The City of Kingston, Volume 2 by R. Lionel DeLisser, as published by the Styles & Bruyn Publishing Company, Kingston, New York, 1896. These mines were created in the production of limestone for the cement industry and are over 100 years old.

This survey map prepared at the request of and for Knaust Bros. Inc. clearly shows, among other features, the location and extent of the so-called large and elongated "lake" referred to in the comments, as well as the walls, support columns or piers, improvements and extent of the usable space of this "cave". The map refers to the total net usable space being 250,000 square feet or 5.74 acres of which 59,250 square feet or 1.36 acres appear to be underlying the three acre parcel now owned by the Knaust family.

This map also clearly shows that no portion of this "cave" (which is actually a man-made mine) extends onto the site of the proposed Kingston

Business Park but to the contrary extends away from the site in a southwesterly direction under Delaware Avenue and under lands now owned by the City of Kingston and known as Hasbrouck Park.

The comments submitted on behalf of the Knaust family fail to describe or even mention the extent of the Knaust family's legal rights to any possible future use of the mined area. However, the search of the County records also failed to uncover any grants, leases or other documentation that the Knaust family have any existing legal rights to the use of any portion of the "caves" underlying lands other than the three acre parcel owned in fee as described in the aforesaid deeds.

As to the prior use of these "caves", the Knaust family has used portions of the same for the commercial production of mushrooms until approximately 1966 when such production was discontinued and the commercial use of the mines abandoned. These mines have remained unused until the date hereof, a period of thirty (30) years and no one, including the Knaust family, has made any apparent attempts to reactivate or reestablish the production of mushrooms at this site, and there are no pending applications for any use of these mines before any agency, officer or board of the City of Kingston.

2. BASIS OF THE CONCERNS OF THE KNAUST FAMILY:

The issues raised by Mark and Herman Karl Knaust of Saugerties as stated on Page 1 of the Report of Paul A. Rubin are economic in origin and concern and not environmental. These concerns and assumptions involve geologic and water quality concerns specific to the Knaust mine and underground lake and relate to the potential economic harm and injury the Kingston Business Park development may have on a possible future commercial

use of the old mines for mushroom production and the protection of the business interests of the Knaust family.

For the reasons hereinafter set forth it is the opinion of the lead agency that most of the alleged possible adverse impacts of this project on a possible future use of these mines for the growing of mushrooms or other economic use in large part conclusory and unsupported by empirical or experimental data, scientific authorities or explanatory information, are extremely speculative and are not reasonably foreseeable or likely. There does not appear to be a sufficiently close nexus or causal relationship between the proposed development of the Kingston Business Park and the mere possibility of future harm caused by such development on a currently non-existent and speculative future use of these mines for commercial mushroom production or other possible economic use to which they may be adapted.

The law is clear that potential economic disadvantage caused by speculative economic loss is not an environmental factor.

While a potential future use of the Knaust mine is not before this Board, considering the existence of numerous stringent federal, state and local environmental and occupational/public safety regulations and criteria that would be applicable, it may not be reasonable for the Knaust family to expect an economically beneficial use of the mine for any purpose for which it may be otherwise physically adapted.

Also, the legal liability of the applicant, its contractors and others for damage done to adjoining owners during construction is also not an environmental issue.

For the above reasons, as well as others hereinafter detailed in addressing specific issued, many, if not most, of the comments submitted on

behalf of Mark and Herman Karl Knaust are not substantive and are not proper for consideration under SEQRA.

However, recognizing that these business and economic concerns are important to the Knaust family and that some environmental issues have been collaterally raised by said comments, the lead agency has caused each of the issues raised in the Rubin comments to be analyzed and evaluated. In such analyses and response the lead agency has recognized and considered that not every conceivable impact need be addressed in the Generic EIS and a rule of reason must be applied. Only the specific significant environmental impacts which can be reasonably anticipated need be addressed, and then to a degree of detail that is appropriate considering the nature and magnitude of the proposed action and the relevance, materiality and significance of its potential impacts. The degree of detail with which each factor is discussed varies with the circumstances and nature of the comment and factor involved.

3. SPECIFIC RESPONSES:

The lead agency's responses to the twenty-three (23) issues raised in Mr. Rubin's comments are as follows:

(a) KARST TOPOGRAPHY.
Issues No. 1 through 12, inclusive, 18 and others as applicable.

The Rubin Report characterizes the site and adjoining lands as having Karst Topography and that the hydrologic setting at the site is a "mature well-karstified carbonate acquifer". The Report further states that due to the failure to identify or recognize this unique hydrogeologic condition and hydrologic setting, insufficient, improper and inadequate engineering and hydrologic testing was conducted; the concerns of the adjacent landowners were not properly addressed; and the stormwater controls designed by the

Applicant are not likely to safeguard water quality in the Kingston Mine and elsewhere.

The Rubin Report suggests that specialized tracer testing be conducted by a recognized Karst hydrologist and accepted standard engineering practice for characterizing carbonate acquifers be followed. The gravamen of the Rubin Report as regards karst acquifers is that with this hydrogeologic condition surface water passes relatively unimpeded and untreated through sinkholes, springs, caves and other passages characteristic of karst topography directly into the groundwater acquifer and then through subsurface channels into the Kingston Mine.

Another concern with such karst topography is that solutionally enlarged subterranean cavities such as caves and sinkholes may adversely affect the structural stability and safety of the proposed improvements on the site or on adjoining lands due to collapse of the bedrock.

In the DGEIS the Geotechnical Engineering Report prepared by GeoDesign, Inc., P.C., concluded that the site was not an active karst and that ongoing chemical weathering processes on site were slow and limited (DGEIS Page 19, Appendix C-7, Page 5 of the Geotechnical Report).

In response to this specific issue and related areas of concern, the Rubin Report was sent by GeoDesign, Inc. to Charles Merguerian, Ph.D., a Professor of Structural Geology at Hofstra University, and who is also a consultant associated with the Duke Geological Laboratory in Westbury, New York. On December 27, 1995 Dr. Merguerian responded in writing to the issue of whether the site was underlain by a maturely karstified carbonate acquifer, which response and annexed illustrations are incorporated herein in their entirety and appear in the FGEIS as Appendix A to the Response of Brinnier & Larios, P.C., under date of January 15, 1996. In summary, Dr.

Merguerian described typical karst topography and conditions as well as the topography and subsurface geology of the site of the proposed Kingston Business Park and the surrounding area. Due to the absence of surface and subsurface features diagnostically associated with a maturely karstified carbonate acquifer (such as disappearing streams, sinkholes, dolines, a network of caverns and caves, circular hills, etc.) on or near the site of the proposed Business Park, it is Dr. Merguerian's professional opinion that the geology of the site is not karstic. Reference is made to his response for a more complete analysis and evaluation.

On January 9, 1996 Dr. Merguerian and Theodore Von Rosenvinge IV, P.E., of GeoDesign, Inc., made a personal inspection of the mines accompanied by Paul Rubin and Messrs. Knaust. The purpose of this site visit was to make technical observations of the geologic conditions existing in the mine, including structural conditions of the mines column and roof structure, and to determine if any karstic processes are or had been active.

The observations and conclusions of these professionals are contained in a letter from Mr. Von Rosenvinge to Dennis Larios, P.E., under date of January 9, 1996, which letter is included in the FGEIS as Appendix D to the Brinnier & Larios, P.C. Response. In summary, it was the opinion of Messrs. Merguerian and Von Rosenvinge that the mine is structurally sound and that there is no evidence for Karst. Reference is made to Appendix D and the January 15, 1996 Brinnier & Larios, P.C. report for a more complete response.

(b) Stormwater Quality and Quantity/Groundwater Protection. Issues No. 2 through 12, inclusive.

Water resources, including groundwater and surface drainage are discussed on Pages 26-28 of the DGEIS as well as in Appendix C-4. At present

the stormwater flows from the site are by way of ephemeral watercourses or channels leading to off-site streams, or by detention in existing depressions and subsequent infiltration into the soil and groundwater. The site was divided into 21 existing drainage catchments (Map #12 of DGEIS) and 19 post development drainage catchments (Map #13 of the DGEIS) and the net change in runoff characteristics calculated. The net increases in peak rates of on-site runoff was to be retained on-site through the use of ex filtration galleries, existing surface depressions and the on-site mined area. No increase in runoff volume or peak rate of runoff were anticipated for off-site areas. The "first flush" contaminants that originate from the impermeable surfaces would be pretreated and controlled by the use of catch basins, oil and grit separators, sumps and subsurface infiltration areas. The "first flush" is defined in the NYS Department of Environmental Conservation Stormwater Management Guidelines for New Development as "the delivery of a disproportionately large load of pollutants during the early part of storms due to the rapid runoff of accumulated pollutants. The first flush in these guidelines is defined as one-half inch of runoff per acre of land which has been made more impervious from pre-development (natural) conditions through land clearing, land grading and construction/development activities".

In this action the impervious surfaces are primarily composed of the roofs of the buildings, the parking areas and the access roadways. The vast majority of any pollutants would be produced from the parking areas and would be the usual products of vehicle use such as oil, grease, tire rubber and dust from wearing parts, as well as de-icing chemicals when required in the winter months. Atmospheric dust, bird droppings and similar contaminants are also present but as there is no heavy industry in the area the

atmosphere pollutants are not anticipated to be large in quantity or important in potency. The goal of the Stormwater Management Plan is to clean the stormwater in the developed portion of the watershed before it reaches existing drainage facilities, and to maintain the runoff at or below the present undeveloped runoff rate. (See Brinnier & Larios, P.C. report of January 15, 1996)

In his report, Mr. Rubin claims that the degradation of the existing water quality of a "lake" situate in the Knaust mine caused by the hydrocarbons and other Business Park contaminants derived from this project is likely to jeopardize the possible future use of this mine for the commercial production of mushrooms. Mr. Rubin further claims that the success of the prior mushroom operations was in a large degree due to an "ingenious heating and cooling system made possible by the mine's high quality lake water". (Page 1 of Rubin Report)

Mr. Rubin questions the stormwater management control measures proposed by the Applicant in the DGEIS due to the assumption that the hydrologic setting of the site is a "maturely Karstified carbonate acquifer". Based on this characterization of the hydrologic setting of the site, Mr. Rubin states that due to such natural Karst features as resolutionally enlarged bedrock fractures, sinkholes and caves, surface water will pass downward rapidly and without adequate pre-treatment into the groundwater and acquifer underlying the site and thereafter into the Knaust mine and lake where it will rapidly degrade the lake water quality. Mr. Rubin requests that extensive tracer and other testing be conducted to assess the likely hydraulic connections to the mine lake.

1. The conclusions made by the Rubin Report that a degradation in the water quality in the mine's "lake" is likely to occur due to the

development of this project, and that such degradation in quality will adversely affect the use of the lake water to cool and heat the mine, are not supported by any evidence and the lead agency finds it difficult to understand what relationship water quality has with temperature regulation in the mine and/or the production of mushrooms. These alleged impacts are speculative, and also do not appear to be relevant or material as the mine has not been used for any purpose for 30 years and its future use for any mushroom production is, at best, an expectancy.

2. The basic assumption of the Rubin Report that the hydraulic setting of the site is karst has been previously addressed in Response No. III (a). In the absence of such an unusual geologic setting the unique hydrogeologic concerns related thereto are not relevant or significant as far as this particular development is concerned and the standard stormwater management guidelines, techniques and procedures should be adequate to protect both the environment and the Knaust "lake" from degradation in quality.

3. The calculation of runoff volumes and rates of discharge from the impermeable areas of the site show that they are not abnormal or unusual, and any potential pollutants are limited in quantity and restricted to those normal for parking areas and roadways.

4. In response to the Rubin comments, the Applicant's engineering firm has modified the stormwater management control plan and has proposed additional structural measures to be used to control and mitigate the potential adverse impacts of stormwater runoff. These measures include VorTechs Stormwater Treatment Systems to remove grit, contaminated sediments, and hydrocarbons and other floating pollutants from the runoff originating on the parking lots and roads ("First Flush" Contaminants) with

the pretreated stormwater being thereafter directed into infiltration basins or "fill areas" on the site before discharge into the on-site mined areas. These methods follow the Department of Environmental Conservation standards for stormwater management and will control and alleviate any adverse impacts of the stormwater runoff for this development. For a more complete discussion and description of the Modified Stormwater Management Plan see the Brinnier & Larios, P.C., report of January 15, 1996, and the Modified Stormwater Management Report, dated January 10, 1996.

As a result of the stormwater management measures proposed by Applicant, prior to discharge into the groundwater the stormwater from the impermeable areas on the site will be pre-treated in accordance with current stormwater management guidelines so as to remove most contaminants. All stormwater discharges will be totally on-site. The Stormwater Management Plan also includes erosion controls to be implemented during construction which will prevent sediment from leaving the site.

5. The acquifer underlying the site and the adjoining premises is not being used as a source of potable water and it is not likely that such use will occur in the future. All properties in the area are serviced by municipal water and the water situate in the mines currently is being put to no use. The acquifer in issue is not in an area of special environmental concern, nor in an ecologically unique or environmentally sensitive area, nor subject to any special groundwater protection area programs and has minor ecological importance and significance.

6. The source of the alleged pollution is effectively limited to normal stormwater runoff from the impermeable surfaces such as roofs and parking areas/roadways. All sewage generated on the site will be discharged into the City of Kingston Sewage Treatment Plant. Therefore, the only

pollutants of possible concern are the normal petroleum products that may leak from vehicles such as oil, grease and gasoline (gasoline normally evaporates on site) and deicing materials such as salt (NaCl). None of these potential contaminants will have a toxicity or a concentration that they will cause any significant adverse environmental change in existing groundwater or surface water quality, and it is anticipated that most of these contaminants will be removed by the control measures to be implemented by the Applicant. All surface water discharges from the site must comply with applicable federal and state surface water and groundwater pollutant concentrations and no hazardous or toxic chemicals or other substances will be discharged from the facility.

7. The lack of karst setting for the site and the marked difference in elevation of water levels in the various mined areas, combined with the results of the deep test borings into the bedrock on the site clearly indicate a lack of hydraulic connectivity between or among the site of the proposed development, the Kingston Mine and the areas affected by stormwater discharges. Lacking such a connection, the concerns of Mr. Rubin regarding direct downward flow of stormwater and contaminant loading into the acquifer appear to be unfounded and unsupported by the evidence. However, assuming that there may be some possible hydrogeologic connection between the on-site discharge areas identified in the Applicant's Stormwater Management Plan and that portion of the mine owned by the Knaust family, the assimilative capacity of the receiving acquifer (estimated by Mr. Knaust to be Eighty Million Gallons) should not be degraded by the relatively minor concentrations of salt and other normal pollutants generated by the proposed development.

It is therefore anticipated that the stormwater discharges from the site will have a minor effect if any on the underlying acquifer and groundwater resources, and there has been no proof introduced that these potential changes to the water in the mine will have any adverse impact on the production of mushrooms, nor an adverse impact on groundwater quality.

(c) Structural Stability of the Site and Surrounding Area including the Kingston Mine; Effects of Necessary Blasting On-Site; Public Safety Issues No. 13 through 19, inclusive

These issues were addressed on Pages 18 to 22 of the DGEIS, as well as in both the 1973 Report on Geotechnical Investigation for the proposed high school prepared by Joseph S. Ward & Associates, Consulting Engineers of Caldwell, New Jersey. While this report is almost 23 years old, there has been no change in the site or the circumstances surrounding the site since 1973 that would invalidate this information, and the mere passage of time does not normally render information and data obsolete nor require constant updates. This is especially true with geologic conditions although the lead agency recognizes that new information can make a prior understanding obsolete. Recognizing that scientific techniques in geologic and engineering testing and analysis has improved since 1973, the Applicant retained the firm of GeoDesign, Inc. of Middlebury, Connecticut to re-examine, re-analyze and re-evaluate the site and the prior studies in the fall of 1995. Included as part of this work was extensive soil testing which was performed by SoilTesting, Inc. of Oxford, Connecticut (Appendix 3 of the DGEIS) and deep test borings into bedrock to determine the presence of cavities and other potential areas of concern underlying the site.

The November, 1995 Geotechnical Report for the Kingston Business Park prepared by GeoDesign, Inc., P.C. of Middlebury, Connecticut (See Appendix C-7 of the DGEIS). SoilTesting, Inc. conducted a subsurface exploration

program consisting of 13 test borings and 10 test pits, which borings were carried to depths ranging from 6 to 52 feet into bedrock. In only one boring (B-5) a cavity was encountered at a depth of 44 feet (Appendix C-7, Geotechnical Report Pages 2 through 4). Thereafter 8 rock probes were taken by GeoDesign, Inc., P.C. on October 25, 26 and 27, 1995 to determine the extent and continuity of the cavity and to evaluate the impact on the roadway design and construction. The report concluded that these cavities were a result of natural chemical weathering and not mining activity and follow a bedding plane.

The November, 1995, Geotechnical report also concluded that due to, among other factors, the geometric relationship between the existing mines and the proposed roadway including the differences in elevation and horizontal distance, vibration levels resulting from the required blasting for the proposed roadway would not create underground rock falls in the mines nor damage nearby dwellings provided a maximum explosive charge per delay was not exceeded. The report further concluded that blasting can easily be accomplished in a manner which will protect the off-site mine and houses from adverse vibration impact using normal blast control techniques. (Geotechnical report, Appendix C-7 to DGEIS, Pages 5 through 7, and DGEIS Pages 20 through 22 for summary and proposed mitigation measures.)

In his comments to the DGEIS, Paul A. Rubin states that due to the presence of the Knaust mine, as well as an active and mature carbonate (Karst) acquifer at the site, additional hydrologic and structural testing is necessary in order to protect both on-site and off-site interests. Mr. Rubin cites the possibility of movement and collapse along fault planes and joints, as well as a historical collapse of a portion of the mine presumably during the construction of Koenig Boulevard.

In its January 2, 1996 letter, GeoDesign, Inc., P.C. (Appendix C to the Brinnier & Larios, P.C. report), addressed the geotechnical, subsurface/geological, and blasting aspects of the proposed development. These responses are included in their entirety in Appendix C and are summarized as follows:

1. Based on the opinion of Dr. Merguerian as confirmed by the test borings and other geotechnical engineering studies done by GeoDesign and SoilTesting, as well as the earlier geotechnical and geologic studies of the site, the unusual structural risks that may be present with a maturely Karstified carbonate acquifer are not present at this site or in the surrounding areas. This is further confirmed by the lack of any significant historical collapse of the bedrock or reported structural problems with existing buildings in the area and by the personal inspection of the mine.

2. The void encountered at Boring B-5 is not an unusual condition and that 40 feet of competent rock overlie this void as evidenced from the aforesaid test borings.

3. The roof of the existing mine has a thickness ranging from a maximum of 200 feet to a minimum of 33 feet, which minimum thickness occurs at a horizontal distance of approximately 300 feet between the proposed roadway cut and the high point of the mine. The closest mapped distance between the mine wall and the roadway cut is about 115 feet.

4. Available maps show that the Kingston Mine does not extend under or near any of the areas to be disturbed for the access road or planned improvements as depicted on the site plan. Appendix 2, Figure 2 to DGEIS.

5. The massive pillars and roof of the existing mine adjoining the site appear well-preserved upon visual inspection and have historically

been stable for nearly a century. The aforesaid survey map of the Knaust mines show a large number of substantial piers or columns that support the roof of the mine unlike a natural cave which is without such intentional reinforcement to provide stability. The evidence of a single rock fall between pillars is a localized and natural condition and not unusual. Normal blast control methods and vibration, distance and change per delay relationship are expected to protect the mine from blast-induced vibrations. (See Appendix C for a more complete response regarding the structural condition of the mine.)

6. The measures being implemented to control blasting to protect nearby off-site dwellings are at least eight times more restrictive than needed to protect the mines. Blasting and related mitigation measures to protect nearby structures from vibration damage will include limitations of explosive charges and performing and monitoring test blasts to determine sensitivity and distance to nearby improvements, to measure particle velocities, and frequency distributions. The response concludes that based on the vibrations expected from normal controlled construction blasting and considering the distance between the mine and nearby dwellings and the site of the blasting, the proposed mitigation measures will avoid adverse effects to the mine and dwellings. These identified control and mitigation measures will be implemented in a complete detailed blasting and monitoring plan to be prepared and submitted by the blasting contractor to the engineer's review and approval before any blasting activity occurs.

7. Any increase in bedrock permeability due to the fracturing of the bedrock from blasting will be limited to the immediate zone of the blast and will not significantly increase the site's overall (average) vertical permeability.

(d) Hazardous Materials
Issue Nos. 10 and 11

The permitted uses that may be conducted at the proposed Kingston Business Park are restricted against the use of hazardous materials or those chemicals which could cause catastrophic effects in the event of a release. All facilities that may locate in the Business Park must meet stringent federal, state and local standards for the storage, use and disposal of any substances that could degrade the groundwater. Future phases of the development shall each undergo an independent environmental review to identify, analyze and evaluate any potential harm that may be caused by such substances. The Karst issue was previously addressed. (See Brinnier & Larios, P.C., report)

(e) Ceiling Collapse Would Disrupt Air Circulation Patterns
Issue No. 14.

The possible impact raised in this issue is not relevant for the following reasons:

a. it is primarily of economic concern;

b. it is not an impact that can be reasonably anticipated;

c. the alleged impact is speculative and conclusory as there is no showing or evidence that a ceiling collapse would be caused by this action nor that it would disrupt air patterns;

d. there is no current economic use of the Knaust mines and none has been in existence since approximately 1966. To the knowledge of the lead agency, no attempts have been made to reactivate the growing of mushrooms and no applications are pending before any local governmental agencies for any permits or approvals. Any commercial use of these mines will require, at a minimum, site plan approval from the City of Kingston Planning Board and

may require a special permit, variances and/or a rezoning of the lands affected, as well as various approvals, permits, licenses and other authorizations pursuant to the NYS Uniform Fire Prevention and Building Code, Federal Occupational Safety and Health Administration (OSHA) requirements, SEQRA environmental review, Department of Environmental Conservation permits, Ulster County Health Department approvals and similar regulating agencies.

(f) Possible Structural Damage From Blasting Activities. Issue No. 15

This concern is primarily a legal issue involving the responsibility of the Applicant and its contractors to affected landowners from negligence and is therefore not substantive and not proper for discussion in a GEIS. To the extent it involves public safety and damage to nearby dwellings it has been adequately addressed in the Geotechnical reports submitted in response to the comments.

(g) Legal and Financial Responsibility for Possible Damage. Issue No. 20

This concern is again a legal issue and not an environmental one and is not substantive. All contractors will be adequately insured.

(h) Army Corps of Engineers Involvement - Wetlands. Issue No. 21

The entire 107 acre site is well-drained and no hydric soils are present. (Pages 22-23 DGEIS, Map #9, Table #1, Appendix C-7 Geotechnical Report, Page #3). The only wet area on the site is located at the northwest corner and has an area of approximately one-quarter (1/4) of an acre. This wet area drains to the southwest off the site and is approximately one hundred fifty (150) lineal feet horizontally from any proposal disturbance or construction and is situate wholly within the proposed buffer zone in

which no development is permitted. The Applicant does not propose any dredging, filling or other disturbance of this wet area and the drainage plan has been modified to direct the limited drainage from impermeable areas (parking lot and roofs) to the northeast away from this wet area so as to protect and preserve its existing water quality. Annexed to this FGEIS is a map showing the location and extent of this wet area and its relationship to the site and proposed improvements.

As to the jurisdictional involvement of the Army Corps of Engineers, even if this wet area were a Corps of Engineers wetland pursuant to Section 404 (a) of the Federal Clean Water Act (33 USC Section 1344), any potential disturbance of this small, isolated wet area would appear to qualify for a Nationwide Permit #26 in accordance with 33 CFR Part 330 and Appendix A to Part 330.

(i) Eligibility of Mine For Designation as an Historical Place. Issue No. 22

The possibility that the Kingston Mines may be eligible for designation on the National Register would not be adversely impacted by the development of the proposed Kingston Business Park. For the reasons heretofore discussed none of the identified effects of this proposed development can be reasonably anticipated to impair the character or quality of such a possible resource.

As to the mines becoming a "public cultural attraction", it is highly unlikely that will occur for economic and public safety reasons and from the strict regulatory controls on such a use. Even if such a use did occur in the future, the traffic noise from the Kingston Business Park would not affect the use. The lead agency notes that Delaware Avenue currently passes over a portion of the mined area, and that the proposed access road to the Business Park is approximately 115 feet from the mines.

(j) Endangered Species/Bats
Issue No. 23

The DGEIS addressed the presence of endangered species on the site. (Page 29) There has been no evidence submitted that any endangered species of bat exists on the site or in the nearby mined areas, nor that the temporary blasting and controlled activities as proposed for this development would in any way threaten any bats, endangered or otherwise. (A personal inspection of the mine held on January 9, 1996 failed to show the presence of any bats in the areas investigated.)

The vibration levels resulting from the blasting activities as discussed in the January 2, 1996 GeoDesign Report (Appendix C to the Brinnier & Larios, P.C. report) are being kept far below the levels that may damage the mines or threaten any bats, and any vibrations will be of a relatively short duration during the construction of the access road and proposed improvements.

Therefore, the possible impact of this proposed development on bats is not large in magnitude or importance, and is not reasonably foreseeable. Any adverse impacts on the natural environment resulting from the construction of the proposed facility will be mitigated by the preservation of a large portion of the site as natural forest by the imposition of the mandatory buffer zone. Additional landscaping must also be done on each parcel within the park in accordance with the landscape plans and criteria contained in the Performance and Development Standards and the local zoning regulations. The identified on-site wet area will also be within the buffer zone and will be preserved in its natural condition.

(k) Further Testing and Research

The DGEIS and the aforesaid responses thereto, including the geotechnical investigations contained in the FGEIS have adequately analyzed

and evaluated the concerns and issues raised in the comments to the DGEIS including the risks of adverse environmental impacts to subsurface and surface water resources, structural stability and public safety issues, wetlands, endangered species and other substantive issues.

Any further investigation is not required and would cause both unreasonable administrative delay and unnecessary expense in contravention of the mandates of SEQRA (6 NYCRR Parts 617.3 (l) and 617.14)

B. Response to Comments from Attorney for Knaust Family

On January 10, 1996 the lead agency received a letter from John J. Privitera, Esq. of the firm of McNamee, Lochner, Titus & Williams, P.C., attorneys at Law, 75 State Street, Albany, NY on behalf of the Knaust family. In this letter Mr. Privitera raises issues and comments on the proposed development and the DGEIS. While this letter was not received by the lead agency before the termination of the official comment period on the DGEIS which closed on December 18, 1995, as the letter contains concerns of potential significant adverse environmental effects not covered by the timely comments by Mr. Rubin and others the lead agency has chosen to consider them in this Final GEIS. The following are the lead agency's responses to these comments:

Comment #1. THE KNAUST PROPERTY IS ZONED AGRICULTURAL.

Response: The lands owned by the Knaust family are currently zoned RRR One-Family Residence District on the Zoning of Map of the City of Kingston (Section 123-7 of the City Zoning Code). The regulations in that zoning district permit farms, truck gardens, greenhouses, nurseries and arboretums on lots having an area of at least five (5) acres, which uses are subject to certain restrictions, as well as site plan review and approval by the City of Kingston Planning Board pursuant to Section 123-29 [Section 123-7, A, (5)]. While the lead agency is not attempting to interpret the meaning of the zoning regulations, it is at least debatable whether the commercial production of mushrooms in the Knaust mine would qualify under the above uses or would meet the minimum lot size requirements. In any event, site plan approval and an environmental review would be required for the re-establishment of such uses. The lead agency again notes that there is

currently no "adjoining agricultural use" of the Knaust mines, the prior commercial use having been discontinued and abandoned in 1966. Furthermore, neither the site of the proposed business park nor the Knaust property is situate within an Agricultural District certified by the Commissioner of the Department of Agriculture and Markets pursuant to Article 25, Sections 303 and 304 of the Agriculture and Markets Law.

Comment #2. ANY REZONING OF THE PROPOSED KINGSTON BUSINESS PARK SITE FROM RRR RESIDENTIAL TO M-1 LIGHT MANUFACTURING WOULD BE ILLEGAL SPOT ZONING.

Response: While the term "spot zoning" has been loosely used by many commentators, in the early case of Rodgers v. Village of Tarrytown, 302 NY 115 (1951), the Court of Appeals defined it as:

> "the process of singling out a small parcel of land for a use classification totally different from that of the surrounding area, for the benefit of the owner of such property and to the detriment of other owners (citations omitted), spot zoning is the very antitheses of planned zoning. If, therefore, an ordinance is enacted in accordance with a comprehensive zoning plan, it is not spot zoning even though it (1) singles out and affects but one small plat...or (2) creates in the center of a large zone small areas or districts devoted to a different use. Thus, the relevant inquiry is not whether the particularly zoning under attack consists of areas fixed within larger areas of different use, but whether it was accomplished for the benefit of individual owners rather than pursuant to a comprehensive plan for the general welfare of the community." (302 NY 115, 123-124).

If an amendment to a zoning ordinance is in accordance with the planning objectives of the community, it will not be spot zoning even if the land area is small, the zoning is radically different from its surroundings and the owners achieve a benefit.

In Asian Americans for Equality v. Koch, 72 NY 2d 121 (1988), the Court of Appeals stated that:

> "Zoning legislation is tested not by whether it defines a well considered plan but by whether it accords with a well considered plan for the development of the community. When a zoning ordinance is amended, the court decides whether it accords with a well considered plan in much the same way, by determining whether the original plan required amendment because of the community's change and growth and whether the amendment is calculated to benefit the community as a whole as opposed to benefiting individuals or a group of individuals" (See, Randolph v. Town of Brookhaven, 37 NY 2d 544, 547; Matter of Town of Bedford v. Village of Mount Kisco, 33 NY 2d 178, 187-188, reargument denied 34 NY 2d 170, 177)."

Whether the proposed rezoning of the 107 acre site from Residential to Light Manufacturing is illegal spot zoning or is pursuant to a well considered plan for the development of the City of Kingston is primarily a legal issue and not an environmental one.

However, to the extent the comment indirectly relates to possible adverse environmental impacts such as effects on the adjoining residential uses and zones, noise, air quality, and neighborhood character, or is related to conformance and compliance with current comprehensive planning for the City of Kingston, these issues are addressed in the DGEIS and FGEIS (See DGEIS Pages 4-5, 25, 37-45, 49, 56-64 and 65-66).

Comment #3. THE PROPOSED DEVELOPMENT WILL ADVERSELY IMPACT THE PROPERTY INTERESTS AND ECONOMIC VIABILITY OF THE KNAUST MINES.

Response: These concerns clearly involve issues of economic loss to the Knaust interests and are not environmental. They were addressed in the Responses to the Rubin Report.

Comment #4. THE DEIS MAKES A SERIES OF FUNDAMENTAL AND COMPOUNDING MISTAKES IN DESCRIBING AND ANALYZING THE ENVIRONMENTAL IMPACTS AND POTENTIAL IMPACTS OF THE PROPOSED ACTION BECAUSE THE GEOLOGY OF THE SITE IS DRAMATICALLY MISIDENTIFIED.

Response: This comment has been adequately addressed in the Responses to the Rubin Report.

Comment #5. CRITICAL INVOLVED AGENCIES HAVE NOT BEEN NOTIFIED OF THIS PROPOSED ACTION, INCLUDING THE NYS DEPARTMENT OF AGRICULTURE; THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY AND THE UNITED STATES DEPARTMENT OF HEALTH.

Response: a) As to the NYS Department of Agriculture, the proposed rezoning of the site of the action does not involve any agricultural lands or districts and the site has never been zoned agricultural (DGEIS Pages 28-29 and 37-41). As to the 3 acres of adjoining land owned by the Knaust family, it is also zoned Residential and there is no pending request to have it rezoned. This land cannot be reasonably characterized as a "farm" nor is any potential economically viable use endangered by the proposed action (See Responses to Rubin Report). It is therefore unlikely that the NYS Department of Agriculture has any jurisdiction by law to approve this action or to make any discretionary decisions relating thereto, and is therefore not an involved agency under SEQRA [6 NYCRR Part 617.2 (t)].

b) As to the US Environmental Protection Agency and US Department of Health, the lead agency notes that federal agencies are not subject to SEQR [6 NYCRR Part 617.2 (c)].

(c) In specific regard to underground injection well permits, underground injection well permits are regulated pursuant to the Underground Injection Control Program under the auspices of the Environmental Protection Agency (40 CPR Parts 144-149). The Underground Injection Control Program is promulgated under Part C of the Safe Water Drinking Act (SWDA) 42 USC 300 f et seq. (Pub. L 93-523).

The Underground Injection Control Permit Program (UICP) regulates underground injections by five classes of wells (Section 144.1 (g). Owners or operators of injection wells must be authorized either by permit or rule by EPA, Class V wells are inventoried and assessed by EPA and regulatory action is to be established at a later date [(Section 144.1 (g)].

Specific inclusions in the UICP Program set forth, "any dug hole or well that is deeper than its largest surface dimension, where the principal function of the hole is the emplacement of fluids". [Section 144.1 (g)(ii).]

The definitions Section (Section 144.3) defines "well" as, "a bored, drilled, or driven shaft, or dug hole, whose depth is greater than the largest surface dimension".

"Well injection" is defined as, "the subsurface emplacement of 'fluids' through a bored, drilled, or driven 'well', or through a dug well, where the depth of the dug well is greater than the largest surface dimension".

"Injection well" is defined as "a well" into which "fluids" are being injected".

"Fluid" is defined as, "any material or substance which flows or moves whether in semi-solid, liquid, sludge, gas, or any other form or state".

Section 144.6 governs classifications of wells. The Stormwater Management and Drainage Plan for the KLDC project does not fit into any of the classifications numbered I-IV. Class V regulates injection wells, "not included in Classes I-IV".

The UICP Program criteria and standards (40 CPR Part 146) classifies Class V injection wells which include, "drainage wells used to drain surface fluid, primarily storm runoff, into a subsurface formation". Note: "Drainage well is not defined". [(Section 146.5 (e) (4).]

Section 146.51 sets forth the criteria and standards applicable to Class V injection wells.

Wells covered include, but are not limited to, "wells which inject non-hazardous fluids into or above formations that contain underground sources of drinking water. It includes all wells listed in 146.5 (e)..." (See above)

The only regulations set forth for Class V wells are described in Section 146.52 and require the following: (Inventory and Assessment) 146.52 (a) - Owner or operator of a Class V well shall, within one year of the effective date of an Underground Injection Control Program, notify the Director of the EPA of the existence of any well meeting the Class V definition and submit the inventory information required in 40 CPR 144.26 (a).

146.52 (b) (1-4) governs the Director of the EPA's assessment report requirements. (To be completed within 3 years of the notification.)

Note: State Underground Injection Control Program (New York State administered program) is regulated pursuant to Sections 147.1650 through 147.1655.

New York State UICP Program is administered by EPA (Section 147.1651), and does not add any review of implementation requirements to the EPA directives for Class V wells. Inventory listings are to include the following information:

a) 1. Facility name and location
2. Name and address of legal contact
3. Ownership of facility
4. Nature and type of injection wells
5. Operating status of injection wells

b) Additional contents - only required in the discretion of the EPA Regional Administrator.

c) Deadlines - One year after the date of effective date or approval of the under ground injection control program for the State.

Class V wells are authorized by EPA rule [Section 144.1 (g)].

Authorization of Underground Injection By Rule (Section 144.24).

Class V wells: "Injection into Class V well is authorized until further requirements under future regulations become applicable".

No permit by EPA is required at initiation of Class V well.

Requiring a Permit (Section 144.25): Director of EPA may require permit for Class V well after receipt of inventory listing in his discretion pursuant to Sections 144.25 (a) (1-4) and (b).

The above regulations do not appear to be applicable to this action for the following reasons:

1. The Stormwater Management Plan contemplates the discharges of pretreated stormwater from the impermeable surfaces into a large canyon or gorge which is located wholly within the property limits of the site and which gorge currently receives most of the stormwater for these areas. This gorge is approximately 80 feet wide by 260 feet in length by approximately 70 deep and

apparently was created or at least enlarged by the prior mining/quarrying operation on the site for the purpose of obtaining limestone for cement manufacture. Within the definitional context of these regulations it can not reasonably be construed that such a gorge is a "bored, drilled or driven shaft or dug hole", nor is its depth greater than its largest surface dimension, nor is the principal function of this gorge the emplacement of fluids. It is therefore presumably not a "well" under the applicable definition.

2. Stormwater from the site has been naturally discharging into this large gorge for over 100 years, and the continued drainage of surface water into this gorge is not the "injection" of fluids nor an artificial change in existing conditions but merely the continuation of the status quo.

3. The stormwater entering this gorge is not a "subsurface emplacement" as the bottom of the gorge is open, broad and accessible and certainly not a subsurface formation.

4. The acquifer beneath the site and the surrounding area is not a source of drinking water. Even if the Underground Injection Well regulatory framework applies, at most the Stormwater Management Plan would result in a Class V Injection Well with no initial permit requirement. An inventory listing provided to the EPA is all that is required.

d) The lead agency finds no basis for the US Department of Health having any jurisdiction. However, even if either of these federal agencies had jurisdiction to grant an approval or issue a permit or authorization for some aspect of this action they would still not be

"involved" in the SEQRA review and nothing that has taken place would either deprive them of such jurisdiction or excuse the Applicant from applying for such approval, permit or other authorization. Permit compliance from a federal agency is separate and apart from this review and is unaffected thereby.

e) The lead agency also notes that this proposed development was the subject of a prior environmental review pursuant to the National Environmental Policy Act (NEPA) [42 U.S.C. 4321 et seq.] due to federal funding of the action by the US Department of Commerce, Economic Development Administration. A finding of no significant impact (FNSI) was made by the federal agency on August 17, 1995. While this FNSI does not constitute compliance with SEQR, the information contained in the FNSI has been considered by the lead agency and clearly indicates that no significant adverse environmental impacts were identified by the NEPA review.

Comment #6. THE DGEIS FAILS TO INVESTIGATE AND ANALYZE THE 'BROWNFIELDS REDEVELOPMENT MOVEMENT' BY CONSIDERING THE REUSE OF CHEAP OLD INDUSTRIAL LAND NOW IN EXISTENCE IN THE CITY.

Response: A "Brownfield" is generally described as a contaminated parcel that was developed in the past (typically as industrial, commercial or transportation property) and is now dormant or underutilized. The U.S. Environmental Protection Agency (EPA) has been using as a "working definition" that a Brownfield "is a previous industrial site which is left undeveloped due to the uncertainty of liability and cleanup costs".

As stated in the DGEIS, Phase I of the proposed business park is specifically designed to retain Huck International, the City's largest manufacturing employer who was planning to leave the City due to inadequate room at its present site for needed expansion and the obsolescence of such

facilities. Future phases are designed to remedy the current lack of any "state of the art" facilities or sites for Light Manufacturing and similar business to locate or expand in the City of Kingston. (DGEIS Page 2-5)

Before making its applications in this action, KLDC investigated the possibility of providing the necessary manufacturing space for Huck in the former industrial areas of the City, which analysis and evaluation is herein summarized.

Other than the areas discussed in the DGEIS as alternative sites, historically the industrial and manufacturing areas of the City of Kingston were located either along the Rondout Creek or along the railroads.

In regard to the development along the northwest bank of the Rondout Creek (the Creek is the boundary between the City of Kingston and the Town of Esopus), this was characterized by predominantly water related industries and was confined to a very narrow strip between Abeel Street, West and East Strand and the Creek, there being a steep hill to the northwest. Numerous residences and stores adjoin or are located to the northwest of these strips and the existing zoning is a patchwork of commercial, manufacturing and residential districts. Block Park is situate in this area, and some of the lands are situate within the 100 year flood plain and subject to periodic flooding. These lands consist of a large number of separate and unrelated parcels, most of which are being currently utilized for manufacturing or water related uses such as boat clubs, marinas, waterfront parks, boat repair facilities and restaurants. Not only is this area topographically and geographically inappropriate for an industrial park in the nature of that proposed by KLDC, the current land use plans of the City of Kingston, including the zoning and the Waterfront Consistence Review Law, promote and propose water-dependent or water-related uses for this area.

As to the former industrial areas along the railroad, these consist of a large number of small, separate and independent lots which are linear in orientation on both sides of and in proximity to the railroad line that runs through the main part of the City. South of Broadway these former industrial/manufacturing sites adjoin Greenkill and Pine Grove Avenues, and to the north of Broadway these sites are located near Cornell Street, Foxhall Avenue, Grand Street and adjacent areas.

Most of the existing improvements are multi-story brick factory buildings which are functionally obsolete for use as a large, modern manufacturing factory and would not meet current governmental regulations. Most of the existing facility buildings have been purchased and rehabilitated for use as offices, governmental buildings, and small commercial or manufacturing uses and are currently in productive use and not vacant or abandoned. Many of the unimproved sites have been recently developed for small commercial facilities. These areas do not represent a centralized and cohesive industrial area or "site" but are spread out and adjoined by other uses such as restaurants, bars and stores and single family detached homes. The current Huck facility is also located in this area. The current zoning designation for these areas are again a quilt work of commercial, manufacturing and residential districts.

The establishment of a modern, updated business park in those areas is subject to the following problems.

1. As Phase I of the proposed business park by itself requires at least sixteen (16) acres of site area, the Applicant would need to somehow acquire a large number of separate parcels of land so as to amass a sufficiently large area for the business park, which would include adequate buffers to protect the existing adjoining residential areas. Lacking the

power of eminent domain this would seem to be extremely difficult, if not impossible, at least within a reasonable time and at a reasonable cost. Even if condemnation were an option, the taking of a large number of existing facilities, businesses and residences would be expensive and not feasible from a legal and political viewpoint, especially as large and currently unused sites in single ownership are available as an alternative. (The lead agency is advised that the City of Kingston could not legally exercise the power of condemnation of property for the business purposes of KLDC even if it were disposed to do so. The acquisition of sufficient lands for the full scale business park would seem highly unlikely.

2. Such acquisition and re-development would require its own separate and independent environmental review under SEQRA. Such an action would involve issues of both primary and secondary displacement of the existing facilities and residences; changes in population patterns and community character and development; alternative sites; cumulative impacts and similar effects, most of which impacts appear to be much more significant and less subject to feasible mitigation measures than those encountered in the current review.

3. Added to the uncertain and potentially large cost of acquisition of the parcels would be the cost of demolition of the existing facilities; the cost of disposing of the demolition debris; the cost of any remedial action required, as well as the cost of construction of the new facility. It is anticipated that the cost of demolition and cleanup will exceed the infrastructure costs at the current site. In any event, the acquisition and re-development of this "old industrial land" will not be "cheap" as suggested by the comment.

4. Such an action would eliminate or at least displace numerous existing smaller facilities which are productive and which currently provide employment to residents and revenue to the City. The elimination and demolition of these facilities would appear counter-productive and a loss of existing tax base which is contrary to the purposes of the Applicant which includes the retention of industry. [Not-For-Profit Corporation Law, Section 1411 (a)].

5. Each of the former industrial/manufacturing parcels would need to be carefully tested and examined for hazardous substances or waste before any acquisition by the Applicant. Under the federal Superfund statute, the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) [42 U.S.C. Section 9607 (a) (1)] and New York state law [6 NYCRR Part 375-1.3 (u)], the potential risk to the Applicant is a very serious and large one because it is not limited to the loss of the value of the property, but could include a cleanup liability that is far more than the value of the property itself.

The processes required by EPA and DEC for the investigations and/or remediation of any problems are lengthy and cumbersome, and the cleanup standards are rigid. The existence of contamination on any of the numerous properties involved would jeopardize the entire action and development. The possible existence of contamination and the constantly shifting liability rules also make lenders very skittish and would make the necessary financing much more difficult to obtain.

6. The scale of the above proposal essentially amounts to an urban renewal activity, with the attendant long-term delay, uncertain and high cost, and substantial risk of failure.

7. The current site itself is part of an industrial site used to quarry limestone for the cement industry. It has remained unused for approximately 100 years and does not have the uncertainty of liability and cleanup costs that are attendant to the mid-town industrial areas where manufacturing and industrial uses were conducted until relatively recently and chemicals commonly used on-site. Furthermore, this site is not in an outlying rural or suburban area, and does not have the potential for any negative economic impact to agriculture.

While it is not the intent of the lead agency to attempt to identify, analyze and evaluate all of the benefits and liabilities of "Brownfields Development" on this response, under the circumstances of this particular action the redevelopment of other old industrial lands in the City of Kingston would not meet the objectives nor be within the legal or financial capabilities of KLDC, and do not appear to be a feasible or practicable alternative.

56.028-1-1

LIBER 1483 PG 363

Form 10870 N.Y. DECD – Covenants Against Grantor with Lien Covenant

This Indenture,

Made the 30th *day of* March

Nineteen Hundred and Eighty-Three

Between KATHARINE M. KNAUST, residing at Villa St. Joseph, Catskill, Greene County, New York,

party of the first part, and

BARBARA KNAUST, residing at Box 178, Saugerties, Ulster County, New York;
MARK H. KNAUST, residing at Box 178, Saugerties, Ulster County, New York; and
HERMAN KARL KNAUST, II, residing at Box 178, Saugerties, Ulster County, New York,

parties of the second part,

Witnesseth *that the party of the first part, in consideration of* —ONE and 00/100— *Dollar* ($1.00) *lawful money of the United States, paid by the parties of the second part, does hereby grant and release unto the parties of the second part, their heirs and assigns forever,*

ALL THAT PIECE OR PARCEL OF LAND above ground and in caves under ground, situate on the westerly side of Delaware Avenue and Locust Avenue in the City of Kingston, Ulster County, State of New York, as more particularly bounded and described as follows:

Beginning at a point in the westerly bounds of Delaware Avenue with the intersection of the westerly bounds of Locust Avenue; thence running northerly along the westerly bounds of Locust Avenue 195± feet to a twin elm tree; thence southwesterly along the base of a cliff of rocks 772± feet to the northerly bounds of Delaware Avenue; thence easterly, southeasterly and northeasterly along the bounds of Delaware Avenue 790± feet to the point, the place of beginning. Containing three (3) acres of land.

Being the same premises conveyed by Knaust Brothers, Inc. to Katharine M. Knaust by Deed dated November 27, 1964 and recorded in the Ulster County Clerk's Office on December 2, 1964 in Liber 1160 of Deeds at page 673.

56.028-1-1

LIBER 1483 PG 363

Form 1987D N.Y. DEED—Covenant Against Grantor with Lien Covenant

This Indenture,

Made the 30th *day of* March

Nineteen Hundred and Eighty-Three

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party of the first part, and

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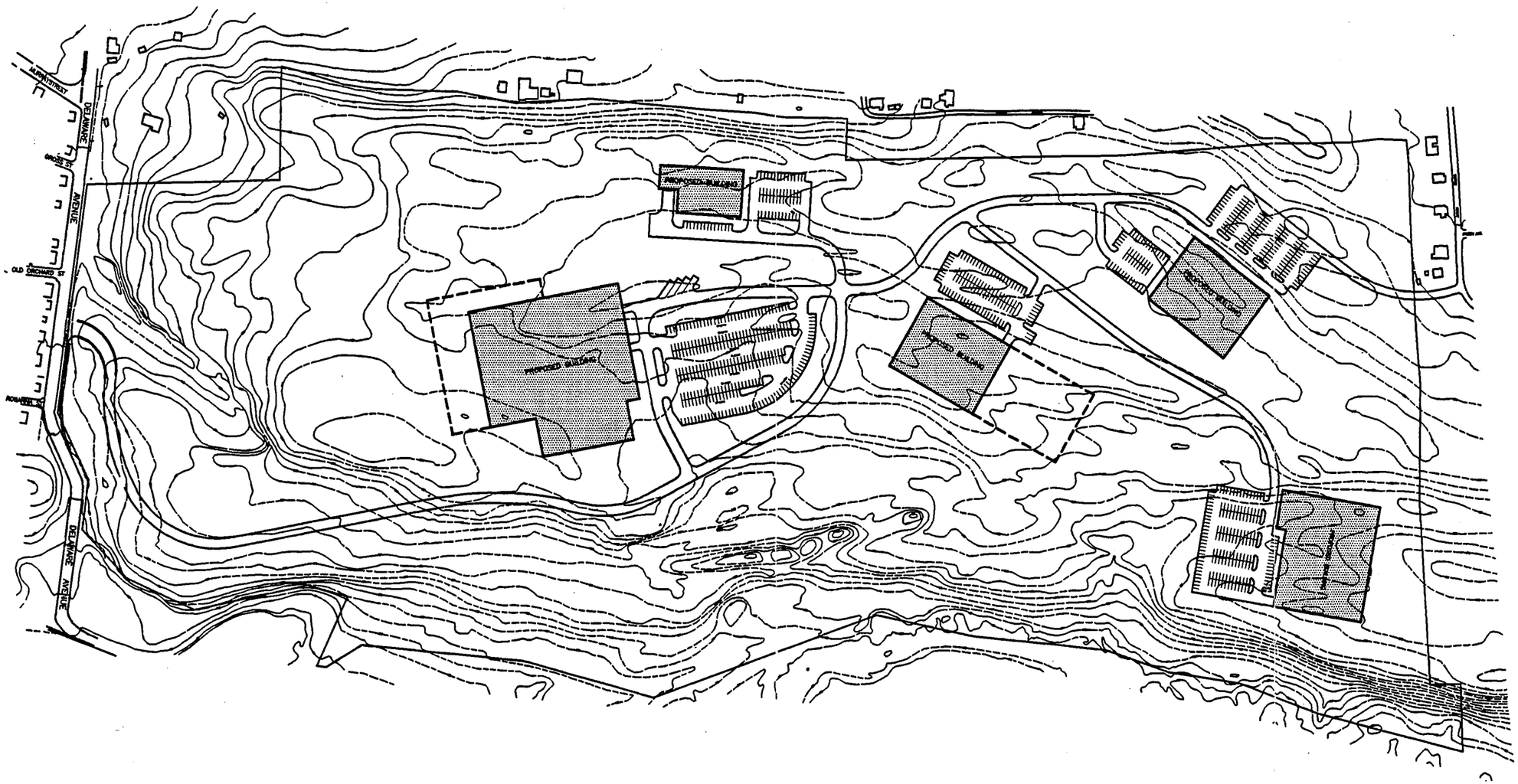
Beginning at a point in the westerly bounds of Delaware Avenue with the intersection of the westerly bounds of Locust Avenue; thence running northerly along the westerly bounds of Locust Avenue 195± feet to a twin elm tree; thence southwesterly along the base of a cliff of rocks 772± feet to the northerly bounds of Delaware Avenue; thence easterly, southeasterly and northeasterly along the bounds of Delaware Avenue 790± feet to the point, the place of beginning. Containing three (3) acres of land.

Being the same premises conveyed by Knaust Brothers, Inc. to Katharine M. Knaust by Deed dated November 27, 1964 and recorded in the Ulster County Clerk's Office on December 2, 1964 in Liber 1160 of Deeds at page 673.

MAPS

MAP NO. 1

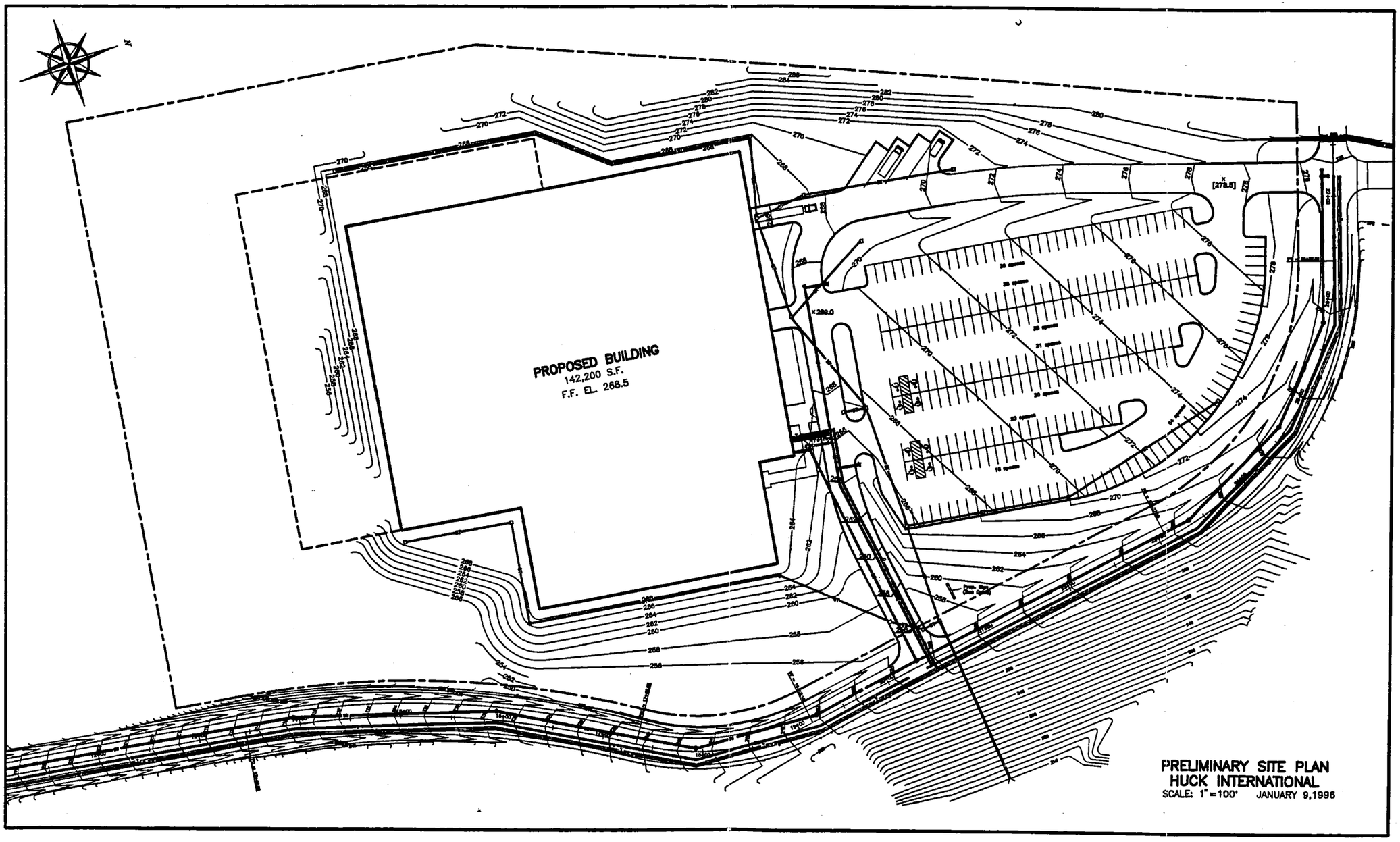


KINGSTON BUSINESS PARK
CONCEPTUAL DEVELOPMENT PLAN

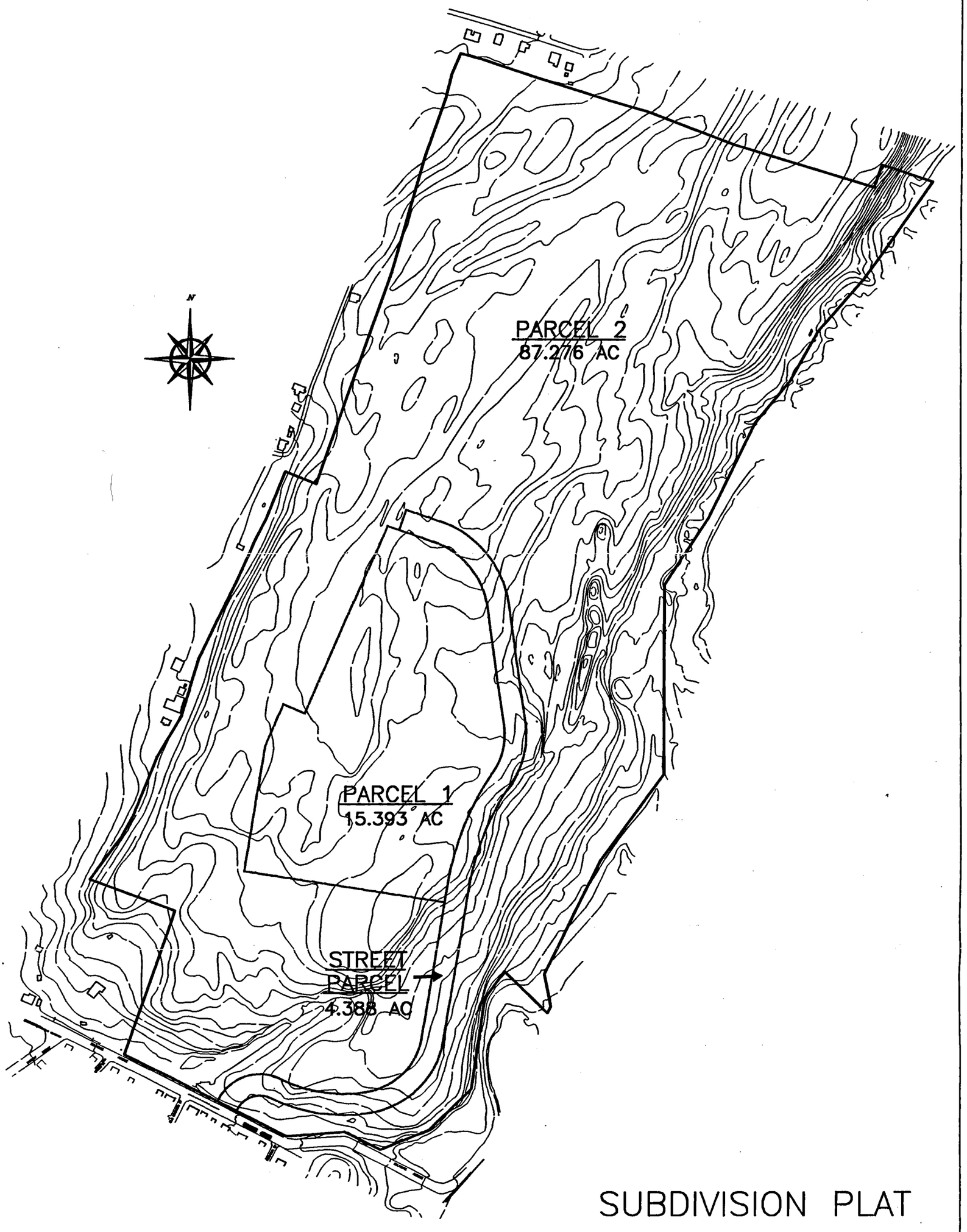
SCALE: 1"=300' JANUARY 1996

BRINNIER AND LARIOS, P.C.

MAP NO. 2


N
PROPOSED BUILDING
142,200 S.F.
F.F. EL. 268.5
PRELIMINARY SITE PLAN
HUCK INTERNATIONAL
SCALE: 1"=100' JANUARY 9,1996

MAP NO. 3

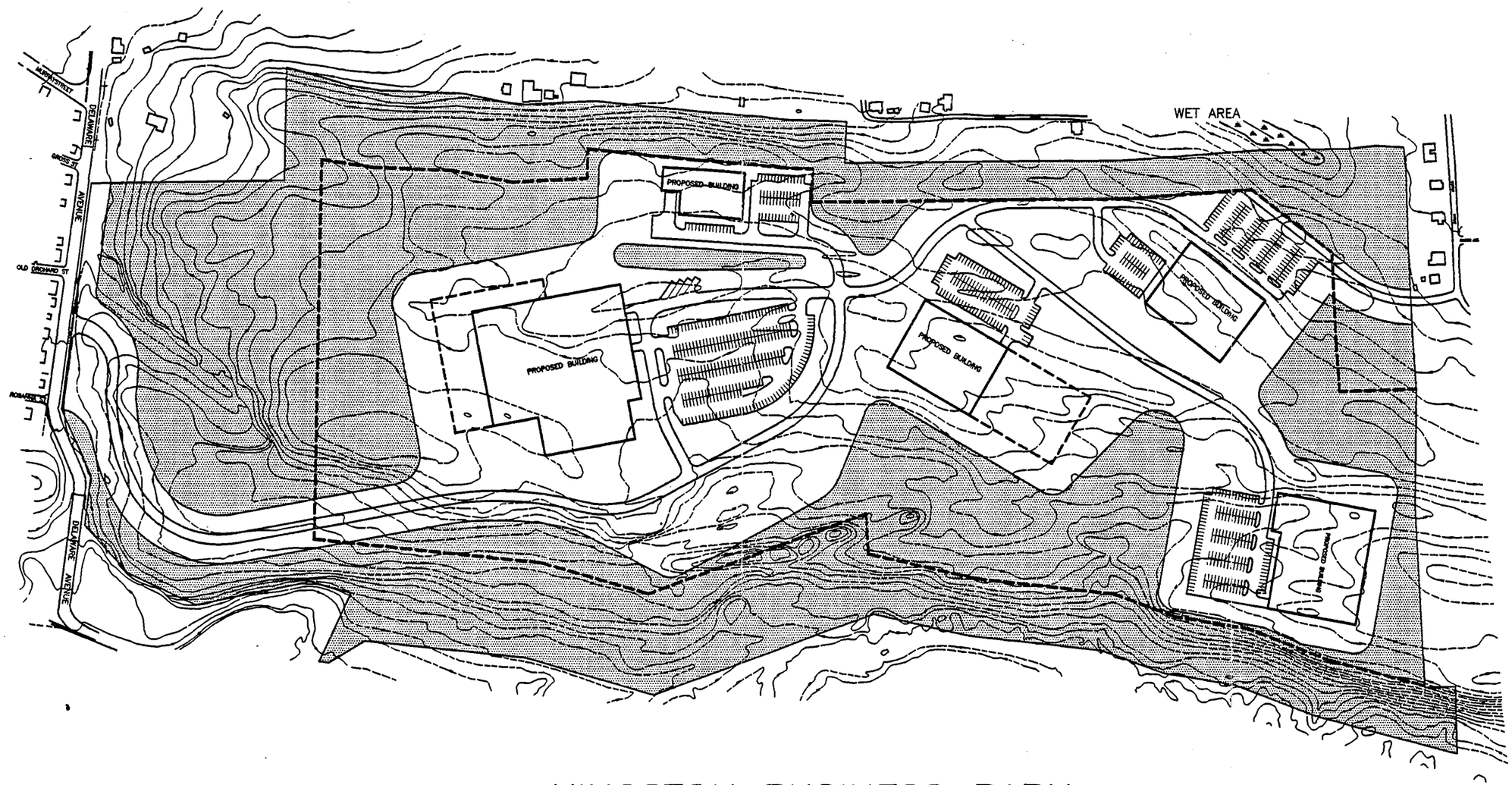


SUBDIVISION PLAT

JANUARY 1996

BRINNIER AND LARIOS, P.C.

MAP NO. 4



AREAS OF NON-DISTURBANCE

--- BUFFER ZONE BOUNDARY (REF. SEC. 507 PERFORMANCE DEVELOPMENT STANDARDS)

KINGSTON BUSINESS PARK
BUFFER ZONE BOUNDARY
AREAS OF NON-DISTURBANCE

SCALE: 1"=300' JANUARY 1996

BRINNIER AND LARIOS, P.C.

MAP NO. 5

(1) Net Usable space; 37,273 Sq Ft.

(2) Net Usable space; 70,000 Sq Ft

(3) Net Usable space; 63,477 Sq Ft.

(4) Net Usable space; 39,250 Sq Ft.

NOTE: 21% of the total space has been allowed for piers.

Total Net Usable Space, 250,000 Sq Ft.
" Cut, 78,832 Cu Yds
Fill, 4,239

THE FOLLOWING HAS BEEN ADDED TO THIS MAP BY BENNETT & LARISE, P.C. FOR ILLUSTRATION PURPOSES.

1. DELAWARE AVENUE - WEST.
2. SIDE STREETS.
3. PROPOSED ACCESS ROAD TO BUSINESS PARK.
4. APPROXIMATE PROPERTY LINE - KNAUST PARCEL.

JANUARY 15, 1996

GROSS STREET

DELAWARE AVENUE

OLD ORCHARD STREET

PROPOSED EDGE OF PAVEMENT

EXISTING EDGE OF PAVEMENT

PROPOSED ACCESS ROAD

STREET BOUNDARY

Park Road

Magnetic North

LEGEND

Wall — Conc. Block
Column
150 — Elev. outside of Cave
16 / 113.0 — Top figure distance from floor to ceiling. Bottom figure Elev. of floor
Outbounds for usable space
Iron Pin
x 165 — Proposed spot elevation

Water

Proposed Roads

Hole

Park Rd 3

Park Rd 2

Park Rd 1

Proposed Entrance

Entrance 15W 18th

Parking

Admin & Service Area

Flammable Stor. Elec.

24 Double Elm Tree

Property Line

Water El. 101.0

NOTE: Entrance road may be modified to lesser grade

DELAWARE AVE. (Outside)

Pond

KNAUST BROS INC.
CAVES AT KINGSTON, N.Y.
SCALE 1" = 50'

I certify that this map is a copy of the original map prepared by Boyd F. Allen, L.S. Jan 1956, with additions added 4/13/65.

John W. Ward, Jr.
L.S. NO. 38819
JUNE 15, 1965

BOYD F. ALLEN ASSOCIATES
LICENSED LAND SURVEYORS
TANNERSVILLE, NEW YORK

SURVEY & MAP BY
BOYD F. ALLEN
JANUARY, 1956

Addition to map 4/13/65

EXHIBIT A

WRITTEN COMMENTS RECEIVED

Bob - F4I

ULSTER COUNTY PLANNING BOARD
244 FAIR STREET • BOX 1800
KINGSTON, NEW YORK 12401
TELEPHONE AREA CODE 914 331-9300

December 11, 1995

Ms. Suzanne Cahill
City Planner, City of Kingston
One Garraghan Drive
Kingston, New York, 12401

RE: DGEIS
Kingston Business Park

Dear Ms. Cahill:

The Board congratulates the City on the level of detail shown in the Generic Environmental Impact Statement and the sensitivity demonstrated in dealing with key issues of its development.

The DGEIS clearly shows that the business park can be developed in an environmentally responsible manner. In addition, the Board notes that not only can the project be accomplished without significant impacts but also, that it should be, given its consistency with regional and community goals. Accordingly, the Board's comments on the DGEIS are directed towards clarification of technical items and suggested changes which, we believe, will contribute to an overall improvement in the project.

TRANSPORTATION

A policy should be included that commits the project to revisit the traffic growth and projections should any of the assumptions contained in the DGEIS alter. This is especially true of the regional external background growth now set at zero which could be influenced by overall development and popularity of the waterfront as well as the trip generation rates of future businesses in the park which may differ from those modeled. D-1

It would be helpful to know the reserve capacities at critical intersections before a change in level of service will be experienced. D-1

The northerly access road is mentioned as being utilized in developing the distribution model (page 7 Regional Distribution). Since this road is no longer being considered some explanation of how and/or if the model was altered is needed. D-2

Tables 3-7 labeled Volume/LOS present only intersection delay times without volumes which should be provided. D-1

The DGEIS is unclear regarding the means of construction access for Phase I. This should be clarified or the impacts associated with the proposed alternates addressed. D-3

Over the long-term, the development of a through-road to at least Third Avenue is in the best interest of public safety and mobility for both the Park and residents of the area. Development of this road should not be artificially precluded although its use for through-traffic could be restricted. D-2

Although the DGEIS presents compelling reasons why Huck will not require public transit access, a policy statement which indicates that the City stands willing to provide this service if needed or requested by Huck and future tenants should be included. This meets a key component of the EDZ strategy, to make work sites accessible to those within the zone. D-4

D **DRAINAGE**

The drainage calculations utilize a ten year storm. We would prefer, and most communities in the County require, the use of a 25 year storm to evaluate post development stormwater impacts. Rather than perform additional computer runs at this time we believe, that the information contained in the DGEIS is sufficient to conclude that stormwater can be handled on-site in an effective manner that deals with both quantity and quality of runoff. Detailed plans should be required as site plans are finalized (see following comment). B-2a.

The objectives contained in the storm water management plan provides design guidance. These should be supplemented by a policy statement which requires submittal of detailed drainage, erosion control and maintenance plans as part of the site plan review requirements. SP

✓ **AESTHETICS**

A 100 ft. buffer is offered as a mitigation measure regarding the visual impacts of the project. Given the sophistication of the methods employed and the importance of the resource involved, we suggest that the use of a flexible buffer directly related to the visual impact is more appropriate. This should identify ridgeline locations and vegetation that F-1

provides screening. Important locations and specimen trees should be marked in the field and preserved.

The visual simulations contained in the DGEIS are excellent. However, some of the underlying assumptions regarding their development are unclear to us.

Questions include:

- were buildings in both phases modeled
- what building height was used
- what first floor elevation was used
- was all foreground vegetation removed

F-3

Answers to these questions could result in policy statements such as:

- any proposed buildings ? feet greater than the modeled height or starting elevation will be required to be remodeled

F-3

- to the maximum extent practical and consistent with the City's site plan standards requiring location of trees greater than 8 inches in diameter, all foreground vegetation critical to viewshed screening will be conserved.

- Specimen trees will be utilized to provide additional screening and breakup building masses which are "sky lined" from important viewpoints.

ZONING & DEVELOPMENT STANDARDS

The Board concurs that the M-1 Light Manufacturing District is the appropriate existing classification within the City's zoning statute to utilize. The DGEIS addresses the gaps regarding the ability of the M-1 classification to mitigate project impacts on its own by the imposition of development standards within the business park. We support the imposition of the proposed development standards within the Park and commend the City for including them in the DGEIS. While the combination of private and public standards is laudable there is concern that the power to vary critical standards such as the buffer area and uses resides with the Development Corporation rather then the City Zoning Board of Appeals.

E.1.

Finally, the standards themselves deserve some additional attention. Variances should be required to meet the standards contained in General City Law. Building height limitations should not exempt "other structures". Lighting standards should be more detailed requiring the use of cut-off luminaries, setting candle power limits, and perhaps limited lighting types, i.e., high pressure sodium. Sign

E.1.

standards should include setbacks and landscaping requirements for free standing signs. Internally lighted free standing signs should be prohibited. Submittal of plans for drainage, erosion and sediment control should be required. A requirement for maintenance of building facades, landscaping, screening, drainage structures, and paved areas is needed. The Development Corporation should be given right of access for inspection purposes. Standards for undergrounding utilities should be included. Amendments to standards should require examination of the DGEIS for potential conflicts. Z0

MISCELLANEOUS

A provision should be made to provide natural gas within the park. H-3

Given the significant vistas to the Hudson River and the Park's location within the Coastal Zone Boundary the inclusion of a trail system, open to the public, should be considered. H-2

Very truly yours,

Dennis Doyle, Principal Planner
Ulster County Planning Board

HH/dms
CC: Hon. Daniel Alfonso
Hon. Jeanette Provenzano
Mr. Steve Finkle

Comments on Draft Generic Environmental Impact Statement (DGEIS) for the development of the KINGSTON BUSINESS PARK (KBP) for the Kingston Local Development Corporation (KLDC)

November 28, 1995

#1. Pg.6, C.1. The rezoning of the property is going from RRR to an M-1, light manufacturing, not I-1. ZO

#2. Pg. 13, B.(1)b. The performance standards should be incorporated into the rezoning decision of the Common Council. ZO

#3. Pg. 13, B.(1)c. The construction roadway should be located on site plan. D-3

#4. Map #5. Has a second emergency access been defined? If so, it should be shown on site plan. D-3

Concerned with the visibility of second, smaller building in phase 1. Will 100' buffer be effective with the steep slopes along the western edge of the site? F-1

A more detailed site plan will be required for the final environmental review. SP

#5. A scale should be provided on the subdivision plat, Map #5A.

#6. Pg. 14, #3. Development Summary. How are the numbers that are shown in the table derived? There is concern that the numbers generated as anticipated parking needs are not adequate to meet the needs of possible uses under the Zoning Ordinance. It is felt that a more conservative approach should be considered. ZO

#7. Pg. 15, #5. Proposed Development Standards. Again, when discussing the imposition of the development standards, it is felt that there should be mention of Common Council adopting certain restrictions within the rezoning documents themselves. E.1

#8. Map #6, Cut and Fill Plan. The area of disturbance is uncomfortably close to the western edge of the plateau area of phase I. Both visibility of the project and erosion are concerns. Because of the extensive cut and fill areas shown, site cross-sections should be provided for a more complete evaluation of the disturbance. A.3.a.

#9. Map #7, Erosion Control. Details of all erosion control features will be required for site plan approval. It appears that the number of erosion control devices and features is very minimal when comparing the plan to the disturbance plan and recognizing the steep slopes which are involved. More stabilization and retention techniques should be incorporated. A.2.a.

The erosion control plan fails to address construction of A.2.b.

Phase II. It was understood that the SEQRA process also incorporates the second phase.

#10. Will the proposed water pump station be located above or below ground? If above ground, building details and elevations will need to be shown for final site plan approval. H.1.b.

#11. Pg. 17, #5 Sewage Disposal. Is the City or KLDC going to install the sanitary sewer? Who is funding the installation? SP

Pg. 17, #7 Off-site Improvements. Do off-site improvements include traffic signals, crosswalks, sidewalks, etc... for both improved pedestrian and vehicular traffic? SP

#12. Pgs. 21 & 22, Mitigation Measures for Blasting. Will there be any pre-blasting or post-blasting surveys completed on adjacent properties? A.1.a.

#13. Pg 25. Will the cut material be used to fill? Will there be excess material and how will it be disposed of? Will vegetation removed during construction be replaced with in-kind plantings? A.3.b.

#14. Maps #10 & #11. These maps are difficult to interpret. They should be altered or provided in color so that they are not distorted in reproduction.

#15. Pg. 29, Mitigation. This section should be more elaborate. Reference construction and erosion control sections, utilize more native species of landscaping, create habitat areas to replace those lost, etc... A.2.a

#16. Pg. 30, Wetlands. The small area which may qualify should be located on the site plan for reference. C.2.a.

#17. Pg. 48, Visual Mitigation. As summized earlier, a 100' buffer on land does not necessarily translate into screeing, dependant on the topography. In cases where the buffer does not reach the plateau area, it is recommended that additional buffer restrictions be imposed to minimize any impact. F.1.

There is concern with the visual impact of the fill area of the access roadway and also with truck or larger traffic along it.

#18. Pg. 62, K.1. Fiscal Impacts. The City of Kingston should also be noted as a recipient of real estate taxes from the site. K.2.

#19. Exhibit 3, KPB Performance and Development Standards:

1. It should be made clarified that these standards are not a replacement of the current Zoning Regulations or other applicable laws. Nor do they negate any current review procedures which are established ZO/SP

E.1.

2. Exhibit A is not included.

3. The definition of parcel boundary line should be defined clearer, perhaps broken down to front, rear and sides.

4. 4.02, The wording of "sole determination" is inappropriate. City of Kingston agencies, as applicable, should be recognized.

5. 5.02, Reference to the City of Kingston Zoning Ordinance should be made so as to reduce the confusion between regulations.

6. 5.07, Reference is made to landscaping standards for the KBP. Are these Section 10? If so, a reference should be made.

5.07(c), Approval of who?

7. 5.10, The proposed guidelines for signage should be consistent with zoning and should be provided for review.

5.10(b), Approval of who?

5.10(c), Installation with local approval only.

5.10(e), Reference to the Noise Ordinance should be made for any possible audible devices. Consideration should also be given to devices which are visible at boundary lines.

8. 5.13, Outdoor storage should be closely monitored so as to be kept properly maintained.

9. 6.01, Plans should also have endoresment of Planning and Building Departments.

10. 6.05, Building permits are only to be issued by the appropriate local agency.

11. 6.07, As built plans should also be submitted to the Building and Planning Departments.

#20. Appendix B, List of agencies is included, individual contacts remains to be supplied.

#21. Appendix C-1, Traffic Impact Analysis:

1. Pg. 2, d. Site Generated Traffic. Throughout the DGEIS, the building size for HUCK has been 142,000 S.F. This increases the square footage of the balance on the site and alters the second component of the SGTV. D.1.

2. Pg. 5, 3.c.: Clarification should be made as to whether the divider to be installed will be painted markings on the pavement or a raised curbed divider? SP

3. Pg.7, 3.: In the third paragraph, what roadway is being referred to at the end of the second sentance?

#22. General:

1. Throughout the document the useage of the City vs. the KLDC should be double checked to insure the correct terminology.

2. If the alternate access way is chosen, will the same utility connections and so forth be utilized? SP

3. A secondary emergency access to the site needs to be identified and developed in conjunction with Phase I improvements. D.3.

4. Site utilization during construction needs to be explored further, i.e.- job trailers, security of site and equipment. SP

Suzanne Cahill

November 17, 1995

MEMORANDUM

TO: SUZANNE CAHILL, CITY PLANNER

FROM: ROBERT SCHROWANG, PLANNING AIDE

RE: KINGSTON BUSINESS PARK - DGEIS

1. Page 2, "will be located within the EDZ" when will the existing boundary lines of the EDZ be changed, so that the site is included.

2. Page 6, item number 1, I-1 should be changed to M-1.

3. Page 12, access road, "consideration will be given to extending this road north through lands of Tilcon Materials, across First Avenue to Route 32. This would provide a second means of access and enhance the location of the Business Park". The traffic study states that the second access is not required to provide adequate LOS, even if the entire park is constructed. If the second access will "enhance" the park will it be built, and will there be an agreement with Tilcon for the possible future road ? D.2.

4. Has the tenant for the second building been determined ?

5. Page 13, construction access, several places in the DGEIS this is discussed, but never finalized. The way that it is described on page 13, gives the impression that additional site clearing would be required, is this true ? D.3.

6. Who will observe the construction of the roadway and building sites, to assure that the approve plans are followed, will the KLDC hire a project manager ? In particular that the 100' buffer is maintained and that by "mistake" additional tress are not cleared (Toys R Us). A clearing plan should be required to be part of the site plan package. C.1.b.

