

Ottawa Light Rail Commission

Greg Barstow
on Monday, May 9, 2022



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OTTAWA LIGHT RAIL COMMISSION
STV INC. - GREG BARSTOW
May 9, 2022

--- Held via Zoom Videoconferencing, with all
participants attending remotely, on the 9th day of
May, 2022, 2:00 p.m. to 5:03 p.m.

1 COMMISSION COUNSEL:

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3 Christine Mainville, Co-Lead Counsel Member

4 Carly Peddle, Commission Counsel Member

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7 PARTICIPANTS:

8

9 Greg Barstow - STV Inc.

10 Michael O'Brien, Esq. & and Theodore Milosevic,

11 Esq., Tyr LLP - Counsel for Greg Barstow

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13

14 ALSO PRESENT:

15

16 Carissa Stabbler, Stenographer/Transcriptionist

17 Alicia Sims, Virtual Technician

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I N D E X

WITNESS: GREG BARSTOW

I N D E X

INDEX OF EXHIBITS

NUMBER/DESCRIPTION

PAGE/LINE NO.

(NONE MARKED)

1 -- Upon commencing at 2:00 p.m. --

2 GREG BARSTOW: AFFIRMED.

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

7 This will be a collaborative interview
8 such that my co-counsel, Ms. Mainville, may
9 intervene to ask questions, and in this case, it
10 will be me who will be intervening to ask
11 questions. If time permits, your counsel may also
12 ask follow-up questions at the end of this
13 interview.

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

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

1 evidence.

2 You'll be given the opportunity to
3 review your transcript and correct any typos or
4 other errors before the transcript is shared with
5 the participants or entered into evidence. Any
6 non-typographical corrections made will be appended
7 to the transcript.

8 Pursuant to Section 33(6) of the Public
9 Inquiries Act, a witness at an inquiry shall be
10 deemed to have objected to answer any question
11 asked of him or her upon the ground that his or her
12 answer may tend to incriminate the witness or may
13 tend to establish his or her liability to civil
14 proceedings at the instance of the Crown or of any
15 person, and no answer given by a witness at an
16 inquiry shall be used or be receivable in evidence
17 against him or her in any trial or other
18 proceedings against him or her thereafter taking
19 place, other than a prosecution for perjury in
20 giving evidence.

21 As required by Section 33(7) of that
22 act, you are hereby advised that you have the right
23 to object to answer any question under Section 5 of
24 the Canada Evidence Act.

25 So as Ms. Mainville mentioned, if you

1 need any breaks, just let us know.

2 GREG BARSTOW: Okay.

3 CHRISTINE MAINVILLE: Thank you, Carly.

4 Mr. Barstow, you work for STV; correct?

5 GREG BARSTOW: Correct.

6 CHRISTINE MAINVILLE: Can you tell us
7 what that company does?

8 GREG BARSTOW: Well, it's a large
9 engineering company that guides agencies,
10 authorities in the design of projects.

11 CHRISTINE MAINVILLE: And what
12 experience does it have in rail specifically?

13 GREG BARSTOW: I believe there's about
14 80 people in the rail vehicle department, and I
15 believe about 20 years of experience.

16 CHRISTINE MAINVILLE: Okay. And does
17 that include you?

18 GREG BARSTOW: I have -- I started in
19 2008, so I have 14 years.

20 CHRISTINE MAINVILLE: You started in
21 2008 at STV or in the rail industry?

22 GREG BARSTOW: STV.

23 CHRISTINE MAINVILLE: Okay. So could
24 you -- and am I right, I don't think we received a
25 CV from you; correct?

1 GREG BARSTOW: You don't. You haven't.

2 CHRISTINE MAINVILLE: Okay. So can you
3 tell us a bit about your background and experience?

4 GREG BARSTOW: Yes. I started in the
5 industry in 1992 working for Morrison-Knudsen,
6 which is a railcar designer.

7 In 1995, I went to Siemens, another
8 designer of railcars. Ten years there. Then I
9 went to Booz Allen Hamilton, which is a consulting
10 firm on rail, for 4 years and now the 14 years at
11 STV.

12 CHRISTINE MAINVILLE: And what's your
13 title at STV?

14 GREG BARSTOW: Engineering specialist.

15 CHRISTINE MAINVILLE: And are you an
16 engineer?

17 GREG BARSTOW: Yes.

18 CHRISTINE MAINVILLE: Okay. And could
19 you -- I understand that STV had two main roles in
20 Stage 1 of Ottawa's LRT project. Could you tell us
21 if that's accurate to your understanding and
22 whether you were involved in both aspects of that
23 work?

24 GREG BARSTOW: I'm not sure what two
25 roles you're speaking of.

1 CHRISTINE MAINVILLE: So it was
2 involved in the design and engineering of the
3 project and later -- support during construction in
4 later phases.

5 GREG BARSTOW: I wouldn't say the
6 design. I would say our role was to support the
7 City in reviewing designs.

8 CHRISTINE MAINVILLE: Okay. So was
9 that its main role on the project?

10 GREG BARSTOW: That was my main role on
11 the project.

12 CHRISTINE MAINVILLE: Okay. So why
13 don't you tell us about your personal involvement,
14 the time frame for that and what it revolved
15 around.

16 GREG BARSTOW: Started in early 2011.
17 We were tasked to come up with a concept report for
18 the vehicle. Then we -- once the car builder was
19 selected, we reviewed -- received documentation,
20 design packages and reviewed them, made comments.

21 My role started to phase down when the
22 design was complete and the first vehicle was
23 on-site, and I had limited involvement after that,
24 which was, say, 2017, 2018.

25 CHRISTINE MAINVILLE: Okay. So if we

1 go back to 2011, what was the concept report for
2 the vehicle that you would have worked on?

3 GREG BARSTOW: The concept report would
4 be a precursor to the specification. The concept
5 report puts together basically, like, a list of
6 requirements for the vehicle. This list would be
7 based on needs from the customer, Canadian
8 standards for design, industry norms, et cetera.

9 CHRISTINE MAINVILLE: Okay. And I take
10 it you have some level of expertise in rolling
11 stock?

12 GREG BARSTOW: Yes.

13 CHRISTINE MAINVILLE: And what about
14 light rail vehicles in particular?

15 GREG BARSTOW: Yes.

16 CHRISTINE MAINVILLE: And were you
17 working mostly by yourself on that, or was there a
18 team of you?

19 GREG BARSTOW: There was -- I had a
20 partner, Peter Tabolt, and we worked for Scott
21 Krieger. There was others on-site in Canada, Keith
22 MacKenzie.

23 CHRISTINE MAINVILLE: All from STV?

24 GREG BARSTOW: All from STV.

25 CHRISTINE MAINVILLE: I take it STV was

1 part of a consortium at that point in time, Capital
2 Transit Partners?

3 GREG BARSTOW: Correct.

4 CHRISTINE MAINVILLE: But STV was
5 primarily responsible for the rolling stock?

6 GREG BARSTOW: Yes.

7 CHRISTINE MAINVILLE: And did you start
8 out from anything in particular? Did you have a
9 starting point when you were asked to devise this
10 concept report for the rolling stock?

11 GREG BARSTOW: Well, we had the basic
12 understanding of the framework of the project, type
13 of vehicle that was desired.

14 CHRISTINE MAINVILLE: And what was
15 that?

16 GREG BARSTOW: Light rail.

17 CHRISTINE MAINVILLE: So did your team
18 have any involvement in the decision to -- or the
19 decision or considerations that went into selecting
20 light rail as the mode of transit?

21 GREG BARSTOW: Not to my knowledge.

22 CHRISTINE MAINVILLE: So that was
23 pretty much determined by the time you came on
24 board?

25 GREG BARSTOW: When I came on board,

1 that was determined.

2 CHRISTINE MAINVILLE: Okay. And what
3 other understandings did you have about the
4 client's needs and basic requirements?

5 GREG BARSTOW: The main goal was to
6 ensure that a service-proven vehicle was provided.
7 The intent was not to have to redesign a new
8 vehicle, and the vehicle had to be proven in the
9 environment to which it would be delivered,
10 climatically.

11 CHRISTINE MAINVILLE: And what was your
12 view as to whether that could be achieved?

13 GREG BARSTOW: I was sure it could be
14 achieved.

15 CHRISTINE MAINVILLE: Okay. Is it your
16 view that it was, that the vehicle selected was
17 service proven in this respect?

18 GREG BARSTOW: I don't believe that it
19 had been.

20 CHRISTINE MAINVILLE: Sorry?

21 GREG BARSTOW: I don't believe that it
22 had been service proven in the environment.

23 CHRISTINE MAINVILLE: And so do you
24 have any knowledge of how it came to be selected?

25 GREG BARSTOW: Three companies were

1 selected, consortiums who moved forward with the
2 project. I believe there was more originally, but
3 three were selected to move forward with their
4 proposals.

5 CHRISTINE MAINVILLE: And were these --
6 were they attached to a particular vehicle provider
7 at that point?

8 GREG BARSTOW: I believe two had
9 selected a vehicle. Possibly one had not, to the
10 best of my recollection.

11 CHRISTINE MAINVILLE: Did you have any
12 input into the proposals that were put forward in
13 respect of the rolling stock?

14 GREG BARSTOW: Yes.

15 CHRISTINE MAINVILLE: Could you tell us
16 about your input on these -- in respect of these
17 three different consortiums?

18 GREG BARSTOW: I can't recall the
19 acronyms for each, but two of the -- there was a
20 Bombardier FLEXITY car that we felt wasn't proven
21 in the environment, service proven with regards
22 to -- part of the service proven in the environment
23 requires a vehicle that has been proven to the
24 performance that the vehicle would require.

25 This would -- was a high-duty type

1 system for light rail between acceleration rates,
2 deceleration rates, top speed of 100 kilometres per
3 hour.

4 So the FLEXITY we didn't see having
5 that level of performance. There was a company
6 named CAF out of Spain. We didn't -- to the best
7 of my recollection, we didn't see the car proposed
8 as service proven.

9 For the Alstom vehicle, they had
10 proposed a type of vehicle called the Citadis
11 Dualis. This car was proven in Nordic countries.
12 It was service proven in that it, you know, was a
13 design -- you know, it's a design currently in use,
14 and we felt that it met the requirements, the
15 Citadis Dualis.

16 CHRISTINE MAINVILLE: Okay. And I take
17 it that that -- well, first of all, was it the
18 Citadis Dualis that was put forward and not the
19 Citadis Spirit?

20 GREG BARSTOW: The Citadis Dualis was
21 put forward to meet the requirements of service
22 proven in the climatic environment and the duty.

23 CHRISTINE MAINVILLE: And so let's just
24 pause for a second. There were requirements in the
25 RFP related to service -- the service-proven aspect

1 of the rolling stock?

2 GREG BARSTOW: I believe so for --
3 absolutely. I mean, I would have to go back and
4 review the PA, but those were the requirements that
5 we had on the evaluation, was to ensure those
6 aspects were met.

7 CHRISTINE MAINVILLE: And can you just
8 articulate what that would have been to the best of
9 your recollection, the -- how that service -- what
10 was the service-proven requirement or how it would
11 have been articulated?

12 GREG BARSTOW: I don't recall the
13 details. Probably a number of cars, probably age
14 of cars, but I don't recall the details.

15 CHRISTINE MAINVILLE: Okay.

16 GREG BARSTOW: Yeah, also, you know,
17 we'd look at the -- the top speed is pretty extreme
18 for light rail, so we'd ensure that was in place.

19 The acceleration and braking are also
20 high end for light rails, so we would look closely
21 at those. And the environment of Ottawa is not too
22 common, so we would look closely at that.

23 As far as the design being service
24 proven, as I say, there would be a number of
25 factors that go into that.

1 CHRISTINE MAINVILLE: Such as?

2 GREG BARSTOW: As I said, I don't
3 recall the details, but it would probably have to
4 do with number of cars in service, age of cars, all
5 in regards to the application that we have, so the
6 top speed and the environment, the cold weather
7 environment with top speed and deceleration,
8 acceleration.

9 CHRISTINE MAINVILLE: Is there any
10 standard definition for what is service proven, or
11 you had to devise your own parameters?

12 GREG BARSTOW: As I said, I don't
13 recall the details. I'm trying to give you some
14 examples of things that would factor in.

15 CHRISTINE MAINVILLE: Yeah, but I'm
16 wondering whether you were -- you recall being able
17 to rely on some standard definition or whether you
18 had to come up with criteria to be met.

