

**Township of Cranford
Flood Advisory Committee
Education and Documentation Task Force**

**Flood Management Information
and
Questions and Answers
December, 2001**

Prepared by the Education and documentation Task Force:

**Elizabeth Burns
Elizabeth Fiume
Joseph H. Musillo
Jonathan Schreir
Donald W. Smitheman
David Weichert**

Cranford Stormwater Control – One Project – Two Distinct Problems – Two Distinct Solutions

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The Stormwater Street Drainage Problem

The Street Drainage Problem:

For decades water from the northeast quadrant of Cranford including, Oak Lane, Ridge Road, Herning Avenue, Kenilworth's Commonwealth Drive, and other streets, has drained by gravity through the same stormwater drain pipes as those streets that lie lower in elevation onto these upland streets. They drained through the stormwater drainage pipes and then over flowed to the streets of the low elevation areas of Venetia Avenue, Glenwood Road, Edgar Avenue, Belmont Avenue, Kensington Avenue, portions of Riverside Drive, and other surrounding streets via the catch basin openings in these low elevation streets.

Similar street flooding occurred on the West Side of the Rahway River from similar drainage conditions.

When the Rahway River rose in elevation, it became higher than the surrounding streets and essentially shutoff all gravity drainage flow. Some river water also backflowed into the low elevation streets through the catch basins that are open to these streets.

As a result, these low elevation streets accumulated several feet of runoff water during any four to five inch storm event trapping people in their homes for as much as 36 hours at times. Residents report that these conditions occurred at least 20 times in the last 25 years.

The Cause:

1. Construction of new houses and neighborhoods was not complemented with stormwater drainage and infrastructure improvements and planning.
2. Failure in the past to provide a method of draining water from low lying streets and subsequently upland streets.
3. Failures in the past to engineer a system to prevent even minimize the significant stormwater backflow that results from a high river.

Reason for the Flood Committee:

Assembled by Tom Denny in 1997 to formulate solutions to the routine street flooding caused by large storm events.

The need for action was dictated by the two storm events of October 20, 1996 and July 15, 1997. Each of these two storm events was over eight inches in rainfall. Both of these two storm events came up to but did not overflow the dikes. But as usual with any storm event that exceeded three to five inches, stormwater was trapped in the streets of the low elevation areas of Venetia Avenue, Glenwood Road, Edgar Avenue, Belmont Avenue, Kensington Avenue, portions of Riverside Drive, and other surrounding streets. People were also trapped with as much as five feet of water in the street and with water in their homes and surrounding their property.

The Solution:

1. Improve the storm water drainage pipe sizes in the low elevation neighborhoods.
2. Capture all the stormwater generated from the northeast quadrant of Cranford including, Oak Lane, Ridge Road, Herning Avenue, Kenilworth's Commonwealth Drive, and other streets by use of ground contouring (swale) and directing the flow to an enlarged storm drain (express) to the river, bypassing all of these low elevation streets.
3. Eliminate river backflow to the low elevation neighborhoods by redirecting stormwater drainage to a central point where it can easily be controlled. That is, closing off all direct discharges to the Rahway River and eliminating all backflow from extensive flapgate leakage at these outfalls which when the Rahway River elevation is high enough, reduces and backs up the drainage flow to the Rahway River and eventually allows Rahway River water to backflow into low elevation neighborhoods. This is solved by intercepting all the

The Stormwater Street Drainage Problem

stormwater drainage pipes before they discharge into the Rahway River at the West side of Riverside Drive. Collecting each individual stormwater flow in a large header that runs parallel to the Rahway River to a single discharge point at Kensington Avenue. This single discharge point would be angled downstream with a riprap splash area to minimize mud, silt, and vegetative blockages. This exit point could easily and quickly be cleaned with a high pressure jet and minimum turbidity. Upstream of the discharge point a single trash rack or debris catcher would be installed to minimize street and neighborhood impacts to stormwater flow and Rahway River pollution and flow. As the Rahway River rises, a gate or a sluice valve would shut off the Rahway River and eliminate backflow. Stormwater drainage flow would then be directed to the suction header of a series of increasing capacity pumps that would be energized to match stormwater drainage flow and discharge that flow to the Rahway River without any street pooling in the low elevation neighborhoods.

4. Installing a properly sized pumping station to drain water from the low elevation neighborhoods during large storm events when the Rahway River elevation exceeds that of the low elevation neighborhoods

What This Project Will Do:

Eliminate most street water backup conditions that inundate lower elevation homes on both the east and west sides of the river resulting from:

- Drainage from other higher elevation neighborhoods.
- River backflows.
- Local inadequate drainage systems.

Additional Actions to Enhance the Plan Viability:

No feasible alternatives can be found without greater neighborhood impact or very high unrealistic maintenance commitment to stormwater drainage pipes with built in traps, siphons, or loop seals that would remain flooded and would be debris dropout points that would rapidly affect the efficacy of the stormwater drain.

However the Township could do the following to further enhance this project:

- Enact a local zero net fill rules, for and at, the site of each property developed or improved in the Township.
- Repair or replace all storm sewers currently in a state of disrepair.
- Continue to install additional storm sewer pipes in future projects to capture and redirect to the express bypass system, additional waters in the northeast quadrant. Specifically those waters originating from the vast areas behind the Orange Avenue School.

The Stormwater Street Drainage Problem

The Rahway River Flooding Problem

The River Flood Problem:

On Thursday September 16, 1999, Hurricane Floyd occurred dumping greater than ten inches of storm water on Cranford and the Rahway River watershed area. This storm overflowed the dikes by two feet causing 450 family homes to flood and several foundations to collapse. This put a greater emphasis on flood control measures. This additional need was added to the project scope. However, this problem is vastly different and distinct from that of the stormwater infrastructure upgrades that were designed to eliminate stormwater drainage and backflow problems. This Rahway River flooding problem could only be addressed with river floodway improvements. Two separate and non-related problems and solutions.

The Additional Flood Problem:

Several decades of permissive construction of new buildings and improvements to existing buildings in Cranford and the entire Rahway River Watershed without regard to the resultant flooding. Each insignificant piece of additional impervious surface added to the watershed increases the breath and depth of the flood and flood fringe zones. More recent stormwater management ordinances regulate the allowable post construction flow, they do not address total runoff completely nor is there any plan to recapture the flood control capacity lost in the past.

Additional impervious surface such as buildings, additions, patios, driveways, parking lots coupled with the resultant tree and vegetation removal, eliminates the ability of stormwater to percolate directly to groundwater, the ability for trees and vegetation to absorb stormwater, and eliminates all drainage delays. Stormwater runoff quickly rushes over impervious surfaces to lower elevations. Normally this runoff is delayed, absorbed, and percolated locally thereby lessening the impact of the storm event on the Rahway River and there-by lessening the crest elevation and flow of the Rahway River allowing it to remain within its banks.

The August 2, 1973 storm event produced a flood with a Rahway River hydraulic flow of 5430 cu-ft/sec and flooded the same low elevation neighborhoods as Floyd. The Floyd storm event produced a Rahway River Hydraulic flow of 8000 cu-ft/sec and flooded a wider area of homes. The increased hydraulic flow of the Rahway River in Cranford is caused by many factors which exist in the entire watershed area.

Improvements to the floodway were needed to optimize or maximize the hydraulic flow capacity of the Rahway River in Cranford without affecting upstream and downstream communities. A flow of 6050 cu-ft/sec is the design maximum, which represents an increase of 950 cu-ft/sec or 18.6% over current flow capacities, will protect from major storms that could overflow the dikes.

Hurricane Floyd, a storm event that exceeded ten inches of rainfall, created an hydraulic Rahway River flow of 8000 cu-ft/sec and overflowed the dike by a nominal 1.95 feet. The elevation of the dike is currently at 68 ft. Hurricane Floyd was a 69.95 ft. storm event.

The two storm events of October 20, 1996 and July 15, 1997 reached the very tip of the current dike, with a Rahway River flow of 4760 cu-ft/sec and 5080 cu-ft/sec respectively. Both storm events slightly exceeded eight inches of rainfall but were contained within the floodway defined by the dikes.

What This Project Will Do:

Projects completed since the flood of 1973 have improved the flood handling capacity of the river by 276%. This project will increase the current level of protection by an additional 20%. With this project in place the level of protection will have increased to 327% more protection than existed in 1973. This level of protection will then be at the maximum attainable locally.

The Additional Solution:

To achieve a Rahway River hydraulic flow capacity increase to 6050 cu-ft/sec, the following steps are necessary. It is important not to get confused with the 100 year protection terminology often used to describe storm events. Today's 99 year storm may later be characterized as an 80 or 85 year storm event as new storm events occur and time passes. For that purpose the N. J. D. E. P. has agreed that the optimum or maximum level of protection that can be designed and installed is one that protects us from a storm event of 6050cu-ft/sec and will lessen the severity of the impact from larger storm events.

Cranford Stormwater Control – One Project – Two Distinct Problems – Two Distinct Solutions

The Rahway River Flooding Problem

The current proposed solution targets this maximum flow capacity of 6050 cu-ft/sec. This represents an improvement of 950 cu-ft/sec or 18.6% over current flow capacities. See the table below which quantifies this improvement.

To achieve a Rahway River hydraulic flow capacity increase to 6050 cu-ft/sec, the following steps are necessary.

1. Continue annual de-silting of the Rahway River by Cranford Engineering and Public Works Departments. (State permits required)
2. Work with the County to de-s snag, remove silt, deepen and flatten the Rahway River bed north of the footbridge to Kenilworth Boulevard and remove fallen and/or dead trees and brush from the channel. (State permits required)
3. Enlisting the aid of Union County whenever possible for de-silting and de-snagging operations.
4. Raise the road and bridge structure of Kenilworth Boulevard at the Rahway River crossing.
5. Raise the dike on the east and west sides of the Rahway River to an elevation of 71 ft. from Kenilworth Boulevard to Springfield Avenue.
6. Evaluate the additional benefits and possible upstream impact of raising the control structure at Lenape basin by two feet using of the Hecht computer-modeling program. This will delay and store 554-acre feet of water during storm events and still leave one foot of freeboard. The cost is small, and the benefits, immediate.

Alternatives and Additional Actions:

No locally feasible alternatives that would further optimize or maximize the level of protection beyond 6050 cu-ft/sec.

Investigate the ability to store up to 554 acre-feet of water in Lenape Park by raising the control structure two feet. This would delay upstream water from elevating the Rahway River and allow local stormwaters some extra time to drain to the Rahway River before the upstream crest travels through Cranford. Evaluate the proposal accurately with the Hecht computer program analysis and not a shoot from the hip knee jerk reaction.

Investigate two collapsible dam installation at the two Cranford dam sites to buy some time for local stormwater drainage to occur.

Investigate a sizable underground Rahway River bypass to eliminate the Springfield Avenue loop.

A global watershed project approach managed by the Army Core of Engineers (“ACOE”) to address the entire Rahway River Basin and enhance the effects of the work proposed in Cranford’s project.

Both local and global zero net fill rules for and at each property developed or improved in the watershed.

Require that each property developed or improved in the flood zone install a permeable driveway surface, install a crawl space with water vents at the pre-development elevation, and not increase the fill on the property from the pre-development amounts.

