

Counting the Crossings

ALTO’s France and Spain comparison, the arithmetic it invites, and what its own engineers, its own government and its own reference countries have already put on the record

1 — The claim

On 14 August 2026 *the Kingston Whig-Standard* published a letter from ALTO’s Chief Project Management Officer and Cadence’s Project Director, responding to community concern about severance along the proposed corridor. The letter states that the project “will not create a wall between communities”, nor a barrier to wildlife or natural water flows, and undertakes to build the crossings needed to maintain local road access, agricultural operations, emergency response routes and ecological connectivity.

As evidence that this can be done, the letter offers two reference networks: the French high-speed network, described as approximately 2,700 kilometres carrying more than 4,000 engineering structures; and Spain’s Madrid-Barcelona-French border line, approximately 750 kilometres with more than 900 overpasses, underpasses and viaducts.

This brief does not dispute those figures. It accepts them, completes the arithmetic they invite, and sets them beside four bodies of evidence the letter does not mention: the crossing count Canada’s own transport department has already published, the statements ALTO’s engineering executive made to Kingston City Council six months earlier, the statutory machinery France and Germany used to manage the same problem, and the recorded performance of wildlife crossings on Spanish high-speed line.

2 — The arithmetic

Divided through, the cited networks imply the following provision rates. A third reference is added: HS2 Phase 1, the closest available greenfield comparator, built through peri-urban and rural England.

Reference network	Length	Structures	Per km	Mean spacing
France, LGV network	~2,700 km	more than 4,000	≈ 1.48	one every ~675 m
Spain, Madrid-Barcelona-border	~750 km	more than 900	≈ 1.20	one every ~833 m
HS2 Phase 1, London-Birmingham	~225 km	more than 500 bridging structures	≈ 2.2	one every ~450 m

The third line is the one worth pausing on, and it cuts against the letter from the opposite direction. **The most recent comparable greenfield high-speed project in a Western democracy provided roughly half again the structure density that ALTO offers as**

reassurance — and did so through a landscape considerably more built up than eastern Ontario.

A fifty per cent spread between two European projects is itself the finding. These totals are governed by terrain, by how much of a route sits in tunnel or on viaduct, and by what each project counts as a structure. Roughly nine tenths of the HS2 Phase 1 alignment runs in tunnel, in cutting or on structures, so a large share of those 500 exist to carry the railway over the landscape rather than to carry a community across the railway. **A structure count is a construction statistic, not a standard of community access.** Whether any of these rates is adequate depends on a quantity the letter does not supply.

3 — What a structure count omits

3.1 A numerator without a denominator

The figure that answers the severance question is a ratio: **structures provided divided by access points severed.** The letter supplies the numerator alone.

A railway can build nine hundred structures and still sever three thousand field entrances, private lanes, township roads and drainage courses. Every severance grievance recorded in France and Spain over four decades is fully compatible with the figures cited. A count of structures tells the reader how much was built; it does not tell them what fraction of what existed was preserved.

3.2 Not every structure restores a local connection

“Engineering structures” and “overpasses, underpasses and viaducts” are categories that include everything a railway requires for its own construction — river crossings, valley viaducts, grade separations where the line meets an existing motorway or railway, and tunnels. A viaduct spanning a river gorge is an engineering structure. It restores nobody’s access to their back field.

The composition of the cited totals is unstated. The subset built specifically to reinstate a severed local connection is necessarily smaller than the headline, and possibly much smaller. Treating the full count as though every structure preserves a community link is generous to the project, and this brief applies that generous reading throughout.

3.3 A different landscape

Eastern Ontario was laid out on a concession survey. Across much of the affected territory, public roads occur at intervals of roughly 1.25 to 2 kilometres, in a regular grid, before counting farm lanes, private driveways and municipal drains. A single road allowance may provide the only legal access to four, six or more farm properties. Whether a provision rate of one structure every 675 metres is adequate in that grid is precisely the question at issue. Citing the French rate does not answer it; it assumes the answer.

A domestic comparison is also available and, so far as the Initiative is aware, has not been made. Highway 416 is a modern, fully grade-separated corridor driven through the same survey grid, the same farmland and several of the same municipalities. The rate at which crossings were provided on that project has not been established here, but it is the natural benchmark against which a European average should be tested.

