

Ottawa Light Rail Commission

Lowell Goudge
on Wednesday, April 6, 2022



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OTTAWA LIGHT RAIL COMMISSION
ALSTOM TRANSPORT CANADA INC. - LOWELL GOUDGE
APRIL 6, 2022

--- Held via Zoom Videoconferencing, with all
participants attending remotely, on the 6th day
of April, 2022, 9:00 a.m. to 1:01 p.m.

1 COMMISSION COUNSEL:

2 Christine Mainville, Co-Lead Counsel Member

3 Fraser Harland, Litigation Counsel Member

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6 PARTICIPANTS:

7 Lowell Goudge: Alstom Transport Canada Inc.

8 Michael Valo and Charles Powell: Glaholt Bowles

9 LLP

10

11 ALSO PRESENT:

12 Helen Martineau, Stenographer/Transcriptionist,

13 Laila Butt, Virtual Technician

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1 --- Upon commencing at 9:00 a.m.

2 LOWELL GOUDGE: AFFIRMED.

3 CHRISTINE MAINVILLE: Good morning.

4 So the purpose of today's interview is to obtain
5 your evidence, under oath or solemn declaration,
6 for use at the Commission's public hearings.

7 This will be a collaborative interview
8 such that my co-counsel, Mr. Harland, may
9 intervene to ask certain questions. If the time
10 permits, your counsel may ask you follow-up
11 questions at the end of this interview.

12 This interview is being transcribed
13 and the Commission intends to enter this
14 transcript into evidence at the Commission's
15 public hearings, either at the hearings or by
16 way of procedural order, before the hearings
17 commence.

18 The transcript will be posted to the
19 Commission's public website, along with any
20 corrections made to it, after it has been
21 entered into evidence. The transcript, along
22 with any corrections later made to it, will be
23 shared with the Commission's participants, and
24 their counsel, on a confidential basis before
25 being entered into evidence.

1 You will be given an opportunity to
2 review your transcript and correct any typos, or
3 any other errors, before the transcript is
4 shared with the participants or entered into
5 evidence. Any non-typographical corrections
6 that you make will be appended to end of the
7 transcript.

8 Pursuant to section 33(6) of the
9 Public Inquiries Act 2009, that section provides
10 that a witness at an inquiry shall be deemed to
11 have objected to answer any question asked him
12 or her upon the grounds that his or her answer
13 may tend to incriminate the witness or may tend
14 to establish his or her liability to civil
15 proceedings at the instance of the Crown, or of
16 any person.

17 And no answer given by a witness at an
18 inquiry shall be used or be receivable in
19 evidence against him or her in any trial or
20 other proceeding against him or her thereafter
21 taking place, other than a prosecution for
22 perjury in giving such evidence.

23 As required by section 33(7) of the
24 Public Inquiries Act, 2009 you are hereby
25 advised that you have the right to object to

1 answer any question under section 5 of the
2 Canada Evidence Act.

3 So with that being said, we may begin,
4 if you're ready?

5 LOWELL GOUDGE: Okay.

6 CHRISTINE MAINVILLE: Could you first
7 speak to your involvement with the Ottawa LRT,
8 Stage 1, more specifically?

9 LOWELL GOUDGE: Okay. My involvement
10 began effectively with the notice to proceed for
11 Alstom on the vehicle contract in -- and I
12 forget the exact date, but it was either
13 mid-February or mid-March 2013. And I was
14 involved full time from that date until the
15 1st of August 2020, when I transitioned into a
16 new role within the company.

17 My principal roles were as the Senior
18 Train System Engineer on the project overseeing
19 all of the train system integration and also the
20 Safety Certifier for the project, for the
21 vehicle side.

22 CHRISTINE MAINVILLE: And just to be
23 clear, you -- which company do you work for?

24 LOWELL GOUDGE: I work for Alstom
25 Transportation.

1 CHRISTINE MAINVILLE: And in terms of
2 your background and experience, could you give
3 us a bit of a sense of that?

4 LOWELL GOUDGE: My background,
5 starting with university, was in power
6 engineering, so it covered all aspects of power
7 engineering from generation to power
8 semi-conductor systems to control systems, et
9 cetera.

10 I spent two and a half years working
11 in high voltage research for a separate company,
12 and in the process of that was also doing my
13 masters degree part-time. That was terminated
14 due to the economic collapse in 1982.

15 I joined with GEC Canada, which was a
16 predecessor company of Alstom, in late 1982 and
17 have worked in the transportation sector
18 exclusively since November of 1982. That
19 includes quality management, engineering
20 management, test engineering, reliability
21 engineering, profit centre management. Then
22 taking on a much larger role as GEC and Alstom
23 merged and involved in the marketing of the
24 European products into North America.

25 I spent two years living in France

1 responsible for tenders into the North American
2 market. And when I returned back, I oversaw the
3 technology transfer of multiple projects from
4 Europe into the North American market.

5 Spent, in total, about 11 years
6 largely involved in multiple projects in New
7 York City on the metro system there. Spent a
8 year as a technical bid manager and then joined
9 the Ottawa project.

10 CHRISTINE MAINVILLE: And on the
11 Ottawa project, Alstom was contracted to deliver
12 the trains, or the rolling stock, correct?

13 LOWELL GOUDGE: That's correct.

14 CHRISTINE MAINVILLE: And that
15 contract was with OLRTC?

16 LOWELL GOUDGE: That's correct.

17 CHRISTINE MAINVILLE: And Alstom also
18 signed a maintenance contract, correct?

19 LOWELL GOUDGE: Yes. I was not
20 involved in the maintenance contract directly,
21 but I was aware it was signed.

22 CHRISTINE MAINVILLE: With RTM?

23 LOWELL GOUDGE: I presume so.

24 CHRISTINE MAINVILLE: Okay. Can you
25 speak to how Alstom came to be selected on this

1 project as it relates to the delivery of the
2 rolling stock?

3 LOWELL GOUDGE: Only with indirect
4 comments, or what would be considered as
5 unsubstantiated comments, because I was not
6 directly involved prior to the signature of
7 contract.

8 My understanding is that the project
9 Request for Proposal was let and multiple
10 proponents joined consortium to offer complete
11 turnkey systems. Alstom was one of those
12 companies, but was not selected for best and
13 final offer. So that took all of our products
14 and services out of the picture.

15 At some point, and I don't know when
16 or how, I believe that OLRTC was selected as a
17 preferred proponent, but the City did not like
18 the vehicle supplier that OLRTC had partnered
19 with and that opened a door for us to offer our
20 vehicles separately from any other consortium,
21 and that was ultimately selected as the package.

22 I don't know the mechanics behind it.
23 That's my understanding of how it happened.

24 CHRISTINE MAINVILLE: Fair enough.
25 To the extent that you know, would

1 Alstom have initially put forward their own
2 signaling system for the trains?

3 LOWELL GOUDGE: Yes.

4 CHRISTINE MAINVILLE: And do you
5 have -- and ultimately the contract only related
6 to the vehicles, correct, and not the signaling
7 system?

8 LOWELL GOUDGE: That's correct.

9 CHRISTINE MAINVILLE: Do you have any
10 understanding of why Alstom was not selected to
11 provide the signaling contract in addition to
12 the trains?

13 LOWELL GOUDGE: The only thing I can
14 suggest, and I don't know absolute, is my
15 understanding of the way that the proponents
16 organized themselves is each of them signed
17 exclusive contracts with their suppliers.

18 So if you had -- let's -- if we take a
19 broad brush of companies that do signaling, you
20 might have Alstom, you might have, at the time,
21 Bombardier, you might have Siemens, you might
22 have AnsaldoBreda, which is now Hitachi, and you
23 have Thales.

24 If you took some of those signaling
25 companies, each of the proponents may have

1 signed secure contracts, on a win-win basis, and
2 the same I believe happened with vehicles, which
3 is why there were very few vehicle suppliers
4 from OLRTC to choose from when theirs was
5 rejected.

6 Everybody partnered up, signed up,
7 signed exclusive and took a package forward.
8 That's my understanding.

9 CHRISTINE MAINVILLE: And just so I'm
10 clear, how would that connect to Alstom's
11 signaling system not being part of that -- part
12 of its package?

13 LOWELL GOUDGE: My understanding is
14 that OLRTC and Thales signed an agreement as
15 part of the bid, because Thales has, quite
16 obviously, a very large Canadian footprint and,
17 aside from anything else, gives it an advantage
18 from a content perspective.

19 CHRISTINE MAINVILLE: And so Thales
20 ultimately did supply the signaling system to be
21 integrated into Alstom's trains, correct?

22 FRASER HARLAND: They supplied it, but
23 it was under separate contract to OLRTC and not
24 Alstom.

25 CHRISTINE MAINVILLE: Do you have an

1 understanding of whether the system that Thales
2 provided is a standard system for them?

3 LOWELL GOUDGE: I believe it's --
4 what's been provided is a newer version or newer
5 standard to what they would normally provide,
6 based on the documents that I'd seen.

7 CHRISTINE MAINVILLE: So something
8 adapted to -- a standard system potentially
9 adapted to this particular project?

10 LOWELL GOUDGE: I believe a new
11 architecture.

12 CHRISTINE MAINVILLE: And what do you
13 mean by a "new architecture"?

14 LOWELL GOUDGE: The first documents
15 that I saw on the project referred to an
16 architecture called "two out of two". What that
17 means explicitly is that on the vehicle side,
18 the equipment has two microprocessors, each of
19 them carries out a vital function, and the two
20 of them must agree for the system to proceed in
21 a safe manner. That would require, on single
22 car, two VOBCs -- complete VOBCs such that
23 if one failed, the other could carry on reliably
24 and safely.

25 At some point, Thales' architecture

1 changed to what they called "two out of three".
2 So each VOBC now has three computers of which
3 two must agree. That allows them to reduce the
4 number of installed VOBCs on a single car from
5 two to one because you can still withstand one
6 failure and carry on. So it gave a more
7 reliable and perceived less costly, but that's a
8 guess, system. And it is a newer approach to
9 other Thales systems that I've been involved
10 with in previous contracts that were two out of
11 two.

12 CHRISTINE MAINVILLE: And do you know
13 whether that was the result of a particular
14 requirement that the City had or OLRTC had on
15 this project?

16 LOWELL GOUDGE: There would be nothing
17 other than cost and reliability that would drive
18 the decision. To my knowledge, there's nothing
19 in the spec that says it must be this
20 architecture. The spec is more performance
21 based.

22 CHRISTINE MAINVILLE: And being a
23 newer system, did that have any implications in
24 terms of the risk to the project?

25 LOWELL GOUDGE: I can't answer on

1 that.

2 CHRISTINE MAINVILLE: In terms of the
3 trains that Alstom supplied, I understand that
4 the Citadis model is one that Alstom has used
5 elsewhere in the world?

6 LOWELL GOUDGE: Not directly, no.
7 The -- what we call Citadis Spirit in North
8 America is a -- or was, I guess now, because
9 it's 11 years ago, was a development project at
10 the onset to bring low-floor technology to North
11 America.

12 The product is very closely aligned in
13 its physical structure, the vehicle -- the
14 bogies, et cetera, to a product that's sold in
15 France under either Citadis Dualis, which is the
16 commercial name, or what's commonly referred to
17 as TTNG, for Tram Train New Generation.

18 The electrical architecture, the
19 systems, system integration is largely the same
20 as all Citadis vehicles. So it's the
21 electronics communications networks, et cetera,
22 of most of the Citadis vehicles in a car
23 structure that is more compliant with the
24 requirements of North America.

25 CHRISTINE MAINVILLE: And so this was

1 adapted for North America and it was a first
2 then for Alstom in North America, correct?

3 LOWELL GOUDGE: It was adapted for
4 North America and Ottawa was the first
5 commercial win for the product.

6 CHRISTINE MAINVILLE: And what would
7 be the implications of that?

8 LOWELL GOUDGE: In terms of?

9 CHRISTINE MAINVILLE: In terms of --
10 well, let me put it this way: This was not a
11 proven vehicle at that point?

12 LOWELL GOUDGE: All of the elements
13 were proven. And this is a common practice in
14 North America when suppliers -- or customers go
15 out for proposal, they ask for "service proven".

16 Everything can be traced back to
17 individual elements proven on other systems or
18 large portions of things proven, but there's all
19 always a degree of customization. The largest
20 portion of customization is the setting up of
21 the supply chain in North America. So you have
22 potentially all new vendors of some of the
23 material. And, again, because of Canadian
24 content, you're setting up supply chain.

25 CHRISTINE MAINVILLE: But this was

1 effectively a new train design?

2 LOWELL GOUDGE: If you said yes to
3 show me a part that's used on a different car,
4 there would be some changes to virtually every
5 part on the train, but the overall design
6 architecture, and the structure of the train is
7 very similar to other trains supplied in Europe.

8 It's been adapted for local production
9 and for the supply chain and for slight
10 differences in vehicle strength requirements, et
11 cetera.

12 CHRISTINE MAINVILLE: What would be
13 the key differences between the trains in Europe
14 and in North America?

15 LOWELL GOUDGE: With the normal --
16 what people might consider an LRT or light rail
17 vehicle in Europe, the normal service speed is
18 70 kilometres an hour and the structural
19 integrity for crash is not the same. This is
20 partly why TTNG, or Citadis Dualis, was chosen
21 as the structural basis for the design.

22 That's a train that is designed to
23 operate in two modes. One is between reasonably
24 close cities, maybe 60, 80 kilometres apart, and
25 operate on the French main line track, as well

1 as come into the city streets and operate like a
2 tramway. And it operates at speeds up to 100
3 kilometres an hour. It more fits the kind of
4 North American definition of a light rail
5 vehicle.

6 CHRISTINE MAINVILLE: Are there any
7 particularities that relate to winterization or
8 the winter conditions in North America?

9 LOWELL GOUDGE: We have some in terms
10 of -- some of the roof design to keep snow from
11 accumulating. We have special filters on the
12 input to the heating and ventilating system so
13 we don't draw snow into the car. The materials,
14 gaskets on doors, et cetera, are all chosen to
15 work down to -40. We have a heated floor so
16 that we don't have the possibility that the
17 floor can slip and freeze -- or freeze and
18 create a slip hazard. There's a lot of things
19 like that that are done.

20 CHRISTINE MAINVILLE: And that were
21 new for Alstom because this was the first train
22 or LRV designed for a North American city?

23 LOWELL GOUDGE: Those technologies
24 are -- none of those that I mentioned are new.
25 We supply trains into Sweden. We have equipment

1 in Kazakhstan in the mountains. We have some
2 equipment that we've sold into Russia.

3 So there are specific materials that
4 you choose to meet the temperature range. Every
5 city has a different temperature range. Some of
6 them can be lumped together into a group, but
7 you have areas where there's low temperature,
8 you have areas where there's high temperature.
9 There are cities that never see freezing in the
10 world. So that is a materials option that is
11 chosen based on where the train is being
12 deployed.

13 CHRISTINE MAINVILLE: So do I
14 understand that the City, in this case, asked
15 for a service-proven vehicle?

16 LOWELL GOUDGE: My understanding is
17 they asked for something to be service proven.
18 And somewhere, I don't know where because it was
19 in the bid phase, there was a presentation made
20 of the Citadis family and it was considered that
21 Citadis was service proven.

22 CHRISTINE MAINVILLE: It was
23 considered by whom?

24 LOWELL GOUDGE: By the City.

25 CHRISTINE MAINVILLE: And was that

1 Alstom's representation as well? That -- or
2 Alstom's position that it was service proven?

3 LOWELL GOUDGE: Yes.

4 CHRISTINE MAINVILLE: And is that --

5 LOWELL GOUDGE: Again, to my
6 understanding because I wasn't involved in the
7 bid.

8 CHRISTINE MAINVILLE: Right.

9 And -- but from your perspective, it
10 was service proven?

11 LOWELL GOUDGE: The -- globally
12 virtually everything on that train had been done
13 somewhere else. All the technologies themselves
14 were largely service proven. So, yes, it would
15 qualify as service proven.

16 As I say, it's something that you get
17 on every contract where people come in and ask
18 for service proven, and they also ask for the
19 latest and greatest of technology.

20 CHRISTINE MAINVILLE: Right.

21 And on that, can you speak a bit about
22 what was specific to the Citadis Spirit as a
23 result of North American standards and
24 requirements as opposed to requirements that the
25 City had in respect of the trains? So what was

1 adapted in terms of the Citadis model because of
2 the city's requirement as opposed to simply
3 adapting to meet North American standards?

4 LOWELL GOUDGE: In terms of the City's
5 requirements, the only thing that would be
6 explicitly, I think, in the project agreement is
7 that we had to have a certain number of full
8 dual-panel doors per length of train. And I
9 think the -- it was something like one full set
10 of doors for every seven metres of train length.
11 And placing doors can become difficult.

12 So that was one that was, to my
13 knowledge, a city requirement.

14 The bulk of the other requirements in
15 the project agreement, the bulk of them are
16 things that are standard in North American
17 trains.

18 The only other one that might be
19 somewhat unique would be the requirement to have
20 the ability to view the platform from monitors
21 within the train through a Wi-Fi network.

22 CHRISTINE MAINVILLE: And what about
23 the -- I understand there was a requirement for
24 a hundred percent low floors?

25 LOWELL GOUDGE: I need to look if it's

1 a hundred percent low floors or a
2 hundred percent within a certain floor height
3 range. But I think, yes, it was meant for low
4 floor, because somewhere in the future planning
5 there was an option that could be exercised to
6 run vehicles in the streets where a low floor at
7 the entranceway was required. I don't believe
8 it was a hundred percent low floor. I believe
9 it might have been 70 percent, but it had to be
10 a hundred percent level access.

11 CHRISTINE MAINVILLE: And what does
12 that mean?

13 LOWELL GOUDGE: It means that all of
14 the doorways have the same relatively low
15 step-up from the top of rail.

16 CHRISTINE MAINVILLE: And was this a
17 city requirement that was specific to this
18 project that was not -- would not otherwise have
19 been required?

20 LOWELL GOUDGE: No. I think most
21 70 percent low floor light-rail vehicles would
22 also be -- would also suit the application. But
23 it's much -- it's much cleaner to be able to
24 walk into and within the LRT without having
25 steps; it's much more accessible.

1 CHRISTINE MAINVILLE: Did this create
2 any particular complications for Alstom during
3 manufacturing?

4 LOWELL GOUDGE: During manufacturing,
5 no. But the whole geometry of the car gets
6 driven by all of the limits of the AODA
7 legislation, and the -- what gets referred to
8 back to back as Americans with Disabilities Act
9 legislation where you have -- every entrance
10 ramp, flat floor section ramp within the car, et
11 cetera, has to comply with geometry requirements
12 of slopes for changes in elevation, et cetera.

13 So it's an interesting challenge to
14 get everything compliant, but that's -- and that
15 drives some of the geometry of the train. But
16 it wasn't city-specific as such.

17 CHRISTINE MAINVILLE: And was there a
18 requirement for a particular speed? I think you
19 mentioned 100 kilometres an hour?

20 LOWELL GOUDGE: Yeah. The project
21 agreement requires that the vehicle be fully
22 capable at speeds up to 100 kilometres an hour.
23 And that means that we actually -- if the track
24 would permit it, we have to actually qualify the
25 vehicle to 110.

1 CHRISTINE MAINVILLE: And was this not
2 a particular city requirement that would not
3 otherwise have been mandated?

4 LOWELL GOUDGE: No. The vehicle was
5 always planned to be 100 kilometre per hour
6 vehicle. That's quite a common maximum speed in
7 North American LRV procurement specs.

8 CHRISTINE MAINVILLE: Was it common
9 for Alstom?

10 LOWELL GOUDGE: It's also the service
11 speed for TTNG. Which, again, that comes back
12 to why that project was considered as the sort
13 of reference arrangement because the vehicle
14 speed, the arrangement of the vehicle, the
15 structure and structural strength of the vehicle
16 were all closely aligned to what we needed for
17 the North American market.

18 CHRISTINE MAINVILLE: So what, if any,
19 aspects of this project did Alstom see as
20 involving added complexity and potentially risk?

21 LOWELL GOUDGE: Well, I think the
22 localization is probably one of the risks. And
23 because Alstom at the time had not done a lot
24 with Thales on the signaling, there was an
25 aspect of risk there.

1 And the other area of risk that we had
2 was that there was a yet-to-be-defined free
3 issue radio from the City. So obviously if it's
4 not defined, how do you design for it?

5 And for the ATC, and for the radio,
6 somebody had provided, in the negotiation of the
7 contract, that there was a cut-off date where if
8 we did not receive full specification by, I
9 think it was April 26, 2013, we could proceed
10 with our own design and our own design
11 assumptions.

12 CHRISTINE MAINVILLE: And I'll come
13 back to each of those pieces. But you made a
14 reference to clients often wanting the latest
15 technology and design. Was there a desire here
16 from the City for -- to be leading edge on
17 technology?

18 LOWELL GOUDGE: I don't think at the
19 time, but we did have some questions as we went
20 through design reviews why couldn't we have
21 certain things. And although it was something
22 that you could use for, say, Internet in your
23 home, it was something that was not yet proven
24 for transit, et cetera. There is always
25 questions about that, especially on information

1 systems.

2 CHRISTINE MAINVILLE: So nothing that
3 created more risk for Alstom in terms of being a
4 first?

5 LOWELL GOUDGE: No. In terms of that,
6 virtually everything we were integrating into
7 the vehicle we had done before.

8 As I say, the one exception that was
9 not as common was the wayside platform cameras.
10 Normally those cameras are vehicle-mounted.

11 FRASER HARLAND: Can I just jump in
12 here? You mentioned the requirement for the
13 doors per length of train. Did that -- and you
14 said that placing doors can be a challenge. So
15 what were the implications of that requirement
16 on train design?

17 LOWELL GOUDGE: Well, really, that was
18 worked out in the geometry at the bid phase to
19 make sure you had the spacing.

20 But you have -- with the Citadis
21 vehicle, we have some slight changes in floor
22 height as you move through the vehicle, it's not
23 perfectly flat. So you have to step up a little
24 bit or go up a ramp a little bit where the
25 running gear is located.

1 So to get the number of doors, you
2 have to have the 1.3 metres of the door, plus
3 enough space between doors that you can open the
4 doors in between and not have the two door
5 panels run into each other, et cetera, et
6 cetera. So you have to place the doors on the
7 train. So that can be, depending on the vehicle
8 arrangement, problematic because some vehicle
9 designs don't have the space between running
10 gears to put multiple door sets.

11 As I say, this vehicle best suits the
12 North American approach, and that's part of the
13 overall design, is to have a high number of
14 doors. It's part of the geometry. It's not a
15 huge challenge for our vehicle architecture, but
16 there's some architectures that it might exclude
17 or disqualify because their arrangement is
18 different. It partially drives the arrangement
19 of the train.

20 CHRISTINE MAINVILLE: Do you know why
21 the City had that particular requirement?

22 LOWELL GOUDGE: The more doors you
23 have, the faster you can allow for ingress and
24 egress. And passenger flow and system capacity
25 was one of the requirements they had at the

1 system level, and obviously those system level
2 things reflect into the vehicle design.

3 CHRISTINE MAINVILLE: And I understand
4 there was an automatic leveling requirement for
5 the stations. Did that have implications in
6 terms of what Alstom needed to design and
7 supply?

8 LOWELL GOUDGE: There is a
9 requirement, you're correct, for -- again with
10 the AODA requirements and the Americans with
11 Disabilities Act. There is a requirement that
12 the maximum step up or down at the door
13 threshold is within -- I think it's plus-minus
14 16 millimetres. Something in that range.

15 That does drive some technical
16 decisions in terms of how you provide suspension
17 to a vehicle and still achieve the platform
18 height, but it was doable within the technology
19 that we had. It didn't really require new
20 technology development.

21 CHRISTINE MAINVILLE: Did it require
22 the design of a new bogie?

23 LOWELL GOUDGE: The bogie was always
24 an adaptation from a previous bogie for the
25 North American market. It did drive some design

1 decisions on the bogie in terms of its overall
2 arrangement because, again, you have to control
3 for things that you can compensate for and
4 things that you cannot.

5 So we can't compensate a hundred
6 percent for the wear of the wheel, so you have
7 to, in your adjust of that plus or minus 16
8 millimetres, allow for mechanical adjustment for
9 the wheel wear. There's things you can't adjust
10 for in the primary suspension, but you do have
11 adjustment on secondary suspension.

12 So we had a budget that we worked
13 through, gave our control range, and also had to
14 allow for a construction tolerance to the
15 platforms.

16 CHRISTINE MAINVILLE: There were
17 supply issues relating to the bogies, right?

18 LOWELL GOUDGE: There were, to my
19 understanding, supply issues related to the
20 bogie more with respect to the localization and
21 the company that we had selected to do the
22 castings.

23 CHRISTINE MAINVILLE: So let's speak
24 first generally about the localization. You're
25 referencing the Canadian content requirement?

1 LOWELL GOUDGE: Yup. Canadian or,
2 within the product strategy, North American.
3 Because, again, the product was developed to be
4 sold in multiple cities across North America.

5 So although it had to contractually
6 meet the Canadian requirements, we also had
7 objectives that we were monitoring to make sure
8 that we were secure within North America to meet
9 a much stricter buy-America requirement.

10 CHRISTINE MAINVILLE: And, sorry, is
11 that a requirement or was that just a --

12 LOWELL GOUDGE: It's an internal
13 requirement because we were developing it for a
14 large customer base in two countries.

15 CHRISTINE MAINVILLE: And so what were
16 the implications of these localization
17 requirements?

18 LOWELL GOUDGE: You have to search out
19 new suppliers, you have to qualify new
20 suppliers, sometimes you have to change the
21 design slightly to adapt the -- what a supplier
22 can give.

23 I wasn't deeply involved in the
24 localization aspects of it so I don't know the
25 total touch of that, but it was part of the

1 issue.

2 CHRISTINE MAINVILLE: Do you --
3 understanding that you weren't that close to it,
4 do you have any examples of changes to suppliers
5 that -- in particular that may have affected the
6 project either from a scheduling perspective or
7 a quality perspective?

8 LOWELL GOUDGE: Well, the bogie you
9 mentioned, because, again, it was a supplier
10 that we'd not used on European supply
11 previously. The roof structure, because it's
12 a -- the roof itself is a large welded assembly
13 of multiple aluminum extrusions that required
14 some work, and I believe in the end we dual
15 sourced it because we had problems with one
16 supplier.

17 Other than that -- and obviously some
18 companies where they set up either with partners
19 or other subsidiaries to do local assembly of
20 their products to get Canadian content. That's
21 about all I can remember in terms of being
22 issued.

23 Some parts may have been more
24 difficult to purchase because there were certain
25 parts that had to come from Europe, just from

1 the technology choice and the supply chain for
2 those was a little more difficult to get into
3 Canada as opposed to the normal supply. But,
4 again, I wasn't all that close to the
5 procurement side of it.

6 CHRISTINE MAINVILLE: And do you know
7 if there were any supply issues in relation to
8 the brakes or the calipers?

9 LOWELL GOUDGE: In terms of local
10 supply procurement, not really. In terms of
11 some other problems, yes. But I don't think
12 those were things that were a function of supply
13 in terms of sourcing as such.

14 We had -- really with the calipers you
15 mentioned, we had a fundamental problem that
16 they failed their life endurance test and had to
17 be redesigned from scratch to meet their life
18 cycle requirements.

19 CHRISTINE MAINVILLE: Do you have an
20 understanding of what was the cause of that?

21 LOWELL GOUDGE: In terms of what the
22 global cause was, I didn't get into the
23 structural aspects of the calipers, as such.
24 But they had failed the mechanical cycle test
25 several times. And at the end, and also through

1 some acquisitions that the brake supplier had
2 made, they had availability of a different
3 caliper. And at some point the decision was
4 made to cut clean and go with the new caliper as
5 the way forward. And that was done by the
6 supplier and we supported the decision.

7 CHRISTINE MAINVILLE: Was this one of
8 Alstom's regular suppliers then?

9 LOWELL GOUDGE: There's only in Europe
10 and North America about four or five brake
11 suppliers. There's not a huge list.

12 You wind up where -- you choose, for a
13 range of vehicles, a base supplier at some point
14 in time as you develop the vehicle. So we
15 chose -- on this case, we chose Wabtec as the
16 overall supplier because, again, Wabtec has a
17 footprint in North America, which is important
18 for going forward in the product development.

19 We chose Wabtec -- they used a caliper
20 that they had used on previous LRVs, but when
21 it came to the full integration of the caliper
22 into the bogie and the final design of the
23 caliper, it could not, in their view, ever meet
24 the mechanical stress requirements. So at some
25 point, they made a decision, which was probably

1 a correct one, to say, Stop. Give up on this
2 approach. Take another caliper that is similar,
3 and that was from a company that Wabtec had
4 purchased in between when we started the project
5 and when the decision was made. So they had a
6 technology available that they could adapt
7 easily and that was the decision. In the end it
8 was the right decision.

9 CHRISTINE MAINVILLE: Did it have
10 repercussions on the schedule and otherwise on
11 the project?

12 LOWELL GOUDGE: It had some minor
13 repercussions in terms of schedule because we
14 had to retrofit a large number of vehicles. But
15 the functioning was kept the same such that the
16 new caliper did not change the way the vehicle
17 braked. We still qualified the vehicles in the
18 exact same way with the exact same criteria.
19 The same performance requirements were made.

20 And in this respect the two could
21 operate transparently, although the differences
22 in the caliper required some different valving
23 in the hydraulic pressure unit and in the
24 controls. So the retrofit had to be phased such
25 that you changed the HPU, the caliper and the

1 software, from the old version to the new
2 version in one step.

3 So it's a logistics problem, but I
4 don't believe it caused that much of a delay in
5 the overall scheme of things, other than it was
6 extra work that nobody ever wants.

7 CHRISTINE MAINVILLE: And the bogies
8 caused more delay, is that fair?

9 LOWELL GOUDGE: I don't believe the
10 bogies caused delay as such. The issue that we
11 had with the casting supplier was a quality and
12 control of process issue. There was a number of
13 castings that were condemned outright. There
14 were a number of castings that were viewed as
15 not fit for the full life of the vehicle. And
16 those were called back in a retrofit
17 systemically within the first couple of years of
18 service to take them out. But they were not
19 deemed at risk of imminent failure, but they
20 would potentially fail at some point in the
21 later years of their life so they were replaced
22 in an overhaul.

23 CHRISTINE MAINVILLE: So you don't see
24 those as having a significant impact on the
25 timeline for the delivery of the vehicles?

1 LOWELL GOUDGE: I can't really answer
2 that. I wasn't that closely attuned to the
3 schedule as such.

4 CHRISTINE MAINVILLE: You spoke about
5 the impact of the localization requirements on
6 the chain of supply. Were there other
7 implications in particular in terms of where the
8 trains were to be assembled?

9 LOWELL GOUDGE: There's a serious
10 dependence on OLRTC in terms of delivering the
11 MSF, fully completed, such that we could build
12 the vehicles there.

13 Because the plan was that you would
14 build the maintenance facility, do the assembly
15 of the vehicles in the maintenance facility, and
16 then turn it over to the City to run the trains
17 afterwards.

18 I think there were probably two things
19 that we -- that are really critical in that
20 thinking. One is, for the facility itself, we
21 were wholly dependent on OLRTC to meet schedule
22 and hand over the MSF to us. And the second
23 one, which I don't think people thought of
24 properly, is as we began running trains, you now
25 have one facility that is expected to be vehicle

1 assembly, but you're also trying to run trains
2 and support trains out of the same facility.
3 And I don't think that was adequately considered
4 in the planning.

5 CHRISTINE MAINVILLE: And just to take
6 a step back, would the trains have been
7 manufactured at the MSF were it not for the
8 Canadian content requirement?

9 LOWELL GOUDGE: I can't really answer
10 that. I've seen that model used in multiple
11 cities. I've also seen companies take on their
12 own leased manufacturing space. That would be a
13 business model decision and I didn't have
14 involvement in that. I don't know how that was
15 worked out. I believe it was part of the
16 original Phase 1 contract that that was the
17 plan.

18 CHRISTINE MAINVILLE: But do I
19 understand that the MSF was not your typical
20 production facility?

21 LOWELL GOUDGE: The building design
22 was done based on the service requirements and
23 reviewed and adapted to make it a production
24 facility, but the problem is that you can't have
25 both production and running maintenance in the

1 same facility.

2 CHRISTINE MAINVILLE: And so from a
3 production perspective, at least before there
4 was maintenance, was it a suitable facility,
5 from your perspective?

6 LOWELL GOUDGE: I think we'd have to
7 say yes. We built 48 cars.

8 CHRISTINE MAINVILLE: But did Alstom
9 face any challenges that it wouldn't normally
10 have faced?

11 LOWELL GOUDGE: From a facilities --
12 it's hard to say. I can't say whether it was
13 the cleanest manufacturing flow or not. But,
14 again, people had the tooling, built the cars.
15 So from a space allotment, it worked.

16 I mean, the production line sort of
17 was folded on top of itself where cars were
18 built, they moved along the outside,
19 transitioned across, moved back the other way,
20 transitioned into the middle and were complete.
21 So the cars moved around a bit in the process
22 but, as I say, we ultimately built 48 cars
23 there, so it made logical sense.

24 FRASER HARLAND: Just to take even a
25 further step back, you mentioned that you've

1 seen other companies use this model before. So
2 have you used this model before in other
3 projects that you've worked on?

4 LOWELL GOUDGE: In other projects
5 that I've been directly involved with? I think
6 no.

7 I know it was done by what's now
8 Alstom, but Bombardier for the Millennium Line
9 and SkyTrain were the vehicles -- a large number
10 of them were built on the west coast.

11 I know that Kinkisharyo who supply
12 LRVs in the US, or were supplying them, did not
13 have a US factory but rented space to do their
14 projects; shipping components to the car and
15 building the cars somewhere local to wherever
16 the City was.

17 It's generally more of a function on
18 the smaller projects where people want local
19 content. And local content varies highly
20 contract to contract. I mean, you might have
21 people say that they want X percent state
22 content or city content.

23 I know the Detroit People Mover, to do
24 the civil work, you had to be a company
25 physically incorporated in the City of Detroit

1 proper to be allowed to even bid on work.

2 So every project has different
3 constraints that way.

4 CHRISTINE MAINVILLE: Did it have
5 implications on the workforce on Alstom's usual
6 labour staff?

7 LOWELL GOUDGE: The model that was
8 chosen was to use a mix of Alstom employees and
9 contracted through a third-party company called
10 Randstad to supply labour.