19 GREG BARSTOW: For service proven?

20 CHRISTINE MAINVILLE: Yeah.

21 GREG BARSTOW: I believe you would find
22 that in the PA, but I can't be sure.

23 CHRISTINE MAINVILLE: I just meant
24 beyond this particular project and project
25 agreement in terms of sources of information that

1 you would look to.

2 GREG BARSTOW: Oh, well, normally --
3 let's say this was part of the requirements for a
4 bid. It would be stipulated, and generally
5 speaking, we would look for the number of cars in
6 service, the age. We'd want to have contact
7 information from that authority. Essentially that
8 would be it, yeah.

9 CHRISTINE MAINVILLE: You mean you
10 would go and consult the other transit authority
11 that would have these trains in service?

12 GREG BARSTOW: Yes.

13 CHRISTINE MAINVILLE: Do you recall
14 doing this in this case for Alstom?

15 GREG BARSTOW: No, I do not.

16 CHRISTINE MAINVILLE: Do you know if
17 someone else would, or would that have fallen on
18 STV or yourself to do that?

19 GREG BARSTOW: I don't recall.

20 CHRISTINE MAINVILLE: Okay.

21 GREG BARSTOW: Would it have fallen --
22 if we were tasked with that, we would have done it.
23 It could be that others in the group were tasked
24 with it. I know I wasn't tasked with it.

25 CHRISTINE MAINVILLE: Okay. And you

1 said the top speed in this case was pretty extreme
2 for light rail. Was that something that Alstom met
3 in terms of already having a light rail vehicle
4 with the -- that achieved that same top speed?

5 GREG BARSTOW: I believe so. I can't
6 be sure of what details they had.

7 CHRISTINE MAINVILLE: Okay.

8 GREG BARSTOW: I know that it was
9 proven in the Nordic countries. I know that it had
10 the acceleration and deceleration. I don't recall
11 the top speed.

12 CHRISTINE MAINVILLE: Okay. And does
13 this -- did these particular requirements, the --
14 if I could put it this way, kind of test the limits
15 of light rail, were those factors that created
16 risk, any particular kind of risk in this project?

17 GREG BARSTOW: We know -- you know, I
18 worked at Siemens for ten years and primarily light
19 rail. These cars were 70 percent low-floor
20 vehicles that could do and did do the requirements
21 of top speed acceleration, deceleration. So I knew
22 firsthand that this was achievable.

23 CHRISTINE MAINVILLE: So you said you
24 knew it could be achieved. I take it you knew
25 Siemens could achieve it?

1 GREG BARSTOW: I knew Siemens could
2 achieve it.

3 CHRISTINE MAINVILLE: Okay. And were
4 they not part of the proponents put forward?

5 GREG BARSTOW: I believe they were part
6 of one of the groups. Maybe that group that did
7 not originally select a vehicle came in later with
8 the Siemens vehicle, to the best of my
9 recollection.

10 CHRISTINE MAINVILLE: Okay. You said
11 that ultimately you don't believe the vehicle that
12 was selected had been service proven in the
13 environment. I'm not putting words in your mouth.

14 So can you walk us through that
15 disconnect between the Citadis Dualis meeting the
16 PA requirements but you having this view as to
17 ultimately the vehicle not being service proven?

18 GREG BARSTOW: The vehicle eventually
19 put forth was called the Citadis, not the Dualis
20 but the Citadis, later named Citadis Spirit.

21 When we checked on the Citadis -- this
22 particular vehicle, we found that it had been
23 operated for a minimal amount of time in Paris and
24 not at the speeds of the duty required, so we were
25 in a position where those requirements were not

1 being met.

2 CHRISTINE MAINVILLE: And what was --
3 when was this -- when did this arise in terms of
4 the time frame on this project?

5 GREG BARSTOW: It's difficult for me to
6 remember this. I remember the evaluation with the
7 Dualis. At some point in the future, we discovered
8 that what was actually being presented bit by bit
9 was not the Dualis. We found out it was a straight
10 Citadis.

11 I have to retract something. I think I
12 was confusing contracts. This Paris vehicle -- is
13 it possible to retract?

14 CHRISTINE MAINVILLE: Yes, please
15 correct anything you need to correct.

16 GREG BARSTOW: This Paris vehicle was
17 a -- when I worked at Siemens, there was a vehicle
18 that Siemens had built that worked in Paris, and
19 there was just a few.

20 That's not the experience of Citadis.
21 I mean, Citadis -- there is a lot of the Citadis
22 vehicle throughout Europe. I don't know that
23 there's any in the climate. I don't know that
24 there's any that meet the top speeds, the
25 acceleration and deceleration, but there's a lot of

1 them out there. That's for sure.

2 Okay, I was confused with another
3 vehicle that was similar design that was a Siemens
4 vehicle. Okay, so Citadis is proven as far as
5 number of cars, but that would be it.

6 CHRISTINE MAINVILLE: So I -- but I
7 think you said that the Citadis Spirit had been in
8 operation?

9 GREG BARSTOW: I don't believe it was
10 called the Citadis Spirit. I believe they named
11 that for the North American market.

12 CHRISTINE MAINVILLE: Okay.

13 GREG BARSTOW: That type of vehicle,
14 Citadis, I know that that design is well proven
15 itself. I don't know that it's proven in the
16 environment or the duty.

17 CHRISTINE MAINVILLE: And what, sorry?

18 GREG BARSTOW: The duty, the
19 acceleration, the top speed, the deceleration
20 rates. That's what I'm referring to as "the duty."

21 CHRISTINE MAINVILLE: Okay. So just to
22 be clear, the Citadis Spirit was new for all
23 intents and purposes of the project?

24 GREG BARSTOW: Well, the Citadis Spirit
25 was based on the Citadis that are used in Europe.

1 CHRISTINE MAINVILLE: Right. And is
2 there -- did the Citadis Dualis meet all of the
3 requirements that the City had?

4 GREG BARSTOW: I believe so.

5 CHRISTINE MAINVILLE: Do you know why
6 the Dualis wasn't used as the model?

7 GREG BARSTOW: Can you repeat?

8 CHRISTINE MAINVILLE: Do you know why
9 the Citadis Dualis wasn't used as the model
10 ultimately?

11 GREG BARSTOW: I think it was used as a
12 proposal because it met the requirements. It had
13 that Nordic experience, which was key to the City.

14 CHRISTINE MAINVILLE: But do you know
15 why they didn't follow through and simply use it?

16 GREG BARSTOW: I have no idea.

17 CHRISTINE MAINVILLE: Do you understand
18 what modifications were made to that model, so
19 effectively the main differences between the
20 Citadis Dualis and the Citadis Spirit?

21 GREG BARSTOW: Well, as we reviewed the
22 design and we looked at, you know, where it was
23 running and what -- under what conditions, we saw
24 that it was a stretch, in particular of the speed,
25 the deceleration, the acceleration.

1 As far as the climate goes, we were
2 told that the car builder would make changes to
3 make it suitable for the environment, but we
4 certainly had our doubts because this is more of a
5 tram than an LRV.

6 CHRISTINE MAINVILLE: Okay. What do
7 you mean by that?

8 GREG BARSTOW: A tram, you know, if
9 you've been to Europe, these cars that run on the
10 surface level. They tend to run fairly slowly.
11 They don't accelerate, decelerate like a metro, for
12 instance, and the LRV that was required would be
13 more similar to a metro-type speeds, acceleration,
14 deceleration.

15 CHRISTINE MAINVILLE: So when you say
16 this was more a tram, do you mean the Citadis
17 Dualis that was running in the Nordic countries?

18 GREG BARSTOW: No. The Citadis -- I
19 don't know about the terms, what they called them,
20 but the standard Citadis that had a lot of
21 experience in Europe, we believe that it was more
22 of a tram style than an LRV.

23 CHRISTINE MAINVILLE: And does that
24 include the Citadis Dualis?

25 GREG BARSTOW: No.

1 CHRISTINE MAINVILLE: Okay. So when
2 you say it was a stretch, I'm just trying to
3 understand what part and which train.

4 GREG BARSTOW: A stretch?

5 CHRISTINE MAINVILLE: Yeah, you said
6 you thought it was a stretch to be running at this
7 speed.

8 GREG BARSTOW: The Citadis that
9 eventually was proposed, we were concerned to what
10 level the Citadis could be taxed to meet the
11 requirements of the City.

12 CHRISTINE MAINVILLE: Okay. And when
13 you say the one that was proposed, do you mean the
14 original one, the Dualis, or the ultimate one, the
15 Spirit?

16 GREG BARSTOW: Yeah, this -- the Dualis
17 was proposed. The Spirit was put forth. And how
18 that came about, I don't know.

19 CHRISTINE MAINVILLE: Okay. Do you
20 know when it came about?

21 GREG BARSTOW: Whenever the decision
22 was made to go with RTG was when it was proposed as
23 the Dualis. I don't know when we got wind of the
24 fact that it was just the standard Citadis. I
25 can't tell you when that was.

1 CHRISTINE MAINVILLE: But at some
2 point, it was clear to STV and would you say the
3 City that this was a different sub-model, if you
4 will?

5 GREG BARSTOW: Yes.

6 CHRISTINE MAINVILLE: And the
7 differences were understood?

8 GREG BARSTOW: It was clear that this
9 100 percent low-floor car was being proposed --
10 being delivered, and we were immediately concerned,
11 yes.

12 CHRISTINE MAINVILLE: And when you say
13 "we," who is that?

14 GREG BARSTOW: Everybody that worked
15 with me in my company. We certainly passed this
16 information on to our colleagues or the client in
17 Ottawa.

18 CHRISTINE MAINVILLE: Do you know who
19 in particular was your main counterpart at the
20 City?

21 GREG BARSTOW: My counterpart at that
22 time was Gareth Jones. I think there was a Craig.
23 Craig -- was it Greg? I can't remember.

24 CHRISTINE MAINVILLE: Is it Gary Craig?

25 GREG BARSTOW: Gary Craig. Who else?

1 I can't recall the other names, but there was a
2 couple other people that we corresponded with.

3 CHRISTINE MAINVILLE: Would you have
4 corresponded with Steve Cripps?

5 GREG BARSTOW: Not so much. I believe
6 Steve was more on the -- Steve wasn't really on the
7 technical side. I believe Steve was more finance
8 or something.

9 CHRISTINE MAINVILLE: Okay. And what
10 were your -- what was the nature of your concerns?

11 GREG BARSTOW: Well, this 100 percent
12 low-floor car has -- the fully low-floor car has
13 less space to install the components required.
14 These cars have a right-angle gearbox. The motor
15 is on the outside, and the power is passed through
16 a right-angle gearbox to the axle, whereas these
17 partial low-floor cars, there's a much larger motor
18 that's mounted directly near the axle.

19 Same thing with the brakes. The
20 brakes -- there was no space. The wheels are a lot
21 smaller on this car. There's no space -- there
22 isn't a lot of space for braking or brake disks.

23 This is the problem with 100 percent
24 low floor. There's really no space to install
25 everything you need. The term "LRV on steroids"

1 was used.

2 CHRISTINE MAINVILLE: By that, do you
3 mean that it pushed the limits of what an LRV can
4 do?

5 GREG BARSTOW: Yes.

6 CHRISTINE MAINVILLE: Wasn't the 100
7 percent low floors a City requirement?

8 GREG BARSTOW: No.

9 CHRISTINE MAINVILLE: What do you
10 recall being the requirement in terms of low floor?

11 GREG BARSTOW: I don't believe that
12 there was a low-floor requirement, but I do know
13 that the concept report talked about 70 percent low
14 floor.

15 CHRISTINE MAINVILLE: What referenced
16 70 percent, sorry?

17 GREG BARSTOW: The concept report.

18 CHRISTINE MAINVILLE: The concept
19 report. Okay.

20 GREG BARSTOW: That concept report was
21 later modified to include this 37-metre vehicle. I
22 don't recall if the low floor -- I believe the
23 low-floor requirement was opened up to allow the
24 100 percent. We were directed to modify the
25 concept report to, shall we say, make this vehicle

1 acceptable.

2 CHRISTINE MAINVILLE: Okay. So do you
3 mean after the change was made to the Citadis
4 Spirit?

5 GREG BARSTOW: I mean before the spec
6 was written, probably after or maybe during the
7 evaluations. At some point, we were tasked,
8 "Please open this concept report up to allow the
9 base vehicle and the hundred -- the 37-metre
10 vehicle, a 37-metre vehicle.

