



Frequently Asked Questions

February 2021

Questions about the LA SkyRail Express (LASRE) Team

1. What companies comprise LA SkyRail Express?

LA SkyRail Express is led by:

- Equity Member, John Laing, the leading P3 transit project developer in North America
- Equity Member, Technology Supplier and Systems Integrator, and Co-Lead O&M Contractor, BYD, the world's leading supplier of electric transportation products
- Lead Construction Contractor, Skanska, one of the world's top design-build contractors
- Co-Lead O&M Contractor, ACI, America's leading private operations and maintenance firm
- Lead Engineer, HDR, one of America's largest employee-owned engineering firms
- Lead Architect, Gensler, one of the world's largest and most respected design firms
- Lead Structural Engineer, Innova, a certified DBE firm that provides specialized monorail structural design

2. Do you have any experience with projects like this?

The LASRE Team member companies collectively bring many years of highly relevant project experience to the table. For example:

- John Laing is one of the world's leading transportation Private-Public Partnership companies, with many successful projects completed around the world
- Skanska is one of the world's leading infrastructure construction companies, and a leading rapid transit construction contractor in Los Angeles
- BYD is a private, entrepreneurial company with state-of-the-art, green, sustainable transportation technologies that have been deployed successfully around the world
- HDR is one of the country's largest and most successful employee-owned engineering firms, with extensive planning and design experience in Los Angeles
- Gensler is one of the world's largest architectural firms, with global experience planning and designing bell-weather rapid transit and transit-oriented development projects
- Innova, a certified Disadvantaged Business Enterprise (DBE), is designing and has designed unique elevated monorail structures for several of the world's largest cities
- Alternate Concepts Inc. (ACI), based in Boston, is the nation's most successful and experienced operations and maintenance contractor for public rapid transit and bus systems

3. Are any of these companies based in Los Angeles?

Yes, most of the member firms are either based here or have a longstanding and significant presence here. For example:

- John Laing's regional leadership is based in Los Angeles and established an office downtown over four years ago



- Skanska has been performing heavy civil transportation work in Southern California for over 100 years; and their LA operations have \$4.3B in transportation projects completed or under construction since 2015. They have built up the region's largest, experienced civil construction work force and construction fleet.
- BYD's downtown LA office is the headquarters for all North and South American operations, and its modern Lancaster plant here in LA County produces battery-electric buses for the entire country through our unionized work force of about 700 locally hired employees
- HDR's downtown LA office, with over 140 experienced staff, has provided engineering services for major transportation and infrastructure projects for over 48 years
- Gensler's downtown LA office provides an array of architectural, design and consulting services across the North American region and beyond, with over 500 staff based in Downtown LA.

4. Have any of the companies ever worked together before?

Yes, almost all of the companies have worked together on relevant projects before, in some cases, with at least three of the firms having done so together on the same project. Just a few examples:

- \$2.5 billion Metro Link US (HDR as the Engineer and Architect of Record; Gensler as a subconsultant partner)
- \$2.1 billion SANDAG MidCoast Transit Project CM/GC (HDR as the Program Manager (major subconsultant); Skanska as the contractor)
- \$78.6 million Caltrans I-5 North Coast Corridor CM/GC, San Elijo Lagoon Double Track project (HDR as the Lead Designer; Skanska as the contractor)
- \$2.3 billion I-4 Ultimate Improvement Project (HDR as part of the Design Joint Venture and a member of the I-4MP team; Skanska as the P3 contractor; John Laing as the equity owner)
- \$1.1 billion Pittsburgh International Airport (HDR and Gensler on a JV contract for the conceptual design)
- \$2.2 billion Denver Eagle P3 Project (ACI, HDR, and John Laing)
- \$1.2 billion Bahia SkyRail Project (BYD and Innova)
- \$9.5 billion Sepulveda/405 Corridor project; advance engineering over a three-year period (BYD, HDR, Gensler, Innova, Manatt, and Cerrell)

These large infrastructure projects demonstrate our combined ability to coordinate services for large infrastructure projects, our complementary skill sets, and our knowledge and experience with dense urban environments, underground structures, bridges, utilities, and third-party coordination.

5. What is LA SkyRail Express proposing?

Several of the world's most experienced companies in delivering rapid transit public/private partnership (P3) projects, all of whom have a very strong presence in Los Angeles, have formed LA SkyRail Express to forge a partnership with the LA County Metropolitan Transportation Authority (Metro). Together, we will deliver a world-class rapid transit system for the voters of Los Angeles County who overwhelmingly voted for a new tax to fund a program of projects in Measure M—the very largest and most visible of which is the Project.



Our vision is to deliver a high-speed, high-capacity, high-service-frequency, state-of-the-art, elevated and at-grade monorail rapid transit system that will:

- Be generally constructed within the existing I-405 right of way
- Remove the construction and environmental impacts from adjacent neighborhoods
- Be completed (for the full corridor) within the voter-approved Measure M budget
- Meet or exceed all stated goals and requirements of Metro's RFP
- Finalize station location in the PDA process in concurrence with Metro and Community
 - Station locations have never been proposed to be positioned in the middle of the freeway

Our proposal greatly extends the reach and impact of the Measure M rapid transit investment, thereby serving as the region's transit solution linking together three light rail lines, the Purple Line Subway, the Orange Line BRT, several rapid bus and local bus lines, and can be extended to LAX and its surrounding activity centers, with high-speed, high-capacity, very high-frequency service.

6. How will you serve UCLA?

LA SkyRail Express' Baseline Proposal is fully compliant with all requirements stated within the RFP. Recognizing the importance of connectivity to UCLA in addition to the base RFP requirements, LASRE discussed several alternative ways to serve UCLA in our proposal to Metro.

The primary alternative, which is UCLA's Preferred option, was developed through an 18 month series of planning and design workshops that our key team members conducted in partnership with UCLA senior staff. Through that process, we developed and evaluated multiple alignment and technology alternatives jointly with the UCLA team. As a result of that process, UCLA identified their preferred alternative, which LASRE then committed to include in its proposal. UCLA already operates BYD-supplied battery-electric buses.

Complementing either the Baseline or Alternative Proposal, the UCLA Preferred Tunnel Option requires a much shorter, shallower, lower-cost, and faster-to-construct tunnel option to directly serve UCLA with an underground station immediately in front of the Luskin Center.