11 That can be a challenge because at the
12 time, you have to remember we had one contract
13 for 34 cars originally, and it becomes very
14 problematic to cycle up a workforce of 100 to
15 150 people for 18 months to two years, or
16 whatever the build phase is, and then say,
17 Goodbye, we don't need you.

18 So you work with a mix of some experts
19 that you bring in from factories worldwide and
20 you take local people for contract. That's the
21 model that was used.

22 CHRISTINE MAINVILLE: So did -- were
23 there challenges in that respect then in terms
24 of locating -- whether a sufficient number of
25 people or sufficiently experienced people to

1 work on the trains?

2 LOWELL GOUDGE: I don't think it was a
3 limit as such because of the design of the
4 train. The fundamental design of the train is
5 such that it can be built anywhere. It does not
6 require any special processes, and I'll qualify
7 that as welding, painting, cutting, machining,
8 drilling, or other things that would be
9 associated with fabrication of parts.

10 The vehicle is a vehicle that is
11 bolted together, screwed together. All the
12 parts come in and it's assembled. There is
13 virtually nothing, other than nuts and bolts
14 work, although some of those fasteners
15 themselves have special processes, but those
16 processes are well documented and defined.

17 So the objective is that it's a
18 vehicle that can be built with a minimum amount
19 of tooling and a minimum amount of specialist
20 work at the assembly site. All the specialist
21 work is done and controlled at subcontractors
22 that are qualified.

23 CHRISTINE MAINVILLE: So you don't see
24 this as having had any potential implications
25 for either the reliability of the system or

1 having had impacts on schedule?

2 LOWELL GOUDGE: On schedule, I don't
3 think it was a problem.

4 On reliability or maybe quality, you
5 may not have people that understand fully what
6 they're doing because they're following a
7 procedure, but they've not built a railcar
8 before.

9 And there may be a problem, but again
10 it's not my area of real expertise, in the
11 engagement of the employees because they're
12 temps. They're working for a temp company.
13 They may not have the same vision of the future
14 with the company as if they were employees.

15 CHRISTINE MAINVILLE: So the bulk of
16 the fleet was to be built at the MSF in Ottawa,
17 but am I correct that the first two LRVs were
18 initially to be built in France?

19 LOWELL GOUDGE: I've heard multiple
20 different schedules. I believe, yes, at some
21 point in time the plan was to build the first
22 two in France, but that then -- that was viewed
23 as a logistical problem from the onset and a
24 procurement issue.

25 So at some point the decision was made

1 to build the first vehicle in -- I don't know if
2 it was the first or the first two, in our
3 facility in Hornell, New York, because that
4 facility was planned to be the owner of the
5 design in the long term for future projects and,
6 therefore, had to support it anyway.

7 As things evolved, they started
8 building one LRV. I think they ultimately
9 decided one LRV in Hornell and one in Ottawa,
10 because it was viewed that we needed to get the
11 skills in place in Ottawa as quickly as we could
12 to follow on with the rest of production.

13 So ultimately they built the first LRV
14 in Hornell and started some of the qualification
15 tests with that LRV in Hornell. And they built
16 the second LRV in Ottawa and that became the LRV
17 that did the bulk of the vehicle dynamic
18 testing.

19 CHRISTINE MAINVILLE: Wasn't the
20 vehicle that did the bulk of the dynamic testing
21 LRV5?

22 LOWELL GOUDGE: No. It was LRV2.

23 CHRISTINE MAINVILLE: Okay. Did these
24 changes in location have an impact on the
25 validation testing or the prototype testing?

1 LOWELL GOUDGE: To some extent, yes.
2 Hornell does not have a test track that can
3 allow it to get to 100 kilometres an hour, so we
4 would have to do testing elsewhere when we
5 switch to the Hornell site. So that was a
6 limitation and that was something that was
7 discussed, and we had looked at alternate
8 possibilities for testing. And really the only
9 two possibilities for testing were to go to the
10 Transportation Development Centre in Colorado,
11 or to test on the main line in Ottawa, if it was
12 available in time.

13 So as we were discussing testing,
14 the -- some of the procedures even were written,
15 testing will either be in Colorado, in Pueblo,
16 or in Ottawa, simply because we hadn't made the
17 decision at the time we had to start developing
18 the test procedures.

19 CHRISTINE MAINVILLE: And am I right
20 that it did not take place in Colorado
21 ultimately?

22 LOWELL GOUDGE: Ultimately, no.

23 CHRISTINE MAINVILLE: And so the plan
24 eventually became that the validation testing
25 would happen in Ottawa?

1 LOWELL GOUDGE: Yes.

2 CHRISTINE MAINVILLE: And can you
3 explain when that happened ultimately?

4 LOWELL GOUDGE: Sometime between
5 February and maybe April or May of 2016.

6 CHRISTINE MAINVILLE: That would have
7 only been on the test track?

8 LOWELL GOUDGE: That was -- at that
9 time, we were led to believe that we would have,
10 by September of 2016, four and a half kilometres
11 of fully electrified main line available for
12 doing testing.

13 CHRISTINE MAINVILLE: But you did not?

14 LOWELL GOUDGE: No, we did not.

15 CHRISTINE MAINVILLE: Can you tell me
16 a bit about how that unfolded?

17 LOWELL GOUDGE: I'm trying to think of
18 the exact timing. Somewhere around November of
19 2016, we had LRV2 moving in the yard and we were
20 performing driver training in the yard up to
21 speeds of about 20.

22 I'd have to look back and see when we
23 did the first walk on the main line, but I think
24 it was in January of 2017 where we did a walk
25 down of the entire main line from the connector

1 tunnel all the way to Blair to look at it,
2 inspect it, and look at obvious things.

3 Sometime in January, around
4 January 2017, we got access to the main line,
5 but it was not all of that track. It was the
6 eastbound track only and we were restricted. We
7 did not have the full four and a half
8 kilometres. We only had a portion of the
9 section between Blair and Cyrville, but not in
10 either of the stations because the stations were
11 still under construction.

12 And we were not able to bring the
13 train back to the MSF on a nightly basis to do
14 anything. It had to be shut down and left. And
15 we could only do testing a portion of the time
16 because the catenary could only be energized a
17 certain amount of time to allow construction to
18 continue on the rest of the system.

19 CHRISTINE MAINVILLE: So what were the
20 implications for testing?

21 LOWELL GOUDGE: If you assumed that
22 you had a test track 24/7, and you only had it
23 for one shift, not counting the time to get
24 permission to energize and the time that you had
25 to deenergize to leave it for the other two

1 shifts for construction, we were trying to
2 compress 24 hours of available time into a
3 realistic five to six hours a day maximum.

4 FRASER HARLAND: Just to clarify in
5 terms of timelines, you mentioned that testing
6 happened, you were saying, February, April,
7 May 2016. But just to understand, do you mean
8 that's when the testing started? Because now
9 you're saying into 2017.

10 LOWELL GOUDGE: We discussed the
11 location of the test track February to May of
12 2016.

13 FRASER HARLAND: Okay.

14 LOWELL GOUDGE: Actual testing began
15 around January 2017 on the main line.

16 FRASER HARLAND: And is this
17 validation testing or serial testing or both?

18 LOWELL GOUDGE: The bulk of serial
19 testing is done statically in the shop. Because
20 the dynamic testing had not been fully done,
21 obviously on the first vehicle you have to make
22 it move before you can do anything.

23 We did a limited portion of dynamic
24 testing to make sure that the train went forward
25 when you select forward, reverse when you went

1 reverse, and it accelerated and braked up to and
2 down from 20 kilometres an hour safely in the
3 yard, such that we could begin expanding the
4 speed out on the main line when we got the main
5 line.

6 Then you do all of your validation
7 testing, your performance testing, any tuning of
8 performance. That then sets the process for the
9 rest of the fleet for the routine testing, which
10 is not as in depth as the qualification testing.

11 FRASER HARLAND: So I just wanted to
12 close the loop on that by asking if you're able
13 to tell us approximately when validation testing
14 was completed?

15 LOWELL GOUDGE: Full and final
16 validation on everything? Sometime towards the
17 end of 2018.

18 FRASER HARLAND: And am I right that
19 given that the expected process would have been
20 that the prototypes would have been completed
21 elsewhere and validated there, that that
22 timeline was much later than would have been
23 ideal for Alstom?

24 LOWELL GOUDGE: For some of it, yes.
25 For some of the validation testing it could only

1 be done on the main line.

2 We had a ride quality requirement.
3 Irrespective of where you do that, the ultimate
4 ride quality test must be done on the city
5 tracks because that's a system requirement.

6 The main tunnel was not open until
7 September of 2018, so obviously ride quality was
8 not complete. And even when we had access to
9 the tunnel, it came with a speed restriction of
10 20 KPH because it wasn't fully validated and
11 released for service.

12 So we didn't -- we actually had to
13 come back and do ride quality again because the
14 facilities weren't ready, even in 2018, to do
15 that portion of the test.

16 The same has to do with the platform
17 viewing system. Until 2018, we did not have the
18 ability to do anything in the tunnel or west of
19 the tunnel because the tunnel was not open. So
20 we couldn't test that system in total until the
21 whole system was opened in the fall of 2018, in
22 terms of accessible for us to run vehicles
23 through it.

24 CHRISTINE MAINVILLE: And you said
25 validation testing on everything was completed

1 at the end of 2018, but what about complete
2 validation testing on the one vehicle, the first
3 prototype?

4 LOWELL GOUDGE: That was done, I
5 think, somewhere in the summer of 2018. I would
6 have to go back and look at things.

7 CHRISTINE MAINVILLE: As of when
8 approximately would it have been possible to go
9 a hundred kilometres an hour and test the right
10 speed?

11 LOWELL GOUDGE: We never got there.

12 CHRISTINE MAINVILLE: Why is that?

13 LOWELL GOUDGE: We were very close.

14 We got to 97 kilometres an hour, that's the
15 fastest we ever got to. The track alignment on
16 the east end of the track did not permit it.

17 And when they opened the track in the
18 western portal, we asked for the -- and we were
19 going to be doing a ride quality and have all
20 the instrumentation to prove train stability,
21 which is largely what you're doing at the higher
22 speeds. We asked for the permission to do that
23 testing up to 110 kilometres an hour on the
24 western part of the alignment, which is
25 virtually straight and flat, for the last two or

1 three stations. That was refused because nobody
2 had got insurance to go beyond 100 kilometres an
3 hour. Even though it was known that to validate
4 for 100, we had to go to 110, there was no
5 insurance and it was actually refused by OLRTC
6 because they would not have insurance.

7 CHRISTINE MAINVILLE: Would they have
8 been responsible for that insurance piece?

9 LOWELL GOUDGE: I would assume, as the
10 system integrator, that all insurance -- if
11 they're offering a track to do testing and they
12 know that the speed that you need to test, I
13 would assume that it's in their scope to have
14 the facilities insured.

15 CHRISTINE MAINVILLE: After RSA, were
16 the vehicles able to go up to 100? Was that
17 resolved?

18 LOWELL GOUDGE: We've never been
19 really allowed to go beyond -- other than one
20 time in March of 2017 where we got to 97 KPH,
21 we've never been allowed to go at maximum speed.
22 And the system speed limit in operation today is
23 90.

24 All of that testing is deferred to
25 Phase 2 where it's perceived we'll get a long

1 enough track to get to 100 and do all the
2 qualification. That's been deferred.

3 CHRISTINE MAINVILLE: So you said the
4 actual testing began around January of 2017, but
5 given the restrictions, including the fact that
6 the stations were still under construction, am I
7 right that there was no ability to do the full
8 validation testing at that point in time? When
9 did it become possible to do complete validation
10 testing.

11 LOWELL GOUDGE: As I say, from the --
12 just the ability to put trains through the
13 system, that wasn't even possible until
14 September of 2018 because the tunnel was not
15 open.

16 CHRISTINE MAINVILLE: Right.

17 LOWELL GOUDGE: On the wayside
18 communications, I don't know when they actually
19 installed all the equipment at every station.
20 That was a separate option in the contract
21 because that was not at the signature of the
22 contract designated to necessarily be Alstom as
23 a supplier.

24 CHRISTINE MAINVILLE: And is it fair
25 to say that the validation testing would have

1 been -- is very significant for Thales, Thales'
2 systems as well?

3 LOWELL GOUDGE: It's also for Thales
4 as well, yes, because clearly their system --
5 they need the physical stuff installed on the
6 track because it's the signaling that controls
7 safe separation of trains. So if you don't have
8 the track, you can't do their portion of
9 validation either.

10 CHRISTINE MAINVILLE: And am I
11 describing validation testing properly when I
12 say that its purpose is typically to validate a
13 prototype before you build the entire fleet?

14 LOWELL GOUDGE: For the train, yes,
15 for the signaling, no.

16 CHRISTINE MAINVILLE: What's the
17 distinction?

18 LOWELL GOUDGE: The train you validate
19 because you want to prove, with the prototype
20 vehicles, that the train performs as specified.
21 Once you've done that, then your production
22 tests are the train is built as designed. So
23 there's a distinct split.

24 With the signaling equipment for the
25 vehicle, you've got a certain amount of

1 signaling equipment, but it requires track
2 installation to validate the vehicle equipment
3 works. But for the wayside portion of the
4 signaling, that is a huge computer network with
5 Wi-Fi access continually along the whole
6 alignment that you have to validate all the way
7 along for the whole system to run.

8 So for them, the validation test is
9 the same as production test because you're
10 building one, you're building one system.

11 CHRISTINE MAINVILLE: I take it that
12 given the delays in the validation testing,
13 the -- most of the trains were, in terms of the
14 rest of the fleet, were already built or close
15 to being --

16 LOWELL GOUDGE: Yeah. I don't have
17 the exact production numbers as to how many
18 vehicles by date. I could go back and kind of
19 recreate it from when I approved safety, et
20 cetera, on each vehicle and approved the dynamic
21 test on each vehicle. But I don't have the
22 exact numbers for when, but, yes, there were a
23 large number of vehicles built before all the
24 validation was done.

25 CHRISTINE MAINVILLE: And so what were

1 the implications of that? What was the impact
2 of not doing any early validation testing?

3 LOWELL GOUDGE: Well, on the signaling
4 side, the design was not yet complete,
5 stabilized, finalized, so there was a very large
6 retrofit to be done to make the signaling work
7 because very clearly the signaling interface
8 wasn't defined and frozen in April of 2013. It
9 wasn't designed and frozen until -- just a
10 wire-to wire perspective, it wasn't designed and
11 frozen, and the final spec issued, until -- I
12 might be wrong by a year, but it was either
13 December of 2016 or December -- I think it was
14 December 2016, but by then we had already
15 committed to a large portion of all the cabling
16 and all the wire installs with our vendor.

17 So the cut-in was something very high
18 up in train numbers on the base contract. So
19 everything before that had to be retrofitted
20 with a very substantial mod.

21 CHRISTINE MAINVILLE: So there was a
22 lot of work to be done in a compressed timeframe
23 at the end?

24 LOWELL GOUDGE: Yes.

25 CHRISTINE MAINVILLE: And how long

1 would you normally want to do validation testing
2 for?

3 LOWELL GOUDGE: Not as long as it
4 took. Normally you would -- I would like to see
5 about six months as a validation for the vehicle
6 through all phases.

7 CHRISTINE MAINVILLE: How does that
8 compare to what happened here?

9 LOWELL GOUDGE: It was definitely
10 longer here.

11 CHRISTINE MAINVILLE: You mean it
12 was -- it stretched out because you could not --
13 you didn't have everything you needed to
14 complete it?

15 LOWELL GOUDGE: On our side I say it
16 stretched out because we didn't have everything
17 we needed.

18 The signal interface wasn't fully
19 developed and finalized to let the trains
20 operate for quite some time after we'd committed
21 to manufacture, so we didn't even start the
22 validation of that right away. So there were a
23 lot of things that got delayed out.

24 Even though we were running the train
25 and doing the train validation itself, the

1 integration of the signaling, the integration of
2 the radio, and some of the things that require
3 the full system, we couldn't do.

4 CHRISTINE MAINVILLE: And is it fair
5 to say that a number of performance issues arose
6 during that validation testing?

7 LOWELL GOUDGE: We had some
8 performance issues in terms of the adjustment of
9 the speed profile, the -- making sure we had the
10 braking profile correct. You have some software
11 bugs that you have to work through.

12 These are all things that happen sort
13 of normally as you go through the process. We
14 had to repeat some validation because we had
15 done the braking validation with the old
16 calipers and then had to repeat it for the new
17 calipers.

18 So there were some things, problems,
19 inefficiencies, et cetera, but whether it's more
20 or less than normal, it's very hard to say.

21 CHRISTINE MAINVILLE: But they were
22 discovered late in the day?

23 LOWELL GOUDGE: Some were discovered
24 late in the day. I'd say the caliper was one
25 that we'd made the decision I think in 2017,

1 mid-summer 2017, to do the change. So that's
2 rather late in the day because we'd been running
3 the train for eight months already when that
4 decision was made.

5 Other aspects of it, for example, with
6 the signaling, because that wasn't frozen,
7 really there were a lot of changes that had to
8 be made because of that. Again, that comes back
9 to the interface not being defined when it
10 should have been.

11 CHRISTINE MAINVILLE: And I'll get to
12 the interface shortly.

13 In terms of that sort of compressed
14 schedule to the end, what, if anything, was put
15 in place to mitigate the delay and the resulting
16 risk?

17 LOWELL GOUDGE: What we did on the
18 validation phase is that we started to increase
19 the number of vehicles to be used for validation
20 because the plan originally said you build two,
21 validate everything, and go on.

22 At the end of it I think we used seven
23 trains to do different parts of validation so
24 that we were running things in parallel.

25 Train one was built in Hornell and

1 some of the initial validation was done there
2 statically.

3 Train two was used for the dynamic
4 testing.

5 Train three was split in half and half
6 of it was sent to NRC Canada to do the
7 environmental testing and climate room.

8 I forget what train four was used for.

9 Train seven was used for the static
10 air flow tests and for the Thales testing.

11 I forget the whole list now, but we
12 split up the functions and had multiple tests
13 going on concurrently just to try and compress
14 the schedule back.

15 At that time, we did not have a
16 shortage of trains. We had trains that were
17 sitting completed so we could do other testing
18 with those trains.

19 CHRISTINE MAINVILLE: And did it lead
20 to some of the issues identified late in the day
21 not being resolved prior to RSA?

22 LOWELL GOUDGE: Some of it, yes.

23 CHRISTINE MAINVILLE: And there
24 were -- can you speak to that? I think there
25 were categories of retrofits and other fixes to

1 be done, some that were deferred post RSA. Can
2 you speak to that?

3 LOWELL GOUDGE: I can speak to some of
4 it. I wasn't involved in all the discussions,
5 but I think there were things that were
6 functionally necessary to make the train work as
7 a revenue service vehicle. There were other
8 things that were not necessarily functional, but
9 could have impacted safety, which I was involved
10 in directly. Then there were other things that
11 were nice to have, or might impact the
12 reliability, but not impact the ability to move
13 people.

14 And it was split into some categories.
15 So the ones that were necessary for service had
16 to be done. There were nine safety waivers that
17 we raised for different things that were found
18 that were noncompliant, or would be a problem
19 long term, but could be managed and mitigated in
20 the short term. And we generated waivers with
21 mitigations on how to do that, and those were
22 all, at the end, signed off by the City and
23 accepted. A large portion of those have now
24 been fully completed. I don't know the exact
25 number.

1 And all of this was documented on what
2 was called the "Minor Deficiency List". As I
3 say, I was specifically concerned about the ones
4 where safety was an issue or there was a
5 noncompliance related to a safety requirement
6 and how those were managed.

7 CHRISTINE MAINVILLE: And can you
8 speak to how those were managed?

9 LOWELL GOUDGE: Yeah. There's -- I
10 forget the whole list off the top of my head,
11 but we had two that were related to long-term
12 fire safety and the fire withstand of the
13 vehicle.

14 One of those was in the area over the
15 bogies where some additional insulation had to
16 be added and a fire resistant paint had to be
17 added, stroked (sic), improved upon. That was
18 something that was taken on and accepted on the
19 basis of the amount of heat that was available
20 from the materials in that area and the fire
21 withstand testing that we had done.

22 The other portion, under the low floor
23 section, was not viewed as a significant risk,
24 at least for Phase 1 where we were absolutely
25 certain there was no way to introduce a large

1 heat source under that portion of the vehicle.
2 That was not as clear in later stages, so it was
3 decided that that had to be completed before any
4 new phases opened, and that one is largely done.
5 I think there is one or two cars left for that
6 to be done.

7 We had an issue with the light in the
8 cab where it was designed to spec with the
9 dimmer, but there was no facility to turn the
10 overhead light off. And even at 10 percent
11 intensity at night, it produced glare on the
12 windshield. So the decision was made that the
13 breakers would be turned off on the cab light so
14 that it would not produce glare. That retrofit
15 is complete. I think that was done fairly early
16 by about the end of 2019.

17 There was two issues related to the
18 cab door. One issue was the original glass door
19 had a tendency to shatter or break so we
20 replaced that with an acrylic door. The acrylic
21 material itself is not the best material to be
22 used in large volumes because it burns, so we
23 had a waiver on that specifically.

24 There was a secondary issue that was
25 raised by the City with the lock on the cab

1 door, where although the City chose the lock and
2 approved the lock, they then came back and said
3 that it was too easy to buy on the open market.
4 They wanted something that was unique and
5 single-sourced so that it couldn't be bought by
6 somebody, because it posed a threat to the
7 driver.

8 And our perspective on that was that
9 that was a potential long-term risk, but in the
10 short term wasn't a risk because anybody that is
11 angry with the driver is not going to go on to
12 Amazon, order something, wait three days for it
13 to come in the mail before he attacks the
14 driver. So that threat is something that really
15 required a much more premeditated security risk,
16 which is actually outside the design constraints
17 of the vehicle.

18 So those were the kinds of things that
19 were on the safety list. There's one that was
20 on the safety list for what's called the gangway
21 or the bellows between the car body sections,
22 where the specification at the onset required a
23 completely flush gangway.

24 We took exception to that at the onset
25 and presented, in all the vehicle designs for

1 the vehicle design book, a recessed gangway.
2 And presented that, discussed it. There were
3 discussions from the City, and from others,
4 whether that gangway being recessed was
5 identifiable as different than a door for
6 visually impaired people. It was decided that
7 the colour was such that it was a grey between
8 white and black, was visually identifiable and,
9 therefore, did not pose a risk of a visually
10 impaired person choosing the gangway over a door
11 as the entry point, and the design was approved.

12 At some point later we were asked to
13 formalize all this with a waiver, which we
14 presented. And the City rejected it on the
15 basis that the specification required flush and
16 they wanted flush, even after they approved the
17 exterior design with the recessed gangway.

18 So we went back and forth with that
19 because it really should at that point have been
20 a change. We presented it openly at the front,
21 they approved it and then withdrew approval and
22 said that it was a safety risk for people, they
23 could fall into that space.

24 So at the end I don't know the
25 commercial status, but we agreed to add a third

1 bellows to the side of the vehicle to bring that
2 out, to mitigate the risk of a fall hazard
3 between the car body section.

4 The safety analysis had already been
5 done for the recessed gangway by OLRTC, so they
6 submitted that safety analysis and everybody
7 understood the risk.

8 And that retrofit is in process. I
9 don't know the extent of coverage at this point.

10 CHRISTINE MAINVILLE: And the waiver,
11 just so I'm clear, you mean that Alstom would be
12 prepared to waive --

13 LOWELL GOUDGE: The waivers for safety
14 were that we were requesting the City waive the
15 implementation for a period in time, but allow
16 the vehicles to go in revenue service on the
17 basis that everybody understood, not just Alstom
18 saying we want this, but everybody understood
19 the risk and the mitigations that were in place.

20 For example, on the gangway, if
21 somebody fell in, you have the platform viewing
22 system. You have people on trains that can
23 press an emergency button, et cetera. So the
24 risk of somebody falling into that space was
25 very little. The risk of them falling in and

1 not being observed was even much less, and it
2 was deemed acceptable to start service.

3 So it was only a permission to have a
4 temporary noncompliance, not a permanent waiver
5 as such.

6 CHRISTINE MAINVILLE: Did you -- well,
7 let me -- did Alstom have any concerns about the
8 readiness of the systems then at the time of
9 opening?

10 LOWELL GOUDGE: I can't say for Alstom
11 globally. I mean, a new system is a risk and a
12 concern because it's something you have never
13 done before. It's different than a system where
14 you're supplying vehicles into an existing
15 infrastructure.

16 I think everybody thought the schedule
17 and the operating tempo was aggressive. There
18 was virtually no time to really test the
19 operating tempo in advance of the whole system.

20 CHRISTINE MAINVILLE: Sorry, the
21 operating tempo?

22 LOWELL GOUDGE: Tempo. The frequency
23 of trains, the number of trains you're running.

24 The whole system, up until somewhere
25 around May of 2019, up until that point in time,

1 irrespective of the number of vehicles that were
2 built, finished in a state that might permit
3 use, up until around May of 2019, there was
4 never more than one train on a track at any one
5 time. Or if there were more than one train on a
6 track, that two parts of the track were
7 physically separated with barriers and devices
8 to prevent trains from passing between them.

9 So up until May 2019, we had never run
10 more than a couple of trains at any one time.
11 And from May to September, they cycled up to the
12 full service availability by doing different
13 types of simulations, et cetera. But there was
14 very little time to bring the system up to full
15 speed.

16 CHRISTINE MAINVILLE: And that was not
17 the way Alstom would typically go about that
18 phase in the --

19 LOWELL GOUDGE: I don't know how
20 Alstom, as a project company, would have done
21 it. My experience is you generally don't go
22 boom on day one with that, with very little
23 time. It was a very accelerated, in my view,
24 go-to service.

25 CHRISTINE MAINVILLE: And would you --

1 in your experience, what you've seen, is there
2 what you would call a burn-in period?

3 LOWELL GOUDGE: Normally on projects
4 I've been involved in, burn-in is not a specific
5 thing.

6 Normally trains go into service and --
7 especially on an existing fleet, you would
8 introduce trains into service. There might be a
9 period in time where failures are not counted
10 against fleet reliability to weed out, you know,
11 minor production errors or infant mortality,
12 things like that.

13 Sometimes you see a period where the
14 first X thousand miles, or kilometres, or hours,
15 whatever the contract is measured in, are not
16 counted. But it's not as common to see a period
17 where you have to do a certain number of
18 kilometres per train as a true "burn-in".

19 CHRISTINE MAINVILLE: It's not an
20 industry standard necessarily?

21 LOWELL GOUDGE: I don't think there's
22 really a standard on service requirements before
23 acceptance, to that extent.

24 CHRISTINE MAINVILLE: And just to be
25 clear, by "infant mortality", do you mean

1 unexpected events or issues?

2 LOWELL GOUDGE: Unexpected or things
3 that are predominant due to -- for lack of a
4 better definition, unexplained stresses that are
5 put on things during production that lead to a
6 very early failure.

7 If you study reliability statistics,
8 virtually every kind of device has what they
9 call a bathtub curve. You have a very high
10 failure rate in a very short period of time,
11 followed by a low and sustained failure rate
12 during it's global life, and then the curve goes
13 up at the end of life as end of life failures
14 take on.

15 So infant mortality defines that
16 period of time -- it may not be politically
17 correct even today as a term, but it defines a
18 period in time immediately after production
19 where parts have demonstrated, historically, a
20 higher than normal in-service failure rate.

21 CHRISTINE MAINVILLE: And in terms of
22 the concern about going -- having a full start,
23 and aggressive start, can you speak to whether,
24 in your experience, it's more common have a soft
25 start?

1 LOWELL GOUDGE: On existing fleets,
2 it's always a soft start because you deliver
3 trains serially. On new start systems, it's a
4 much harder and much sharper start because you
5 start from nothing and all of a sudden you go.

6 And a lot of times the -- there's a
7 lot of fanfare with a new start system. Usually
8 rides are free, for example. It's kind of the
9 ploy. Let's get people out, give them a ride
10 for free for a week. So you can have some very
11 hard times.

12 I mean, the first new start I was
13 involved with was in Vancouver. And the
14 vehicles were just absolutely packed, crush
15 loaded on the first day because everybody was on
16 for free.

17 CHRISTINE MAINVILLE: So what was --
18 is it fair to say that what was more concerning
19 to you, or Alstom, was less that it was a hard
20 start, or a full start, but more about how much
21 it was accelerated?

22 LOWELL GOUDGE: I think the
23 compression from when you only ran a single
24 vehicle to full service capacity was the bigger
25 issue.

1 CHRISTINE MAINVILLE: And can you
2 speak to what informed that acceleration in
3 terms of why there was not an ability to get
4 more time?

5 LOWELL GOUDGE: I think that's largely
6 something that was driven by the politics in the
7 City.

8 The original -- there was never -- in
9 the project, there was never a start date for
10 the system. There was only a
11 handover-to-the-City date.

12 But one would logically assume that
13 the handover to the City would be followed by
14 some period in time with the start. I mean,
15 it's not a big issue, but there was never a
16 clear, this is the deadline for start of
17 service.

18 But the politics were demanding. The
19 system is late. The system is late. When's it
20 going to start? So there was always a pressure
21 at some point to get a start.

22 CHRISTINE MAINVILLE: Did Alstom
23 expect then that the vehicles were going into
24 service shortly after RSA in September of 2019?

25 LOWELL GOUDGE: By that time I think,

1 yes, we did. I think it was pretty clear that
2 the handover would happen, the City would run
3 for a minimum of 12 or 14 days, or something
4 like that, and then go into service. That was
5 understood by that point in time.

6 CHRISTINE MAINVILLE: Was it
7 understood long before in terms of the
8 significance of the RSA date?

9 LOWELL GOUDGE: That I can't answer.

10 I think everybody knew that everybody
11 was late, but I don't think the real service
12 date was known long in advance. I think at some
13 point there was, for lack of a better
14 expression, a line in the sand was drawn and
15 everybody understood that that was the date they
16 were working to at that point. But that date
17 was never -- it clearly -- when the original RSA
18 date of May of 2018 was passed, that had never
19 been committed properly or acknowledged that the
20 system was going to be late until it was late.

21 I mean, if you look at the original
22 RSA date in the contract, it was in May of 2018;
23 the tunnel didn't open until September. I mean,
24 you knew it was going to be late, nobody perhaps
25 knew how much. But nobody was willing to say,

1 this is what it is and adjust your schedule
2 accordingly. We were always held, make it now.
3 Make it now. We want to start now. We want to
4 start now.

5 So you couldn't plan -- even knowing
6 the system was late, you couldn't plan that it
7 was late and rearrange your schedule to do
8 things more logically because nobody was willing
9 to commit. So everybody was towing the line of,
10 Oh, everybody's on time. Kind of like a liars'
11 poker.

12 CHRISTINE MAINVILLE: We'll speak more
13 about the delays, but I guess that's my
14 question. Did the RSA date ultimately come to
15 lose some meaning or significance for Alstom?

16 LOWELL GOUDGE: I don't think it lost
17 meaning or significance to us. If you take the
18 original RSA date of May 2018, yeah, that was --
19 by September 2018, that was viewed as completely
20 insignificant.

21 The bigger problem was more
22 frustrating because we never had a workable date
23 and could never have a proper dialogue of the
24 fact that everybody is late, everybody is
25 impacted, what is the proper date? What should

1 we plan for? So we were trying to meet
2 unrealistic dates all along, and that became
3 frustrating because the target kept moving.

4 FRASER HARLAND: And was that, would
5 you say, despite Alstom trying to have that
6 dialogue? Or, like, what was Alstom's role in
7 changing the RSA date and what was the response?

8 LOWELL GOUDGE: I can't speak to that
9 dialogue. That was a commercial discussion that
10 I wasn't privy to.

11 FRASER HARLAND: And so is that more a
12 project manager type person who would be
13 involved?

14 LOWELL GOUDGE: That is a project
15 manager type person. But I know from an
16 off-the-record discussion I had with one of my
17 counterparts at Thales, and one of the
18 counterparts at OLRTC, walking out of the
19 building after a long day, one of them turned to
20 another and said, Is it only me or is everybody
21 really late on this?

22 At the working level, we all knew it
23 was late.

24 CHRISTINE MAINVILLE: Okay. We'll
25 pause here and take a break.

1 -- RECESSED AT 10:43 A.M. --

2 -- RESUMED AT 10:55 A.M. --

3 CHRISTINE MAINVILLE: We could speak
4 now about the interface between the Thales and
5 Alstom systems.

6 Could I first ask, how was your
7 relationship with Thales defined in terms of
8 whether there was something in place, a
9 Memorandum of Understanding, or any other
10 parameters for the relationship?

11 LOWELL GOUDGE: My understanding,
12 although it may be incomplete on the contractual
13 side, is that we had no relationship whatsoever
14 with Thales. We had a requirement, I believe,
15 to offer support to all OLRTC with respect to
16 the development of a mutual interface with
17 Thales. But other than that, there was no
18 contractual requirement directly between us and
19 Thales.

20 Thales, in terms of what Alstom would
21 view it as, would be a free issue component by
22 our customer.

23 CHRISTINE MAINVILLE: Being OLRTC?

24 LOWELL GOUDGE: Yes.

25 CHRISTINE MAINVILLE: And what

1 experience does Alstom have working with
2 Thales' systems prior to this project?

3 LOWELL GOUDGE: We might have one or
4 two projects in Europe. And then I had been
5 involved very early on in three projects on a
6 vehicle with Thales equipment installed in the
7 1980s, that being the Toronto SRT, the Detroit
8 People Mover, and the BC Transit Expo Line for
9 SkyTrain. A little bit of work, but not much
10 with the Bangkok project, again with Bombardier
11 at the time.

12 CHRISTINE MAINVILLE: And was this an
13 integration of Alstom trains and Thales
14 signaling systems?

15 LOWELL GOUDGE: No. The Bombardier
16 projects, it was a Bombardier, or before
17 Bombardier, UTDC, vehicle where GEC, or now
18 Alstom, was supplying only the traction
19 equipment.

20 CHRISTINE MAINVILLE: So was this the
21 first time that Thales' signaling system was
22 being integrated into Alstom trains?

23 LOWELL GOUDGE: First or second.
24 There might have been one in Europe. I don't
25 know exactly.

1 But the integration itself shouldn't
2 be a difficult function. The Thales equipment
3 only has to supply a certain number of signals
4 to the train for the train as a whole. And I
5 don't believe those signals changed
6 significantly from one project to another, so
7 it's more a question of them not having that
8 whole definition at the onset.