11 Maybe that was not specifically for the
12 Citadis, but that was a change that took place
13 early on where that standard 30 metre, 70 percent
14 low floor was not going to be the only
15 allowable-type vehicle that would be accepted or at
16 least referenced in the concept report.

17 CHRISTINE MAINVILLE: And who gave that
18 direction?

19 GREG BARSTOW: I knew you would ask. I
20 don't know the process for which it went through.
21 I know that I was given the task by Joe North, who
22 was STV.

23 CHRISTINE MAINVILLE: Joe North you
24 said?

25 GREG BARSTOW: Joe North, yes. I'm

1 not -- I'm not sure where he got this from or who
2 directed it, but I remember him asking me to do it.

3 CHRISTINE MAINVILLE: And can you walk
4 me through -- I take it the concept report would
5 inform the RFP, and then the --

6 GREG BARSTOW: Yeah, the concept
7 report, like I say, is a list of requirements. And
8 the RFP, the PSOS they called it -- PSOS is
9 operating specification. The specification, the
10 vehicle, the PSOS, that was -- the starting point
11 for that is the concept report.

12 CHRISTINE MAINVILLE: And so amending
13 the concept report would have amended the
14 requirements presumably?

15 GREG BARSTOW: Essentially.

16 CHRISTINE MAINVILLE: But are you
17 saying by then the RFP period was over by the time
18 the change was made?

19 GREG BARSTOW: I don't recall the
20 timing.

21 CHRISTINE MAINVILLE: Maybe we could
22 walk back a bit. Were you involved in the industry
23 consultations that were intended to -- or that were
24 a first step, as I understand it, to devising the
25 requirements?

1 GREG BARSTOW: I was not involved in
2 any industry consultation.

3 CHRISTINE MAINVILLE: Do you know of
4 any taking place?

5 GREG BARSTOW: If so, it would have
6 been before my time.

7 CHRISTINE MAINVILLE: Okay. And was
8 there not a desire to have a low-floor vehicle
9 because of the potential -- because of potential
10 extension plans which would have the vehicle run
11 effectively on the streets as opposed to on its own
12 line?

13 GREG BARSTOW: I don't know the reasons
14 behind the desire of the longer vehicle. If I
15 recall, there was a belief that more -- maybe five
16 30-metre vehicles would have to be coupled, and RTG
17 was proposing two of these 37-metre vehicles could
18 meet the capacity requirements for less number of
19 vehicles. This was something about it.

20 It was a sales -- it was part of the
21 selling of this to the City, I guess. That's what
22 I recall. That's -- it's just a fragment of the
23 overall, but I recall seeing the design of the two
24 car instead of the four, five car as being a
25 factor.

1 CHRISTINE MAINVILLE: In their
2 selection you mean?

3 GREG BARSTOW: In their selection,
4 yeah, in accepting the -- well, that's what -- let
5 me think. This is what wound up happening.
6 Two-car consists would run instead of -- well, we
7 expected to be four-car consists.

8 CHRISTINE MAINVILLE: Okay. So just
9 going back to the original concept report, the -- I
10 take it you believe the 70 percent low floor met
11 the City's needs?

12 GREG BARSTOW: We felt with the
13 requirement to go with an LRV, that we would put
14 forth the vehicle that has met the duty, and that's
15 what we -- that's the only thing that we put in it
16 was the 70 percent low floor would -- we knew -- as
17 I mentioned, we knew that at least these cars could
18 have the space available for the equipment required
19 to operate at those conditions.

20 CHRISTINE MAINVILLE: And 70 percent,
21 does that allow the vehicle to interface with the
22 city streets?

23 GREG BARSTOW: That design can
24 interface with city streets, yes.

25 CHRISTINE MAINVILLE: Okay. Doesn't

1 need to be 100 percent low floor beyond the
2 streets?

3 GREG BARSTOW: No.

4 CHRISTINE MAINVILLE: Okay. What's the
5 difference? Is it just the actual height between
6 70 and 100 percent?

7 GREG BARSTOW: Where the bogies are,
8 that area would be high floor.

9 CHRISTINE MAINVILLE: I see.

10 GREG BARSTOW: So right around the
11 bogies is where you have the motor and the brakes,
12 and that area would be high floor to ensure that
13 you had the space to put the required components.

14 CHRISTINE MAINVILLE: Okay.

15 GREG BARSTOW: As I say, with 100
16 percent low floor, you have to move the motors on
17 board to the side, and then there's a gear box
18 which is just -- it's not the same level of
19 performance. That's why you normally see them more
20 of a tramway that slowly travels through the city.
21 Normally on the surface level.

22 CHRISTINE MAINVILLE: Okay. So I take
23 it 100 percent low floor is a more challenging
24 endeavour?

25 GREG BARSTOW: It's more challenging to

1 use a 100 percent low floor in the City of Ottawa
2 for sure.

3 CHRISTINE MAINVILLE: Why in particular
4 in the City of Ottawa?

5 GREG BARSTOW: Because the City wanted
6 100 kilometres per hour. The City wanted braking
7 rates, acceleration rates that we knew would be
8 difficult for that style of vehicle to attain.

9 CHRISTINE MAINVILLE: Could the 100
10 percent low-floor requirement have been linked to
11 greater accessibility?

12 GREG BARSTOW: No.

13 CHRISTINE MAINVILLE: Okay.

14 GREG BARSTOW: The floor height of the
15 low-floor portion would be the same as the low
16 floor, 100 percent low floor, and a design with
17 respect to the platforms so that there would be no
18 step.

19 CHRISTINE MAINVILLE: So you don't know
20 where that requirement ultimately came from, the
21 100 percent low floor?

22 GREG BARSTOW: I don't know if that
23 became a requirement or if that's just what was
24 received. I know there was more talk about the
25 length issue.

1 CHRISTINE MAINVILLE: Right. Yeah, so
2 let's move on to that. So initially your concept
3 report had four-car consists?

4 GREG BARSTOW: Mm-hm.

5 CHRISTINE MAINVILLE: And is that more
6 common in the industry?

7 GREG BARSTOW: I would say not. In my
8 experience, light rail usually run two-car
9 consists. Go ahead.

10 CHRISTINE MAINVILLE: No, no, go ahead.

11 GREG BARSTOW: You know, the original
12 plan was for, I believe, 150-metre platforms in
13 Ottawa, reduced by this two-car consists down to
14 120 or maybe less, but to run four cars together is
15 fairly rare.

16 CHRISTINE MAINVILLE: So is there a
17 reason you had not provided for two-car consists at
18 the time?

19 GREG BARSTOW: To Ottawa?

20 CHRISTINE MAINVILLE: Yes.

21 GREG BARSTOW: No, Ottawa had a certain
22 ridership requirement, and there's no way two-car
23 consists would meet those requirements for
24 ridership.

25 CHRISTINE MAINVILLE: But isn't that

1 what was ultimately produced?

2 GREG BARSTOW: Well, these are -- I
3 would have to double-check. Is it 47 metres? I'm
4 calling it 37, but excuse me, they may be 47 metres
5 long. Maybe there's a way -- well, I'd just like
6 to couch my 37 number. They may be longer than
7 that.

8 CHRISTINE MAINVILLE: Yeah, so
9 ultimately the consists that are being used are
10 quite long; right?

11 GREG BARSTOW: Yes.

12 CHRISTINE MAINVILLE: And so did you
13 simply not envision that in the original concept
14 report?

15 GREG BARSTOW: No, we never envisioned
16 a two-car consist at all.

17 CHRISTINE MAINVILLE: Is that because
18 they're not normally as lengthy as they are in this
19 case?

20 GREG BARSTOW: You won't find the 30 --
21 the 70 percent low-floor car in that design really
22 is the issue.

23 CHRISTINE MAINVILLE: Okay. So if I'm
24 paraphrasing, you didn't think you could meet the
25 service-proven requirement by providing for a

1 two-car consist going at the speed required by the
2 City?

3 GREG BARSTOW: Well, in -- you know, in
4 reviewing what's available in the industry, we
5 weren't aware of any vehicle that length.

6 CHRISTINE MAINVILLE: Okay. And --

7 GREG BARSTOW: You really won't find
8 that. You don't find that in a light rail vehicle.

9 CHRISTINE MAINVILLE: And indeed the
10 ones Alstom ultimately produced, is that part of
11 what was new on this project?

12 GREG BARSTOW: These cars wasn't (ph)
13 quite new on the project.

14 CHRISTINE MAINVILLE: Sorry, these cars
15 were quite new?

16 GREG BARSTOW: These cars are -- like I
17 said, these cars are European-based. I don't know
18 if the -- what was ultimately this four-car
19 concept, four-body section vehicle. I don't
20 know -- I don't know that a car of this length --
21 I'm not -- I'm not aware -- I don't know what's
22 happening in Europe, if there's cars of this
23 length.

24 I know they have longer cars with
25 multiple body sections, multiple articulations that

1 snake through the city at slow speeds. This car
2 seems longer than the ones that I would be familiar
3 with, but it could be. I certainly have never seen
4 that kind of a car in a more urban LRV environment
5 with subway sections, et cetera.

6 CHRISTINE MAINVILLE: Okay. Were you
7 involved in the design consultations that were had
8 with some of the vehicle proponents or vehicle
9 suppliers?

10 GREG BARSTOW: I was involved with the
11 evaluations. I don't know that we had such
12 consultation. We looked at what they were
13 proposing and sort of gave it a thumbs up or a
14 thumbs down.

15 CHRISTINE MAINVILLE: So who do you
16 recall giving the thumbs up to during your
17 evaluations in terms of rolling stock supplier?

18 GREG BARSTOW: Well, I gave the thumbs
19 down to CAF, whoever proposed CAF. I gave the
20 thumbs down to the FLEXITY. I mean, not just me on
21 my own, but I mean in a meeting.

22 I'm thinking that one of the car
23 builders hadn't selected a vehicle but was pushing
24 forward a 30-metre, 70 percent low floor. You'd
25 have to look at the proposals that they put forth.

1 I think -- we believe that they hadn't selected a
2 vehicle, so maybe that was difficult, but I believe
3 one of them was selecting a 70 percent low floor.

4 And the Citadis Dualis was not a thumbs
5 down. I just don't recall giving a thumbs up, but
6 I know I didn't kick it out. Those other cars I
7 said no. This Dualis, I don't know if we said yes
8 to or what, but I don't recall a
9 thumbs-up-thumbs-down kind of a mentality.

10 CHRISTINE MAINVILLE: Did you
11 understand when Dualis was presented that there
12 would need to be changes to what was being used out
13 there?

14 GREG BARSTOW: No. Dualis it can
15 (AUDIO GLITCH) to low-floor car as well, proven in
16 the environment. I wasn't aware of any issues the
17 Dualis would have in particular because the Dualis
18 was so well proven in the Nordic environments, more
19 than one city. It seemed feasible.

20 CHRISTINE MAINVILLE: Did you ever have
21 meetings with Alstom representatives directly?

22 GREG BARSTOW: At this time, no, not
23 me. We would have evaluation meetings. It was
24 kind of a limited role. We came in; we had
25 meetings with these consortiums. Maybe there'd be

1 a representative from the car builder, but there
2 was no consultation per se. This evaluation would
3 have taken place, and then the City would have made
4 the decision, and then the project starts.

5 CHRISTINE MAINVILLE: Okay. So you
6 don't recall any consultations or meetings with
7 CAF?

8 GREG BARSTOW: CAF, no. I mean, these
9 meetings, they propose these vehicles, and they
10 were clearly not meeting the service-proven
11 requirements.

12 CHRISTINE MAINVILLE: Do you recall
13 Alstom entering the picture after CAF was rejected?

14 GREG BARSTOW: Is that what happened?
15 They got rid of CAF and took Alstom? That may be.

16 CHRISTINE MAINVILLE: Do you recall
17 Alstom coming in fairly late in the day after RTG
18 had been selected?

19 GREG BARSTOW: I don't recall the
20 timing.

21 CHRISTINE MAINVILLE: Who would have
22 been in charge of this for the City, these various
23 discussions and decision-making?

24 GREG BARSTOW: John Jensen was one,
25 Gareth Jones, Gary Craig. There's others.

1 CHRISTINE MAINVILLE: And you don't
2 recall how late or early in the day the change from
3 the Dualis to the Citadis occurred or --

4 GREG BARSTOW: I don't know. I really
5 don't know that.

6 CHRISTINE MAINVILLE: Okay.

7 GREG BARSTOW: When meetings started,
8 we found out. And I don't know how long it was,
9 but I remember being surprised that this car was
10 100 percent low floor because that's not what was
11 proposed.