4 — The denominator Canada has already published

The missing denominator is not, in fact, entirely missing. In a briefing note prepared for a Parliamentary committee appearance in March 2023, Transport Canada described what a full high-speed system between Québec City and Toronto would require: a fully enclosed and fenced corridor, a straighter alignment, full double tracking, and complete grade separation on an alignment that **currently carries more than 1,000 public and private crossings**.

That figure described the northern High Frequency Rail alignment, which ran through comparatively sparse terrain — mixed agriculture, Canadian Shield, wetlands and large-frontage rural lots. The southern corridor now being prioritised passes through some of the most intensively farmed land in eastern Ontario, where the concession grid is at its tightest. On the southern option the 1,000 figure is more likely a floor than a ceiling.

The Initiative's own Road Severance and Grade Separation analysis puts the proportion of crossings permanently closed rather than bridged on rural high-speed corridors in the range of 30 to 60 per cent. Applied to a published floor of 1,000 crossings, that implies somewhere between 300 and 600 permanent road closures across the corridor. The range is the Initiative's estimate, not a figure either ALTO or Transport Canada has published.

1,000+

CROSSINGS ON THE ALIGNMENT — TRANSPORT CANADA, 2023

300-600

IMPLIED PERMANENT CLOSURES AT INTERNATIONAL RATES

Neither ALTO nor Transport Canada has published a crossing assessment, a criteria methodology for deciding which roads are bridged, or any analysis of detour adequacy. The letter's reassurance is offered in the absence of the one document that could substantiate it.

5 — What ALTO told Kingston in February

Six months before the letter appeared in Kingston's newspaper, ALTO's Vice-President of Systems Engineering and Interface appeared before Kingston City Council and answered questions on precisely this subject. The transcript is the most detailed on-record account ALTO has given of its approach to road crossings, and it does not read as the letter does.

Asked by a councillor whether a standard spacing between crossings would apply, he described a working assumption that every road would receive some form of duct or overpass, noting that the roads belong to municipalities or road authorities and could not be cut unilaterally.

He then qualified it in the same answer: in reality, some crossings would be considered for consolidation in order to lower costs and improve construction, subject to discussion with the road authority.

Pressed further by the Deputy Mayor on fencing and crossings, he set out the operational objective plainly — that grade separations would vary by area, would form part of route

selection, and that ALTO would **“try and limit the number of overpasses that we’ll need to get created”**.

He also confirmed that modern high-speed passenger rail must be completely segregated and fully fenced wherever level access is possible, irrespective of whether the line runs at 200 or 300 km/h.

Read together, those statements describe a starting assumption subject to cost-driven consolidation, an explicit objective of minimising the number of overpasses, and continuous fencing between whatever crossings survive. **The councillor’s direct question — whether a standard spacing would apply — was not answered**, and no spacing standard has been published since.

The February statements and the August letter are addressed to the same city. They are not easily reconciled.

6 — What France and Germany also built

The most consequential omission in the letter is not a number. It is a law.

6.1 Two countries legislated the problem

Neither France nor Germany left farm access to be resolved project by project. France operates a statutory land-reorganisation procedure — *aménagement foncier agricole et forestier*, formerly *remembrement* — whose express purpose includes repairing the disruption caused to rural territory by the route of major linear works, high-speed railways among them. Germany enacted a federal land consolidation statute in 1953 covering the same situation. In both, farmers hold seats on the body that decides, that body can compulsorily redraw the farms and the farm tracks together, the project owner pays, and decisions may be appealed to the courts.

Where a line severs farmland, surrounding parcels can be reorganised so that holdings are returned in a workable shape. Land is assembled in advance through SAFER, the French rural land agency, which holds pre-emption rights over agricultural property coming to market. Spain has an analogous procedure in *concentración parcelaria*.

6.2 The record on the ground

The scale is not incidental. On the Le Mans–Rennes high-speed line, SAFER placed roughly 3,700 hectares into reserve, pre-empting agricultural land offered for sale within a corridor extending up to three kilometres from the future alignment, so that displaced farmers could be compensated in land rather than only in money.

