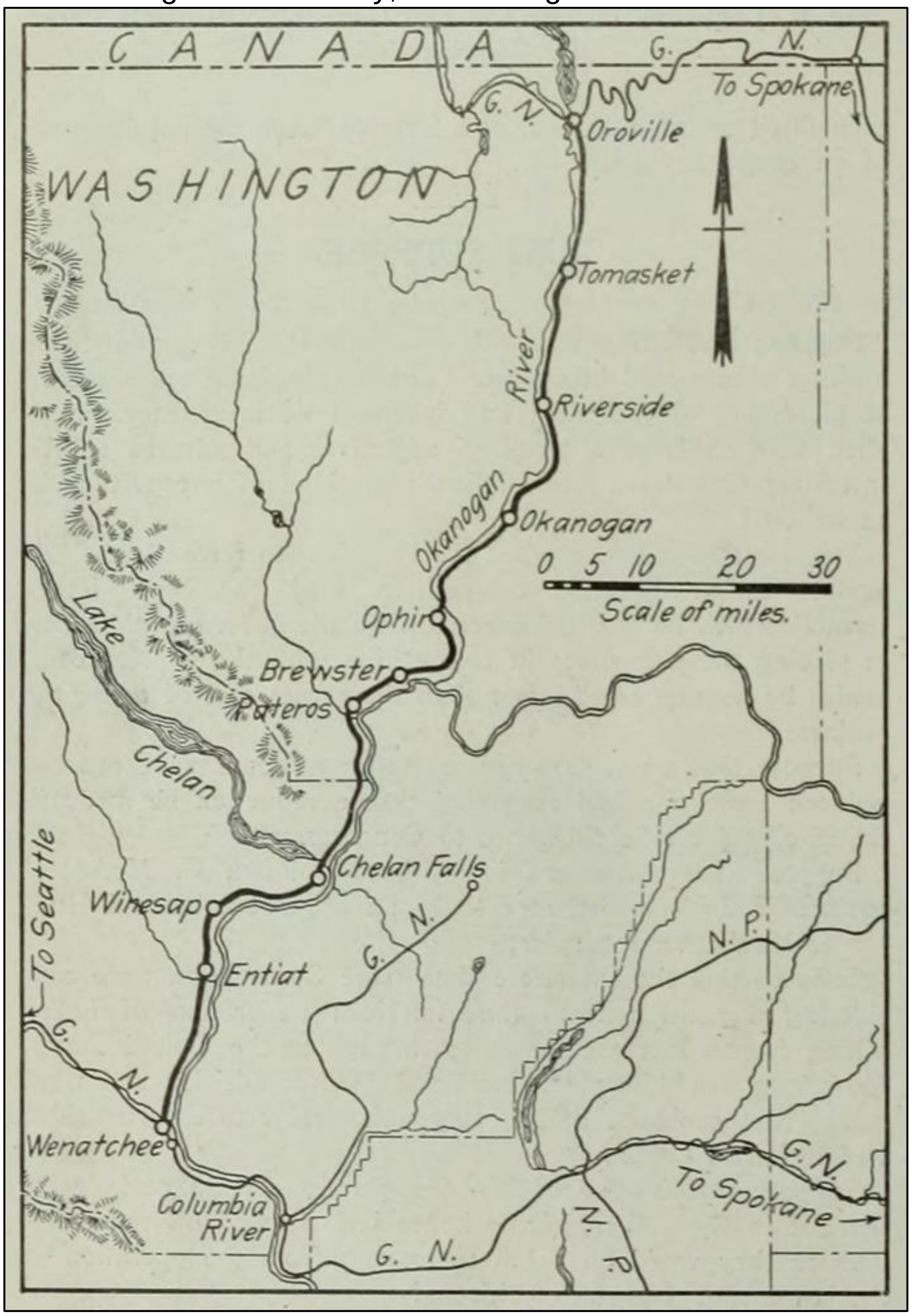
Shared-Use Operations Plan: Wenatchee–Oroville Rail Corridor

Introduction and Background

Corridor Overview: The Wenatchee–Oroville rail corridor in central Washington is a 131-mile former Great Northern branch line running north from Wenatchee along the Columbia River into the Okanogan River Valley, terminating at Oroville near the



Canadian border[1]

. Today the line is operated by the Cascade & Columbia River Railroad (CSCD, a Genesee & Wyoming short line) and interchanges with BNSF Railway at Wenatchee[1]. The corridor serves sparsely populated but economically active communities (Entiat, Chelan, Brewster, Okanogan/Omak, Tonasket, and Oroville) and carries freight such as lumber, wood chips, and limestone, with about 5,200 carloads moved in 2008[2][3]. Basic station infrastructure is assumed to be in place at the principal towns for future passenger service.

Existing Freight Operations: Currently, BNSF freight traffic on the line consists of **one local freight turn operating five days a week (weekdays)** under CSCD management[4]. This train typically originates at Omak (the railroad's operations base) early each morning, proceeds north to Oroville, then runs south the full length of the line to Wenatchee, and returns north to Omak by evening[4]. On this "out-and-back" daily run (approximately 274 miles round-trip[4]), the freight usually hauls empty cars northbound (for loading lumber, wood products, calcium carbonate, etc.) and carries loaded cars southbound to Wenatchee for interchange onto BNSF[5]. Only one train is on the line at any given time under current practice, and dispatching is handled via **track warrants in dark territory** (no wayside signals)[6]. The train crew contacts a centralized dispatcher by radio each morning to obtain track authority for the day's run[6].

Freight Train Profile: The freight schedule and profile are relatively low-density. **Frequency** is one round-trip per day (weekday), with the train typically departing Omak around 5:00 AM and finishing back at Omak by late afternoon or early evening[4]. **Train length** ranges from ~20 to 40 cars per day, depending on traffic; a "light" day might see ~25 cars southbound[7]. **Speeds** on the line are currently limited by track conditions to about **25 mph maximum** for freight[8] (FRA Class II track in many segments). Indeed, on a typical run "25 miles per hour – the fastest they'll go" is noted as a realistic upper limit today[8]. The line's physical plant is modest: it is a **Class III railroad** by federal definition[9], and many stretches remain **unsignaled** with **old 90- to 100-year-old rail** still in place in spots[10]. There are several short sidings or yard tracks at Omak, Oroville, and perhaps a few intermediate points from the historical Great Northern era, but no regular meets occur under current one-train-per-day operations.