On a related matter, the Team also worked collaboratively with senior officials from the Getty Center, and through this process we jointly developed a design concept for a SkyRail station that will directly serve the Getty Center – a solution that simply cannot be achieved with a heavy rail tunnel under the Santa Monica Mountains.

Even with the additional capital cost of the UCLA-preferred alternative, should Metro adopt it, the LASRE proposal clearly shows the project fitting within Metro's Measure M budget.

That cost estimate was based upon three years of detailed engineering analysis and actual costs of similar projects built elsewhere in the world, adjusted for the costs of labor and materials in Southern California, designed to meet or exceed all applicable seismic design criteria.



7. Will the Team meet Buy America? If so, how?

Yes. We will meet or exceed Buy America requirements, just as we have done, for example, with BYD's electric bus manufacturing plant in Lancaster. Our specific proposal for this project is to build the monorail vehicles in Lancaster in partnership with organized labor, at a new plant, the property for which we already own, and for which we have already completed the design. We also will establish an American Supply Chain, just as we have done for the bus plant.

8. What is the DBE commitment for the team? And how to achieve the commitment?

Because Metro decided to procure the system through a two-step process, the first step of which is the Pre-Development Agreement (PDA) phase, they have first developed goals for DBE participation for that phase. In our comprehensive proposal to Metro for the PDA work, LA SkyRail Express committed to meet or exceed those goals for each phase of the work, as follows:

- Phase 1: 30.02%
- Phase 2: 26.06%
- Phase 3: 25.21%
- Phase 4: 24.94%
- Phase 5: TBD, per RFP Requirements

These commitments are based upon the extensive experience that key Team members have compiled by working successfully with DBE firms on relevant projects, both around the country and here in Los Angeles County on previous and going Metro projects. So, these are not just "paper" commitments. Our proposal delineates the comprehensive outreach program the Team completed and identifies more than 30 primarily locally based firms that we selected to perform specific work tasks on the project.

9. How will your proposed SkyRail project compliment Metro's bus service?

The LASRE Team feels strongly that implementing SkyRail in the Sepulveda Corridor all the way from the Valley to Expo Line, and eventually to LAX, is perhaps the very best way to reinforce, enhance, and expand the reach of Metro's local, express, and Rapid bus service throughout the western portions of Los Angeles County – while at the same time making them more productive and efficient. To summarize, SkyRail will:

- Link riders to at least 28 existing crossing bus routes (17 local and express, 5 Rapid, and 6 "Blue" routes) to the entire corridor by providing high speed and very frequent SkyRail service, such that the extremely frequent service will greatly facilitate transfers to and from the bus routes;
- Greatly extend the reach of all crossing bus routes by linking them to the substantial employment, education, cultural, and retail destinations along the corridor; and
- Connect them to all of the crossing rapid transit lines, including the Orange Line BRT in the Valley, the Purple Line Subway, and the Exposition and Crenshaw light rail lines.

Assuming Metro opts to implement our Alternative Proposal for SkyRail from the Orange Line BRT in the Valley all the way to LAX, ten of the SkyRail stations the LASRE Team has proposed along the line could readily interface with the following existing Metro bus routes -- all without any significant re-routing being required:



By doing so, many of the SkyRail stations will further enhance the effectiveness of existing multi-route transportation hubs in the Metro bus system, such as:

- Orange Line BRT Station
- 101 Station
- UCLA Station
- Santa Monica Station
- Culver City Station
- LAX Station

The Team has developed conceptual designs for these stations that take these high frequency transfer opportunities into account.

Furthermore, implementation of SkyRail provides Metro with an opportunity to replace existing parallel bus routes that operate along the highly congested 405 freeway with the much higher speed and higher frequency SkyRail service. For example, should Metro so decide, this could include redeploying both the rolling stock and work forces for the 734 route that travels over Sepulveda Pass and the FlyAway buses from the Valley. In both cases, SkyRail will make those trips in a fraction of the time and will do so much more reliably.

Quite importantly, carrying those passengers on SkyRail will be far less costly to Metro, and thereby will help alleviate the financial crunch Metro is facing with respect to operating deficits. Our conservative projections show that SkyRail from the Valley to LAX can more than cover its annual operations and maintenance costs from fares and ancillary revenues – as compared to bus lines that require operational subsidies.

Our projections assume the fare structure will be established by Metro, not by our team, and that they will be comparable to existing bus and rail fares. This should ensure fare equity throughout the corridor. In doing this analysis, we also assumed that fares from transferring passengers will be divided equally between the connecting bus and rail lines and the SkyRail line.

Such a redeployment of bus resources would be aimed directly at making the existing crossing bus lines more successful, because it could improve the service frequency on those routes. In the LASRE Team's view, increasing bus service frequency is the key to increasing bus ridership.

These enhancements to bus service in the corridor made possible through implementation of SkyRail will help extend the social equity and environmental justice of the system. Improving bus service, increasing bus ridership, and expanding the reach of local and express bus routes throughout the corridor will provide added and significant benefits to the lower income, historically disadvantaged communities that depend on them for urban mobility.

10. How does the SkyRail proposal address Social Equity and Environmental Justice considerations?

The LA SkyRail Express proposal is specifically designed to greatly improve equity of access throughout the western portion of Los Angeles County. First, and as mentioned previously, by providing high-speed, high-frequency service throughout the corridor, the system greatly expands the reach of the estimated 22



local, express, and Rapid bus lines with which it will interface. Second, by immediately extending the Project to LAX, LASRE will bring highly interconnected rapid transit service within reach of many lower-income neighborhoods. These vital features are expanded upon below.

Improve accessibility for residential and employment centers

- By extending to LAX with our Alternative Proposal, we will be serving an area that within three miles of the proposed LAX Station contains approximately 216,000 jobs – both blue collar and white collar jobs.

Support transit-oriented communities (TOC) policies

- Stations are designed to facilitate creation of mixed-use transit-oriented development by integrating access from a pedestrian plaza at ground level, or even from the second level of adjacent private property – and those developments will be required to comply with local, regional, and state requirements for low-income housing.

Support first/last-mile connections

- We have identified our preferred first mile/last mile provider and have considered options for further expanding the reach of the stations by directly addressing and incorporating first mile/last mile alternatives into our plans. These programs are specifically designed to improve access to transit for historically underserved communities.