12 CHRISTINE MAINVILLE: And did you or
13 STV express concern about whether that met the
14 requirements of the PA?

15 GREG BARSTOW: Oh, we absolutely did.
16 I know you're going to ask me who did I say it to,
17 and I don't know. It was kind of a firestorm. You
18 know, it seems to me that it was a big deal that
19 involved everybody.

20 CHRISTINE MAINVILLE: And the City,
21 there were a lot of -- there was a lot of activity?

22 GREG BARSTOW: I believe that it was a
23 big deal.

24 CHRISTINE MAINVILLE: Okay. And do you
25 have any insight into how the City moved forward

1 from that or what decisions were made?

2 GREG BARSTOW: Well, it was accepted.
3 I think the belief was that it could be made to
4 happen, so it was accepted, you know, against our
5 recommendations. Just because, you know, has
6 anyone ever seen a low-floor car with that design
7 perform at these requirements?

8 CHRISTINE MAINVILLE: And, I mean,
9 we've spoken about the low floors. Can you just --
10 I just want to make sure we exhaust your view on
11 this.

12 What were the challenging aspects of
13 the vehicle requirements -- or maybe I should
14 phrase it differently -- of what was being produced
15 ultimately by Alstom? What were the risk factors
16 for you?

17 GREG BARSTOW: Well, as I said, the
18 limited space available for the braking and
19 propulsion, the motor, propulsion motor, the
20 brakes, the limited availability of space is
21 essentially really what it comes down to.

22 The wheels are very small on this car,
23 not what you would -- not anything I was familiar
24 with because this was my first 100 percent
25 low-floor car. And the wheels are tiny, which, as

1 you know, isn't good for stability and, well, it's
2 just a train that's more designed to go at slow
3 speeds. I mean, I think -- I think that even
4 Alstom would agree to that.

5 So when you have small wheels and
6 limited room for a disk, you have difficulty in
7 getting the braking rates because the disk can only
8 be so large to sit underneath the low floor.

9 And the motor has to be, as I said,
10 shifted to the side and out board and powered
11 through a gearing mechanism that isn't the best for
12 acceleration. So these are the factors that lead
13 us to be worried about this design.

14 CHRISTINE MAINVILLE: When you say it's
15 not good for stability, what do you mean by
16 "stability"?

17 GREG BARSTOW: Well, standard wheels, a
18 larger diameter have more of a self-steering
19 capability. They have -- if you look at the
20 particulars of the profile, there's a larger
21 flange. There's a greater running tread width.
22 The flange angle is different.

23 CHRISTINE MAINVILLE: What are the
24 implications of that?

25 GREG BARSTOW: Well, I mean, the first

1 thing that comes to mind is -- you know, this is a
2 question that I haven't really thought about. I --
3 I'm not -- I'm not suggesting that this is a
4 probability of a derailment.

5 I -- you know, we would have to consult
6 an expert on this wheel dynamics. I don't believe
7 that the derailments were caused by the wheel
8 diameter, but that wheel is about half the diameter
9 of a standard railcar.

10 It's kind of a wheel that would go on a
11 tram or a very low-duty type car. That's why it
12 kind of looked like a tram. Tram -- you know a
13 tram is a car that goes through the city at slow
14 speeds. You see them in Europe. They usually
15 don't go more than 10 or 15 miles an hour. That's
16 what you're looking at.

17 CHRISTINE MAINVILLE: This change in
18 these risks, did it impact the level of oversight
19 of the rolling stock manufacturing that ensued?

20 GREG BARSTOW: Oversights? In what
21 regard?

22 CHRISTINE MAINVILLE: Either by the
23 City or STV in particular.

24 GREG BARSTOW: As far as I know, there
25 wasn't any particular -- I don't know if you mean

1 QC on the shop floor. As far as the design goes,
2 yes, I mean, every submittal of which there was
3 hundreds were strongly reviewed and strongly
4 disapproved.

5 CHRISTINE MAINVILLE: So is it Alstom's
6 designs that were reviewed by STV?

7 GREG BARSTOW: Alstom's, yes.

8 CHRISTINE MAINVILLE: Okay. And how
9 were they -- why were they disapproved of?

10 GREG BARSTOW: There's too many to
11 list. You know, if I had the documentation, I
12 could -- I could tell you that -- be more specific,
13 but, you know, most aspects of the vehicle had
14 issues. These were not all related to the duty.
15 It had to do with the climatic adaptations for the
16 City. But, again, it -- I would have to research
17 the documents.

18 CHRISTINE MAINVILLE: Do you recall
19 knowing whether Alstom would need to make
20 adaptations to North American standards?

21 GREG BARSTOW: You know, they named
22 this car the Citadis Spirit at some point
23 throughout the process, and they started to talk
24 about the North American-type vehicle would be the
25 Spirit. Can you ask the question again?

1 CHRISTINE MAINVILLE: So did you know
2 that at the outset when this -- for instance, when
3 the Citadis Dualis was being presented, did you
4 know it would need to be adapted to North American
5 standards?

6 GREG BARSTOW: I knew that the
7 Europeans would come in with their EN standards,
8 European norms, and we always have a challenge
9 trying to get the car builder to prove that the
10 European norms meet the Canadian and American
11 standards.

12 So, I mean, that's -- wouldn't be the
13 first car that had these issues, but there would be
14 some work to adapt the standards, if I'm answering
15 you correctly.

16 CHRISTINE MAINVILLE: So you're
17 saying -- am I paraphrasing correctly when I say
18 that it was known that the Citadis Dualis was based
19 on European standards, and there would be some
20 adaptation required and some challenges related to
21 that?

22 GREG BARSTOW: Yes, there should have
23 been. I believe that they were accepted by the
24 City.

25 CHRISTINE MAINVILLE: Sorry, what was

1 accepted?

2 GREG BARSTOW: Accepted as is with the
3 European norms.

4 CHRISTINE MAINVILLE: So that when --
5 when the decision was made to go with Alstom, it
6 was decided that they could use European standards
7 or --

8 GREG BARSTOW: There was -- there was a
9 lot of noncompliances that were accepted, okay, so
10 rather than prove maybe the European -- this -- I
11 guess I should back away because I don't really
12 recall the details, but there was noncompliances
13 that were accepted.

14 CHRISTINE MAINVILLE: I see.
15 Noncompliances to the project agreement that were
16 accepted by the City?

17 GREG BARSTOW: Yes.

18 CHRISTINE MAINVILLE: So just to be
19 clear, am I right that the vehicle requirements
20 called for U.S. standards being --

21 GREG BARSTOW: There was a combination
22 of U.S. and Canadian standards.

23 CHRISTINE MAINVILLE: Okay. And was
24 there -- I may be confusing two different things.
25 If you could clarify what needed to meet U.S. and

1 Canadian standards and whether that was a necessary
2 part of having this project in Ottawa or whether
3 some aspects of the European standards could have
4 been used.

5 GREG BARSTOW: The European standards
6 are relatively similar, I would say, and then there
7 are differences.

8 CHRISTINE MAINVILLE: Which standards
9 are you referencing?

10 GREG BARSTOW: Well, for instance, the
11 car shell was to be made from ASTM, American
12 Standard of Test and Measures. ASTM -- ah, shit.
13 558. There was -- I don't think the -- if I had
14 the references -- I won't say B558.

15 It's a weathering steel that we had
16 specified that would form a patina and not rust.
17 So Alstom came up with a European standard for
18 steel that didn't have the levels of copper, didn't
19 have the weathering capabilities of the specified
20 steel. And, yeah, that's what they used.

21 CHRISTINE MAINVILLE: Was it not the
22 case that the steel that had been prescribed in the
23 requirements was not available anymore?

24 GREG BARSTOW: No. It's a matter of --
25 I don't know why they refused to meet the spec, but

1 they did.

2 CHRISTINE MAINVILLE: Okay. Did -- let
3 me ask you this: Were any of the requirements
4 taken from the or informed by the earlier
5 procurement that Ottawa had had that had seen
6 Siemens be the vehicle supplier, which was
7 ultimately a failed procurement?

8 GREG BARSTOW: I'm familiar with the
9 failed procurement only in that it failed. I don't
10 know any of the details of the PA. I wasn't
11 involved at all.

12 CHRISTINE MAINVILLE: Were any of the
13 requirements on this project informed by that
14 earlier procurement?

15 GREG BARSTOW: Not that -- I'm not
16 aware of that.

17 CHRISTINE MAINVILLE: Okay. Was it
18 necessary for Alstom to -- was it necessary for the
19 PA to provide for U.S. standards, or could a
20 different set of standards have been used for this
21 project?

22 GREG BARSTOW: You'd have to be more
23 specific.

24 CHRISTINE MAINVILLE: Well, can you
25 tell me about how these standards work and what

1 standards applied, what these standards are
2 exactly?

3 GREG BARSTOW: Well, there's hundreds
4 of standards that talk about everything from how
5 the car steers and how much it -- how much it hunts
6 back and forth on the rails. There's talk about --
7 I mean, you name it. Just how the glass is
8 manufactured and what testing has to be done.
9 Everything to do with the car and everything --
10 every test would be impacted by these standards.

11 CHRISTINE MAINVILLE: Okay.

12 GREG BARSTOW: And it's not to say that
13 they're completely different. The overall design
14 standards were relatively similar. Also with the
15 Canadian and American, they're very similar.

16 CHRISTINE MAINVILLE: And with this
17 being a North American project, does that
18 necessarily inform what standards have to apply, or
19 do you have some measure of discretion?

20 GREG BARSTOW: Well, a normal
21 procurement, we would require a North American --
22 our standards, North American requirements,
23 European standards would not be so easily accepted.
24 There would have to be a base justification made
25 before any European standard would be accepted.

1 There would have to be a justification to prove the
2 equivalence.

3 CHRISTINE MAINVILLE: So I guess what
4 I'm trying to get at is was there some level of
5 adaptation that Alstom needed to do that was a
6 first for them based on what standards applied?

7 GREG BARSTOW: I don't recall any --
8 anything that they did that was a first for them.
9 I think what they delivered is exactly what they
10 would tend to deliver.

11 CHRISTINE MAINVILLE: What they what to
12 deliver?

13 GREG BARSTOW: That they normally
14 deliver. As an example, the steel. They normally
15 use that steel, and they used that steel on this
16 project.

17 CHRISTINE MAINVILLE: Didn't they have
18 to --

19 GREG BARSTOW: Where it came to be
20 something they'd have to reinvent or learn, they
21 pushed back. They wanted to say that this is a
22 design build maintain, so we do -- kind of do what
23 we want to is kind of the mentality.

24 So there was multiple -- there was, you
25 know, dozens and dozens of noncompliances to the

1 PA, the PSOS in particular for the vehicles where
2 they just refused to comply.

3 We're allowed -- I don't know. All I
4 know is that noncompliances just seemed to go away
5 as issues or at least didn't impact anything.

6 CHRISTINE MAINVILLE: Didn't they have
7 to devise new supply chains to meet the standards
8 and perhaps the Canadian content requirements?

9 GREG BARSTOW: They had Canadian
10 content requirements. I can't speak to whether or
11 not that was met. I'm just -- I'm thinking. I
12 don't know that they met the Canadian content
13 requirement. Maybe the manufacturing, the shop
14 there and the employees, but I don't know of
15 anything else that met the Canadian content.

16 CHRISTINE MAINVILLE: Were you involved
17 in -- previously involved in other P3 projects?

18 GREG BARSTOW: No, I have not.

19 CHRISTINE MAINVILLE: Did you
20 understand the rolling stock requirements to be
21 fairly prescriptive for a P3 project?

22 GREG BARSTOW: No.

23 CHRISTINE MAINVILLE: Were they
24 performance-based?

25 GREG BARSTOW: Yes.

1 CHRISTINE MAINVILLE: You said STV
2 strongly disapproved of the design submitted by
3 Alstom. What was the response to STV's input?

4 GREG BARSTOW: Well, I suppose the
5 comments would go to RTG. RTG would provide a
6 reply. We would disapprove again. Eventually it
7 would go away. I don't know what would happen. I
8 would stop seeing those documents.

9 CHRISTINE MAINVILLE: What was the
10 nature of your concerns? I know you said there
11 were several items that you can't recall, but did
12 it help you with perceived risks or challenges that
13 it would create?