Current Flow Capacity				Added Capacity of Improvements				Capacity after Improvements			
Cubic Feet per Second	Gallons per second	Gallons per Minute	Gallons per Hour	Cubic Feet per Second	Gallons per second	Gallons per Minute	Gallons per Hour	Cubic Feet per Second	Gallons per second	Gallons per Minute	Gallons per Hour
5,100	38,150	2,289,000	137,300,000	950	7,160	426,400	25,580,000	6,050	45,260	2,715,000	162,900,000
1 Cubic foot is equal to 7.481 gallons											

Project Phases

Project Phases:

Phase 1 – Install an express bypass sewer in the northeast quadrant with a collection swale at the head in the wooded area west of Oak Lane and North of Ridge Street.

Increase the size of two storm sewer trunk lines in the low elevation areas on Edgewood and Glenwood Roads.

Phase 2 – Install a pump station slightly north of the Kensington-Balmiere footbridge area.

Install storm sewer intercept header from local drainage and trunk lines along Riverside Drive from Normandy Place to the pumps station and from the Riverside Drive northern terminus to the pump station .

Phase 3 – Install elevation improvements to east side of river dike to a nominal 70.2 - 70.7 foot elevation.

Phase 4 – Install elevation improvements to west side of river dike to a nominal 70.2 - 70.7 foot elevation and a small pump station at Nomahegan Park basin near Park Drive slightly west of Romore Place.

Phase 5 – Install new storm sewer trunk line on the west side of river from West End Drive beginning at Crescent Place and running along the west bank of the river to Balmiere Parkway at the footbridge and then under the river to connect it to the Phase 2 pump station at the Kensington-Balmiere footbridge.

Phases 1, 2, 4, and 5 together eliminates most street water backup conditions and drainage problems that inundate lower elevation homes on both the east and west sides of the river at a result of drainage from other higher elevation neighborhoods, river backflows, and local inadequate drainage systems.

Phases 3 and 4 together improves the current flood handling capacity of the Rahway River in Cranford by almost 20% to the local maximum permissible. This along with previous projects will represent a 327% improvement in flood protection over the conditions that were in place in 1973. These project phases bring the level of flood protection to the maximum allowed for this section of the Rahway River.

Questions and Answers

Questions Asked at the Township Committee Meeting on Tuesday May 29, 2001

The following questions were asked at the Township Committee Meeting on Tuesday May 29, 2001 (Nos. 1 to 51 inclusive)

Ridge Street Resident

1.) Storm sewer for new homes on Oak and Ridge drain into woods which eventually runs into a pipe and into the river. Why was contractor allowed to funnel water into the woods instead of the existing storm sewers?

When new homes were built in the northeast quadrant no engineering consideration was given to the accumulated effect of this construction on the lower elevations west of these new homes. A problem that already existed was exacerbated by this lack of recognition of a growing problem and subsequent failure to improve the storm sewer infrastructure as building continued upland (Ridge, Oak, Herning, Kenilworth) and within the low elevation areas as well. When water from these areas can not get to the river before it rises above street elevation it accumulates in the low elevation streets for as long as 36 hours and as deep as 5 feet. In the last 23 years this has happened approximately 20 times, trapping families in the low elevations in their homes and inundating their basements and ground elevation rooms and garages. These events largely go unnoticed by residents in the upland or northeast quadrant areas. Draining directly to the wooded area causes local high water tables and necessitates the need for sump pumps in the properties adjacent to the wooded area where they were never previously needed. Draining directly to the wooded area causes runoff to flow to the low elevation areas where it will pool and inundate those neighborhoods in small storms ranging from 3 to 5 inches.

2.) If this system that is in place working, why create swale?

The problem is that what is in place now is not working. Yes, on Ridge and Oak it works, but at the expense and hardship of other residential neighborhoods. This solution will remove water from Ridge, Oak, Kenilworth, and other upland areas from the low elevation areas to their west. The swale is merely a sloped contour to direct the water to a drainage pipe that will be sized to carry all stormwater runoff and direct it to the river while bypassing the other low elevation neighborhoods and removing this large component of their street water problems. See answer to question 1.

3.) Concerned that after the swale is completed he will be able to look down Ridge Street and see the Kenilworth Boulevard.

During the design phase the swale will be designed in such a way to eliminate this concern. The swale will be designed such that it is not in a straight line parallel to residential houses on Ridge. It is important to note that this is a design detail that can be easily addressed during the design. Right now no effort has been authorized for design. The current concept phase places an un-designed

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swale on paper only to show its existence as a piece of a solution. Design details will be completed and concerns such as this can be easily addressed once the design phase is in progress.

4.) Can't believe the size of the swale and that there is enough runoff that will fill it or enough water being collected to push the water down the pipe to the river.

The size of the swale will be such that it spans the width of the woods to capture any un-piped runoff from those neighborhoods and direct the runoff and water dumped there from local drainage pipes to a properly sized drainage pipe directly to the river without impact to other neighborhoods. The elevation of the wooded area is such that there will always be a gravity drain to the river.

5.) Believes that the project is moving the flood problem from Riverside Drive to Oak & Ridge, which have never flooded.

Actually, the problem has not been perceived by residents of Oak and Ridge because their water is efficiently whisked away to other lower elevation neighborhoods. However, during heavy rain storm events of from 3 to 5 inches, other streets have their drainage systems overloaded and then inundated by water from upland neighborhoods in addition to their own local drainage. The newer homes on Riverside drive do not experience this routine inundation of water but other areas of Riverside drive have dealt with these problems for decades without relief. These include streets like Edgar, Glenwood, Brookdale, Venetia, Kensington, Henley, and parts of Riverside.

6.) Was under the impression that nothing could be built in the woods because it was Green Acres. What portion of this land is Green Acres?

A small portion of the wooded area is Green Acres land and those areas will be avoided. The New Jersey Department of Environmental Protection ("NJDEP") will oversee any concerns in these areas.

7.) Why do the woods have to be destroyed? Estimates that over 100 trees will have to be destroyed.

Just enough trees must be removed to allow the swale to be configured and the exit pipe installed. Many trees can be replanted after the installation.

This is the least invasive approach. Other engineers retained by Residents of the Riverside Drive, in attempt to eliminate the drainage pipe, have proposed clear cutting the entire 8 acre wooded area and the creation of a three foot deep retention basin capable of holding a 24 acre-feet of stormwater storage. The Township's consulting engineer noted early on, that this drastic approach was unnecessary and not a minimally invasive approach and created safety, health, and water management problems as well, and did not pursue this approach.

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The important lesson to be learned from this is that two separate and independent engineering firms have concluded that this stormwater from these upland neighborhoods must be addressed as a key component of a multi faceted plan to allow relief to the lower elevation neighborhoods.

8.) Is under the impression that, by law, the swale cannot be fenced.

The swale is merely a contour that can occur naturally or be constructed. Of itself, it offers no safety hazards. During non storm events it will be like a dry grassy area very shallow slopes. During a storm event there will be a slow brook like flow that will drain the area. After the storm event the swale will dry up as the storm runoff subsides. There will be no back pressure from the river holding water in the swale since the river elevation is lower than the pipe. There are swales around the town. Two of near equal size exist in the rear of Orange Avenue School. One is part of a softball field's right field and the other is just east of the first. There are swales around the town that are used as integral parts of drainage schemes. There is no need to fence them in since once one is seen, all safety concerns will be put in perspective. While there is no law prohibiting a fence around a swale, one can wonder why we do not fence in the Rahway river, which has far more serious safety implications.

9.) Will water sit in the swale, seep into the ground, raise the water table and flood houses on Oak and Ridge?

Just the opposite will occur. Drainage on Oak and Ridge will not be affected by this improvement. The swale will remove stormwater from the area in a quicker and more efficient than it currently is drained. Currently, stormwater is allowed to percolate to groundwater in the wooded area as some of it makes its way to a drainage pipe. This current condition causes an artificially elevated ground water table and has caused some adjacent neighbors on Herning to require a sump pump where none was previously needed. Part of this groundwater surcharging will be reduced as a side benefit of the system.

10.) Would residents around the swale be required to purchase flood insurance?

These improvements will not affect the flood plain delineation. The purpose of these improvements is to correct decades of storm water infrastructure problems that slowly grew with new construction and additions that added additional unaddressed burden to older lower elevation neighborhoods. If you are not in a flood plane or flood fringe area now, this improvement will not change that. The purchase of flood insurance is generally required by lien holders at time of property purchase. Since this by-pass storm sewer and pump improvement does not affect the flood plane, your status with your lien holder will not change as a result.

11.) Concerned about absorption value of trees and standing water. Will water attract mosquitoes?

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And will it be necessary to spray?

While there will be some localized loss of absorption do to the loss of trees, the drainage will carry this water with it directly and efficiently to the river. Many of the trees can be replanted once construction is complete. According to the Union County Mosquito Commission, mosquitoes are only a concern in standing stagnant water. Even the Rahway river with its seemingly stagnant summer state, has enough unobserved flow to eliminate it as a mosquito concern. This swale will be sloped to the drainage pipe to allow flow until all stormwater has runoff. Currently stormwater runoff in the wooded area is allowed to contribute to any standing water problems that exist in the wooded area. This project would remove more water directly from the wooded area, improving the standing water issues that may currently exist. See questions 11 and 13.

Herning Avenue Resident

12.) Concerned over lack of educations.

The Flood Committee was originally instructed not to disseminate any information on their own out of the committee. Information would come from the engineering department and Township officials conversant with the project, to give a unified and factual presentation. This was an attempt to keep incorrect, inaccurate, or biased information from being given out without official approval. Unfortunately much inaccurate information was given out and amplified by those without a total understanding of the project goals and how the solution addressed those goals. The officials did not do an effective job at getting the facts out. To that end, a presentation is being planned by the Township which will present all goals and project facts. It is late in coming but the Township has finally woken to the needs to educate. It is unfortunate that misinformation and the resultant hysteria was allowed to be the only information to prevail. We feel the presentation will fully describe the project goals, how the improvements address those goals, and answer questions raised during the information void. Any questions can also be posed to the Township Engineer if there is still a concern or piece of information needed, or a question left unanswered. This has always been the case. Please avail yourself of his expertise and experience an additional educational avenue.

13.) Stated that standing water is killing the trees in the woods.

If standing water is a current problem in the woods, this improvement will mitigate that to a large degree. The stormwater runoff portion of any standing water will be directed to a stormwater drainage pipe for direct and efficient removal from the area. Currently stormwater runoff in the wooded area is allowed to contribute to any standing water problems that exist in the wooded area. This project would remove more water directly from the wooded area, improving the standing water issues that may currently exist. See questions 11 and 13.

14.) Will there be a grate over the intake pipe?

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Yes.

Oak Lane Resident

15.) When all of the trees are cut down, won't all the water go into my basement? If not where will the water go?

The only trees that will be cut down are those necessary to construct the swale and install the new larger drainage pipe. Many of these trees can be replanted and the relatively small amount of immediate stormwater absorption that their loss affects will be directly and efficiently drained from the area by the improvement. See question 11.

16.) What safety precautions will be taken for children playing in the area?

While safety is a perceived problem, it stems from the misunderstanding of what a swale is. It is a gentle slope that like the two behind Orange Avenue School that go generally unnoticed in the topography of the land. There are swales around the town that are used as integral parts of drainage schemes. Of the two of near equal size that exist in the rear of Orange Avenue School, one is part of a softball field's right field and the other is just east of the first.

