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| **Verlon Farm, Montgomery, powys** |
| **Transport Statement** |
| **February 2024** |
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**Verlon Farm, Montgomery, powys**

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Transportation Planning, Highway Design and Environmental Assessment

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1. introduction
	1. The land at Verlon Farm, Montgomery, is allocated to accommodate 54 dwellings under reference P45 HA1 in the Powys Local Development Plan 2011 – 2026 (the LDP), which was adopted in April 2018. However, as noted in the LDP, the housing site area extends to 10.8 Hectares and “*Part of the site is phased beyond the plan period*”.
	2. The table forming Appendix A of the LDP – “*LDP Housing and Employment Sites*” advises: *“Large Site capable of being phased beyond the Plan period. Development Brief required for phasing and potential future phasing as provision of new link road necessary to realise full allocation. Plan anticipates approx. 2 ha being developed…As part of any development proposal the existing junction of the B4385/B4388 will need to be permanently closed up to all vehicular traffic.”*
	3. Based on the allocated area being 10.8 hectares and only 2 hectares being developed within the plan period, it appears the intention was for the phasing to deliver a link road in order to establish the full allocation (i.e. 10.8 hectares) rather than the initial 2 hectares / 54 dwellings. However, the second part, at the end of the quote above, indicates that the existing B4385/B4388 junction would need to be closed to vehicular traffic as part of **any** development proposal; which effectively requires a new link road to be created at the outset.
	4. The provision of a link road is not straight-forward due to the topography of the land between the B4385 and B4388. Creating a direct, straight link would require the construction of a large embankment to carry the new link, which would be visually intrusive and prohibitively expensive to construct. It would also sterilise a significant proportion of the land. In addition, provision of a link road at the outset would not be financially viable based on a development of 54 dwellings. This would also preclude development of the larger site area, as the funding generated from the first phase would not be available to contribute towards the subsequent, future phases.
	5. In recognition of this constraint, as part of the review into the potential for providing residential development at Verlon Farm, a meeting was held with Powys County Council to discuss the phasing of delivery and the potential for creating a new link road between the B4385 Station Road and B4388 Forden Road, in order to avoid the existing junction with Pool Road to the south. The potential for serving the initial allocation of 54 units via the existing road network was also discussed.
	6. A Traffic Survey Report was produced in October 2019 which considered the ability of the local road network to accommodate both the initial phase of 54 dwellings and the larger scheme. It was found that technically, the existing road network could accommodate both schemes within normally accepted capacity criteria.
	7. Since the initial report was prepared, there have been a number of changes in the area. Planning permission was granted for a new development off Fordon Roadfor “*Erection of 33 affordable local need dwellings, formation of vehicular access road and all associated works”* at “*Land Off Forden Road Montgomery Powys SY15 6EU”* under planning application reference *20/2118/FUL* on 22nd October 2021. That development has now been constructed and occupied.
	8. Also, as part of the Welsh Government review of speed limits, the speed limit within most of Montgomery has been reduced from 30 mph to 20 mph.
	9. There has also been a pandemic since the preparation of the original report, which significantly affected traffic movement when travel restrictions were in place. In many areas, traffic flows have not reached the levels that existed prior to the Covid 19 pandemic, as people have adopted new ways of working, which has reduced commuting trips and general traffic movement.
	10. As a result of this, Powys County Council was consulted to establish whether it would be necessary to repeat the original traffic surveys undertaken, upon which the assessment was based. It was agreed that subject to specifically addressing the recent development of 33 affordable dwellings on Fordon Road and its impact, the original data could be used with traffic growth applied.
	11. The remainder of this report considers the existing road network and its ability to safely accommodate residential development at Verlon Farm with and without the new road link and concludes the full development of the site could come forward without breaching normal capacity thresholds. However, given the aspiration to develop a new link between the B4385 Station Road and B4388 Forden Road, the proposed development of up to 54 dwellings has been designed to protect the ability to construct the link through the site, which would be funded through the subsequent phases in the fullness of time.
2. Existing Road network
	1. The B4388 Forden Road heads north from the B4358 Station Road / Pool Road priority T junction as the minor arm. Forden Road is a single carriageway route with a nominal width of approximately 5.5m and is subject to a 20 mph speed limit for the initial 110m from the junction. Immediately to the north of the Arthurs Gate residential access junction the speed limit increases to 30 mph.
	2. The existing site access is located approximately 21m to the north of the speed limit change; falling within the 30 mph speed limit area.
	3. Existing development is primarily located to the east of Forden Road within Montgomery, and a pedestrian footway runs along that side of the carriageway, which benefits from street lighting. The footway was upgraded and extended as part of the recent development to the north, which is access via “Trem Y Fridd”, a residential cul-de-dac located approximately 278m from the 20 mph speed limit.
	4. However, the Trem Y Fridd junction sits within a 40 mph speed limit area. The speed limit increases from 30 mph to 40 mph approximately 41m to the south of the junction and continues approximately 216m to the north of it, at which point in increases to then national speed limit of 60 mph for single carriageway roads.
	5. The pedestrian footway terminates at the end of the northern radius which forms the Trem Y Fridd junction, to which the street lighting along Forden Road has been extended.