14 GREG BARSTOW: There was issues with
15 maintainability, issues with performance,
16 reliability, all aspects of the ability of the
17 consortium to deliver on the requirements of the
18 PA.

19 As you see today, the -- well, I mean,
20 the availability of vehicles was never what it's
21 supposed to be. Probably never has been or will
22 be. These are all related to reliability,
23 maintainability, et cetera.

24 So, yes, it does run the gamut, and
25 these were all highlighted and disapproved for

1 these aspects.

2 CHRISTINE MAINVILLE: How would this
3 input be provided? Is it documented somewhere?

4 GREG BARSTOW: Yes, the -- so the
5 design package would come in with an Excel
6 spreadsheet, and we would start to make our
7 comments, and we'd go back, and they would reply.
8 And this was the process.

9 CHRISTINE MAINVILLE: In writing you
10 mean?

11 GREG BARSTOW: In writing, yeah.

12 CHRISTINE MAINVILLE: Michael, is this
13 something that can be identified for us and
14 produced if not already produced?

15 MICHAEL O'BRIEN: Yes, I believe that
16 this set of documentation has all been produced,
17 and what we will do is provide you with the
18 document numbers. And we can of course, you know,
19 see whether there's any other documents of this
20 nature that should be produced, but it's my
21 understanding that this is all previously produced.

22 CHRISTINE MAINVILLE: Thank you.

23 MICHAEL O'BRIEN: Christine, I'm just
24 having a look at the time.

25 CHRISTINE MAINVILLE: Yeah, it might be

1 a good time for a break. Okay, let's go off
2 record.

3 -- OFF THE RECORD DISCUSSION --

4 -- RECESSED AT 3:27 P.M. --

5 -- RESUMED AT 3:43 P.M. --

6 CHRISTINE MAINVILLE: Mr. Barstow, were
7 you involved in the devising or reviewing the
8 requirements for the signalling system?

9 GREG BARSTOW: No, I was not.

10 CHRISTINE MAINVILLE: Do you have any
11 view as to the selection of Thales as signalling
12 system provider to be integrated with Alstom's
13 rolling stock, whether that created any particular
14 risk?

15 GREG BARSTOW: No, I don't have any
16 knowledge on that side of things.

17 CHRISTINE MAINVILLE: If Alstom could
18 have provided the signalling system, would that be
19 something that you would deem preferable or
20 advisable to avoid -- to limit the number of
21 interfaces?

22 GREG BARSTOW: I don't know.

23 CHRISTINE MAINVILLE: Do you know if --
24 let me rephrase. What information did you have
25 about operations, planned operations and how the

1 operator intended to operate the train to inform
2 the designs?

3 GREG BARSTOW: There was a couple guys
4 that were involved at some time, Michael Morgan and
5 Peter -- Mike Morgan's team I guess it was. At
6 that time, he was in charge of the operations and
7 very limited, but I think they had some input at
8 times.

9 CHRISTINE MAINVILLE: Did you have a
10 concept of operations early on in the process?

11 GREG BARSTOW: There was others like
12 maybe Keith MacKenzie. There would be more of the
13 specialists and operations interfaces.

14 CHRISTINE MAINVILLE: Is that something
15 you would want to have to inform what's needed on
16 the design front?

17 GREG BARSTOW: I mean, yes, some of
18 their information would wind up in the concept
19 report. Some of the requirements as a stakeholder
20 they would review. Same with the PA, the spec
21 itself, their input would be contained within the
22 specification.

23 CHRISTINE MAINVILLE: Did you feel you
24 would have wanted more information about that in
25 the earlier stages?

1 GREG BARSTOW: Not particularly.

2 CHRISTINE MAINVILLE: Okay.

3 GREG BARSTOW: I wanted more
4 maintenance interfacing.

5 CHRISTINE MAINVILLE: In what respect?

6 GREG BARSTOW: Well, you know, the
7 specification had been reduced in scope with a lot
8 of reliability, maintainability aspects removed,
9 and without these protections in the specification,
10 I wanted the maintenance team to make comments
11 to -- you know, to talk about what their role would
12 be and what I saw as issues relating to
13 maintenance, but they never had a role.

14 They never really replied. It's just
15 RTM, I guess, is the group. They didn't seem to
16 want to be involved. That's the aspect that I had
17 issue with.

18 CHRISTINE MAINVILLE: At what stage of
19 the project are you talking about, are you
20 referencing?

21 GREG BARSTOW: My entire time there
22 throughout the design.

23 CHRISTINE MAINVILLE: So you would have
24 wanted more information about how maintenance
25 intended to operate for design purposes?

1 GREG BARSTOW: Well, I wanted them to
2 chime in on issues that I saw in maintenance, but I
3 didn't have any power because those sections were
4 moved from the specification.

5 CHRISTINE MAINVILLE: What issues did
6 you see on maintenance early on in the project?

7 GREG BARSTOW: I mean, you name it.
8 Removing, installing any component. Maintenance
9 was not really considered, and it seemed like the
10 mentality is it's not our problem because this is
11 being done by Alstom, so don't worry about it.
12 Same with reliability, don't worry about it. It's
13 their problem.

14 CHRISTINE MAINVILLE: Who was conveying
15 this?

16 GREG BARSTOW: IO did a lot of that.

17 CHRISTINE MAINVILLE: Sorry?

18 GREG BARSTOW: Infrastructure Ontario.

19 CHRISTINE MAINVILLE: Okay.

20 GREG BARSTOW: Yeah, more so
21 Infrastructure Ontario. They -- they reviewed our
22 spec and removed a lot of these sections that the
23 P3 was supposed to cover essentially. The DBM, the
24 design build maintain, we shouldn't care about
25 maintenance because it's not our purview.

1 So I got a lot of pushback from RTG and
2 Alstom to even -- to even look at these things
3 because it's protected by the PA, but I thought
4 that in the long run, the City would get the black
5 eye even if RTM has to pay the price.

6 CHRISTINE MAINVILLE: What kind of
7 things did you think ought to have been included
8 about maintenance in the PA that were not?

9 GREG BARSTOW: Well, in our normal
10 projects, we have more like a 700-page spec, and we
11 had about 50 pages for the vehicle. And so all
12 aspects of mean time between failures, mean time to
13 repair, these are requirements that are normally in
14 the spec, and that would cover just about
15 everything that you would have to maintain. So
16 it's about reliability and availability.

17 CHRISTINE MAINVILLE: Did you think
18 there ought to be -- well, what did you think about
19 the incentivizations for maintenance to be
20 performed properly as provided for in the PA?

21 GREG BARSTOW: Personally thought it
22 was a disaster waiting to happen.

23 CHRISTINE MAINVILLE: Why is that?

24 GREG BARSTOW: Well, first of all, RTM
25 never played a role. It didn't have any interest

1 in how the design was progressing with respect to
2 maintenance. You know, IO didn't care about
3 reliability because they felt that the
4 incentivization would be in place to someone's
5 in-force reliable vehicle. These kinds of aspects
6 of the P3, a lot -- I think contributed to a lot of
7 the problems.

8 CHRISTINE MAINVILLE: I take it you
9 think the maintenance requirements or
10 specifications need to be a bit more prescriptive?

11 GREG BARSTOW: I think if you leave it
12 to the car builder, you're going to get the most
13 cost-effective design that they can give you.

14 CHRISTINE MAINVILLE: Which may
15 complicate maintenance?

16 GREG BARSTOW: Which complicates
17 everything. Impacts reliability because as an
18 example, the steel that they use, it will rust.
19 The steel that we specified would not. This is --
20 you know, this is impacting the life of the
21 vehicle.

22 To say that Alstom is incentivized to
23 produce a good vehicle, just wasn't -- it's not
24 borne out, in my opinion.

25 CHRISTINE MAINVILLE: So what have you

1 seen done? Is it greater incentivization in terms
2 of penalties, or is it more about just prescribing
3 certain base requirements?

4 GREG BARSTOW: I don't think the
5 incentives really made a difference. I think it's
6 more about enforcing the requirements that you
7 have, not providing waivers and holding -- yeah,
8 having a more prescriptive spec and requirements
9 that are in force. I don't think the
10 incentivization works or worked in this case.

11 CHRISTINE MAINVILLE: Where did -- did
12 you see waivers being provided here where you
13 didn't think they ought to be?

14 GREG BARSTOW: Yes.

15 CHRISTINE MAINVILLE: In what regard?

16 GREG BARSTOW: I don't have the list in
17 front of me, but, I mean, there was dozens of
18 waivers, and I didn't agree with any of them.

19 CHRISTINE MAINVILLE: You're talking
20 about maintenance specifically?

21 GREG BARSTOW: No.

22 CHRISTINE MAINVILLE: You mean to the
23 vehicle manufacturing?

24 GREG BARSTOW: Yeah, all aspects of the
25 whole project. Waivers would be passed by me, and

1 I would say absolutely not, and then they would be
2 approved. That's what I experienced.

3 There's a guy, I think his name is
4 Grant. Somebody was there to sign off on all the
5 waivers.

6 CHRISTINE MAINVILLE: For the City?

7 GREG BARSTOW: For the City.

8 CHRISTINE MAINVILLE: You don't recall
9 his full name?

10 GREG BARSTOW: I don't. I think it was
11 Grant, but I can't be 100 percent sure. But there
12 was an individual in charge of signing the waivers,
13 and they always got signed, as far as I could tell.

14 CHRISTINE MAINVILLE: Was this someone
15 in the implementation office?

16 GREG BARSTOW: Yes. Again, I think the
17 thinking and the logic behind it was falling back
18 on these incentives. As an example, the steel, it
19 would be up to RTM to touch up any chipped steel
20 that -- chipped paint to prevent corrosion, but I
21 just didn't think that was realistic. I'd rather
22 have the steel that doesn't rust. So it was very
23 frustrating at times.

24 CHRISTINE MAINVILLE: Was it understood
25 on the City's end that there would be -- in light

1 of these waivers and decisions, there would be
2 increased pressure, if you might say, on
3 maintenance following revenue service?

4 GREG BARSTOW: Can you repeat it?

5 CHRISTINE MAINVILLE: Was -- from your
6 perspective, did the City understand that given
7 these waivers and decisions that were being made
8 over the course of the build -- design and build,
9 that there would be increased pressure on
10 maintenance following revenue service?

11 GREG BARSTOW: I believe that that was
12 clear, but once again, it was not so concerning
13 because they have a maintenance contract.

14 CHRISTINE MAINVILLE: They're not
15 responsible for it you mean?

16 GREG BARSTOW: Right.

17 CHRISTINE MAINVILLE: In terms of the
18 number of trains that would be required for service
19 to meet demand, what was your understanding or your
20 input about what that looked like?

21 GREG BARSTOW: First I should say that
22 47 metres is the length.

23 CHRISTINE MAINVILLE: Okay.

24 GREG BARSTOW: 37 was in the concept
25 report. 47 is what we wound up with.

1 As far as the operations and passenger
2 loading, you know, this was more Larry Gaul and
3 Keith MacKenzie would be involved with those.

4 CHRISTINE MAINVILLE: Okay.

5 GREG BARSTOW: And that would be --
6 possibly Gary Craig was involved with that. These
7 were on a higher level.

8 CHRISTINE MAINVILLE: Were there other
9 disagreements with Infrastructure Ontario or the
10 City's other advisors that you're aware of?

11 GREG BARSTOW: I wasn't aware of any
12 other advisors. I just experienced Infrastructure
13 Ontario.

14 CHRISTINE MAINVILLE: Did they have any
15 rail experience on their team?

16 GREG BARSTOW: I understand they were
17 civil.

18 CHRISTINE MAINVILLE: And do you think
19 the disagreements or the different perspectives
20 stem from -- of course there's specialization in
21 P3s, but from your perspective, was that informed
22 by your experience with rail, that you thought
23 these incentives may not be sufficient on the
24 maintenance front?

25 GREG BARSTOW: Well, I know Alstom, and

1 I know how they like to keep costs down, and I just
2 felt like this would be not in their -- in front of
3 their view. The priority is to keep the costs down
4 and worry about the maintenance costs later is the
5 way I experienced it. They didn't seem too
6 concerned.

7 CHRISTINE MAINVILLE: So it's not
8 necessarily that the penalties or deductions were
9 insufficient. It may just be that it's not what's
10 going to do it ultimately?

11 GREG BARSTOW: You know, I felt like
12 they were going to challenge -- try to challenge
13 their way out of the penalties is what I was
14 guessing.

