

A Report for

CAUSE - Campaign Against Urban Sprawl in Essex

The scope for high-quality rail services to support sustainable urban development

prepared by

Jonathan Tyler

Passenger Transport Networks, York

I INTRODUCTION

1.1 CAUSE – Campaign Against Urban Sprawl in Essex – recognises the scale of development in north Essex to which the pressure for new homes is leading but is deeply concerned about the risk that it will not be planned in forms and locations that make it sustainable. In particular, schemes led by opportunistic developers or local plans over-influenced by short-term political expediency may allow new houses to be built on sites that are unsupported by a good range of services and facilities and that force residents into dependence on private cars. This would be unacceptable both with respect to existing levels of congestion in the area and to the critical need to protect the environment.

1.2 The campaign therefore commissioned advice from consultants committed to the principles of integrated land-use and transport planning in order to present their case in the context of the current round of preparation of local plans. Passenger Transport Networks, based in York, was asked to examine the scope for enhancements of rail services that would support well-sited development. This report summarises our findings and includes technical graphs illustrating possible future services. It complements the wider-ranging reports on the planning issues prepared by Tim Pharoah and Joanna Chambers.

1.3 Passenger Transport Networks [PTN] is the trading name of the consultancy offered by Jonathan Tyler. He has worked in the railway industry for over fifty years and has extensive experience in operations, demand research and long-term planning. He specialises in strategic timetabling studies and is a well-known champion of the Swiss approach to integrated, multi-modal public transport offering high standards of access and connectivity.

1.4 Geographically CAUSE is primarily concerned with the area served by Tendring District Council (from the eastern edge of Colchester to the coast between the estuaries of the Stour and Colne), Colchester Borough Council and Braintree District Council (stretching from the Suffolk border to just north of Chelmsford); the north-eastern part of Chelmsford City Council's area is also of interest because of the railway connection.

1.5 The railway routes in the area comprise the Great Eastern Main Line [GEML] from Norwich and Ipswich to London Liverpool Street via Colchester and Chelmsford and its branches serving Harwich, Clacton-on-Sea and Walton-on-the-Naze, Sudbury and Braintree. With the exception of the diesel-worked Sudbury branch all the lines are electrified on the 25kV overhead system. At present the inter-city passenger trains between Norwich and London are formed of locomotive-hauled coaches while all other services consist of single, double or triple 4-car electric multiple-units [EMUs] of Classes 321 and 360. A high volume of container-carrying trains on the GEML serves the Port of Felixstowe, and occasional freight services run on the branches.

1.6 Passenger services are provided by *Abellio Greater Anglia*¹ under a franchise contract that runs to October 2016. Three bidders have been selected to tender for the new franchise; they are Abellio, First Group and National Express. This will run for about nine years, with the option of a short extension. The inner-suburban service between Shenfield and Liverpool Street has been transferred to TfL Rail in preparation for it becoming one of the two eastern arms of Crossrail. Freight services are operated by a number of independent companies.

2 SUSTAINABLE PUBLIC TRANSPORT

2.1 The essence of sustainable and integrated public transport is that it must attract a substantial modal share of journeys as an alternative to use of private cars – in conjunction with walking and cycling for shorter journeys and for access to the buses and trains that provide the network of public transport. This requires a commitment by government and operators and by the communities they serve to develop appropriate infrastructure and the service-offer and to secure the necessary funding. That commitment is not always apparent, and too often easy phrases about sustainability and integration are not matched by reality. It follows that this report will emphasise the need for determined vision and ambition on the part of the various players.

2.2 To attract journeys from cars and to ensure that citizens without a car (either at all or for particular trips) have a good standard of access to the destinations their lives need, bus and train services must call at conveniently-located stops and must run at a frequency that recognises the instant availability of the car. This is generally acknowledged to be a minimum of half-hourly in populous areas and for settlements from the larger villages upwards in size. A continuum then applies, so that the more densely-populated an area the higher the appropriate frequency – up to over thirty trains/hour on tube lines in central London.

2.3 It goes almost without saying that railway stations – and bus stops – must be attractive places in their own right, that vehicles must be of a high standard (the bar is set by contemporary cars), that fares must be reasonable and that the design of the system, the provision of information and everyday reliability are critically important. Regrettably this has to be said because what is presently offered is too often deficient in one or more of these respects. However this report will mostly concentrate on the issues of frequency and timetabling for the railway service.