Promote investment in disadvantaged communities

- By immediately extending the Project to LAX, we will bring rapid transit service within reach of many lower-income residential neighborhoods across the South Bay region.

And from the perspective of the environmental clearance process, Environmental Justice is a mandatory consideration, one which most likely will show the LASRE proposal to be vastly superior. We believe that the assessment will show that adoption of our Alternative Proposal, which extends all the way to LAX and can be completed within the Measure M budget and the “28 by 28” target schedule (or at least by 2030), will provide significant Environmental Justice benefits. In doing so, Fare Equity also can be achieved, especially in view of our assumption that Metro will establish the fare structure.

As mentioned above, these benefits not only will benefit residents in the South Bay area, they also will connect residents with jobs throughout the entire 19+ mile corridor, including traditionally underserved and disadvantaged communities in the San Fernando Valley. Further, with the passage of SB 1000, local municipalities are required to consider Environmental Justice in their respective General Plans, which means that these equity of access benefits can be more fully realized through cooperation and coordination with local municipalities all along the line.

11. How many jobs will your proposed project create? And if it truly is a lower cost solution, does that mean it will create fewer jobs? For example, fewer jobs than a higher cost tunnel alternative?



The LA SkyRail Express Project could create tens of thousands of good-paying direct jobs over a four-to-five-year period, assuming it goes forward to implementation. As a starting point, in 2021 the Federal Highway Administration of the United States Department of Transportation updated its 2007 estimate and published new guidelines stating that on average, heavy construction of major highway projects creates 13,000 jobs for every \$1 billion of construction value, per year. To cross-check this estimate, we reviewed another key source, the American Public Transit Association (APTA). In 2017, APTA estimated that rapid transit construction generates an average of 13,210 jobs per \$1 billion of expenditure. It should be noted that the APTA estimate combined both construction and manufacturing jobs.

Therefore, using a figure of 13,000 jobs created per year per \$1 billion of expenditure, and assuming the Measure M budget of \$9.5 billion, that equates to a total of up to 123,500 person-years of direct construction and manufacturing employment – a remarkable total of direct job creation.

Further, the Economic Multiplier Effect of job creation also has been widely studied. For example, the Economic Policy Institute estimates the following:

- For every direct construction job created, an average of about two indirect jobs are created, including both supplier jobs and induced jobs.
- For every direct manufacturing job created, an average of about 5.6 indirect jobs are created.

Regardless of whether those exact averages will apply here, **the bottom line is that building this project will create hundreds of thousands of person-years of direct and indirect jobs**. Further, our Team members' track record here in Southern California demonstrates that to the maximum extent possible, these will be local hires, with specialized training, working in close cooperation with organized labor.

Finally, as to a comparison to a subway alternative, it is important to point out that implementation of such an underground project most likely will take many more years to complete than will the SkyRail project. For example, if the total cost of a subway alternative is at least twice that of the SkyRail project (as Metro's own estimates would suggest would be the case), and the construction takes roughly twice as long (which has been the case in LA County), the annual job creation would be roughly the same for at least five years.



Specific Questions about the LA Metro Sepulveda Pass Transit Corridor Project

1. Why does monorail make sense for this corridor?

In short, **LA SkyRail Express provides Metro with a solution that is both technically and financially feasible, delivering the entire corridor under a single contract**—an outcome that Metro can fully realize through their proposed Pre-Development Agreement (PDA) and Public/Private Partnership (P3) process.

The LASRE Team's Proposal to Metro includes two alternatives: a "Baseline" proposal that would extend from the East San Fernando Valley light rail line to the Expo Line Station in the Westside; and an "Alternative" proposal that extends from the Valley all the way to LAX. Both alternatives are shown to fit well within the Measure M budget of \$9.5 billion (2015 dollars).

Both alternatives are shown to be far less costly and time-consuming to construct than the alternatives developed in Metro's Transit Feasibility Study (TFS), all of which included extensive underground construction, and all of which would exhaust or even greatly exceed that budget just to extend from the Valley to Westside -- thereby leaving the southern portion of the corridor, including LAX and the entire South Bay area, to 2057 or beyond.

When comparing these alternatives on the basis of the benefits that these expenditures will yield—for example, SkyRail built within the budget over the entire corridor versus the other alternatives exhausting the budget but built only to the Westside—the SkyRail solution greatly exceeds the performance of the TFS alternatives in every category. The benefit of building the entire corridor, when one considers the immense travel-shed of the greater LAX and South Bay area that SkyRail will seamlessly serve, is demonstrated by an independent study summarized in our proposal that was completed by USC Urban Planning Professor, Dr. Marlon Boarnet.

Further, if this comparison is expanded to show the TFS alternatives extending all the way to LAX, the already substantial capital and operating cost differences come into play in an even larger way. In other words, for the other alternatives to deliver benefits comparable to SkyRail, both their capital and O&M costs (as estimated by Metro itself) are roughly double to triple the cost of SkyRail.

2. What are the key benefits of a monorail system?

By selecting high-speed, quiet, comfortable, state-of-the art monorail technology, and by virtue of placing the alignment within or adjacent to the I-405 freeway in an elevated configuration, the system is both attractive and highly visible, while at the same time greatly reducing environmental impacts to the communities along the corridor.

Key benefits include:

- Reduced disruptive construction period
- Reduced construction cost
- A Getty Center Station that will also serve the Leo Baeck Temple, the siting and configuration of which reflect input provided by the Getty Center in a series of workshops



- Fits within the I-405 median between the US-101 freeway and the Purple Line Subway, while maintaining the ability for Metro to implement the planned I-405 ExpressLanes Project
- Travels at 65 mph over Sepulveda Pass with fully loaded trains
- Includes an LAX Station that is designed to take advantage of the unprecedented multi-modal transfer opportunities to the LAX Automated People Mover and Consolidated Rent-A-Car (CONRAC) facility, the Crenshaw/LAX Line LRT, and Metro’s regional bus transit center—transfers that are greatly enhanced by the very high-frequency service of the monorail system
- Provides for the possibility of future extensions to the north across the Valley and to the south along the I-405 freeway toward Long Beach and Orange County, as well as for a direct, one-seat ride to the new Inglewood Sports and Entertainment Complex
- Both the Baseline and Alternative Proposals can be implemented on an accelerated basis in response to Mayor Garcetti’s “28 by 28” initiative, within Metro’s projected cash flow for the corridor.

