# TECHNICAL REVIEW COMMITTEE
# FLOOD STUDY TOWN OF SUSSEX

Recommendation Talking Points:

***The Review Approach:***

The RV Anderson report provides the technical basis for the flood study in Sussex. This report form the Technical Review Committee provides a series of recommendations when implemented could effectively control flooding in Sussex. The ongoing and needed future discussions at the political level will be required and will focus on answering the following questions:

1. Are the effects of climate change and land use on the flooding risk and severity in the Town of Sussex "real"?
2. What is the magnitude of these changes?
3. What options are potentially available to mitigate the increased flood risk?
4. What are the ballpark costs and effectiveness of these mitigative options?

The adoption of mitigative measures (including development controls, "green-options" and the do-nothing approach) are to be discussed by council and is the political / implementation piece that would generally follow our technical work.

***The Discussion and Recommendations:***

When discussing flooding in the Town of Sussex, impacted properties generally experience two (2) types of flooding. Overland surface water flooding and the second being groundwater impact on habitable living space. Given that distinction, the two phenomena are considerably different when reviewing the technical aspects of flood mitigation in any community.

Generally, and a result of this study, surface water or overland flooding can be technically solved through basic planning statements, beginning of regulatory control of living or habitable space below set elevations in Sussex and incorporating a capital improvement program specifically implemented to address the adverse effects of overland flooding. It is believed this regiment of regulatory control and capital improvements sets a balance

It should be noted the Town's participation in the Regional Services Commission 8 ongoing review of the flooding issue in the greater region is seen as an important study. Given the single most effective mitigation efforts generally happen upstream it is therefore understood the underlining solution rests with the entire areas within the region not one single community. Our technical committee believes future participation in the RSC 8 study as an important part of the Town's efforts of addressing flooding in Sussex.

With that in mind, the Technical Committee would like to first focus on Surface water or overland flooding and recommend mitigation measures as part of the Town of Sussex Flood Management Plan.

1. By-law language and modifications: The Technical review Committee believes and recommends mitigation measures to control and eliminate future impacts to new buildings and new developments within the Town's municipal boundaries can be achieved with a high degree of success and can be highly effective with minimal, or no costs, associated with this approach for future development within the Town of Sussex.

   A review of the existing By-law requirements / policy statements for the Town are as follows, highlighting added:

   Municipal Plan, By-law 704-10, Section 12.0 Environmental:

   *Objective:*

   *The objectives of this section of the Municipal Plan are:*
   - *to sustain or enhance the quality of the environment while ensuring that economic development occurs in a timely manner; and*
   - *to recognize the need to address the issue of climate change at a local level and move forward to develop a sustainable community plan.*

   *Policies:*

   *12.1 It is a policy to continue to protect and limit development in areas including:*

   *(a) river banks;*
   *(b) areas with significant development constraints;*
   *(c) significant natural habitat; and*
   *(d) other areas of open space value.*

   *12.2 It is a policy that Council will continue to ensure that land uses within and abutting designated open spaces are compatible with and have minimal impacts on the natural environment.*

   *12.3 It is a policy that Council will continue to secure land, wherever possible, within environmentally sensitive areas:*

   *(a) through appropriate zoning mechanisms;*
   *(b) as a condition of approval for development agreements; and*
   *(c) through land acquisitions, where appropriate.*

*12.4* *It is a policy to inform developers of the flood plain map and the following policies with respect to the issuance of Building Permits:*

*(a)* *The Building Inspector shall ascertain whether a property is located in either the 20 year or 100 year flood plain as indicated on the Flood Risk Map supplied by the Department of The Environment.*

*(b)* *The Building Inspector shall advise the applicant of potential flooding, if the property is located in a flood plain, as indicated on the Flood Risk Map supplied by the Department of The Environment and Local Government.*

*(c)* *The Building Inspector shall request, in addition to plans, specifications and other details under the Building By-Law, a plan indicating the elevation of the lowest floor of all buildings.*

*(d)* *The Building Inspector shall indicate on the Building Permit that a proposed development is in an area designated as a flood plain.*

*(e)* *The Building Inspector will require building plans showing how the structure has been designed for potential flooding and signed by an engineer licensed to practice within the Province of New Brunswick.*

*12.5* *It is a policy to encourage the Provincial Government to enact legislation to mitigate flooding for future development in the 1/100 year flood plain.*