7. The majority of the access road will be in constructed in a rock cut. The geotechnical report recommends that the rock be cut on an angle of 4 vertical per 1 horizontal, which has been indicated on the road sections. The question and concern is will additional rock removal (visual impact) be required to assure safe vehicular access to the site. Has consideration been given to the potential icing problem with the majority of road being constructed in what will appear to be a tunnel. A.1.c.

8. How will the City pay for items such as the blasting specialist ?

9. Page 21, Who will write the specifications and be responsible for their review for the project ?

10. Are street lights proposed along the new roadway ? How high will these lights be ? The KLDC design standards only allow 20' but CHG&E would probably want standard poles which are higher. If standard poles are installed, has the visual impact been addressed. F.4

11. Will bonds be required for the individual parcel site work ?

12. What will become of the excess rock which is removed ? The areas of fills appear to be minimal. A.3.b.

13. The KLDC development standards need to be revised to more closely follow and conform to the Zoning Ordinance. The process of site plan approval should be added to the standards to make an applicant to the KLDC aware that review and approval by the Kingston Planning Board is a requirement. E.1. ↓

14. The following is a listing of general questions/concerns with the standards.

a. 2.14 Parcel boundary line, the definitions needs to be made clearer.

b. 5.04 Building heights are limited to 40', but chimneys, towers ect. are not, has the visual impact of any proposed items over 40' been addressed.

c. 5.02(a) A listing similar to the zoning ordinance would more definitive, and cause less confusion than a general statement of "sufficient" spaces

d. 5.02(b) Is the intent of this statement to allow parking within the required setback ?

e. 5.07(g) Is the intent of this section to require a 100' buffer around the entire property boundary (107 acres) ? Or is it also the intent to include a 100' buffer on individual lot perimeters (front yard ect.)? If so, how do the setbacks of 75', 50' ect. correlate. Numerous section contradict each other as to what can and can't be constructed within the setback.

f. 9.03 How will variances be handled, what happens if the KLDC denies the variance and the ZBA grants, who has the control ? This section should also include not only the PB, but the ZBA who has the power to grant variances.

g. 6.03 Approval of plans, should this be revised as to include PB not just the KLDC as "sole"

h. 6.05 Is the wording of this paragraph correct ? "only from Corporation"

j. 7.01 The parcel performance and development standards for restaurants, cafeterias ect, have not been included. ↓

15. Site plan drawing 2 of 8, indicates parking within the required 75' setback, is this correct ?

16. Page 4 of the geotechnical report, states that the 8' cavity found at station 12+00 had further testing done on it, have we received the addendum to the report as of this date. A.1.b.

17. The test borings and test pits were only done in the area of phase one, is the area for the phase 2 improvements suitable to support their construction ? A.1.b.

B7:\BPSC

City of Kingston

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KINGSTON, NEW YORK 12401
(914) 331-0080 FAX: (914) 331-4057
CORPORATION COUNSEL OFFICE

TO: Sue Cahill, City Planner

FROM: Donna K. Hintz - Asst. Corporation Counsel DKH

DATE: November 15, 1995

RE: **Kingston Business Park**

I have completed my review of the Draft Generic Environmental Impact Statement for the Kingston Business Park. The following questions came to mind:

1. Who will insure that the 100 ft. buffer will be established and maintained? (Page 13) SP.

2. The Kingston Local Development Corporation's Performance and Development Standards must conform to the City of Kingston's zoning requirements. The City of Kingston's Planning Board has final approval on any development, however, the Planning Board may consider a KLDC standard in evaluating any improvement in the Business Park. 20

3. Who will be building and paying for the Delaware Avenue Booster Pump Station? (Page 16) L

4. Who will be paying for widening Delaware Avenue and improving the sanitary sewer and water connections? (Page 17) L

5. Is the City actually employing blasting specialists or is it the KLDC? (Page 21)

6. Are there or aren't there perennial streambeds on the site? (Page 27) B.2.b.

7. Proposed infiltration areas were conservatively analyzed. Would a worst case scenario analysis be more helpful? (Page 27) B.2.a.

8. In addressing pedestrian safety on Delaware Avenue, it was mentioned that a crossing guard would be stationed at the intersection. However, there is already a crossing guard on duty. If there is already a crossing guard does this really count as mitigation? (Page 35-36) D.4.

9. Who will be bearing the cost of the entrance road? (Page 64) L

lvw

KINGSTON WATER DEPARTMENT

PO 1537
CITY OF KINGSTON, N.Y. 12401

COMMISSIONERS
JOSEPH DE CICCO
President
KEITH WHITE
JOSEPH McGRANE
JOHN GADDIS
JUNE DIAMOND
Secretary

T.R. GALLO
Mayor
JUDITH A. HANSEN
Superintendent

OFFICE: CITY HALL
TELEPHONE (914) 331-0175

Memo

To: Suzanne Cahill, City Planner

From: Judith Hansen, Superintendent

Re: Accuracy of EIS for Kingston Business Park

Date: November 20, 1995

I have reviewed the section of the EIS referring to Water Supply and have found, what I consider to be, serious errors in the description of our water supply. I have noted the errors on a copy of the relevant pages and have inserted possible corrections. Briefly, the areas of concern are:

1. Although we have 4 raw water storage reservoirs, 3 of them are small auxiliary reservoirs that are only used in emergencies. While all are located in the Town of Woodstock, only the auxiliary sources are in the Sawkill watershed and are situated along the Sawkill Creek. Under normal conditions all of our water comes through Cooper Lake which is part of the Mink Hollow watershed. H.1.a.

2. The Kingston Water Department does sell water to the Town of Ulster for some of the Town's customers. However, we so not distribute this water to those customers. Rather, we sell the water to the Town from 2 points of connection within the City of Kingston and the Town distributes it to their residents. This may appear to be a minor point, but it has serious legal implications for this Department. H.1.a.

3. The Engineering Report on Water Supply, which is contained in Appendix C3 of the EIS, states that our Treatment Plant has a capacity of 6 MGD. This is incorrect and puts the Report in conflict with the body of the EIS where the capacity of the Plant is stated as being 8 MGD. The design capacity of the Plant is, in fact, 8 MGD. The safe yield on our watershed, however, has been calculated at 6 MGD. H.1.a.

Admittedly, these errors do not impact the substance of the EIS. However, they are inaccuracies concerning our overall water system and, if possible, should be corrected.

AWWA MEMBER
AMERICAN WATER WORKS ASSOCIATION

H. COMMUNITY SERVICES AND UTILITIES

1. Water Supply

a. Setting

The City of Kingston is served by a central water system, operated by a municipal water department established in 1895. The city's water supply source consists of four reservoirs ~~along the East Hill~~ in the Town of Woodstock. Water from ~~the lowest reservoir, base Zena~~ Cooper Lake, the principal storage reservoir, is piped into the ~~adjacent~~ Edmund T. Cloonan Water Treatment Plant, a designated American Water Works Historic ~~Building~~ Landmark. From here, treated water is piped to the City and distributed throughout the City, and also portions of the Town of Ulster. Flows are primarily by gravity, excepting for two small "high pressure" districts. The water system has a nominal capacity of 8 million gallons per day (mgd), with average water production at 4 mgd.

* Not really (see below

The site is bordered on its south by Delaware Avenue, which has 6" and 14" water mains. The site parallels (but does not abut) Third Avenue to the west, where 6" and 8" water mains exist to supply this residential service area. At the far north end of the site, private property and residences separate the subject site from Fourth Avenue and Ulster Street, which have 8" water mains.

In conjunction with this study, the Kingston Water Department (KWD) conducted flow tests at existing fire hydrants at different locations within the local distribution system. The most significant flow test was conducted on Delaware Avenue, where hydrant #4.82 was flowed at 1230 GPM, while Hydrant #5.48 yielded pressures of 105 psig static and 87 psig residual. These tests indicate that the system is capable of supplying a flow in excess of 1230 GPM while maintaining satisfactory downstream residual pressures.

* We Do NOT Distribute WATER to Town Customers. we sell the Town water (at 2 points within the City) & they Distrib it!

b. Potential Impacts

Based on conservative estimates, the Kingston Business Park will require 50,000 gallons per day upon complete build-out of all phases. Peak

ENGINEERING REPORT ON WATER SUPPLY

KINGSTON BUSINESS PARK
DELAWARE AVENUE, KINGSTON, NEW YORK

Introduction

The proposed Kingston Business Park is planned for two phases. Phase I will result in the construction of two buildings for industrial/manufacturing purposes, totalling 250,000 SF. Phase II is conceptually planned as another 250,000 SF of building space, again for industrial/manufacturing purposes. The entire site encompasses about 107 acres of land in the City of Kingston, and is located off of Delaware Avenue (see Exhibit 1).

The purpose of this report is to provide an analysis of water supply needs and requirements for the proposed project, to evaluate the adequacy of the city water system to supply domestic and fire-fighting services to the project, and to describe alternatives for providing the required services.

Existing Water Supply

Water supply to the site is provided by the City of Kingston Water Department (KWD). In this area, the pressure gradient is off of Binnewater Reservoir, which is fed by the KWD filter plant located in Zena. The KWD currently supplies an average of about 4.0 MGD, whereas the filter plant has a reported capacity of 8 MGD ~~(1989 Ulster County Water Supply Study - Stearns & Wheler Engineers)~~. The KWD has indicated that they will be able to supply the projected water demands to the project (see Exhibit #2). *

The subject site is bordered on its south by Delaware Avenue, which has 6" and 14" water mains. The site parallels (but does not abut) Third Avenue to the west, where 6" and 8" water mains exist to supply this residential service area. At the far north end of the site, private property and residences separate the subject site from Fourth Avenue and Ulster Street, which have 8" water mains.

In conjunction with this study, the KWD conducted flow tests at existing fire hydrants at different locations within the local distribution system. The results of said tests, as reported by the KWD, are shown in Appendix A. Refer to Exhibit 3 for hydrant locations. The most significant flow test was conducted on Delaware Avenue, where hydrant #4.82 was flowed at 1230 GPM, while hydrant #5.48 yielded pressures of 105 psig static and 87 psig residual. These tests indicate that the system is capable of supplying a flow in excess of 1230 GPM while maintaining satisfactory downstream residual pressures.

* The referenced report was prepared by outside agencies with little input from this Dept. or our engineers.

City of Kingston

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URBAN CULTURAL PARK COMMISSION

Mr. Lee Molyneaux, Chairman
Kingston Planning Board
1 Garraghan Drive, City Hall
Kingston, New York 12401

December 4, 1995

Dear Chairman Molyneaux,

The Kingston Urban Cultural Park Commission, acting as the Waterfront Consistency Review Board, has reviewed the Coastal Assessment forms filled out by the applicants for the construction of the Kingston Business Park to be located on Delaware Avenue.

The Waterfront Consistency Review Board has found the application to be consistent with the policies set forth in the Local Waterfront Revitalization Program. A copy of our review of the Coastal Consistency Assessment form is attached for your reference.

On behalf of the Kingston UCP Commission.
Yours Truly,

Christine A. Howard

Christine A. Howard
KUCP, Coordinator

URBAN CULTURAL PARKS COMMISSION LWRP COASTAL CONSISTENCY ASSESSMENT FORM: This form is to be used in determining whether an action, located within the coastal boundary of the City of Kingston, would be consistent, to the maximum extent practicable, with the policies and purposes of the approved City of Kingston Local Waterfront Revitalization Program (LWRP) in accordance with local law #4 of the year 1992, no board, officer, office, person, or other agency shall undertake a proposed action if it has been determined to be inconsistent with the LWRP.

PART I:
DEVELOPMENT POLICIES:

CONSISTENT=C CONSISTENT AS MODIFIED=M INCONSISTENT=I

POLICY 1:
RESTORE, REVITALIZE, AND REDEVELOP DETERIORATED AND UNDER-UTILIZED WATERFRONT AREAS FOR COMMERCIAL AND INDUSTRIAL, CULTURAL, RECREATIONAL, AND OTHER COMPATIBLE USES.

C M I

POLICY 1A:
REDEVELOP THE FORMERLY INDUSTRIALIZED AND MINED AREAS OF THE HUDSON RIVER WATERFRONT TO INCLUDE WATER-DEPENDENT AND WATER-ENHANCED RECREATIONAL USES AND OTHER COMPATIBLE USES THAT WILL INCREASE PUBLIC ACCESS TO AND PUBLIC ENJOYMENT OF THIS AREA.

C M I NA

POLICY 1B:
PROMOTE REPLACEMENT OF EXISTING USES WHICH DETRACT FROM THE RONDOUT CREEK WATERFRONT AND WHICH DISCOURAGE MORE APPROPRIATE DEVELOPMENT IN THIS AREA.

C M I NA

POLICY 1C:
RESTORE AND REVITALIZE THE PREDOMINANTLY RESIDENTIAL CHARACTER OF THE HISTORIC WILBUR AND PONCKOCKIE NEIGHBORHOODS.

C M I NA

POLICY 1D:
RESTORE AND REVITALIZE THE MIXED RESIDENTIAL AND SMALL-SCALE COMMERCIAL CHARACTER OF THE HISTORIC RONDOUT NEIGHBORHOOD.

C M I NA

POLICY 1E:
RESTORE, REVITALIZE, AND REDEVELOP THE AREA BETWEEN KINGSTON POINT AND THE EAST STRAND ALONG THE RONDOUT CREEK FOR COMMERCIAL AND RECREATIONAL WATER-DEPENDENT AND WATER-ENHANCED USES THAT WIL INCREASE PUBLIC ENJOYMENT OF THIS AREA

C M I NA

POLICY 2:
FACILITATE THE SITING OF WATER DEPENDENT USES AND FACILITIES ON OR ADJACENT TO COASTAL WATERS.

C M I NA

POLICY 2A:
DEVELOP NEW WATER-DEPENDENT USES ALONG THE RONDOUT CREEK AND HUDSON RIVER WATERFRONTS.

C M I NA

POLICY 2B:
PRESERVE EXISTING WATER-DEPENDENT AND WATER-ENHANCED USES.

C M I NA

POLICY 2C:
ADAPT THE MILLEN STEEL, CORNELL STEAMSHIP COMPANY AND OTHER SIMILAR HISTORIC BUILDINGS FOR USES MORE APPROPRIATE TO THEIR WATERFRONT LOCATION.

C M I NA

POLICY 3:
FURTHER DEVELOP THE STATE'S MAJOR PORTS OF ALBANY, BUFFALO, NEW YORK, OGDNESBURG, AND OSWEGO AS CENTERS OF COMMERCE AND INDUSTRY AND ENCOURAGE THE SITING IN THESE PORT AREAS, INCLUDING THOSE UNDER THE JURISDICTION OF THE STATE, PUBLIC AUTHORITIES OF LAND USE AND DEVELOPMENT WHICH IS ESSENTIAL TO OR IN SUPPORT OF THE WATERBORNE TRANSPORTATION OF CARGO AND PEOPLE.

C M I NA

POLICY 4:
STRENGTHEN THE ECONOMIC BASE OF SMALLER HARBOR AREAS BY ENCOURAGING THE DEVELOPMENT AND ENHANCEMENT OF THOSE TRADITIONAL USES AND ACTIVITIES WHICH HAVE PROVIDED SUCH AREAS WITH THEIR UNIQUE MARITIME IDENTITY.

C M I NA

POLICY 4A:
ENCOURAGE THE DEVELOPMENT AND EXPANSION OF THE TROLLEY MUSEUM, INCLUDING REHABILITATION OF THE OLD RAIL TRACKS FROM THE STRAND TO KINGSTON POINT.

C M I NA

POLICY 4B:
SUPPORT THE CONTINUED GROWTH OF THE MARITIME MUSEUM ADJACENT TO THE RONDOUT CREEK AND THE LIGHTHOUSE OFF KINGSTON POINT AS A VALUABLE INSTITUTION DEVOTED TO EDUCATING THE PUBLIC ABOUT THE HUDSON RIVER AND KINGSTON'S HISTORIC HARBOR.

C M I NA

POLICY 4C:
PROMOTE PRIVATE DEVELOPMENT OF ON-SHORE FACILITIES, INCLUDING DOCKS, TO SERVE THE HUDSON RIVER TOUR BOAT INDUSTRY.

C M I NA

POLICY 5:
ENCOURAGE THE LOCATION OF DEVELOPMENT IN AREAS WHERE PUBLIC SERVICES AND FACILITIES ESSENTIAL TO SUCH DEVELOPMENT ARE ADEQUATE.

C M I NA

POLICY 5A:
ENCOURAGE DEVELOPMENT AND ADAPTIVE RE-USE IN THE WEST STRAND, RONDOUT CREEK, AND URBAN RENEWAL AREAS WHERE THE INFRASTRUCTURE IS ADEQUATE AND UNDERUSED.

C M I NA

POLICY 5B:
UPGRADE CERTAIN DEFICIENT INFRASTRUCTUR ELEMENTS IN THE RONDOUT, WEST STRAND AND PONCKHOCKIE NEIGHBORHOODS AND ALONG THE HUDSON RIVER.

(C.) M I

POLICY 6:
EXPEDITE PERMIT PROCEDURES IN ORDER TO FACILITATE THE SITING OF DEVELOPMENT ACTIVITIES AT SUITABLE LOCATIONS.

(C.) M I

POLICY 7: FISH AND WILDLIFE POLICIES
SIGNIFICANT COASTAL FISH AND WILDLIFE HABITATS, AS IDENTIFIED ON THE COASTAL AREA MAP, SHALL BE PROTECTED, PRESERVED, AND WHERE PRACTICAL, RESTORED SO AS TO MAINTAIN THEIR VIABILITY AS HABITATS.

C M I NA

POLICY 7A:
THE RONDOUT CREEK HABITAT SHALL BE PROTECTED, PRSERVED AND WHERE PRACTICAL, RESTORED SO AS TO MAINTAIN ITS VIABILITY AS A HABITAT.

C M I NA

POLICY 7B:
THE LOCALLY IMPORTANT HABITAT AT KINGSTON POINT PARK, ALSO KNOWN AS K.E.4, SHALL BE PROTECTED, PRESERVED AND WHERE PRATICABLE, RESTORED SO AS TO MAINTAIN ITS VIABILITY AS A HABITAT.

C M I NA

POLICY 8:
PROTECT FISH AND WILDLIFE RESOURCES IN THE COASTAL AREA FROM THE INTRODUCTION OF HAZARDOUS WASTES AND OTHER POLLUTANTS WHICH ACCUMULATE IN THE FOOD CHAIN OR WHICH CAUSE SIGNIFICANT SUBLETHAL OR LETHAL EFFECTS ON THOSE RESOURCES.

C (M) I

POLICY 9:
EXPAND RECREATIONAL USE OF FISH AND WILDLIFE RESOURCES IN COASTAL AREAS BY INCREASING ACCESS TO EXISTING RESOURCES, SUPPLEMENTING EXISTING STOCKS, AND DEVELOPING NEW RESOURCES. SUCH EFFORTS SHALL BE MADE IN A MANNER WHICH ENSURES THE PROTECTION OF RENEWABLE FISH AND WILDLIFE RESOURCES AND CONSIDERS OTHER ACTIVITIES DEPENDENT ON THEM.

C M I NA

POLICY 10:
FURTHER DEVELOP COMMERCIAL FINFISH, SHELLFISH, AND CRUSTACEAN RESOURCES IN THE COASTAL AREA BY:
(i) ENCOURAGING THE CONSTRUCTION OF NEW OR IMPROVEMENT OF EXISTING ON SHORE COMMERCIAL FISHING FACILITIES:
(ii) INCREASING MARKETING OF THE STATE'S SEAFOOD PRODUCTS; AND
(iii) MAINTAINING ADEQUATE STOCKS AND EXPANDING AQUACULTURE FACILITIES. SUCH EFFORT SHALL BE MADE IN A MANNER WHICH ENSURES THE PROTECTION OF SUCH RENEWABLE FISH RESOURCES AND CONSIDERS OTHER ACTIVITIES DEPENDENT ON THEM.

C M I NA

POLICY 10A:
ENCOURAGE RETAIL AND WHOLESALE FISH MARKETING WITHIN THE WATERFRONT AREA.

C M I NA

POLICY 11: FLOODING AND EROSION HAZARDS POLICIES
BUILDINGS AND OTHER STRUCTURES WILL BE SITED IN THE COASTAL AREA SO AS TO MINIMIZE DAMAGE TO PROPERTY AND THE ENDANGERING OF HUMAN LIVES CAUSED BY FLOODING AND EROSION.

(C) M I

POLICY 12:
ACTIVITIES OR DEVELOPMENT IN THE COASTAL AREA WILL BE UNDERTAKEN SO AS TO MINIMIZE DAMAGE TO NATURAL RESOURCES AND PROPERTY FROM FLOODING AND EROSION BY PROTECTING NATURAL PROTECTIVE FEATURES INCLUDING BEACHES, DUNES, BARRIER ISLANDS, AND BLUFFS. PRIMARY DUNES WILL BE PROTECTED FROM ALL ENCROACHMENTS THAT COULD IMPAIR THEIR NATURAL PROTECTIVE CAPACITY.

(C) M I

POLICY 13: THE CONSTRUCTION OR RECONSTRUCTION OF EROSION PROTECTION STRUCTURES SHALL BE UNDERTAKEN ONLY IF THEY HAVE A REASONABLE PROBABILITY OF CONTROLLING EROSION FOR AT LEAST THIRTY YEARS AS DEMONSTRATED IN DESIGN AND CONSTRUCTION STANDARDS AND/OR ASSURED MAINTENANCE OR REPLACEMENT PROGRAMS.

C M I

POLICY 13A:
BULKHEADS SHALL BE RECONSTRUCTED ALONG RONDOUT CREEK.

C M I NA

POLICY 14:
ACTIVITIES AND DEVELOPMENT INCLUDING THE CONSTRUCTION OR RECONSTRUCTION OF EROSION PROTECTION STRUCTURES SHALL BE UNDERTAKEN SO THAT THERE WILL BE NO MEASURABLE INCREASE IN EROSION OR FLOODING AT THE SITE OF SUCH ACTIVITIES OR DEVELOPMENT OR AT OTHER LOCATIONS.

C M I

POLICY 15:
MINING, EXCAVATION, OR DREDGING IN COASTAL WATERS SHALL NOT SIGNIFICANTLY INTERFERE WITH THE NATURAL COASTAL PROCESSES WHICH SUPPLY BEACH MATERIALS TO LAND ADJACENT TO SUCH WATERS AND SHALL BE UNDERTAKEN IN AMANNER WHICH WILL NOT CAUSE AN INCREASE IN EROSION OF SUCH LAND.

C M I NA

POLICY 16:
PUBLIC FUNDS SHALL ONLY BE USED FOR EROSION PROTECTIVE STRUCTURES WHERE NECESSARY TO PROTECT HUMAN LIFE, AND NEW DEVELOPMENT WHICH REQUIRES A LOCATION WITHIN OR ADJACENT TO AN EROSION HAZARD AREA TO BE ABLE TO FUNCTION, OR EXISTING DEVELOPMENT: AND ONLY WHERE THE PUBLIC BENEFITS OUTWEIGH THE LONG-TERM MONETARY AND OTHER COSTS INCLUDING THE POTENTIAL FOR INCREASING EROSION AND ADVERSE EFFECTS ON NATURAL PROTECTIVE FEATURES.

C M I NA

POLICY 17:
WHENEVER POSSIBLE, USE NONSTRUCTURAL MEASURES TO MINIMIZE DAMAGE TO NATURAL RESOURCES AND PROPERTY FROM FLOODING AND EROSION. SUCH MEASURES SHALL INCLUDE: (1) THE SETBACK OF BUILDINGS AND STRUCTURES; (2) THE PLANTING OF VEGETATION AND THE INSTALLATION OF SAND FENCING AND DRAINING; (3) THE RESHAPING OF BLUFFS; AND (4) THE FLOOD-PROOFING OF BUILDINGS OR THEIR ELEVATION ABOVE THE BASE FLOOD LEVEL.

C M I NA

POLICY 18:
TO SAFEGUARD THE VITAL ECONOMIC, SOCIAL AND ENVIRONMENTAL INTERESTS OF THE STATE AND OF ITS CITIZENS, PROPOSED MAJOR ACTIONS IN THE COASTAL AREA MUST GIVE FULL CONSIDERATION TO THOSE INTERESTS, AND TO THE SAFEGUARDS WHICH THE STATE HAS ESTABLISHED TO PRTECT VALAUABLE COASTAL RESOURCE AREAS.

(C) M I

PUBLIC ACCESS POLICIES

POLICY 19:
PROTECT, MAINTAIN, AND INCREASE THE LEVELS AND TYPES OF ACCESS TO PUBLIC WATER RELATED RECREATION RESOURCES AND FACILITIES SO THAT THESE RESOURCES AND FACILITIES MAY BE FULLY UTILIZED BY ALL THE PUBLIC IN ACCORDANCE WITH REASONABLY ANTICIPATED PUBLIC RECREATION NEEDS AND THE PROTECTION OF HISTORIC AND NATURAL RESOURCES. IN PROVIDING SUCH ACCESS, PRIORITY SHALL BE GIVEN TO PUBLIC BEACHES, BOATING FACILITIES, FISHING AREAS, AND WATERFRONT PARKS.

C M I NA

POLICY 19A:
PROTECT, MAINTAIN AND INCREASE LEVELS AND TYPES OF ACCESS TO KINGSTON POINT PARK AND WEST STRAND PLAZA.

C M I NA

POLICY 19B:
PROVIDE PEDESTRIAN ACCESS TO THE LIGHTHOUSE AT KINGSTON POINT PARK.

C M I NA

POLICY 20:
ACCESS TO THE PUBLICLY-OWNED FORESHORE AND TO LANDS IMMEDIATELY ADJACENT TO THE FORESHORE OR THE WATER'S EDGE THAT ARE PUBLICLY-OWNED SHALL BE PROVIDED, AND IT SHOULD BE PROVIDED IN SUCH A MANNER COMPATIBLE WITH ADJOINING USES. SUCH LANDS SHALL BE RETAINED IN PUBLIC OWNERSHIP.

C M I NA

POLICY 20A:
PROVIDE OPPORTUNITIES FOR CONTINUOUS PUBLIC ACCESS ALONG THE RONDOUT CREK WATERFRONT FROM WEST STRAND TO KINGSTON POINT AND TO THE HUSON RIVER FROM KINGSTON POINT TO THE CITY LINE.

C M I NA

RECREATION POLICIES

POLICY 21:
WATER DEPENDENT AND WATER ENHANCED RECREATION SHALL BE ENCOURAGED AND FACILITATED AND SHALL BE GIVEN PRIORITY OVER NON-WATER RELATED USES ALONG PRESERVATION AND ENHANCEMENT OF OTHER COASTAL RESOURCES AND TAKES INTO ACCOUNT DEMAND FOR SUCH FACILITIES. IN FACILITATING SUCH ACTIVITIES, PRIORITY SHALL BE GIVEN TO AREAS WHERE ACCESS TO THE RECREATION OPPORTUNITIES OF THE COAST CAN BE PROVIDED BY NEW OR EXISTING PUBLIC TRANSPORTATION SERVICES AND TO THOSE AREAS WHERE THE USE OF THE SHORE IS SEVERELY RESTRICTED BY EXISTING DEVELOPMENT.

C M I NA

POLICY 21A:
DEVELOP, EXPAND AND IMPROVE EXISTING PUBLIC WATER-DEPENDENT AND ENHANCED RECREATION FACILITIES ALONG THE HUDSON RIVER AND RONDOUT CREEK WATERFRONTS.

C M I NA

POLICY 21B:
ENCOURAGE THE DEVELOPMENT, EXPANSION AND IMPROVEMENT OF PRIVATE WATER-DEPENDENT AND ENHANCED RECREATION FACILITITES ALONG THE HUDSON RIVER AND RONDOUT CREEK WATERFRONTS.

C M I NA

POLICY 22:
DEVELOPMENT, WHEN LOCATED ADJACENT TO THE SHORE, SHALL PROVIDE FOR WATER-RELATED RECREATION AS A MULTIPLE USE WHENEVER SUCH RECREATIONAL USE IS APPROPRIATE IN LIGHT OF REASONABLY ANTICIPATED DEMAND FOR SUCH ACTIVITIES AND THE PRIMARY PURPOSE OF THE DEVELOPMENT.

C M I NA

HISTORIC AND SCENIC POLICIES

POLICY 23:
PROTECT, ENHANCE, AND RESTORE STRUCTURES, DISTRICTS, AREAS, OR SITES THAT ARE OF SIGNIFICANCE IN THE HISTORY, ARCHITECTURE, ARCHAEOLOGY, OR CULTURE OF THE STATE, ITS COMMUNITIES, OR THE NATION.

C M I

POLICY 23A:
THE CHARACTER OF THE RONDOUT AND CHESTNUT STREET HISTORIC DISTRICTS SHALL BE PRESERVED WHILE ACCOMMODATING ECONOMIC GROWTH INDIVIDUAL HISTORIC STRUCTURES OUTSIDE THESE DISTRICTS SHALL BE PRESERVED IN LIKE MANNER.

C M I NA

SCENIC QUALITY POLICIES

POLICY 24:
PREVENT IMPAIRMENT OF SCENIC RESOURCES OF STATEWIDE SIGNIFICANCE AS IDENTIFIED ON THE COASTAL AREA MAP. IMPAIRMENT SHALL INCLUDE:

(i) THE IRREVERSIBLE MODIFICATION OF GEOLOGICAL FORMS, THE DESTRUCTION OR REMOVAL OF STUCTURES, WHEREVER THE GEOLOGIC FORMS, VEGETATION OR STRUCTURES ARE SIGNIFICANT TO THE SCENIC QUALITY OF AN IDENTIFIED RESOURCE; AND

(ii) THE ADDITION OF STRUCTURES WHICH, BECAUSE OF SITING OR SCALE, WILL REDUCE IDENTIFIED VIEWS OR WHICH BECAUSE OF SCALE, FORM, OR MATERIALS WILL DIMINISH THE SCENIC QUALITY OF AN IDENTIFIED SOURCE.

C M I NA

POLICY 25:
PROTECT, RESTORE AND EHANCE NATURAL AND MAN-MADE RESOURCES WHICH ARE NOT IDENTIFIED AS BEING OF STATEWIDE SIGNIFICANCE, BUT WHICH CONTRIBUTE TO THE SCENIC QUALITY OF THE COASTAL AREA.

C M I

POLICY 25A:
PROTECT, RESTORE AND ENHANCE SCENIC VIEWS OR VISTAS OF LOCAL IMPORTANCE, INCLUDING VIEWS FROM HASBROUCK PARK, KINGSTON POINT, RONDOUT II LIGHTHOUSE, ISLAND DOCK, AND THE PORT EWEN SUSPENSION BRIDGE.

C M I

POLICY 25B:
PROTECT, PRESERVE AND ENHANCE THE GENERAL VISUAL QUALITY OF THE HUDSON RIVER AND RONDOUT CREEK WATERFRONTS.

C M I

AGRICULTURAL LANDS POLICY

POLICY 26:
TO CONSERVE AND PROTECT AGRICULTURAL LANDS INT HE STATE'S COASTAL AREA, AN ACTION SHALL NOT RESULT IN A LOSS, NOT IMPAIR THE PRODUCTIVITY, OF IMPORTANT AGRICULTURAL LANDS AS IDENTIFIED ON THE COASTAL AREA MAP, IF THAT LOSS OR IMPAIRMENT WOULD ADVERSELY AFFECT THE VIABILITY OF AGRICULTURE IN AN AGRICULTURAL DISTRICT OR IF THERE IS NO AGRICUTURAL DISTRICT IN THE AREA SURROUNDING SUCH LANDS.

C M I NA

ENERGY AND ICE MANAGEMENT POLICIES

POLICY 27:
DECISIONS ON THE SITING AND CONSTRUCTION OF MAJOR ENERGY FACILITIES IN THE COASTAL AREA WILL BE BASED ON PUBLIC ENERGY NEEDS, COMPATIBILITY OF SUCH FACILITIES WITH THE ENVIRONMENT, AND THE FACILITY'S NEED FOR A SHOREFRONT LOCATION.

C M I NA

POLICY 28:
ICE MANAGEMENT PRACTICES SHALL NOT DAMAGE SIGNIFICANT FISH AND WILDLIFE AND THEIR HABITATS, INCREASE SHORELINE EROSION OR FLOODING, OR INTERFERE WITH PRODUCTION OF HYDROELECTRIC POWER.

C M I NA

POLICY 29:
ENCOURAGE THE DEVELOPMENT OF ENERGY RESOURCES ON THE OUTER CONTINENTAL SHELF, IN LAKE ERIE AND IN OTHER WATER BODIES, AND ENSURE ENVIRONMENTAL SAFETY OF SUCH ACTIVITIES.

C M I NA

WATER AND AIR RESOURCES POLICY

POLICY 30:
MUNICIPAL, INDUSTRIAL, AND COMMERCIAL DISCHARGE OF POLLUTANTS INCLUDING BUT NOT LIMITED TO TOXIC AND HAZARDOUS SUBSTANCES INTO COASTAL WATERS WILL CONFORM TO STATE AND NATIONAL WATER QUALITY STANDARDS.

(C) M I

POLICY 30A:
WATER COURSES AND THE ATMOSPHERE SHOULD BE KEPT CLEAN AND POLLUTION ABATED WHERE IT NOW EXISTS.

(C) M I

POLICY 30B:
SOURCES OF POTABLE WATER SUPPLY AND WATER TABLE SHOULD BE SAFEGUARDED.

C M I

POLICY 31:
STATE COASTAL AREA POLICIES AND PURPOSES OF APPROVED LOCAL WATERFRONT REVITALIZATION PROGRAMS WILL BE CONSIDERED WHILE REVIEWING COASTAL WATER CLASSIFICATIONS AND WHILE REVIEWING COASTAL WATER CLASSIFICATIONS AND WHILE MODIFYING WATER QUALITY STANDARDS; HOWEVER, THOSE WATERS ALREADY OVER BURDENED WITH CONTAMINANTS WILL BE RECOGNIZED AS BEING A DEVELOPMENT CONSTRAINT.

C M I NA

POLICY 32:
ENCOURAGE THE USE OF ALTERNATIVE OR INNOVATIVE SANITARY WASTE SYSTEMS IN SMALL COMMUNITIES WHERE THE COSTS OF CONVENTIONAL FACILITIES ARE UNREASONABLY HIGH GIVEN THE SIZE OF THE EXISTING TAX BASE OF THESE COMMUNITIES.

C M I NA

POLICY 33:
BEST MANAGEMENT PRACTICES WILL BE USED TO ENSURE THE CONTROL OF STORMWATER RUNOFF AND COMBINED SEWER OVERFLOWS DRAINING INTO COASTAL WATERS.

C M I

POLICY 33A:
ELIMINATE COMBINED STORM AND SANITARY SEWERS WHERE FEASIBLE.

C M I

POLICY 33B:
WORK TOWARD UPGRADING COMBINED STORM AND SANITARY SEWERS WHERE SEPARATE SYSTEMS ARE INFEASIBLE.

C M I NA

POLICY 34:
DISCHARGE OF WASTE MATERIALS FROM VESSELS INTO COASTAL WATERS WILL BE LIMITED SO AS TO PROTECT SIGNIFICANT FISH AND WILDLIFE HABITATS, RECREATIONAL AREAS, AND WATER SUPPLY AREAS.

C M I NA

POLICY 34A:
MARINAS SHALL BE REQUIRED TO MAKE SEWAGE DISCHARGE FACILITIES ACCESSIBLE FOR USE BY THE GENERAL PUBLIC.

C M I NA

POLICY 35:
DREDGING AND DREDGE SPOIL DISPOSAL IN COASTAL WATERS WILL BE UNDERTAKEN IN A MANNER THAT MEETS EXISTING STATE DREDGING PERMIT REQUIREMENTS AND PROTECTS SIGNIFICANT FISH AND WILDLIFE HABITATS, SCENIC RESOURCES, NATURAL PROTECTIVE FEATURES, IMPORTANT AGRICULTURAL LANDS, AND WETLANDS.

C M I NA

POLICY 36:
ACTIVITIES RELATED TO THE SHIPMENT AND STORAGE OF PETROLEUM AND OTHER HAZARDOUS MATERIALS WILL BE CONDUCTED IN A MINIMIZE SPILLS INTO COASTAL WATERS; ALL PRACTICABLE EFFORTS WILL BE UNDERTAKEN
TO EXPEDITE THE CLEANUP OF SUCH DISCHARGES; AND RESTITUTION FOR DAMAGES WILL BE REQUIRED WHEN THESE SPILLS OCCUR.

C M I NA

POLICY 36A:
ALL TANKS AND TANK FARMS SHALL BE CONTAINED BY LAND BERMS OR STRUCTURES TO PREVENT PETROLEUM OR HAZARDOUS OR OTHER STORED PRODUCTS FORM ENTERING OTHER PUBLIC OR PRIVATE LANDS OR BODIES OF WATER OR DRAINAGE COURSES OR SYSTEMS.

C M I NA

POLICY 37:
BEST MANAGEMENT PRACTICES WILL BE UTILIZED TO MINIMIZE THE NON-PROFIT DISCHARGE OF EXCESS NUTRIENTS, ORGANICS, AND ERODED SOILS INTO COASTAL WATERS.

C M I NA

POLICY 38:
THE QUALITY AND QUANTITY OF SURFACE WATER AND GROUND WATER SUPPLIES WILL BE CONSERVED AND PROTECTED, PARTICULARLY WHERE SUCH WATERS CONSTITUTE THE PRIMARY OR SOLE SOURCE OF WATER SUPPLY.

C M I NA

POLICY 39:
THE TRANSPORT, STORAGE, TREATMENT, AND DISPOSAL OF SOLID WASTES, PARTICULARLY HAZARDOUS WASTES WITHIN COASTAL AREAS WILL BE CONDUCTED IN SUCH A MANNER SO AS TO PROTECT GROUNDWATER AND SURFACE WATER SUPPLIES, SIGNIFICANT FISH AND WILDLIFE HABITATS, RECREATION AREAS, IMPORTANT AGRICULTURAL LAND, AND SCENIC RESOURCES.

C M I

POLICY 40:
EFFLUENT DISCHARGE FROM MAJOR STEAM ELECTRIC GENERATING AND INDUSTRIAL FACILITIES INTO COASTAL WATERS WILL NOT BE UNDULY INJURIOUS TO FISH AND WILDLIFE AND SHALL CONFORM TO STATE WATER QUALITY STANDARDS.

C M I NA

POLICY 41:
LAND USE OR DEVELOPMENT IN THE COASTAL AREA WILL NOT CAUSE NATIONAL OR STATE AIR QUALITY STANDARDS TO BE VIOLATED.

(C) M I

POLICY 42:
COASTAL MANAGEMENT POLICIES WILL BE CONSIDERED IF THE STATE RECLASSIFIED LAND AREAS PURSUANT TO THE PREVENTION OF SIGNIFICANT DETERIORATION REGULATIONS OF THE FEDERAL CLEAN AIR ACT.

(C) M I

POLICY 43:
LAND USE OR DEVELOPMENT IN THE COASTAL AREA MUST NOT CAUSE THE GENERATION OF SIGNIFICANT AMOUNTS OF ACID RAIN PRECURSORS: NITRATES AND SULFATES.

(C) M I

POLICY 44:
PRESERVE AND PROTECT TIDAL AND FRESHWATER WETLANDS AND PRESERVE THE BENEFITS DERIVED FROM THESE AREAS.

C M I NA

City of Kingston

NEW YORK

VISITOR CENTER
20 BROADWAY
KINGSTON, N.Y. 12401

TELEPHONE
914 331-7517

URBAN CULTURAL PARK COMMISSION

PART II: This section to be completed whenever a "consistent if modified" or "inconsistent" finding is rendered. (Use additional paper as needed)

POLICY # 8

POLICY SECTION: PROTECT FISH AND WILDLIFE RESOURCES IN THE COASTAL AREA FROM THE INTRODUCTION OF HAZARDOUS WASTES AND OTHER POLLUTANTS WHICH ACCUMULATE IN THE FOOD CHAIN OR WHICH CAUSE SIGNIFICANT SUBLETHAL OR LETHAL EFFECTS ON THOSE RESOURCES.

M= INCONSISTENT AS MODIFIED

THE WATERFRONT CONSISTENCY REVEIW BOARD AGREES THAT LIMITING USES FOR THE KINGSTON BUSINESS PARK SHOULD BE MET IN THE PROBLEM OF RUN OFF OIL FROM CARS AND TRUCKS ON PAVED AREAS. THIS AREA SHOULD BE ADDRESSED. ALSO TO BE ADDRESSED IS THE PROBLEM OF EXHAUST FROM THE INDUSTRIAL USES OF THE BUSINESS PARK. THE KINGSTON FIRE DEPT. SHOULD BE CONTACTED FOR HELP IN THE AREAS OF EMPLOYING THEIR HAZARDOUS WASTE PROGRAMS.

City of Kingston

NEW YORK

VISITOR CENTER
20 BROADWAY
KINGSTON, N.Y. 12401

TELEPHONE
914 331-7517

URBAN CULTURAL PARK COMMISSION

PART II: This section to be completed whenever a "consistent if modified" or "inconsistent" finding is rendered. (Use additional paper as needed)

POLICY # 25, 25A, 25B
POLICY SECTION NAME: SCENIC QUALITY POLICIES

Explanation: THE WATERFRONT CONSISTENCY REVIEW BOARD REALIZES THAT THE KINGSTON BUSINESS PARK IS WITHIN THE CITY'S COASTAL BOUNDARY AND THAT THE PROPERTY IS NOT LOCATED DIRECTLY ON THE WATERFRONT. DESIGN STANDARDS BEING APPLIED; I.E.- KEEPING SITE DISTURBANCE AS MINIMAL AS POSSIBLE, LIMITING NUMBER OF TREE CUTTINGS, REPLACING TREES WITH NATURAL VEGETATION, LIMITING BUILDING HEIGHTS, KEEPING BUILDING MATERIALS LIMITED SO AS TO CREATE AN AESTHETIC DEVELOPMENT, LIMITING ALLOWABLE USES, IMPOSING MORE STRINGENT SETBACKS, ETC...

SCENIC HUDSON INC

9 Vassar Street
Poughkeepsie, NY
12601-3091
914-473-4440
FAX 914-473-2648

December 1, 1995

Mr. Steve Finkle
Kingston Local Development Corporation
1 Garraghan Drive
Kingston, NY 12401

Re: Kingston Business Park

Dear Mr. Finkle:

Thank you for meeting with Scenic Hudson staff yesterday, and providing a copy of the Draft Environmental Impact Statement for the Kingston Business Park. We are sorry that were unable to attend the public hearing on November 30 to deliver these comments in person. We request that you enter these comments into the official record.

The Kingston Local Development Corporation's proposed Kingston Business Park should help to meet the City's needs in an environmentally responsible manner. This facility will provide additional room for the City's largest employer, Huck Industries, and eventually expand Kingston's employment base by 600-800 jobs. The site is easily served by municipal water and sewer and the proposal is consistent with the City's Local Waterfront Revitalization Plan, and Ulster County Land Use Plan.

As the region's premier organization dedicated to the protection, and enhancement of the natural and scenic resources of the Hudson Valley, we believe that strong cities are essential if our rural resources are to be spared from sprawling suburban development. This proposal will help further mutual objectives of Scenic Hudson and the City of Kingston by enhancing economic opportunities at appropriate locations within riverfront cities.

So often, new business parks are located at the edge of an urbanized area, contributing to sprawl and the decline of city centers. It is heartening to see that the Local Development Corporation proposes to provide extensive employment opportunities at a location within the City on local bus routes and within walking distance of many residents.

We would like to offer the following comments to help improve the project:

Visual Impacts

Upon review of the Draft Environmental Impact Statement, particularly the visual simulations in that document, Scenic Hudson staff suggests that the visual impacts of the business park could be further reduced by clearing less vegetation around the building site, avoiding disturbance of significant stands of trees on the site, and planting trees and landscaping to screen the building from River view. F.2.

The visual simulations -- particularly those from the Rhinecliff Train Station, Kington Point Park, Kingston Point Lighthouse and the Hudson River east of Kingston Point -- indicate that a large notch would be removed from the trees along the ridgeline. This type of disturbance should be avoided because of its unnatural appearance from the River and eastern shore. F.2.

Access for Commuters

We suggest that every effort be made to encourage access by modes other than single occupancy vehicle. A sidewalk along the access road would provide a safe route for pedestrians. Bike racks or lockers at the buildings would be a nice amenity for bicycle commuters. D.4.

Based on the number of employees that would potentially work at the business park, provisions should be made for a place where buses could pick up and drop off riders at building entrances. D.4.

Public Access to the Site

As per our discussion last August, you indicated that the City was willing to develop public access trails on the site to enable employees, and local residents to take advantage of the views from the ridge. These trails could eventually be linked with trails along the Hudson River or Rondout Creek to H.2.a.

form a part of the Hudson River Valley Greenway.

The DEIS did not address the possibility of public access to the site. We hope, however, that the City is still considering a trail on the undeveloped portion of the Kingston Business Park. Scenic Hudson staff would be happy to work with the City in this regard.

Performance and Development Standards

The Performance and Development Standards state (page 10) that building heights are restricted to 40 feet, not including chimneys, radio towers, etc. This is significantly taller than the 30' limit that you indicated would apply. Once chimneys, radio towers, and other appurtenances are added to the height of a 40' roof, visual impacts could be considerable. Scenic Hudson suggests that the standards be revised to reflect a 30' maximum height. E.1.

We hope these comments will be helpful to the Kingston Development Corporation as it plans the Kingston Business Park. If you have any questions, please do not hesitate to call me at 473-4440.

Sincerely,

Jeff Anzevino

Jeffrey Anzevino
Waterfront Specialist/
Planner

/rp

Recv'd 12-5-95
Kingston Planning Board

3208 Broadway East
Kingston, N.Y.
Dec 4, 1995

The Broadway East Community Builders would like to express their concerns about the upcoming "Huck" project on Delaware Avenue.

As concerned tenents we have to wonder about increased heavy truck traffic on Leonig Blvd and Murray St. As you know, this is a very busy school crossing area. Several bad accidents have occured here recently, including one fatality. D.5.

We would like to know if there will be a large increase in big trucks taking equiptment to the site or removing debris to other areas? If this will be the case, additional crossing personnel may be needed to insure safe passage.

Thank you for addressing our concerns,

Susan G Murphy
acting sec. Broadway East Community Builders

December 13, 1995

TO: Kingston Local Development Corporation
T. R. Gallo, President

Comments/questions regarding the Draft Generic Environmental Impact Statement (DEIS).

- Summary refers to subsequent stages analysis being based on a conceptual site plan and MAY require supplemental analysis.

  1. What measures will be available to residents to ensure further analysis?

- B. Development Plan 2.6. refers to a 100-foot buffer around the entire perimeter of site....except for essential roads and utilities. F.1.

  1. Request is made to increase buffer area to 250 feet where proposal park adjoins family dwellings on the west.

  2. An exception to stated buffer zone where it borders residential homes is unacceptable.

- Map No. 7 reflects a straw bale dike on the western edge of the proposed park. Drawn area behind straw bale dike is not described, and appears to be in the buffer zone.

  1. If indeed this reflects a subsurface infiltration area, then buffer zone of natural vegetation will be destroyed. This is unacceptable. A.2.a.

  2. If number one is accurate, what measures will be taken to prevent (homes bordering the park on the west and downhill from the park) storm water run-off from damaging those homes and properties?

III. Environmental Setting, Potential Impacts and Mitigation Measures 1.6 (2) studies reflect effects of blasting vibrations...as compared to surface structures, and blasting can be accomplished to protect off-site houses from adverse vibration impact. Legal

  1. Who will be responsible for ANY damage sustained to nearby homes as a result of blasting?

  2. Will there be a mechanism to immediately halt the blasting should adverse effects occur? A.1.a

- 2.6.&c. Map No. 9 reflects STD as the primary and largest occurring area especially in the proposed Huck Building area. The primary impact resulting from site development will be erosion and downslope sedementation.

  1. What measures will be taken to prevent erosion of the western edge of the park where residential dwellings are downhill from the park? A.2.a.

  2. Again request buffer zone be increased to 250 feet to prevent erosion and downslope sedimentation in this area (western edge). F.1.

  3. Erosion control barriers erected to contain run-off sediment - will destroy natural vegetation intended to be buffer zone. F.2

  4. Table No. 1 reflects STD to have a Seasonal High Water table up to and greater than six feet. Previous question regarding water run-off again applies here, and in addition what remedies will be offered for future damage to homes and properties as a result of water run-off? A.2.a.

2. Surface Drainage

Map No. 12 and Map No. 13

- Legend reflects only an S other letters are used on maps with no identification.

  1. Request explanation of both maps with a legend reflecting letter meanings. B.2.a.

C. Terrestrial and Aquatic Ecology and Wetlands

  1. a. Inquires made to US Fish and Wildlife Service - C.1.a.

     1. Request review of same.

     b. Mitigation does not address approaches regarding chemicals to be used in landscaping maintenance and winter time road cleaning that would result in carriage by storm water run off into the soil and absorbed by plants. B.2.c.

     1. Request mitigation measure

  2. a. Wetlands

     1. Request survey and results of wetland areas. C.2.a.

- E.1.c. Again request increase of buffer zone to 250 feet on west edge. F.1

THE GEA GROUP
GEA Engineering, P.C.
GEA Environmental Consultants, Inc.
GEA Water Solutions
www.geaengineering.com

100 AIRPORT EXECUTIVE PARK
SUITE 105
NANUET, NY 10954

ZACHARY CHAPLIN
Engineering Assistant
zchaplin@geaengineering.com

(845) 371-5522
FAX (845) 371-5526

FOR PUBLIC ACCESS TO RECORDS

Records Access Officer

I HEREBY APPLY TO INSPECT THE FOLLOWING RECORD: **(Please be as specific as possible)**

FGEIS for Kingston Bussiness Park

Signature

1/19/12
Date

Zachary Chaplin
Please Print Name

GEA Engineering
Representing

100 Airport Park, Nanuet, NY
Mailing Address

845-371-5522
Phone

ZChaplin@GEAEngineering.com
E-mail

NOTE: The following are fees that will charged for copies: Letter: $.25 Legal: $.35 11x17:$.50

For more information on the Freedom of Information Law please visit the Department of States website at the following address

http://www.dos.state.ny.us/coogwww.html

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___ Other (specify) _____

Signature

Asst. Planner
Title

1/19/12
Date

****

NOTICE: YOU HAVE A RIGHT TO APPEAL A DENIAL OF THIS APPLICATION TO THE HEAD OF THIS AGENCY.

Name

Business Address

WHO MUST FULLY EXPLAIN HIS REASONS FOR SUCH DENIAL IN WRITING SEVEN DAYS OF RECEIPT OF AN APPEAL.

I HEREBY APPEAL:

- F.2.8 (1) building is VERY near the edge of the steep hillside. (p 45)
Request any and all buildings be moved two acres farther east. F.1.

- H.1.2.Noise (p 58)
Request copy local law No. 1 of 1992, Chapter 79 of the City Code Book.

IV. Adverse Environmental Impacts which cannot be avoided.

1. If over 2/3 of site undisturbed then no reason why park cannot be moved 2 acres farther to east away from residential dwellings on west edge? F.1

VII. Growth Inducing Aspects....should not create any significant impact. (p 75)

1. What safeguards will be in place to ensure this statement?

Performance and development - setback area - define. E.1.

Exhibit 3
5.04 Building Heights = not exceed 40 feet
B. Development plan - states,
2. (p 14) maximum height of 24 feet

1. Why the difference in height of buildings?

5.06 Illumination -
....light source not visible in any season from outside the park.

1. How will this be accomplished?

5.07 g1. Request to increase buffer to 250 feet west edge.

2. Request to prohibit any walkways or trails on west edge

Section 8 define setback as it applies to 3) 4) 5)

Section 9 9.01
b) add and approval by neighboring residents

Section 10 Landscape Standards
Nicely done

Exhibit 4

1. Request copy of enclosure from 5/19/1995.

2. Request copy of the order form listing topographic quadrangles.

Exhibit 6 SEQR
B 1. Original statements "over 2/3 of parcel to be undisturbed - now 60 acres to be developed.
B. i height 40 ft
20. produce noise exceeding local ambient levels

Impact on Plants/Animals pg 8
8. Request revision to reflect a truthful statement
16. Blasting and noise - Potentially large impact with no definite plans for neighboring dwellings

Visual EAF Addendum
2. Visibility - Yes - Previous statements say no -?

SEQR Declaration
page 4
2. Adverse effect on residents and neighborhood
4. Storm water runoff.
What "written in stone" actions will be taken to mitigate these issues?

EDA Project

#3 Endangered Species -
occasional transient individuals - Request findings that satisfied Section 7 of Endangered Species act.

VI. Conclusion - environmental impact statement not necessary - If information submitted for EDA project no.01-49-03497 is inaccurate - guess who it affects?
Environmental Impact Determination - based on submission of not totally true or accurate statements

Appendix 1

Request proposed building be moved two acres east from proposed site.

Respectfully submitted,

Pat Vaselewski
102 Fourth Avenue
Kingston, New York 12401

P.S. Would you like to purchase a lovely home?

Rec'd 12-18-95

December 13, 1995

TO: City of Kingston Planning Board

RE: Kingston Business Park

Dear Mr. Chairman;

We would like to take this opportunity to be put on record in support of moving the entrance and access road to the proposed Kingston Business Park at least 200 feet to the west of Roseanna Street as supported by Alderman Robert Senor.

D-3

We would also like to note that we are opposed to any future tenants of this Park being allowed to use this road as an entrance or non-emergency exit. We would also like to be assured that there will be a traffic signal installed at this new intersection and a crossing guard available during school hours.

Thank You,

Richard J. Schoonmaker

Nancie Secreto-Schoonmaker

Richard J. Schoonmaker
Nancie Secreto-Schoonmaker
71 Abruyn Street
Kingston, NY 12401

CC: Robert Senor

Rec'd 12-18-95

December 13, 1995

To: City of Kingston Planning Board

RE: Kingston Business Park

Dear Mr. Chairman;

I would like to take this opportunity to go on record in support of moving the access road at least 200 feet to the west of Roseanna Street. D.3

I would also like to be assured that there will be a traffic signal installed at the new intersection. and a crossing guarding during school hours so the area children will be safe crossing this new entrance.

Thank You,

B. J. Schoonmaker

B.J. Schoonmaker
71 Abruyn Street
Kingston, NY 12401

Student at John F. Kennedy

CC: Robert Senor

Rec'd 12-18-95

December 13, 1995

To: City of Kingston Planning Board

RE: Kingston Business Park

Dear Mr. Chairman;

I would like to take this opportunity to go on record in support of moving the access road at least 200 feet to the west of Roseanna Street. D.3

I would also like to be assured that there will be a traffic signal installed at the new intersection. and a crossing guard during school hours.

Thank You,

Lance Woodworth

Lance A Woodworth
71 Abruyn Street
Kingston, New York 12401

CC: Robert Senor

Recv'd 12-18-95

December 13, 1995

TO: City of Kingston Planning Board

RE: Kingston Business Park

Dear Mr. Chairman;

I would like to take this opportunity to be put on record in support of moving the entrance and access road to the Kingston Business Park 200 feet to the west of Roseanna Street as supported by Mayor T.R. Gallo. D.3

I would also like to note that I am opposed to ANY future tenants of this Park being allowed to use this road as an entrance or non-emergency exit.

Thank You,

Josephine F. Schoonmaker

Josephine F. Schoonmaker
71 Abruyn Street
Kingston, NY 12401

Eugene F. Nagele

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Paul A. Rubin
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Rec'd 12-15-95

December 15, 1995
Hand-Delivered

Sue Cahill; City Planner
Kingston Planning Board
City of Kingston Planning Office
City Hall, 1 Garraghan Drive
Kingston, New York 12401

RE: **Geologic and Water Quality Concerns Specific To The Knaust Mine and Underground Lake: Evaluation Of Contaminant Potential Stemming From The Kingston Local Development Corporation's Proposed Kingston Business Park (Comments on Nov. 1995 Draft Generic Environmental Impact Statement)**

Dear Ms. Cahill:

A.L.

The issues raised in this letter are provided on behalf of *Mark Knaust and Herman Karl Knaust* of Saugerties and should be fully evaluated by the Kingston Planning Board (Lead Agency) prior to preparation of a final Environmental Impact Statement (EIS). I am a hydrogeologist with a special research focus in karst hydrology; having over 20 papers published on geology, land use planning, contaminant transport, and hydraulic controls in karst terranes. **The issues raised in this letter center on protecting the business interests of the Knaust family, as they stand to be seriously jeopardized if this project is approved in its proposed format.**

The Knaust family owns property abutting the proposed Kingston Business Park, including a large roof and pillar mine (the Kingston Mine) formerly used as a mushroom plantation. An article in Power magazine (Sturges, 1957) identifies this mine as part of the largest mushroom growing operation in the world (≈ 15-million lbs/yr). The success of the operation, to a large degree, hinged on the ingenious heating and cooling system made possible by the mine's high-quality lake water. The Knaust family plans to use this mine for business purposes in the future, most likely as a mushroom plantation. Degradation of water quality in the mine's large and elongate "lake" (a now water-filled portion of the mine) by hydrocarbons and other Business Park contaminants is likely to jeopardize a mushroom plantation. Airborne contaminant dispersal or contamination from the water is likely to result in disease or direct attack of the fungi (e.g., mushrooms).

Preparer's of the DEIS have failed to 1) recognize the hydrologic setting [a maturely karstified carbonate aquifer]; 2) conduct hydrogeologic testing specific to this setting; 3) evaluate environmental risks attendant to this setting; 4) address off-site runoff impacts to neighboring properties, inclusive of rapid subsurface contaminant transport; and 5) design stormwater systems protective of underground water resources. The risk of adverse environmental impact to subsurface and surface water resources is great. With the information provided in the DEIS, it is not possible for involved agencies to demonstrate *"that the action chosen is the one that minimizes or avoids environmental impacts to the maximum extent practicable"* (as per SEQR regulations: 6 NYCRR 617; NYS DEC, 1995). Similarly, incomplete and inadequately characterized site hydrology will make it impossible for involved agencies to reasonably prepare written SEQR findings statements after a final EIS has been filed as required in Part 617.9. This letter demonstrates that the responsible lead agency (i.e., the Kingston Planning Board) is not yet in a position (scientifically and legally) to vouch for the adequacy and accuracy of the DEIS. As the DEIS stands, its hydrogeologic characterization is incomplete and it would not be prudent to advance the application without proper hydrogeologic testing, evaluation, and stormwater impact consideration. **On behalf of the Knaust family, I recommend that the Kingston Planning Board place a moratorium on preparation of the final EIS until 1) the hydrogeologic conditions present at the proposed site are correctly characterized via standard hydrogeologic and engineering methodologies, 2) the environmental risks are properly addressed, 3) the structural risks to planned buildings are properly characterized, and 4) the November DEIS is revised accordingly.**

PROPOSED KINGSTON BUSINESS PARK OVERLIES CARBONATE AQUIFER

Issue 1: **Preparer's of the DEIS have failed to recognize the hydrologic setting present at the proposed Kingston Business Park (i.e., a mature well-karstified carbonate aquifer). As a result, they have 1) not conducted standard engineering and hydrologic testing, 2) not addressed the concerns of adjacent landowners, and 3) not designed stormwater controls in a manner likely to safeguard water quality both in the Kingston Mine and elsewhere.**

The preparer's state: *"For these reasons, **karst processes are believed not to be active on the project site**"* [emphasis added] (DEIS, p. 19). The reasons provided are not entirely clear but appear to be:

A) *"Because of the high elevations of the project site, relative to the surrounding area, the groundwater table in the bedrock is at a very low elevation, possibly lower than any point on the property."* This is apparently important because:

B) *"High groundwater conditions in the bedrock enhance the solution process, while fluctuating bedrock groundwater levels can trigger undermining and collapse of overlying rock and soils, creating a sinkhole, and other expressions of "karst" landforms."* and

C) *"There are no running streams on the site or developed water courses on the site to maintain a high water table in the bedrock."* In keeping with this reasoning, the applicant concludes:

☼ *"Topographic depressions at or near the summit are isolated low spots in the overlying mantle of glacial till and allied soils."* and *"The topography of the site and its vicinity, as well as the surficial sedimentary deposits have been influenced by scouring and sedimentation associated with glaciation and deglaciation during the Pleistocene Epoch."* (DEIS, p. 22)

C) from above, although used by the preparers' to suggest that it is not karst, is in fact a rationale used and documented by karst researchers around the world in support of active karst. It is not the relative elevation of the groundwater table *[although no testing and data collection by the preparer have occurred upon which to base any characterization]* in the bedrock that is critical to karst (i.e., solutional or conduit) development, but rather the following requirements 1) a pre-existing network of integrated openings connecting recharge and discharge areas, 2) a significant volume of water undersaturated with respect to $CaCO_3$, and 3) the dissolution and removal of bedrock by moving water (Palmer, 1991).

Items A), B) and C) above, reveal a complete lack of understanding of the dynamics of carbonate aquifer systems. In addition, the applicant indiscriminately and interchangeably uses the terms caves, caverns and mine - two very different features - one naturally occurring and one man-made. The former may carry a large tributary drainage basin naturally funnelling water through it and the other may disrupt the pre-existing flow system. I recommend that preparers' of the DEIS familiarize themselves with recent karst work (e.g., ASTM, 1990; ASTM, 1995; Palmer, 1986, 1991; Palmer and Palmer, 1989; White, 1988; Ford and Williams, 1989; Beck 1984, 1993, 1995; Beck and Wilson, 1987; Quinlan, 1989; Quinlan and Ewers, 1985; Quinlan et al., 1992). This should result in their rescoping all hydrologic aspects of the project

by 1) contracting with a recognized karst hydrologist with expertise in tracer testing, and 2) following accepted standard engineering practice for characterizing carbonate aquifers.

Engineers and hydrologists familiar with site characterization in karst terranes typically pattern their investigations based on methodologies in these ASTM standards:

> ASTM, 1990, ***Special problems of ground-water monitoring in karst terranes***. Principal author: Quinlan, J.F., In Nielsen, D.M., and Johnson, A.I., eds. Ground Water and Vadose Zone Monitoring. ASTM Special Technical Publication 1053. American Society for Testing and Materials, Philadelphia, p. 275-304. And more recently:
>
> ASTM, 1995, ***Standard guide for design of ground-water monitoring systems in karst and fractured-rock aquifers***. ASTM Special Technical Publication D-5717-95. American Society for Testing and Materials.

Although it is not within the scope of my comments to educate engineering firms seeking to provide hydrogeologic expertise such as that prepared for Section III of the DEIS (Environmental Setting, Potential Impacts and Mitigation Measures), it is important to list physical evidence of the presence of an active and mature carbonate (i.e., karst) aquifer at the proposed Kingston Business Park site. *Once it is clear that the proposed site overlies a carbonate aquifer, the need to conduct suitable hydrologic and structural testing in order to protect on-site and off-site interests should be obvious.* Evidence documenting the presence of a carbonate aquifer includes:

- Numerous sinkholes (dolines) throughout the proposed site, some of which show evidence of subsurface soil sapping through active underlying flow systems. If this were not the case, natural erosion processes would have obliterated many of these features. Most precipitation directly recharges the soil-mantle and epikarst (i.e., a zone of enhanced bedrock-dissolution beneath the soil zone; a percolation zone). It is likely that drainage and percolation into and surrounding these sinkholes flows to segments of a remnant trunk passage, being attracted to an area of low hydraulic head.
- Limited to non-existent surface drainage in the site area (e.g., most sinkholes do not contain ponds, therefore they drain internally into the underlying carbonate units).
- An enterable west-northwesterly trending cave intersected in the Kingston Mine during mining operations, complete with stalactites and stalagmites (now closed, Knaust, pers. comm.).

- Borehole B-5 penetrated an ≈ 8.4' ft. void after drilling through ≈ 39.6 ft of competent limestone. Significant conduit development, as in the instance of the B-5 cavity, requires a significant volume of undersaturated water, flowing both into and out of the conduit in order to form the large cave passage encountered during drilling. Caves develop along groundwater paths of greatest discharge and solutional aggressiveness. Conduits of this size require at minimum of 10,000 years to form (Palmer, 1984; Dreybrodt, 1990; Palmer, 1991).

- The presence of inwashed sand, silt, gravel and decomposed organics in the Borehole B-5 conduit demonstrates the hydraulic connection between the land surface (via sinkhole and fracture infiltration), this conduit and some lower discharge point. Aquifer recharge occurs in this manner through the epikarst until discharging in a spring or, alternately in the Kingston Mine lake due to hydraulic flow disruption resulting from mining. The only way to assess groundwater flow direction, destination and velocity in a karst terrane, other than physical entry in traversable cave segments, is via tracer testing (ASTM 1053, 1990; ASTM D-5717-95, 1995). Only qualified experts should conduct tracer testing.

  This is particularly important because topographic divides rarely coincide with groundwater divides in karst terranes (Quinlan, 1989). Cave systems in New York State have survived numerous glaciations and erosional removal, some for greater than 350,000 years (Rubin, 1991a; Palmer et al. 1991a, 1991b). It is important to consider that the proposed Business Park ridge may have been physically different when its internal drainage developed. Nonetheless, solutionally enlarged fractures and relict caves and swallet holes in the groundwater basin remain integral, functioning components of the epikarst, funnelling runoff and infiltrating meteoric waters to deeper conduit flow routes (Rubin et al., 1995).

  In geologic settings, such as that of the proposed Kingston Business Park, flow systems are often dendritic or branchwork in nature, with flow coalescing downgradient from narrow fracture partings, dissolutionally enlarged bedding planes and fractures, and numerous tributary conduits. This continuum of groundwater feeders ranges from narrow poorly connected fractures to well connected cave passages, meters in diameter. At one extreme of the karst network, sinkholes or karst depressions form concurrently with caves, removing detrital material downward through solutionally widened fissures in the epikarst into increasingly larger fissures and conduits (Palmer, 1991; Ford and Williams, 1989; White, 1988). Different elements of the flow system include open and closed-conduit flow. A typical vadose component of a branchwork system is an air-filled (vadose) canyon passage (e.g., B-5) extending from a sinkhole to a water-filled (phreatic) tubular passage.

- The presence of *"Soil Seams"* in borings B-7, B-14 and B-16, as in the B-5 conduit, provide direct evidence for dissolutional fracture enlargement and movement of surface soils through the epikarst. Non-karstified lithified bedrock does not have soil seams. This can only occur through dissolution of the bedrock followed by sediment inwashing.

- The presence of natural dissolutionally enlarged fractures to 0.65 feet within carbonate beds; sometimes preferentially following fault planes.

- Rapid subsurface flow as documented by small streams flowing out through fractures and fault planes now disrupted by mining. One such small stream was observed flowing at an estimated 8 gpm. Carbonate aquifers are well known for their rapid, turbulent flow components. This rapid, non-Darcian flow, is very different from porous media or typical fractured bedrock aquifers. Contaminant transport is rapid and not diluted. The contaminant potential is extreme.

- Groundwater infiltration into the Kingston Mine responds dynamically to storm infiltration and snowmelt. Downward percolation occurs through the epikarst, as observed through roof fractures in the Kingston Mine. The rapid increase in ceiling drip rates signals that the carbonate aquifer continues to actively function. The precipitation of sometimes large flowstone deposits indicates that percolation water has been in contact with fractured, secondary porosity portions of the carbonate aquifer for some distance prior to carbon dioxide degassing. Flowstone situated in a mine addit approximately 170 feet northeast of the proposed Huck International building has 71 feet of precipitated flowstone and rimstone dams.

- An additional line of evidence, although not by itself definitive, is the unusual turbidity observed in the lake following the October 21, 1995 storm event. While the source of some of the suspended sediment present in the lake probably was from surface runoff into the mine, the areal extent of high suspended concentrations strongly suggests direct infiltration and transport of fine particulates from ridge-top sinkholes and the subjacent epikarst. The same physical properties are likely to transport contaminant-laden stormwater runoff directly into the mine.

HYDROLOGIC SETTING, STORMWATER AND GROUNDWATER CONTAMINATION

Issue 2: **The western and northern extent of water-filled portions of the Kingston Mine are not known and may extend directly under portions of the planned access road and drainage ditch. Contaminant infiltration through planned infiltration galleries and the subjacent epikarst may rapidly degrade the water quality of the lake.**

The applicant apparently conducted no confirmatory survey of the Kingston Mine, yet, *"based on the available topographical mapping"*, was able to determine *"[t]he minimum horizontal distance between the mine walls/roof and the proposed roadway cuts is approximately 115 feet"* (DEIS, p. 20). Topographic maps do not depict map patterns of roofed mines. Even existing maps (Allen, 1956) only show air-filled portions, not flooded portions extending to the west toward the planned access road.

Similarly, the applicant, apparently based on no subsurface mine survey data, was able to ascertain that the uppermost *"tunnel roof"* is approximately 95 feet lower in elevation than the proposed lowest roadway grades. No data supports this. It is likely that this distance may only be half this. The applicant's failure

to include marked contour intervals on DEIS maps makes this difficult to determine. This information is critical in calculating explosive loads and assessing potential blast impacts.

Structurally, carbonate removal in the Kingston Mine followed the folded Rondout Formation. Mining proceeded for a considerable distance along the strike and down the dip of the eastern flank of an anticline. Mining also proceeded over the hinge of the anticline (observable in the mine) and continued along the strike and down the dip of the western flank of the anticline.

Reference to Allen's (1956) survey and map of the Kingston Mine indicates that flooded portions (i.e., the lake) extend some 1250 feet along strike. Although the extent of this water is readily observed in the Kingston Mine, the applicant's "*[i]nspection of these deep cavern areas indicated that they were generally well-drained, with some small areas of entrapped water*" (DEIS, Appendix C4). Tracer dilution testing documented a lake volume on the order of 80,000,000 gallons (Knaust, pers. comm.). Using an average ceiling height and mined bed thickness of 24 feet, projected flooded portions of the mine can, by calculation, be roughly projected to extend 350 feet to the west. Thus, it is likely that the areal extent of the mine is twice that surveyed by Allen.

Direct downward infiltration of roadway and drainage ditch contaminants through the epikarst may rapidly contaminate the lake. Uncertainties specific to the structural geology and the lateral connectivity of flooded portions of the mine along strike require more rigorous determination. Engineers, geophysicists and geologists have successfully determined the underground extent and configuration of abandoned and water-filled mines. For example, Smith and Randazzo (1993) accomplished this with analyses of electrical resistivity, incorporating boreholes for cavity verification. Similarly, Kilty and Lange (1992) and Lange and Kilty (1992) have demonstrated success locating cavities through the use of natural potential. Such an assessment is necessary above the Kingston Mine in order to evaluate potential blasting, water quality, and heavy traffic impacts.

Issue 3: **The applicant's engineers have failed to properly and adequately evaluate the environmental risks attendant to the karst setting present onsite.**

Groundwater in soil and most fractured bedrock aquifers moves slowly, enabling contaminants to be partially treated and diluted. Karst aquifers, on the other hand, are often characterized by appreciable and sometimes rapid groundwater flow. They have virtually no ability to treat water-borne contaminants, instead they merely transmit contaminants, much as a sewer pipe would with little attenuation of contaminants (Ford and Williams, 1989). Wastes may flow rapidly and untreated for many miles along strike.

Most cavities encountered during drilling are dissolutionally enlarged bedding planes, fractures, and conduits. It is critical that individual borehole cavities (e.g., B-5) be viewed as connected high porosity (tertiary; Teutsch and Sauter, 1992) conduit flow paths which integrate groundwater flow from fractures with significantly lower porosities. Caves develop along groundwater paths of greatest discharge and solutional aggressiveness. Groundwater flow in mature karst settings, such as that in the proposed Kingston Business Park, converges toward large phreatic (at or below the water table) passages where zones of low head attract water from surrounding openings (Palmer, 1991).

Issue 4: **"Storm drainage at building sites are to consist of catch basins and piping to subsurface infiltration areas"** (DEIS, p. 16). **Drainage from subsurface infiltration areas will directly recharge the epikarst, drain through solution channels and caves, and discharge to unknown locations - possibly the Kingston Mine.** This black-box method of handling contaminated stormwater assumes no responsibility for protection of the waters of the State or those of adjacent property owners.

Carbonate aquifers and their receiving streams or mines are very sensitive to contaminant inputs and require special land use consideration. Carbonate aquifer hydrology is very different from porous media (i.e., soil) and fractured bedrock aquifers with slow laminar groundwater flow, instead being characterized by rapid non-Darcian (i.e., turbulent; non-laminar) subsurface flow through conduits (i.e., caves) with no natural filtration of contaminants.

Whereas subdivision and development within karst basins have historically occurred on an individual application basis, a more broad-based master planning process is needed to maximize protection of groundwater and surface water resources. Planning in environmentally sensitive areas should take into account the likely cumulative contaminant loading into the karst system, and a

reasonable measure of it and its receiving stream's assimilative capacity. This has not been considered in the DEIS. The development of an area must be within the natural constraints of its geology and hydrology (Rubin, 1992, 1995).

Issue 5: **Stormwater overflow drainage into the "Old Open Mines" depicted on Map Nos. 4 and 7 may, partially or wholly, drain southeast into the lake in the Kingston Mine.** The applicant states: *"Overflows from these infiltration areas will be piped to the cavern areas"* (DEIS, p. 16). A steeply dipping and elongate fault plane forms the east-facing quarry wall in these cavern areas. Infiltrating epikarst water at its southern end rapidly sinks, disappearing into quarry rubble. This water may follow dissolutionally enlarged fractures and channels along one or more fault planes until discharging into the Kingston Mine. Only tracer testing can verify this likely flow route.

Extensive faulting proximal to the "Old Open Mines" and the Kingston Mine significantly increases the likelihood of a hydraulic connection from one to the other. Marshak (1990) has documented some of the faults present locally. Specifically, he has identified a zone of accommodation faulting that developed in the core of an overtightened fold. Marshak's Fig. 18 (p. 24) clearly illustrates arcuate fault trends changing curve direction from northeast to north-northeast near the "Old Open Mines". This arcuate fault trend is evident from exposures progressing from the southwestern portion of the Kingston Mine to the northeastern portion of the Kingston Mine to the southeastern end of the "Old Open Mines". Trends of these fault planes strike sequentially N69°E, N44°E, and N7°E, respectively. Epikarstic or stormwater overflow water entering the "Old Open Mines" may readily follow dissolutionally enlarged fractures along arcuate and steeply inclined fault planes to the Kingston Mine. Tracer testing must be conducted by qualified tracer experts to assess the likely hydraulic connection. It should also be conducted to legally protect the Kingston Local Development Corporation.

Issue 6: **Apparently, the applicant intends to directly discharge stormwater, including roadway oil, grease, gas, salt, etc., into the Knaust Kingston Mine. This will directly and immediately degrade the lake water.** Page 16 of the DEIS states: *"Roadways are to be pitched to ditches and directed via surface swale, piping and depressions to cavern areas located near the eastern* ***and southern portions*** [emphasis added] *of the site"*. The "cavern

areas" near the southern portion of the site are apparently the Kingston Mine owned by the Knaust family. It is surprising to find that the applicant plans to discharge their stormwater to this mine 1) without permission of the landowner, and 2) in light of their own statement on page 19 of the DEIS:

> *"The cavern, owned by an adjoining landowner, has not been recently used, but the owner has indicated a desire to re-establish a mushroom farm, a logical* [idea] *given the cave's favorable temperature and humidity characteristics."*

The project must be rescoped so that no stormwater runoff drains to the Kingston Mine via surface runoff or surface infiltration into the epikarst that then drains to the Knaust lake. In addition, the revised DEIS should include a map depicting lot boundaries and the names of all adjacent property owners.

Issue 7: **Disturbed site areas may result in the off-site release of fine particulates during intense precipitation and snowmelt events with significant runoff. This may directly flow into the Kingston Mine, thus degrading water quality.**

The applicant briefly addresses site soils, some of which have a high erosion hazard when vegetation is removed. Specifically, *"[t]he primary impacts resulting from site development will be erosion and downslope sedimentation ... once vegetation, topsoil and bedrock is removed ..."* (DEIS, p. 23). The applicant fails to provide a detailed evaluation of the size of disturbed areas with related design storm, intensity values and runoff calculations. Fine particulates resulting from site clearing activities may quickly become entrained and wash into the Kingston Mine. Particles may enter the lake via overland flow, through sinkholes and the subjacent epikarst. Sinkholes situated beneath building footprints and in planned infiltration areas may comprise regular, but episodic, sediment input points to the lake.

Temporary sedimentation basins (as suggested in Section 10: 1a DEIS) would have to be of sufficient size to detain all turbid stormwater until after sediment had settled out; perhaps many days. The settling velocity of silts and clays (likely byproducts of clearing operations) is determined by Stoke's Law, which states that the settling velocity is proportional to the square of the particle diameter. Once movement is initiated, the behavior of fine particles (i.e., clays and silts) in fluids is controlled by the settling velocity of the particles and the laws of fluid motion. Fine colloidal

clay, for example, has a surface area approximately 10,000 times as the same weight of medium-sized sand. The large surface area per unit mass allows even very small currents to maintain small particles in suspension. Particulates moving through the epikarst may discharge into the lake in the Kingston Mine. Slow sediment settling rates in a quiescent lake are likely to degrade water quality for extended periods of time. Settling basin design and size should be addressed in the revised DEIS.

The lake's ability to cleanse itself of sediment additions, and particulate settling rates should be evaluated by the applicant in a stormwater risk assessment and management strategy.