	6. As part of the Trem Y Fridd development, New Road, which was the eastern part of a crossroads at the top of the crest on Forden Road, as been truncated and now forms a pedestrian / cycle access to / from Forden Road, with emergency access to / from Trem Y Fridd by way of removable bollards, which prevent general use by vehicles.
	7. there are several dwellings located to the west side of the carriageway, which also benefit from access to Forden Road.
	8. The B4385 Station Road / Pool Road has a nominal width of approximately 5.7m and is also subject to a 20 mph speed limit. The footway along the east side of Forden Road continues along the east side of Pool Road as it climbs uphill into the town.
	9. Station Road also climbs from the junction around a left-hand bend when heading in a north-westerly direction towards Newtown, via a meandering route which generally follows the topography of the hillside. A pedestrian footway continues along the north/east side of Station Road as it heads out of the town, where the speed limit increases initially to 30 mph approximately 90m from the Forden Road junction, then up to the national speed limit approximately 210m beyond.
	10. The junction between Station Road / Forden Road / Pool Road is located on the outside of a bend, with access to / from Forden Road, being controlled by Give Way markings and associated signage. The formal bellmouth of Forden Road extends approximately 28.4m. The opposing traffic lanes on Forden Road are separated by an intermittent line close to the centre of the carriageway, as are those on Station Road / Pool Road.
	11. Due to the alignment of the roads and the changes in level between them, the junction arrangement is configured more in the form of a ‘Y’ than a traditional ‘T’. Whilst the junction sits at the bottom of a dip in the B4385 Pool Road / Station Road corridor, Forden Road continues to descend from this dip via a double left-right bend from the priority route.
	12. Due to the limited road space at the junction, vehicles turning left from Station Road into Forden Road either initially swing right into the opposing traffic lane of the B4385 or encroach into the the opposing traffic lane of the B4388 Forden Road, within which vehicles approaching the junction would travel. In the case of large vehicles, the offside lanes of both the B4385 and B4388 are used in order to complete the left turn.
	13. It is understood that it is this constraint, combined with what was believed to be restricted visibility that is of concern to the Highway Authority and led to the requirement for a new link road between the B4385 and B4388 within the LDP.
	14. With a new link in place, the Station Road approach to the junction could be closed to vehicles and the priority would then change to the Forden Road / Pool Road corridor by removing the Give Way markings, as vehicles would travel along the new link, then onto Forden Road, continuing into Pool Road; or vice versa when travelling in the opposite direction.
	15. Visibility to the left (south) at the junction was measured on site to extend 124m to the near edge, 107m to the centreline, 94.3m to the centreline of the far (oncoming) traffic lane and 81.3m to the far edge of Pool Road from 2.4m back from the edge of the B4385 along the centreline of Forden Road. Forward visibility for northbound traffic travelling along Pool Road towards a vehicle waiting to turn right into Forden Road extended approximately 69m.
	16. The comparable visibility splay to the right (northwest) from the same point on Forden Road extended 74.7m to the near edge, 69.9m to the centreline of the near (oncoming) traffic lane and 64.7m to the centreline. Forward visibility from a vehicle waiting to turn right into Forden Road towards traffic approaching along Station Road extended approximately 54.5m.
	17. These visibility splays significantly exceed the distance of 43m required under Manual fo Streets guidance based on a vehicle travelling at 30 mph. The subsequent reduction to a 20 mph speed limit has increased the margin of safety at the junction, as the reduced speed corresponds with a stopping distance of 25m.
	18. There is an existing access located on the west side of Forden Road between and opposite the junctions with Verlon Close and Arthur’s Gate, which would be improved and upgraded to serve the initial residential development at Verlon Farm.
	19. Visibility at the access was measured to extend 102m to the nearside, 99.6m to the centreline of the near (oncoming) traffic lane and 96.8m to the centreline of the carriageway to the right (south) from a set-back of 2.4m from the near carriageway edge. The comparable visibility splay to the left (north) extended 59m to the near edge, 112m to the centreline, 139m to the centre of the far (oncoming) traffic lane and 144m to the far edge of the carriageway. It was noted that the view to the near edge of the carriageway to the left could be extended significantly by minor trimming of the nearside hedgerow.
	20. It is therefore apparent that appropriate levels of visibility are achievable at the proposed access location for the development site at Verlon Farm.
3. baseline traffic flows
	1. In the absence of baseline traffic data on the local roads, new traffic surveys were undertaken along Forden Road (Sites 1 to 3), Station Road (Site 4) and Pool Road (Site 5).
	2. The traffic counts were undertaken over a 7 day period between 11 and 17 May 2019 inclusive using Automatic Traffic Counters (ATCs). The ATCs recorded directional, classified vehicle movements in each direction, 24 hours per day and provided an hourly breakdown of traffic flows. Vehicle speeds were also recorded by direction at each ATC.
	3. The grid references for and photographs of each of the ATC Sites are provided with the results summaries forming Appendix A to this report.
	4. During the period of the surveys there was a water main burst on Pool Road, which resulted in an unscheduled emergency road closure between 10:00 on Wednesday 15th and 15:00 on Thursday 16th May. The impact of the closure on recorded traffic movements at Site 5 is apparent and has been taken into account when reviewing the daily and hourly flows by excluding incomplete days and / or peak hours from the respective volume calculations. i.e. the 7 day average for Site 5 is based on the weekend plus 3 full days, whilst the 5 day weekday (Monday to Friday) averages are based on 3 days (Monday, Tuesday and Friday) at Site 5. When looking at peak hour periods, the AM peak hour on Wednesday was recorded as was the PM peak hour on Thursday. Therefore, only the AM peak hour on Thursday and the PM peak hour on Wednesday were excluded from the respective totals, which were subsequently averaged over a 4 day period at Site 5.