Upgrade Assumptions: For planning purposes, it is assumed the corridor will be upgraded to **FRA Class III track standards**, supporting **40 mph** freight and **60 mph** passenger speeds[11]. These track improvements (heavier rail, better tie/ballast conditions, geometry corrections) will allow significantly faster passenger schedules and somewhat faster freight speeds, though freight may still be limited by heavy tonnage and grades. Additionally, installation of **Centralized Traffic Control (CTC)** signaling and **Positive Train Control (PTC)** is planned in phases to enable safe, efficient shared operations (details in later sections).

This report presents a detailed **shared-use operations plan** for introducing **one daily passenger round-trip** over this corridor, integrated with the existing BNSF/CSCD freight service. Key elements include a proposed passenger timetable with station stops and run-times, an analysis of freight slotting and meet points, siding expansion recommendations to facilitate meets, signaling and PTC implementation strategy, and dispatch protocols to minimize conflicts. The goal is to accommodate the new passenger service **without degrading freight reliability**, while maintaining safety and schedule fidelity for both. The following sections provide the operational analysis and recommendations in a format suitable for transportation authority review.

Passenger Service Plan

Service Pattern: The planned passenger service is a **daily intercity round-trip** between Wenatchee and Oroville (one northbound and one southbound trip per day). This could be operated with a single trainset (e.g. a push-pull consist or DMU set) based either in Wenatchee or Oroville. For this study, we assume the train originates in Wenatchee in the morning, runs to Oroville by midday, and returns to Wenatchee by evening. This schedule pattern allows residents of the smaller communities (Chelan, Okanogan/Omak, Tonasket, etc.) to travel to the regional hub of Wenatchee during the day, while also providing connectivity for Wenatchee-area travelers to reach the Okanogan Valley and Canadian border region. (An inverse schedule with morning southbound and evening northbound could be alternatively considered; however, the chosen pattern aligns passenger movements with likely travel demand into Wenatchee's employment, medical, and shopping centers during the day.)

Station Stops: Proposed station stops (with basic platform facilities) include: **Wenatchee**, **Chelan** (serving the Lake Chelan area, likely at Chelan Falls or an accessible point near US 97A), **Brewster/Pateros** (a combined stop to serve the mid-Columbia communities), **Okanogan–Omak** (a single stop to serve the twin cities in Okanogan County, likely at Omak which has the larger population and railroad yard), **Tonasket**, and **Oroville**. These six stops balance coverage of major communities with travel time – spacing averages ~20–30 miles between stops. Minor communities like Entiat or Riverside could be flag stops or future additions if demand warrants, but initially focusing on the larger towns keeps the schedule reasonable. Basic station infrastructure (short platforms, shelters, parking) is assumed to be in place at these stops as given.

Running Times: With Class III track (60 mph capable) and the relatively lightweight passenger consist, the one-way schedule is expected to be on the order of **3.5–4 hours** end-to-end including station stops. Table 1 presents a **proposed passenger timetable**. This is a preliminary schedule estimating running times based on distances and allowed speeds, and it incorporates some padding for meets and station dwell. The northbound trip (Train P1) is a morning departure from Wenatchee; the southbound trip (Train P2) is an afternoon departure from Oroville:

Station	Northbound P1 – Depart	Southbound P2 – Depart
Wenatchee (BNSF interchange)	09:00 (origin)	–
Entiat	09:30	17:45
Chelan (Chelan Falls)	10:00	17:15
Pateros/Brewster	10:50	16:20
Omak (Okanogan)	11:55	15:15
Tonasket	12:30	14:35
Oroville	13:00 (arrive)	14:00 (origin)

Table 1: Proposed Daily Passenger Timetable (approximate times). Bolded stops indicate primary stations; Entiat is shown as a possible flag stop.

In this schedule, Train P1 departs Wenatchee at 9:00 AM and arrives Oroville by 1:00 PM, with intermediate dwell times of 2–5 minutes at each stop. Train P2 departs Oroville at 2:00 PM (after a one-hour layover/turn) and arrives back in Wenatchee by ~6:00 PM. The overall one-way running time is about **4 hours**, which corresponds to an average speed of ~33 mph including stops – conservative given the mountainous profile and multiple stops. With track upgrades and a modern trainset, running times could potentially be trimmed (for example, ~3.5 hours end-to-end). A one-hour turnaround at Oroville is built in to allow crew break and train servicing (and to provide schedule recovery buffer in case of delays). At Wenatchee, the train would tie up overnight (or potentially continue as a thru-service if connected to other routes, not considered here).

Equipment and Capacity: While equipment selection is outside the scope of this operations study, we assume a self-propelled diesel multiple-unit (DMU) or a push-pull train of 2–3 coaches plus a diesel locomotive would be used. Such a consist can attain 60 mph and accelerate/brake faster than freight trains, aiding in keeping schedule and clearing meets quickly. Capacity of 100–150 seats would likely suffice initially, with low ridership expected in this rural corridor (potentially a few dozen riders per day in early years, based on analogous services). The train would be PTC-equipped and outfitted for FRA compliant passenger service. Notably, **push-pull operation or a DMU** avoids needing to turn the train at terminals – the locomotive can run around or the DMU can change direction without a wye. (If a run-around move is needed at Oroville for a locomotive-hauled train, the one-hour layover includes time to reposition the locomotive on the other end of the train.)

Integrated Operations and Timetable Analysis

Introducing a daily passenger round-trip alongside the daily freight requires careful scheduling and infrastructure to avoid conflicts. Given **one freight and one passenger train** each way per day, at least **one meet (opposing train pass) will occur in each direction**. In fact, because the freight does a round-trip and the passenger does a round-trip, their paths will cross twice daily (once during the freight's southbound run and once during its northbound run). The operations plan aims to **schedule these meets at planned siding locations**, and to use dispatch protocols that minimize delays.