The statutory framework is precise about scale. Article L.123-24 of the *Code rural et de la pêche maritime* obliges the project owner, where expropriation for a major public work is liable to compromise the structure of farm holdings, to fund land-reorganisation operations and their connected works. It further requires that the reorganisation perimeter be **at least twenty times the area the railway itself takes**.

On the LGV Bretagne–Pays de la Loire the line absorbed roughly 2,215 hectares. Against that, **seventeen separate land-reorganisation operations were ordered across nearly 50,000 hectares** — six in *Ille-et-Vilaine*, six in *Mayenne*, five in *Sarthe*. In *Mayenne* alone, 865 hectares of railway footprint was matched by 1,330 hectares of land assembled and held in reserve. The published impact study is unambiguous about the purpose: these

operations are a measure to reduce and compensate the effects of the railway on the structure of farm businesses.

Nor are the deciding bodies committees of officials. Each intercommunal commission seats, for every affected commune, three landowners and three working farmers alongside the mayor or a councillor, and the commission is sovereign within its own territory.

Cadence's Project Director is quoted in French agricultural trade coverage of that same project, explaining that the land reserve had to account for the right-of-way, the land-reorganisation operations and the environmental compensation measures together.

6.3 A seat at the table, or a petition to Parliament

The comparison extends beyond land law. HS2 was authorised through a Hybrid Bill, which gave affected landowners, parish councils and local authorities a legal right to appear before a Parliamentary Select Committee and challenge specific design decisions, including individual road closures. Hundreds exercised it. One Cheshire parish council had to petition to prevent the permanent closure of a single road. By mid-2023 the process had generated 497 formal undertakings and assurances — a register of concessions extracted through legal challenge rather than offered in advance. Even a classified A-road in Buckinghamshire was permanently stopped up, with only a pedestrian and cycle underpass retained.

Canada has no equivalent. There is no petition right, no select committee, and no statutory seat. On 4 June 2026 the five organisations representing effectively the entire farm sector in Ontario and Quebec concluded that ALTO's proposed collaboration agreement was not in their members' interests to sign, citing the need to communicate openly with their own memberships. In France they would not have had to negotiate for a place at the table. They would already have held one in law.

6.4 No Ontario equivalent

Ontario has no *aménagement foncier*. There is no rural land agency holding pre-emption rights, no commission empowered to reorganise surrounding holdings, and no mechanism by which a project owner can restore workable field geometry to a farm it has cut in two. The available instruments are expropriation and negotiated purchase of what is physically required. The High-Speed Rail Network Act, moreover, removed the Hearing of Necessity that would otherwise have applied.

The European comparison is therefore accurate and non-transferable in the same breath.

The French and German outcomes rest in part on legal tools Canada does not possess, and a letter that cites France's structure count while omitting France's land-reorganisation regime describes half of how the problem was solved. This is a gap in Canadian law rather than a failing of the project sponsor — but it is a gap that must be closed before European mitigation outcomes can reasonably be promised here, and closing it is not within ALTO's gift.

7 — A structure is not automatically an access

Even where a crossing is provided, two unresolved questions determine whether it functions.

Dimensions. A livestock crossing and a machinery crossing are not the same structure. A standard cattle underpass stands at roughly 2.1 metres. A modern combine or grain cart requires four metres or more. A structure built to the wrong clearance is a closure so far as the equipment is concerned. No minimum dimensions have been published, and no spacing standard.

Maintenance. Responsibility for maintaining these structures over their service life has not been assigned. ALTO describes its approach as still being developed. France required roughly a decade of litigation and legislation to settle the same question. Municipalities along the corridor carry the residual liability if it is not settled in advance.

Road safety. A closed farm crossing does not eliminate the equipment movement; it relocates it onto the public road network. On the Ontario Federation of Agriculture's own figure, slow-moving farm vehicles are between 3.8 and 4.8 times more likely to be involved in a fatal collision per kilometre travelled. Severance is therefore also a road-safety question, and it has not been assessed.