9 CHRISTINE MAINVILLE: What do you mean
10 by the "definition"?

11 LOWELL GOUDGE: Well, to be clear, the
12 train receives an effort or thrust demand, a
13 motoring and brake train line, door control
14 commands, and then there might be one or two
15 other signals, but it's a very limited function.
16 The ATC system is designed to take the train
17 from A to B with no other inputs. So it
18 shouldn't be a significant issue.

19 The one thing that Thales was
20 requesting, that we never understood and never
21 got a full answer to, was their requirement to
22 have a separate set of lines to look at train
23 integrity instead of deriving the integrity of
24 the train from the existing system. And I
25 believe that was a capacity problem or a

1 computing problem on their part and, also, we do
2 it this way so we want this irrespective of if
3 it's necessary.

4 But the thing was that the full system
5 design, as I say, was not available in 2013 when
6 it should have been. I don't know -- I don't
7 know whether that was Thales' requirement to
8 OLRTC or not. All I know is that that was the
9 date it was guaranteed to us.

10 CHRISTINE MAINVILLE: You mean Thales'
11 specifications?

12 LOWELL GOUDGE: Yes, their interface
13 specifications. I have no idea what their
14 deliverable time scale was to OLRTC and whether
15 the schedules actually aligned.

16 CHRISTINE MAINVILLE: Right. Did you
17 come to understand that Thales' design process
18 is an iterative one?

19 LOWELL GOUDGE: By iterative you mean
20 serial in terms of one built upon the next?

21 CHRISTINE MAINVILLE: In stages. To
22 be designed in stages with a preliminary design
23 working -- interfacing with Alstom to eventually
24 get to a final design?

25 LOWELL GOUDGE: It became obvious that

1 that is what was happening, but that's not what
2 we were expecting.

3 CHRISTINE MAINVILLE: Right. Alstom's
4 contract provided for Thales to -- or OLRTC, to
5 be more accurate, to provide to Alstom a
6 finalized CBTC specification by April 26, 2013,
7 correct?

8 LOWELL GOUDGE: Correct.

9 CHRISTINE MAINVILLE: And in terms of
10 your experience I take it, with other signaling
11 systems, is it not -- is it not typically an
12 iterative process? What's your experience in
13 that regard?

14 LOWELL GOUDGE: For me it should not
15 be an iterative process.

16 If you look at New York City, for
17 example, on the R160 fleet, which is the last
18 project I worked on with New York, it required
19 that the trains be CBTC ready, which meant you
20 drop a box in, hook up the components and it
21 should work. And aside from a couple of wiring
22 errors and an antenna cable that was bent
23 incorrectly, when we put the Siemens equipment
24 on for one of the lines in New York, the vehicle
25 interfaced cleanly with the ATC as a drop-in,

1 having had no meetings.

2 CHRISTINE MAINVILLE: Isn't there a
3 need to integrate different train behaviours
4 from Alstom and Thales and make sure that they
5 align?

6 LOWELL GOUDGE: There's a little bit
7 of tuning, and it's really only the tuning when
8 you want to place the train at a platform.
9 Because you're attempting to hit a target that I
10 think in Ottawa it's something like plus/minus
11 one and a half metres, with a basically
12 100 percent accuracy.

13 I've seen in other systems that use
14 different technology it be plus/minus 30 or 40
15 millimetres with a 99 percent reliability rate.

16 So, again -- and that's a technology
17 choice. The current technology has a wider
18 margin because it's not as accurate as, for
19 example, the SkyTrain technology, but that's
20 hugely expensive on the infrastructure.

21 But aside from tuning the stopping
22 point, and stopping on the platform, basically
23 the system runs autonomously. It shouldn't --
24 it doesn't need to know everything about the
25 vehicle to make it run.

1 FRASER HARLAND: Just on that point,
2 is it your position then that Thales had
3 everything that was required -- that it required
4 in order to produce a finalized CBTC spec? I
5 understand there were issues even related to
6 space and train geometry. So if Thales didn't
7 know that, then how could they possibly have a
8 final spec for Alstom?

9 LOWELL GOUDGE: They knew from the
10 beginning, and they told us in one of the very
11 first interface meetings what the maximum
12 envelope of their equipment would be. And I
13 think it was 1013 millimetres in height by a
14 width by a depth. And that was defined absolute
15 because we needed that number so that we could
16 do the cab design, because the equipment is fit
17 in the cab.

18 And they knew all the components they
19 were integrating into their equipment by that
20 time. They had the data sheets for every rack
21 that went into the equipment.

22 They knew what they had to integrate
23 by that time so there shouldn't have been any
24 real issue about them not knowing the volume.

25 CHRISTINE MAINVILLE: Did Alstom not

1 change its train design, including in respect of
2 where -- whether this system -- the CBTC system
3 would be in the cab or outside?

4 LOWELL GOUDGE: Our design was this
5 would always be in the cab.

6 CHRISTINE MAINVILLE: Could --

7 LOWELL GOUDGE: Having said that, at
8 one point, and I think it was OLRTC that
9 actually asked, if we could put it on the roof.
10 And we looked at that. In the end that was
11 decided by others not to be followed, but it was
12 something that was -- we were asked to look at,
13 if we could put it on a box on the roof.

14 CHRISTINE MAINVILLE: And what was the
15 reason for looking at that possibility?

16 LOWELL GOUDGE: I think some of it was
17 to do with the volume of their equipment.
18 Which, from talking with others since, is the
19 largest of anybody's ATC equipment.

20 Some of it was concerns over the
21 amount of space that the cubicle took in the cab
22 potentially restricting the driver's ability to
23 look backwards on that side on the cab.

24 The cab is cramped. It's very tight
25 to fit everything that's in the cab and

1 accommodate even the largest person that might
2 get in the cab. It's cramped. But in the end,
3 the decision was to stay with the equipment
4 where it was.

5 But it was reviewed at one point to
6 look at putting it on the roof.

7 CHRISTINE MAINVILLE: So that was not
8 initiated by Alstom?

9 LOWELL GOUDGE: No.

10 CHRISTINE MAINVILLE: No?

11 LOWELL GOUDGE: No.

12 CHRISTINE MAINVILLE: Would an
13 unfinalized train design by Alstom have
14 prevented Thales, though, from being able to
15 finalize its ICD?

16 LOWELL GOUDGE: It should not have
17 been. As I say, they know the signals that they
18 require. And from the perspective of how the
19 ATC equipment goes into the train, it should not
20 have.

21 I think the fundamental problem with
22 Thales, and I don't know where the problem --
23 where the cause of the problem began, but the
24 fundamental problem with Thales was that their
25 expectation in the contract was to deliver a kit

1 of parts that somebody else would assemble. Our
2 expectation in the contract is we would receive
3 a fully-tested rack that would install -- it was
4 self-contained and installed in the vehicle.
5 Yes, there were some other peripherals that had
6 to be installed separately, but the bulk of the
7 equipment was one big rack fully tested.

8 CHRISTINE MAINVILLE: And is that
9 because that's Alstom's experience in respect of
10 other ATC equipment?

11 LOWELL GOUDGE: That's our experience
12 with our -- as a car builder in receiving our
13 own signaling.

14 And, as I say, in New York where there
15 was a space and mechanical outline, and with the
16 exception of a little bit of tolerancing on bolt
17 holes, the box just dropped straight in, it
18 screwed down to the car, and that was it. You
19 hook up the connectors and you're done.

20 So our expectation was to receive a
21 drop-in unit. And I don't believe that's -- and
22 fully tested. And I don't believe either of
23 those things is outside of industry norm.

24 CHRISTINE MAINVILLE: And Thales
25 eventually was required to provide personnel to

1 assemble and test the rack, correct?

2 LOWELL GOUDGE: We received them
3 assembled. I don't believe we received them
4 tested ever, and their -- what they call PICO,
5 or preliminary installation and check out,
6 required us to do a lot of measurements
7 internally, that would only be necessarily on
8 the premise that the equipment was not fully
9 tested when it was sent.

10 I don't know who did the assembly and
11 who did what level of testing they received.

12 CHRISTINE MAINVILLE: So you don't
13 know whether Alstom ultimately did the static
14 PICO testing relating to the vehicles?

15 LOWELL GOUDGE: We ultimately did the
16 static PICO testing to a mutually-agreed
17 procedure. I know it was not everything that
18 Thales was asking for. And, as I say, I do not
19 know who did the assembly and whatever testing
20 was done on the Thales components. It was not
21 Alstom.

22 CHRISTINE MAINVILLE: Okay. Did -- I
23 take it Alstom came to understand that -- fairly
24 early on that Thales was going to be delivering
25 something in parts not the way that Alstom

1 expected it, correct?

2 LOWELL GOUDGE: No.

3 CHRISTINE MAINVILLE: No?

4 LOWELL GOUDGE: We didn't know it was
5 going to come in parts until we received the --
6 a package of documentation. And I don't recall
7 when it was, sometime between November 2015 and
8 of August 2016, that included their installation
9 instructions, which started at "all the
10 individual parts". And it was at that point
11 that it became aware that Thales' contract and
12 ours were not aligned because they were
13 delivering a kit of parts and we were expecting
14 a fully-assembled tested rack.

15 CHRISTINE MAINVILLE: Right. And so
16 if we can go back a little bit. Was there any
17 early thought put into the systems integration,
18 the Thales and Alstom systems integration?

19 LOWELL GOUDGE: Due to the lack of a
20 spec, we started pushing for meetings. And the
21 first of those happened in about June of 2013,
22 because we didn't have a spec. So we started
23 having meetings and discussions at that point in
24 time.

25 So that's when we started getting

1 things defined at least to work with, like, how
2 big is it? What's the size of the rack? That
3 kind of thing.

4 But -- and they went through one or
5 two evolutions of the specification up until
6 about August of 2013. And then we never got a
7 formal release of the specification after that
8 for several years.

9 CHRISTINE MAINVILLE: Should there not
10 have been, though, even prior to that, planning
11 around the systems' integration piece at the
12 contracting phase or the design phase?

13 LOWELL GOUDGE: Well, as I say, we'd
14 started -- because we didn't have a spec, we
15 started having meetings in 2013. I don't know
16 what was, in total, conveyed, understood,
17 whatever, about the volume of the equipment
18 prior to contract. I was not party to those
19 discussions.

20 I'm sure something took place. I
21 don't know what the something really in total
22 consisted of.

23 CHRISTINE MAINVILLE: Do you know what
24 the plan was in terms of who was to oversee this
25 integration?

1 LOWELL GOUDGE: My understanding was
2 that because Thales was subcontracted to OLRTC,
3 and Alstom was contracted to OLRTC, OLRTC was
4 responsible to do the integration.

5 We had no contractual relationship
6 whatsoever with Thales.

7 CHRISTINE MAINVILLE: Did OLRTC fully
8 perform that role?

9 LOWELL GOUDGE: No. They hosted the
10 function, but they didn't drive the function as
11 such. It basically -- if I was to sort of
12 metaphorically describe how it happened, their
13 concept of system integration was put the two
14 suppliers in the room and they'll figure it out.

15 CHRISTINE MAINVILLE: And there
16 started being meetings and workshops between
17 Alstom and Thales, correct?

18 LOWELL GOUDGE: Yes.

19 CHRISTINE MAINVILLE: What was OLRTC's
20 role in those workshops?

21 LOWELL GOUDGE: For the first three
22 months, they had a contract administrator.

23 CHRISTINE MAINVILLE: Which is not a
24 systems' integrator?

25 LOWELL GOUDGE: No.

1 CHRISTINE MAINVILLE: And who was
2 that?

3 LOWELL GOUDGE: Alex Turner.

4 CHRISTINE MAINVILLE: Did OLRTC
5 understand that there was a need for an actual
6 systems' integrator?

7 LOWELL GOUDGE: Ultimately, yes, but
8 they didn't fill the position of Director of
9 System Integration until January of 2014.

10 CHRISTINE MAINVILLE: Do you know why
11 that was?

12 LOWELL GOUDGE: I know why they filled
13 the position, they realized they had a hole.
14 But I don't know why they didn't realize
15 beforehand they needed somebody to look at it.

16 I think, from a speculation point of
17 view, given the bulk of the work at the time was
18 already entered toward construction, they didn't
19 perceive perhaps that the system integration
20 work had to be done on the vehicle, even though
21 the vehicles weren't due to be started for a few
22 years. They didn't appreciate the timeline
23 necessarily, but that's only speculation.

24 CHRISTINE MAINVILLE: And did Alstom
25 raise concerns or requests about systems

1 integration prior to then?

2 LOWELL GOUDGE: There were, I believe,
3 lots of letters contractually with respect to
4 the failure of having a final spec in time.
5 There were multiple change orders put in that
6 were escalating over time for the first two
7 years of the project, due to the failure to have
8 a spec to integrate to on the 26th of April,
9 2013. It was an ongoing claim.

10 CHRISTINE MAINVILLE: And how did
11 OLRTC resolve that delay in terms of Alstom
12 receiving the specs it needed?

13 LOWELL GOUDGE: Not really all that
14 well. As I say, they just assumed that we would
15 take -- if you had a meeting, even if there was
16 a commitment to come out with a new version of
17 the specifications such that we could look at
18 the evolution and work to that, we never got
19 them. We got draft after draft after draft with
20 no commitment of a finalized spec for two to
21 three years.

22 They just didn't appreciate that we
23 needed something that didn't say "Draft" to
24 design to.

25 I don't know if that was a contract

1 problem with them or what it was, between OLRTC
2 and Thales, I don't know.

3 CHRISTINE MAINVILLE: You were the
4 main person at Alstom's side at these workshops
5 and meetings, correct?

6 LOWELL GOUDGE: Yes.

7 CHRISTINE MAINVILLE: So was that
8 conveyed that you were waiting on a finalized
9 ICD?

10 LOWELL GOUDGE: All the time.

11 CHRISTINE MAINVILLE: Were agreements
12 arrived at in the context of these meetings that
13 the parties expected would be acted upon?

14 LOWELL GOUDGE: We would come to
15 technical understandings where they would say,
16 This is how we're going to do something to -- at
17 one point they requested that everybody that was
18 at the meeting sign the minutes, as trying to
19 impose it as a contractual, This is how it's
20 going to be done. But we never ever got
21 documentation to substantiate that in follow-on
22 releases of the specification.

23 So they were trying to force us to
24 work with minutes of meetings as the only
25 traceability to requirement specifications.

1 CHRISTINE MAINVILLE: And did Alstom
2 convey concerns about that?

3 LOWELL GOUDGE: I believe so.

4 CHRISTINE MAINVILLE: Well, --

5 LOWELL GOUDGE: In terms of the lack
6 of a final spec. It was -- as I say, we
7 received four different revisions of Rev3 of
8 their spec. How do you work with four different
9 versions of the same document?

10 CHRISTINE MAINVILLE: How would you
11 describe Alstom and Thales' collaboration?

12 LOWELL GOUDGE: Frustrating.

13 CHRISTINE MAINVILLE: Would earlier
14 systems integration planning have largely
15 facilitated that or addressed those issues, do
16 you think?

17 LOWELL GOUDGE: It should have. It
18 probably would have, but, again, I don't know
19 and I really don't know what Thales was
20 contracted to do.

21 CHRISTINE MAINVILLE: Right.

22 LOWELL GOUDGE: There were -- in
23 off-the-record discussions, there were comments
24 about the fact that they only ever owed three
25 versions of their specification.

1 Well, if it's not developed and they
2 keep doing it piecewise, that might suit their
3 contractual requirements to release, but that
4 doesn't help us. I don't really think the two
5 contracts were aligned.

6 CHRISTINE MAINVILLE: And Alstom
7 didn't have visibility into what Alstom's own
8 expectations were based on their subcontract,
9 correct?

10 LOWELL GOUDGE: We knew what our
11 expectations were. We had no visibility of what
12 Thales' were.

13 As I say, it was rumoured they had a
14 completely different set of terms and
15 conditions, but that was something that was
16 commented by the Thales project manager over a
17 coffee in between sessions of the meeting, not
18 something that was tabled.

19 CHRISTINE MAINVILLE: So how did
20 Alstom work with OLRTC to resolve these issues?

21 LOWELL GOUDGE: We put in claim after
22 claim after claim for change. That's all we can
23 do.

24 CHRISTINE MAINVILLE: And do I
25 understand that Alstom, not having a finalized

1 spec, reverted to either the first iteration of
2 the ICD or its --

3 LOWELL GOUDGE: I believe we froze
4 everything to the Rev2.

5 CHRISTINE MAINVILLE: ICD Revision 2.

6 LOWELL GOUDGE: Yes, ICD.

7 CHRISTINE MAINVILLE: Was that clear
8 to OLRTC and Thales that Alstom was -- pending a
9 finalized ICD, it was working towards those
10 specs?

11 LOWELL GOUDGE: I can't honestly say
12 whether it was as clearly as you've stated put
13 to them or not.

14 CHRISTINE MAINVILLE: You did not --
15 you don't recall personally expressing it
16 directly in that way during the workshops and
17 meetings?

18 LOWELL GOUDGE: We always requested,
19 when are we getting the final version? But I
20 don't think -- I don't know if we said, We're
21 not working at all, explicitly.

22 We came to understand technically what
23 they were doing, with the full expectation that
24 after the meeting, a revision was coming.

25 And the problem was you'd go to the

1 meeting in good faith and get nothing back.

2 CHRISTINE MAINVILLE: Did you
3 understand that Thales was at least at times
4 waiting on information or data from Alstom?

5 LOWELL GOUDGE: They were probably at
6 some point in time, but that was much more a
7 later issue in terms of -- when you look at the
8 system, you have the electrical interfaces. How
9 many wires, et cetera? How big is the box? The
10 mechanical, and then you have the
11 communications. Communications is all done by
12 software.

13 So at one point we gave them all of
14 our standard protocols for the network they were
15 communicating over, and we gave a first copy or
16 a second copy of the interface controls that we
17 thought we were getting, and in which message
18 those variables would be passed back and forth,
19 et cetera.

20 And that went through, I'm not sure if
21 it's four or five revisions over time as things
22 were consolidated. We were going to -- we asked
23 for things. They said, No, we can't give that.
24 We can give something else, et cetera. So there
25 was some give and take there, but that was all

1 on the software side.

2 The hardware, as I say, we needed to
3 have that absolutely finalized and that wasn't
4 finalized until the summer of 2016.

5 And the document we received that
6 reflected that was, I think, in November of
7 2016.

8 CHRISTINE MAINVILLE: And do you know
9 why Thales was delayed on this?

10 LOWELL GOUDGE: Other than they hadn't
11 finalized their design, no.

12 CHRISTINE MAINVILLE: So you didn't
13 know why they hadn't finalized the design?

14 LOWELL GOUDGE: No, I don't. The only
15 thing is that really I guess they were not
16 accustomed to defining absolute, at their
17 outputs, everything that they needed.

18 We had -- at least once or twice, we
19 had signals either added to or removed from, the
20 signals that we were going to get from the ATC,
21 and they reassigned relays within their
22 equipment to different function.

23 In the end, my sort of cynical view of
24 it was that they designed their kit, but all the
25 wiring to get it to work was done on our side of

1 the train.

2 So they gave a bunch of uncommitted
3 relays and then we did the connections on our
4 side through terminals and put it back in
5 instead of them wiring the function. It made
6 their rack more complex, it made the train
7 wiring more complex, but allowed them to do what
8 they called their first article inspection in
9 2014 and say, Here's the rack, but the functions
10 weren't defined yet. Because all the functions
11 were wiring that they hadn't yet worked out, but
12 had to be done on our side of the train.

13 So their schedule was completely
14 misaligned because they had their first article
15 equipment in November of 2014 to a finalized
16 spec that wasn't released until November of
17 2016.

18 CHRISTINE MAINVILLE: So how did
19 Alstom mitigate these -- or plan --

20 LOWELL GOUDGE: We couldn't. We
21 couldn't. How do you plan for something you
22 don't know for two years?

23 CHRISTINE MAINVILLE: Was there
24 information or data that Alstom was reluctant to
25 provide to Thales?

1 LOWELL GOUDGE: To my knowledge, no.

2 CHRISTINE MAINVILLE: Were there any
3 implications of Thales being a competitor to
4 Alstom?

5 LOWELL GOUDGE: Not that I was aware
6 of. I mean, at one point one of Alstom's parent
7 companies owned Thales, so I don't know how they
8 viewed the competition perspective of it.

9 CHRISTINE MAINVILLE: If I can give
10 you an example of the IO signal diagram, is it
11 accurate to say that Alstom did not incorporate
12 Thales' changes to the ICD in its own design as
13 it relates to that?

14 LOWELL GOUDGE: We didn't incorporate
15 the changes until we got the final
16 specification.

17 And at that -- the fundamental problem
18 with their IO diagram, aside from the train
19 integrity line, which was something we never
20 understood why they couldn't determine in
21 another method.

22 The fundamental issue was in their IO
23 diagram they specified that we gave them X
24 number of DC power feeds. I think there's, in
25 total, 7 circuit breakers that we have dedicated

1 to the ATC equipment. If you supply 7 circuit
2 breakers, you expect to give 7 power and seven
3 return. You don't expect to wire the 10, 12,
4 14 points daisy chained in your side and take 14
5 separate wires to the rack for them. You expect
6 all that connection done on their side. They
7 didn't. They expected us to do all that
8 connection. It added hundreds of wires into our
9 rack.

10 CHRISTINE MAINVILLE: You said that
11 OLRTC brought in a systems integrator in January
12 of 2014, that being Jacques Bergeron, correct.

13 LOWELL GOUDGE: Yes.

14 CHRISTINE MAINVILLE: And how did he
15 facilitate the integration then as of that point
16 in time?

17 LOWELL GOUDGE: Jacques Bergeron to
18 give him credit, tried to get things moving and
19 ultimately made decisions based on what he was
20 presented with on both sides.

21 A large number of the times the cost
22 of -- at that point, accommodating Thales versus
23 us wound up with us having to do the changes
24 irrespective of who was responsible. Only
25 because Thales would raise their flag and say,

1 Oh, this was -- this is in a past safety case.
2 We don't want to change it or we have to redo
3 that, and they would have an exorbitant price.
4 Therefore, it always became our job to do the
5 changes, but he, at least, attempted to move
6 things along.

7 CHRISTINE MAINVILLE: From that point
8 in time, did OLRTC take the system integration
9 responsibility more seriously?

10 LOWELL GOUDGE: They took it more
11 seriously, but I think it was handicapped by
12 whatever commercial agreement they had with
13 Thales, and, again, that's only a speculation.

14 I just think that they were stuck in a
15 position where they had Thales on one side
16 claiming delays, and us on the other side and
17 they chose the lesser of two evils.

18 CHRISTINE MAINVILLE: It appears,
19 based on what you know, a fundamental flaw at
20 the outset of the process, correct?

21 LOWELL GOUDGE: Yeah. To me somewhere
22 the two schedules were just wholly misaligned
23 and the requirements were misaligned.

24 CHRISTINE MAINVILLE: Did OLRTC have
25 the experience necessary to do the systems

1 integration?

2 LOWELL GOUDGE: I don't know all the
3 people involved at the RTG level well enough,
4 because it starts with Rideau Transit Group.

5 Every one of the new phase of transit
6 developments is going under the 3P,
7 private-public partnership sort of motto where
8 you hire a company to design, build, operate, or
9 not, for a portion of time, maintain, and then
10 transfer to the original purchaser.

11 Every one of these projects is a mix
12 of companies each with a skill set. OLRTC was a
13 company formed to execute that portion of the
14 contract for RTG, so it was a new entity itself.

15 And every new 3P partnership is a new
16 mix of players because you work with somebody,
17 then you do a project with them, then you start
18 new partnerships, or whatever, with another
19 team. You bid the next one.

20 So you wind up with a large number of
21 companies that are good at some portions, like
22 SNC is a reasonably good engineering firm, so
23 they're part of the RTG makeup, but how they
24 support it? I don't know how they viewed that
25 overall.

1 CHRISTINE MAINVILLE: Do you know if
2 SNC was the entity responsible for providing a
3 system's integrator?

4 LOWELL GOUDGE: SNC was the
5 engineering portion of the RTG project, to my
6 understanding.

7 CHRISTINE MAINVILLE: Do you know if
8 they were to fill that role, or sought to fill
9 that role?

10 LOWELL GOUDGE: Not really.

11 CHRISTINE MAINVILLE: Did Alstom
12 interface with RTG, EJV, and I don't know to
13 what extent you would have distinguished them,
14 but they were the design engineers on the
15 project?

16 LOWELL GOUDGE: We dealt with one or
17 two people, or at least I did, that were RTG,
18 but mostly we dealt with people that wore the
19 hat of OLRTC, whether they were seconded from
20 SNC or whether they were OLRTC employees, I
21 don't know, but they were representing largely
22 as OLRTC.

23 CHRISTINE MAINVILLE: Could you speak
24 to OLRTC's management of the project generally?

25 LOWELL GOUDGE: Not really. For me

1 it's really hard to say how much they managed or
2 whether they just acted as a post office box, a
3 letter came in and a letter went somewhere. I
4 didn't really see much of a management style
5 other than that.

6 Now, I didn't go to all the meetings.
7 I didn't go to all project meetings, et cetera,
8 so I can't say whether that's a fair assessment
9 or not.

10 But they seem to act more as a mailbox
11 and they would disposition letters out, or just
12 outright say, no, and play the -- respond
13 contractually, but not substantively on a
14 technical issue.

15 CHRISTINE MAINVILLE: Do you have any
16 sense of whether they appeared to be
17 sufficiently resourced?

18 LOWELL GOUDGE: My impression is
19 under-resourced.

20 CHRISTINE MAINVILLE: Is it accurate
21 to say that Alstom and Thales ICDs never ended
22 up fully speaking to each other? Being fully
23 integrated?

24 LOWELL GOUDGE: No, they are fully
25 integrated. The trains go down the track, the

1 doors open and close, the trains are operating
2 within their safety requirements, et cetera.
3 So, yes, they ultimately got integrated.

4 CHRISTINE MAINVILLE: Is it possible
5 though that some behaviours may not be reflected
6 in, for instance, Thales' ICD if they're unaware
7 of them?

8 LOWELL GOUDGE: Oh yeah.

9 CHRISTINE MAINVILLE: And am I right
10 that this -- there's some example of this
11 happening, for instance, in terms of the
12 emergency brake tests, which over time it was
13 identified and required a change in the
14 software?

15 LOWELL GOUDGE: It's no so much an
16 emergency brake test. If I understand what
17 you're asking specifically, Thales programmed in
18 a periodic testing of their equipment, which
19 includes testing the response of the system to
20 emergency brake as part of their safety
21 validation.

22 I think the first time that that was
23 discovered the train was actually on the main
24 line and it disabled the train. Because they
25 asked for, ultimately, five emergency brake

1 applications within two minutes, and on our
2 power scheme if you open the circuit breaker
3 more than three times in ten minutes it locks
4 out because there's a risk of a much worse event
5 happening due to the gases that can build up in
6 the circuit breaker. And it's a standard
7 industry practice to have that kind of lockout.

8 We didn't know they were doing the EB
9 test until the train locked out on the main
10 line. That's still not resolved. It's being
11 managed by leaving the train parked every night
12 in emergency brake.

13 CHRISTINE MAINVILLE: Was this
14 around -- during the testing phase that this
15 arose?

16 LOWELL GOUDGE: I don't recall if it
17 was in the system testing or if it was in the
18 first week of revenue service. It was around
19 that time.

20 CHRISTINE MAINVILLE: It may have led
21 to some performance issues?

22 LOWELL GOUDGE: Well, it led to a
23 delay on the main line because the train was
24 stranded. And, as I say, there's nothing even
25 today in Thales' document to say that they

1 implement an auto test and that this is what
2 we're doing on the train lines.

3 CHRISTINE MAINVILLE: Do you recall
4 another issue about a software issue that led to
5 a passenger being momentarily trapped in the
6 door?

7 LOWELL GOUDGE: Yup. The -- I think
8 it was version 7 of their software, or what they
9 call Build 7, and I think it was Build 7. Where
10 I don't know what they were attempting to
11 achieve but they changed the functionality of
12 the doors. And -- the ATC system controls the
13 doors, and there's a reason for that. The ATC
14 system knows, to a very high safety level, where
15 the train is all the time, it knows to within a
16 metre or so all the time on the track everywhere
17 where the train is. It knows the platform it's
18 at, it knows which side of the doors are safe to
19 open. So they control the doors, the door
20 enable, everything.

21 In Version 7 instead of holding the
22 door enable when the driver leaves the cab to
23 change ends, they changed it to they took the
24 door enable away when the driver took the
25 driver's key out. And when you take away door

1 enable the doors closed and they closed on a
2 passenger. Now, they closed and they stopped
3 but the passenger was still kind of stuck in the
4 door, not in physical harm but just plain stuck.

5 CHRISTINE MAINVILLE: It's fair to say
6 that the integration of the two subsystems was
7 ad hoc?

8 LOWELL GOUDGE: Yup.

9 CHRISTINE MAINVILLE: And were there
10 any, what you might call, unnatural divisions of
11 responsibility as between Thales and Alstom in
12 the contracts?

13 LOWELL GOUDGE: I don't know what
14 Thales' divisions and responsibilities are so I
15 can't answer that.

16 My perception is that both Thales and
17 Alstom are attempting to do the same thing from
18 time-to-time, in terms of safety, and that leads
19 to some problems.

20 Thales believes they're responsible
21 totally for safety; Alstom believes we're
22 responsible totally for safety, to some extent.
23 So both parties try and do things. And doors is
24 a great example of where that conflict comes in.

25 Thales is responsible to enable the

1 doors. Alstom is responsible to make the train,
2 as a whole, safe, which includes things like not
3 moving with doors open. Irrespective of who is
4 responsible for enabling the doors we don't let
5 the train move if the doors are open.

6 But Thales also are looking for a
7 change of door status to say the train is safe
8 to move, so they're trying to do the same
9 function we're doing. And that's, I believe,
10 partly because some of their historical
11 documents and their safety case are built around
12 certain functions that may not be the same as
13 what they're installing into today.

14 CHRISTINE MAINVILLE: Was there -- I
15 mean, there was concern on Alstom's part about
16 it being responsible for installing Thales'
17 equipment, was there not?

18 LOWELL GOUDGE: There was some concern
19 expressed in terms of not so much installing
20 their equipment but doing what we consider to be
21 factory testing of their equipment, that's a
22 concern because we're not the supplier.

23 And we shouldn't be -- in the vehicle
24 phase of installing equipment we shouldn't be
25 having to test inside their equipment, so that's

1 a concern.

2 CHRISTINE MAINVILLE: And was that in
3 Alstom's subcontract that it was to do that?

4 LOWELL GOUDGE: I don't know if that's
5 clearly enough defined. As I say, our
6 expectation at the vehicle level is we received
7 a fully-tested piece of equipment. We knew that
8 we would do some static -- what they call static
9 PICO testing to make sure that we're hooked up
10 correctly, but the detail of what Thales was
11 asking us to do in the static PICO is well
12 beyond what any other signaling company would
13 expect a vehicle builder to do.

14 And I'm basing that on my experience
15 in New York with Siemens and my knowledge of how
16 we work with our own signaling equipment.

17 CHRISTINE MAINVILLE: So there's
18 nothing else that you recall in terms of, you
19 know, looking at the contract and what Alstom
20 was expected to do that jumped out at you as not
21 being something that you thought Alstom should
22 be responsible for?

23 LOWELL GOUDGE: With Thales? No, I
24 don't think so.

25 CHRISTINE MAINVILLE: Please speak to

1 testing and commissioning. Can you talk about
2 what the original plan was for that?

3 LOWELL GOUDGE: To the best of my
4 knowledge, yes. I wasn't involved in the detail
5 of the planning or testing and commissioning,
6 but my understanding was that the initial plan
7 for the qualification testing, as I said, it was
8 originally to be done in France because the
9 vehicles were going to be built in France.

10 When it moved that was then split to
11 some testing on the first vehicle in Hornell and
12 then the testing in Pueblo, Colorado, or at the
13 Ottawa site, and ultimately it was the Ottawa
14 site.

15 From the production testing, given
16 that the plan was to always build the production
17 vehicles in Ottawa, the production testing was
18 always in Ottawa.

19 CHRISTINE MAINVILLE: Were there
20 changes to the production testing plan?

21 LOWELL GOUDGE: There were evolutions
22 over time but, largely, no. It was -- I mean,
23 other than building it up -- the plan itself was
24 always it would be tested in Ottawa because that
25 was the production area.

1 There were changes in the procedure
2 from time-to-time as, for example, the schematic
3 change, so if we did a change in the schematic
4 you had to implement some changes in test.

5 Remember what I said initially,
6 production testing is testing that the product
7 is as designed. If you change the design you
8 have to change production tests.

9 But in terms of global planning, no,
10 the planning was always in Ottawa.

11 CHRISTINE MAINVILLE: Did the schedule
12 for it change? The testing and commissioning
13 schedule?

14 LOWELL GOUDGE: For the qualification
15 testing, yes, there were regular updates to show
16 the status of what would be done, et cetera; for
17 production, I don't know. I don't know in
18 detail the production schedule. I wasn't really
19 involved in that.

20 CHRISTINE MAINVILLE: Do you know what
21 consideration there was for seasonal conditions
22 in the testing and commissioning plans?

23 MICHAEL VALO: Sorry, Christine, I
24 don't meant to interrupt. I just want to make
25 sure that you and Lowell are talking about the

1 same thing. I hear you asking about testing and
2 commissioning, and I hear Lowell talking about
3 qualification and serial testing.

4 Are you talking about testing and
5 commissioning of the system or just the
6 vehicles?

7 CHRISTINE MAINVILLE: Of the vehicles.

8 MICHAEL VALO: Okay.

9 LOWELL GOUDGE: For the vehicles there
10 wasn't a lot in terms of seasonal conditions
11 that impacted qualification testing. And even
12 production testing, as long as it's not a
13 blizzard when you go out so that you can test
14 the acceleration rate, because you're reliant on
15 the adhesion of the wheel to the rail.

16 Aside from that there was very little
17 in terms of restrictions on seasonal testing.
18 We tested in the dead of winter. We tested in
19 the summer.

20 CHRISTINE MAINVILLE: So is it
21 accurate to say that the vehicles were running
22 in the winter prior to RSA?

23 LOWELL GOUDGE: Yes. The vehicles
24 were parked in the winter and sometimes they had
25 to plow the track around the vehicle to get it

1 out of the snow drifts.