Freight Schedule (Baseline): The freight train's existing schedule (as derived from current practice) is roughly as follows: depart Omak ~5:00 AM northbound, arrive Oroville ~7:30 AM, perform industry switching and turn the train, depart Oroville southbound ~8:30 AM, pass back through Omak ~9:30–10:00 AM without stopping long, continue south and arrive Wenatchee ~1:00 PM, interchange cars at Wenatchee (set out loads, pick up empties), then depart Wenatchee northbound ~2:00 PM and return to Omak by ~5:30–6:00 PM. This schedule may vary with daily work (e.g. local setouts at Brewster or Entiat industries), but it is a useful representative plan[4][12]. Table 2 summarizes a **representative freight timetable** (times approximate, for illustration):

Location	**Southbound Freight (daily)**	**Northbound Freight (daily)**
Oroville (turn/load)	Depart 08:30	Arrive ~07:30
Tonasket (pass)	09:00	~07:00
Omak (crew base)	Pass 10:00	Depart 05:00
Brewster (work propane/grain)	~11:00 (meets P1)	~15:50 (meets P2)
Chelan Falls	~11:45	~15:00
Wenatchee (interchange)	Arrive 13:00	Depart 14:00

Table 2: Representative Freight Timing (assumes one crew doing Omak→Oroville→Wenatchee→Omak in a single day). Times are approximate estimates for analysis.

From these timetables, one can identify the likely **train meets** with the proposed passenger:

- **Morning/Late Morning Meet:** The *southbound freight* (from Oroville to Wenatchee) and the *northbound passenger* (Wenatchee to Oroville) will be on the line at the same time in the late morning. Based on the above schedules, these two trains would converge roughly in the **midpoint of the line around 10:30–11:00 AM**. In our example, the meet is planned near **Brewster** at ~10:50–11:00 AM. Brewster (MP ~70) is roughly halfway between Wenatchee and Oroville. In the P1/P2 timetable, the passenger reaches Brewster at 10:50 AM, and the freight would be coming through Brewster around 11:00 AM; thus a **meet at Brewster siding** is ideal. The passenger can arrive a few minutes earlier and hold if needed until the freight is in the clear. This timing avoids either train having to wait long – passenger P1's scheduled 10-minute station stop at Brewster (10:50–11:00) doubles as a meet allowance. The freight, meanwhile, can use that time to perform a brief propane or grain car switch at Brewster (which is an actual freight customer location[13]), effectively using that work as "planned dwell" that enables the passenger to pass.
- **Afternoon Meet:** The *northbound freight* (returning to Omak in afternoon) and the *southbound passenger* (returning to Wenatchee) will both be on the line roughly mid-afternoon. By around 3:00–4:00 PM these trains will encounter each other in the **southern half of the line**. In our schedule, passenger Train P2 departs Oroville at 14:00 and is around **Omak by ~15:15** and Chelan by ~17:15, while the freight departs Wenatchee at 14:00 and is around **Chelan by ~15:00–15:30**. This suggests their meet will occur in the **Chelan-to-Omak segment**, likely closer to the south. An approximate calculation puts the meet around **3:45 PM in the vicinity of Chelan Falls (MP ~38–40)**. Because our example P2 timetable has a stop at Chelan Falls at 17:15, some adjustment is needed – obviously we want the meet to occur *before* the passenger reaches Chelan. In practice, we would schedule the passenger to hold at a siding slightly north of Chelan or adjust its departure a bit to ensure a meet at a siding. One strategy is to plan a meet at a **new siding near Chelan Falls (MP 37–39)** around 3:40–3:50 PM. The freight, climbing northward with empties, can be scheduled to arrive and hold at that siding just before the passenger gets there, giving Train P2 a clear path south once the freight is in the hole. Our timetable above shows P2 at Chelan Falls by 17:15 only because we did not fully optimize for the meet – in an operational schedule, P2 would likely reach Chelan Falls by ~3:45 PM if it departed Oroville at 14:00, which aligns with the freight's timing. (For clarity: if needed, the passenger could depart Oroville slightly later, say 14:30, to meet the freight a bit further north – for example near **Malott/Okanogan (MP ~80)** – but that would push the passenger arrival in Wenatchee to nearly 7:00 PM. The chosen times balance a timely arrival with manageable meets.)

Adjusted Schedule and Meets: In practice, dispatchers will adjust these times as needed, but the plan is to have **two planned meet locations** for each daily cycle: - **Mid-morning at Brewster (approximately 11:00 AM):** Northbound passenger holds if needed on siding while southbound freight clears (or vice versa). Both then continue. - **Mid-afternoon at Chelan Falls (approximately 3:45 PM):** Northbound freight takes siding to allow southbound passenger to pass and continue to Wenatchee.

These meets are designed to occur at locations with new or extended sidings (see next section) to avoid either train waiting on the main line. With these planned passes, the **passenger schedule remains fluid and on-time**, and the freight's work windows are preserved (the freight can still perform its switching en route and interchange, just with the requirement to be at the meet points at roughly scheduled times). Notably, the freight's morning northbound leg (Omak to Oroville) is completed before the passenger even departs Wenatchee, and the passenger's evening last leg into Wenatchee is after the freight has cleared that segment, so those portions are conflict-free.

We assume **passenger priority** at meets (the passenger train will be on a timetable with advertised times, so it should be given precedence to minimize public delay). In practical terms, this means the freight will take the siding in advance of the scheduled meet whenever feasible. Because the freight can build some buffer (e.g., leaving Wenatchee promptly at 14:00 and perhaps not doing intermediate work on the return), it should be able to reach the afternoon meet point slightly early and wait for the passenger if needed. In the morning, the freight can likewise plan to reach Brewster slightly after 10:50 to allow the passenger to glide in without delay. These operational tactics are codified in the dispatch protocols later.

The net result of this timetable integration is that **both trains complete their runs with minimal delay**: the passenger round-trip fits into roughly a 9:00–18:00 window, and the freight's duty cycle remains about 12 hours (05:00–17:00), similar to current. Meets are limited to two predictable locations/times. Contingencies for delays (e.g., if the freight is running late leaving Wenatchee, the dispatcher could hold the passenger's departure from Oroville slightly to ensure the meet occurs at a siding rather than on open track). Overall, this coordinated schedule demonstrates feasibility of the shared use with just one passenger round-trip – the low traffic volume and long stretches between trains make it a manageable scenario with proper sidings and control.