The proposed pipe opening will have a grate to prevent unauthorized access. Other safety precautions will be addressed as the concerns become apparent during design and construction.

17.) Per phone call with County Engineer, is under the impression that trees will not be allowed to be cut down.

There is a small area of the woods that is designated as Green Acres. Work in these areas will be avoided and if they need to be partially disturbed will be under the supervision of the NJDEP.

Herning Avenue Resident

18.) What about the ecological balance?

All efforts will be made during construction to minimize what must be disturbed to allow safe construction. Many of the trees removed can be replanted. See question 17.

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19.) Concerned about encephalitis.

If the concern is that of disease carrying mosquitoes, according to the Union County Mosquito Commission, mosquitoes are only a concern in standing stagnant water. Even the Rahway river with its seemingly stagnant summer state, has enough unobserved flow to eliminate it as a mosquito concern. This swale will be sloped to the drainage pipe to allow a brisk flow until all stormwater has runoff. One local resident is concerned that existing standing water is killing the trees, but standing water is a current problem in the woods, this improvement will mitigate that to a large degree. The stormwater runoff portion of any standing water will be directed to a stormwater drainage pipe for direct and efficient removal from the area. Currently stormwater runoff in the wooded area is allowed to contribute to any standing water problems that exist in the wooded area. This project would remove more water directly from the wooded area, improving the standing water issues that may currently exist. See questions 11 and 13.

20.) Concerned about the proximity of the swale to the bike path and that it will be an attraction to children.

The two swales behind the Orange Avenue School's property are of no observable safety concern in an area where many children are present daily. One is part of a softball field's right field and the other is just east of the first. There are swales around the town that are used as integral parts of drainage schemes.

The Rahway river with its pedestrian and bike paths pose a greater safety concern but still not one that clamors for immediate resolution because the perceived risk is very low. Once the swale is in place and residents see how innocuous its presence is, safety concerns will be put in perspective and all will be addressed to the satisfaction of the local neighborhood.

21.) Will plan provide the protection promised?

The plan is two fold.

Eliminate routine but devastating stormwater drainage problems from the lower elevation neighborhoods. This problem is not to be confused with flooding from the river. This is a regular occurring problem. See questions 1, 2, and 6.

The initial goal was to alleviate the stormwater drainage deficiency in the low elevation neighborhoods; to remove the impact of higher elevation neighborhood stormwater on the lower elevation neighborhoods; and to correct any river backflow problems.

This is accomplished with the installation of the express or bypass stormwater sewer and direction swale; with the improvements to stormwater drainage pipes in the lower elevation neighborhoods;

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with the redirecting of stormwater sewer pipes at the river towards a common discharge; and the installation of a pumping station.

The second goal is to improve the level of protection from a river flood. While this was a goal that was officially added later, it was being addressed in part from the beginning and is now being addressed more aggressively.

This goal is accomplished by increasing the dike elevation by 2 feet; by desilting and desnagging the river north of the footbridge; and by continuing a program of desilting throughout the river in Cranford. While this may seem small and insignificant, it will increase the flow capacity of the river from 5100 cubic feet per second to 6050 cubic feet per second, an improvement of 950 cubic feet per second or 18.6%. In 1973 a river flow of 1850 cubic feet per second was enough to flood. With improvements throughout the years the flow capacity has been improved upon until the current flow capacity of 5100 cubic feet of flow was in place. This proposed improvement will give us the optimum protection possible with local efforts. Beyond this a regional effort is necessary and is currently being studied by the Army Corps of Engineers. Those studied and resultant solutions can best be thought of in decades to implementation.

Oak Lane Resident

22.) Concerned by inconsistencies state by the township committee (mainly Green Acres property).

There is a small portion of Green Acres property within the wooded area. These areas will be avoided as much as possible. If some of them cannot be avoided, the NJDEP will approve and supervise any improvements constructed in these areas.

23.) Is it possible to wind the swale so it won't take out so many trees?

Yes, and that will be a plan design detail accomplished in the design phase not only to minimize the number of mature trees removed but also to prevent a straight line view across the width of the wooded area. Keep in mind that many of the trees removed for construction will be replanted.

24.) Can swale be in Green Acres property?

There is a small portion of Green Acres property within the wooded area. These areas will be avoided as much as possible. If some of them cannot be avoided, the NJDEP will have to give permission to disturb those areas. The NJDEP will need to approve and supervise any improvements constructed in these areas.

25.) Can pipe A and pipe B in the woods be connected to alleviate the problem?

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This is always a possibility, but it would entail more tree removal and disruption in the woods. The facts that there currently is a disconnect with all three pipes from Oak and Ridge further isolates their neighborhoods to any effects. As far as alleviating the problem, this would not be enough to solve the problem. Were it that easy. There is a runoff from several areas that are not collected in these by these existing pipes. Areas such as adjacent properties, the Commonwealth area of Kenilworth, the rear and side yards of

26.) Would dollars be better spent upgrading the current storm sewers?

The current stormwater problem is not only the stormwater sewers from the Oak, Ridge, and Herning. While it would be nice if earlier officials would have thought out and implemented a plan for infrastructures that would support the future development that was to eventually occur, they did not. We are now left with a festering problem that grows with every piece of new impervious construction and addition allowed. This portion of the project addresses storm sewer capacity. We are at the point where increases to the size of the local stormwater sewers in the lower elevation neighborhoods will not be enough to solve this infrastructure deficit. It requires a multi faceted approach to catch up and fix. The approach includes improving storm sewer capacity in the lower elevation neighborhoods, by passing upland drainage from higher elevation neighborhoods around the lower elevation neighborhoods, and collecting and pumping all additional waters from a central point out of the lower elevation neighborhoods. Every improvement helps the overall problem, just as the improvements made to benefit Columbia residents temporarily impacted the residents of Dunham, Henley, Normandy and neighboring streets, when all was complete a problem was solved on Columbia and no long term effects were suffered. This project does upgrade local stormwater sewers but that in and of itself is not enough to solve the problem.

Oak Lane Resident

27.) Is the storm sewer drain at the end of the paper street Ridge (close to Kenilworth) causing the flood problem?

The problem is multi faceted and this is one of the components that make up the problem. All stormwater from the northeast quadrant and from Commonwealth that drains through the lower elevation neighborhoods must be intercepted and diverted around or by passed around those neighborhoods.

Herning Avenue Resident

28.) Pipe running through 203 Oak Lane, crosses Columbia, Oak and Manor seems to be collapsed at Locust and Arbor – is this contributing to the flooding?

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By and large the problem is multi faceted and this could be one of those small components that make up the problem. It sounds like the current condition of this stormwater pipe is a benefit to the low elevation neighborhoods. In either case it may easily be returned to its intended state by some simple Township maintenance.

29.) Is any maintenance being done at the Lenape basin by the shooting range?

This area is maintained by the county and rest assured if any degradation in stormwater capacity is determined by the Township, we will pursue the county to restore it.

30.) Are trees and silt being removed from the river to help the flow?

In 1973, 3 ½ miles of the river was dredged to its optimum level. Since then in an on again and off again fashion the policy has been to retain those improvements by desilting the entire length of the dredged area. The area north of the footbridge up to the Boulevard has never been addressed and needs to be desnagged of all its growth and silt in the channels and possibly dredged to improve capacity. This is a separate maintenance solution that is unrelated to the more prevalent infrastructure drainage problems suffered by the residents of the low elevation neighborhoods.

Herning Avenue Resident

31.) Isn't the size of the swale overkill?

The swale will be designed and sized as small as possible while allowing it to effective in capturing stormwater draining to the area to be fully captured and directed to a bypass stormwater pipe.

32. Will trees be replaced on private property and will any property that is involved in the construction be altered? I.e.: if the street in front of a home is torn up will the property be shortened or will sidewalks be added?

Trees and other property improvements on private property will be replaced. The size, however, may not be as mature as the originals. All private property and neighborhoods disrupted during construction will be returned to the pre-construction state.

Riverside Drive Resident

33.) 600 block of Riverside Drive does not flood on a regular basis, but will be impacted most by the construction – is this necessary?

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This appears to be the only plan that is feasible from a cost, construction, and maintenance perspective. While some areas of Riverside do not flood, theirs is the only feasible route to the river. As a community we are often called upon to help other neighbors in and out of town. That is what a community does. Every improvement helps the overall problem, just as the improvements made to benefit Columbia residents temporarily impacted the residents of Dunham, Henley, Normandy, and neighboring streets, when all was complete a local problem was solved on Columbia and no long term effects were suffered by those neighborhoods that were temporarily inconvenienced by the construction. Some neighbors had to temporarily endure more than others.

34.) Home will have pipes on both sides of foundation. Worried about cracks to walls and foundations during construction, inconvenience for about three months during construction, husband works out of home, has small children.

While no damage to your home is anticipated, much will be done to make sure that the pipe installation will not impact your house and the property is returned to its original condition. In the remote possibility that damage may occur, it will be repaired as part of the contract.

35.) Worried that once phase one is complete that the total project will not be done and will cause flood problem where there were none.

Every phase of the project is an improvement. The desired total result will not be attained without a complete project, all phases. Completion of less than the total project jeopardizes the effectiveness of the project but has only positive impacts and no negative impacts. Partial completion will only partially eliminate a drainage problem and not cause a flooding problem.

Oak Lane Resident

36.) Will water remain in the swale for 5-6 hours after a rainfall?

Water will flow from the swale to the entrance of the grate covered express bypass pipe much like a funnel to a container. The swale is not a basin for detention but merely a way to intercept and redirect water to the bypass pipe entrance. It will continue to drain by virtue of its sloped nature and will have runoff in it for the duration of the storm and the subsequent runoff period. That duration will vary depending on storm size and storm duration and will drain the area at a much faster rate than the current topography does.

37.) Will swale overflow or will standing water seep into the ground raising the water table and flooding neighboring basements?

The swale will not overflow. It will be designed to handle large storm flows. Remember, no new water is being added to the wooded area. The swale's purpose is to remove existing stormwater

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drainage more directly and efficiently. Currently, without the swale to help remove the stormwater drainage, stormwater both runs off to low elevation areas and inundates them and percolates locally into the groundwater table. The swale and drain pipe will greatly reduce both conditions by design.

38.) Will the swale be maintained? Commented that current system is not being maintained.

The Township will maintain the swale. The beauty of this passive system is that the maintenance effort required is admittedly relatively insignificant.

39.) Is there an alternate plan that will not destroy property and decrease property values?

All stormwater improvements enhance property values by lessening the chance of stormwater damage. People in flood recovery homes have found that not even the knowledge that a foundation failure and knowledge of floodwaters and mud filling basements and first floors have deterred property values. Buyers have paid premiums for homes that are newly renovated. The flood was not an impact. This fact is sustained by the tax assessor and the unusually high price paid for houses that have flooded and that still have mold openly showing on their siding. There is no evidence what so ever that property values would be decreased by any improvement project which pales in the face of a flooded property.

All alternatives have been looked at and the existing proposal is still being reviewed for the third time. Alternatives are too costly and prohibitively not feasible from a maintenance aspect, do not represent sound engineering choices, and which will frustrate and aggravate maintenance efforts and costs.