Traffic Flows

* 1. For ease of reference, the results of the traffic surveys have been tabulated at Appendix B, which includes the daily and peak hour average flows together with the highest and lowest on any given day for each time period at each site, and the resulting day to day variation.
	2. At all count sites it was found that the peak hour periods occurred between 08:00 – 09:00 and 17:00 – 18:00, with the highest flows occurring during the PM peak hour. The highest hourly flow was recorded on Pool Road with a total of 358 movements, which compares with the corrected weekday average of 333 and the day to day variation of 45 vehicles.
	3. The next busiest link was Station Road, with a peak of 223 movements during the PM peak hour, which also demonstrated a day to day variation of 77 movements and a 5 day average of 203.
	4. The peak hour flows along Forden Road varied between 168 to the north of the town, 199 along the middle section and 193 immediately to the north of the Pool Road / Station Road junction.
	5. The peak daily 24 hour traffic flows followed the same pattern; with the highest recorded total of 3773 movements occurring on Pool Road. The highest flow on Station Road was 2342 whilst that on Forden Road was 1954, which occurred at the southern ATC (Site 3), immediately to the north of the Pool Road / Station Road junction.
	6. The typical width of the roads varies between 5.5m and 5.75m, which facilitates two way traffic movement. On-street parking can reduce the width to effectively a single lane, whereby vehicles travelling in opposing directions must give-way to allow an opposing vehicle to pass, which reduces the capacity when compared with an unrestricted route. Notwithstanding this, it is apparent that the existing traffic flows are relatively low and therefore the routes are currently operating with significant levels of reserve or spare capacity.
	7. This is confirmed by comparing the observed flows with the hourly design flows contained within TA79/99 “*Traffic Capacity of Urban Roads*”, which indicates “*A busy high street carrying predominantly local traffic with frontage activity including loading and unloading, with a 30 mph speed limit, more than 2 side roads per km, unlimited access to houses, shops and businesses, unrestricted parking and unloading, frequent at-grade pedestrian crossings and kerbside bus stops*” provides an hourly capacity of 1250 vehicles per hour based on a width of 6.1m.
	8. TA79/99 was withdrawn in March 2020 as part of the ongoing update and rationalisation of the Design Manual for Roads and Bridges (DMRB), without a replacement document. However, similar capacities are identified within “*TAG Unit M3.1 Highway Assignment Modelling*”. “*Table D.5 Definition of Variables used in Speed/Flow Relationships for Urban Roads*” identifies a maximum realistic capacity of 800 vehicles per 3.65m wide lane, giving a cumulative peak of 1600 vehicles per hour for a 2 lane carriageway.
	9. Whilst the local roads are slightly narrower, the ability to accommodate two-way flows is broadly similar when taking into account the published capacity provides for unrestricted parking and unloading, which would also effectively reduce the route to single lane working. The example described in TA79/99 would also be expected to experience reductions in capacity as a result of frequent at-grade pedestrian crossings within a busy high street environment.
	10. Given that the highest 24 hour daily flow of 3773 vehicle movement equates to approximately 3 times the hourly capacity identified above, it is apparent that the link capacity of the local roads should not be considered a technical constraint to development in this case.