2 I mean, the vehicle -- the vehicle
3 went out -- usually it was sent out on a Monday
4 morning and came back on Friday night and was
5 parked on the testing area in between, unless
6 there was something that necessitated it to come
7 back sooner.

8 CHRISTINE MAINVILLE: Would you
9 consider that there was enough testing done as
10 it related to winter conditions then?

11 LOWELL GOUDGE: From the perspective
12 of what is testable I think there was enough.

13 We went through all of the prescribed
14 testing that was not only in the contract but
15 typical things that are done for winter
16 environments. It's -- if I sort of look at
17 where you're headed with this, and the fact that
18 we did have problems with some winter
19 conditions, clearly there were things,
20 especially in terms of system operation, that
21 would have been better to spend more time in the
22 winter.

23 There was some obvious misses that
24 appeared after the second winter, or the first
25 winter of revenue service, that we always look

1 at when you have a problem or a failure and how
2 did we miss it? What went wrong on our
3 qualification, et cetera? That's part of the
4 normal process. But it wasn't for lack of
5 trying to do and follow the standards.

6 But we found issues, some of them site
7 specific. The environment and the amount of
8 salt that we get exposed to from the roadway
9 that we run parallel to, or bridges. That they
10 plow the road directly on to the guideway.

11 We're exposed to some environments
12 that may have surprised us a little bit, but
13 we've worked through those and dealt with them
14 largely.

15 CHRISTINE MAINVILLE: Did it -- I
16 understand it went through some winter
17 simulation -- the rolling stock went through
18 some winter simulation with the NRC?

19 LOWELL GOUDGE: Yes.

20 CHRISTINE MAINVILLE: Do you know what
21 the outcome come of that was?

22 LOWELL GOUDGE: There were two aspects
23 of that, and those were more about cold
24 temperature and a bit of ice than they were
25 about winter performance as such.

1 The climate room testing -- there were
2 two things, one is, does the -- do the doors
3 open if they have a layer of ice over all the
4 seals, et cetera? Do the windshields defrost?
5 And whether the train leaks or not, or how badly
6 the train leaks, whatever, as one side of the
7 climate performance.

8 The other side of the climate
9 performance is all about the heating and cooling
10 system and the interior temperatures as a
11 function to the specification requirements.

12 So in Ottawa the interior climate
13 control is defined as between the 1st percentile
14 and 99th percentile of a heating and air
15 conditioning standard as the temperatures for
16 the Ottawa region.

17 So that means minus 21.8 and plus
18 31.8, I think it is, as that's when the
19 temperature in the interior of the car has to be
20 between 19 and 22 degrees, or something like
21 that. And that defines how much heating and
22 cooling power is installed in the train.

23 That's different from in a hurricane,
24 with a ridiculous rainfall, does the train leak?
25 Which was the other part of the climate testing.

1 So there was one that was, do the
2 systems start at minus 40 or minus 25? And can
3 the doors open when they're coated with ice, et
4 cetera? That was one part of the climate. And
5 the other part, as I say, was the heating and
6 cooling for the passengers.

7 In general the vehicle, at the onset,
8 did not perform adequately for heating and
9 cooling and we did duct modifications, and
10 prototyped those modifications in the climate
11 room and demonstrated the improvement.

12 On the exterior side there was some
13 concern over the defrosting of the windshield
14 and how fast -- or how long it took, but there's
15 no real standard for railcars in cold soaking
16 and defrosting because the railcars are not cold
17 soaked at minus 20 and covered in ice, they're
18 sitting heating at plus 4 all the time.

19 So there was -- there's gaps in the
20 test method versus the real environment. And
21 there was some water leaks in the train so we
22 had a problem. The biggest problem we had was
23 with the cab window, which was not resolved
24 until the Phase 2 cars, and is being
25 retrofitted.

1 CHRISTINE MAINVILLE: On the Phase 1
2 cars?

3 LOWELL GOUDGE: Yeah.

4 CHRISTINE MAINVILLE: Overall could
5 you -- are you able to speak to how testing and
6 commissioning was impacted by the various delays
7 on the project?

8 LOWELL GOUDGE: I think basically it
9 was pushed late. As I say, I don't know if
10 other than the delays and moving later and
11 later, which we attempted to compensate by
12 including more vehicles in the scope of
13 commissioning, I don't know how much else it
14 would have impacted.

15 The only other thing that the delay
16 really impacts is the amount of work, because
17 it's more retrofit than it is built in from the
18 onset. So there's a delay that you build up
19 because it takes time to retrofit, and retrofit
20 is never as efficient as new build.

21 So the delay in testing commissioning
22 pushed more into retrofit scope than was perhaps
23 expected.

24 CHRISTINE MAINVILLE: And are you able
25 to speak to the plan for a trial running?

1 LOWELL GOUDGE: Not really, other than
2 I knew it was happening.

3 CHRISTINE MAINVILLE: You're not aware
4 of what changes there were to that process, if
5 any, along the way?

6 LOWELL GOUDGE: The only part of it
7 that I was involved with was what was -- again,
8 it came into the modifications. What was
9 necessary for vehicle mods to be done for trial
10 running, i.e., simulating the service
11 condition. Because obviously the vehicles had
12 to be in a service condition state to do trial
13 running.

14 CHRISTINE MAINVILLE: Could we spend a
15 bit of time talking about the derailments and
16 some of the breakdowns?

17 LOWELL GOUDGE: Okay.

18 CHRISTINE MAINVILLE: So in terms of
19 derailment number 2 in September of 2021, can
20 you speak to the causes of that derailment?

21 LOWELL GOUDGE: That derailment was a
22 quality miss where there's a requirement to bolt
23 the gearbox, or the hub of the gearbox to the
24 axle. And the final step of the bolting and
25 torquing process was not done. And quite simply

1 the gear box fell off and we ran over it and
2 derailed the train.

3 CHRISTINE MAINVILLE: And that was a
4 quality issue within Alstom, correct?

5 LOWELL GOUDGE: Yes.

6 CHRISTINE MAINVILLE: And what would
7 you say the root cause of that was?

8 LOWELL GOUDGE: I think there's a
9 bunch of causes. Clearly there was a miss in
10 the application of the torque and the failure to
11 detect it. Some of that was preventable. If
12 the torque machine had been reviewed and the
13 result reviewed prior to release from service,
14 because it would have shown that it didn't do
15 the torque process.

16 The other part of it is that that was
17 in a cycle-up time from 7 trains per day to 11
18 trains per day. And that cycle-up time was
19 based on the -- or the 7 trains per day that we
20 were running at that point in time was based on
21 the fleet that we felt we could sustain,
22 following the first derailment, with the safety
23 inspections to ensure the first derailment cause
24 never happened again.

25 So I don't know, because I was not at

1 the site to see the real environment, but I can
2 understand that there would be an incredible
3 amount of pressure to increase the fleet, reduce
4 the time for turnaround.

5 And cycling up from 7 trains to 11
6 trains in service when you have a passenger
7 utilization of maybe 10 or 15 people on a train,
8 that can hold 600 in service, didn't seem to be
9 necessary but it was requested by the City.

10 CHRISTINE MAINVILLE: Is there any
11 connection to the bogie design?

12 LOWELL GOUDGE: In terms of previous
13 problems with the bogie? No. In terms of the
14 fact that the gear box mounts on the bogie,
15 obviously it's related to bogie design. But in
16 terms of previous issues, no.

17 CHRISTINE MAINVILLE: Did this
18 particular bogie design require any particular
19 torquing or very accurate torquing that is maybe
20 unique or not as --

21 LOWELL GOUDGE: It's the same gearbox
22 interface as on TTNG exactly, so it's not a new
23 step. It's not something that was invented for
24 Ottawa.

25 CHRISTINE MAINVILLE: And are you

1 aware of the quality control issues raised by
2 the TSB in its rail advisory letter relating to
3 this derailment?

4 LOWELL GOUDGE: I don't know if I've
5 read that one in full detail.

6 I know there's concerns with the
7 quality. And we've made a tremendous effort in
8 terms of improving the traceability of quality
9 through the maintenance and retrofit process.

10 We've -- after this quality issue we
11 took a standdown and looked at all the safety
12 critical bolts on the vehicle and reviewed all
13 of those applications, did a complete fleet
14 check on all of those, plus other areas where we
15 had known issues, and people would be unbolting
16 or removing parts, and checked all of those and
17 did a complete sweep of all the process to make
18 sure that we were secure.

19 We strengthened a lot of areas, but a
20 lot of this was managed through the Service
21 Quality Department directly not through
22 engineering.

23 Engineering helped identify the
24 critical bolts and then it was left up to
25 service quality to go through, set up the

1 process, the inspections, et cetera, to make
2 sure there were no more misses.

3 CHRISTINE MAINVILLE: Now, can you
4 speak to the first derailment in August, 2021?

5 LOWELL GOUDGE: Yup.

6 CHRISTINE MAINVILLE: What would have
7 been the cause of that, to your understanding?

8 LOWELL GOUDGE: The cause of that,
9 what we call a "cartridge bearing assembly" that
10 holds the wheel bearing, the hub, and it's very
11 much like an automotive application product for
12 the low-floor vehicles. That bearing assembly
13 failed.

14 It appears that it failed in a process
15 where the nut that keeps the load on the bearing
16 released the load, allowed for a large increase
17 in the play of the bearing, ultimately metal to
18 metal contact with other parts and a complete
19 failure of the hub in that process. And when
20 the hub failed we lost a wheel.

21 CHRISTINE MAINVILLE: And that was
22 because it overheated, correct?

23 LOWELL GOUDGE: The overheating is a
24 results of the failure not a cause. The cause
25 of the failure is that the nut for the bearing

1 came undone.

2 CHRISTINE MAINVILLE: And do you
3 understand what the root cause of that is?

4 LOWELL GOUDGE: That is still under
5 investigation with Le Creusot and their
6 supplier, Texelis in France. Le Creusot is our
7 bogie company internally.

8 I don't have the full details of where
9 they are in the investigation today in terms of
10 why this design failed. Again, this hub is
11 identical to what's on TTNG.

12 CHRISTINE MAINVILLE: And so the
13 overheating would have simply -- potentially
14 allowed for detection of an issue if the heat
15 had been detectable?

16 LOWELL GOUDGE: That is also subject
17 to debate. The normal bearing detection for
18 overheating, if you're using wayside detectors,
19 or even built-in vehicle detectors, is for
20 temperatures around 110 to 115 degrees
21 centigrade.

22 There were nylon or plastic plugs in
23 the axle that slumped and partially melted, and
24 their melting temperature is 110. Whether it
25 would be detectable or not is highly

1 questionable.

2 And we did have some failures similar
3 to this on TTNG where they do have on-board hot
4 axle detectors. And although we've never had
5 the parts separate, but the rest of the symptoms
6 and metal-to-metal contact, et cetera, took
7 place and the 110 degree axle detectors did not
8 activate.

9 So whether it would be detectable by
10 what is considered a standard application is
11 highly debatable.

12 CHRISTINE MAINVILLE: I'm right to say
13 that there was no heating detector system
14 installed on these trains?

15 LOWELL GOUDGE: No.

16 CHRISTINE MAINVILLE: No there wasn't?

17 LOWELL GOUDGE: No, there was not.

18 CHRISTINE MAINVILLE: And what would
19 be the reason for that?

20 LOWELL GOUDGE: It's not a standard
21 approach on light rail vehicles, or for even
22 metro vehicles. It's generally an approach for
23 trains that do not come back to the workshop on
24 a periodic basis, they might be around the
25 country. Or if you take freight cars in North

1 America they could be between two countries and
2 thousands of miles away from their home base.
3 They may never get to their home base.

4 Or in Europe with intercountry
5 transportation they might go back to their home
6 depot once in a while but they're inspected
7 elsewhere. So -- and they go much larger
8 distances.

9 Also, most of the -- not all but most
10 bearing detection schemes are mounted physically
11 on the wayside. And even with those schemes
12 there's probably 20 or 30 major derailments a
13 year of trains that have overheated bearings
14 after having passed within the last minute a
15 bearing detector, So it is not a 100 percent
16 guaranteed mechanism.

17 CHRISTINE MAINVILLE: And TSB's rail
18 safety advisory letter suggests that OLRT may
19 wish to ensure that it has heat detection
20 systems in place to monitor temperatures of LRV
21 cartridge roll bearing assemblies. Is that
22 something that has been followed up on?

23 LOWELL GOUDGE: We have done some
24 preliminary investigations. We've not -- I
25 don't know if we have an instruction from OLRTC

1 to do it.

2 But we have done some preliminary
3 investigations of different bearing schemes,
4 temperature is one. But in our own perspective
5 temperature is not an effective means.

6 We've dissected the timeline of the
7 first derailment, based on everything we know,
8 including maintenance records, the behaviour of
9 other vehicles, et cetera. We believe this
10 condition could have been detected 90,000
11 kilometres before the derailment, roughly, based
12 on measurements we know from other maintenance
13 equipment in the shop.

14 And the containment process we're
15 doing is aimed at picking it up by doing a
16 safety inspection every 7,500 kilometres,
17 picking it up very early in the phase before it
18 can propagate to a problem.

19 The derailment itself, when the
20 bearing came apart, when the other parts then
21 overheated from high metal-to-metal contact, it
22 happened within 5 kilometres of the derailment.

23 So, from our perspective, a warning
24 that gives you 5 kilometres of advance notice
25 compared to a warning that gives you 90,000, is

1 inadequate.

2 There are other possible means of
3 detection. For example, vibration, noise, et
4 cetera, that we've also explored that might be
5 able to give us somewhere in the 40 or 50,000
6 kilometre range before the ultimate failure
7 happens. That would be a much more logical
8 approach than something that gives you five
9 minutes warning, and much less maintenance
10 intensive, that gives us the 70 or 80 or 90,000
11 kilometre warning.

12 So we've explored some of those things
13 but not to a point that anything can be
14 implemented. We've looked at what is possible
15 and what the objectives need to be. And, from
16 my perspective, something that gives you five
17 minutes' warning is useless.

18 CHRISTINE MAINVILLE: So is this
19 process ongoing?

20 LOWELL GOUDGE: It's ongoing but I
21 don't think there's been any clear direction
22 given to us as to a need yet. I know there's
23 been some questions asked as to what we're
24 looking at, but it's background activity. It's
25 not a -- at this point it's not a top activity,

1 because our expectation is when we resolve the
2 issue it's done. And it's much more viable to
3 solve the issue than to try and find methods to
4 detect something that is not going to be a
5 long-term problem.

6 In general, on light rail and metro
7 applications, axle bearing failures are not a
8 problem. If you have a problem you deal with
9 it, it's gone. And installing a detection
10 system for a one-off event is not a viable
11 engineering approach.

12 CHRISTINE MAINVILLE: So you're saying
13 this would not have been seen as a risk ahead
14 of --

15 LOWELL GOUDGE: No.

16 CHRISTINE MAINVILLE: But we don't
17 know why it happened then as a one-off?

18 LOWELL GOUDGE: We don't have the why
19 of why it happened. We have some very good
20 ideas but it's part of the failure investigation
21 to get the final details as to exactly why and
22 exactly what needs to be done to prevent it.

23 As I say, at this point we have a very
24 reliable but maintenance-intensive way to ensure
25 it doesn't happen again.

1 CHRISTINE MAINVILLE: I don't know if
2 you recall seeing this in TSB's rail safety
3 advisory letter, but it spoke about a
4 consolidated safety file for the OLRT
5 documenting potential hazards, one of which
6 identified locked and unlocked axle as a hazard?

7 LOWELL GOUDGE: Yes. This axle never
8 locked.

9 CHRISTINE MAINVILLE: Right. And the
10 letter points out that it doesn't specifically
11 reference a risk of overheating.

12 LOWELL GOUDGE: No. A locked axle is
13 something that's always considered. Because
14 when you lock an axle you drag the wheel and you
15 develop a very deep flange where it's dragged
16 and locked. And that goes -- and can hit the
17 switch and lead to a derailment at switches. So
18 a locked axle is always a standard
19 consideration.

20 CHRISTINE MAINVILLE: So from your
21 perspective there was nothing missing there from
22 the potential hazards that could be anticipated?

23 LOWELL GOUDGE: No.

24 CHRISTINE MAINVILLE: Are you aware of
25 what this file is, a consolidated safety file?

1 LOWELL GOUDGE: Yes. I wrote a large
2 portion of it.

3 CHRISTINE MAINVILLE: Who has input
4 into that?

5 LOWELL GOUDGE: That file takes --
6 it's starts with our safety assurance management
7 plan and it basically is the chronological
8 application of our safety assurance management
9 plan.

10 It describes generally the vehicle
11 systems; it describes all of the safety
12 processes that we went through; the outcome of
13 those safety process; it references all of the
14 individual safety studies and documents;
15 highlights all of the areas of risk; it
16 highlights the mitigations transferred to other
17 people; it lists all of the waivers for entry
18 into service; and the final consideration that
19 the design of the vehicle is safe.

20 CHRISTINE MAINVILLE: So is it only
21 produced by Alstom?

22 LOWELL GOUDGE: Yes.

23 CHRISTINE MAINVILLE: And how did the
24 City's safety regulations fit into that?

25 LOWELL GOUDGE: What safety regulation

1 specifically?

2 CHRISTINE MAINVILLE: So my
3 understanding is that the federal government
4 typically would regulate the safety standards
5 for this type of vehicle, but they were
6 delegated to the City.

7 LOWELL GOUDGE: I don't know exactly
8 how the process works, but my understanding of
9 the process is that the operation of transit
10 systems themselves are not automatically a
11 federally-regulated function. It's only
12 federally regulated when they cross political
13 jurisdiction boundaries.

14 And there is a specific list of
15 federally-regulated railways. I don't know if
16 it requires an act of Parliament or only a memo
17 of Cabinet to modify the list.

18 That list covers the original O-train
19 even though the vehicles don't meet the railway
20 standards for federally-regulated railways,
21 because the O-train runs on track that is under
22 the Federally Regulated Railways Act. It also
23 covers GO Transit but not Toronto transit.

24 So it's very specific and it's really
25 oriented towards the main line freight and

1 intercity passenger travel but not mass transit.
2 None of the vehicle standards meet the
3 requirements to run on federally-regulated
4 railways.

5 CHRISTINE MAINVILLE: Are you aware
6 though of city-based safety standards?

7 LOWELL GOUDGE: I'm not aware of any
8 city-based safety standards that apply to rail
9 vehicles.

10 CHRISTINE MAINVILLE: Or regulations?

11 LOWELL GOUDGE: Or regulations.

12 And when we originally started this
13 contract we were not aware that the
14 Transportation Safety Board and Transport Canada
15 were part of the regulatory authority for the
16 City of Ottawa. In fact, at one point it was
17 mentioned in a meeting that they were not
18 involved. The involvement is something that the
19 City appears to have done with the TSB
20 separately.

21 CHRISTINE MAINVILLE: Could you speak
22 to the wheel cracks that surfaced?

23 LOWELL GOUDGE: Yup.

24 CHRISTINE MAINVILLE: Is it fair to
25 say that it's unusual? An unusual occurrence

1 for new trains?

2 LOWELL GOUDGE: Yes, it is. It's an
3 unusual occurrence for any train.

4 CHRISTINE MAINVILLE: Do you know
5 whether a similar issue happened in France on
6 Alstom trains?

7 LOWELL GOUDGE: My understanding is
8 it's not happened elsewhere.

9 CHRISTINE MAINVILLE: And is it
10 accurate to say that it was -- this was not a
11 new -- that the wheel supplier, first of all,
12 was Lucchini, an Italian company?

13 LOWELL GOUDGE: Yup.

14 CHRISTINE MAINVILLE: And it was not a
15 new supplier for Alstom?

16 LOWELL GOUDGE: I don't know their
17 total history with Alstom so I can't answer
18 that.

19 CHRISTINE MAINVILLE: But the issue
20 resulted from a new process that it followed for
21 shipping the wheels? Well, for preparing the
22 wheels for maintenance and then shipping?

23 LOWELL GOUDGE: My understanding is
24 that the initial wheels that we received did not
25 have a specific threaded hole plugged and

1 protected from corrosion.

2 That hole is used to assist in
3 removing the wheel from the hub. As with a car,
4 I think if you've changed tires on a car
5 sometimes you find that wheels can be almost
6 seized on to the hub or axle and they're very
7 hard to get off. Given the extremely tight fit
8 of the wheel onto the hub that's something
9 that's quite expected on the railcar.

10 So there are threaded holes in the
11 wheel that are to be used by pushing screws in
12 to sort of jack the hub, or the wheel off the
13 hub. The initial wheels, and I think even some
14 of the spare wheels that were in stock, did not
15 have anything plugging those holes so they were
16 prone to corrosion.

17 That was noticed and at some point it
18 was requested that Lucchini put the jacking
19 screws into the wheel. And the correspondence
20 back-and-forth included the fact they had to
21 make sure that those screws, when they were
22 installed, did not the stick into the hub and
23 interfere with installation of the wheel.

24 At the end of the day, when we
25 discovered the wheels cracked it was during the

1 bogie overhaul, that I mentioned earlier that
2 was, among other things, taking some of the
3 questionable bogie frames off. It was covered
4 during the bogie overhaul process that there was
5 a wheel crack and that those screws were in fact
6 interfering with the wheel sitting flush on the
7 hub.

8 CHRISTINE MAINVILLE: In its rail
9 safety advisory letter the TSB suggests that
10 OLRT and Alstom expedite the removal of all
11 Lucchini resilient wheels that were originally
12 installed and equipped with jacking crews. Do
13 you know whether that's been done?

14 LOWELL GOUDGE: It has been done on
15 all revenue vehicles, with the exception of one
16 that was damaged in a derailment. It's called
17 up as a work order to be done before that
18 vehicle is repaired and returned to service.

19 And there are one or two vehicles
20 where the bogies had been made prior to the
21 discovery of the issue that have not yet been
22 sold to the city. And, again, it's been called
23 up on a work order to be done before those
24 vehicles are sold.

25 CHRISTINE MAINVILLE: So how many

1 vehicles were taken out of service following
2 this issue?

3 LOWELL GOUDGE: When we found the
4 issue we did an emergency inspection, and we
5 were then doing inspection every one or two days
6 on every vehicle to ensure that there were no
7 cracks.

8 Anything that was suspicious we had an
9 external, nondestructive testing company come
10 and do a test to say whether there was a crack
11 or not. And that inspection process carried on
12 until we could start cycling wheels through and
13 replacing wheels and/or wheel centres that were
14 subject to crack, based on being stressed, over
15 about an 18-month period.

16 CHRISTINE MAINVILLE: Was there any
17 impact of the cracked wheels on the operational
18 performance of the trains?

19 LOWELL GOUDGE: Other than
20 availability of vehicles due to the inspection,
21 no.

22 CHRISTINE MAINVILLE: And do you know
23 how the issue could have been prevented, the
24 issue of substandard components, how it could be
25 prevented in the future?

1 LOWELL GOUDGE: On this issue it's a
2 miss at the supplier quality, so it would
3 require more surveillance at an already
4 ISO9001-certified supplier, because that's the
5 only way that you can do it.

6 If you get a miss you have to go back
7 and revisit their processes. But you're reliant
8 on them being certified to ISO9001, to follow
9 what they write and write what they follow.

10 CHRISTINE MAINVILLE: In terms of the
11 wheel flats, I understand they were, at least in
12 part, due to too many emergency brakes?

13 LOWELL GOUDGE: Yes.

14 CHRISTINE MAINVILLE: And that was
15 linked to the system operating at the same level
16 of performance in bad weather, including winter
17 conditions?

18 LOWELL GOUDGE: Yup.

19 CHRISTINE MAINVILLE: And is it also
20 accurate to say that it was linked to the train
21 speed profiles not suiting Alstom's braking
22 mechanisms?

23 LOWELL GOUDGE: I think that would be
24 an inferred rather than a direct conclusion.

25 The fundamental problem is that the

1 vehicle specification requires the braking to be
2 done a certain way, which is to be done as much
3 as possible through the traction motors so that
4 the vehicle can regenerate energy. As a result
5 it requires all the braking to be done on the
6 motored axles, so six out of ten axles.

7 If the vehicle had been designed to a
8 different approach, which was to say, make sure
9 that you can use as many axles as possible for
10 braking and use all ten axles, you could have
11 alleviated some of those flats but not all of
12 them.

13 The fundamental problem at the onset
14 was the City was trying to run a performance
15 level that exceeded the design intent of the
16 vehicle in winter conditions.

17 You cannot sustain the operating speed
18 profile that's in the ATC system in bad
19 conditions with the vehicle; it's a
20 nonsustainable performance.

21 CHRISTINE MAINVILLE: Is that a --
22 does that link to Thales' piece more than Alstom
23 or is it an interface issue?

24 LOWELL GOUDGE: I think it links to a
25 lack of understanding by the City as to how to

1 run a train, more than Thales or Alstom
2 specifically.

3 The vehicle is capable, in perfect
4 conditions, of meeting performance requirements.

5 The vehicle alignment, or the train
6 alignment on the track, and what we were given,
7 requires the vehicle to operate under a certain
8 level of performance to make the schedule,
9 that's just physics. You have curves, you can
10 only go so fast on curves, and there's a lot of
11 curves in the Ottawa system.

12 So the ATC system is programmed to try
13 and meet that schedule. That's fine when it's
14 not raining or snowing or cold, but if you have
15 adverse weather conditions you have to take the
16 performance down.

17 The City, having never run really a
18 rail system before, didn't have that
19 understanding so they were trying to run the
20 fastest schedule possible in extremely bad
21 weather conditions, and that led to overspeed,
22 station overshoot, a lot of emergency brake
23 events, a lot of use of sand and a lot of spin
24 slide events simply because the track was too
25 slippery to meet the performance.

1 And the ATC system is designed with
2 three levels of performance so that you can turn
3 the performance down with the push of a button,
4 essentially, to say, I want less because the
5 system can't work to that.

6 Now, whether that's lack of
7 familiarity with the system, lack of training, I
8 can't answer. But clearly they didn't
9 understand it for the first year.

10 CHRISTINE MAINVILLE: But was that
11 agreed to in the contracts, whether by Alstom or
12 Thales or both?

13 LOWELL GOUDGE: There was an ultimate
14 level of system capacity, but I don't really
15 think that anybody understood -- or at the
16 specification writing point, that that capacity
17 can't be met in a blizzard, for example. The
18 City was trying to run it all the time.

19 FRASER HARLAND: Just very
20 practically, would it be the train operator who
21 would switch it from 3 to 2 to 1? Who in
22 operations --

23 LOWELL GOUDGE: It's in the control
24 centre. The system is -- this system does not
25 require a train operator.

1 FRASER HARLAND: Right.

2 LOWELL GOUDGE: In fact many of the
3 systems where Thales has got their equipment
4 there is nobody on the train at all. So it's
5 done in the main control centre.

6 FRASER HARLAND: Okay.

7 LOWELL GOUDGE: And they're supposed
8 to be looking at the weather. There is supposed
9 to be a weather management plan so that you deal
10 with the forecast and plan your service
11 according to the weather forecast.

12 I don't know how that was ultimately
13 developed between OLRTC, RTM and the City, but
14 clearly it wasn't understood. Even though the
15 Thales system provided for reduced performance
16 easily, I don't believe anybody had set the
17 parameters for how to do that in terms of what
18 conditions you do, et cetera.

19 And it wasn't until we got into the
20 wheel flats issue and the investigation, and
21 looked at the propensity to slide as a function
22 of weather, and presented to the City the worst
23 case scenarios when things were happening, how
24 much worse it got when the temperature was at,
25 say, minus 5 or minus 10 compared to zero,

1 compared to rain, compared to sunshine.

2 And we presented all of that data as
3 part of the investigation, and they're now using
4 some of that data to operate the trains, but
5 nobody had looked at that prior to the issue
6 happening.

7 CHRISTINE MAINVILLE: The schedule for
8 Alstom changed in May 2016 as a result of Alstom
9 submitting a schedule revision, correct? Which
10 was accepted by OLRTC, which became the V5
11 schedule?

12 LOWELL GOUDGE: I've heard about the
13 V5. Again, I wasn't involved intimately in the
14 schedule. I'm aware that there were multiple
15 schedules. I don't know whether there was ever
16 one accepted or not. V5 is the one that most
17 people talk about.

18 CHRISTINE MAINVILLE: Wouldn't you, as
19 an engineer on the train, know what schedule
20 you're working towards?

21 LOWELL GOUDGE: My responsibility was
22 not commitment to schedule, mine was technical
23 integration. There's a difference in Alstom.
24 We have a train system engineer that's
25 responsible for integration, and my role was

1 oversight of that function not directly doing
2 it, and also the safety certification.

3 You have a train engineering manager
4 that's responsible for cost, quality, delivery.
5 It's the train engineering manager's
6 responsibility to manage the schedule and make
7 sure things get done.

8 Mine was predominantly an oversight,
9 review and approve. So when things came I
10 dispatched them as expeditiously as possible.

11 CHRISTINE MAINVILLE: Who was the
12 train engineering manager?

13 LOWELL GOUDGE: It started off as an
14 engineer in France, Alexander Shawari, because
15 the bulk of the initial train design was done in
16 France.

17 That position was transferred as -- he
18 had a deputy in Hornell, who then moved to
19 Ottawa, Luc Monteyne who ultimately became the
20 engineering manager in Ottawa.

21 Then that function changed when Luke's
22 ex-patriot contract ended and another ex-pat,
23 Frederick Millien came in and took that
24 position, and he's now departed.

25 And that changed from France to Ottawa

1 as a function of the shift in the work. When
2 you're in production it's better to have your
3 engineering manager at the production facility
4 not at the design facility any more, because
5 more of your demand for time and resource comes
6 out of production as opposed to design.

7 CHRISTINE MAINVILLE: Would you be
8 asked to implement mitigation plans for -- to
9 mitigate the delays?

10 LOWELL GOUDGE: I was not, no. The
11 only time I was involved in some of the
12 mitigation plans was when it came to, for
13 example, the decision to move the testing to
14 Ottawa.

15 In terms of assessment of how much
16 track do we have? Do we think we can do
17 everything, et cetera? But not in the details
18 of the mitigation plan. That was out of my
19 purview.

20 CHRISTINE MAINVILLE: And what was
21 your assessment on the move to Ottawa? Is it
22 fair to say that you -- the bottom line was you
23 had no concerns provided access to the track was
24 made available by a certain time?

25 LOWELL GOUDGE: Yeah. My view is that

1 it was a positive move. You had the vehicles
2 there, you had people that knew the vehicles and
3 built the vehicles there to support it if
4 anything went wrong. You had all the parts
5 there to do it. You didn't need a logistics
6 train or chain to support a vehicle at a site
7 where there was nothing.

8 So it was -- in my view it was a
9 positive view and it was on the real track.

10 CHRISTINE MAINVILLE: Do you have any
11 view or understanding as to whether Alstom was
12 operating on a tight budget for what it had to
13 deliver?

14 LOWELL GOUDGE: I don't even know the
15 selling price of the train.

16 CHRISTINE MAINVILLE: Okay. One
17 question, the contract provided for the entire
18 energized Confederation Line track to be
19 available for integration testing by the RSA
20 date of May 24th, 2018, if I'm not mistaken.
21 How does that align with the start of operations
22 if it's only to be made available for
23 integration testing as of the RSA date?

24 LOWELL GOUDGE: I wasn't aware of that
25 actually until you just said it.

1 My understanding was that to meet the
2 RSA date the track had to be available long
3 before that.

4 CHRISTINE MAINVILLE: Right. And when
5 was integration testing done, if you recall?

6 LOWELL GOUDGE: The full integration I
7 would have to say somewhere in the summer of
8 2019.

9 CHRISTINE MAINVILLE: Was that
10 compressed?

11 LOWELL GOUDGE: Yup. I mean, as I
12 say, it's -- at that point my major effort was
13 to make sure that the consolidated safety file
14 was complete and we could issue the safety
15 release for what was the pending start of
16 revenue service.

17 So I was much more at that point
18 chasing all the safety documentation and making
19 sure the safety file was there to stand behind
20 the train was safe.

21 CHRISTINE MAINVILLE: So did you have
22 concerns, from a safety perspective, in terms of
23 when -- in terms of whether the trains were
24 ready by the RSA date?

25 LOWELL GOUDGE: We had, as I say, a

1 list of safety issues that we were cognizant of
2 and aware of in terms of certifications on the
3 train.

4 One of the other ones that I didn't
5 speak about earlier, but remember I said there
6 were things that would improve operational
7 reliability but weren't safety issues. We had a
8 door software version that was in -- expected to
9 be certified sometime in the end of September,
10 October. We did not start service with that
11 because it wasn't certified. But that improved
12 several reliability functions in the
13 previously-certified software. So we started
14 with a degraded door system only because we
15 didn't have the software certified for the final
16 system. There were things like that.

17 But I didn't have any real concerns on
18 the system as far as safety -- the system is
19 largely designed that it won't move if it's not
20 safe.

21 CHRISTINE MAINVILLE: Right.

22 LOWELL GOUDGE: So I had concerns
23 about reliability and things that would stop it
24 from moving, but I didn't have concerns about
25 safety.

1 CHRISTINE MAINVILLE: So A bit more
2 about reliability and performance in terms of
3 potential -- well, in terms of your concerns
4 regarding readiness for operations, is that
5 fair?

6 LOWELL GOUDGE: Yeah. I mean, we'd
7 noticed some things that were -- even in the
8 limited time that we had we'd noticed some
9 things that required effort or repairs to bring
10 them up to a level of reliability that would
11 suit the ultimate needs of the contracts, but
12 they weren't stopping the trains from starting
13 the revenue service.

14 CHRISTINE MAINVILLE: Did you convey
15 those concerns, if you want to call them
16 concerns, or potential issues, either to OLRTC
17 directly or to anyone responsible for those
18 communications?

19 LOWELL GOUDGE: Those concerns were, I
20 think, pretty openly discussed. As I say, the
21 door software is a great example. We noticed
22 several issues with the door system that new
23 software would resolve, but the software wasn't
24 through its safety certification process, that
25 takes about eight weeks. So we started with an

1 older version of software that was certified,
2 just not as reliable.

3 So those were openly discussed.
4 That's why there was a list of, for example,
5 modifications that were blocking for revenue
6 service and other ones that would be done at
7 some later date because they didn't stop service
8 from starting. That was part of what was
9 discussed, I believe, with the minimum
10 deficiency list and with the different
11 configurations of the train.

