CHANGE YOUR WORLD

CELL C LIMITED

Waterfall Campus
Cnr Maxwell Drive and Pretoria Main Road
Buccleuch, Ext 10, 2090

Private Bag X36, Benmore, 2010
Johannesburg, South Africa

T +27 (0)84 174 4000
F +27 (0)84 167 6598
W www.cellc.co.za

Registration Number: 1999/007722/06

21 July 2023

The Independent Communications Authority of South Africa
350 Witch-Hazel Avenue,
Eco Point Office Park,
Eco Park, Centurion, Gauteng.

Attention: Mr O Mhlanga
Mr R Mandevu
Per e-mail: ctr@icasa.org.za
RMandebvu@icasa.org.za

Dear Sir/Madam

RE: CALL TERMINATION RATE REVIEW PROCESS – COMMENTARY ON THE METHODOLOGIES TO BE USED IN THE COST MODELS

1. Cell C Limited ("**Cell C**") is grateful for the opportunity provided by Independent Communications Authority of South Africa ("**ICASA**") to make submissions in the ongoing call termination rate (**"CTR"**) review. In this regard, Cell C makes this submission to ICASA on the overall modelling approach and other related issues. Our collection of the data requested by ICASA remains ongoing for delivery in September 2023 as requested.

2. Cell C believes that ICASA's proposed approach to regulating call termination rates will lead to significant detrimental impacts for Cell C andother similarly situated or smaller licenced operators including new mobile voice challenger licensees ("**smaller operators**"), which will in turn lead to negative impacts on the effectiveness and competitiveness of the mobile market for consumers in South Africa.

3. ICASA's plan to apply the same, symmetrical rates to Cell C and the two larger operators Vodacom and MTN, fails to recognise the long-standing realities of the market and its two dominant players. Because of the entrenched large market share of approx. 80% held by both, Vodacom and MTN have for many years enjoyed on-net calling advantages which Cell C and other smaller operators are simply unable to replicate. This has led to a market structure which has not fundamentally improved in the past decade. There is no effective competition between the players in the market, and challenger operators such as Cell C cannot effectively target those call volumes, customer groups or segments of the market which are entrenched within the large operators. Put simply, symmetrical termination rates do not correspond with the highly asymmetrical market in evidence today.

4. Consequently, Cell C finds itself only able to target and gain a share in a small portion of the market, and has achieved substantially less than ICASA's target of a small operator operating at a minimum efficient scale of 20% market share[1]. The entrenched and static nature of the market shares of the two large players demonstrates that the competitive landscape has not improved and ICASA's interventions in what is intended to be pro-competitive measures have not been strong or broad enough. ICASA's application of asymmetry in call termination rates in the past has been one of those intended interventions, but in Cell C's opinion, the implementation of call termination rate regulation has not sufficiently reflected the cost and market asymmetries between large and small players, and has not effectively addressed any part of the market dominance of Vodacom and MTN.

5. Alongside voice, Cell C must also compete in the mobile data market – itself the subject of a major inquiry in 2019 by the Competition Commission. The growth of data traffic makes the market challenges faced by Cell C extremely difficult to overcome. Due to higher frequency spectrum needing more sites for coverage, and higher cost (high-demand) spectrum, the differences in economies of scale of the players in the market become even more pronounced than in the voice market. As part of its inquiry, the Competition Commission came to the view that the market has two dominant operators, Vodacom and MTN, and that the retail mobile market is "stubbornly concentrated", i.e. entrenched. Furthermore, the Competition Commission added that Vodacom certainly (and MTN borderline possibly) has a market share in mobile services which for many years exceeds the threshold for a conclusive determination of dominance[2]. ICASA cannot ignore these findings as they evidently apply to the broader market in which ICASA seeks to apply its wholesale call termination regulations.

6. Cell C urges ICASA to consider pro-competitive, and importantly pro-small operator, regulatory mechanisms which reflect the significant differences between smaller operators such as Cell C, and larger operators Vodacom and MTN. Such differences include the long-standing market shares significantly less than 20%, demonstrably higher unit costs of traffic faced by small operators, the needs for smaller operators to match the coverage of large operators, and greater reliance on roaming as an unavoidable network input cost.

7. VoIP and OTT services will introduce a shift in the use of the traditional circuit switched voice as compared to packet switched voice. This will negatively impact the voice termination market whereby the data used for packet-switched voice increases which contributes to losses in the traditional circuit-switched voice call market. We believe that this will amplify the dominance of the large players over smaller operators.

8. Applying symmetric call termination rates on Cell C and large operators Vodacom and MTN will further entrench the large market shares of Vodacom and MTN to the benefit of their shareholders, while significantly disadvantaging Cell C as a smaller operator with higher unit

[1] Minimum efficient scale of 20% was set out by ICASA in paragraph 2.8 of ICASA's Briefing note on asymmetry in mobile and fixed voice call termination, 13 February 2018
[2] Data Service Market Inquiry, Final Report, Summary and Recommendations, paragraphs 13, 20

costs. Symmetric call termination rates will reinforce the market failure and lessen competition, to the detriment of consumers. Symmetric call termination rates would also, in Cell C's opinion, go against the objectives set out in the Competition Commissions' Data Services Market Inquiry, where enhancing price-based mobile competition[3] is needed to improve outcomes for consumers (including cost plus fair return for access to facilities), alongside the recommendation for enhancing ICASA's regulatory mechanisms[4].

9. As a result, Cell C urges ICASA to recognise the importance of call termination rates between operators and smaller operators as a key regulatory mechanism in the market to address the broader competitive market failure in the South African mobile market. Cell C urges ICASA to continue to apply asymmetric termination rates between Vodacom/MTN and Cell C, for another 3-4 year period, reflecting Cell C's materially higher unit cost and long-standing lower market share circumstances evident in the market.
10. Cell C was the first operator to promote and proactively support the on boarding of MVNO's in order to foster continued market competition. In addition, Cell C has been very deliberate in pricing constructs and product propositions in improving affordability to customers over the years.
11. Cell C remains fully committed to the ICASA process and will fully cooperate in the process to support the Call Termination Review underway. The review outcomes must be fair, equitable and promote competition in the call termination market. look forward to further engagement with ICASA in this regard.