15 CHRISTINE MAINVILLE: Okay.

16 GREG BARSTOW: So they didn't seem to
17 really care. It never really came up.

18 CHRISTINE MAINVILLE: Do you recall the
19 trial running requirements in the project
20 agreement?

21 GREG BARSTOW: Not so much in the
22 project agreement. I mean, I knew they had certain
23 mileage they wanted in trial running. I know the
24 availability of cars was putting pressure with the
25 opening day, and the requirements for trial running

1 were being taxed.

2 CHRISTINE MAINVILLE: Did you have any
3 involvement initially in those requirements --

4 GREG BARSTOW: No.

5 CHRISTINE MAINVILLE: -- in devising
6 them? No?

7 GREG BARSTOW: No.

8 CHRISTINE MAINVILLE: Do you recall
9 what the original intention was for trial running
10 and what that would look like?

11 GREG BARSTOW: Well, trial running is
12 what we call "burn-in" in the rail industry, and
13 the intent is to ensure that any failures or some
14 standard designs -- any of that would get burned
15 out. You burn the car in, so you work out the bugs
16 before you have passengers involved.

17 CHRISTINE MAINVILLE: Do you have any
18 experience with that and how long that should
19 normally go on for?

20 GREG BARSTOW: You know, it depends
21 project to project, but it's usually -- I would --
22 I'm saying I -- I think it's usually 1,000 miles,
23 500 to 1,000 miles.

24 CHRISTINE MAINVILLE: What would that
25 have represented in this case with the number of

1 trains you were supposed to be running?

2 GREG BARSTOW: Well, that's for each
3 train you would -- before they enter service, they
4 would run that number of miles.

5 CHRISTINE MAINVILLE: Over each train?

6 GREG BARSTOW: Yeah.

7 CHRISTINE MAINVILLE: Do you know what
8 was done here and how that compares?

9 GREG BARSTOW: Well, what they call
10 trial running, I think it's the same. It's when
11 you're running throughout the alignment without
12 passengers. And I don't know what they -- what
13 their number was, but I'm sure that it was
14 challenging because things were behind schedule,
15 and cars needed to be made available.

16 CHRISTINE MAINVILLE: What was your
17 involvement at that point in time? Were you still
18 working on this project?

19 GREG BARSTOW: I was definitely phasing
20 out at that point. My involvement would have been
21 probably -- if it was eight hours a week, I'd be
22 surprised.

23 CHRISTINE MAINVILLE: Okay. Was that
24 just the natural phasing out of your work based on
25 the time lines?

1 GREG BARSTOW: You know, my role was
2 through the design phase, so when it comes into the
3 operations, it -- it's not really my role anymore.
4 This is Larry Gaul, I think was the guy.

5 CHRISTINE MAINVILLE: Okay. Were you
6 involved in the independent assessment team?

7 GREG BARSTOW: Partially. Maybe less
8 than half of the field trips. The assessment was
9 really just assessing the construction side for the
10 most part. It wasn't so much assessment of
11 vehicles. So that's why my role fell away because
12 we wanted to look at the alignment to where the --
13 just where the delays looked more extreme actually
14 than the vehicles.

15 CHRISTINE MAINVILLE: To the main line?

16 GREG BARSTOW: Yes.

17 CHRISTINE MAINVILLE: And was that as a
18 result of the sinkhole?

19 GREG BARSTOW: It probably was blamed
20 on the sinkhole.

21 CHRISTINE MAINVILLE: What was your
22 perspective on that?

23 GREG BARSTOW: Well, the sinkhole was
24 used as an explanation for a long time.

25 CHRISTINE MAINVILLE: And did that not

1 seem reasonable to you?

2 GREG BARSTOW: You can only go to the
3 well so many times.

4 CHRISTINE MAINVILLE: What do you think
5 explained the delays to the main line being
6 completed?

7 GREG BARSTOW: One I saw was limited
8 workforce. You know, you come into a station, and
9 you really don't see much being done. We wondered
10 how in the hell were they going to finish on time.

11 CHRISTINE MAINVILLE: Were you involved
12 in looking at the geotechnical risk?

13 GREG BARSTOW: No.

14 CHRISTINE MAINVILLE: Were you involved
15 in any of the testing and commissioning planning?

16 GREG BARSTOW: As far as testing, I was
17 not involved with the actual testing, but
18 sometimes -- I believe that I reviewed some of the
19 test reports. And, yeah, I had one long list of
20 issues with the test reports. It's typical -- just
21 like the design, there was -- just about everything
22 we looked at had issues.

23 CHRISTINE MAINVILLE: So you mean the
24 results of some of the testing?

25 GREG BARSTOW: Yes.

1 CHRISTINE MAINVILLE: What were the
2 issues you would see?

3 GREG BARSTOW: It's hard to answer
4 these questions because there's so many. I mean,
5 I'd have to look at the document. You know, I
6 mean, it's a long time ago, but it just never
7 ceased to amaze me that there was always an open
8 issue.

9 CHRISTINE MAINVILLE: Are you
10 referencing the rolling stock or signalling system
11 in particular or more broadly?

12 GREG BARSTOW: For me, it's always the
13 rolling stock.

14 CHRISTINE MAINVILLE: Okay. Did you
15 get any results or oversee any of the integration
16 testing held?

17 GREG BARSTOW: I don't recall any
18 integration testing. I don't recall.

19 CHRISTINE MAINVILLE: So the testing
20 you would have been apprised of was more Alstom's
21 testing?

22 GREG BARSTOW: Yes.

23 CHRISTINE MAINVILLE: Do you know if
24 the issues you identified were resolved over time?

25 GREG BARSTOW: I don't know.

1 CHRISTINE MAINVILLE: Do you know what
2 thought was given to systems integration earlier in
3 the design and planning for the project?

4 GREG BARSTOW: I'm just thinking. It
5 seemed like the ATC system, you know, would -- the
6 Thales car-borne equipment seemed like an
7 afterthought. You know, I don't think that the --
8 I don't think that that was handled so well, but
9 yet the platform interface was well done, I
10 thought. Not a lot on that front.

11 CHRISTINE MAINVILLE: When you say the
12 ATC seemed like an afterthought, was that for
13 OLRTC?

14 GREG BARSTOW: No. The integration
15 between Thales and Alstom, I think -- I don't think
16 it went very well. It seemed delayed.

17 CHRISTINE MAINVILLE: What was that --
18 what's your perspective based on?

19 GREG BARSTOW: I think you have two
20 strong-headed teams, and you know how that works.

21 CHRISTINE MAINVILLE: Do you know if
22 that ultimately had implications for the system?

23 GREG BARSTOW: There was a lot of
24 finger pointing. There was a lot of issues, false
25 warnings. You know, there's protection systems

1 into, you know -- I don't remember the acronym, but
2 you know, intrusion detection system.

3 These warnings would indicate that
4 somebody was in the right-of-way. These would go
5 off and shut the car down, shut the whole train
6 down all the time, and it was a long battle to
7 figure out, you know, what's the problem. So this
8 was causing the trains to be stopped in service.

9 Same thing with the emergency braking
10 system. Thales had a whole host of triggers to
11 trigger the emergency brakes, so the train was
12 constantly being emergency braked, flattening the
13 wheels, shutting the whole -- shutting the whole
14 alignment down because of all these emergency
15 brakes, which it didn't need to be that way.

16 But that was really sort of outside of
17 my role. The integration, that Thales system,
18 that's what was going on, but, I mean, I can't tell
19 you a whole lot more.

20 CHRISTINE MAINVILLE: These issues such
21 as the emergency braking issues, that's ultimately
22 an integration problem, correct, between the two
23 systems, the Thales and Alstom systems?

24 GREG BARSTOW: Yes. Thales -- you
25 know, Thales is responsible to make sure that

1 emergencies don't happen, so in my opinion, they --
2 anything under the sun could trigger an emergency
3 brake as a protection mechanism, but it became a
4 situation where emergency brakes were occurring all
5 the time, and that shuts the whole line down.

6 CHRISTINE MAINVILLE: Shuts the whole
7 line down?

8 GREG BARSTOW: Yeah. Once the train is
9 stopped, the CBTC system prevents the next car from
10 moving close to that car, so the whole line gets
11 backed up, so that was ugly.

12 CHRISTINE MAINVILLE: Was this resolved
13 prior to RSA, to your knowledge?

14 GREG BARSTOW: I doubt it. Maybe.
15 Like I say, I wasn't really involved, but it was a
16 difficult situation.

17 CHRISTINE MAINVILLE: Did you at any
18 point provide input or were asked to provide input
19 about the amount of integration testing that should
20 be done or the burn-in period that should be done
21 with this particular train?

22 GREG BARSTOW: Yes, the burn-in, yes.
23 Not the integration so much, but I know my burn-in
24 number was cut. I remember that.

25 CHRISTINE MAINVILLE: It was cut you

1 said?

2 GREG BARSTOW: Cut down, yes.

3 CHRISTINE MAINVILLE: Do you recall
4 approximately what your burn-in number would have
5 been?

6 GREG BARSTOW: I would guess that it
7 was 2,000 kilometres, and it became 500, but these
8 are -- these are rough guesses.

9 CHRISTINE MAINVILLE: And would these
10 have been reported -- this input, would that have
11 been provided to the same people you mentioned
12 earlier, Gary Craig and others, or by then was it
13 someone else?

14 GREG BARSTOW: Well, these would have
15 been in my spec, so this is before any design would
16 go. And I don't recall how it was cut or who cut
17 it, but I remember them thinking that it was
18 excessive. And when I say "them," I mean -- I
19 don't recall.

20 I think most of my feedback would come
21 from Gareth Wood or -- mostly Gareth Wood because
22 Gareth Jones was off the project. So he was my
23 main interface. But, again, this was early on.
24 This could have been IO. I can't say.

25 CHRISTINE MAINVILLE: So you're saying

1 your burn-in number was cut at the specification
2 stage? It didn't make it into the specifications?

3 GREG BARSTOW: It didn't make it into
4 the specification, as far as I recall.

5 CHRISTINE MAINVILLE: And Gareth Wood,
6 did he have any particular rail experience? Do you
7 know?

8 GREG BARSTOW: Yes, Gareth Wood had
9 rail experience.

10 CHRISTINE MAINVILLE: Do you have any
11 sense of why he thought that was excessive, the
12 burn-in number you put forward?

13 GREG BARSTOW: Again, I cannot lay this
14 on Gareth Wood. I -- my feeling is that, again, it
15 was outside of our responsibility, so it was not
16 something that we needed to worry about. It
17 happened all the time. That wouldn't normally be a
18 Gareth Wood comment. That would be from a higher
19 level.

20 CHRISTINE MAINVILLE: And out of your
21 scope, does this come back to this issue of not
22 being too prescriptive and this being a P3 and
23 therefore looking at broader performance measures?
24 Is that where the disagreement was?

25 GREG BARSTOW: Yeah, I think the whole

1 nature of the P3 caused a lot of the normal
2 concerns to wash away and not take them very
3 seriously. And so normally, we would have, like I
4 said, 700 pages to ensure that the vehicle is done
5 right, and the number of waivers would be -- would
6 have been a fraction of this.

7 When you force the car builder to do
8 these things, you get a better result, and when you
9 step away and leave it up to them, you get this
10 result. That's my feeling.

11 CHRISTINE MAINVILLE: Do you understand
12 that -- did you understand that IO's role was
13 reduced over the course of the project?

14 GREG BARSTOW: I don't know. I only
15 saw them when they were reviewing our spec.

16 CHRISTINE MAINVILLE: Do you know --
17 well, were you involved in the journey time
18 requirements?

19 GREG BARSTOW: Journey time? I haven't
20 heard that phrase.

21 CHRISTINE MAINVILLE: Okay. The --

22 GREG BARSTOW: Trip time.

23 CHRISTINE MAINVILLE: Trip time.

24 GREG BARSTOW: I mean, roughly I knew
25 the trip-time requirements, the passenger-capacity

1 requirements, but these were not -- these were
2 prescribed to me. I mean, these weren't developed
3 on my side.

4 CHRISTINE MAINVILLE: Were they
5 prescribed by the City?

6 GREG BARSTOW: I don't know where they
7 came from. I know that the PA was very -- it
8 seemed to me that the PA was more focused on trip
9 time and passenger capacity.

10 These were the main, like, facets of
11 what they needed, how many passengers and what the
12 trip time was, the mean time between vehicles. You
13 know, the "headway" they call it.

