

Base Specification Working Group

CW 3110 – R21: SUB-GRADE, SUB-BASE AND BASE COURSE CONSTRUCTION

Agenda

- **Introductions** – [Brad Neirinck](#)
- **Pavement Design Guideline** – [Ahmed Ghazy](#)
- **Update on 2021 Tender Schedule and Tenders incorporating RCA** – [Brad Neirinck/Ahmed Ghazy](#)
- **2021 Development Projects and Process for Pay Adjustments** – [UDI/Brad Neirinck](#)
- **Ladco Presentation (Ken Wong Bay)** – [Ladco/Ahmed Ghazy](#)
- **Review of City response to Limestone Industry Comments** – [Ahmed Ghazy](#)
- **RCA production schedules for 2021 construction season** – [MHCA](#)
- **Industry Information and Data on Sustainability Issues** – [MHCA](#)

Purpose of Working Group

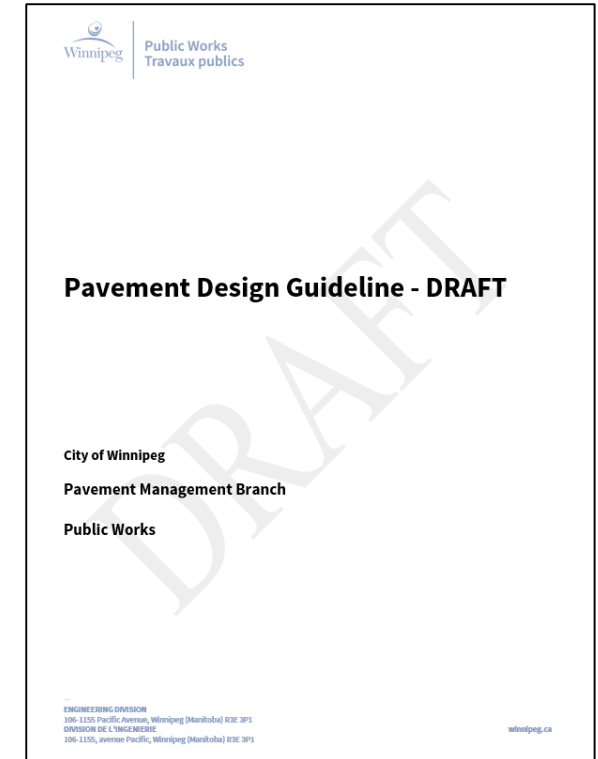
- Purpose of the Base Specification Working Group is to consult with industry on the implications of producing materials, installing materials, other related construction aspects and the related impacts on construction cost and life cycle sustainability.
- It is meant to be predominately technical in nature.

Process and Upcoming Specification Revisions

- **Working Groups and Process for Future Updates**
 - The City in consultation with ACEC, MHCA, and UDI will identify a Working Group for each specification
 - The Group will identify issues with the current specifications from City and industry perspectives
 - The City will develop draft revisions to the specifications
 - The City will consult with the working group on proposed revisions and solicit feedback
 - The City will finalize the proposed specification
 - The proposed specification will be used in pilot projects and monitored during initial implementation
 - Solicit feedback after construction season
 - Finalize the proposed specification ahead of tendering for targeted construction season
- **Future Updates (Concrete and Asphalt Specifications)**
 - The City is expecting to update the asphalt and concrete specification in 2021 and 2022, respectively
- **Harmonization of Specification**
 - Full harmonization is not likely attainable due to a variety of circumstances
 - The City will continue to discuss any proposed changes with MI

Pavement Design Guideline

- A Pavement Design Guideline has been prepared by the Public Works Department, Pavement Management Branch to set out design requirements to promote uniformity of pavement design.
- AASHTO 1993 and Mechanistic-Empirical Design Procedure will be used based on their applicability to the road classification and traffic volumes
- Generally haven't received any concerns from our design teams, except the capability for local design teams to provide designs based on ME Procedure
- The City is expecting to finalize the Guideline by April 2021



Pavement Design Guideline

- **For high traffic volume roads (heavily trafficked Collectors, Industrial, Regional):**
 - Engineering consultant will compile all design factors that affect the design, such as subgrade soil conditions, traffic volumes, etc.
 - The City will undertake and recommend pavement designs
 - Engineering consultant will comment on the recommended structure based on experience and constructability
 - The City will finalize and approve the final design
- **For Local Streets and Alleys:**
 - Engineering consultant will compile all design factors that affect the design, such as subgrade soils conditions, traffic volumes, etc.
 - Engineering consultant can either use the AASHTO 93 to generate the structure or select a structure from the Guideline based on the site conditions.
 - The City will review and approve the final design