2.4 In north Essex parts of the prevailing offer can be deemed inadequate by these standards. On GEML the frequency is a good five trains/hour south of Colchester, with additional services in

¹ *Abellio* is the trading name of the franchises operated by the Dutch Railway.

the peak periods. This comprises two Norwich inter-city trains and three regional² services (one each starting from Ipswich, Clacton and Colchester Town). On the other hand, the Harwich, Walton, Sudbury and Braintree branches and the local stations on the Clacton branch only have a basic hourly service, while the regional service from Clacton is also only hourly.

2.5 This situation is intimately linked with the point that CAUSE is making. If new housing is to be located where a significant number of future journeys are naturally made by public transport and where trains and buses secure access to job-opportunities, higher-order shopping and service centres and leisure possibilities then it will be essential to increase frequencies (and improve other standards in tandem). In its most ambitious scenario CAUSE has asked its consultants to consider the case for settlements of a size and position that would facilitate development of 'Colchester METRO'. The core of this report is therefore concerned with the interaction between feasible enhancements of the rail services in this part of Essex and the location and scale of development that would ensure sufficient demand to support such enhancements.

3 THE GREAT EASTERN MAIN LINE

3.1 GEML is a largely double-track railway faced with a high and rising demand for its available capacity. It has relatively few loops where one train can pass another and four tracks only in the London suburban area between Shenfield and Liverpool Street. Grade-separated junctions remove conflicts at Colchester between down trains toward Clacton and up trains from the Ipswich direction and likewise at Shenfield between down Southend trains and up trains on the main line. However there are significant flat junctions at Manningtree and Witham (for the Braintree branch).

3.2 The services GEML carries are

- * inter-city Norwich <> London : 2 trains/hour with an extra service in the up morning and down evening peaks;
- * regional : 4 trains/hour into Liverpool Street (3 from Colchester or beyond and 1 from Braintree), with roughly double that number in the peak periods;
- * local : 3 trains/hour, rising to 8 in the peaks, from the Southend Victoria line, which joins GEML at Shenfield;
- * freightliner³ trains from and to Felixstowe : approximately 1/hour; and
- * miscellaneous workings, such as empty trains from and to depots, other freight, civil engineers' works trains and the leaf-blowing trains in the autumn.

3.3 It should be stressed that the capacity of a railway cannot be expressed as a predetermined number of 'paths' that are there to be divided up between a set of operators. The characteristics

2 We define a regional train as one connecting one or more large centres with selected stations that serve self-contained settlements. It is thus differentiated on the one hand from inter-city trains that primarily serve only the larger centres (though they may call at some smaller places) and on the other from local trains that serve either a string of suburban stations in conurbations or minor places on branch lines. In practice this categorisation cannot be exact, but the term 'regional' is more satisfactory than the traditional but now misleading term 'semi-fast'.

3 The term is used generically in this report for trains comprising flat wagons loaded with shipping containers rather than exclusively for the trains of Freightliners Ltd (the successor company to the original British Rail operation that initiated this type of working in Europe).

of paths vary with the specification of the traction (particularly power/weight ratios and acceleration and deceleration rates), speeds and required calling points, and it is therefore the chosen mix of paths on the existing infrastructure that determines the effective capacity of a route and its sub-sections. Real difficulties can occur when rising demands make those choices increasingly fraught and when expanding the infrastructure is either physically complicated or expensive or most likely both.

3.4 We take each service in turn to discuss future requirements. An influential campaign in East Anglia has achieved a commitment in the Invitation to Tender for the franchise that the inter-city service will be improved: it is to have adequate capacity for a growing market, new coaches and at least one daily train in each direction running between Norwich and London in 90 minutes (and 60 minutes from Ipswich). This means that it must be assumed that the service will require four paths in each direction in each directional peak period and three for most of the rest of the day. Moreover, given the cost of upgrading the route sufficiently to secure the 90-minute timing and the disruptive effect of one-off schedules for fast trains, it seems likely that there will be a standard path in each hour for a fast service, probably stopping only at Ipswich and Colchester.

3.5 Such a fast and frequent service has a profound impact on the overall timetable. It means that the off-peak regional service of 4 trains/hour from Witham inwards must be smartly timed, with a careful selection of stops and in due course trains with faster acceleration than the present units (though 321s and especially 360s are no slouches). Up to four extra paths will be used in each peak hour to cater for the large and growing volume of commuting to Stratford and Liverpool Street. There is a presumption that the Braintree service will be increased from the present hourly pattern (roughly every 40 minutes in the peaks) to half-hourly throughout the day.