14 CHRISTINE MAINVILLE: Did those
15 specifications cause any concern for you?

16 GREG BARSTOW: Well, yeah, they needed
17 something like a three-minute headway to maintain
18 the passenger -- to carry the passengers. And, you
19 know, with a longer train, you carry more
20 passengers. You have more time in between trains.

21 So this headway, because this train was
22 on the lower side of capacity, was three minutes.
23 And this just means that anything can, you know,
24 ripple through the entire alignment.

25 If you have a one-minute delay, it

1 cascades, so I was worried definitely that it
2 wouldn't be able to maintain a three-minute
3 headway. And then you see these emergency brakes
4 all the time, which, you know, takes five minutes
5 to correct.

6 So I saw the whole alignment being
7 bogged down, and a lot of this kind of relates back
8 to that -- yeah, okay, it's a 47-metre train times
9 two, but the original plan was 150-metre platforms,
10 four or five. At one time it was five; maybe it
11 became four of these standard 30-metre vehicles was
12 the thinking early on. So now we have a 96-metre
13 vehicle. You know, it just -- it requires more
14 trains and less headway in between, which is
15 difficult for a system anyway.

16 Where you have the end of the tracks,
17 the way they were designed, there's no loop. The
18 trains need to get backed up at the terminus
19 because they're trying to swap ends and swap
20 tracks. All that could have happened behind the
21 station, which is a lot easier.

22 So the whole system just seemed
23 congested. And, I mean, this isn't my role, but
24 it's pretty obvious that it was going to be a
25 challenge.

1 CHRISTINE MAINVILLE: When you say this
2 wasn't your role, what were the limitations on your
3 role or STV's role in this regard?

4 GREG BARSTOW: Again, I'm talking about
5 the alignment layout. That's not my role. That
6 would be the construction side. The passenger
7 capacity and trip times which result in that
8 certain headway, these are created by the City. I
9 mean, you know, the City decides what the capacity
10 needs to be, what it will be in the future. So
11 these kind of don't fall under my role.

12 CHRISTINE MAINVILLE: Would you
13 normally expect the travel time or the trip time to
14 be dependent on weather conditions, inclement
15 weather?

16 GREG BARSTOW: No.

17 CHRISTINE MAINVILLE: No?

18 GREG BARSTOW: No. The CBTC takes the
19 speed and distance between the next train, and it's
20 all automated. The only control the driver has is
21 how long the doors are open.

22 I mean, the only caveat to that would
23 be is if there was ice -- freezing rain on the
24 rails. I know there's a lot of freezing rain
25 there. This could have some impact.

1 CHRISTINE MAINVILLE: Okay. Do you
2 recall being asked to opine on an initial proposal
3 for meeting substantial completion by RTG?

4 GREG BARSTOW: No. This was outside of
5 my time. These activities were going on after I
6 was off the project essentially.

7 CHRISTINE MAINVILLE: Okay. Maybe we
8 can bring up STV 313.

9 GREG BARSTOW: I don't know what that
10 means.

11 CHRISTINE MAINVILLE: Sorry, we'll
12 bring it up for you to look at to see if you
13 recognize it.

14 GREG BARSTOW: Okay.

15 CHRISTINE MAINVILLE: Sorry, I guess
16 2 -- it might be 299. STV 299, it's the same
17 thing. Now, I have a cover email that might give
18 some context to what this is, but do you happen to
19 recognize it?

20 GREG BARSTOW: Not really. I mean,
21 I -- I'm not sure if this is me or not.

22 CHRISTINE MAINVILLE: Okay. So let's
23 go back a step to STV 296. You'll see this is an
24 email dated September 5, 2018. And you're not
25 copied on it, but you'll see one of the attachments

1 says:

2 "RTG Nov 2nd RSA Proposal -
3 Krieger-Barstow Comments."

4 GREG BARSTOW: Okay.

5 CHRISTINE MAINVILLE: And I don't know
6 if you recall when the original May 2018 RSA date
7 was missed. Eventually there was a subsequent
8 target date that was in November 2018 --

9 GREG BARSTOW: Okay.

10 CHRISTINE MAINVILLE: -- to meet RSA.

11 So my understanding of this would be
12 that you provided comments on the new RSA proposal,
13 so the new proposal to meet RSA by November 2018 by
14 RTG. Does that sound at all familiar?

15 GREG BARSTOW: Not really, but
16 sometimes I may comment on things that I don't know
17 that are going into the RSA. I'm not sure. Maybe
18 you could show me what --

19 CHRISTINE MAINVILLE: Sure. So let
20 me -- just to see if it refreshes your memory. So
21 this is an email from Tom Prendergast, who's on the
22 STV team; correct?

23 GREG BARSTOW: Tom was -- yeah, he was
24 in charge of this aspect of the project. He came
25 in later.

1 CHRISTINE MAINVILLE: Okay. And you
2 see here he'll say:

3 "Attached are marked up copies
4 of the document you sent to the
5 Independent Assessment Team for
6 review and comment. In the comments
7 document provided by Krieger and
8 Barstow they have inserted
9 recommended language that the IAT
10 believes should be inserted into the
11 slides as noted."

12 And I'll take you to a PowerPoint with
13 slides that I believe is being referenced here to
14 see if that rings a bell. But then a bit further
15 down he says:

16 "Lastly, attached are two
17 documents summarizing the
18 outstanding critical vehicle issues
19 related to the Alstom fleet along
20 with examples of standard vehicle
21 acceptance criteria/practices used
22 by agencies to ensure the vehicles
23 are ready to be used in revenue
24 service.

25 The first of these documents

1 clearly illustrates that there are a
2 number of outstanding vehicle issues
3 that need resolution, some of which
4 need to be completed prior to cars
5 being placed in service.

6 The second document, while not
7 necessarily being part of the PA,
8 and therefore not enforceable
9 per se, helps to illustrate the
10 risks associated with vehicles
11 having poor or unacceptable
12 reliability issues, and why the need
13 for a sufficient fleet size (minimum
14 service requirement plus
15 unscheduled/scheduled maintenance
16 spares) cannot be compromised
17 without assuming unacceptable risks
18 in delivering service."

19 So in terms of his description of those
20 two documents, one of them is the one I pulled up
21 earlier. Does that refresh your memory at all as
22 to whether you had any involvement in one of the
23 two documents he describes?

24 GREG BARSTOW: Well, I could say with
25 respect to these RSA dates and this overall

1 language, I'm not familiar with this, but when you
2 describe the attached critical items list, then
3 some of them I may.

4 CHRISTINE MAINVILLE: Okay. I'll go
5 back to the other document, but let's file this one
6 for identification purposes, STV 296, so as the
7 first exhibit.

8 And so maybe we'll go to -- back to
9 299, STV 299, which is the Critical Ottawa Vehicle
10 Issues. And so do you think it's possible you
11 wrote this or had input into this document?

12 GREG BARSTOW: I did not write this,
13 but I would have to review it to see if I recognize
14 any of the language, but this is not my document.

15 CHRISTINE MAINVILLE: Okay. Yeah,
16 please take a couple minutes to review it.

17 GREG BARSTOW: This looks like Scott.

18 CHRISTINE MAINVILLE: Scott Krieger?

19 GREG BARSTOW: Yes.

20 CHRISTINE MAINVILLE: Okay.

21 GREG BARSTOW: I mean, some of the meat
22 and potatoes of this would have come from me
23 probably, any kind of reference listing of issues
24 could be me, but not letter per se.

25 CHRISTINE MAINVILLE: Okay. If we

1 could go down to Completion of Tests, the third
2 point there:

3 "It is unknown at this time if
4 RTG has written any procedures for
5 vehicle integration at this time."

6 Let me just pause. What would be the
7 procedures for vehicle integration?

8 GREG BARSTOW: Vehicle integration is
9 basically, yeah, the vehicle and all of its
10 interfaces with main line, stations, integration
11 with the signalling system, you know, the
12 maintenance facility.

13 CHRISTINE MAINVILLE: There would be
14 written procedures to address these various
15 interfaces?

16 GREG BARSTOW: Yeah, yeah, the vehicle
17 would be fully tested to make sure it's interfaced
18 with all of its interfaces, you know, to verify
19 that it's fit for service on the alignment.

20 CHRISTINE MAINVILLE: Do you know if
21 this ultimately was done, that -- whether RTG had
22 written procedures to address these integration --
23 these integrated components?

24 GREG BARSTOW: I don't know. I did not
25 see those if there were any.

1 CHRISTINE MAINVILLE: And then --

2 GREG BARSTOW: You know, I should say
3 I -- this kind of is an interface between RTG and
4 Alstom, and these are areas of integration with
5 respect to their own team where there seemed to be
6 a lot of falling down.

7 I don't know. RTG would try to get
8 Alstom to do things, and Alstom wouldn't do them.
9 And this is kind of an interface in itself, and,
10 yes, they had difficulties in those areas.

11 CHRISTINE MAINVILLE: If we go down to
12 Vehicle Count on Opening Day and the third bullet
13 there, it states:

14 "Early life failures of
15 components is always an issue on new
16 vehicle design."

17 First of all, do you agree with that
18 statement?

19 GREG BARSTOW: Yes. That's the point
20 for the burn-in.

21 CHRISTINE MAINVILLE: Yeah. And it
22 says:

23 "It appears that RTG has
24 reduced the time for burn-in and
25 trial running with each new schedule

1 submitted. The risk associated with
2 an unproven vehicle/infrastructure
3 is very high."

4 GREG BARSTOW: Mm-hm.

5 CHRISTINE MAINVILLE: You agree with
6 that as well?

7 GREG BARSTOW: Yeah. Yes.

8 CHRISTINE MAINVILLE: And so I think as
9 we've discussed, you at this point in time or STV
10 did not see the Citadis Spirit as a proven vehicle;
11 correct?

12 GREG BARSTOW: We saw the Citadis as
13 proven in the tram environment, is what I was
14 saying. Not proven in the ways of the PA with
15 regard to the duty cycle and the climatic, so not
16 service proven for this project, no.

17 CHRISTINE MAINVILLE: And so given that
18 this was effectively a new interface with a new
19 infrastructure, it was STV's view that you needed
20 sufficient burn-in or trial running time, that that
21 was particularly critical in these circumstances;
22 is that fair to say?

23 GREG BARSTOW: Well, it's always
24 important, but the fact that it's a new signalling
25 system and it's being taxed in a way that it's not

1 been taxed and the weather, all of these complicate
2 things. And, yeah, the more burn-in you have, the
3 more likely you are to wind up with a reliable
4 revenue service.

5 CHRISTINE MAINVILLE: And I take it
6 this was conveyed to the City?

7 GREG BARSTOW: Well, this is a letter
8 to Manconi; right?

9 CHRISTINE MAINVILLE: Yeah, cover
10 email, yes, amongst others.

11 If you look at the last page,
12 Additional Open Issues, which is a list of open
13 items. Now, this is in, sorry, September 2018. Do
14 you happen to know whether or how these items were
15 resolved?

16 GREG BARSTOW: No, not at all.

17 CHRISTINE MAINVILLE: Okay. We'll file
18 this as Exhibit 2 -- or actually, I don't think we
19 need to actually formally file the two documents as
20 exhibits. They'll be identified by document
21 number. My apologies for the confusion.

22 So I just want to take you to the
23 PowerPoint that's referenced in the cover email.
24 It's STV 297. Do you recall commenting on this
25 PowerPoint? Sorry, can you go to the first slide?

1 Yes.

2 GREG BARSTOW: I don't believe so.
3 Again, my role was limited at this time.

4 CHRISTINE MAINVILLE: Yes, but if it
5 was titled "Krieger-Barstow Comments," is it
6 possible you did and you simply don't recall?

7 GREG BARSTOW: Well, I can't tell
8 anything from the first page.

9 CHRISTINE MAINVILLE: No. Let's just
10 see if you recognize or if it refreshes your
11 memory, Slide 10. So this talks about vehicle
12 testing, and the comment is:

13 "Traditionally, months of
14 extensive testing in real operating
15 condition would be carried out to
16 identify latent design issues.
17 Alstom claimed they would like to
18 see 3000-5000 km. This will not be
19 possible. As such, latent design
20 issues may be identified after start
21 of service, which could affect the
22 ability to run the vehicles."

23 Do you have any recollection of this
24 input?

25 GREG BARSTOW: No, I really don't. I

1 would imagine this is Scott. This looks like
2 Scott. You know, we may have talked about it. You
3 remember those burn-in numbers I was talking about?