This is the least invasive approach. Other engineers retained by Residents of the Riverside Drive, in attempt to eliminate the drainage pipe, have proposed clear cutting the entire 8 acre wooded area and the creation of a three foot deep retention basin capable of holding a 24 acre-feet of stormwater storage. The Township's consulting engineer noted early on, that this drastic approach was unnecessary and not a minimally invasive approach and created safety, health, and water management problems as well, and did not pursue this approach.

The important lesson to be learned from this is that two separate and independent engineering firms have concluded that this stormwater from these upland neighborhoods must be addressed as a key component of a multi faceted plan to allow relief to the lower elevation neighborhoods.

Oak Lane

40.) Is there a middle road project (not as extensive) that could perhaps solve the problem for 75% of the homes effective at a lesser cost?

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The current stormwater problem is not only the stormwater sewers from the Oak, Ridge, and Herning. While it would be nice if earlier officials would have thought out and implemented a plan for infrastructures that would support the future development that was to eventually occur, they did not. We are now left with a festering problem that grows with every piece of new impervious construction and addition allowed. This portion of the project addresses storm sewer capacity. We are at the point where increases to the size of the local stormwater sewers in the lower elevation neighborhoods will not be enough to solve this infrastructure deficit. It requires a multi faceted approach to catch up and fix. The approach includes improving storm sewer capacity in the lower elevation neighborhoods, by passing upland drainage from higher elevation neighborhoods around the lower elevation neighborhoods, and collecting and pumping all additional waters from a central point out of the lower elevation neighborhoods. Every improvement helps the overall problem, just as the improvements made to benefit Columbia residents temporarily impacted the residents of Dunham, Henley, Normandy, and neighboring streets, when all was complete a problem was solved on Columbia and no long term effects were suffered. This project does upgrade local stormwater sewers but that in and of itself is not enough to solve the problem.

The problem is two fold

Eliminate routine but devastating stormwater drainage problems form the lower elevation neighborhoods. This problem is not to be confused with flooding from the river. This is a regular occurring problem. See questions 1, 2, and 6.

The initial goal was to alleviate the stormwater drainage deficiency in the low elevation neighborhoods; to remove the impact of higher elevation neighborhood stormwater on the lower elevation neighborhoods; and to correct any river backflow problems.

This is accomplished with the installation of the express or bypass stormwater sewer and direction swale; with the improvements to stormwater drainage pipes in the lower elevation neighborhoods; with the redirecting of stormwater sewer pipes at the river towards a common discharge; and the installation of a pumping station.

The second goal is to improve the level of protection from a river flood. While this was a goal that was officially added later, it was being addressed in part from the beginning and is now being addressed more aggressively.

This goal is accomplished by increasing the dike elevation by 2 feet; by desilting and desnagging the river north of the footbridge; and by continuing a program of desilting throughout the river in Cranford. While this may seem small and insignificant, it will increase the flow capacity of the river from 5100cubic feet per second to 6050 cubic feet per second, an improvement of 950 cubic feet per second or 18.6%. In 1973 a river flow of 1850 cubic feet per second was enough to flood. With improvements throughout the years the flow capacity has been improved upon until the current flow

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capacity of 5100 cubic feet of flow was in place. This proposed improvement will give us the optimum protection possible with local efforts. Beyond this a regional effort is necessary and is currently being studied by the Army Corps of Engineers. Those studied and resultant solutions can best be thought of in decades to implementation. See question 52.

In heavy storms of 3 to 5 inches or more, water flowing from the express bypass sewer is drainage intended for the river and delayed because low elevation street sewers are not capable of handling the drainage to the river. This condition is exacerbated as time goes on and the river rises to a point where no water is being drained from low elevation streets and in fact water begins to backflow from the river to the low elevation streets. The express sewer along with the other components of the proposed plan alleviate all these problems. Water from the higher elevation neighborhoods in the northeast quadrant and Kenilworth are bypassed around the low elevation neighborhoods getting that water downstream as fast as possible before the river crest comes down the channel. Additional drainage from these neighborhoods are still intended for the river and will max out at an estimated 150 cubic feet per second during the heaviest downpour, a volume that is insignificant to the capacity of the river to flow of 5100 cubic feet per second and even of less significance when the dike improvements are in place raising the river flow capacity to 6050 cubic feet per second and even less significant if it is dispensed with before the river crest wave gets to the town several hours later. Local low elevation stormwater drainage sewer pipes will only be taxed with the burden of local neighborhood water and will not be as great a volume to deal with. An estimate of 100 cubic feet per second maximum flow will need to be addressed during the heaviest downpour. Since this plan calls for the local drainage pipes from both sides of the river to be increased in size and to be diverted to a single discharge point, the backflow problem is efficiently and inexpensively solved by a single point of positive shutoff in place of the flap gates that far from prevent a backflow. When the river rises to the point where no local low elevation street drainage can occur the single discharge valve will be closed and the pumping system will continue to feed stormwater drainage to the river. All facets of the plan must be in place for the system to work properly. To install the pumps first would be of little help since the pumps would not be able to handle the flow until it is reduced by diverting 60 % of it with the express bypass installation.

41.) The homes around the swale will suffer from loss of property value.

The swale which is a contour of the ground inside the woods will not impact property values in the surrounding neighborhoods. It will appear like a winding path within the woods. As replanted trees mature, the swale will be partially camouflaged to look like a natural depression in the woods. As for property values being negatively affected, a case can be made for the opposite. The swale and drainage pipe installation will quickly remove stormwater runoff that is dumped into the woods while minimizing the potential for standing water to accumulate, reducing the health risks of standing water, and lessening the impact on the ground water table. All positives to the neighborhoods.

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Claremont Avenue Resident

42.) Don't forget that this is not just a Floyd problem, but also a heavy rain problem causing flooding.

Phase 1, 2, and 5 address the frequent stormwater runoff and neglected infrastructure problems. They are the most controversial because construction will be in the neighborhoods and not totally at the river. They are also the most beneficial because they are simple solutions that address problems that occur most frequently.

Edgewood and Henley Resident

43.) Concerned about the length of time that has elapsed without any work being done.

The longer the project is delayed the more costly it will become. Outside funding, which is currently abundant may dry up. Low elevation neighborhoods like yours may be inundated by several storms in the meantime.

Oak Lane Resident

44.) What is the connection of the swale to the express sewer?

The swale acts like a gently sloping funnel that directs stormwater runoff via gravity flow into the grating at the entrance to the express or bypass stormwater sewer.

45.) Can trees be saved in the woods?

The only trees that will be cut down are those necessary to construct the swale and install the new larger drainage pipe. Many of these trees can be replanted and the relatively small amount of immediate stormwater absorption that their loss affects will be directly and efficiently drained from the area by the improvement. The alternate proposal by an outside engineer to cut down all the trees and use the area as a three foot deep retention basin was never a part of the Township's plan nor was it given any support by the Township's consultant. The engineering firm that proposed this alternate "solution" was focused on removal of the express bypass pipe from the project so his client would not have that pipe running by the client's house. This engineer did not address the health, safety, water management, and local neighborhood concerns in his proposal. The township's consultant dismissed this solution early on in their own study as unacceptable and unnecessary.

Herning Avenue Resident

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46.) Has no current flood problem, but believes there are small underground streams running through his property. If the express sewer comes through will it disturb these streams and cause his home to flood?

The express bypass sewer will not interrupt any underground streams that flow in the subsurface. These streams that may exist are merely the ground water drainage plumes caused by the natural hydrology to make its way westward to the Rahway river to drain. The express stormwater bypass pipe will not be deep enough to affect any ground water plumes since it is both not deep enough and will also flow parallel to groundwater flows towards the river.

Oak Lane Resident

47.) Concerned about Killam's presentation and the confusion it caused.

Unfortunately, while Killam is a respected engineering firm, they came to the meeting thinking they were presenting the best engineering solution to a supportive and interested audience. This could be further from the truth. They were not prepared nor were they alerted to the controversy that would be presented from pre-released rumor and misinformation. Their presentation was also lacking in that it described the solution without first presenting a history; presenting the two separate problems, namely, frequent street ponding to 5 feet for as much as 36 hours and infrequent river flooding; and failing to define their objectives first. Their presentation did not make use of the modern presentation tools and may have caused more confusion to those who had no knowledge of the history, problems, goals, and possible solutions.

Riverside Drive Resident

48.) Concerned that no other plan has been looked into and that her home will be disturbed after putting it back together as a result of Floyd.

The Township's consultants arrived at this best possible plan to achieve both the infrastructure improvements necessary to eliminate frequent stormwater deluges of low elevation neighborhoods and improving the river flow capacity by approximately 18.6%. Other pipe routing proposals were evaluated and found to be too expensive and require a high level of maintenance. Another outside proposal to store this water in a wooded area by cutting down all 8 acres of trees and storing the storm water there in a three foot deep basin was rejected because the local neighborhoods would be severely impacted by an unnecessary and drastic permanent change to their neighborhoods. The health, safety, and ongoing water management issues were also detractors to this proposal but were far outweighed by the unnecessary removal of all trees to address this problem. The plan being considered is the least permanently invasive.

49.) Concerned about decrease in property value.

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All stormwater improvements enhance property values by lessening the chance of stormwater damage. People in flood recovery homes have found that not even the knowledge that a foundation failure and knowledge of floodwaters and mud filling basements and first floors have deterred property values. Buyers have paid premiums for homes that are newly renovated. The flood was not an impact. This fact is sustained by the tax assessor and the unusually high price paid for houses that have flooded and that still have mold openly showing on their siding. There is no evidence what so ever that property values would be decreased by any improvement project which pales in the face of a flooded property.

50.) Ask the Army Corp to design a plan and why are we staying with Kilam?

The Army Core of Engineers (“ACOE”) will study the problem from a global or regional flooding standpoint and will respond with plans and action when funding is available. Typically ACOE projects are completed in timeframes of decades and the solution may turn a bucolic river into a concrete lined drainage pit similar to the Linden River.

The major problem we are trying to address is related to the regular routine stormwater inundation of low elevation neighborhoods that trap families in their homes and destroy property in garages and their contents, in living spaces behind garages, and basements. The ACOE will not address these infrastructure problems and they are the major problem of concern and focus of the township’s problem. The township has finally recognized the need to improve the stormwater drainage infrastructure deficiency that has been ignored in the past as neighborhoods were growing without these needed improvements. What currently exists is that the stormwater drainage infrastructure is taxed beyond its capacity and can no longer handle water from higher elevations without inundating lower elevations with excessive stormwater. These issues are not going to be addressed by the ACOE because they are restricted from dealing with local drainage problems. Their mission is to control flooding from rivers and streams.

The other smaller issue is the plan to improve and expand the areas river maintenance within Cranford while raising a section of the Rahway river dike by 2 feet on both banks of the river from the Boulevard to the first bridge at Springfield Avenue. This is a reasonable Cranford self-help immediate 18.6% flow improvement that we can put in place while we wait the historic decades for the ACOE to study, propose, fund, and install a solution to a problem that has occurred twice in 25 years. Granted there were two additional occasions, in 1996 and 1997 where the river came within a hair of overflowing and flooding but raising the dikes in the Cranford plan would have addressed the worried concerns on those nights. The river would have had some freeboard and the stormwater drainage infrastructure improvements would have eliminated stormwater lakes in the streets and the routine property damage. Those two storms did not overflow the dikes and add tremendous volumes of flood waters to the streets already inundated with stormwater drainage. The reason we were able to contain those storm waters within the dikes was the Cranford self-help projects put in place since

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1973 allowing a river that could only hold 1850 cubic feet per second flow to now contain a flow of 5100 cubic feet per second. The current Township project would boost that to 6050 cubic feet per second, an 18.6% improvement. Project costs would be minimal to Cranford because of the State and County funding currently available.