Siding Program for Meets and Overtakes

To enable smooth meets **without bottlenecks**, additional siding capacity is required on the corridor. Presently, under single-train operation, passing sidings are unused; many old sidings may be too short (e.g. 1,500–3,000 ft) or out of service. A program of upgrading or constructing sidings to approximately **8,000 ft useable length** is recommended. An 8,000-ft siding (about 1.5 miles) can accommodate the full length of typical freight trains on this line (which might be up to ~50–70 cars in the future, though currently 40 cars is typical[7]). This length also future-proofs for any longer unit trains or potential additional traffic. Below is the **siding improvement plan** with priorities:

Siding Location	Scope and Description	Purpose	Priority Phase

(approx. MP)			
Brewster vicinity (MP ~68)	Construct new 8,000-ft siding (or extend existing siding/industrial track) on the straight segment through Brewster/Pateros. Includes powered turnouts at each end and signal control.	Primary meet point for mid-morning passenger vs. freight. Also allows freight to perform switching at Brewster industries off the main while passenger passes.	Phase 1 (High Priority)
Chelan Falls (MP ~38)	Reinstate or build a siding of ~8,000 ft along the former GN siding alignment at Chelan Falls. Leverage the relatively flat terrain. Install powered turnouts and signals.	Primary meet point for afternoon/evening train passes. Allows holding northbound freight clear of the main while southbound passenger runs through. Also provides operational flexibility near southern end (staging maintenance or holding extras clear of Amtrak mainline junction).	Phase 1 (High Priority)
Omak–Okanogan (MP ~85–88)	Extend an existing yard track or build a siding track independent of the yard at Omak, ~7,000–8,000 ft. Likely extend from Okanogan (south of Omak) through the Omak yard limits, tying back in north of the passenger station.	Provides a long passing track in the northern half for flexibility: could be used if scheduling requires a meet in Omak area (e.g., delayed trains), and lets the passenger train bypass freight switching in Omak yard. Also doubles as staging for work trains or a refuge track for maintenance equipment.	Phase 2
Tonasket (Janis) (MP ~115)	Upgrade the old siding near Janis (4.8 mi south of Tonasket) or construct new ~8,000 ft siding near Tonasket town. Turnouts may be hand-thrown initially, upgradable to power.	Secondary meet location for future needs – e.g., if a second daily passenger is added or if freight schedules change. Also allows meets north of Omak if needed. Supports operations near limestone loading spur (Columbia River Carbonate).	Phase 3 (Future)
Wenatchee – Appleyard (MP 0–3)	Leverage existing BNSF double-track or yard tracks at Wenatchee/Appleyard as a “virtual siding.” (No new siding built, but ensure about 8,000 ft of track space is available for	Allows the passenger train to be staged at Wenatchee (pre-trip boarding and post-trip layover) without impeding BNSF mainline or freight interchange moves. Can also	Phase 1 (Coordinate with BNSF)

	staging the passenger train clear of the main.) Minor track reconfiguration if needed.	temporarily hold a train if a conflict arises with mainline traffic.	

Table 3: Siding Improvement Program for Wenatchee–Oroville Corridor.

Phase 1 focuses on the two critical meet locations identified: **Brewster and Chelan Falls sidings**. These should be implemented **before passenger service begins**, as they are required to execute the planned meets reliably. Both will be fully signaled and dispatcher-controlled to expedite entry/exit and minimize delay. Along with these, coordinating use of existing track at **Wenatchee** for staging is also a Phase 1 task (this may involve working with BNSF to allow the passenger train to occupy a portion of Wenatchee's Appleyard or a depot track during layovers).

Phase 2 includes the **Omak siding extension**, which while not strictly required for the initial schedule, provides valuable flexibility. For example, if the freight's timing changes or if additional trains (say a second freight job) ever run, a long siding in Omak means a north-end meet can occur. It also ensures that if the passenger and freight both end up in Omak around similar times (e.g., passenger arriving while freight is still working the yard), they can operate around each other. Phase 2 would likely be implemented within a few years of service start, or sooner if funding permits, since it also enhances operational fluidity for the freight.

Phase 3 (Tonasket area siding) is more **future-oriented**. With only one daily passenger and one daily freight, we do not anticipate regular meets in the far north section – the single Phase 1 sidings suffice. However, should passenger service frequency increase (e.g., two round-trips a day), or if heavy seasonal traffic requires a second freight train on some days, a Tonasket siding provides a mid-northern meet point. Additionally, Tonasket's local industry (calcium carbonate loading) could benefit from a siding where freight cars can be left/picked up off the main. The Phase 3 siding can be deferred until demand grows. In the interim, the old **"Janis" siding** (if still partially intact) could be used as a stub or for storage, but full refurbishment would wait for demonstrable need.

All new sidings will be built with **#15 or #20 turnouts** (suitable for 30–40 mph entry speeds) if possible, to minimize slowing of the mainline train when diverging. Each will have **electric switch machines** and be integrated into the CTC control system (see next section), allowing the dispatcher to line routes and set signals for meets well in advance. The approximate 8,000 ft length ensures even a locomotive + 50-car freight (~~7,000 ft) fits without encroaching fouling points, and leaves some buffer for safety. Longer sidings also provide resilience: if one train is slightly late, it can enter the siding early and wait; the opposing train can maintain speed on the main and pass without delay.

In summary, the siding program enables **fluid passing movements** and provides **recovery options**. By phasing the investments, the most critical needs (Brewster and Chelan Falls) are addressed first, aligned with the immediate operational plan, while secondary improvements (Omak, Tonasket) follow as enhancements. This approach optimizes capital spending by focusing on known meet points for the initial service, yet leaves room to scale up the infrastructure if and when rail traffic increases on the corridor.