12 CHRISTINE MAINVILLE: When you say
13 openly discussed do you mean with OLRTC or also
14 with the City?

15 LOWELL GOUDGE: My understanding is
16 between OLRTC, the City and Alstom's contract
17 management.

18 CHRISTINE MAINVILLE: And in your
19 opinion is the level of post-opening
20 improvements or rectifications -- deficiency
21 rectifications that would be required a normal
22 level?

23 LOWELL GOUDGE: Some of it I think was
24 exasperated by the compression of the schedule
25 and qualification, versus production time and

1 the large number of retrofits that had to be
2 done. So there was a portion that is abnormal
3 in that respect.

4 It's normal, in my experience,
5 virtually with any project that there are
6 retrofits and changes that get done and things
7 that get borne out because something doesn't
8 work as you expect it, or doesn't work as it did
9 on a previous system and you have corrections to
10 it. That's part of the normal process and a
11 reliability building -- or growth program.

12 I would say ours is a little heavier
13 than some because of the compression of some of
14 the schedule, but it is not totally outside the
15 norm for a new system and a new build.

16 CHRISTINE MAINVILLE: And it's fair to
17 say that from the outset there was a decision
18 made to start production knowing there would be
19 design changes resulting in retrofits, correct?

20 LOWELL GOUDGE: Yes.

21 CHRISTINE MAINVILLE: That was to
22 avoid schedule delays?

23 LOWELL GOUDGE: That was to avoid
24 schedule delay.

25 CHRISTINE MAINVILLE: So the original

1 plan did include late retrofits but there ended
2 up being significantly more, right?

3 LOWELL GOUDGE: I think the amount of
4 work was much higher than the original plan
5 because of how late some of the issues were
6 ultimately imposed and how many vehicles were
7 built prior to the integration of that design.

8 CHRISTINE MAINVILLE: And would that
9 be primarily as a result of the Thales
10 interface?

11 LOWELL GOUDGE: That was one of the
12 largest batches of work that had to be done, and
13 that had to be done to start revenue service,
14 because obviously you can't run without the
15 signaling system.

16 CHRISTINE MAINVILLE: So how was that
17 mitigated, the lateness of resolving those
18 issues?

19 LOWELL GOUDGE: Just with a lot of
20 manpower. I mean, at that point it becomes
21 manpower and resources.

22 I wasn't involved in the planning of
23 it. There were other people that were directly
24 tasked to running the retrofits that were
25 necessary for service.

1 Basically engineering is the what, not
2 the how, the when and the resources that get
3 thrown at it.

4 CHRISTINE MAINVILLE: And part of it,
5 am I right, had to do with late City decisions
6 on some items?

7 LOWELL GOUDGE: There were some that
8 were late City decisions. I mean, the driver
9 radio, if you got back to that magic date of
10 April 26, 2013, the driver radio -- I don't even
11 believe the City had elected the supplier at
12 that point.

13 And this is the thing you have to
14 understand, the City had a capital project that
15 was in the planning phase to revamp their entire
16 radio system. That system covers police, fire,
17 ambulance, garbage collection, all the City
18 trucks, buses and the transit system and the new
19 LRT.

20 The first meeting we had on the City
21 radio, I think it was sometime in 2016, where we
22 had -- we had the City and most of their
23 proponents. It was still kind of at the sort of
24 ad hoc committee meeting. The first meeting we
25 had with their supplier, Bell, when they

1 asked -- and I think it was in 2017 they asked,
2 When do we need the documents? And Jacques
3 Bergeron said, April 26, 2013. And the response
4 was, Oh, we're a bit late.

5 That one, again, the City had a
6 requirement and they weren't managing that
7 requirement at all to be consistent with the
8 delivery of the vehicles.

9 CHRISTINE MAINVILLE: And so how did
10 Alstom deal with not having those specifications
11 and the information in due time?

12 LOWELL GOUDGE: We designed based on
13 the radio from the past Citadis projects, which
14 did not have any of the implemented functions
15 that were required ultimately by the City, and
16 there were changes to the wiring that were
17 necessary as a result.

18 Now, what we did do is we put some
19 spare wires in place that ran from logical
20 points of the train to the radio as a kind of
21 anticipation, and then we just run and left
22 unterminated.

23 But we had equipment that we still had
24 to install. We didn't have an interface defined
25 until very late. So there was still retrofit to

1 be done.

2 CHRISTINE MAINVILLE: Which had to be
3 completed before RSA?

4 LOWELL GOUDGE: Yeah.

5 CHRISTINE MAINVILLE: And that was
6 done through manpower again?

7 LOWELL GOUDGE: Yes.

8 CHRISTINE MAINVILLE: And then did --
9 were there late decisions to the design book
10 that impact Alstom's schedule?

11 LOWELL GOUDGE: The design and style
12 book was really only the interior appearance and
13 the outside appearance of the train.

14 The process went on longer than it
15 should have. I wasn't involved at the onset in
16 just the style aspects, but my understanding was
17 that we owed them three designs, of which they
18 would pick one. So we can't -- and there was
19 some general guidelines given to the industrial
20 designer at the time to include things like the
21 sort of maple leaf logo of the City on the
22 trains.

23 There were some different paint
24 schemes, colour schemes, front cab arrangement,
25 et cetera, that were given.

1 My understanding is we were obligated
2 to give three and they would pick one. So we
3 gave three; they asked for five variants on one
4 of them. So we gave those; they asked for
5 further variants.

6 I think that aspect of it led to some
7 delays at the beginning just in the overall
8 shape of the train because it became sort of a
9 Pandora's Box. It was never you delivered one
10 and that was it. You delivered one, they want
11 variants on it. You deliver another, they want
12 variants on it, et cetera, et cetera. And that
13 went on much longer than anticipated.

14 I don't know how much that can be
15 attributed to total delay. As I say, the
16 biggest issue we had through the design and
17 style process, as I mentioned earlier, was the
18 gangway and the flush bellows, where we exposed
19 right up front that it was going to be recessed.
20 It was reviewed, it was assessed, it was
21 approved. Then when we got asked to put the
22 formal submission in for that approval it got
23 rejected, but we had proceeded on good faith.

24 And we still haven't, I don't think,
25 completed the retrofit of that bellows to make

1 them all relatively flush to the vehicle,
2 because it happened two or three years after
3 approval was given for the outside design.

4 CHRISTINE MAINVILLE: Have there been
5 obstacles to Alstom's ability to get retrofits
6 done?

7 LOWELL GOUDGE: I think the biggest
8 obstacle to get retrofits done is the lack of
9 vehicles available for retrofit, because of the
10 requirements to support a large service fleet
11 even throughout the pandemic.

12 CHRISTINE MAINVILLE: You mean make a
13 requirement to make vehicles available -- or
14 certain level of service available to the
15 ridership?

16 LOWELL GOUDGE: I think there were two
17 things -- the original plan was to try and
18 introduce Phase 2 trains so that we could --
19 because they'd be at a much later build state.
20 We could then withdraw some of the Phase 1
21 trains and run them through the retrofits.

22 But between Phase 2 acceptance being
23 somewhat blocked, and I don't know all the
24 reasons for that, and the service and the
25 operating tempo that the City wanted to run even

1 with the pandemic, we could have taken a lot of
2 trains out of service and ran them through
3 retrofits and still made a service that made
4 sense for the ridership with a much smaller
5 fleet.

6 CHRISTINE MAINVILLE: Was there not in
7 fact an ability to slow the service down at
8 least at some point during the pandemic to
9 deal -- and perhaps it wasn't for retrofits but
10 more for maintenance purposes?

11 LOWELL GOUDGE: It could have been --
12 pick a reason to say reduce the fleet. We're
13 running multiple units, so two coupled LRVs.
14 Each LRV has a capacity of 300 people for the
15 service capacity, it can actually hold more than
16 that but the service capacity calculation was
17 based on 300 people per LRV. We're running
18 multiple units of two so we can hold 600 people.
19 If you take the September derailment as an
20 example, there were 13 people on a train that
21 could hold 600.

22 You could have run single unit. You
23 could have saved on wear and tear. You could
24 have eased maintenance. You could have allowed
25 for a fleet of vehicles to be withdrawn for

1 retrofits. You could have done a lot of things.
2 But they've never run a single car, even though
3 the original service plan was to run single cars
4 at some times.

5 CHRISTINE MAINVILLE: Do you know why
6 that is? Why that level of service availability
7 is being maintained?

8 LOWELL GOUDGE: Nope.

9 CHRISTINE MAINVILLE: Could it be
10 impacted by the fact that the City is not
11 responsible for maintenance under the contract?

12 LOWELL GOUDGE: It could be. I don't
13 know the conditions of the maintenance contract
14 and what they're paid for versus -- in total.
15 So it may be, Oh, well, we're paying this much
16 for service we'll get the service irrespective
17 of whether we need it. I don't know.

18 But certainly there's no need, or
19 there was no need during the pandemic to run the
20 service they were running.

21 CHRISTINE MAINVILLE: Do you have any
22 knowledge of the post-opening change in
23 management to RTM?

24 LOWELL GOUDGE: I know there's some
25 different people there but I don't know a lot of

1 the details about an overall structure of RTM.

2 CHRISTINE MAINVILLE: You weren't
3 involved in that transition?

4 LOWELL GOUDGE: No.

5 CHRISTINE MAINVILLE: Did you have any
6 concerns relating to the readiness of OLRTC
7 generally at the time of opening of the service?

8 LOWELL GOUDGE: I had a general
9 perception that neither RTM or the City were
10 ready to start service when it started.

11 CHRISTINE MAINVILLE: What is that
12 based on, or what is that perception?

13 LOWELL GOUDGE: Leading up to the
14 start of service we were discussing, in some
15 meetings with John Manconi and others, about the
16 readiness and the safety certification, et
17 cetera. We had a discussion about the system
18 that's used for viewing the side of the vehicle.
19 And I made a comment about the fact that I
20 didn't understand why they weren't prepared to
21 have a spotter on the platform, because even in
22 the safety studies it was predicted that the
23 system could go down from time to time and you
24 had to have spotters on platforms at certain
25 times. And it was like a lightning bolt from

1 the heavens in that nobody had considered -- and
2 the example I use is, let's say a guy takes a
3 steam shovel and digs through the fibre optic
4 backbone for the network; the whole thing stops.

5 How do you maintain service when that
6 network goes down if you don't have a plan to
7 put spotters in place?

8 To my knowledge today they still don't
9 have that plan in place.

10 CHRISTINE MAINVILLE: Right. So there
11 never were spotters?

12 LOWELL GOUDGE: Initially there were
13 never spotters, because Alstom had technical
14 problems with the system we paid to put spotters
15 on the platform, but there was never a plan to
16 have spotters. Even a roster of people to draw
17 from in the event of a system outage to keep the
18 system running; never planned. And to my
19 knowledge it's still not planned.

20 CHRISTINE MAINVILLE: And is your view
21 of -- sorry, Fraser, did you have a question?

22 FRASER HARLAND: I was just going to
23 clarify. To your knowledge is that -- the
24 spotter contract is that something that the
25 OLRTC took over from Alstom? Do you have

1 knowledge of that?

2 LOWELL GOUDGE: I believe OLRTC took
3 the cost over from Alstom at some point in time
4 when we demonstrated a specific level of
5 reliability.

6 And I believe they're still in place.
7 I think people are trying to remove them at some
8 point. But, as I say, even if you remove them
9 as a full-time job you still have to have the
10 ability as an operator to deploy a mitigation
11 if, for whatever reason outside your control,
12 the system goes down. As I say, the example is
13 a guy digs through the cable.

14 FRASER HARLAND: And so the contract
15 that they took over is not -- is different to
16 you than having a proper plan in place for
17 spotters?

18 LOWELL GOUDGE: The contract that was
19 taken over was a mitigation to an extremely low
20 reliability that required people at every
21 platform, because the system did not work well
22 enough and reliable enough to open the system
23 without a physical spotter there. That's
24 different than the condition of today, and is
25 different from a planning for having the ability

1 to supplement should something happen and the
2 system go down either at a station or globally.

3 Because this is a large,
4 interconnected network. Not all of it is
5 Alstom's responsibility for the construction of.

6 And as a whole network we're only
7 tapped in to the platform cameras, we're not
8 responsible for the platform camera system.

9 So you could have a station go down,
10 you could have the whole network go down, et
11 cetera, and those need mitigation irrespective
12 of how the vehicle system works; and that's not
13 planned.

14 FRASER HARLAND: And that's helpful.
15 Thank you.

16 CHRISTINE MAINVILLE: Is your view of
17 the City's readiness for operations tied to
18 these same issues or is that based on something
19 else?

20 LOWELL GOUDGE: Globally I think they
21 were not ready. As I say, when we talk about
22 people being late my view is the project was
23 late but the City was also not really ready to
24 take it on.

25 I think they should have had more

1 time, more training and a lot more people
2 involved in how the trains worked and how the
3 system worked than they did. But that again is
4 a feel more than anything else.

5 CHRISTINE MAINVILLE: And is that OC
6 Transpo or broader than that concerning the
7 operators?

8 LOWELL GOUDGE: I think it's OC
9 Transpo. I don't know how OC Transpo works with
10 the City.

11 CHRISTINE MAINVILLE: Well, in terms
12 of readiness of the operators specifically did
13 you have a view as to that?

14 LOWELL GOUDGE: Well, I think
15 readiness of the operators -- as I say, they
16 only had two weeks of operating the system
17 really at full operating tempo before they went
18 into service.

19 CHRISTINE MAINVILLE: Prior to that
20 were they only training on the test track?

21 LOWELL GOUDGE: As I say, when you
22 look at the -- and there's two parts of
23 operators. There are the operators in the
24 control centre that really only had two weeks.

25 CHRISTINE MAINVILLE: Okay.

1 LOWELL GOUDGE: And you have the train
2 operators, what they call electric rail
3 operators or EROs, those people -- up until
4 May you the probably only had one or two people
5 a day moving a train around on the main line.
6 Because up until May we only ever had one train
7 or two trains on a main line on a day. So they
8 were operating the trains for testing purposes
9 for other things, but not really driving the
10 trains or operating the trains as they should.

11 And it wasn't until after they started
12 in May of 2019 increasing the number of trains
13 that were operating and trying to different
14 operating tempos that you really had more than
15 just a couple of people driving trains.

16 It probably wasn't until we go into
17 sometime in August, and for four to six weeks
18 from August through mid-September that they
19 really had a full compliment, and even then it
20 wasn't all day necessarily. I think it was only
21 the last two weeks where they really ran an
22 attempted schedule.

23 CHRISTINE MAINVILLE: Thank you. I
24 know we're at the end of our time. Maybe I can
25 just ask, is there anything you think,

1 Mr. Goudge, that you want to add before we wrap
2 up?

3 LOWELL GOUDGE: I'm trying to make
4 sure before I put my foot in my mouth how to
5 extract it.

6 No. I think from a point of view I
7 think we've about addressed it, at least based
8 on what I saw the topics were and your
9 questions.

10 CHRISTINE MAINVILLE: Okay. Michael,
11 anything you need to ask?

12 MICHAEL VALO: No, I don't think so.
13 I think there's -- there are a few questions you
14 asked that I think we can help direct you to in
15 documents if it was helpful, but I don't think
16 it would require Lowell or anything like that.

17 CHRISTINE MAINVILLE: That would be
18 helpful, yes. We can go off the record.

19 --- Concluded at 1:01 p.m..

20
21
22
23
24
25

1 REPORTER'S CERTIFICATE

2
3 I, HELEN MARTINEAU, CSR, Certified
4 Shorthand Reporter, certify;

5 That the foregoing proceedings were
6 taken before me at the time and date therein set
7 forth;

8 That the statements of the presenters
9 and all comments made at the time of the meeting
10 were recorded stenographically by me;

11 That the foregoing is a certified
12 transcript of my shorthand notes so taken.

13
14 Dated this 7th day of April, 2022.

15
16 

17
18 PER: HELEN MARTINEAU
19 CERTIFIED SHORTHAND REPORTER
20
21
22
23
24
25

WORD INDEX

< 1 >

1 5:8 35:16
59:24 115:1
138:21 154:20
1.3 25:2
1:01 1:16
163:19
10 60:10 97:3
118:7 139:25
10:43 73:1
10:55 73:2
100 16:2 21:19,
22 22:5 38:14
42:3 49:2, 4, 16
50:1 78:12
123:15
1013 79:13
11 7:5 13:9
117:17 118:5
110 21:25
48:23 49:4
121:20, 24 122:7
115 121:20
12 70:3 97:3
13 155:20
14 70:3 97:4
15 118:7
150 38:15
16 26:14 27:7
18 38:15
18-month
134:15
19 113:20
1980s 74:7
1982 6:14, 16, 18
1st 5:15 113:13

< 2 >

2 49:25 92:5
114:24 116:19
138:21 154:18,
22
20 43:21 46:2
47:10 114:17
123:12
2009 4:9, 24
2013 5:13 23:9
53:8 76:5 77:6
84:21 85:6, 15
88:9 150:10
151:3
2014 87:9 95:9,

15 97:12
2015 84:7
2016 43:5, 10,
19 45:7, 12
53:13, 14 84:8
94:4, 7 95:17
140:8 150:21
2017 43:24
44:4 45:9, 15
49:20 50:4
55:25 56:1
151:1
2018 46:17
47:7, 14, 17, 21
48:1, 5 50:14
70:18, 22 71:18,
19 143:20
2019 60:16
64:25 65:3, 9
69:24 144:8
162:12
2020 5:15
2021 116:19
120:4
2022 1:8, 16
164:14
21.8 113:17
22 113:20
24 45:2
24/7 44:22
24th 143:20
25 114:2
26 23:9 77:6
150:10 151:3
26th 88:8

< 3 >

3 138:21
30 78:14 123:12
300 155:14, 17
31.8 113:18
33(6) 4:8
33(7) 4:23
34 38:13
3P 99:6, 15

< 4 >

4 114:18
40 16:15 78:14
114:2 125:5
48 36:7, 22

< 5 >

5 5:1 124:22,

24 139:25
50,000 125:5

< 6 >

6 1:8
60 15:24
600 118:8
155:18, 21
6th 1:15
< 7 >
7 96:25 97:1, 2
104:8, 9, 21
117:17, 19 118:5
7,500 124:16
70 15:18 20:9,
21 125:10
7th 164:14

< 8 >

80 15:24 125:10
< 9 >
9:00 1:16 3:1
90 49:23
90,000 124:10,
25 125:10
97 48:14 49:20
99 78:15
99th 113:14

< A >

a.m 1:16 3:1
73:1, 2
ability 19:20
47:18 50:7, 12
58:12 69:3
80:22 154:5
155:7 159:10, 25
abnormal 148:2
absolute 9:14
79:14 94:16
absolutely
59:24 68:14
94:3
accelerated
46:1 65:23
68:21
acceleration
69:2 110:14
acceptable 64:2
acceptance
66:23 154:22
accepted 58:23
59:18 140:10, 16

access 20:10
44:4 47:8 52:5
142:23
accessible
20:25 47:22
accommodate
81:1
accommodating
97:22
accumulating
16:11
accuracy 78:12
accurate 77:5
78:18 96:11
101:20 110:21
118:19 131:10
135:20
accustomed
94:16
achieve 26:17
104:11
acknowledged
70:19
acquisitions
31:1
acrylic 60:20
Act 4:9, 24 5:2
21:8 26:11
101:10 129:16,
22
acted 89:13
101:2
activate 122:8
activity 125:24,
25
Actual 45:14
50:4 87:5
ad 105:7
150:24
adapt 28:21
32:6
adaptation
26:24
adapted 11:8, 9
14:1, 3 15:8
19:1 35:23
adapting 19:3
add 62:25
163:1
added 22:20
59:16, 17 94:19
97:8
addition 9:11
additional 59:15

addressed
90:15 163:7
adequately 35:3
114:8
adhesion 110:15
adjust 27:7, 9
71:1
adjustment
27:8, 11 55:8
administrator
86:22
advance 64:19
70:12 124:24
advantage 10:17
adverse 137:15
advised 4:25
advisory 119:2
123:18 127:3
133:9
AFFIRMED 3:2
after 3:20
49:15 54:20
62:16 67:18
69:24 72:19
85:7 88:19
91:21, 22 92:24
111:24 119:10
123:14 154:2
162:11
aggressive
64:17 67:23
ago 13:9
agree 11:20
12:3
agreed 62:25
138:11
agreement
10:14 19:6, 15
21:21 98:12
agreements
89:11
ahead 126:13
aimed 124:15
air 57:10
113:14
Alex 87:3
Alexander
141:14
align 78:5
143:21
aligned 13:12
22:16 76:15
84:12 91:5
alignment 48:15,
24 52:6 137:5, 6

<p>alleviated 136:11</p> <p>allotment 36:15</p> <p>allow 25:23 27:8, 14 42:3 44:17 63:15</p> <p>allowed 38:1 49:19, 21 95:7 120:16 121:14 155:24</p> <p>allows 12:3</p> <p>ALSTOM 1:7 2:7 5:11, 24 6:16, 22 7:11, 17, 25 8:11 9:1, 10, 20 10:24 13:3, 4 14:2 16:21 21:2 22:9, 19, 23 24:3 26:6 36:8 37:8 38:8 46:23 50:22 63:11, 17 64:7, 10 65:17, 20 68:19 69:22 71:15 72:5 73:5, 20 74:1, 13, 18, 22 76:23 77:5 78:4 79:8, 25 81:8, 13 83:13, 21, 23, 25 84:18 86:3, 17 87:24 88:11 90:1, 11 91:6, 20, 25 92:8 93:4 95:19, 24 96:4, 11 100:11 101:21 105:11, 17, 21 106:1 107:19, 21 117:4 128:21 131:6, 15, 17 133:10 136:22 137:1 138:11 140:8, 23 143:11 151:10 158:13, 25 159:3</p> <p>Alstom's 10:10, 21 18:1, 2 31:8 38:5 72:6 77:3 82:9 89:4 91:7 96:6 106:15 107:3 135:21 147:16 152:10</p>	<p>154:5 160:5</p> <p>alternate 42:7</p> <p>aluminum 29:13</p> <p>Amazon 61:12</p> <p>ambulance 150:17</p> <p>America 6:24 13:8, 11, 24 14:1, 2, 4, 14, 21 15:14 16:8 28:4, 8 31:10, 17 123:1</p> <p>American 7:1, 4 16:4, 22 18:23 19:3, 16 22:7, 17 25:12 26:25 28:2</p> <p>Americans 21:8 26:10</p> <p>amount 39:18, 19 44:17 51:25 59:19 80:21 112:7 115:16 118:3 149:3</p> <p>analysis 63:4, 6</p> <p>and/or 134:13</p> <p>angry 61:11</p> <p>AnsaldoBreda 9:22</p> <p>antenna 77:22</p> <p>anticipated 127:22 153:13</p> <p>anticipation 151:21</p> <p>anybody 61:10 138:15 139:16</p> <p>anybody's 80:19</p> <p>anyway 41:6</p> <p>AODA 21:6 26:10</p> <p>apart 15:24 124:20</p> <p>appearance 152:12, 13</p> <p>appeared 101:16 111:24</p> <p>appears 98:18 120:14 130:19</p> <p>appended 4:6</p> <p>application 20:22 117:10 120:11 122:10 128:8</p>	<p>applications 103:1 119:13 126:7</p> <p>apply 130:8</p> <p>appreciate 87:22 88:22</p> <p>approach 12:8 25:12 32:2 122:21, 22 125:8 126:11 136:8</p> <p>approval 62:21 153:22 154:3</p> <p>approve 141:9</p> <p>approved 52:19, 20 61:2 62:11, 16, 21 153:21</p> <p>approximately 46:13 48:8</p> <p>APRIL 1:8, 16 23:9 43:5 45:6 53:8 77:6 88:8 150:10 151:3 164:14</p> <p>architecture 11:11, 13, 16, 25 12:20 13:18 15:6 25:15</p> <p>architectures 25:16</p> <p>area 23:1 40:10 59:14, 20 108:25 111:5</p> <p>areas 17:7, 8 119:14, 19 128:15</p> <p>arose 55:5 103:15</p> <p>arrangement 22:13, 14 25:8, 17, 18 27:2 152:24</p> <p>arrived 89:12</p> <p>article 95:8, 14</p> <p>aside 10:17 77:21 78:21 96:18 110:16</p> <p>asked 4:11 17:14, 17 48:18, 22 62:12 80:9, 12 93:22 102:25 125:23 142:8 151:1 153:3, 4, 21 163:14</p>	<p>asking 46:12 83:18 102:17 107:11 110:1</p> <p>aspect 22:25 153:6</p> <p>aspects 6:6 22:19 28:24 30:23 56:5 112:22 152:16</p> <p>assemble 82:1 83:1</p> <p>assembled 34:8 39:12 83:3</p> <p>assemblies 123:21</p> <p>assembly 29:12, 19 34:14 35:1 39:20 83:10, 19 120:9, 12</p> <p>assessed 153:20</p> <p>assessment 101:8 142:15, 21</p> <p>assist 132:2</p> <p>associated 39:9</p> <p>assume 49:9, 13 69:12</p> <p>assumed 44:21 88:14</p> <p>assumptions 23:11</p> <p>assurance 128:6, 8</p> <p>ATC 23:5 75:16 77:25 80:19 81:19 82:10 94:20 97:1 104:12, 13 136:18 137:12 138:1</p> <p>attacks 61:13</p> <p>attempted 98:5 115:11 162:22</p> <p>attempting 78:9 104:10 105:17</p> <p>attending 1:15</p> <p>attributed 153:15</p> <p>attuned 34:2</p> <p>August 5:15 84:8 85:6 120:4 162:17, 18</p> <p>authority 130:15</p> <p>auto 104:1</p> <p>automatic 26:4</p>	<p>automatically 129:10</p> <p>automotive 120:11</p> <p>autonomously 78:23</p> <p>availability 31:2 65:12 134:20 156:6</p> <p>available 32:6 42:12 43:11 45:2 59:19 76:5 142:24 143:19, 22 144:2 154:9, 13, 14</p> <p>avoid 148:22, 23</p> <p>aware 7:21 84:11 96:5 116:3 119:1 127:24 130:5, 7, 13 140:14 143:24 145:2</p> <p>axle 116:24 121:23 122:4, 7 126:7 127:6, 7, 12, 14, 18 132:6</p> <p>axles 136:6, 9, 10</p> <p>< B ></p> <p>back 7:2 14:16 21:8 22:11 23:13 33:16 35:6 36:19, 25 43:22 44:13 47:13 48:6 52:18 56:8 57:14 61:2 62:18 84:16 93:1, 18 95:4 111:4, 7 122:23 123:5 135:6 150:9</p> <p>back-and-forth 132:20</p> <p>backbone 158:4</p> <p>background 6:2, 4 125:24</p> <p>backwards 80:23</p> <p>bad 135:16 136:18 137:20</p> <p>badly 113:5</p>
---	--	---	---	--

Bangkok 74:10
barriers 65:7
base 28:14
31:13 53:18
123:2, 3
based 11:6
12:21 17:11
35:22 91:8
97:19 98:19
117:19, 20
124:7, 11
134:14 151:12
155:17 157:12
160:18 163:7
basically 78:11,
22 86:11 115:8
128:7 150:1
basing 107:14
basis 3:24
10:1 15:21
44:13 59:19
62:15 63:17
122:24
batches 149:12
bathtub 67:9
BC 74:8
bearing 120:9,
10, 12, 15, 17, 25
121:17 123:10,
15, 21 124:3, 20
126:7
bearings 123:13
began 5:10
34:24 45:14
50:4 81:23
beginning
79:10 153:7
behaviour 124:8
behaviours
78:3 102:5
believe 8:16
10:2 11:3, 10
20:7, 8 29:14
33:4, 9 35:15
40:20 43:9
73:14 75:5, 25
82:21, 22 83:3
88:2 90:3 92:3
106:9 124:9
139:16 147:9
150:11 159:2, 6
believes 105:20,
21
Bell 150:25

bellows 61:21
63:1 153:18, 25
bent 77:22
Bergeron 97:12,
17 151:3
best 8:12
25:11 60:21
108:3
better 67:4
70:13 111:21
142:2
bid 7:8 10:15
17:19 18:7
24:18 38:1
99:19
big 69:15 82:7
85:2 93:9
bigger 68:24
71:21
biggest 114:22
153:16 154:7
bit 6:3 18:21
24:24 36:21
43:16 74:9
78:6 82:16
84:16 112:12,
24 116:15
146:1 151:4
black 62:8
Blair 44:1, 9
blizzard 110:13
138:17
blocked 154:23
blocking 147:5
Board 130:14
body 61:21
63:3
bogie 26:22, 23,
24 27:1, 20
29:8 31:22
118:11, 13, 14,
15, 18 121:7
133:1, 3, 4
bogies 13:14
27:17 33:7, 10
59:15 133:20
bolt 82:16
116:22 157:25
bolted 39:11
bolting 116:24
bolts 39:13
119:12, 24
Bombardier
9:21 37:8
74:10, 15, 16, 17

book 62:1
152:9, 12
boom 65:22
borne 148:7
bottom 142:22
bought 61:5
boundaries
129:13
Bowles 2:8
box 77:20
80:13 82:17
93:9 101:2
117:1 118:14
153:9
brake 31:1, 10
75:13 102:12,
16, 20, 25
103:12 137:22
braked 32:17
46:1
brakes 30:8
135:12
braking 55:10,
15 135:21
136:1, 5, 10
break 60:19
72:25
breakdowns
116:16
breaker 103:2, 6
breakers 60:13
96:25 97:2
bridges 112:9
bring 13:10
38:19 44:12
63:1 65:14
146:9
broad 9:19
broader 161:6
brought 97:11
brush 9:19
budget 27:12
143:12
bugs 55:11
build 34:11, 14
38:16 40:21
41:1 51:13
56:20 99:8
103:5 104:9
108:16 115:18,
20 148:15
154:19
builder 82:12
107:13

building 35:21
37:15 41:8
52:10 72:19
108:23 148:11
built 36:7, 14,
18, 22 37:10
39:5, 18 40:7,
16, 18 41:13, 15
51:22 52:14, 23
56:25 65:2
76:20 106:11
108:9 115:17
143:3 149:7
built-in 121:19
bulk 19:14, 15
40:15 41:17, 20
45:18 82:6
87:17 141:15
bunch 95:2
117:9
burn-in 66:2, 4,
18
burns 60:22
buses 150:18
business 35:13
Butt 2:13
button 63:23
138:3
buy 61:3
buy-America
28:9
< C >
cab 60:8, 13, 18,
25 79:16, 17
80:3, 5, 21, 23,
24, 25 81:2
104:22 114:23
152:24
Cabinet 129:17
cable 77:22
159:13
cabling 53:15
calculation
155:16
caliper 31:3, 4,
19, 21, 23 32:2,
16, 22, 25 55:24
calipers 30:8,
14, 23 55:16, 17
call 13:7 66:2
67:9 83:4
104:9 105:10
107:8 120:9
146:15 162:2

called 11:16
12:1 33:16
38:9 59:2
61:20 95:8
133:16, 22
camera 160:8
cameras 24:9,
10 160:7
CANADA 1:7
2:7 5:2 6:15
30:3 57:6
130:14
Canadian 10:16
14:23 27:25
28:1, 6 29:20
35:8
capable 21:22
137:3
capacity 25:24
68:24 75:25
138:14, 16
155:14, 15, 16
capital 150:14
car 11:22 12:4
13:22 15:3
16:13 21:5, 10
37:14 61:21
63:3 82:12, 18
113:19 132:3, 4
156:2
carried 134:11
carries 11:19
carry 11:23
12:6
cars 36:7, 14,
17, 21, 22 37:15
38:13 60:5
114:24 115:2
122:25 156:3
cartridge 120:9
123:21
case 17:14
31:15 98:1
106:11 139:23
casting 33:11
castings 27:22
33:13, 14
categories
57:25 58:14
catenary 44:16
caused 33:4, 8,
10
CBTC 77:6, 19
79:4 80:2