Yours sincerely

Themba Phiri
Executive Head: Regulatory

[3] Data Service Market Inquiry, Final Report, Summary and Recommendations, paragraphs 53, 53.1
[4] Data Service Market Inquiry, Final Report, Summary and Recommendations, paragraph 54

COMMENTS ON ICASA'S OVERALL APPROACH

12. Cell C has undertaken an initial review of all the files and documents issued to industry on ICASA's website.[5] This includes the original versions released on 26 May 2023 and the revised versions released on 21 June 2023.

13. Whilst we reserve the right to comment in the future on aspects within the models and documents that we have not yet raised in this submission (especially given that the models provided thus far are only shells populated with placeholder values), Cell C are nonetheless in a position to provide important feedback on the following broad issues within ICASA's process as a whole:
    13.1. ICASA's apparent refusal to recognise the continued market failures in the mobile sector in South Africa
    13.2. need for continued asymmetry for smaller operators like Cell C
    13.3. ICASA's overall approach to the CTR review
    13.4. issues identified in the cost model shells published thus far.

14. We consider these in turn. Our technical comments on specific technical issues identified in the cost models are provided in Annex A.

Refusal to acknowledge the failings in the market

15. On 28 March 2022, ICASA published its Findings Document on the Review of the 2014 Pro-competitive Remedies imposed on Licensees in terms of the Call Termination Regulations (CTR) of 2014 ('2022 findings document'). In this document, ICASA continued its march to symmetry of mobile termination rates, saying in paragraph 4.7.10.1 that "mobile termination rates should be symmetric (in line with fixed termination rates, which moved to symmetry on 1 October 2020), for the reasons already provided by the Authority in the Reasons Document for the Call Termination Regulations of 2014".

16. Paragraph 4.5.19.1 of this findings document also stated that "*the move to the LRIC-plus cost standard from 2014 removed the market failure associated with above-cost pricing and also provided considerable market assistance to the smaller operators*."

17. Cell C has (repeatedly) emphasised to ICASA over the past decade that the 2014 CTR process was massively flawed, both in modelling approach and in the pricing approach. Whilst ICASA claimed the approach was 'pro-competitive' in 2014 (i.e. allowing the small operator a higher termination rate

5 https://www.icasa.org.za/legislation-and-regulations/inquiries/call-termination-rate-review

based on the efficient cost of a small operator), the measure was in fact 'pro-large operator'. This bias arose because:

17.1. large operators were given a glide path above their efficient cost

17.2. a conservative growth forecast was assumed for the large operators, which they easily exceeded;

17.3. a substantial forecast in subscribers and traffic was assumed for the small operators which was impossible to achieve.

18. The large operators were forecast to achieve only modest traffic growth, whilst the small operators were forecast to grow substantially. Therefore, as Cell C has repeatedly explained to ICASA, Cell C under-recovered in that period.

19. The 2014 process is a clear example of how the implementation of a principle is just as important as the principle itself. Whilst a LRIC-plus pricing approach with asymmetric rates was meant to be pro-competitive in theory, in practice the flawed implementation of the modelling underpinning the pricing was in fact pro-large operator.

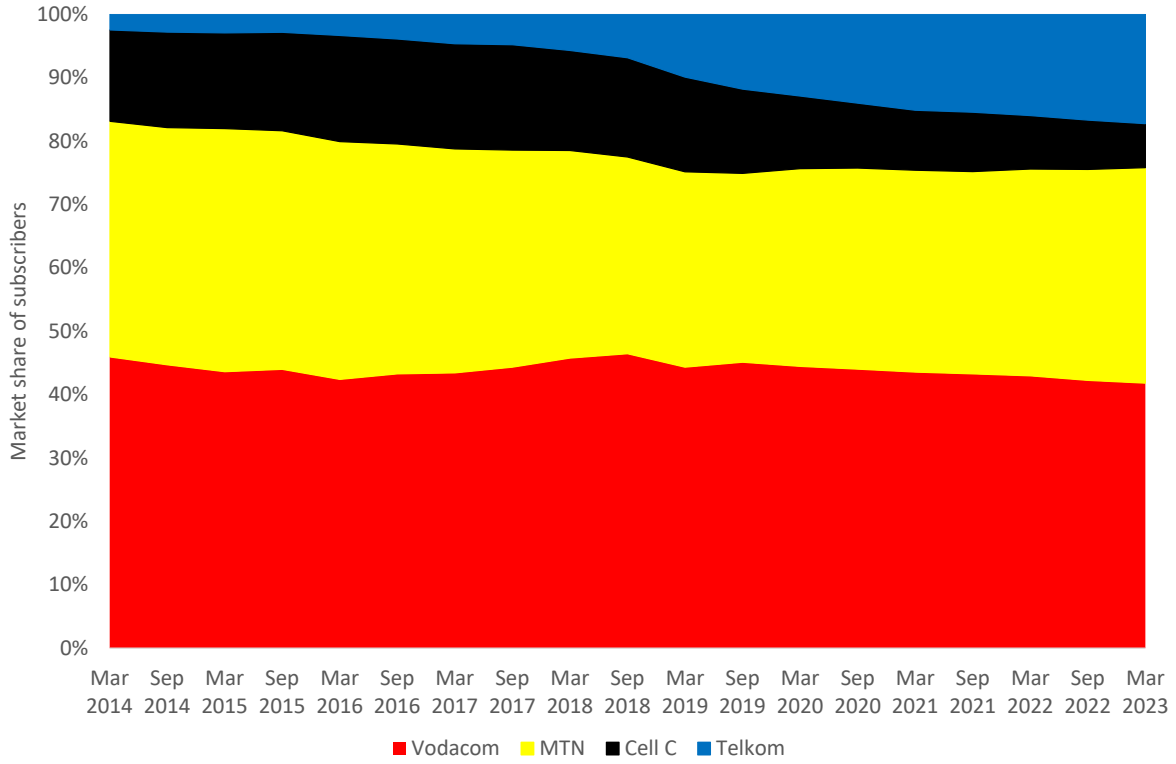
20. In the current CTR process, ICASA are proposing a symmetric pricing approach. ICASA are presenting this as a pro-competitive approach in an effectively competitive market, as has been the experience in other jurisdictions (in particular, the European Union (EU) Member States). However, the South African mobile market does not function nearly as well as those in the EU and this is the fundamental flaw in ICASA's reasoning. Symmetric pricing of call termination rates will not be a pro-competitive remedy in South Africa since the South African mobile market is not effectively competitive.