3.6 At present the maximum capacity on GEML is realised in one hour in the inbound morning peak when 22 trains run into Liverpool Street. Six of these come from the Southend line, which is also expected to absorb the two extra paths that it is thought can be found when Crossrail takes the suburban service out of Liverpool Street. There is therefore unlikely to be any scope for additional trains from places east of Shenfield⁴. In theory nonetheless this should not rule out a more frequent 'metro' service limited to serving Colchester and its surrounding territory, that is local trains not running to and from London. However some severe constraints exist.

3.7 First, the natural extent of such a service would be Manningtree to Chelmsford, but at both stations track layouts make turning trains difficult and the solutions would be very expensive. Turning at Witham and Colchester would be somewhat easier but still not operationally straightforward, and such a short service could not have a significant impact on modal split.

3.8 Second, in order to make such a service attractive in the context of planned development increasing the population around existing and possibly additional stations the frequency would have to be every 15 minutes [see ¶2.2 above]. This could be provided by a combination of two London regional services and two locals in each hour, but the capacity and pathing issues discussed above mean that no additional calls at new stations could be made, at least without new rolling stock with dramatically faster acceleration – which cannot be assumed to materialise.

3.9 Third, the cost of building new stations on main lines is very high because of the need for land, probably realignment of track, alterations to signalling and disruption during the works. To justify such expenditure demand would have to be considerable, and that is unlikely to arise from

4 Network Rail [NR] believes that it will be possible to run more than 24 trains/hour once advanced signalling is introduced, but this remains technically unproven and many operators are cautious. Moreover it is evident from observation and from performance data that current operations are unstable.

any politically credible scale of development around any of the suggested sites⁵.

3.10 Finally and probably definitively, provision for freight trains will be the determining factor. The forecasts for freight are contentious, but as a working assumption there will need to be two paths every hour between the peak periods (when freight is excluded)⁶. Ideally these need to be 'clean' paths (ie. with no layovers in loops or awkward allowances that slow them down). From careful analysis of a number of options PTN has concluded that they can only be found as an alternative use of the capacity that may be taken in the peak by a fourth Norwich train. This in turn means that only one local path would be available, resulting in an unacceptable pattern of trains at 15, 15 and 30 minute intervals.

3.11 We therefore recommend that CAUSE should not pursue the case for new housing to be located at any of the suggested GEML sites that do not have existing stations. Compact developments close to and with good access (especially on foot or by bicycle or by means of good bus links) to Marks Tey, Kelvedon and Witham stations should be supported, but it should be recognised that these would be principally attractive for commuting and other journeys to London and maybe some intermediate places such as Chelmsford. A brisk and regular half-hourly service to and from Colchester, as now, would be attractive for certain types of journey but would not provide the convenience of a metro-style timetable.

3.12 We also recommend two other possibilities. One is the proposal to improve the Braintree frequency to half-hourly, which is essential to support the considerable growth envisaged in that area if serious road congestion is to be avoided. Such a plan would certainly be in accord with CAUSE objectives, although again this is largely about London commuting⁷.

3.13 The other possibility stems from consideration of the long-term future of the line between Sudbury and Marks Tey. As a diesel-operated country branch it is an anachronism. A policy to secure its future should be to double the hourly frequency, to electrify it and to improve the rather slow timings. And because the junction faces toward Colchester it is possible that two paths/hour could be found for a local service (alternating with the two regionals) between, say, Colchester

5 One new station, namely Beaulieu Park north of Chelmsford, has been granted planning permission by Chelmsford City Council as a key element in the building of 3600 homes. However it has not yet been agreed by Network Rail other than in broad outline (and its implications for timetable planning appear not to have been evaluated), while the cost of at least £22 million may be causing problems. This mis-match in institutional processes sets a damaging precedent since building of homes has started and occupiers may become committed to car-based lifestyles long before the station opens.

6 Network Rail expects a fivefold increase in rail-borne containers through Felixstowe up to 2043, partly from underlying growth and partly from a higher modal share. This seems to PTN to be unlikely for a number of reasons, but it must be recognised as the prevailing planning assumption. Some relief for GEML will be afforded by diverting traffic away from London via the cross-country Felixstowe ... Bury St. Edmunds ... Ely ... Peterborough ... Nuneaton route, but even allowing for a busy night timetable two daytime GEML paths will be needed in each direction each hour. A pair fits well with the passenger paths but any more than that would be problematic.

7 A half-hourly service cannot be worked on the single-track Braintree branch in its current configuration, which is why it only has an hourly service with an awkward non-standard peak pattern. Network Rail lists a half-hourly service as a longer-term output and states that this will require installation of an intermediate crossing loop. However, NR (and the Office of Rail and Road as regulator) are being challenged over a tendency to seek capital infrastructure solutions before considering operating solutions. In this case the alternative might be some fettling of the track to raise slow linespeeds together with a timetable solution based on close timing of up and down trains through the junction at Witham. This would be a key determinant of the entire GEML pattern but would not necessarily be acceptable when its consequences for connectivity at many other nodes were considered.