8 — What the closures cost

8.1 Emergency response

Under Ontario Regulation 257/00, paramedic services report performance against a six-minute target for sudden cardiac arrest and eight minutes for the highest-acuity calls. Rural services already struggle to meet these on geography alone. Published research on rural out-of-hospital cardiac arrest finds that each additional kilometre of distance adds approximately 37 seconds to response time, and multiple peer-reviewed studies place the reduction in survival probability at 6 to 10 per cent for every additional minute.

A closure adding a five-kilometre detour therefore adds roughly three minutes at rural road speeds, against a clinical window measured in single digits. Volunteer fire services face the same arithmetic, with the added loss of the tactical option of approaching a scene from more than one direction. No such analysis has been published for this corridor.

8.2 The uncosted line item

Grade separation is among the most capital-intensive elements of any high-speed corridor after tunnels and major viaducts. On Ontario cost data, a rural overbridge spanning a double-track electrified corridor falls between roughly \$5 million and \$20 million depending on class of road, with provincial highway separations higher. Applied to the number of structures a 1,000-crossing alignment would require, the total falls in the range of \$3.2 to \$8.4 billion. That range is the Initiative's estimate from the unit costs above, not a figure ALTO has published.

That range has never been broken out in ALTO's published capital estimate, and no methodology has been published explaining how many crossings will be provided or at what standard. It is a substantial and unscrutinised component of a figure that remains unverified.

9 — Claims that cannot be tested as written

A high-speed railway operating above 300 km/h is fully grade-separated and continuously fenced along its length. ALTO's own engineering executive confirmed as much to Kingston

City Council. The structure is, by engineering necessity, a continuous barrier; the design question is where the openings are placed and how many there are, not whether the barrier exists.

The defensible commitment is that severance will be mitigated at designed crossings, to a stated standard, at a stated density. A categorical undertaking that no wall will be created is not a commitment that can be tested, and it will be quoted back by every landowner and every municipality that later finds an access closed.

The undertaking on wildlife is the hardest of the three to substantiate, and much of the relevant evidence comes from the country the letter cites. **An early two-year study of fifteen underpasses and two overpasses along a 25-kilometre section of Spanish high-speed line recorded no deer or wild boar crossings at all (Rodríguez and others, 1996).** Crossing-structure design has advanced considerably in the thirty years since, and that study should not be read as the last word. The more recent literature does not settle the question in the project's favour either. A systematic review and meta-analysis of crossing structures across road and rail found that while structures allowed animals to cross in almost every dataset examined, a decline in wildlife movement following construction was prevented in fewer than 40 per cent of cases, and that many structures have been poorly implemented or poorly evaluated. The standard reference chapter on railways as barriers records that the consequences of habitat loss and fragmentation caused by railways alone remain largely unexplored, and that mitigation has rested principally on wildlife passes whose effectiveness is still being established.

On the Spanish network specifically, the best-documented impact is on birds. Monitoring by on-board camera estimated bird-train collision mortality at 60.5 birds per kilometre per year on a section carrying 53 trains a day, and 26.1 on a section carrying 25. Later work found high-speed rail associated with species-specific change and biotic homogenisation in the surrounding bird community, and recorded uncapped catenary poles acting as pitfall traps for cavity-nesting birds. Anti-birdstrike barriers are routinely fitted to viaducts; their effectiveness has been the subject of continuing study rather than a settled matter.

Crossing structures for large mammals are expensive, species-specific and not always used, and sensory disturbance extends beyond the fence line, where structures do not reach at all. None of this establishes that the corridor cannot be crossed by wildlife. It establishes that whether it can depends on design decisions and monitoring commitments that have not yet been made, and that a categorical undertaking given in advance of them is not one a reader can test.

The commitment on natural water flows is the more readily deliverable of the three.

10 — Questions ALTO can answer now

The letter makes commitments specific enough to be substantiated. The following can be answered without a finalised alignment.

- **The ratio.** Against Transport Canada's figure of more than 1,000 crossings, how many are assumed to receive a structure, and how many will be closed?
- **The criteria.** What methodology determines whether a road is bridged or dead-ended, and what detour distance is treated as acceptable in a rural setting?