3. Can SkyRail climb the steep grades over Sepulveda Pass? If so, at what speed?

Yes. As mentioned above, the grades on both sides of the pass are slightly less than 6 percent, and the rubber tire monorail trains can operate on sustained grades of up to 6 percent, and up to 10 percent on shorter segments. Fully loaded trains are shown in the proposal to travel over the pass at approximately 65 mph.

4. Can SkyRail meet the high speed and high-capacity requirements of the Sepulveda corridor?

- a. If so, at what speed?**
- b. At what capacity**
- c. With what level of crowding (i.e., are you assuming Asian levels of crowding?)**
- d. At what frequency?**

Yes, SkyRail exceeds the Project Parameters defined by Metro for capacity, and provides both higher speeds and frequencies than those envisioned in the TFS:

- initial capacity of over 14,000 passengers per hour per direction (pphpd), at American standards for standees
- ultimate capacity of nearly 19,000 pphpd
- which exceeds the Metro-specified 12,000 pphpd
- higher speed (nominally 65 mph)
- higher-frequency service (two minutes during extended peak periods and special events), greatly enhancing connections with all crossing bus and rail lines, which in turn greatly expands the “footprint” of the line

5. Where will the stations be located?

- a. Why not put a station at ____?**
- b. Will parking be provided at stations?**



The ultimate decision on the number of stations and station locations will be Metro's, and we anticipate they will work quite closely with the community through the environmental process in making those decisions. Similarly, the ultimate decision on station area parking will be made by Metro – knowing that in this highly urbanized corridor, finding sufficient land for station parking can be quite challenging and controversial.

That said, our Team's proposal included the following stations for Metro's consideration:

- Van Nuys Station (only in the Baseline Proposal)
- Sherman Way Station (only in the Baseline Proposal)
- Orange Line Station (including a large parking lot)
- 101 Station
- Getty Center Station
- Purple Line Station (and UCLA Station, see below)
- Santa Monica Blvd. Station
- Expo Line Station
- Venice Blvd. Station (only in the Alternative Proposal)
- Culver City Station (only in the Alternative Proposal)
- LAX Station (only in the Alternative Proposal)

6. Are any stations planned to be located in the middle of the freeway?

First, it is very important to note that the Team has never proposed stations in the median of the freeway. To enhance accessibility, all stations are proposed to be located at the side of the freeway. Renderings showing several of these stations are included in the Executive Summary document posted on the LASRE website.

The Team's Lead Architect, Gensler, has prepared a design book that illustrates how the stations have been devised to greatly expand the footprint of the line by also directly serving (within walking distance) a remarkable number of major residential, office, and commercial concentrations.

In addition, we have focused on further expanding the reach of the stations by directly addressing, and incorporating, first mile/last mile alternatives into our plans for the stations. Accordingly, if Metro would so desire, we intend to design and operate a system that enhances access to the stations and improves multimodal connectivity.

7. How much will it cost?

Both the Baseline and Alternative Proposals, including construction to LAX are estimated to be well within Metro's budget for Measure M -- both the initial capital cost and the ongoing operations and maintenance costs.

LA SkyRail Express will only release cost information LA Metro has published from the team's proposal. Our Baseline Proposal's Capital Cost estimate is \$6.1 Billion, and respective O&M Cost estimate is \$44 Million per year.

8. How soon could the project be built?

Depending upon the duration of the environmental clearance process, it is still possible for an initial operating segment to be open in time for the 2028 Olympics, while work continues on the remainder of the line. The full proposal from the Valley to LAX is estimated to be completed by 2030 – within Metro’s Measure M budget and forecasted revenue stream.

9. What will be the travel time?

- a. From the Valley to the Westside**
- b. From the Valley to LAX?**

Our computer simulation model shows the following end-to-end travel times:

- From the Van Nuys/LOSSAN corridor station to the Expo Station = 24 minutes
- From the Orange Line BRT Station to the LAX Station = 29.9 minutes

10. Will the trains create additional noise within the residential neighborhoods along the corridor? And what about other environmental impacts?

As a rubber-tired straddle-type monorail, the noise and vibration emitted from the vehicles is substantially less than any steel-wheeled technology. In addition to the lower noise associated with electric propulsion and rubber tires, the vehicles are equipped with side skirts that cover the tires to further reduce their low noise emissions. Our detailed noise measurements indicate that the incremental noise effect of the monorail will be negligible as compared to the existing ambient freeway noise. Also, detailed noise and vibration measurements inside the monorail show average noise levels to be only 69.6 dBA at 50 mph and 74.1 dBA at 75 mph

The LA SkyRail Express monorail technology and preferred alignment provide major attributes that substantially reduce the potential for adverse environmental impacts during construction and operation, including noise, as compared to the largely underground alternatives. When taken in combination with the more than three years of advance planning and engineering work already completed by the Team, this will also enable the Team to help accelerate completion of the PDA process.

Acceleration of the PDA process will in turn enable Metro to accelerate the Federal Transit Administration’s formal environmental process. Our proposal shows how construction can be advanced to enable Project completion, for at least an initial operating segment, by as early as 2028.

The following features of the Team’s Proposal will help render it environmentally superior to the other alternatives, as summarized below:

- The elevated construction process for the much smaller guide beams, columns, and footings will consume a fraction of the materials that the heavy rail alternatives will consume, including concrete, steel, and water.
- The energy efficiency features of SkyRail, such as rechargeable, long-life, recyclable batteries and regenerative braking in which energy created in braking is stored in wayside batteries, can reduce vehicle energy consumption by as much as 30%, and/or could provide power to help power passenger stations and the grid.

- Construction within the I-405 freeway corridor will result in a superior evaluation of Irreversible or Irrecoverable Commitment of Resources in the following categories:
 - Project materials and energy consumption
 - Geology and soils hazards
 - Sensitive biological resources
 - Archaeological and historical resources
 - Land use and state transportation planning
 - Greenhouse gases (GHGs) and criteria air pollutants
- Ability to Fund through Measure M. The far lower cost of SkyRail means it can be funded through Measure M, rather than relying upon trying to find billions of dollars from other local, state, and/or federal funding sources in competition with cities throughout the country, far beyond the substantial level of such funds that already were assumed to be obtained as an integral part of the Measure M funding plan. This critically important factor (funding availability) often is included in federal and state environmental documents wherever the life-cycle costs of the final alternatives vary widely, as they do here.