Zoning By-law 1350-10 Requirements Section 40, Special Powers:

Under Section 40, Subsection 2, the PAC is granted special power to prohibit development if in their opinion the development the site has the following limitations:

*Planning Advisory Committee*

*(a)* *No building or structure may be erected on any site, where it would otherwise be permitted under this By-Law, when, in the opinion of the Planning Advisory Committee, the site is marshy, subject to flooding, excessively steep or otherwise unsuitable, by virtue of its soil or topography.*

Currently, and at the time of building the Town's sole requirement for elevation control for any development on any street within the Town at the time of new construction is as stated in the Town's Building By-law 151-16, Section 7, subsection 3, which states as follows:

*By-law 151-16; Section 7: Foundations*

*(3)* *All new foundations for new developments shall be formed and poured such that the lowest elevation of the top of the foundation wall shall have a minimum elevation of 0.46 metres or 460 millimetres above the center line of the affronting street (s). This is applicable to all new development to be placed or erected, located or relocated on any registered building lot or any parcel of land which is*

*greater in mean elevation than 0.92 metres or 920 millimetres lower that the centerline elevation of the aforementioned street(s).*

*If any building lot or any parcel of land has a mean lot elevation lower than 0.92 metres or 920 millimetres below the centerline of the affronting street(s), the requirement of 7(3) is waived but a proposed lot grading plan must be submitted with the required building plans*
*and approved by the Building Inspector prior to the issuance of a Building Permit.*

The RV Anderson technical study has now identified and validated the 1985 mapping identified and used by the Town as referenced in the current Municipal Plan By-law 704-10. In addition, the study has quantified the effects of climate change by assigning an adjustment in elevation of 0.36 meters above the 1985 NBDOE mapping for climate change, referenced until the year 2100 as being valid and measurable.

**RECOMMENDATION 1:** ***It is therefore recommending a text revision of the Sussex Municipal Plan By-Law and Zoning By-law to include provisions to preclude future development of habitable space below the climate change updated Flood Water Level Elevation to accommodate the 0.36 meter addition as noted by the Flood Study for Trout Creek, 100 year return period. It is believed prudent to implement one elevation change (0.360 meters) to avoid confusion and misapplication in evaluating future building permits with respect to flood risk.***

This new process will set out our future building permit and development approval process that will provide orderly future development within the municipality while protecting a property owner's investment and includes the most current climate change data in the approval process. One main question relating to this proposed restriction a reasonable person may have is what will this look like. In a simple answer it is currently being practiced by subdivision development currently being undertaken in Sussex, notable the development on Carriage Lane. For all intentional purposes the aesthetics of the subdivision development have not been compromised in the buildout of the development while flood mitigation has been incorporated in the design.

The Technical Committee recommends these changes be drafted and adopted by the Town to secure future reasonably flood proofed tax base growth in the municipality and these changes be given the highest priority as part of this solution.

***Specifically, this recommendation would add reference to the elevations on the 1985 NBDOE mapping current referenced in the Town's Municipal Plan By-law while adding the 0.36 meter climate change elevation adjustment as the set elevation in Sussex for habitable / livable space for future construction.***

2. Silver bullet overland flooding solution: Although no solution offers a clean silver bullet solution to our unique over land flooding and ground water flooding combination the study has highlighted the East Town Limit Flow Diversion Channel (noted Option illustrated in section 5.2.4 of the Study, Page 19) as having the potential to service and implement a unique and expensive practical solution that could mitigate flooding experiences in Town effectively.

   At issue in this solution / diversion channel is very expensive capital expenditure investment and is installed totally outside the municipal boundaries of Sussex. It is an all or nothing solution not conducive to phasing. This solution may receive review by agencies unrelated to the Town as the infrastructure that would be installed in a neighboring municipality with different views of flood mitigation and solutions. The solution would also requires undisclosed land costs to secure necessary right-of –way and this solution is believed could be prone to adverse discharge of water during a storm affecting an unknown number of properties on the outlet end of the constructed / engineered diversion.