<p>centigrade 121:21 centre 6:21 42:10 138:24 139:5 161:24 centres 134:13 certain 3:9 19:7 20:2 23:21 29:24 44:17 51:25 59:25 66:17 75:3 106:12 136:2 137:7 142:24 154:14 157:24 certainly 156:18 CERTIFICATE 164:1 certification 141:2 146:24 157:16 certifications 145:2 certified 135:8 145:9, 11, 15 147:1 164:3, 11, 19 Certifier 5:20 certify 164:4 cetera 6:9 13:14, 21 15:11 16:14 21:11, 12 23:24 25:5, 6 52:20 55:19 63:23 65:13 93:9, 19, 24 101:7 102:2 109:16 112:3 113:4 114:4 120:1 122:6 124:9 125:4 139:18 142:17 152:25 153:12 157:17 160:11 chain 14:21, 24 15:9 30:1 34:6 143:6 chained 97:4 challenge 21:13 24:14 25:15 38:11 challenges 36:9 38:23 change 28:20 32:16 56:1</p>	<p>62:20 80:1 88:5 91:22 98:2 102:13 104:23 106:7 109:3, 7, 8, 12 156:22 changed 12:1 32:25 75:5 104:11, 23 132:4 140:8 141:21, 25 changes 15:4 21:12 24:21 29:4 41:24 56:7 96:12, 15 97:23 98:5 108:20 109:1, 4 116:4 148:6, 19 151:16 changing 72:7 Charles 2:8 chasing 144:18 check 83:5 119:14 checked 119:16 choice 30:1 78:17 choose 10:4 17:4 31:12 choosing 62:10 chose 31:15, 19 61:1 98:17 chosen 15:20 16:14 17:11 38:8 Christine 2:2 3:3 5:6, 22 6:1 7:10, 14, 17, 22, 24 8:24 9:4, 9 10:9, 19, 25 11:7, 12 12:12, 22 13:2, 25 14:6, 9, 25 15:12 16:6, 20 17:13, 22, 25 18:4, 8, 20 19:22 20:11, 16 21:1, 17 22:1, 8, 18 23:12 24:2 25:20 26:3, 21 27:16, 23 28:10, 15 29:2 30:6, 19 31:7 32:9 33:7, 23 34:4 35:5, 18 36:2, 8</p>	<p>38:4, 22 39:23 40:15 41:19, 23 42:19, 23 43:2, 6, 13, 15 44:19 47:24 48:7, 12 49:7, 15 50:3, 16, 24 51:10, 16 52:11, 25 53:21, 25 54:7, 11 55:4, 21 56:11 57:19, 23 59:7 63:10 64:6, 20 65:16, 25 66:19, 24 67:21 68:17 69:1, 22 70:6 71:12 72:24 73:3, 23, 25 74:12, 20 75:9 76:10, 16, 21 77:3, 9 78:2 79:25 80:6, 14 81:7, 10, 12 82:8, 24 83:12, 22 84:3, 15 85:9, 23 86:7, 15, 19, 23 87:1, 4, 10, 24 88:10 89:3, 7, 11 90:1, 4, 10, 13, 21 91:6, 19, 24 92:5, 7, 14 93:2 94:8, 12 95:18, 23 96:2, 9 97:10, 14 98:7, 18, 24 100:1, 7, 11, 23 101:15, 20 102:4, 9 103:13, 20 104:3 105:5, 9 106:14 107:2, 17, 25 108:19 109:11, 20, 23 110:7, 20 111:8 112:15, 20 115:1, 4, 24 116:3, 14, 18 117:3, 6 118:10, 17, 25 120:3, 6, 21 121:2, 12 122:12, 16, 18 123:17 125:18 126:12, 16 127:1, 9, 20, 24 128:3, 20, 23 129:2 130:5, 10,</p>	<p>21, 24 131:4, 9, 14, 19 133:8, 25 134:16, 22 135:10, 14, 19 136:21 138:10 140:7, 18 141:11 142:7, 20 143:10, 16 144:4, 9, 21 145:21 146:1, 14 147:12, 18 148:16, 21, 25 149:8, 16 150:4 151:9 152:2, 5, 8 154:4, 12 155:6 156:5, 9, 21 157:2, 5, 11 158:10, 20 160:16 161:5, 11, 19, 25 162:23 163:10, 17 chronological 128:7 circuit 96:25 97:1 103:2, 6 Citadis 13:4, 7, 15, 20, 22 15:20 17:20, 21 18:22 19:1 24:20 151:13 cities 15:24 17:9 28:4 35:11 City 7:7 8:17 12:14 16:1, 22 17:5, 14, 24 18:25 19:13 20:17 22:2 23:3, 16 25:21 34:16 37:16, 22, 25 47:4 58:22 60:25 61:1 62:3, 14 63:14 69:7, 13 70:2 77:16 118:9 129:6 130:16, 19 133:22 136:14, 25 137:17 138:18 139:13, 22 147:14, 16 150:5, 8, 11, 14, 17, 20, 22 151:5, 15 152:21 154:25 156:10</p>	<p>157:9 160:23 161:10 city-based 130:6, 8 city's 19:2, 4 128:24 160:17 city-specific 21:16 civil 4:14 37:24 claim 88:9 91:21, 22 claiming 98:16 clarify 45:4 158:23 clean 31:4 cleaner 20:23 cleanest 36:13 cleanly 77:25 clear 5:23 10:10 60:2 63:11 66:25 69:16 70:1 75:11 92:7 125:21 clearly 51:4 53:7 70:17 92:12 107:5 111:19 117:9 138:8 139:14 clients 23:14 climate 57:7 113:1, 7, 8, 12, 25 114:4, 10 close 15:24 29:3 30:4 46:12 48:13 52:14 102:1 closed 105:1, 2 closely 13:12 22:16 34:2 coast 37:10 coated 114:3 co-counsel 3:8 coffee 91:17 cognizant 145:1 cold 112:23 114:15, 16 137:14 Co-Lead 2:2 collaboration 90:11 collaborative 3:7 collapse 6:14</p>
---	--	--	--	--

<p>collection 150:17</p> <p>Colorado 42:10, 15, 20 108:12</p> <p>colour 62:7 152:24</p> <p>come 16:1 18:17 23:12 29:25 39:12 47:13 61:13 71:14 76:17 84:5 88:16 89:14 111:6 112:21 122:23 134:9</p> <p>comes 22:11 56:8 105:24 142:5</p> <p>coming 92:24</p> <p>commands 75:14</p> <p>commence 3:17</p> <p>commencing 3:1</p> <p>comment 157:19</p> <p>commented 91:16</p> <p>comments 8:4, 5 90:23 164:9</p> <p>commercial 13:16 14:5 62:25 72:9 98:12</p> <p>COMMISSION 1:6 2:1 3:13</p> <p>commissioning 108:1, 5 109:12, 22 110:2, 5 115:6, 13, 21</p> <p>Commission's 3:6, 14, 19, 23</p> <p>commit 71:9</p> <p>commitment 88:16, 20 140:22</p> <p>committed 53:15 54:20 70:19</p> <p>committee 150:24</p> <p>common 14:13 22:6, 8 24:9 66:16 67:24</p> <p>commonly 13:16</p> <p>communicating 93:15</p>	<p>communications 13:21 50:18 93:11 146:18</p> <p>companies 8:12 9:19, 25 29:18 35:11 37:1 96:7 99:12, 21</p> <p>company 5:16, 23 6:11, 16 27:21 32:3 37:24 38:9 40:12, 14 65:20 99:8, 13 107:12 121:7 131:12 134:9</p> <p>compare 54:8</p> <p>compared 124:25 139:25 140:1</p> <p>compensate 27:3, 5 115:11</p> <p>competition 96:8</p> <p>competitor 96:3</p> <p>complete 8:10 11:22 36:20 47:8 48:1 50:9 53:4 54:14 60:15 119:13, 17 120:18 144:14</p> <p>completed 34:11 46:14, 20 47:25 57:17 58:24 60:3 152:3 153:25</p> <p>completely 61:23 71:19 91:14 95:13</p> <p>complex 95:6, 7</p> <p>complexity 22:20</p> <p>compliant 13:23 21:14</p> <p>complications 21:2</p> <p>compliment 162:19</p> <p>comply 21:11</p> <p>component 73:21</p> <p>components 37:14 77:20 79:18 83:20 134:24</p>	<p>compress 45:2 57:13</p> <p>compressed 53:22 56:13 144:10</p> <p>compression 68:23 147:24 148:13</p> <p>computer 52:4</p> <p>computers 12:2</p> <p>computing 76:1</p> <p>concept 86:13</p> <p>concern 64:12 67:22 106:15, 18, 22 107:1 114:13</p> <p>concerned 59:3</p> <p>concerning 68:18 161:6</p> <p>concerns 64:7 80:20 87:25 90:2 119:6 142:23 144:22 145:17, 22, 24 146:3, 15, 16, 19 157:6</p> <p>Concluded 163:19</p> <p>conclusion 135:24</p> <p>concurrently 57:13</p> <p>condemned 33:13</p> <p>condition 116:11, 12 124:10 159:24</p> <p>conditioning 113:15</p> <p>conditions 16:8 91:15 109:21 110:10 111:10, 19 135:17 136:16, 19 137:4, 15, 21 139:18 156:13</p> <p>Confederation 143:18</p> <p>confidential 3:24</p> <p>configurations 147:11</p> <p>conflict 105:24</p> <p>connect 10:10</p>	<p>connection 97:6, 8 118:11</p> <p>connections 95:3</p> <p>connector 43:25</p> <p>connectors 82:19</p> <p>consider 15:16 106:20 111:9</p> <p>consideration 109:21 127:19 128:18</p> <p>considered 8:4 17:20, 23 22:12 35:3 122:10 127:13 158:1</p> <p>consisted 85:22</p> <p>consistent 151:7</p> <p>consolidated 93:22 127:4, 25 144:13</p> <p>consortium 8:10, 20</p> <p>constraints 38:3 61:16</p> <p>construction 27:14 44:11, 17 45:1 50:6 87:18 160:5</p> <p>contact 120:18 122:6 124:21</p> <p>containment 124:14</p> <p>content 10:18 14:24 27:25 29:20 35:8 37:19, 22</p> <p>context 89:12</p> <p>continually 52:5</p> <p>continue 44:18</p> <p>contract 5:11 7:15, 18, 20 8:7 9:5, 11 10:23 18:17 23:7 35:16 37:20 38:12, 20 50:20, 22 53:18 66:15 70:22 77:4 81:25 82:2 84:11 85:18 86:22 88:25 99:14 107:19 111:14 130:13 141:22 143:17 147:16 156:11,</p>	<p>13 158:24 159:14, 18</p> <p>contracted 7:11 38:9 86:3 90:20</p> <p>contracting 85:12</p> <p>contracts 9:17 10:1 12:10 91:5 105:12 138:11 146:11</p> <p>contractual 73:12, 18 86:5 89:19 91:3</p> <p>contractually 28:5 88:3 101:13</p> <p>control 6:8 27:2, 13 33:12 75:13 104:19 113:13 119:1 138:23 139:5 159:11 161:24</p> <p>controlled 39:21</p> <p>controls 32:24 51:6 93:16 104:12</p> <p>convey 90:2 146:14</p> <p>conveyed 85:16 89:8</p> <p>cooling 113:9, 22 114:6, 9</p> <p>copy 93:15, 16</p> <p>correct 4:2 7:12, 13, 16, 18 9:6, 8 10:21 14:2 26:9 32:1 40:17 55:10 67:17 77:7, 8 83:1 84:1 86:17 89:5 91:9 97:12 98:20 117:4 120:22 140:9 148:19</p> <p>corrections 3:20, 22 4:5 148:9</p> <p>correctly 107:10</p> <p>correspondence 132:19</p> <p>corrosion 132:1, 16</p>
--	--	--	---	--

<p>cost 12:17 97:21 141:4 159:3 costly 12:7 COUNSEL 2:1, 2, 3 3:10, 24 counted 66:9, 16 counterparts 72:17, 18 counting 44:23 countries 28:14 123:1 country 122:25 couple 33:17 65:10 77:21 162:15 coupled 155:13 coverage 63:9 covered 6:6 114:17 133:3 covers 129:18, 23 150:16 crack 133:5 134:10, 14 cracked 132:25 134:17 cracks 130:22 134:7 cramped 80:24 81:2 crash 15:19 create 16:18 21:1 created 24:3 credit 97:18 Creusot 121:5, 6 crews 133:12 criteria 32:18 critical 34:19 119:12, 24 cross 129:12 Crown 4:15 crush 68:14 CSR 164:3 cubicle 80:21 current 78:17 curve 67:9, 12 curves 137:9, 10, 11 customer 28:14 73:22 customers 14:14 customization</p>	<p>14:19, 20 cut 31:4 cut-in 53:17 cut-off 23:7 cutting 39:7 cycle 30:18, 24 38:14 cycled 65:11 cycle-up 117:17, 18 cycling 118:5 134:12 cynical 94:23 Cyrville 44:9 < D > daisy 97:4 damaged 133:16 data 79:20 93:4 95:24 140:2, 4 date 5:12, 14 23:7 52:18 69:9, 11 70:8, 12, 15, 16, 18, 22 71:14, 18, 22, 25 72:7 76:9 143:20, 23 144:2, 24 147:7 150:9 164:6 Dated 164:14 dates 72:2 day 1:15 45:3 55:22, 24 56:2 57:20 65:22 68:15 72:19 117:17, 18, 19 132:24 162:5, 7, 20 164:14 days 61:12 70:3 134:5 DC 96:24 dead 110:18 deadline 69:16 deal 126:8 139:9 151:10 155:9 dealt 100:16, 18 112:13 debatable 122:11 debate 121:17 December 53:13, 14</p>	<p>decided 41:9 60:3 62:6 80:11 decision 12:18 31:3, 6, 25 32:5, 7, 8 35:13 40:25 42:17 55:25 56:4 60:12 81:3 142:13 148:17 decisions 26:16 27:1 97:19 150:5, 8 152:9 declaration 3:5 dedicated 96:25 deemed 4:10 33:19 64:2 deenergize 44:25 deep 127:15 deeply 28:23 deferred 49:24 50:2 58:1 Deficiency 59:2 147:10, 20 defined 23:4 39:16 53:8 56:9 73:7 79:14 85:1 95:10 107:5 113:13 151:24 defines 67:15, 17 113:21 defining 94:16 definitely 54:9 definition 16:4 67:4 75:8, 10 defrost 113:4 defrosting 114:13, 16 degraded 145:14 degree 6:13 14:19 122:7 degrees 113:20 121:20 delay 33:4, 8, 10 56:15 88:11 103:23 115:15, 18, 21 148:24 153:15 delayed 54:23 94:9 delays 52:12 71:13 98:16</p>	<p>115:6, 10 142:9 148:22 153:7 delegated 129:6 deliver 7:11 68:2 81:25 143:13 153:11 deliverable 76:14 delivered 153:9, 10 delivering 34:10 83:24 84:13 delivery 8:1 33:25 141:4 151:8 demand 75:12 142:5 demanding 69:18 demonstrated 67:19 114:11 159:4 departed 141:24 Department 119:21 dependence 34:10 dependent 34:21 depending 25:7 deploy 159:10 deployed 17:12 depot 123:6 depth 46:10 79:14 deputy 141:18 derailed 117:2 derailment 116:19, 20, 21 117:22, 23 119:3 120:4 124:7, 11, 19, 22 127:17 133:16 155:19 derailments 116:15 123:12 deriving 75:23 describe 86:12 90:11 describes 128:10, 11 describing 51:11 design 15:1, 5, 21 16:10 23:4,</p>	<p>10, 15, 20 24:16 25:13 26:2, 6, 22, 25 28:21 31:22 35:21 39:3, 4 41:5 53:4 61:16 62:1, 11, 17 76:5, 17, 22, 24 79:16 80:1, 4 81:13 85:12 88:24 94:11, 13 96:12 99:8 100:14 109:7 118:11, 15, 18 121:10 128:19 136:15 141:15 142:4, 6 148:19 149:7 152:9, 11 153:16 154:3 designated 50:22 designed 15:22 16:22 51:22 53:9, 10 60:8 75:16 76:22 94:24 109:7 136:7 138:1 145:19 151:12 designer 152:20 designs 25:9 61:25 152:17 desire 23:15 despite 72:5 detail 107:10 108:4 109:18 119:5 details 121:8 126:21 142:17 157:1 detect 117:11 126:4 detectable 121:15, 25 122:9 detected 124:10 detection 121:14, 17 123:10, 19 125:3 126:9 detector 122:13 123:15 detectors 121:18, 19 122:4, 7 determine 96:20</p>
---	---	---	--	--

Detroit 37:23,
25 74:7
develop 31:14
127:15
developed 28:3
54:19 91:1
139:13
developing
28:13 42:17
development
13:9 26:20
31:18 42:10
73:16
developments
99:6
device 67:8
devices 65:7
diagram 96:10,
18, 23
dialogue 71:23
72:6, 9
difference
140:23
differences
15:10, 13 32:21
different 15:3
17:5 25:18
31:2 32:22
38:2 40:20
56:23 58:17
62:5 64:13
65:12 78:3, 14
90:7, 8 91:14
94:22 113:23
124:3 136:8
147:10 152:23
156:25 159:15,
24, 25 162:13
difficult 19:11
29:24 30:2 75:2
digs 158:3
159:13
dimmer 60:9
direct 135:24
163:14
direction 125:21
directly 7:20
8:6 13:6 37:5
58:10 73:18
92:16 112:10
119:21 141:1
146:17 149:23
Director 87:8
Disabilities 21:8

26:11
disabled 102:24
discovered
55:22, 23
102:23 132:25
discovery
133:21
discussed 42:7
45:10 62:2
146:20 147:3, 9,
13
discussing
42:13 157:14
discussion 72:9,
16 157:17
discussions
58:4 62:3
84:23 85:19
90:23
dispatched
141:10
disposition
101:11
disqualify 25:17
dissected 124:6
distances 123:8
distinct 51:23
distinction
51:17
distinguished
100:13
divisions
105:10, 14
doable 26:18
document 90:9
94:5 103:25
documentation
84:6 89:21
144:18
documented
39:16 59:1
documenting
127:5
documents
11:6, 14 106:11
128:14 151:2
163:15
doing 6:12
40:6 43:12
48:19, 21 53:2
54:25 65:12
91:2 92:23
103:8 104:2
106:9, 20

124:15 134:5
141:1
door 8:19 25:2,
4, 10 26:12
60:18, 20 61:1
62:5, 10 75:13
104:6, 19, 22, 24,
25 105:4 106:7
145:8, 14
146:21, 22
doors 16:14
19:8, 10, 11
24:13, 14 25:1,
3, 4, 6, 14, 22
102:1 104:12,
13, 18, 19 105:1,
23 106:1, 3, 4, 5
113:2 114:3
doorways 20:14
draft 88:19, 23
drag 127:14
dragged 127:15
draw 16:13
158:16
drawn 70:14
drifts 111:1
drilling 39:8
drive 12:17
26:15, 25 86:10
driven 21:6
69:6
driver 43:20
61:7, 11, 14
104:22, 24
150:8, 10
driver's 80:22
104:25
drives 21:15
25:18
driving 162:9, 15
drop 77:20
drop-in 77:25
82:21
dropped 82:17
dual 29:14
Dualis 13:15
15:20
dual-panel 19:8
duct 114:9
due 6:14 67:3
84:19 87:21
88:7 103:5
134:20 135:12
151:11

dynamic 41:17,
20 45:20, 23
52:20 57:3

< E >
earlier 90:13
133:1 145:5
153:17
early 53:2
60:15 67:6
74:5 83:24
84:17 124:17
eased 155:24
easily 32:7
139:16
east 48:16
eastbound 44:6
easy 61:3
EB 103:8
economic 6:14
edge 23:16
effective 124:5
effectively 5:10
15:1
efficient 115:20
effort 75:12
119:7 144:12
146:9
egress 25:24
EJV 100:12
elected 150:11
electric 162:2
electrical 13:18
93:8
electrified 43:11
electronics
13:21
elements 14:12,
17
elevation 21:12
emergency
63:23 102:12,
16, 20, 25
103:12 134:4
135:12 137:22
employees 38:8
40:11, 14 100:20
enable 104:20,
22, 24 105:1, 25
enabling 106:4
ended 101:21
141:22 149:1
ends 104:23
endurance

30:16
energize 44:24
energized 44:16
143:18
energy 136:4
engagement
40:11
Engineer 5:18
140:19, 24
141:14
engineering 6:6,
7, 19, 20, 21
99:22 100:5
119:22, 23
126:11 141:3, 5,
12, 20 142:3
150:1
engineers
100:14
ensure 117:23
123:19 126:24
134:6
enter 3:13
entered 3:21, 25
4:4 87:18
entire 43:25
51:13 143:17
150:15
entity 99:14
100:2
entrance 21:9
entranceway
20:7
entry 62:11
128:17
envelope 79:12
environment
112:7 114:20
118:1
environmental
57:7
environments
111:16 112:11
equipment
11:18 16:25
17:2 50:19
51:24 52:1, 2
74:6, 19 75:2
77:23 79:12, 16,
19, 21 80:17, 19
81:3, 19 82:7,
10 83:8 85:17
94:22 95:15
97:1 102:18
106:17, 20, 21,

24, 25 107:7, 16
124:13 139:3
151:23
equipped 133:12
EROs 162:3
errors 4:3
66:11 77:22
escalating 88:6
especially
23:25 66:7
111:20
essentially
138:4
establish 4:14
Europe 7:4
15:7, 13, 17
29:25 31:9
74:4, 24 123:4
European 6:24
29:10
event 103:4
126:10 158:17
events 67:1
137:23, 24
eventually
42:24 76:23
82:25
Everybody 10:6
63:6, 17, 18
64:16 68:15
70:10, 15 71:9,
24 72:20 89:17
everybody's
71:10
evidence 3:5,
14, 21, 25 4:5,
19, 22 5:2
evils 98:17
evolution 88:18
evolutions 85:5
108:21
evolved 41:7
exact 5:12
32:18 43:18
52:17, 22 58:24
exactly 74:25
118:22 126:21,
22 129:7
example 56:5
63:20 68:8
77:17 78:19
96:10 102:10
105:24 109:2
125:3 138:17
142:13 146:21
147:4 155:20
158:2 159:12
examples 29:4
exasperated
147:24
exceeded
136:15
exception 24:8
61:24 82:16
133:15
exclude 25:16
exclusive 9:17
10:7
exclusively 6:18
execute 99:13
exercised 20:5
existing 64:14
66:7 68:1 75:24
exorbitant 98:3
expanding 46:3
ex-pat 141:22
ex-patriot
141:22
expect 69:23
97:2, 3, 5
107:13 148:8
expectation
81:25 82:2, 20
92:23 107:6
126:1
expectations
91:8, 11
expected 34:25
46:19 84:1
89:13 97:7
107:20 115:23
132:9 145:8
expecting 77:2
84:13
expedite 133:10
expeditiously
141:10
expensive 78:20
experience 6:2
65:21 66:1
67:24 74:1
77:10, 12 82:9,
11 98:25
107:14 148:4
experienced
38:25
expertise 40:10
experts 38:18
explain 43:3
explicitly 11:17
19:6 92:21
explored 125:4,
12
Expo 74:8
exposed 112:8,
11 153:18
expressed
106:19
expressing
92:15
expression
70:14
extent 8:25
42:1 63:9
66:23 100:13
105:22
exterior 62:17
114:12
external 134:9
extra 33:6
extract 163:5
extremely 132:7
137:20 159:19
extrusions
29:13

< F >
fabrication 39:9
face 36:9
faced 36:10
facilitate 97:15
facilitated 90:15
facilities 36:11
47:14 49:14
facility 34:14,
15, 20, 25 35:2,
20, 24 36:1, 4
41:3, 4 60:9
142:3, 4
fact 50:5 71:24
90:24 111:17
118:14 130:16
132:20 133:5
139:2 155:7
156:10 157:19
factories 38:19
factory 37:13
106:21
fail 33:20
failed 11:23
30:16, 24
120:13, 14, 20
121:10
failure 12:6
33:19 67:6, 10,
11, 20 88:4, 7
112:1 117:10
120:19, 24, 25
125:6 126:20
failures 66:9
67:13 122:2
126:7
Fair 8:24 33:8
50:24 55:4
68:18 101:8
105:5 130:24
142:22 146:5
148:16
fairly 60:15
83:23
faith 93:1
153:23
fall 47:21
62:23 63:2
falling 63:24, 25
familiarity 138:7
family 17:20
fanfare 68:7
fast 114:14
137:10
fasteners 39:14
faster 25:23
fastest 48:15
137:20
February 43:5
45:6, 11
federal 129:3
federally 129:12,
22
federally-
regulated
129:11, 15, 20
130:3
feeds 96:24
feel 161:4
fell 63:21 117:1
felt 117:21
fibre 158:3
figure 86:14
file 127:4, 25
128:5 144:13, 19
fill 87:8 100:8
filled 87:12
filters 16:11
final 8:13
31:22 46:15
53:11 76:24
79:8 88:4 90:6
92:19 96:15
116:24 126:21
128:18 145:15
finalize 81:15
finalized 53:5
54:19 77:6
79:4 88:20
89:8 91:25
92:9 94:3, 4, 11,
13 95:15
find 126:3
132:5
fine 137:13
finished 65:2
fire 59:12, 16,
20 150:16
firm 99:22
fit 33:15 79:16
80:25 128:24
132:7
fits 16:3
fixes 57:25
flag 97:25
flange 127:15
flat 21:10
24:23 48:25
flats 135:11
136:11 139:20
flaw 98:19
fleet 40:16
46:9 51:13
52:14 66:7, 10
77:17 117:21
118:3 119:13
154:10 155:5,
12, 25
fleets 68:1
floor 16:15, 17
20:2, 4, 6, 8, 21
21:10 24:21
59:22
floors 19:24
20:1
flow 25:24
36:13 57:10
flush 61:23
62:15, 16 133:6
153:18 154:1
folded 36:17
follow 41:12
112:5 135:8, 9
followed 67:11
69:13 80:11
123:22 131:20

following 40:6
117:22 134:1
follow-on 89:21
follow-up 3:10
foot 163:4
footprint 10:16
31:17
force 89:23
forecast 139:10,
11
foregoing 164:5,
11
forget 5:12
57:8, 11 59:10
formal 85:7
153:22
formalize 62:13
formed 99:13
forth 62:18
93:18 164:7
forward 9:1
10:7 31:5, 18
45:24, 25
found 58:17
112:6 134:3
frames 133:3
France 6:25
13:15 40:18, 22
108:8, 9 121:6
131:5 141:14,
16, 25
Fraser 2:3
10:22 24:11
36:24 45:4, 13,
16 46:11, 18
72:4, 11 79:1
138:19 139:1, 6
158:21, 22
159:14 160:14
Frederick
141:23
free 23:2 68:8,
10, 16 73:21
freeze 16:17
freezing 17:9
freight 122:25
129:25
French 15:25
frequency 64:22
Friday 111:4
front 62:20
152:24 153:19
froze 92:3
frozen 53:8, 9,
11 56:6

frustrating
71:22 72:3
90:12
full 5:14 19:7,
9 23:8 31:21
33:15 44:7
46:15 50:7
55:3 65:12, 14
67:22 68:20, 24
75:21 76:4
92:23 119:5
121:8 144:6
161:17 162:19
full-time 159:9
fully 21:21
34:11 40:5
43:11 45:20
47:10 54:18
58:24 82:7, 22
83:8 86:7
101:22, 24
fully-assembled
84:14
fully-tested
82:3 107:7
function 11:19
30:12 37:17
75:2, 15 86:10
94:22 95:5
106:9 113:11
129:11 139:21
141:1, 21 142:1
functional 58:8
functionality
104:11
functionally
58:6
functioning
32:15
functions 57:12
95:9, 10 106:12
145:12 151:14
fundamental
30:15 39:4
81:21, 24 96:17,
22 98:19
135:25 136:13
future 20:4
40:13 41:5
134:25
< G >
gangway 61:20,
23 62:1, 4, 10,

17 63:5, 20
153:18
gaps 114:19
garbage 150:17
gases 103:5
gaskets 16:14
gear 24:25
117:1 118:14
gearbox 116:23
118:21
gears 25:10
GEC 6:15, 22
74:17
general 114:7
126:6 152:19
157:8
generally 27:24
37:17 65:21
100:24 122:22
128:10 157:7
generated 58:20
generation 6:7
13:17
geometry 21:5,
11, 15 24:18
25:14 79:6
give 6:2 28:22
32:1 68:9
93:23, 24, 25
96:9 97:2, 18
125:5 153:2
given 4:1, 17
46:19 50:5
52:12 87:17
108:15 125:22
132:7 137:6
152:19, 25 154:3
gives 10:17
124:24, 25
125:8, 10, 16
giving 4:22
Glaholt 2:8
glare 60:11, 14
glass 60:18
global 30:22
67:12 109:9
globally 18:11
64:11 160:2, 20
Good 3:3 93:1
99:21, 22
126:19 153:23
Goodbye 38:17
go-to 65:24
GOUDGE 1:7
2:7 3:2 5:5, 9,

24 6:4 7:13, 16,
19, 23 8:3 9:3,
8, 13 10:13
11:3, 10, 14
12:16, 25 13:6
14:3, 8, 12 15:2,
15 16:9, 23
17:16, 24 18:3,
5, 11 19:4, 25
20:13, 20 21:4,
20 22:4, 10, 21
23:18 24:5, 17
25:22 26:8, 23
27:18 28:1, 12,
18 29:8 30:9,
21 31:9 32:12
33:9 34:1, 9
35:9, 21 36:6,
11 37:4 38:7
39:2 40:2, 19
41:22 42:1, 22
43:1, 4, 8, 14, 17
44:21 45:10, 14,
18 46:15, 24
48:4, 11, 13
49:9, 18 50:11,
17 51:3, 14, 18
52:16 53:3, 24
54:3, 9, 15 55:7,
23 56:17 57:22
58:3 59:9
63:13 64:10, 22
65:19 66:3, 21
67:2 68:1, 22
69:5, 25 70:9
71:16 72:8, 14
73:11, 24 74:3,
15, 23 75:11
76:12, 19, 25
77:8, 14 78:6
79:9 80:4, 7, 16
81:9, 11, 16
82:11 83:2, 15
84:2, 4, 19
85:13 86:1, 9,
18, 21, 25 87:3,
7, 12 88:2, 13
89:6, 10, 14
90:3, 5, 12, 17,
22 91:10, 21
92:3, 6, 11, 18
93:5 94:10, 14
95:20 96:1, 5,
14 97:13, 17
98:10, 21 99:2

100:4, 10, 16, 25
101:18, 24
102:8, 15
103:16, 22
104:7 105:8, 13
106:18 107:4,
23 108:3, 21
109:14 110:9,
23 111:11
112:19, 22
115:3, 8 116:1,
6, 17, 21 117:5,
8 118:12, 21
119:4 120:5, 8,
23 121:4, 16
122:15, 17, 20
123:23 125:20
126:15, 18
127:7, 12, 23
128:1, 5, 22, 25
129:7 130:7, 11,
23 131:2, 7, 13,
16, 23 133:14
134:3, 19 135:1,
13, 18, 23
136:24 138:13,
23 139:2, 7
140:12, 21
141:13 142:10,
25 143:14, 24
144:6, 11, 25
145:22 146:6,
19 147:15, 23
148:20, 23
149:3, 11, 19
150:7 151:12
152:4, 7, 11
154:7, 16
155:11 156:8,
12, 24 157:4, 8,
13 158:12
159:2, 18
160:20 161:8,
14, 21 162:1
163:1, 3
government
129:3
great 105:24
146:21
greatest 18:19
grey 62:7
grounds 4:12
group 17:6
99:4
growth 148:11

<p>guaranteed 76:9 123:16 guess 12:8 13:8 71:13 94:15 guidelines 152:19 guideway 112:10 guy 158:2 159:13</p> <p>< H > half 6:10 43:10 44:7 57:5 78:11 hand 34:22 handicapped 98:11 handover 69:13 70:2 handover-to-the-City 69:11 happen 42:25 55:12 70:2 126:25 160:1 happened 8:23 10:2 43:3 45:6 54:8 84:21 86:12 117:24 124:22 126:17, 19 131:5, 8 154:2 happening 77:1 102:11 103:5 116:2 139:23 140:6 happens 125:7 hard 36:12 55:20 68:11, 19 101:1 132:7 harder 68:4 hardware 94:2 Harland 2:3 3:8 10:22 24:11 36:24 45:4, 13, 16 46:11, 18 72:4, 11 79:1 138:19 139:1, 6 158:22 159:14 160:14 harm 105:4 hat 100:19 hazard 16:18 63:2 127:6</p>	<p>hazards 127:5, 22 head 59:10 headed 111:17 hear 110:1, 2 heard 40:19 140:12 hearings 3:6, 15, 16 heat 59:19 60:1 121:14 123:19 heated 16:15 heating 16:12 113:9, 14, 21 114:5, 8, 18 122:13 heavens 158:1 heavier 148:12 height 20:2 24:22 26:18 79:13 Held 1:14 71:2 Helen 2:12 164:3, 18 help 91:4 163:14 helped 119:23 helpful 160:14 163:15, 18 high 6:11 17:8 25:13 53:17 67:9 104:14 124:21 higher 48:21 67:20 149:4 highlights 128:15, 16 highly 37:19 121:25 122:11 hire 99:8 historical 106:10 historically 67:19 history 131:17 hit 78:9 127:16 Hitachi 9:22 hoc 105:7 150:24 hold 118:8 155:15, 18, 21 holding 104:21 holds 120:10 hole 87:13 131:25 132:2</p>	<p>holes 82:17 132:10, 15 home 23:23 123:2, 3, 5 honestly 92:11 hook 77:20 82:19 hooked 107:9 Hornell 41:3, 9, 14, 15 42:2, 5 56:25 108:11 141:18 hosted 86:9 hot 122:3 hour 15:18 16:3 21:19, 22 22:5 42:3 46:2 48:9, 14, 23 49:3 hours 45:2, 3 66:14 HPU 32:25 hub 116:23 120:10, 19, 20 121:10 132:3, 6, 8, 12, 13, 22 133:7 huge 25:15 31:11 52:4 hugely 78:20 hundred 19:24 20:1, 2, 8, 10 27:5 48:9 hundreds 97:8 hurricane 113:23 hydraulic 32:23</p> <p>< I > i.e 116:10 ICD 81:15 89:9 92:2, 5, 6, 9 96:12 102:6 ICDs 101:21 ice 112:24 113:3 114:3, 17 idea 76:13 ideal 46:23 ideas 126:20 identical 121:11 identifiable 62:5, 8 identified 57:20 102:13 127:6 identify 119:23</p>	<p>immediately 67:18 imminent 33:19 impact 33:24 34:5 41:24 53:1 58:11, 12 134:17 152:10 impacted 58:9 71:25 110:11 115:6, 14 156:10 impacts 40:1 115:16 impaired 62:6, 10 implement 104:1 109:4 142:8 implementation 63:15 implemented 125:14 151:14 implications 12:23 14:7 24:15 26:5 28:16 34:7 38:5 39:24 44:20 53:1 96:3 important 31:17 impose 89:19 imposed 149:6 impression 101:18 improve 145:6 improved 59:17 145:11 improvement 114:11 improvements 147:20 improving 119:8 inadequate 125:1 include 149:1 152:20 included 84:8 132:20 includes 6:19 102:19 106:2 including 50:5 80:1 115:12 124:8 135:16 incomplete 73:12 incorporate 96:11, 14</p>	<p>incorporated 37:25 incorrectly 77:23 increase 56:18 118:3 120:16 increasing 162:12 incredible 118:2 incriminate 4:13 indirect 8:3 individual 14:17 84:10 128:14 industrial 152:19 industry 66:20 82:23 103:7 inefficiencies 55:19 infant 66:11, 25 67:15 inferred 135:24 information 23:25 93:4 95:24 151:11 informed 69:2 infrastructure 64:15 78:20 ingress 25:23 initial 57:1 108:6 131:24 132:13 141:15 initially 9:1 40:18 109:5 158:12 initiated 81:8 input 16:12 128:3 inputs 75:17 Inquiries 4:9, 24 inquiry 4:10, 18 in-service 67:20 inside 106:25 insignificant 71:20 inspect 44:2 inspected 123:6 inspection 95:8 124:16 134:4, 5, 11, 20 inspections 117:23 120:1 install 82:3 151:24</p>
---	--	---	---	---