- **The composition.** Of the French and Spanish structure counts cited, what share exists to reinstate a severed local access, as distinct from carrying the line over a watercourse, motorway or existing railway?
- **Dimensions and spacing.** What minimum clearances will agricultural crossings meet, and will they be sized for machinery or only for livestock?
- **Maintenance.** Who owns and maintains each structure over its service life, and who carries the cost?
- **Emergency access.** Which paramedic services and municipal fire services have been consulted on response-route continuity, on what dates, and what were the findings?
- **Cost.** What provision for grade separation is carried in the capital estimate, and why has it not been disclosed as a separate line?
- **Land reorganisation.** Is any parcel-reorganisation or land-reserve mechanism contemplated for severed agricultural holdings, and under what statutory authority would it operate?

11 — Conclusion

The letter is right that decades of international experience exist and should be drawn on. The difficulty is that it draws on one part of that experience and omits the rest.

France built more than four thousand structures. France also rebuilt the farms, gave farmers a statutory seat on the body that decided, and paid for it out of the project. Britain gave affected communities a right of audience before Parliament and conceded 497 undertakings under challenge. Spain, cited here as a model, has recorded high-speed line mortality at roughly two and a half times conventional rail and crossing structures that large mammals decline to use.

Against that, Canada has a consultation that closed before the impacts were analysed, no statutory land-reorganisation procedure, no right of audience, and no published crossing standard. **Until the ratio is published, the criteria are disclosed and the standards are set, the assurance offered to corridor communities rests on a figure that cannot bear the weight placed on it.**

Status of the figures. The structure and length figures for France and Spain are as stated in the 14 August letter and used here as given. The Transport Canada crossing count, the HS2 structure count, the Kingston council statements, the French statutory provisions and areas, the HS2 petition figures, the emergency-response research and the wildlife findings are all quoted from the sources listed below and can be checked there. Everything else is a calculation or an estimate by the Initiative and is identified as such where it appears: the per-kilometre and mean-spacing rates, the 30 to 60 per cent closure proportion and the 300 to 600 closures that follow from it, the \$3.2 to \$8.4 billion grade-separation range, and the detour arithmetic in section 8.1. Where ALTO or Transport Canada has not published a figure, this brief says so rather than inferring one, and makes no claim about what anyone knew or intended.

of civils structures reported in *New Civil Engineer*, 15 June 2022, and repeated on the Institution of Civil Engineers project page. Route length taken here as approximately 225 km; some sources give 208 route km, which would raise the per-kilometre rate rather than lower it. Crossing count: Transport Canada, TRAN Committee Appearance Binder, Item 15, High Frequency Rail, 7 March 2023. ALTO statements: City of Kingston Council meeting, 17 February 2026, closed-captioning transcript. On French and German land reorganisation: *Chambres d'agriculture France*; *Aménagement Foncier Agricole et Forestier — Étude d'impact*, LGV Bretagne / Pays de la Loire, Département de la Mayenne, Lot F (ATLAM, July 2013), published by the French Ministry of Ecological Transition, for Article L.123-24 of the Code rural et de la pêche maritime, the seventeen operations across nearly 50,000 ha, the ~2,215 ha LGV footprint, the 20:1 minimum ratio of reorganisation perimeter to footprint, the Mayenne SAFER reserves and the composition of the intercommunal commissions; WikiAgri on SAFER land reserves for the Le Mans-Rennes line. HS2 petition process, Pickmere Parish Council and the A4010 stopping-up per UK Parliament and HS2 Ltd records. Emergency response research: *BMC Emergency Medicine* (2025); Ontario Regulation 257/00. Wildlife: Rodríguez, Crema and Delibes (1996) for the underpass study; Rytwinski and others, systematic review and meta-analysis of crossing-structure effectiveness, for the movement-decline finding; Barrientos and Borda-de-Água, "Railways as Barriers for Wildlife: Current Knowledge," in *Railway Ecology* (Springer, 2017); García de la Morena and others (2017) for the on-board camera mortality estimates; Malo and others (2017) on bird response and catenary-pole mortality; and work on high-speed rail and bird-community homogenisation published in *PLOS One* (2024). Crossing dimensions, maintenance status, the OFA slow-moving-vehicle figure and the 4 June 2026 farm-organisation decision per E. Durant, 16 August 2026. Grade separation cost range and closure proportions per the Initiative's Road Severance and Grade Separation technical analysis, March 2026.