Issue 8: **The applicant's engineers have failed to properly and adequately design stormwater runoff systems protective of underground water resources. Insufficient information is presented in the DEIS to evaluate the quantities of stormwater runoff likely to be generated. In addition, the applicant plans to dispose of stormwater runoff directly into the groundwater flow system; in the complete absence of any information specific to the system.**

Page 28 of the DEIS states: *"The increase in runoff will be retained on-site through use of exfiltration galleries, existing surface depressions and mined caverns. It can therefore be concluded that the storm water management plan will result in no increase in runoff volume or peak rate of runoff to off-site areas."* For these depressions to be capable of accepting large quantities of stormwater runoff in short duration requires conduit-pipe flow conditions. Considering that the applicant believes the site is not in a karst setting, it is difficult to provide for the large infiltration rates needed to essentially achieve rapid, non-laminar flow. In order for exfiltration galleries to handle large volumes of runoff, water must not only flow into them, but out of them. Again, a likely discharge location for sinkhole drainage is to the Kingston Mine. This may be particularly serious since *"[u]nder the proposed storm water management plan, "first flush" contaminants will be controlled by providing catch basin sumps and subsurface infiltration areas"* (DEIS, p. 28). Also, *"[c]hemicals used in landscape maintenance and wintertime road clearing can be carried by stormwater runoff into the soil and absorbed by plants"* (DEIS, p. 29). Tracer testing and aquifer characterization are required.

The applicant should thoroughly detail all assumptions, calculations, etc. to substantiate that:

"All stormwater will be disposed on site and there will be no [emphasis added] *increase in the rate of off-site discharge."*

The revised DEIS should provide rationale for stormflow assessment values used (e.g., storm return period, duration, intensity, infiltration rates). Greater detail is needed in order to assess the TR-55 runs, including an explanation of the low CN's utilized in post-development runs.

Issue 9: **The hydrogeology of the proposed site and its relationship to groundwater and surface water resources has not been determined. The report preparers' indicate that it is acceptable to degrade groundwater since it is not used locally at this time. Furthermore, the report preparers' have not characterized the depth to groundwater, groundwater flow directions and velocities, and locations where the groundwater discharges (e.g., the Kingston Mine, Hudson River, Rondout Creek). Nonetheless, the applicant plans to discharge stormwater directly to the underlying aquifer.**

Page 26 of the DEIS references two papers that characterized groundwater resources in unconsolidated deposits and in specific wells; none at the proposed site. Apparently, since *"[g]roundwater resources near the site were broadly investigated ..."*, this somehow translates into site-specific information. Nowhere else would this type of assessment be acceptable for a project of this magnitude. No direct information on the groundwater flow system was obtained, not even one depth to the water table. Yet, *"[g]iven the project's location within the city limits ... there is no impact expected upon this resource."* Certainly, it is difficult to assess potential impacts without any information.

Interestingly, the preparers' have surmised the groundwater flow direction under the site; in the absence of any hydrologic data:

"Fractures and voids in these underground folded rock formations give support to [the] assumption of a general northeast direction of groundwater flow" (DEIS, Appendix C4).

Notwithstanding the fact that groundwater flow in karst terranes is predominantly controlled by bedrock dip and strike (and in some instances faults) and not fractures, it should be noted that fractures in the site area trend northeast, southwest, northwest, and southeast. The

complex structural fabric in this area may significantly alter groundwater flow directions that might be predicted in undeformed areas. Locally, mining may have further disrupted natural groundwater flow directions. Knowledge of geologic and hydrologic controls in karst terranes can be used to predict groundwater flow directions (Palmer, 1986; Rubin and Lemiszki, 1992; Ogden, 1992). Groundwater tracing is required.

The virtual complete lack of information specific to both on and offsite water resources and the bedrock aquifer is readily apparent in Table 1 below. Few borings were advanced greater than 13 feet into bedrock.

TABLE 1

Bore-Hole	Soil Thickness (ft)	Bedrock Thickness (ft)	~ Total Depth Elev (msl)	Comments
B-1	7	8	129	
B-2	2.5	10	157.5	
B-3	6.3	21.7	158	
B-4	8	10	176	
B-5	4	48	204	8.4' ft *"Void"* = cave passage encountered from ~ 212.4 to 204 ft. msl; inwashed sand, gravel and organics
B-6	5	22	222	
B-7	5	13	236	*"Soil Seams"* encountered at 240.6 and 239.8 ft. msl
B-8	2.5	5.5	175.5	
B-9	1	5	274	
B-10	5	6.5	NA	
B-11	6.5	8.5	NA	
B-12	**MISSING**			
B-13	**MISSING**			
B-14	3	6	NA	*"Soil Seam"* at 3.7 ft.
B-15	**MISSING**			
B-16	7.5	8	NA	*"Soil Seam"* at 14.7 ft.

Page 27 (DEIS) states that *"[s]tormwater flows are accommodated via intermittent channels and ponding in the depressions, with water reaching perennial streams in the former case, or seeping into the soil and underlying bedrock in the latter case."* Again, these surface depressions are sinkholes that transmit water, including any contaminants, through the epikarst. It is likely that this water discharges to the Kingston Mine lake. Tracer testing is required to determine groundwater flow routes.

Issue 10: **Storage tank, distribution line and equipment spills are likely to rapidly infiltrate the epikarst and contaminate the Kingston Mine.** Containment engineering of hazardous materials associated with light industrial and commercial development, where spills have potential to rapidly degrade groundwater resources (e.g., Kingston Mine) and receiving streams, should be addressed in the revised DEIS.

Issue 11: **Failure to contain chemical wastes lost through leakage, spills or foundation/storage tank collapse could result in the off-site release of contaminants to groundwater (including the Kingston Mine) and surface water resources.** Infiltration through sinkholes and the epikarst may rapidly and directly contaminate groundwater resources and receiving streams. Once a spill occurs in a karst terrane, its transport time may be measured in hours or days. After groundwater flow routes are determined below and beyond the proposed site (via tracer tests), it will be necessary to put forth a spill response plan. Such plans are now standard emergency response strategies in similar high-risk karst terranes.

Issue 12: **Portions of the Full Environmental Assessment Form need to be revised following site hydrogeologic characterization.** These include sections pertaining to: depth to the water table, action affecting any non-protected existing or new body of water, subsurface discharge, adverse affect on groundwater, siltation, and possibly endangered species.

STRUCTURAL STABILITY OF THE KINGSTON MINE AND NEARBY HOMES

Issue 13: **The structural stability of mine pillars and the mine roof may be jeopardized from nearby blasting and industrial road traffic. Blasting vibrations may cause movement and collapse along fault planes and joints.** Eastern portions of the mine have roof thicknesses on the order of 25 feet (Knaust, pers. comm.), making it particularly susceptible to blast vibrations. Road collapse in karst terranes is well documented (e.g., White, 1988; Ford and Williams, 1989; Mellett and Maccarillo, 1995; Martin, 1995; Moore, 1995). In order to assess mine stability, engineering computations of rock stress loads and the strengths of pillars and mine roof should be conducted. Natural joint (i.e., fractures) concentrations and faults observable in the roof and walls of the mine greatly increase the risk of

ceiling collapse and should be factored into the analysis. In addition, this analysis should factor in the mechanically weak and laterally extensive fault planes that large portions of the mine follow. Miners recognized prominent fault plane weaknesses in their mining, taking advantage of the natural mineralized and slickensided surfaces that mined rock readily cleaved from.

Reference to the preparer's boring logs reveals repeated bedrock core descriptions of **"FRACTURED"**. Similarly, multiple fracture sets, some trending toward the planned access road, can be mapped on the roof of the Kingston Mine. An addit situated some 170 feet northeast of the planned Huck International building has exposed nine (9) different fault planes within 145 feet. Marshak (1990) described the structural setting here as marking a significant structural discordance in the fold-thrust belt (i.e, an overprint of two non-coaxial thrusting events), representing the southern limit of the Hudson Valley Fold-Thrust Belt. The associated fracturing and faulting throughout this area place the Kingston Mine at appreciable risk from blast vibrations.

Some measure of potential off-site blasting risks (i.e., to the Kingston Mine), although not witnessed, was inadvertently obtained during construction of Koenig Boulevard. The roof of the Kingston Mine was free of collapse features shortly before blasting commenced approximately 3,000 feet to the west. A routine visit to the mine within one week of blasting cessation found that a major roof collapse had occurred (Knaust, pers. comm.). This roof spall litters the floor of the mine, covering an area some 40 ft. x 50 ft. x 1.2 feet thick. The timing of this collapse strongly suggests that it resulted from blast vibrations. Again the need for detailed blast procedures is obvious and should be provided in a revised DEIS. It is not sufficient to simple state that *"[t]he mines are outside of the zone of influence of the blasting required within the proposed building footprints"* (DEIS, p. 21).

Issue 14: **Ceiling collapse would disrupt the air circulation patterns engineered to efficiently heat and cool a mushroom plantation.** Mitigation of ceiling collapses would place undue financial burden on the Knaust family. In addition, worker safety might be compromised due to the uncertain structural integrity of the ceiling.

Issue 15: **Seismic waves or "vibrations" stemming from blasting activities may result in structural damage and annoying and unpleasant vibrations to homeowners and historic structures. So as not to incur undue expense from claims of foundation damage, plaster cracking or window breakage, the applicant should conduct a survey of pre-existing building conditions prior to blasting.** Repeated vibrations may eventually cause damage (Perkins, B., Jr. and Jackson, W.F., 1964). In addition, the applicant should address remedies, monetary or otherwise, should structural damage occur.

The applicant states: *"It is desirable to limit vibrations at the closest neighboring structures to a maximum vibrational level of 1.0 inches per second, and this level should not be reached in more than one or two of the closest blasts. For routine blasting within the quarry, a peak particle velocity of not more than 0.5 inches per second at the nearest houses should be maintained."* (Mining and Reclamation Plan, Addendum 2, p. 34-35). The applicant reports that a peak particle velocity of 1.0 in/sec is typically described as *"unpleasant"*, with 24 percent of households likely to complain. The peak particle velocity of 0.5 in/sec results in "acceptable" vibrations that are typically described as *"disturbing"*, with only 18 percent of households likely to complain. The applicant should address the rationale by which he has the legal right to routinely, or ever, subject a community to this seismic activity.

Issue 16: **Ground vibrations from on-site blasting are likely to adversely impact local homeowners.** The applicant states, based on **non-referenced** *"data"*, that they can easily achieve a *"restriction"* of vibration levels (as measured by peak particle velocity) of less than 10 to 12 inches per second; reputedly a value required to fracture mass rock and create underground rock falls in mines. The applicant fails to state actual peak particle velocities they will use during blasting. Nearby homeowners will want further clarification, as peak particle velocities of 6.0 in/sec result in 90 percent of households likely to complain with a typical description of vibration experienced as *"Unbearable"* (McGraw-Hill Standard Handbook for Civil Engineers; referenced in ATC, 1995).

Issue 17: **The geophysical methods (and their proper application) to be employed for monitoring seismic impacts associated with blasting need to be specified.** The equipment, its technical and engineering specifications, its proper placement, and methods used to assess seismic waves near

and in the Kingston Mine and adjacent homes should be documented. In addition, the applicant should evaluate the geology proximal to the site - all homes and historic structures (e.g., local church) may not be situated on bedrock. Wave propagation, attenuation and destructive power, and monitoring requirements through consolidated and unconsolidated deposits (e.g., clays, gravels) should also be addressed.

The applicant provides no data but states: *"A similar analysis was made to predict the maximum charge per delay size to protect nearby dwellings which are as close as approximately 400 feet from the proposed cut in the area of the mine."* (DEIS, p. 21) If this even roughly approximates the above mentioned peak particle velocity of 10 to 12 inches per second, structural mine and homeowner damage may occur. ATC (1995) states that it is generally accepted that no structural damage (cracking plaster, etc.) will be produced if the peak particle velocity does not exceed 2.0 in/sec. The applicant must detail their blasting strategy, pilot testing and vibration monitoring methodology, complete with planned locations, such that no ground vibrations occur beyond their immediate site. It is not enough to state that *"[b]lasting can easily be accomplished in a manner which will protect the off-site mine and houses from adverse vibration impact under* ***normal*** [emphasis added] *blast control techniques"* (DEIS, p. 21).

Issue 18: **Lack of karst-specific engineering studies beneath planned building foundations, roadways, parking areas and drainage areas could lead to slow or catastrophic collapse.** Physical examination of the proposed Phase 1 building site reveals the presence of numerous broad, shallow and closed depressions. The applicant's engineers address these features: *"[t]opographic depressions at or near the summit are isolated low spots in the overlying mantle of glacial till and allied soils"* (DEIS, p. 19). These isolated low spots that nearly ring and underlie the proposed Huck Manufacturing building are sinkholes. They drain internally through solutionally enlarged conduits, down through the epikarst, coalescing with additional solution channels until reaching even larger conduits (e.g., caves). An extensive literature has built up in response to numerous building collapses stemming from poor foundation conditions over sinkholes (e.g., numerous papers in Beck 1984, 1993, 1995; Beck and Wilson, 1987; also White, 1988; Ford and Williams, 1989). Many papers in these publications address the types of engineering studies needed to provide necessary protections to corporate facilities, groundwater and surface water. A recent and disastrous example occurred

on February 23, 1994 in Allentown, Pennsylvania when a sinkhole developed and completely destroyed the Corporate Plaza Building, valued at more than $9,000,000.

Foundation studies in maturely karstified terranes, such as in the proposed Kingston Business Park, are of great importance. Buildings constructed over cave passages, mines or sinkholes have the potential of collapsing or settling into solution passages. While the ultimate determination of the integrity of the subsurface in terms of structural support lies with the building contractor, responsibility for properly characterizing the nature of the subsurface geology must initially lie with the lead agency.

Issue 19: **Blasting may locally increase bedrock permeability, thus increasing contaminant infiltration potential.** McKown et al. (1995) have demonstrated increases in bedrock permeability from low yielding rock by factors up to 100 percent in response to blasting. Should blasting result in increased groundwater infiltration to the Kingston Mine from an increased zone of capture, contaminated water may discharge to the lake.

LIABILITY

Issue 20: **Legal and financial responsibility for water quality degradation and blast-related mine structural failure should be clearly spelled out in the revised DEIS.** The substantial risk to planned Knaust business activities warrant legal and financial protection. Two possible means of affording the necessary financial protection may be through 1) posting of bonds whereby money is placed in an ESCROW or other similarly protected account, or 2) insurance policies held by all appropriate agencies and contractors. The involved parties should include the Kingston Local Development Corporation; the certified engineering company responsible for characterizing site geology, hydrogeology, and stormwater control design; and the blasting contractor. The applicant should address provisions for legal and financial protections for the Knaust family in the revised DEIS.

It is important that the insurance carriers document the adequacies of the terms and conditions of their contracts specific to all potential risks (e.g., structural and water quality damage to adjoining properties).

It is important that the blasting contractor understand the physical conditions present on or immediately off-site. His insurance should be suitable to cover all inherent dangers and liabilities. Recent legal cases have held blasters liable for damages.

WETLAND

Issue 21: **The proposed Kingston Business Park may require issuance of an individual Department of the Army Section 404 permit.** A small onsite wetland should be delineated and evaluated by the U.S. Army Corps of Engineers, Regulatory Branch. Written confirmation as to whether individual or nationwide permit conditions apply should be obtained.

HISTORIC RESOURCE

Issue 22: **The Kingston roof-and-pillar mine may be eligible for designation on the National Register of Historic Places.** The Kingston Mine represents one of the better preserved roof-and-pillar mines that contributed to the Kingston-Rosendale area's recognition as the largest and best producers of natural magnesian cement in the country circa 1825-1918 (Ries, 1901; Marshak, 1990). Structural roof weakening, water quality degradation and nearly overhead road traffic would cause adverse impacts to this resource. In the event the Knaust family determined to convert the mine to some public cultural attraction, nearly overhead traffic noise may cause a significant adverse impact.

WILDLIFE

Issue 23: **Bats, possibly including endangered species, use the Kingston Mine as a hibernaculum. Blasting activities are likely to threaten these species if conducted during late fall and winter months.** Similarly, bat populations may be present in cave passages beneath the proposed Kingston Business Park site. An inventory of bat species should be incorporated in the revised DEIS.

In closing, structural and water quality risks (i.e., mine water degradation) to the Knaust family and their business plans are real. The Knaust family wishes to be 1) kept abreast of all developments regarding this action, and 2) included in the review and evaluation of all tracer and other test protocols and activities planned in order to properly characterize the site. A moratorium should be placed on the preparation of the final EIS until all concerns are properly addressed. Thank you.

Sincerely,

Paul A. Rubin
Hydrogeologist

cc: Mark Knaust
Herman Karl Knaust
Christine Delorier: U.S. Army Corps of Engineers
NYS DEC Region 3; New Paltz
Alderman Robert Senor
Daily Freeman

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January 10, 1996

VIA TELEFAX (914) 331-4058
AND FEDERAL EXPRESS

Ms. Suzanne Cahill
City Planner
City of Kingston
Office of Planning and Engineering
City Hall
Garraghan Drive
Kingston, New York 12401-6065

Re: Proposed Kingston Business Park

Dear Ms. Cahill:

On behalf of the Knaust family, I hope and expect that your subterranean visit to the Knaust property yesterday was enlightening and revealed the need to shift development of the proposed Kingston Business Park to another site within the City. If the City approves this development as outlined in the DEIS, the Knaust family will be compelled to pursue legal remedies to protect the sensitive carbonate aquifer and their property interests.

The Knaust property is a unique and invaluable natural resource which maintains an extremely sensitive and rare environment of pure air, water, humidity, temperature and darkness. The property is properly zoned agricultural and once supported part of the biggest mushroom plantation in the world. Temporary international trade conditions defeated the economic viability of the Knaust mushroom plantation some years ago. However, the economics have changed and revival of the plantation is now feasible. The subterranean environment can house at least 23 acres of cultivation and support many jobs. The City of Kingston cannot threaten the economic viability of this operation without just compensation.

Agriculture has long been the backbone of New York's economy. To the extent that the project's sponsor, the Kingston Local Development Corporation, is charged with the responsibility of balancing local economic interests, it must preserve and protect rather than endanger the purity of the subterranean ecosystem at the Knaust property.

The project's sponsor proposes blasting about 60,000 yards of rock essentially above the Knaust property, then building a manufacturing facility that may drain all spills, leaks and contaminated runoff into the Knaust property. The proposed factory is simply incompatible with the Knaust agricultural use.

The City has also taken several legal missteps which doom the selected site. A "rezoning" from residential and agricultural to allow for manufacturing is proposed. This proposal will lead the City into the trap of blatantly illegal spot zoning that cannot survive judicial scrutiny, particularly when it endangers an adjoining agricultural use.

Moreover, the City has not given the hard look which the law requires the City to engage in with respect to alternate sites analysis. As a professional planner you know that since the project sponsor is a quasi-governmental body, any site can be used - particularly if the City is prepared to rezone to facilitate the project. Close scrutiny of the DEIS makes clear that there is only one tenant for the park at this time, Huck International. The "alternate sites" discussion in the DEIS is nothing more than transparent lip service which is insufficient as a matter of law. The needs of Huck International are minuscule compared to the bulky "Kingston Business Park" proposal. According to the project description, Huck International only needs a few acres for its operation. However, the "alternate sites" section of the DEIS starts with the artificial and false assumption that 50 acres are necessary for the project.

DS to Final

In addition to illegal spot zoning and fatal alternate sites analysis, the site selection is archaic, expensive and completely void of any true economic redevelopment vision for the City. A 'brownfields redevelopment movement' is sweeping the northeast. Old industrial parks and areas which have become outmoded and abandoned are being rebuilt, taking advantage of existing zoning and infrastructure and putting properties back on the tax rolls. If the project sponsor is prepared to spend $435,000.00 on land costs, extend sewers and water lines including construction of a whole new pump station, blast 60,000 cubic yards of hard rock and build a quarter mile of new road before a single brick is laid, it

clearly has an obligation to explore the large parcels of cheap old industrial land where buildings can simply be razed, where there is no zoning concern and infrastructure is already in place.

I am now involved in my second brownfield redevelopment project in New York. I can provide you with information on the legal aspects of this program and the tremendous economic leverage it provides.

Revisiting alternate sites is not difficult because the City must go back to square one in any event in order to comply with New York Law. Several, critical involved agencies have not been notified of this proposed action including but not limited to the New York State Department of Agriculture (rezoning of agricultural land which endangers a farm); the United States Environmental Protection Agency (the only agency which grants underground injection well permits which the proposed project sets forth as the storm water and spill management plan); and United States Department of Health (regarding water quality in the carbonate aquifer which is threatened by the action).

Of course, the DEIS also makes a series of fundamental and compounding mistakes in describing and analyzing the environmental setting and potential impacts of the proposed action because the geology of the site is dramatically misidentified.

Informed by the hand delivered, December 15, 1995 letter on this project which has been provided to the City by Paul A. Rubin, I am sure the City now understands that the DEIS completely fails to recognize the hydrologic setting as a maturely karstified carbonate aquifer. In this geologic setting, surface drainage can move with great speed through natural subsurface pathways into pristine aquifers such as the Knaust Lakes. I will not repeat the precise findings and concerns which have been explored by Mr. Rubin. I have worked with Mr Rubin as an expert witness for ten years; I am extremely confident in his expertise and his findings. If the City of Kingston and the project applicant are committed to the current site, proper environmental impact analysis under New York Law and in accordance with ASTM standards can only be accomplished after extensive testing and analysis by an experienced karst hydrogeologist working for the City.

Total miscomprehension of the geological setting by the authors of the DEIS also raises significant risk of catastrophic failure of the project and Huck International. That is, in failing to understand that bedrock at the site is fractured and hollow, the

blasting activity that is planned could result in collapses of the ground surface as well as collapses within the Knaust property and among the subterranean natural resources. Moreover, the failure to acknowledge the karst terrane risks the lack of comprehensive geophysical evaluation; that is, the proposed site may not support the foundation or activity of the proposed industrial park. These geological points are well established in the Rubin letter. They cannot be ignored.

The DEIS is also sorely deficient in many other areas, including the long term evaluation of the cumulative impact of the overall site plan for the fully developed industrial park on air quality, transportation, water quality, noise, neighborhood character and the unique Knaust property.

Thank you for your prompt attention to these matters. Please keep me informed of the City's decisions on these issues.

Sincerely,

/s/

John J. Privitera

JJP/srm

cc: Mr. Mark H. Knaust
T.R. Gallo, Mayor
New York State Department of Agriculture and Markets
New York State Department of Environmental Conservation
New York State Department of Transportation
New York State Department of Health
Ulster County Health Department
Ulster County Planning Board
Richard Riseley, Esq.
U.S. Environmental Protection Agency
Department of the Army, New York District Corp of Engineers
Hon. Maurice Hinchey
Kingston Daily Freeman
Times Herald Record

EXHIBIT B

PUBLIC HEARING TRANSCRIPT

COPY

PUBLIC HEARING

on

KINGSTON BUSINESS PARK

Jointly held between the

Kingston Planning Board

and the

Laws and Rules Committee

of the Kingston Common Council

City Hall
One Garraghan Drive
Kingston, New York

November 30, 1995
7:00 p.m.

VALLEY REPORTING SERVICE
113 Green Street
Kingston, New York 12401
(914) 331-4020

PRESENT:

Planning Board Members:

Lee Molyneaux - Chairman

Ralph Swenson

Bernard Matthews

Jim Muller

Suzanne Cahill - Planning Director

Bob Schrowang - Planning Aide

Donna Hintz, Esq., Corporation Counsel

LAWS AND RULES COMMITTEE ALDERMEN:

John Martino - Chairman

Charlie Landi

Tony Bell

Bob Senor

* * *

MR. MOLYNEAUX: I'd like to call this meeting to order. My name is Lee Molyneaux. I'm chairman of the Kingston Planning Board. The Planning Board members present here tonight are Bernie Matthews, Jim Muller, Ralph Swenson. And we have from the city engineer's office Bob Schrowang, city planner Suzanne Cahill from the city planner's office, Donna Hintz is from corporation counsel's office. And also I'd like to introduce the Laws and Rules Committee. John Martino, Alderman Martino is the chairman, and John, just introduce everyone.

MR. MARTINO: Charlie Landi is on the Laws and Rules Committee, Tony Bell is also on Laws and Rules and Bob Senor. That takes care of the Laws and Rules for tonight. We may have other members that come down later on in the meeting.

MR. MOLYNEAUX: Thank you.

I should say that today's date is November 30th, 1995, and tonight's meeting concerns the Kingston Business Park. This is a coordinated SEQRA public hearing on the draft generic environmental impact statement, site

development plan review, subdivision approval and rezoning. The project's name is Kingston Business Park, and the project's sponsor is the City of Kingston Local Development Corporation, address is City of Kingston, City Hall, One Garraghan Drive, Kingston, New York.

The Kingston Local Development Corporation is organized and existing pursuant to section 402 and 1411 of the not-for-profit corporation law of the state of New York and was incorporated on May 27th, 1994. The purpose of the sponsor of this project is to promote and assist in the growth and development of business concerns within the City of Kingston, and particularly to encourage the location and expansion of industrial, manufacturing and commercial capacity and the creation of new and improved job opportunities.

The lead agency is the City of Kingston Planning Board. The description of action of the proposed project includes the following actions:

Number one is the acquisition and purchase by KLDC of a 107.056 acre tract of land and appurtenant easements from Tilcon Materials,

Inc., for the purpose of developing a business park. This land is situated in the City of Kingston, Ulster County, New York, northerly of Delaware Avenue, easterly of Third/Fourth Avenues and westerly of Locust Street and is hereinafter referred to as the site.

Number two, the amendment of the zoning map of the City of Kingston by the Common Council of the city to change the zoning classification from its current RRR residential classification to M-1 light manufacturing to permit its development as a business park.

Three, the approval by the City of Kingston Planning Board of a site development plan for phase one of the proposed business park, consisting of 250,000 square feet of facility, of which 143,000 square feet is designed for Huck International. The balance of the site is undergoing conceptual review only.

Number four, the approval by the City of Kingston Planning Board of a two lot subdivision of the site for the purpose of separating phase one from the remainder of the park so that it can be leased as a separate parcel or lot.

Number five, other actions under consideration include Ulster County Health Department approvals of water supply and sewage disposal, a New York State Department of Transportation industrial access grant and a New York State Department of Environmental Conservation S.P.D.E.S. general permit for storm water discharges.

The purpose of the public hearing tonight is this is a combined and consolidated hearing for the following purposes:

To consider the environmental impacts of the proposed action and for public comment on the draft generic EIS. Comments on the draft generic EIS will be received at the hearing and thereafter until the 18th day of December, 1995 6789.

Number two, to consider the advisability of amending the zoning map of the City of Kingston, Ulster County, New York, to change the zoning district classification of the 107 plus or minus acre parcel of land as is more particularly hereinabove described. Such lands are currently situated within the RRR residential district of

the City of Kingston zoning map, and the Common Council is considering rezoning the parcel to the M-1 light manufacturing zoning district for the purpose of construction of the aforesaid business park.

Number three, to consider the advisability of approving the site development plan for the construction of phase one of the proposed business park. All review of any subsequent phases of the business park shall be conceptual only, and no site development plan approval is being sought at this time for such subsequent phases. Any subsequent phases of the proposed business park will undergo a separate environmental review.

Number four, to consider the advisability of subdividing the 107.056 acre site of the proposed business park into two parcels, one consisting of approximately 14 plus/minus acres and the other the remainder of the site. The 14 plus/minus acre parcel would be the site of the proposed Huck International facility.

And item number six is the notice of public hearing. The notice of this public

hearing was published in the Kingston Daily Freeman, a newspaper of general circulation in the area of potential impact and effect of the action on November 14th and 24th, 1995.

A notice of public hearing and notice of acceptance of the DSEIS was also published in the Environmental News Bulletin. Notices of public hearings were also filed with all involved agencies.

Number seven, type of hearing. This hearing is a legislative type of public hearing, which is an informal hearing where unsworn public comments and statements are taken and written comments submitted. A stenographer is preparing a transcript of all comments for the record.

Section eight, comment period and responses. Written comments and statements of this action will continue to be received by the lead agency until and including Monday, December 18th, 1995. If you do not have an opportunity to comment at this hearing or desire to supplement or amend any oral or written comments you may do so through December 18th, 1995, by mailing or delivering your written comments to Susan Cahill,

planning director of the City of Kingston at City Hall, One Garraghan Drive, Kingston, New York 12401. The Planning Board as lead agency will respond to and answer all substantive comments on the final Generic Environmental Impact Statement to be prepared and filed after the close of the comment period.

Section nine, the order and time limits of the commentators shall be as follows. One, the project sponsor's presentation -- I'm sorry, the comments from the public officials will have a time limit of five minutes per speaker. Comments from involved agencies will also have a five minute per speaker. Comments from all others, including those of the general public, will be three minutes for each speaker. Each person shall have one opportunity to speak and the boards reserve the right to vary the time period of any speaker. All speakers must sign in with the official stenographer and must identify themselves by name, address and representative capacity, if any. And this has been adopted by the City of Kingston Planning Board and the Laws and Rules Committee of the Common Council of the

City of Kingston this 30th day of November, 1995.

And I would just like to make a comment to the public, just to review this, all your comments tonight will be recorded and they will be answered in writing. So I'm just trying to set the expectation here that, you know, you might have a question or a concern or comment tonight that you're looking to be addressed immediately. It probably will not, but they will all be recorded and answered in writing.

I would like now, Mayor T.R. Gallo is the president of Kingston Development Corporation and I would ask him to say a few words.

MAYOR GALLO: Thank you.

As president of the Development Corporation we're proposing to the Development Corporation to buy this parcel of land. We're going to buy it at no cost to the city taxpayers. We're going to use $100,000 of community development money and $322,000 of a recent grant to the city, a grant the city obtained from the EDI Plan, Economic Development Incentive. The purchase price of that property will be through federal grants, federal resources.

First, I want to speak first and foremost to let you know I am listening. I listened at a public information meeting that we had last month and we had concerns about the safety of the residents on Delaware Avenue in Ponckhockie. I do support moving the road up 200 feet. That was mentioned by a resident. And I support that movement. It's going to cost the city approximately another $100,000 to do it. We're going to have to remove some more rock and we're going to have to make the road different diameters and move it somewhat. But we have that money, I'm confident we have that $100,000 in the federal and state grants that we have received. We can do it within budget and I support that. And I will doing everything in my power to make sure that that happens. I want to assure all of the rest we've given two letters out to all the residents in the immediate area and I've met personally with many concerned neighbors and property owners in the area.

I want to concur with what the Planning Board chairman just stated, that you can in fact speak tonight. We will answer you in writing.

You can also write to us with any question you have up until December 18th. We'll answer that. I want to go one step further and say to the residents if you ask a question tonight and you want an answer, you can come in to City Hall tomorrow or the next day and we'll talk to you about it. Our doors are still open. If you want to go further you can put your question in writing to the Planning Board and they'll answer officially. We'd like to make this process as open as possible to keep the residents informed.

What we're going to do tonight, I'm going to turn the microphone over to Steve Finkle, who's going to tell you a little about the economic impact of the development of the business park and what it really means to the City of Kingston as far as job creation and as far as increasing the commercial tax base and the economic benefits. When he completes his presentation we'll have Dan Shuster, who will have some charts. He'll explain the process a little more in detail. Then we'll open it up to the public. Everyone feel free to come up to the mike and we'll do everything we can to answer.

Thank you very much.

Steve?

Thank you very much.

MR. FINKLE: As you've heard before, some of you, or you may have read in the newsletters, this project came about when Huck International stated that they had to expand and could not do so at their current facility in midtown. Without having a viable option to expand in the City of Kingston, that company, the largest manufacturer, would have had to leave the city, would have taken its tax base, would have taken its employees, in terms of local expenditures and payroll, to another area; possibly even one of the alternatives was out of state. What this project does is it helps retain 205 quality jobs in the City of Kingston. This will allow for an expansion to at least another 30 jobs or so within the near future.

Huck has a large payroll in this area. It's probably over five million dollars. They spend about a million and a half or more in local goods and services, supporting the neighborhood shops, the suppliers in the area and other

businesses, and of course a lot of residents who live in the City of Kingston. So that was the impetus in getting the park going. And the park will allow the city and the Development Corporation to accommodate a few more buildings over time up in that area. And at the time the park could be built out, there could be as many as 600 jobs up in that area. There could be as much as half a million dollars generated in payments and taxes; $200,000 in land rent; probably payrolls up in the 12, 13 million dollar range; local expenditures to businesses for goods and services, maybe three to four million dollars. And for every time a business like Huck spends money and pays people in payroll dollars, those people then go out in the community and get a hair cut, buy food, occasionally buy a car, and that money helps circulate and keep the area healthy.

Without having a good economic base, without having jobs in manufacturing, the viability of the city suffers. Just as a result, for example, of the IBM downsizing and closure of their plants in Ulster, not only were there 7,000

jobs lost but the value of the real estate in the City of Kingston and in this general area decreased by something like 20%. It's important that you have a good mix of commercial and industrial neighbors in your city in order to keep the taxes in balance, in order to provide opportunity for kids getting out of school to get jobs in the area, and to keep the area healthy. If you look at areas that have lost a lot of their manufacturing jobs, they're in distress. So this project I believe is significant in that it helps keep a very good employer, very good neighbor, Huck, in the City of Kingston. I've lived down the block from Huck for 15 years, literally, and found it to be a very good neighbor. It keeps them in the city. It offers some hope for some future development.

The park is being planned by a municipal, quasi-municipal corporation, so there's a lot of good controls over the appearance of it and how it's going to be conducted. There's a lot of positive benefits.

I'd like to hear what the project is about in some more detail from Dan Shuster, the

planning consultant who's been preparing the draft generic environmental impact statement.

MR. SHUSTER: Thank you, Steve.

Now, I'd like to do two things this evening, and I'll try to be brief so you people will have an opportunity to express your opinions and comments. I'd like to first describe the basic plan that is being proposed and discuss how it will be implemented, and secondly I'd like to summarize the environmental impact statement which has been prepared for the project.

The site is a 107 acre site on the north side of Delaware Avenue between the Ponckhockie neighborhood and Fourth Street. It's a site which has been owned by Tilcon Materials for many years. It sits higher than the surrounding lands, it's a plateau across or north, directly north of Hasbrouck Park. The overall plan for the site contemplates the ultimate development of as much as 500,000 thousand square feet of light industrial manufacturing space. As shown on the conceptual site plan, five building sites have been designated. The first site is the proposed site for Huck Manufacturing, with approximately a

140,000 square foot building on the southern end of the site.

Those of you who are familiar with the site know that access to the site poses somewhat of a challenge. A variety of alternative access roads were looked at before the final plan was prepared. The second most feasible alternative is an access road leading from Delaware Avenue up the east side of the slope reaching the summit of the site at approximately midpoint. We're well aware of the concern of our residents in the neighborhoods of where that access intersects with Delaware Avenue. Two alternatives are in the environmental impact statement. The mayor has expressed his preference for the one which intersects Delaware Avenue approximately 200 feet to the west of Roseanna Street.

A VOICE: Point the mike towards you.

MR. SHUSTER: Towards me, okay.

A VOICE: There you go.

MR. SHUSTER: Two alternatives are discussed in the environmental impact statement to make sure they were examined completely and all aspects relating to them, both positive and

negative, were considered. The final decision will be made as part of the final environmental impact statement and the finding statement which follows that. You've heard the direction that the mayor is leaning to and that will certainly be given the most consideration.

MAYOR GALLO: Thank you, Dan, thank you.

MR. SHUSTER: Only about 60 of the 107 acres of the site are actually part of the development plan. Much of the site is steep, much of the site is rock. A substantial amount of it is undevelopable. Other portions of the site will be preserved as a buffer established as part of the conditions affecting development, which preclude it from any site disturbance.

After the Huck site is developed four other building sites will be made available. There is no exact timetable for when those will be developed. We anticipate that, according to schedule, the Huck site would be under construction in early 1996, and completion would take place at the end of 1996. The remaining sites depend on the level of interest and the nature of the interested parties. But once that

access road is in and the first --

A VOICE: They're in.

MR. SHUSTER: Once the access road is in and the first building is constructed --

A VOICE: Yes, they are, we've been up there.

MR. SHUSTER: -- we anticipate that it will be a very marketable site, providing the jobs and economic benefits that Steve Finkle discussed.

This map is an enlargement of the Huck site, the first site to be developed. It shows the location of the building, parking areas. And prepared for submittal to the Planning Board are detailed site plans which show the proposed grading of the site, landscaping, utilities, lighting, all of the detailed aspects of site development which must be approved by the Planning Board prior to the issuance of a building permit.

You notice it gets bigger and bigger with each map. This is one of the detailed site plans. And as you can see it shows the location of every tree, every parking space, all of the

detailed contour lines, so that all aspects of development are carefully analyzed and approved by the Planning Board. And they must be followed upon issuance of a building permit.

As I mentioned, two access points to Delaware Avenue were investigated. This is the initial location showing the access opposite Roseanna Street, which was carefully looked at. Upon receiving the comments of people in the area familiar with how that intersection, how that roadway works, a second alternative was developed, which moves the access point from approximately 200 feet to the west past the crest of the hill. It's slightly longer and slightly more expensive, but it avoids the concern of stopping on an uphill, particularly in inclement weather. The road itself, Delaware Avenue, will be widened to provide a turning lane for left turning vehicles into the access road, a traffic signal will be provided to regulate turning movements, sidewalks will be provided on the north side of Delaware Avenue, guardrails as necessary. And a commitment has been made for a crossing guard at that intersection during school

hours.

As part of the State Environmental Quality Review Act, it's required that a detailed map analysis be made of all the potential effects of a project such as this. When the application was submitted to the Planning Board, the Planning Board reviewed it and approved the scope of the draft environmental impact statement. It spelled out all of the areas and concerns to be addressed in the environmental impact statement, which is this large green book that has been available for review for the last two or three weeks.

I won't go into all of the details of that document. Let me just cover a couple of major concerns. The first one that was addressed was the traffic impact. In terms of traffic we were concerned about -- there were two possible concerns. Once is the capacity of the local street system to absorb the additional traffic generated by the new employment at the industrial park. Traffic counts were made on Delaware Avenue at the intersection of Delaware Avenue and Murray Street to record the existing traffic volumes on the streets. Then the future traffic,

not only from the first phase of development, the Huck site, but the potential development of the entire site, were projected. Those vehicles were added to the traffic already on the street and were analyzed using formulas and procedures which measure the ability of the intersection to accommodate all of the vehicles, the turning movements they make during the peak hours of operation. That analysis demonstrated that there was ample capacity to handle all of the traffic that would be generated by this project. The other concern is that of safety, which is why so much attention was made to the intersection, the access road and Delaware Avenue. And a great deal of concern was placed on traffic safety measures built into the design, including the -- to reiterate, a traffic light, turning light, sidewalks, guardrails. And upon that evaluation, based on those elements we believe the planning satisfies the safety concerns related to traffic.

A number of other alternatives for access were also investigated. Required under the environmental impact statement procedure is an evaluation of all other possible alternatives to

the project itself, as well as to various aspects of the project. And one of them was traffic access. Other locations that might be possible were examined. All of them were discarded as not being feasible or not being as appropriate as the one which has been selected using Delaware Avenue.

Another area of consideration was the possible visual impact of this project; where could it be seen from, how would it look. In order to do that, a series of photographs were taken from key viewing points, public places that would have potential views of the site. Hasbrouck Park, Shults Park, some locations on the river and across the river. The existing photographs were taken and then, through photo simulation process, the roadway and building were superimposed on the photographs to show what the site would like look like upon development. From some locations, Hasbrouck Park for instance, it will be almost impossible to see any of the buildings on the site. A small portion of the road may be visible. From other locations the roadway itself will not be seen, the pavement of

the roadway or even the cuts, the rock cuts that will be required to construct the roadway, because the roadway has been designed so that it is cut into the hillside, and not having the cut on one side and the large still areas on the downhill side, but rather it's been cut in so the vegetation on the downhill side of road will be retained, which would screen the roadway from most locations. The buildings themselves will be partially visible from the river and possibly from Shults Park. Because the site is higher than most of the view points, the parking lots will not be visible. The upper portions of the buildings may be visible.

The buildings will be attractively designed. They are in an area which is developed around it for other uses. The views from the river, for instance, show the many industrial uses that exist on the river. The buildings will be a relatively minor intrusion on views from the river. And although the buildings will be seen we believe the impact will not be significant or severe.

Another concern was the effects of road

construction which require blasting of the rock on the slopes and also blasting which will take place to make the development sites available. Geology -- geologists and engineers have examined the blasting procedures, have analyzed the existing lay of the land. There was some concern because there are old mines below the site. Extensive testing was done to evaluate the depth of those mines, what the potential impact of the blasting might be on them. It was determined that no impacts on the underground caves would result from blasting. The applicant has agreed to follow stringent procedures to regulate blasting activities following the city's blasting ordinance. Notification will be made to all surrounding residents prior to any blasting. Blasting will be supervised by city personnel to ensure that no severe impacts will result from that activity. Most of the other activities, potential impacts were evaluated in the environmental impact statement.

The environmental impact statement is still available for review in City Hall by anyone who wishes to go through it in detail.

As was mentioned before, comments will be accepted until December 18th. All written comments and all comments made at the hearing tonight will be answered and presented in a document called a final environmental impact statement, which must be received and approved by the Planning Board before it takes any further action.

Thank you very much.

Jim?

MR. MOLYNEAUX: That basically completes the Kingston Local Development Corporation's presentation. And I would just like to compliment this audience on giving everybody a chance to speak. And now it is your chance to speak. The only thing I would like to just repeat is that when you do walk up to the microphone, please state your name and your address before you comment. And just in fairness to everybody I just want to read the rules again.

The comments from public officials are limited to five minutes. The comments from involved agencies is five minutes. And comments from all others, general public, whoever, is

three minutes. And I would ask anybody that has a comment to please come up. I will adjust the microphone.

MR. SENOR: Mr. Chairman?

MR. MOLYNEAUX: Yes?

MR. SENOR: If I may ask, being that this book, this environmental impact statement, as thick as it is, there's an awful lot of things that are going to be addressed with the development of this park. If somebody goes beyond the three minutes or five minutes I would ask that the board or the committee give a little leeway because this is going to be quite an impact to that community. And I only received the book on Tuesday, myself, and there's quite a few questions I'm saying on my own. Now I'm sure the audience has some questions that might take a little more than three minutes.

MAYOR GALLO: Let's find out ---

MR. SENOR: -- affects the future of that neighborhood and that community.

MAYOR GALLO: Let's find out from the audience before we go changing the rules.

MR. MOLYNEAUX: Yes, let's -- what I will

do in response to Alderman Senor, I will use my discretion and I am not, you know, going to just --it just depends on how it goes. Again, I would ask anyone that has comments to please come up to the microphone.

MR. KNAEST: I'll be the first one, okay.

My name is Mark Knaest, K-N-A-E-S-T, I live in Saugerties.

MAYOR GALLO: Your address so we can write back to you?

MR. KNAEST: P.O. Box 178, Saugerties, New York. Zip, 12477.

MAYOR GALLO: Thank you.

MR. KNAEST: I and my family are the owners of the mine at the base of Delaware Avenue, and we've made the city and Planning Board aware of certain concerns we have regarding this project. And I just want to say that, you know, I'm in favor of the city retaining its tax base, but right now we're having certain people look over this document and we will have comments and concerns to express to the Planning Board here.

MR. MOLYNEAUX: Good.

MR. KNAEST: So that's all I want to say.

MR. MOLYNEAUX: Thank you very much.

Anybody else?

MS. MacCANDLISH: Yeah.

MR. MOLYNEAUX: Just a reminder, please state your name and spell it for the stenographer.

MS. MacCANDLISH: Arlene MacCandlish, M-A-C-C-A-N-D-L-I-S-H.

And I've never done this before.

MR. MOLYNEAUX: Could you state your address, please?

MS. MacCANDLISH: 222 East Union Street, Kingston, New York.

MR. MOLYNEAUX: Thank you.

MS. MacCANDLISH: This is breaking my heart, really. This is the last woodlands, big woodlands left in Kingston. And it's abutting, it's abutting the Hudson River, you know that.

We live near the river and we see thousands of migrating birds and they come across the Hudson River and then they cross over by our house and they spend the night in those woods. Who speaks for the woods?

C.

A VOICE: Who? The folks, people who live there.

MR. MOLYNEAUX: I'm sorry, if you are going to speak would you state your name and your address? Thank you.

MS. MacCANDLISH: This is Mr. MacCandlish.

I think it stinks. I mean, that's all I can say. I mean you're -- the frog -- we know these woods. The frog bogs -- we were in there before the snow, and they have already, illegally by the way, made all these access roads, okay, all the roads are in. Now, I talked to the environmental people and they said that these access roads are illegal and not one bit of grass should have been moved at this point. In other words you did wrong already. That's all. They said that there's nothing they can do about this. They said that it's the fox guarding the chicken coop. The Planning Board is doing all the environment -- I haven't heard one thing about anything like habitat loss. You're talking environment, you're talking roads. I'm talking birds, I'm talking deer, frog bogs, turtles.

That's all. I think it's awful, I really do. The last spot. If it was me, if I was the mayor I'd buy the place and kiss the ground that we still have one lousy spot that's still left in Kingston.

I could say a lot more.

MR. MOLYNEAUX: Thank you.

MR. SENOR: My name is Bob Senor. I reside at 63 Crane Street. I'm a resident taxpayer of the City of Kingston, I'm a resident of Ponckhockie. I'm going to have to live with this project for as long as it's built. I also speak for the community on some issues here.

After reading this this week there was some questions that I'd just like to put forth for an answer at a future date. One is, can better steps be taken to notify the public of future development in there, because if somebody comes in to develop after Huck is built, the way this is set up the Local Development Corporation oversees who goes in, what tenants can be there, what tenants can't. And when I read this book, research laboratories are allowed under this new zoning, and businesses of that nature. We as the

Z

residents might not know what tenants are going in there because the Local Development Corporation may not have to come before the Planning Board if they meet all the criteria. That will be answered in a letter.

I'd like to see some other additional steps for the residents other than a legal notice that we can be notified of future development, future tenants in that park, so they can have something other than these little legal notes that most people don't even read. That's one issue.

Another issue is on page 13 of this book. It speaks of an access road off of Fourth Avenue at the back end, and it says for the purpose of emergency vehicles after the job, upon completion of the job. I'd like to ask if that's the only time it's going to be used, if it's not going to be used for a possible entrance way now so they can start the building while the roads are being built. Because I don't think the residents of that area are aware of that access emergency road, and there might be a possibility that that road might be used for the development of the

building while the main road is being built.

Another question was when I read through this, it speaks of the ten year storm plan in here. I would like to see a 20 year storm plan and I'd also like to see -- I did not see anything in here from the DEC in reference to the storm water going into caves that are presently there, because these storm waters are going to have oil that's going onto the parking lot, other contaminated materials that might effect the future, maybe in 50 years in the future in the area, so I'd like to see that in the impact statement. B.2.c

Another issue I'm quite concerned about is on page 31. When you talk about the access road, I strongly urge that we use the second alternative 200 feet out. But when I read the paragraph here, it says phase one and phase two, site access for both phases will be via Delaware Avenue. We were led to believe in the beginning of this project that only the Huck project would be off Delaware. Any future building would come off the 32 entrance, which was feasible because you would have more money to do that. So on page D.

31 it says site access for both phases one and two would be off Delaware. The community was misled on this. I'd like to know exactly what is really going on with that. I know what it says here, I know what we were told, but then when I read it --

Another issue is on Murray Street where the traffic study was done. I don't believe consideration was taken into Murray Street and Koenig Boulevard, which is Route 9W. Yes, you took account of the pedestrians in the intersection for Murray Street and Delaware Avenue, but the construction vehicles, the employees will be coming up Murray Street. Rondout Gardens and Broadway has up in the neighborhood of probably, between both common locations, 150 to 200 children that are in that intersection on a daily basis. I don't see that addressed as a traffic safety problem. We have one crossing guard for crossing 9W, but nowhere is there a crossing guard addressed for that particular area. So I'd like to see some more research done on that. D.5.

You speak of construction going from

seven o'clock in the morning until dusk. In the summertime dusk is between 8:30 and nine. I don't think the residents in the immediate area should have to put up with blasting or bulldozers in the evening hours when they come home from work. They might want to sit in their backyards. I would ask that that be changed to six p.m. in the evening. I know it may prolong the project more, but these people are being inconvenienced as it is.

Another area that wasn't addressed, and I am sure will be addressed at this time was over on East Chester Street where the dust from the repaving -- there's going to be a lot of dust from the blasting. I'd like to know what steps are going to be taken for the property owners in the beginning before the blasting starts and the road starts, whether you're going to have provisions when you start doing that building. You're going to have a flash flood which is going to bring a lot of stuff out there. I can see already some problems weren't met, because this morning the kids had to walk up that hill on the unshoveled sidewalks. It wasn't until later that

day the sidewalks were shoveled. We're going to be facing that.

Another issue which was brought up was the wildlife. When I read this, the wildlife to me it sounds just like a draft out of someone's -- any statement, because really it doesn't speak of the habitat that's in there. It speaks nothing of turkeys that are in there, there's a couple of -- many different flocks. It speaks nothing of the red fox that have been spotted in this area, the prairie dogs. So I'd like to see a, I guess you'd want to say a better environmental impact statement done on the wildlife that's in there. If we are really going to affect it how we're going to affect it. I'm not trying to put stops on the project but I don't think we went into enough detail in looking into some of it because you're talking about a how many year project that these people have to live with.

C.

The other thing I did not see in the impact statement is whether the land values will change in one way or another in this area, whether it be greater or -- can that be addressed

K.

as far as what is projected out, like if there's property owners who are going to be down or up because of this, whether this project is done before the traffic problems are going to occur. And that should be looked at.

The last and final thing I'd like to speak about is blasting. Can we please have some letter in the clerk's office ready to go before the blasting starts on steps the property owners can take to file claims the minute blasting starts? If there's any blasting at all right now you bet somebody -- you cannot even get a claim against the city because of the way the process works. Or maybe we can even hand deliver something to the residents in that area beforehand so they know what to look for before the blasting occurs.

There is more, I'll probably be submitting more writing, but like I say, I only got it this week. But I don't think these -- I don't think they are addressed in complete detail. I'd like to see them addressed in more detail.

One other thing that I did find here was

the water pump station to increase the water to the park area, especially fire protection it shows. And it doesn't show it on this map. That pump station is going to be right off Delaware Avenue on the corner. Is there any other location they can put that so it's not right out there on the open, so we can keep some of the wild, we can hopefully see some of the wild and it's going to be set back in, or can that pump be put in the ground so somehow it's not seen?

H. 1.1

Thank you.

MR. MOLYNEAUX: Thank you.

Anybody else?

MR. VANWAGENEN: Good evening. My name is Charles Vanwagenen. I live at 286 Third Avenue in Kingston. I'm a grandson of Milly Berardi, and I'm an ancestral descendent of the Vanwagenens that have been in Ulster County and the Kingston area for the past 345 years. My statement includes ideas, examples and a couple of concerns, so it shouldn't take me too long.

If Tilcon is willing to sell this property, why not purchase the adjacent land either across from the Brickyard or the land on

First Avenue to the left and right quarries? It seems to me that semideveloped land would be cheaper to develop. Why not, it's within city limits. These areas that I'm talking about are here and --

Alt. L.

MR. MOLYNEAUX: Could I ask you to turn around and show the audience, they may be interested.

MR. VANWAGENEN: Sure.

Here, both sides of First Avenue where the old -- where the swimming quarry used to be and on the other side. Both of these --

MR. MOLYNEAUX: And then for me because I didn't see.

MR. VANWAGENEN: Over here and to here and here.

MR. MOLYNEAUX: Okay, thank you.

MR. VANWAGENEN: Both of these areas that I've just pointed out are already predeveloped by Tilcon, and it seems to me it would be cheaper to build this industrial park in that area than destroy an area which is relatively old.

The woods is my main concern. When I say it's relatively old, there's several stands of

C.1.a.

old hemlocks. I don't know if any core readings have been taken of the trees there, but they're quite old. The wildlife population, as Mr. Senor pointed out there are turkeys back there. There's at least one flock of 20 or more turkeys which I've seen on several occasions in my backyard as well as in the woods. There's also deer, both male and female; foxes, partridge, and a woodpecker, a colleeded (phonetic) woodpecker. It's a very large woodpecker which is about 12 to 18 inches. And there's also archaeological sites there which include foot quarries, which I do not know if they're included in this green book, but that information was obtained through speaking with an archaeological gentleman that was here doing this work earlier this year.

My idea, since the majority of people from Kingston and the outlying areas are proud of the history, heritage and natural beauty of the area, is why not exploit it by designating it as Kingston's own wildlife preserve, with limited trails and viewpoints. Therefore we would be keeping up with the times by creating a tourist attraction that would be tied in with other

H.2.c

related activities such as the Wildlife Festival, the Hudson River Sloop Clearwater Festival, the Ulster County Fair. The woods could also be used for cross-country skiing, bicycling and as a destination for school kids on class field trips. If you think tourist revenue will be launched from an industrial park --

Finally, I'd like to point out the lack of foresight of Kingston in the past with their projects, several of which include what I call Garraghan's blunder, the removal of the Rondout, or another famous saying in Kingston is let's build a Jack In The Box. It was a beautiful building, it cost a lot to heat, we lost it. Another example is covering the railroad tracks that go to the Brickyard. The possibilities for a tourist attraction there are shocking. And allowing the whole destruction of Kingston to just fall apart -- do the licenses of the Kingston Local Development Corporation, Huck and the other tenants include steps of environmental protection and conservation, and if so, will they be disclosed and open for discussions? Don't let Kingston's past become Kingston's future. Create

the future by changing the past, by saving what we have now.

Thank you.

MR. MOLYNEAUX: Thank you.

MS. SECRETO: Hi, I'm Tony Secreto. I'm a member of the IAM Machinist Union, Local Lodge 1562. I work at Huck Manufacturing, P.O. Box 1338, Kingston, New York.

I just want to say that one of the concerns over to Huck with our members and our workers are that we have a lot of local steel workers and construction workers, union workers out of work right now, unemployed. And we would like to ask if when you go through with this project if you could look into the labor council and try to use organized labor unions to do some of the work.

Thank you.

MR. MOLYNEAUX: Thank you.

MR. PORTER: My name is Robert Porter. I live at 134 Third Avenue, Kingston, New York.

I have some concerns which I've addressed before and I'm just going to put it on the public record right now.

Living on Third Avenue we have nothing but a hill in back of us where this projected park would be. Syzmanski Street -- and I live right here, so literally you are in my backyard. And since you're going to be in my backyard and be a neighbor of mine, I'd like you to be a good neighbor. And I'd like the record to note that I want a recourse of legal action taken during this blasting. I realize the city will do everything in its power, and so will the contractors, to ensure my foundation will not be destroyed one more time nor anymore of my walls will be cracked. And the fact of the matter is, I've been living down there since 1975 and having the cement plant blasting in East Kingston rattled my foundation, cracked my walls. And during the construction of Koenig Boulevard the same thing happened over and over again. And I'm sure if we check our public records we'll find that the same guarantees were given to the citizens at that time. Well, I happen to have a little better working knowledge of government and you'd better put more money into the insurance fund there because there will be a list. And I mean it's

started to line up because we've started to take pictures of our walls now and we're videotaping everything. That's primarily the concern.

Number two, we live in the area. I chose to stay there even when I thought of moving out because of the location, the actual wooded areas. It's one of the few areas that I can say is pretty, it's prestigious, it's a nice area to come home to. I usually don't go the environmental route, being like on the conservative end we're usually shooting at each other on these issues, but there's something in the quality of life and the esthetics of where we live. It's a very beautiful life.

During the first phase of this, I believe it was last year, somebody brought up the question, what about wildlife. I remember the reply -- it's in print, we can access it in the library, it's in the public records -- was don't worry about the wildlife, it will move. Now, I will start a petition to get the DEC in there to get it to stop this process. That's where you come in. Where there is wildlife there it's a part of the city. That should be protected as

C.La

much as my home as well as the proposed industrial park. We have to learn to live with everyone and not destroy one thing for the sake of the dollar, and at the same time not take one instance and we'll go forget about people and their incomes. And I think this falls on the shoulders of the three groups here; elected officials, an appointed oversight board and a third party organization, the Kingston Development -- company; am I correct, company or corporation?

A VOICE: Corporation.

MR. PORTER: Corporation, thank you.

My concern is not with their corporation and I agree this concerns -- for the public record, there was a development corporation built a few years ago, named R-A-R-R-A, and some of them are sleeping; there's no input of the people into the board. Well, here we have an autonomous input, there's no input into it except a mayoral appointment. I would like to see public representation representing me to that board. How do we know what research went into there? These are things that have to be addressed, and I

believe that involve some direct concerns.

Third, you're going to have construction going on down there before building the road. I think it should be at least 200 feet above where it is. At the same time, knowing construction, somebody is going to get an itch, time is money, we're not making it on this. I'm already concerned that the Fourth Avenue access will be opened up and during construction time we'll find D.3. vehicles tearing up and down or we'll have the destruction of our neighborhood from the construction people. I need to have a guarantee that that will not happen, in writing, that that access road will not be used for any construction during phase one. I need to have that in writing as a guarantee. If not, that's going to be my concern and the concern of others in our area because we have -- right now we don't even have sidewalks in our neighborhoods. How are our kids going to get to school when we have to deal with construction workers? Nothing against the workers, I belonged to the same union you workers do until Huck laid me off, which isn't going against Huck. At that time somebody is going to

get there, they're going to be using it, going down that street so fast by the East Chester Street bypass. Well, it's going to be real exciting when these guys starts trucking down there because it's that kind of neighborhood where you're dealing with people who live there, you have people in the neighborhood who want to protect, take care of things. This gentleman sitting back here, we have not -- we have an individual sitting back here who lives right down from this property. We didn't receive any notification of the process, what's going on whatsoever, except in the Kingston Freeman. I hope that will be addressed. And I will not be left in the lurch again. I received nothing, no letters, neither did my neighbors. And I have this gentleman who lives right up here on Syzmanski Street. I would think this case needs to be addressed even more so.

To reiterate my concerns, the blasting, I know you're going to be doing the best you can, but that's never going to be the best. I don't want to take six months to hire a lawyer to recoup my losses. We have to learn to live with

our environment, not just massacre it, because many of us live in the area because of the esthetics of the area. Three, I do not want to see our streets used for access for construction purposes.

Thank you.

MR. MOLYNEAUX: Thank you.

MR. FEENEY: Good evening, gentlemen. My name is Ed Feeney and I live on 33 Dunneman Avenue.

My concern is when and if this job goes to contract, is the city going to play on a level field this time? I live right back of East Chester Street. When the fire department wanted to go there, the city --

THE REPORTER: Sir, I can't understand you.

MR. MOLYNEAUX: That's a court reporter. Could you repeat what you just said? I'm sorry, she's trying to take it all down with the stenographer machine.

MR. FEENEY: Oh. Well, what I'm concerned about if it's going to be on a level field, you understand. Is the City of Kingston

going to put a welder on private equipment? Incidentally, that welder should have been getting the per diem rate, which is much higher than the city rate. Also, if the fire department never watered down this here new road there, what's a private contractor doing the job for?

Thank you.

MR. MOLYNEAUX: Thank you.

Anyone else?

(No response)

MR. MOLYNEAUX: Going once, twice?

(No response)

MR. MOLYNEAUX: Last chance.

(No response)

MR. MOLYNEAUX: I'd like to thank you all for coming. This concludes the meeting. Thank you.

(Time noted: 8:05 p.m.)

EXHIBIT C

DETAILED RESPONSE TO COMMENTS BY PAUL RUBIN ON BEHALF OF KNAUST

AUGUSTUS S. BRINNIER, P.E., L.L.S.
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January 15, 1996

Ms. Suzanne Cahill, City Planner
City of Kingston Planning Board
1 Garraghan Drive
Kingston, N.Y. 12401

Re: **Response to Public Comment on DGEIS-Kingston Business Park**
Comments of Paul A. Rubin, Hydrogeologist on behalf of Knaust

Dear Ms. Cahill:

The following comments are in response to the letter/report submitted by Paul A. Rubin during the public comment period on behalf of Knaust.

Introduction

See letter of GeoDesign, Inc. dated January 2, 1996
See letter of Charles Merguerian, Ph. D., dated December 27, 1995
See letter of GeoDesign, Inc. dated January 9, 1996

Issue No. 1

See letter of GeoDesign, Inc. dated January 2, 1996
See letter of Charles Merguerian, Ph. D., dated December 27, 1995
See letter of GeoDesign, Inc. dated January 9, 1996

Issue No. 2

See letter of GeoDesign, Inc. dated January 2, 1996
See letter of Charles Merguerian, Ph. D., dated December 27, 1995
See letter of GeoDesign, Inc., dated January 9, 1996

In addition:

There are no planned infiltration galleries in the vicinity of the Knaust property or along the access road where it is at its nearest proximity to the Knaust property.

Issue No. 3

See letter of GeoDesign, Inc. dated January 2, 1996
See letter of Charles Merguerian, Ph. D., dated December 27, 1995
See letter of GeoDesign, Inc. dated Jaunary 9, 1996

Issue No. 4

Drainage from subsurface infiltration areas will directly recharge the epikarst, drain through solution channels and caves, and discharge to unknown locations-possibly the Kingston Mine.

Response:

This issue is raised based on a misinterpretation of the geological setting (see report of Dr. Merguerian) and a misunderstanding of the storm water management plan. Subsurface infiltration trenches will be utilized on the site only where areas of substantial fill depth are proposed. This will allow for parital filtration of the stormwater within the large volume of processed fill material and filtration fabric. This is a recommendation included in the NYSDEC, SPDES General Permit GP-93-06, Article 17, Title 7,8, and Article 70 (See Stormwater Management, page 12 and page 32 of NYSDEC requirements).

Additionally, other measures are being designed and utilized to address stormwater quality concerns and requirements. These include: extended detention, vegetative swales, grit traps, rock check dams, filtration and flow attentuation.

Much of the discussion of Mr. Rubin in this issue relates to the "rapid, non-Darcian flow" which may occur in a karst system. This is not a karst system. The fractured bedrock is therefore expected to exhibit slow, laminar flow characteristics as stated by Mr. Rubin in paragraph 2, Issue 4.

Issue No.5

Stormwater overflow drainage into the "Old Open Mines" depicted on Map Nos. 4 and 7 may, partially or wholly drain southeast into the lake in the Kingston Mine.

Response:

There is no evidence that the Old Open Mines are hydraulically connected to the Kingston Mine. The existing evidence is to the contrary. See GeoDesign letter of January 9, 1996. Page 2, paragraph 3, "this observation argues against any hydraulic connectivity betwen these bodies through the formation", and Page 2, last paragraph, "This indicates a high hydraulic gradient and low hydraulic conductivity (permeability) of the limestone bedrock formation."

Issue No. 6

Apparently, the applicant intends to directly discharge stormwater, including roadway oil, grease, salt, etc., into the Knaust Kingston Mine. This will directly and immediately degrade the lake water.

Response:

Mr. Rubin misunderstands the drainage analysis included in the DGEIS. There are no planned discharges to the "Kingston Mine". Discharges of stormwater from certain subcatchments will occur to the vertical mines situated 1600 ft north of the Kingston Mine and to a lesser degree, to the vertical mine located 800-900 ft feet west of the Kingston Mine. These two abandoned mines will be, in conjunction with other upland measures, used for the purpose of stormwater management and treatment. The mine entrance near Delaware Avenue and a **small portion** of the mine (cave) are owned by Knaust. The **vast majority of the mine is owned by the City of Kingston and was deeded to the City of Kingston on January 17, 1928** by the Newark Lime & Cement Manufacturing Company and is a municipal park. A small portion of the mine is situated on lands to be conveyed to the Kingston Local Development Corporation. Use of the Kingston Mine for commercial mushroom production purposes would likely require additional property acquisition and numerous discretionary approvals.

It is our understanding, based on 40 years of municipal engineering work, that the sale or lease of park lands by a municipality requires special legislation by the NYS Assemby and Senate and is an extremely difficult process. Additionally, it is our understandng that the use of municipal park land for commercial activity is inconsistent with both state and local statutes.

First flush stormwater treatment is provided in accordance with federal and state guidelines. For a detailed analyis of these issues, refer to the modified stormwater management report and stormwater pollution prevention plan.

Issue No. 7

Disturbed site areas may result in the off-site release of fine particulates during intense precipitation and snowmelt events with significant runoff. This may directly flow into the Kingston Mine, thus degrading water quality.

Response:

Areas disturbed during construction will be subject to erosion control and sedimentation control measures designed to minimize releases of fine particulates. This is a permit requirement for the construction project. There will be no direct discharge to the Kingston Mine and the surface water runoff patterns on the project, existing and proposed, are contrary to Mr. Rubin's allegation. In fact, surface water runoff patterns are largely directed away from the Kingston Mine.

Issue No. 8

The applicant has failed to properly and adequately design stormwater runoff systems protective of underground water resources. Insufficient information is presented in the DEIS to evaluate the quantities of stormwater run-off likely to be generated. In addition, the applicant plans to dispose of stormwater runoff directly into the groundwater flow system; in the complete absence of any information specific to the system.

Response:

Detailed design of stormwater systems were not, and need not, be included in the DGEIS. Quantities of stormwater runoff for the pre-development and post-development condition were presented in detail in the DGEIS for each sub-catchment and totalled for the entire project parcel. In addition, methodologies to be utilized for stormwater management are included.

The applicant does not plan to dispose of untreated stormwater runoff directly into the groundwater flow system. Detailed modeling of the groundwater flow system on the property would be extemely expensive and is not necessary for the proper design of a stormwater management system on this property.

The stated objectives of the water quality management guidelines established by the NYSDEC include: control of the first flush and control of thermal discharges. The heiracrchy of methods for managing Stormwater Quality are: 1) infiltration, 2) retention , 3) extended detention and 4) flow and pollutant attenuation by open vegetated swales, buffer zones, filter strips, buffering, sedimentation. (Source : NYSDEC SPDES General Permit for Storm Water Discharges from Construction Activities, Effective Date August 1, 1993).

The Stormwater Management Plan established for the project is consistent with the objectives established by NYSDEC in that first flush treatment is provided and control of thermal discharges to stormwater systems is provided. Additionally, a combination of infliltration and extended detention is proposed, along with the stormwater management adjuncts for flow and pollutant attentuation.

In reponse to Mr. Rubin's comment related to exfiltration, the exfiltration galleries will be limited to extensive "fill areas" on the site, where treatment is provided by deep and extensive filtering media and fabric. Secondly, stormwater treatment systems will be installed (e.g., Vortechs STS) in specific areas where large impervious surfaces, subject to partial contamination, dictate the need for capture and treatment of stormwater.

Lastly, processed material will be used in the two existing vertical mines on the property (**not** the "Kingston Mines") for final stormwater polishing. See modifed Stormwater Management Report, dated January 10, 1996.

With regard to the continual references by Mr. Rubin of a "karst setting" and this premise being the foundation for nearly all of the concerns and issues outlined in his letter, it is important to refer in this response to the letter report of Charles Merguerian, phD, dated December 27, 1995, in which it is strongly concluded that the geology is not karstic. Also see the GeoDesign, Inc. letter of January 9, 1996 which summarizes the inspection of the Kingston Mine and strongly concludes **"absolutely no evidence of karst was found."** (Page 2, final paragraph).

Therefore, many of the issues raised related to hydrogeology in a karst setting are both irrelevant and erroneous, as is the the Rubin assumption that the "Kingston Mine" is directly connected to other mined excavations present on the project parcel.

Issue No. 9

The hydrogeology of the proposed site and its relationship to groundwater and surface water resources has not been determined. The report preparers' indicate that it is acceptable to degrade groundwater since it is not used locally at this time. Furthermore, the report preparers' have not characterized the depth to groundwater, groundwater flow directions and velocities, and locations where the groundwater discharges (e.g., the Kingston Mine, Hudson River, Rondout Creek). Nonetheless, the applicant plans to discharge stormwater directly to the underlying acquifer.

Response:
The fact that groundwater resources in the area are not presently utilized is undeniable. Furthermore, drinking water supplies cannot be developed in this area unless the City of Kingston Water Department so chooses to integrate these limited resources into its water supply system. There are no such plans contemplated.

With regard to depth of groundwater, it is noted that groundwater was not detected in any of the borings taken during the geotechnical evaluation for the project, including the additional borings taken on October 25-27, 1995 that were drilled to depths of 50-80 feet (see GeoDesign report dated November 03, 1995).

The applicant intends to direct a portion of the site's treated stormwater to two mined excavations on the property for final polishing and attenuation.

Issue No. 10

Storage tank, distribution line and equipment spills are likely to rapidly infiltrate the epikarst and contaminate the Kingston Mine.

Response:

At this time, there are no anticipated storage tank installations associated with the project. The project site will be served by natural gas supplied by Central Hudson G&E Corporation. Distribution lines will include: water mains, sanitary sewer mains, and stormwater conveyance pipes. These utilities will all be installed in accordance with NYSDEC and NYSDOH regulations regarding pressure-testing, separations, etc. The design of the utility system is subject to NYSDEC and UCDH review/approval.

Storage of hazardous materials on or near any of the proposed buildings is not contemplated. However, any such storage that could possibly occur in the future would be subject to NYSDEC containment regulations and requirements (and a separate permit process). Storage of such materials requires 2 levels of containment to prevent spill releases, and leak detection/monitoring devices.

Issue No. 11

Failure to contain chemical wastes lost through leakage, spills, or foundation/storage tank collapse could result in the off-site release of contaminants to groundwater (including the Kingston Mine) and surface water resources.

Response:

See reponse to Issue No. 10.

Also:
Any future chemical waste storage would be in containment (both primary and secondary), with leak detection and spill prevention and countermeasure plans in effect.

The karst terrain references are erroneous.

Issue No. 12

Portions of the Full Environmental Asssessment Form need to be revised following site hydrogeologic characterization.

Response:

The site is adequately defined in the EAF, DGEIS, and additional information provided in the FGEIS. Mr. Rubin erroneously characterizes the site as karst.

Issue No. 13 through Issue No. 19

See letter of GeoDesign, Inc. dated January 2, 1996.
See letter of GeoDesign, Inc. dated November 3, 1995
See letter of GeoDesign, Inc. dated January 9, 1996

Issue Nos. 20-23

These issues are not directly related to engineering aspects of the project and, therefore, responses are not offered in this correspondence.

Thank you for your consideration of these repsonses presented on behalf of the applicant, the Kingston Local Development Corporation.

Very truly yours,

BRINNIER AND LARIOS, P.C.

Dennis M. Larios, P.E.

APPENDICES

A: Modified Stormwater Management Report-dated January 10, 1996
B: GeoDesign letter/report, dated November 3, 1995
C: GeoDesign letter/report, dated January 2, 1996
Including report of Dr. Charles Merguerian, dated December 27, 1995
D: GeoDesign letter/report, dated January 9, 1996

cc: Mayor T.R. Gallo, Kingston Local Development Corporation
Richard Riseley, Esquire
Steven Finkle, Kingston EDZ
Dan Shuster

APPENDIX A

MODIFIED STORMWATER MANAGEMENT REPORT AND POLLUTION PREVENTION PLAN

SEE EXHIBIT F IN THIS FGEIS

APPENDIX B

GeoDesign, Inc. Report of November 03, 1995

GEODESIGN INCORPORATED

GEOTECHNICAL ENGINEERS AND ENVIRONMENTAL CONSULTANT

d/b/a GeoDesign, Inc., P.C.

Friday, November 03, 1995
File No. 053-01

Dennis M. Larios, PE
Brinnier and Larios, P.C.
67 Maiden Lane
PO Box 3720
Kingston, New York 12401

Re: Addendum to Geotechnical Report
Rock Probes - B-5/Station 12+00 Vicinity
Kingston Business Park, Kingston, NY

Dear Dennis:

We have completed rock probing in the vicinity of boring B-5 (roadway Station 12+00) where a soil-filled cavity was encountered at a depth of 44 feet. Probing was undertaken to explore the extent and continuity of the cavity and to evaluate impact on roadway design and construction.

Probe Data

Eight rock probes were taken at the locations and to the depths shown on the attached Plan (sheet 1 of 2) and Table 1. The probes were made by a hydraulic rock drilling rig which drilled a 3-inch hole at each location. The rig mobilized to the site on Wednesday morning (10/25/95) and completed drilling on Friday (10/27/95).

The rate of advance of the drilling bit was monitored by our field engineer. When cavities were encountered they were distinguished by the change in advance rate. As shown on the attached Table and Figures cavities varied from inches to over 8 feet in thickness. The top of the cavities varies from approximate Elevations 190 feet to 215 feet.

Interpretation of Data

Our interpretation of the probe data is presented on Sections A-A' and B-B'. Section B-B' indicates some continuity of the cavities in the east-west direction with approximately a 30 degree dip (into the hillside). This is consistent with field observations of the bedding plane dip of bedrock outcrops east of the probe locations.

Although limestone-based cement mining has taken place at the site, there are no mapped mines or direct evidence of mining in this specific area. The limited thicknesses of the

probed cavities suggests natural chemical weathering of the limestone as the mechanism which created the cavities (solution cavities). It is difficult to envision such thin layers being the result of past mining activity.

Based on probe drilling rates which indicated about one minute per foot above the cavities and one half minute per foot below, the cavities appear to follow a contact plane between two bedrock layers. It is possible that the soil encountered in B-5 which contained some wood fiber is soil which has washed in through joint and bedding plane pathways connected to the ground surface to the east.

Section A-A' suggests less continuity of the cavities in the north-south direction along the upslope edge of the proposed roadway.

Design and Construction Considerations

Cavities are expected to be encountered in the deep excavations made for the roadway in this area. Although such cavities were not encountered in other test borings at the site, cavities may be encountered in other areas during excavation.

The extent of the cavities could be mapped in advance of construction with an extensive program of additional probes. Alternatively, actual conditions can be addressed with contingency plans to be implemented as needed during construction.

In either case, design plans and specifications should include provisions for local slope stabilization measures (e.g. concrete infill, concrete pillar supports) to address field conditions encountered during construction. Where the cavities appear just below the roadway similar measures should be employed to fill cavities in the subgrade.

We recommend that an experienced field engineer be on-site during the roadway excavation to observe actual conditions and make recommendations regarding remedial measures.

After you have reviewed the information contained in this letter, please call to discuss.

Sincerely,

GeoDesign, Inc.