21. Cell C note that ICASA is subject to an ongoing legal appeal on the 2022 findings document.

Need for continued asymmetry for smaller operators like Cell C

22. South Africa has had a persistently ill-functioning mobile market structure in both the wider and more narrow markets for as long as Cell C has been in existence. Vodacom and MTN remain by far the two well-established operators with significant market shares (consistently in excess of 70% of subscribers combined, as shown below). The other two operators, Cell C (third entrant) and Telkom Mobile (fourth entrant), have been in the market for more than a decade, but still remain unable to achieve the scale of the incumbents due to the continuing market failures. As can be seen in the chart below, it appears that the third and fourth operators are competing with each other for scale, with the top two operators retaining their combined market share in their "entrenched duopoly".

Figure 1: Market share of subscribers by operator in South Africa, 2014 to present[6]



23. Cell C would also emphasise that, whilst Telkom's market share has grown recently, it remains significantly smaller than Vodacom/MTN. Telkom's growth will have been significantly supported through the benefits of scale and scope it gains from its dominant incumbent fixed business. These benefits include (i) extensive use of its fixed infrastructure in its mobile network deployment, (ii) common/overhead cost synergies with its fixed business and (iii) competitive fixed-mobile bundle pricing it can offer, including 'on-net' fixed-mobile and mobile-fixed calling. These are all benefits that Cell C cannot replicate.

24. In the first nine years from Cell C's launch in 2001, the market for call termination was unregulated. During this period, the incumbents used their first mover advantage and growing dominance to set termination rates substantially above their costs, which created a distorted competitive situation that curtailed Cell C's growth. This was combined with significant on-net/off-net price differentials in the retail market as a means to constrain the ability of small entrants and challengers to gain market share from the large players. Those price differentials persist today in parts of the retail market.

---

6 Excludes wholesale subscribers.

25. In the first two regulatory interventions by ICASA in 2010 and 2014, ICASA failed to impose balanced, pro-competitive regulation, with poorly defined asymmetry rates. Cell C has frequently argued that the regulation was frequently more 'pro-large operator' than 'pro-competition'.

26. The most recent (2018) CTR process, whilst not rectifying the broader market failures, was more balanced than the 2014 CTR process and more supportive of a pro-competitive and pro-challenger situation. This was because the glide paths were intended (to our understanding) to be entirely cost-based, starting at top-down costs of termination at different (large and small) scales in 2018 and ending at bottom-up costs of termination at different (large and small) scales in 2020. This process gave effect to the rationale of asymmetry, in reflecting that large and small operators have different levels of call termination cost.

27. The implication of this overall process is that in 22 years of operation, Cell C has competed in a mobile market with effectively, only 4½ years of balanced, pro-competitive call termination regulation (those being the 4½ most recent years), having been implemented by ICASA. This is simply not enough time to address the historic imbalances in the industry, particularly since the industry has been rocked by ongoing economic stability. The governing statute for the sector, the ECA, which anticipated a series of pro-competitive measures to address the market imbalance, has been in effect 16 of the 22 years of Cell C's existence. It is therefore with great concern to Cell C, that ICASA's Discussion Document on CTR is now forging ahead with an unbalanced regulatory intervention, namely an abrupt move to symmetry.

28. Paragraph 4.7.10.2 of the Findings document states that "The Authority has already granted small entrants asymmetry for twelve years, which is more than the recommended international best practice of three to four years." This is the wrong perspective on two counts:
    28.1. Small operator asymmetry is of little pro-competitive benefit if the large entrant rate is not set in a pro-competitive way (in the 2010 and 2014 CTR processes, the large operator rate was set above the actual/efficient cost of a large operator)
    28.2. Whilst, three to four years of small operator asymmetry may be enough time for a pro-competitive asymmetric pricing remedy to work in other jurisdictions, in South Africa the anti-competitive effects of the past years take longer to be resolved given the entrenched positions of the two largest operators.

29. As we have stated elsewhere in this response, ICASA seems to have set its mind on symmetry without any consideration for what evidence the results of the modelling process could actually produce in support of continued cost-based asymmetry for small operators versus large operators. This is reflected

in the bottom-up model shells released thus far, which have very little consideration for modelling the costs of operators of different scale.

30. Cell C is also of the strong view that LRAIC+ should be the costing approach used for asymmetric pricing for small operators, rather than pure LRIC. Cell C noted the framework used in ICASA's guide documentation [7] released to assess the merits of pure LRIC. This framework was based on four criteria considered by Ofcom in 2009, namely (i) economic efficiency, (ii) distributional effects, (iii) competitive effects, and (iv) commercial and regulatory consequences.

31. However, the assessment in the guide documentation is only a very high-level consideration at best and (strangely) focuses more on other countries rather than the specific circumstances of South Africa. In particular, for criteria (iv), it is stated that "the commercial impact on individual licensees will depend on the calling patterns: licensees with balanced calling patterns will experience reductions in revenues as well as costs, and so reducing termination rates will have a neutral impact on overall profitability in this case". However, ICASA are very much aware that calling patterns in South Africa are not balanced due to the entrenched duopoly present that Cell C has described to ICASA repeatedly over the last ten years. No presentation of an analysis of the call volumes to originated and terminated by operators in South Africa has been presented by ICASA.

32. If ICASA wish to explore the merits of pure LRIC, then that is their prerogative. However, ICASA should actually undertake the analysis required, rather than just make assertions.

ICASA's overall approach to the CTR review

33. There were numerous comments made by industry (not just Cell C, but also other stakeholders) regarding the commencement of this modelling-related phase of the CTR review. These were set out in the document regarding the responses to stakeholder requests for clarification ('June 2023 clarification document').[8]

34. When it released its finding document in 2022, ICASA indicated that it would set a symmetric termination rate, set through the modelling of the "efficient

---

7 See https://www.icasa.org.za/uploads/files/Guide-mobile-and-fixed-termination-rates-v0.3.pdf

8 https://www.icasa.org.za/uploads/files/Responses-to-Stakeholder-Requests-for-Clarification-15-June-2023.pdf

cost of providing termination service by a hypothetical efficient operator **using LRIC or the LRIC-plus cost standard**." (our emphasis)[9]

35. However, at the very outset of its modelling process commencing in May 2023, ICASA released both a document justifying the use of (pure) LRIC and a bottom-up model of mobile networks that was only capable of calculating (pure) LRIC. Therefore, the message ICASA had undeniably sent to industry at that points was that it had already chosen its cost standard for pricing, without any prior engagement with industry.