In short the Township consultant's plan addresses the bigger problem as well as the flooding and is capable of giving substantial relief in a short period of time. It addresses the main problem, stormwater drainage infrastructure shortfalls. The ACOE is prohibited from addressing this. It gives Cranford immediate self-help relief from the lesser occurring events of river flooding by improving the river flow capacity by 18.6%. The ACOE efforts can only supplement these improvement after a long process of investigation, engineering, acceptance, and bureaucratic funding and monetary prioritization.

51.) Find a solution that will not harm any family in town.

The solution being considered is the least invasive to the Township and the families involved. Many families will no longer have to deal with the stress of worry from a large rainstorm while at work or while asleep and the subsequent damage that results. Keeping in mind that stormwater damage is not covered by insurance unless the river floods the streets and homes. Any solution will impact someone. This plan is minimally invasive. The swale will be absorbed into the wooded area and camouflaged with replanted trees and natural forest regrowth. The properties and streets affected will be brought back to original condition. The temporary construction inconveniences will be gone after completion. The problem will be greatly diminished and damage and recovery will be less frequent, less probable, and less costly. One of Cranford's local self-help projects was the infrastructure improvements to the stormwater drainage on Columbia. Many other neighborhoods along Dunham, Henly, Normandy, and the surrounding streets suffered the temporary inconveniences and annoyances of construction. Looking back, the problem on Columbia was solved and other neighborhoods accepted the inconveniences as a community need to help out their neighbors. It is what makes communities.

Cranford Stormwater Control – One Project – Two Distinct Problems – Two Distinct Solutions

Questions and Answers

Questions Asked at the Township Committee Meeting on Tuesday May 29, 2001

Questions and Answers

Questions Asked at the Township Committee Meeting on Tuesday May 15, 2001

The following questions were asked at the Township Committee Meeting on Tuesday May 15, 2001 (Nos. 52 to 101 inclusive)

Jorn

52.) Should dike be built first to accommodate express sewer – Wouldn't water flowing from express sewers into existing dikes cause flooding?

In heavy storms of 3 to 5 inches or more, water flowing from the express bypass sewer is drainage intended for the river and delayed because low elevation street sewers are not capable of handling the drainage to the river. This condition is exacerbated as time goes on and the river rises to a point where no water is being drained from low elevation streets and in fact water begins to backflow from the river to the low elevation streets. The express sewer along with the other components of the proposed plan alleviate all these problems. Water from the higher elevation neighborhoods in the northeast quadrant and Kenilworth are bypassed around the low elevation neighborhoods getting that water downstream as fast as possible before the river crest comes down the channel. Additional drainage from these neighborhoods are still intended for the river and will max out at an estimated 150 cubic feet per second during the heaviest downpour, a volume that is insignificant to the capacity of the river to flow of 5100 cubic feet per second and even of less significance when the dike improvements are in place raising the river flow capacity to 6050 cubic feet per second and even less significant if it is dispensed with before the river crest wave gets to the town several hours later. Local low elevation stormwater drainage sewer pipes will only be taxed with the burden of local neighborhood water and will not be as great a volume to deal with. An estimate of 100 cubic feet per second maximum flow will need to be addressed during the heaviest downpour. Since this plan calls for the local drainage pipes from both sides of the river to be increased in size and to be diverted to a single discharge point, the backflow problem is efficiently and inexpensively solved by a single point of positive shutoff in place of the flap gates that far from prevent a backflow. When the river rises to the point where no local low elevation street drainage can occur the single discharge valve will be closed and the pumping system will continue to feed stormwater drainage to the river. All facets of the plan must be in place for the system to work properly. To install the pumps first would be of little help since the pumps would not be able to handle the flow until it is reduced by diverting 60 % of it with the express bypass installation.

53.) How long would construction be on each property?

While each property is different, the proposed construction varies on each property, and the project has not been designed yet, an accurate estimate is not possible. A general estimate would be no longer than two weeks. That may be extended to cover the time to make reparations to critical property repair needs such as driveways. Other less critical reparations needs may be addressed in a non contiguous time frame.

Questions and Answers

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54.) What is involved in obtaining permits and preparing property for construction?

Once the plan is approved, the design will be started. After design, much of the needed information that is currently non factual will be factual based on a design. The design will be converted to a bid specification and a request for bids. A contractor will be selected and awarded the contract. The township will secure all necessary easements, apply to the NJDEP for stream encroachment permits, and the contractor can begin work once the permits are issued.

55.) What happens if home is damaged?

The Township will hold the contractor responsible to repair all damage resulting from their installation. If the contractor does not respond in a reasonable time the Township can pay another contractor to make the necessary repairs and then go after the original contractor for reimbursement.

Denny

56.) Exactly what amount of protection is the plan buying?

This question is posed as if there is only one problem, one goal, and one solution required. In fact

One problem is the needed stormwater infrastructure improvements that eliminate the frequent flooding conditions in the low elevation neighborhoods. The plan phases 1, 2, and 5 will eliminate this problem and residents will no longer fear the frequent 3 to 5 inch storm or greater, up to a storm that produces a river flow capacity of 6050 cubic feet per second or less.

The remaining phases address storms of greater than capacity. The storms of October 20 1996 and July 25, 1997 which prompted the formation of the flood committee were at the top of the dike ready to overflow but did not. Had they overflowed the dike the damage would have been equally devastating to the surrounding neighborhoods. Both of those storms were greater than 8 inches with river flows of 4760 and 5080 cubic feet per second respectively. The current dike will support a river flowing at 5100 cubic feet per second. The current plan phases 3 and 4 that deal directly with Rahway channel improvements will extend the current river dike protection by an additional 950 cubic feet per second of flow to a new capacity of 6050 cubic feet per second flow that will remain in the dikes. An improvement of 18.6 %. Beyond this effort, no further improvements are possible locally since improving the flow further would adversely affect downstream communities.

In the flood of the early 70's the river easily overflowed its banks at a flow of 1850 cubic feet per second. The current capacity of 5100 cubic feet per second was attained through the continued improvements made on the river to the tune of 276% improvement.

Questions and Answers

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57.) With existing plan will there be any flooding in a Floyd type storm?

Floyd was a storm of greater than 10 inches and produced a flow of 8000 cubic feet per second. As you can understand, this was never a goal. The present project has phases 3 and 4 which will maximize the river flow capacity without adversely impacting downstream communities. The original project goals were to alleviate the low elevation neighborhood stormwater drainage and to increase the level of protection to a maximum 60 year protection or a 1.7% probable storm. That goal was later increased to the current plan capacity of 6050 cubic feet per second which is the maximum the NJDEP will allow. To attain protection up to a 100 year or 1% storm was and still is an impossibility given the constraints of downstream adverse impact and refusal of NJDEP to approve such a project.

The project goal was increased to the maximum attainable, a 6050 cubic feet per second river flow, up from the vague and ever changing target of what can constitute a 60 year or 1.7% storm.

The current plan phases 3 and 4 that deal directly with Rahway channel improvements will extend the current river dike protection by an additional 950 cubic feet per second of flow to a new capacity of 6050 cubic feet per second flow that will remain in the dikes. An improvement of 18.6 %. Beyond this effort, no further improvements are possible locally since improving the flow further would adversely affect downstream communities. This added level of protection is needed to convert as many as storms as possible into non flood events.

58.) Will future upstream building and development have any adverse effect on the current plan?

All development in town and upstream have the potential to erode our level of protection. But the plan can not address the upstream changes. It can only protect Cranford to the maximum allowable level. Continued development both in town and upstream will tax infrastructure and flood channel improvements. The current plan is the most Cranford can do for itself.

A regional plan for development and flood control can supplement the flood channel portion of Cranford's self-help plan.

Oak Lane Resident

59.) Building a 25-acre retention basin would destroy the woods; cause flooding that never existed before and decreases property value of the homes around the basin. Basin will also create a safety problem for children and become a breeding sight for mosquitoes.

Questions and Answers

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Your question implies this idea to be a fact. It is just misinformation that is not connected to the Township's plan. No one from the Township is proposing a 25 acre retention basin.

The wooded area is only 8 acres total.

The engineer for some of the residents on Riverside has proposed clear cutting the wooded area and creating a retention basin three feet deep or 24 acre-feet not a 25 acre basin. This was a part of the Roper report for a study paid for by the residents of Riverside drive. The report was presented to the Township in an effort to eliminate the construction of a drainage pipe along the side of their properties. It is not now, nor has it ever been part of the Township's plan. The Township's consultant thinks the destruction of that many trees and the creation of a 24 acre-foot retention basin in a residential neighborhood is irresponsible advice in the face of better alternatives that do not destroy such a large piece of the natural environment.

60.) Who can she call when her basement floods?

The Cranford Police and Fire Department will respond to all calls for help. However, if your concern is from the previous question about the retention basin, you can rest assured that it is not a viable consideration. Additionally the Township's plan will do no harm to any resident's situation. The quick and efficient removal of water from the area

Denny

61.) What would the actual cost of the entire project be if it were to go out to bid?

Current estimates are around 8.2 million. An exact number cannot be known until a project design is completed and the project is bid. Many factors will impact costs. Delays, inflation, change orders, scope changes to address concerns both before bid and after award.

Morin

62.) Once the okay was given for the design stage when would an estimate of cost be ready?

A good estimate would be three to six months to design and put together a bid specification and then to actually bid the job and allow for bids to return.

63.) How long would DEP permitting take?

Generally no longer than 90 days by regulation if all permit requests are complete and not deficient any information needed.

Questions and Answers

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This process can run concurrent with the bid preparation and bidding steps.

64.) What is the total # of easements needed for phase one?

Phase 1 will need a total of 12 easements. Some will be new, some will be temporary expansions of old easements, and some will be temporary during construction.

Brookdale Road Resident

65.) Concerned that the pipe is going within four feet of her foundation and the contractor will be using pile drivers that will cause cracks in her foundation?

Since the design phase will not start until a plan is approved, the exact dimensions and path cannot be determined. The 4 feet boundary will more likely be 8 feet, but that will be determined in the design phase.

The installation of sheet piling will protect the excavation and your foundation during the drain pipe installation. The sheet piling installation will be monitored for vibration amplitude. Should it approach a safe limit, the operation will be stopped and another installation method will be used.

If after all precautions have been taken, any unlikely damage will be repaired by the installation contractor.

66.) Why not get an objective opinion of the flood plan, why have Killam review their own work?

No one has asked Killam to review their own work. Killam has been asked to step out of the plan stage and provide detailed factual reasoning why alternatives which they rejected as untenable avenues to pursue were not pursued. To substantiate their engineering judgement on these alternatives, Killam went into a design mode on the alternatives to gather factual data. Many experts in various professions often dismiss untenable solutions to problems in their field of expertise. Very few will be able to or willing to, produce a factual account to substantiate their expert decisions. Killam has. The purpose of hiring an expert is to lead you down the best path to a solution and to use their expertise and experience to steer you away from costly and unworkable paths. Killam is the recognized expert that other engineering firms go to for opinion and data when dealing with flood control and the Rahway river basin.

