

AMG

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Memo re: wastewater facilities,
sewerage

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Elson T. Killam Associates Inc.



MEMORANDUM

To John Coley Date November 16, 1983
From Stanley Kaltnecker
Subject High Density Zoning and Sewerage Facilities Costs

Job No. _____

The parcels of land within the Township presently being looked at for high density zoning will all have impact on the existing wastewater facilities as the wastewater facilities were designed in accordance with present zoning and Regional Planning Studies and these parcels would generate more wastewater than originally planned for.

Putting aside the fact that development of any of these tracts at a density higher than presently zoned for would restrict development of remaining lands in the Township (from a sewage aspect), the costs of sewerage of these high density tracts has been briefly evaluated.

The Mountain Boulevard tract is within 400'± of the Middlebrook Interceptor. From the approximate connection point of the Mountain Boulevard tract to the interceptor downstream to Bridgewater Township, the new interceptor would have sufficient "unused" capacity at this time after the existing dwellings were tied in. It must be recognized, of course, that this "unused" capacity was actually reserved or provided for other vacant lands in accordance with the present zoning and regional studies and the Mountain Boulevard tract would be taking that capacity. Therefore, the costs of sewerage of the Mountain Boulevard tract would only be that for the 400' or so of connecting pipe-line which might be on the order of \$5,000 to \$10,000.

The AMG tract in the Stage III sewer district is at the head waters of the Stage III plant and it would appear as though it would be seweraged through the existing Dock Watch Hollow subdivision and down Dock Watch Hollow Road through the future interceptor to Bridgewater. The future interceptor would be approximately 4,000 feet long and is estimated to cost about \$300,000. The project is to be EPA funded. While design has been completed, construction has not been started. In addition, it is likely that the sewer system through the Dock Watch Hollow subdivision will have to be supplemented to handle the additional flow should AMG tract be developed beyond its present zoning. This could involve as much as 4,000 feet of sewer line which could cost \$200,000 to \$300,000.



The wastewater from the Timber properties, which is within the Stage V service area, would require about 2,000' to 3,000' of additional off site piping plus expansion of the existing treatment plant. The total costs for these facilities is estimated at \$1 to \$1.3 million.

Development of the Sky Top properties, which is within the Stage V service area, could involve as much as 6,000' of pipe, half of which would parallel the existing interceptor plus significant expansion of the treatment plant should expansion even be allowed by the NJDEP. The cost of these off site improvements is estimated at \$3.8 to \$4.1 million. This does not include the possibility that the NJDEP may not permit such a large treated wastewater flow discharge to the Dead River and could possibly require a higher degree of treatment and/or piping the effluent to the Passaic River.

The Sterling Road tract which is in the Stage I - II service area would discharge to the existing Stiles Road pumping station which would appear at this time to have just sufficient capacity to handle the additional flow. The pumping station discharges to a gravity sewer to the Stage I - II treatment plant. The capacity of the gravity sewer to the treatment plant has sufficient capacity for the flow from an additional 150 units except for a 500 ft. reach that would have to be paralleled costing about \$5,000 to \$10,000. Expansion of the plant to accommodate the Sterling Road tract high density development will be necessary and is estimated that plant expansion will cost from \$.5 to \$.7 million.

The Route 78 tract is also located within the Stage I - II service area and adjacent to an existing sewer system which has sufficient capacity to handle the wastewater flow. However, the treatment plant will require expansion at an estimated cost cost of \$.8 to \$1.0 million.



MEMORANDUM

To John Coley Date November 16, 1983
From Stanley Kaltnecker
Subject High Density Zoning Impact on Sewerage Facilities Planning

Job No. _____

The following outlines the impact of rezoning tracts of land presently zoned for .5 to 1.5 acres per unit to a higher density of 6 to 7 units per acre on the sewerage facilities of the Township.

The Township of Warren lies within two major wastewater drainage basins. The northern part of the Township lies within the Upper Passaic River Basin and the southern portion of the Township lies within the Upper Raritan River Basin. In all there are five sewer districts as follows.