36. ICASA has indicated multiple times in the June 2023 clarification document that it has, in fact, not yet decided on the cost standard to be applied (or indeed, on other features of its modelling such as the depreciation approach).

37. These declarations by ICASA must be sincere.

38. It is essential that, after this unfortunate mis-step at the beginning of its modelling process, that ICASA make all its future cost modelling and pricing decisions based on careful, evidence-based reasoning tailored to the specific circumstances of the South African market, rather than rushing through the process to an ill-judged decision.

39. Cell C also notes the revised timeline set out by ICASA. Whilst Cell C welcomes the far more adequate amount of time now provided for the data collection and top-down model population by stakeholders, Cell C notes that important future stages of the process appear to be getting compressed as a result. In particular, in the revised timetable, draft models are planned for release on 16 October, whilst submissions on the draft models are expected on 30 October. This will give stakeholders less than two weeks to review the models.

40. ICASA's own experience from the previous CTR processes, most recently the 2018 process, will show that more than two weeks is required to review draft models given their complexity. ICASA should allow for four to six weeks of review time for any draft materials, with more time given especially for the first draft. Cell C therefore urges ICASA to revisit the later milestones in the CTR process and ensure adequate time is allowed for each stage. This should be true for both industry review and ICASA preparation, since ICASA should not rush the process and attempt to "bulldoze" through the consultation responses without giving adequate consideration to arguments and evidence raised by

[9] See https://www.icasa.org.za/uploads/files/Call-Termination-Regulations-2014-Findings-Document-on-the-Review-of-the-2014-Pro-competitive-Remedies-imposed-on-Licensees.pdf, paragraph 4.7.10.3.

stakeholders. If providing adequate time at all stages for all parties requires an extension of the timeline beyond the current planned end-date of 22/03/2024, then ICASA should do this without hesitation.

41. Cell C also wants to strongly emphasise to ICASA that proper, separate modelling of large scale and small-scale operators must continue in this process, as was done last time. Considering different operator scales will be crucial to ICASA's understanding of the structural issues facing the smaller operators in the South African mobile market, along with modelling of LRAIC and LRAIC+ results to understand the relative costs of different scale operators considering the substantial common costs of mobile (coverage) networks.

42. The current bottom-up models allow for minimal distinction between the modelling of different scales, with only a handful of inputs being distinguishable between different operator modes. The bottom-up models require considerable refinement to ensure that modelling of different operator scales is possible with sufficient rigour. Refinements would include, as a minimum, better parameterisation and/or modelling of:
    - 42.1. Market share of traffic types being potentially different to the market share of subscribers
    - 42.2. The assumed population coverage being able to vary between radio technology generations
    - 42.3. The split of traffic by geotype being able to vary by traffic type and by different radio technologies
    - 42.4. Allowing redundancy and spare asset capacity to be modelled within the network design for all modelled assets
    - 42.5. The ability to assume that the spectrum band used for population coverage by a particular spectrum band being able to be an above-1GHz band
    - 42.6. long-run average incremental costs, including mark-ups for common/business costs (LRAIC+)
    - 42.7. Allowing spectrum holdings to vary between different modelled operators.

43. Finally, ICASA must ensure that it takes full account of the top-down models as submitted by industry stakeholders. These models are important to ICASA's understanding of mobile costs in South Africa because they tell ICASA the real underlying costs of voice termination currently being experienced by other operators and how they differ between operators with large scale and small scale.

Issues identified in the cost models

44. Cell C has undertaken an initial review of both the bottom-up model (BU-mobile-FWA-cost-model-v1.5.xlsx) and top-down model (TD-mobile-FWA-cost-model-v0.4.xlsx) shells as published on ICASA's website.

45. ICASA should not mistakenly believe that prior exposure to the shell models will save time when reviewing draft models later on the process. This seems to be the assumption by ICASA given that only two weeks are allowed to review draft models and submit comments.

46. Model review is just as concerned (if not more concerned) with the input data as with the formulae. The input data in the shells is primarily (nonsense) placeholder values. Therefore, Cell C reserve the right to provide more detailed technical comments at a later stage.

47. What the model shells do enable is to highlight important functionality that is absent or poorly configured. Cell C have identified several shortcomings that are described below.

48. As part of its initial high-level review, Cell C has identified a large number of several basic formula/label errors or shortcomings that it describes in Annex A. The annex includes 11 issues identified in the top-down model and 30 issues in the bottom-up model.

49. These errors raise concern to Cell C as to the quality and level of care being applied within ICASA's modelling process from the outset, and the risk that errors become 'fixed' in the models before they can be fully scrutinised by the involved parties and relied upon by ICASA. The top-down model is very simple, and yet some elementary (and obvious) errors have been identified.

50. Of particular concern is that several errors within the bottom-up model appear to have been introduced following changes made to the first shell published by ICASA in late May 2023 (for example, the entry BU16 in Annex A). These changes include reducing the modelling period from 2013–2048 to 2018–2037. This points to ICASA rushing to complete the process, when ICASA's focus should in fact be on arriving at a robust and appropriate outcome.

51. The sense Cell C has of the bottom-up model is that it is a model developed in another country that is being reused from another modelling exercise, without any due care and attention given to what the model needs to consider in the context of South Africa. For example, modelling of operators of smaller scale appears to be a minimalist afterthought, with only a handful of very coarse inputs varying by operator. There is also no current ability for the model to reflect differing coverage by radio technology, or flexibility on the options for spectrum bands used for coverage.

52. It should not be the role of Cell C or other industry stakeholders to audit the model in depth, but rather to provide feedback on the modelled operators and conceptual approach. Cell C expects ICASA to ensure a more careful review of all future model versions is made.

53. Cell C implore ICASA to not rush the modelling process and to ensure the models are robust, well constructed and thoughtfully populated, calibrated and reviewed to reflect the actual circumstances of the mobile market in South Africa.

54. In addition, there are several broader areas where Cell C consider the models of mobile networks to be lacking. We outline these below, but they are:
    54.1. cost standards used in the bottom-up model
    54.2. choice of depreciation method in the bottom-up model
    54.3. proper modelling of large and small operators in the bottom-up model
    54.4. geotype definition in the bottom-up model
    54.5. modelling of the costs of national roaming in both the bottom-up and top-down models
    54.6. greater use of the tried-and-tested models developed by ICASA in 2018.