This project was reviewed by the current township engineer and two previous township engineers and found to be the best solution to both of the problems of frequent low elevation neighborhood stormwater drainage and the less frequent Rahway river flooding problem.

Questions and Answers

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Similar reviews with similar opinions have occurred with the NJDEP and the ACOE. Currently Camp Dresser Magee (“CDM”), another respected engineering firm, is reviewing the Killam plan.

67.) What is the procedure for obtaining easements?

The Township mails the resident an agreement to sign for the easement. The resident can contact the Township to clarify the scope of the project and property reparations. Once the resident understands, agrees, and signs the easement agreement, the Township can proceed with the work.

If the resident and the Township cannot come to an agreement on the easement and the project is held up, the Township can proceed with obtaining easements through the eminent domain protocol, since the public works project benefits the greater good of the population and temporarily inconveniences only the few.

Denny

68.) Can the municipality pay for an insurance policy to cover the homes where potential damage may occur?

Potential damage reparations are stipulations that should be included in a bid specification and construction contract and insured by a contractor’s performance bond or personal bond. Any reparations not made to the satisfaction of the township can be deducted from final payment and subsequently corrected by a smaller more specific contract with another general contractor. Insurance policies will not get the reparations completed properly, they will only recover money to get the work done correctly. The best way to have reparations properly completed is a tightly worded contract with payment and performance benchmarks that will allow the Township to point to a specific failure to perform and substantiate a reason not to complete payment. The bond will be the insurance policy and will foster a high level of cooperation by the contractor.

Venetia Avenue

69.) Concerned about miss-information coming from Grosser report.

The misinformation given out by many sources have been a problem that fosters distrust. Those who intentionally perpetuate misinformation have a personal agenda. Those who unintentionally perpetuate misinformation are people who just need to be presented with factual and correct information. It is surprising how few of our elected officials know the details of a project they are about to vote on. Some of their questions belie their ignorance of the details. They cannot effectively respond to questions as a result. Even a couple of them need an education and the hope is that answering these questions and composing a factual educational presentation will fill the voids.

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The Grosser report was commissioned by a neighborhood with an agenda and a goal to come up with alternate plans to the Township consultant's plan. The report recommended alternative ideas that were either expensive to implement, inappropriate for residential neighborhoods, or engineering, construction, and maintenance nightmares. The Grosser report was never asked to come up with a comprehensive alternative plan that met the same relief goals as the Township consultant's plan. At best the Roper report can be characterized as a cursory brainstorming effort. Had Grosser been seriously commissioned to investigate the engineering and community concerns in general for a project of this magnitude, they would have surely discounted their own cursory suggestions early on. When asked to comment on the Grosser report alternatives, the Township's consultant explained that these alternatives were also initially considered and dismissed as either expensive to implement, inappropriate for residential neighborhoods, or engineering, construction, and maintenance nightmares. We asked our consultant to begin a detailed investigation into these alternatives to justify their engineering judgement not to pursue them. Their detailed investigation substantiated their initial decision and is open to review by Grosser to determine which plan is more appropriate. Many myths are being circulated as fact, as a result of the Grosser report. It is important for residents who have questions and doubts to go to the Engineering department and learn the history, the problems, the goals, and how the proposed plan works to a solution to those goals. Those few that have taken the time have been convinced of the efficacy and simplicity of the plan.

Herning Avenue Resident

70.) In regard to the swale, how many trees will come down?

Since the plan has not reached the design stage, no tree count can be projected. Once the plan is approved for the design stage, details will be identified and number of trees to come down will be identified. Once construction is complete, many trees can be replanted and with time nature will reclaim the area.

71.) Will it be above or below ground?

If by it you mean the swale, yes. To get an idea of what a swale looks like, you can view the two swales behind Orange Avenue School. Each is about 500 feet in length and the western most swale is part of right field in the softball field. If you have a hard time identifying them it is because of how well they blend into their surroundings.

72.) What precautions are being taken to protect children?

The two swales behind Orange Avenue School's property are of no observable safety concern in an area where many children are present daily. One is part of a softball field's right field and the other

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is just east of the first. There are swales around the town that are used as integral parts of drainage schemes.

The Rahway river with its pedestrian and bike paths pose a greater safety concern but still not one that clamors for immediate resolution because the perceived risk is very low. Once the swale is in place and residents see how innocuous its presence is, safety concerns will be put in perspective and all will be addressed to the satisfaction of the local neighborhood.

Oak Lane Resident

73.) Why can't swale be underground with trees planted on top?

A swale is a contoured surface feature that efficiently directs or funnels water to a specific area or drainage pipe entrance. It naturally blends into its surrounding environment and will be grass covered. Once the ground is contoured into a swale, many of the trees can be replanted.

To get an idea of what a swale looks like, you can view the two swales behind Orange Avenue School. Each is about 500 feet in length and the western most swale is part of right field in the softball field. If you have a hard time identifying them it is because of how well they blend into their surroundings.

A swale is not an underground structure. It has no metal or concrete or any manmade components. To collect the drainage and runoff of the woods underground, would require underground placement of concrete structures with an iron grating at the surface. This would run length of the wooded lot. No trees could be planted above this type of structure. A swale, being a feature of the land constructed with natural earth would be grass covered. Additionally, once the ground is contoured into a swale, many of the trees can be replanted and the natural woods would eventually reclaim the area.

74.) Does Green Acres designation prevent work being done on that property?

Only certain areas of the wooded lots are identified as Green Acres property. The proposed work will be completed in areas other than the Green Acres portions of the wooded lots and in any areas where preexisting underground drainage pipes may need to be increased in capacity, since maintenance and improvements to those structures are allowable. Currently a natural drainage ditch drains a portion of the water to the start of a drainage pipe. The pipe will be enlarged and the ditch will be functionally replaced by a contour area.

Ridge Street Resident

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75.) Concerned about ambiguities of consultants plan. Who will monitor consultant and will the decision of which trees will come down be the consultants alone?

What is currently perceived as ambiguity of the Township's consultant's plan is because the plan while it has some detail, has not been designed yet. Once the plan is allowed to move forward to the design stage, more details and specific information will be available. Following design all concerns will be used to fine tune the design to the desired acceptable final design.

The Township's Engineering department will supervise the construction contractor. The engineering consultant's responsibility is to finalize an acceptable plan that addressed all the goals, incorporates any details requested by our Engineering department. Then under the supervision of our Engineering department, the consultant creates a bid specification package for contractors to bid on the work based on plan design and any additional conditions the Township's Engineering department and Township officials want included. The Township approves the bid package and then entertains the bidding process. The Township selects the successful contractor and then lets the contract.

The Engineering department with the assistance of the consulting engineer supervise the contractor's work to make sure it meets all criteria in the contract.

Decisions about trees necessary for removal will be initially made by the consulting contractor in the design phase and reviewed, modified as necessary, and approved by the Township's Engineering department.

76.) What will happen to DEP application if there is opposition from the community?

Each permit application process has built in periods for comments and answers to those comments. The citizen's opposition must be expressed in writing to the permitting authority within the comment period.

Typically a permit application has a specified interested party comment period followed by an NJDEP evaluation and response period. These periods are of a specific length. Factual comments are generally addressed straight forward. Comments not based in dispute of fact may be responded to and answered as inapplicable. Not all comments may be individually answered since some may be redundant or reworded slightly differently. A general answer may be given. If a factual dispute is deemed valid, the NJDEP may delay issuing a permit until the facts can be determined.

Oak Lane Resident

77.) Will swale be grass or concrete?

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The swale will be a contoured area within the woods and will eventually be made up of the current natural ground cover or grass, whichever prevails naturally.

78.) Could there be a meeting of Herning Avenue and Oak Lane residents to explain project?

Yes, you should schedule a meeting with Dan Aschenbach and Jeff Sias the Township Engineer.

Brookdale Road

79.) House will have pipe four feet from foundation. What will happen in five-ten year from now if the underground pipe causes damage to foundation?

While it is highly unlikely, if any future foundation damage occurs that is related to the pipe installation the Township will be liable for the repairs. However it should be noted that prior to the design phase, no one can state for sure exactly how close to your foundation the pipe will have to pass. A more likely scenario would be in the order of 8 feet.

80.) How much will property value suffer?

Many homes are bought and sold regularly with easements with underground utilities. A stormwater pipe in one's side yard is not uncommon and is not a detractor to property values. The easements in question are for pipes in areas where home improvements would not be allowed because of currently existing side setback restrictions. Therefore there is no new ongoing home improvement construction hardship created.

81.) Who would buy a home with easements on both sides of the home?

Many homes are bought and sold regularly with easements with underground utilities. A stormwater pipe in one's side yard is not uncommon and is not a detractor to property values. The easements in question are for pipes in areas where home improvements would not be allowed because of currently existing side setback restrictions. Therefore there is no new ongoing home improvement construction hardship created.

82.) Has anyone on the committee visited the homes that will be affected?

The current Flood Committee chairman, Dan Aschenbach, has visited with the occupants of the several homes to hear the concerns and to give correct information to the local residents. Similar efforts were made by other Township Committee members. Early on it was felt that having too many voices from the Flood Committee may not give a consistent and well educated perspective since each committee member brings their own experience to the table. For over the last four years the Flood Committee, working openly, has inspected these areas and given information to professionals to

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assemble a cogent and economically feasible plan that benefits the original target goals and has the least temporary impact on the community. Most Flood Committee members agonizingly live in homes that are regularly affected by large rainstorms, they live in these homes every day.

Riverside Drive Resident

83.) Does anyone realize the impact that construction will have on the homes where the pipe is going through?

Everyone is aware of the temporary inconveniences that construction will cause. The impact will not be miniscule but it will be temporary. What few people are aware of is the regular damage that many more endure that is caused by heavy rainstorms of 3 to 5 inches or more. These residents must repeatedly recover a stable life and a constantly live in a stressful condition when at work or away from home or trying to sleep during a large storm. Their quality of life impact is not temporary. They are often reminded when the neighborhoods along Dunham, Henley, Normandy, and surrounding streets acted as a community several years ago, and endured the temporary inconveniences of construction to correct a flooding problem on Columbia. This is a good example of how a true community works.

84.) How can husband run a business out of the home with construction going on?

Some will be inconvenienced more than others. There will be extra noise near some of the houses, but as construction moves away from each individual house, so will the noise. Alternatives may be to utilize the furthest room in their house from the construction or a basement area. Some may make brief temporary arrangements for alternate work sites. Each temporary situation is impacted differently. It is dependent on the level of tolerance and ingenuity of the resident to take personal steps to function within the temporary construction period near their house.

85.) Concerned that the Democratic process has been lost and that the only information that is available is information that leaks out.