Theodore von Rosenvinge IV, PE
Principal

Ulrich La Fosse, PE
Principal Reviewer

encl: Table 1, Plan view with sections (2 sheets)
M:\CLIENT\LARIOS\LTR2.WPD

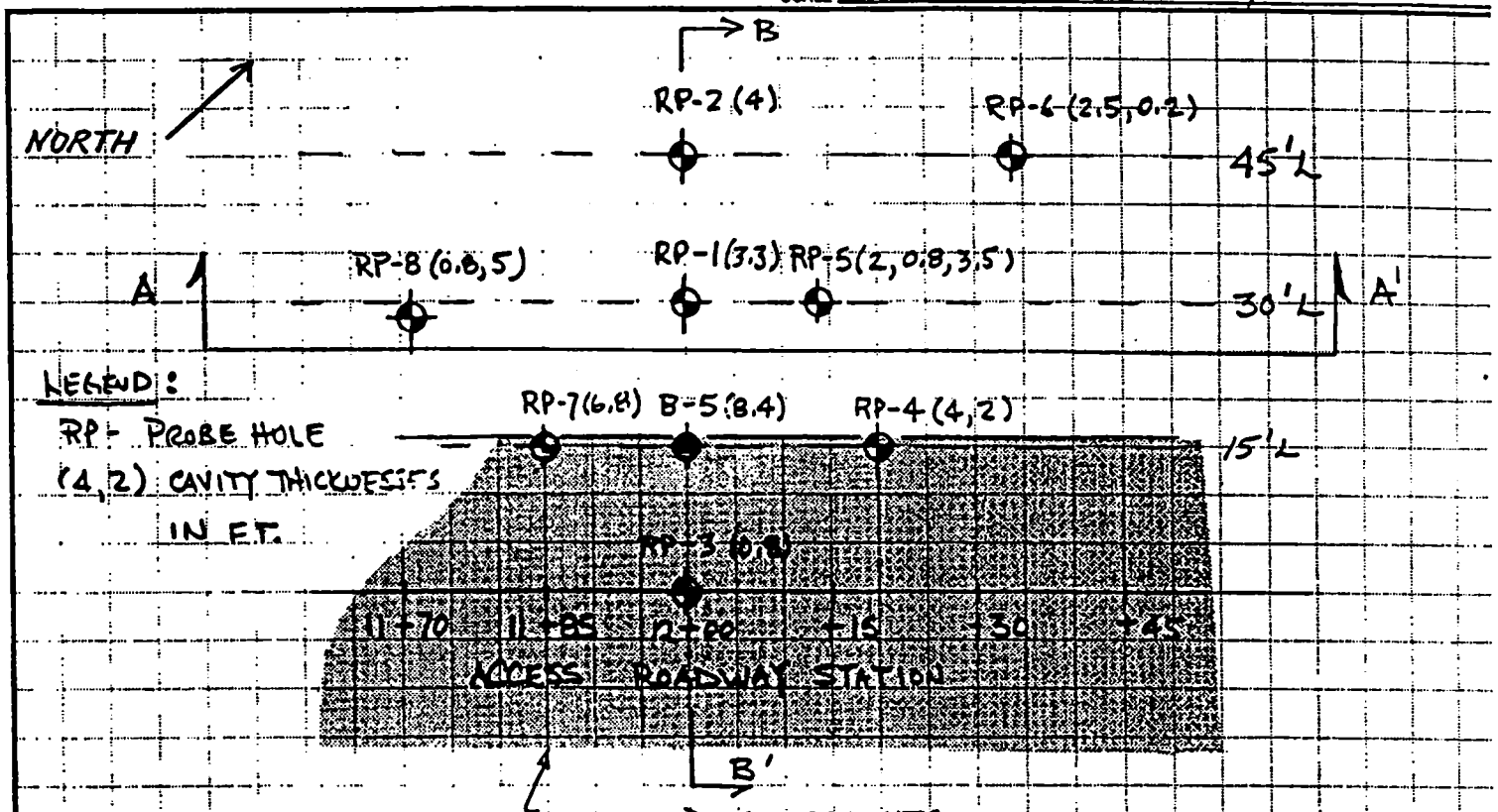
TABLE 1

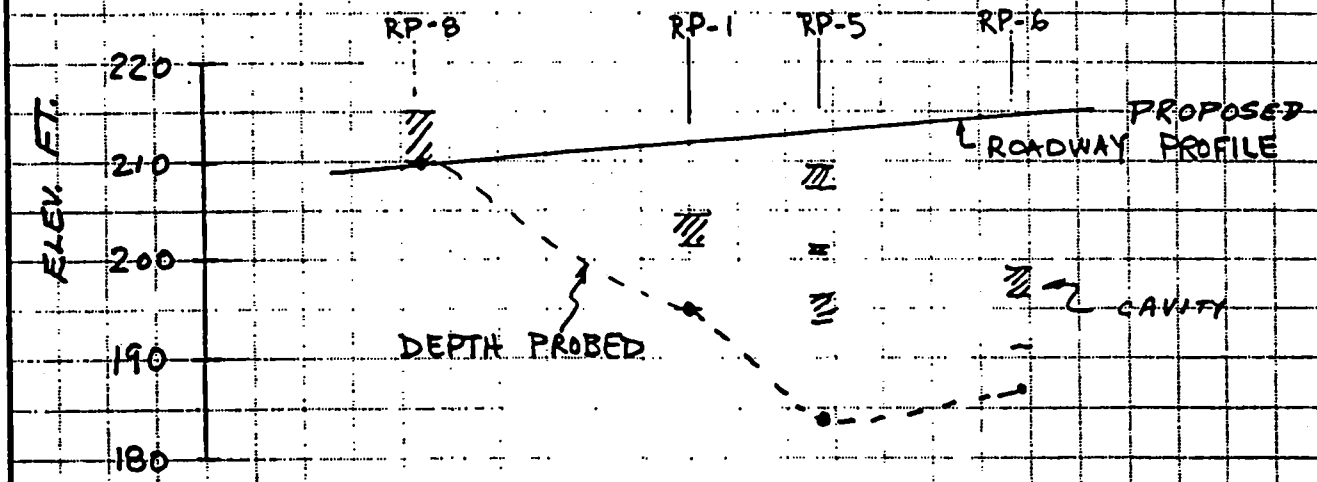
November 2, 1995

SUMMARY OF ROCK PROBES - ROADWAY STATION 12+00 VICINITY							
KINGSTON BUSINESS PARK, KINGSTON, NY							
Probe Number	Depth (ft.)	Station	Offset (ft.)	Ground Elev. (ft.)	Depth to Top of Cavity (ft.)	Thickness Cavity (ft.)	Elev. Top of Cavity (ft.)
B-5	52	12+00	15 L	256	43.6	8.4	212.4
RP-1	66	12+00	30 L	261	56.5	3.3	204.5
RP-2	80	12+00	45 L	264	63.5	4	200.5
RP-3	60	12+00	CL	252	47	0.8	205
RP-4	70	12+20	15 L	256	52	4	204
				256	62	2	194
RP-5	76	12+13	30 L	260	51	2	209
				260	59.5	0.8	200.5
				260	63.5	3.5	196.5
RP-6	70	12+33	30 L	257	58.5	2.5	198.5
				257	65.8	0.2	191.2
RP-7	60	11+85	15 L	255	40.5	6.8	214.5
RP-8	50	11+72	28 L	260	36	0.8	224
				260	45	5	215
Total	584						

GEODESIGN
INCORPORATED
GEOTECHNICAL ENGINEERS
AND ENVIRONMENTAL CONSULTANTS
984 SOUTHFORD ROAD • MIDDLEBURY, CT 06762
TEL: 203.758.8836 • FAX: 203.758.8842

JOB 023-01 KINGSTON BUSINESS PARK
SHEET NO. ____ OF 2
CALCULATED BY TVR DATE 10-30-95
CHECKED BY ULF DATE 11-3-95
SCALE 1" = 20'





SECTION A-A'

(SECTION B-B' ON SHT 2 of 2)

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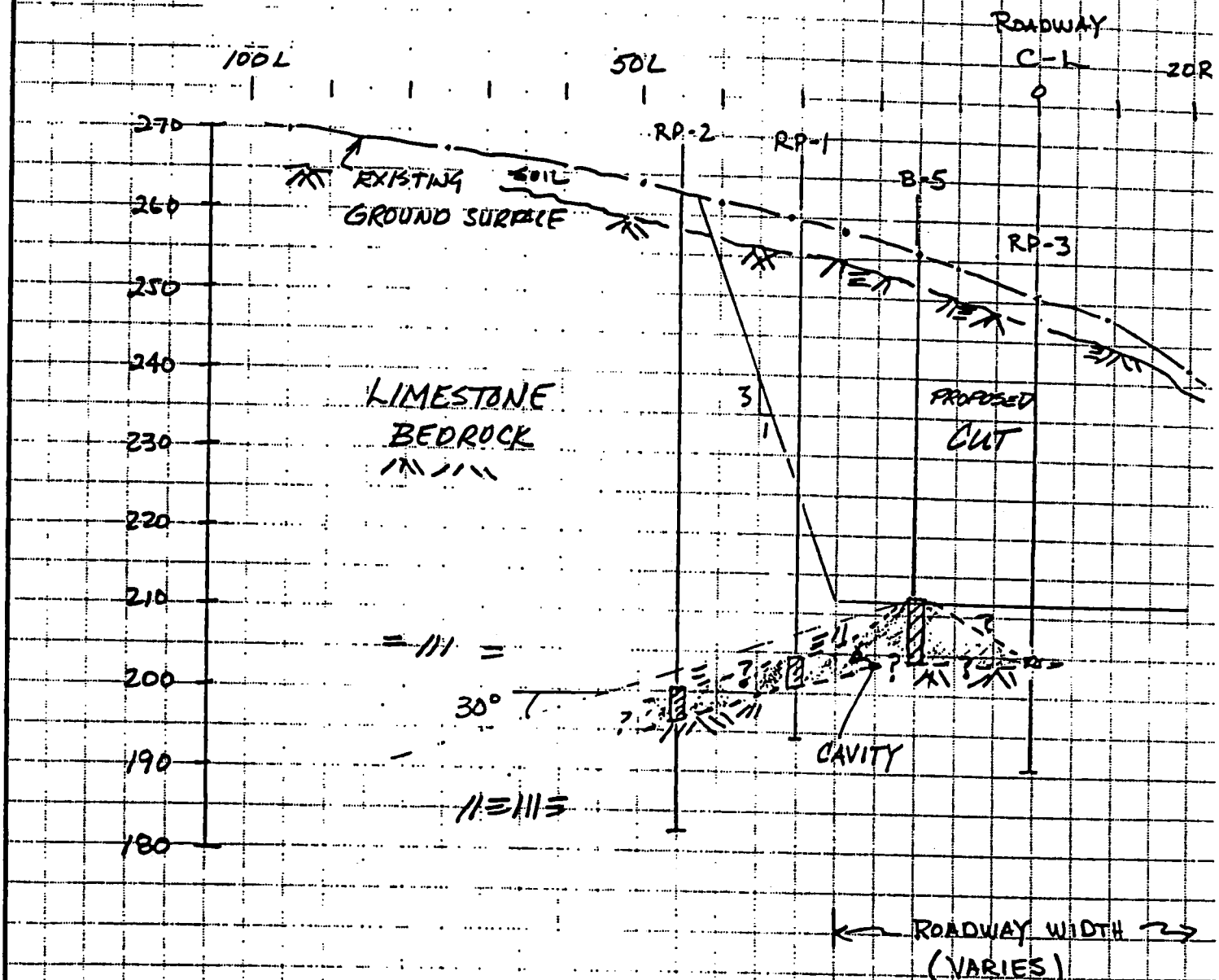
JOB 053-01 KINGSTON BUSINESS PAR
SHEET NO. 2 OF 2
CALCULATED BY TVR DATE 11-2-95
CHECKED BY ULF DATE 11-3-95
SCALE 1" = 20'



SECTION B-B'

APPENDIX C

GeoDesign, Inc., Report of January 02, 1996
Charles Merguerian, Ph. D., Report of December 27, 1995

GEODESIGN
INCORPORATED

GEOTECHNICAL ENGINEERS AND ENVIRONMENTAL CONSULTANTS

d/b/a GeoDesign, Inc., P.C.

January 2, 1996
File No. 053-01

Mr. Dennis Larios, P.E.
Brinnier and Larios, P.C.
67 Maiden Lane
P.O. Box 3720
Kingston, New York 12401

Re: Proposed Kingston Business Park
Kingston, New York

Dear Dennis:

The following are GeoDesign's responses to the letter dated December 15, 1995 prepared by Paul A. Rubin as comments to the Kingston Business Park Draft Generic Environmental Impact Statement (DEIS) accepted on November 9, 1995. Note that our responses are limited to the geotechnical, subsurface/geological, and blasting aspects of the project. We have italicized pertinent excerpts of the Rubin report for easy reference.

Introduction - (Third Paragraph):

Item No. 3 of the last sentence of this paragraph recommends that *".....the structural risks to planned buildings be [are] properly characterized"*. No further discussion on this topic is provided by Mr. Rubin in the detailed comments to support this statement. We can only surmise that this recommendation refers to risks which Mr. Rubin perceives will result to the proposed structures based on his premise that the bedrock underlying the site is "maturely karstified" and may result in collapse due to sinkhole mechanisms.

A thorough response to Mr. Rubin's assertions of Karst conditions is provided in a special report prepared by Dr. Charles Merguerian - a Full Professor of Structural Geology at Hofstra University, Hempstead, NY and President of Duke Geological Laboratory in Westbury, NY. Dr. Merguerian's resume and his report are attached as Appendix A.

In summary (after a detailed discussion in the appended report), Dr. Merguerian concludes that: **".....the region has been uplifted, weathered, and eroded to develop a stream-dissected glaciated landscape without a trace of karst. The false impression that the region's geology is**

karstic can not hold up in the face of geologic fact. In my opinion, the Kingston area should not be termed a 'maturely karstified carbonate aquifer'..... " (as characterized by Mr. Rubin).

This confirms the conclusions of our geotechnical engineering studies, as well as previous geotechnical and geologic studies, that evidence for such unusual structural risks is not present. Moreover, there is a lack of reported structural problems to buildings (e.g. buildings falling into sinkholes) in the site vicinity.

Issue 1: Mr. Rubin's opening and central point is that the *"....hydrologic setting at the proposed Kingston Business Park (is)... a mature well-karstified carbonate aquifer)"*. Five pages on this issue attempt to support the thesis of *".....an active and mature (i.e., karst) aquifer"*. Because of these perceived karstic conditions, he outlines the need to perform extensive studies to assess impact on water quality in the abandoned mines.

Dr. Merguerian methodically refutes this thesis on numerous technical grounds in his attached report (see above bolded excerpt from report).

A void encountered at Boring B-5 characterized by Mr. Rubin as a *"cave"* was explored with supplemental work - additional rock probes which are summarized in the attached addendum to the geotechnical report in Appendix B. The probes found the void to vary from a few inches to several feet and to dip to the west, a direction consistent with bedding angles in this vicinity. Dr. Merguerian has since reviewed the addendum and notes (12/30/95 telephone conversation) that it is quite common to get such zones of low angle bedding plane thrusts in this area and that the conditions encountered with the probing are not a demonstration of karst.

Furthermore, the continuity of the massive bedrock above and below the voids, and the lack of openings above the voids are inconsistent with a karst condition. Mr. Rubin apparently agrees with the character of the upper bedrock layer as he describes the 40 feet of rock above the B-5 void as *"competent limestone"*.

Finally, the assertion that soil seams do not occur in non-karstified bedrock is incorrect. We can point to numerous projects throughout the Northeast where joints and seams in the rock are filled with soil as a result of weathering.

Issue 2: This issue relates to adequacy of survey data in the mines.

The geometry of the mine relative to the new construction is based on the mapping of the mine reported in the July 1973 Geotechnical Investigation by Joseph S. Ward & Associates. The data from this study is included in Appendix 2 of Appendix C7 of the DEIS.

Based on this data the thickness of the mine roof in the areas closest to the proposed rock cuts varies

from a maximum of approximately 200 feet to a minimum of approximately 33 feet. The minimum roof thickness occurs at a horizontal distance of approximately 300 feet (due east from the proposed rock cut) between the proposed roadway cut and the high point (hinge of the anticline) of the mine in this area.

The closest mapped horizontal distance between the near (north-western) mine wall and the proposed near (south-eastern) edge of roadway cut is approximately 115 feet (at proposed roadway Sta. 5+30). No cross section is available through the existing mine in the area of Sta. 5+30 (the area where the proposed roadway rock cut will be closest to the mine). However, based on the ground surface topography in this area, and based on interpolating the general mine geometry between its entrance and the nearest available cross section, the minimum roof thickness of the mine at the closest point to the proposed blasting is anticipated to be at least 33 feet.

Issue 3: *"The applicant's engineers have failed to properly and adequately evaluate the environmental risks attendant to the karst setting present onsite".*

Mr. Rubin notes that *"groundwater in soil and most fractured bedrock aquifers moves slowly, enabling contaminants to be partially treated and diluted. Karst aquifers, on the other hand, are often characterized by appreciable and sometimes rapid groundwater flow.....they merely transmit contaminants".*

Again, the characterization of the bedrock mass as a mature karst aquifer is fundamentally erroneous (refer to Appendix A report). Characterization of the bedrock mass as fractured is appropriate.

Issue 13: *"The structural stability of mine pillars and the mine roof may be jeopardized from nearby blasting and industrial road traffic".*

See response to Issue 2 for a discussion on mine roof thickness.

The structural stability and condition of the existing pillars and mine roof of the offsite mines were not quantitatively evaluated or part of the scope of the geotechnical engineering study for the site. However, a site visit was made with an experienced blasting contractor as part of the geotechnical report. The purpose was to observe the onsite and adjacent conditions as they relate to rock removal and blasting. As part of the site visit the typical mine pillar and roof structure was observed from the mine entrance.

The massive rock pillars appeared stable by "inspection" and have reportedly withstood the test of time for nearly a century. However, evidence of a rock fall was observed - a slab of rock between pillars appears to have dropped to the tunnel floor. Such local instability can be expected to naturally occur in these manmade openings and pose a risk to humans entering the mines for any purpose.

The fracturing of the bedrock at the site is not unusual and is common to many bedrock formations.

Construction blasting is commonly performed in fractured bedrock. Blast control methods and vibration, distance, and charge per delay relationships which normally apply to fractured rock apply to this site.

Based on vibrations expected from normal controlled construction blasting and distance between the mine and the blasting, the mine is not expected to be adversely affected by blast-induced vibrations.

It is hard to envision *"industrial traffic"* affecting the mine stability.

The closest distance between the proposed buildings and the mine and addits is approximately 350 feet (not *"170 feet"* as stated in the second paragraph of Issue 13).

Complete detailed blasting and blast monitoring procedures cannot reasonably be established during the design phase. The contractor has not been selected and thus his preferred sequence of operations is not known during the design phase. However, as stated on page 21 of the DEIS, the project specifications will outline applicable restrictions and blast control methods to limit vibrations (peak particle velocity). Peak particle velocities on the ground surface near wood-framed structures are normally limited to 2.0 inches per second or less.

Issue 15: *"Seismic waves or 'vibrations' stemming from blasting activities may result in structural damage and annoying and unpleasant vibrations to homeowners and historic structures"*

The method which off-site blast generated vibrations will be addressed for this project is described on page 21 of the DEIS. Blasting and related mitigation measures to protect adjacent property is commonly handled in this manner for construction projects which involve blasting of bedrock. Refer to the section below on related Issues 16 and 17.

The second paragraph of this section of Mr. Rubin's letter erroneously attributes the quote: *"It is desirable to limit vibrations....to 1.0 inches per second..... should be maintained."* to the DEIS. This quote, which was presumably obtained from the referenced source (Mining and Reclamation Plan, Addendum 2) explicitly relates to *"blasting in the quarry"* and does not specifically apply to the Kingston project.

Issues 16 and 17: Relate to ground vibrations and monitoring methods.

The discussion on Pages 20 and 21 of the DEIS references data which predicts the effects of blasting vibrations on underground mines. This data was obtained from pages 348-349 of the text "Explosives and Blasting", 1987, Atlas Powder Co.

Page 20 references an allowable peak particle velocity of 10 to 12 inches per second to protect the mines. This data and the estimates of related scale distance and maximum charge per delay were provided to show that **measures used to control blasting to protect nearby off-site dwellings**

(which are as close as 400 feet from the blasting) control. Since allowable vibrations for dwellings (typically 0.5 to 2.0 inches per second depending on specifics of vibration frequency and construction type) are much lower than for mines (10 to 12 inches per second), protecting dwellings will result in more restrictive blasting than would be required for protecting the mines. This is the case despite the greater distance from the blasting to the houses than from the blasting to the mines.

As note in the response to Issue 13, detailed blasting and blast monitoring procedures cannot be reasonably established during the design phase. Project specifications will outline limits on particle velocity. A blasting plan will be submitted by the blasting Contractor for the Engineer's review and approval.

A typical blasting and monitoring program consists of performing test blasts which are monitored using geophones placed on the ground surface near the most sensitive improvement (building, utility, etc.) and/or the improvement nearest to the blasts, and/or the nearest property line. The number of geophones and seismographs is depend on the details of the Contractor's blasting plan and sensitivity and distance to nearby improvements. The geophones transmit their readings to a seismograph which computes the vector sum of the particle velocities measured along three orthogonal axes, yielding the peak particle velocity (PPV).

The seismograph also measures and records the vibration's frequency distribution, and the over pressure (in decibels). Test blasts are typically performed in areas further from the improvements to be protected. The data which they generate is used to develop site-specific vibration attenuation relationships in the form of PPV vs. scaled distance plots. This information is subsequently used to refine the blasting plan and plan the production phase vibration monitoring.

Lastly, note that Mr. Rubin's recommendation that *"no ground vibration occurs beyond the[eir] immediate site"* **is not construction industry practice as it is impossible to achieve and would prohibit blasting entirely if it were required.** Common practice and corresponding blasting restrictions (laws and ordinances) require protection of persons and property; not a zero tolerance standard of "no ground vibrations".

Issue 18: Again, Mr. Rubin expounds on the *"mature karst"* thesis and resulting *"catastrophic collapse"* and *"disastrous"* examples of corporate headquarters sinking into the ground. As set forth above, Dr. Merguerian has amply responded to this thesis in his attached report. Moreover borings and probes have been taken to depths of up to 80 feet to explore the subsurface conditions at the site.

Issue 19: "Blasting may locally increase bedrock permeability....."

Blasting bedrock causes fracturing of the bedrock in the immediate zone of the blast. The size of the zone depends on explosive type, charge weight and size, powder factor, rock type and condition, drill

hole geometry, drill hole pattern and spacing, and related factors. Beyond the immediate zone of the blast, the bedrock (and overlying unconsolidated materials) transmits energy in the form of vibrations but is not fractured.

Increase or decrease of the permeability of bedrock will only occur in the immediate zone of the blast which are fractured during blasting - a zone termed "overbreak". In the proposed roadway rock cuts, overbreak in the cut sidewalls will be limited by the pre-split (described on Page 16 of the DEIS). At the bottom of the proposed rock cuts in the roadway and building areas, a thickness of approximately 2 to 4 feet of overbreak is common and is expected.

The paper referenced by Mr. Rubin to a special case of blasting to locally enhance production of groundwater recovery wells for remediation purposes is not applicable to this site. The zone of increased fracturing in the bedrock is insignificant in increasing the site's overall (average) vertical permeability and recharge to the underlying bedrock aquifer. Note that the newly constructed roofed and paved areas will decrease infiltration which will have the opposite effect (e.g., decreased infiltration).

Closing

We trust this meets your needs in our technical areas. If you need additional assistance after review of our report please feel free to call.

Very Truly Yours,

GeoDesign, Inc.

Theodore von Rosenvinge IV, PE
Principal

Ulrich La Fosse, PE
Principal

cc: Steve Finkle

attachments: Dr. Merguerian Report
GeoDesign, Inc. Addendum Report

APPENDIX A

DUKE GEOLOGICAL LABORATORY
16 Middle Lane
Westbury, NY 11590
(516) 334-7415

December 27, 1995

Mr. Theodore von Rosenvinge IV, P.E.
GeoDesign, Inc.
984 Southford Road
Middlebury, CT 06762

Dear Mr. Rosenvinge:

Per your request, I have examined in detail the 12/15/95 letter by Mr. Paul A. Rubin, delivered to Sue Cahill, City Planner, Kingston Planning Board citing his concerns and technical comments supporting his opposition to the Kingston Local Development Corporation's proposed Kingston Business Park. In addition to Mr. Rubin's 23-page letter, I have examined appropriate sections of the November 1995 Draft Environmental Impact Statement (DEIS), read the November 1995 GeoDesign Geotechnical Report and addenda, and have consulted a number of pertinent geological references (cited below) that bear on Mr. Rubin's central thesis identifying the Kingston area as a *"maturely karstified carbonate aquifer"*. After a careful review of the literature, and for the multitude of geological reasons stated below, I feel that Mr. Rubin has misrepresented the facts to conform to his stated desire to halt development in the region.

As a field geologist who has had experience mapping and leading professional field trips in the Rosendale-Kingston area, in my opinion, the Kingston area **CAN NOT** be considered a mature karst. Rather, the region can best be classified as a glaciated, immature landscape predominantly underlain by folded- and faulted carbonate rocks showing no evidence for pervasive karstic features. The region experiences normal surface drainage (excepting anomalous barbed tributaries) without abrupt subsurface disappearance of streams. Surface drainage indicates a lack of interconnected subsurface features (such as solution channels, caverns, and caves) regionally diagnostic of karst. Thus, in rebuttal to any characterization of the Kingston region as karst, the following is organized into five major headings: Definition of Karst, Conditions Leading to Karst Development, Geology of Typical Karst Terrains, Geology of the Kingston Area, and Reasons for Abandoning Thesis that Kingston is a *"maturely karstified carbonate aquifer"*. The text is followed by Illustrations (referred to as figures herein) and References.

Definition of Karst

According to the Glossary of Geology, published by the American Geological Institute (1972, p. 383), **karst** is defined as *"A type of topography that is formed over limestone, dolomite, or gypsum by dissolving or solution, and that is characterized by closed depressions or sinkholes, caves, and underground drainage"*. The etymology is Germanic and stems from the Slavic *kras*, meaning "a bleak, waterless place." The classic type-locality for karst is a limestone region of Yugoslavia known as Slovenia. Geomorphologists (geologists who study the development of landforms) utilize the term karst freely, combining the fantastic karst towers of the Guilin region of southern China with areas of flat monotonous relief such as the Nullarbor Plain in Australia (Jennings 1983) and all karstic-landform types in between. In the United States, these include the sinkhole country in Kentucky and Tennessee, the cockpit country of Puerto Rico, and many other areas around the world (Figure 1).

Conditions Leading to Karst Development

Three factors are needed to promote the development of karst. Firstly, pure massive limestone with well-developed joints or faults must crop out at the surface. Secondly, adequate rainfall is a necessity. Karst landforms are absent in areas where rainfall is less than 10-12 in./year (Sweeting 1973). Thirdly, vertical and underground circulation of drainage is an important ingredient fostered by areas of high topographic relief. According to noted geologist A. K. Lobeck, in his classic textbook on the subject of geomorphology, in suitable climates two basic types of carbonate subsurface geologic structures result in the development of karst. The first of these is termed **Karst Topography in a Plateau Region** where in the early stages dendritic drainage patterns of surface streams predominate (Figure 2A). Later, in late-youth and maturity (Figures 2B and 2C), dissolution along pre-existing joints and faults leads to the development of subsurface solution channels followed by surface depressions known as **sinkholes**. In some instances the sinkholes enlarge to great size producing **valley sinks**. All surface drainage disappears by percolating downward into anastomosing solution cavities and sinks. In the post-mature (old age) stage, very little original plateau surface remains except for remnant **karstic hills**, **mesas** and **buttes** (Figure 2D).

A second variety of karst landform, more appropriate to evaluating the possible developmental stage of karst in the vicinity of Kingston, New York, is termed **Karst Topography in Complicated Structure** wherein folded and faulted carbonate rocks predominate. In this case, early youthful development (Figure 3A) brings about a few scattered **sinkholes** (and funnel-shaped enlargements called **dolines**) but surface drainage, which follows zones of faulting and folding, predominates. Elongate steep-

walled depressions are sometimes found but these are of tectonic origin (related to erosion of faults and disrupted fold limbs) and not related to significant dissolution. In the late youthful stage (Figure 3B), **enlarged sinkholes** and **dolines** have increased greatly in number, and severely pock-mark the land surface. Underground **collapse of caves and caverns** can promote the joining of sinkholes and dolines into resembling valley sinks typical of the plateau type. In the mature stage (Figure 3C) *[which Mr. Rubin classifies the Kingston area]*, extremely rugged conditions prevail with the coalescence of the surface dissolution features. Downward percolating, **disappearing streams** develop on the surface (except in areas of impermeable rock strata breached by erosion where normal surface drainage forms), underground waters flow, and a **honeycomb of caves and caverns** predominate. In old age, all of the surface carbonate rocks are stripped away and underlying impermeable strata may force resumption of normal surface streams (Figure 3D).

Geology of Typical Karst Terrains

As described above, karst typically develops in tropical- to sub-tropical regions underlain by laterally continuous flat-lying to folded carbonate rocks that are cut by great numbers of intersecting high-angle joints and/or faults. In such environments, high ambient temperature and humidity acting in concert with abundant rainfall produce dissolution resulting in underground drainage, caves and caverns, and eventual decay and collapse of surface carbonate strata to produce sinkholes and a unique topography that varies greatly depending upon initial geologic structure and stage of maturity. Surface drainages tend not to exist because all water percolates downward to infill all connected subsurface openings, thus raising the water table. Based on these well-documented surface- and subsurface features, the Kingston area **simply does not fit** any of the geomorphic models presented above except for a vague similarity to that pictured in Figure 3A (early youth), but with an important distinction.

Figure 4, a portion of the Kingston East United States Geological Survey topographic map, shows the linear aspect of the hilly limestone region surrounding the proposed site. The NE orientation of the hills follows the regional trend (strike) of the strata and shows the sculpting effects of SSW-directed glacial flow. The Kingston area was strongly modified by glaciers and immature surface streams do drain the area. Yet, none of the large-scale features typically associated with karst (i.e. - sinkholes, dolines, disappearing streams, a network of caverns and caves, etc.) occur in the region. Circular hills and closed depressions dominate maps of karst areas. Figure 5 illustrates a topographic maps of a pitted, mature karst terrain (in Puerto Rico) which obviously bears no resemblance to the linear topography of the Kingston area. (Compare with Figure 4.) Such topographic features simply do not exist within or near the

Kingston area. Outcrop-scale mini-examples of karst are of local interest to students of geology, however.

Geology of the Kingston Area

Stratigraphically, the Kingston region consists of three distinct layers of massive carbonate rock. The lowest and oldest of these consists of interlayered dolostone and limestone of Cambrian- to Ordovician age (The Sauk Sequence) which is not exposed at the surface near Kingston. This sequence is overlain by a vast thickness (>10,000' in some areas) of black shale and sandstone of the Tippecanoe Sequence (Normanskill formation) which is in turn overlain by Silurian clastic sedimentary rocks and two carbonate sequences that do crop out in the region. The lower of these includes the Silurian Rondout formation which consists of four poorly fossiliferous members that alternate from dolostone to limestone. These rocks are strongly folded and unconformably overlain by a great thickness of fossiliferous Devonian (Helderbergian Group) limestones which form the bulk of the surface exposures throughout the Kingston region.

Recent structural studies of the region by Marshak (1990) and Merguerian and Sanders (1991, 1994) indicate that both the Silurian Rondout formation and the overlying Devonian Helderbergian sequence is highly folded and faulted by low-angle bedding-plane thrust faults and high-angle reverse faults of probable latest Paleozoic (terminal-stage Appalachian orogeny) age. Figure 6, a map and geologic section in the vicinity of the proposed site from Marshak's (1990) map, indicates that the region is folded into major anticlines and synclines with many of these folds cut by faults. In contrast to folded mature karst terrains elsewhere, the Kingston-area limestones occupy hilly areas, not the valleys as is typical for karst. This, in and of itself, argues against a mature-karst classification for the region, as limestones in a mature karst would occupy valleys not ridges. (See Figure 3C and related discussion above.)

Reasons for Abandoning Thesis that Kingston is a "maturely karstified carbonate aquifer".

The subsurface geology of the proposed Kingston Business Park area is dominated by highly folded- and faulted carbonate rocks (See Figure 6.) that vary from Silurian (Rondout formation) to Devonian (Helderbergian Group) in age. The lack of pervasive, high-angle, intersecting joint sets precludes a primary geological condition that would foster mature karst development regardless of climatic condition. In addition, as argued above, the topography and geomorphic features of Kingston are not at all indicative of karst terranes.

The topographic map of the site and surrounding area (Compare figures 4 and 5.) indicates a total lack of circular- or

elongate features that could be interpreted as sinkholes, dolines, or valley sinks. What is more, within a *"mature karst"*, disappearing drainages, interconnected caves and caverns, and deeply eroded valleys underlain by limestone develop over long periods time. The Kingston area, in contrast, displays linear topography, immature surface drainage, preserved, high-standing limestone ridges, and no hint of the subsurface features diagnostic of karst.

In the vicinity of Kingston, modern surface drainage is immature with rivers flowing northeastward in marked contrast to the southward regional gradient followed by the Hudson River. Note that Rondout Creek and the Wallkill River flow northeastward into the Hudson near Kingston, thus forming a barbed tributary. This drainage anomaly is suggestive of recent surface-slope reversal (presumably, in response to post-glacial uplift). No doubt that glacial erosion and deposition have had a strong effect on the resulting topography. Here, we are looking at a rejuvenated immature valley and ridge topography not, by any means, a mature karst topography.

Climatologists make the case that during a portion of the Cenozoic Era, tropical climates prevailed long enough in the region to induce immature karst development and a stage of youthful karst may have formed at this time. I suspect that the weathered upper bedrock surface encountered in some borings preserve the effects of Cenozoic tropical climatic conditions. In most cases the action of glaciers has scoured and removed any trace of Cenozoic tropical weathering products and has left an areally important drift sheet instead. Today, in the midst of temperate climatic conditions and in the aftermath of post-Cenozoic uplift and glacial rebound, the region has been uplifted, weathered, and eroded to develop a stream-dissected glaciated landscape **without a trace of karst.**

The false impression that the region's geology is karstic can not hold up in the face of geological fact. In my opinion, the Kingston area should not be termed a *"maturely karstified carbonate aquifer"* because of the absence of surface- and subsurface features diagnostically associated with such a classification.

Respectfully Submitted

Charles Merguerian, Ph. D.
Professor, Structural Geology

Illustrations

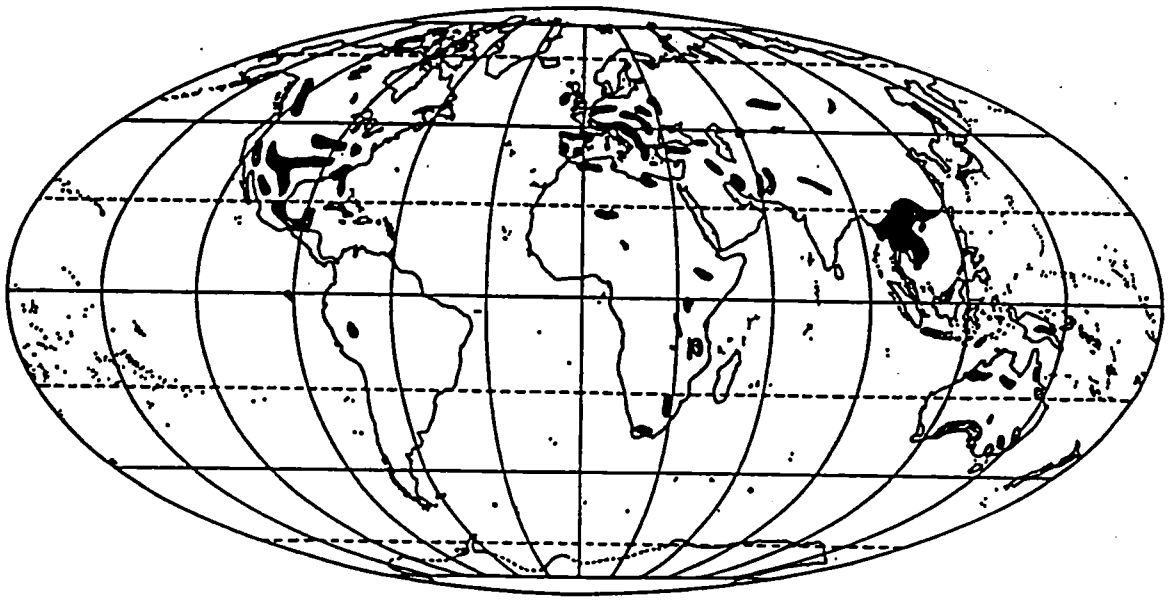


Figure 1 - World map showing the global distribution of significant areas of karst-landform development. (From Sweeting, 1973, fig. 2, p. 7.)

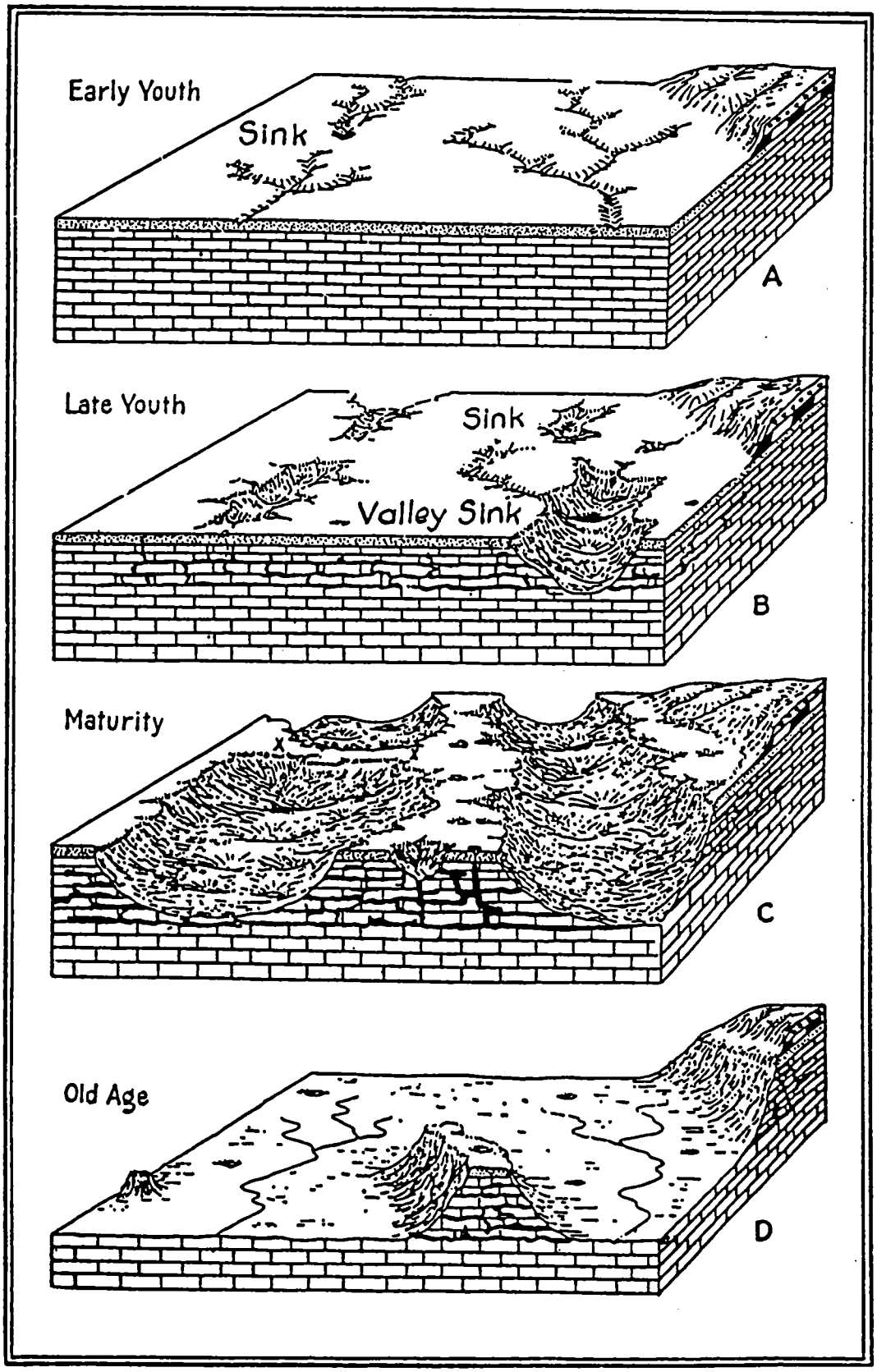


Figure 2 - Four stages in the karst development of a plateau having underground drainage. Note, except for the earliest and latest stages, the total absence of surface drainage. (From Lobeck, 1939, p. 130.)

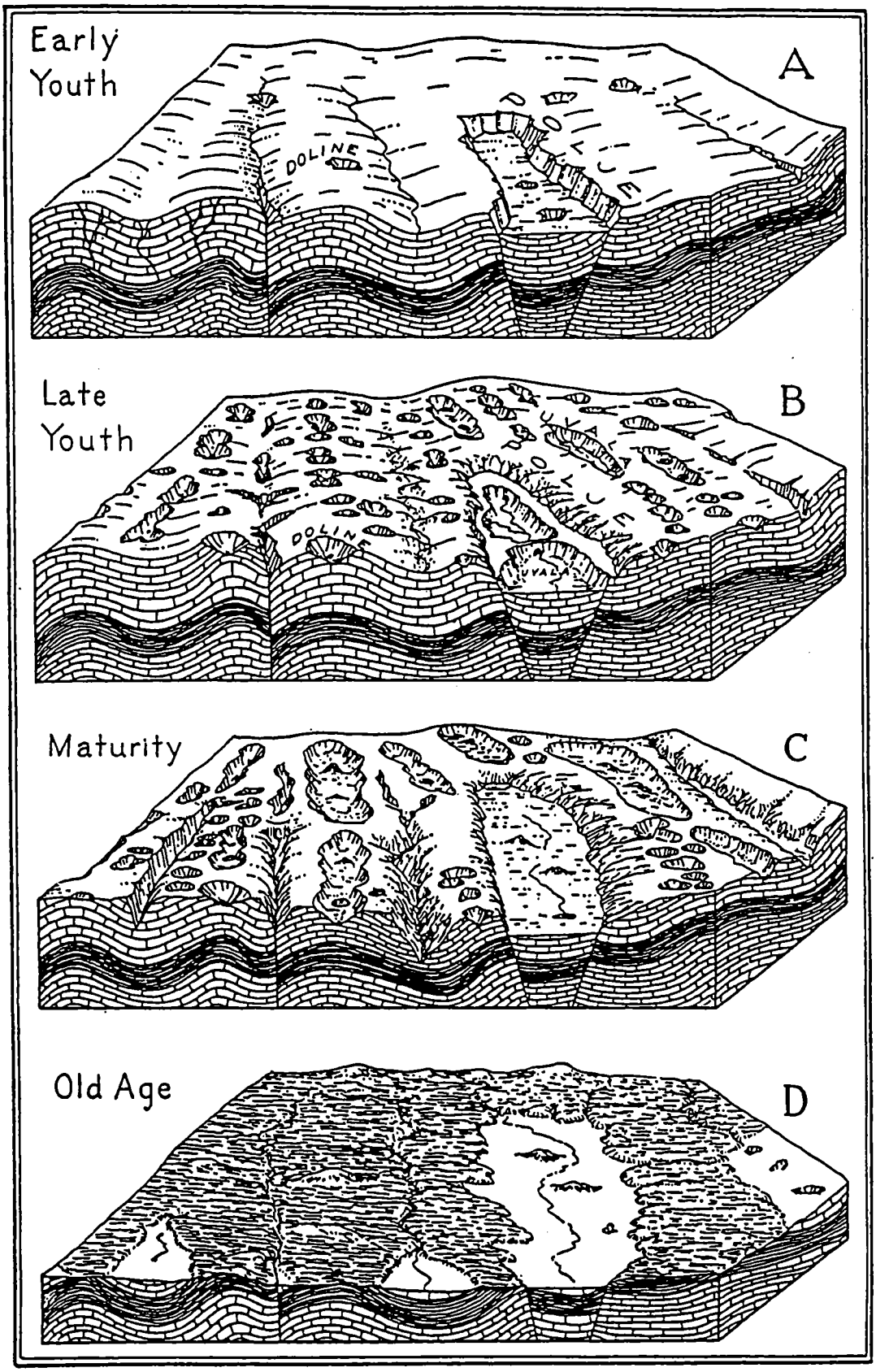


Figure 3 - Four stages in the karst development of a folded and faulted region (similar to Kingston area) having underground drainage. Note, except for the earliest and latest stages, the total absence of surface drainage. (From Lobeck, 1939, p. 132.)

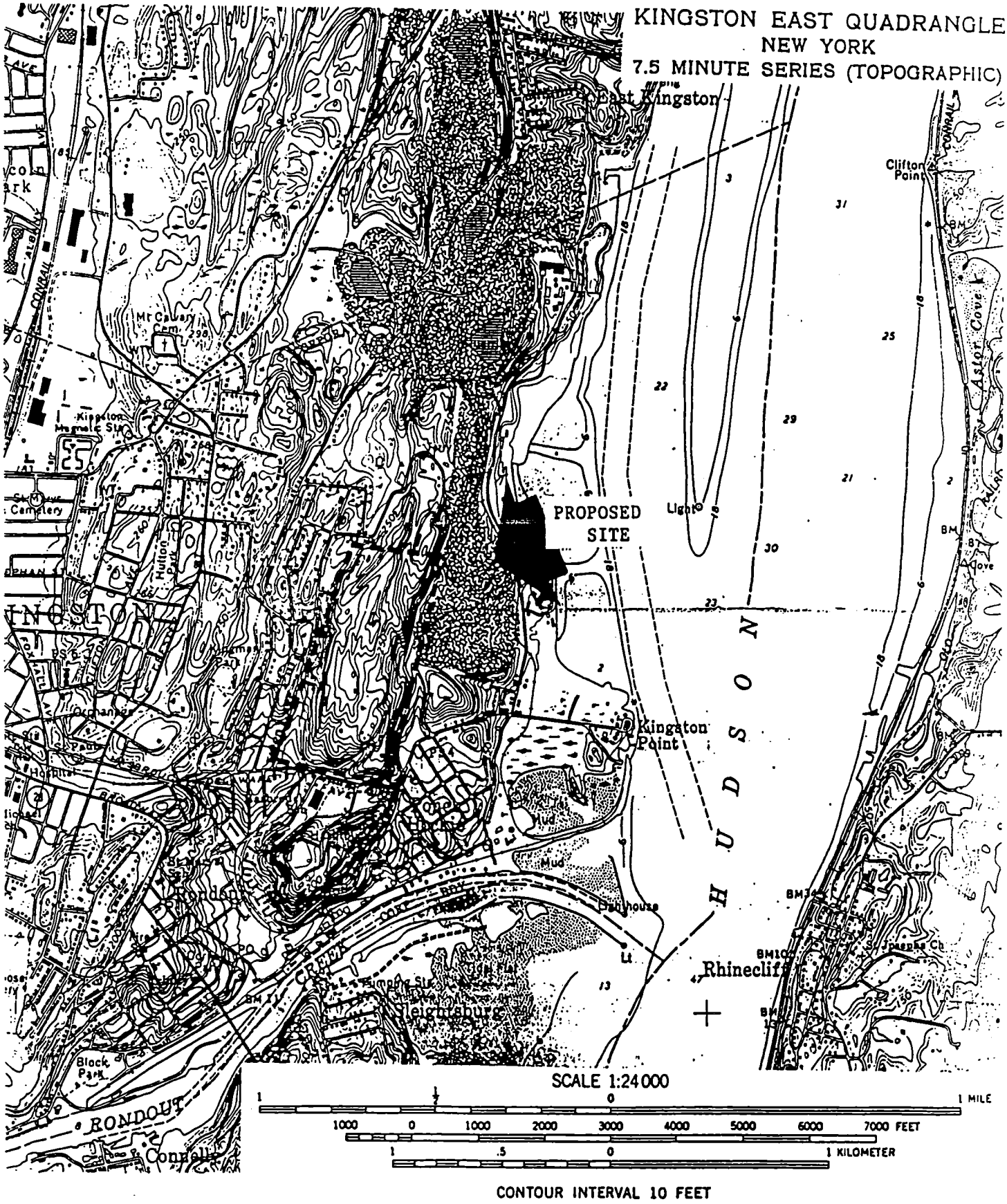


Figure 4 - A portion of the East Kingston United States Geological Survey topographic map showing the location of the proposed Kingston Business Park (dashed lines with arrow) and surrounding areas.

Figure 5 - Topographic map of the limestone country south-east of Manati, north coast of Puerto Rico (map extends 2.5 km on each side). (From Sweeting, 1973, fig. 33, p. 68.)

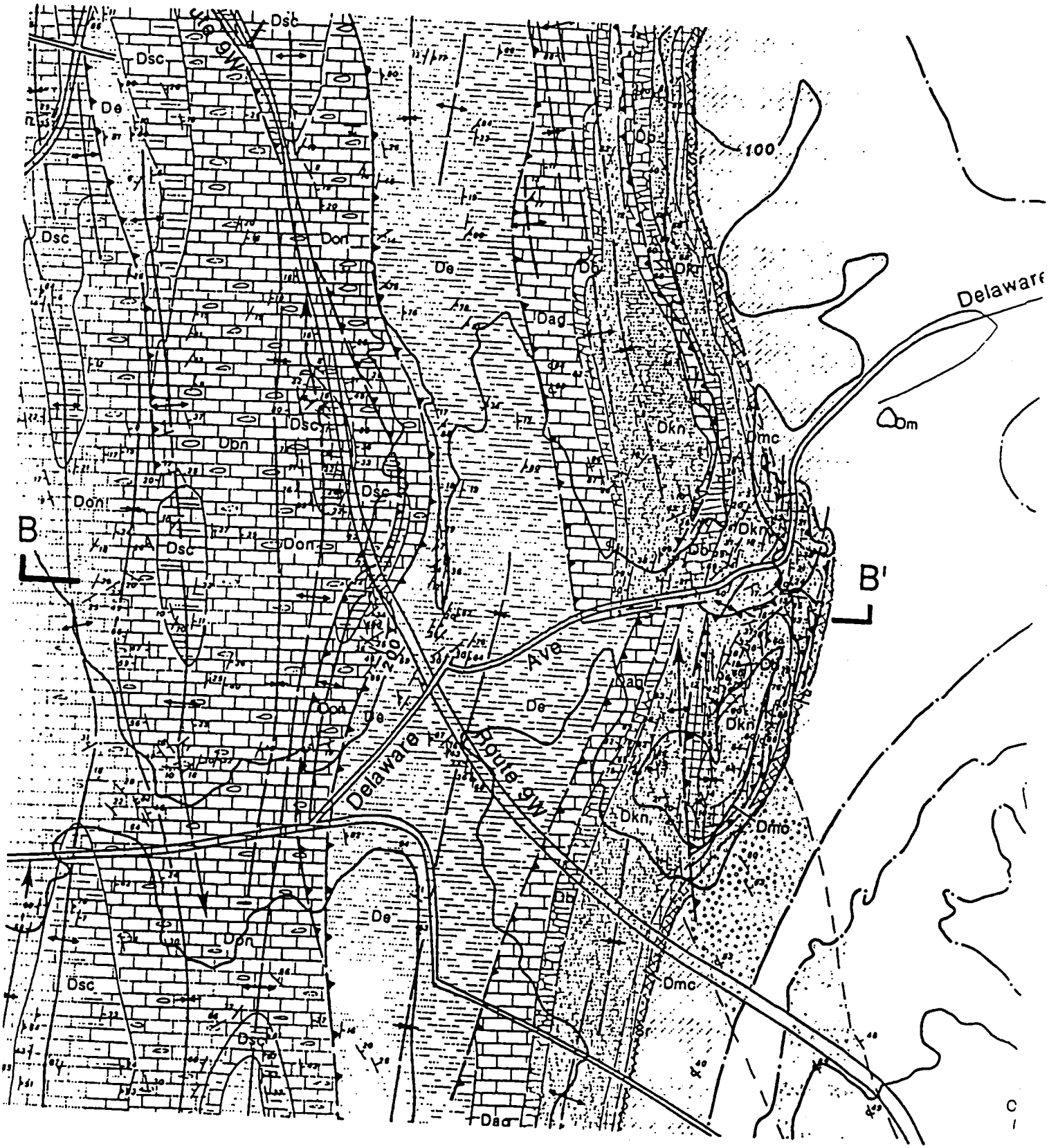
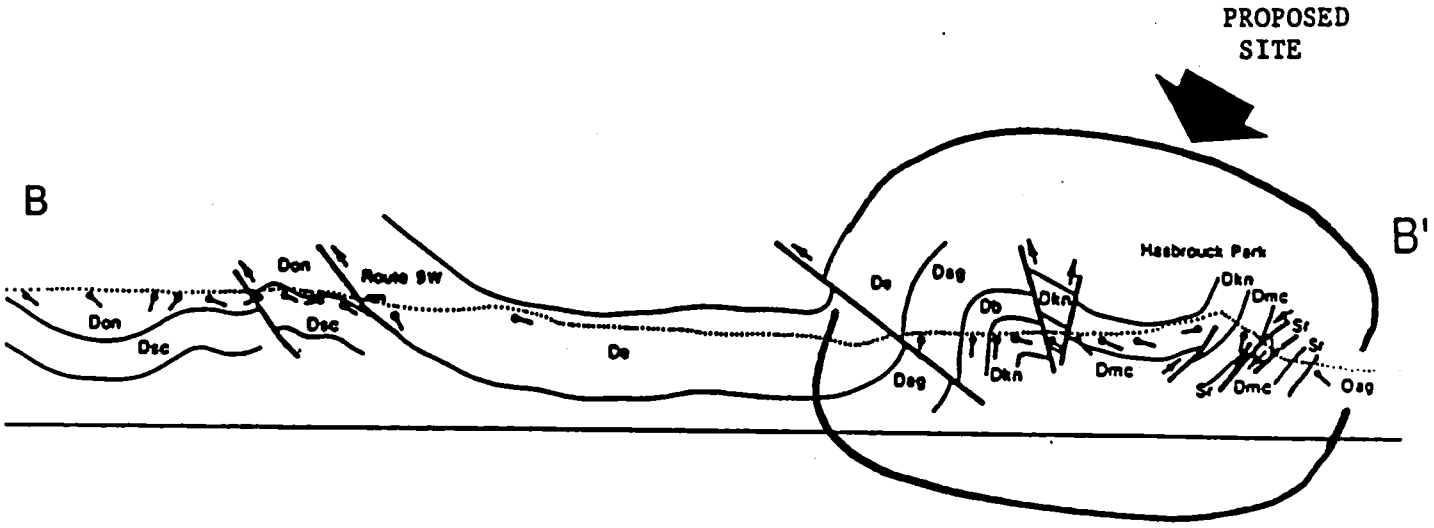


Figure 6 - Geologic map and section (B-B') [next page] through vicinity of proposed Kingston Business Park. Note the folded and faulted structure of the Devonian limestones which predominate in the vicinity of Kingston. (From Marshak, 1990, Plate 3.)

EXPLANATION

- Dh — Hamilton Group
- Don — Onondaga Limestone
- Dsc — Schoharie Formation
- De — Esopus Shale
- Dag — Alsen, Port Ewen, & Glenerie Formations
- Db — Becraft Limestone
- Dkn — Kalkberg & New Scotland Formations
- Dmc — Manlius & Coeymans Formations
- Sr — Rondout Formation: Binnewater Sandstone & Rondout Fm.
- Sh — High Falls Shale
- — Taconic Unconformity
- Oq — Quassaic Formation
- Om, Op — Martinsburg Formation: Poughkeepsie Melange
- Oag — Austin Glen Formation (allochthonous)

- Shoreline (lake, river, or creek)
- Road or Highway
- Strike and Dip of Bedding
- Vertical Bedding
- Strike and Dip of Cleavage
- Vertical Cleavage
- Formation Contact, dashed where approximately located
- Thrust Fault: Barbs on the Hanging-Wall Sheet, dashed where inferred
- High-Angle Fault
- Tear Fault
- Anticline Crest with Plunge Direction, dashed where inferred
- Syncline Crest with Plunge Direction, dashed where inferred
- Mesoscopic Folds with Plunge Direction



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Specialties:
Subsurface Geologic Structure
Fault and Foundation Analysis
Geologic Maps and Databases
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EDUCATION:

Ph.D. (1985) Columbia University (Tectonics)
M.Phil. (1983) Columbia University (Geology)
M.S. (1977) City College of New York (Field Mapping)
B.S. (1972) City College of New York (Geology)

EXPERIENCE:

Dr. Merguerian has over 25 years of experience in geologic mapping and structural analysis of complexly deformed metamorphic terrains, plutonic- and volcanic districts, and areas underlain by sedimentary- and glacial strata. His chief interests lie in ductile- and brittle-fault analysis and earthquake-hazard assessment of crystalline terranes. His allied interests lie in computer analysis of geologic processes, prediction of ore and mineral deposits according to plate- tectonic setting, and geophotography. He has performed pure- and applied research and published maps and reports from such widely separated areas as southeastern New York and New York City, New Jersey, western Connecticut and Massachusetts, central and southern California, and Nevada.

In the last decade, Merguerian's research efforts have focused on field- and tunnel mapping and laboratory research on the surface- and subsurface structure of New York City and vicinity, resolving fine details in the local structure, stratigraphy, metamorphism, and seismicity. His work documents the existence of numerous ductile- and brittle faults which crosscut Manhattan Island, the East River Channel, and adjacent areas and affirms the seismic potential of southeastern New York, long thought to be invulnerable to earthquake hazard.

PROFESSIONAL HISTORY:

Dr. Merguerian is currently a Full Professor of Structural Geology at Hofstra University. He is the President of Duke Geological Laboratory in Westbury, New York and has consulted for the United States Geological Survey, the California and Connecticut State Geological Surveys, the New York City Department of Environmental Protection, and numerous geotechnical and engineering firms. His consulting experience encompasses basic and site-specific geologic mapping, subsurface engineering geology and foundation analysis, mineral exploration, and multimedia presentation.

AFFILIATIONS:

The Geological Society of America (Since 1972)
The Association of Engineering Geologists (Since 1974)
The American Geophysical Union (Since 1977)
Sigma Xi (Since 1977)
The New York Mineralogical Club (Since 1978)
The New York Academy of Sciences (Since 1981, Chair 1986)
Society of Economic Paleontologists and Mineralogists (Pacific Section) (Since 1981)
History of Earth Sciences Society (Since 1982)
National Association of Geology Teachers (Since 1982)

RESEARCH PUBLICATIONS:

(See attached)

SCIENTIFIC PUBLICATIONS OF CHARLES MERGUERIAN

1977

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APPENDIX B

GEODESIGN INCORPORATED
GEOTECHNICAL ENGINEERS AND ENVIRONMENTAL CONSULTANT
d/b/a GeoDesign, Inc., P.C.

Friday, November 03, 1995
File No. 053-01

Dennis M. Larios, PE
Brinnier and Larios, P.C.
67 Maiden Lane
PO Box 3720
Kingston, New York 12401

Re: Addendum to Geotechnical Report
Rock Probes - B-5/Station 12+00 Vicinity
Kingston Business Park, Kingston, NY

Dear Dennis:

We have completed rock probing in the vicinity of boring B-5 (roadway Station 12+00) where a soil-filled cavity was encountered at a depth of 44 feet. Probing was undertaken to explore the extent and continuity of the cavity and to evaluate impact on roadway design and construction.

Probe Data

Eight rock probes were taken at the locations and to the depths shown on the attached Plan (sheet 1 of 2) and Table 1. The probes were made by a hydraulic rock drilling rig which drilled a 3-inch hole at each location. The rig mobilized to the site on Wednesday morning (10/25/95) and completed drilling on Friday (10/27/95).

The rate of advance of the drilling bit was monitored by our field engineer. When cavities were encountered they were distinguished by the change in advance rate. As shown on the attached Table and Figures cavities varied from inches to over 8 feet in thickness. The top of the cavities varies from approximate Elevations 190 feet to 215 feet.

Interpretation of Data

Our interpretation of the probe data is presented on Sections A-A' and B-B'. Section B-B' indicates some continuity of the cavities in the east-west direction with approximately a 30 degree dip (into the hillside). This is consistent with field observations of the bedding plane dip of bedrock outcrops east of the probe locations.

Although limestone-based cement mining has taken place at the site, there are no mapped mines or direct evidence of mining in this specific area. The limited thicknesses of the

probed cavities suggests natural chemical weathering of the limestone as the mechanism which created the cavities (solution cavities). It is difficult to envision such thin layers being the result of past mining activity.

Based on probe drilling rates which indicated about one minute per foot above the cavities and one half minute per foot below, the cavities appear to follow a contact plane between two bedrock layers. It is possible that the soil encountered in B-5 which contained some wood fiber is soil which has washed in through joint and bedding plane pathways connected to the ground surface to the east.

Section A-A' suggests less continuity of the cavities in the north-south direction along the upslope edge of the proposed roadway.

Design and Construction Considerations

Cavities are expected to be encountered in the deep excavations made for the roadway in this area. Although such cavities were not encountered in other test borings at the site, cavities may be encountered in other areas during excavation.

The extent of the cavities could be mapped in advance of construction with an extensive program of additional probes. Alternatively, actual conditions can be addressed with contingency plans to be implemented as needed during construction.

In either case, design plans and specifications should include provisions for local slope stabilization measures (e.g. concrete infill, concrete pillar supports) to address field conditions encountered during construction. Where the cavities appear just below the roadway similar measures should be employed to fill cavities in the subgrade.

We recommend that an experienced field engineer be on-site during the roadway excavation to observe actual conditions and make recommendations regarding remedial measures.

After you have reviewed the information contained in this letter, please call to discuss.

Sincerely,

GeoDesign, Inc.

Theodore von Rosenvinge IV, PE
Principal

Ulrich La Fosse, PE
Principal Reviewer

encl: Table 1, Plan view with sections (2 sheets)
INCLUDE-IN\PROBES.WPD

TABLE 1

November 2, 1995

SUMMARY OF ROCK PROBES - ROADWAY STATION 12+00 VICINITY							
KINGSTON BUSINESS PARK, KINGSTON, NY							
Probe Number	Depth (ft.)	Station	Offset (ft.)	Ground Elev. (ft.)	Depth to Top of Cavity (ft.)	Thickness Cavity (ft.)	Elev. Top of Cavity (ft.)
B-5	52	12+00	15 L	256	43.6	8.4	212.4
RP-1	66	12+00	30 L	261	56.5	3.3	204.5
RP-2	80	12+00	45 L	264	63.5	4	200.5
RP-3	60	12+00	CL	252	47	0.8	205
RP-4	70	12+20	15 L	256	52	4	204
				256	62	2	194
RP-5	76	12+13	30 L	260	51	2	209
				260	59.5	0.8	200.5
				260	63.5	3.5	196.5
RP-6	70	12+33	30 L	257	58.5	2.5	198.5
				257	65.8	0.2	191.2
RP-7	60	11+85	15 L	255	40.5	6.8	214.5
RP-8	50	11+72	28 L	260	36	0.8	224
				260	45	5	215
Total	584						

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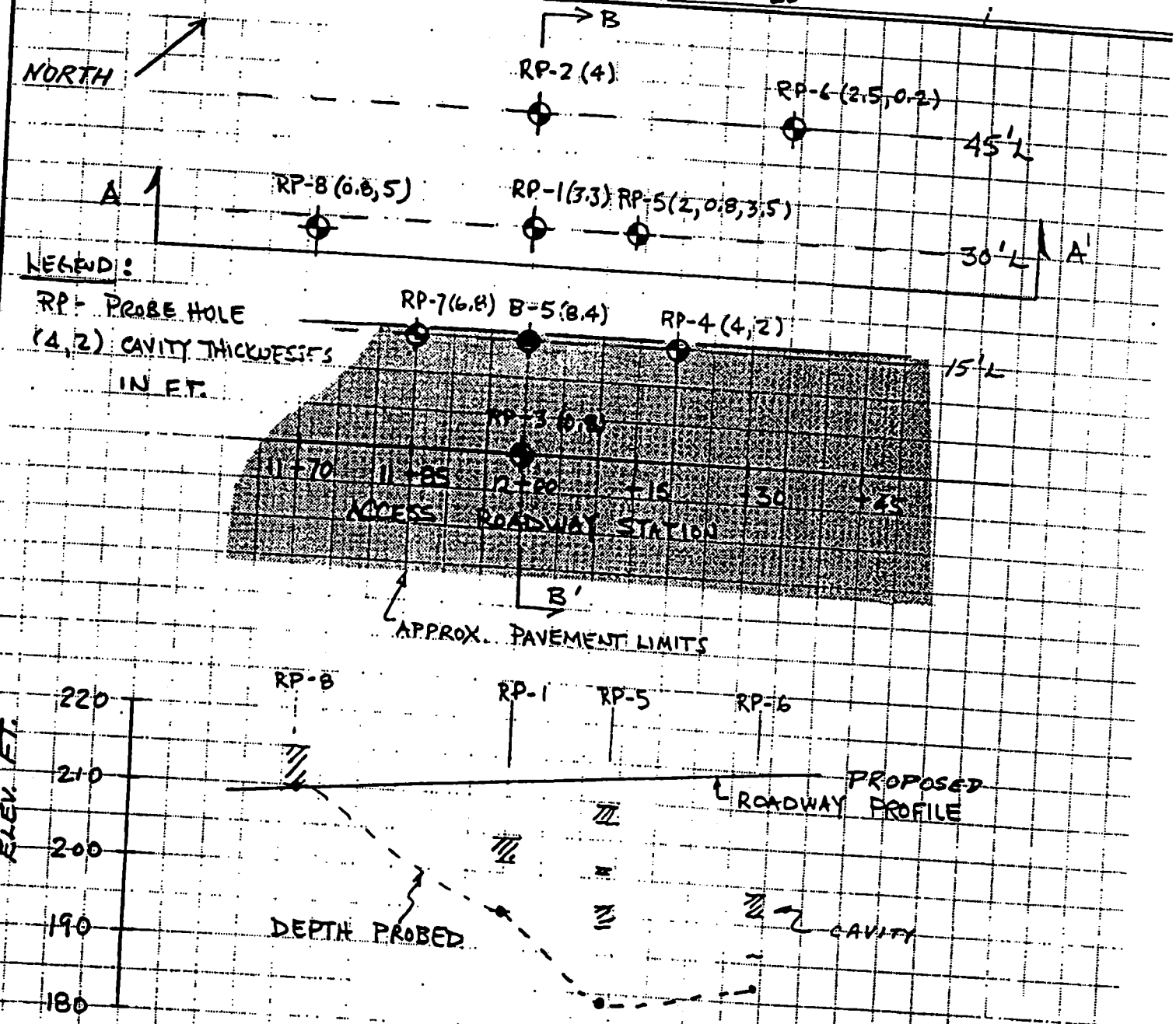
JOB U23-01 KINGSTON BUSINESS PARK
SHEET NO. ____ OF 2
CALCULATED BY TVR DATE 10-30-95
CHECKED BY ULF DATE 11-3-95
SCALE 1" = 20'



SECTION A-A'

(SECTION B-B' ON SHT 2 of 2)

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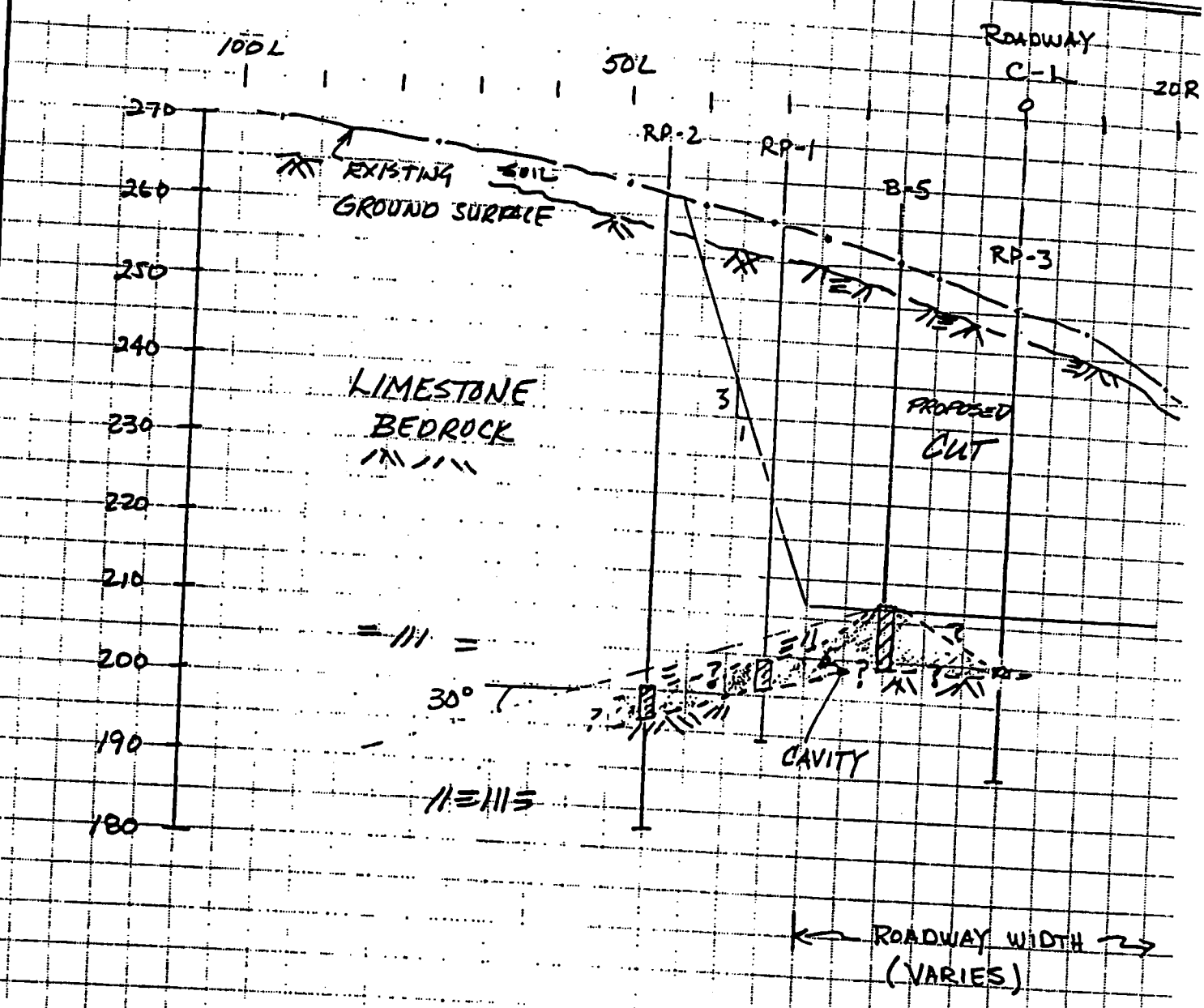
JOB 053-01 KINGSTON BUSINESS PA
SHEET NO. 2 OF 2
CALCULATED BY TVR DATE 11-2-95
CHECKED BY ULF DATE 11-3-95
SCALE 1" = 20'



SECTION B-B'

APPENDIX D

GeoDesign, Inc. Report of January 09, 1996

GEODESIGN
INCORPORATED

GEOTECHNICAL ENGINEERS AND ENVIRONMENTAL CONSULTANTS

January 9, 1996
File No. 053-01

Dennis Larios, P.E.
Brinnier & Larios, P.C.
67 Maiden Lane
P.O. Box 3720
Kingston, New York 12401
Fax (914) 338-7660

Re: Site Visit to Former Cement ("Knaust") Mine
Delaware Avenue
Kingston, New York

Dear Dennis:

This letter summarizes a January 9, 1995 site visit by the team of our subconsultant, Dr. Charles Merguerian and the undersigned to a former cement mine located north and south of Delaware Avenue in Kingston, NY.

The purpose of the visit was to make technical observations of geologic conditions including structural conditions of the mine's column and roof structure, and evidence of karstic processes, if any. Our team's observations and conclusions relative to these items is presented herein.

SITE VISIT

The site visit began at 1:30 p.m. and was concluded at 2:45 p.m. The mine was accessed via an entrance located north of Delaware Avenue. Present during the visit were Mr. Knaust and his son, and their consultant, Mr. Paul Rubin as well as Mr. Stephen M. Finkle - Kingston Ulster Economic Zone Coordinator and Mr. Michael Moriello. The site visit proceeded from north to south under Delaware Avenue past the so-called "Alternate Exit" (old Survey & Map by Boyd E. Allen) to the south end of the mine.

Summary of Observations:

1. **General** - The mine is a standard "room and pillar" type. The unit that was extensively mined was the buff-colored Whiteport Dolostone of Silurian age. The Whiteport is in contact with the overlying Manlius (lower Devonian) formation in it's typical highly laminated form. The formation is everywhere massive although cut by a number of vertical joints oriented between N 10 and N 30 degrees E. No major faults were observed.

At the mine entrance the mine occupies a coherent structure, anticlinal in nature. Layering on the west flank is oriented N 30 degrees E (strike), 22 degrees NW (dip). At the east flank near the mine entrance, layering dips gently (roughly 5 degrees). The layering at the crest of the anticline is horizontal. There is a lack of cross joints in comparison with the strike joints

2. **Pillars** - It appears that roughly 70 or 80 percent of the rock has been mined out. The remaining pillars support the ceiling which is largely unbroken and lacks evidence of significant rock-fall. Pillar diameters range

from 25 to 30 feet or more and were spaced at regular intervals with spans typically 50 feet or less. These pillars were intact, massive and exhibited well-preserved layering. No significant deterioration, evidence of solution, or accumulation of rubble at the pillar bases was observed. There was minor evidence of whitish solution-related carbonate coatings on some support pillars. None of these resulted in megascopic dripstone features.

3. **Roof** - The roof of the mine, although cut by a few northeast-trending joints (delineated by icicles), was intact and of uniform condition and appearance. With the exception of a few blocks near the entrance, and at the south end where a single 15 to 20 foot diameter semi-circular ceiling collapse was observed, blocks were conspicuously absent from the mine floor. Moreover, none of the following were observed: roots or vegetation suspended from the ceiling, dripstone, flowstone, stalactites, or cavities. Rather, original sedimentary structure was preserved in the form of laminated bedding, mud cracks and, according to Mr. Knaust, fossils.

4. **Standing Water** - Observations of standing water on the anticlinal flanks were made. Standing water was observed over an area in excess of 150 feet long and 30 feet wide in the entrance area on (west flank). Roughly 1000 feet south of the mine entrance, where dips of strata steepen to roughly 30 degrees, standing water was found on both flanks of the anticline at different levels. A roughly 30 foot difference in water level was found with the water lower on the east flank. This observation argues against any hydraulic connectivity between these bodies through the formation.

Water appeared still and clear. No evidence of groundwater flow was evident. An occasional drip into the standing water was audible.

CONCLUSIONS

Structure Condition - The room and pillar mine structure appears sound and has supported the roof for close to 100 years.

"Karst" - Lack of solution features is consistent with the lack of intersecting joint sets, a precondition necessary for solution characteristic of karst. Standing water trapped at the base of the anticlinal flank excavations was observed at markedly differing elevations separated by comparatively short horizontal distance (mine width). This indicates a high hydraulic gradient and low hydraulic conductivity (permeability) of the limestone bedrock formation. Similarly, standing water has also been observed at higher elevations in uphill surface mines. **Absolutely no evidence for karst was found.**

Very Truly Yours,

GeoDesign, Inc.