Cost standards used

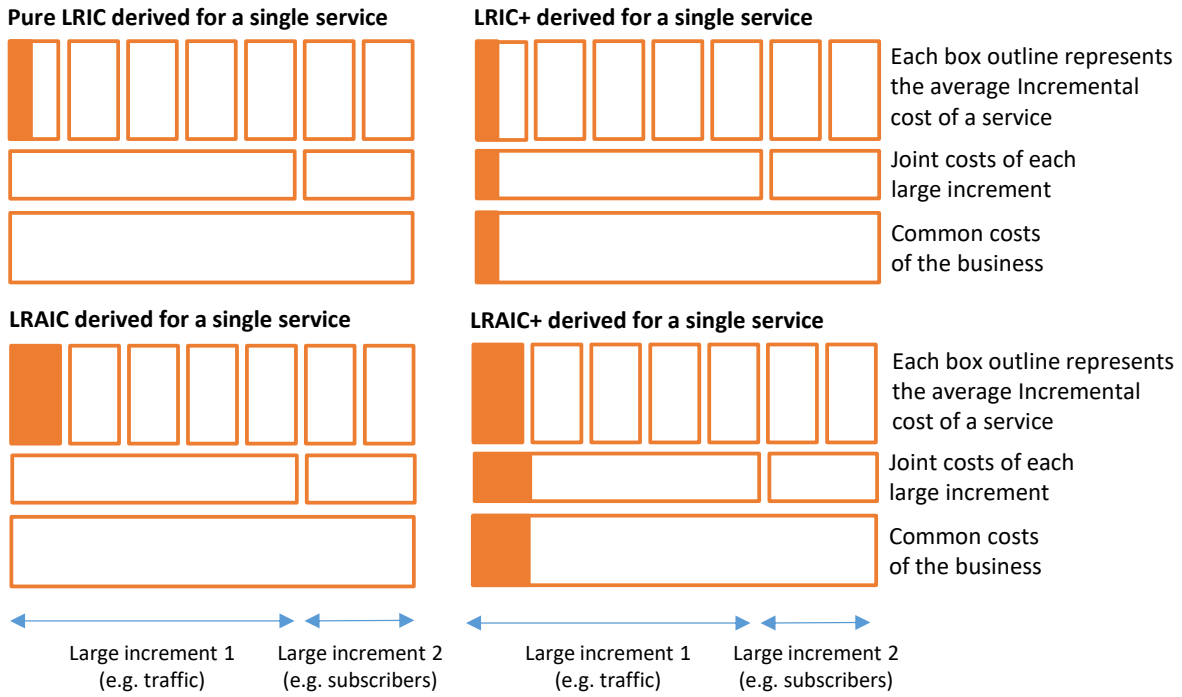
55. Perhaps the largest omission in the bottom-up model is the lack of a calculation of the average incremental cost of termination. Cell C would refer to this costing approach as "LRAIC+" (long-run average incremental costs, with a mark-up for common business costs). This is the costing method that was used for pricing in the 2018 process (and in the 2014 process). Importantly, ICASA referred to this method as "LRIC+" in its 2022 Findings document.[10]

56. Cell C notes there is various terminology in use by different authors, including (pure) LRIC, LRIC+, LRAIC and LRAIC+. Cell C's interpretation is as follows:
    56.1. LRAIC and LRAIC+ are average measures of cost, where the costs of the network are allocated between services using routeing factors and the service volumes.
    56.2. (pure) LRIC and LRIC+ are truly incremental measures of costs, where it is only the avoidable cost of the service that is of interest

[10] See paragraph 4.7.10.1 of https://www.icasa.org.za/uploads/files/Call-Termination-Regulations-2014-Findings-Document-on-the-Review-of-the-2014-Pro-competitive-Remedies-imposed-on-Licensees.pdf

57. A diagram of the four different approaches to costing are shown below. Broadly speaking:
    57.1. (pure) LRIC only recovers a fraction of the incremental cost of a service, since it is only those costs avoided if the service in question is treated as the last service in the stack
    57.2. LRAIC would recover the incremental cost of a service, but would not allow for recovery of joint/common costs
    57.3. LRAIC+ would recover the incremental costs and an allocable share of the joint/common costs
    57.4. LRIC+ likely recovers a smaller share of the joint/common costs than with LRAIC+

Figure 2: Graphical illustration of the four different incremental costing methods (LRIC, LRIC+, LRAIC, LRAIC+)



58. In the bilateral meeting between ICASA and Cell C in June 2023, it was indicated that a "LRIC+" calculation could be added to the bottom-up model i.e. a mark-up of the (pure) LRIC currently calculated in the model.

59. Cell C does not see this as a viable option, since the main objective of a "+"is the sufficient/recovery of joint/common costs. LRIC+ as indicated in the bilateral meeting does not at all correspond to the LRIC+ as intended by ICASA in its historical documents.

60. ICASA is already modelling a calculation in the top-down models that is similar to LRAIC+, since it is effectively calculating a fully allocated cost (FAC) of the top-down expenditures using a routeing factor table. A similar routeing factor table must be included in the bottom-up model to allow a proper LRAIC+ calculation to be implemented, since only this cost standard properly illustrates the variation in costs that will be experienced by the operators of significantly different scale in South Africa.

Choice of depreciation method

61. The bottom-up model only includes a calculation of the pure LRIC of termination, which uses economic depreciation to annualise the capex and opex. Section 3.2.1 of ICASA's guide documentation states that the model applies "a levelised cost of incoming voice minutes, including a time trend for inflation. This is the approach proposed by the GSMA, for example, and applied by regulators such as Comreg."

62. ICASA has chosen to apply economic depreciation (and Cell C does not agree with its implementation in this case).Cell C has undertaken an initial review of the pure LRIC calculation and noted two apparent significant shortcomings in ICASA's implementation that are described below. These are:
    62.1. Trend used to weight the demand volumes
    62.2. Whether economic depreciation is done before or after the difference step (i.e. placement of economic depreciation in the calculation).

63. In both cases, the implementation is not at all consistent with best practice. Moreover, the implementation is also different from the ComReg approach referenced in the guide documentation. Therefore, the statement in the guide documentation is factually incorrect.