These concerns are unfounded. The current flood committee was re-established by Commissioner Thomas Deny in July of 1997 following two heavy rainstorm events on October 20, 1996 and July 25, 1997. The Flood Committee has met under commissioners from both parties. The meetings have been open to observers and anyone who wanted to work on the committee to contribute to the solution has been welcomed. Information has been available in the Engineering Department but only a couple of interested parties have sought information and asked for details from the Engineering Department. Township Commissioners will gladly return calls and follow up on concerns. Citizens also can bring concerns to the Township Committee meetings and address their representatives. Information that gets out from sources including newspaper reporters who fail to understand the problem, the goal, and the solution, other than a knowledgeable official or the

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Township Engineer is froth with inaccuracies, bias, and misleading information. To get the true facts one must get involved. This project is about correcting a neglected infrastructure that causes regular hardships to many residents and later this project embraced an additional river flood focus. Because the project has not been designed and remains in the concept stage, little details are available except the concept. If design on this project is allowed to go through, the details will become available as the design progresses. Information about the project has always been available and all meetings were held with an open door.

86.) Will there be manholes on the properties where easements are granted?

There will be no manholes, cleanouts, or other evidence that a pipe is in residence under ground.

87.) Will there ever be a need in the future to upgrade or repair pipes on private property?

The pipe size will be designed to be capable of handling all runoff and stormwater drainage generated from the northeast quadrant source and will include all increases for upland development and impervious surface additions with generously anticipated variances from the building codes. There will be no further need to increase or upgrade stormwater pipe sizes. Since this is not a pressurized system pipe repairs are not anticipated in this century.

Riverside Drive Resident

88.) What is the downstream effect on homes on Casino, Forest, etc.? Some of these homes have small creeks or brooks running past them, would this project cause them to run over?

All phases of this project will not adversely affect water elevations on any other part of the river. The purposes are, during frequent storm events, to get stormwater to the river directly with an express bypass stormwater sewer and remove local water from low elevation neighborhood streets by increasing pipe sizes and by installing a pump station. The other purpose is to contain more water within the dikes during infrequent flood conditions. The dike solution design will be limited to these the current project size to maximize protection without adverse effects downstream. This issue has already been considered when presenting the project to the NJDEP. State regulations do not permit projects that create a flooding condition in another neighborhood. Additionally, the bridge physical structures will not allow it to happen.

Brookdale Road Resident

89.) Why is the consultant locked into a gravity flow system? Can't the water be piped though the streets to the Kenilworth Blvd. Where it would eventually, by pump, be deposited into the river.

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A gravity system is the most efficient and least invasive system requiring the smallest amount of maintenance and attention to operation and preparedness. Kenilworth is at a higher elevation and water would have to be pumped up hill into Kenilworth. It is doubtful if their residents and officials would not allow a Cranford public works project to proceed through their town.

Oak Lane Resident

90.) What is the size of the swale?

The final size and path will be determined in the design stage. It will span the width of the woods to enable it to capture all the stormwater to be diverted to the bypass storm sewer. Take a look at the ones that exist behind Orange Avenue School for a perspective. If you have a hard time identifying them it is because of how well they blend into their surroundings.

91.) Who will maintain the swale?

The Township will maintain the swale.

92.) Concerned about proximity to bike path and the safety of children walking the path.

The two swales behind Orange Avenue School's property are of no observable safety concern in an area where many children are present daily. One is part of a softball field's right field and the other is just east of the first. There are swales around the town that are used as integral parts of drainage schemes.

The Rahway river with its pedestrian and bike paths pose a greater safety concern but still not one that clamors for immediate resolution because the perceived risk is very low. Once the swale is in place and residents see how innocuous its presence is, safety concerns will be put in perspective and all will be addressed to the satisfaction of the local neighborhood.

Denny

93.) Would a collapsible dam have any effect on the flow in the river during flooding conditions?

A collapsible dam will help to move water down stream quicker if utilized to completely drain the river bed sufficiently in advance of an impending storm. This would further enhance the impact of the proposed express bypass system and the local stormwater drainage improvements by allowing that water to be quickly received and whisked away downstream before upstream water enters the area using up valuable flow capacity. Any improvement to river flow capability helps the situation, just as a bypass around the Springfield loop would.

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Riverside Drive Resident

94.) What is the Floodway?

The naturally occurring breath that floodwaters from a river take when in flood or higher than normal conditions. It can exceed the river banks during extreme flood conditions.

95.) Would an application to the DEP to make changes in the Flood Way be accepted?

Generally the NJDEP looks favorably on flood improvement projects that have no adverse impact on areas outside of the improvement zone.

96.) Why would the Township governing body ask a consultant to critique it's own work?

Essentially, the township had asked their consultant to look at some alternative areas of concern that the consultant had dismissed as unfeasible from a best engineering and maintenance standpoint. They did this based on their knowledge of the area, their knowledge of the problem, their knowledge of the goals, and their engineering judgement. The Township asked them to develop their engineering judgement into a factual and expensive evaluation to satisfy some concerns. Much like trying to decide how to get oneself to work in the next town. Do you consider the option of purchasing a brand new full sized bus or is that option you can dismiss without further consideration. Based on their engineering judgement they dismissed some obvious options. The township just asked their consultant to present a detailed consideration.

97.) How many easements are needed to complete project?

Each phase of the project will need easements to construct. Easements may be needed to allow temporary access to areas where pipe sizes will be increased. Easements will be needed to install new pipes. Easements will be needed to access and construct in areas where the dike will be raised.

Phase 1, 2, may only require up to 12 easements. A few will be new easements and the rest will be temporary increases to existing easements to allow construction.

Oak Lane Resident

98.) Considering the proposed size of the swale, isn't it really a retentions basin?

The purpose of a swale is to direct water towards a central collection point or drainage pipe where it is quickly and efficiently carried away. Swales are not retention basins which hold and retains water indefinitely. Swales are also not detention basins which temporarily delay or slow the discharge of water to lessen the downstream impact of the discharge. Swales are quite the opposite. They are not

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intended for storage. They are like funnels used to direct drainage efficiently and quickly into a drainage system. A swale combined with a sufficiently sized drainage pipe will remove existing water from the wooded area quicker and result in less pooling. At the same time, the direct benefit to your neighbors is tremendous. Swales are natural grassy contours that direct water. They are not concrete and steel. Swales all over town for drainage.

The swale is merely a contour that can occur naturally or be constructed. Of itself, it offers no safety hazards. During non storm events it will be like a dry grassy area very shallow slopes. During a storm event there will be a slow brook like flow that will drain the area. After the storm event the swale will dry up as the storm runoff subsides. There will be no back pressure from the river holding water in the swale since the river elevation is lower than the pipe. There are swales around the town. Two swales of near equal size exist in the rear of Orange Avenue School. One is part of a softball field's right field and the other is just east of the first. There are swales around the town that are used as integral parts of drainage schemes. Once a swale is seen, all concerns will be put in perspective and addressed to the satisfaction of the local neighborhood.

99.) How often will swale be utilized?

Swales are permanent passive contours that can occur naturally or be constructed. Their appeal is that are passive, require little or no maintenance, are grass covered, and work without any adverse impact. The swale may be seen as a grassy path which will be working during a storm and remain dry after stormwater has drained.

100.) Is it normal procedure to design a plan for a 100 year flood in a residential development?

The current normal procedure is to discourage development in a flood plane. Since there is so much pre existing development in the flood plane, few towns are willing to purchase them and remove them from the tax rolls, and restore the land to a natural state. This is a tremendous expense coupled with a tremendous loss in tax revenue. Recently Rahway went this route with a small amount of homes.

New construction is allowed but only slightly limited in its stormwater impact. Each new driveway, addition, roof, shed, and home adds to the additional amount of land not available to either absorb water or delay runoff. Current restrictions deal mainly with protecting the new construction rather than its impact.

Designing and installing stormwater drainage plans must parallel development. In many cases it has not and attempts to catch up are ill perceived.

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One can not design for 100 year of 50 year storms and expect the design to last. With each new major storm previous storms are reevaluated and their size compared with new history. In the early 1970s the storm that flooded Cranford might have been considered a 100 yr. storm event. Today that pails the volume of a Floyd type storm.

It makes more sense to talk in terms of storm size as measured by the river flow that is produced, rather than a probability term like 100 year or 50 year event.

In the 1970s the flow needed to overflow the river was 1850 cubic feet per second. With local improvements the flow capacity of the river has been improved to the current level of protection of 5100 cubic feet per second, a 276% improvement. These improvements have allowed us to contain several storms within the river banks. The most recent of these being the storms of October 20, 1996 which produced a flow of 4760 cubic feet per second and a few months later, the storm of July 25, 1997 which produced a flow of 5080 cubic. Both of these storm events and several others could have flooded the area like Floyd did were it not for the improvements made along the way.

The current plan calls for an additional improvement amounting to an additional 950 cubic feet per second in river flow capacity. The new capacity after the improvement would be 6050 cubic feet per second. Local design constraints prevent us from going any further without adversely affecting downstream neighborhoods and downstream towns.

Phase 1 and 2 of the current plan deals with the more frequent problem of stormwater drainage systems which have not kept pace with development.

Venetia Avenue Resident

101.) Concerned about the miss-information that is clouding the project.

It is unfortunate that there is some much misinformation out there about the project. Some of the misinformation comes local neighborhood entities that have parochial concerns. Some print media coverage is focused on sensationalism and not a true understanding of the plan and its benefits. This is evident in omitted information, misquotes and misinterpretations that lead to misinformation and false rumors. The flood committee and the Township are working to answer all questions posed by citizens and to put together a plan information package to be disseminated to the affected community. Those that have taken the time to review the project with the Engineering Department have come away with an impressive understanding of how the project works and what benefits are attained. With all public works improvement projects of this size there will be temporary inconveniences and concerns during construction that must and will be addressed. Once the improvements are in place, the majority who suffer regularly will be thankful to those who were

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inconvenienced temporarily by construction. Neighborhoods that are now concerned will see how the improvement benefits even their areas so a lesser degree.

Questions and Answers

Questions Gathered from Cranford Township South Side Residents

The following questions were gathered from discussions of Flood Committee members with Cranford Township south side residents. (Nos. 102 to 107 inclusive)

102.) How will my property taxes be affected by flood improvements?

Issues(s): cost of flood improvements and method of payment versus cost savings by preventing flooding, perhaps increased real estate values?

There is currently enough revenue available from State and County commitments to cover the majority of the work. The project will be bonded for long term debt in the beginning. A portion of these bonds will be interest free. As construction is completed, bond money will be used to pay off the immediate construction costs. The State and County funds will be applied like a refund to pay down the bond and the small portion that may be remaining will be paid off long term from Township tax revenues. Because of the long term nature of the bonds and the State and County monies available, the impact on the local taxpayer will not be substantial. Failure would be to allow the funding opportunities to pass and not have derived any improvement from the opportunity.

103.) I don't flood now. Will the flooding be re-located to my home property?

Issue(s): river capacity. Engineering feels the runoff will be earlier in the storms, but moderated.

A visual example may be given so people can understand. For example, try pouring from a bucket into another bucket via a siphon. If you pour the bucket of water all at once, it overfills the siphon and splashes over (floods). If you pour in a larger but steady stream, you can transfer

all the water safely into the other bucket. If this analogy fits, use it or another visual. People feel right now the river is at capacity, and increasing water into the river will overflow it more. Engineering says the river is not at capacity early in storms, but the spillover from the North side floods the entire area later in the storm. The key is to visually convince people that the river is not at capacity and can handle the additional water.