Update on 2021 Tender Schedule and Tenders incorporating RCA

Granular B Interim Recycled Concrete Sub-base

Tests	Testing Method	Interim Granular B	
		50 mm	100 mm
Los Angeles Abrasion, % maximum	ASTM C535 (Grading 1)	--	35
Los Angeles Abrasion, % maximum	ASTM C131 (Grading A)	35	--
California Bearing Ratio (CBR) - 4 days soaked, % minimum @ 2.54 mm	ASTM D1883	50	--
Micro-Deval Abrasion, % maximum	ASTM D6928	20	20
Percentage of Fractured Particles, minimum two or more fractured faces, % mass	ASTM D5821	70	60
Atterberg Limits* Liquid Limit,% maximum Plasticity Index,% maximum	ASTM D4318	22 4	25 6
Content Composition, maximum	Mass %	10% asphalt material 3% clay 3% deleterious materials	

*Atterberg Limits shall not be a basis for rejection

Granular B Interim Recycled Concrete Sub-base

- In consultation with the City, design teams generate a pavement design for each location based on the site investigation results. The following are two streets using alternate bids and a street using Granular C:

Dowker	
Option #1	Option #2
50 mm Type 1A 70 mm Type III 100 mm – Granular A Base Course 300 mm – 100 mm Granular A Sub-base Class A Geogrid Separation/Filtration Geotextile Fabric	50 mm Type 1A 70 mm Type III 100 mm – Granular A Base Course 400 mm – 100 mm Granular B Interim Sub-base (RCA) Class A Geogrid Separation/Filtration Geotextile Fabric
Grosvenor	
Option #1	Option #2
50 mm Type 1A 100 mm Type III 100 mm – Granular A Base Course 150 mm – 50 mm Granular A Sub-base 250 mm – 100 mm Granular A Sub-base Class A Geogrid Separation/Filtration Geotextile Fabric	50 mm Type 1A 120 mm Type III 100 mm – Granular A Base Course 200 mm – 50 mm Granular B Interim Sub-base (RCA) 300 mm – 100 mm Granular B Interim Sub-base (RCA) Class A Geogrid Separation/Filtration Geotextile Fabric

Atlantic Ave
Option #2
50mm - Type 1A Asphalt 70mm - Type III Asphalt 100mm - Base course (Limestone Granular B) 125mm - 50mm Sub-base (Granular C) Geogrid (Class B) – As required 350mm - 100mm Sub-base (Granular C) Class A Geogrid Separation/Filtration Geotextile Fabric

2021 Development Projects and Process for Pay Adjustments

- **Developers to identify projects they are undertaking in 2021**
- **Process for Pay Adjustments:**
 - The City will continue to waive pay adjustments; however, the rejection and removal criteria are still applicable
 - The payment adjustments will be incorporated into the next specification revision – CW3110-R22
 - The next revision of CW3110 will contain a new clause (located at approximately 5.10). Initial draft:
“Where the work is not contracted directly by the City, Payment Adjustments shall be assessed on the Contract by the Contract Administrator in consultation with the City Representative designated to oversee the work. Payment shall be made to the City, care of the Director of Public Works, by the Developer authorized to undertake that work as part of an executed agreement, permit, or other such similar authorization.”

Ladco Presentation (Ken Wong Bay) – [Ladco](#)

Ladco Presentation – Ken Wong Bay

- The intention of R21 is not to reduce the material cost but to improve the durability and drainage of our streets and prolong the life of our pavements
- Ladco's design team provided a generic design (no site investigation) for Ken Wong Bay, and the City commented and refined the design based on the available information
- Where the testing shows weak subgrade, a minimum of 250 to 300 mm subbase material is required to bridge over the unsuitable soils, which is the case for Ken Wong Bay
- The City was not copied on test results for this project. The 100mm test results show that three tests were performed, two failed and one passed. The successful test was sampled by the Contractor and the design team did not witness the sampling.

Ladco Presentation – Ken Wong Bay

- Ladco reported that base unit costs increased 11%, and Sub-base increased 23%, resulting in an increase of 12% a linear meter for base and sub-base. Costs per linear meter for the entire structure increased 3%
- There is a significant difference in cost to supply and place R21 base and sub-base. The following is a summary of the increase in price between R19 and R21 for four suppliers:

	Base (>500 Cubic Meters)	50 mm (2000 Tonnes)	100 mm (3000 Tonnes)	Ken Wong Bay
	Change in the price (%)	Change in the price (%)	Change in the price (%)	
Supplier A	5.73%	7.64%	7.78%	- 2.5%
Supplier B	37.84%	34.08%	22.99%	+ 7.6%
Supplier C	6.96%	27.44%	27.30%	+ 3.4%
Supplier D	17.30%	8.84%	10.66%	+ 1.7%

Review of City response to Limestone Industry Comments

RCA production schedules for 2021 construction season

Industry Information and Data on Sustainability Issues

- Available limestone reserves
- A comparison of production processes (Limestone vs. RCA) and available data on emissions to produce and haul material
- Available data on production noise for Limestone and RCA
- Available data on amount of concrete road waste that is disposed in landfills within the last two years (projects, amounts & circumstances)