(1) Trend used to weight the demand volumes

64. On the first point, Ofcom has previously described economic depreciation in quite a helpful way, characterising it as:
    "a cash flow analysis to answer the question: what time series of prices, consistent with trends in the underlying costs of production and given forecast traffic, yield an expected present value equal to the capital and operating cash flows from building and running the network?"[11]

[11] See https://www.ofcom.org.uk/__data/assets/pdf_file/0021/74361/annex_11_to_17.pdf, paragraph A11.234

65. They key feature of economic depreciation is that cost recovery should reflect (i) the cost trend of the assets (i.e. underlying costs of production) and the trend in demand (i.e. given forecast traffic).

66. In the shell model, the traffic is weighted using the inflation time series in cells '2 Dimensioning'!D527:X527. Therefore, in this model, the assumption in the economic depreciation calculation is that the unit capex of all mobile network assets and the unit opex of all mobile network assets are all assumed to evolve with inflation.[12] This is not the case, especially for the unit capex of assets that are electronic in nature (which can have a negative cost trend over time). Therefore, the economic depreciation calculation as it stands is not reflecting the costs of production of mobile termination services.

67. When we review the document on ComReg's website referred to in footnote 19 of the guide documentation, it is clear from Section 8.5 of that document that the economic depreciation is calculated on an asset-by-asset basis, using the asset cost trend specified for that asset. Therefore, the current implementation is not consistent with the ComReg implementation.

(2) Placement of economic depreciation in the calculation

68. When we review the document on ComReg's website referred to in footnote 19 of the guide documentation, it is clear from Figure 9.2 that in order to derive the pure LRIC of voice termination, economic depreciation is applied to the difference in costs incurred between the two cases (i.e. the case of the network carrying all services ('the baseline') and the case of the network carrying all services except termination).

69. However, in the shell model, the "6 Termination" worksheet shows that the pure LRIC of voice termination is calculated as the difference in economic cost between the two cases. So, ComReg calculates the "economic cost of the difference", whilst the shell model calculates the "difference of the economic costs". Therefore, again, the current implementation is not consistent with the ComReg implementation.

70. Based on these two issues alone, it is clear that the economic depreciation calculation is not currently fit for purpose. ICASA must also justify to industry why it is considering moving to economic depreciation from tilted annuity, which has been used in the previous costing processes. The use of economic

---

12 We note that assets can have different cost trends when the unit capex and unit opex values are being derived: this global use of inflation only occurs within the economic depreciation. For example, in the "Tranceiver, controller,backhaul" worksheet, the placeholder capex trend for all active equipment is –3%, whilst the opex trend is assumed to be inflation.

depreciation requires many more assumptions than a tilted annuity model, not least demand forecasts for future traffic (in this model, out to 2037).

71. ICASA must be sensible and conservative when determining demand forecasts, since assuming aggressive growth in traffic out into the 2030s will reduce economic costs per minute calculated for the 2020s. This is because economic depreciation calculates cost recovery based on both the change in volumes over time and change in unit asset costs over time. The change of depreciation method from forward-looking tilted annuity to an all-time economic depreciation calculation is also going to lead to windfall losses or gains (though it is hard to say which at this stage) and those losses or gains are likely to be higher or lower for large operators compared to small operators when compared to the current forward-looking tilted annuity cost path.

Proper modelling of large and small operators

72. With regard to ICASA's bottom-up model of mobile networks, whilst there is some limited capability to model operators of different scale (in terms of coverage, market share and unit costs of equipment), ICASA is not capturing other differences such as the assumed spectrum holdings, differences in overhead costs and the distinction between market share of subscribers and market share of traffic.

73. These are features that ICASA knows can impact the network costs of an operator and were considered in the 2018 process. ICASA should ensure the bottom-up model can consider these features through improved parameterisation in the model (effectively, through including more input cells on the Scenarios worksheet that can vary by modelled operator).

Geotype definition

74. The shell models and data requests provided suggest that the mobile model use three geotypes, defined using population density as applied to the "main places" from the Statistics South Africa's Census 2011. The population density thresholds for the three geotypes are as set out below.

Geotype	Definition
Cities	More than 1500 inhabitants per km^2
Towns, Semi-dense areas	Between 300 and 1500 inhabitants per km^2
Rural areas	Less than 300 inhabitants per km^2

75. We recommend that ICASA instead refer to a shapefile produced by the Council for Scientific and Industrial Research (CSIR). This shapefile is publicly

available[13] and splits South Africa into 25 000 sub-areas. The population density for each sub-area can be calculated immediately. We would then propose to define geotypes as follows:

Geotype	Definition
Dense urban	More than 3000 inhabitants per km^2
Urban	Between 300 and 3000 inhabitants per km^2
Rural	Between 30 and 300 inhabitants per km^2
Remote	Less than 30 inhabitants per km^2

76. The benefit of this definition, in our view, is the better granularity of the network modelling of the rural/remote areas compared to the coarser definition proposed by ICASA. The use of four geotypes is also consistent with the 2018 model, although the population density boundaries were set differently.

Modelling of the costs of national roaming

77. As previously described, a significant omission is the modelling of any carriage of traffic by national roaming. This is a dimension that was modelled in some detail in the 2018 process but has been (for some unknown reason) omitted in this process thus far.

78. Small-scale operators depend on some level of domestic roaming in order to serve their subscribers, since they do not have national coverage from their own network. This is also missing from the top-down model, since the cost per minute should be a blend of the costs of own-network traffic and the costs of traffic delivered via roaming.

79. Both models should include the capability for a proportion of traffic to be carried (and costed) using domestic roaming. ICASA should refer to their models developed in 2018 to parameterise these features in a similar way.

Greater use of the models developed by ICASA in 2018

80. The v1.5 model appears to frequently source the model developed by the European Commission ("Eurorate model") for inputs. This is the case, for example, for many cells on the "2 Dimensioning" worksheet, as well as the assumed radii on the "3 Geography" worksheet.

[13] Downloaded from http://gap.csir.co.za/gap/images/gis-data-layers/settlement-typology. This webpage is accessible from https://gap.csir.co.za/gap/download-maps-and-data. The shape representing Lesotho must be deleted.

81. Cell C finds it highly questionable that ICASA is not referring to its own models developed in 2018 for inputs by default. These models were refined through great effort by all parties concerned throughout 2018 over multiple consultations. These models provide a much more robust and South-Africa specific set of parameters than the European-specific parameters to be found in the Eurorate model.