Traffic Speeds

* 1. Appendix B also summarises the recorded traffic speeds in terms of the average, the 85th percentile (i.e. that exceeded by 15% of traffic) and the wet weather 85th percentile speeds (upon which the required visibility splays are calculated). As the traffic surveys were undertaken in dry conditions, in order to establish the wet weather design speeds a deduction of 2.5 mph is required.
	2. With the exception of Site 1 on Forden Road, which falls to the north of the 30 mph speed limit that existed when the traffic counts were undertaken, it was found that both the average and 85th percentile speeds exceeded the posted speed limit, except for those recorded at Site 3, at the southern end of Forden Road, where speeds are naturally constrained due to its proximity to the junction.
	3. Speeding in 30 mph zones is common. In the absence of speed survey data or features to naturally constrain speeds, a default 85th percentile wet weather design speed of 60 kph (37.28 mph) is typically adopted. By comparing the observed 85th percentile speeds recorded at the ATC sites, within the 30 mph zone, it is apparent that speeds are within this default at all locations except for Site 2, mid-way along Forden Road, where the design speeds are established to be 43.2 mph northbound and 39.2 mph southbound.
	4. The speed survey data has been superseded by the updated speed limits, which have reduced in the area. As a result, it would be expected that speeds under existing conditions would also be lower than those recorded in 2019.
1. Highway Safety
	1. In order to review the safety performance of the local road network, the Crashmap database has been interrogated. When preparing the original report, it was found that there had been no recorded personal injury accidents with the most recent and preferred 5 year period available (2014 – 2018 inclusive) along the sections of Forden Road, Station Road and Pool Road within the study area. Additional data is now available to the end of 2022, which revealed there had been several slight injury accidents on the road network during 2021 and 2022.
	2. On Forden Road, in April 2021, a car collided with three pedestrians walking within the carriageway with their back to oncoming traffic, all of whom suffered slight injuries. The collision occurred in dry, daylight conditions within the 30 mph speed limit. It is unclear what caused the accident. However, it is noted that there is now a footway along this section of the highway, which was constructed as part of the recent development to the north.
	3. In July 2021, on Forden Road at the former New Road crossroads, there was a collision involving a car turning right, which was not impacted, and another travelling along the priority route, which struck a permanent object, presumably taking avoiding action to avoid colliding with the other car. This occurred prior to the reduction in the speed limit from 60 to 40 mph at that point.
	4. In June 2021 a light goods vehicle (3.5 tonnes or under) left the carriageway on the left-hand bend approximately 0.3km to the northwest of the Forden Road / Station Road / Pool Road junction in wet / damp conditions.
	5. A car had a similar incident approximately 0.3km further to the north in July 2021 in wet / damp conditions.
	6. In August 2022 a car turned right at the Chirbury Road junction across the path of another continuing ahead, resulting in slight injury in dry, daylight conditions.
	7. In April 2022, approximately 250m to the south at the crossroads junction with Broad Street and Church Bank, a car collided with a cyclist resulting in slight injury.
	8. Away from the main B class roads, there was a slight injury accident in April 2021 on Kerry Road, when a cyclist ran into the back of a car, which was parked on the carriageway.
	9. In the event there is a feature of the road network that results in compromised safety for its users, it is normal to find a number of incidents in the same location which have common characteristics. In this case, all of the recorded injury accidents were in different locations, which suggest driver error, rather than an inherent characteristic of the road layout.
	10. Powys County Council has expressed concerns regarding the alignment of the Station Road / Pool Road / Forden Road junction, as its alignment restricts visibility and also requires vehicles turning left into Forden Road to encroach into the opposing traffic lanes of the carriageway in order to undertake the manoeuvre.
	11. Notwithstanding these physical constraints, it is apparent that the junction has a good safety record, which suggests road users can safely accommodate each other and successfully make the turning movements to / from Forden Road.
	12. A review of the visibility provision at the B4385 / B4388 junction was undertaken based on the findings of the speed surveys, before the lower 20 mph speed limit was introduced. When taking into account the gradients on the approaches, it was found that the visibility splay to the right of Forden Road exceeded requirements for vehicles to stop safely based on Manual for Streets 2 (MfS2) criteria, as did the visibility splays to the left. The forward visibility splay towards a vehicle waiting to turn right into Forden Road exceeded the calculated MfS2 criteria for all vehicle types, whilst the forward visibility from the right turning vehicle met that required for a light vehicle (car / motorcycle) to stop safely whilst it was just below that required for a HGV.
	13. Notwithstanding this, under the design guidance the forward visibility splay is measured along the centrelines of the traffic lanes. In this case, due to the normal road position of a driver they would be placed to the right of the centreline when waiting to turn right into Forden Road. Similarly, the width of an oncoming large vehicle would occupy the majority of the oncoming traffic lane along Station Road. As a result, when taking into account the increased distance available to the far edge of the oncoming traffic lane from the waiting driver’s position, it is evident that the physical, actual forward visibility splay would actually be acceptable towards an oncoming large vehicle.
	14. This conclusion is further reinforced due to the lower speed limit now in force, which increases the margin of safety for road users.
2. proposed development
	1. The proposed development site is approximately 2 hectares in area and is identified within the LDP allocation to provide 54 dwellings. It is proposed to access the initial phase of the development via an existing access to Forden Road, which would be improved to a formal priority T junction as part of the scheme.
	2. The initial length of the access could also provide the eastern end of a new link between the B4385 and B4388. The western end could then be constructed as part of the later phases of the wider development area in the future.
	3. A visualisation of the link connecting the B4385 and B4388 is provided in the Figures section. The link has been subject to very preliminary design based on a requirement to follow the existing land-form as closely as possible whilst meeting reasonable design standards. The link has been designed on the assumption that it would be subject to a 30 mph speed limit throughout.
	4. To establish the likely traffic attractions to the proposed development, the TRICS database was interrogated based on mixed private / affordable housing land uses. The TRICS output is provided at Appendix C, which indicates 0.140 arrivals / 0.330 departures / 0.470 total movements per dwelling during the AM peak hour (08:00 – 09:00). The comparable PM peak hour (17:00 – 18:00) trip rates were 0.362 arrivals / 0.232 departures / 0.594 total movements per dwelling.
	5. Based on the above trip rates and the allocated 54 units in the local plan, the initial phase of the development would generate 8 arrivals / 18 departures / 26 total movements during the AM peak hour and 20 arrivals / 13 departures / 33 total movements during the PM peak hour.
	6. Following the initial phase of development, it is anticipated that up to a further 146 dwellings could be provided beyond the initial area of 2 hectares, resulting in 200 total dwellings within the overall site. Based on the development of 200 units and the trip rates above, the site would generate 28 arrivals / 66 departures / 94 total movements during the AM peak hour and 73 arrivals / 47 departures / 120 total movements during the PM peak hour.
	7. In terms of traffic distribution, by analysing the directional AM and PM peak hour traffic flows observed at the ATCs, as illustrated in Figure 1, which is provided in the Figures section of this report, it is established that during the AM peak hour, 20.7% entered Montgomery from Forden Road, 43.2% from Pool Road and 36.1% from Station Road. The opposing directional proportions were 29.8% leaving via Forden Road, 40.7% via Pool Road and 29.5% via Station Road.
	8. The comparable PM peak hour flows were 30% entering via Forden Road, 37% via Pool Road and 33% via Station Road. The outbound proportions during the PM peak hour were 19.7% via Forden Road, 48.5% via Pool Road and 31.8% via Station Road.
	9. Based upon these traffic distributions, the following additional traffic movements to/from Montgomery are predicted as a result of the proposed development of 54 dwellings during the AM and PM peak hour periods:

 Table 5.1 Flows To / From Montgomery – 54 Dwellings

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Forden Road | Pool Road | Station Road | Total |
| 54 Dwellings (8 Arrivals / 18 Departures) AM Peak Hour |
| In From | 2 | 3 | 3 | 8 |
| Out To | 6 | 7 | 5 | 18 |
| Total | 8 | 10 | 8 | 26 |
| 54 Dwellings (20 Arrivals / 13 Departures) PM Peak Hour |
| In From | 6 | 7 | 7 | 20 |
| Out To | 3 | 6 | 4 | 13 |
| Total | 9 | 13 | 11 | 33 |

* 1. By repeating the exercise based on 200 dwellings within the overall site area, the following development traffic flows are established for the larger scheme:

 Table 5.2 Flows To / From Montgomery – 200 Dwellings

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Forden Road | Pool Road | Station Road | Total |
| 200 Dwellings (28 Arrivals / 66 Departures) AM Peak Hour |
| In From | 6 | 12 | 10 | 28 |
| Out To | 20 | 27 | 19 | 66 |
| Total | 26 | 39 | 29 | 94 |
| 200 Dwellings (73 Arrivals / 47 Departures) PM Peak Hour |
| In From | 22 | 27 | 24 | 73 |
| Out To | 9 | 23 | 15 | 47 |
| Total | 31 | 50 | 39 | 120 |