Town (or the Clacton line) and Sudbury⁸. This would be subject to being able to find an acceptable path for Sudbury-bound trains across the down line at Marks Tey, but it would be a basis for development out to Sudbury in accordance with CAUSE principles.

4 THE CLACTON AND WALTON LINE

4.1 The line between Clacton-on-Sea and Colchester is a 31.2 km electrified double-track railway. It has stations at Clacton, Thorpe-le-Soken, Weeley, Great Bentley, Alresford, Wivenhoe and Hythe (the last being in the outskirts of Colchester). Within Colchester two spurs off the line form a triangle with Colchester Town station (formerly St. Botolphs) at its apex, while the GEML junction lies just east of Colchester station (formerly Colchester North). At Thorpe-le-Soken an 8.0 km single-track branches off to serve Kirby Cross, Frinton-on-Sea and Walton-on-the-Naze.

4.2 The basic timetable is an hourly regional train between Clacton and London, calling on the branch at Thorpe-le-Soken and Wivenhoe (and not running into the Town station), and an hourly all-stations local train between Walton and Colchester that runs into and reverses at Town. The local arrives at Thorpe before the regional and then follows it in order to offer faster journeys for Walton line passengers and connections between Clacton and the smaller intermediate stations. Extra services operate in the peak, partly because a large rolling-stock depot is located at Clacton.

4.3 This is a thin service for an electrified, double-track railway, but it reflects the modest population around the intermediate stations and the demographics of an area with an unusually high proportion of elderly people⁹. It is undesirable for this to continue because it does not make optimal use of an expensive asset. PTN hopes that the next franchisee will consider doubling the frequency of both components to bring them to the minimum frequency that renders a service convenient and attractive, namely half-hourly. Although the business case may not be strong (despite the availability of EMUs off-peak that would make the costs largely marginal) there could be social benefits, particularly by enhancing access to jobs and services for those without a car.

4.4 The case for such an enhancement would be strengthened by the form of development that CAUSE espouses. Usage of the intermediate stations is currently rather poor, but they are quite well located for the villages they serve and/or have sizeable sites suitable for housing within their walking catchments. They therefore offer the potential for generating additional travel on the line while averting development at sites that would add to road congestion. Moreover, there is a possible case for up to three new stations that would add further traffic.

* Clacton station serves the town centre and holiday area well – its size attests the town's one-time popularity for seaside breaks and could readily accommodate a resurgence of rail's modal share, given an attractive service – but the town has spread to the north and a new station 3.5 km from the terminus has been proposed to improve access.

* On the outskirts of Colchester lies the campus of the University of Essex. The railway passes along its southern edge, and a station there, although away from the centre of the campus, could be convenient for many journeys by staff and students. Moreover it could have substantial benefits by facilitating good employment opportunities for people along a line which runs through an area much in need of economic regeneration.

8 As with Braintree NR lists a doubled frequency as requiring a passing loop. In the Sudbury case this is probably more necessary, but its location requires careful planning in the context of timetabling objectives.

9 After the line was electrified in 1959 there was sufficient up-market commuting to London to justify a build of EMUs designed for the service and providing 'griddle' catering throughout. This has declined, the catering was withdrawn in 1980 and the through trains are now slightly slower than they were.

* The third possible new station would serve sites for housing at Thorrington, between Great Bentley and Alresford (the original station there was closed in 1957).

4.5 It will be noted that we do not recommend reopening of the Brightlingsea branch: it would be expensive to do so for a modest population that is much better served by its bus service, and by occupying a path between Alresford and Colchester branch trains would diminish the potential of the longer-distance service for Clacton and Walton.

4.6 Although occupants of new housing in the area can be expected to make some use of a half-hourly service the critical question is whether sufficient population growth could be attracted to make a quarter-hourly service feasible and thereby generate a virtuous circle of much-increased demand, high modal shares for rail and a sustainable 'metro' service of high quality. Although the purpose of this report is to examine the issues in principle rather than to prepare a business case **it cannot be emphasised too strongly that the Metro concept depends on acceptance of quite large-scale development around the stations.**

4.7 In considering whether it would be operationally feasible the promising starting point is an under-used asset ripe for enhancement rather than a project requiring extensive and expensive new build. Two trains/hour could be doubled to four using rolling stock that otherwise stands idle between the peaks. It is envisaged that the second local would run from and to Clacton, leaving the Walton spur with an hourly service. The only constraint is the need for careful planning at the two junctions on the direct line where a train running into Colchester Town and reversing to run eastwards may conflict with a westbound regional train and where frequent or lengthy closures of East Gate Level Crossing must be avoided for the sake of traffic circulation within Colchester¹⁰.