82. The change of the modelling structure from the 2018 models to the current proposed version also introduces many questions of principle which are not explored by ICASA, suggesting that the consultant has chosen an 'easy' model without any reference to the recent (robust) modelling principles and implementation undertaken in the 2018 process. Such questions include:
    82.1. why is there a change from forward-looking tilted annuity to a whole-timeframe economic depreciation?
    82.2. why is pure LRIC the only costing approach implemented?
    82.3. why is the network modelling so coarse with little detailed parameterisation by technology and geotype (Cell C suspect it is precisely because only pure LRIC is being calculated, which means that the calculation of incremental network costs is the emphasis, rather than total network costs)?

83. Cell C strongly recommends that ICASA's 2018 models are used as the default source for inputs when more recent operator data has not been provided.

ANNEX A: TECHNICAL ISSUES IDENTIFIED IN THE COST MODEL SHELLS

84. The issues we have identified in the top-down model are set out below.

No.	Cell reference	Description of error
TD01	'2 Network traffic (mbps)'!A2	The label is misleading and imprecise. We propose clearer wording below. Take annual volumes for the service, multiply by conversion to busy-hour Mbps and multiply by routing factor- to get % Voice and other as well as proportions of traffic for different services
TD02	'2 Network traffic (mbps)'!C17:C19	The formulas that should be in these cells appear to be missing
TD03	'2 Network traffic (mbps)'!E17	The formula is looking at 3G domestic data volumes ('Volumes data input'!E55) when it should be looking at 4G domestic data volumes ('Volumes data input'!E74)
TD04	'2 Network traffic (mbps)'!E18	The formula is looking at 3G roaming inbound data volumes ('Volumes data input'!E56) when it should be looking at 4G roaming inbound data volumes ('Volumes data input'!E75)
TD05	'2 Network traffic (mbps)'!E19	The formula is looking at 3G roaming outbound data volumes ('Volumes data input'!E57) when it should be looking at 4G roaming outbound data volumes ('Volumes data input'!E76)
TD06	'2 Network traffic (mbps)'!G13:J13	These formulae are all referencing the cell 'Assumptions and conversions'!C10 (conversion factor for 3G core transmission traffic) rather than the named range sms_to_mbps_ave
TD07	'3.1 OPEX- network elements'!C27:K31	This table has the same columns as the table directly above it, but they are in a different order. This makes reading the model more difficult
TD08	'4.1 CAPEX- network elements'!F6:F20	These columns are calculating cost of capital as gross book value (column C) multiplied by WACC, whereas they should be calculating net book value (column E) multiplied by WACC
TD09	'Volumes data input'!A38:E40	The rows in the table for 2G data volumes are missing
TD10	'Assumptions and conversions'!B10:D10	These inputs are not being used (at least, not after the above correction is made to cells '2 Network traffic (mbps)'!G13:J13) and can be deleted
	'Assumptions and conversions'!A9	This label should say “Gigabytes to Mbps (busy hour)” like the voice and SMS labels in the rows above

TD11	'Assumptions and conversions'!B12:B14	These formula are deriving a straight average across technologies, when the inputs to do a volume-weighted average (in cells 'Routing and network'!C5:E7) are already available.

85. The issues we have identified in the bottom-up model of mobile networks are set out below. We refer to the model version released on 26 May 2023 as the v1 model, whilst the version released on 21 June 2023 is the v1.5 model (since its filename is BU-mobile-FWA-cost-model-v1.5.xlsx).

No.	Cell reference(s)	Description of error
BU01	'2 Dimensioning'!D122:W139	The v1.5 model derives operator network traffic volumes from total market traffic volumes using a single market share percentage (Summary!B29**)**. This does not accurately reflect an operator's demand since the market share of voice, subscribers and data megabytes can differ significantly for operators in South Africa. This flexibility should be included in the model.
BU02	Scenarios!C5:C8	The v1.5 model has a single input for assumed coverage (of population), which is used across all three modelled radio technologies (2G, 3G and 4G). In reality, coverage by radio technology can vary significantly and this should be reflected in the model by having separate inputs for 2G coverage, 3G coverage and 4G coverage.
BU03	'2 Dimensioning'!37:102	When calculating spectral efficiency and spectral capacity, there is no allowance for design utilisation and therefore the values do not reflect the true effective capacity. Utilisation factor input cells should be added into the model and set to a value of 60–70%. ICASA's previous model can be used for reference.
BU04	'3 Geography'!E82:E84	The percentage values labelled "4G data traffic" are not used to allocate the 4G data busy hour traffic to geotypes in rows 93–110, but also the 2G data traffic (but not 3G data traffic). This is inconsistent and should be corrected.
BU05	'3 Geography'!B82:E84	For the splitting of busy hour traffic by geotype for each technology, there should be a weighting that reflects the coverage of that technology. The model is far too simplistic in this regard, by inflexibly assuming the same population coverage for each of 2G, 3G and 4G. For example, the model should be capable of modelling the costs of a network with 80%

		coverage for 2G, 70% coverage for 3G and 50% coverage for 4G: this is not currently possible.
BU05	'3 Geography'!D40:D57	The calculation of number of coverage sites in these cells assumes that each spectrum band and technology is required to cover the same area in each geotype. This is a considerable simplification and the model should be improved to allow the modelling of differing coverage by technology
BU06	'4a Network demand - RAN'!F53:F55	These cells are multiplying the number of sites for 4G above-1GHz by the downlink Mbit/s per site for 4G sub-1GHz (cell D28). This is an error: the formula should be using the downlink Mbit/s per site for 4G above-1GHz (cell D29)
BU07	'4a Network demand - RAN'!D24:D29	The calculation of "spectrum capacity downlink" is restricted by the implicit assumption that there is only one carrier per sector. In these cells, the average spectral efficiency is multiplied by carrier bandwidth to give the capacity per sector. We would expect an additional step here to take into account the number of carriers per sector.
BU08	'4a Network demand - RAN'!D12:D13	We would expect the formulas in these cells to have an INDEX() function to look up the correct spectral efficiency for the available bandwidth (in '2 Dimensioning'!D73:D76). Currently the formula is using a specific cell reference for the input for a 2x10MHz carrier, but if the bandwidth was changed to 2x5/2x15/2x20MHz, then the formula would be wrong and would need to be manually updated.
BU09	'4a Network demand - RAN'!D113:AS115	The calculation of total coverage sites required assumes that only 4G sub-1GHz (and not 4G above-1GHz) can be used to provide coverage. This is not the case for all operators, so we would expect 4G 1800MHz to also be included when sizing the coverage network. In order to do this, changes would be needed to the way the model considers spectrum options.
BU10	'ITU'!A6:K21	The traffic volume inputs (particularly for voice) are taken from the ITU Datahub split into separate categories and these categories continue to be used throughout the model. The network sizing calculation only requires the traffic inputs for data/voice/SMS split by technology and geotype, so the traffic data inputs could be aggregated here. The list of traffic categories is not consistent between sheets, both in terms of the number and

