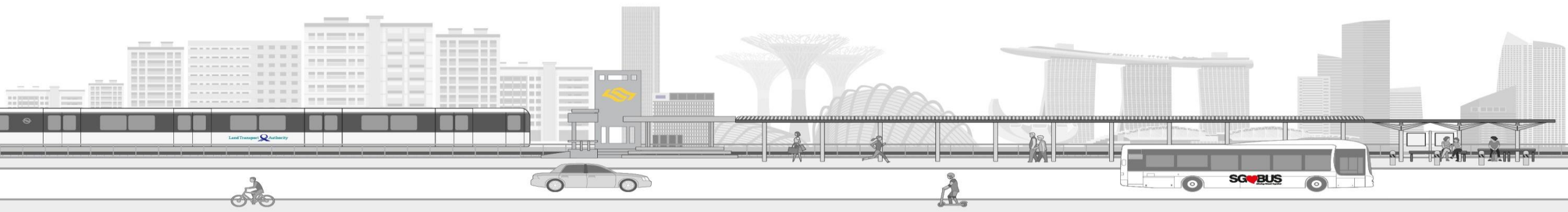# Theme 1: Productivity

Problem Statement 2:

Automate a seamless and time-saving process to generate, check artwork or design of road signs as per latest LTA's SDRE and design manual

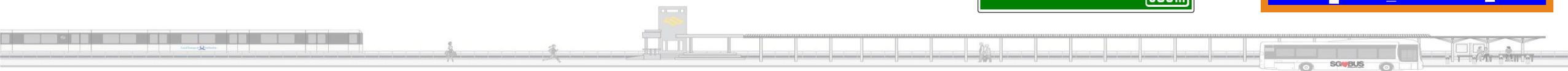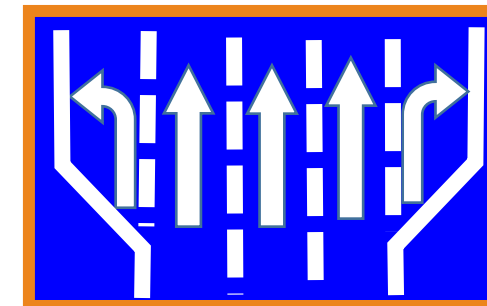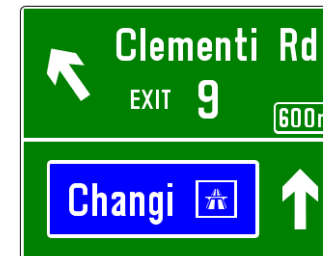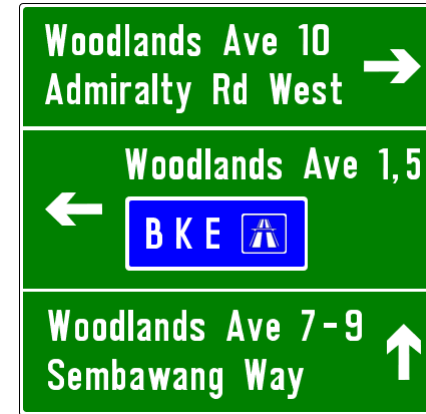Presenter – Tong Shi Yi (Traffic Design & Management)

Background / Info

- On average **2640 signs/mth** which require **1300** man hours for review/approval by TDM. It usually takes few rounds of iterations to clear each artwork

- Manual & time-consuming in cross-checking the details/dimensions of the sign artwork submitted by consultants/contractors. Some of the common errors are such:

  - ➤ Font Factor – category of roads
  - ➤ Arrow placement
  - ➤ Alignment of legends
  - ➤ Word and letter spacing
  - ➤ Logo size etc.

- Feedback gathered from survey supported an automated signs' design program to reduce iterations and increase efficiency in the approval process.