* 1. The distributions above are illustrated in Figures 2 and 3 based upon the existing road layout for comparison purposes. However, as can be seen from Figure 3, the illustration assumes the new link between B4385 Station Road and B4388 Forden Road is not constructed, and that all development traffic passes through a single access. It is more likely that a second access would be constructed along the Forden Road frontage to serve the wide site, even if the new link road is constructed.
	2. To place these traffic flows in context, they have been compared with the observed movements on the road network recorded by the ATCs by referring to the traffic flow summaries provided in Appendix A. The table below compares the baseline day to day variations during the AM and PM peak hours with the comparable development flows on the respective links.

 Table 5.3 Peak Hour Link Flow Variations Comparison

|  |  |  |  |
| --- | --- | --- | --- |
|  | Existing Variation | Development | Difference |
| Time PeriodRoad Link | AM | PM | AM | PM | AM | PM |
| 54 Dwellings |
| Forden Road (North) | 32 | 23 | 8 | 9 | 24 | 14 |
| Forden Road (Middle) | 39 | 54 | 8 | 9 | 31 | 45 |
| Forden Road (South) | 28 | 43 | 18 | 24 | 10 | 19 |
| Station Road | 76 | 77 | 8 | 11 | 68 | 66 |
| Pool Road | 31 | 45 | 10 | 13 | 21 | 32 |
|  | 200 Dwellings |
| Forden Road (North) | 32 | 23 | 26 | 31 | 6 | -8 |
| Forden Road (Middle) | 39 | 54 | 26 | 31 | 13 | 23 |
| Forden Road (South) | 28 | 43 | 68 | 89 | -40 | -46 |
| Station Road | 76 | 77 | 29 | 39 | 47 | 38 |
| Pool Road | 31 | 45 | 39 | 50 | -8 | -5 |

* 1. The table above demonstrates that the quantum of development traffic associated with the initial 54 units falls well within the range of existing, observed day to day variation on all sections of the local road network considered. With the full development of 200 dwellings, the development traffic flows fall within the existing range of day to day variations on all links except for the northern section of Forden Road during the PM peak hour; the southern section of Forden Road, where it connects to the Station Road / Pool Road junction; and along Pool Road itself.
1. JUNCTION Capacity
	1. The capacity of the site access has been tested using PICADY, the standard modelling software for priority junction assessment. Due to the low baseline flows, rather than undertake multiple assessments to demonstrate the access could accommodate the development traffic at various phases, its capacity has been tested under an assumed worst-case scenario whereby the entire potential development of 200 dwellings within the wider site is served by the single point of access proposed to serve the initial phase of 54 dwellings within the plan period.
	2. The higher of the observed 2019 baseline Forden Road traffic flows in the vicinity of the access have been projected to the 2026 design year using TEMPro growth factors for the Powys 005 Middle Super Output Area (MSOA), which revealed a factor of 1.0429 during the AM peak period and 1.0399 during the PM peak period; indicating existing baseline traffic is predicted to increase by 4.29% and 3.99% across the respective peak periods.
	3. By applying these factors to the 2019 baseline traffic flows presented in Figure 1, then including the development traffic flows at the site access indicated in Figure 3 based on 200 units and the existing road network, the following traffic movements are established:

 Table 6.1 Site Access Traffic Flows – 2026 200 Dwellings AM Peak Hour

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ToFrom | Forden RoadSouth | Access | Forden RoadNorth | Total |
| Forden Road (S) | 0 | 22 (0) | 100 (2.2) | 122 (1.8) |
| Access | 46 (0) | 0 | 20 (0) | 66 (0) |
| Forden Road (N) | 69 (1.5) | 6 (0) | 0 | 75 (1.4) |
| Total | 115 (0.9) | 28 (0) | 120 (1.8) | 263 (1.2) |

 Table 6.2 Site Access Traffic Flows – 2026 200 Dwellings PM Peak Hour

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ToFrom | Forden RoadSouth | Access | Forden RoadNorth | Total |
| Forden Road (S) | 0 | 51 (0) | 82 (1.3) | 133 (0.8) |
| Access | 38 (0) | 0 | 9 (0) | 47 (0) |
| Forden Road (N) | 99 (0.9) | 22 (0) | 0 | 121 (0.7) |
| Total | 137 (0.7) | 73 (0) | 91 (1.2) | 301 (0.7) |

 (xx) = % HGVs in total traffic flow

* 1. The PICADY output is provided at Appendix D for information. The results of the are summarised below.