   **RECOMMENDATION 2:** ***For the reasons noted above this solution is dismissed by the technical committee.***

3. Multiple Method Approach: The Technical Review Committee believes a unique made in Sussex solution as a combination of multiple approaches to provide a cost effective, phased in approach to address flooding damages in Town. Our recommended solution offers the community as follows:
   a. Revised scope of the current Town's Flood Subsidy Program. The technical Review Committee believes a revision of the town's current flood subsidy program should be revised to include a section of this innovative Town program to include cost sharing for those property owners wishing to invest in their properties to offset the costs of structure improvements to effectively adjust their habitable living spaces to a higher elevation in keeping with the R.V. Anderson Studies findings inclusive of climate change.

      It should be noted that the Town is currently eligible for flood mitigation monies under the Disaster Financial Assistance program and will be discussed further in this report. The Town has been advised through the Department of Public Safety staff that group applications facilitated by and through the Town from a group of private property owners or business owners that approval of applications to construct mitigation measures on their properties could be considered for approval under the DFA funding program. If the Town of Sussex facilitated the application process under the Town's Subsidy Program it could open additional levels of funding eligibility for private home owners to flood proof properties.

**RECOMMENDATION 3:** ***For the reasons noted above it is recommended the Town implement changes in the Flood Subsidy Program to facilitate group applications under the program.***

***In addition, and to specifically address existing homes within the affected areas, the Town should consider expanding the subsidy program to cost share with homeowners wishing to invest to elevate habitable living areas to elevations identified as part of this study, inclusive of climate change.***

***It is recognised this addition could be cost prohibitive to many and applicatios would need to be considered with group application approval under DFA and the need to have a finite budget number in any budget year.***

b. *Specific landscape / elevation adjustments projects:*

i. The Rehabilitation of the Trout Creek section between the Maple Avenue Bridge and the Leonard Drive Bridge as a practical solution in that vicinity as part of this review. The program and constructing improvements as outlined in the Town's current Infrastructure Canada under the Small Communities Fund application will address the flood measures needed in this area of Sussex and the potential of eligibility of funding under this Infrastructure program makes this project attractive and feasible given the higher capital cost.

This project is seen as a critical to the protection of the Downtown core and the long term sustainability of the central business district of the Town of Sussex.

ii. Review and implement changes necessary to the currently constructed and installed earthen berm behind the properties known as the Gateway Mall Area of the Town. This investment should receive review to improve its effectiveness and failures seen in April 2014.

iii. Review in more detail the changes necessary on the south western side of Trout Creek in the Wallace Court vicinity. It is believed subtle changes using landscape earthen berms as an effective and viable option is achievable in this area with minimal effects on the visual character of the subdivision and area.

iv. Review in more detail the changes necessary in the Holman, McLean and Stewart Avenue section of the flood mapping. This section will be the most difficult area to address and likely take a number of years to correct the problem and issues and will likely not be 100% achievable with any solution.

v. Review in more detail the changes necessary on the south western side of Trout Creek in the Willow Court / Birch Street and Oak Court areas. It is believed subtle changes utilizing installation of a swale of open ditch perpendicular to the Trout Creek Channel on the property in Sussex Corner parallel to the rear property lines on the eastern side of Oak Court. This section of Town is believed to have a viable option of improvement with success achievable in this area.

**RECOMMENDATION 4:** ***Develop a capital plan improvement program to begin to address improvements. To begin an application process as outlined in Section 6 of this report to better define the program costs of the projects as outlined above.***

***It should be noted the Technical committee has avoided the political question of which project should be undertaken first as a priority under any program.***

***RECOMMENDATION* 5:** ***Continue to solicit funding from other levels of government for all projects identified as funding programs are identified while having where practical shovel ready projects for approval consideration.***

4. Tax implications and costs of a Capital Improvement Program: It is believed a strategic investment in the Town's infrastructure over the next 7 years in the amount of $350,000 per year in the years 2017 to 2023 would effectively eliminate instances of overland flooding experienced similar to that experienced in April 2014. It would eliminate the stigma of flood prone areas that are seen as obstacles to investment in Sussex and future growth to the Town's tax base.

   The technical Review Committee would be remiss in not noting the effects of ground water flooding would still be experienced in the existing homes currently affected by this phenomena.

   Strictly speaking, by securing funding only by borrowing for a period of no more than ten (10) years could address the issue permanently with a high degree of success in Sussex. Implementing flood works capital program in Sussex in the amount $350,000 per year would see the full effect on the tax rate in years eight (8) to eleven (11). In subsequent years you would see a corresponding reduction of borrowed funds as the debt is retired over years twelve (12) to sixteen (16). The costs of such a program would see a maximum of $0.10 tax increase in year eight (8).