Signaling and Train Control Upgrades (CTC & PTC)

To safely manage mixed passenger and freight operations at up to 60 mph, the corridor will require significant signaling and train control upgrades. Currently, **no wayside signals** exist on the CSCD line – authority is granted by dispatcher via track warrants (a form of “manual block” control in dark territory)[6]. Introducing passenger service triggers additional regulatory and safety requirements. Specifically, under the Rail Safety Improvement Act (RSIA) and FRA regulations, any main line carrying **regularly scheduled intercity passenger trains** is required to implement an FRA-certified **Positive Train Control (PTC)** system (with limited exceptions for low-frequency operations)[15]. Additionally, to optimize operations (minimize meet delays and allow higher speeds), installing a modern **Centralized Traffic Control (CTC)** signaling system is highly recommended. The following is the **phased deployment strategy** for signaling and PTC:

- **Phase 1: Core CTC Segments & PTC Initialization (Years 1–2).** In this initial phase, the focus is on signalizing the **key meet locations and junctions**, and equipping the railroad with the backbone of a PTC system. This includes:
- **Control Points at Sidings:** Install full CTC control at the new **Brewster siding** and **Chelan Falls siding**. Each will become a control point (CP) with entry signals governing blocks on either side. Intermediate **ABS (Automatic Block Signals)** may be placed to create smaller blocks between these sidings if necessary for signal spacing.
- **Wenatchee South End Integration:** Coordinate with BNSF to install an interlocking at the **Wenatchee junction** (where the branch joins the BNSF main). This likely means putting a power turnout and signals protecting the movement from CSCD track onto BNSF main (the passenger train entering/exiting)[15]. This interlocking will be integrated into BNSF’s CTC system on the Scenic Subdivision, and the CSCD dispatcher will have to cooperate with BNSF’s dispatcher to get a slot for the passenger to occupy the main line at Wenatchee Station. (Alternatively, if the passenger terminates on a dedicated track at Wenatchee off the main, an interlocked crossover from the branch to that track would be set up.)
- **PTC System Setup:** Begin implementing a **PTC overlay** on the line. The logical choice is to use a system interoperable with BNSF’s **I-ETMS** (Interoperable Electronic Train Management System), since the train will venture onto BNSF trackage at Wenatchee. Wayside interface units, GPS coverage, radio base stations, and back-office server integration would be installed. During Phase 1, the PTC may operate in a limited **“warrant enforcement” mode** – meaning the dispatcher still issues movement authorities (track warrants), but the PTC onboard will enforce those limits and speeds. This provides a safety net against human error (preventing train-to-train collisions, overspeed, or misaligned switch incidents) even before full CTC is everywhere.

- **Onboard Equipment:** Equip the passenger train's locomotive/DMU and the CSCD freight locomotives with PTC onboard units and train control computers. Training will be provided for crews to use PTC. By the end of Phase 1, the system should be in testing and possibly **operational over at least the siding areas** and critical points. Note that **FRA regulations allow a limited operations exemption** for PTC if fewer than 4 trains a day run on dark territory[15]. While our corridor (2 trains each way = 4 movements) might technically qualify for such an exemption initially, it is strongly recommended to implement PTC regardless, given the safety benefits and future expansion possibility. (Indeed, the FRA has signaled that relying on such exemptions, even with temporal separation, may not provide equivalent safety[16].)

- **Phase 2: Full Corridor CTC and PTC Activation (Years 3–5).** This phase completes the signalization of the entire line and fully activates PTC for revenue service:

- **Extend CTC to All Blocks:** Install additional intermediate signals and control points such that roughly every 8–10 miles (or less in approach to busy areas) there are blocks governed by signals. Likely additional control points will be at **Omak**, **Tonasket/Janis**, and possibly a midpoint between Brewster and Chelan Falls (e.g. around **Winesap/Entiat** area) to break up a long block. After Phase 2, the dispatcher (located at a central control office) will have **full visibility and remote control** of all switches and signals on the corridor.
- **PTC Final Implementation:** With all switches monitored and an accurate track database loaded, activate PTC line-wide in fully functional mode. This means the system will enforce movement authorities, speed limits (including temporary slow orders), and signal indications automatically. Any conflicting movement or missed signal will result in an automatic brake application. The **PTC system will be interoperable** with BNSF's system at Wenatchee – when the passenger train transitions to BNSF track (the short distance into Wenatchee station), it will continuously operate under PTC. By Phase 2 completion, the corridor will meet or exceed all FRA safety requirements for mixed passenger/freight service.
- **Central Dispatching Upgrades:** Equip the CSCD dispatch center (or contracted dispatch service) with a modern CTC dispatch console showing track occupancy in real time. During Phase 2, dispatching transitions from voice warrants to signal control. Dispatchers will set routes for meets and moves via the CTC system; signal indications and PTC authority will convey those to trains. This reduces radio chatter and human error.
- **Grade Crossing Interface:** With higher speeds, ensure that active grade crossing protection is upgraded for reliability. While not strictly "signaling," Phase 2 includes verifying that crossing signal activation timings are adjusted for 60 mph trains (longer detection circuits if needed). PTC can be configured to warn if a crossing malfunctions as well. Over 34 public crossings exist on the line[17], so this is non-trivial – possibly an investment in some crossing closures or advanced protections (constant warning time devices) is warranted as part of this phase.

- **Phase 3: Advanced Optimizations (Year 5+):** In later years, if traffic increases, further tech enhancements can be added:

- **Traffic Management System (TMS):** An overlay software to optimize meets and train pacing (helpful if frequency grows).
- **Additional Signal Blocks:** If a second passenger train or more freights are introduced, additional intermediate signals could subdivide long stretches to allow closer train spacing.
- **PTC Upgrades:** As PTC technology evolves (e.g. possibly moving block or ERTMS level 3 style operation), the system can be upgraded to allow even more flexible train spacing or higher speeds if needed.
- **Passenger Train Control Enhancements:** Consider equipping passenger trains with **Automatic Train Control (ATC)** for smoother compliance with speed reductions (this would be built into PTC's onboard logic in modern systems).

Under this signaling plan, by the time passenger service is running, at least the meet points will be fully protected by signals and PTC enforcement. This dramatically reduces the risk of collision or misrouting. It also increases efficiency – for example, a passenger train no longer needs to stop for a hand-thrown switch at a siding; the dispatcher can pre-align the turnout and display a **clear signal** for the main, so the train can glide through at 30–40 mph. Similarly, if the passenger is running a bit late, the dispatcher can hold a signal red for the freight at a siding until the passenger passes, rather than relying on radio instructions. All of this is especially important given the **mixed speed differential**: passenger at 60 mph vs freight at 40 mph. PTC will ensure that if, say, a slow freight has not cleared a block in time, the approaching passenger will automatically slow or stop before danger.