Theodore von Rosenvinge, IV, P.E.
Principal

cc: Dr. Charles Merguerian - Duke Geological Laboratory

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TABLE 1

November 2, 1995

SUMMARY OF ROCK PROBES - ROADWAY STATION 12+00 VICINITY

KINGSTON BUSINESS PARK, KINGSTON, NY

Probe Number	Depth (ft.)	Station	Offset (ft.)	Ground Elev. (ft.)	Depth to Top of Cavity (ft.)	Thickness Cavity (ft.)	Elev. Top of Cavity (ft.)
B-5	52	12+00	15 L	256	43.6	8.4	212.4
RP-1	66	12+00	30 L	261	56.5	3.3	204.5
RP-2	80	12+00	45 L	264	63.5	4	200.5
RP-3	60	12+00	CL	252	47	0.8	205
RP-4	70	12+20	15 L	256	52	4	204
				256	62	2	194
RP-5	76	12+13	30 L	260	51	2	209
				260	59.5	0.8	200.5
				260	63.5	3.5	196.5
RP-6	70	12+33	30 L	257	58.5	2.5	198.5
				257	65.8	0.2	191.2
RP-7	60	11+85	15 L	255	40.5	6.8	214.5
RP-8	50	11+72	28 L	260	36	0.8	224
				260	45	5	215
Total	584						

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984 SOUTHFORD ROAD • MIDDLEBURY, CT 06762
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JOB U23-01 KINGSTON BUSINESS PARK
SHEET NO. ____ OF 2
CALCULATED BY TVR DATE 10-30-95
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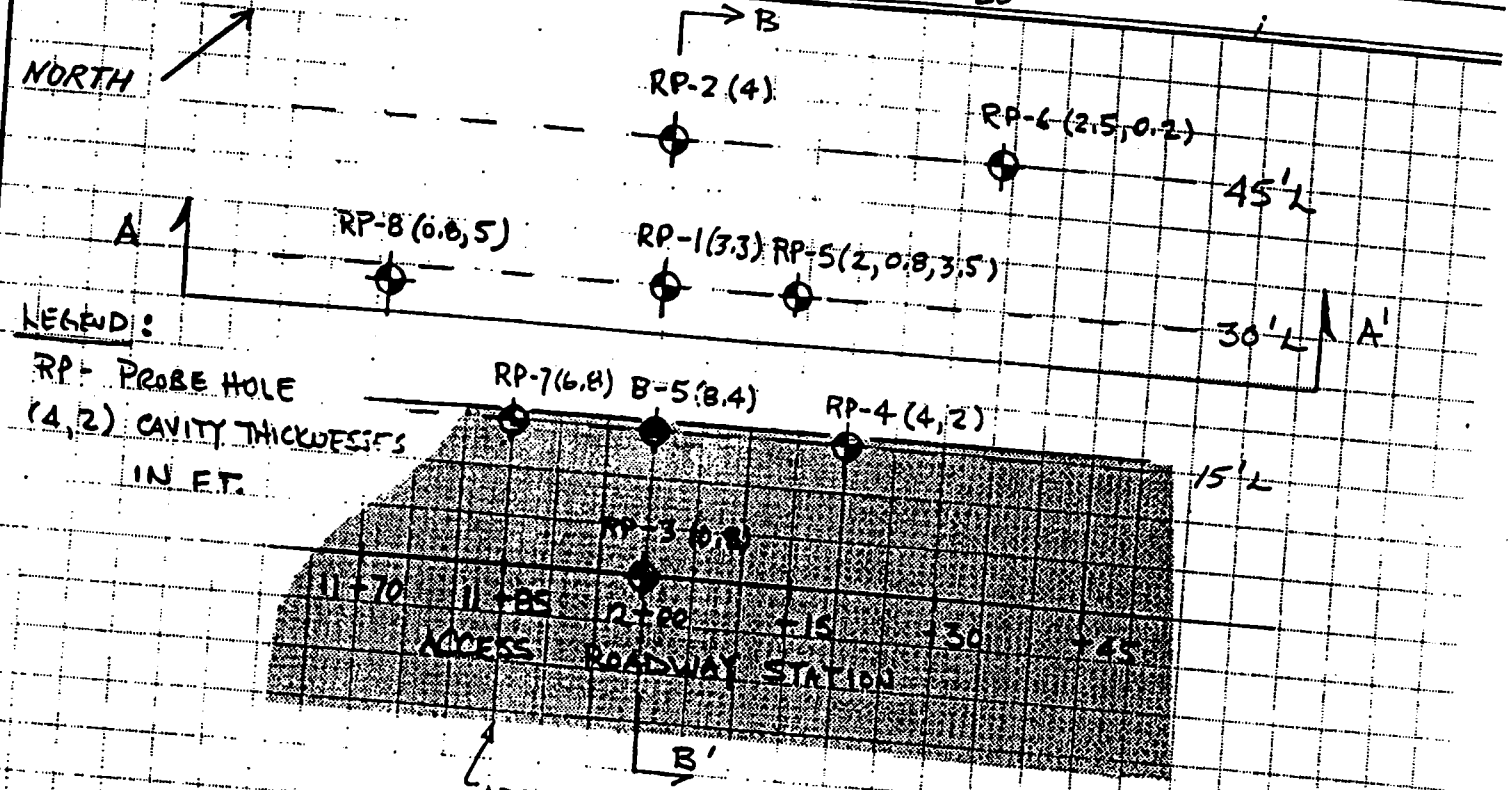

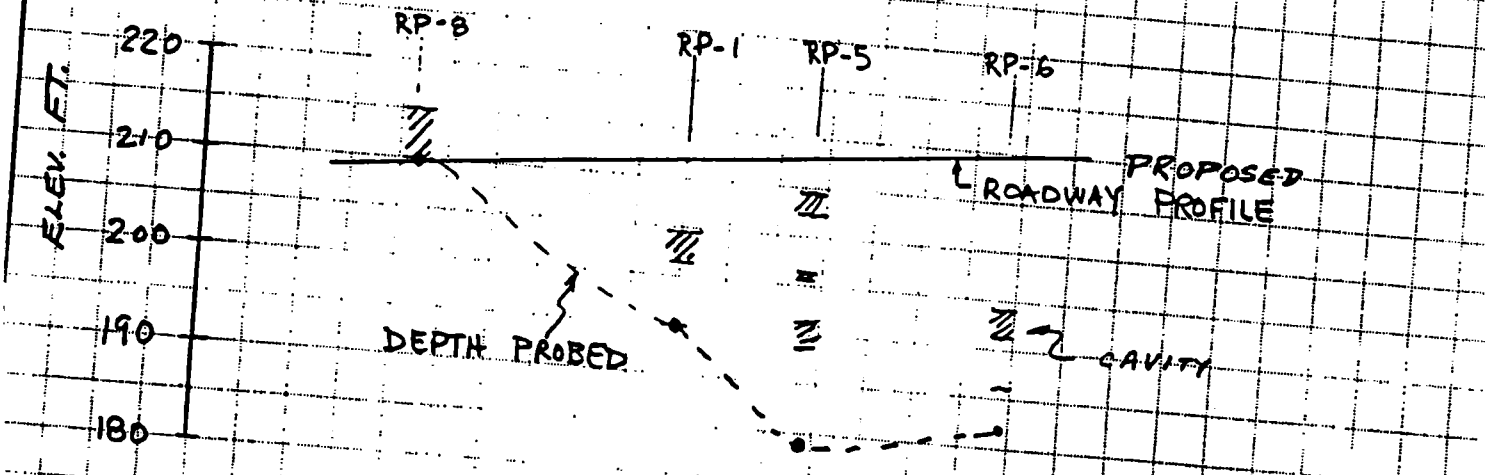

SECTION A-A'

(SECTION B-B' ON SHT 2 of 2)

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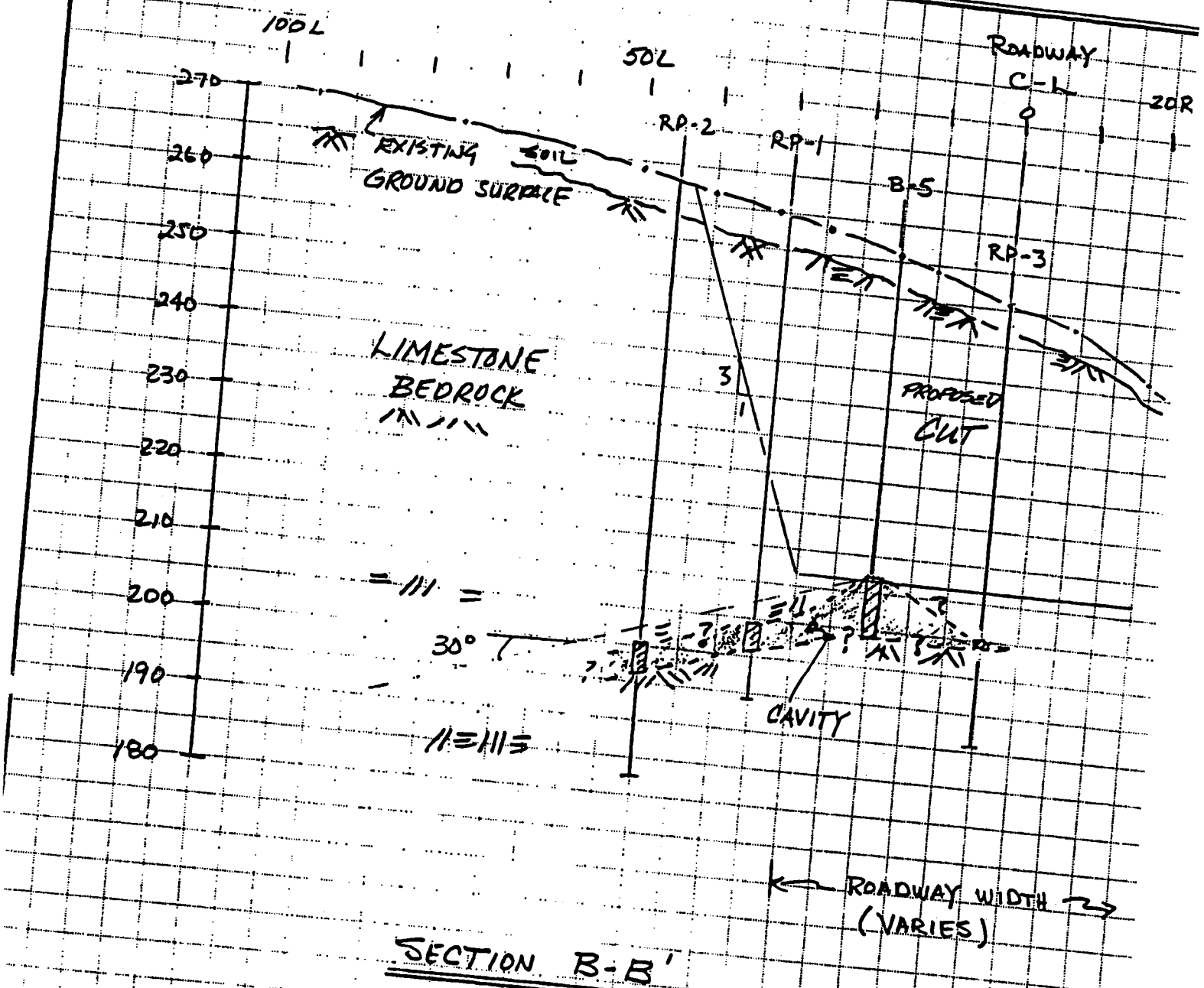


SECTION B-B'

EXHIBIT D

REVISED DEVELOPMENT STANDARDS

KINGSTON BUSINESS PARK

PERFORMANCE AND DEVELOPMENT STANDARDS

CITY OF KINGSTON LOCAL DEVELOPMENT CORPORATION

INDEX

Development Standards

Section 1 - Property

The real property subject to these standards is located in the City of Kingston, County of Ulster and State of New York and consists of 107.059 acres situate northerly of Delaware Avenue. The location and boundaries of said property is depicted on a site plan attached hereto and made a part hereof as Exhibit "A".

Section 2 - Definitions

The words and phrases defined in this action shall have the following meanings when used elsewhere in these Standards.

2.01 "Approval" shall mean the written approval by the City of Kingston Local Development Corporation (the "Corporation"). Any said approval must be requested in writing to the Corporation and presented for its review, recommendations, and the Corporation's written approval secured before any improvement is installed or constructed on a Parcel or a variance is considered.

2.02 "Business Park" shall mean the land area owned or operated by The City of Kingston Local Development Corporation and depicted on Exhibit "A".

2.03 "Building" shall mean any man-made, above grade structure wholly or partially enclosed including all projections or extensions therefrom, as well as any additions or changes thereto.

2.04 "Building Coverage" shall mean the surface area of a Parcel that may be covered by Buildings, sometimes expressed as a percentage of the total Parcel area.

2.05 "Corporation" is The City of Kingston Local Development Corporation, or the designated Manager of the Business Park.

2.06 "Development Standards or "Standards" shall mean the regulations, restrictions and covenants governing the development of the Business Park and activities of tenants, occupants, owners and their employees, visitors, patrons, and other users as set forth herein.

2.07 "Floor Area Ratio" shall mean the floor area in square feet of all buildings on a Parcel or group of Parcels divided by the area of such lot in square feet.

2.08 "Front Setback Line" shall mean a line that is parallel to the street on which a Parcel abuts and shall extend from side boundary line to side boundary line. On a Parcel that abuts two or more streets, the Front Setback Line shall apply to each boundary line abutting a street.

2.09 "Improvements" shall mean but shall not be limited to Buildings, retaining walls, ditches, culverts, lighting supports, earth fills, berms, earth excavations, paving, ground cover, fences, signs, landscaping, utilities and telephone lines, constructed, installed or placed on, under or above any Parcel by or on the account of a Tenant, occupant or owners.

2.10 "Landscaping" shall mean the aesthetic improvement of Parcels, through the use of lawns, ground cover, trees, and shrubs, as well as walls, screenings, terraces, fountains, pools, and other water arrangements.

2.11 "Landscape Coverage" shall mean the relative portion of the surface area of a Parcel to be covered by Landscaping, sometimes expressed as a percentage of the total Parcel area.

2.12 "Tenant" shall mean any person, firm, corporation or other entity who has or enters into an agreement, lease or other type of contractual relationship with the Corporation regarding a Parcel.

2.13 "Owner" shall mean any person, firm, corporation or other entity who acquires fee title to a Parcel.

2.14 "Parcel" shall mean one or more of the individually defined lots within the Business Park designated for a particular use.

2.15 "Parcel Boundary Line" shall mean each of the perimeter lines of each Parcel or portion of a Parcel as depicted on a subdivision plat and site plan.

2.16 "Rear Setback Line" shall mean the line parallel to the rear Parcel Boundary Lie and shall extend from a Side Setback Line to a Side Setback Line.

2.17 "Setback Area" shall mean those areas between the front, rear, and side Parcel Boundary Lines and their respective front, rear and side setback lines.

2.18 "Side Setback Line" shall mean the line parallel to the Side Parcel Boundary Line and shall extend from the front setback line to the rear Parcel Boundary Line.

2.19 "Street" shall mean the rights-of-way and improvements thereon maintained by the Corporation or the City of Kingston or other governmental agency for use as a vehicle thoroughfare.

Section 3 - Compliance with Regulations and Building Codes.

The placement or construction of all Improvements on the Business Park shall comply with all laws, rules and regulations of any federal, state, county, city or other government authorities now and hereafter created that may have jurisdiction. The stipulated references shall be the New York State Uniform Fire Prevention and Building Code (Title 19 NYCRR) and the Zoning Code of the City of Kingston (Chapter 123).

These Performance and Development Standards shall be in addition to any and all applicable governmental codes, rules and regulations, including but not limited to the Zoning Code and Planning Board regulations of the City of Kingston. The grant of approval and/or a variance by the Corporation shall not exempt a tenant or owner from obtaining any and all applicable governmental approvals and/or variances, including those from the City of Kingston.

Section 4 - Performance Standards - General

Subsection 4.01 - General

The Performance Standards of this section shall be applicable to all parcels, but shall not supersede or otherwise invalidate other additional Standards that may be hereinafter imposed on individual or designated groups of parcels. Should a conflict arise between the Performance and Development Standards set forth herein and any inconsistent federal, state, county or city regulation, the more restrictive regulations or standards shall apply.

Subsection 4.02 - Hazardous Activities

No activity shall be conducted on any parcel that may be or may become hazardous to public health and safety. The determination of what activities may be or become hazardous to public health and safety shall be in the sole discretion of the Corporation. No activity shall be permitted which is illegal or contravenes any federal, state or local code, rule or regulation.

Subsection 4.03 - Noise

All operations and facilities located on a parcel shall comply with the applicable requirements of the noise control law of the City of

Kingston, being Local Law No. 1 of the Year 1992, Chapter 79 of the Code of the City of Kingston, as the same may be amended.

Subsection 4.04 - Air Pollution

Except for the operation of motor vehicles to, from and on a parcel as incidental to the use thereof, the following requirements shall apply:

(a) Any use producing atmospheric emissions shall comply with standards established by any federal, state or other local governmental authorities now or hereafter created that may have jurisdiction thereof.

(b) The emission of noxious or objectionable odors will not be permitted.

Subsection 4.05 - Heat or Glare

Any operation producing intense glare or heat shall be performed in an enclosed or screened area so that the glare or heat emitted will not be perceptible at any Parcel Boundary Line of the Parcel where they originate.

Subsection 4.06 - Waste Disposal

All disposal of storm and sanitary sewage and manufacturing waste shall be in accordance with all applicable laws or regulations of any federal, state, local or any other government authority now or hereafter created that may have jurisdiction, and shall further be in conformance with the master drainage plan developed for the Business Park.

Section 5 - Development Standards - General

Subsection 5.01 - General

The types of uses and improvements permitted on each parcel shall be limited to those defined in the general Development Standards in this section and to the specific Performance and Development Standards set forth for each parcel in Section 8 hereinafter.

Subsection 5.02 - Automobile and Truck Parking and Loading

(a) Paved and marked off-street parking areas sufficient for all the automobiles and trucks of any Tenant or Owner and its employees and customers and other vehicles used in the conduct of a

Tenant's business shall be provided on each parcel. Parking shall not be permitted on the common access roads to and from the Business Park.

(b) No vehicular parking shall be permitted within a distance of thirty (30) feet of the common access roads. Parking and maneuvering layouts shall be in accordance with accepted traffic engineering standards as recognized and enforced by applicable federal, state or other governmental authorities now or hereafter created that may have jurisdiction.

Berming in the setback areas is encouraged to assist in screening of drives and parking in the setback areas.

(c) Buildings and other improvements on parcels shall be designed so that all motor vehicles of the maximum length permitted to use the highways of the State of New York without an special permit may be maneuvered and loaded or unloaded at service docks off the common access roads. Vehicle maneuvering for loading and unloading will not be permitted on the common access roads. However, the maneuvering and loading of specialized construction equipment vehicles and/or devices may be permitted temporarily during the construction of improvements, subject to approval.

(d) Unless physical conditions otherwise prohibit, and then only on approval by the Corporation, all loading docks shall be provided at the side or rear of the Buildings. Loading facilities shall be constructed so that no part of the longest legal loading vehicle being loaded or unloaded at any loading dock, loading door, or loading area will extend beyond the Parcel Boundary Line.

(e) All parking and loading facilities must also meet the applicable provisions of the City of Kingston Zoning Code and Regulations, or a variance therefrom obtained by the tenant or owner.

Subsection 5.03 - Building and Construction Materials

(a) All building materials used shall be subject to approval and must comply with all applicable Building Codes, i.e. New York State Uniform Fire Prevention and Building Code (Title 19 NYCRR).

(b) All heating and cooling towers, equipment, etc., placed on the roofs of buildings shall be screened or enclosed so that they are architecturally compatible with the main portion of the building.

(c) Accessory buildings, enclosures and fences shall enhance the design of and be of the same quality of materials as the building(s) they serve.

Subsection 5.04 - Building Heights

All building heights shall confirm to the rules and regulations of the Corporation. No building shall exceed in height thirty-five (35) feet above average finished grade. This height limitation shall not apply to chimneys, radio towers, aerials or other structures accessory to a permitted use and which require a greater height to be functional. Such structures shall be limited to the minimum functional height required and shall be of such materials, colors and location as to minimize the visual effects.

Subsection 5.05 - Dust Control

All ground areas not covered by buildings shall be landscaped or paved, shall be properly drained and graded, and shall be maintained in good condition free of weeds, trash and other debris.

Subsection 5.06 - Illumination

The design, location and installation of exterior lighting on the parcels shall be subject to approval and shall comply in all respects to the requirements of any federal, state and other governmental body having applicable jurisdiction standards. Exterior lighting shall be aimed generally downward and shielded. No exterior light source shall exceed twenty-eight (28) feet above finished grade except as may be required by law.

Subsection 5.07 - Landscaping and Buffer Zones

(a) All areas not paved or covered by buildings shall be landscaped in accordance with the Corporation's landscaping standards for each parcel, which are hereinafter set forth in Section 10. In addition to trees, ground cover and gardens, landscaping may include, where appropriate, the use of walls, screening, terraces and other landscaping arrangements.

(b) Landscaping, subject to approval, shall be installed within 90 days after the notice of completion and occupancy of the first building to be constructed on the parcel.

(c) Plans, specifications and inspection for landscaping shall be subject to approval of the Corporation.

(d) Plant material shall be of the highest grade and quality as defined by published authoritative standards applicable to the local area. Wherever possible, plant material shall be indigenous to New York. At a minimum, the plant material shall consist of the size and specifications as set forth in Section 10 of these Standards.

(e) A continuous landscaping strip having a minimum width of twenty-five (25) feet shall be required to be installed and maintained on all parcels abutting the streets within the Business Park. Said landscaping strip shall consist of grass lawns, ground cover, trees, shrubs or any combination thereof as approved by the Corporation.

(f) For the purposes of maintaining and enhancing the scenic and visual qualities of the Park, protecting the quality of adjoining residential areas and to preserve the existing open space, there shall be maintained a buffer zone along the perimeter of the property, which buffer zone shall be located and have the dimensions as shown on Exhibit "A". This buffer shall be retained in its natural condition with the cutting or removal of vegetation and trees limited to selective trimming and the removal of dead, fallen, dangerous or diseased trees. No improvements or structures of any kind shall be constructed thereon except naturally appearing walkways or trails, as well as improvements and necessary clearing connected with the road and driveway system, drainage facilities, utilities and similar essential services or infrastructure improvements.

Subsection 5.08 - Underground Service Lines

Power, telephone, utilities and sewer service lines shall be underground and in no event shall electric power line, water pipe, gas pipe, sewer pipe, or drainage pipe (other than rainwater leaders) be installed or maintained on any parcel above the surface of the ground or traversing the property except for meter or transformer connections that shall be screened or enclosed in a manner approved by the Corporation.

Subsection 5.09 - Setback Areas

Setback Areas shall be those areas that lie between the Setback Lines and their corresponding, parallel Parcel Boundary Line. All Front Setback Areas or Side Setback Areas facing the common access roads except for driveways, sidewalks, other walkways, and automobile parking (if not prohibited), shall be used exclusively for the planting and growing of trees, shrubs, lawns and other ground cover or material, subject to approval. If landscaping is

not properly maintained by the Tenant or Owner, the Corporation may undertake such maintenance as it deems necessary, with the expense therefore borne by the Tenant or Owner, Corporation shall solely determine whether Tenant's landscape maintenance is proper.

Subsection 5.10 - Signs and Advertising

All signs shall comply with the regulations of any federal, state, local or other governmental authorities now or hereafter created that may have jurisdiction. Corporation will set forth architectural guidelines for signs and advertising in greater detail in a separate document. However, the following general conditions shall also govern signs and advertising.

(a) No signs or other advertising devices of any character shall be erected, pasted, posted, painted, displayed or otherwise made visible on any part of a building or parcel without approval.

(b) Signs on any parcel shall be limited solely to those that identify the name and type of business of the Tenant or Owner. Signs advertising products or services or containing other direct sales information shall be discouraged and shall be subject to approval of the Corporation.

(c) Corporation may install any signs as it deems necessary throughout the Business Park, subject to any required governmental approvals.

(d) The size of signs shall be in a direct proportion to the size of the building and the exposure to the common access roads, as applicable. No signs shall obstruct the vision of automotive traffic.

(e) No advertising media or device such as flashing or rotating devices, phonographs, radios, public address systems, sound production or reproduction devices, shall be permitted without approval of the Corporation if the effect shall be audible at the Parcel Boundary Lines of a parcel. Compliance with Section 4.03 hereof is also required.

(f) All permitted signs and advertising devices that are installed shall be properly maintained, and Corporation shall have the right to require the removal of any sign or device not maintained to Corporation's satisfaction.

(g) No signs or advertising shall be mounted directly or painted on the exterior roof or face of any building, nor shall the

height of any sign be greater than 12 feet above the average grade elevation of a parcel.

(h) The Tenant or Owner shall have the right to install and maintain one or more signs on the parcel identifying it and its operations, provided, however, the subject matter, type, design, number, location and elevation of such signs, and whether lighted or unlighted, shall be subject to and in accordance with the written approval of the Corporation. All signs must conform to the architectural scheme of the Business Park or meet the requirements of the Corporation.

Subsection 5.11 - Parcel Coverage

Permitted parcel coverage by buildings and other improvements shall be prescribed hereinafter.

Subsection 5.12 - Outside Storage

No vehicles, equipment, materials, supplies or products shall be stored or permitted to remain on any parcel outside a building unless such storage is suitably shielded from public view by an appropriate screen compatible with the design of the building. Said screen shall be subject to approval of the Corporation.

Section 6 - Design and Construction of Improvements - All Parcels

Subsection 6.01 - General

No improvements of any kind shall be erected, altered, placed, assembled or permitted to remain on a parcel until plans prepared by an architect and/or engineer licensed to practice in the State of New York showing the type of use, location, size and architectural and engineering design of same have been approved by Corporation. Plans must be submitted in duplicate. Both copies will be retained by Corporation. It is the Tenant's or Owner's responsibility to ensure that the Corporation be aware of all changes, corrections and alterations.

Only plans stamped "approved" by the Corporation will be used by Tenant's or Owner's contractors.

Any and all plans for improvements, as well as alterations to existing improvements, shall also bear the approval or endorsement of any governmental agency having jurisdiction thereover, including but not limited to the City of Kingston Building Department or Planning Department.

Subsection 6.02 - Plan and Aesthetic Requirement

(a) All plans for improvement shall be signed and sealed approved by architects and/or engineers licensed to practice in the State of New York.

(b) Plans shall include topographic, grading, drainage and utility plans showing (1) foot contours and spot elevations referenced to an approved datum and a plot plan at a scale not smaller than one (1) inch equals thirty (30) feet showing the relationship of the proposed improvements on the parcel to the improvements on the adjacent parcels and to the utilities and roads.

(c) Plans submitted to Corporation for approval shall include preliminary plans and specifications of all proposed improvements in sufficient detail to determine if the plans are in compliance with these Development Standards. The plans and specifications may be manufacturer's standards plans, if sufficient. Plans shall be at a suitable scale, but in no event smaller than 1/16 inch to the foot.

(d) Ground cover plans, including landscaping, shall incorporate, at a minimum, Corporation's general landscaping and paving requirements for the parcel.

(e) An accurate architectural perspective rendering of the proposed improvements, including the proposed exterior color schemes, style, materials and design, wording and place of all signs proposed shall be prepared. One of the primary purposes of said rendered shall be to provide an accurate representation of the proposed improvements so that the Corporation may judge whether said improvements are compatible with the character of the Business Park.

(f) Any other plans, specifications, or design features that Corporation may deem necessary and request shall be prepared.

(g) Samples, no smaller than one (1) foot square of all materials and/or paint or other coating colors used on all improvements and visible from ground level from the exterior of all improvements, shall be submitted to Corporation. Corporation reserves the right to approve all said materials and/or colors, and reserves the further right to suggest alternative materials and/or colors that, in the sole opinion of the Corporation, shall be determined to be more compatible with Corporation's objectives for the overall aesthetic character and quality of improvements at the Business Park.

(h) The Corporation's objective for the overall aesthetic character of the improvements at the Business Park is that they should be compatible with the character of a first class development.

Subsection 6.03 - Approval of Plans

(a) Approval of plans and specifications for compliance with these Development Standards and for aesthetics shall be at the sole discretion of Corporation.

(b) Approval of said plans and specifications may be withheld because of failure to comply with any of the Development Standards set forth herein.

(c) Approval of plans by the Corporation shall not exempt the tenant or owner from compliance with site plan approval and/ or Building Code approval from the City of Kingston and other governmental agencies.

Subsection 6.04 - Plans for Alterations to Improvements

All plans for alterations to the parcel(s) either for the construction of additional improvements or for alterations to existing improvements that are visible from the exterior of any buildings or that affect the structural system of any building or change any grade or landscaping shall be prepared, submitted and approved under the provision of this Section 6.

Subsection 6.05 - Issuance of Building and Related Permits

Tenant or Owner shall obtain a permit or permits from the Corporation stating that the uses and plans for the Tenant's or Owner's parcel have been approved by Corporation as being in full compliance with the Development Standards. There can be no change to "Approved" plans without the Corporation's written consent. Tenant or owner shall also obtain all permits and approvals required by governmental agencies, including those of the City of Kingston.

Subsection 6.06 - Removal of Unapproved Improvements

Improvements made on parcels without the approval of plans for said improvements are hereby determined to be unapproved improvements constructed or installed in violation of the conditions and restrictions of this Declaration. Unapproved improvements shall be immediately removed from the parcel at Tenant's or Owner's sole expense. Portions of improvements that are not constructed exactly

as indicated and specified on approved plans are also hereby determined to be unapproved and shall be immediately removed from parcel at Tenant's or Owner's sole expense.

Subsection 6.07 - "As Built Drawing"

Will be submitted to the Corporation and the City of Kingston Building and Planning Departments within 120 days of completing the construction.

Section 7 - Business Park Land Use:

Subsection 7.01 - General

General land uses within the Business Park shall be limited to the following permitted uses:

1. Business and professional offices;
2. Corporate or other business headquarters or regional offices;
3. Manufacturing, assembling, converting, altering, finishing, cleaning or any other processing and incidental storage of products or materials.
4. Research design and development laboratories and testing facilities not involving hazardous, inflammable, toxic, odorous or volatile materials.
5. Wholesale storage distribution and warehousing facilities.
6. Restaurants, cafeterias, daycare and recreational facilities intended and designed primarily for the use of persons employed at the Park, or business invitees.

Section 8 - Parcel Performance and Development Standards

Subsection 8.01 - Building coverage and other requirements:

1) Maximum building coverage shall be 40% and the Floor Area Ratio shall not exceed a density of .6.

2) Minimum landscaping coverage shall be 20%.

3) Front, Rear and Side Setback Lines shall each be a minimum of 50 feet.

4) All Parcel Boundary Lines abutting common access roads shall be considered as Front Boundary Lines.

5) If a single Tenant or Owner uses two or more parcels with a common boundary line between them, the Side Setback restrictions

may be waived by the Corporation for the term of the shortest agreement.

6 Truck loading docks, doors and utility service areas shall be located at the rear of Building so that they will not be clearly visible from the common access road fronting the parcel.

Section 9 - General Provisions

Subsection 9.01 - Continuity of Performance and Development Standards

(a) It is expressly provided that the Performance and Development Standards herein set forth shall apply to all development of the Business Park.

(b) To retain flexibility and permit the adoption of new techniques, materials, criteria, procedures and the like, any of the conditions of these Performance and Development Standards may be changed from time to time by the Corporation in accordance with the provisions of Subsection 9.04.

Subsection 9.02 - Right to Contract Portions of Parcels

Corporation reserves the exclusive right, at its sole discretion, to enter into a Lease Agreement or other type of contractual relationship with any existing or prospective Tenant or Owner regarding any portion of a parcel subject to Corporation first determining that said portions and the remaining portion of said parcel may also be developed, and used in conformance with the Performance and Development Standards that were applicable to the original undivided parcel.

Subsection 9.03 - Variances

(a) The provisions of these Performance and Development Standards and any request for variance therefrom are to be interpreted, administered and enforced by the Corporation.

(b) The Tenants or Owners or prospective Tenants and Owners may request a variance from these Performance and Development Standards.

(c) Request for a variance from these Performance and Development Standards shall be made in writing to Corporation.

(d) This Subsection only applies to variances from the strict application of these Standards. A variance from the zoning

regulations of the City of Kingston may also need to be obtained from the Zoning Board of Appeals of the City.

Subsection 9.04 - Amendments and Variances - Adoption Procedures

A full statement of any proposed changes or amendment to these Performance and Development Standards, as well as any requested variances therefrom, shall be referred to the City of Kingston Planning Board and Planning Department for their review and recommendations at least thirty (30) days before any final action is taken by the Corporation in regard to such proposed amendment or variance. If the Corporation fails to receive recommendations within 30 days after such referral, the Corporation may take final action without such recommendations.

was 90 days

Notice of any meeting of the Corporation in which final action is to be taken on any amendment to or variance from these Standards shall be advertised once in a newspaper of general circulation in the City of Kingston at least seven (7) calendar days before such meeting, which notice shall state the nature of the action under consideration.

In taking final action on any proposed amendment or variance request the Corporation shall make appropriate findings which shall include the following:

a. whether an undesirable change will be produced in the character of the Business Park or adjoining neighborhood or whether a detriment to nearby properties will be created by the proposed amendment or variance, and

b. whether the proposed amendment or variance will have an adverse effect or impact on the physical or environmental conditions in the Business Park or adjoining neighborhood and zoning districts.

If the Corporation acts contrary to any written recommendations of the City of Kingston Planning Board or Planning Department, it shall set forth in its resolution the reasons for such contrary action.

Section 10 - Landscape Standards

1. Erosion Control

The developer of a parcel shall indicate the method of erosion control that will be used during construction to minimize sediment run-off from the site.

a) Temporary sedimentation basins shall be utilized to entrap sediment while allowing storm water to be detained with gradual run-off. Utilization of earth berms, hay bales, diversion swales, etc., shall be used with entrapped silt being periodically removed from the site as necessary. The developer is responsible for any material that leaves the site, which material shall be removed at his expense. Sedimentation basins shall be removed at completion of construction after lawn turf has been established.

b) Disturbed areas that shall be seeded will be seeded and mulched with hay as soon as practical to inhibit erosion. Slopes that remain unfinished for more than 45 days shall be temporarily seeded and mulched with annual rye and hay to sustain temporary vegetation cover.

2. Landscape Plan

The developer of a parcel shall prepare and submit for approval a landscape plan indicating wooded areas to remain, rock outcrops, existing large trees (12" DBH and larger) to be saved and the layout of new trees and shrubs to be planted as part of the project.

a) Provide a plant list indicating common name, botanical name, size and quantity of trees and shrubs to be planted.

b) Provide details of tree and shrub planting, staking and mulching.

3. Material

a) Manure -- well rotted, unleached, stable or cattle manure, free from harmful chemicals. Processed or hydrated manure may be used (Bovung or equal).

b) Mulch -- peat moss to be natural organic material, brown, clear, low in content of mineral and woody material. mildly acid, granulated or shredded. Silvabark to be Douglas Fir bark "standard" 1/2 inch to 1 inch in size, or equal.

c) Fertilizer -- analysis: 10-20-10 with 50% organic nitrogen.

4. Preparation

a) Prior to excavation of tree pits, shrubs or ground cover beds, or driving of stakes or placing of deadmen, the

contractor shall ascertain the locations of all underground structures and utilities, and take precautions to prevent damage to them.

b) Size of tree pits to be the plant material ball plus 24 inches in width and 6 inches deeper than the ball depth.

c) All shrub beds shall be excavated to a depth of 18 inches over entire area and ground cover beds 12 inches.

d) Apply Hubbard-Hall "Simazine" weed inhibitor (or equal) to all ground cover beds and juniper beds strictly according to manufacturer's instruction.

e) Extreme caution shall be used to prevent weed inhibitor from washing or running into seeded areas.

5. Planting

a) Normal seasons for planting shall be followed.

b) Preparations for planting may begin earlier than specified season, provided the staking of the plant locations has been completed and approved and the grounds is not in a frozen or excessively moist condition. Planting work may continue beyond the specified time if so approved by the Architect, following the Architect's directions for post-season planting.

c) Planting shall be done in approved fashion by competent and experienced plantspersons.

d) Prune plants according to practices only upon completion of the work under this contract and repair all injuries. Prune in such a manner as not to change the natural habit or shape of the plant. Coat cut branches with an approved tree paint or shellac.

e) Obstructions below ground or overhead: Where such conditions are encountered in excavation of planting areas and where the stones, boulders or other obstructions cannot be broken and removed by hand methods and where trees to be planted are found to be under overhead wires, other locations for the planting may be designated by the Architect.

f) Mix topsoil backfill for shrubs and tree pits, planting and ground cover beds with one part of peat and one part of manure to five parts of topsoil and with three points 10-20-10

commercial fertilizer per cubic yard or as recommended by the soil analysis.

g) Setting Plants: Plant to such depth that the finished grade level at the plant after settlement will be the same as that at which the plant was grown. When the pit is nearly filled with topsoil mixture, add water as necessary and allow it to soak away. Fill the hold to finished grade and form a shallow saucer around each plant. All plants shall be thoroughly puddled and tamped in an approved manner on completing planting.

6. Staking and Wrapping

a) Support trees immediately after replanting. Staking and wrapping shall be by approved methods or as directed by the Architect.

b) The trunks of all trees shall be staked with two 8 foot cedar stakes equally spaced about the tree, set vertically and securely fastened. Trees to be guyed with two strands of wire per stake, which shall run through rubber hose at the tree and be twisted tight.

c) Friction guards for wire shall be 2 ply fabric bearing rubber hose, not less than 1 inch in diameter or equal. Wrapping materials shall be first quality 6 inch burlap at least 8 ounce in weight and waterproof Sisal-Kraft paper, or equal, 4 inch in width or suitable strength.

d) Guy wire shall be pliable #10 gauge, galvanized, annealed steel wires.

7. Care of Finished Areas

Finished planting areas shall be cultivated, raked and kept in an orderly condition. Cover tightly all pits and beds with a layer of peat moss 2 inches deep and mix thoroughly in the upper 3 inches of soil, prior to placing Silvabark mulch.

8. Maintenance and Acceptance

Maintenance shall begin immediately after each plant is planted and continue until final acceptance. Maintenance includes watering, weeding, cultivating, spraying, tightening and repairing of guys and stakes, removal of dead materials, pruning, resetting plants to proper grades in upright

position, restoration of the plant saucer, and other necessary operations.

Protect lawn areas during and after planing, any damage resulting from planting operations shall be repaired promptly at the Contractor's expense.

9. Guarantee

Plants shall be guaranteed for a maximum of one year, and shall be alive and in satisfactory growth at the end of the guarantee period. Dead plants at the end of the guarantee period shall be replaced. Species and size shall be equal to the original planting.

10. Recommended Plant Species and Size

a) Plant material shall consist of mixture of evergreen and deciduous trees and shrubs to enhance the building setting. A mixture of shade trees, pine, hemlock and/or spruce is encouraged in setback areas to create a naturalized stand of woods rather than a formal line of trees or hedgerow. Steep areas shall be covered with ground cover where mowing is impractical.

b) Shrubs shall be a minimum size of 2'-2 1/2' with spreading type varieties. Evergreen trees shall be a minimum height of 8'-10'. Ornamental trees shall be a minimum height of 8'-9'. Deciduous shade trees shall be a minimum size of 3"-3 1/2" cal.

c) Ground cover beds shall be treated with approved weed inhibitor.

d) Shade trees shall have lower branches removed at a height of no less than 10' or no greater than 12'.

e) the following plant varieties are recommended with other varieties subject to review based on location, habit of growth and hardiness.

Shrubs - Evergreen

a) Yew in variety
b) Hetzi & Pfitzers juniper
c) Andora, Sargent & Bar Harbor juniper
d) Hybrid Rhododendron in variety (not red)

e) Caroline Rhododendron
f) Rosebay Rhododendron
g) Holly (Ilex crenata varieties)
h) Mountain Laurel
i) Leucothoe
j) Japanese Andromeda
k) Azalea in variety (not red)
l) Glossy Abelia

Shrubs - Deciduous

a) Lilac
b) Forsythia
c) Mockorange
d) Spirea in variety
e) Cotoneaster in variety
f) Red stem and Yellow twig dogwood
g) Euonymus
h) Viburnum in variety
i) Firethorn
j) Conelian Cherry
k) Regal Privet

Ornamental Trees

a) European White Birch
b) Crabapple in variety
c) Washington Hawthorn
d) Dogwood, Pink and White
e) Japanese Dogwood
f) Amur maple
g) Shadblow
h) Saucer Magnolia
i) Flowering cherry in variety

Shade Trees - Deciduous

a) Sugar Maple
b) Red Maple
c) Schwedler Maple
d) Red Oak
e) Pin Oak
f) Thornless Locust in variety
g) European Beech
h) London Plane
i) Sweetgum

j) Linden in variety

Trees - Evergreen

a) White Pine
b) Austrian Pine
c) White Spruce
d) Norway Spruce
e) Blue Spruce
f) Eastern Hemlock
g) Douglas Fir

Ground Cover

a) Pachysandra
b) Purple leaf winter creeper
c) Myrtle
d) Baltic Ivy
e) Hall's honeysuckle

THESE PERFORMANCE AND DEVELOPMENT STANDARDS WERE ADOPTED BY THE CITY OF KINGSTON LOCAL DEVELOPMENT CORPORATION BY RESOLUTION DATED _____, 1996.

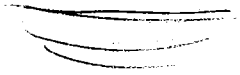


EXHIBIT E

SITE WORK SPECIFICATIONS

APPLICABLE PORTIONS OF SITE WORK SPECIFICATIONS

SECTION 02110 - SITE CLEARING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY:

A. This Section includes the following:

1. Protection of existing trees.
2. Removal of trees and other vegetation.
3. Topsoil stripping.
4. Clearing and grubbing.
5. Removing above-grade improvements.
6. Removing below-grade improvements.
7. Saw-cutting.

1.03 PROJECT CONDITIONS:

A. Traffic: Conduct site clearing operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks or other occupied or used facilities without permission from authorities having jurisdiction.

B. Protection of Existing Improvements: Provide protection necessary to prevent damage to existing improvements indicated to remain in place.

Protect improvements on adjoining properties and on Owner's property.

C. Restore damaged improvements to their original condition, as acceptable to property owners.

D. Protection of Existing Trees and Vegetation: Protect existing trees and other vegetation indicated to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning or bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line. Provide temporary guards to protect trees and vegetation to be left standing.

E. Water trees and other vegetation to remain within limits of contract work as required to maintain their health during course of construction operations.

F. Provide protection for roots over 1-1/2 inch diameter that are cut during construction operations. Coat cut faces with an emulsified asphalt, or other acceptable coating, formulated for use on damaged plant tissues. Temporarily cover exposed roots with wet burlap to prevent roots from drying out; cover with earth as soon as possible.

G. Repair or replace trees and vegetation indicated to remain which are damaged by construction operations, in a manner acceptable to the Engineer. Employ a licensed arborist to repair damages to trees and shrubs.

H. Replace trees which cannot be repaired and restored to full-growth status, as determined by arborist.

I. Improvements on Adjoining Property: Authority for performing removal and alteration work on property adjoining Owner's property will be obtained by Owner prior to award of contract.

J. Extent of work on adjacent property is indicated on Drawings.

K. Saw-cutting: Saw-cut existing pavement as indicated on the drawings.

PART 2 - PRODUCTS (Not applicable).

PART 3 - EXECUTION

3.01 SITE CLEARING:

A. General: Remove trees, shrubs, grass and other vegetation, improvements, or obstructions as required to permit installation of new construction. Remove similar items elsewhere on site or premises as specifically indicated. "Removal" includes digging out and off-site disposing of stumps and roots.

B. Cut minor roots and branches of trees indicated to remain in a clean and careful manner, where such roots and branches obstruct installation of new construction.

C. Topsoil: Topsoil is defined as friable clay loam surface soil found in a depth of not less than 4 inches. Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones, and other objects over 2 inches in diameter, and without weeds, roots, and other objectionable material.

D. Strip topsoil to whatever depths encountered in a manner to prevent intermingling with underlying subsoil or other objectionable material.

Remove heavy growths of grass from areas before stripping.

Where existing trees are indicated to remain, leave existing topsoil in place within drip lines to prevent damage to root system.

E. Stockpile topsoil in storage piles in areas indicated or directed. Construct storage piles to provide free drainage of surface water. Cover storage piles, if required, to prevent wind erosion.

F. Clearing and Grubbing: Clear site of trees, shrubs and other vegetation, except for those indicated to be left standing.

1. Completely remove stumps, roots, and other debris protruding through ground surface.

2. Chipping. Wood may be reduced to chips by the use of an approved chipping machine or stump grinder. Chips shall be 1/2 inch maximum thickness or of other approved thicknesses. Chips resulting therefrom may be disposed of by being stockpiled and used as mulch for planting, by distribution on the ground surface in wooded areas within the right-of-way as approved by the Engineer, or by disposal at a location off the contract site satisfactory to the Engineer.

3. Salvage of Marketable Timber. In the interest of conservation, the Contractor shall make every effort possible to salvage marketable timber produced as a result of clearing operations, provided the amount of timber is great enough to make the hauling practical. In general, marketable timber is construed to mean logs 8' to 16' in length, plus appropriate trimming allowance, having a diameter inside the bark, at the small end, approximately 10".

In the event that the Contractor is not successful in salvaging marketable timer, he shall advise the Engineer, in writing, of his efforts to salvage and indicate the reason why the timber could not be salvaged.

Any wood that is cut up in firewood lengths or other marketable lengths may be neatly piled adjacent to the right-of-way in an area provided by the contractor for periods in excess of one week but shall be removed prior to

completion of the contract.

4. Use only hand methods for grubbing inside drip line of trees indicated to remain.

5. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.

   Place fill material in horizontal layers not exceeding 6 inched loose depth, and thoroughly compact to a density equal to adjacent original ground.

G. Erosion Control Devices are to be installed after clearing and grubbing, but prior to excavation work. Sediment trap, silt fence and hay bales shall be installed as shown on the drawings or as directed by the Engineer. Devices shall be maintained for duration of the work and removed at the completion of the work.

H. Removal of Improvements: Remove existing above-grade and below-grade improvements as indicated and as necessary to facilitate new construction.

1. Abandonment or removal of certain underground pipe. Removal of abandoned underground piping or conduit interfering with construction is included under this Section.

3.02 DISPOSAL OF WASTE MATERIALS

A. Burning on Owner's Property: Burning is not permitted.

B. Chipping. Non-marketable wood products may be chipped and used for mulch or disposed of off-site.

C. Marketable Timber: Trees shall be cut and all marketable timber salvaged as per Section 3.01, F, 3.

D. Removal from Owner's Property: Remove combustible and non-combustible waste materials and unsuitable topsoil from Owner's property.

END OF SECTION 02110

SECTION 02150 - SHORING AND BRACING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK:

A. Extent of shoring and bracing work includes, but is not limited to, the following:

1. Shoring and bracing necessary to protect existing buildings, streets, walkways, utilities, and other improvements and excavation against loss of ground or caving embankments.

2. Maintenance of shoring and bracing.

3. Removal of bracing, as required.

B. Types of shoring and bracing system includes, but is not limited to, the following:

1. Shoring and Bracing

1.03 QUALITY ASSURANCE:

A. Supervision: Engage and assign supervision of shoring and bracing work to a qualified foundation consultant.

B. Regulation: Comply with local codes and ordinances of governing authorities having jurisdiction.

1.04 SUBMITTALS:

A. Layout Drawings: Provide layout drawings for shoring and bracing system and other data prepared and sealed by a registered Professional Engineer licensed in the State of the project. System design and calculations must be acceptable to local authorities having jurisdiction.

1.05 JOB CONDITIONS:

A. Before starting work, check and verify governing dimensions and elevations. Survey condition of adjoining properties. Take photographs, to record any prior settlement or cracking of structures, pavements, and other improvements. Prepare a list of such damages, verified by dated photographs, and signed by Contractor and Engineer and others conducting the investigation.

B. Survey adjacent structures and improvements, establishing exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations. Locate datum level used to establish benchmark elevations sufficiently distant so as not to be affected by movement resulting from excavation operations.

C. During excavation, resurvey benchmarks weekly, employing a licensed Land Surveyor or registered Professional Engineer, licensed in the State of the project. Maintain accurate log of surveyed elevations for comparison with original elevations. Promptly notify Engineer if changes in elevations occur or if cracks, sags or other damage is evident.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. General: Provide suitable shoring and bracing materials which will support loads imposed. Materials need not be new, but should be in serviceable condition.

1. If wood is part of shoring system near existing structures, use pressure preservative treated materials or remove before placement of backfill.

PART 3 - EXECUTION

3.01 SHORING:

A. Whenever shoring is required, locate the systems to clear permanent construction and to permit forming and finishing of concrete surfaces. Provide shoring system adequately anchored and braced to resist earth and hydrostatic pressures.

B. Shoring systems retaining earth on which the support or stability of existing structures is dependent must be left in place at completion of work.

3.02 BRACING:

A. Locate bracing to clear columns, floor framing construction and other permanent work. If necessary to move a brace, install new bracing prior to removal of original brace.

B. Do not place bracing where it will be cast into or included in permanent concrete work, except as otherwise acceptable to Engineer.

C. Install internal bracing, if required, to prevent spreading or distortion to braced frames.

D. Maintain bracing until structural elements are rebraced by other bracing or until permanent floor construction is able to withstand lateral earth and hydrostatic pressures.

E. Remove sheeting, shoring and bracing in stages to avoid disturbance to underlying soils and damage to structures, pavements, facilities, and utilities.

F. Repair or replace, as acceptable to Engineer, adjacent work damaged or displaced through the installation or removal of shoring and bracing work.

END OF SECTION 02150

SECTION 02200 - EARTHWORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and general provisions of contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to this Section.

1.02 SUMMARY:

A. This Section includes the following:

1. Preparing of subgrade for roadways, parking areas and building pads including excavation, embankment and compaction.

2. Processing subbase material for access road and building pad.

3. Excavation, backfill and compaction for storm drainage system.

3. Blasting permit.

5. Soil Boring Data.

1.03 DEFINITIONS:

A. Unclassified Excavation: Unclassified excavation shall consist of the excavation and disposal of all materials, of any description, encountered in the course of construction, unless otherwise specified in the contract.

B. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Engineer. Unauthorized excavation, as well as remedial work directed by Engineer shall be at Contractor's expense.

Backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Engineer.

C. Additional Excavation: When excavation has reached required subgrade elevations, notify Engineer, who will make an inspection of conditions. If Engineer determines that bearing materials at required subgrade elevations are unsuitable, continue excavation until suitable bearing materials are encountered and replace excavated material as directed by Engineer. The Contract Sum may be adjusted by an

appropriate Contract Modification.

Removal of unsuitable material and its replacement as directed will be paid on basis of conditions of the Contract relative to changes in work.

D. Embankment. The embankment is defined as the portion of a fill section situated between the embankment foundation and the subgrade surface, excluding any material placed under another section of these specifications.

E. Embankment Foundation. The embankment foundation is defined as the surface upon which an embankment is constructed after all clearing and grubbing and the removal of all structures and obstructions has been completed.

F. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, crushed slag, and natural or crushed sand.

G. Subgrade Surface. The subgrade surface is defined as the surface of the road section upon which the subbase is placed.

H. Subgrade Area. The subgrade area is defined as that portion of an embankment situated above either of the following, but excluding any material placed under another section of these specifications.

a. A line located two feet below the subgrade surface and extended to the intersection with the embankment side slopes, or

b. The embankment foundation, whichever is higher.

The material and compaction requirements for the subgrade area in embankments are found in Part 2, 2.01 and 3.03 of this section respectively.

In cut sections, the subgrade area is not defined except where undercut and backfill with a select material item is specified or ordered; in such cases, the payment lines for undercut work shall define the subgrade area.

I. Embankment Side Slope Area. The embankment side slope areas shall be defined as those cross-sectional areas of an embankment situated outside of lines projected downward and outward on a one on one slope from the edges of the subgrade surface to their intersection with the embankment foundation, but excluding any portion lying within a subgrade area.

J. Blast Rock Fill. A material which is a well graded blasted rock meeting a certain gradation and which shall be found in Part 2, 2.01 of this section.

K. Suitable Material. A material whose composition is satisfactory for use in embankment construction is designated as a suitable material. The moisture content has no bearing upon such designation. In general, any material (inorganic) soil,

blasted or broken rock and similar materials of natural or man made origin, including mixtures thereof, are considered as suitable materials. Determination of whether a specific material is a suitable material shall be made by the Engineer on the above basis.

L. Unsuitable Materials. Any material containing vegetable or organic matter, such as muck, peat, organic silt, topsoil or sod, that is not satisfactory for use in embankment construction under previous sections is designated as an unsuitable material. Certain man made deposits of industrial waste, sludge or landfill may also be determined to be unsuitable materials.

M. Borrow. Borrow is defined as material required for earthwork construction in excess of the quantity of suitable material available from the required grading, cuts and excavations. Borrow may be necessary even though not shown on the plans.

N. Proof Rolling. Proof rolling shall consist of applying test loads over the subgrade surface by means of 50-ton pneumatic-tired roller of specified design, to locate and permit timely correction of deficiencies likely to adversely affect performance of the pavement structure.

O. Graded Surfaces. The Contractor shall form and trim all graded surfaces to the lines and grades shown on the plans or as modified by the Engineer.

P. Select Granular Fill - Slope Protection. This work shall consist of excavating for, furnishing, and installing granular fill slope protection in accordance with these specifications, in reasonably close conformity to the lines and grades shown on the plans, or where directed by the Engineer.

Q. Applying Water. Under this work, the Contractor shall furnish and apply water for dust control, for compaction purposes and for such other purposes (not provided for in other Sections) as called for on the plans, in these specifications or as directed by the Engineer.

1.04 SUBMITTALS:

A. Test Reports: Submit the following reports directly to the Engineer from the testing services, with copy to Contractor (Contractor to pay for tests and reports):

1. Test reports on borrow material.

2. Field reports; inplace soil density tests.

3. One optimum moisture-maximum density curve for each type of soil encountered.

4. Report of actual unconfined compressive strength and/or results of bearing

tests of each strata tested.

1.05 QUALITY ASSURANCE:

A. Codes and Standards: Perform excavation work in compliance with applicable requirements of authorities having jurisdiction.

B. Testing and Inspection Services: Contractor shall employ and pay for a qualified independent geotechnical testing laboratory to perform soil testing and inspection service during earthwork operations.

C. Testing Laboratory Qualifications: To qualify for acceptance, the geotechnical testing laboratory must demonstrate to the Engineer's satisfaction, based on evaluation of laboratory-submitted criteria conforming to ASTM E 699, that is has the experience and capability to conduct required field and laboratory geo-technical testing without delaying the progress of the work.

1.06 PROJECT CONDITIONS:

A. Site Information: Test boring and test pit operations were performed by the Owner. Boring and test pit logs are included at the end of this section. Data in subsurface investigation reports was used for the basis of the design and are provided to the Contractor for information only. Conditions are not intended as representations or warranties of accuracy or continuity between soil borings. The Owner will not be responsible for interpretations or conclusions drawn from this data by Contractor. Additional test borings and other exploratory operations may be performed by Contractor, at the Contractor's option; however, no change in the Contract Sum will be authorized for such additional exploration.

B. Existing Utilities: Locate existing underground utilities in areas of excavation work. If utilities are indicated to remain in place, provide adequate means of support and protection during earthwork operations.

Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility Owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner. No extra payment will be made for this work; this work shall be included in Item No. 2 - Site Preparation.

Do not interrupt existing utilities serving facilities occupied by Owner or others, during occupied hours, except when permitted in writing by Engineer and then only after acceptable temporary utility services have been provided.

Provide minimum of 48-hour notice to Engineer, and receive written notice to proceed before interrupting any utility.

Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shutoff of services if lines are active.

C. Use of Explosives:

1. General. The Contractor shall perform all work in the contract in a workmanlike manner with due regard to the safety and health of the employees and of the public.

   The Contractor shall comply with Title 29 Code of Federal Regulations Part 1926, Safety and Health Regulations for Construction (OSHA) regarding the safety and protection of persons employed in construction and demolition work.

2. Drilling and Blasting. A project meeting relative to the method, manner and procedure of blasting operations shall be held at the site with the Engineer, the Contractor, the project blaster and representatives of all interested agencies, prior to the commencement of drilling and blasting operations.

   The Blasting Contractor will discuss maximum explosive charge per delay, dirll hole diameter, sequenced delays and, if necessary, the decking of individual holes; he will utilize these controls to minimize blast induced vibrations. The Contractor's drilling and blasting methods must be approved prior to the commencement of drilling and blasting operations.

   Prior to the commencement of drilling and blasting the Contractor will conduct a pre-blast survey.

   Whenever explosives are used, they shall be of such character and strength and in such amounts as is permitted by the State and local laws and ordinances and all respective agencies having jurisdiction over them. In special cases the right is reserved for the Engineer and those agencies to specify the maximum size of the charges.

   Blasting shall be done only at such time as the Engineer and those agencies shall approve and under such restrictions as they may impose.

   The blasting contractor will provide vibration monitoring devices and field monitoring to insure that blasting meets project criteria.

   The Contractor shall employ only experienced supervisors and workmen in the handling, loading and firing of the explosives. The Contractor's attention is directed to the requirements of Industrial Code Rule 39 of the State of New York, Department of Labor, Board of Standards and Appeals, and the applicable Sections of the Labor Law which, together with the conditions

indicated herein shall provide for the possession, handling, storage and transportation of all explosives used at the site.

The Blasting Contractor shall drill and blast along the access road at a width of 46" to a depth of six (6) feet below finish grade to allow for the installation of utilities under a future contract.

3. Explosives in Demolition. Demolition work shall not be performed by the use of explosives unless approved by the Engineer.

4. Excavation or Blasting Near Combustible Gas Pipes.

   a. No person shall discharge explosives in the ground, nor shall any person other than a state, county, city, town or village employee regularly engaged in the maintenance and repair thereof excavate in any existing street, highway or public place, unless notice thereof in writing shall have been given at least seventy-two hours in advance to the person, corporation or municipality engaged in the distribution of gas, electricity, steam or water, or the provision of telephone or telegraph service in such territory. The person having direction or control of such work shall give notice and further he shall ascertain whether there is within one hundred feet in such street, highway or public place, or in the case of a proposed discharge of explosives, within a radius of two hundred feet of such discharge, any pipe or any other person, corporation or municipality conveying combustible gas, and if there be any such pipe he shall also give such notice to any such other person, corporation or municipality. Provided, however, that in any emergency involving danger to life, health or property it shall be lawful to excavate without using explosives if the notices prescribed herein are given as soon as reasonably possible, and to discharge explosives to protect a person or persons from an immediate and substantial danger of death or serious personal injury if such notices are given before any such discharge is undertaken. Any such work shall be performed in such a manner as to avoid damage to any utility facilities.

   b. If in the course of any such excavation, blasting or other work, damage or the potential thereof is occasioned to any utility facility used in the transmission or distribution of gas, electricity, water, steam, telephone, or telegraph, whether by direct contact, undermining of soil or other support thereof, or otherwise, the person having direction or control of such work shall promptly take all reasonable measures necessary to protect individuals and the public from loss or the potential thereof and shall immediately notify the person, corporation or municipality owning or operating such utility of such damage or potential damage to its facilities. Neglect on the part of the person having direction or control of such works, responsible for any damage or potential damage

to such facilities (a) to take such safety precautionary measures as are necessary or reasonably required promptly or (b) to immediately notify the Owner or operator of the utility facility involved or damage or potential damage to its facilities, occasioned by such person or under his direction or control, shall be a violation of this section and constitute a misdemeanor. Nothing herein contained shall preclude or prevent recovery of monetary damages by the Owner or operator of the utility facility involved or by any other person suffering damages from the disruption of utility services occasioned by excavation, blasting or other work in the vicinity thereof.

5. City of Kingston Application for Blasting (Excavation) Permit. The Contractor and/or his licensed blaster will apply for a Blasting Permit from the City of Kingston Building Inspector. A copy of this permit is included at the end of this Section.

D. Protection of Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights.

Operate warning lights as recommended by authorities having jurisdiction.

Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

Perform excavation by hand within dripline of large trees to remain. Protect root systems from damage or dryout to the greatest extent possible. Maintain moist condition for root system and cover exposed roots with moistened burlap.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Tests and Control Methods. Materials, tests and control methods pertaining to the item requirements and work of this Section will be performed in conformance with the procedures contained in appropriate NYSDOT publications in effect on the date of the advertisement for bids. These publications are available upon request to the Regional Director or the Director, Soil Mechanics Bureau.

B. Select Materials and Subgrade Area Material Requirements. The requirements for select materials and subgrade area materials are described below. The procedure for acceptance or rejection of these materials shall be as described in the appropriate Soil Control Procedure (SCP) manual.

1. Subgrade Area Material. Subgrade area material shall consist of blast rock

material having no particles greater than ten (10) inches in maximum dimension and meeting the following:

a. Blast Rock Fill shall be well-graded blasted rock and/or soil mixture meeting the gradation provided below. Well-graded means that at least twenty-five (25%) is less than 6 inches (6") in size, and at least ten percent (10%) is less than three quarter (3/4") in size. The Contractor shall vary drilling, blasting, and excavation procedures as needed and/or the mixing proportions with granular on-site soil sources in order to meet these gradation requirements. Drilling, blasting, and excavation procedure shall include, but are not limited to, drill pattern spacing powder factors, explosive type and packaging, hoe-ramming, and sequence of excavation/blasting. Mixing procedures shall include, but are not limited to, mixing proportions, and methods and equipment used to mix and spread the materials.

Blast rock fill is to be placed within 12 inches (12") of subgrade levels in roadway areas, of slab subgrade in building floor slab areas, and of bottom of foundations.

Blast Rock Fill shall be hard durable blasted rock and on-site sand, gravel, and silt mixed as necessary. It shall be free from ice, snow, trash, debris, stumps, roots and organic materials and shall conform to the following gradation requirements:

Sieve Size	Percent Finer by Weight
10 - inch	100
6 - inch	25 - 100
3/4 - inch	10 - 75
No. 200	0 - 15

2. Select Borrow and Select Fill.

a. Gradation. Material furnished for these items shall have not particles greater than 24 inches in maximum dimension. Of the portion passing the 4 inch square sieve, the material shall have the following gradation:

Sieve Size	Percent Passing By Weight
No. 40	0 to 70
No. 200	0 to 15

b. Soundness. The material shall be sound and durable. When the Owner elects to test for the soundness requirement, a material with a Magnesium Sulfate Soundness Loss exceeding 35 percent will be

rejected.

3. Subbase Material. Material for use under this item shall be Subbase Course Type 2, shall meet the following gradation and shall be the result of the crushing of on-site excavated rock.

a. Gradation.

Type	Sieve Size Designation	Percent Passing By Weight
2	2 inch	100
	1/4 inch	25 - 60
	No. 40	5 - 40
	No. 200	0 - 10

4. Select Granular Fill - Slope Protection. Material furnished for use under this item shall consist of rock, stone, slag, cobbles, or gravel substantially free of shale or other soft, poor durability particles.

a. Gradation

1. Broken or blasted unweathered rock used for this item shall be well graded, having no particles greater than 24 inches in maximum dimension, and substantially free from particles greater than 12 inches in maximum dimension, containing little or no material passing the No. 10 mesh sieve.

2. All materials, other than or blasted unweathered rock, shall meet the following gradation requirements:

Material Size	Percent Passing by Weight
24 Inch Max. Dimension	100
6 Inch Max. Dimension	90 to 100
2 Inch Square Sieve	0 to 30
1/4 Inch Sieve	0 to 10

b. Soundness Where the Engineer elects to test for this requirement, a material with a Magnesium Sulfate Soundness Loss exceeding 35 percent will be rejected.

C. Water. Water used for dust control or compaction purposes may be obtained from any source. When used for watering seeded or sodded areas, or surfaces to be seeded or sodded, water shall be free from oil, have a pH not less than 6.0 nor greater than 8.0 and shall be free from impurities injurious to vegetation.

PART 3 - EXECUTION

3.01 CONSTRUCTION DETAILS

A. General. The Contractor shall remove all soil, rock, and other material, and utilize or dispose of these materials as required by the plans and specifications. All excavation and embankment work shall be executed to payment lines shown on the plans, except where directed by the Engineer, in writing, prior to performing the work. Attention is directed to the provisions of Section 107, Legal Relations and Responsibility to Public, regarding Contractor responsibilities in performing the work of this section.

All graded earth surfaces outside the roadway limits shall be smoothed and trimmed in reasonably close conformity (plus or minus 6 inches) of true grade. After trimming, the area shall be left in a compact and satisfactory condition, free of large stones or other objectionable materials.

Earthwork construction operations requiring compaction shall not be performed from November 1 through April 1 except with written permission of, and under such special conditions and restrictions as may be imposed by the Engineer.

B. Archaeological Salvage. Whenever, during the course of construction, historical objects are encountered, such objects shall not be destroyed or moved. Work shall be stopped and rescheduled to avoid disturbing such areas and the Engineer of the project shall be notified immediately.

The Engineer will, through the proper channels, notify the Owner, who will arrange to have an immediate inspection of the site made by the State Historic Preservation Office (SHPO).

In the event that the objects are to be removed or salvaged, agreements between the Owner and the Contractor will be made to cover the cost of any extra work. Such work will be limited to that performed within the right-of-way, and at any location under direct control of the Contractor used as a source of approved borrow material.

C. Scheduling of Work to Minimize Soil Erosion and Water Pollution. The Contractor shall prepare and submit to the Engineer for approval, schedules for all excavation, stripping, embankment, fill and grading operations connected with the project in or outside of the project limits. Schedules shall be prepared to: 1) sequence the work in such a manner that the exposed unprotected surface area of any earth material that is subject to erosion by wind or water will not exceed a total of 750,000 square feet at any given time without prior approval by the Engineer, and: 2) to perform permanent erosion control work at the earliest possible time during the course of construction at all locations. Such schedules shall include the following temporary and permanent erosion control measures: Soil Erosion, Water and Air Pollution Abatement, and Placing Erosion Control Devices. Earthwork shall not be started

at a given location until the method and sequencing of all operations are approved by the Engineer.

D. Drainage and Grading. The Contractor shall provide and maintain slopes, crowns and ditches on all excavation and embankments to insure satisfactory surface drainage at all times. Ditches and other drainage facilities necessary to remove ponded water shall be constructed as soon as practical to have the work area dry during the progression of work. All existing culverts and drainage system shall be maintained in satisfactory operating condition throughout the course of the work. If it is necessary to interrupt existing surface drainage, sewers or under-drainage, then temporary drainage facilities shall be provided until the permanent drainage work is complete. Top-of-slope interceptor ditches, where shown on the plans, shall be completed before adjacent excavation operations are begun. In earth cuts, the Contractor shall progress his excavation operations in such a manner that the portion of the cut immediately adjacent to the design slope is at least five feet lower than the general level of the cut at all times until the lower payment line is reached.

Where seepage causes instability of cutslopes, excavation and backfill or other corrective measures shall be performed as ordered by the Engineer and paid for under the appropriate item. Excavation for the installation of slope protection may be necessary at any time and location throughout the duration of the contract and may not necessarily coincide with the Contractor's performance of the general excavation work.

3.02 EXCAVATION:

A. Excavation Classifications: All excavated materials shall be classified as "Unclassified" Excavation.

B. Presplitting and Fragmentation Blasting

Attention is directed to NYSDOT Standard Specifications Section 107-05, Safety and Health Requirements, concerning rock drilling and blasting work.

Presplitting is required where the design rock slope is one vertical on one horizontal or steeper and the vertical height of the exposed rock slope exceeds five feet. Ripping will not be allowed within ten feet of a slope that requires presplitting. Test sections will be required at the outset of presplit drilling and blasting operations for the evaluation of the presplit rock slopes by the Engineer. The Contractor will be required to completely expose the presplit rock face in the test section for evaluation prior to any further presplit drilling.

A test section for the presplit section will be required. This will be 15 to 20 holes of presplit drilling on one end of the cut. The test area will be thoroughly cleaned to view the blasted slope. The test section must be approved by the Resident Engineer before presplit drilling can continue.

All rock slopes shall be thoroughly scaled to the satisfaction of the Engineer. For rock excavations involving multiple lifts, scaling of upper lifts shall be completed prior to drilling and fragmenting of lower lifts. Scaled rock slopes shall be stable and free from possible hazards of falling rocks or rock slides that endanger public safety. If, after proper scaling, such conditions still exist, a determination of the cause will be made by an Engineer and it is determined that the conditions are the result of poor workmanship or improper methods employed by the Contractor, the Contractor shall provide approved remedial treatment, at no expense to the Owner. Such treatment may include, but is not necessarily limited to, laying back the slope, rock bolting, or shotcreting. In no case shall the subgrade be trimmed prior to the completion of the scaling operation at any location.

1. Presplitting. Prior to drilling presplitting holes, the overburden shall be removed to a depth of 6-8" above the rock surface along the presplitting line. The methods of collaring the holes the achieve proper inclination and alignment shall be approved by the Engineer.

   The presplitting holes shall be a maximum of four inches in diameter , spaced not more than three feet center to center along the slope, and drilled at the designed slope inclination for a maximum slope distance of 60 feet. When excavation operations are conducted in multiple lifts, the presplitting holes for successive lifts may be offset a distance of not more than three feet for a design slope of one vertical on one horizontal and not more than one foot for slopes of steeper design; however, a presplitting hole shall not be started inside the payment line. If presplitting is conducted in lifts, each lift shall be approximately equal depth. All presplitting holes shall be checked and cleared of obstructions immediately prior to loading any holes in a round. All presplitting holes shall be loaded with a continuous column charge manufactured especially for presplitting which contains not more than 0.35 pounds of explosive per foot. The top of the charge shall be located not more than three feet below the top of the rock. A bottom charge of not more than three pounds of packaged explosives may be used; however, no portion of any bottom charge shall be placed against a proposed finished slope. Each presplitting hole shall be filled with No. 1A crushed stone stemming meeting the gradation requirements of NYSDOT Specification 703-02, Coarse Aggregates. The presplitting charges shall be fired with detonating cord extending the full depth of each hole and attached to a trunk line at the surface. Detonation of the trunk line shall be with electric blasting cap(s) and shall precede the detonation of fragmentation charges within the section by a minimum of 25 milliseconds. Presplitting shall extend for a minimum distance equal to the burden plus three feet beyond the limits of fragmentation blasting within the section.

2. Fragmentation Blasting: Fragmentation holes, or portions thereof, shall not be drilled closer than four feet to the proposed finished slopes. Where presplitting is required, fragmentation holes adjacent to the presplitting holes

shall be drilled parallel to the presplitting holes for the full depth of the production lift at a spacing not exceeding the spacing of the production pattern. Only packaged explosives shall be used ten feet or less from a design slope which requires presplitting regardless of the construction sequence.

Fragmentation charges shall be detonated by properly sequencing millisecond delay electric blasting caps.

C. Suitable Materials. Moisture content has no bearing on the suitability of material to be used for embankment construction, however, the moisture content of a material may be such that its use will require extensive manipulation. It is the Contractor's responsibility to determine the economics of using, or stockpiling and replacing, such materials.

When a contract includes the Item "Unclassified Excavation" all excavated suitable materials shall be utilized for embankment construction unless a surplus exists; all surplus material shall be processed into subbase material or stockpiled as directed by the Engineer. Non-surplus excavated materials may, with permission of the Engineer, be used for items or purposes other than embankment construction, if the Contractor furnishes, at no additional cost to the Owner, a quantity of suitable material having a compacted volume equal to that which the excavated material would have occupied in the embankment.

D. Unsuitable Materials. All excavated unsuitable materials shall be disposed of as surplus materials under the provisions of 3.02, H.

E. Disposal of Surplus Excavated Materials. Only unsuitable materials shall be considered as surplus.

When the Contractor has surplus materials that he wishes to dispose of within the right-of-way, the Engineer will, whenever possible, allow the material to be used to flatten embankment side slopes, or if this is not possible, allow deposition in other locations within the right-of-way as designated and approved by the Engineer. Where complete disposal of surplus materials cannot be accommodated within the right-of-way, the excess shall be disposed of on-site as directed by the Engineer. All disposal within the right-of-way shall be subject to the Engineer's approval of final condition and appearance, but is not subject to the provisions governing lift placement and compaction of embankment.

F. Embankment and Foundation. After completion of the work required in Clearing and Grubbing, and Removal of Structures and Obstructions, the embankment foundation shall be prepared. Sod and topsoil shall be removed where the final pavement grade is 6 feet or less above the existing ground surface and in other areas designated in the plans or by the Engineer. Prior to embankment construction and subbase course placement, the surface on which the embankment and/or subbase is to be placed shall be thoroughly compacted to the satisfaction of the Engineer. Unsuitable materials other than sod and topsoil shall be removed to the depths

shown in the plans or as directed by the Engineer. Underwater areas shall be filled with approved fill, to two feet above the water surface at the time of placement.

Where embankments are to be constructed over ground that will not adequately support embankment construction equipment, an initial layer of fill may be allowed to form a working platform. The need, manner of construction, and thickness of such a layer shall be subject to approval of the Engineer, and the layer will be permitted only where the lack of support is, as determined by the Engineer, not due to deficient ditching, grading or drainage practices or where the embankment could be constructed in the approved manner by the use of different equipment or procedures. Thicknesses of up to 3 feet may be permitted for such a layer.

In locations where embankments are to be constructed on hillsides or against existing embankments with slopes steeper than 1 (vertical) on 3 (horizontal), the slopes shall be benched. the benches shall be constructed as shown on the NYSDOT Standard Sheet, "Earthwork Transition and Benching Details."

Where old pavement is encountered within 2 feet of the top of the subbase course, it shall be thoroughly broken up or scarified.

G. Embankments. The embankment shall be constructed of suitable material as defined by 1.03, K, Suitable Material. Embankment material shall not be placed on frozen earth, nor shall frozen soils be placed in any embankments. Embankment material shall be placed and spread in lifts (layers) of uniform thickness, then uniformly compacted. During embankment construction operations, earth moving equipment shall be routed as evenly as possible over the entire width of embankments. At the close of each day's work, the working surface shall be crowned, shaped and rolled with smooth steel wheel or pneumatic tired rollers, for proper drainage.

Particles with a dimension in excess of two-thirds of the loose lift thickness are designated as oversized particles. Oversized particles shall be removed prior to compaction of the lift and may be placed in the Embankment Side Slope Area. Embankments constructed from rock products shall be spread by bladed equipment on each lift to minimize the formation of large voids as the work progresses. The top lift of a rock fill shall be thoroughly chinked.

Damage to any compacted lift at any time during the course of construction, such as rutting under the loads imposed by earth moving equipment, shall be fully repaired by the Contractor at his own expense prior to placement of any overlying materials.

It is intended that all suitable excavated material (earth, mass rock and trench rock) will be used in embankment areas or if surplus will be processed or stockpiled as directed by the Engineer.

H. Subgrade Area. Where a subgrade area is defined in an embankment by subsection 1.03 H, Subgrade Area, the material placed shall conform to Subsection 2.01, B,

Subgrade Area Material, placed and compacted in conformance with the Subsection 3.03. Where longitudinal and transverse changes from cut to fill are encountered in the work, a subgrade transition section shall be provided in conformance with N.Y.S.D.O.T. Standard Sheet "Earthwork Transition and Benching Details." Where a subgrade area becomes defined by Subsection 1.03.H in a cut section, the materials placed and other details shall be as specified under Subsection 3.05C, unless otherwise required by the Contract Documents. Prior to subbase course placement, the surface on which the subbase is to be placed shall be thoroughly compacted to the satisfaction of the Engineer.

3.03 COMPACTION: PAVED AREAS

A. General Requirements. It shall be the Contractor's responsibility to properly place and compact all materials in the road section, and to correct any deficiencies resulting from insufficient or improper compaction of such material throughout the contract period. The Contractor shall determine the type, size and weight of compactor best suited to the work at hand, select and control the lift (layer) thickness, exert proper control over the moisture content of the material, and other details necessary to obtain satisfactory results. During the progression of the work, the Engineer will inspect the Contractor's operations and will permit the work to continue where:

1. Lift thickness is controlled and does not exceed the maximum allowed according to the equipment classifications in subparagraph B of this subsection, and the equipment meets all specified class criteria. Thinner lifts and lighter equipment than the maximum allowed may be necessary for satisfactory results on some materials.

2. The compositive effort (number of passes and travel speed) is uniformly applied and not less than that specified for the given equipment class and lift thickness. Higher efforts than the minimum allowed may be necessary for satisfactory results on some materials.

3. The Engineer concludes from a visual observation that proper compaction has been attained, with the exception of backfill at structures, culverts, pipes, conduits, and direct burial cables. However, the Engineer reserves the right to perform density tests at any time. When tests are performed, the results shall indicate that not less than 90 percent of Standard Proctor Maximum Density is attained, with the exception of backfill at structures, culverts, pipes, conduits, and direct burial cables. However, the Engineer reserves the right to perform density tests at any time. when tests are performed, the results shall indicate that not less than 90 percent of Standard Proctor Maximum Density is attained in any portion of an embankment, or 95 percent in a subgrade area, or as specified for other items with a percent maximum density requirement.

4. Significant rutting under the action of the compactor is not observed on the final passes on a lift. Whenever the Contractor's operations do not conform to the above criteria, or requirements contained on other subparagraphs of this subsection, the Engineer will prohibit placement of an overlying lift until the Contractor takes effective corrective action.

   When the Engineer determines that density tests are necessary, the Contractor shall provide any assistance requested to facilitate such tests. Such assistance shall include, but will not be limited to, excavation and backfill or test pits and holes. This work shall be considered to be incidental construction.

   Damage to any compacted lift at any time during the course of construction, such as rutting under the loads imposed by earth moving equipment, shall be fully repaired by the Contractor at his own expense prior to placement of any overlying materials.

B. Compaction Equipment. The selection of compaction equipment is the Contractor's responsibility, but shall be subject to meeting the requirements of Section 203-213 of N.Y.S.D.O.T. Standard Specifications and approval by the Engineer with respect to its provisions. All compaction equipment shall be marked by a permanently attached manufacturer's identification plate designating the name of the manufacturer, model number and serial number of the machine as minimum identification. This plate shall be installed in a readily visible location. Compaction equipment lacking such an original manufacturer's identification plate, or with altered or illegible plates, will not be recognized as acceptable compaction equipment. Any equipment not principally manufactured for compaction purposes and equipment which is not in proper working order in all respects shall not be approved or used. The Engineer will also withhold approval of any compactor for which the Contractor cannot furnish manufacturer's specifications covering data nor obvious from a visual inspection of the equipment and necessary to determine its classification.

   The term, "pass," for any type of compactor, shall denote one direct vertical application of compactor effort over all elemental areas of a lift surface. Terms in common parlance, such as "coverage," "trips," etc., have no significance, equivalence, or application under these specifications.

   1. Compaction Equipment for Confined Areas. In areas inaccessible to conventional compactors, or when maneuvering space is limited, impact rammers, plate or small drum vibrators, or pneumatic buttonhead compaction equipment may be used with layer thickness not exceeding 6 inches before compaction. However, materials placed for subbase course construction shall have a maximum compacted thickness of 6 inches. Hand tampers shall not be permitted. The Engineer may approve or reject any of the above described mechanical devices based upon the results of appropriate on-site field tests.

C. Moisture Control. All fill or backfill material to be compacted, shall be at a moisture content for proper compaction of that material using the compactor selected by the Contractor to perform the work. The Contractor shall be responsible for determining the proper moisture content, and for controlling it within proper limits as the work is progressed. When water must be added to a material, it may be added on the lift or in the excavation or borrow pit. Water added on the lift, however, shall be applied by use of an approved pressure distributor. Distributors must be approved and documented by the Engineer. Documentation by the Engineer shall be adequate evidence of his approval. Water added shall be thoroughly incorporated into the soil, and manipulation shall be provided whenever necessary to attain uniformity of moisture distribution in the soil. When the moisture content of a lift about to be compacted exceeds the required amount, compaction shall be deferred until the layer has dried back to the required amount. Natural drying may be accelerated by blending in a dry material or manipulation alone, to increase the rate of evaporation. Increased loose lift thickness caused by blending in a dry material, however, may necessitate a change in compaction equipment to meet the minimum provisions of sub-paragraph B of this subsection.

3.04 PROOF ROLLING IN EMBANKMENT SECTIONS:

Immediately prior to final trimming of the subgrade surface and placement of subbase materials in embankment sections, all areas of the subgrade surface within roadway limits shall be proof rolled according to the requirements of this subsection. This work, and any delays due to this work, shall be considered incidental to the embankment item.

A. Equipment. The proof roller shall consist of a chariot type rigid steel frame with a box body suitable for ballast loading up to fifty (50) tons gross weight, and mounted on four (4) pneumatic tired wheels acting in a single line across the width of the roller on its transverse load center line. The wheels shall be equipped with 18.00 x 24, or 18.00 x 25,24 ply tires, and shall be suspended on articulated axles such that all wheels carry approximately equal loads when operating over uneven surfaces.

B. Determination of Roller Stress. Initially, the gross ballasted weight and tire inflation pressure of the proof roller shall be adjusted to the highest stress level shown in Figure 203-4 of N.Y.S. Standard Specifications, based on:

1. The Engineer's general description of the subgrade soils.

2. The Engineer's estimation of the relative subgrade support within the subgrade soil description range.

The initial roller stress for embankments constructed of rock shall be the maximum level listed in Figure 203-4 (Gross Tons 50, Tire psi 130). Figure 203-4 is reproduced at the end of this Section.

The roller shall be operated briefly to establish the acceptability of the initial stress

level. Proof rolling of the embankment shall be performed at the next lower stress level whenever operation of the roller at a higher stress level is accompanied by consistent lateral displacement of soil out of the wheel paths.

C. Procedure. After an acceptable stress level is established, two complete passes of the roller shall be applied over all elements of the area to be proof rolled. Any deficiencies disclosed during the proof rolling operation shall be corrected. Subsidence depressions shall be filled with material similar to the subgrade soil and then compacted in a normal manner. After compaction, these areas shall be proof rolled again. Corrective work shall be judged complete and accepted by the Engineer when all elements of the subgrade surface over a given embankment show a satisfactory uniform response to the proof roller.

D. Exceptions. Proof rolling of the subgrade surface in embankment sections will not be required in any area where:

1. Due to restrictions in available access and/or maneuvering space, use of the proof roller may damage adjacent work;

2. The proof roller will approach a culvert, pipe or other conduit closer than 5 feet in any direction.

3.05 PROOF ROLLING IN CUT SECTIONS

Immediately prior to final trimming of the subgrade surface and placement of subbase materials in cut sections, all areas of the subgrade surface within roadway limits shall be proof rolled according to the requirements of this subsection. This work, and any delays due to this work, shall be considered incidental to the excavation item.

A. Purpose. In cut sections, the purpose of proof rolling is to determine the location and extent of areas below the subgrade surface that require corrective undercutting and are not so specified in the contract plans.

B. Equipment. The proof roller used in embankment sections, as specified in 3.04.A. shall be employed for proof rolling in cut sections except that the roller shall be loaded to achieve a single stress level in operation, using a gross ballasted weight of 30 tons and all tires inflated to 40 psi.