11. Will passengers be able to look into the windows of my home?

Essentially no. First, there are very few residences within view range of where the guideway will be located. Second, the vehicles will be passing by at rapid speeds, comparable to or even faster than the posted speed limit on the freeway.

12. Will traffic lanes be removed to make space for the columns?

No. The engineering firms on the Team have looked into this in detail, and in almost all cases, the columns will fit within the existing median. In a few other locations, there is sufficient space to create a wide enough median, approximately six or seven feet wide, without widening the freeway. And these columns, which need only be about four feet wide due to the much lighter weight of the vehicles and the lighter, pre-cast 27.5 inch wide beams, are fully compliant with Caltrans' seismic design standards. Please refer to the next question and answer for additional relevant information.

13. Can Metro still add a set of toll lanes in the Sepulveda Pass if there are columns in the median?

LA SkyRail Express engineering team members HDR and Innova collaborated on a study that addressed the feasibility of constructing the SkyRail guideway in the median of the I-405, in particular, over the Sepulveda Pass. Innova developed a narrower column that still would comply with seismic design criteria, and HDR investigated the actual geometry over the pass.

While the reconstructed I-405 freeway's cross section varies from area to area within this section, the bottom-line finding was that placing the columns in the median, with proper protection, requires essentially the same space that Caltrans already requires wherever they have columns, light posts, or signposts. The drainage analysis also developed a simple drainage solution; and the sight distance analysis confirmed that the existing freeway geometry already violates desirable sight distance criteria, such that the impact of the SkyRail columns would be minimal.



In other words, the design and construction issues that Metro faces in implementing the I-405 ExpressLanes Project are essentially the same, whether SkyRail is there or not. Specifically, we found that re-striping to convert the existing HOV lanes to paid ExpressLanes can be done without any freeway widening; and adding a second pair of ExpressLanes in each direction will fit in many areas, but there are some areas that likely will require some shoulder widening (with or without SkyRail in the median).

14. What are the impacts from construction when the guideway is being built?

SkyRail uses a dual guideway structure, where both of the slender 27.5-inch-wide guide beams are typically supported by a row of single columns with crossheads, either as simply supported spans or as a series of post-tensioned continuous structures. This enables the strict geometric design criteria and tolerance standards to be met in a controlled setting using sophisticated computer-controlled forms and a comprehensive quality-controlled process.

The SkyRail system is designed to enhance and accelerate constructability. No other high-speed, high-capacity, fully proven rapid transit technology can come close to matching the constructability advantages of SkyRail. Fully-loaded at specified North American standee levels, SkyRail trains are much lighter than comparable heavy rail trains—30% less per lineal foot of guideway than comparably loaded CRRC subway trains for Metro, for example. The narrow pre-cast guide beams provide both the structural support and guidance geometry, thereby avoiding the need for wide “bridge” type structures to support conventional trains, which in addition to their massive structures, require much higher maintenance steel rail trackwork or running surfaces and guiderail assemblies to be affixed to the bridge structures.

Resulting from these inherent and unique SkyRail features, the following constructability benefits will be realized:

- Approximately 50% savings in concrete and steel per lineal foot of elevated guideway as compared to the structures required for heavy rail transit (with substantial additional savings as compared to underground construction)
- Smaller footings, which in turn not only reduce the time and cost required to construct the footings, it also significantly reduces their footprint
- Reduced utility and drainage issues and greater flexibility in column placement

The majority of the spans will be constructed using pre-cast columns and beams, which will greatly speed up the guideway erection process, significantly reduce overall construction time, and minimize both traffic and visual impacts during construction. This means that construction will proceed at a rate of approximately 0.4 miles per month, thereby creating the opportunity to erect the entire guideway over the entire corridor from the Valley to LAX in about 18 to 24 months (assuming construction starts at both ends and moves toward the middle). Most importantly, this also means that **only the median HOV lanes of the freeway would need to be used for foundations and erection**, not the general purpose lanes.

15. Why should Metro introduce yet another technology in the County in addition to the many existing ones (i.e., bus, BRT, light rail, subway, Metrolink commuter rail)?

- a. **Won't it cost more to operate in maintain?**
- b. **Is there a skilled work force who knows the technology?**
- c. **Won't it force everyone to transfer?**
- d. **How can it be cost competitive when there are no economies of scale?**



SkyRail in this corridor will provide a heretofore unavailable mobility option for longer, higher speed transit trips in one of the nation's most highly congested travel corridors. SkyRail is a high-speed, high-capacity, and very frequent service solution for Metro that will provide an attractive mobility alternative for people living and working throughout the west sector of LA County. When coupled with the iconic visibility of the system (as compared to being buried underground), this represents a true game-changer for Metro.

The robust operating capabilities of the SkyRail system will support the generation of new transit trips made by people who have mobility options, as well as for people who do not have access to a private automobile. It will greatly improve mobility in the corridor by making transfers to and from all of Metro's various transit technologies that cross this corridor, including light rail, subway, and local, rapid, and BRT bus lines, far more attractive. Wait times will be so much shorter due to the very high frequency of SkyRail service, and also because the proposed stations are designed to facilitate those transfers.

Further, by adopting our Alternative Proposal for service extending throughout the Corridor from the Valley to LAX as defined in Measure M, this line will truly become a "regional connector". It will achieve these critically important objectives:

- greatly accelerate completion of the entire corridor, making it much easier to use the existing and planned Metro radial, downtown-oriented east-west lines
- provide much-needed high-speed, safe, reliable, and frequent north-south rapid transit service that links together major employment and retail centers throughout the entire line—all the way from LAX to the Valley.

The Team already has assembled a skilled labor force that knows this technology and will guide its construction and ongoing operations and maintenance. Further, the skills needed by the construction workers are quite comparable to those needed for other highway and rapid transit projects constructed in the region, and Skanska, as the lead construction contractor, has access to a highly trained and experienced workforce.

As to the question about transfers, the world's greatest cities all have multiple rapid transit lines that involve transfers. Specific to this corridor here in Los Angeles, regardless of which technology is chosen by Metro, transfers to and from all of the crossing lines will be necessary. The key distinguishing factor for SkyRail is its very high service frequency, which greatly facilitates transfers – to the point where passengers will not even need to have a timetable to be able to use the system efficiently and effectively.