4 CHRISTINE MAINVILLE: Yes.

5 GREG BARSTOW: So that number there is
6 already the reduced number, 500 to 1,000. So maybe
7 we talked about it, but I see the document.

8 CHRISTINE MAINVILLE: Okay. And you're
9 referencing the second paragraph:

10 "Additionally, each vehicle
11 would have been required to operate
12 failure free (burn in) for 500-1000
13 km to identify infant mortality
14 issues."

15 So you would --

16 GREG BARSTOW: That would mean if
17 the -- if there was a failure, you start back at
18 zero.

19 CHRISTINE MAINVILLE: Sorry, repeat
20 that.

21 GREG BARSTOW: If you have a failure in
22 that time, you reset the clock, and you start at
23 kilometre 1.

24 CHRISTINE MAINVILLE: Right.

25 GREG BARSTOW: The point is this could

1 be much longer.

2 CHRISTINE MAINVILLE: Okay.

3 "These issues, combined with a
4 decrease in the starting day fleet
5 count (e.g. no spare vehicles) will
6 make it very difficult to maintain
7 the required level of service."

8 That's the final comment on this page.
9 So you agree with these statements?

10 GREG BARSTOW: Yes.

11 CHRISTINE MAINVILLE: And I take it you
12 weren't there ultimately to know how much was done?

13 GREG BARSTOW: No, I really wasn't. I
14 don't know what they finally agreed to. I know
15 they were low on cars for a long time. I know they
16 wanted to try to use some Stage 2 cars to increase
17 their car count. That's about all I know in this
18 stage.

19 CHRISTINE MAINVILLE: And I just want
20 to see if you agree with this statement at Slide
21 12. You're indicating:

22 "They" -- I think in reference
23 to OLRTC -- "are proposing to run
24 trial running with some single cars,
25 which is not acceptable on multiple

1 technical customer and PA fronts."

2 So I take it running single cars during
3 trial running was not -- did not meet the PA
4 requirement; is that your recollection?

5 GREG BARSTOW: I don't recall what the
6 trial running requirements were, but it's not
7 surprising that this would be stated.

8 CHRISTINE MAINVILLE: Because during
9 trial running, you would want to recreate what
10 service will be, which was supposed to be double
11 cars; correct?

12 GREG BARSTOW: Yeah, and there's
13 aspects of double car running that need to be taxed
14 and trialed, you know, all the connections between
15 the cars. You know, your acceleration, your
16 braking, your door openings, and all of this
17 interface needs to be tested on all cars.

18 CHRISTINE MAINVILLE: And similarly, if
19 we go to Slide 13, that would be the case for
20 pretrial running as well? You'll see bullet 3 --
21 or point 3 says:

22 "Undertaking pre-trial running
23 with single car vehicles is a major
24 deviation from the PA and does not
25 yield true operating environment

1 issues."

2 GREG BARSTOW: Same thing, yes.

3 CHRISTINE MAINVILLE: And why would you
4 also want to replicate the double-car environment
5 for pretrial running?

6 GREG BARSTOW: Well, I don't know how
7 they break down the trial running requirements. Of
8 course, the more time that you can run it, as you
9 said, as a willing service, the more likely you are
10 to find the problems.

11 CHRISTINE MAINVILLE: What was pretrial
12 running intended for? Do you recall?

13 GREG BARSTOW: I don't -- you know, I
14 mean, trial running, I believe, was a PA
15 requirement, and pretrial running -- I'm guessing.
16 I would imagine that it was -- I don't know. I
17 don't know the basis for pretrial running. My
18 guess is that that would not be part of the PA.

19 CHRISTINE MAINVILLE: Okay.

20 GREG BARSTOW: Maybe it is. I'm not
21 sure.

22 CHRISTINE MAINVILLE: Was Mr. Krieger
23 on the project longer than you were in terms of
24 being more fully involved?

25 GREG BARSTOW: Krieger was involved up

1 until -- I don't know when the start date was, but
2 he was on for maybe six months, and then me for
3 eight years, and then him for, I don't know, three,
4 four years.

5 CHRISTINE MAINVILLE: Sorry, did he
6 stay on after you started phasing out?

7 GREG BARSTOW: Yeah. This time frame
8 here you're looking at is when he was active and I
9 was not.

10 CHRISTINE MAINVILLE: Okay. Okay.
11 Great. So we'll leave some of these questions to
12 him. We can bring this down.

13 GREG BARSTOW: And Larry Gaul was the
14 operations guy, I believe, so if you can get him,
15 he can probably help with the end-term stuff.

16 And there was a Ron Pilkington. The
17 name might be off. Ron P. was involved at that
18 time too.

19 CHRISTINE MAINVILLE: What would you
20 say are the risks associated with vehicles having
21 poor reliability?

22 GREG BARSTOW: Well, the main -- the
23 main thing is availability. You know, you don't
24 have the shop space to correct these cars. You
25 don't have the number of cars out in service.

1 That's one aspect.

2 The other one is failures on the main
3 line that cascade throughout your service and delay
4 everything. Spare parts can be problems on some
5 contracts. I'm not familiar with these design,
6 build, maintain contracts. They're becoming more
7 common, but I'm not so familiar with passing the
8 maintenance on to the car builder. It's becoming
9 more common. I don't know how well that works.
10 But the main thing is availability of cars.

11 CHRISTINE MAINVILLE: It will impact
12 the passenger experience?

13 GREG BARSTOW: Yes. It will be a
14 longer wait time. There could be stops on the
15 line. You could have to get out and take shuttle
16 buses. You know, it can be, yeah, problematic.

17 CHRISTINE MAINVILLE: How concerned did
18 you understand the City to be about these
19 reliability or performance issues?

20 GREG BARSTOW: I have a hard time
21 knowing what they felt. You know that I did not
22 espouse the incentivization program, but, you know,
23 I guess in a way they felt that that was the best
24 way to prioritize these things, but to me, it
25 didn't work well.

1 CHRISTINE MAINVILLE: Because
2 ultimately, it's fair to say they generally sided
3 with IO on the approach to take to the requirements
4 when there was a disagreement with -- between STV
5 and IO?

6 GREG BARSTOW: If you're going back to
7 the original spec where IO was involved, I can't
8 recall the City, RIO being -- actively pushing IO.
9 It felt like IO came down and they are -- well, you
10 know, acted like the ultimate customer in a way,
11 and they came in and they dictated what they wanted
12 to see, and we did it. And I don't know that RIO
13 was or the City -- I don't know how much they were
14 buying into it. It really seemed like IO was
15 running the show.

16 So I wouldn't suggest that the City was
17 pro or con. It just seemed like IO had some power.
18 But, yeah, we had reliability information. We had
19 maintainability. We had all these requirements in
20 the original spec that went away because we don't
21 care.

22 CHRISTINE MAINVILLE: Would you have
23 had an original spec on the AVKR average that would
24 need to be met during trial running?

25 GREG BARSTOW: I don't know what AVKR

1 is.

2 CHRISTINE MAINVILLE: The -- your
3 indulgence.

4 GREG BARSTOW: It must be a Canadian
5 term. Average kilometres.

6 CHRISTINE MAINVILLE: It's the average
7 kilometres run basically -- aggregate vehicle
8 kilometre availability ratios.

9 GREG BARSTOW: I'm not familiar with
10 that or anything related to it.

11 CHRISTINE MAINVILLE: Okay.

12 GREG BARSTOW: I mean, we have mean
13 time between failure, MTBR numbers that we've
14 prescribed to our system.

15 CHRISTINE MAINVILLE: It's also
16 characterized as availability performance. And I
17 think you reference what should be meant in terms
18 of vehicle availability which would be achieved
19 before going into service, would you not?

20 GREG BARSTOW: I believe that would
21 come from staff or Larry Gaul or both.

22 CHRISTINE MAINVILLE: Let me ask you
23 this: Would you expect -- before going into
24 service, would you expect the trains -- the vehicle
25 availability to be at least as good as what will be

1 required during revenue -- during service
2 operations to not incur any penalties?

3 GREG BARSTOW: Oh, yeah, I mean, your
4 availability numbers that you prescribe, you need
5 at least that many in the beginning because you're
6 more likely to have issues. So going into service
7 with a reduced car count is doubly damaging.
8 Number one, you haven't done the trial running, and
9 number two, you -- so you're going to expect more
10 failures.

11 The fact that they were going into
12 service with a reduced number of cars, I mean, it
13 showed -- it was clear to the City that the system
14 wasn't up to par.

15 And you've got to remember that
16 sinkhole happened, like, seven years before this is
17 going on. So I can just see them blaming the
18 sinkhole.

19 CHRISTINE MAINVILLE: Well, 2016, was
20 it not?

21 GREG BARSTOW: Oh, I don't know. Was
22 it?

23 CHRISTINE MAINVILLE: And this was in
24 2019 ultimately that they went into service.

25 GREG BARSTOW: Oh, I thought it was

1 earlier.

2 CHRISTINE MAINVILLE: Did you believe
3 they needed the full complement of vehicles that
4 had been planned for to go into service to make
5 sure vehicle availability was -- that they could
6 meet vehicle availability?

7 GREG BARSTOW: I think they felt they
8 obviously -- yeah, of course they had to. Whether
9 or not they were ever going to get there was a
10 different question.

11 CHRISTINE MAINVILLE: So you foresaw
12 challenges if they didn't have the full complement
13 of vehicles available?

14 GREG BARSTOW: Yes.

15 CHRISTINE MAINVILLE: Okay. We're at
16 5. Is there anything I haven't asked you about
17 that you think is important for us to know?

18 GREG BARSTOW: Well, I don't know if
19 this P3 approach has been effective on other
20 railcar procurements. I wonder about that. I
21 would suggest that the City try a different
22 approach next time or the design build maintain
23 aspects of it. There's just conflicting interests
24 there.

25 CHRISTINE MAINVILLE: Even if the same

1 entities ultimately are responsible for each of
2 those aspects?

3 GREG BARSTOW: Yes, yes. I think it
4 becomes a conflict of interest, and there's nobody
5 there watching the henhouse, so to speak.

6 CHRISTINE MAINVILLE: Carly, did you
7 have follow-up questions?

8 CARLY PEDDLE: No, I didn't. Thank
9 you.

10 CHRISTINE MAINVILLE: Michael, anything
11 you wanted to --

12 MICHAEL O'BRIEN: I have a couple of
13 brief ones if the reporter will indulge.

14 Mr. Barstow, you were speaking a few
15 minutes ago about the specifications and mentioned
16 reliability information, maintainability
17 information. You said a few other words, and then
18 you said "because we don't care." What do you mean
19 by "we don't care"?

20 GREG BARSTOW: Oh, okay, sorry about
21 that. I was quoting the IO representative who kept
22 saying, "Do we care? Do we care?" every time we
23 went through a line item in the spec.

24 "Do we care?" alluding to the fact that
25 penalties, it's not our problem. We don't need

1 this information because the penalties will
2 ultimately take care of these problems, so we don't
3 need to specify. That's what I meant by "do we
4 care; I don't care."

5 MICHAEL O'BRIEN: Thank you. Aside
6 from the documents that you reviewed that were put
7 to you today in the examination, can you confirm
8 that your testimony today was based on your
9 recollection?

10 GREG BARSTOW: It's my recollection,
11 yes. I don't have any documentation in front of
12 me.

13 MICHAEL O'BRIEN: When did you stop
14 working on the project in a primary capacity?

15 GREG BARSTOW: I would be estimating
16 that it was 2017, 2018.

17 MICHAEL O'BRIEN: Those are all my
18 questions. Thank you, Ms. Mainville. Thank you,
19 Mr. Barstow.

20 GREG BARSTOW: Thank you.

21 CHRISTINE MAINVILLE: Thank you. We
22 can go off record.

23

24 -- Adjourned at 5:03 p.m.

25

1 REPORTER'S CERTIFICATE


2
3 I, CARISSA STABBLER, Registered
4 Professional Reporter, certify;

5
6 That the foregoing proceedings were
7 held remotely via Zoom videoconference at the time
8 therein set forth, at which time the witness was
9 put under oath by me;

10
11 That the testimony of the witness
12 and all objections made at the time of the
13 examination were recorded stenographically by me
14 and were thereafter transcribed;

15
16 That the foregoing is a true and
17 correct transcript of my shorthand notes so taken.

18
19 Dated this 10th day of May 2022.

20
21 
22 _____
23 NEESONS, A VERITEXT COMPANY
24 PER: CARISSA STABBLER, RPR
25 COURT REPORTER

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