A) Upper Passaic River Basin

1. Stage I - II service area
2. Stage IV service area
3. Stage V service area

B) Upper Raritan River Basin

1. Stage III service area (Dock Watch Hollow)
2. Middlebrook service area

The attached map illustrates the service areas and the locations of the tracts of land for which higher density zoning is being considered.

Both the Upper Raritan and Upper Passaic River Basin have been the subject of regional studies on wastewater such as the 208 Water Quality Management Plan, 201 Facilities Plans, or Environmental Impact Statements. The above studies set forth the populations and sewage quantities for which wastewater facilities can be designed. The population projections were handed down from the State to the Counties and apportioned to the various 208 planning areas. New Jersey DEP requirements provide that all wastewater facilities built within the planning areas conform to the 208 and 201 Planning Studies. Basically then the population projections were not developed by Warren Township, but were in fact developed by 208 planning studies. It is my understanding that the total population increase for New Jersey was developed



by Federal agencies and assigned to the State. The State then disaggregated these populations to the counties and the counties disaggregated the populations to the various municipalities. These populations were then used in the 208 planning studies. This was a long arduous process involving both the Federal and State Agencies and the Agencies performing the 208 and 201 studies. In Warren Township, the population projections developed for the 208 Plan is essentially in accordance with the present zoning of Warren Township.

NJDEP approval requests for recent construction of wastewater facilities in Warren Township have had to demonstrate that the wastewater flows and populations to be served were in accordance with the Regional 208 and 201 Facilities Plans. The construction of a central sanitary sewer collection system for the Middlebrook District is the most recent project undertaken by the Authority. As part of the approval process, it was necessary to demonstrate to the Federal and State Agencies that the sewer capacity proposed would serve no more than the population projections developed by the 208 plan. In addition, the amount of wastewater flow per person is a subject of much discussion with the USEPA and the NJDEP. The normal allowance of 100 gallons per day per person, would equate to a peak design flow of 1360 gallons per day per dwelling, was not acceptable to these agencies, and after considerable discussion of a value of 80 gallons per day per person was accepted along with a peak design flow of 1030 gallons per day per dwelling. Once this flow rate was established as a basis of design and utilizing the 208 population projections, the total wastewater flow contribution from the Township of Warren - Middlebrook District was established. This flow was utilized in sizing the collectors and interceptors. The design flow limitations have a greater impact on the interceptor than the collectors. The capacity of a pipe is highly dependent upon its slope as well as its diameter and in the case of the collectors, the prevailing ground slopes in Warren Township allow steep pipe grades so that some of the collectors can provide more capacity than is necessary. However, the interceptor, which is the main line receiving the flow from the collectors, does not have steep ground slopes readily available, as the interceptor generally runs along the side of the East Branch of the Middlebrook. In this regard, it had to be demonstrated to the EPA and DEP that the interceptor, as designed, would be of a size and slope that it would have no more capacity than necessary to convey the actual design flow as developed by the 208 population studies and the EPA per person wastewater flow. In instances where the initial design provided for an interceptor slope or pipe size that was excessive, revisions had to be made to reduce the pipe size so that no spare capacity would be provided.

The above approval process was typical of that applied to any wastewater project within the Township and by the virtue of that process, the existing facilities are designed to handle wastewater flows as developed in the regional plans which is essentially that which would be developed based upon present



zoning. Therefore, any development or densities greater than that presently zoned for cannot be accommodated by the sewer system without denying other landowners of their rightful use of the wastewater facilities.

Presently, two parcels of land within the Upper Raritan River Basin are being considered for higher density zoning than presently zoned for. One parcel, the AMG tract, lies within the Dock Watch Hollow or the Stage III District, and the other parcel located off Mountain Boulevard lies within the Middlebrook District.

