# Math 106—Calculus II   Project 2
## Out of the gutter again...

by Gavin LaRose (glarose@NebrWesleyan.edu), Nebraska Wesleyan University, January 1997



After your resounding success in the defence field, your next contract with Sophisticated Mathematical Contractors, Inc., is something rather closer to home. Welbilt Design and Construction, Inc., a growing construction company in Lonlinc, has contacted you to assist with its contract to build a “deep tunnel” in Lonlinc.

**Welbilt Design and Construction, Inc.**

6533 Haybaler Highway
Lonlinc, SK
04685

21 February, 1997

Sophisticated Technical Contractors, Inc.
Suite 1, Strawmarket Business Plaza
Lonlinc, SK 04685

Dear STC:

Welbilt Design and Construction, after working primarily in the commercial sector of construction in southern Lonlinc, has recently landed a large government contract for the construction of a "deep tunnel" in Lonlinc. This is a large (55' diameter) tunnel built well below the city, into which the city's sewer system can be voided during storms that threaten to overwhelm the system—thus preventing the release of untreated sewage into the environment. The configuration of the tunnel is shown in figure 1, and it is shown end-on in figure 2.

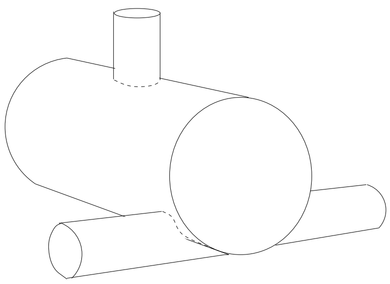

**Figure 1**: deep tunnel configuration

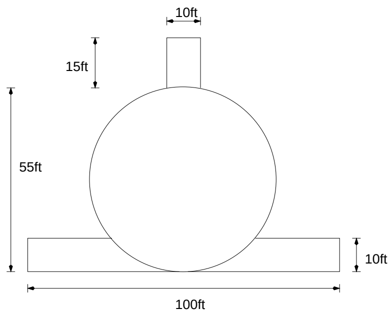


**Figure 2**: end view of tunnel

The length of the large tunnel section will depend on the phase of the construction (which is slated to extend over 7 years), and so should remain unspecified. Irrespective of this, however, the work required to pump the sewage back out of the deep tunnel is a significant concern, as it determines the nature of the pumps required to accomplish this task. We have therefore contracted with your company to find the work that it would take to empty the deep tunnel.

As we are good friends with one of the established pillars of Lonlinc, Dr. Gavin LaRose, we have arranged that he be available to answer any technical questions that might arise in the course of your investigation. In this vein, you should contact him with indications of your preliminary work by the 28th of February, and with further evidence of your progress on or by the 10th of that month. We expect your final report, which should conform to the usual mathematical standards, by the 17th of March.

Yours sincerely,

Frankyl O. Y. Drite
President, Welbilt Inc.

foyd:glr