<p>installation 52:2 83:5 84:8 132:23 installed 12:4 50:19 51:5 74:6 82:4, 6 113:22 122:14 132:22 133:12 installing 106:13, 16, 19, 24 126:9 installs 53:16 instance 4:15 102:6, 11 instruction 123:25 instructions 84:9 instrumentation 48:20 insulation 59:15 insurance 49:2, 5, 6, 8, 10 insured 49:14 integrate 78:3 79:22 88:8 integrated 10:21 74:22 101:23, 25 102:3 integrating 24:6 79:19 integration 5:19 13:19 31:21 55:1 74:13 75:1 84:17, 18 85:11, 25 86:4, 13 87:9, 19 88:1 90:14 97:15 98:8 99:1 105:6 140:23, 25 143:19, 23 144:5, 6 149:7 integrator 49:10 86:24 87:6 97:11 100:3 integrity 15:19 75:23 96:19 intends 3:13 intensity 60:11 intensive 125:10 intent 136:15 intercity 130:1 interconnected 160:4</p>	<p>intercountry 123:4 interesting 21:13 interface 53:7 54:18 56:9, 12 73:4, 16 76:12 79:11 93:16 100:12 118:22 136:23 149:10 151:24 interfaced 77:25 interfaces 93:8 interfacing 76:23 interfere 132:23 interfering 133:6 interior 113:10, 12, 19 152:12 internal 28:12 internally 83:7 121:7 Internet 23:22 interrupt 109:24 intervene 3:9 interview 3:4, 7, 11, 12 intimately 140:13 introduce 59:25 66:8 154:18 invented 118:23 investigation 121:5, 9 126:20 139:20 140:3 investigations 123:24 124:3 involved 5:14 6:23 7:6, 20 8:6 12:9 18:6 28:23 37:5 58:4, 9 66:4 68:13 72:13 74:5 99:3 108:4 109:19 116:7 130:18 140:13 142:11 149:22 152:15 157:3 161:2 involvement 5:7, 9 35:14 130:18 involving 22:20 IO 96:10, 18, 22 Irrespective 47:3 65:1 76:2</p>	<p>97:24 106:3 156:16 160:11 ISO9001 135:8 ISO9001- certified 135:4 issue 23:3 29:1 33:10, 12 40:24 59:4 60:7, 18, 24 68:25 69:15 73:21 75:18 79:24 93:7 96:22 101:14 104:4 117:4 119:10 121:14 126:2, 3 131:5, 19 133:21 134:2, 4, 23, 24 135:1 136:23 139:20 140:5 144:14 153:16 issued 29:22 53:11 issues 27:17, 19 30:7 55:5, 8 57:20 60:17 67:1 79:5 90:15 91:20 103:21 112:6 118:16 119:1, 15 145:1, 7 146:16, 22 149:5, 18 160:18 Italian 131:12 items 150:6 iteration 92:1 iterative 76:18, 19 77:12, 15 < J > jack 132:12 jacking 132:18 133:12 Jacques 97:12, 17 151:2 January 43:24 44:3, 4 45:15 50:4 87:9 97:11 job 98:4 159:9 John 157:15 joined 6:15 7:8 8:10 jump 24:11 jumped 107:20 June 84:21</p>	<p>jurisdiction 129:13 < K > Kazakhstan 17:1 keeps 120:15 kept 32:15 72:3 key 15:13 104:25 kilometre 22:5 125:6, 11 kilometres 15:18, 24 16:3 21:19, 22 42:3 43:10 44:8 46:2 48:9, 14, 23 49:2 66:14, 18 124:11, 16, 22, 24 kind 16:3 52:18 67:8 68:8 71:10 85:3 103:7 105:3 150:23 151:20 kinds 61:18 Kinkisharyo 37:11 kit 81:25 84:13 94:24 knew 70:10, 24, 25 72:22 79:9, 18, 22 91:10 107:7 116:2 143:2 knowing 71:5 79:24 148:18 knowledge 12:18 19:13 96:1 107:15 108:4 156:22 158:8, 19, 23 159:1 known 49:3 70:12 119:15 knows 104:14, 15, 17, 18 KPH 47:10 49:20 < L > labour 38:6, 10 lack 67:3 70:13 84:19 90:5</p>	<p>112:4 136:25 138:6, 7 154:8 Laila 2:13 large 10:16 14:18 28:14 29:12 32:14 37:9 52:23 53:5, 15 58:23 59:25 60:22 97:21 99:20 120:16 128:1 148:1 154:10 160:3 largely 7:6 13:19 18:14 48:21 60:4 69:5 90:14 100:21 108:22 112:14 145:19 larger 6:22 123:7 largest 14:19 80:19 81:1 149:12 late 6:16 55:22, 24 56:2 57:20 69:19 70:11, 20, 24 71:6, 7, 24 72:21, 23 115:9 149:1, 5 150:5, 8 151:4, 25 152:9 160:22, 23 lateness 149:17 latest 18:19 23:14 layer 113:3 Le 121:5, 6 lead 57:19 67:5 127:17 leading 23:16 157:13 leads 105:18 leaf 152:21 leak 113:24 leaks 113:5, 6 114:21 leased 35:12 leave 44:25 leaves 104:22 leaving 103:11 led 43:9 103:20, 22 104:4 137:21 153:6</p>
---	--	--	--	---

left 44:14 60:5
119:24 151:21
legislation 21:7,
9
length 19:8, 10
24:13
lesser 98:17
letter 101:3
119:2 123:18
127:3, 10 133:9
letters 88:3
101:11
level 20:10
26:1 72:22
83:11 99:3
104:14 107:6
135:15 136:15
137:8 138:14
146:10 147:19,
22 154:14
156:6 159:4
leveling 26:4
levels 138:2
liability 4:14
liars 71:10
life 30:16, 17
33:15, 21 67:12,
13
LIGHT 1:6
15:16 16:4
60:7, 10, 13
122:21 126:6
lightning 157:25
light-rail 20:21
limit 39:3 49:22
limitation 42:6
limited 45:23
75:15 146:8
limits 21:6
lines 75:22
77:24 104:2
link 136:22
linked 135:15,
20
links 136:24
lists 128:17
Litigation 2:3
living 6:25
LLP 2:9
load 120:15, 16
loaded 68:15
local 15:8
29:19 30:9
37:15, 18, 19
38:20

localization
22:22 27:20, 24
28:16, 24 34:5
located 24:25
locating 38:24
location 41:24
45:11
lock 60:25
61:1, 2 127:14
locked 103:9
127:6, 8, 12, 16,
18
lockout 103:7
locks 103:3
logical 36:23
125:7 151:19
logically 69:12
71:8
logistical 40:23
logistics 33:3
143:5
logo 152:21
long 41:5
49:25 53:25
54:3 58:19
70:7, 12 72:19
110:12 114:14
144:2
longer 54:10
152:14 153:13
long-term 59:11
61:9 126:5
looked 42:7
80:10 119:11
125:14 139:21
140:5
looking 80:15
106:6 107:19
125:24 139:8
loop 46:12
lose 71:15
lost 71:16
120:20
lot 16:18 22:23
53:22 54:23
56:7 68:6, 7
83:6 110:10
119:19, 20
137:10, 22, 23
149:19 155:1
156:1, 25 161:1
lots 88:3
low 17:7 19:24
20:1, 3, 6, 8, 14,

21 59:22 67:11
159:19
LOWELL 1:7
2:7 3:2 5:5, 9,
24 6:4 7:13, 16,
19, 23 8:3 9:3,
8, 13 10:13
11:3, 10, 14
12:16, 25 13:6
14:3, 8, 12 15:2,
15 16:9, 23
17:16, 24 18:3,
5, 11 19:4, 25
20:13, 20 21:4,
20 22:4, 10, 21
23:18 24:5, 17
25:22 26:8, 23
27:18 28:1, 12,
18 29:8 30:9,
21 31:9 32:12
33:9 34:1, 9
35:9, 21 36:6,
11 37:4 38:7
39:2 40:2, 19
41:22 42:1, 22
43:1, 4, 8, 14, 17
44:21 45:10, 14,
18 46:15, 24
48:4, 11, 13
49:9, 18 50:11,
17 51:3, 14, 18
52:16 53:3, 24
54:3, 9, 15 55:7,
23 56:17 57:22
58:3 59:9
63:13 64:10, 22
65:19 66:3, 21
67:2 68:1, 22
69:5, 25 70:9
71:16 72:8, 14
73:11, 24 74:3,
15, 23 75:11
76:12, 19, 25
77:8, 14 78:6
79:9 80:4, 7, 16
81:9, 11, 16
82:11 83:2, 15
84:2, 4, 19
85:13 86:1, 9,
18, 21, 25 87:3,
7, 12 88:2, 13
89:6, 10, 14
90:3, 5, 12, 17,
22 91:10, 21
92:3, 6, 11, 18

93:5 94:10, 14
95:20 96:1, 5,
14 97:13, 17
98:10, 21 99:2
100:4, 10, 16, 25
101:18, 24
102:8, 15
103:16, 22
104:7 105:8, 13
106:18 107:4,
23 108:3, 21
109:14, 25
110:2, 9, 23
111:11 112:19,
22 115:3, 8
116:1, 6, 17, 21
117:5, 8 118:12,
21 119:4 120:5,
8, 23 121:4, 16
122:15, 17, 20
123:23 125:20
126:15, 18
127:7, 12, 23
128:1, 5, 22, 25
129:7 130:7, 11,
23 131:2, 7, 13,
16, 23 133:14
134:3, 19 135:1,
13, 18, 23
136:24 138:13,
23 139:2, 7
140:12, 21
141:13 142:10,
25 143:14, 24
144:6, 11, 25
145:22 146:6,
19 147:15, 23
148:20, 23
149:3, 11, 19
150:7 151:12
152:4, 7, 11
154:7, 16
155:11 156:8,
12, 24 157:4, 8,
13 158:12
159:2, 18
160:20 161:8,
14, 21 162:1
163:3, 16
low-floor 13:10
120:12
LRT 5:7 15:16
20:24 150:19
LRV 16:22
22:7 41:8, 9, 13,

15, 16 123:20
155:14, 17
LRV2 41:22
43:19
LRV5 41:21
LRVs 31:20
37:12 40:17
155:13
Luc 141:19
Lucchini 131:12
132:18 133:11
Luke's 141:21
lumped 17:6

< M >
machine 117:12
machining 39:7
made 3:20, 22
17:19 23:13
31:2, 4, 25 32:5,
19 36:23 40:25
42:16 55:25
56:4, 8 60:12
95:5, 6 97:19
119:7 133:20
142:24 143:22
148:18 155:3
157:19 164:9
magic 150:9
mail 61:13
mailbox 101:10
main 15:25
42:11 43:11, 23,
25 44:4 45:15
46:4 47:1, 6
89:4 102:23
103:9, 23
129:25 139:5
162:5, 7
maintain 99:9
158:5
maintained
156:7
maintenance
7:18, 20 34:14,
15 35:25 36:4
119:9 124:8, 12
125:9 131:22
155:10, 24
156:11, 13
maintenance-
intensive 126:24
Mainville 2:2
3:3 5:6, 22 6:1
7:10, 14, 17, 22,

24 8:24 9:4, 9
10:9, 19, 25
11:7, 12 12:12,
22 13:2, 25
14:6, 9, 25
15:12 16:6, 20
17:13, 22, 25
18:4, 8, 20
19:22 20:11, 16
21:1, 17 22:1, 8,
18 23:12 24:2
25:20 26:3, 21
27:16, 23 28:10,
15 29:2 30:6,
19 31:7 32:9
33:7, 23 34:4
35:5, 18 36:2, 8
38:4, 22 39:23
40:15 41:19, 23
42:19, 23 43:2,
6, 13, 15 44:19
47:24 48:7, 12
49:7, 15 50:3,
16, 24 51:10, 16
52:11, 25 53:21,
25 54:7, 11
55:4, 21 56:11
57:19, 23 59:7
63:10 64:6, 20
65:16, 25 66:19,
24 67:21 68:17
69:1, 22 70:6
71:12 72:24
73:3, 23, 25
74:12, 20 75:9
76:10, 16, 21
77:3, 9 78:2
79:25 80:6, 14
81:7, 10, 12
82:8, 24 83:12,
22 84:3, 15
85:9, 23 86:7,
15, 19, 23 87:1,
4, 10, 24 88:10
89:3, 7, 11 90:1,
4, 10, 13, 21
91:6, 19, 24
92:5, 7, 14 93:2
94:8, 12 95:18,
23 96:2, 9
97:10, 14 98:7,
18, 24 100:1, 7,
11, 23 101:15,
20 102:4, 9
103:13, 20
104:3 105:5, 9
106:14 107:2,
17, 25 108:19
109:11, 20
110:7, 20 111:8
112:15, 20
115:1, 4, 24
116:3, 14, 18
117:3, 6 118:10,
17, 25 120:3, 6,
21 121:2, 12
122:12, 16, 18
123:17 125:18
126:12, 16
127:1, 9, 20, 24
128:3, 20, 23
129:2 130:5, 10,
21, 24 131:4, 9,
14, 19 133:8, 25
134:16, 22
135:10, 14, 19
136:21 138:10
140:7, 18
141:11 142:7,
20 143:10, 16
144:4, 9, 21
145:21 146:1,
14 147:12, 18
148:16, 21, 25
149:8, 16 150:4
151:9 152:2, 5,
8 154:4, 12
155:6 156:5, 9,
21 157:2, 5, 11
158:10, 20
160:16 161:5,
11, 19, 25
162:23 163:10,
17
major 123:12
144:12
makeup 99:23
making 55:9
144:18
manage 141:6
managed 58:19
59:6, 8 101:1
103:11 119:20
management
6:19, 20, 21
100:24 101:4
128:6, 8 139:9
147:17 156:23
manager 7:8
72:12, 15 91:16
141:3, 12, 20
142:3
manager's 141:5
managing 151:6
Manconi 157:15
mandated 22:3
manner 11:21
manpower
149:20, 21 152:6
manufacture
54:21
manufactured
35:7
manufacturing
21:3, 4 35:12
36:13
maple 152:21
March 49:20
margin 78:18
market 7:2, 4
22:17 26:25
61:3
marketing 6:23
Martineau 2:12
164:3, 18
mass 130:1
masters 6:13
material 14:23
60:21
materials 16:13
17:3, 10 59:20
maximum 22:6
26:12 45:3
49:21 79:11
meaning 71:15,
17
means 11:17
20:13 21:23
113:17 124:5
125:2
meant 20:3
77:19 109:24
measured 66:15
measurements
83:6 124:12
mechanical
27:8 30:24
31:24 82:15
93:10
mechanics 8:22
mechanism
123:16
mechanisms
135:22
meet 17:4 19:3
28:6, 8 30:17
31:23 34:21
72:1 129:19
130:2 137:13,
25 144:1
meeting 88:15
89:18 91:17
92:24 93:1
130:17 137:4
150:20, 24 164:9
meetings 78:1
79:11 84:20, 23
85:15 86:16
89:5, 12, 24
92:17 101:6, 7
157:15
melted 121:23
melting 121:24
Member 2:2, 3
memo 129:16
Memorandum
73:9
mentioned
16:24 21:19
24:12 29:9
30:15 36:25
45:5 130:17
133:1 153:17
merged 6:23
message 93:17
met 138:17
metal 120:17, 18
metal-to-metal
122:6 124:21
metaphorically
86:12
method 96:21
114:20
methods 126:3
metre 104:16
metres 19:10
25:2 78:11
metro 7:7
122:22 126:6
Michael 2:8
109:23 110:8
163:10, 12
microprocessors
11:18
middle 36:20
mid-February
5:13
mid-March 5:13
mid-September
162:18
mid-summer
56:1
miles 66:14
123:2
Millennium 37:8
Millien 141:23
millimetres
26:14 27:8
78:15 79:13
mine 140:22
141:8
minimum 39:18,
19 70:3 147:9
minor 32:12
59:2 66:11
minus 27:7
113:17 114:2,
17 139:25
minute 123:14
minutes 89:18,
24 103:1, 3
125:9, 17
misaligned
95:14 98:22, 23
misses 111:23
120:2
missing 127:21
mistaken 143:20
mitigate 56:15
63:2 95:19
142:9
mitigated 58:19
149:17
mitigation
142:8, 12, 18
159:10, 19
160:11
mitigations
58:21 63:19
128:16
mix 38:8, 18
99:11, 16
mod 53:20
model 13:4
19:1 35:10, 13
37:1, 2 38:7, 21
modes 15:23
modifications
114:9, 10 116:8
147:5
modify 129:17
mods 116:9

<p>momentarily 104:5 Monday 111:3 monitor 123:20 monitoring 28:7 monitors 19:20 Monteyne 141:19 months 38:15 54:5 56:3 86:22 morning 3:3 111:4 mortality 66:11, 25 67:15 motored 136:6 motoring 75:13 motors 136:3 motto 99:7 mountains 17:1 mounted 123:10 mounts 118:14 mouth 163:4 move 24:22 45:22 58:12 98:5 106:5, 8 142:13, 21 143:1 145:19 moved 36:18, 19, 21 108:10 141:18 Mover 37:23 74:8 moving 43:19 72:3 97:18 106:3 115:10 145:24 162:5 MSF 34:11, 22 35:7, 19 40:16 44:13 multiple 7:3, 6 8:9 25:10 28:4 29:13 35:10 40:19 57:12 88:5 140:14 155:13, 18 mutual 73:16 mutually-agreed 83:16</p> <p>< N > necessarily 50:22 58:8 66:20 83:7 87:23 162:20</p>	<p>necessary 58:6, 15 76:3 98:25 116:9 118:9 149:25 151:17 necessitated 111:6 needed 22:16 26:6 41:10 54:13, 17 79:15 87:15 88:12, 23 94:2, 17 needs 126:22 146:11 negotiation 23:6 neither 157:9 network 19:21 52:4 93:14 158:4, 6 160:4, 6, 10 networks 13:21 new 5:16 7:6 11:10, 13 13:17 14:22 15:1 16:21, 24 26:19, 22 28:19 31:4 32:16 33:1 41:3 55:16 60:4 64:11 68:3, 7, 12 77:16, 18, 24 82:14 88:16 99:5, 14, 15, 18 107:15 115:20 118:22 131:1, 11, 15, 20 146:22 148:15 150:18 newer 11:4 12:8, 23 nice 58:11 night 60:11 103:11 111:4 nightly 44:13 noise 125:3 noncompliance 59:5 64:4 noncompliant 58:18 nondestructive 134:9 nonsustainable 136:20 non- typographical</p>	<p>4:5 Nope 156:8 norm 82:23 148:15 normal 15:15, 17 30:3 55:20 67:20 112:4 121:17 147:21 148:4, 10 normally 11:5 24:10 36:9 54:1, 4 55:13 66:3, 6 North 6:24 7:1, 4 13:7, 10, 24 14:1, 2, 4, 14, 21 15:14 16:4, 8, 22 18:23 19:3, 16 22:7, 17 25:12 26:25 28:2, 4, 8 31:10, 17 122:25 notes 164:12 notice 5:10 124:24 noticed 132:17 146:7, 8, 21 November 6:18 43:18 84:7 94:6 95:15, 16 NRC 57:6 112:18 number 12:4 19:7 25:1, 13 32:14 33:12, 14 37:9 38:24 52:23 55:5 56:19 58:25 64:23 65:1 66:17 75:3 79:15 96:24 97:21 99:20 116:19 148:1 162:12 numbers 52:17, 22 53:18 nut 120:15, 25 nuts 39:13 nylon 121:22</p> <p>< O > object 4:25 objected 4:11 objective 39:17</p>	<p>objectives 28:7 125:15 obligated 153:1 observed 64:1 obstacle 154:8 obstacles 154:5 obtain 3:4 obvious 44:2 76:25 111:23 OC 161:5, 8, 9 occurrence 130:25 131:3 October 145:10 offer 8:10, 13, 19 73:15 offering 49:11 office 101:2 off-the-record 72:16 90:23 old 33:1 55:15 older 147:1 OLRT 123:18 127:4 133:10 OLRTC 7:15 8:16, 18 10:4, 14, 23 12:14 34:10, 21 49:5 63:5 72:18 73:15, 23 76:8, 14 77:4 80:8 86:2, 3, 7 87:4 88:11 89:1 91:20 92:8 97:11 98:8, 24 99:12 100:19, 20, 22 123:25 139:13 140:10 146:16 147:13, 16 157:6 158:25 159:2 OLRTC's 86:19 100:24 on-board 122:3 one-off 126:10, 17 ones 58:15 59:3 145:4 147:6 ongoing 88:9 125:19, 20 onset 13:10 40:23 61:22, 24 75:8 114:7 115:18 136:13 152:15</p>	<p>open 25:3 47:6, 19 50:15 61:3 70:23 102:1 103:2 104:19 106:3, 5 113:3 114:3 159:22 opened 8:19 47:21 48:17 60:4 opening 64:9 157:7 openly 62:20 146:20 147:3, 13 operate 15:23, 25 16:1 32:21 54:20 99:8 137:7 140:4 operates 16:2 operating 64:17, 19, 21 102:1 135:15 136:17 143:12 154:25 161:16, 17 162:8, 10, 13, 14 operation 49:22 111:20 129:9 operational 134:17 145:6 operations 138:22 143:21 146:4 160:17 operator 138:20, 25 159:10 operators 161:7, 12, 15, 23 162:2, 3 opinion 147:19 opportunity 4:1 opposed 18:24 19:2 30:3 142:6 optic 158:3 option 17:10 20:5 50:20 order 3:16 61:12 79:4 133:17, 23 orders 88:5 organized 9:16 oriented 129:25 original 35:16 60:18 69:8 70:17, 21 71:18 99:10 108:2 129:18 148:25</p>
---	---	--	--	---

<p>149:4 154:17 156:3 originally 38:13 56:20 108:8 130:12 133:11 O-train 129:18, 21 OTTAWA 1:6 5:7 7:9, 11 14:4 40:16 41:9, 11, 16 42:11, 16, 25 78:10 108:13, 17, 18, 24 109:10 113:12, 16 118:24 130:16 137:11 141:19, 20, 25 142:14, 21 outage 158:17 outcome 112:21 128:12 outline 82:15 outputs 94:17 outright 33:13 101:12 outset 98:20 148:17 outside 36:18 61:16 80:3 82:23 148:14 152:13 154:3 159:11 overall 15:5 25:13 27:1 31:16 33:5 99:25 115:4 153:7 157:1 overhaul 33:22 133:1, 4 overhead 60:10 overheated 120:22 123:13 124:21 overheating 120:23 121:13, 18 127:11 oversaw 7:2 oversee 85:24 overseeing 5:18 overshoot 137:22 oversight 141:1, 8</p>	<p>overspeed 137:21 owed 90:24 152:17 owned 96:7 owner 41:4 < P > p.m 1:16 163:19 package 8:21 10:7, 12 84:6 packed 68:14 paid 156:14 158:14 paint 59:16 152:23 painting 39:7 pandemic 154:11 155:1, 8 156:19 Pandora's 153:9 panels 25:5 parallel 56:24 112:9 parameters 73:10 139:17 parent 96:6 parked 103:11 110:24 111:5 Parliament 129:16 part 10:11, 15 15:3, 5 25:12, 14 28:25 35:15 48:24 76:1 99:23 102:20 106:15 112:3 113:25 114:4, 5 116:6 117:16 126:20 130:15 135:12 140:3 147:8 148:10 150:4 partially 25:18 121:23 participants 1:15 2:6 3:23 4:4 particular 11:9 12:13 21:2, 18 22:2 25:21 29:5 34:7 118:18</p>	<p>particularities 16:7 parties 89:13 105:23 partly 15:20 106:10 partnered 8:18 10:6 partners 29:18 partnership 99:7, 15 partnerships 99:18 parts 29:23, 25 39:9, 12 56:23 65:6 67:19 82:1 83:25 84:5, 10, 13 119:16 120:18 122:5 124:20 143:4 161:22 part-time 6:13 party 85:18 passed 70:18 93:18 123:14 passenger 25:24 104:5 105:2, 3 118:6 130:1 passengers 114:6 passing 65:8 pause 72:25 paying 156:15 pending 92:8 144:15 people 15:16 18:17 34:23 36:14 37:18, 21, 23 38:15, 20, 25 40:5 58:13 62:6, 22 63:22 68:9 74:8 99:3 100:17, 18 118:7 119:15 128:17 140:17 143:2 149:23 155:14, 17, 18, 20 156:25 158:16 159:7, 20 160:22 161:1 162:3, 4, 15 perceive 87:19</p>	<p>perceived 12:7 49:25 percent 19:24 20:1, 2, 8, 9, 10, 21 27:6 37:21 60:10 78:12, 15 123:15 percentile 113:13, 14 perception 105:16 157:9, 12 perfect 137:3 perfectly 24:23 perform 86:8 114:8 performance 12:20 32:19 46:7, 8 55:5, 8 103:21 112:25 113:7, 9 134:18 135:16 136:14, 20 137:4, 8, 16, 25 138:2, 3 139:15 146:2 performing 43:20 performs 51:20 period 63:15 66:2, 9, 13, 16 67:10, 16, 18 69:14 134:15 periodic 102:18 122:24 peripheries 82:5 perjury 4:22 permanent 64:4 permission 44:24 48:22 64:3 permit 21:24 48:16 65:2 permits 3:10 person 4:16 62:10 72:12, 15 81:1 89:4 personally 92:15 personnel 82:25 perspective 10:18 18:9 29:6, 7 36:3, 5 53:10 61:8 81:18 96:8 111:11 124:4, 23 125:16 127:21 144:22</p>	<p>phase 17:19 24:18 35:16 38:16 49:25 56:18 59:24 65:18 85:12 99:5 103:14 106:24 114:24 115:1 124:17 150:15 154:18, 20, 22 phased 32:24 phases 54:6 60:4 physical 13:13 51:5 105:4 159:23 physically 37:25 65:7 123:10 physics 137:9 pick 152:18 153:2 155:12 picking 124:15, 17 PICO 83:4, 14, 16 107:9, 11 picture 8:14 piece 49:8 85:11 107:7 136:22 pieces 23:13 piecewise 91:2 place 4:21 25:6 41:11 42:20 56:15 63:19 73:8 78:8 85:20 122:7 123:20 151:19 158:7, 9 159:6, 16 placing 19:11 24:14 plain 105:4 plan 34:13 35:17 40:21 42:23 56:20 71:5, 6 72:1 85:24 95:19, 21 108:2, 6, 16, 20, 23 115:25 128:7, 9 139:9, 10 142:18 149:1, 4 154:17 156:3 158:6, 9, 15 159:16</p>
---	--	---	--	--

<p>planned 22:5 41:4 158:18, 19 160:13 planning 20:4 35:4 85:10 90:14 108:5 109:9, 10 149:22 150:15 159:25 plans 109:22 142:8, 12 plastic 121:22 platform 19:20 24:9 26:17 47:16 63:21 78:8, 22 104:17 157:21 158:15 159:21 160:7, 8 platforms 27:15 157:24 play 101:12 120:17 players 99:16 plow 110:25 112:10 ploy 68:9 plugged 131:25 plugging 132:15 plugs 121:22 plus 25:2 27:7 113:17 114:18 119:14 plus/minus 78:10, 14 plus-minus 26:13 point 8:15 11:25 14:11 31:3, 13, 25 33:20 40:21, 25 50:8 62:11, 12, 19 63:9 64:25 69:21 70:5, 13, 16 78:22 79:1 80:8 81:5 84:10, 23 87:16 89:17 93:6, 13 96:6 97:15, 22 98:7 117:20 125:13, 25 126:23 130:16 132:17 138:16 144:12, 17 149:20 150:12</p>	<p>155:8 159:3, 8 163:6 points 97:4 127:10 151:20 poker 71:11 police 150:16 political 129:12 politically 67:16 politics 69:6, 18 portal 48:18 portion 14:20 44:8, 15 45:23 47:15 51:8 52:3 53:15 58:23 59:22 60:1 99:9, 13 100:5 128:2 148:2 portions 14:18 99:21 pose 62:9 posed 61:6 position 18:2 79:2 87:8, 13 98:15 141:17, 24 positive 143:1, 9 possibilities 42:8, 9 possibility 16:16 80:15 possible 48:8 50:9, 13 102:4 125:2, 14 136:3, 9 137:20 141:10 possibly 79:7 post 58:1 101:2 posted 3:18 post-opening 147:19 156:22 potential 39:24 61:9 127:5, 22 146:3, 16 potentially 11:8 14:22 22:20 33:20 80:22 121:13 Powell 2:8 power 6:5, 6, 7 96:24 97:2 103:2 113:22 practically 138:20 practice 14:13 103:7</p>	<p>predecessor 6:16 predicted 157:22 predominant 67:3 predominantly 141:8 preferred 8:17 preliminary 76:22 83:5 123:24 124:2 premeditated 61:15 premise 83:8 prepared 63:12 157:20 preparing 131:21 prescribed 111:13 PRESENT 2:11 presentation 17:19 presented 61:25 62:2, 14, 20 97:20 139:22 140:2 presenters 164:8 press 63:23 pressure 32:23 69:20 118:3 presume 7:23 pretty 70:1 146:20 prevent 65:8 126:22 preventable 117:11 prevented 81:14 134:23, 25 previous 12:10 26:24 31:20 118:12, 16 148:9 previously 29:11 previously- certified 145:13 price 98:3 143:15 primarily 149:9 primary 27:10 principal 5:17 prior 8:6 57:21 74:2 85:10, 18</p>	<p>88:1 110:22 117:13 133:20 140:5 149:7 161:19 private-public 99:7 privy 72:10 problem 30:15 33:3 35:24 40:3, 9, 23 58:18 71:21 75:25 76:1 81:21, 22, 23, 24 89:1 92:25 96:17 112:1 114:22 124:18 126:5, 8 135:25 136:13 problematic 25:8 38:14 problems 29:15 30:11 55:18 105:19 111:18 118:13 158:14 procedural 3:16 procedure 40:7 83:17 109:1 procedures 42:14, 18 proceed 5:10 11:20 23:9 proceeded 153:23 proceeding 4:20 proceedings 4:15 164:5 process 6:12 33:12 36:21 46:8, 19 55:13 63:8 76:17 77:12, 15 98:20 112:4 116:4, 25 117:15 119:9, 17 120:1, 14, 19 124:14 125:19 128:13 129:8, 9 131:20 133:4 134:11 146:24 148:10 152:14 153:17 processes 39:6, 15, 16 128:12 135:7</p>	<p>procurement 22:7 30:5, 10 40:24 produce 60:14 79:4 produced 60:11 128:21 product 13:12, 14 14:5 28:2, 3 31:18 109:6 120:11 production 15:8 35:20, 23, 25 36:3, 16 41:12 51:21 52:9, 17 66:11 67:5, 18 108:15, 16, 17, 20, 25 109:6, 8, 17, 18 110:12 142:2, 3, 6 147:25 148:18 products 6:24 8:13 29:20 profile 55:9, 10 136:18 profiles 135:21 profit 6:21 program 148:11 programmed 102:17 137:12 project 5:18, 20 7:9, 11 8:1, 8 11:9, 15 12:15, 24 13:9 19:6, 15 20:18 21:20 22:12, 19 29:6 32:4, 11 38:2 65:20 69:9 72:12, 14 74:2, 10 75:6 77:18 88:7 91:16 99:17 100:5, 15, 24 101:7 115:7 148:5 150:14 160:22 projects 7:3, 6 37:3, 4, 14, 18 41:5 66:3 74:4, 5, 16 99:11 151:13 prone 132:16 propagate 124:18 propensity 139:21</p>
--	--	--	---	---

<p>proper 38:1 71:23, 25 159:16 properly 34:24 51:11 70:19 proponent 8:17 proponents 8:10 9:15, 25 150:23 Proposal 8:9 14:15 prosecution 4:21 protected 132:1 protocols 93:14 prototype 41:25 48:3 51:13, 19 prototyped 114:10 prototypes 46:20 prove 48:20 51:19 proven 14:11, 13, 15, 17, 18 17:17, 21 18:2, 10, 14, 15, 18 23:23 provide 9:11 11:5 26:16 77:5 82:25 95:25 provided 11:2, 4 23:6 77:4 139:15 142:23 143:17 provides 4:9 providing 100:2 public 3:6, 15, 19 4:9, 24 Pueblo 42:15 108:12 purchase 29:24 purchased 32:4 purchaser 99:10 purpose 3:4 51:12 purposes 155:10 162:8 Pursuant 4:8 purview 142:19 push 138:3 pushed 115:9, 22 pushing 84:20 132:11</p>	<p>put 9:1 14:10 25:10 50:12 56:14 67:5 77:23 80:9, 13 84:17 86:13 88:5 91:21 92:12 95:4 132:18 151:18 153:21 158:7, 14 163:4 putting 81:6 < Q > qualification 41:14 46:10 50:2 108:7 109:14 110:3, 11 112:3 147:25 qualified 32:17 39:22 qualify 18:15 21:24 28:19 39:6 quality 6:19 29:7 33:11 40:4 47:2, 4, 7, 13 48:19 116:22 117:4 119:1, 7, 8, 10, 21, 25 135:2 141:4 question 4:11 5:1 71:14 75:7 143:17 158:21 questionable 122:1 133:3 questions 3:9, 11 23:19, 25 125:23 163:9, 13 quickly 41:11 quite 10:15 22:6 54:20 116:25 132:9 < R > R160 77:17 rack 79:20 82:3, 7 83:1 84:14 85:2 95:6, 9 97:5, 9 radio 23:3, 5 55:2 150:9, 10, 16, 21 151:13, 20 RAIL 1:6 15:16 16:4 20:15</p>	<p>110:15 119:2 122:21 123:17 126:6 127:2 130:8 133:8 137:18 162:2 railcar 40:7 132:9 railcars 114:15, 16 railway 129:19 railways 129:15, 20, 22 130:4 rain 140:1 rainfall 113:24 raining 137:14 raise 87:25 97:25 raised 58:17 60:25 119:1 ramp 21:10 24:24 ran 68:23 117:1 151:19 155:2 162:21 Randstad 38:10 range 17:4, 5 20:3 26:14 27:13 31:13 125:6 rate 67:10, 11, 20 78:15 110:14 read 119:5 readiness 64:8 146:4 157:6, 16 160:17 161:12, 15 ready 5:4 47:14 77:19 144:24 157:10 160:21, 23 real 40:10 70:11 79:24 114:15, 20 118:1 143:9 145:17 realistic 45:3 realize 87:14 realized 87:13 really 24:17 26:19 30:10, 14 34:1, 19 35:9 42:8 49:19 56:7 61:14 62:19 64:18 66:22 72:21</p>	<p>78:7 85:21 88:13 90:19 91:4 94:15 100:10, 25 101:1, 4 109:18 115:16 116:1 129:24 137:17 138:14 152:12 160:23 161:17, 24 162:9, 14, 19, 21 rearrange 71:7 reason 80:15 104:13 122:19 155:12 159:11 reasonably 15:23 99:22 reasons 154:24 reassigned 94:21 recall 84:6 92:15 103:16 104:3 107:18 127:2 144:5 receivable 4:18 receive 23:8 82:2, 20 received 83:2, 3, 11 84:5 90:7 94:5 107:6 131:24 receives 75:12 receiving 82:12 88:12 recessed 62:1, 4, 17 63:5 73:1 153:19 record 163:18 recorded 164:10 records 124:8 recreate 52:19 rectifications 147:20, 21 redesigned 30:17 redo 98:2 reduce 12:3 118:3 155:12 reduced 139:15 reference 22:13 23:14 127:11 references 128:13 referencing 27:25</p>	<p>referred 11:15 13:16 21:7 reflect 26:2 reflected 94:6 102:5 refused 49:1, 5 regard 77:13 regarding 146:4 regenerate 136:4 region 113:16 regular 31:8 109:15 regulate 129:4 regulated 129:12, 22 regulation 128:25 regulations 128:24 130:10, 11 regulatory 130:15 rejected 10:5 62:14 153:23 relate 16:7 related 9:5 27:19 59:5, 11 60:17 79:5 111:10 118:15 relates 8:1 96:13 relating 27:17 83:14 119:2 157:6 relation 30:7 relationship 73:7, 10, 13 86:5 relatively 20:14 154:1 relays 94:21 95:3 release 85:7 91:3 117:13 144:15 released 47:11 95:16 120:16 releases 89:22 reliability 6:20 12:17 39:25 40:4 58:12 66:10 67:7 78:15 145:7, 12, 23 146:2, 10 148:11 159:5, 20</p>
--	---	---	--	--

reliable 12:7
126:24 147:2
159:22
reliably 11:23
reliant 110:14
135:7
reluctant 95:24
remember
29:21 38:12
109:5 145:5
remotely 1:15
removal 133:10
remove 159:7, 8
removed 94:19
removing
119:16 132:3
rented 37:13
repaired 133:18
repairs 146:9
repeat 55:14, 16
repercussions
32:10, 13
replaced 33:21
60:20
replacing 134:13
Reporter 164:4,
19
REPORTER'S
164:1
representation
18:1
representing
100:21
Request 8:9
requested
89:17 92:18
118:9 132:18
requesting
63:14 75:20
requests 87:25
require 11:21
26:19, 21 39:6
55:2 81:18
118:18 135:3
138:25 163:16
required 4:23
20:7, 19 29:13
32:22 61:15, 22
62:15 77:18
79:3 82:25
83:6 102:13
146:9 147:21
151:15 159:20
requirement
12:14 19:2, 13,