A central sanitary sewer system for the Middlebrook system was just completed. This central sewer system will discharge to the Township of Bridgewater and ultimately Somerset-Raritan Wastewater Treatment Plant. The system is not tied in as Bridgewater has not completed the construction of the necessary facilities to receive Warren's flow although all facilities are presently under construction. Furthermore, there may be difficulties encountered with Somerset-Raritan Treatment Plant as the plant flow is presently at the design capacity and the flow from Warren and Bridgewater may not be accepted by Somerset-Raritan until the plant is expanded. The Middlebrook Sanitary Sewer System was designed to serve about 2360 equivalent connections which would provide capacity for the population and commercial uses within the Middlebrook Basin in accordance with the present zoning. Equivalent connections is defined as the sum of the residential dwellings plus commercial flows expressed as equivalent residential connections. Within the Middlebrook Basin there exists about 760 equivalent connections meaning that 1600 connections were provided for future growth in accordance with the present zoning. If the Mountain Boulevard tract was developed at 6 units per acre, a total of about 370 dwellings could be constructed. The sewer system was designed to allow for about 38 dwellings from this tract or about 2-1/2% of the equivalent connections provided future growth. The 370 units would utilize 23% of the 1600 connections allowed for future growth. Since the 1600 connections were actually allowed for development of all the existing lands as presently zoned within the Middlebrook Basin, existing landowners would be denied their rightful use of the sewer as the capacity for the high density would utilize their connections. If the Mountain Boulevard tract was developed with 370 units, the remaining vacant lands could, therefore, be developed to only 76% of what they are presently entitled to.

The Stage III District is presently sewered to a small wastewater treatment plant. The wastewater treatment plant is to be abandoned and an interceptor constructed from the treatment plant to the Township of Bridgewater connection with Warren Township. The interceptor design and construction is the responsibility of Bridgewater Township. It is reported that the interceptor has been designed and approved by the EPA and the DEP, although construction has not been initiated. The same planning process that was experienced for the Middlebrook District was also complied with for the



design of the interceptor for the Stage III District. The Stage III interceptor was designed for 1140 equivalent connections which provides for the population that would be experienced if the basin was developed in accordance with the present zoning and 208/201 regional plans. At the present time, there are approximately 180 equivalent connections, leaving about 960 equivalent connections for future growth. The AMG tract, which is at the head waters of this sewer district, could realize approximately 550 units if developed in accordance with the present proposals. The design of the sewer system was based upon 52 units from the AMG tract or 5½% of the equivalent connections reserved for future growth. Of the 960 equivalent connections reserved for future growth in accordance with the zoning plan, development of the AMG tract with 550 units would utilize 57% of the "unused" capacity. This means that the remaining landowners could only develop their tracts to 43% of what they are entitled to under present zoning.

In the Upper Raritan River Basin, it can be seen that the impact of high density on the Mountain Boulevard tract has less impact on the remaining vacant lands in the Township than the AMG tract in the Dock Watch Hollow District. In addition, the Mountain Boulevard tract is immediately adjacent to the interceptor sewer whereas the AMG tract requires the construction of the Dock Watch Hollow Interceptor and more than likely paralleling of the existing sanitary sewer through the Dock Watch Hollow Development which AMG abuts.

In the Upper Passaic River Basin, there are four tracts of land for which higher density zoning is being considered. The Sky Top property and the Timber properties both lie within the Stage V sewer district. The Sterling Road tract and the Route 78 tract both lie within the Stage I - II sewer district.

The wastewater treatment plant for the Stage V plant was paid for by those landowners who subscribed to the plant construction for a specific flow allocation. These subscribers account for approximately 1350 equivalent connections for which the treatment plant was designed and approved by the State Agencies. Again, the design flow and connections had to be in accordance with the regional planning studies and so demonstrated to the state. The regional planning studies allow for about a total of 1900 equivalent connections within the Stage V service area. Therefore, since 1350 connections are already subscribed to, there is approximately 550 equivalent connections remaining within the Stage V sewer district to meet the requirements of the vacant lands in accordance with the present zoning. However, there is no treatment plant capacity at this time for these connections.

The development of the Timber property for high densities could result in approximately 430 dwelling units whereas 40 dwelling units were



originally planned for this tract in the Stage V sewer district. Of the 550 equivalent connections remaining, based upon 208 population projections, the Timber properties would utilize about 80%, meaning that the remaining vacant lands could only be developed to 20% of that which they are presently entitled to by present zoning.