It is worth noting that FRA allowed some passenger operations on short lines with temporal separation to proceed without immediate PTC installation (e.g., the Nashville & Eastern's Music City Star service) by demonstrating equivalent safety with strict schedules[15]. However, the consensus now (post-2018) is that **PTC is strongly preferred** for any new passenger service on shared track. Our plan meets that by implementing PTC in Phase 1/2. In the interim (Phase 1 testing period), operations could begin under a waiver *only if* stringent measures are in place (e.g., **freight curfews** such that passenger and freight are never in the same section at the same time until PTC is live, absolute block protection for the passenger, etc.). For example, FRA regulations provide an exemption for dark territory with ≤4 trains/day[15] – our plan technically fits that, so FRA might allow the first months of service under the condition of perfect schedule separation. Still, we assume a rapid deployment of at least a basic PTC by the service start, given public expectations and the state's safety culture.

Finally, a **phased implementation map** (conceptual) would illustrate Phase 1 signal locations (Wenatchee junction, Chelan Falls CP, Brewster CP), Phase 2 fill-ins (CTC expansion Omak, Tonasket, etc.), and note PTC zones. Such a map would show **Phase 1** covering roughly Wenatchee–Chelan Falls and Brewster area in CTC, with dark territory beyond managed by warrants+PTC; **Phase 2** then covers Oroville to Wenatchee entirely in CTC/PTC. A written description suffices here, as above.

Dispatching and Operating Protocols

Even with improved infrastructure, effective **dispatching protocols** will be crucial to minimize conflicts between passenger and freight. The following practices are recommended:

- **Scheduled "Passenger Window" and Freight Work Adjustments:** Establish a timetable that gives the passenger train priority during certain parts of the day. For example, **mid-morning (approximately 10:30–11:30 AM)** and **mid-afternoon (3:30–4:30 PM)** are designated passenger meet windows – during these times the freight is scheduled to be in a siding (Brewster and Chelan Falls respectively) to meet the passenger. Dispatch orders will reflect this: the freight must plan its departure and any intermediate switching such that it can clear the main by the scheduled meet time. In essence, these are **mini-curfews**: e.g., "Freight must not occupy main track between Brewster and Chelan Falls after 10:45 AM until passenger has passed." Such protocols ensure the passenger is not delayed by freight occupying the next block.

- **Train Priority Rules:** The passenger train will generally run as a **first-class train with priority** over the local freight. This means if the passenger is on time, the freight will take siding in advance and yield. If the passenger is late, the dispatcher may still hold the freight if it can avoid further delaying the passenger, depending on where the trains are. (If the freight is already far beyond a meet point when a passenger delay occurs, dispatch can evaluate, but given one passenger train, the policy can be straightforward: keep freight out of the passenger's way). The freight, being unscheduled and more flexible, can absorb some waiting time without major issue (the crew's day is planned for up to 12 hours which includes some slack). This priority rule will be codified in the timetable special instructions – similar to how Amtrak trains are given priority on host freight lines by agreement, the passenger here will have **written superiority** over the freight in opposing directions.

- **Use of Sidings for Overtakes:** In the rare event the passenger catches up to a slower freight (for example, if a second freight were ever on line or an extra works ahead), the dispatcher will arrange an **overtake** at a siding. Because only one regular freight runs and it starts well ahead of the passenger, this shouldn't occur in normal ops. But if, say, MOW equipment or an extra local is on the line, dispatch can tuck the slower movement into the nearest siding to let the passenger overtake and pass. The long sidings (8,000 ft) accommodate this even if the freight hasn't finished its run – it can hold mid-route. This is another reason Brewster and Omak sidings are valuable: mid-line places for overtakes.

- **Temporal Separation (if needed for PTC waiver):** As noted, initially the plan might employ partial **temporal separation** until PTC is fully functional. This could mean scheduling the freight slightly earlier or later to avoid any simultaneous running in the same signaled block until confidence in PTC. For example, one could require that the freight not depart Wenatchee northbound until the passenger has arrived Wenatchee (ensuring no afternoon meet at all). In our integrated schedule we did schedule an afternoon meet, but if regulators were concerned pre-PTC, one could impose a rule like "freight will not leave Wenatchee until 30 minutes after passenger arrival" – effectively a curfew that day. However, this would severely delay the freight's return to Omak (into the night). Our plan avoids needing strict separation by deploying PTC quickly; still, the dispatch protocols can include a **contingency order** that if PTC is down, then temporal separation is enforced (i.e., treat the trains like **one-at-a-time** on the line, holding one completely until the other is clear of the single track). This is a fail-safe mode.

- **Meet Communication:** Prior to each trip, the dispatcher will confer with the freight crew and passenger operator to confirm meet locations and any expected deviations. For instance, in the morning the dispatcher might issue a track bulletin: "Passenger Train P1 expected to meet Freight F1 at Brewster Siding. F1 to hold main for P1" or vice versa depending on plan. With CTC, this will be handled by signal indication (signals will be set to route trains accordingly), but clear communication adds redundancy. Moreover, because the freight may do local stops, the dispatcher needs updates if the freight is running behind schedule so that if necessary the meet plan can be changed (e.g., move meet from Chelan Falls to Omak if freight is late – though that would delay passenger, so it would be last resort).

- **Station Dwell and Turnaround Management:** The **passenger train's dwell times** at endpoints and intermediate stops will be managed to facilitate meets and not impede freight. For example, at **Oroville** the passenger has a scheduled 1-hour layover (13:00–14:00). During this time, the freight (if on time) has already departed Oroville at 08:30 and is well down the line, so no conflict. However, the passenger should occupy a **station track** or stub track during layover if possible, not the main, so that if for any reason a late-arriving extra freight or maintenance vehicle needed to get around, it could. Oroville historically had a small yard and possibly a siding – one of those tracks can serve as a **dedicated passenger layover track**, keeping the main line clear. Similarly, at **Wenatchee**, the passenger will tie up on a track (likely a depot track) that does not block the BNSF main. If the passenger train arrives Wenatchee at 18:00 and the crew is off duty, the train will be secured on a siding or yard track. BNSF's through freights on the main line will not be impeded (this requires coordination for an appropriate spot – in Phase 1 plan, using Appleyard or a house track as noted in Siding Program).