The attached Schedule "A" provides details to the debt profile of this capital improvement program.

***RECOMMENDATION 6: Implement a capital improvement program beginning in 2017 in the amount of $350,000 per year for 7 construction years.***

5. Approach and phasing: The Technical Committee has purposely avoided the recommendation of commercial areas first or in the alternative the residential areas first. There is merit in both arguments in mitigating residential areas prior to commercial areas. This political decision needs to be addressed as this policy document is further drafted.

   Realistically given the studied approach the Town has current infrastructure installed in the Gateway Mall area and for all practical purposes a modest investment would correct the issues experienced in April 2014 and can be address quickly while making the installed infrastructure functional.

   ***RECOMMENDATION 7: The Technical Review Committee recommends a program of more detailed design beginning in 2017 utilizing the funding under the Disaster Financial Relief and that the Town implement a 7 year program beginning in the Fall 2017 or early 2018 and ending our successful capital program no later than the fall of 2024.***

6. 2014 Flood Mitigation Funding: It is believed the Town Sussex can take advantage if the estimated $77,000 of funding available under the Town two (2) current Disaster Financial Assistance claims in April 2014 and again in December 2014.

   ***RECOMMENDATION 8: The Technical Committee recommends the Town authorise a flood mitigation application under the Disaster Financial Assistance Program to begin the process of refining the solutions as highlighted above. It is believed a direct deliverable of this engineering evaluation will secure the necessary information to produce plans and elevations necessary for the Town to further evaluate phasing and tendering with accurate technical information to produce a capital program to mitigate the flood issue over the next 7 to 10 years.***

   This process will also secure a more refined total flood mitigation costs currently estimated at $2,500,000.00.

On behalf of Mike, Bud and myself I want to thank Hans and R.V. Anderson for the work and guidance through this process and I would also like to thank Council for the opportunity to serve our community in the capacity of the Technical Review Committee.

7. Questions and answers:

Respectfully submitted;

Technical Review Committee,

Mike Cummings,
Bud Pearson
Scott Hatcher.

| General Capital Fund Repayment Schedule Proposed Flood program- $350,000 per year for 7 years @ 5% | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
| 2017 Capital Program | - | 60,625.00 | 60,625.00 | 60,625.00 | 60,625.00 | 60,625.00 | 60,625.00 | 60,625.00 | | | | | | |
| 2018 Capital Progam | - | - | 60,625.00 | 60,625.00 | 60,625.00 | 60,625.00 | 60,625.00 | 60,625.00 | 60,625.00 | | | | | |
| 2019 Capital Program | - | - | - | 60,625.00 | 60,625.00 | 60,625.00 | 60,625.00 | 60,625.00 | 60,625.00 | 60,625.00 | | | | |
| 2020 Capital Program | - | - | - | - | 60,625.00 | 60,625.00 | 60,625.00 | 60,625.00 | 60,625.00 | 60,625.00 | 60,625.00 | | | |
| 2021 Capital Program | - | - | - | - | - | 60,625.00 | 60,625.00 | 60,625.00 | 60,625.00 | 60,625.00 | 60,625.00 | 60,625.00 | | |
| 2022 Capital Program | | - | - | - | - | - | 60,625.00 | 60,625.00 | 60,625.00 | 60,625.00 | 60,625.00 | 60,625.00 | 60,625.00 | |
| 2023 Capital Program | | | - | - | - | - | - | 60,625.00 | 60,625.00 | 60,625.00 | 60,625.00 | 60,625.00 | 60,625.00 | 60,625.00 |
| | | | | | | | | | | | | | | |
| Subtotal | | 60,625.00 | 121,250.00 | 181,875.00 | 242,500.00 | 303,125.00 | 363,750.00 | 424,375.00 | 363,750.00 | 303,125.00 | 242,500.00 | 181,875.00 | 121,250.00 | 60,625.00 |
| | | | | | | | | | | | | | | |
| Tax rate increase | | 0.0146548 | 0.029309585 | 0.04396438 | 0.05861917 | 0.07327396 | 0.08792875 | 0.10258355 | 0.08792875 | 0.07327396 | 0.05861917 | 0.04396438 | 0.02930958 | 0.0146548 |

Notes:
Tax rate increase based on
2016 assessment of $413,687,200