C. Procedure. Two complete passes shall be applied over all elements of the area to be proof rolled. Where any portion of the cut subgrade surface fails to provide a satisfactory support for the proof rolling operation, the Engineer may order corrective undercut and backfill work performed. Backfill of undercuts shown on the plans or ordered by the Engineer shall meet the requirements of Select Granular Subgrade, placed and compacted as approved by the Engineer. Where natural soil below this course will not support the weight of the construction equipment, and when ordered by the Engineer, the course shall be placed in one lift. No additional

proof rolling shall follow corrective work.

D. Exceptions. Proof rolling of the subgrade surface in cut sections will not be required in any area where subgrade surface is in a rock cut, or where undercut and backfill has been previously performed. The Engineer may order undercutting and backfill without proof rolling of any cut where the need for corrective work, as determined by the Engineer, is obvious without actual proof rolling. The Engineer may also delete proof rolling in any cut section where, based upon a written evaluation by a Soils Engineer, proof rolling would be detrimental to the work.

3.06 COMPACTION: BUILDING AREA:

Compact top 12 inches of subgrade and each layer of subbase @ 95 percent density.

3.07 FILL AND BACKFILL AT STRUCTURES, CULVERTS, PIPES, CONDUITS AND DIRECT BURIAL CABLES:

The type of material to be used in bedding, filling and backfill at structures, culverts, pipes, conduit and direct burial cable and payment lines, therefore, shall be in conformance with the details shown on or as noted on the plans or as ordered by the Engineer.

Fill or backfill material at structures, culverts and pipes shall be deposited in horizontal layers not exceeding 6 inches in thickness prior to compaction. Compaction of each layer shall be as specified under Subsection 3.03, Compaction. A minimum of 95 percent of Standard Proctor Maximum Density will be required. When placing fill or backfill around culverts and pipes, layers shall be deposited to progressively bury the pipe or culvert to equal depths on both sides. When filling behind abutments and similar structures, all material shall be placed and compacted in front of the walls prior to placing fill behind the walls to a higher elevation.

Fill or backfill for conduit or cable placed in a trench shall be carefully placed in a horizontal layer to a depth of six inches over the top of the conduit or cable. This layer of material shall be compacted, however, the remaining portion of the trench shall be backfilled in accordance with the preceding paragraph. Where cables or conduits are placed and backfilled by a machine on one operation, the above requirements for backfilling do not apply.

Where sheeting has been used for the excavation, and incremental removal of sheeting is not specified in the plans or proposal, sheeting shall be pulled when the trench has been backfilled to the maximum unsupported trench depth allowed by Title 29 Code of Federal Regulations, Part 1926, Safety and Health Regulations for Construction (OSHA).

3.08 SELECT GRANULAR FILL, SLOPE PROTECTION

The Contractor shall perform the excavation in accordance with the requirements for "Mass Rock Excavation" as described elsewhere in these specifications. The Contractor shall then spread material conforming to the requirements given in 2.01, 4, in one layer to its full thickness by a method approved by the Engineer. The work shall be performed where shown on the plans or where directed by the Engineer in accordance with the details shown on the plans. Compaction of the slope protection is not required.

3.09 SUBGRADE SURFACE TOLERANCE

After compaction, the subgrade surface shall not be above design elevation at any location.

3.10 STABILITY OF EXCAVATIONS

A. General: Comply with local codes, ordinances, and requirements of agencies having jurisdiction.

B. Slope sides of excavations to comply with local codes, ordinances, and requirements of agencies having jurisdiction.

3.11 DEWATERING

A. Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area.

B. Do not allow water to accumulate in excavations. Remove water to prevent softening or foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.

C. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or runoff areas. Do not use trench excavations as temporary drainage ditches.

3.12 STORAGE OF EXCAVATED MATERIALS:

A. Stockpile excavated materials acceptable for backfill and fill where directed. Place, grade and shape stockpiles for proper drainage.

B. Locate and retain soil materials away from edge of excavations. Do not store within

drip line of trees indicated to remain.

C. Dispose of excess excavated soil material and materials not acceptable for use as backfill and fill as directed by the Engineer.

3.13 EXCAVATION FOR PAVEMENTS:

A. Cut surface under pavements to comply with cross-sections, elevations and grades as indicated.

3.14 TRENCH EXCAVATION FOR PIPES AND CONDUIT:

A. Excavate trenches to uniform width, sufficiently wide to provide ample working room and a minimum of 9 inches of clearance on both sides of pipe or conduit.

B. Excavate trenches and conduit to depth indicated or required to establish indicated slope and invert elevations and to support bottom of pipe or conduit on undisturbed soil. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

C. Where rock is encountered, carry excavation 6 inches below required elevation and backfill with a 6-inch layer of crushed stone or Item 4 to installation of pipe.

D. For pipes and equipment 6 inches or larger in nominal size, shape bottom of trench to fit bottom of pipe for 90 degrees (bottom 1/4 of the circumference). Fill depressions with tamped sand backfill. At each pipe joint, dig bell holes to relieve pipe bell of loads ensure continuous bearing of pipe barrel on bearing surface.

3.15 COLD WEATHER PROTECTION:

A. Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F.

3.16 BACKFILL AND FILL:

A. General: Place soil material in layers to required subgrade elevations, for each area classification listed below, using materials specified in Part 2 of this section.

1. Under grassed areas, use satisfactory excavated or borrow material.

2. Under curbs and pavements & buildings, use subbase material, satisfactory excavated blast-rock fill or processed material, or a combination.

3. Under piping and conduit and equipment, use subbase materials where required over rock bearing surface and for correction of unauthorized excavation. Shape excavation bottom to fit bottom 90 degrees of cylinder.

4. All pipe shall be bedded on a minimum of 6" of crushed stone, pea gravel or R.O.B. as per the drawings or as directed by the Engineer.

5. Provide 4-inch-thick concrete base slab support for piping or conduit less than 2'-6" below surface of roadways. After installation and testing of piping or conduit, provide minimum 4-inch-thick encasement (sides and top) of concrete prior to backfilling or placement of roadway subbase.

B. Backfill excavations as promptly as work permits, but not until completion of the following:

Inspection, testing, approval, and recording locations of underground utilities have been performed and recorded.

Removal of concrete formwork.

Removal of shoring and bracing, and backfilling of voids with satisfactory materials.

Removal of trash and debris from excavation.

3.17 GRADING:

A. General: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated or between such points and existing grades.

B. Grading: Grade areas to prevent ponding. Finish surfaces free from irregular surface changes and as follows:

1. Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10 foot above or below required subgrade elevations.

2. Pavements: Shape surface of areas under pavement to line, grade, and cross-section, with finish surface not more than 1/2 inches above or below required subgrade elevation.

C. Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each area classification.

3.18 PAVEMENT SUBBASE COURSE:

A. General: Subbase course consists of placing subbase material, in layers of specified thickness, over subgrade surface to support a pavement base course.

Refer to Part 2, 2.01.3 for subbase course specification.

B. Grade Control: During construction, maintain lines and grades including crown and cross-slope of subbase course.

C. Placing: Place subbase course material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting subbase material during placement operations.

When a compacted subbase course is indicated to be 6 inches thick or less, place material in a single layer. When indicated to be more than 6 inches thick, place material in equal layers, except no single layer more than 6 inches or less than 3 inches in thickness when compacted.

3.19 BUILDING SUBBASE COURSE

A. General: Subbase course consists of placing subbase material, in layers of specified thickness, over subgrade surface to support a building slab.

Refer to part 2, 2.01.3 for subbase course specification.

B. Grade Control: During construction, maintain lines and grades of subbase course.

C. Placing: Place subbase course material on prepared subgrade in layers of uniform thickness, conforming to indicated thickness. Maintain optimum moisture content for compacting subbase material during placement operations.

When a compacted subbase course is indicated to be 6 inches thick or less, place material in a single layer. When indicated to be more than 6 inches thick, place material in equal layers, except no single layer more than 6 inches or less than 3 inches in thickness when compacted.

3.20 FIELD QUALITY CONTROL:

A. Test Pits: The General Contractor will, at the direction of the Engineer, excavate a minimum of six (6) test pits in the area of the access road to a depth of six (6) feet below finish grade to insure that all drilling and blasting has been performed as specified.

B. Quality Control Testing During Construction: Allow testing service to inspect and

approve each subgrade and fill layer before further backfill or construction work is performed.

C. Perform field density tests in accordance with ASTM D 1556 (sand cone method) or ASTM D 2167 (rubber balloon method), as applicable.

Field density tests may also be performed by the nuclear method in accordance with ASTM D 2922, providing that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D 1556. In conjunction with each density calibration check, check the calibration curves furnished with the moisture gages in accordance with ASTM D 3017.

If field tests are performed using nuclear methods, make calibration checks of both density and moisture gages at beginning of work, on each different type of material encountered, and at intervals as directed by the Engineer.

D. Paved Areas & Building Slab Subgrade: Perform at least one field density test of subgrade for every 2,000 sq. ft. of paved area, but in no case fewer than three tests.

In each compacted fill layer, perform one field density test for every 2,000 sq. ft. of paved area or building slab, but in no case fewer than three tests.

E. In the opinion of the Engineer, based on testing service reports and inspection, subgrade or fills that have been placed are below specified density, perform additional compaction and testing until specified density is obtained.

3.21 EROSION CONTROL:

A. Provide erosion control methods in accordance with requirements of authorities having jurisdiction and as shown on the drawings.

B. Contractor shall be responsible for all control measures necessary to prevent damage resulting from erosion and sedimentation to on-site and off-site areas.

C. Temporary de-silting basins, terraces, contour furrows, channel linings, waterways or other measures shall be installed in a manner satisfactory to the Engineer and maintained in good operating condition.

D. Contractor shall provide adequate protection or complete the grading as specified without delay on areas that may be potential contributors to pollution of natural waterways or cause damage because of sedimentation. The Contractor shall provide required maintenance and repair until final acceptance.

E. Erosion control devices shall be left in place for use by Contractors performing work not included in this Contract.

3.22 MAINTENANCE:

A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

B. Repair and reestablish grades in settled, eroded, and rutted areas to specified tolerances.

C. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.

D. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality and condition of surface or finish to match adjacent work, eliminate evidence of restoration to greatest extent possible.

3.23 DISPOSAL OF EXCESS AND WASTE MATERIALS:

A. Transport waste material, including unacceptable excavated material, trash, and debris and dispose of these materials on the Owner's property and as approved by the Engineer.

B. It is intended that all suitable excavated unclassified materials will be used in embankment areas, processed for subbase material or if excess will be stockpiled as shown on the drawing and as directed by the Engineer.

END OF SECTION 02200

APPLICATION FEE: _____

APPLICATION FOR BLASTING (EXCAVATION) PERMIT

SEPARATE PERMIT REQUIRED FOR EACH SPECIFIC OPERATION

APPLICANT'S NAME _____

COMPANY OR CONTRACTOR _____

APPLICANT'S ADDRESS _____

DATE FILED _____ DATE ISSUED _____ DATE EXPIRED _____

*PERMIT SHALL EXPIRE THREE (3) MONTHS FROM THE DATE OF ISSUANCE

CERTIFICATE OF INSURANCE (PROOF OF)
( ) LIABILITY COVERAGE - ONE MILLION/TWO MILLION (1,000,000/2,000,000)
NAME OF COMPANY _____ POLICY NO. _____
( ) PROPERTY DAMAGE - THREE HUNDRED THOUSAND/FIVE HUNDRED THOUSAND (300,000/500,000)
( ) WORKMEN'S COMPENSATION
( ) CERTIFICATE OF COMPETENCE ISSUED TO (ATTACH COPY)
NAME _____
ADDRESS _____
CLASS A _____ CLASS B _____ CLASS C _____

PARTICULAR PLACE WHERE (BLASTING) OR (EXCAVATION) IS TO BE DONE _____

OWNER'S NAME _____

STREET _____

LOT _____

DURATION OF (BLASTING)-(EXCAVATION) _____ # OF HOLES _____
OF BLASTS _____

BRIEF DESCRIPTION OF WORK TO BE PERFORMED: _____

APPLICATION IS HEREBY MADE TO THE BUILDING DEPARTMENT FOR THE ISSUANCE OF A BLASTING/EXCAVATION PERMIT PURSUANT TO CODE OF THE TOWN OF ULSTER CHAPTER 61 PART 61-6A1 BUILDING CONSTRUCTION AND FIRE PREVENTION.

THE APPLICANT CERTIFIES THAT THE PROPOSED WORK IS AUTHORIZED BY THE OWNERS OF RECORD AND THAT ALL BLASTING/EXCAVATIONS WILL CONFORM TO LOCAL LAWS REGULATING EXPLOSIVES/EXCAVATIONS AND THE INDUSTRIAL CODE OF THE STATE OF NEW YORK PART 39.

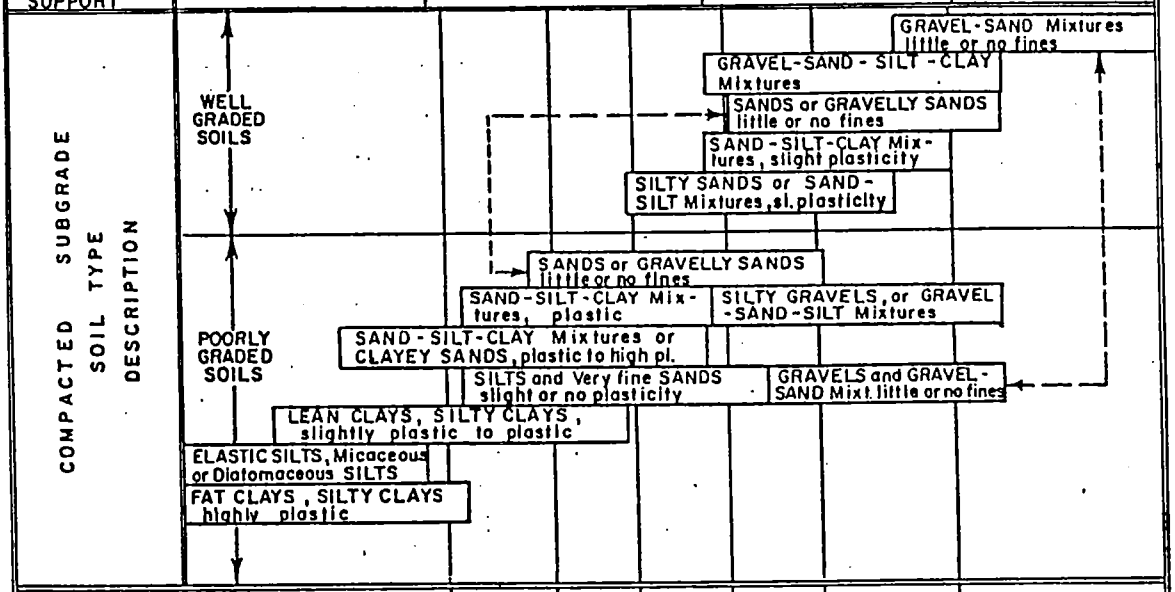
NOTIFICATION SECTION 8 C AND D OF THE BLASTING ORDINANCE:

C. WRITTEN NOTICE OF THE DATE AND APPROXIMATE TIME OF THE BLASTING SHALL, ADDITIONALLY BE GIVEN TO THE POLICE DEPARTMENT, BUILDING DEPARTMENT NO LESS THAN TWENTY-FOUR HOURS PRIOR TO BLASTING.

D. THE APPLICANT SHALL SUBMIT AN AFFIDAVIT OF NOTIFICATION TO THE BUILDING INSPECTOR PRIOR TO COMMENCING BLASTING/EXCAVATION.

SIGNATURE ADDRESS DATE

Figure 203-4 GUIDE FOR SELECTING THE INITIAL STRESS LEVEL FOR PROOF ROLLING EMBANKMENT SECTIONS



STRESS LEVEL	MINIMUM	1	2	3	4	5	MAXIMUM
GROSS TONS	30	34	38	42	46	50	50
TIRE PSI	40	50	60	70	80	90	130

SOILTESTING, INC.
140 OXFORD RD.
OXFORD, CT 06478
CT (203) 888-4531
N.Y. (914) 946-4850

FOREMAN - DRILLER: EK/rc
INSPECTOR: Bob Marshall

GROUND WATER OBSERVATIONS
AT none FT AFTER 0 HOURS
AT ____ FT AFTER ____ HOURS

CLIENT: GeoDesign, Inc. (Project #053-01)
PROJECT NO.: G125-4262-95
PROJECT NAME: Kingston Industrial Park
LOCATION: Delaware Avenue-Kingston, NY

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	NQ2
SIZE I.D.	3 3/4"	1 3/8"	2 1/8"
HAMMER WT.		140#	BIT
HAMMER FALL		30"	dia

SHEET 1 OF 1
HOLE NO. B-1

BORING LOCATIONS: as located
OFFSET

DATE START 10-5-95 DATE FIN. 10-5-95
SURFACE ELEV. 144 +/-
GROUND WATER ELEV. ____

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	SAMPLE TYPE	SAMPLE PEN	SAMPLE REC	SAMPLE DEPTH @ BOT	BLOWS PER 6 IN. ON SAMPLER (FORCE ON TUBE) 0-6	6-12	12-18	CORING TIME PER FT (MIN)	DENSITY OR CONSIST / MOIST	STRATA CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	ss	24"	16"	2'0"	4	4			dry	3"	TOPSOIL
							12	15			compact		Brn F-SAND & SILT, lit F-M gravel
5		2	ss	24"	12"	7'0"	3	2			dry		Brn F-M SAND, sm silt, lit F-M gravel
							6	35			loose	7'0"	(weathered rock end of spoon)
												8'0"	WEATHERED ROCK
		1	c	60"	60"	13'0"	RQD=	63%		9.0			BEDROCK
10										6.0			fractured gry
										5.0			LIMESTONE
										5.0			
										5.0			
		2	c	24"	24"	15'0"	RQD=	83%		5.0			fractured gry
15										7.0		15'0"	E.O.B.
20													
25													
30													
35													E.O.B. 15'0"
40													

GROUND SURFACE TO ____ FT. USED ____ CASING THEN ____ CASING TO ____ FT

HOLE NO. B-1

A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER
C = COARSE M = MEDIUM F = FINE
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND = 35 - 50%

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140 OXFORD RD.
OXFORD, CT 06478
CT (203) 888-4531
N.Y. (914) 946-4850

FOREMAN - DRILLER: EK/rc
INSPECTOR: Bob Marshall

GROUND WATER OBSERVATIONS
AT none FT AFTER 0 HOURS
AT ____ FT AFTER ____ HOURS

CLIENT: GeoDesign, Inc. (Project #053-01)
PROJECT NO.: G125-4262-95
PROJECT NAME: Kingston Industrial Park
LOCATION: Delaware Avenue-Kingston, NY

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	NQ2
SIZE I.D.	3 3/4"	1 3/8"	2 1/8"
HAMMER WT.		140#	BIT dia
HAMMER FALL		30"	

SHEET 1 OF 1
HOLE NO. B-2

BORING LOCATIONS: as located
OFFSET

DATE START 10-9-95 DATE FIN. 10-9-95
SURFACE ELEV. 170 +/-
GROUND WATER ELEV. ____

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	SAMPLE TYPE	SAMPLE PEN	SAMPLE REC	SAMPLE DEPTH @ BOT	BLOWS PER 6 IN. ON SAMPLER (FORCE ON TUBE) 0-6	6-12	12-18	CORING TIME PER FT (MIN)	DENSITY OR CONSIST MOIST	STRATA CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	SS	24"	12"	2'0"	3	7			dry	4"	TOPSOIL
							14	12			compact	2'6"	Brn F-M SAND & SILT, lit F-C gravel
		1	C	60"	60"	7'6"	RQD=	83%		8.0			BEDROCK
										5.0			fractured gry
5										4.0			LIMESTONE
										3.0			
										3.0			
		2	C	60"	60"	12'6"	RQD=	100%		4.0			fractured gry
										4.0			
10										3.0			
										4.0			
										4.0		12'6"	E.O.B.
15													
20													
25													
30													
35													E.O.B. 12'6"
40													

GROUND SURFACE TO ____ FT. USED ____ CASING THEN ____ CASING TO ____ FT
A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND = 35 - 50%
C = COARSE M = MEDIUM F = FINE

HOLE NO. B-2

SOILTESTING, INC.
140 OXFORD RD.
OXFORD, CT 06478
CT (203) 888-4531
N.Y. (914) 946-4850

FOREMAN - DRILLER: EK/rc
INSPECTOR: Bob Marshall

GROUND WATER OBSERVATIONS
AT none FT AFTER 0 HOURS
AT ____ FT AFTER ____ HOURS

CLIENT: GeoDesign, Inc. (Project #053-01)
PROJECT NO.: G125-4262-95
PROJECT NAME: Kingston Industrial Park
LOCATION: Delaware Avenue-Kingston, NY

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	NQ2
SIZE I.D.	3 3/4"	1 3/8"	2 1/8"
HAMMER WT.		140#	BIT
HAMMER FALL		30"	dia

SHEET 1 OF 1
HOLE NO. B-3

BORING LOCATIONS: as located
OFFSET:

DATE START 10-9-95 DATE FIN. 10-9-95
SURFACE ELEV. 187 +/-
GROUND WATER ELEV. ____

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	SAMPLE TYPE	SAMPLE PEN	SAMPLE REC	SAMPLE DEPTH @ BOT	BLOWS PER 6 IN. ON SAMPLER (FORCE ON TUBE) 0-6	6-12	12-18	CORING TIME PER FT (MIN)	DENSITY OR CONSIST MOIST	STRATA CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	ss	24"	13"	2'0"	1	1			dry	4"	TOPSOIL
							5	9			loose		lt-brn F-SAND,sm silt,tr F-gravel
5		2	ss	16"	6"	6'4"	10	31			dry		Gry F-C GRAVEL,sm F-sand,lit silt,tr
							50/4				v-dense	6'4"	wood frags (root fibers)
		1	c	42"	6"	11'6"	RQD= 0%			7.0		8'0"	WEATHERED ROCK
										7.0			BEDROCK
10										5.0			fractured gry
										3/16"			
		2	c	48"	16"	15'6"	RQD= 0%			8.0			fractured gry
										7.5			
										7.5			
15										7.0			
		3	c	60"	60"	20'6"	RQD= 67%			9.0			fractured gry
										9.5			
										9.0			
										9.0			LIMESTONE
20										8.5			
		4	c	30"	30"	23'0"	RQD= 30%			8.0			gry fractured
										8.0			
										3.5/6"			
		5	c	60"	48"	28'0"	RQD= 42%			6.0			gry fractured
25										5.5			
										5.0			
										5.0			
										4.0		28'0"	E.O.B.
30													
35													E.O.B. 28'0"
40													

GROUND SURFACE TO ____ FT. USED ____ CASING THEN ____ CASING TO ____ FT
A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND = 35 - 50%
C = COARSE M = MEDIUM F = FINE

HOLE NO. B-3

SOILTESTING, INC.
140 OXFORD RD.
OXFORD, CT 06478
CT (203) 888-4531
N.Y. (914) 946-4850

FOREMAN - DRILLER: EK/rc
INSPECTOR: Bob Marshall

GROUND WATER OBSERVATIONS
AT none FT AFTER 0 HOURS
AT ____ FT AFTER ____ HOURS

CLIENT: GeoDesign, Inc. (Project #063-01)
PROJECT NO.: G125-4262-95
PROJECT NAME: Kingston Industrial Park
LOCATION: Delaware Avenue-Kingston, NY

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	NQ2
SIZE I.D.	3 3/4"	1 3/8"	2 1/8"
HAMMER WT.		140#	BIT
HAMMER FALL		30"	dia

SHEET 1 OF 1
HOLE NO. B-4
BORING LOCATIONS: as located
OFFSET
DATE START 10-10-95 DATE FIN. 10-10-95
SURFACE ELEV. 194 +/-
GROUND WATER ELEV.

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	SAMPLE TYPE	SAMPLE PEN	SAMPLE REC	SAMPLE DEPTH @ BOT	BLOWS PER 6 IN. ON SAMPLER (FORCE ON TUBE) 0-6	6-12	12-18	CORING TIME PER FT (MIN)	DENSITY OR CONSIST MOIST	STRATA CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	ss	24"	20"	2'0"	4	4			dry	3"	TOPSOIL
							14	49			compact		lt-brn F-M SAND, lit F-M gravel, tr silt
5		2	ss	24"	18"	7'0"	9	9			dry		Brn F-SAND & SILT, lit F-gravel
							11	12			compact	8'0"	
		1	c	60"	52"	13'0"	RQD=40%			9.0			BEDROCK
10										8.0			gry fractured
										8.0			LIMESTONE
										7.0			
		2	c	60"	55"	18'0"	RQD= 64%			7.0			
15										8.0			gry fractured
										7.0			
										6.0			
										6.0			
										5.0		18'0"	E.O.B.
20													
25													
30													
35													E.O.B. 18'0"
40													

GROUND SURFACE TO ____ FT. USED ____ CASING THEN ____ CASING TO ____ FT
HOLE NO. B-4
A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER
C = COARSE M = MEDIUM F = FINE
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND = 35 - 50%

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CT (203) 888-4531
N.Y. (914) 946-4850

FOREMAN - DRILLER: EK/rc
INSPECTOR: Bob Marshall

GROUND WATER OBSERVATIONS
AT none FT AFTER 0 HOURS
AT ____ FT AFTER ____ HOURS

CLIENT: GeoDesign; Inc. (Project #053-01)
PROJECT NO.: G125-4262-95
PROJECT NAME: Kingston Industrial Park
LOCATION: Delaware Avenue-Kingston, NY

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	NQ2
SIZE I.D.	3 3/4"	1 3/8"	2 1/8"
HAMMER WT.		140#	BIT
HAMMER FALL		30"	dia

SHEET 1 OF 2
HOLE NO. B-5

BORING LOCATIONS: as located
OFFSET

DATE START 10-11-95 DATE FIN. 10-11-95
SURFACE ELEV. 256 +/-
GROUND WATER ELEV. ____

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	SAMPLE TYPE	SAMPLE PEN	SAMPLE REC	SAMPLE DEPTH @ BOT	BLOWS PER 6 IN. ON SAMPLER (FORCE ON TUBE) 0-6	6-12	12-18	CORING TIME PER FT (MIN)	DENSITY OR CONSIST / MOIST	STRATA CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	ss	24"	12"	2'0"	4	4			dry	3"	TOPSOIL
							4	8			loose		Brn F-SAND & SILT, tr F-gravel
												4'0"	WEATHERED ROCK
5		1	c	24"	9"	6'0"	RQD=0%			8.0			BEDROCK
										7.0			gry fractured
		2	c	60"	56"	11'0"	RQD= 61%			5.0			LIMESTONE
										7.0			
										7.0			
10										8.0			
		3	c	60"	60"	16'0"	RQD= 100%			7.0			Gry FRACTURED
										8.0			
										8.0			LIMESTONE
										8.0			
15										8.0			
		4	c	60"	60"	21'0"	RQD=98%			8.0			Gry FRACTURED
										8.0			
										8.0			LIMESTONE
										8.0			
20										8.0			
		5	c	60"	60"	26'0"	RQD=100%			7.0			Gry FRACTURED
										7.0			
										7.0			LIMESTONE
										7.0			
25										6.0			
		6	c	60"	60"	31'0"	RQD=100%			5.0			Gry FRACTURED
										5.0			
										5.0			LIMESTONE
										5.0			
30										6.0			
		7	c	60"	60"	36'0"	RQD=100%			5.0			Gry FRACTURED
										6.0			
										7.0			LIMESTONE
										6.0			
35										7.0			
		8	c	60"	60"	41'0"	RQD=88%			6.0			Gry FRACTURED
										7.0			
										7.0			LIMESTONE
										5.0			
40										6.0			

GROUND SURFACE TO ____ FT. USED ____ CASING THEN ____ CASING TO ____ FT

HOLE NO. B-5

A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER
C = COARSE M = MEDIUM F = FINE
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND = 35 - 50%

SOILTESTING, INC.
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CT (203) 888-4531
N.Y. (914) 946-4850

FOREMAN - DRILLER: EK/rc
INSPECTOR: Bob Marshall
GROUND WATER OBSERVATIONS: none AT ____ FT AFTER 0 HOURS; AT ____ FT AFTER ____ HOURS

CLIENT: GeoDesign, Inc. (Project #053-01)
PROJECT NO.: G125-4262-95
PROJECT NAME: Kingston Industrial Park
LOCATION: Delaware Avenue-Kingston, NY

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	NQ2
SIZE I.D.	3 3/4"	1 3/8"	2 1/8"
HAMMER WT.		140#	BIT
HAMMER FALL		30"	dia

SHEET 2 OF 2
HOLE NO. B-5
BORING LOCATIONS: as located
OFFSET
DATE START 10-11-95 DATE FIN. 10-11-95
SURFACE ELEV. 256 +/-
GROUND WATER ELEV. ____

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	SAMPLE TYPE	SAMPLE PEN	SAMPLE REC	SAMPLE DEPTH @ BOT	BLOWS PER 6 IN. ON SAMPLER (FORCE ON TUBE) 0-6	6-12	12-18	CORING TIME PER FT (MIN)	DENSITY OR CONSIST MOIST	STRATA CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		9	C	60"	33"	46'0"							Gry FRACTURED LIMESTONE
							(advanced core barrel)					43'7"	
						46'0"	to 48'0" VOID						VOID
45												48'0"	
		2	SS	24"	24"	50'0"	14	14					Brn F-C SAND, sm silt, lit F-gravel, tr decomposed organics
50							12	12			compact		
		3	SS	24"	4"	52'0"	WOR/24					52'0"	Brn F-SAND, lit silt, tr F-gravel E.O.B.
55													
60													
65													
70													
75													E.O.B. 52'0"
80													

GROUND SURFACE TO ____ FT. USED ____ CASING THEN ____ CASING TO ____ FT
A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS

HOLE NO. B-5

SOILTESTING, INC.
140 OXFORD RD.
OXFORD, CT 06478
CT (203) 888-4531
N.Y. (914) 946-4850

FOREMAN - DRILLER: El/rc
INSPECTOR: Bob Marshall

GROUND WATER OBSERVATIONS
AT none FT AFTER 0 HOURS
AT ____ FT AFTER ____ HOURS

CLIENT: GeoDesign, Inc. (Project #053-01)
PROJECT NO.: G125-4262-95
PROJECT NAME: Kingston Industrial Park
LOCATION: Delaware Avenue-Kingston, NY

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	NQ2
SIZE I.D.	3 3/4"	1 3/8"	2 1/8"
HAMMER WT.		140#	BIT
HAMMER FALL		30"	dia

SHEET 1 OF 1
HOLE NO. B-6

BORING LOCATIONS: as located
OFFSET:

DATE START 10-12-95 DATE FIN. 10-12-95
SURFACE ELEV. 249 +/-
GROUND WATER ELEV. ____

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	SAMPLE TYPE	SAMPLE PEN	SAMPLE REC	SAMPLE DEPTH @ BOT	BLOWS PER 6 IN. ON SAMPLER (FORCE ON TUBE) 0-6	6-12	12-18	CORING TIME PER FT (MIN)	DENSITY OR CONSIST / MOIST	STRATA CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	ss	24"	20"	2'0"	7	14			dry	4"	TOPSOIL
							13	13			compact		Brn F-M SAND, sm silt, lit F-C gravel
5												5'0"	
		1	c	60"	60"	10'6"	RQD-60%			8.0	dry		BEDROCK
										5.0			Gry FRACTURED.
										6.0			LIMESTONE
										6.0			
10										7.0			
		2	c	60"	60"	15'6"	RQD=92%			8.0			Gry FRACTURED
										8.0			LIMESTONE
										9.0			
										7.0			
15										8.0			
		3	c	60"	52"	20'6"	RQD=100%			10.0			Gry FRACTURED
										8.0			LIMESTONE
										8.0			
										8.0			
20										8.0			
		4	c	60"	60"	25'6"	RQD= 100%			9.0			Gry FRACTURED.
										8.0			
										7.0			LIMESTONE
										6.0			
25										5.0			
		5	c	18"	15"	27'0"	RQD= 100%			7.0			Gry FRACTURED
										5.0		27'0"	E.O.B.
30													
35													E.O.B. 27'0"
40													

GROUND SURFACE TO ____ FT. USED ____ CASING THEN ____ CASING TO ____ FT
HOLE NO. B-6

A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS C = COARSE
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER M = MEDIUM
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND = 35 - 50% F = FINE

SOILTESTING, INC.
140 OXFORD RD.
OXFORD, CT 06478
CT (203) 888-4531
N.Y. (914) 946-4850

FOREMAN - DRILLER: EK/rc
INSPECTOR: Bob Marshall

GROUND WATER OBSERVATIONS
AT none FT AFTER 0 HOURS
AT ____ FT AFTER ____ HOURS

CLIENT: GeoDesign, Inc. (Project #063-01)
PROJECT NO.: G125-4262-95
PROJECT NAME: Kingston Industrial Park
LOCATION: Delaware Avenue-Kingston, NY

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	NQ2
SIZE I.D.	3 3/4"	1 3/8"	2 1/8"
HAMMER WT.		140#	BIT
HAMMER FALL		30"	dia

SHEET 1 OF 1
HOLE NO. B-7

BORING LOCATIONS: as located
OFFSET

DATE START 10-13-95 DATE FIN. 10-13-95
SURFACE ELEV. 254 +/-
GROUND WATER ELEV. ____

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	SAMPLE TYPE	SAMPLE PEN	SAMPLE REC	SAMPLE DEPTH @ BOT	BLOWS PER 6 IN. ON SAMPLER (FORCE ON TUBE) 0-6	6-12	12-18	CORING TIME PER FT (MIN)	DENSITY OR CONSIST MOIST	STRATA CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	SS	24"	16"	2'0"	4	8			dry	4"	TOPSOIL
							9	12			compact		Yellow/brn F-M SAND, sm silt, lit F-C gravel
5												5'0"	
												6'0"	WEATHERED ROCK
												8'0"	PARTIALLY WEATHERED BEDROCK
		1	C	60"	58"	13'0"	RQD=42%			8.0			BEDROCK
10										10.0			(Gry to Lt-brn FRACTURED LIMESTONE)
										10.0			
										9.0			
										9.0		13'0"	
		2	C	24"	22"	15'0"	RQD=28%			6.0		13'5"	SOIL SEAM
15										7.0		14'0"	BEDROCK (Gry/lt-brn FRACTURED LIMESTONE)
		3	C	36"	36"	18'0"	RQD=56%			10.0		14'2"	SOIL SEAM
										6.0			BEDROCK
										5.0			(Gry/lt-brn FRACTURED LIMESTONE)
												18'0"	E.O.B.
20													
25													
30													
35													E.O.B. 18'0"
40													

GROUND SURFACE TO ____ FT. USED ____ CASING THEN ____ CASING TO ____ FT
A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER
PROPORTIONS USED: TRACE = 0-10% LITTLE = 10-20% SOME = 20-35% AND = 35-50%
C = COARSE M = MEDIUM F = FINE

HOLE NO. B-7

SOILTESTING, INC.
140 OXFORD RD.
OXFORD, CT 06478
CT (203) 888-4531
N.Y. (914) 946-4850

FOREMAN - DRILLER: EK/rc
INSPECTOR: Bob Marshall

GROUND WATER OBSERVATIONS
AT none FT AFTER 0 HOURS
AT ____ FT AFTER ____ HOURS

CLIENT: GeoDesign, Inc. (Project #053-01)
PROJECT NO.: G125-4262-95
PROJECT NAME: Kingston Industrial Park
LOCATION: Delaware Avenue-Kingston, NY

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	NQ2
SIZE I.D.	3 3/4"	1 3/8"	2 1/8"
HAMMER WT.		140#	BIT
HAMMER FALL		30"	dia

SHEET 1 OF 1
HOLE NO. B-8
BORING LOCATION: as located
OFFSET
DATE START 10-16-95 DATE FIN. 10-16-95
SURFACE ELEV. 183 +/-
GROUND WATER ELEV. ____

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	SAMPLE TYPE	SAMPLE PEN	SAMPLE REC	SAMPLE DEPTH @ BOT	BLOWS PER 6 IN. ON SAMPLER (FORCE ON TUBE) 0-6	6-12	12-18	CORING TIME PER FT (MIN)	DENSITY OR CONSIST MOIST	STRATA CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	ss	24"	16"	2'0"	2	4			dry	3"	TOPSOIL
							3	6			loose	2'0"	Brn F-M SAND & SILT, lit F-M gravel
		1	c	60"	60"	7'6"	RQD= 73%			5.0		2'6"	WEATHERED ROCK
										4.0			BEDROCK
5										4.0			(Gry FRACTURED LIMESTONE)
										4.0			
										4.0		7'6'	E.O.B.
10													
15													
20													
25													
30													
35													E.O.B. 7'6"
40													

GROUND SURFACE TO ____ FT. USED ____ CASING THEN ____ CASING TO ____ FT
A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND = 35 - 50%
C = COARSE M = MEDIUM F = FINE

HOLE NO. B-8

SOILTESTING, INC.
140 OXFORD RD.
OXFORD, CT 06478
CT (203) 888-4531
N.Y. (914) 946-4850

FOREMAN - DRILLER: EK/rc
INSPECTOR: Bob Marshall

GROUND WATER OBSERVATIONS
AT none FT AFTER 0 HOURS
AT ____ FT AFTER ____ HOURS

CLIENT: GeoDesign, Inc. (Project #053-01)
PROJECT NO.: G125-4262-95
PROJECT NAME: Kingston Industrial Park
LOCATION: Delaware Avenue-Kingston, NY

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	NQ2
SIZE I.D.	3 3/4"	1 3/8"	2 1/8"
HAMMER WT.		140#	BIT
HAMMER FALL		30"	dia

SHEET 1 OF 1
HOLE NO. B-9
BORING LOCATIONS: as located
OFFSET
DATE START 10-17-95 DATE FIN. 10-17-95
SURFACE ELEV. 280 +/-
GROUND WATER ELEV. ____

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	SAMPLE TYPE	SAMPLE PEN	SAMPLE REC	SAMPLE DEPTH @ BOT	BLOWS PER 6 IN. ON SAMPLER (FORCE ON TUBE) 0-6	6-12	12-18	CORING TIME PER FT (MIN)	DENSITY OR CONSIST MOIST	STRATA CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	ss	11"	6"	11"	4	50/5			dry	3"	TOPSOIL
		1	c	60"	60"	6'0"	RQD=38%			6.0		1'0"	Brn F-M SAND & SILT, lit weathered rock
										5.0			BEDROCK
										12.0			(Gry FRACTURED LIMESTONE)
5										11.0			
										10.0		6'0"	E.O.B.
10													
15													
20													
25													
30													
35													
40													

E.O.B. 6'0"

GROUND SURFACE TO ____ FT. USED ____ CASING THEN ____ CASING TO ____ FT
A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND = 35 - 50%
C = COARSE M = MEDIUM F = FINE

HOLE NO. B-9

SOILTESTING, INC.
140 OXFORD RD.
OXFORD, CT 06478
CT (203) 888-4531
N.Y. (914) 946-4850

FOREMAN - DRILLER: EK/rc
INSPECTOR: Bob Marshall

GROUND WATER OBSERVATIONS
AT none FT AFTER 0 HOURS
AT ____ FT AFTER ____ HOURS

CLIENT: GeoDesign, Inc. (Project #053-01)
PROJECT NO.: G125-4262-95
PROJECT NAME: Kingston Industrial Park
LOCATION: Delaware Avenue-Kingston, NY

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	NQ2
SIZE I.D.	3 3/4"	1 3/8"	2 1/8"
HAMMER WT.		140#	BIT
HAMMER FALL		30"	dia

SHEET 1 OF 1
HOLE NO. B-10
BORING LOCATIONS: as located
OFFSET
DATE START 10-18-95 DATE FIN. 10-18-95
SURFACE ELEV.:
GROUND WATER ELEV.:

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	SAMPLE TYPE	SAMPLE PEN	SAMPLE REC	SAMPLE DEPTH @ BOT	BLOWS PER 6 IN. ON SAMPLER (FORCE ON TUBE) 0-6	6-12	12-18	CORING TIME PER FT (MIN)	DENSITY OR CONSIST / MOIST	STRATA CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	ss	24"	20"	2'0"	3	2			dry	3"	TOPSOIL
							2	5			loose		Brn F-M SAND & SILT, lit F-C gravel
5												5'0"	
												6'0"	WEATHERED ROCK
		1	c	60"	60"	11'6"	RQD=77%			7.0			BEDROCK
										7.0			(Gry FRACTURED LIMESTONE)
										5.0			
10										5.0			
										7.0		11'6"	E.O.B.
15													
20													
25													
30													
35													E.O.B. 11'6"
40													

GROUND SURFACE TO ____ FT. USED ____ CASING THEN ____ CASING TO ____ FT
HOLE NO. B-10
A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER
C = COARSE M = MEDIUM F = FINE
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND = 35 - 50%

SOILTESTING, INC.
140 OXFORD RD.
OXFORD, CT 06478
CT (203) 888-4531
N.Y. (914) 946-4850

FOREMAN - DRILLER: EK/RC
INSPECTOR: Bob Marshall

GROUND WATER OBSERVATIONS
AT none FT AFTER 0 HOURS
AT ____ FT AFTER ____ HOURS

CLIENT: GeoDesign, Inc. (Project #053-01)
PROJECT NO.: G125-4262-95
PROJECT NAME: Kingston Industrial Park
LOCATION: Delaware Avenue-Kingston, NY

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	NQ2
SIZE I.D.	3 3/4"	1 3/8"	2 1/8"
HAMMER WT.		140#	BIT
HAMMER FALL		30"	dia

SHEET 1 OF 1
HOLE NO. B-11
BORING LOCATIONS: as located
OFFSET
DATE START 10-17-95 DATE FIN. 10-17-95
SURFACE ELEV.:
GROUND WATER ELEV.:

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	SAMPLE TYPE	SAMPLE PEN	SAMPLE REC	SAMPLE DEPTH @ BOT	BLOWS PER 6 IN. ON SAMPLER (FORCE ON TUBE) 0-6	6-12	12-18	CORING TIME PER FT (MIN)	DENSITY OR CONSIST MOIST	STRATA CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	ss	24"	12"	2'0"	3	3			dry	4"	TOPSOIL
							5	7			loose		Brn F-M SAND & SILT, lit F-M gravel, cobbles, boulders
5		2	ss	18"	6"	6'6"	6	7			dry		SAME
							16	50/0			compact	6'6"	
													WEATHERED ROCK
												10'0"	
10		1	c	60"	60"	15'0"	RQD=72%			8.0			BEDROCK
										9.0			(Gry FRACTURED LIMESTONE)
										10.0			
										7.0			
15										8.0		15'0"	E.O.B.
20													
25													
30													
35													E.O.B. 15'0"
40													

GROUND SURFACE TO ____ FT. USED ____ CASING THEN ____ CASING TO ____ FT

HOLE NO. B-11

A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER
C = COARSE M = MEDIUM F = FINE
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND = 35 - 50%

SOILTESTING, INC.
140 OXFORD RD.
OXFORD, CT 06478
CT (203) 888-4531
N.Y. (914) 946-4850

FOREMAN - DRILLER: EK/rc
INSPECTOR: Bob Marshall

GROUND WATER OBSERVATIONS
AT none FT AFTER 0 HOURS
AT ____ FT AFTER ____ HOURS

CLIENT: GeoDesign, Inc. (Project #053-01)
PROJECT NO.: G125-4262-95
PROJECT NAME: Kingston Industrial Park
LOCATION: Delaware Avenue-Kingston, NY

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	NQ2
SIZE I.D.	3 3/4"	1 3/8"	2 1/8"
HAMMER WT.		140#	BIT
HAMMER FALL		30"	dia

SHEET 1 OF 1
HOLE NO. B-14

BORING LOCATIONS: as located

OFFSET

DATE START 10-17-95 DATE FIN. 10-17-95
SURFACE ELEV.:
GROUND WATER ELEV.:

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	SAMPLE TYPE	SAMPLE PEN	SAMPLE REC	SAMPLE DEPTH @ BOT	BLOWS PER 6 IN. ON SAMPLER (FORCE ON TUBE) 0-6	6-12	12-18	CORING TIME PER FT (MIN)	DENSITY OR CONSIST MOIST	STRATA CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	ss	24"	8"	2'0"	1	1			dry	3"	TOPSOIL
							1	1			v-loose		Brn F-M SAND & SILT, lit F-gravel, tr weathered rock
		1	c	18"	18"	4'6"	RQD=0%			7.0		3'0"	BEDROCK
										5/6"			(gry FRACTURED LIMESTONE)
5		2	c	54"	50"	9'0"				5/6"		3'6"	SOIL SEAM
										9.0		3'8"	BEDROCK
										8.0			(Gry FRACTURED LIMESTONE)
										8.0		9'0"	E.O.B.
10													
15													
20													
25													
30													E.O.B. 9'0"
35													
40													

GROUND SURFACE TO ____ FT. USED ____ CASING THEN ____ CASING TO ____ FT
A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND = 35 - 50%
C = COARSE M = MEDIUM F = FINE

HOLE NO. B-14

SOILTESTING, INC.
140 OXFORD RD.
OXFORD, CT 06478
CT (203) 888-4531
N.Y. (914) 946-4850

FOREMAN/DRILLER EVE

INSP. Bob Marshall

GROUND WATER OBSERVATIONS
AT none FT AFTER 0 HOURS
AT ____ FT AFTER ____ HOURS

CLIENT GeoDesign, Inc. (Project #053-01)

PROJECT NO. G125-4262-95

PROJECT NAME Kingston Industrial Park

LOCATION Delaware Avenue-Kingston, NY

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	NQ2
SIZE I.D.	3 3/4"	1 3/8"	2 1/8"
HAMMER WT.		140#	BIT
HAMMER FALL		30"	dia

SHEET 1 OF 1
HOLE NO. B-16

BORING LOCATIONS
as located
400 ft. west of B-14
OFFSET

DATE START 10-18-95 DATE FIN. 10-18-95
SURFACE ELEV. ____
GROUND WATER ELEV. ____

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	SAMPLE TYPE	SAMPLE PEN	SAMPLE REC	SAMPLE DEPTH @ BOT	BLOWS PER 6 IN. ON SAMPLER (FORCE ON TUBE) 0-6	6-12	12-18	CORING TIME PER FT (MIN)	DENSITY OR CONSIST MOIST	STRATA CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	ss	24"	12"	2'0"	6	5			dry	3"	TOPSOIL
							4	6			loose		Brn F-M SAND & SILT, sm F-M gravel, cobbles/boulders
5		2	ss	24"	12"	7'0"	16	30			dry		Brn F-M SAND, sm silt, sm weathered rock
							24	28			v-dense	7'6"	
												8'0"	WEATHERED ROCK
10		1	c	34"	21"	13'4"	RQD=52%			4.0		10'6"	PARTIALLY WEATHERED BEDROCK
										8.0			BEDROCK
										7/10"		14'6"	(Gry FRACTURED LIMESTONE)
		2	c	26"	26"	15'6"	RQD=73%			1/2"		14'8"	SOIL SEAM
										9.0			BEDROCK (Gry FRACTURED LIMESTONE)
15										7.0		15'6"	E.O.B.
20													
25													
30													
35													
40													

E.O.B. 15'6"

GROUND SURFACE TO ____ FT. USED ____ CASING THEN ____ CASING TO ____ FT

HOLE NO. B-16

A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER
C = COARSE M = MEDIUM F = FINE
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND = 35 - 50%

TEST PIT FIELD LOG

GeoDesign, Inc. 984 Southford Road, Middlebury, Connecticut 06762 GEOTECHNICAL ENGINEERS and ENVIRONMENTAL CONSULTANTS	PROJECT Kingston Industial Park Kingston, New York	TEST PIT NO. TP-1 FILE No. 053-01 DATE October 10, 1995

EXCAVATION EQUIPMENT

GeoDesign Engineer: R. Marshall

WEATHER: Clear, 60's (F)

CONTRACTOR Soil Testing, Inc.
OPERATOR Vinny Organti
MAKE Case MODEL 580k
CAPACITY 1/5 cy REACH 18 feet

GROUND ELEV. 190 FT.___

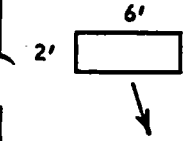
TIME STARTED 0830 HRS
TIME COMPLETED 0845 HRS

DEPTH	SOIL DESCRIPTION	FIELD TESTING (OVA)	EXCAV. EFFORT	BOULDER COUNT QTY CLASS	REMARK NO.
0					
0.5'	Brown to Dark Brown HUMUS/TOPSOIL		E	6A	1.
1'					
	Yellow Brown F/M SAND and SILT, Li. F. Gravel		E		2.
2'					
2.5'			VD		
3'	REFUSAL ON BEDROCK - END OF EXPLORATION				
4'					
5'					
6'					
7'					
8'					
9'					
10'					
11'					
12'					
13'					
14'					
15'					
16'					

REMARKS:

1. No groundwater encountered.
2. Soil sample obtained at 2' depth.
3. Location at roadway Station 9+50 centerline.

TEST PIT PLAN



APPROX. VOLUME = _____cu.yd EXCAVATED

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

EXCAVATION EFFORT

E-----EASY
M-----MODERATE
D-----DIFFICULT

PROPORTIONS USED

TRACE (TR.) 0 - 10%
LITTLE (LI.) 10 - 20%
SOME (SO.) 20 - 35%
AND 35 - 50%

ABBREVIATIONS

F-FINE
M-MEDIUM
C-COARSE
F/M-FINE TO MEDIUM
F/C-FINE TO COARSE
V-VERY
GR-GRAY
BN-BROWN
YEL-YELLOW

GROUNDWATER

ELAPSED TIME TO READING (HRS.)	DEPTH TO GROUND WATER

TEST PIT FIELD LOG

GeoDesign, Inc. 984 Southford Road, Middlebury, Connecticut 06762 GEOTECHNICAL ENGINEERS and ENVIRONMENTAL CONSULTANTS	PROJECT Kingston Industial Park Kingston, New York	TEST PIT NO. TP-2 FILE No. 053-01 DATE October 10, 1995

EXCAVATION EQUIPMENT

GeoDesign Engineer: R. Marshall
WEATHER: Clear, 60's (F)

CONTRACTOR Soil Testing, Inc.
OPERATOR Vinny Organti
MAKE Case MODEL 580k
CAPACITY 1/5 cy REACH 18 feet

GROUND ELEV. 250 FT.___
TIME STARTED 1200 HRS
TIME COMPLETED 1210 HRS

DEPTH	SOIL DESCRIPTION	FIELD TESTING (OVA)	EXCAV. EFFORT	BOULDER COUNT QTY CLASS	REMARK NO.
0					
0.5'	Brown to Dark Brown HUMUS/TOPSOIL		E	4A	1.
1'	Yellow Brown Fine SAND, so. Silt, tr. f/c Gravel		E	3A, 1B	
2'			VD		2.
3'	REFUSAL ON BEDROCK - END OF EXPLORATION				
3.0'					
4'					
5'					
6'					
7'					
8'					
9'					
10'					
11'					
12'					
13'					
14'					
15'					
16'					

REMARKS:

1. No groundwater encountered.
2. Soil sample obtained at 2.5' depth.
3. Location at roadway Station 21+00 centerline.

TEST PIT PLAN

6'
2'
NORTH

APPROX. VOLUME = _____cu.yd EXCAVATED

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

EXCAVATION EFFORT

E-----EASY
M-----MODERATE
D-----DIFFICULT

PROPORTIONS USED

TRACE (TR.) 0 - 10%
LITTLE (LI.) 10 - 20%
SOME (SO.) 20 - 35%
AND 35 - 50%

ABBREVIATIONS

F-FINE
M-MEDIUM
C-COARSE
F/M-FINE TO MEDIUM
F/C-FINE TO COARSE
V-VERY
GR-GRAY
BN-BROWN
YEL-YELLOW

GROUNDWATER

ELAPSED TIME TO READING (HRS.)	DEPTH TO GROUND WATER

TEST PIT FIELD LOG

GeoDesign, Inc.
984 Southford Road, Middlebury, Connecticut 06762
GEOTECHNICAL ENGINEERS and ENVIRONMENTAL CONSULTANTS

PROJECT
Kingston Industial Park
Kingston, New York

TEST PIT NO. TP-3
FILE No. 053-01
DATE October 10, 1995

EXCAVATION EQUIPMENT

GeoDesign Engineer: R. Marshall
WEATHER: Clear, 60's (F)

CONTRACTOR Soil Testing, Inc.
OPERATOR Vinny Organti
MAKE Case MODEL 580k
CAPACITY 1/5 cy REACH 18 feet

GROUND ELEV. 245 FT.
TIME STARTED 1145 HRS
TIME COMPLETED 1157 HRS

DEPTH	SOIL DESCRIPTION	FIELD TESTING (OVA)	EXCAV. EFFORT	BOULDER COUNT QTY CLASS	REMARK NO.
0					
0.3'	TOPSOIL/SUBSOIL		E	2A	1.
1'	Yellow Brown Fine SAND, so.(-) Silt, tr. f/c gravel		E	2A	2.
2'					
3'	2.5'		VD		
3.0'	REFUSAL ON BEDROCK - END OF EXPLORATION				
4'					
5'					
6'					
7'					
8'					
9'					
10'					
11'					
12'					
13'					
14'					
15'					
16'					

REMARKS:

1. No groundwater encountered.
2. Soil sample obtained at 2.5' depth.
3. See plan for location

TEST PIT PLAN

6'
2'
NORTH

APPROX. VOLUME = _____ cu.yd

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

EXCAVATION EFFORT

E-----EASY
M-----MODERATE

PROPORTIONS USED

TRACE (TR.) 0 - 10%
LITTLE (LI.) 10 - 20%
SOME (SO.) 20 - 35%
AND 35 - 50%

ABBREVIATIONS

F-FINE
M-MEDIUM
C-COARSE
F/M-FINE TO MEDIUM
F/C-FINE TO COARSE
V-VERY
GR-GRAY
BN-BROWN
YEL-YELLOW

GROUNDWATER

ELAPSED TIME TO READING (HRS.)	DEPTH TO GROUND WATER

TEST PIT FIELD LOG

GeoDesign, Inc. 984 Southford Road, Middlebury, Connecticut 06762 GEOTECHNICAL ENGINEERS and ENVIRONMENTAL CONSULTANTS	PROJECT Kingston Industrial Park Kingston, New York	TEST PIT NO. TP-4 FILE No. 053-01 DATE October 10, 1995

EXCAVATION EQUIPMENT

GeoDesign Engineer: R. Marshall

WEATHER: Clear, 60's (F)

CONTRACTOR Soil Testing, Inc.
OPERATOR Vinny Organti
MAKE Case MODEL 580k
CAPACITY 1/5 cy REACH 18 feet

GROUND ELEV. 260 FT. t

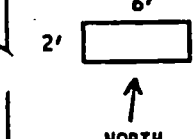
TIME STARTED 1255 HRS
TIME COMPLETED 1310 HRS

DEPTH	SOIL DESCRIPTION	FIELD TESTING (OVA)	EXCAV. EFFORT	BOULDER COUNT QTY CLASS	REMARK NO.
0					
0.7'	TOPSOIL/HUMUS		E		1.
1'–3'	Yellow Brown Fine SAND, so. Silt, li. f/c gravel		E	1A	2.
			VD	2A	
3.0'	REFUSAL ON BEDROCK - END OF EXPLORATION				
4'–16'					

REMARKS:

1. No groundwater encountered.
2. Soil sample obtained at 2' depth.
3. See plan for location

TEST PIT PLAN



APPROX. VOLUME = cu.yd

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

EXCAVATION EFFORT

E-----EASY
M-----MODERATE

PROPORTIONS USED

TRACE (TR.) 0 - 10%
LITTLE (LI.) 10 - 20%
SOME (SO.) 20 - 35%
AND 35 - 50%

ABBREVIATIONS

F-FINE
M-MEDIUM
C-COARSE
F/M-FINE TO MEDIUM
F/C-FINE TO COARSE
V-VERY
GR-GRAY
BN-BROWN
YEL-YELLOW

GROUNDWATER

ELAPSED TIME TO READING (HRS.)	DEPTH TO GROUND WATER

TEST PIT FIELD LOG

GeoDesign, Inc. 984 Southford Road, Middlebury, Connecticut 06762 GEOTECHNICAL ENGINEERS and ENVIRONMENTAL CONSULTANTS	PROJECT Kingston Industrial Park Kingston, New York	TEST PIT NO. TP-5 FILE No. 053-01 DATE October 10, 1995

EXCAVATION EQUIPMENT

GeoDesign Engineer: R. Marshall

WEATHER: Clear, 60's (F)

CONTRACTOR Soil Testing, Inc.
OPERATOR Vinny Organti
MAKE Case MODEL 580k
CAPACITY 1/5 cy REACH 18 feet

GROUND ELEV. 270 FT. ±

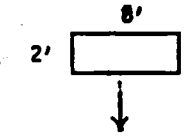
TIME STARTED 1050 HRS
TIME COMPLETED 1110 HRS

DEPTH	SOIL DESCRIPTION	FIELD TESTING (OVA)	EXCAV. EFFORT	BOULDER COUNT QTY CLASS	REMARK NO.
0					
0.5'	TOPSOIL/HUMUS		E		1.
1'	Yellow Brown to Orange Brown Fine SAND, so. Silt, tr. f/c Gravel		E		
2'					
2.5'			E		
3'	Light Brown/Tan Fine SAND, so. Silt		E		2.
4'					
4.5'	REFUSAL ON BEDROCK - END OF EXPLORATION		VD		
5'					
6'					
7'					
8'					
9'					
10'					
11'					
12'					
13'					
14'					
15'					
16'					

REMARKS:

1. No groundwater encountered.
2. Soil sample obtained at 3'depth.
3. See plan for location

TEST PIT PLAN



APPROX. VOLUME = cu.yd

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

EXCAVATION EFFORT

E-----EASY
M-----MODERATE

PROPORTIONS USED

TRACE (TR.) 0 - 10%
LITTLE (LI.) 10 - 20%
SOME (SO.) 20 - 35%
AND 35 - 50%

ABBREVIATIONS

F-FINE
M-MEDIUM
C-COARSE
F/M-FINE TO MEDIUM
F/C-FINE TO COARSE
V-VERY
GR-GRAY
BN-BROWN
YEL-YELLOW

GROUNDWATER

ELAPSED TIME TO READING (HRS.)	DEPTH TO GROUND WATER

TEST PIT FIELD LOG

GeoDesign, Inc. 984 Southford Road, Middlebury, Connecticut 06762 GEOTECHNICAL ENGINEERS and ENVIRONMENTAL CONSULTANTS	PROJECT Kingston Industial Park Kingston, New York	TEST PIT NO. TP-6 FILE No. 053-01 DATE October 10, 1995

EXCAVATION EQUIPMENT

GeoDesign Engineer: R. Marshall

WEATHER: Clear, 60's (F)

CONTRACTOR Soil Testing, Inc.
OPERATOR Vinny Organti
MAKE Case MODEL 580k
CAPACITY 1/5 cy REACH 18 feet

GROUND ELEV. 275 FT. ±

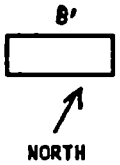
TIME STARTED 1330 HRS
TIME COMPLETED 1345 HRS

DEPTH	SOIL DESCRIPTION	FIELD TESTING (OVA)	EXCAV. EFFORT	BOULDER COUNT QTY CLASS	REMARK NO.
0					
0.5'	TOPSOIL/HUMUS		E		1.
1'	Yellow Brown Fine SAND, so. Silt, li.(-) f/c Gravel		E	2A	
2'			E		
3'			M		2.
3'	Yellow Brown F/M SAND, so.(-) Silt, so.(-) f/c Gravel		M	3A	
4'					
5'					
5.5'			VD		
6'	REFUSAL ON BEDROCK - END OF EXPLORATION				
7'					
8'					
9'					
10'					
11'					
12'					
13'					
14'					
15'					
16'					

REMARKS:

1. No groundwater encountered.
2. Soil sample obtained at 4' depth.
3. See plan for location

TEST PIT PLAN



APPROX. VOLUME = _____cu.yd

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

EXCAVATION EFFORT

E-----EASY
M-----MODERATE

PROPORTIONS USED

TRACE (TR.) 0 - 10%
LITTLE (LI.) 10 - 20%
SOME (SO.) 20 - 35%
AND 35 - 50%

ABBREVIATIONS

F-FINE
M-MEDIUM
C-COARSE
F/M-FINE TO MEDIUM
F/C-FINE TO COARSE
V-VERY
GR-GRAY
BN-BROWN
YEL-YELLOW

GROUNDWATER

ELAPSED TIME TO READING (HRS.)	DEPTH TO GROUND WATER

TEST PIT FIELD LOG

GeoDesign, Inc.
984 Southford Road, Middlebury, Connecticut 06762
GEOTECHNICAL ENGINEERS and ENVIRONMENTAL CONSULTANTS

PROJECT
Kingston Industrial Park
Kingston, New York

TEST PIT NO. TP-7
FILE No. 053-01
DATE October 10, 1995

EXCAVATION EQUIPMENT

GeoDesign Engineer: R. Marshall
WEATHER: Clear, 60's (F)

CONTRACTOR Soil Testing, Inc.
OPERATOR Vinny Organti
MAKE Case MODEL 580k
CAPACITY 1/5 cy REACH 18 feet

GROUND ELEV. 280 FT. ±
TIME STARTED 1130 HRS
TIME COMPLETED 1145 HRS

DEPTH	SOIL DESCRIPTION	FIELD TESTING (OVA)	EXCAV. EFFORT	BOULDER COUNT QTY CLASS	REMARK NO.
0					
0.3'	TOPSOIL/HUMUS		E	2A	1.
1'	Yellow Brown to Orange Brown F. SAND and SILT, tr. fine gravel		E	2A	2.
2'					
2.5'			VD		
3'	REFUSAL ON BEDROCK - END OF EXPLORATION				
4'					
5'					
6'					
7'					
8'					
9'					
10'					
11'					
12'					
13'					
14'					
15'					
16'					

REMARKS:

1. No groundwater encountered.
2. Soil sample obtained at 2' depth.
3. See plan for location

TEST PIT PLAN

8'
2'
NORTH

APPROX. VOLUME = _____cu.yd

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

EXCAVATION EFFORT

E-----EASY
M-----MODERATE

PROPORTIONS USED

TRACE (TR.) 0 - 10%
LITTLE (LI.) 10 - 20%
SOME (SO.) 20 - 35%
AND 35 - 50%

ABBREVIATIONS

F-FINE
M-MEDIUM
C-COARSE
F/M-FINE TO MEDIUM
F/C-FINE TO COARSE
V-VERY
GR-GRAY
BN-BROWN
YEL-YELLOW

GROUNDWATER

ELAPSED TIME TO READING (HRS.)	DEPTH TO GROUND WATER

TEST PIT FIELD LOG

GeoDesign, Inc.
984 Southford Road, Middlebury, Connecticut 06762
GEOTECHNICAL ENGINEERS and ENVIRONMENTAL CONSULTANTS

PROJECT
Kingston Industial Park
Kingston, New York

TEST PIT NO. TP-8
FILE No. 053-01
DATE October 10, 1995

EXCAVATION EQUIPMENT

GeoDesign Engineer: R. Marshall
WEATHER: Clear, 60's (F)

CONTRACTOR Soil Testing, Inc.
OPERATOR Vinny Organti
MAKE Case MODEL 580k
CAPACITY 1/5 cy REACH 18 feet

GROUND ELEV. 265 FT. ±
TIME STARTED 1020 HRS
TIME COMPLETED 1030 HRS

DEPTH	SOIL DESCRIPTION	FIELD TESTING (OVA)	EXCAV. EFFORT	BOULDER COUNT QTY CLASS	REMARK NO.
0					
0.5'	TOPSOIL/HUMUS		E		1.
1'	Yellow Brown F/M SAND and SILT, tr. fine Gravel		E		
2'					
2.5'			VD		
3'	WEATHERED BEDROCK				
3.5'	REFUSAL ON BEDROCK - END OF EXPLORATION				
4'					
5'					
6'					
7'					
8'					
9'					
10'					
11'					
12'					
13'					
14'					
15'					
16'					

REMARKS:

1. No groundwater encountered.
2. Soil sample obtained at 2' depth.
3. See plan for location

TEST PIT PLAN

8'
2'
NORTH

APPROX. VOLUME = _____ cu.yd

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

EXCAVATION EFFORT

E-----EASY
M-----MODERATE
VD----VERY DIFFICULT

PROPORTIONS USED

TRACE (TR.) 0 - 10%
LITTLE (LI.) 10 - 20%
SOME (SO.) 20 - 35%
AND 35 - 50%

ABBREVIATIONS

F-FINE
M-MEDIUM
C-COARSE
F/M-FINE TO MEDIUM
F/C-FINE TO COARSE
V-VERY
GR-GRAY
BN-BROWN
YEL-YELLOW

GROUNDWATER

ELAPSED TIME TO READING (HRS.)	DEPTH TO GROUND WATER

TEST PIT FIELD LOG

GeoDesign, Inc.
984 Southford Road, Middlebury, Connecticut 06762
GEOTECHNICAL ENGINEERS and ENVIRONMENTAL CONSULTANTS

PROJECT
Kingston Industial Park
Kingston, New York

TEST PIT NO. TP-9
FILE No. 053-01
DATE October 10, 1995

EXCAVATION EQUIPMENT

GeoDesign Engineer: R. Marshall
WEATHER: Clear, 60's (F)

CONTRACTOR Soil Testing, Inc.
OPERATOR Vinny Organti
MAKE Case MODEL 580k
CAPACITY 1/5 cy REACH 18 feet

GROUND ELEV. 270 FT. ±
TIME STARTED 1020 HRS
TIME COMPLETED 1030 HRS

DEPTH	SOIL DESCRIPTION	FIELD TESTING (OVA)	EXCAV. EFFORT	BOULDER COUNT QTY CLASS	REMARK NO.
0					
0.5'	TOPSOIL/HUMUS		E		1.
1'			E		
2'				2A	
3'	Yellow Brown Fine SAND, so. Silt, trace f/c Gravel			2A,1B	
4'					
5'				3A	
6'				4A	
7'					
8'	8'				
9'	REFUSAL ON BEDROCK - END OF EXPLORATION				
10'					
11'					
12'					
13'					
14'					
15'					
16'					

REMARKS:

1. No groundwater encountered.
2. See plan for location

TEST PIT PLAN

8'
2'
NORTH

APPROX. VOLUME = _____ cu.yd

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

EXCAVATION EFFORT
E-----EASY
M-----MODERATE

PROPORTIONS USED

TRACE (TR.) 0 - 10%
LITTLE (LI.) 10 - 20%
SOME (SO.) 20 - 35%
AND 35 - 50%

ABBREVIATIONS

F-FINE
M-MEDIUM
C-COARSE
F/M-FINE TO MEDIUM
F/C-FINE TO COARSE
V-VERY
GR-GRAY
BN-BROWN
YEL-YELLOW

GROUNDWATER

ELAPSED TIME TO READING (HRS.)	DEPTH TO GROUND WATER

TEST PIT FIELD LOG

GeoDesign, Inc.
984 Southford Road, Middlebury, Connecticut 06762
GEOTECHNICAL ENGINEERS and ENVIRONMENTAL CONSULTANTS

PROJECT
Kingston Industial Park
Kingston, New York

TEST PIT NO. TP-10
FILE No. 053-01
DATE October 10, 1995

EXCAVATION EQUIPMENT

GeoDesign Engineer: R. Marshall
WEATHER: Clear, 60's (F)

CONTRACTOR Soil Testing, Inc.
OPERATOR Vinny Organti
MAKE Case MODEL 580k
CAPACITY 1/5 cy REACH 18 feet

GROUND ELEV. 260 FT. ±
TIME STARTED 1020 HRS
TIME COMPLETED 1030 HRS

DEPTH	SOIL DESCRIPTION	FIELD TESTING (OVA)	EXCAV. EFFORT	BOULDER COUNT QTY CLASS	REMARK NO.
0					
0.7'	TOPSOIL/HUMUS		E		1.
1'	Yellow Brown Fine SAND, some Silt		E		
2'			VD		
2.5'	REFUSAL ON BEDROCK - END OF EXPLORATION				
3'					
4'					
5'					
6'					
7'					
8'					
9'					
10'					
11'					
12'					
13'					
14'					
15'					
16'					

REMARKS:

1. No groundwater encountered.
2. See plan for location

TEST PIT PLAN

7'
2'
NORTH

APPROX.
VOLUME = cu.yd

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

EXCAVATION EFFORT

E-----EASY
M-----MODERATE

PROPORTIONS USED

TRACE (TR.) 0 - 10%
LITTLE (LI.) 10 - 20%
SOME (SO.) 20 - 35%
AND 35 - 50%

ABBREVIATIONS

F-FINE
M-MEDIUM
C-COARSE
F/M-FINE TO MEDIUM
F/C-FINE TO COARSE
V-VERY
GR-GRAY
BN-BROWN
YEL-YELLOW

GROUNDWATER

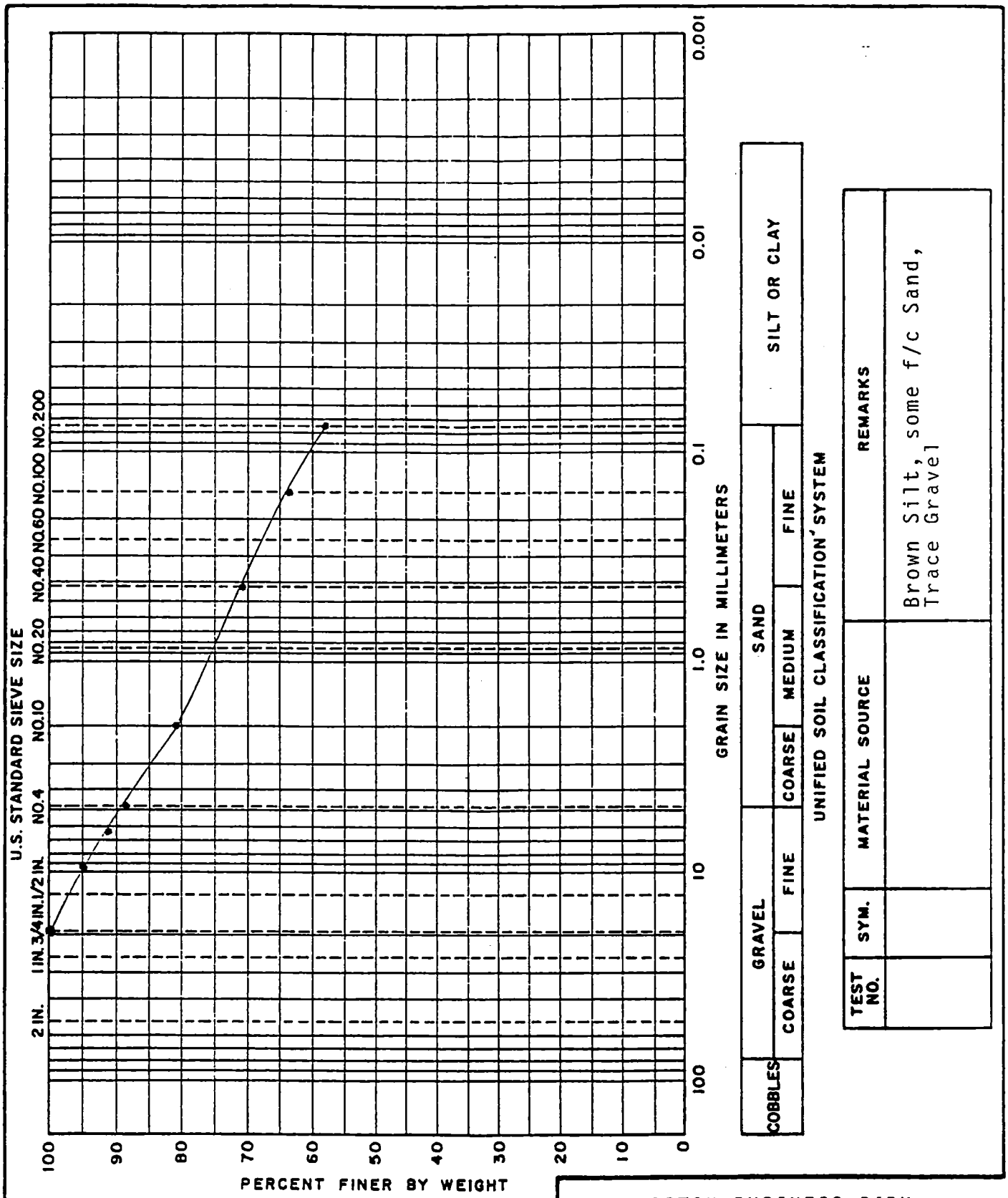
ELAPSED TIME TO READING (HRS.)	DEPTH TO GROUND WATER

KINGSTON BUSINESS PARK
KINGSTON, NY

GRADATION TESTS

BORING NO. TP-2
SAMPLE
DEPTH 2-5 ft.
TECH.

TEST SERIES NO.
DATE 10/26/95



KINGSTON BUSINESS PARK

KINGSTON, NY

GRADATION TESTS

BORING NO. TP-5
SAMPLE
DEPTH 3 feet
TECH.

TEST SERIES NO.
DATE 10/24/95

953-01

KINGSTON BUSINESS PARK
KINGSTON, NY

GRADATION TESTS

BORING NO. TP-1 TEST SERIES NO.
SAMPLE
DEPTH 2 ft. DATE 10/26/95
TECH

KINGSTON BUSINESS PARK

KINGSTON, NY

GRADATION TESTS

BORING NO. TP-7 TEST SERIES NO.

SAMPLE

DEPTH 2 ft. DATE 10/24/95

TECH

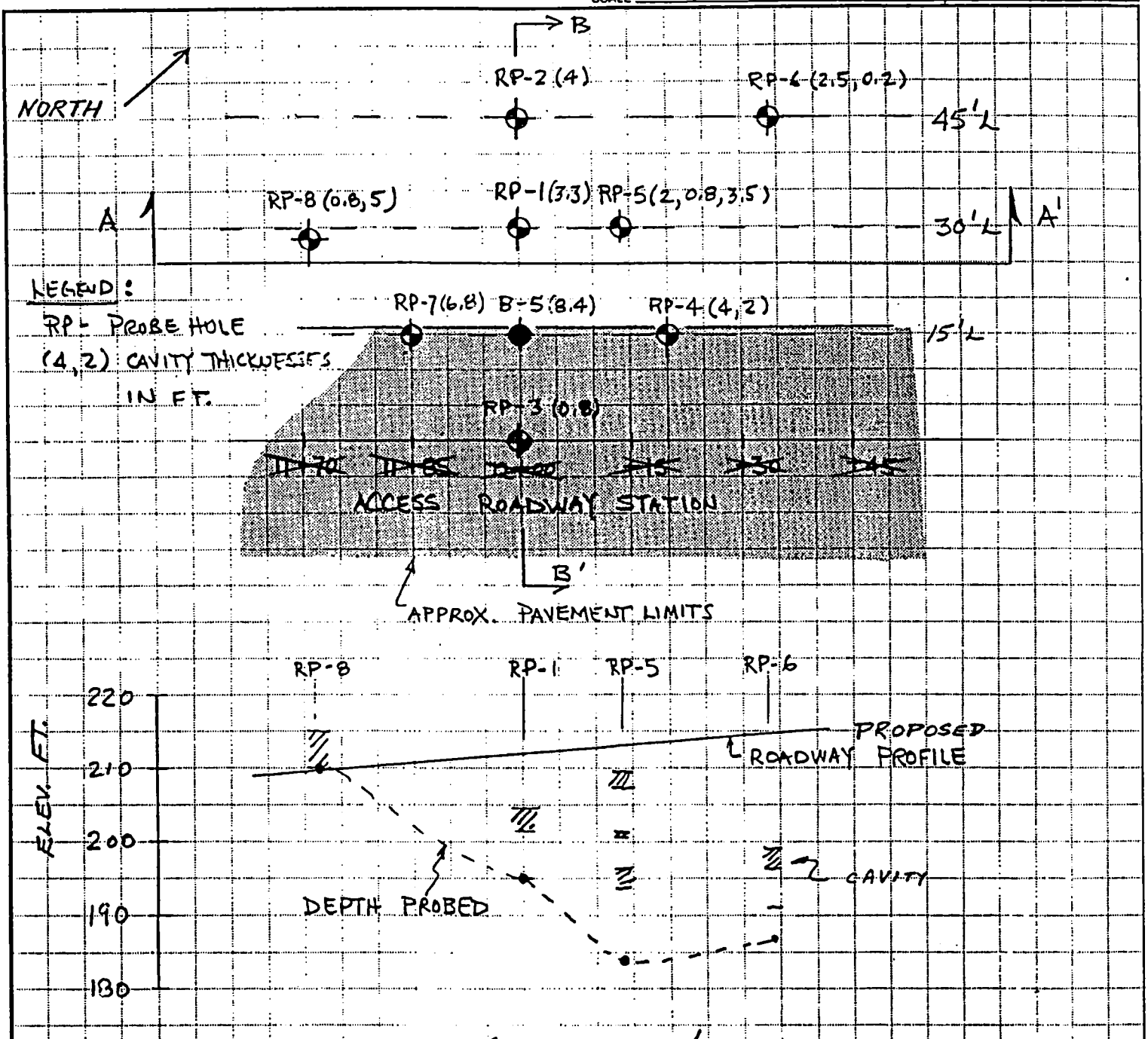
TABLE 1

KINGSTON BUSINESS PARK - SUMMARY OF EXPLORATION DATA						
Exploration	Station/Offset feet	Elevation (Ground) feet	Topsoil thickness inches	Glacial Till thickness feet	"Weathered" Rock thickness feet	Bedrock depth*** feet
Access Road	**					
B-1	1+00/10' left	144	3	6.8	1	8
B-2	3+00/15' left	170	4	2.2		2.5
B-3	5+00/15' left	187	4	6.3	1.7	8
B-4	7+00/15' left	194	3	7.8		8
TP-1	9+50/center	190	6	2.5		3
B-5	12+00/15' left	256	3	3.8		4
B-6	14+00/15' left	249	4	4.7		5
B-7	16+00/15' left	254	4	4.7	3	8
B-8	24+00/center	183	3	1.8	0.5	2.5
B-9	26+50/center	280	3	0.8		1
Building Area						
B-10	*		3	4.8	1	6
B-11	*		4	6.2	3.5	10
B-14	*		3	2.8	2.8	3
B-16	*		3	7.3	3	10
TP-2	*		6	2.5		3
TP-3	*		4	2.8		3
TP-4	*		8	2.3		3
TP-5	*		6	4		4.5
TP-6	*		6	5		5.5
TP-7	*		4	2.2		2.5
TP-8	*		6	2	1	3.5
TP-9	*		6	7.5		8
TP-10	*		8	1.8		2.5
Average Thickness			5	4		5
* located in building area - please refer to plan for location						
** See Dwgs.						
*** sum of topsoil, glacial till and weathered rock thicknesses = depth to bedrock						

SUMMARY OF ROCK PROBES - ROADWAY STATION 12+00 VICINITY							
KINGSTON BUSINESS PARK, KINGSTON, NY							
Probe Number	Depth (ft.)	Station	Offset (ft.)	Ground Elev. (ft.)	Depth to Top of Cavity (ft.)	Thickness Cavity (ft.)	Elev. Top of Cavity (ft.)
B-5	52	12+00	15 L	256	43.6	8.4	212.4
RP-1	66	12+00	30 L	261	56.5	3.3	204.5
RP-2	80	12+00	45 L	264	63.5	4	200.5
RP-3	60	12+00	CL	252	47	0.8	205
RP-4	70	12+20	15 L	256	52	4	204
				256	62	2	194
RP-5	76	12+13	30 L	260	51	2	209
				260	59.5	0.8	200.5
				260	63.5	3.5	196.5
RP-6	70	12+33	30 L	257	58.5	2.5	198.5
				257	65.8	0.2	191.2
RP-7	60	11+85	15 L	255	40.5	6.8	214.5
RP-8	50	11+72	28 L	260	36	0.8	224
				260	45	5	215
Total	584						

GEODESIGN
INCORPORATED
GEOTECHNICAL ENGINEERS
AND ENVIRONMENTAL CONSULTANTS
984 SOUTHFORD ROAD • MIDDLEBURY, CT 06762
TEL: 203.758.8836 • FAX: 203.758.8842

JOB 053-01 KINGSTON BUSINESS PARK
SHEET NO. 1 OF 2
CALCULATED BY TVR DATE 10-30-95
CHECKED BY ULF DATE 11-3-95
SCALE 1" = 20'



SECTION A-A'

(SECTION B-B' ON SHT 2 of 2)

EXHIBIT F

MODIFIED STORM WATER MANAGEMENT REPORT

MODIFIED

STORM WATER MANAGEMENT REPORT

KINGSTON BUSINESS PARK

Delaware Avenue, Kingston, N.Y.