Table 6.3 Site Access 2026 200 Dwellings

|  |  |  |  |
| --- | --- | --- | --- |
| Movement | Maximum RFC | Maximum Queue (Vehicles) | Inclusive Delay (Minutes/Vehicle) |
| AM | PM | AM | PM | AM | PM |
| B – AC | 0.154 | 0.115 | 0.2 | 0.1 | 0.14 | 0.14 |
| C – AB | 0.011 | 0.040 | 0.0 | 0.1 | 0.09 | 0.11 |

 A = Forden Road (South) B = Site Access C = Forden Road (North)

* 1. The PICADY results above demonstrate that even if the entire potential development of 200 units within the wider site was served by a single point on Forden Road, the proposed access would operate well within the normal desirable maximum Ratio of Flow to Capacity (RFC) of 0.85; which retains a 15% reserve capacity below the theoretical saturation level of 1.0. As can be seen from the results, the maximum RFC of 0.154 is significantly below the desirable limit of 0.85. The results also demonstrate that the minimal queues and delays on all approaches to the junction remain within acceptable limits and based on their low values are considered to be insignificant.
	2. The same assessment was undertaken for the existing B4385 Station Road / Pool Road / B4388 Forden Road junction based upon the 2026 design year with the additional traffic based upon 200 dwellings within the wider development area.
	3. In the absence of observed turning counts, the junction capacity assessments were based upon the entry and exit flows on each link during the PM peak hours. The PICADY software then creates a turning matrix based on these flows. In order to reflect the peak hour simulation performed by PICADY when inputting hourly flows, the assumed profile with the ODTAB option of PICADY was used to establish the direct input flows for each 15 minute segment of the AM and PM peak hour periods considered.
	4. The PICADY output is provided at Appendix D and summarised below:

 Table 6.4 B4385 Station Road / Pool Road / B4388 Forden Road Junction 2026 200 Dwellings

|  |  |  |  |
| --- | --- | --- | --- |
| Movement | Maximum RFC | Maximum Queue (Vehicles) | Inclusive Delay (Minutes/Vehicle) |
| AM | PM | AM | PM | AM | PM |
| B – AC | 0.229 | 0.264 | 0.3 | 0.4 | 0.13 | 0.14 |
| C – AB | 0.147 | 0.173 | 0.2 | 0.2 | 0.12 | 0.13 |

 A = Station Road (South) B = Forden Road C = Pool Road

* 1. As with the proposed site access junction, the PICADY results above demonstrate that even if the entire potential development of 200 units within the wider site was served by Forden Road without the new link between the B4385 and B4388, resulting in the development traffic using the existing junction between those routes, the existing junction would operate well within the normal desirable maximum RFC of 0.85; as demonstrated by the highest RFC being 0.264. The results also demonstrate that the minimal queues and delays on all approaches to the junction remain within acceptable limits and are again considered to be insignificant.
	2. Since the previous capacity assessments were undertaken, the new development of 33 affordable dwellings at Trem Y Fridd have been constructed. Whilst that development would add traffic to the network under current baseline conditions, the assessment undertaken above demonstrates the site access and local junction could accommodate an traffic associated with an additional 200 units at the Verlon Farm site.
	3. Given the proposed development being considered is for up to 54 dwellings, adding the 33 affordable dwellings results in a cumulative increase of 77, which leaves 123 units above the proposed levels that could demonstrably be accommodated on the network.
	4. Based on the foregoing, it is evident that in terms of operational capacity, it would not be necessary to provide the new link between the B4385 Station Road and B4388 Forden Road in order to accommodate the proposed development.
	5. Should the new link be constructed, if the existing priority along Forden Road is retained where it meets the new link, the traffic that currently runs freely along the B4385 Station Road / Pool Road corridor would divert to the new link and be required to turn to / from it at the priority junction with Forden Road at its eastern end. At its western end, the link would join the existing alignment as a continuation, taking priority over the stub retained to the south, which would only serve the neighbouring land and existing dwellings on Station Road, whilst also providing an alternative pedestrian / cycle link.
	6. In order to establish whether the proposed access junction could accommodate the cumulative traffic volumes associated with the existing diverted traffic and the proposed development, the observed flows on Station Road have been added to the site access / link of the PICADY analysis, whilst the flows on the southern section of Forden Road have been assumed to reflect those on Pool Road, as the Pool Road traffic would have no option but to continue into the southern section of Forden Road if Station Road is blocked to vehicles at that point. The flows on Forden Road to the north of the site access were retained as observed, as these should not be directly affected by the new link.
	7. These base flows were then projected to 2026 using the TEMPro factors previously reported, and the development flows for 200 units detailed on Figure 3 added to the 2026 baseline to create cumulative entry / exit flows on each link; noting that the development flows allocated to Station Road on Figure 3 are excluded, as they would travel along the western part of the link, thereby avoiding the Forden Road junction at the eastern end of the link. These flows were then entered into PICADY using the DIRECT entry option based on 15 minute time segments calculated in accordance with the ODTAB peak hour profile, as per the assessment of the existing B4385 / B4388 junction.
	8. The PICADY output is provided at Appendix D and summarised below:

 Table 6.5 New Link / B4388 Forden Road Junction 2026 200 Dwellings

|  |  |  |  |
| --- | --- | --- | --- |
| Movement | Maximum RFC | Maximum Queue (Vehicles) | Inclusive Delay (Minutes/Vehicle) |
| AM | PM | AM | PM | AM | PM |
| B – AC | 0.363 | 0.354 | 0.6 | 0.5 | 0.18 | 0.19 |
| C – AB | 0.046 | 0.093 | 0.1 | 0.1 | 0.11 | 0.11 |

 A = Forden Road (South) B = New Link C = Forden Road (North)

* 1. The PICADY results above demonstrate that diverting the existing B4385 Station Road along a new link to Forden Road through the development of 200 dwellings would not breach the capacity of the proposed site access / eastern link junction to Forden Road. The maximum RFC of 0.363 remains significantly below the desirable maximum of 0.85 and the associated queues and delays are not significant.
	2. Based upon the findings of the assessments undertaken above it is evident that the existing road network retains sufficient capacity to accommodate the initial 54 dwellings allocated on the Verlon Farm site during the Plan Period to 2026. The existing road network could also accommodate the cumulative development of 200 dwellings within the wider allocated area without resulting in unacceptable capacity impacts.
	3. The assessment also demonstrates that should a new link be created between the B4385 Station Road and B4388 Forden Road through the development site, a simple priority junction, as is proposed to serve the initial 54 units, could also accommodate the increase in traffic associated with the diversion of existing Station Road flow to the new link, together with the vehicle movements associated with the additional 146 dwellings anticipated to be provided within the wider site area.
1. appraisal & summary
	1. Based on the findings of the review undertaken, it is evident that in terms of capacity, the new link required under the Adopted Powys Local Development Plan 2011 - 2026 would not be necessary to facilitate the development of Verlon Farm for residential purposes.
	2. In terms of the initial 54 units within the plan period, it is evident that the quantum of development traffic on any link within the study area falls within the existing range of normal day to day variations. As a result of this, whilst in principle any increase in traffic activity results in increased potential for conflict, in practical terms there would be no noticeable change in terms of day to day activity when compared with the existing situation.
	3. Whilst it is recognised that the existing junction between the B4385 Station Road / Pool Road and B4388 Forden Road does have constraints in terms of the left turn movement from Station Road to Forden Road, the evidence available indicates this has not led to a level of personal injury accidents, which would lead to concerns regarding junction safety.
	4. It has been established that the visibility at the junction is acceptable and therefore, taking into account the good safety record and the fact that the development traffic flows would fall within the range of existing day to day variations on a network that retains sufficient capacity to accommodate the modest increase, it is concluded that the impact of the initial 54 unit scheme served by a single access to Forden Road should be considered acceptable on the existing road network.
	5. The study undertaken demonstrates that the simple priority junction provided to serve the initial 54 dwellings could accommodate the diversion of Station Road along a new link to Forden Road with the cumulative increase of 200 dwellings connecting to the link from the wider Verlon Farm development area.
	6. Notwithstanding this, the proposed site layout has been designed to facilitate a change in priority at the site access junction, should that be preferred by the Highway Authority in the future, in the event the new link road is constructed.
	7. Should the priorities be revised between the site access and Foden Road, it is anticipated that the priority at the existing B4385 / B4388 junction would also be changed, such that there would be no Give-Way between Forden Road and Pool Road, which would effectively become a through-route. The implications of removing the constraint of the junction and its effects on traffic speeds would need to be considered in the context of existing accesses as part of a more detailed appraisal of the link road.
	8. Having considered the foregoing, it is concluded that the proposed development of 54 dwellings at the Verlon Farm site would be acceptable in terms of its highway impacts.

**FIGURES**

**APPENDIX A**

**Traffic Survey Data Summaries**

**APPENDIX B**

**Traffic Survey Results Summaries**

**APPENDIX C**

**TRICS Output**

**APPENDIX D**

**PICADY Output**