Pain Points

- Currently using Excel worksheet to cross-check dimensions of signs only. Further manual check may still be required, such as:

  - Arrow placement
  - Alignment of legends
  - Word and letter spacing
  - Logo size etc.

- Consultants/contractors may not be well versed in standards which resulted in errors on the artwork, especially for new sign makers.

  - Variations between different letterings

- Multiple iterations between LTA and consultants/contractors leading up to final artwork approval
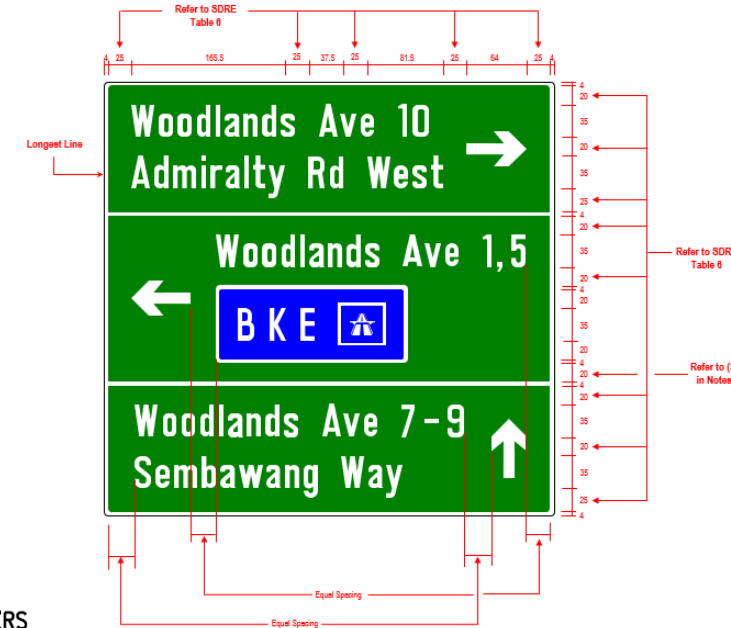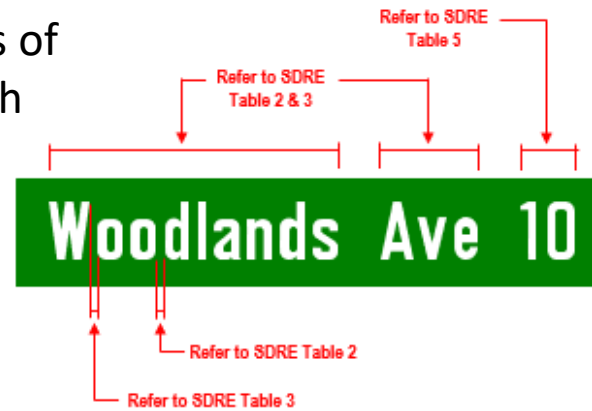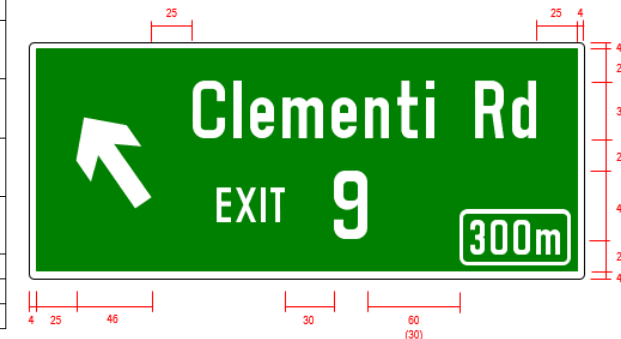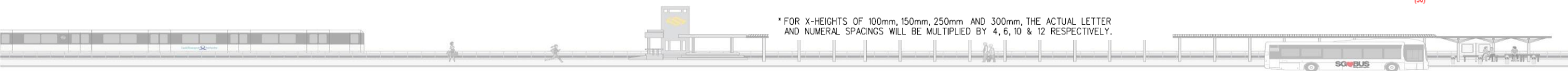