Prepared for:

KINGSTON LOCAL DEVELOPMENT CORPORATION

City Hall, Kingston, N.Y.

January 10, 1996

Prepared by:

BRINNIER AND LARIOS, P.C.
PROFESSIONAL ENGINEERS
67 Maiden Lane, Kingston, N.Y.

MODIFIED

STORM WATER MANAGEMENT REPORT

KINGSTON BUSINESS PARK

Delaware Avenue, Kingston, N.Y.

Prepared for:

KINGSTON LOCAL DEVELOPMENT CORPORATION

I Garraghan Drive, City Hall, Kingston, N.Y. 12401

January 10, 1996

Prepared by:

BRINNIER AND LARIOS, P.C.
PROFESSIONAL ENGINEERS
67 Maiden Lane, Kingston, N.Y. 12401

MODIFIED STORM WATER MANAGEMENT REPORT
KINGSTON BUSINESS PARK
Delaware Avenue, Kingston, N.Y.

January 10, 1996

INTRODUCTION

The proposed project consists of development of three to five independent and separate facilities ultimately totaling up to 500,000 square feet on a 107-acre site owned by the Kingston Local Development Corporation. The property consists of a vacant, unimproved parcel located northerly of Delaware Avenue, easterly of Third Avenue/Fourth Avenue and westerly of Locust Street and North Street. Topographic conditions restrict usable building area to approximately 60 acres. A location map is attached as Exhibit 1.

The development is planned to occur in phases. Phase 1 consists of construction of approximately 250,000 square feet of light industrial space in two buildings. Huck International, the single designated developer at this time, plans to begin construction of a 142,000 square foot facility in early 1996.

PURPOSE, METHODOLOGY AND OBJECTIVES

The purpose of this report is to present an engineering evaluation of existing (i.e. pre-development) and proposed (i.e. post-development) storm water conditions at the site. The report is intended to form the basis for subsequent detailed engineering design of storm water management facilities to be installed in conjunction with construction of individual project sites.

The method used in the report follows the urban hydrology model developed by the U.S.D.A. Soil Conservation Service known as the TR-55 (Technical Release 55) procedure for calculating storm runoff volume and peak rate of discharge from small watersheds. The report analyzes the 2, 10, 25, and 100-year, 24-hour storm events for comparison of pre- and post-development conditions.

The objectives of the storm water management plan are as follows:

- Prevent flooding of abutting properties by limiting post development off-site runoff to rates equal to or less than existing rates.

- Prevent excessive ponding and flooding within proposed paved and other impervious areas.
- Maintain, to the greatest extent possible, existing site drainage patterns.
- Enhance the quality of storm water generated from the proposed project prior to discharge via "first-flush" treatment techniques.
- Utilize on-site features (i.e.mined excavations, depressions, etc.) for peak flow attentuation and extended detention and filtration.
- Utilize excess rock from road and building site cut areas for construction of subsurface exfiltration areas under parking lots.

EXISTING CONDITIONS

Site relief across the entire 107-acre parcel is very irregular, consisting generally of short slopes ranging from 10 to 30 percent. The site varies in elevation from 130 at Delaware Avenue to an elevation of 290 at several locations on the property. Soils consist of an average 4-foot depth of a silty glacial till and a 5-inch layer of topsoil overlying folded and tilted limestone bedrock. The glacial till is comprised of a heterogeneous mixture of boulders, gravel, sand, silt and clay. The site is heavily wooded with dispersed areas of rock outcrop.

Soils over approximately 90 percent of the site are classified as variations of "Stockbridge-Farmington Rock outcrop, hilly" by the *Soil Survey of Ulster County* (see Exhibit 2). Other soils consist of "Plainfield loamy sand" and "Plainfield-Riverhead complex, very steep". Hydrologic classification is in the B-C range, demonstrating low to moderate rates of water transmission.

Used during the 19th century for mining of limestone for manufacture of cement, the site contains several deep, open mines. Fractures and voids in these underground folded rock formations give support to assumption of a general northeast direction of groundwater flow. Inspection of these deep mined areas indicated that they were generally well-drained, with some small areas of entrapped water.

In order to determine the peak rate of runoff and associated storm water volumes, the site was divided into a total of 21 existing drainage catchments (see Exhibit 3). While several areas of the site contribute runoff to larger drainage areas located off the property, only those portions of these catchments within the site boundary were used for purposes of determining any net change in storm water flow resulting from development. Excluding a small area located at the north end of the site, no runoff originating from adjacent properties flows onto the site.

Runoff from those catchment areas identified under existing conditions are summarized in the following tables for each of the 2, 10, 25, and 100-year storm events:

TABLE OF ON-SITE STORM WATER DISCHARGES
EXISTING CONDITIONS
(2-YEAR)

AREA	PEAK FLOW (CFS)	VOLUME (AC-FT)
D	0.8	0.08
E	1.4	0.11
I	5.4	0.6
J	0.7	0.08
K	6.7	0.62
M	0.8	0.14
N	4.2	0.48
Q	2.9	0.68
TOTALS	22.9	2.79

TABLE OF OFF-SITE STORM WATER DISCHARGES
EXISTING CONDITIONS
(2-YEAR)

AREA	PEAK FLOW (CFS)	VOLUME (AC-FT)
A	1.7	0.22
B	0.7	0.07
C	2.0	0.31
F	9.2	1.31
G	2.9	0.25
H	1.6	0.23
L	3.1	0.21
O	2.9	0.33
P	4.7	0.5
R	3.3	0.38
S	3.2	0.34
T	2.0	0.22
U	0.1	0.0
TOTALS	37.4	4.37

TABLE OF ON-SITE STORM WATER DISCHARGES
EXISTING CONDITIONS
(10-YEAR)

AREA	PEAK FLOW (CFS)	VOLUME (AC-FT)
D	1.9	0.23
E	2.9	0.24
I	12.9	1.44
J	1.7	0.21
K	15.1	1.42
M	1.8	0.32
N	10.1	1.14
Q	7.5	1.75
TOTALS	53.9	6.75

TABLE OF OFF-SITE STORM WATER DISCHARGES
EXISTING CONDITIONS
(10-YEAR)

AREA	PEAK FLOW (CFS)	VOLUME (AC-FT)
A	3.8	0.47
B	1.7	0.19
C	4.8	0.76
F	21	3.02
G	6.1	0.53
H	3.8	0.55
L	6.6	0.45
O	6.4	0.73
P	11.4	1.23
R	9.9	1.19
S	7.0	0.77
T	4.9	0.54
U	0.6	0.03
TOTALS	88	10.46

TABLE OF ON-SITE STORM WATER DISCHARGES
EXISTING CONDITIONS
(25-YEAR)

AREA	PEAK FLOW (CFS)	VOLUME (AC-FT)
D	2.2	0.26
E	3.4	0.27
I	15	1.68
J	1.9	0.24
K	17.5	1.63
M	2.1	0.38
N	11.7	1.33
Q	8.9	2.06
TOTALS	62.7	7.85

TABLE OF OFF-SITE STORM WATER DISCHARGES
EXISTING CONDITIONS
(25-YEAR)

AREA	PEAK FLOW (CFS)	VOLUME (AC-FT)
A	4.3	0.54
B	1.9	0.21
C	5.6	0.88
F	24.3	3.49
G	7	0.6
H	4.4	0.64
L	7.6	0.51
O	7.4	0.84
P	13.3	1.43
R	12	1.44
S	8	0.88
T	5.7	0.63
U	0.7	0.05
TOTALS	102.2	12.14

TABLE OF ON-SITE STORM WATER DISCHARGES
EXISTING CONDITIONS
(100-YEAR)

AREA	PEAK FLOW (CFS)	VOLUME (AC-FT)
D	3.2	0.38
E	4.7	0.38
I	21.7	2.42
J	2.8	0.35
K	24.9	2.33
M	3	0.54
N	16.9	1.92
Q	13.2	3.06
TOTALS	90.4	11.38

TABLE OF OFF-SITE STORM WATER DISCHARGES
EXISTING CONDITIONS
(100-YEAR)

AREA	PEAK FLOW (CFS)	VOLUME (AC-FT)
A	6.1	0.77
B	2.7	0.30
C	8.1	1.28
F	34.7	5.0
G	9.6	0.83
H	6.4	0.93
L	10.6	0.72
O	10.5	1.19
P	19.3	2.09
R	18.7	2.25
S	11.4	1.25
T	8.3	0.92
U	1.3	0.10
TOTALS	147.7	17.63

PROPOSED CONDITIONS

The proposed storm water management program consists of both open and closed systems to convey runoff to existing ravines and mines located on the property. Roadways are to be pitched to ditches and directed via surface swale, piping and depressions to mined excavation areas located near the eastern and southern portions of the site. Storm drainage directly from building sites are to consist of catch basins with deep sumps and vapor tight traps to capture sediment and minimize carryover of floating contaminants. This runoff will then be directed to stormwater treatment units ("Vortechs") that provide efficient removal of settleable and floatable products, including sand, silt, metals, hydrocarbon-laden sediments, etc. Discharge will then be to on-site areas, with the exception of the northwesterly building and parking lot (post-development subcatchment N2) which will flow into an extended detention basin with outlet flow control to a future roadside ditch, ultimately to existing drainage off-site (north of project). The extended detention basin will require a volume of about 1.5 Ac.-Ft. in order to maintain the post-development peak discharge rate within the 25-year pre-development discharge rate (i.e., Catchment C, peak flow = 5.6 cfs).

The largest on-site mine (post-development subcatchment I2) will be partially filled with processed filtration material, and will provide extended detention and additional filtration of the stormwater runoff from Sub-Catchment I2.

Roadside ditches will be constructed with rip-rap, and will be underlaid with permeable geotextile material to provide filtration of any runoff percolating into the subsurface along the length of the drainage swale.

In order to determine the net change in runoff characteristics from existing conditions, the site was divided into a total of 19 post-development drainage catchments (see Exhibit 4). Catchment I2, as referenced above, was further divided into 5 subareas.

Since areas for exfiltration have not yet been delineated, this report conservatively assumes no on-site exfiltration.

An emergency overflow pipe from the on-site mines in Post-Development Sub-Catchment C2 will be provided, and will convey excess stormwater to the combined sewer system along Delaware Avenue.

The resulting peak discharge rates and volumes are summarized in the following tables for each of the 2, 10, 25, and 100-year storm events:

TABLE OF ON-SITE STORM WATER DISCHARGES
POST-DEVELOPMENT
(2-YEAR)

AREA	PEAK FLOW (CFS)	VOLUME (AC-FT)
C2	2.4	0.5
D2	8.8	0.91
I2	46	3.74
J2*	15.2	1.13
R2*	1.5	0.11
TOTALS	73.9	6.39

* Discharge to existing depression located partially on-site (at the extreme northeast corner of property)

TABLE OF OFF-SITE STORM WATER DISCHARGES
POST-DEVELOPMENT
(2-YEAR)

AREA	PEAK FLOW (CFS)	VOLUME (AC-FT)
A2	2.9	0.32
B2	4.6	0.44
E2	0.8	0.07
F2	1.1	0.14
G2	3.1	0.3
H2	1.2	0.18
K2	12.5	0.93
L2	1.7	0.21
M2	0.7	0.07
N2	2.0*	1.23
02	0.8	0.08
P2	0.8	0.04
Q2	2.8	0.24
S2	3.0	0.20
TOTALS	38.0	4.45

* Peak flow of 15.2 cfs from this catchment attenuated to pre-development peak discharge rate with adjustable outlet controlled extended detention basin(1.5 Ac.-Ft. +\-).

TABLE OF ON-SITE STORM WATER DISCHARGES
POST-DEVELOPMENT
(10-YEAR)

AREA	PEAK FLOW (CFS)	VOLUME (AC-FT)
C2	6.3	1.32
D2	18.5	1.91
I2	82.6	6.84
J2*	27.8	2.07
R2*	3.0	0.24
TOTALS	138.2	12.38

* Discharge to existing depression located partially on-site (at the extreme northeast corner of property)

TABLE OF OFF-SITE STORM WATER DISCHARGES
POST-DEVELOPMENT
(10-YEAR)

AREA	PEAK FLOW (CFS)	VOLUME (AC-FT)
A2	6.4	0.72
B2	11.2	1.08
E2	1.8	0.21
F2	2.5	0.3
G2	9.3	0.93
H2	2.9	0.42
K2	27.6	2.06
L2	3.6	0.44
M2	1.7	0.19
N2	4.8*	2.44
02	1.8	0.22
P2	1.7	0.13
Q2	5.9	0.5
S2	6.4	0.43
TOTALS	87.6	10.07

* Peak flow of 29.9 cfs from this catchment attenuated to pre-development peak discharge rate with adjustable outlet controlled extended detention basin (1.5 Ac.-Ft. +\-).

TABLE OF ON-SITE STORM WATER DISCHARGES
POST-DEVELOPMENT
(25-YEAR)

AREA	PEAK FLOW (CFS)	VOLUME (AC-FT)
C2	7.4	1.57
D2	21.2	2.19
I2	82	7.66
J2*	31.1	2.31
R2*	3.5	0.28
TOTALS	145.2	14.01

* Discharge to existing depression located partially on-site (at the extreme northeast corner of property)

TABLE OF OFF-SITE STORM WATER DISCHARGES
POST-DEVELOPMENT
(25-YEAR)

AREA	PEAK FLOW (CFS)	VOLUME (AC-FT)
A2	7.4	0.84
B2	13.1	1.25
E2	2.2	0.24
F2	2.8	0.35
G2	11.3	1.13
H2	3.4	0.49
K2	31.8	2.38
L2	4.1	0.51
M2	1.9	0.22
N2	5.6*	2.76
02	2.1	0.25
P2	2.0	0.15
Q2	6.7	0.57
S2	7.4	0.49
TOTALS	101.8	11.63

* Peak flow of 33.8 cfs from this catchment attenuated to pre-development peak discharge rate with adjustable outlet controlled extended detention basin (1.5 Ac.-Ft. +\-).

TABLE OF ON-SITE STORM WATER DISCHARGES
POST-DEVELOPMENT
(100-YEAR)

AREA	PEAK FLOW (CFS)	VOLUME (AC-FT)
C2	11.1	2.35
D2	29.5	3.05
I2	114	10.14
J2*	41.1	3.07
R2*	4.8	0.38
TOTALS	200.5	18.99

* Discharge to existing depression located partially on-site (at the extreme northeast corner of property)

TABLE OF OFF-SITE STORM WATER DISCHARGES
POST-DEVELOPMENT
(100-YEAR)

AREA	PEAK FLOW (CFS)	VOLUME (AC-FT)
A2	10.4	1.18
B2	19.1	1.83
E2	3.1	0.34
F2	4	0.51
G2	17.6	1.76
H2	4.9	0.71
K2	45	3.36
L2	5.7	0.72
M2	2.8	0.3
N2	8.1*	3.75
02	3.0	0.36
P2	2.9	0.22
Q2	9.3	0.79
S2	10.3	0.64
TOTALS	146.2	16.52

* Peak flow of 45.9 cfs from this catchment attenuated to pre-development peak discharge rate with adjustable outlet controlled extended detention basin (1.5 Ac.-Ft. +\-). The extended detention basin may not retain the entire 100-year storm volume since it is designed to contain, at maximum, the 25-year storm.

SUMMARY AND CONCLUSIONS

Calculations of peak flow and runoff volume for the 2, 10, 25, and 100- year, 24-hour storm events under existing and post-development conditions are summarized in the following table:

SUMMARY OF PEAK DISCHARGES AND RUNOFF VOLUMES (2-YEAR)

	Total On-Site Peak Flow	Discharge Volume	Total Off-Site Peak Flow	Discharge Volume
Pre-development	22.9 CFS	2.79 AC-FT	37.4 CFS	4.37 AC-FT
Post-development	73.9 CFS	6.39 AC-FT	38.0 CFS	4.45 AC-FT
Net change	+ 51 CFS	+ 3.60 AC-FT	+ 0.6 CFS	+ 0.08 AC-FT

The above results indicate that the proposed storm water management plan will result in: (1) an increase of 51 cfs in peak rate of on-site runoff (3.6 acre-feet), and (2) a net increase of 0.6 cfs in peak rate of off-site runoff (0.08 acre-feet). This increase is considered negligible, and it is concluded that the storm water management plan will result in no increase in runoff volume or peak rate of runoff to off-site areas during the 2-year storm.

SUMMARY OF PEAK DISCHARGES AND RUNOFF VOLUMES (10-YEAR)

	Total On-Site Peak Flow	Discharge Volume	Total Off-Site Peak Flow	Discharge Volume
Pre-development	53.9 CFS	6.75 AC-FT	88 CFS	10.46 AC-FT
Post-development	138.2 CFS	12.38 AC-FT	87.6 CFS	10.07 AC-FT
Net change	+ 84.3 CFS	+ 5.63 AC-FT	- 0.4 CFS	- 0.39 AC-FT

The above results indicate that the proposed storm water management plan will result in: (1) an increase of 84.3 cfs in peak rate of on-site runoff (5.63 acre-feet), and (2) a net decrease of 0.4 cfs in peak rate of off-site runoff (0.39 acre-feet). The increase in runoff will be retained on-site through use of existing surface depressions and mined excavations. It can therefore be concluded that the storm water management plan will result in no increase in runoff volume or peak rate of runoff to off-site areas during the 10-year storm.

SUMMARY OF PEAK DISCHARGES AND RUNOFF VOLUMES (25-YEAR)

	Total On-Site Peak Flow	Discharge Volume	Total Off-Site Peak Flow	Discharge Volume
Pre-development	62.8 CFS	7.85 AC-FT	102.2 CFS	12.14 AC-FT
Post-development	145.2 CFS	14.01 AC-FT	101.8 CFS	11.63 AC-FT
Net change	+ 82.4 CFS	+ 6.16 AC-FT	- 0.4 CFS	- 0.51 AC-FT

The above results indicate that the proposed storm water management plan will result in: (1) an increase of 89.8.6 cfs in peak rate of on-site runoff (6.16 acre-feet), and (2) a net decrease of 0.4 cfs in peak rate of off-site runoff (0.51 acre-feet). The increase in runoff will be retained on-site through use of existing surface depressions and mined excavations. It can therefore be concluded that the storm water management plan will result in no increase in runoff volume or peak rate of runoff to off-site areas during the 25-year storm.

SUMMARY OF PEAK DISCHARGES AND RUNOFF VOLUMES (100-YEAR)

	Total On-Site Peak Flow	Discharge Volume	Total Off-Site Peak Flow	Discharge Volume
Pre-development	90.4 CFS	11.38 AC-FT	147.7 CFS	17.63 AC-FT
Post-development	200.5 CFS	18.99 AC-FT	146.2 CFS*	16.52 AC-FT*
Net change	+ 110.1 CFS	+ 7.61 AC-FT	- 1.5 CFS*	- 1.11 AC-FT*

* These values may vary depending on the ultimate impact of the extended detention basin, since the basins holding volume would only be designed for the 25-year storm.

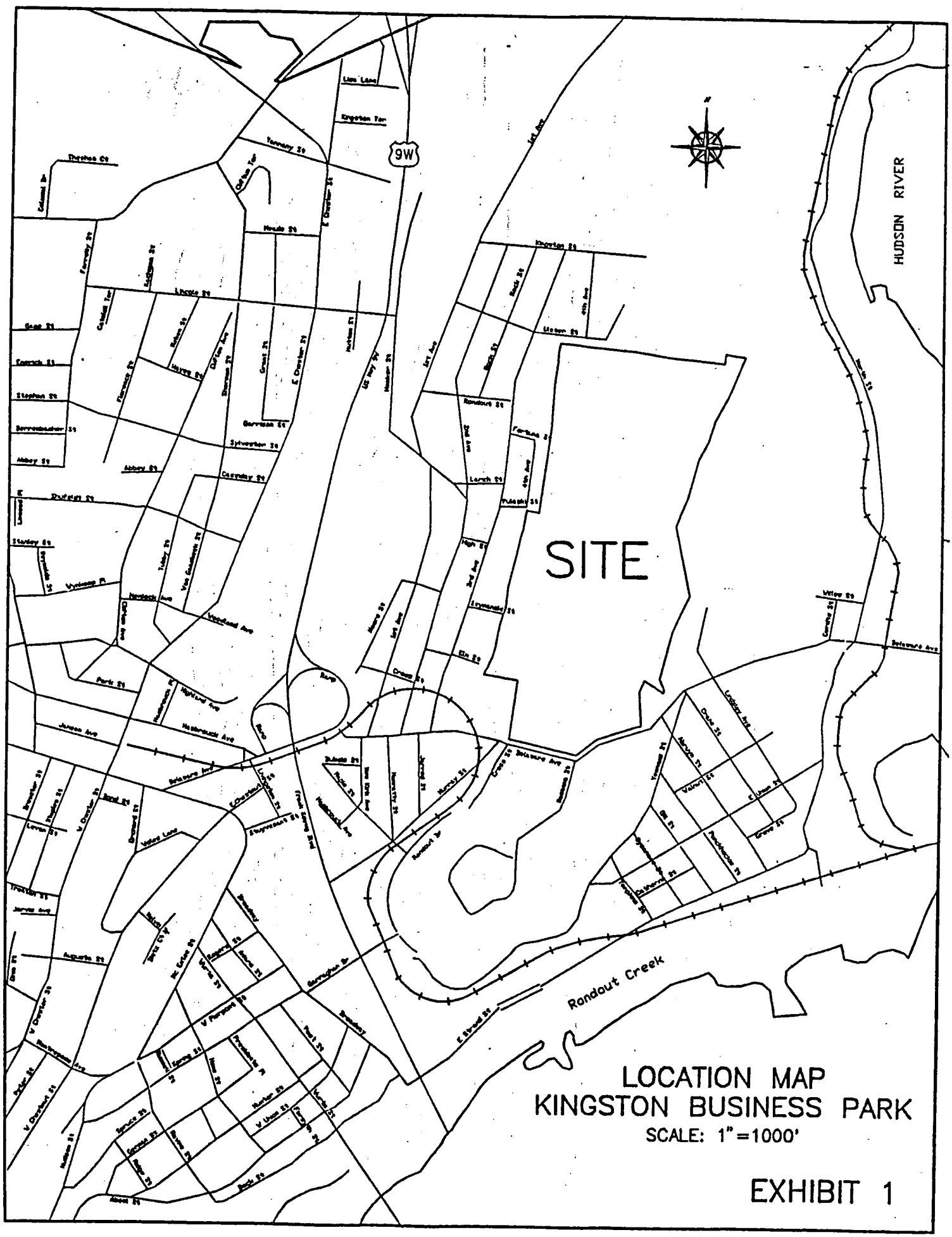
The above results indicate that the proposed storm water management plan will result in: (1) an increase of 110.1 cfs in peak rate of on-site runoff (7.61 acre-feet), and (2) a net decrease of 1.5 cfs in peak rate of off-site runoff (1.11 acre-feet). The increase in runoff will be retained on-site through use of existing surface depressions and mined excavations. Because the extended detention basin is only designed for the 25-year storm event, it is possible that post development peak flows and discharge volumes could exceed pre-development values.

Under the proposed storm water management plan, "first flush" contaminants will be captured and removed by catch basins with deep sumps and vapor tight traps. Additional "first-flush" stormwater quality will be provided by "Vortechs" treatment units, which will remove silt, sand, metals, floating contaminants, etc, from the stormwater stream.

Processed stone will be used to partially fill the mined excavation on post-development subcatchment I2, which will provide additional filtration of runoff. The filled-in mine will also provide an extended detention time. Road-side ditches will be lined with rip-rap stone, and underlaid with permeable geotextile. This will provide filtration of any runoff percolating into the subsurface along the length of the drainage swales.

To prevent siltation of the drainage collection and conveyance system during construction, haybale dikes will be placed around all catch basins while parking lots and roadways are at subgrade and prior to stabilization. Storm water piping will be sized for the 25-year storm event.

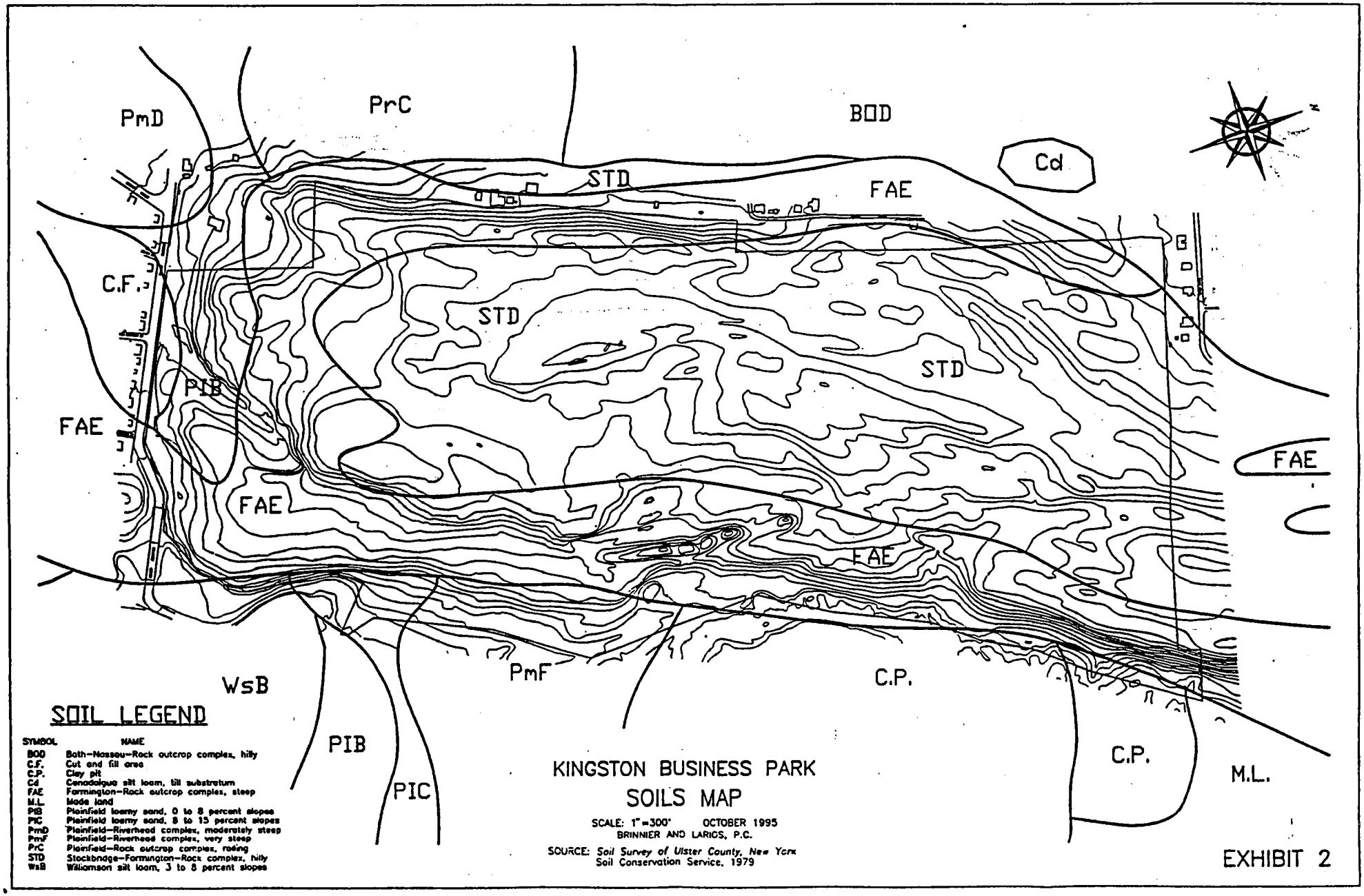
There is a Stormwater Pollution Prevention Plan prepared for the project that provides additional detail and methodology for the control of stormwater quality on the project.



LOCATION MAP
KINGSTON BUSINESS PARK

SCALE: 1" = 1000'

EXHIBIT 1



SOIL LEGEND

SYMBOL	NAME
BOD	Bath–Nassau–Rock outcrop complex, hilly
C.F.	Cut and fill area
C.P.	Clay pit
Cd	Canadaigua silt loam, till substratum
FAE	Farmington–Rock outcrop complex, steep
M.L.	Made land
PIB	Plainfield loamy sand, 0 to 8 percent slopes
PIC	Plainfield loamy sand, 8 to 15 percent slopes
PmD	Plainfield–Riverhead complex, moderately steep
PmF	Plainfield–Riverhead complex, very steep
PrC	Plainfield–Rock outcrop complex, rolling
STD	Stockbridge–Farmington–Rock complex, hilly
WsB	Williamson silt loam, 3 to 8 percent slopes

KINGSTON BUSINESS PARK
SOILS MAP

SCALE: 1"=300' OCTOBER 1995
BRINNIER AND LARIOS, P.C.

SOURCE: *Soil Survey of Ulster County, New York*
Soil Conservation Service, 1979

EXHIBIT 2

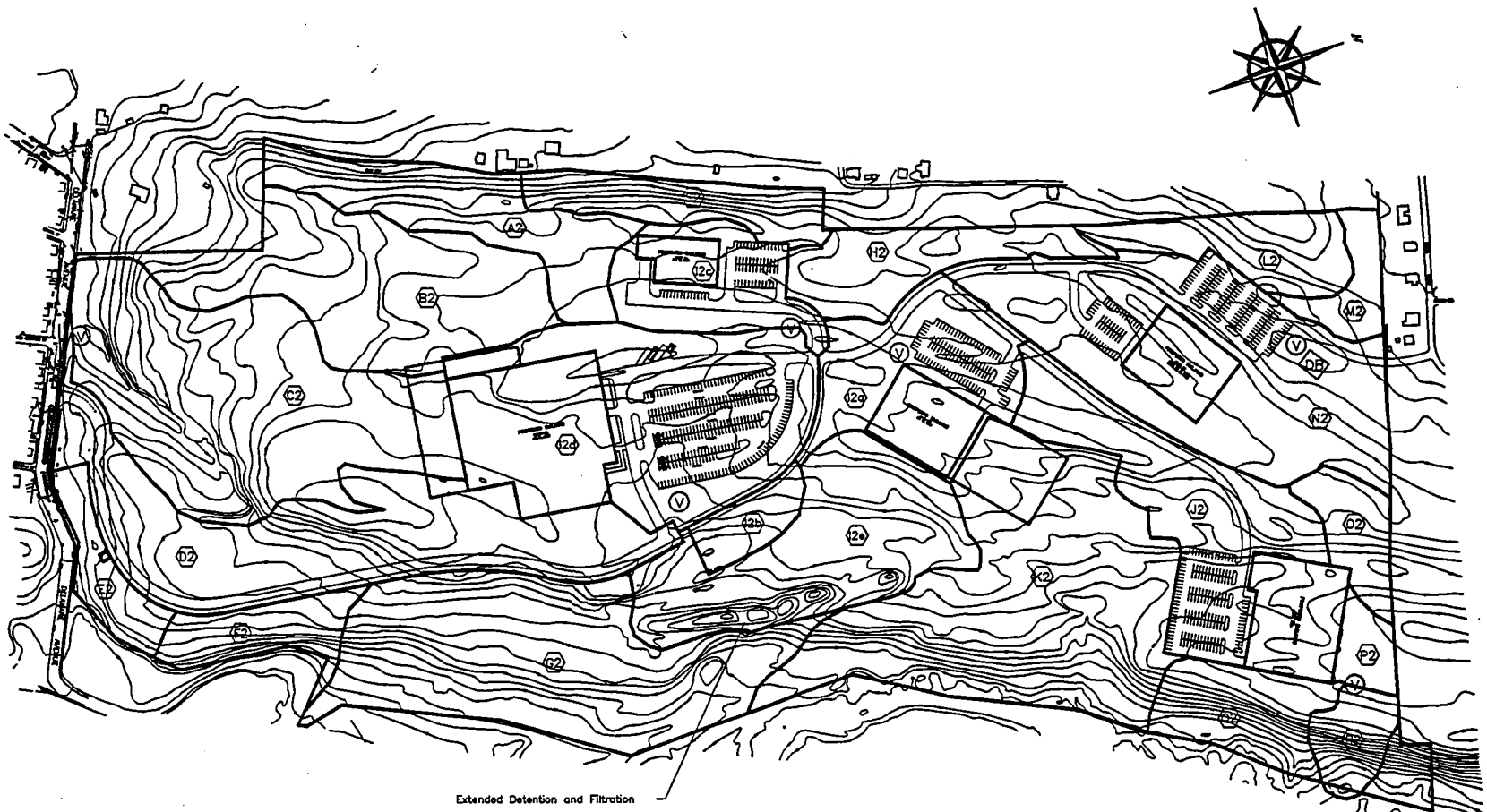
KINGSTON BUSINESS PARK
STORMWATER MANAGEMENT PLAN
EXISTING DRAINAGE AREAS

SCALE: 1"=300' OCTOBER 1995
BRINKER AND DARCS, P.C.

LEGEND

Ⓢ DRAINAGE CATCHMENT AREA

EXHIBIT 3



LEGEND

- (D2) Drainage Catchment Area
- (V) First-Flush Treatment (Vortechs)
- [DB] Extended Detention Basin

KINGSTON BUSINESS PARK

MODIFIED STORM WATER MANAGEMENT PLAN

POST-DEVELOPMENT DRAINAGE AREAS/RUNOFF TREATMENT

JANUARY 1996 SCALE: 1"=300'

BRINNIER AND LARIOS, P.C.

Brinnier & Larios, P. C.
PROJECT:Kingston Business Park
PRE- DEVELOPMENT
2-YEAR

DATE: 1/10/96
SHEET: OF

EXISTING SUBCATCHMENT DATA

SUBCAT # 1 A
AREA= 2.4 ACRES
CN= 68
TC= 46 MIN
PEAK FLOW= 1.7 CFS
RAINFALL= 4 INCHES
VOL= .22 AC.FT.

SUBCAT # 2 B
AREA= 1 ACRES
CN= 66
TC= 36 MIN
PEAK FLOW= .7 CFS
RAINFALL= 4 INCHES
VOL= .07 AC.FT.

SUBCAT # 3 C
AREA= 4.7 ACRES
CN= 63
TC= 64 MIN
PEAK FLOW= 2 CFS
RAINFALL= 4 INCHES
VOL= .31 AC.FT.

SUBCAT # 4 D
AREA= 1.4 ACRES
CN= 63
TC= 41 MIN
PEAK FLOW= .8 CFS
RAINFALL= 4 INCHES
VOL= .08 AC.FT.

SUBCAT # 5 E
AREA= 1.1 ACRES
CN= 71
TC= 22 MIN
PEAK FLOW= 1.4 CFS
RAINFALL= 4 INCHES
VOL= .11 AC.FT.

SUBCAT # 6 F
AREA= 17.2 ACRES
CN= 65
TC= 55 MIN
PEAK FLOW= 9.2 CFS
RAINFALL= 4 INCHES
VOL= 1.31 AC.FT.

SUBCAT # 7 G
AREA= 2.4 ACRES
CN= 71
TC= 25 MIN
PEAK FLOW= 2.9 CFS
RAINFALL= 4 INCHES
VOL= .25 AC.FT.

SUBCAT # 8 H
AREA= 3.4 ACRES
CN= 63
TC= 56 MIN
PEAK FLOW= 1.6 CFS
RAINFALL= 4 INCHES
VOL= .23 AC.FT.

SUBCAT # 9 I
AREA= 8.7 ACRES
CN= 63
TC= 36 MIN
PEAK FLOW= 5.4 CFS
RAINFALL= 4 INCHES
VOL= .6 AC.FT.

SUBCAT # 10 J
AREA= 1.3 ACRES
CN= 63
TC= 47 MIN
PEAK FLOW= .7 CFS
RAINFALL= 4 INCHES
VOL= .08 AC.FT.

SUBCAT # 11 K
AREA= 7.6 ACRES
CN= 66
TC= 28 MIN
PEAK FLOW= 6.7 CFS
RAINFALL= 4 INCHES
VOL= .62 AC.FT.

SUBCAT # 12 L
AREA= 2.2 ACRES
CN= 69
TC= 14 MIN
PEAK FLOW= 3.1 CFS
RAINFALL= 4 INCHES
VOL= .21 AC.FT.

SUBCAT # 13 M

AREA= 2 ACRES
CN= 63
TC= 77 MIN
PEAK FLOW= .8 CFS
RAINFALL= 4 INCHES
VOL= .14 AC.FT.

SUBCAT # 14 N

AREA= 6.9 ACRES
CN= 63
TC= 37 MIN
PEAK FLOW= 4.2 CFS
RAINFALL= 4 INCHES
VOL= .48 AC.FT.

2-Year Pre

SUBCAT # 15 O

AREA= 3.8 ACRES
CN= 67
TC= 37 MIN
PEAK FLOW= 2.9 CFS
RAINFALL= 4 INCHES
VOL= .33 AC.FT.

SUBCAT # 16 P

AREA= 7.7 ACRES
CN= 62
TC= 34 MIN
PEAK FLOW= 4.7 CFS
RAINFALL= 4 INCHES
VOL= .5 AC.FT.

SUBCAT # 17 Q

AREA= 12.9 ACRES
CN= 59
TC= 110 MIN
PEAK FLOW= 2.9 CFS
RAINFALL= 4 INCHES
VOL= .68 AC.FT.

SUBCAT # 18 R

AREA= 11.6 ACRES
CN= 53
TC= 41 MIN
PEAK FLOW= 3.3 CFS
RAINFALL= 4 INCHES
VOL= .38 AC.FT.

SUBCAT # 19 S

AREA= 4 ACRES
CN= 67
TC= 35 MIN
PEAK FLOW= 3.2 CFS
RAINFALL= 4 INCHES
VOL= .34 AC.FT.

SUBCAT # 20 T

AREA= 3.4 ACRES
CN= 62
TC= 35 MIN
PEAK FLOW= 2 CFS
RAINFALL= 4 INCHES
VOL= .22 AC.FT.

SUBCAT # 21 U

AREA= .8 ACRES
CN= 46
TC= 26 MIN
PEAK FLOW= .1 CFS
RAINFALL= 4 INCHES
VOL= 0 AC.FT.

EXISTING ROUTING DATA

EXISTING MEMORY DATA

EXISTING PONDING DATA

Brinnier & Larios, P. C.
PROJECT:Kingston Business Park
PRE-DEVELOPMENT
10-YEAR

DATE: 1/10/96
SHEET: OF

EXISTING SUBCATCHMENT DATA

SUBCAT # 1 A
AREA= 2.4 ACRES
CN= 68
TC= 46 MIN
PEAK FLOW= 3.8 CFS
RAINFALL= 6 INCHES
VOL= .47 AC.FT.

SUBCAT # 2 B
AREA= 1 ACRES
CN= 66
TC= 36 MIN
PEAK FLOW= 1.7 CFS
RAINFALL= 6 INCHES
VOL= .19 AC.FT.

SUBCAT # 3 C
AREA= 4.7 ACRES
CN= 63
TC= 64 MIN
PEAK FLOW= 4.8 CFS
RAINFALL= 6 INCHES
VOL= .76 AC.FT.

SUBCAT # 4 D
AREA= 1.4 ACRES
CN= 63
TC= 41 MIN
PEAK FLOW= 1.9 CFS
RAINFALL= 6 INCHES
VOL= .23 AC.FT.

SUBCAT # 5 E
AREA= 1.1 ACRES
CN= 71
TC= 22 MIN
PEAK FLOW= 2.9 CFS
RAINFALL= 6 INCHES
VOL= .24 AC.FT.

SUBCAT # 6 F
AREA= 17.2 ACRES
CN= 65
TC= 55 MIN
PEAK FLOW= 21 CFS
RAINFALL= 6 INCHES
VOL= 3.02 AC.FT.

SUBCAT # 7 G
AREA= 2.4 ACRES
CN= 71
TC= 25 MIN
PEAK FLOW= 6.1 CFS
RAINFALL= 6 INCHES
VOL= .53 AC.FT.

SUBCAT # 8 H
AREA= 3.4 ACRES
CN= 63
TC= 56 MIN
PEAK FLOW= 3.8 CFS
RAINFALL= 6 INCHES
VOL= .55 AC.FT.

SUBCAT # 9 I
AREA= 8.7 ACRES
CN= 63
TC= 36 MIN
PEAK FLOW= 12.9 CFS
RAINFALL= 6 INCHES
VOL= 1.44 AC.FT.

SUBCAT # 10 J
AREA= 1.3 ACRES
CN= 63
TC= 47 MIN
PEAK FLOW= 1.7 CFS
RAINFALL= 6 INCHES
VOL= .21 AC.FT.

SUBCAT # 11 K
AREA= 7.6 ACRES
CN= 66
TC= 28 MIN
PEAK FLOW= 15.1 CFS
RAINFALL= 6 INCHES
VOL= 1.42 AC.FT.

SUBCAT # 12 L
AREA= 2.2 ACRES
CN= 69
TC= 14 MIN
PEAK FLOW= 6.6 CFS
RAINFALL= 6 INCHES
VOL= .45 AC.FT.

10-Year Pre

SUBCAT # 13 M

AREA= 2 ACRES
CN= 63
TC= 77 MIN
PEAK FLOW= 1.8 CFS
RAINFALL= 6 INCHES
VOL= .32 AC.FT.

SUBCAT # 14 N

AREA= 6.9 ACRES
CN= 63
TC= 37 MIN
PEAK FLOW= 10.1 CFS
RAINFALL= 6 INCHES
VOL= 1.14 AC.FT.

SUBCAT # 15 O

AREA= 3.8 ACRES
CN= 67
TC= 37 MIN
PEAK FLOW= 6.4 CFS
RAINFALL= 6 INCHES
VOL= .73 AC.FT.

SUBCAT # 16 P

AREA= 7.7 ACRES
CN= 62
TC= 34 MIN
PEAK FLOW= 11.4 CFS
RAINFALL= 6 INCHES
VOL= 1.23 AC.FT.

SUBCAT # 17 Q

AREA= 12.9 ACRES
CN= 59
TC= 110 MIN
PEAK FLOW= 7.5 CFS
RAINFALL= 6 INCHES
VOL= 1.75 AC.FT.

SUBCAT # 18 R

AREA= 11.6 ACRES
CN= 53
TC= 41 MIN
PEAK FLOW= 9.899999 CFS
RAINFALL= 6 INCHES
VOL= 1.19 AC.FT.

SUBCAT # 19 S

AREA= 4 ACRES
CN= 67
TC= 35 MIN
PEAK FLOW= 7 CFS
RAINFALL= 6 INCHES
VOL= .77 AC.FT.

SUBCAT # 20 T

AREA= 3.4 ACRES
CN= 62
TC= 35 MIN
PEAK FLOW= 4.9 CFS
RAINFALL= 6 INCHES
VOL= .54 AC.FT.

SUBCAT # 21 U

AREA= .8 ACRES
CN= 46
TC= 26 MIN
PEAK FLOW= .6 CFS
RAINFALL= 6 INCHES
VOL= .03 AC.FT.

EXISTING ROUTING DATA

EXISTING MEMORY DATA

EXISTING PONDING DATA

Brinnier & Larios, P. C.
PROJECT:Kingston Business Park
PRE-DEVELOPMENT
25-YEAR

DATE: 1/10/96
SHEET: OF

EXISTING SUBCATCHMENT DATA

SUBCAT # 1 A
AREA= 2.4 ACRES
CN= 68
TC= 46 MIN
PEAK FLOW= 4.3 CFS
RAINFALL= 6.5 INCHES
VOL= .54 AC.FT.

SUBCAT # 2 B
AREA= 1 ACRES
CN= 66
TC= 36 MIN
PEAK FLOW= 1.9 CFS
RAINFALL= 6.5 INCHES
VOL= .21 AC.FT.

SUBCAT # 3 C
AREA= 4.7 ACRES
CN= 63
TC= 64 MIN
PEAK FLOW= 5.6 CFS
RAINFALL= 6.5 INCHES
VOL= .88 AC.FT.

SUBCAT # 4 D
AREA= 1.4 ACRES
CN= 63
TC= 41 MIN
PEAK FLOW= 2.2 CFS
RAINFALL= 6.5 INCHES
VOL= .26 AC.FT.

SUBCAT # 5 E
AREA= 1.1 ACRES
CN= 71
TC= 22 MIN
PEAK FLOW= 3.4 CFS
RAINFALL= 6.5 INCHES
VOL= .27 AC.FT.

SUBCAT # 6 F
AREA= 17.2 ACRES
CN= 65
TC= 55 MIN
PEAK FLOW= 24.3 CFS
RAINFALL= 6.5 INCHES
VOL= 3.49 AC.FT.

SUBCAT # 7 G
AREA= 2.4 ACRES
CN= 71
TC= 25 MIN
PEAK FLOW= 7 CFS
RAINFALL= 6.5 INCHES
VOL= .6 AC.FT.

SUBCAT # 8 H
AREA= 3.4 ACRES
CN= 63
TC= 56 MIN
PEAK FLOW= 4.4 CFS
RAINFALL= 6.5 INCHES
VOL= .64 AC.FT.

SUBCAT # 9 I
AREA= 8.7 ACRES
CN= 63
TC= 36 MIN
PEAK FLOW= 15 CFS
RAINFALL= 6.5 INCHES
VOL= 1.68 AC.FT.

SUBCAT # 10 J
AREA= 1.3 ACRES
CN= 63
TC= 47 MIN
PEAK FLOW= 1.9 CFS
RAINFALL= 6.5 INCHES
VOL= .24 AC.FT.

SUBCAT # 11 K
AREA= 7.6 ACRES
CN= 66
TC= 28 MIN
PEAK FLOW= 17.5 CFS
RAINFALL= 6.5 INCHES
VOL= 1.63 AC.FT.

SUBCAT # 12 L
AREA= 2.2 ACRES
CN= 69
TC= 14 MIN
PEAK FLOW= 7.6 CFS
RAINFALL= 6.5 INCHES
VOL= .51 AC.FT.

25-Year Pre

SUBCAT # 13 M

AREA= 2 ACRES
CN= 63
TC= 77 MIN
PEAK FLOW= 2.1 CFS
RAINFALL= 6.5 INCHES
VOL= .38 AC.FT.

SUBCAT # 14 N

AREA= 6.9 ACRES
CN= 63
TC= 37 MIN
PEAK FLOW= 11.7 CFS
RAINFALL= 6.5 INCHES
VOL= 1.33 AC.FT.

SUBCAT # 15 O

AREA= 3.8 ACRES
CN= 67
TC= 37 MIN
PEAK FLOW= 7.4 CFS
RAINFALL= 6.5 INCHES
VOL= .84 AC.FT.

SUBCAT # 16 P

AREA= 7.7 ACRES
CN= 62
TC= 34 MIN
PEAK FLOW= 13.3 CFS
RAINFALL= 6.5 INCHES
VOL= 1.43 AC.FT.

SUBCAT # 17 Q

AREA= 12.9 ACRES
CN= 59
TC= 110 MIN
PEAK FLOW= 8.899999 CFS
RAINFALL= 6.5 INCHES
VOL= 2.06 AC.FT.

SUBCAT # 18 R

AREA= 11.6 ACRES
CN= 53
TC= 41 MIN
PEAK FLOW= 12 CFS
RAINFALL= 6.5 INCHES
VOL= 1.44 AC.FT.

SUBCAT # 19 S

AREA= 4 ACRES
CN= 67
TC= 35 MIN
PEAK FLOW= 8 CFS
RAINFALL= 6.5 INCHES
VOL= .88 AC.FT.

SUBCAT # 20 T

AREA= 3.4 ACRES
CN= 62
TC= 35 MIN
PEAK FLOW= 5.7 CFS
RAINFALL= 6.5 INCHES
VOL= .63 AC.FT.

SUBCAT # 21 U

AREA= .8 ACRES
CN= 46
TC= 26 MIN
PEAK FLOW= .7 CFS
RAINFALL= 6.5 INCHES
VOL= .05 AC.FT.

EXISTING ROUTING DATA

EXISTING MEMORY DATA

EXISTING PONDING DATA

Brinnier & Larios, P. C.
PROJECT:Kingston Business Park
PRE-DEVELOPMENT
100-YEAR

DATE: 1/10/96
SHEET: OF

EXISTING SUBCATCHMENT DATA

SUBCAT # 1 A
AREA= 2.4 ACRES
CN= 68
TC= 46 MIN
PEAK FLOW= 6.1 CFS
RAINFALL= 8 INCHES
VOL= .77 AC.FT.

SUBCAT # 2 B
AREA= 1 ACRES
CN= 66
TC= 36 MIN
PEAK FLOW= 2.7 CFS
RAINFALL= 8 INCHES
VOL= .3 AC.FT.

SUBCAT # 3 C
AREA= 4.7 ACRES
CN= 63
TC= 64 MIN
PEAK FLOW= 8.100001 CFS
RAINFALL= 8 INCHES
VOL= 1.28 AC.FT.

SUBCAT # 4 D
AREA= 1.4 ACRES
CN= 63
TC= 41 MIN
PEAK FLOW= 3.2 CFS
RAINFALL= 8 INCHES
VOL= .38 AC.FT.

SUBCAT # 5 E
AREA= 1.1 ACRES
CN= 71
TC= 22 MIN
PEAK FLOW= 4.7 CFS
RAINFALL= 8 INCHES
VOL= .38 AC.FT.

SUBCAT # 6 F
AREA= 17.2 ACRES
CN= 65
TC= 55 MIN
PEAK FLOW= 34.7 CFS
RAINFALL= 8 INCHES
VOL= 5 AC.FT.

SUBCAT # 7 G
AREA= 2.4 ACRES
CN= 71
TC= 25 MIN
PEAK FLOW= 9.600001 CFS
RAINFALL= 8 INCHES
VOL= .83 AC.FT.

SUBCAT # 8 H
AREA= 3.4 ACRES
CN= 63
TC= 56 MIN
PEAK FLOW= 6.4 CFS
RAINFALL= 8 INCHES
VOL= .93 AC.FT.

SUBCAT # 9 I
AREA= 8.7 ACRES
CN= 63
TC= 36 MIN
PEAK FLOW= 21.7 CFS
RAINFALL= 8 INCHES
VOL= 2.42 AC.FT.

SUBCAT # 10 J
AREA= 1.3 ACRES
CN= 63
TC= 47 MIN
PEAK FLOW= 2.8 CFS
RAINFALL= 8 INCHES
VOL= .35 AC.FT.

SUBCAT # 11 K
AREA= 7.6 ACRES
CN= 66
TC= 28 MIN
PEAK FLOW= 24.9 CFS
RAINFALL= 8 INCHES
VOL= 2.33 AC.FT.

SUBCAT # 12 L
AREA= 2.2 ACRES
CN= 69
TC= 14 MIN
PEAK FLOW= 10.6 CFS
RAINFALL= 8 INCHES
VOL= .72 AC.FT.

100-Year
Pre

SUBCAT # 13 M

AREA= 2 ACRES
CN= 63
TC= 77 MIN
PEAK FLOW= 3 CFS
RAINFALL= 8 INCHES
VOL= .54 AC.FT.

SUBCAT # 14 N

AREA= 6.9 ACRES
CN= 63
TC= 37 MIN
PEAK FLOW= 16.9 CFS
RAINFALL= 8 INCHES
VOL= 1.92 AC.FT.

SUBCAT # 15 O

AREA= 3.8 ACRES
CN= 67
TC= 37 MIN
PEAK FLOW= 10.5 CFS
RAINFALL= 8 INCHES
VOL= 1.19 AC.FT.

SUBCAT # 16 P

AREA= 7.7 ACRES
CN= 62
TC= 34 MIN
PEAK FLOW= 19.3 CFS
RAINFALL= 8 INCHES
VOL= 2.09 AC.FT.

SUBCAT # 17 Q

AREA= 12.9 ACRES
CN= 59
TC= 110 MIN
PEAK FLOW= 13.2 CFS
RAINFALL= 8 INCHES
VOL= 3.06 AC.FT.

SUBCAT # 18 R

AREA= 11.6 ACRES
CN= 53
TC= 41 MIN
PEAK FLOW= 18.7 CFS
RAINFALL= 8 INCHES
VOL= 2.25 AC.FT.

SUBCAT # 19 S

AREA= 4 ACRES
CN= 67
TC= 35 MIN
PEAK FLOW= 11.4 CFS
RAINFALL= 8 INCHES
VOL= 1.25 AC.FT.

SUBCAT # 20 T

AREA= 3.4 ACRES
CN= 62
TC= 35 MIN
PEAK FLOW= 8.3 CFS
RAINFALL= 8 INCHES
VOL= .92 AC.FT.

SUBCAT # 21 U

AREA= .8 ACRES
CN= 46
TC= 26 MIN
PEAK FLOW= 1.3 CFS
RAINFALL= 8 INCHES
VOL= .1 AC.FT.

EXISTING ROUTING DATA

EXISTING MEMORY DATA

EXISTING PONDING DATA

Brinnier & Larios, P. C.
PROJECT:KINGSTON BUSINESS PARK (REVISED CONCEPT PLAN)
POST- DEVELOPMENT
2-YEAR

DATE: 1/10/96
SHEET: 1 OF 4

EXISTING SUBCATCHMENT DATA

SUBCAT # 1 (A2)
AREA= 3.78 ACRES
CN= 67
TC= 37 MIN
PEAK FLOW= 2.9 CFS
RAINFALL= 4 INCHES
VOL= .32 AC.FT.

SUBCAT # 2 (B2)
AREA= 6.74 ACRES
CN= 62
TC= 29 MIN
PEAK FLOW= 4.6 CFS
RAINFALL= 4 INCHES
VOL= .44 AC.FT.

SUBCAT # 3 (C2)
AREA= 10.23 ACRES
CN= 58
TC= 97 MIN
PEAK FLOW= 2.4 CFS
RAINFALL= 4 INCHES
VOL= .5 AC.FT.

SUBCAT # 4 (D2)
AREA= 8.92 ACRES
CN= 70
TC= 32 MIN
PEAK FLOW= 8.8 CFS
RAINFALL= 4 INCHES
VOL= .91 AC.FT.

SUBCAT # 5 (E2)
AREA= 1.29 ACRES
CN= 62
TC= 35.4 MIN
PEAK FLOW= .8 CFS
RAINFALL= 4 INCHES
VOL= .07 AC.FT.

SUBCAT # 6 (F2)
AREA= 1.64 ACRES
CN= 67
TC= 46.3 MIN
PEAK FLOW= 1.1 CFS
RAINFALL= 4 INCHES
VOL= .14 AC.FT.

SUBCAT # 7 (G2)
AREA= 8.96 ACRES
CN= 53
TC= 30.6 MIN
PEAK FLOW= 3.1 CFS
RAINFALL= 4 INCHES
VOL= .3 AC.FT.

SUBCAT # 8 (H2)
AREA= 2.6 ACRES
CN= 63
TC= 56.4 MIN
PEAK FLOW= 1.2 CFS
RAINFALL= 4 INCHES
VOL= .18 AC.FT.

SUBCAT # 9 (I2: see further breakdown of this S.C. attached)
AREA= 0 ACRES
CN= 80
TC= 6 MIN
PEAK FLOW= 0 CFS
RAINFALL= 4 INCHES
VOL= 0 AC.FT.

SUBCAT # 10 (J2)
AREA= 6.99 ACRES
CN= 81
TC= 17 MIN
PEAK FLOW= 15.2 CFS
RAINFALL= 4 INCHES
VOL= 1.13 AC.FT.

SUBCAT # 11 (K2)
AREA= 10.71 ACRES
CN= 67
TC= 16 MIN
PEAK FLOW= 12.5 CFS
RAINFALL= 4 INCHES
VOL= .93 AC.FT.

SUBCAT # 12 (L2)
AREA= 2.2 ACRES
CN= 69
TC= 46.2 MIN
PEAK FLOW= 1.7 CFS
RAINFALL= 4 INCHES
VOL= .21 AC.FT.

SUBCAT # 13 (M2)

AREA= 1.01 ACRES
CN= 66
TC= 36 MIN
PEAK FLOW= .7 CFS
RAINFALL= 4 INCHES
VOL= .07 AC.FT.

SUBCAT # 14 (J2)

AREA= 9.75 ACRES
CN= 75
TC= 21.6 MIN
PEAK FLOW= 15.2 CFS
RAINFALL= 4 INCHES
VOL= 1.23 AC.FT.

SUBCAT # 15 (O2)

AREA= 1.33 ACRES
CN= 63
TC= 41.4 MIN
PEAK FLOW= .8 CFS
RAINFALL= 4 INCHES
VOL= .08 AC.FT.

SUBCAT # 16 (P2)

AREA= .73 ACRES
CN= 65
TC= 18.4 MIN
PEAK FLOW= .8 CFS
RAINFALL= 4 INCHES
VOL= .04 AC.FT.

SUBCAT # 17 (G2)

AREA= 2.29 ACRES
CN= 71
TC= 24.6 MIN
PEAK FLOW= 2.8 CFS
RAINFALL= 4 INCHES
VOL= .24 AC.FT.

SUBCAT # 18 (R2)

AREA= 1.12 ACRES
CN= 71
TC= 21.6 MIN
PEAK FLOW= 1.5 CFS
RAINFALL= 4 INCHES
VOL= .11 AC.FT.

SUBCAT # 19 (S2)

AREA= 2.12 ACRES
CN= 69
TC= 13.8 MIN
PEAK FLOW= 3 CFS
RAINFALL= 4 INCHES
VOL= .2 AC.FT.

EXISTING ROUTING DATA

EXISTING MEMORY DATA

EXISTING PONDING DATA

Brinnier & Larios, P. C.
PROJECT:K.B.P. (sc I2)
POST- DEVELOPMENT
2-YEAR

DATE: 1/10/96
SHEET: 3 OF 4

EXISTING SUBCATCHMENT DATA

SUBCAT # 1 (I2a)
AREA= 4.74 ACRES
CN= 80
TC= 21 MIN
PEAK FLOW= 9.2 CFS
RAINFALL= 4 INCHES
VOL= .73 AC.FT.

SUBCAT # 2 (I2b)
AREA= .9 ACRES
CN= 61
TC= 6 MIN
PEAK FLOW= 1.1 CFS
RAINFALL= 4 INCHES
VOL= .04 AC.FT.

SUBCAT # 3 (I2c)
AREA= 3 ACRES
CN= 82
TC= 25.8 MIN
PEAK FLOW= 5.7 CFS
RAINFALL= 4 INCHES
VOL= .5 AC.FT.

SUBCAT # 4 (I2d)
AREA= 9.62 ACRES
CN= 89
TC= 15 MIN
PEAK FLOW= 28.7 CFS
RAINFALL= 4 INCHES
VOL= 2.06 AC.FT.

SUBCAT # 5 (I2e)
AREA= 5.88 ACRES
CN= 63
TC= 30 MIN
PEAK FLOW= 4.2 CFS
RAINFALL= 4 INCHES
VOL= .41 AC.FT.

EXISTING ROUTING DATA

REACH # 1
PEAK FLOW= 9.2 CFS
MAX. FLOW POSSIBLE= 36 CFS
MAX. WATER DETAINED= 0 AC.FT.

REACH # 2
PEAK FLOW= 9.7 CFS
MAX. FLOW POSSIBLE= 33 CFS
MAX. WATER DETAINED= 0 AC.FT.

REACH # 3
PEAK FLOW= 5.7 CFS
MAX. FLOW POSSIBLE= 14 CFS
MAX. WATER DETAINED= 0 AC.FT.

REACH # 4
PEAK FLOW= 5.7 CFS
MAX. FLOW POSSIBLE= 17 CFS
MAX. WATER DETAINED= 0 AC.FT.

REACH # 5
PEAK FLOW= 32.5 CFS
MAX. FLOW POSSIBLE= 72 CFS
MAX. WATER DETAINED= 0 AC.FT.

REACH # 6
PEAK FLOW= 42.3 CFS
MAX. FLOW POSSIBLE= 107 CFS
MAX. WATER DETAINED= 0 AC.FT.

2-Year Post

EXISTING MEMORY DATA

MEMORY 1
PEAK FLOW= 9.7 CFS

MEMORY 2
PEAK FLOW= 32.3 CFS

MEMORY 3
PEAK FLOW= 42.2 CFS

MEMORY 4
PEAK FLOW= 46 CFS

EXISTING PONDING DATA

Brinnier & Larios, P. C.
PROJECT:KINGSTON BUSINESS PARK (REVISED CONCEPT PLAN)
POST-DEVELOPMENT
10-YEAR

DATE: 1/10/96
SHEET: 1 OF 4

EXISTING SUBCATCHMENT DATA

SUBCAT # 1 (A2)
AREA= 3.78 ACRES
CN= 67
TC= 37 MIN
PEAK FLOW= 6.4 CFS
RAINFALL= 6 INCHES
VOL= .72 AC.FT.

SUBCAT # 2 (B2)
AREA= 6.74 ACRES
CN= 62
TC= 29 MIN
PEAK FLOW= 11.2 CFS
RAINFALL= 6 INCHES
VOL= 1.08 AC.FT.

SUBCAT # 3 (C2)
AREA= 10.23 ACRES
CN= 58
TC= 97 MIN
PEAK FLOW= 6.3 CFS
RAINFALL= 6 INCHES
VOL= 1.32 AC.FT.

SUBCAT # 4 (D2)
AREA= 8.92 ACRES
CN= 70
TC= 32 MIN
PEAK FLOW= 18.5 CFS
RAINFALL= 6 INCHES
VOL= 1.91 AC.FT.

SUBCAT # 5 (E2)
AREA= 1.29 ACRES
CN= 62
TC= 35.4 MIN
PEAK FLOW= 1.8 CFS
RAINFALL= 6 INCHES
VOL= .21 AC.FT.

SUBCAT # 6 (F2)
AREA= 1.64 ACRES
CN= 67
TC= 46.3 MIN
PEAK FLOW= 2.5 CFS
RAINFALL= 6 INCHES
VOL= .3 AC.FT.

SUBCAT # 7 (G2)
AREA= 8.96 ACRES
CN= 53
TC= 30.6 MIN
PEAK FLOW= 9.3 CFS
RAINFALL= 6 INCHES
VOL= .93 AC.FT.

SUBCAT # 8 (H2)
AREA= 2.6 ACRES
CN= 63
TC= 56.4 MIN
PEAK FLOW= 2.9 CFS
RAINFALL= 6 INCHES
VOL= .42 AC.FT.

SUBCAT # 9 (I2 ; See further breakdown of this S.C. attached)
AREA= 0 ACRES
CN= 80
TC= 6 MIN
PEAK FLOW= 0 CFS
RAINFALL= 6 INCHES
VOL= 0 AC.FT.

SUBCAT # 10 (J2)
AREA= 6.99 ACRES
CN= 81
TC= 17 MIN
PEAK FLOW= 27.8 CFS
RAINFALL= 6 INCHES
VOL= 2.07 AC.FT.

SUBCAT # 11 (K2)
AREA= 10.71 ACRES
CN= 67
TC= 16 MIN
PEAK FLOW= 27.6 CFS
RAINFALL= 6 INCHES
VOL= 2.06 AC.FT.

SUBCAT # 12 (L2)
AREA= 2.2 ACRES
CN= 69
TC= 46.2 MIN
PEAK FLOW= 3.6 CFS
RAINFALL= 6 INCHES
VOL= .44 AC.FT.

SUBCAT # 13 (M2)

AREA= 1.01 ACRES
CN= 66
TC= 36 MIN
PEAK FLOW= 1.7 CFS
RAINFALL= 6 INCHES
VOL= .19 AC.FT.

SUBCAT # 14 (N2)

AREA= 9.75 ACRES
CN= 75
TC= 21.6 MIN
PEAK FLOW= 29.9 CFS
RAINFALL= 6 INCHES
VOL= 2.44 AC.FT.

SUBCAT # 15 (O2)

AREA= 1.33 ACRES
CN= 63
TC= 41.4 MIN
PEAK FLOW= 1.8 CFS
RAINFALL= 6 INCHES
VOL= .22 AC.FT.

SUBCAT # 16 (P2)

AREA= .73 ACRES
CN= 65
TC= 18.4 MIN
PEAK FLOW= 1.7 CFS
RAINFALL= 6 INCHES
VOL= .13 AC.FT.

SUBCAT # 17 (Q2)

AREA= 2.29 ACRES
CN= 71
TC= 24.6 MIN
PEAK FLOW= 5.9 CFS
RAINFALL= 6 INCHES
VOL= .5 AC.FT.

SUBCAT # 18 (R2)

AREA= 1.12 ACRES
CN= 71
TC= 21.6 MIN
PEAK FLOW= 3 CFS
RAINFALL= 6 INCHES
VOL= .24 AC.FT.

SUBCAT # 19 (S2)

AREA= 2.12 ACRES
CN= 69
TC= 13.8 MIN
PEAK FLOW= 6.4 CFS
RAINFALL= 6 INCHES
VOL= .43 AC.FT.

EXISTING ROUTING DATA

EXISTING MEMORY DATA

EXISTING PONDING DATA

Brinnier & Larios, P. C.
PROJECT:K.B.P. (sc I2)
POST - DEVELOPMENT
10 - YEAR

DATE: 1/10/96

EXISTING SUBCATCHMENT DATA

SUBCAT # 1 (I2a)
AREA= 4.74 ACRES
CN= 80
TC= 21 MIN
PEAK FLOW= 17 CFS
RAINFALL= 6 INCHES
VOL= 1.36 AC.FT.

SUBCAT # 2 (I2b)
AREA= .9 ACRES
CN= 61
TC= 6 MIN
PEAK FLOW= 2.8 CFS
RAINFALL= 6 INCHES
VOL= .13 AC.FT.

SUBCAT # 3 (I2c)
AREA= 3 ACRES
CN= 82
TC= 25.8 MIN
PEAK FLOW= 10.3 CFS
RAINFALL= 6 INCHES
VOL= .91 AC.FT.

SUBCAT # 4 (I2d)
AREA= 9.62 ACRES
CN= 89
TC= 15 MIN
PEAK FLOW= 48.2 CFS
RAINFALL= 6 INCHES
VOL= 3.46 AC.FT.

SUBCAT # 5 (I2e)
AREA= 5.88 ACRES
CN= 63
TC= 30 MIN
PEAK FLOW= 9.899999 CFS
RAINFALL= 6 INCHES
VOL= .98 AC.FT.

EXISTING ROUTING DATA

REACH # 1
PEAK FLOW= 17.2 CFS
MAX. FLOW POSSIBLE= 36 CFS
MAX. WATER DETAINED= 0 AC.FT.

REACH # 2
PEAK FLOW= 18.1 CFS
MAX. FLOW POSSIBLE= 33 CFS
MAX. WATER DETAINED= 0 AC.FT.

REACH # 3
PEAK FLOW= 10.3 CFS
MAX. FLOW POSSIBLE= 14 CFS
MAX. WATER DETAINED= 0 AC.FT.

REACH # 4
PEAK FLOW= 10.2 CFS
MAX. FLOW POSSIBLE= 17 CFS
MAX. WATER DETAINED= 0 AC.FT.

REACH # 5
PEAK FLOW= 55.5 CFS
MAX. FLOW POSSIBLE= 72 CFS
MAX. WATER DETAINED= 0 AC.FT.

REACH # 6
PEAK FLOW= 73.9 CFS
MAX. FLOW POSSIBLE= 107 CFS
MAX. WATER DETAINED= 0 AC.FT.

10-Year Post

EXISTING MEMORY DATA

MEMORY 1
PEAK FLOW= 18.1 CFS

MEMORY 2
PEAK FLOW= 55.4 CFS

MEMORY 3
PEAK FLOW= 73.6 CFS

MEMORY 4
PEAK FLOW= 82.6 CFS

EXISTING PONDING DATA

Brinnier & Larios, P. C.
PROJECT:KINGSTON BUSINESS PARK (REVISED CONCEPT PLAN)
POST-DEVELOPMENT
25-YEAR

DATE: 1/10/96
SHEET: 1 OF 4

EXISTING SUBCATCHMENT DATA

SUBCAT # 1 (A2)
AREA= 3.78 ACRES
CN= 67
TC= 37 MIN
PEAK FLOW= 7.4 CFS
RAINFALL= 6.5 INCHES
VOL= .84 AC.FT.

SUBCAT # 2 (B2)
AREA= 6.74 ACRES
CN= 62
TC= 29 MIN
PEAK FLOW= 13.1 CFS
RAINFALL= 6.5 INCHES
VOL= 1.25 AC.FT.

SUBCAT # 3 (C2)
AREA= 10.23 ACRES
CN= 58
TC= 97 MIN
PEAK FLOW= 7.4 CFS
RAINFALL= 6.5 INCHES
VOL= 1.57 AC.FT.

SUBCAT # 4 (D2)
AREA= 8.92 ACRES
CN= 70
TC= 32 MIN
PEAK FLOW= 21.2 CFS
RAINFALL= 6.5 INCHES
VOL= 2.19 AC.FT.

SUBCAT # 5 (E2)
AREA= 1.29 ACRES
CN= 62
TC= 35.4 MIN
PEAK FLOW= 2.2 CFS
RAINFALL= 6.5 INCHES
VOL= .24 AC.FT.

SUBCAT # 6 (F2)
AREA= 1.64 ACRES
CN= 67
TC= 46.3 MIN
PEAK FLOW= 2.8 CFS
RAINFALL= 6.5 INCHES
VOL= .35 AC.FT.

SUBCAT # 7 (G2)
AREA= 8.96 ACRES
CN= 53
TC= 30.6 MIN
PEAK FLOW= 11.3 CFS
RAINFALL= 6.5 INCHES
VOL= 1.13 AC.FT.

SUBCAT # 8 (H2)
AREA= 2.6 ACRES
CN= 63
TC= 56.4 MIN
PEAK FLOW= 3.4 CFS
RAINFALL= 6.5 INCHES
VOL= .49 AC.FT.

SUBCAT # 9 (I2 ; See further breakdown of this S.C. attached)
AREA= 0 ACRES
CN= 80
TC= 6 MIN
PEAK FLOW= 0 CFS
RAINFALL= 6.5 INCHES
VOL= 0 AC.FT.

SUBCAT # 10 (J2)
AREA= 6.99 ACRES
CN= 81
TC= 17 MIN
PEAK FLOW= 31.1 CFS
RAINFALL= 6.5 INCHES
VOL= 2.31 AC.FT.

SUBCAT # 11 (K2)
AREA= 10.71 ACRES
CN= 67
TC= 16 MIN
PEAK FLOW= 31.8 CFS
RAINFALL= 6.5 INCHES

SUBCAT # 12 (L2)
AREA= 2.2 ACRES
CN= 69
TC= 46.2 MIN
PEAK FLOW= 4.1 CFS
RAINFALL= 6.5 INCHES

25-Year Post

SUBCAT # 13 (M2)

AREA= 1.01 ACRES
CN= 66
TC= 36 MIN
PEAK FLOW= 1.9 CFS
RAINFALL= 6.5 INCHES
VOL= .22 AC.FT.

SUBCAT # 14 (N2)

AREA= 9.75 ACRES
CN= 75
TC= 21.6 MIN
PEAK FLOW= 33.8 CFS
RAINFALL= 6.5 INCHES
VOL= 2.76 AC.FT.

SUBCAT # 15 (O2)

AREA= 1.33 ACRES
CN= 63
TC= 41.4 MIN
PEAK FLOW= 2.1 CFS
RAINFALL= 6.5 INCHES
VOL= .25 AC.FT.

SUBCAT # 16 (P2)

AREA= .73 ACRES
CN= 65
TC= 18.4 MIN
PEAK FLOW= 2 CFS
RAINFALL= 6.5 INCHES
VOL= .15 AC.FT.

SUBCAT # 17 (Q2)

AREA= 2.29 ACRES
CN= 71
TC= 24.6 MIN
PEAK FLOW= 6.7 CFS
RAINFALL= 6.5 INCHES
VOL= .57 AC.FT.

SUBCAT # 18 (R2)

AREA= 1.12 ACRES
CN= 71
TC= 21.6 MIN
PEAK FLOW= 3.5 CFS
RAINFALL= 6.5 INCHES
VOL= .28 AC.FT.

SUBCAT # 19 (S2)

AREA= 2.12 ACRES
CN= 69
TC= 13.8 MIN
PEAK FLOW= 7.4 CFS
RAINFALL= 6.5 INCHES
VOL= .49 AC.FT.

EXISTING ROUTING DATA

EXISTING MEMORY DATA

EXISTING PONDING DATA

Brinnier & Larios, P. C.
PROJECT:K.B.P. (sc I2)
POST- DEVELOPMENT
25-YEAR

DATE: 1/10/96
SHEET: 3 OF 4

EXISTING SUBCATCHMENT DATA

SUBCAT # 1 (I2a)

AREA= 4.74 ACRES
CN= 80
TC= 21 MIN
PEAK FLOW= 19.1 CFS
RAINFALL= 6.5 INCHES
VOL= 1.53 AC.FT.

SUBCAT # 2 (I2b)

AREA= .9 ACRES
CN= 61
TC= 6 MIN
PEAK FLOW= 3.3 CFS
RAINFALL= 6.5 INCHES
VOL= .16 AC.FT.

SUBCAT # 3 (I2c)

AREA= 3 ACRES
CN= 82
TC= 25.8 MIN
PEAK FLOW= 11.5 CFS
RAINFALL= 6.5 INCHES
VOL= 1.01 AC.FT.

SUBCAT # 4 (I2d)

AREA= 9.62 ACRES
CN= 89
TC= 15 MIN
PEAK FLOW= 53.2 CFS
RAINFALL= 6.5 INCHES
VOL= 3.82 AC.FT.

SUBCAT # 5 (I2e)

AREA= 5.88 ACRES
CN= 63
TC= 30 MIN
PEAK FLOW= 11.5 CFS
RAINFALL= 6.5 INCHES
VOL= 1.14 AC.FT.

EXISTING ROUTING DATA

REACH # 1

PEAK FLOW= 19.2 CFS
MAX. FLOW POSSIBLE= 36 CFS
MAX. WATER DETAINED= 0 AC.FT.

REACH # 2

PEAK FLOW= 20.4 CFS
MAX. FLOW POSSIBLE= 33 CFS
MAX. WATER DETAINED= 0 AC.FT.

REACH # 3

PEAK FLOW= 11.5 CFS
MAX. FLOW POSSIBLE= 14 CFS
MAX. WATER DETAINED= 0 AC.FT.

REACH # 4

PEAK FLOW= 11.4 CFS
MAX. FLOW POSSIBLE= 17 CFS
MAX. WATER DETAINED= 0 AC.FT.

REACH # 5

PEAK FLOW= 61.4 CFS
MAX. FLOW POSSIBLE= 72 CFS
MAX. WATER DETAINED= 0 AC.FT.

REACH # 6

PEAK FLOW= 82 CFS
MAX. FLOW POSSIBLE= 107 CFS
MAX. WATER DETAINED= 0 AC.FT.