4.8 Analysis of timetabling options indicates that evolution of the service could go further to offer two regional trains and four local trains/hour, although **it must be stressed that this is intimately dependent on decisions about the overall structure of the GEML timetable.** The pattern would be two locals between each pair of regionals with one serving Clacton and thereby giving that section four trains/hour and the other serving Walton half-hourly. With the existing type of trains and none of the extra stations this could provide an attractive offer. There would be one requirement for an infrastructure upgrade and one potential operational problem.

4.9 What cannot be managed within this plan are the extra stations. That would require new rolling stock that through faster acceleration and sharper braking could absorb the loss of time and the extra dwell time. Clacton North is a matter of not compromising the short turnrounds that the outline timetable suggests are possible. University of Essex is a matter of retaining the crucial timings at Thorpe and at the Colchester junctions. Thorrington is similar, but as an intermediate stop between two quite close existing stations (which would prevent trains reaching linespeed) it would have the largest effect and would be difficult to justify unless the scale of housing development were exceptionally large (and therefore unlikely to be locally acceptable).

4.10 In order to secure connections at Thorpe-le-Soken from Clacton into a local and from Walton into a regional (as now) and to do so in the two directions simultaneously (which is a necessary function of an integrated timetable) the disused platform and the third line would have to be restored, but this would hardly be a major project¹¹. The operational problem is that even

10 It currently closes about six to eight times in each morning peak hour, sometimes for some minutes. Replacement with a bridge is impossible in a dense urban environment.

11 It is envisaged that the restored northern line would have an independent connection to the Walton branch and a crossover at its centre to enable the two Walton trains to occupy the northern side of the island together. The third platform would offer flexibility in the event of out-of-course running. There would also need to be provision for bi-directional ('wrong-line') running for about 2 km west of Thorpe.

with a timetable arranged to minimise the number of closures of East Gate Crossing there might still be too many from the point of view of traffic circulation.

4.11 As a possible longer-term mitigation we refer to the 'tram-train' concept. Tram-trains are vehicles built to run both as traditional trams and on mainline railways amongst conventional 'heavy-rail' trains. This allows them to offer highly flexible services, typically connecting relatively low-density areas with large town centres and their principal stations. Since the first scheme was opened and quickly became successful in Karlsruhe a number of other projects in Germany and elsewhere have been developed.

4.12 In Britain however the concept has been treated with great caution, partly because of real or imagined technical issues and partly because of difficulties thrown up by the statutory and institutional structure of public transport. One trial scheme involving the Sheffield tram system and a section of Network Rail line in the Rotherham area is being taken forward, albeit extremely slowly. It is also clear that tram-train may be expensive and therefore require exceptional circumstances to justify it. For these reasons, and because campaign groups are inclined to latch onto the concept somewhat too readily as an apparently easy solution to a problem, thereby risking the perceived credibility of their cause, we chose not to recommend tram-train as a central or early feature of our report.

4.13 Nevertheless there are two circumstances that make it worthy of consideration as a longer-term project. One is the problem of running more trains across the level crossing at East Gate. The other is the fact that neither of Colchester's stations is well-sited: Town is on the edge of the centre and close to a busy road junction while the GEML station (North) lies some distance away in an unpleasant maze of roads. At the same time (as the complementary reports will explain) the city centre is spoilt by excessive volumes of traffic and over-complex routing of buses.

4.14 A possible scheme to address these problems would be for the local service on the Clacton line to be operated by trains capable of street running. They would leave the direct line avoiding the Town station at the existing Colne Junction and run into but not reverse at Town station. From there the tram route would turn up Queen Street and along the High Street before running via North Hill to North Station. This would not only achieve a huge improvement in access to the centre and hence boost its economy, but it could be a major step in creating the kind of traffic-free city-centre environment that is becoming commonplace in mainland Europe and that is essential in reducing outputs of carbon.

Jonathan Tyler

Passenger Transport Networks
49 Stonegate
YORK YO1 8AW

01904 611187 / ptn@btconnect.com / www.passengertransportnetworks.co.uk

14 December 2015

Strategic Plan for an Integrated Regular-Interval Timetable
R25A: Clacton-on-Sea ... Colchester

Timetable illustration for CAUSE