TABLE 2:
RECOMMENDED SPACING BETWEEN LOWER CASE LETTERS

LETTERS	WHEN COMBINED WITH LETTERS	LETTER SPACING
o, b, d, g, h, i, j, l, m, n, o, p, q, u	ALL	5
e, c, s	v, w, x, y ALL OTHERS	4 5
f, t	v, w, x, y, z, f, t, o, c, e, s ALL OTHERS	4 5
k, x	v, w, y ALL OTHERS	4 5
r, v, w, y, z	v, w, x, y, z f, t, o, c, e, s ALL OTHERS	3 4 5
' (APOSTROPHE)	ALL	5
, (COMMA)	ALL	10
/	ALL	20

* FOR X-HEIGHTS OF 100mm, 150mm, 250mm AND 300mm, THE ACTUAL LETTER AND NUMERAL SPACINGS WILL BE MULTIPLIED BY 4, 6, 10 & 12 RESPECTIVELY.
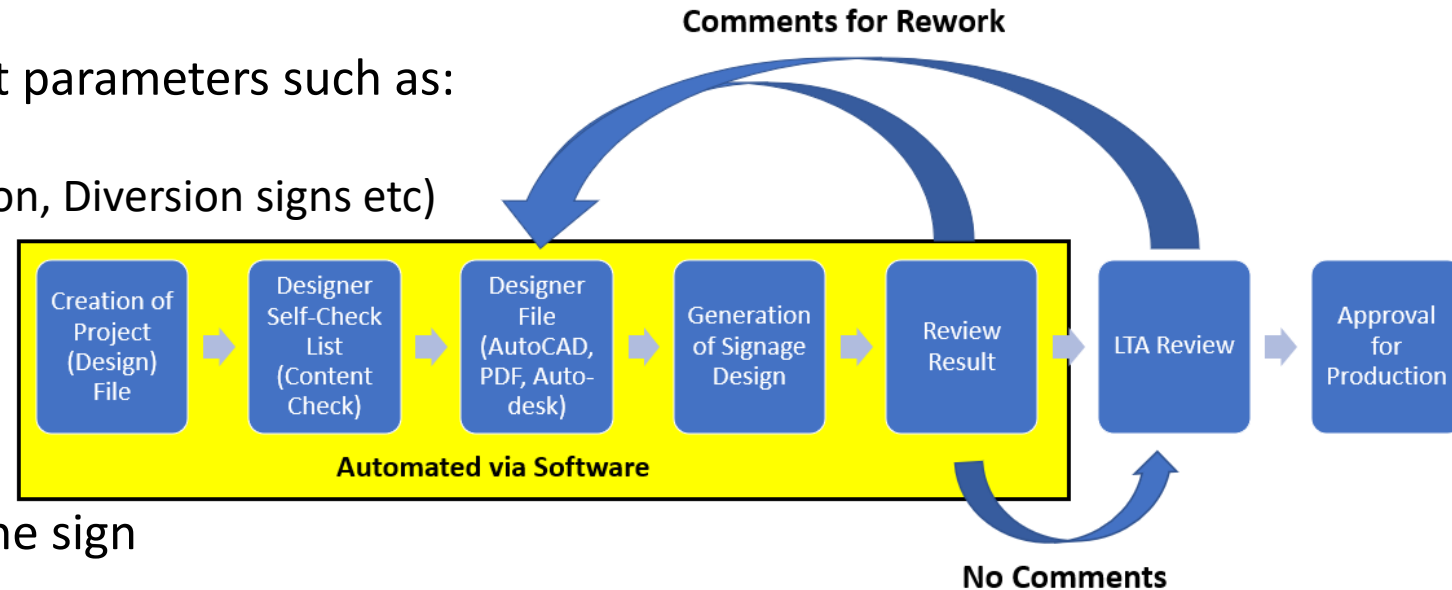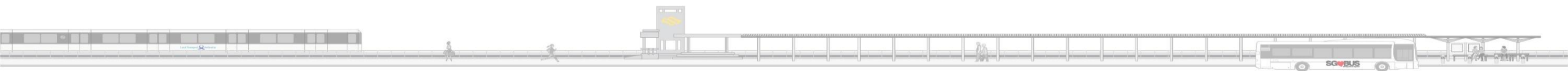
Expected Functions of the Software