- **Crew and Equipment Turns:** The **turn time** for the passenger crew at Oroville (1 hour) is explicitly intended to allow any **unexpected freight delay to clear**. For example, if the freight were slower than usual and was still on the single track north of Omak when the passenger arrived Oroville, the passenger could potentially depart a bit later (up to the limit of crew hours) to wait until the freight clears onto a siding. The 60-minute layover gives some buffer to absorb such adjustments without stranding passengers. Additionally, that time is used for the crew to perform a quick inspection (walk the train), and for running the locomotive around if needed (though as mentioned, using a cab car or DMU would eliminate runaround moves). The crew must also comply with hours-of-service; a single crew can do the ~9-hour round trip within the 12-hour limit easily. The freight crew's schedule (perhaps 05:00–17:00) is tighter but still within 12 hours. If significant delays risk crew hour violations, the dispatcher will have to manage it (e.g., call a relief crew or tie down the train – but with one freight, this is unlikely).

- **Freight Scheduling Flexibility:** The railroad might consider adjusting the freight call time slightly to better complement the passenger. For instance, **starting the freight an hour earlier** (at 4:00 AM from Omak) could ensure it's further along by the time of the meet, providing even more cushion. Similarly, if the freight could interchange at Wenatchee a bit faster and depart earlier northbound (say at 13:30 instead of 14:00), it would meet the passenger slightly further south, possibly at an already clear Chelan Falls siding, reducing potential delay. These tweaks can be refined as operational experience is gained. The key is that the **freight's work (switching)** at intermediate points should be done outside of the passenger's path. For example, the freight should ideally finish any switching at Omak and Brewster **before** the passenger is on that segment of track. The schedule we chose inherently does this: freight works Oroville and Brewster in the morning before the passenger arrives; works Wenatchee during the passenger's midday layover at Oroville; and has no switching on the northbound leg except maybe Omak at the end of day, which is after the passenger has passed.

- **Contingency Planning:** Dispatch protocols will include contingency plans for common issues:

- **Passenger Train Late Departure:** If the passenger leaves Wenatchee late (e.g., mechanical issue delaying start), the dispatcher could hold the freight at Omak longer so that it still meets south of Omak instead of at Brewster, or conversely, get the freight out ahead to avoid being stuck behind. Because only one freight, it's manageable – the dispatcher could even decide to send the freight all the way to Wenatchee ahead of the delayed passenger (essentially swapping order) if the delay is major, though that would upset the passenger schedule severely. More likely, a slight delay would just mean the meet moves a bit (Brewster meet might move closer to Wenatchee if passenger is behind schedule).
- **Freight Delay or Extra Work:** If the freight is delayed (locomotive problem, extra cars to switch, etc.) and will miss the meet slot, the dispatcher should **notify the passenger crew before departure** if possible and either delay the passenger's start or plan to hold the passenger at a station en route to wait. PTC and CTC will convey the freight's location automatically, aiding these decisions. In a severe delay, the freight might be instructed to hold at a siding and let the passenger come to it (even if not the planned siding).
- **MOW or Emergencies:** Maintenance-of-way windows will be arranged during overnight or weekends whenever possible. If an emergency track repair must

occur, the dispatcher can coordinate a **work zone** and possibly run the passenger at restricted speed through it. PTC can enforce temporary speed restrictions as needed. Given one passenger train, accommodating it through work zones is simpler than on a busy line – crews can plan around its schedule, perhaps doing work after it passes or before it comes.

- **Communication Protocol:** Both trains will be on the same radio channel (per CSCD's practice, likely 160.785 MHz per records[18]). The dispatcher will give explicit meet orders until everyone is comfortable with signal system. Even after CTC, standard practice might have the dispatcher confirm meets via radio as a backup (belt-and-suspenders approach for safety). Each crew will also have the other train's schedule in writing, so they are aware of expected meet points.

Safety Protocols: In addition to PTC, some operational rules will be emphasized. For example, when passenger and freight are in the same block approaching a meet, **restricted speed rules** apply if for any reason signal or PTC is lost. The freight should be prepared to stop short of the meet if the passenger isn't clear, and vice versa – but under CTC this scenario is protected by signals (red if track occupied). Both crews will undergo joint training drills for meets and emergency scenarios (like an evacuation of the passenger train, which freight crew might assist with if nearby).

Summary of Operations: With the above protocols, a typical day might proceed as follows: - **Morning:** Freight F1 departs Omak 5:00 AM. Dispatch monitors its progress. Passenger P1 crew on duty ~8:00 AM prepping train in Wenatchee. By 8:50, dispatcher confirms F1 is south of Omak and will be at Brewster by ~11:00. P1 gets signal to depart Wenatchee at 9:00 on time. F1 reaches Brewster 10:55 and takes siding (perhaps after switching a car or two). P1 gets approach signal at Brewster, rolls through main at ~11:00 while F1 crew waves from the siding. P1 stays on schedule, F1 departs siding right after P1 clears, continuing to Wenatchee. - **Midday:** P1 arrives Oroville 13:00, passengers disembark, crew prepares return. F1 arrived Wenatchee 13:00 as well, interchange is done by 13:45. Dispatcher confirms P2 departure time 14:00 is okay; F1 can depart Wenatchee by 14:00 as planned. - **Afternoon:** F1 northbound and P2 southbound now head toward each other. By 15:30, F1 is nearing Chelan Falls CP. Dispatcher has aligned Chelan Falls siding for F1 to enter. F1 takes siding ~15:40 and waits. P2 (on time, left Oroville 14:00) approaches Chelan Falls around 15:45 with a **green signal** on the main. P2 highballs through at 50–60 mph while F1 is stopped in the clear. Once P2 is safely past and a signal indication given, F1 throttles up and gets back onto the main heading for Omak. P2 continues south, makes its Chelan stop around 17:15 (slightly later due to earlier meet, but within schedule pad), then Entiat, then Wenatchee by 18:00, right on time. F1 arrives Omak ~17:30, done for day. Both crews go off duty satisfied with an on-schedule day. - **Evening:** Dispatcher "blocks out" the line for the night (no more movements scheduled), perhaps allows a MOW crew to fix a crossing after 8 PM, etc. The cycle repeats next day.

This scenario highlights how, with the right sidings and dispatching, **delays are avoided and both trains fulfill their missions**. The freight still interchanged its cars on time and the passenger met its timetable.