16. How safe will it be?

- a. *In the case of brush fires over the Pass?*
- b. *In the case of earthquakes?*
- c. *What happens when the system shuts down whenever the electricity is shut down (i.e., "rolling blackouts")?*

Several factors combine to make the Sepulveda Pass section safe in the event that wildfires similar to the "Getty Fire" were to occur again:

- The alignment is proposed to be placed primarily within the median, where there are no nearby flammable materials



- The system itself is inherently non-flammable, including the concrete guideway structures and the aluminum trains.
- In the event emergency response officials were to decide that SkyRail service should be temporarily suspended, the automatic train control system can be pre-programmed to terminate service in that section, while informing passengers of the temporary service change in real time through central-to-train communications.
- The trains have backup on-board rechargeable batteries that can propel fully loaded trains to the nearest safe station in the event of a regional power outage. This means that in the future, if the electric power utilities continue to implement rolling blackouts during high-fire-danger periods, no SkyRail passengers would be endangered.

With respect to earthquakes, the entire structure will be designed in conformance with current Caltrans and Metro seismic design criteria, which, in essence, require that the structures would not experience catastrophic failure. In other words, the monorail will be one of the very safest places to be in the event of “the big one”. In our view, this makes it a far safer place to be than in a tunnel.

Evidence of just how robust monorail structures can be was demonstrated during the big Kobe earthquake of 1995 in Japan, where numerous buildings and roadways collapsed, leaving more than 45,000 people homeless. Their monorail line, which was built to significantly less stringent criteria than we have here in California, suffered only minor damage and was back up and running again long before any other transportation modes.

17. Will you meet Metro’s goals for DBE (small, woman-owned, minority) participation? If so, how?

Yes, the LASRE Team has formally committed to meet or exceed Metro’s goals for DBE participation. For the PDA phase alone, the Team completed a very successful outreach program that attracted the interest of 260 local and regional small and disadvantaged businesses and selected over 30 of them to be part of the Team, with specific scopes of work and budgets for each of them. A key to success of the DBE participation program is precisely this – providing the firms with specific scopes of work and budgets, and then helping to mentor them as their work proceeds.

All of this is an integral part of our program – and it is based upon the approach implemented by key Team members Skanska and HDR having met or exceeded Metro’s goals on previous and currently underway major contracts.

18. How can local businesses, and small businesses, have a fair shot at working on the project when all of the work goes to only one team?

For the construction and O&M phases, there will be additional DBE outreach programs undertaken, which will open up dozens of new opportunities for meaningful participation by primarily local construction companies.

**19. Will organized labor be able to participate in the project?
a. If so, how?**



Yes, the Team has assumed from the beginning that this project will be built and operated and maintained through collaborative agreements with organized labor – which also is fully consistent with Metro’s policies. This will be facilitated by the fact that key Team members already have compiled strong track records working successfully with organized labor, including Skanska’s strong working relationships with local unions involved in construction, and BYD’s strong working relationships with local unions involved in vehicle manufacturing.

20. How can we the taxpayers be protected from cost overruns?

The LASRE financing plan is highly credible because our cost estimates are based upon plan and profile drawings for the entire alignment, structural design concepts based upon recently constructed dual-beam monorail guideways, an operational plan that includes six-car trains running on two-minute headways from day one, and inclusion of significant contingencies.

That said, global experience with large urban rapid transit projects suggests that estimates based upon conceptual level designs often understate what the actual costs can become when site-specific issues such as unforeseen geotechnical conditions and unidentified utilities are encountered.

In this case, however, there are two important things to consider:

- Estimates for SkyRail are much lower than the Measure M budget, thereby leaving a great deal of room for cost growth as design details are developed.
- The potential for such cost growth is greatly reduced by the inherent characteristics of SkyRail technology’s design and construction as an elevated system with much smaller footings—especially as compared to the unknowns associated with underground construction.

Equally important is the fact that Metro is seriously considering implementing the project using a Public/Private Partnership (P3) approach, where the selected team implements the project for a fixed price, not just for construction, but also most importantly, for ongoing operations and maintenance. This means that the Team must build long term quality into the project from the very beginning. No other Metro project already completed or currently underway shifts all of those project cost, completion, and performance risks to the private sector partner. LA SkyRail Express fully supports this approach and has the financial strength to guarantee our performance.

While this approach assigns most of the risks to the private partner, it doesn’t necessarily shift all of the risks. Cost overruns on large rapid transit projects typically occur largely as a result of at least three key issues:

- changed conditions: such as previously unknown soil conditions, groundwater, and contaminated soils
- previously unidentified underground utilities
- delays and challenges associated with property acquisition

SkyRail’s unique technology avoids most if not all of these issues. It enables much faster construction and less risk of delays compared to the heavy rail alternatives, all of which entail extensive underground construction.

21. What happens when there are problems?

- a. **Who fixes them and who pays for fixing them?**
- b. **Won't you just walk away if there are problems?**

Problems can and do happen with large public infrastructure projects. Under the P3 approach, the responsibility for resolving them lies with the selected team, and LASRE accepts that responsibility.

When urban mass transit officials around the world are asked to list the biggest problems they have encountered while delivering new rapid transit projects, they typically place poor or incomplete system integration at the very top of this list. Therefore, critical to life-cycle and performance success on projects with a high level of technology and systems integration complexity is building and empowering an effective System Integration Group—beginning during the initial PDA phases and continuing through the O&M period. Accordingly, System Integration is a major emphasis of our proposal to Metro.

22. Why should we support this in view of the fact that it won't go to the South Bay and LAX until at least 2057?

Assuming Metro selects LA SkyRail Express, **it will go to the South Bay and connect with LAX – as an integral part of the entire project** – and be open within the 2028 to 2030 time frame. The actual opening date depends largely upon the duration of the environmental documentation and approval process.

Our proposal to Metro includes a project plan of finance that show this to be financially viable within the sources identified in Measure M. It describes that complete line in detail, including potential station locations, a preliminary operating plan, and capital and O&M cost estimates. It is a very real proposal.

It is the extraordinarily high cost of the underground alternative that would push the South Bay and LAX connection back to 2057 – or beyond.

23. How will COVID 19 affect the funding and the project?

LA SkyRail Express included a Covid 19 Response Plan in our proposal, a plan which includes innovative financing and other measures aimed at aiding Metro through the financial crisis created by the pandemic -- and doing so without delaying project completion.