- To auto-generate road signs artwork with input parameters such as:

  - Types of signs (Directional, Facilities, Information, Diversion signs etc)
  - Categories of roads (Expressway, Arterial, etc.)
  - Number of directions on the sign
  - Content / Legend (Road names) etc.

- Automation of spacing and alignment within the sign

- Generation of sign artwork (in colour) with comments such as total size of sign with 100% accuracy

Comments for Rework

Creation of Project (Design) File → Designer Self-Check List (Content Check) → Designer File (AutoCAD, PDF, Auto-desk) → Generation of Signage Design → Review Result

Automated via Software

→ LTA Review → Approval for Production

No Comments

Expected Outcome

- Increase efficiency level in the design/approval of signs' submission

Questions & Answers

Q1: Can you elaborate on the sample files/rules/checklist that would be shared as a guideline?
A1: Please refer to Annex A in Xcite website for the reference for sample signs.
Guidelines for the sign designs are to be taken reference from Standard Details of Road Elements (SDRE) – Chapter 7 on Directional Signs and Annex B – Design Manual for Signs in the Xcite website.
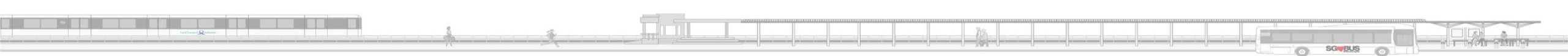
https://www.lta.gov.sg/content/dam/ltagov/industry_innovations/industry_matters/development_construction_resources/Street_Work_Proposals/Standards_and_Specifications/SDRE/Content_Page_JULY_2020.pdf

Q2: When LTA receives the signages document., it is in AutoCAD or PDF?
A2: The documents are generally in pdf format. At times, the submissions do also include the documents in the respective formats from the drawing tools, such as dwg or dgn. These files are primarily used for more detailed checks.

Q3: Would LTA like to make the AutoCAD file a compulsory file format when the new solution is in production stage?
A3: No. The solution provided should take into consideration that the industry is using different drawing software and be able to read/ provide the output in the respective file formats. In addition, the formats of the solution should include functions that allows verification of measurements of spacing size, height of letters etc.
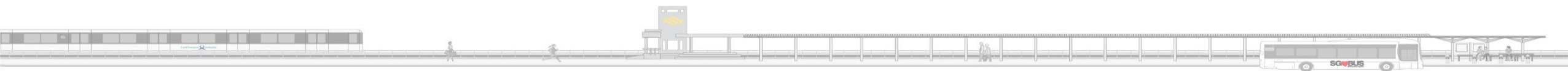
Questions & Answers

Q4: Do we have a permutations of all possible designs and are there a database of all approved signs over the years?

A4: Guidelines of design parameters, such as spacings between each lettering, for all possible permutations is available in Standard Details of Road Elements (SDRE), Chapter 7 on Directional Signs. Currently, we do not have a compiled database of the approved signs over the years. However, a sample of traffic signs has been attached in Annex A for reference.

Q5: Who are the ultimate users of this software? LTA, contractors or consultant?

A5: Based on our engagements with the companies which we have been dealing operationally with, there are demands of automation of sign designs due to the nature of works Consultants/Contractors/Architects are handling in the areas of Roads & Rails projects, road maintenance, road diversions, new developments and even between various Agencies. LTA planners could also benefit using the software as they could plan and allocate space for placement of new signs for new and future road network too.

Thank You

Contact us at:

Xcite@lta.gov.sg