Excellent analogy, an additional analogy to describe what will happen is pouring water down the sink and watching it drain quickly as an express bypass system may allow. Then pouring the same water down the sink when it is full and barely draining itself as fast as it fills. This shows that water that gets to the river first is drained before the big flow from upstream reaches the area. At that later time, all water is in competition for the limited capacity.

The proposed plan will improve to the point of elimination of most of those stormwater drainage inadequacies from higher elevation neighborhoods. These inadequacies cause low elevation neighborhoods to become inundated with stormwater from higher elevation neighborhoods during

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frequent storm of 3 to 5 inches and more. Phase 1 does this by express bypassing as much as 150 cubic feet per second of higher elevation water directly, efficiently, and quickly to the river so it can drain before the river elevation rises and makes it difficult to drain storm water. Phase 1 and 5 also increases the drainage pipe sizes in the low elevation neighborhoods. Phase 2, the pumping system enables the 100 cubic feet per second maximum flow from the low elevation neighborhoods to be pumped to the river when it is high enough to prohibit drainage through gravity. Phases 3 and 4 improves the river flow capacity by 18.6% to 6050 cubic feet per second.

None of the plan improvement phases has a negative flood impact on any property. All phases of the plan are focused on direct, quick, and efficient drainage of stormwater which is an all around improvement in the management and effects of stormwater everywhere. The neighbors around the wooded area where the swale will be located may show a slight benefit since water will be quickly directed towards a positive drain instead of the current condition of slow drainage and standing water.

104.) Those people knowingly bought in a flood zone. Why should I pay to help them out now?

Issue(s): all of Cranford is a potential flood zone. Jeff has a great grayscale map of town showing that.

Many homes suffered the flood waters of Floyd. The project proposed is to improve drainage flows, redirect drainage from the higher elevation neighborhoods of the north east out of the neighborhoods in the low elevations, and to substantially improve the capacity of the river to drain water away from Cranford. Development through the decades did not include a parallel stormwater infrastructure improvements or alternate plan to deal with the additional waters of development. Many of the neighborhoods that show concern today are part of the development that contributes substantially to the problem. In the past, Cranford residents acted as a community and improved the river flow capacity 276% since the 1970s. This plan not only addresses improving the river flow capacity to the maximum allowable capacity, it also addresses the inadequacies of the stormwater drainage system.

The neighbors along Dunham, Herning, Normandy, and associate side streets were inconvenienced during improvements that eliminated the flooding on Columbia. It is what a community does. To take a neighborhood parochial approach would not allowed any shared services or improvements. Think about how we would fund road resurfacing and repairs, police, fire, schools, parks, and many other activities and services if we don't pool our resources to improve and protect ourselves and our community. When we start doubting why we act as a community we can cease to be a community.

Imagine a fire or police department failing to respond to your home because you did not want to fund their salaries because you hardly or never use the service and didn't feel the need to contribute. How we improve our community is how we keep property values high. Communities who neglect problems will see their value and appeal diminish.

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Questions Gathered from Cranford Township South Side Residents

As it is, the State and County funding for this project will greatly relieve the local burden. There is currently enough revenue available from State and County commitments to cover the majority of the work. The project will be bonded for long term debt in the beginning. A portion of these bonds will be interest free. As construction is completed, bond money will be used to pay off the immediate construction costs. The State and County funds will be applied like a refund to pay down the bond and the small portion that may be remaining will be paid off long term from Township tax revenues. Because of the long term nature of the bonds and the State and County monies available, the impact on the local taxpayer will not be substantial. Failure would be to allow the funding opportunities to pass and not have derived any improvement from the opportunity. See question 102.

105.) Are all the improvements for the North side of town flood area? How does that affect the people living further down the river?

Issue(s): relocation of floodwaters, similar to question (b).

The Township plan has been specifically reviewed to make sure that the improvements of the plan will not have any adverse impacts on downstream neighborhoods in town and in downstream towns. Projects that do not meet this criteria are not allowed by the NJDEP which has already reviewed the plan and indicated that it is the most Cranford can do locally to protect itself.

106.) Are we going to flood during a Floyd?

Issue(s): flood protection. Facts and candor are important. If we are going to flood during a hurricane, tell people now. The issue is to relieve the chronic flood issues.

The current plan is two fold and addresses two separate problems. It was never intended to be a Floyd solution. The plan's first goal was to eliminate stormwater drainage infrastructure inadequacies that caused northeast neighborhood stormwater to inundate lower elevation neighborhoods local to the river at a time when local drainage near the river could not get into the river.

The plan's second goal was to improve the level of river protection from its current state to the maximum we can attain locally without adversely impacting downstream towns and neighborhoods. That improvement in protection is about 18.6 %. A Floyd size storm level of protection can not be attained locally. Every improvement has added protection. Since the early 1970's where a storm of 1850 cubic feet would flood the town, we have improved by 276% to today's level of protection where it takes a river flow of more than 5100 cubic feet per second to begin to flood. The current proposed plan will add an additional 18.6% improvement up to 6050 cubic feet per second flow.

Plan Goal 1:

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Questions Gathered from Cranford Township South Side Residents

Eliminate routine but devastating stormwater drainage problems from the lower elevation neighborhoods. This problem is not to be confused with flooding from the river. This is a regular occurring problem. See questions 1, 2, 6, and 57.

The initial goal was to alleviate the stormwater drainage deficiency in the low elevation neighborhoods; to remove the impact of higher elevation neighborhood stormwater on the lower elevation neighborhoods; and to correct any river backflow problems.

This is accomplished with the installation of the express or bypass stormwater sewer and direction swale; with the improvements to stormwater drainage pipes in the lower elevation neighborhoods; with the redirecting of stormwater sewer pipes at the river towards a common discharge; and the installation of a pumping station.

Plan Goal 2:

The second goal is to improve the level of protection from a river flood. While this was a goal that was officially added later, it was being addressed in part from the beginning and is now being addressed more aggressively.

This goal is accomplished by increasing the dike elevation by 2 feet; by desilting and desnagging the river north of the footbridge; and by continuing a program of desilting throughout the river in Cranford. While this may seem small and insignificant, it will increase the flow capacity of the river from 5100 cubic feet per second to 6050 cubic feet per second, an improvement of 950 cubic feet per second or 18.6%. In 1973 a river flow of 1850 cubic feet per second was enough to flood. With improvements throughout the years the flow capacity has been improved upon until the current flow capacity of 5100 cubic feet of flow was in place. This proposed improvement will give us the optimum protection possible with local efforts. Beyond this a regional effort is necessary and is currently being studied by the Army Corps of Engineers. Those studied and resultant solutions can best be thought of in decades to implementation.

Floyd was a storm of greater than 10 inches and produced a flow of 8000 cubic feet per second. As you can understand, this was never a goal. The present project has phases 3 and 4 which will maximize the river flow capacity without adversely impacting downstream communities. The original project goals were to alleviate the low elevation neighborhood stormwater drainage and to increase the level of protection to a maximum 60 year protection or a 1.7% probable storm. That goal was later increased to the current plan capacity of 6050 cubic feet per second which is the maximum the NJDEP will allow. To attain protection up to a 100 year or 1% storm was and still is an impossibility given the constraints of downstream adverse impact and refusal of NJDEP to approve such a project.

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The project goal was increased to the maximum attainable, a 6050 cubic feet per second river flow, up from the vague and ever changing target of what can constitute a 60 year or 1.7% storm.

The current plan phases 3 and 4 deal directly with Rahway channel improvements will extend the current river dike protection by an additional 950 cubic feet per second of flow to a new capacity of 6050 cubic feet per second flow that will remain in the dikes. An improvement of 18.6 %. Beyond this effort, no further improvements are possible locally since improving the flow further would adversely affect downstream communities. This added level of protection is needed to convert as many as storms as possible into non flood events. It is the maximum that can be added per NJDEP regulations.

107.) We hear about Millburn, etc property development causing a lot of our present flood problems. What is Cranford or the State doing to protect down river properties from these construction/flood measures in upriver towns?

Federal, State, and County governments can do a lot to protect the downstream communities. Currently there is oversight but the amount of impervious surface allowed to be constructed in all towns including Cranford, is essentially unchecked at the local level. Every house or addition built in Cranford and upstream affects the flooding conditions. Each is perceived as an insignificant piece, but the pieces add up quickly. Major projects have drainage control, individual projects do not. Contact your representatives in these governments and insist that a regional plan be implemented in the entire Rahway River and surrounding area watershed. Things like no net fill laws at the site of construction, site mitigation of additional impervious surface affects. Site storage of stormwater drainage with managed slow releases after storm events and river crests have past, all can help to keep the current conditions from getting worse. Added regional flood projects that protect the region, local county and town flood projects to protect local residents as much as possible while a long term regional a strategy, protection plan, and stormwater management project can be put in place to supplement local efforts all improve the conditions. Cranford is trying to do its part. The State and County are admirably offering funding, but the Federal State, and County governments need to hear the citizens clamoring for a big picture solution. Keep in mind that the request for funding was a major commitment on Cranford's part brought about by citizens who made their strong desires known. Priorities of Federal, State, and County governments get tougher to impact since these bigger government entities have more issues to address.

**Township of Cranford
Flood Advisory Committee
Sub-Committee on Education and Documentation**

Donald Smitheman - Chairman

To: Dan Aschenbach - Cranford Flood Committee Chairman

From: Flood Advisory Committee – Sub-committee on Education and Documentation

Date: Thursday November 29, 2001

Subject: Township Consultant's Stormwater Control Plan Description and Responses to Citizen Questions

The Flood Advisory Committee has directed a this sub-committee to assemble an educational document or body of knowledge to help people understand terms and concepts associated with flooding and flood control in general. There seemed to be a void in local information that can help people understand what storm water drainage and flooding are all about. That document has not been completed. A simple attempt is made to explain the history of flooding, along with current problems and how the proposed plan addresses those problems.

Additionally, during past meetings, citizens have expressed many questions about the current proposed flood control project and the proposed planned solutions. Approximately 107 questions were asked. This indicates a need for information by the citizens. While all the information can be obtained from the Township's engineering department, a citizen would have to spend considerable time discussing questions with the staff and pouring over documents and maps to understand the drainage and flood problems and the current project's proposed solutions. Because the Township has not funded the design phase, the details of the proposed project have not be addressed. Following the initial design, all citizen concerns that are not addressed in that design will be addressed in its fine tuning.

Some time has passed, and although the 107 citizen questions were addressed to the Township Committee and Township Officials, there seemed to be no effort to answer these individual questions for the citizens. Failure to do this in a timely with the information currently available left citizens frustrated. In an attempt to fill the void, the this sub-committee has compiled a list of the questions as gathered from the videotape of the meetings and has proposed factual answers to those questions. While some details can not be answered until the design phase is complete, most questions can be answered with existing information. Attached is a simple attempt to explain the history of flooding, along with current problems and how the proposed plan addresses those problems followed by the 107 questions with answers.

While the remainder of the educational information is compiled, this sub-committee has deemed that it is important that these questions and answers along with the enclosed brief summary of the two problems, their causes, and how the proposed solution addresses the problems, be disseminated to the residents as soon as possible.

Please give this information to the public at large so there is a volume of knowledge that addresses all concerns in a factual manner. We will be happy to work with the Township Committee to disseminate this information for all to read.

Sincerely,

Donald Smitheman

Chairman - Flood Advisory Committee - Sub-Committee on Education and Documentation