24. Will you, and how will you, meet Buy America on this project, especially in view of the Biden Administration's push for a higher level of U.S. content?

The answer is yes, LA SkyRail Express will meet or exceed Buy America. In addressing this question, it is important to note that there are no United States based rapid transit vehicle manufacturers – and there have been none for at least 40 years. Therefore, any vehicle supplier will need to deal with this requirement.



SkyRail technology is Buy America compliant through local vehicle assembly and locally sourced, labor-friendly construction that maximizes job creation. Many of the system's sub-assemblies are standard transit-grade components available from a number of American suppliers, thereby allowing for competitive and transparent pricing. And just as they already have done for their Buy America compliant battery-electric bus manufacturing facility in Los Angeles County, BYD will develop a supply chain of American suppliers for SkyRail vehicles and systems. BYD will develop that American supply chain during the PDA process.

Generic Technology Questions

1. What is SkyRail?

SkyRail is a fully integrated, driverless, state-of-the-art straddle type monorail system that incorporates all of the features needed for rigorous line-haul urban transit applications, including high speed, high capacity, and highly reliable service.

2. Is monorail proven technology/can it be used in urban environments where line-haul high-capacity service is needed?

To realize our vision for the Sepulveda Transit Corridor Project, LA SkyRail Express™ selected SkyRail™ technology. SkyRail is the world's most advanced, driverless, straddle-type monorail system, representing the state of the art of monorail technology that has evolved over nearly 60 years from an amusement park ride to a proven, high-capacity, urban rapid transit solution—a technology family that has become the new system of choice in several of the world's largest cities, all of which already had Heavy Rail Transit (HRT), including São Paulo, Bangkok, Cairo, and Panama City.

As a matter of fact, the International Monorail Association lists straddle-type urban monorail transit systems in 42 cities around the world—totaling 269 miles and over 400 stations, and states that they are carrying millions of passengers each day.

Following a seven-year development program, LA SkyRail Express team member BYD released SkyRail technology for urban applications in 2016. In only four years since then, BYD has constructed five new systems, and recently has been awarded its first two major urban projects in the Americas (in Salvador and São Paulo, Brazil).

3. Can monorails switch?

Straddle monorail guideway switching has been performed safely and reliably for nearly 60 years, starting with the Tokyo Haneda Line in 1964. Since then, guideway switching technology has progressed continuously, with all of the modern systems around the world employing a variety of switch types and configurations to essentially match the switching requirements of conventional rail systems.



Building upon this successful history, BYD has designed, manufactured, and installed five types of guide beam switches using transit-grade components. By combining them in various configurations, these switches provide the same functionality that rail switches provide, including operating in pinched loops with end-of-line turn-backs, crossovers between guide beams, pocket tracks along the line, accessing multiple beams in the maintenance facility, and branching and merging of lines.

Fully interlocked with the automatic train control system in a fail-safe manner, guide beam switches perform all of these functions by employing beam replacement, pivot, articulated, and flexible articulated switches.

4. Can monorails be evacuated in the event of an emergency?

Emergency evacuation walkways are provided continuously along the guideway in compliance with the same codes and standards that other technologies must comply with. These walkways typically consist of structural steel frames anchored to the guideway beams to support non-slip walkway panels. Cable trays and maintenance walkways typically are also supported by this system. The walkways are located between the guideway beams for the majority of the alignment; however, where the beams split apart, such as entering center platform stations, short portions of the walkway will be located on the side of the beams.

Nonetheless, in almost all cases, the safest place for passengers will be in the vehicles. For example, in case of a regional power outage, the on-board batteries of the SkyRail system will provide power to move the train to the closest available station for passengers to disembark. In the very rare case where a train may be immobile, the next option would be to have another monorail train push the disabled train to the nearest station. Only in the extremely rare case of a life-threatening emergency would passengers be evacuated to the emergency walkways, where they would travel to egress locations at the stations (or in the case of a long distance between two stations, to an intermediate location where they could access a “safe haven”). This approach is entirely consistent with the approach used by other technologies.

5. What is the passenger carrying capacity of SkyRail?

SkyRail can provide over three times the peak line capacity of Metro’s light rail lines (approximately 5,000 passengers per hour per direction – pphpd), and more than the capacity of Metro’s Purple Line subway when it is finally built out to operate at its highest possible service frequency. For example, six-car SkyRail trains, operating at two-minute peak period headways, will provide an initial installed peak capacity of over 14,000 pphpd, versus the 12,000 pphpd level required to meet the Project Parameters specified by Metro. Up to eight-car trains will meet even higher high demand periods by providing peak capacity of nearly 19,000 pphpd at American standing space specifications (four standees per square meter, 2.7 square feet per standee).

6. What is the top speed of SkyRail?

SkyRail enhances project performance with a top operational speed of 75 mph. The trains have been extensively tested at this speed, and are being offered on projects around the world. We recommend operating at scheduled top speeds of approximately 65 mph to save energy and provide for a speed



adjustment capability to stay on schedule in the event of passenger-induced delays. While the station spacing and alignment geometry combine to determine what the actual top speed will be at each point of the line, we have performed detailed train simulation model runs which show that fully loaded six-car trains can travel over Sepulveda Pass at 65 mph.

7. How loud are SkyRail trains as they pass by?

The system is both attractive and highly visible, while at the same time greatly reducing environmental impacts to the communities along the corridor. Among these environmental advantages is the significantly lower noise levels emanated by the rubber-tired straddle monorail vehicles. And not only are the noise levels significantly lower, there is no steel wheel on steel rail “squeal”.

Our comprehensive noise measurements confirm that the noise level of the monorail vehicles will be negligible compared to the current noise levels generated by automobile, bus, and truck traffic on the 405 Freeway.

8. Is SkyRail energy efficient? If so, how can that be, given the fact that rubber tires create more friction than steel wheels on steel rails?

Yes, Sky Rail is energy efficient. As a matter of fact, traveling by SkyRail will be one of the most energy efficient modes of travel. While rubber tires do indeed create more friction than steel wheels do, there are several other key factors that offset any additional energy consumption associated with that friction. These factors include:

- The trains themselves are roughly 30 percent lighter, such that much less energy is needed to simply propel the trains.
- The stations are much shorter, such that much less energy will be needed within the stations themselves.
- SkyRail incorporates containerized, rechargeable, long-life batteries configured in energy storage facilities that are highly efficient in capturing the energy generated by the electric motors when the trains decelerate. Studies have estimated that this factor alone can reduce energy consumption by up to 30 percent.