19, 23 20:17
21:18 22:2
24:12, 15 25:21
26:4, 9, 11
27:25 28:9, 11,
13 35:8 47:2, 5
59:5 73:14, 18
75:21 76:7
89:25 116:22
151:6, 7 154:13
requirements
13:24 15:10
18:24 19:5, 14
21:11 25:25
26:10 28:6, 17
30:18 31:24
32:19 34:5
35:22 66:22
91:3 98:23
102:2 113:11
130:3 137:4
154:10
requires 21:21
52:1 129:16
136:1, 5 137:7
research 6:11
resilient 133:11
resistant 59:16
resolve 88:11
91:20 126:1
146:23
resolved 49:17
57:21 103:10
114:23
resolving 149:17
resource 142:5
resourced
101:17
resources
149:21 150:2
respect 18:25
27:20 32:20
38:23 73:15
80:1 82:9 88:3
148:3
respond 101:12
response 72:7
102:19 151:3
responsibilities
105:14
responsibility
98:9 105:11
140:21 141:6
160:5

responsible 7:1
49:8 86:4
97:24 100:2
105:20, 22, 25
106:1, 4, 16
107:22 140:25
141:4 146:17
156:11 160:8
rest 41:12
44:18 46:9
52:14 122:5
restricted 44:6
restricting 80:22
restriction 47:9
restrictions
50:5 110:17
result 12:13
18:23 117:13
136:4 140:8
149:9 151:17
resulted 131:20
resulting 56:15
148:19
results 120:24
RESUMED 73:2
retrofit 32:14,
24 33:16 53:6
60:14 63:8
115:17, 19, 22
119:9 151:25
153:25 154:9
retrofits 57:25
148:1, 6, 19
149:1, 24 154:5,
8, 21 155:3, 9
156:1
retrofitted 53:19
114:25
return 97:3
returned 7:2
133:18
Rev2 92:4
Rev3 90:7
revamp 150:15
revenue 58:7
63:16 103:18
111:25 133:15
144:16 146:13
147:5 149:13
reverse 45:25
46:1
reverted 92:1
review 4:2
141:9

reviewed 35:23
81:5 117:12, 13
119:12 153:20
reviews 23:20
Revision 92:5,
24 140:9
revisions 90:7
93:21
revisit 135:7
ride 47:2, 4, 7,
13 48:19 68:9
Rideau 99:4
ridership
154:15 155:4
rides 68:8
ridiculous
113:24
risk 12:24
22:20, 25 23:1
24:3 33:19
56:16 59:23
61:9, 10, 15
62:9, 22 63:2, 7,
19, 24, 25 64:11
103:4 126:13
127:11 128:15
risks 22:22
road 112:10
roadway 112:8
role 5:16 6:22
72:6 86:8, 20
100:8, 9 140:25
roles 5:17
roll 123:21
rolling 7:12 8:2
112:17
roof 16:10
29:11, 12 80:9,
13 81:6
room 57:7
86:14 113:1
114:11
root 117:7
121:3
roster 158:16
roughly 124:11
routine 46:9
RSA 49:15
57:21 58:1
69:24 70:8, 17,
22 71:14, 18
72:7 110:22
143:19, 23
144:2, 24 152:3

RTG 99:3, 14,
23 100:5, 12, 17
RTM 7:22
139:13 156:23
157:1, 9
rumoured 91:13
run 20:6 25:5
34:16 35:1
47:22 52:7
65:9 70:2
78:25 112:9
130:3 136:14
137:1, 17, 19
138:18 149:14
151:21 154:21,
25 155:22
156:2, 3, 19
running 24:25
25:9 34:24
35:25 54:24
56:2, 24 64:23
110:21 115:25
116:10, 13
117:20 149:24
155:13, 17
156:20 158:18
runs 78:23
129:21
Russia 17:2

< S >
safe 11:21
51:7 104:18
106:2, 7 128:19
144:20 145:20
safely 11:24
46:2
Safety 5:20
52:19 58:9, 16
59:4, 5, 12
61:19, 20 62:22
63:4, 6, 13 98:1
102:2, 20
104:14 105:18,
21, 22 106:11
117:22 119:11
123:18 124:16
127:2, 4, 25
128:6, 8, 11, 13,
14, 24, 25 129:4
130:6, 8, 14
133:9 141:2
144:13, 14, 18,
19, 22 145:1, 7,

18, 25 146:24
157:16, 22
salt 112:8
sand 70:14
137:23
saved 155:23
scale 76:14
scenarios
139:23
schedule 32:10,
13 34:3, 21
40:1, 2 56:14
57:14 64:16
71:1, 7 95:13
109:11, 13, 18
137:8, 13, 20
140:7, 9, 11, 14,
19, 22 141:6
147:24 148:14,
22, 24 152:10
162:22
schedules
40:20 76:15
98:22 140:15
scheduling 29:6
schematic
109:2, 3
scheme 33:5
103:2
schemes
123:10, 11
124:3 152:24
scope 49:13
115:12, 22
scratch 30:17
screwed 39:11
82:18
screws 132:11,
19, 21 133:5
seals 113:4
search 28:18
seasonal
109:21 110:10,
17
secondary
27:11 60:24
seconded
100:19
section 4:8, 9,
23 5:1 21:10
44:9 59:23 63:3
sections 61:21
sector 6:17
secure 10:1

28:8 119:18
security 61:15
seized 132:6
select 45:25
selected 7:25
8:12, 16, 21
9:10 27:21
self-contained
82:4
selling 143:15
semi-conductor
6:8
Senior 5:17
sense 6:3
36:23 101:16
155:4
separate 6:11
10:23 50:20
75:22 97:5
122:5
separated 65:7
separately 8:20
82:6 130:20
separation 51:7
September
43:10 47:7
50:14 65:11
69:24 70:23
71:19 116:19
145:9 155:19
serial 45:17, 18
76:20 110:3
serially 68:3
serious 34:9
seriously 98:9,
11
service 14:15
15:17 17:17, 21
18:2, 10, 14, 15,
18 22:10 33:18
35:22 47:11
58:7, 15 63:16
64:2 65:12, 24
66:6, 8, 22
68:24 69:17, 24
70:4, 11 103:18
111:25 116:10,
12 117:13
118:6, 8 119:20,
25 128:18
133:18 134:1
139:10 144:16
145:10 146:13
147:6, 7 149:13,
25 154:10, 14,

24 155:2, 3, 7,
15, 16 156:3, 6,
16, 20 157:7, 10,
14 158:5 161:18
service-proven
17:15
services 8:14
sessions 91:17
set 19:9 29:18
75:22 91:14
99:12 119:25
139:16 164:6
sets 25:10 46:8
setting 14:20, 24
shape 153:8
shared 3:23 4:4
sharper 68:4
shatter 60:19
Shawari 141:14
sheets 79:20
shift 44:23
142:1
shifts 45:1
shipping 37:14
131:21, 22
shop 45:19
124:13
short 58:20
61:10 67:10
shortage 57:16
Shorthand
164:4, 12, 19
shortly 56:12
69:24
shovel 158:3
show 15:3
109:15
shown 117:14
shut 44:14
sic 59:17
side 5:21
11:17 30:5
53:4 54:15
63:1 73:13
80:23 89:4
94:1, 25 95:4,
12 97:4, 6
98:15, 16
104:18 113:6, 8
114:12 157:18
sides 97:20
Siemens 9:21
77:23 107:15
sign 89:18

signal 54:18
96:10
signaling 9:2, 6,
11, 19, 24 10:11,
20 22:24 51:6,
15, 24 52:1, 4
53:3, 6, 7 55:1
56:6 74:14, 21
77:10 82:13
107:12, 16
149:15
signals 75:3, 5,
15 81:17 94:19,
20
signature 8:6
50:21
signed 7:18, 21
9:16 10:1, 6, 7,
14 58:22
significance
70:8 71:15, 17
significant
33:24 51:1
59:23 75:18
significantly
75:6 149:2
similar 15:7
32:2 122:2
131:5
simply 19:2
42:16 116:25
121:13 137:24
simulating
116:10
simulation
112:17, 18
simulations
65:13
single 11:21
12:4 68:23
155:22 156:2, 3
single-sourced
61:5
site 39:20 42:5
108:13, 14
112:6 118:1
143:6
sitting 57:17
114:18 133:6
size 85:2
skill 99:12
skills 41:11
SkyTrain 37:9
74:9 78:19

slide 137:24
139:21
slight 15:9
24:21
slightly 28:21
slip 16:17, 18
slippery 137:25
slopes 21:12
slow 155:7
slumped 121:23
smaller 37:18
155:4
SNC 99:22
100:2, 4, 20
snow 16:10, 13
111:1
snowing 137:14
soaked 114:17
soaking 114:15
soft 67:24 68:2
software 33:1
55:10 93:12
94:1 102:14
104:4, 8 145:8,
13, 15 146:21,
23 147:1
sold 13:14
17:2 28:4
133:22, 24
solemn 3:5
solve 126:3
somebody 23:6
61:6 63:21, 24
82:1 87:15
99:16
somewhat
19:19 154:23
sooner 111:7
sorry 28:10
64:20 109:23
158:21
sort 22:12
36:16 55:12
56:13 86:11
94:23 99:7
111:16 132:12
150:23 152:21
153:8
sought 100:8
source 60:1
sourced 29:15
sourcing 30:13
space 25:3, 9
35:12 36:15
37:13 62:23

<p>63:24 79:6 80:21 82:15 spacing 24:19 spare 132:14 151:19 speak 5:7 7:25 18:21 27:23 57:24 58:2, 3 59:8 67:23 69:2 71:12 72:8 73:3 100:23 107:25 115:5, 25 116:20 120:4 130:21 145:5 speaking 101:22 spec 12:19, 20 53:11 60:8 79:4, 8 84:20, 22 85:14 88:4, 8, 20 90:6, 8 92:1 95:16 special 16:11 39:6, 15 specialist 39:19, 20 specific 17:3 18:22 20:17 66:4 112:7 129:14, 24 131:25 159:4 specifically 5:8 59:3 60:23 102:17 127:10 129:1 137:2 161:12 specification 23:8 61:22 62:15 77:6 85:5, 7 89:22 90:25 96:16 113:11 136:1 138:16 specifications 76:11, 13 88:17 89:25 151:10 specified 51:20 96:23 specs 22:7 88:12 92:10 speculation 87:16, 23 98:13 speed 15:17 21:18 22:6, 11, 14 46:4 47:9</p>	<p>48:10 49:12, 21, 22 55:9 65:15 135:21 136:17 speeds 16:2 21:22 43:21 48:22 spend 111:21 116:14 spent 6:10, 25 7:5, 7 spin 137:23 Spirit 13:7 18:22 split 51:23 57:5, 12 58:14 108:10 spoke 34:4 127:3 spotter 157:21 158:24 159:23 spotters 157:24 158:7, 11, 13, 14, 16 159:17 SRT 74:7 stability 48:20 stabilized 53:5 staff 38:6 Stage 5:8 stages 60:2 76:21, 22 stand 144:19 standard 11:2, 5, 8 19:16 66:20, 22 93:14 103:6 113:15 114:15 122:10, 20 127:18 standards 18:23 19:3 112:5 129:4, 20 130:2, 6, 8 standdown 119:11 start 42:17 54:21 64:2 67:22, 23, 25 68:2, 3, 4, 5, 7, 12, 20 69:9, 14, 16, 20, 21 71:3, 4 99:17 114:2 134:12 143:21 144:15 145:10 148:18 149:13 157:10, 14</p>	<p>started 32:4 41:7, 14 45:8 56:18 84:9, 20, 22, 25 85:14, 15 86:16 87:21 130:12 141:13 145:13 146:25 157:10 162:11 starting 6:5 146:12 147:8 starts 99:4 128:6 state 37:21 65:2 116:12 154:19 stated 92:12 statements 164:8 static 57:9 83:13, 16 107:8, 11 statically 45:19 57:2 station 50:19 137:22 160:2, 9 stations 26:5 44:10 49:1 50:6 statistics 67:7 status 62:25 106:7 109:16 stay 81:3 steam 158:3 Stenographer/Tra nscriptionist 2:12 stenographically 164:10 step 24:23 26:12 33:2 35:6 36:25 116:24 118:23 steps 20:25 step-up 20:15 stick 132:22 stock 7:12 8:2 112:17 132:14 Stop 32:1 145:23 147:7 stopped 105:2 stopping 78:21, 22 146:12 stops 158:4 straight 48:25 82:17</p>	<p>stranded 103:24 strategy 28:2 streets 16:1 20:6 strength 15:10 22:15 strengthened 119:19 stress 31:24 stressed 134:14 stresses 67:4 stretched 54:12, 16 stricter 28:9 stroked 59:17 structural 15:18, 21 22:15 30:23 structure 13:13, 23 15:6 22:15 29:11 157:1 stuck 98:14 105:3, 4 studies 128:14 157:22 study 67:7 stuff 51:5 style 101:4 152:11, 16 153:17 subcontract 91:8 107:3 subcontracted 86:2 subcontractors 39:21 subject 121:16 134:14 submission 153:22 submitted 63:6 submitting 140:9 subsidiaries 29:19 substandard 134:24 substantial 53:20 substantiate 89:21 substantively 101:13 subsystems 105:6</p>	<p>sudden 68:5 sufficient 38:24 sufficiently 38:25 101:17 suggest 9:14 suggests 123:18 133:9 suit 20:22 91:2 146:11 suitable 36:4 suiting 135:21 suits 25:11 summer 48:5 94:4 110:19 144:7 sunshine 140:1 supplement 160:1 supplied 10:22 13:3 15:7 supplier 8:18 28:21 29:9, 16 31:1, 6, 13, 16 33:11 50:23 106:22 121:6 131:11, 15 135:2, 4 150:11, 25 suppliers 9:17 10:3 14:14 28:19, 20 29:4 31:8, 11 86:14 supply 10:20 14:21, 24 15:9 16:25 26:7 27:17, 19 29:10 30:1, 3, 7, 10, 12 34:6 37:11 38:10 75:3 97:1 supplying 37:12 64:14 74:18 support 35:2 41:6 73:15 99:24 143:3, 6 154:10 supported 31:6 supposed 139:7, 8 surfaced 130:22 surprised 112:12 surveillance 135:3 suspension 26:16 27:10, 11</p>
--	---	--	--	---

<p>suspicious 134:8 sustain 117:21 136:17 sustained 67:11 Sweden 16:25 sweep 119:17 switch 42:5 127:17 138:21 switches 127:17 symptoms 122:5 System 5:18, 19 7:7 9:2, 7 10:11, 20 11:1, 2, 8, 20 12:8, 23 13:19 16:12 25:24 26:1 39:25 44:18 47:5, 17, 20, 21 49:10, 22 50:13 51:4 52:7, 10 55:3 63:22 64:11, 13, 19, 24 65:14 68:7 69:10, 19 70:20 71:6 74:21 75:16, 24 76:4 78:23 80:2 86:13 87:9, 19 93:8 98:8 102:19 103:17 104:12, 14 110:5 111:20 113:10 122:13 126:10 135:15 136:18 137:11, 12, 18 138:1, 5, 7, 14, 24 139:15 140:24 145:14, 16, 18 146:22 148:9, 15 149:15 150:16, 18 157:17, 23 158:14, 17, 18 159:12, 21, 22 160:2, 8, 12 161:3, 16 systemically 33:17 systems 6:8 8:11 12:9 13:19 14:17 24:1 51:2 64:8 68:3 73:5 74:2, 14 77:11 78:13</p>	<p>84:17, 18 85:11 86:24 87:6, 25 90:14 97:11 98:25 114:2 123:20 128:11 129:10 139:3 system's 100:3 < T > tabled 91:18 takes 115:19 128:5 146:25 158:2 talk 108:1 140:17 160:21 talking 80:18 109:25 110:2, 4 116:15 tapped 160:7 target 72:3 78:9 tasked 149:24 team 99:19 tear 155:23 technical 7:8 26:15 89:15 101:14 140:22 158:13 technically 92:22 Technician 2:13 technologies 16:23 18:13 technology 7:3 13:10 18:19 23:15, 17 26:18, 20 30:1 32:6 78:14, 16, 17, 19 temp 40:12 temperature 17:4, 5, 7, 8 112:24 113:19 121:24 124:4, 5 139:24 temperatures 113:10, 15 121:20 123:20 temple 64:21 tempo 64:17, 19, 22 154:25 161:17 temporary 64:4 tempos 162:14 temps 40:12 tend 4:13</p>	<p>tendency 60:19 tenders 7:1 term 41:5 58:19, 20 61:10 67:17 terminals 95:4 terminated 6:13 terms 6:1 12:24 13:2 14:8, 9 16:9 19:1, 4 24:3, 5 26:6, 16 27:1 29:21 30:9, 10, 13, 21 32:13 34:7, 10 38:23 45:5 47:22 52:13 55:8 56:13 67:21 69:3 70:7 73:7, 20 76:20 77:9 85:24 88:11 90:5 91:14 93:7 102:11 105:18 106:19 107:18 109:9 110:10, 17 111:20 116:18 118:12, 13, 16 119:8 121:9 135:10 139:17 142:15 144:22, 23 145:2 146:2, 3 161:11 test 6:20 30:16, 24 42:2, 11, 18 43:7 44:22 45:11 47:4, 15, 20 48:9 49:12 52:8, 9, 21 64:18 83:1 102:16 103:9 104:1 106:25 109:4 110:13 114:20 134:10 161:20 testable 111:12 tested 82:7, 22 83:4, 9 84:14 108:24 110:18 testing 41:18, 20, 25 42:4, 8, 9, 13, 15, 24 43:12 44:15, 20 45:5, 8, 14, 17, 19, 20, 24 46:7, 9, 10,</p>	<p>13, 25 47:25 48:2, 23 49:11, 24 50:4, 8, 10, 25 51:11 52:12 53:2 54:1 55:6 57:4, 7, 10, 17 59:21 83:11, 14, 16, 19 102:18, 19 103:14, 17 106:21 107:9 108:1, 5, 7, 11, 12, 15, 17, 20 109:6, 12, 15, 22 110:1, 3, 4, 11, 12, 17 111:5, 9, 14 113:1, 25 115:5, 21 134:9 142:13 143:19, 23 144:5 162:8 tests 41:15 51:22 57:10, 12 102:12 109:8 Texelis 121:6 Thales 9:23 10:14, 15, 19 11:1, 25 12:9 22:24 51:1, 3 57:10 72:17 73:4, 7, 14, 17, 19, 20 74:6, 13, 21 75:2, 19 76:7, 10, 17 77:4 78:4 79:2, 6 81:14, 22, 24 82:24 83:18, 20, 24 84:11, 18 86:2, 6, 17 89:2 90:11, 19 91:12, 16 92:8 93:3 94:9 95:25 96:3, 7, 12 97:22, 25 98:13, 15 101:21 102:6, 17 103:25 105:11, 14, 16, 20, 25 106:6, 16 107:10, 23 136:22 137:1 138:12 139:3, 15 149:9 Thaless 74:2 theirs 10:4 thing 9:13 19:5 66:5 75:19</p>	<p>76:4 85:3 94:15 105:17 110:1 115:15 150:13 158:4 things 14:18 16:18 19:16 23:21 26:2 27:3, 4, 9 30:12 33:5 34:18 39:8 41:7 44:2 48:6 54:23 55:2, 12, 18 56:24 58:5, 8, 10, 17 61:18 66:12 67:2, 5 71:8 82:23 85:1 93:21, 23 97:18 98:6 105:23 106:2 111:15, 19 113:2 125:12 133:2 139:23 141:7, 9 145:6, 16, 23 146:7, 9 148:6 152:20 154:17 156:1 162:9 thinking 34:20 third 62:25 third-party 38:9 thought 34:23 64:16 84:17 93:17 107:21 thousand 66:14 thousands 123:2 threaded 131:25 132:10 threat 61:6, 14 threshold 26:13 thrown 150:3 thrust 75:12 tied 160:17 tight 80:24 132:7 143:12 time 3:9 5:14 9:20 22:23 23:19 31:14 38:12 40:21 42:12, 17 43:9 44:15, 17, 23, 24 45:2 49:20 50:8 54:20 57:15 63:15 64:8, 18, 25</p>
---	---	---	---	---

65:5, 10, 14, 23 66:9 67:10, 16, 18 69:4, 14, 25 70:5 71:10 74:11, 21 76:14 79:20, 23 84:24 87:17 88:4, 6 89:10 93:6, 21 97:16 98:8 99:9 102:12, 22 103:19 104:15, 16 108:22 111:21 114:18 115:19 116:15 117:17, 18, 20 118:4 138:18 142:5, 11, 24 146:8 147:25 151:11 152:20 157:7, 23 159:3 161:1 162:24 164:6, 9 timeframe 53:22 timeline 33:25 46:22 87:22 124:6 timelines 45:5 times 30:25 68:6, 11 93:3 97:21 103:3 156:4 157:25 time-to-time 105:18 109:2 timing 43:18 tires 132:4 today 49:22 67:17 103:25 106:13 121:9 158:8 159:24 today's 3:4 told 79:10 tolerance 27:14 tolerancing 82:16 tooling 36:14 39:19 top 20:15 36:17 59:10 125:25 topics 163:8 Toronto 74:7 129:23 torque 117:10, 12, 15	torquing 116:25 118:19 total 7:5 28:25 47:20 85:16, 21 96:25 131:17 153:15 156:14 totally 105:21, 22 148:14 touch 28:25 towing 71:9 traceability 89:25 119:8 traced 14:16 track 15:25 21:23 42:2 43:7 44:5, 6, 22 45:11 48:15, 16, 17 49:11 50:1 51:6, 8 52:1 65:4, 6 101:25 104:16 110:25 129:21 137:6, 24 142:16, 23 143:9, 18 144:2 161:20 tracks 47:5 traction 74:18 136:3 Train 5:18, 19 13:17 15:1, 5, 6, 22 16:21 17:11 18:12 19:8, 10, 21 21:15 24:13, 16 25:7, 19 39:4 44:13 45:24 48:20 51:14, 18, 20, 22 53:18 54:24, 25 56:3, 25 57:3, 5, 8, 9 58:6 65:4, 5 66:18 75:4, 12, 13, 16, 22, 24 78:3, 8 79:6 80:1 81:13, 19 95:1, 6, 12 96:18 102:23, 24 103:9, 11, 23 104:2, 15, 17 106:1, 5, 7 113:5, 6, 22, 24 114:21 117:2 118:7 131:3 135:20 137:1, 5 138:20, 25 139:4 140:19,	24 141:3, 5, 12, 15 143:6, 15 144:20 145:3 147:11 151:20 152:13 153:8 155:20 162:1, 5, 6 training 43:20 138:7 161:1, 20 trains 7:12 9:2, 12 10:21 13:3 15:7, 13 16:25 18:25 19:17 34:8, 16, 24 35:1, 2, 6 39:1 50:12 51:7 52:13 54:19 56:23 57:16, 18 63:22 64:23 65:8, 10 66:6, 8 68:3 74:13, 22 77:19 101:25 102:1 117:17, 18, 19 118:5, 6 122:14, 23 123:13 131:1, 6 134:18 140:4 144:23 146:12 152:22 154:18, 21 155:2 161:2 162:7, 8, 10, 12, 15 Tram 13:17 tramway 16:2 transcribed 3:12 transcript 3:14, 18, 21 4:2, 3, 7 164:12 transfer 7:3 99:10 transferred 128:16 141:17 transit 23:24 74:8 99:4, 5 129:9, 23 130:1 150:18 transition 157:3 transitioned 5:15 36:19, 20 transparently 32:21 Transpo 161:6, 9 TRANSPORT 1:7 2:7 130:14	Transportation 5:25 6:17 42:10 123:5 130:14 trapped 104:5 travel 130:1 tremendous 119:7 trial 4:19 115:25 116:9, 12 trucks 150:18 true 66:18 trying 35:1 43:17 45:1 72:1, 5 89:18, 23 106:8 112:5 136:14 137:19 138:18 159:7 162:13 163:3 TSB 119:2 130:19 133:9 TSB's 123:17 127:2 TTNG 13:17 15:20 22:11 118:22 121:11 122:3 tuning 46:7 78:7, 21 tunnel 44:1 47:6, 9, 18, 19 50:14 70:23 turn 34:16 60:9 138:2 turnaround 118:4 turned 60:13 72:19 Turner 87:3 turnkey 8:11 type 72:12, 15 129:5 types 65:13 typical 35:19 111:15 typically 51:12 65:17 77:11 129:4 typos 4:2 < U > ultimate 47:3 125:6 138:13 146:11	ultimately 8:21 9:5 10:20 36:22 41:8, 13 42:21, 22 43:3 71:14 83:13, 15 87:7 97:19 102:3, 25 108:13 120:17 139:12 141:19 149:6 151:15 unaware 102:6 unbolting 119:15 uncommitted 95:2 under-resourced 101:19 understand 13:3 17:14 19:23 26:3 35:19 40:5 45:7 76:17 79:5 83:23 87:5 91:25 92:22 93:3 102:16 112:16 118:2 121:3 135:11 138:9 150:14 157:20 understanding 8:8, 23 9:10, 15 10:8, 13 11:1 17:16 18:6 27:19 29:3 30:20 73:9, 11 86:1 100:6 108:6 120:7 129:3, 8 131:7, 23 136:25 137:19 143:11 144:1 147:15 152:16 153:1 understandings 89:15 understood 63:7, 17, 18 70:5, 7, 15 75:20 85:16 96:20 138:15 139:14 undone 121:1 unexpected 67:1, 2 unexplained 67:4
---	---	---	--	--

<p>unfinalized 81:13 unfolded 43:16 unique 19:19 61:4 118:20 unit 32:23 82:21 155:22 units 155:13, 18 university 6:5 unlocked 127:6 unnatural 105:10 unrealistic 72:2 unsubstantiated 8:5 unterminated 151:22 unusual 130:25 131:3 updates 109:15 useless 125:17 usual 38:5 UTDC 74:17 utilization 118:7</p> <p>< V > V5 140:10, 13, 16 validate 49:3 51:12, 18 52:2, 6 56:21 validated 46:21 47:10 validation 41:25 42:24 45:17 46:6, 13, 16, 25 47:25 48:2 50:8, 9, 25 51:9, 11 52:8, 12, 24 53:2 54:1, 5, 22, 25 55:6, 14, 15 56:18, 19, 23 57:1 102:21 Valo 2:8 109:23 110:8 163:12 valving 32:22 Vancouver 68:13 variables 93:18 variants 153:3, 5, 11, 12 varies 37:19 various 115:6</p>	<p>vehicle 5:11, 21 8:18 10:3 11:17 13:13 14:11 15:10, 17 16:5 17:15 21:21, 25 22:4, 6, 13, 14, 15 24:7, 21, 22 25:7, 8, 11, 15 26:2, 17 31:14 32:16 33:15 34:25 39:10, 18 41:1, 17, 20 45:21 48:2 51:25 52:2, 20, 21 54:5 58:7 59:13 60:1 61:17, 25 62:1 63:1 68:24 74:6, 17 77:24 78:25 82:4 87:20 106:23 107:6, 13 108:11 110:25 111:2 114:7 116:9 119:12 121:19 128:10, 19 129:5 130:2 133:18 134:6 136:1, 4, 7, 16, 19 137:3, 5, 7 143:6 154:1 157:18 160:12 vehicle-mounted 24:10 vehicles 8:20 9:6 10:2 13:20, 22 20:6, 21 31:13 32:14, 17 33:25 34:12, 15 37:9 47:22 49:16 51:20 52:18, 23 56:19 63:16 64:14 65:1 68:14 69:23 83:14 87:21 108:9, 17 110:6, 7, 9, 21, 23 115:12 116:11 120:12 122:21, 22 124:9 129:19 130:9 133:15, 19, 24 134:1, 20 143:1, 2, 3</p>	<p>149:6 151:8 154:9, 13 155:25 vendor 53:16 vendors 14:22 ventilating 16:12 version 11:4 33:1, 2 88:16 92:19 104:8, 21 145:8 147:1 versions 90:9, 25 versus 97:22 114:20 147:25 156:14 viable 126:2, 10 vibration 125:3 Videoconferenci ng 1:14 view 19:20 31:23 65:23 73:21 87:17 94:23 142:25 143:8, 9, 11 158:20 160:16, 22 161:13 163:6 viewed 33:14 40:22 41:10 59:23 71:19 96:8 99:24 viewing 47:17 63:21 157:18 Virtual 2:13 virtually 15:4 18:12 24:6 39:13 48:25 64:18 67:8 148:5 visibility 91:7, 11 vision 40:13 visually 62:6, 8, 9 vital 11:19 VOBC 12:2 VOBCs 11:22 12:4 voltage 6:11 volume 79:24 80:17 85:17 volumes 60:22</p> <p>< W > Wabtec 31:15, 16, 19 32:3 wait 61:12</p>	<p>waiting 89:8 93:4 waive 63:12, 14 waiver 60:23 62:13 63:10 64:4 waivers 58:16, 20 63:13 128:17 walk 20:24 43:23, 24 walking 72:18 wanted 46:11 61:4 62:16 154:25 wanting 23:14 wants 33:6 warning 124:23, 25 125:9, 11, 17 water 114:21 wayside 24:9 50:17 52:3 121:18 123:11 wear 27:6, 9 155:23 weather 135:16 137:15, 21 139:8, 9, 11, 22 website 3:19 weed 66:10 week 68:10 103:18 weeks 146:25 161:16, 24 162:17, 21 welded 29:12 welding 39:7 west 37:10 47:18 western 48:18, 24 whatsoever 73:13 86:6 wheel 27:6, 9 110:15 120:10, 20 127:14 130:22 131:11 132:3, 8, 11, 12, 19, 23 133:5, 6 134:13 135:11 139:20 wheels 131:21, 22, 24 132:5, 13, 14, 25 133:11 134:12, 13, 17</p>	<p>When's 69:19 white 62:8 wholly 34:21 98:22 wider 78:17 width 79:14 Wi-Fi 19:21 52:5 willing 70:25 71:8 win 14:5 wind 31:12 99:20 window 114:23 windshield 60:12 114:13 windshields 113:4 winter 16:8 110:18, 22, 24 111:10, 15, 18, 22, 24, 25 112:16, 18, 25 135:16 136:16 winterization 16:7 win-win 10:1 wire 53:10, 16 97:3 wires 93:9 97:5, 8 151:19 wire-to 53:10 wiring 77:21 94:25 95:5, 7, 11 151:16 wish 123:19 withdraw 154:20 withdrawn 155:25 withdrew 62:21 withstand 12:5 59:12, 21 witness 4:10, 13, 17 won't 145:19 wore 100:18 work 5:23, 24 16:15 29:14 33:6 37:24 38:1, 18 39:1, 14, 20, 21 53:6, 22 55:11 58:6 74:9 77:21 85:1 87:17, 20 88:18 89:24</p>
--	--	---	--	--

<p>90:8 91:20 94:25 99:16 107:16 115:16 133:17, 23 138:5 142:1 148:8 149:4, 12 159:21 workable 71:22 worked 6:17 24:18 27:12 35:15 36:15 37:3 77:18 95:11 112:13 161:2, 3 workforce 38:5, 14 working 6:10 40:12 70:16 72:22 74:1 76:23 92:9, 21 140:20 works 52:3 129:8 160:12 161:9 workshop 122:23 workshops 86:16, 20 89:4 92:16 world 13:5 17:10 worldwide 38:19 worse 103:4 139:24 worst 139:22 wound 97:23 wrap 163:1 write 135:9 writing 138:16 written 42:14 wrong 53:12 112:2 143:4 wrote 128:1</p> <p>< Y > yard 43:19, 20 46:3 Yeah 21:20 52:16 59:9 71:18 98:21 102:8 115:3 142:25 146:6 152:4 year 7:8 53:12 123:13 138:9</p>	<p>years 6:10, 25 7:5 13:9 33:17, 21 38:15 85:8 87:22 88:7, 21 95:22 154:2 yet-to-be- defined 23:2 York 7:7 41:3 77:16, 18, 24 82:14 107:15 Yup 28:1 104:7 105:8 120:5 130:23 131:13 135:18 144:11</p> <p>< Z > zero 139:25 Zoom 1:14</p>			
---	---	--	--	--