Conclusion

In conclusion, the Wenatchee–Oroville corridor can accommodate a daily passenger round-trip alongside existing freight service **with careful operational planning and targeted infrastructure upgrades**. The analysis shows that with Class III track upgrades (40–60 mph speeds)[11], a robust siding program, and phased signal and PTC implementation, the passenger train can run reliably without causing bottlenecks for freight. Key recommendations include constructing long passing sidings at Brewster and Chelan Falls in Phase 1 to facilitate meets, upgrading to CTC signaling with PTC enforcement for safety, and establishing dispatch protocols that prioritize the passenger while giving the freight predictable slots (e.g. scheduled meet windows and curfews). Table 4 summarizes the core elements of this shared-use plan:

- **Daily Timetable** – A 3.5–4 hour one-way passenger schedule with stops at major towns, timed to meet the freight at siding locations (see Table 1). Freight schedule remains one round-trip/day, adjusted slightly to fit around the passenger windows.
- **Sidings & Infrastructure** – New 8,000 ft sidings at Brewster and Chelan Falls (Phase 1) and Omak (Phase 2), plus use of existing Wenatchee trackage. These eliminate mainline stand-offs and allow meets at speed. Future siding at Tonasket (Phase 3) for expansion.
- **Signaling & PTC** – Introduction of CTC signals at sidings and interlockings, expanded to full line control in Phase 2. PTC overlay (interoperable with BNSF) to protect all train movements – initially focusing on conflict prevention at meets and later fully governing all operations[15].
- **Dispatch & Rules** – A clear set of operating rules giving the passenger train priority (first-class), using planned meets and possibly brief freight holds to avoid delays. Freight will schedule its work to be clear of main during passenger runs, and communication/coordination is enhanced through modern dispatch systems and crew training. Temporal separation is available as a backup safety measure if technical systems fail, but not routinely needed once PTC is active[16].

All relevant stakeholders – the short-line operator (Genesee & Wyoming), BNSF (for Wenatchee integration), WSDOT Rail (as a likely sponsor), and local communities – should be involved in refining the plan. The recommended investments in track and signal will require capital funding, but they bring the infrastructure to a state of good repair and safety for both freight and passenger uses. In addition to operational feasibility, these upgrades also improve freight fluidity (e.g., faster running times, safer operations) which benefits local shippers and the regional economy.

With this plan in place, a formal operations agreement would be drafted between the passenger service sponsor and the freight operator, codifying the train schedule slots, dispatch priorities, maintenance responsibilities, cost-sharing for PTC, etc. The result will be a **safe, reliable mixed-use corridor** providing passenger mobility to North Central Washington while preserving the vital freight link. We have shown that through strategic siding placement and advanced train control, even a single-track rural branch can host passenger service without sacrificing freight efficiency – a true shared-use success model.

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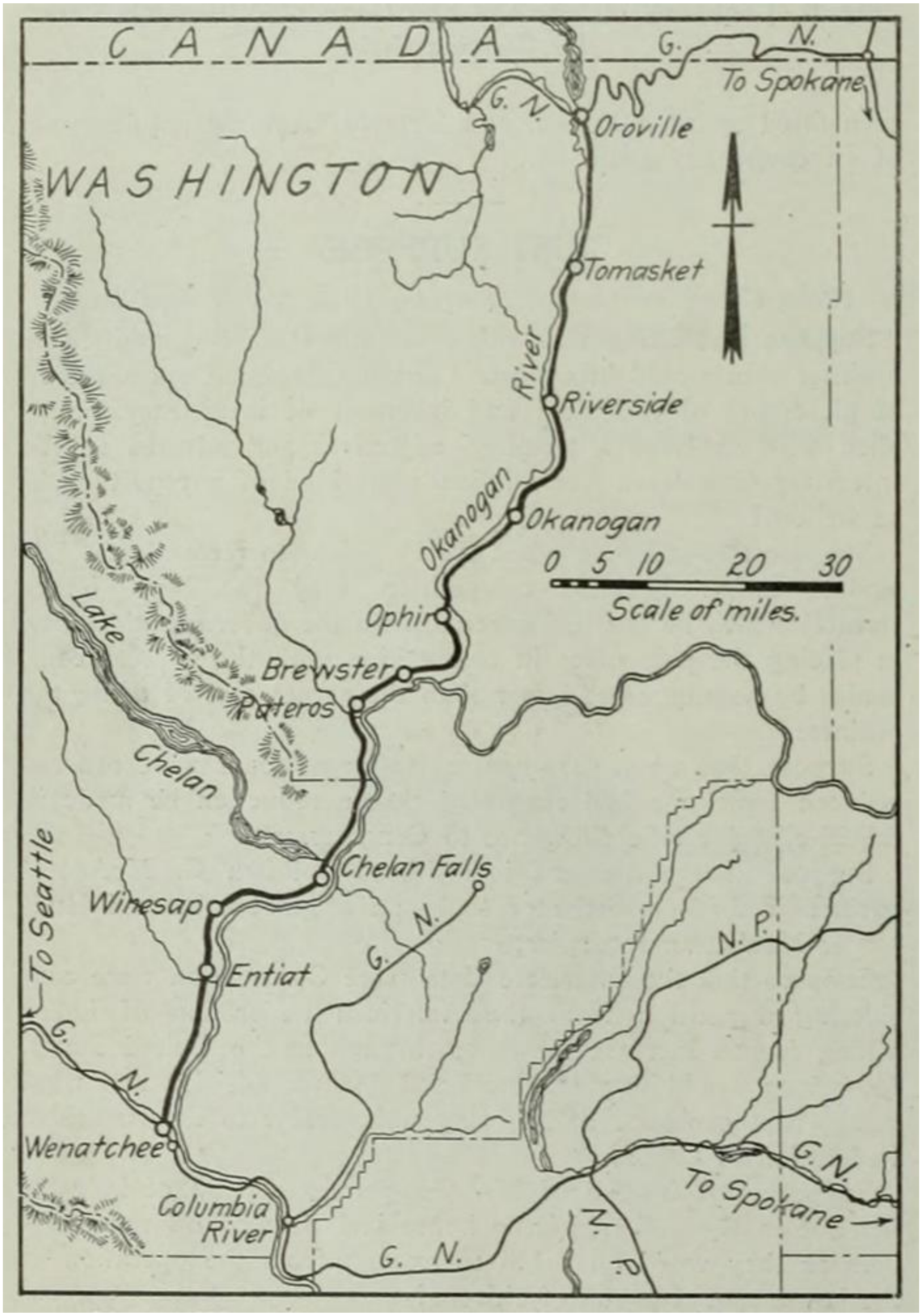
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