It should also be mentioned that this additional friction between rubber tires and concrete guide beams (as compared to steel wheels on steel rails), actually is a major operational advantage for the system. It eliminates noisy and unpredictable steel wheel slip and slide, thereby making accurate station stopping more predictable and achievable. It eliminates steel wheel/rail squeal. And it enables the vehicles to traverse much steeper grades, at speed, thereby helping to avoid the need for very costly and disruptive tunnels. Finally, the very large overall operating and maintenance cost savings referred to in a subsequent answer fully take into account the energy cost of operating a SkyRail system.

9. What is the maximum grade for SkyRail?

10 percent over short distances, and about 6 percent for prolonged sections – which is much greater than the grade-climbing capability of traditional steel wheel subway systems. Relevant to this project is the fact that the steepest sections of the I-405 freeway as it traverses over Sepulveda Pass are less than 6 percent.

10. What is the minimum turning radius for SkyRail?

The minimum turning radius is about 150 feet, which is much less than subway systems, and as such, provides maximum alignment flexibility, while at the same time greatly reducing construction impacts, property acquisition, and relocations.

11. Can monorail be used in a tunnel or at-grade? If so, why not just put it in a tunnel?

Yes, monorail can be placed in underground sections using either cut and cover or tunneling construction methods – as has been in other large cities. While there may be one or two locations where that would be necessary, in general, constructing underground systems is cost-prohibitive, generally averaging at least two to four times more per mile overall than an elevated monorail.

The alignment also can be placed in at-grade sections, but in that case, it would need to be fenced and fully protected from intrusion.

12. How does the capital cost of a monorail project compare to other rail technologies, such as light rail, heavy rail, subway?

As a general rule of thumb, transit planners often answer this question by citing the “1:3:10” guideline, which states that on average, an elevated system costs roughly three times more per mile to construct than an at-grade system; and an underground system costs roughly 10 times more per mile. Of course, site-specific factors can affect this -- but it is fair to say that as compared to other elevated transit technologies, all of which require much more massive, costly, and obtrusive structures, urban straddle monorail systems cost significantly less to construct than other elevated technologies, which in turn significantly increases the cost savings as compared to subways.

Further, as the low-cost right-of-way opportunities for at-grade light rail lines in many of our cities already have already been taken, light rail lines are becoming much more costly to construct due to the need for extensive aerial and/or underground grade separations. In Los Angeles County, for example, this has driven the average cost per mile for new light rail lines to exceed \$250 million per mile, which is nearing the realm of fully automated, much faster, much higher capacity monorail alternatives.

While the state-of-the-art high-speed, high-capacity, line haul urban monorail technology may not yet have been deployed in the United States, transit leaders are looking to this versatile and efficient option—elevated straddle monorails placed alongside or within freeways and high-volume arterial roadways—as an alternative to much more expensive, fully grade-separated options such as subways. SkyRail technology is this option, offering high-speed, high-capacity, and frequent service at a fraction of the construction cost of subways.

13. If light rail really is less costly, why not just build light rail?

First, as mentioned above, constructing light rail in highly urbanized, dense corridors almost certainly would require extensive tunneling and elevated construction, because there are no at-grade alignment opportunities still available in those corridors. Light rail still makes sense where at-grade right of way



opportunities are available, where peak hour demand is relatively low, and where the line is relatively short, such as in abandoned railroad rights of way and in-street alignments.

In all other higher demand, urbanized corridors with high potential ridership levels, especially longer corridors like this that will attract many more riders, light rail rapidly becomes cost-prohibitive and cannot meet the capacity and speed requirements because it has grade crossings. Therefore, transit planners are seeking lower impact elevated alternatives such as monorail to avoid the high cost, construction disruption, and uncertainty of subways.

14. What is it that makes SkyRail so lightweight relative to light rail or heavy rail?

First, the vehicles themselves are lighter weight – roughly 30 percent lighter per foot of length than comparable light rail or subway vehicles. This arises from at least two key factors:

- Monorail vehicles use much lighter weight structural frames than traditional rail vehicles. This is because the rail vehicle frames must support the very heavy “trucks” or “bogies” that contain the steel wheels and electric motors.
- To the contrary, straddle monorail vehicles typically are much lower profile because they actually do “straddle” the guide beams, and because they do not require those large and very heavy bogies.

Second, from an overall system perspective, the monorail’s elevated guideway structures are far lighter, less costly, and faster and easier to construct than comparable elevated structures required by traditional rail vehicles. Our team’s structural engineers estimate that the monorail structure requires roughly half the concrete and steel.

15. How does the operations and maintenance cost for monorail compare to other rail technologies, such as light rail or heavy rail?

Monorail operations and maintenance (O&M) costs are much lower. There are many important reasons for this, including but not limited to the following:

- The guideway structures are much smaller and lighter, and do not have any guidance rails on top of them. This makes them nearly maintenance-free.
- The straddle type monorail vehicles operate in a much cleaner environment, affected by a fraction of the dirt and debris that the subway and light rail alternatives are subjected to.
- The monorail system includes state-of-the-art energy conservation measures, such as wayside energy storage with environmentally friendly rechargeable batteries that efficiently capture and store energy that is regenerated on-board when the trains decelerate.
- The advanced automatic, communications-based, positive train control system greatly reduces labor costs.

16. How long are the stations?

This depends upon the maximum train length required to meet the proposed project’s peak hour demand. As an example, the Red and Purple Line subway stations in Los Angeles County are 450 feet long, and after several major modifications are made at some point in the future to the alignment and train control system, both lines will be able to operate six-car trains at their ultimate highest service frequency capability



of 4 minutes between successive trains. This will provide an ultimate peak line capacity of about 16,740 passengers per hour per direction (pphd) – as compared to their current peak line capacity of only about 6,696 pphd.

Compare that to eight-car SkyRail trains operating on 2-minute headways (which is totally realistic), which would require stations to be only about 330 feet long. Under that configuration, SkyRail would provide a peak line capacity of about 18,780 pphd (at the same standee crowding level as the subway, as specified here in the United States).