4.24
25-Year
Post

EXISTING MEMORY DATA

MEMORY 1

PEAK FLOW= 20.4 CFS

MEMORY 2

PEAK FLOW= 61.2 CFS

MEMORY 3

PEAK FLOW= 81.8 CFS

MEMORY 4

PEAK FLOW= 82 CFS

EXISTING PONDING DATA

Brinnier & Larios, P. C.
PROJECT:KINGSTON BUSINESS PARK (REVISED CONCEPT PLAN)
POST-DEVELOPMENT
100-YEAR

DATE: 1/10/96
SHEET: 1 OF 4

EXISTING SUBCATCHMENT DATA

SUBCAT # 1 (A2)
AREA= 3.78 ACRES
CN= 67
TC= 37 MIN
PEAK FLOW= 10.4 CFS
RAINFALL= 8 INCHES
VOL= 1.18 AC.FT.

SUBCAT # 2 (B2)
AREA= 6.74 ACRES
CN= 62
TC= 29 MIN
PEAK FLOW= 19.1 CFS
RAINFALL= 8 INCHES
VOL= 1.83 AC.FT.

SUBCAT # 3 (C2)
AREA= 10.23 ACRES
CN= 58
TC= 97 MIN
PEAK FLOW= 11.1 CFS
RAINFALL= 8 INCHES
VOL= 2.35 AC.FT.

SUBCAT # 4 (D2)
AREA= 8.92 ACRES
CN= 70
TC= 32 MIN
PEAK FLOW= 29.5 CFS
RAINFALL= 8 INCHES
VOL= 3.05 AC.FT.

SUBCAT # 5 (E2)
AREA= 1.29 ACRES
CN= 62
TC= 35.4 MIN
PEAK FLOW= 3.1 CFS
RAINFALL= 8 INCHES
VOL= .34 AC.FT.

SUBCAT # 6 (F2)
AREA= 1.64 ACRES
CN= 67
TC= 46.3 MIN
PEAK FLOW= 4 CFS
RAINFALL= 8 INCHES
VOL= .51 AC.FT.

SUBCAT # 7 (G2)
AREA= 8.96 ACRES
CN= 53
TC= 30.6 MIN
PEAK FLOW= 17.6 CFS
RAINFALL= 8 INCHES
VOL= 1.76 AC.FT.

SUBCAT # 8 (H2)
AREA= 2.6 ACRES
CN= 63
TC= 56.4 MIN
PEAK FLOW= 4.9 CFS
RAINFALL= 8 INCHES
VOL= .71 AC.FT.

SUBCAT # 9 (I2; See further breakdown of this S.C. attached)
AREA= 0 ACRES
CN= 80
TC= 6 MIN
PEAK FLOW= 0 CFS
RAINFALL= 8 INCHES
VOL= 0 AC.FT.

SUBCAT # 10 (J2)
AREA= 6.99 ACRES
CN= 81
TC= 17 MIN
PEAK FLOW= 41.1 CFS
RAINFALL= 8 INCHES
VOL= 3.07 AC.FT.

SUBCAT # 11 (K2)
AREA= 10.71 ACRES
CN= 67
TC= 16 MIN
PEAK FLOW= 45 CFS
RAINFALL= 8 INCHES
VOL= 3.36 AC.FT.

SUBCAT # 12 (L2)
AREA= 2.2 ACRES
CN= 69
TC= 46.2 MIN
PEAK FLOW= 5.7 CFS
RAINFALL= 8 INCHES
VOL= .72 AC.FT.

100-Year Post

SUBCAT # 13 (M2)

AREA= 1.01 ACRES
CN= 66
TC= 36 MIN
PEAK FLOW= 2.8 CFS
RAINFALL= 8 INCHES
VOL= .3 AC.FT.

SUBCAT # 14 (N2)

AREA= 9.75 ACRES
CN= 75
TC= 21.6 MIN
PEAK FLOW= 45.9 CFS
RAINFALL= 8 INCHES
VOL= 3.75 AC.FT.

SUBCAT # 15 (O2)

AREA= 1.33 ACRES
CN= 63
TC= 41.4 MIN
PEAK FLOW= 3 CFS
RAINFALL= 8 INCHES
VOL= .36 AC.FT.

SUBCAT # 16 (P2)

AREA= .73 ACRES
CN= 65
TC= 18.4 MIN
PEAK FLOW= 2.9 CFS
RAINFALL= 8 INCHES
VOL= .22 AC.FT.

SUBCAT # 17 (Q2)

AREA= 2.29 ACRES
CN= 71
TC= 24.6 MIN
PEAK FLOW= 9.3 CFS
RAINFALL= 8 INCHES
VOL= .79 AC.FT.

SUBCAT # 18 (R2)

AREA= 1.12 ACRES
CN= 71
TC= 21.6 MIN
PEAK FLOW= 4.8 CFS
RAINFALL= 8 INCHES
VOL= .38 AC.FT.

SUBCAT # 19 (S2)

AREA= 2.12 ACRES
CN= 69
TC= 13.8 MIN
PEAK FLOW= 10.3 CFS
RAINFALL= 8 INCHES
VOL= .69 AC.FT.

EXISTING ROUTING DATA

EXISTING MEMORY DATA

EXISTING PONDING DATA

EXISTING SUBCATCHMENT DATA

SUBCAT # 1 (I2a)
AREA= 4.74 ACRES
CN= 80
TC= 21 MIN
PEAK FLOW= 25.3 CFS
RAINFALL= 8 INCHES
VOL= 2.03 AC.FT.

SUBCAT # 2 (I2b)
AREA= .9 ACRES
CN= 61
TC= 6 MIN
PEAK FLOW= 4.8 CFS
RAINFALL= 8 INCHES
VOL= .23 AC.FT.

SUBCAT # 3 (I2c)
AREA= 3 ACRES
CN= 82
TC= 25.8 MIN
PEAK FLOW= 15.1 CFS
RAINFALL= 8 INCHES
VOL= 1.33 AC.FT.

SUBCAT # 4 (I2d)
AREA= 9.62 ACRES
CN= 89
TC= 15 MIN
PEAK FLOW= 68.1 CFS
RAINFALL= 8 INCHES
VOL= 4.9 AC.FT.

SUBCAT # 5 (I2e)
AREA= 5.88 ACRES
CN= 63
TC= 30 MIN
PEAK FLOW= 16.7 CFS
RAINFALL= 8 INCHES
VOL= 1.65 AC.FT.

EXISTING ROUTING DATA

REACH # 1
PEAK FLOW= 25.2 CFS
MAX. FLOW POSSIBLE= 36 CFS
MAX. WATER DETAINED= 0 AC.FT.

REACH # 2
PEAK FLOW= 27.3 CFS
MAX. FLOW POSSIBLE= 33 CFS
MAX. WATER DETAINED= 0 AC.FT.

REACH # 3
PEAK FLOW= 14.7 CFS
MAX. FLOW POSSIBLE= 14 CFS
MAX. WATER DETAINED= 0 AC.FT.

REACH # 4
PEAK FLOW= 14.8 CFS
MAX. FLOW POSSIBLE= 17 CFS
MAX. WATER DETAINED= 0 AC.FT.

REACH # 5
PEAK FLOW= 72 CFS
MAX. FLOW POSSIBLE= 72 CFS
MAX. WATER DETAINED= .69 AC.FT.

REACH # 6
PEAK FLOW= 99.4 CFS
MAX. FLOW POSSIBLE= 107 CFS
MAX. WATER DETAINED= 0 AC.FT.

100-Year Post

EXISTING MEMORY DATA

MEMORY 1

PEAK FLOW= 27.3 CFS

MEMORY 2

PEAK FLOW= 78.6 CFS

MEMORY 3

PEAK FLOW= 99.3 CFS

MEMORY 4

PEAK FLOW= 114 CFS

EXISTING PONDING DATA

DRAFT

STORM WATER POLLUTION PREVENTION PLAN
KINGSTON BUSINESS PARK

Delaware Avenue, Kingston, N.Y.

Prepared for:

KINGSTON LOCAL DEVELOPMENT CORPORATION

City Hall, Kingston, N.Y.

January 1996

Prepared by:

BRINNIER AND LARIOS, P.C.
PROFESSIONAL ENGINEERS
67 Maiden Lane, Kingston, N.Y.

STORM WATER POLLUTION PREVENTION PLAN
KINGSTON BUSINESS PARK
Delaware Avenue, Kingston, N.Y.

January 1996

INTRODUCTION

The proposed project consists of construction of site improvement work related to development of two industrial building sites located on Delaware Avenue in the City of Kingston. The site, to be acquired by the Kingston Local Development Corporation, consists of a vacant, unimproved parcel located northerly of Delaware Avenue, easterly of Third Avenue/Fourth Avenue and westerly of Locust Street and North Street. Work associated with this project will affect approximately 25 acres of the 107-acre parcel.

The purpose of this Storm Water Pollution Prevention Plan is to identify those practices and to provide those assurances necessary to minimize and prevent pollutants from entering into the waters of the United States. The Plan has been developed as part of the SPDES General Permit for storm water discharges from construction activities.

GENERAL

This Storm Water Pollution Prevention Plan has been prepared relative to site construction to be performed at the subject site by contractors and subcontractors retained by the Kingston Local Development Corporation and/or other persons or corporations associated with development of the site. The Plan has been prepared in accordance with good engineering practices and:

- describes the implementation of practices which will be used to reduce pollutant loadings during construction.
- identifies potential sources of pollution which may affect the quality of storm water discharges.
- complies with the conditions of the General Permit.

PLAN REVIEW

Any applicable Federal, State and local regulatory agencies which have jurisdiction may elect to review this Plan and, if necessary, may notify the Kingston Local Development Corporation that the Plan does not meet the requirements of the regulations. Should the Plan need to be revised, the contractor, subcontractor, engineer and the Kingston Local Development Corporation will make the required revisions to the Plan within seven (7) days and submit written certification that the changes have been made. This Plan will be kept available at the site for review by regulatory agencies, engineers, contractors, etc.

PLAN UPDATE

The contractor, subcontractor, engineer or Kingston Local Development Corporation may amend this storm water pollution prevention plan when there is a change in design, construction, operation, or maintenance which has a significant effect on the potential for discharge of pollutants. The Plan will also be updated/amended if it is found to be ineffective in minimizing pollutants from storm water discharges. Superseded plans should be marked as such and revision dates will be placed on updated plans and distributed to the appropriate parties.

CONTENTS OF STORM WATER POLLUTION PREVENTION PLAN

The following are requirements for the Storm Water Pollution Prevention Plan:

1. A description of the nature of construction consisting of this Plan, site construction drawings and project technical specifications.
2. A sequence of construction for erosion and sediment control is indicated on the site drawings. In addition, a construction schedule will be prepared by the contractor and approved by the Owner with a description of intended sequences of construction activities. This schedule shall become part of this Plan.
3. Estimates of total site area and total site to be disturbed, as shown on the site drawings.
4. Estimates of the runoff coefficients of the site after construction activities.
5. A site map indicating:
   - Discharge patterns and directions anticipated after major grading activities
   - Areas of soil disturbance
   - Locations of structural and nonstructural controls, such as catch basins, diversion swales and outlet structures.
   - Locations where storm water is to be discharged

POTENTIAL STORM WATER QUALITY ISSUES

Potential construction related water quality impacts include:

1. Increased turbidity due to silt, sediments, clays and dust
2. Increased odors
3. Potential for oils, greases and fuels entering storm water from machinery or spills
4. Solid wastes due to litter
5. Potential for solvents and detergent residues to enter water courses due to cleaning operations
6. Potential for erosion caused by water discharges from dust control measures, water main and sanitary sewer testing.

STORM WATER CONTROLS DURING CONSTRUCTION

The following measures and best management practices will be implemented to abate and control potential pollutants in storm water discharges during construction:

1. Haybale erosion barriers and/or silt fences to be located on downgradient storm water runoff paths and adjacent to new construction.
2. Gravel stabilized construction entrance/exit routes to minimize soil disturbance and movement.
3. Haybale erosion checks within ditches.
4. Inlet sediment traps to reduce storm water velocities and minimize sediment travel into catch basins and detention areas..
5. Straw bale dikes and/or silt fences to be located surrounding existing and proposed catch basin inlets.
6. Riprap outlet trap/energy dissipator to reduce storm water velocities and capture sediments from culverts and ditches.
7. Riprap lined ditches to reduce storm water velocities and capture sediments.

Project plans will provide technical material and performance specifications including details of installation and maintenance to be utilized in the construction and maintenance of erosion control facilities.

Inspection of erosion control facilities shall be required to assure maximum adherence to the intent and letter of this Plan.

Quality assurance and quality control measures will be continued throughout the duration of construction activities to repair and/or replace the mitigation measures installed on the site.

ADDITIONAL STORM WATER CONTROLS

The following controls and measures are to be implemented at the site in order to minimize pollution to receiving waters:

1. Erosion and sediment controls indicating stabilization practices involving seeding, mulching, geotextiles, etc. with a description of interim and permanent measures to be utilized at the site.
2. Catch basins, manholes and storm water culverts will be utilized to direct flows as required to minimize erosion impacts.
3. Solid waste disposal dumpsters, portable toilets and other controls in accordance with local codes and ordinances.
4. Proper disposal of water from dust control measures and testing of water and sewer mains.

POST-DEVELOPMENT STORM WATER QUALITY CONTROLS

The following is a list of storm water pollutants which may be present as a result of the type of industrial activities anticipated to be developed at the site:

1. Dust, dirt and litter.
2. Increased siltation and turbidity.
3. Oils and greases.
4. Anti-skid compounds including salt and sand.
5. Increased temperature.
6. Heavy metals

The following measures and best management practices will be implemented in subsequent contracts to control potential pollutants in storm water discharges following completion of the project:

1. Retention of silt fencing and/or haybale erosion barriers on downgradient storm water runoff paths.
2. Installation of Vortechs Stormwater Treatment System to remove grit, contaminated sediments, metals, hydrocarbons and other floating pollutants from surface runoff..
3. Use of hoods within catch basins located within parking areas to remove greases and oils.
4. Use of sumps within catch basins to allow for settlement of solids.
5. Installation of stone rip-rap within ditches to filter storm water pollutants.
6. Installation of processed stone at the base of discharge ravines to clarify storm water.

MAINTENANCE

The following procedures will be utilized to assure effective operation of erosion and sediment control measures outlined in this Plan:

1. Periodic inspection and cleaning of swales, storm water conduits, catch basins, siltation traps and sumps.
2. Disturbed areas not intended for pavement will be seeded with ryegrass to protect against erosion as soon as practical after construction.
3. Trash receptacles will be emptied on a regular basis and contents disposed of properly.
4. Materials subject to exposure to rain and having the potential for contributing pollutants to runoff will be covered with tarps and other devices.
5. Fertilizers and lime will be properly stored and applied to seeded areas to promote vegetative growth.

INSPECTIONS

The Kingston Local Development Corporation or their agent will provide qualified personnel to inspect disturbed areas of the construction site for compliance with the control measures outlined in this Plan. These inspections will be completed once every seven days or within 24 hours after a major storm event. A written record will be maintained of these inspections. Copies shall be provided to the Contractor and Owner.

CONTRACTORS

The Storm Water Pollution Prevention Plan identifies the Contractor and/or Subcontractor responsible for implementation of the Plan. Each contractor shall indicate his understanding of these responsibilities by affixing his signature the certification statement provided in this document.

The certification states that the Contractor responsible for elements of the Plan understands local codes pertaining to storm water quality and will comply with the codes and the "Stormwater Management Guidelines for New Developments: and Soil and Water Conservation Service "Guidelines for Urban Erosion and Sediment Control".

RETENTION OF RECORDS

The following documents shall be retained for a period of three years from the date the site is finally stabilized:

1. Notice of Intent (NOI)
2. Storm Water Pollution Prevention Plan
3. Reports and inspections generated during implementation of the Plan
4. Contractor certifications
5. Notice of Termination (NOT)

COMPARISON OF PRE-DEVELOPMENT WITH POST-DEVELOPMENT RUNOFF

Information and calculations of pre- and post-development runoff for the site are contained in a document prepared by Brinnier and Larios, P.C. entitled "Modified Storm Water Management Report, January 1996" and forms a part of this Storm Water Pollution Prevention Plan.

TABLE OF RUNOFF COEFFICIENTS

	Existing (acres)	Proposed (acres)	Runoff Coefficient
Impervious (pavement, roofs)	0	3	0.9
Stone/gravel surfaces	0	8	0.4
Wooded areas	25	2	0.1
Grass/other	0	12	0.3
TOTALS	25	25	--

CONTRACTORS' CERTIFICATION

Project Description: Contract 'A', Site Development Work, Kingston Business Park

Name of Contractor:

Address of Contractor:

Telephone:

CERTIFICATION:

"I certify under penalty of law that I understand and agree to comply with the terms and conditions of the pollution prevention plan for the construction site identified in such plan as a condition of authorization to discharge storm water. I also understand that the operator must comply with the terms and conditions of the New York State Pollution Discharge Elimination System ("SPDES") general permit for storm water discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards."

Name, title and signature:

Date::

STORM WATER POLLUTION PREVENTION PLAN

CERTIFICATION

Owner's Name: Kingston Local Development Corp.

Address: City Hall, 1 Garraghan Drive, Kingston, N.Y. 12401

Telephone: (914) 331-0080

CERTIFICATION:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law."

Authorized individual:

Signature:

Title:

Date:

ATTACHMENTS

Notice of Intent (NOI) for Storm Water Discharges Associated with Industrial Activity Under the SPDES General Permit

Notice of Termination (NOT) for Coverage Under the SPDES General Permit for Storm Water Discharges Associated with Industrial Activity

Votechs Stormwater Treatment System

Temporary Ground Construction Entrance/Exit

Energy Dissipator

Straw Bale Dike

Silt Fence

Silt Fence Drop Inlet Sediment Barrier

See Reverse for Instructions

SPDES FORM

DEC

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233-3505

Notice of Intent (NOI) for Storm Water Discharges Associated with Industrial Activity Under the SPDES General Permit

Submission of this Notice of Intent constitutes notice that the party identified in Section I of this form intends to be authorized by a SPDES permit issued for storm water discharges associated with industrial activity in the State in Section II of this form. Becoming a permittee obligates such discharger to comply with the terms and conditions of the permit. ALL NECESSARY INFORMATION MUST BE PROVIDED ON THIS FORM.

I. Facility Operator Information

Name: KINGSTON LOCAL DEVELOPMENT CO Phone: 9143310080

Address: CITY HALL 1 GARRAGHAN DRIVE Status of Owner/Operator: M

City: KINGSTON State: NY ZIP Code: 12401-

II. Facility/Site Location Information

Name: KINGSTON BUSINESS PARK

Is the Facility Located on Indian Lands? (Y or N): N

Address: DELAWARE AVENUE

City: KINGSTON State: NY ZIP Code: 12401-

Latitude: Longitude: Quarter: Section: Township: Range:

III. Site Activity Information

MS4 Operator Name: N/A

Receiving Water Body: N/A

If You are Filing as a Co-permittee, Enter Storm Water General Permit Number:

Are There Existing Quantitative Data? (Y or N): N

Is the Facility Required to Submit Monitoring Data? (1, 2, or 3): 1

SIC or Designated Activity Code: Primary: CO 2nd: 3rd: 4th:

If This Facility is a Member of a Group Application, Enter Group Application Number:

If You Have Other Existing NPDES Permits, Enter Permit Numbers:

IV. Additional Information Required for Construction Activities Only

Project Start Date: 03/01/96

Completion Date: 12/31/96

Estimated Area to be Disturbed (in Acres): 25

Is the Storm Water Pollution Prevention Plan in Compliance with State and/or Local Sediment and Erosion Plans? (Y or N): Y

V. Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Print Name: TR GALLO

Date:

Signature: _____

Instruction—NYSDEC Form 91-19-12 (9/92)
Notice of Intent (NOI)
For Storm Water Discharges Associated With Industrial Activity to Be Covered Under the SPDES General Permit

Who Must File A Notice Of Intent Form

Federal law at 40 CFR Part 122 prohibits point source discharges of storm water associated with industrial activity to a water body(ies) of the U.S. without a National Pollutant Discharge Elimination System (NPDES) permit. New York State has been delegated the NPDES program and administers its State Pollutant Discharge Elimination System (SPDES) program in lieu of EPA's NPDES program. Wherever the term "NPDES" is used in the NOI form, the reader should substitute "SPDES". The operator of an industrial activity that has a storm water discharge that qualifies for coverage under a SPDES Storm Water General Permit must submit the NOI form to obtain coverage. If you have questions about whether federal regulations require you to obtain a permit for your storm water discharge, contact the EPA Storm Water Hotline at (703) 821-4823. If you have questions concerning the applicability and coverage of the SPDES Storm Water General Permits, contact the New York State of Environmental Conservation at (518) 457-9601. In order to cancel your coverage under the General Permit you must submit a Notice of Termination (NOT) form. Failure to submit a NOT will result in the obligation to pay a yearly Regulatory Fee.

Where To File The NOI Form

New York State intends on using EPA's information management system. Therefore, NOIs must be sent to the following address:

Storm Water Notice of Intent
PO Box 1215
Newington, VA 22122

Completing The Form

You must type or print using upper-case letters, in the appropriate areas only. Please place each character between the marks. Abbreviate if necessary to stay within the number of characters allowed for each item. Use one space for breaks between words, but not for punctuation marks unless they are needed to clarify your response. If you have any questions on this form, call the EPA Storm Water Hotline at (703) 821-4823.

Section I—Facility Operator Information

Give the legal name of the person, firm, public organization, or any other entity that operates the facility or site described in this application. The name of the operator may or may not be the same as the name of the facility. The responsible party is the legal entity that controls the facility's operation, rather than the plant or site manager. Do not use a colloquial name. Enter the complete address and telephone number of the operator.

Enter the appropriate letter to indicate the legal status of the operator of the facility:

F—Federal M—Public (other than federal or state)
S—State P—Private

Section II—Facility/Site Location Information

Give the facility's or site's official or legal name and complete street address, including city, state, and ZIP code. If the facility or site lacks a street address, indicate the state, the latitude and longitude of the facility to the nearest 15 seconds, or the quarter, section, township, and range (to the nearest quarter section) of the approximate center of the site.

Indicate whether the facility is located on Indian lands.

Section III—Site Activity Information

If the storm water discharges to a municipal separate storm sewer system (MS4), enter the name of the operator of the MS4 (e.g. municipality name, county name) and the receiving water of the discharge from the MS4. (A MS4 is defined as a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) that is owned or operated by a state, city, town, borough, county, parish, district, association, or other public body which is designed or used for collecting or conveying storm water.)

If the facility discharges storm water directly to receiving water(s), enter the name of the receiving water.

If you are filing as a co-permittee and a storm water general permit number has been issued, enter that number in the space provided.

Indicate whether or not the owner or operator of the facility has existing quantitative data that represent the characteristics and concentration of pollutants in storm water discharges.

Indicate whether the facility is required to submit monthly data by entering one of the following:

1 Not required to submit monitoring date;
2 Required to submit monitoring data;
3 Not required to submit monitoring data; submitting certification for monitoring exclusion.

Those facilities that must submit monitoring data (e.g. choice 2) are: Section 313 EPCRA facilities; primary metal industries; land disposal units/incinerators/BIFs; wood treatment facilities; facilities with coal pile runoff; and, battery reclaimers.

List, in decreasing order of significance, up to four 4-digit standard industrial classification (SIC) codes that best describe the principal products or services provided at the facility or site identified in Section II of this application.

For industrial activities defined in 40 CFR 122.26(b)(14)(i)-(xi) that do not have SIC codes that accurately describe the principal products produced or services provided, the following 2-character codes are to be used:

HZ Hazardous waste treatment, storage, or disposal facilities, including those that are operating under interim status or a permit under subtitle C of RCRA [40 CFR 122.26(b)(14)(iv)];

LF Landfills, land application sites, and open dumps that receive or have received any industrial wastes, including those that are subject to regulation under subtitle D of RCRA [40 CFR 122.26(b)(14)(v)];

SE Steam electric power generating facilities, including coal handling sites [40 CFR 122.26(b)(14)(vii)];

TW Treatment works treating domestic sewage or any other sewage sludge or wastewater treatment device or system, used in the storage, treatment, recycling, and reclamation of municipal or domestic sewage [40 CFR 122.26(b)(14)(ix)];

CO Construction activities [40 CFR 122.26(b)(14)(x)].

If the facility listed in Section II has participated in Part 1 of an approved storm water group application and a group number has been assigned, enter the group application number in the space provided.

If there are other SPDES permits presently issued for the facility or site listed in Section II, list the permit numbers. If an application for the facility has been submitted but no permit number has been assigned, enter the application number.

Section IV—Additional Information Required for Construction Activities Only

Construction activities must complete Section IV in addition to Sections I through III. Only construction activities need to complete Section IV.

Enter the project start date and the estimated completion date for the entire development plan.

Provide an estimate of the total number of acres of the site on which soil will be disturbed (round to the nearest acre).

Indicate whether the storm water pollution prevention plan for the site is in compliance with approved state and/or local sediment and erosion plans, or storm water management plans.

Section V—Certification

Federal statutes provide for severe penalties for submitting false information on this application form. Federal regulations require this application to be signed as follows:

For a corporation: by a responsible corporate officer, which means: (i) president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions, or (ii) the manage of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

For a partnership or sole proprietorship: by a general partner or the proprietor; or

For a municipality, state, federal, or other public facility: by either a principal executive officer or ranking elected official.

Paperwork Reduction Notice

Public reporting burden for this application is estimated to average 0.5 hours per application, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate, any other aspect of the collection of information, or suggestions for improving this form, including any suggestions which may decrease or reduce the burden to: Chief, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20490, or Director, Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, D.C. 20603.

Please See Instructions Before Completing This Form

SPDES FORM

DEC

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233-3505

Notice of Termination (NOT) for Coverage Under the SPDES General Permit for Storm Water Discharges Associated with Industrial Activity

Submission of this Notice of Termination constitutes notice that the party identified in Section II of this form is no longer authorized to discharge storm water associated with industrial activity under the SPDES program. ALL NECESSARY INFORMATION MUST BE PROVIDED ON THIS FORM.

I. Permit Information

NPDES Storm Water General Permit Number: _____

Check Here if You are No Longer the Operator of the Facility: ☐

Check Here if the Storm Water Discharge is Being Terminated: ☐

II. Facility Operator Information

Name: _____ Phone: _____

Address: _____

City: _____ State: _____ ZIP Code: _____

III. Facility/Site Location Information

Name: _____

Address: _____

City: _____ State: _____ ZIP Code: _____

Latitude: _____ Longitude: _____ Quarter: _____ Section: _____ Township: _____ Range: _____

IV. Certification

I certify under penalty of law that all storm water discharges associated with industrial activity from the identified facility that are authorized by a NPDES general permit have been eliminated or that I am no longer the operator of the facility or construction site. I understand that by submitting this Notice of Termination, I am no longer authorized to discharge storm water associated with industrial activity under this general permit, and that discharging pollutants in storm water associated with industrial activity to waters of the United States is unlawful under the Clean Water Act where the discharge is not authorized by a NPDES permit. I also understand that the submittal of this Notice of Termination does not release an operator from liability for any violations of this permit or the Clean Water Act.

Print Name: _____ Date: _____

Signature: _____

Instructions For Completing Notice of Termination (NOT) Form

Who Should File A Notice of Termination (NOT) Form

Permittees who are presently covered under the New York State issued State Pollutant Discharge Elimination System (SPDES) General Permit for Storm Water Associated with Industrial Activity should submit a Notice of Termination (NOT) form when their facilities no longer have any storm water discharges associated with industrial activity as defined in the storm water regulations at 40 CFR 122.26(b)(14), or when they are no longer the operator of the facilities. Failure to file a Notice of Termination will result in the continued obligation to pay a yearly Regulatory Fee.

For construction activities, elimination of all storm water discharges associated with industrial activity occurs when disturbed soils at the construction site have been finally stabilized and temporary erosion and sediment control measures have been removed or will be removed at an appropriate time, or that all storm water discharges associated with industrial activity from the construction site that are authorized by a SPDES general permit have otherwise been eliminated. Final stabilization means that all soil-disturbing activities at the site have been completed, and that a uniform perennial vegetative cover with a density of 70% of the cover for unpaved areas and areas not covered by permanent structures has been established, or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed.

Where to File NOT Form

New York State is using EPA's information management system. Therefore, NOTs must be sent to the following address:

Storm Water Notice of Termination
Box 1185
Newington, VA 22122

Completing the Form

Type or print, using upper-case letters, in the appropriate areas only. Please place each character between the marks. Abbreviate if necessary to stay within the number of characters allowed for each item. Use only spaces for breaks between words, but not for punctuation marks unless they are needed to clarify your response. If you have any questions about this form, call the EPA Storm Water Hotline at (703) 821-4823.

SEE REVERSE SIDE OF THIS FORM FOR FURTHER INSTRUCTIONS

Instructions—NYSDEC Form 91-19-13(9/92)
Notice of Termination (NOT) of Coverage Under The SPDES General Permit for Storm Water Discharges Associated With Industrial Activity

Section I Permit Information

Enter the existing SPDES Storm Water General Permit number assigned to the facility or site identified in Section III. If you do not know the permit number, contact the EPA Storm Water Hotline at (703) 821-4823.

Indicate your reason for submitting this Notice of Termination by checking the appropriate box.

If there has been a change of operator and you are no longer the operator of the facility or site identified in Section III, check the corresponding box.

If all storm water discharges at the facility or site identified in Section III have been terminated, check the corresponding box.

Section II Facility Operator Information

Give the legal name of the person, firm, public organization, or any other entity that operates the facility or site described in this application. The name of the operator may or may not be the same name as the facility. The operator of the facility is the legal entity which controls the facility's operation, rather than the plant or site manager. Do not use a colloquial name. Enter the complete address and telephone number of the operator.

Section III Facility/Site Location Information

Enter the facility's or site's official or legal name and complete address, including city, state and ZIP code. If the facility lacks a street address, indicate the state, the latitude and longitude of the facility to the nearest 15 seconds, or the quarter, section, township, and range (to the nearest quarter section) of the approximate center of the site.

Section IV Certification

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For a partnership or sole proprietorship: by a general partner or the proprietor; or

For a municipality, state, federal, or other public facility: by either a principal executive officer or ranking elected official.

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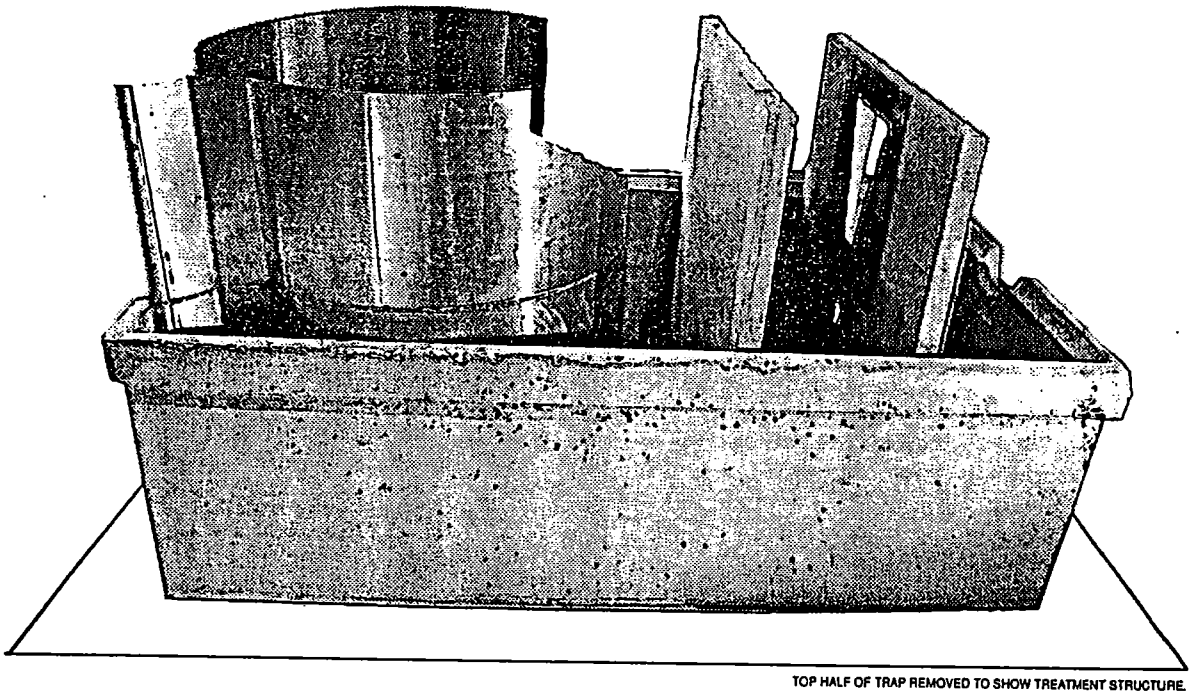
Vortechnics



TOP HALF OF TRAP REMOVED TO SHOW TREATMENT STRUCTURE.

VORTECHS™ STORMWATER TREATMENT SYSTEM

A major advancement in oil and grit separator (OGS) technology, the Vortechs™ Stormwater Treatment System efficiently removes grit, contaminated sediments, metals, hydrocarbons and other floating pollutants from surface runoff. This innovative design combines two unique treatment structures to eliminate turbulence within the system—ensuring proper physical separation and capture of sediment and oils.

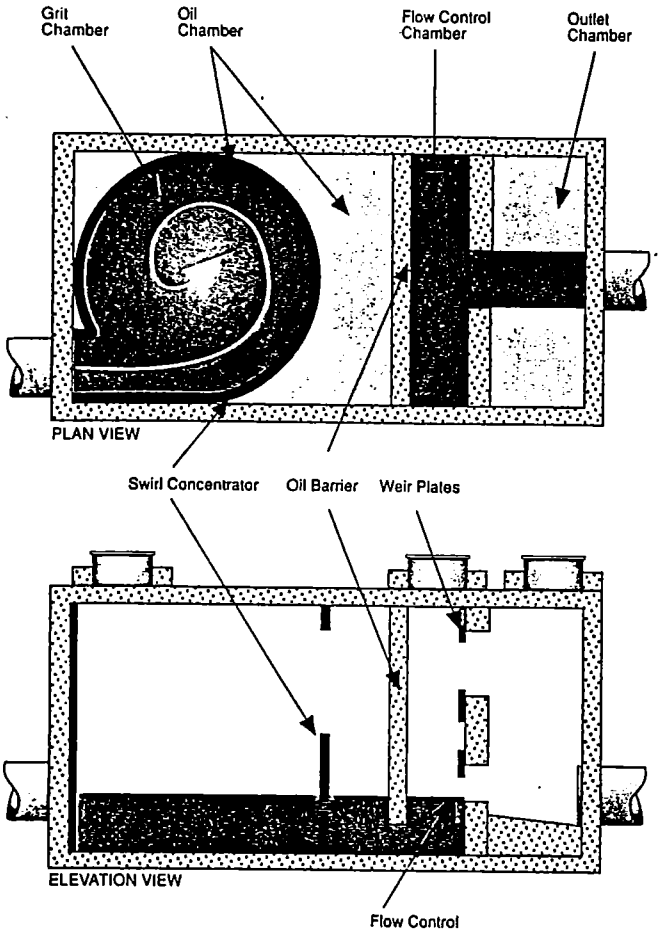
FEATURES:

- **High treatment efficiency:** Over 80% of contaminated sediment is removed during the "first flush".
- **Innovative flow control:** Seals off bottom of floatables barrier preventing loss of captured oils during clean-out.
- **Large treatment capacity:** Even the heaviest storms can be treated without bypassing peak flows.
- **Easy inspection—lower clean-out costs:** Dry weather volume significantly less than with conventional traps of the same size.

APPLICATIONS:

- Parking Lots
- Gas Stations
- Industrial Sites
- Retail Outlets
- Streets/Roadways
- Vehicle Maintenance Facilities
- Wetlands Protection

PATENT PENDING



FEATURES

Grit Chamber

The swirling motion created by the tangential inlet directs settleable solids toward the center. During peak storms this structure dissipates potentially disruptive flows—sediment is caught in the swirling flow path and settles back onto the pile after the storm event is over.

Oil Chamber

The center barrier traps floatables in the oil chamber. Unlike conventional oil traps that lack flow controls and extra tank capacity, the Vortechs™ System is highly resistant to flow surges.

Flow Control Chamber

As the storm event builds in intensity, the low-flow control within the Vortechs™ System will cause the inlet pipe to become submerged. This process floats oily pollutants up above the inlet pipe—and out of influent stream. Thus, the Vortechs™ System keeps captured pollutants in the trap by reducing forces which encourage resuspension and wash-out.

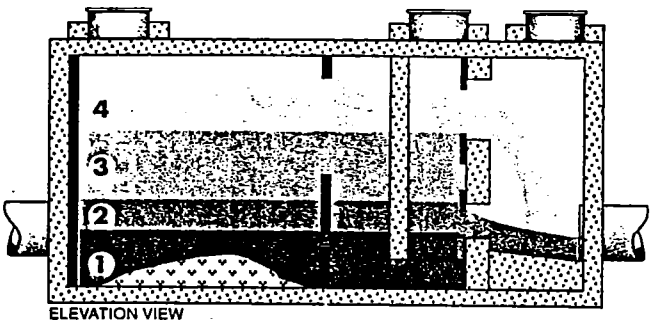
PHASES OF OPERATION

1) Dry weather/storm subsidence phase

Treated runoff is decanted out of the Vortechs™ System at a controlled rate restoring the water level to a low dry weather volume. This low dry weather level not only facilitates visual inspection of sediment and floatables accumulation but also significantly decreases maintenance costs by reducing pump-out volume.

2) Initial Wet Weather Phase

During this phase of operation a two-month storm event will cause the water level to rise above the top of the inlet pipe. This flow control effectively reduces inlet velocity and turbulence. 85% of storm events do not exceed the initial wet weather phase—sediment and floatables removal during this stage is very high.



3) Transition Phase

Flow attenuation achieved during this phase helps to utilize fully the storage capacity of storm sewer pipes and the Vortechs™ System. To increase storage volume further, on or off-line detention basins can be designed to fill during the transition phase. Swirling action increases at this stage capturing sediments and moving material which may have been deposited at inlet (during low flows) into the center of the chamber.

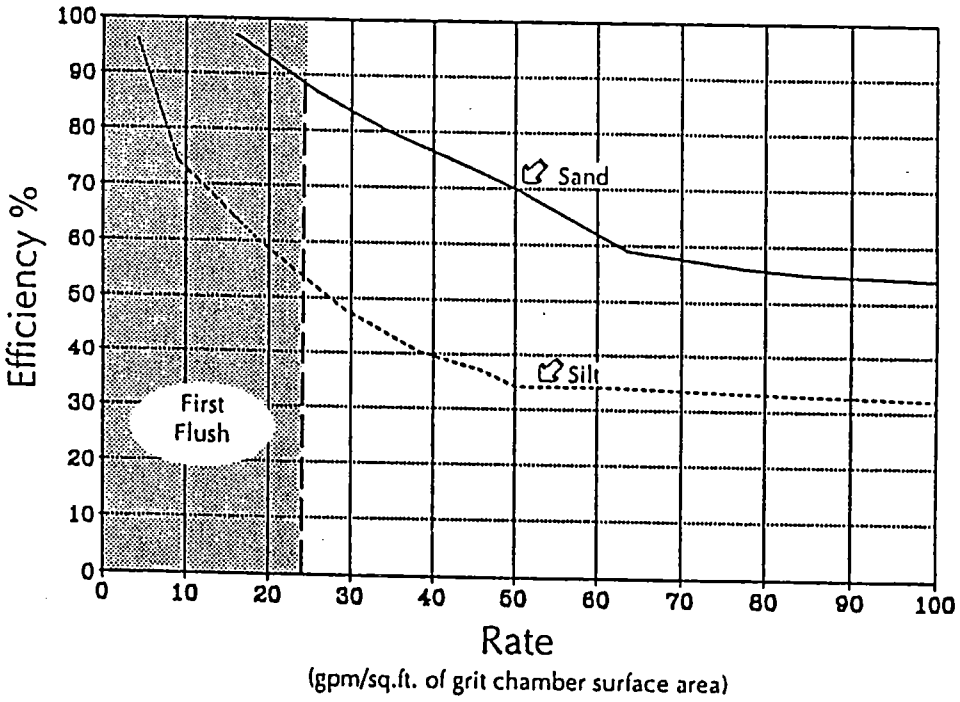
4) Full Capacity Phase

During this phase, the storm drains are operating at peak capacity, typically at 5 to 25 year storm flow rates. To accommodate greater volumes, Vortechnics can assist designers with configuring a peak flow by-pass. Treatment efficiencies for the Vortechs™ System remain constant during this phase, while conventional "plug flow" OGSs have been shown to fail and drop down to negative treatment efficiencies.

Vortechnics

TECHNICAL BULLETIN NO. 1

SEDIMENT REMOVAL EFFICIENCES



These performance curves were produced under the auspices of the EPA-funded Maine Environmental Internships program of the Maine Science and Technology Commission. The square footage on which any system is rated is the water surface area within the swirl chamber only, (not the overall tank "footprint").

The Vortechs™ System is designed to retain all previously captured particulates in all storms of greater than 2-month rainfall intensity. The 2-month storm operating rate is generally about 15-25 gpm/sqft.

Studies completed by the Metro Washington Congress of Governments have shown that conventional "plug flow" oil/grit separators typically lose particulates captured in previous smaller storms on average every other month. From this Vortechnics concludes that conventional plug flow systems operate at "negative efficiencies" in storms of 2-month or greater intensities.

These removal efficiency curves demonstrate that Vortechs Systems do not resuspend and lose sediment as flow rate increases up to 100 gpm/sqft flow rates (i.e., approximately a 25 year storm). Actual observations of Vortechs installations reveal steady increase in sediment pile depths over a number of seasons. Particle size analysis of these sediments show Vortechs Systems are capturing and retaining the full spectrum of particle sizes including those classified as silt and clay (See Vortechnics Technical Bulletin No.2).

September 1995

VORTECHNICS™ TECHNICAL BULLETIN NO. 2

PARTICLE SIZE DISTRIBUTION OF SEDIMENTS AND THE EFFECT ON HEAVY METAL REMOVAL

Sediments removed from Vortechs™ installations in Portland and South Portland, Maine were analyzed by a soil testing laboratory to determine size and distribution. These results were compared to similar tests done on sediments carried in highway runoff[1] and material removed from catch basins by "Vactor" truck[2]. The highway runoff sediment data is useful in characterizing typical total stormwater sediment loading. The catch basin data is indicative of sediment removed by typical plug-flow tanks. This data is plotted below for graphical comparison:

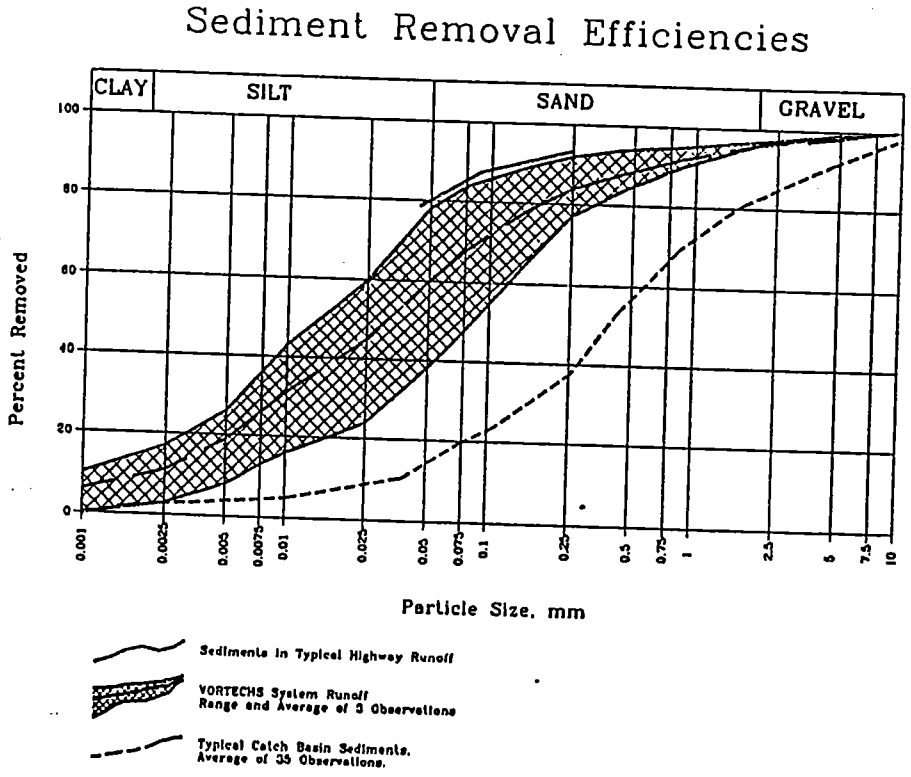


FIGURE 1

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[1] Yousef, Y. A. et.al., 1991, Maintenance Guidelines In Accumulated Sediments in Retention/Detention Ponds Receiving Highway Runoff, Florida Department of Transportation, Tallahassee FL, p. 17. The study included samples from Highway 50, (Sacramento), I-81, (Harrisburg), I-94, (Milwaukee) and I-85, (Effland). The curve shown is the average of the four samples.

[2] Analysis of sediments from 35 catch basins performed under the direction of Steven Lazoff, Laboratory Director, Aquatic Research , Inc., Seattle WA and reported to Bob Storer, King County Surface Water Management Division, Seattle WA June 21, 1993.

The curve describing pumpings from catch basins is similar to the other curves in the "large particle" range; typically, over 90 % of particles captured in catch basin sumps sampled are smaller than 5 millimeters. This suggests that catch basins are effective in removing large, heavy particles. In the "small particle" region, the curve shows that only 10% of the particles in catch basin sumps are smaller than 35 microns, (silt size), suggesting that catch basins are ineffective in removing fine, silty particles.

The curves describing sediments extracted from Vortechs™ Systems show enhanced effectiveness across the entire range of particle sizes. In the "mid-range" for example, over 80% of the sediment retained by a Vortechs System is approximately 250 microns, ("medium sand"), and finer particles, compared with less than 40% of the sediment in catch basin sumps. The difference between the curves may be interpreted as sediment loss from the catch basins due to turbulence and the re-suspension of previously deposited grit. These problems are widely recognized to occur in catch basins and, for that matter, conventional oil/grit separators during brief periods of high flow.

The curve describing the particle size distribution of sediments found in highway runoff from the study by Dr. Yousef is the result of averaged samples taken from highway sites across the U.S. and therefore is representative of sediment loading. The curve describing sediments in highway runoff and the curves describing sediments in the Vortechs Systems are very similar. This shows that the Vortechs System is highly effective is capturing sediment particles found in highway runoff. The fact that the curves are of such similar shape suggests further that Vortechs System removal efficiencies apply equally to the full spectrum of particle sizes and that the Vortechs never washes out.

A catch basin or virtually any tank with a sump where particles can be stored can effectively settle particles out of stormwater runoff if the flow rate is low enough. In most wet weather the flow rate is low enough to achieve high efficiency. But the converse is widely recognized to also be true; that is, when the flow rate is high, the efficiency is low, often dropping to negative efficiency with the result that the overall efficiency over time approaches zero, especially for fine-grained particles.

Fine-grained sediments pose the greatest environmental threat. Heavy metals, nutrients and hydrocarbons adhere to the surface of suspended particles and are transported by stormwater runoff. A large number of small particles will provide a larger total surface area for substances to adhere to than a smaller number of larger particles of the same total volume. Trapping this material will significantly reduce the presence of these harmful contaminants in surface waters.

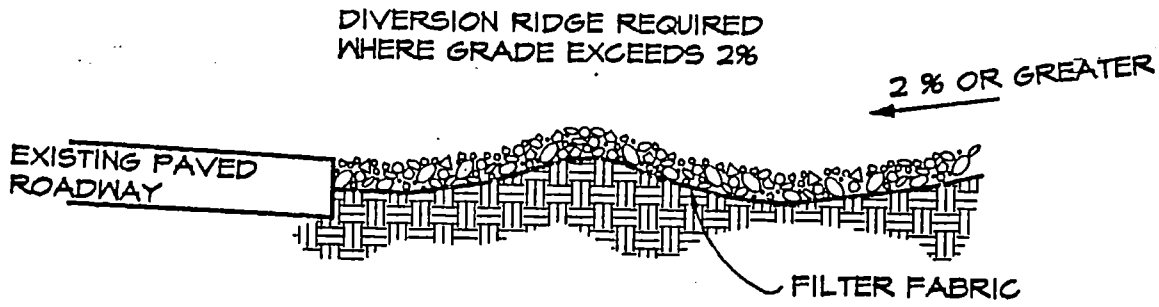
For example, a 1.0-mm. cube has a surface area of 6 square millimeters. Dividing that one cube into a thousand 0.1-mm. cubes increases the total surface area tenfold to 60 square millimeters. 70% of sediments found in catch basins are 1 mm or smaller while 70% of sediments removed by Vortechs Systems are 0.1 mm or smaller so the potential for pollutant capture is much greater.

Relative to more traditional Best Management Practices, (BMP's), for stormwater quality improvement, the Vortechs™ System compares very favorably to these methods with respect to dry weight concentrations, (mg/kg), of metals found in captured sediments[3]:

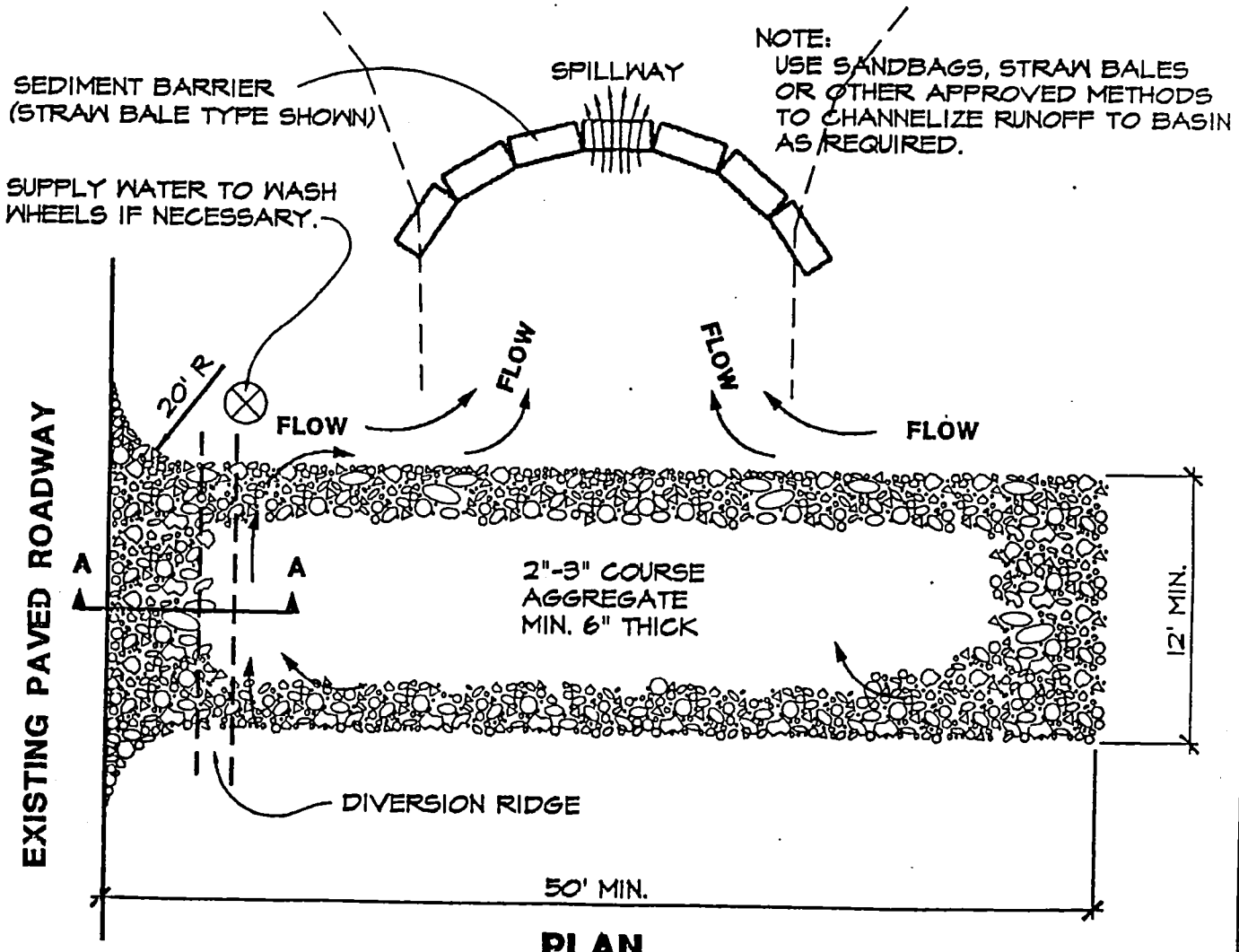
	Detention Basin	Sand Filter	Sand Filter w/ Sediment Chamber	Wet Pond	Grassed Swale	BMP Average	Vortechs Average	Variation
Cadmium	4	1.3	4.6	6.4	1.9	3.6	2.8	-22%
Chromium	30	30	52	36	30	36	55	53%
Copper	59	43	71	24.5	27	45	85	89%
Lead	161	81	171	160	420	199	417	110%
Nickel	N/A	30	49	38	13	33	37	12%
Zinc	448	182	418	299	202	310	470	52%
Number of Observ'ns	11	1	1	38	8	N/A	3	N/A

Research now indicates that the greatest environmental risk appears to occur when metal and hydrocarbon-laden sediments are deposited in downstream lakes and estuaries. This material has a long term negative impact on the health of suface waters. The data presented in this report shows the Vortechs System is approximately 50% more effective in capturing these sediments than conventional BMP's.

[3] Schueler, Thomas R. and Yousef, Y. A. 1994. Pollutant Dynamics of Pond Muck. Watershed Protection Techniques. Vol. 1, No. 2, p. 44.



SECTION A - A



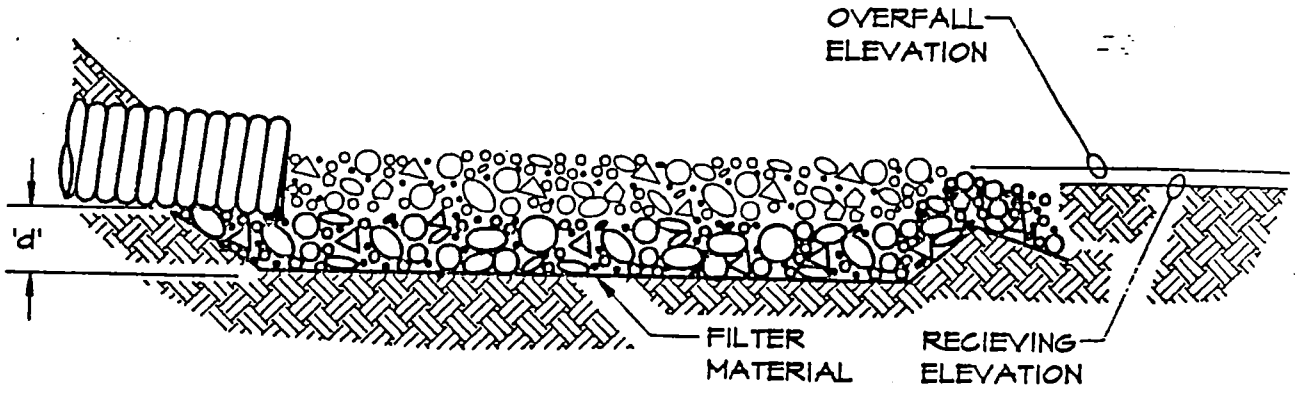
PLAN

NOTES:

1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABLIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

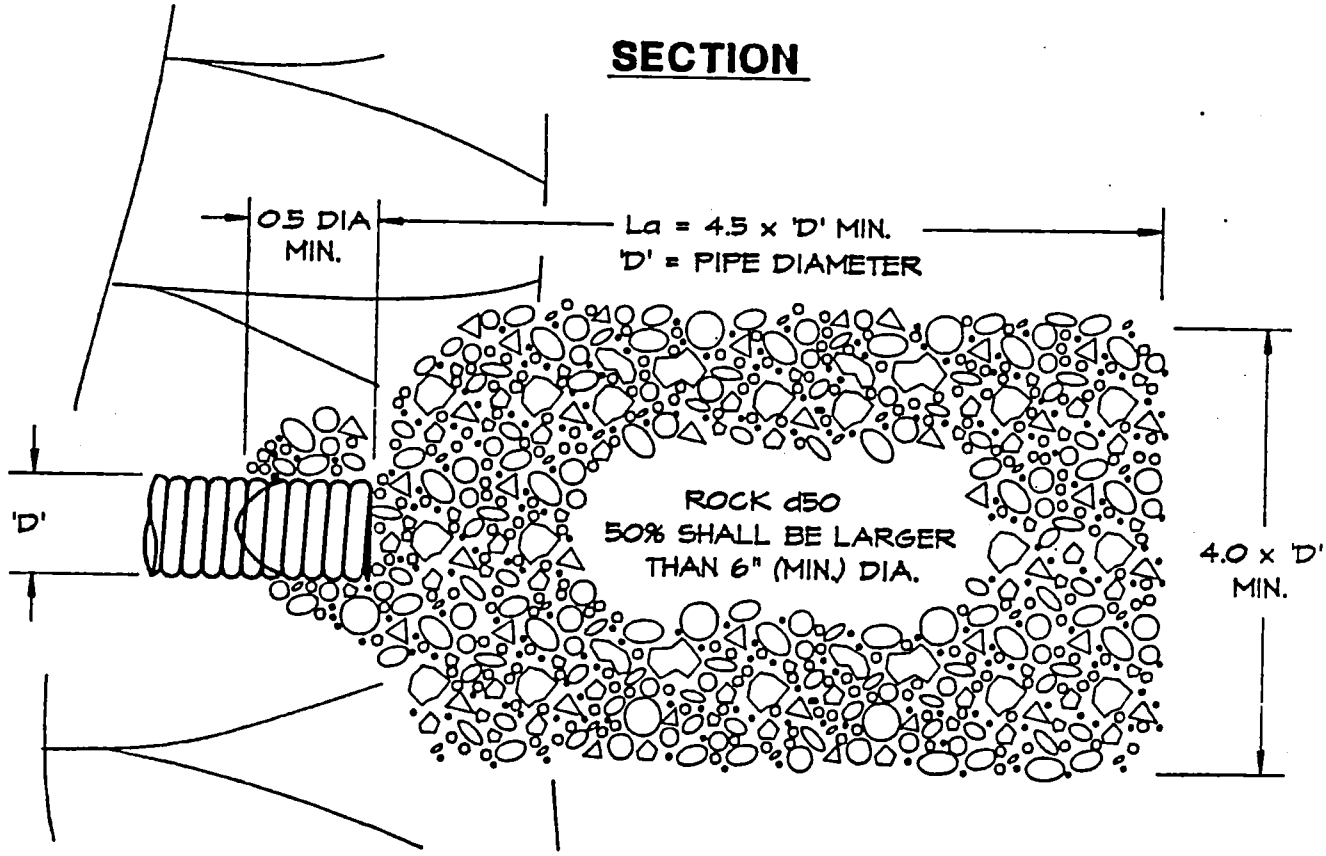
TEMPORARY GRAVEL CONSTRUCTION ENTRANCE/EXIT

FILE: GRADE07



THICKNESS ('d') = 1.5 x MAX ROCK DIAMETER (6" MIN.)

SECTION



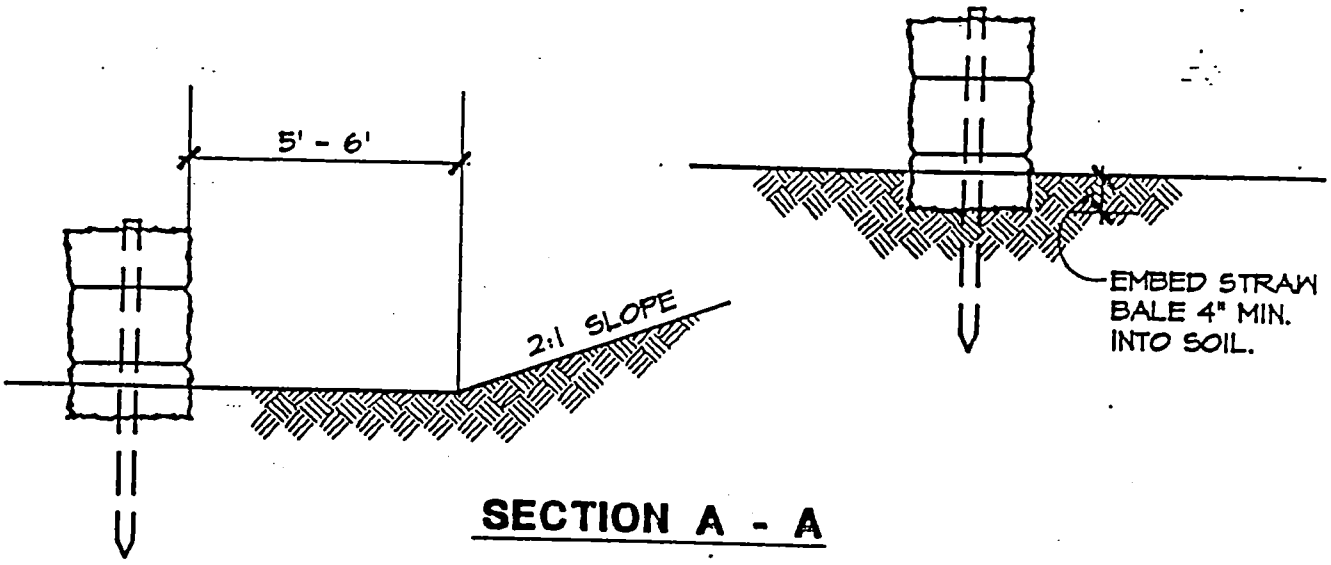
PLAN

NOTES:

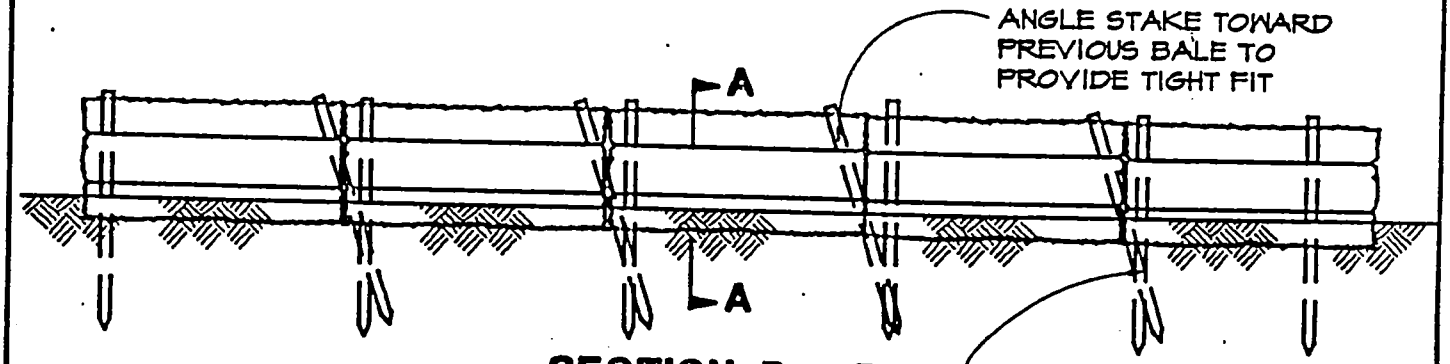
1. 'La' = LENGTH OF APRON. DISTANCE 'La' SHALL BE OF SUFFICIENT LENGTH TO DISSIPATE ENERGY.
2. APRON SHALL BE SET AT A ZERO GRADE AND ALIGNED STRAIGHT.
3. FILTER MATERIAL SHALL BE FILTER FABRIC OR 6" THICK (MIN.) GRADED GRAVEL LAYER.

ENERGY DISSIPATOR

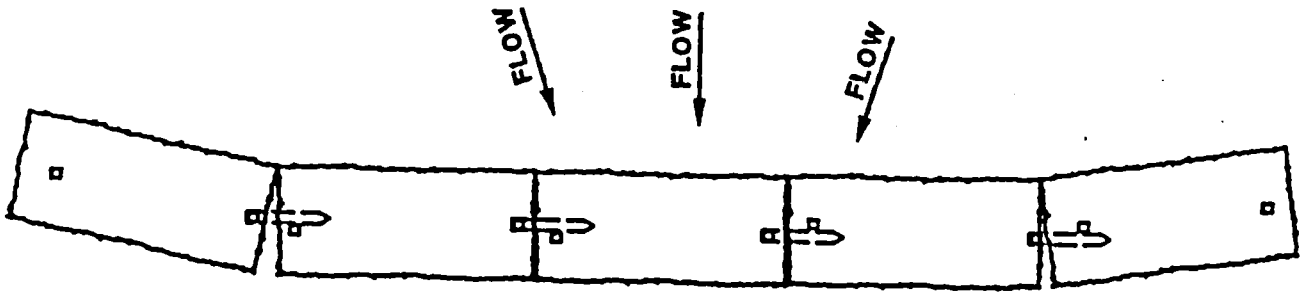
FILE: RNOFF06



SECTION A - A



SECTION B - B



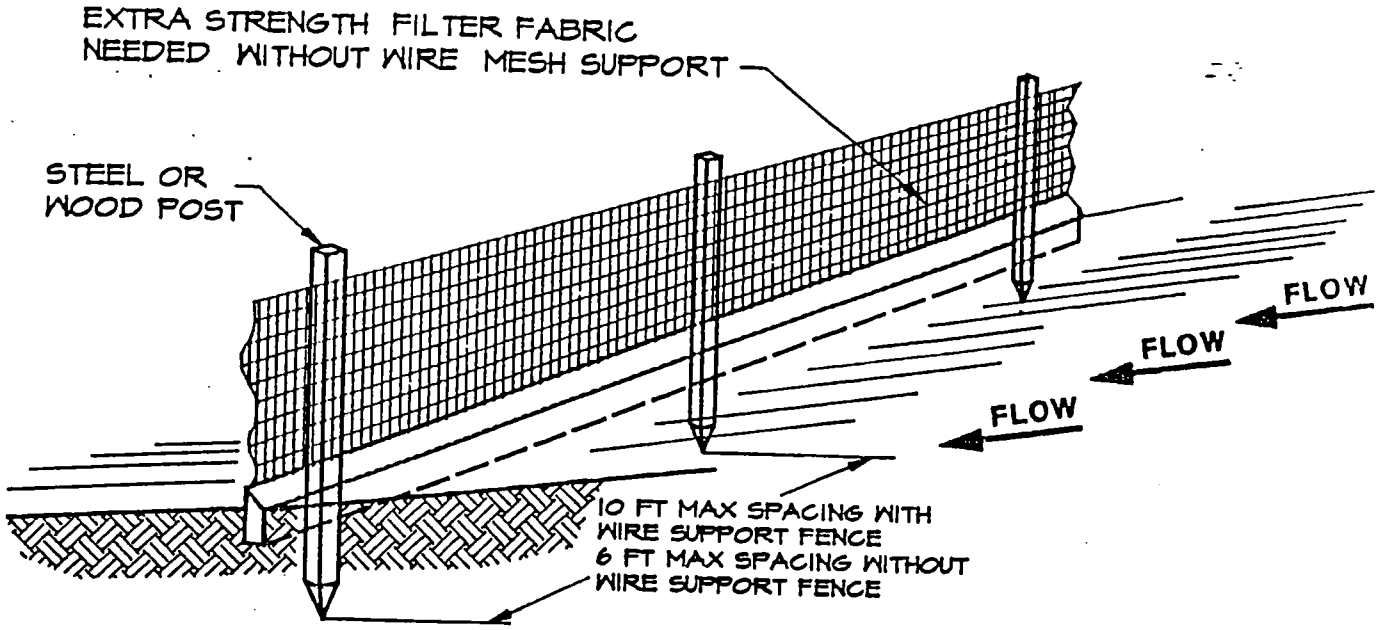
PLAN

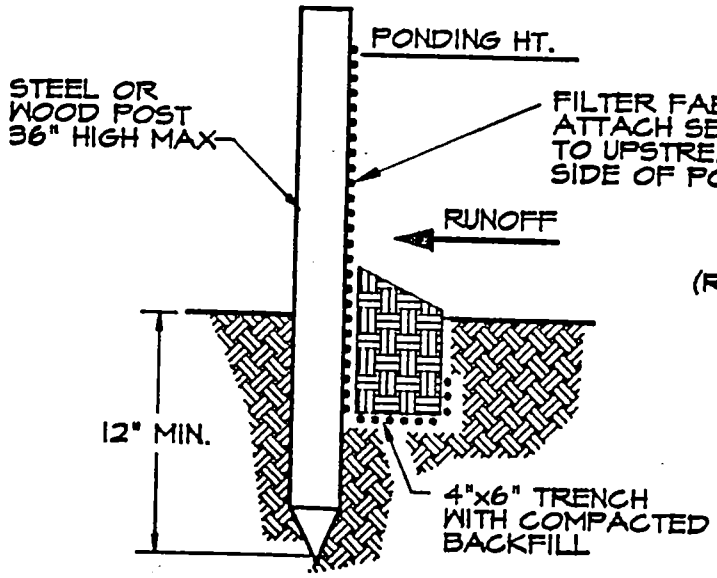
NOTES:

1. THE STRAW BALES SHALL BE PLACED ON SLOPE CONTOUR.
2. BALES TO BE PLACED IN A ROW WITH THE ENDS TIGHTLY ABUTTING. USE STRAW, ROCKS, OR FILTER FABRIC TO FILL GAPS BETWEEN THE BALES AND TAMP THE BACKFILL MATERIAL TO PREVENT EROSION OR FLOW AROUND BALES.

STRAW BALE DIKE

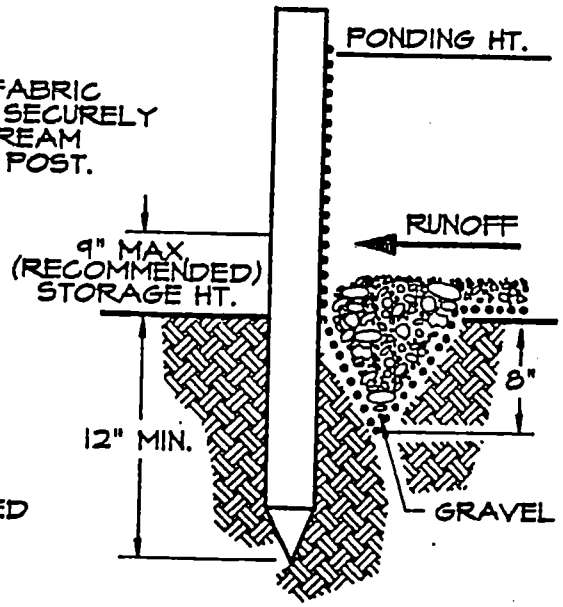
FILE: SEDIM03





STANDARD DETAIL

TRENCH WITH NATIVE BACKFILL



ALTERNATE DETAIL

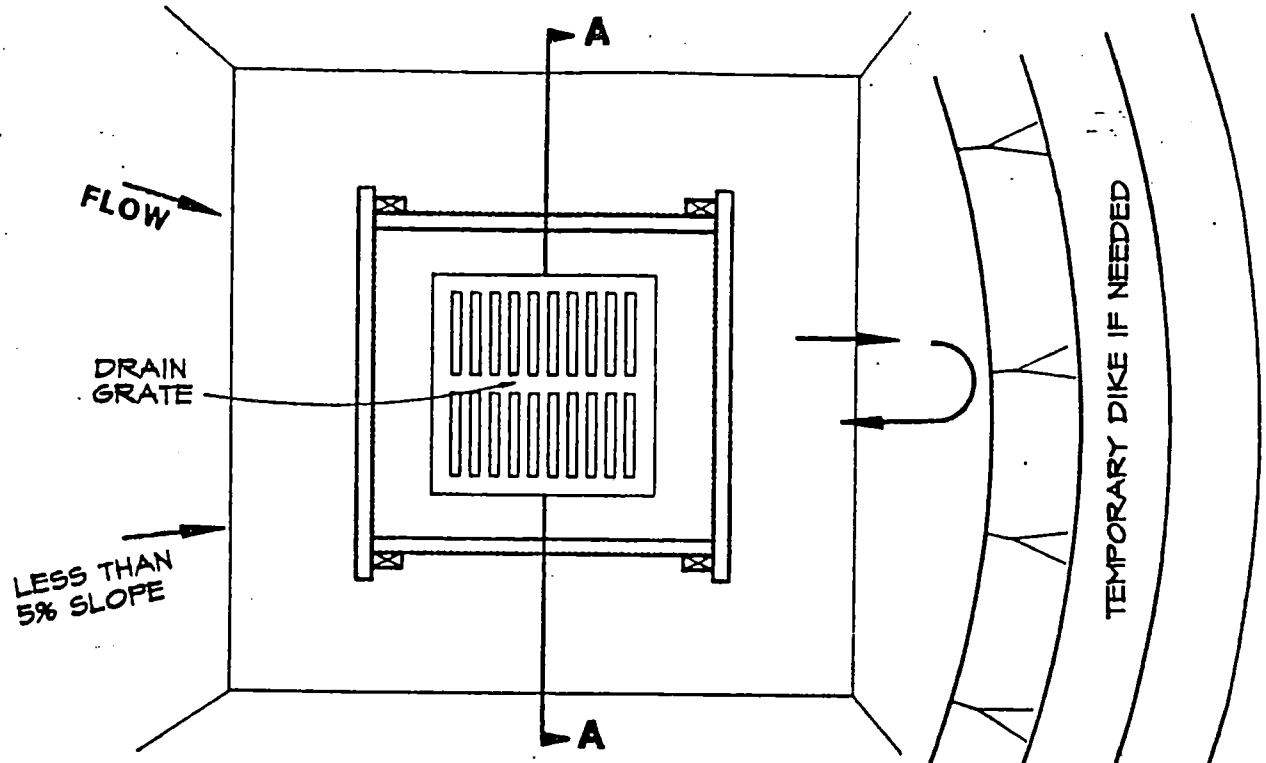
TRENCH WITH GRAVEL

NOTE:

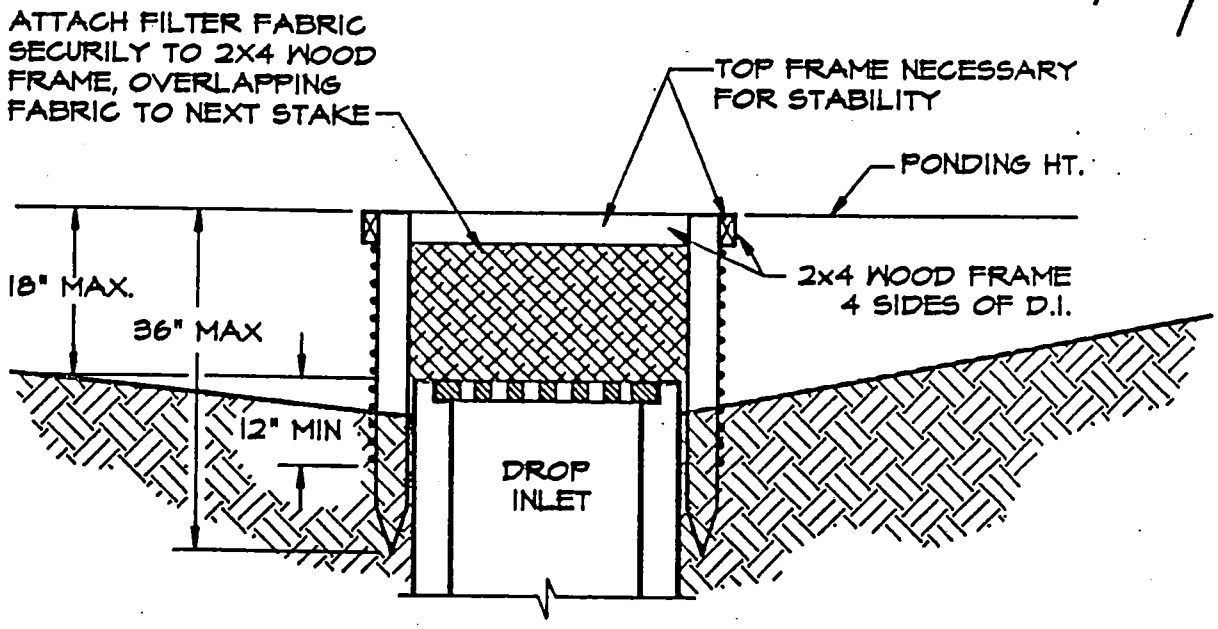
1. INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT AND REMOVE SEDIMENT WHEN NECESSARY.
2. REMOVED SEDIMENT SHALL BE DEPOSITED TO AN AREA THAT WILL NOT CONTRIBUTE SEDIMENT OFF-SITE AND CAN BE PERMANENTLY STABILIZED.
3. SILT FENCE SHALL BE PLACED ON SLOPE CONTOURS TO MAXIMIZE PONDING EFFICIENCY.

SILT FENCE

FILE: SEDIM03



PLAN VIEW



SECTION A-A

NOTES:
1. DROP INLET SEDIMENT BARRIERS ARE TO BE USED FOR SMALL, NEARLY LEVEL DRAINAGE AREAS. (LESS THAN 5%)
2. USE 2X4 WOOD OR EQUIVALENT METAL STAKES, (3 FT. MIN. LENGTH)
3. INSTALL 2X4 WOOD TOP FRAME TO INSURE STABILITY.
4. THE TOP OF THE FRAME (PONDING HEIGHT) MUST BE WELL BELOW THE GROUND ELEVATION DOWNSLOPE TO PREVENT RUNOFF FROM BY-PASSING THE INLET. A TEMPORARY DIKE MAY BE NECESSARY ON THE DOWNSLOPE SIDE OF THE STRUCTURE.

SILT FENCE DROP INLET SEDIMENT BARRIER

FILE: SEDIMOT