		the name of the categories. This makes it very hard to check data inputs are flowing through correctly.
BU11	'Data Only'!W20:X28	The mobile data traffic calculation in these cells takes the “Total Mobile Data Volumes (GB) Consumed – Domestic” and assumes that an additional percentage of this amount should be included as “Consumed Mobile Data Volumes (GB) - roaming inbound”. The value for “Total Mobile Data Volumes (GB) Consumed – Domestic” is originally taken from the ITU source category “Mobile-broadband internet traffic (within the country)” which “refers to broadband traffic volumes originated within the country from 3G networks or other more advanced mobile networks, including 3G upgrades, evolutions or equivalent standards in terms of data transmission speeds”. We believe that this value already includes mobile data volumes for inbound roaming, and the additional percentage should be set to zero.
BU12	'ITU'!A16:K18	The data inputs from ITU Datahub for “Total international incoming telephone traffic”, “Total international outgoing telephone traffic”, and “Total international telephone traffic” are being treated as mobile only. For example, ITU defines “Total international incoming telephone traffic” as “effective (completed) international incoming minutes of telephone traffic originating outside the country and terminating in national fixed and mobile networks without transit, including managed VoIP”. The model takes this value and labels it “International incoming to mobile” in 'Data Only'!J19:J28, and later “International incoming mobile voice (Minutes)” in '1 Volumes'!B64:U66
BU13	'ITU'!A14:K14	The values for “Outgoing mobile traffic to international” taken from ITU Datahub are not being included in the calculation of mobile traffic volumes in the model. Instead, the ITU Datahub input for “Total international outgoing telephone traffic” ('ITU'!A17:K17) is used to create the values for “International outgoing mobile voice (Minutes)” (in '1 Volumes'!B58:U60). As mentioned above, the ITU categories for “Total […] telephone traffic” includes both fixed and

		mobile networks. We believe the wrong category is therefore being used.
BU14	'1 Volumes'!A69:U72	The table for “Mobile voice traffic - inbound roaming (incoming + outgoing) (Minutes)” is linking to the values for “International incoming to mobile” ('Data Only'!G109:Z109, 'Data Only'!G139:Z139, 'Data Only'!G167:Z167) rather than “International roaming inbound (incoming + outgoing)” ('Data Only'!G104:Z104, 'Data Only'!G133:Z133, 'Data Only'!G162:Z162)
BU15	'1 Volumes'!A33:U42	The model assumes that “Off-net mobile voice traffic - domestic (Minutes)” and “Incoming mobile voice traffic - domestic (Minutes)” are the same, and uses the values for “Local mobile off-net voice traffic ('Data Only'!G101:Z101, 'Data Only'!G130:Z130, 'Data Only'!G159:Z159). This assumption does not always hold true, especially for smaller operators. The traffic should be dimensioned separately based on operator data
BU16	'2 Dimensioning'!D145:E145, D147:E149 and D154:W162	In the v1 model provided, the hard coded percentages for "2G data proportion" (D145:E145) and "device proportion" (D147:E149) were used for years 2019 and 2020 in the table labelled “Technology change decay - voice, SMS” (cells D154:W162). In the v1.5 model, these values are used for years 2024 and 2025 instead. We assume that this is an error.
BU17	'4a Network demand - RAN'!C164	The named range for this cell incorrectly labels the transceiver dimension as kHz, when the unit is given as MHz.
BU18	'4b Network demand - core'!D15:W16	The number of GGSN and SGSN network elements required has been hardcoded as 1. We would expect these values to be driven by data traffic/subscriber requirements. In any case, we would also expect a minimum of 2 units for all assets in this table, to ensure network redundancy.
BU19	'4b Network demand - core'!D14:W14	The number of SMSC units is currently calculated using only 2G SMS. We would expect this to also take into account 3G and 4G SMS. We would also expect a minimum of 2 units for all equipment in this table, to ensure spare capacity.

BU20	'ITU'!29:71	From row 29 in this worksheet, there are hardcoded percentages that should have been highlighted red.
BU21	'ITU'!A8:K9, 'ITU'!A10:K12 and 'ITU'!A14:K14	The data inputs in these rows do not appear to be used in the model and could be removed.
BU22	'Data Only'!69:93	Some rows in the "per subscriber volume" table use the TREND() function to generate forecasts (rows 71–73, 76, 80–82, 84, 86, 88). In these rows, the TREND() function considers the periods 2013–2021 or 2014–2021. As the columns 2013–2017 are 0, this is distorting the forecasts being generated.
BU23	'Data Only'!H20:H28, N24:N28, R24:R28, S20:S28 and V20:V28	Formulae appear to be missing for these cells
BU24	'Data Only'!K77:AK77, K88:AK88, K91:AK91	Formulas are missing for these rows
BU25	'Data Only'!D20:G20 and J20	The values in these cells for 2021 are hardcoded. Should they be linked to the input data in the "ITU" sheet like the rest of the years in the column?
BU26	'Data only'!AM4:AP12	The source label here is incorrect. Traffic volumes are taken from the ITU database pasted in the "ITU" worksheet rather than the “State of the ICT sector in South Africa” report.
BU27	'Site type 1 - tower'!C41 and C44	These hard coded values should be highlighted red
BU28	'Site type 1 - tower'!:C:C, 'Site type 2 – roof'!C:C	In the v1 model, the original costs in column C were treated as costs in 2012 (with a passive asset price index applied to the following years). In the v1.5 model, the costs in column C are treated as 2017 prices however the values remain unchanged. It should be ensured that these values are indeed calculated in 2017 terms and not 2012 terms
BU29	'Site type 2 - roof'!C6 and C9	These cells are highlighted red, however they are empty and not used in the calculation
BU30	'SA geography – MP'!N6:O6	The formulas in these cells are missing a final step to subtract the "city" geotype area and population value, so as to give only the “town and suburban” geotype result. The current formula means that area and population for the “city” geotype are being double counted – once under “city”, and again under “town and suburban”.