The Skytop properties, also within the Stage V sewer district, could be developed to about 1390 units under the high density proposal. The number of dwellings under present zoning would be 130 for this tract and that was provided for in the regional planning studies. Since there are an equivalent of 550 connections remaining in this basin in accordance with the regional plans, the development of the Sky Top tract would result in approximately 2-1/2 times the number of connections allowed for. Under these circumstances, no development of remaining land could be accommodated by the sewer system as allowed for in the Regional Plan. Furthermore, the Stage V wastewater plant discharges to the Dead River, which is a small stream over which the State has concern as to its capacity to receive treated plant effluent and it is questionable that expansion of the plant beyond that evaluated for the regional studies (1900 connections) would even be permitted. This could result in the possibility that the plant effluent, if expanded beyond that provided for in the Regional Studies, be piped to a larger receiving stream such as the Passaic River some 2-1/2 miles away.

In the case of either the Timber properties or the Sky Top properties, additional treatment plant capacity would have to be constructed along with additional off site sewer piping. More site sewer piping would be required for the Sky Top properties as it is closer to the head waters of the drainage basin and hence further from the Stage V treatment plant, then the Timber properties and because of the larger tract of land and higher wastewater flow, the existing trunk sewer would also have to be paralleled to handle the wastewater flow from the Sky Top property.

The Sterling Road site and the Route 78 site are both within the Stage I - II Service Area. In accordance with the regional studies and the present zoning, the Stage I - II Service Area will accommodate approximately 2700 equivalent connections. At the present time approximately 1170 equivalent connections are existing or have been subscribed to and paid by landowners. The existing treatment plant capacity is sized to serve the 1170 connections only. In accordance with the regional wastewater facility plan, presently 1530 additional connections can be developed within this service area.

The development of the Sterling Road tract could result in 150 dwelling units on a parcel of land for which originally 42 units were planned. The 150 units would then utilize about 10% of the remaining connections allowed for in the regional planning studies and would allow the remaining lands to be developed to 90% of their present zoning. The Route 78 tract



could result in the development of 240 units on a tract of land presently zoned for about 36 units. Development of this tract will utilize approximately 16% of the remaining connections as allowed for in the regional planning studies allowing the remaining land to be developed to about 84% of its present zoning. The combined development of the Sterling Road and Route 78 tract could result in 390 units on parcels of lands that were zoned for 78 units. These two tracts will then use 26% of the potential connections provided for in the Regional Planning Studies allowing the remaining lands to be developed up to about 74% of present zoning allowances.

Existing sanitary sewer pass through both the Sterling Road and Route 78 properties. However, additional treatment plant capacity for either or both tracts would have to be provided for.

The receiving stream for the Stage I - II treatment plant, which includes the Route 78 and Sterling Road properties, is the Passaic River. The regional studies provided for an additional 1530 equivalent connections within this service area and since these two proposed tracts will utilize about 400 units, the treated effluent load on the receiving stream would be within that evaluated in the regional plans.

Summarizing then if we accept the fact that development of any parcel in excess of the present zoning will deny other landowners the use of the sanitary system designed in accordance with the regional planning studies, the following illustrates the impact of higher density development.

<u>Description of Tract</u>	<u>Sewer Capacity Required by Tract as a Percent of Total Sewer Capacity Remaining as Established by Present Zoning and Regional Studies</u>
<u>Upper Passaic River Basin</u>	
A) Mountain Boulevard	23%
B) AMG Tract	57%
<u>Upper Passaic River Basin</u>	
A) Sterling Road Tract	10%
B) Route 78 Tract	16%
C) Timber Tract	80%
D) Sky Top Tract	250%

It can be seen from the above that the impact of the receiving stream will be the most significant for the development of the Sky Top properties which would actually put the polluttional load on the stream far in excess of that provided for in the Regional Studies. There is a question as to whether or not such a development and expansion of the plant to receive the development could be accommodated by the receiving stream. High density development on any of the parcels in the Upper Passaic River Basin will require the construction of additional wastewater treatment capacity.